

Tender Document for Works

(Two-Envelope Tendering Process Without Prequalification)

Procurement of:

C-1: Priority Section - Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous works in connection with laying of New BG Double Railway line of HORC Project from Km 49.7 to Km 55.6 and its connectivity (new BG single line) from proposed Manesar Station of HORC to existing Patli Railway Station of IR Network

Tender No: HORC/HRIDC/C-1/2021

Contract title: Civil Construction Contract (C-1)

Project: Haryana Orbital Rail Corridor Project

Loan No.: 000370

Employer: Haryana Rail Infrastructure Development Corporation Limited

Country: INDIA

Issued on: 03.12.2021

PART 1 – Tendering Procedures

Table of Contents

Section I - Instructions to Tenderers.....	4
Section II - Tender Data Sheet (TDS)	33
Section III. Evaluation and Qualification Criteria	48
Section IV - Tender Forms.....	64
Section V - Eligible Countries	126
Section VI - Prohibited Practices.....	127

Section I - Instructions to Tenderers (ITT)

Contents

A. General	6
1. Scope of Tender	6
2. Source of Funds	6
3. Prohibited Practices	7
4. Eligible Tenderers	7
5. Eligible Materials, Equipment, and Services	9
B. Contents of Tender Document	10
6. Sections of Tender Document.....	10
7. Clarification of Tender Document, Site Visit, Pre-Tender Meeting.....	10
8. Amendment of Tender Document	12
C. Preparation of Tenders	12
9. Cost of Tendering	12
10. Language of Tender	12
11. Documents Comprising the Tender	12
12. Letter of Tender and Schedules	14
13. Alternative Tenders.....	14
14. Tender Prices and Discounts.....	14
15. Currencies of Tender and Payment.....	15
16. Documents Comprising the Technical Proposal.....	15
17. Documents Establishing the Eligibility and Qualifications of the Tenderer ...	16
18. Period of Validity of Tenders	16
19. Tender Security	16
20. Format and Signing of Tender	18
D. Submission of Tenders	18
21. Sealing and Marking of Tenders.....	18
22. Deadline for Submission of Tenders.....	19
23. Late Tenders.....	19
24. Withdrawal, Substitution, and Modification of Tenders	19

E. Public Opening of Technical Parts of Tenders	20
25. Technical Part Opening.....	20
F. Evaluation of Tenders – General Provisions	22
26. Confidentiality	22
27. Clarification of Tenders	22
28. Deviations, Reservations, and Omissions	22
29. Nonmaterial Nonconformities	22
G. Evaluation of Technical Parts of Tenders	23
30. Evaluation of Technical Parts	23
31. Determination of Responsiveness.....	23
32. Qualification of the Tenderers	24
33. Subcontractors.....	24
H. Public Opening of Financial Parts of Tenders	25
34. Public Opening of Financial Parts	25
I. Evaluation of Financial Parts of Tenders	26
35. Evaluation of Financial Parts	26
36. Correction of Arithmetical Errors	27
37. Conversion to Single Currency	28
38. Provision for Development of Domestic Industry	28
39. Comparison of Tenders.....	28
40. Abnormally Low-Priced Tenders	28
41. Unbalanced or Front-Loaded Tenders	29
42. Most Advantageous Tender	29
43. Employer’s Right to Accept Any Tender, and to Reject Any or All Tenders	29
44. Standstill Period.....	29
45. Notification of Intention to Award	30
J. Award of Contract	30
46. Award Criteria	30
47. Notification of Award	30
48. Debriefing by the Employer.....	31
49. Signing of Contract	32
50. Performance Security	32
51. Procurement Related Complaint	32

Section I - Instructions to Tenderers

A. General

- 1. Scope of Tender**
- 1.1 In connection with the Specific Procurement Notice (SPN) indicated in the **Tender Data Sheet (TDS)**, the Employer, as specified in the **TDS**, issues this Tender Document for the provision of Works as specified in Section VII, Works' Requirements. The name, identification, and number of lots (contracts) of this tender are specified in the **TDS**.
- 1.2 Throughout this Tender Document:
- (a) the term “in writing” means communicated in written form (e.g., by mail, e-mail, fax, including, if specified in the **TDS**, distributed or received through electronic-procurement system used by the Employer) with proof of receipt;
 - (b) if the context so requires, “singular” means “plural” and vice versa;
 - (c) “Day” means calendar day, unless otherwise specified as a “Business Day.” A Business Day is any day that is a working day of the Recipient. It excludes the Recipient’s official public holidays;
 - (d) “ESHS” means environmental, social, health and safety; and
 - (e) the word “tender” is synonymous with “bid” and “tenderer” with “bidder”, and the words “tender documents” with “bidding documents”.
- 2. Source of Funds**
- 2.1 The Recipient specified in the **TDS** has received or has applied for financing (hereinafter called “funds”) from the Asian Infrastructure Investment Bank (hereinafter called (“AIIB” or “the Bank”) in an amount specified in the **TDS**, toward the project named in the **TDS**. The Recipient intends to apply a portion of the funds to eligible payments under the contract(s) for which this Tender Document is issued.
- 2.2 Payment by the Bank will be made only at the request of the Recipient and upon approval by the Bank, and will be subject, in all respects, to the terms and conditions of the Loan (or other financing) Agreement. The Loan (or other financing) Agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods, equipment, plant, or materials, if such payment or import is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the

Charter of the United Nations. No party other than the Recipient shall derive any rights from the Loan (or other financing) Agreement or have any claim to the proceeds of the Loan (or other financing).

3. Prohibited Practices

- 3.1 The Bank requires compliance with the Bank's Policy on Prohibited Practices as set forth in Section VI.
- 3.2 In further pursuance of this policy, Tenderers shall permit and shall cause their agents (whether declared or not), subcontractors, sub-consultants, service providers, suppliers, and their personnel, to permit the Bank to inspect all accounts, records and other documents relating to any prequalification process, tender submission, proposal submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the Bank.

4. Eligible Tenderers

- 4.1 A Tenderer may be a firm that is a private entity, a state-owned enterprise or institution subject to ITT 4.6 or any combination of such entities in the form of a joint venture (JV) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Tendering process and, in the event the JV is awarded the Contract, during contract execution. Unless specified in the **TDS**, there is no limit on the number of members in a JV.
- 4.2 A Tenderer shall not have a conflict of interest. Any Tenderer found to have a conflict of interest shall be disqualified. A Tenderer may be considered to have a conflict of interest for the purpose of this Tendering process, if the Tenderer:
 - a) directly or indirectly controls, is controlled by or is under common control with another Tenderer; or
 - b) receives or has received any direct or indirect subsidy from another Tenderer; or
 - c) has the same legal representative as another Tenderer; or
 - d) has a relationship with another Tenderer, directly or through common third parties, that puts it in a position to influence the Tender of another Tenderer, or influence the decisions of the Employer regarding this Tendering process; or
 - e) or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the Works that are the subject of the Tender; or
 - f) or any of its affiliates has been hired (or is proposed to be hired) by the Employer or Recipient as Engineer for the Contract implementation; or

- g) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the TDS ITT 2.1 that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm; or
 - h) has a close business or family relationship with a professional staff of the Recipient (or of the project implementing agency, or of any other beneficiary of the Bank's financing, or of any other party representing or acting on behalf of the Recipient) who: (i) are directly or indirectly involved in the preparation of the Tender Document or specification of the Contract, and/or the Tender evaluation process of such Contract; or (ii) would be involved in the implementation or supervision of such Contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Bank throughout the Tendering process and execution of the Contract; or
 - i) is an affiliate of the Recipient, or of a procurement agent engaged by the Recipient, unless the Recipient demonstrates to the satisfaction of the Bank that there is no significant degree of common ownership, influence or control between the Recipient on the one hand, and the Recipient's agent and the affiliate on the other.
- 4.3 A firm that is a Tenderer (either individually or as a JV member) shall not participate in more than one Tender, except for permitted alternative Tenders. Such participation shall result in the disqualification of all Tenders in which the firm is involved. However, this does not limit: (a) the inclusion of the same Subcontractor in more than one Tender for the same contract; or (b) the ability of one Tenderer to be a Subcontractor in another Tender for the same contract.
- 4.4 A Tenderer may have the nationality of any country, subject to the restrictions pursuant to ITT 4.8. A Tenderer shall be deemed to have the nationality of a country if the Tenderer is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or sub-consultants for any part of the Contract including related Services.
- 4.5 A Tenderer that has been declared, and remains, as at the relevant date, ineligible pursuant to the Bank's Policy on Prohibited Practices as described in Section VI, shall be ineligible to be prequalified for,

tender for, propose for, or be awarded a Bank-financed contract or benefit from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall have determined. The list of debarred firms and individuals is available at the electronic address specified in the **TDS**.

- 4.6 Tenderers that are state-owned enterprises or institutions in the Employer's Country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Bank, that they (i) are carrying-out or are established for a business purpose, and are operating on a commercial basis; (ii) are financially and managerially autonomous; (iii) are not controlled by the government on day-to-day management; and (iv) are not under the supervision of the Employer or its procuring agency.
- 4.7 A Tenderer shall not be under suspension from Tendering by the Employer as the result of the operation of a Tender–Securing or Proposal-Securing Declaration.
- 4.8 Firms and individuals may be ineligible if so indicated in Section V and (a) as a matter of law or official regulations, the Recipient's country prohibits commercial relations with the firm or individual's country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or the contracting of works or services required; or (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Recipient's country prohibits any import of goods or contracting of works or services from the firm or individual's country, or any payments to any country, person, or entity in that country. When the Works are implemented across jurisdictional boundaries (and more than one country is a Recipient, and is involved in the procurement), then exclusion of a firm or individual on the basis of ITT 4.8 (a) above by any country may be applied to that procurement across other countries involved, if the Bank and the Recipients involved in the procurement agree.
- 4.9 A Tenderer shall provide such documentary evidence of eligibility satisfactory to the Employer, as the Employer shall reasonably request.
- 4.10 A firm that is under a sanction of debarment by the Recipient from being awarded a contract is eligible to participate in this procurement, unless the Bank, at the Recipient's request, is satisfied that the debarment; (a) relates to fraud or corruption or other prohibited practices, and (b) followed a judicial or administrative proceeding that afforded the firm adequate due process.
- 5.1 The materials, equipment and services to be supplied under the Contract and financed by the Bank may have their origin in any

5. Eligible Materials,

Equipment, and Services

country subject to the restrictions specified in Section V, Eligible Countries, and all expenditures under the Contract will not contravene such restrictions. At the Employer’s request, Tenderers may be required to provide evidence of the origin of materials, equipment and services.

B. Contents of Tender Document

6. Sections of Tender Document

6.1 The Tender Document consists of Parts 1, 2 and 3, includes all the sections specified below, and should be read in conjunction with any Addenda issued in accordance with ITT 8.

PART 1 Tendering Procedures

- Section I - Instructions to Tenderers (ITT)
- Section II - Tender Data Sheet (TDS)
- Section III - Evaluation and Qualification Criteria
- Section IV - Tender Forms
- Section V - Eligible Countries
- Section VI - Prohibited Practices

PART 2 Works Requirements

- Section VII - Works’ Requirements

PART 3 Conditions of Contract and Contract Forms

- Section VIII - General Conditions of Contract (GCC)
- Section IX - Particular Conditions of Contract (PCC)
- Section X - Contract Forms

6.2 The Specific Procurement Notice issued by the Employer is not part of the Tender Document.

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

6.4 The Tenderer is expected to examine all instructions, forms, terms, and specifications in the Tender Document and to furnish with its Tender all information and documentation as is required by the Tender Document.

7. Clarification of Tender

7.1 A Tenderer requiring any clarification of the Tender Document shall contact the Employer in writing at the Employer’s address specified

Document, Site Visit, Pre-Tender Meeting

in the **TDS** or raise its enquiries during the pre-Tender meeting if provided for in accordance with ITT 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received no later than fourteen (14) days prior to the deadline for submission of Tenders. The Employer shall forward copies of its response to all Tenderers who have acquired the Tender Document in accordance with ITT 6.3, including a description of the inquiry but without identifying its source. If so, specified in the **TDS**, the Employer shall also promptly publish its response at the web page identified in the **TDS**. Should the clarification result in changes to the essential elements of the Tender Document, the Employer shall amend the Tender Document following the procedure under ITT 8 and ITT 22.2.

- 7.2 The Tenderer 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 Tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Tenderer's own expense.
- 7.3 The Tenderer and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Tenderer, 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 **TDS**, the Tenderer's designated representative is invited to attend a pre-Tender meeting and/or a Site of Works visit. 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 Tenderer is requested to submit any questions in writing, to reach the Employer not later than one week before the meeting.

7.6 Minutes of the pre-Tender meeting, if applicable, including the text of the questions asked by Tenderers, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Tenderers who have acquired the Tender Document in accordance with ITT 6.3. If so, specified in the **TDS**, the Employer shall also promptly publish the Minutes of the pre-Tender meeting at the web page identified in the **TDS**. Any modification to the Tender Document that may become necessary as a result of the pre-Tender meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to ITT 8 and not through the minutes of the pre-Tender meeting. Nonattendance at the pre-Tender meeting will not be a cause for disqualification of a Tenderer.

8. Amendment of Tender Document

8.1 At any time prior to the deadline for submission of Tenders, the Employer may amend the Tender Document by issuing addenda.

8.2 Any addendum issued shall be part of the Tender Document and shall be communicated in writing to all who have obtained the Tender Document from the Employer in accordance with ITT 6.3. The Employer shall also promptly publish the addendum on the Employer's web page in accordance with ITT 7.1.

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

C. Preparation of Tenders

9. Cost of Tendering

9.1 The Tenderer shall bear all costs associated with the preparation and submission of its Tender, and the Employer shall not be responsible or liable for those costs, regardless of the conduct or outcome of the Tendering process.

10. Language of Tender

10.1 The Tender, as well as all correspondence and documents relating to the Tender exchanged by the Tenderer and the Employer, shall be written in the language specified in the **TDS**. Supporting documents and printed literature that are part of the Tender may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the **TDS**, in which case, for purposes of interpretation of the Tender, such translation shall govern.

11. Documents Comprising the Tender

11.1 The Tender shall comprise two Parts, namely the Technical Part and the Financial Part. These two Parts shall be submitted simultaneously in two separate sealed envelopes (two-envelope tendering process). One envelope shall contain only information relating to the Technical Part and the other, only information relating to the

Financial Part. These two envelopes shall be enclosed in a separate sealed outer envelope marked “ORIGINAL TENDER”.

11.2 The Technical Part shall contain the following:

- (a) Letter of Tender – Technical Part: prepared in accordance with ITT 12;
- (b) Tender Security or Tender-Securing Declaration: in accordance with ITT 19.1;
- (c) Alternative Tender – Technical Part: if permissible, in accordance with ITT 13;
- (d) Authorization: written confirmation authorizing the signatory of the Tender to commit the Tenderer, in accordance with ITT 20.3;
- (e) Eligibility: documentary evidence in accordance with ITT 17.1 establishing the Tenderer’s eligibility to tender;
- (f) Qualifications: documentary evidence in accordance with ITT 17.2 establishing the Tenderer’s qualifications to perform the Contract if its Tender is accepted;
- (g) Conformity: a technical proposal in accordance with ITT 16;
- (h) Any other document required in the **TDS**.

11.3 The Financial Part shall contain the following:

- (a) Letter of Tender – Financial Part: prepared in accordance with ITT 12 and ITT 14;
- (b) Bill of Quantities: completed in accordance with ITT 12 and ITT 14;
- (c) Alternative Tender - Financial Part: if permissible in accordance with ITT 13; and
- (d) Any other document required in the **TDS**.

11.4 The Technical Part shall not include any information related to the Tender price. Where material financial information related to the Tender price is contained in the Technical Part, the Tender shall be declared non-responsive.

11.5 In addition to the requirements under ITT 11.2, Tenders submitted by a JV 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 Tender shall be signed by all members and submitted with the Tender, together with a copy of the proposed Agreement.

- 11.6 The Tenderer shall furnish in the Letter of Tender – Financial Part information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Tender.
- 12. Letter of Tender and Schedules**
- 12.1 The Letter of Tender – Technical Part, the Letter of Tender – Financial Part, and Schedules, including the Bill of Quantities, shall be prepared using the relevant forms furnished in Section IV, Tender Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITT 20.3. All blank spaces shall be filled in with the information requested.
- 13. Alternative Tenders**
- 13.1 Unless otherwise specified in the **TDS**, alternative Tenders shall not be considered.
- 13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the **TDS**, and the method of evaluating different alternative times for completion will be described in Section III, Evaluation and Qualification Criteria.
- 13.3 Except as provided under ITT 13.4 below, Tenderers wishing to offer technical alternatives to the requirements of the Tender Document must first price the Employer’s design as described in the Tender Document and 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 Tenderer with the Most Advantageous Tender conforming to the basic technical requirements shall be considered by the Employer.
- 13.4 When specified in the **TDS**, Tenderers are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified in the **TDS** and described in Section VII, Works’ Requirements. The method for their evaluation will be stipulated in Section III, Evaluation and Qualification Criteria.
- 14. Tender Prices and Discounts**
- 14.1 The prices and discounts (including any price reduction) quoted by the Tenderer in the Letter of Tender and in the Bill of Quantities shall conform to the requirements specified below.
- 14.2 The Tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Tenderer shall be deemed covered by the rates for other items in the Bill of Quantities and will not be paid for separately by the Employer.
- 14.3 The price to be quoted in the Letter of Tender – Financial Part, in accordance with ITT 12.1, shall be the total price of the Tender, excluding any discounts offered.

- 14.4 The Tenderer shall quote any discounts and the methodology for their application in the Letter of Tender – Financial Part, in accordance with ITT 12.1.
- 14.5 Unless otherwise specified in the **TDS** and the Conditions of Contract, the rates and prices quoted by the Tenderer 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 Tenderer shall furnish the indices and weightings for the price adjustment formulae in the Table of Adjustment Data in Section IV, Tender Forms, and the Employer may require the Tenderer to justify its proposed indices and weightings.
- 14.6 If so specified in ITT 1.1, Tenders are being invited for individual lots (contracts) or for any combination of lots (packages). Tenderers wishing to offer discounts for the award of more than one Contract shall specify in their Tender the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Discounts shall be submitted in accordance with ITT 14.4, provided the Tenders for all lots (contracts) are opened at the same time. If, however, rated criteria are used in accordance with ITT 30.2, discounts on condition of award of more than one Contract shall not be used for Tender evaluation purpose.
- 14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 28 days prior to the deadline for submission of Tenders, shall be included in the rates and prices and the total Tender Price submitted by the Tenderer.

**15. Currencies of
Tender and
Payment**

- 15.1 The currency (ies) of the Tender and the currency (ies) of payments shall be the same and shall be as specified in the **TDS**.
- 15.2 Tenderers 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 unit rates and prices and shown in the Table of Adjustment Data in the Appendix to Tender in Section IV, Tender Forms, are reasonable, in which case a detailed breakdown of the foreign currency requirements shall be provided by Tenderers.

**16. Documents
Comprising the
Technical
Proposal**

- 16.1 The Tenderer shall furnish a technical proposal in the Technical Part of the Tender including a statement of work methods, equipment, personnel, schedules and any other information as stipulated in Section IV, Tender Forms, in sufficient detail to demonstrate the adequacy of the Tenderer's proposal to meet the works' requirements and the completion time.

- 17. Documents Establishing the Eligibility and Qualifications of the Tenderer**
- 17.1 To establish Tenderer’s eligibility in accordance with ITT 4, Tenderers shall complete the Letter of Tender – Technical Part, included in Section IV, Tender Forms.
- 17.2 In accordance with Section III, Evaluation and Qualification Criteria, to establish its qualifications to perform the Contract, the Tenderer shall provide the information requested in the corresponding information sheets included in Section IV, Tender Forms.
- 17.3 If provisions for development of domestic industry (such as a margin of domestic preference) apply as specified in accordance with ITT 38.1, domestic Tenderers, individually or in joint ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility specified in accordance with ITT 38.1.
- 18. Period of Validity of Tenders**
- 18.1. Tenders shall remain valid for the Tender Validity period specified in the **TDS**. The Tender Validity period starts from the date fixed for the Tender submission deadline (as prescribed by the Employer in accordance with ITT 22). A Tender valid for a shorter period shall be rejected by the Employer as nonresponsive.
- 18.2. In exceptional circumstances, prior to the expiration of the Tender validity period, the Employer may request Tenderers to extend the period of validity of their Tenders. The request and the responses shall be made in writing. If a Tender Security is requested in accordance with ITT 19, it shall also be extended for a corresponding period. A Tenderer may refuse the request without forfeiting its Tender security. A Tenderer granting the request shall not be required or permitted to modify its Tender, except as provided in ITT 18.3.
- 18.3. If the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial Tender validity period, the Contract price shall be determined as follows:
- (a) in the case of fixed price contracts, the Contract price shall be the Tender price adjusted by the factor specified in the **TDS**;
 - (b) in the case of adjustable price contracts, no adjustment shall be made; or
 - (c) in any case, Tender evaluation shall be based on the Tender price without taking into consideration the applicable correction from those indicated above.
- 19. Tender Security**
- 19.1 The Tenderer shall furnish as part of the Technical Part of its Tender, either a Tender Security or a Tender-Securing Declaration, as specified in the **TDS**, in original form and, in the case of a Tender Security, in the amount and currency, or in the case of a Tender-Securing Declaration, for the period of ineligibility, as specified in the **TDS**.

- 19.2 A Tender-Securing Declaration shall use the form included in Section IV, Tender Forms.
- 19.3 If a Tender Security is specified pursuant to ITT 19.1, the Tender Security shall be a demand guarantee in any of the following forms at the Tenderer's option:
- (a) an unconditional guarantee issued by a bank;
 - (b) an irrevocable letter of credit;
 - (c) a cashier's or certified check; or
 - (d) another security specified in the **TDS**,
- from a reputable source from an eligible country. In the case of a bank guarantee, the Tender Security shall be submitted either using the Tender Security Form included in Section IV, Tender Forms, or in another substantially similar format approved by the Employer prior to Tender submission. The Tender Security shall be valid for twenty-eight (28) days beyond the original validity period of the Tender, or beyond any period of extension if requested under ITT 18.2.
- 19.4 If a Tender Security or Tender-Securing Declaration is specified pursuant to ITT 19.1, any Tender not accompanied by a substantially responsive Tender Security or Tender-Securing Declaration shall be rejected by the Employer as non-responsive.
- 19.5 If a Tender Security is specified pursuant to ITT 19.1, the Tender Security of unsuccessful Tenderers shall be returned as promptly as possible upon the successful Tenderer's signing the Contract and furnishing the Performance Security pursuant to ITT 49 and ITT 50 respectively.
- 19.6 The Tender Security of the successful Tenderer shall be returned as promptly as possible once the successful Tenderer has signed the Contract and furnished the required Performance Security.
- 19.7 The Tender Security may be forfeited, or the Tender-Securing Declaration executed:
- (a) if a Tenderer withdraws its Tender during the period of Tender validity specified by the Tenderer on the Letter of Tender, or any extension thereto provided by the Tenderer; or
 - (b) if the successful Tenderer fails to:
 - (i) sign the Contract in accordance with ITT 49; or
 - (ii) furnish a Performance Security in accordance with ITT 50.
- 19.8 The Tender Security or the Tender-Securing Declaration of a JV shall be in the name of the JV that submits the Tender. If the JV has not been

legally constituted into a legally enforceable JV at the time of Tendering, the Tender Security or the Tender-Securing Declaration shall be in the names of all future members as named in the letter of intent referred to in ITT 4.1 and ITT 11.5.

20. Format and Signing of Tender

- 20.1 The Tenderer shall prepare one original set of the Technical Part of the Tender and one original set of the Financial Part of the Tender as described in ITT 11 and ITT 21, and clearly mark them “ORIGINAL”. Alternative Tenders, if permitted in accordance with ITT 13, shall be clearly marked “ALTERNATIVE.” In addition, the Tenderer shall submit copies of the Tender, in the number specified in the **TDS** and clearly mark them “COPY”. In the event of any discrepancy between the original and the copies, the original shall prevail.
- 20.2 Tenderers shall mark as “CONFIDENTIAL” all information in their Tenders which is confidential to their business. This may include proprietary information, trade secrets, or commercial or financially sensitive information.
- 20.3 The original and all copies of the Tender shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Tenderer. This authorization shall consist of a written confirmation as specified in the **TDS** and shall be attached to the Tender. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Tender where entries or amendments have been made shall be signed or initialed by the person signing the Tender.
- 20.4 In case the Tenderer is a JV, the Tender shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.
- 20.5 Any amendments such as inter-lineation, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Tender.

D. Submission of Tenders

21. Sealing and Marking of Tenders

- 21.1 Tenderers may submit their Tenders by mail or by hand. If so specified in the **TDS**, Tenderers shall have the option of submitting their Tenders electronically. Procedures for submission, sealing, and marking are as follows:
 - (a) Tenderers submitting Tenders by mail or by hand shall enclose the original Technical Part of the Tender, the original Financial Part of the Tender, and the respective copies of the Tender, including Alternative Tenders if permitted in accordance with ITT 13, in separate sealed envelopes. The envelopes shall be duly marked as "ORIGINALTECHNICAL PART",

"ORIGINAL-FINANCIAL PART", "COPY-TECHNICAL PART", "COPY-FINANCIAL PART", "ALTERNATIVE-ORIGINAL-TECHNICAL PART", "ALTERNATIVE-ORIGINAL-FINANCIAL PART", "ALTERNATIVE-COPY-TECHNICAL PART", and "ALTERNATIVE-COPY-FINANCIAL PART". These envelopes shall then be enclosed in one single package. The rest of the procedure shall be in accordance with ITT 21.2 through ITT 21.5.

- (b) Tenderers submitting Tenders electronically shall follow the electronic tender submission procedures specified in the **TDS**.

21.2 The inner and outer envelopes shall:

- (a) bear the name and address of the Tenderer;
 (b) be addressed to the Employer in accordance with ITT 22.1; and
 (c) bear the specific identification of this Tendering process specified in accordance with TDS ITT 1.1.

21.3 The outer envelopes and the inner envelopes containing the Technical Part of Tender shall bear a warning not to open before the time and date for the opening of Technical Part of Tender, in accordance with ITT 25.1.

21.4 The inner envelopes containing the Financial Part of Tender shall bear a warning not to open until advised by the Employer in accordance with ITT34.

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

22. Deadline for Submission of Tenders

22.1 Tenders must be received by the Employer at the address and no later than the date and time specified in the **TDS**.

22.2 The Employer may, at its discretion, extend the deadline for the submission of Tenders by amending the Tender Document in accordance with ITT 8, in which case all rights and obligations of the Employer and Tenderers previously subject to the deadline shall thereafter be subject to the deadline as extended.

23. Late Tenders

23.1 The Employer shall not consider any Tender that arrives after the deadline for submission of Tenders, in accordance with ITT 22. Any Tender received by the Employer after the deadline for submission of Tenders shall be declared late, rejected, and returned unopened to the Tenderer.

24. Withdrawal, Substitution, and

24.1 A Tenderer may withdraw, substitute, or modify its Tender after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization

Modification of Tenders

in accordance with ITT 20.3 (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Tender must accompany the respective written notice. All notices must be:

- (a) prepared and submitted in accordance with ITT 20 and ITT 21 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL”, “SUBSTITUTION”, “MODIFICATION”; and
- (b) received by the Employer prior to the deadline prescribed for submission of Tenders, in accordance with ITT 22.

24.2 Tenders requested to be withdrawn in accordance with ITT 24.1 shall be returned unopened to the Tenderers.

24.3 No Tender may be withdrawn, substituted, or modified in the interval between the deadline for submission of Tenders and the expiration of the period of Tender validity specified by the Tenderer on the Letter of Tender or any extension thereof.

E. Public Opening of Technical Parts of Tenders**25. Technical Part Opening**

25.1 Except in the cases specified in ITT 23 and ITT 24.2, the Employer shall publicly open and read out in accordance with this ITT all Tenders received by the deadline, at the date, time and place specified in the **TDS**, in the presence of Tenderers’ designated representatives and anyone who chooses to attend. Any specific electronic Tender opening procedures required if electronic Tendering is permitted in accordance with ITT 21.1, shall be as specified in the **TDS**.

25.2 First, envelopes marked “Withdrawal” shall be opened and read out and the envelope with the corresponding Tender shall not be opened, but returned to the Tenderer. No Tender withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at Tender opening.

25.3 Next, envelopes marked “Substitution” shall be opened and read out and exchanged with the corresponding Tender being substituted, and the substituted Tender shall not be opened, but returned to the Tenderer. No Tender substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Tender opening.

25.4 Next, envelopes marked “Modification” shall be opened and read out with the corresponding Tender. No Tender modification shall be

permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Tender opening.

- 25.5 Next, all remaining envelopes marked “TECHNICAL PART” shall be opened one at a time. All envelopes marked “FINANCIAL PART” shall remain sealed, and kept by the Employer in safe custody until they are opened, at a later public opening, following the evaluation of the Technical Part of the Tenders. On opening the envelopes marked “TECHNICAL PART” the Employer shall read out: the name of the Tender, the presence or the absence of a Tender Security, or Tender-Securing Declaration, if required, and whether there is a modification; and Alternative Tender - Technical Part; and any other details as the Employer may consider appropriate.
- 25.6 Only Technical Parts of Tenders and Technical Parts of Alternative Tenders that are opened and read out at Tender opening shall be considered further for evaluation. The Letter of Tender – Technical Part and the separate sealed envelopes marked “FINANCIAL PART” are to be initialed by representatives of the Employer attending Tender opening in the manner specified in the **TDS**.
- 25.7 At the tender opening the Employer shall neither discuss the merits of any Tender nor reject any Tender (except for late Tenders, in accordance with ITT 23.1).
- 25.8 The Employer shall prepare a record of the Technical Part of Tender opening that shall include, as a minimum:
- (a) the name of the Tenderer and whether there is a withdrawal, substitution, or modification;
 - (b) the receipt of envelopes marked “FINANCIAL PART”;
 - (c) the presence or absence of a Tender Security or Tender-Securing Declaration, if one was required any alternative Tenders; and
 - (d) if applicable, any Alternative Tender – Technical Part.
- 25.9 The Tenderers’ representatives who are present shall be requested to sign the record. The omission of a Tenderer’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 Tenderers who submitted Tenders in time and posted online when electronic Tendering is permitted.

F. Evaluation of Tenders – General Provisions

- 26. Confidentiality**
- 26.1 Information relating to the evaluation of Tenders and recommendation of contract award shall not be disclosed to Tenderers or any other persons not officially concerned with the Tendering process until information on Intention to Award the Contract is transmitted to all Tenderers in accordance with ITT 45.
- 26.2 Any attempt by a Tenderer to influence the Employer in the evaluation of the Tenders or Contract award decisions may result in the rejection of its Tender.
- 26.3 Notwithstanding ITT 26.2, from the time of Tender opening to the time of Contract award, if a Tenderer wishes to contact the Employer on any matter related to the Tendering process, it shall do so in writing.
- 27. Clarification of Tenders**
- 27.1 To assist in the examination, evaluation, and comparison of the Tenders, and qualification of the Tenderers, the Employer may, at its discretion, ask any Tenderer for a clarification of its Tender, allowing a reasonable time for response. Any clarification submitted by a Tenderer that is not in response to a request by the Employer shall not be considered. The Employer’s request for clarification and the response shall be in writing. No change, including any voluntary increase or decrease, in the prices or substance of the Tender shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders, in accordance with ITT 36.
- 27.2 If a Tenderer does not provide clarifications of its Tender by the date and time set in the Employer’s request for clarification, its Tender may be rejected.
- 28. Deviations, Reservations, and Omissions**
- 28.1 During the evaluation of Tenders, the following definitions apply:
- (a) “Deviation” is a departure from the requirements specified in the Tender Document;
 - (b) “Reservation” is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Tender Document; and
 - (c) “Omission” is the failure to submit part or all of the information or documentation required in the Tender Document.
- 29. Nonmaterial Nonconformities**
- 29.1 Provided that a Tender is substantially responsive, the Employer may waive any nonconformities in the Tender.
- 29.2 Provided that a Tender is substantially responsive, the Employer may request that the Tenderer submit the necessary information or

documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Tender related to documentation requirements. Requesting information or documentation on such nonconformities or omissions shall not be related to any aspect of the price of the Tender. Failure of the Tenderer to comply with the request may result in the rejection of its Tender.

- 29.3 Provided that a Tender is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Tender Price. To this effect, the Tender Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component in the manner specified in the **TDS**.

G. Evaluation of Technical Parts of Tenders

30. Evaluation of Technical Parts

30.1 In evaluating the Technical Parts of each Tender, the Employer shall use the criteria and methodologies listed in this ITT and Section III, Evaluation and Qualification Criteria. No other evaluation criteria or methodologies shall be permitted.

30.2 If specified in the **TDS**, the Employer's evaluation will be carried out by applying rated criteria that take into account technical factors, in addition to cost factors. An Evaluated Tender Score will be calculated for each responsive Tender using the formula specified in Section III, Evaluation and Qualification Criteria. The scores to be given to technical factors and sub-factors are specified in the **TDS**. The weights to be given to the cost and the total technical score are specified in the **TDS**.

31. Determination of Responsiveness

31.1 The Employer's determination of a Tender's responsiveness is to be based on the contents of the Tender itself, as defined in ITT 11.

31.2 A substantially responsive Tender is one that meets the requirements of the Tender Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:

- (a) if accepted, would:

- (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
 - (ii) limit in any substantial way, inconsistent with the Tender Document, the Employer's rights or the Tenderer's obligations under the proposed Contract; or
- (b) if rectified, would unfairly affect the competitive position of other Tenderers presenting substantially responsive Tenders.

31.3 The Employer shall examine the technical aspects of the Tender submitted in accordance with ITT 16, in particular, to confirm that all requirements of Section VII, Works' Requirements have been met without any material deviation, reservation or omission.

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

32. Qualification of the Tenderers

32.1 The Employer shall determine to its satisfaction whether the eligible Tenderers that have submitted substantially responsive Tender - Technical Parts meet the qualifying criteria specified in Section III, Evaluation and Qualification Criteria.

32.2 The determination shall be based upon an examination of the documentary evidence of the Tenderer's qualifications submitted by the Tenderer, pursuant to ITT 17. The determination shall not take into consideration the qualifications of other firms such as the Tenderer's subsidiaries, parent entities, affiliates, subcontractors (other than Specialized Subcontractors if permitted in ITT 33.3), or any other firm(s) different from the Tenderer.

32.3 If a Tenderer does not meet the qualifying criteria specified in Section III, Evaluation and Qualification Criteria, its Tender shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

32.4 Only Tenders that are both substantially responsive to the Tender Document, and meet all Qualification Criteria shall have their envelopes marked "FINANCIAL PART" opened at the second public opening.

33. Subcontractors

33.1 Unless otherwise stated in the **TDS**, the Employer does not intend to execute any specific elements of the Works by subcontractors selected in advance by the Employer.

33.2 Tenderers may propose subcontracting up to the percentage of total value of contracts or the volume of works as specified in the **TDS**.

Subcontractors proposed by the Tenderer shall be fully qualified for their parts of the Works.

- 33.3 The subcontractor's qualifications shall not be used by the Tenderer to qualify for the Works unless their specialized parts of the Works were previously designated by the Employer in the **TDS** as can be met by subcontractors referred to hereafter as 'Specialized Subcontractors', in which case, the qualifications of the Specialized Subcontractors proposed by the Tenderer may be added to the qualifications of the Tenderer.

H. Public Opening of Financial Parts of Tenders

34. Public Opening of Financial Parts

- 34.1 Following the completion of the evaluation of the Technical Parts of the Tenders, and the Bank has issued its no objection (if applicable), the Employer shall notify in writing those Tenderers whose Tenders were considered non-responsive to the Tender Document or failed to meet the Qualification Criteria, advising them of the following information:
- (a) the grounds on which their Technical Part of Tender failed to meet the requirements of the Tender Document;
 - (b) their envelopes marked "FINANCIAL PART" will be returned to them unopened after the completion of the selection process and the signing of the Contract; and
 - (c) notify them of the date, time and location of the public opening of the envelopes marked "FINANCIAL PART".
- 34.2 The Employer shall, simultaneously, notify in writing those Tenderers whose Tenders - Technical Parts have been evaluated as substantially responsive to the Tender Document and met all Qualifying Criteria, advising them of the following information:
- (a) their Tender has been evaluated as substantially responsive to the Tender Document and met the Qualification Criteria;
 - (b) When rated criteria are used, the evaluated technical scores;
 - (c) their envelope marked "FINANCIAL PART" will be opened at the public opening of the Financial Parts; and
 - (d) notify them of the date, time and location of the second public opening of the envelopes marked "FINANCIAL PART" as specified in the **TDS**.
- 34.3 The opening date should allow Tenderers sufficient time to make arrangements for attending the opening. The Financial Part of the

Tender shall be opened publicly in the presence of Tenderers' designated representatives and anyone who chooses to attend.

- 34.4 At this public opening the Financial Parts will be opened by the Employer in the presence of Tenderers, or their designated representatives and anyone else who chooses to attend. Tenderers who met the Qualification Criteria and whose Tenders were evaluated as substantially responsive will have their envelopes marked "FINANCIAL PART" opened at the second public opening. Each of these envelopes marked "FINANCIAL PART" shall be inspected to confirm that they have remained sealed and unopened. These envelopes shall then be opened by the Employer. The Employer shall read out the names of each Tenderer, and the total Tender prices, per lot (contract) if applicable, including any discounts and Alternative Tender - Financial Part, and any other details as the Employer may consider appropriate.
- 34.5 Only envelopes of Financial Part of Tenders, Financial Parts of Alternative Tenders and discounts that are opened and read out at tender opening shall be considered further for evaluation. The Letter of Tender – Financial Part and the Priced Bill of Quantities are to be initialed by representatives of the Employer attending the tender opening in the manner specified in the **TDS**.
- 34.6 The Employer shall neither discuss the merits of any Tender nor reject any envelopes marked "FINANCIAL PART".
- 34.7 The Employer shall prepare a record of the Financial Part of the Tender opening that shall include, as a minimum:
- (a) the name of the Tenderer whose Financial Part was opened;
 - (b) the Tender price, per lot (contract) if applicable, including any discounts; and
 - (c) if applicable, any Alternative Tender – Financial Part.
- 34.8 The Tenderers whose envelopes marked "FINANCIAL PART" have been opened or their representatives who are present shall be requested to sign the record. The omission of a Tenderer'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 Tenderers.

I. Evaluation of Financial Parts of Tenders

35. Evaluation of Financial Parts

- 35.1 To evaluate the Financial Part, the Employer shall consider the following:

- (a) the Tender price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities for admeasurement contracts, but including Daywork items, where priced competitively;
- (b) price adjustment for correction of arithmetic errors in accordance with ITT 36.1;
- (c) price adjustment due to discounts offered in accordance with ITT 14.4;
- (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITT 37;
- (e) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITT 29.3; and
- (f) the additional evaluation factors are specified in the **TDS** and Section III, Evaluation and Qualification Criteria.

35.2 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 Tender evaluation.

35.3 If this Tender Document allows Tenderers to quote separate prices for different lots (contracts), the methodology to determine the lowest evaluated cost of the contract combinations, including any discounts offered in the Letter of Tender – Financial Part, is specified in Section III, Evaluation and Qualification Criteria. If, however, rated criteria are used in accordance with ITT 30.2, discounts on condition of award of more than one contract shall not be used for Tender evaluation purpose.

36. Correction of Arithmetical Errors

36.1 In evaluating the Financial Part of each Tender, the Employer shall correct arithmetical errors on the following basis:

- (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;
- (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
- (c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

- 36.2 Tenderers shall be requested to accept correction of arithmetical errors. Failure to accept the correction in accordance with ITT 36.1, shall result in the rejection of the Tender.
- 37. Conversion to Single Currency** 37.1 For evaluation and comparison purposes, the currency(ies) of the Tender shall be converted into a single currency as specified in the **TDS**.
- 38. Provision for Development of Domestic Industry** 38.1 Unless otherwise specified in the **TDS**, provision for development of domestic industry (such as a margin of preference for domestic Tenderers¹) shall not apply.
- 39. Comparison of Tenders** 39.1 The Employer shall compare the evaluated costs of all substantially responsive Tenders established in accordance with ITT 35.1 to determine the Tender that has the lowest evaluated cost.
- 39.2 If ITT 30.2 is applicable, the Employer shall evaluate the technical score and financial score of each tender and determine the Tender with the highest combined technical and financial score in accordance with TDS ITT 30.2.
- 40. Abnormally Low-Priced Tenders** 40.1 An Abnormally Low-Priced Tender is one where the Tender price, in combination with other elements of the Tender, appears so low that it raises material concerns as to the capability of the Tenderer in regard to the Tenderer's ability to perform the Contract for the offered Tender Price.
- 40.2 In the event of identification of a potentially Abnormally Low-Priced Tender, the Employer shall seek written clarifications from the Tenderer, including detailed price analyses of its Tender 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 Tender Document.
- 40.3 After examining the clarifications given and the detailed price analyses presented by the Tenderer, the Employer may as appropriate:
- (a) accept the Tender, if the evidence provided satisfactorily accounts for the low tender price, in which case the Tender is not considered abnormally low; or
 - (b) accept the Tender, but require that the amount of the Performance Security be increased at the expense of the Tenderer to a level sufficient to protect the Employer against

¹An individual firm is considered a domestic Tenderer for purposes of the margin of preference if it is registered in the country of the Employer, has more than 50 percent ownership by nationals of the country of the Employer, and if it does not subcontract more than 10 percent of the contract price, excluding provisional sums, to foreign contractors. JVs are considered as domestic Tenderers and eligible for domestic preference only if the individual member firms are registered in the country of the Employer or have more than 50 percent ownership by nationals of the country of the Employer, and the JV shall be registered in the country of the Employer. The JV shall not subcontract more than 10 percent of the contract price, excluding provisional sums, to foreign firms. JVs between foreign and national firms will not be eligible for domestic preference.

financial loss. The amount of the Performance Security shall generally be not more than 20% of the Contract Price; or

- (c) reject the Tender, if the evidence provided does not satisfactorily account for the low tender price and make a similar determination for the next ranked Tender, if required.

41. Unbalanced or Front-Loaded Tenders

41.1 If the Tender that is evaluated as the Most Advantageous Tender is, in the Employer's opinion, seriously unbalanced or front loaded, the Employer may require the Tenderer to provide written clarifications. Clarifications may include detailed price analyses to demonstrate the consistency of the Tender prices with the scope of works, proposed methodology, schedule and any other requirements of the Tender Document.

41.2 After the evaluation of the information and detailed price analyses presented by the Tenderer, the Employer may as appropriate:

- (a) accept the Tender; or
- (b) accept the Tender, but require that the total amount of the Performance Security be increased at the expense of the Tenderer to a level not exceeding 20% of the Contract Price; or
- (c) reject the Tender and make a similar determination for the next ranked Tender.

42. Most Advantageous Tender

42.1 The Employer shall determine the Most Advantageous Tender. The Most Advantageous Tender is the Tender of the Tenderer that meets the Qualification Criteria and whose Tender has been determined to be substantially responsive to the Tender Documents and:

- (a) when rated criteria are used, is the tender with the highest combined technical and financial score; or
- (b) when rated criteria are not used, is the tender with the lowest evaluated cost.

43. Employer's Right to Accept Any Tender, and to Reject Any or All Tenders

43.1 The Employer reserves the right to accept or reject any Tender and to annul the Tendering process and reject all Tenders at any time prior to Contract Award, without thereby incurring any liability to Tenderers. In case of annulment, all Tenders submitted and specifically, Tender securities, shall be promptly returned to the Tenderers.

44. Standstill Period

44.1 The Contract shall not be awarded earlier than the expiry of the Standstill Period. The Standstill Period shall be ten (10) Business Days unless extended in accordance with ITT 48. The Standstill Period commences the day after the date the Employer has transmitted to each Tenderer the Notification of Intention to Award the Contract. Where only one Tender

is submitted, or if this contract is in response to an emergency situation recognized by the Bank, the Standstill Period shall not apply.

45. Notification of Intention to Award

45.1 The Employer shall send to each Tenderer the Notification of Intention to Award the Contract to the successful Tenderer. The Notification of Intention to Award shall contain, at a minimum, the following information:

- (a) the name and address of the Tenderer submitting the successful Tender;
- (b) the Contract price of the successful Tender;
- (c) the names of all Tenderers who submitted Tenders, and their Tender prices as readout, and as evaluated, and when rated criteria are used, the evaluated technical and financial scores, and the combined total scores;
- (d) a statement of the reason(s) the Tender (of the unsuccessful Tenderer to whom the notification is addressed) was unsuccessful, unless the price or score information in (c) above already reveals the reason;
- (e) the expiry date of the Standstill Period; and
- (f) instructions on how to request a debriefing and/or submit a complaint during the standstill period.

J. Award of Contract

46. Award Criteria

46.1 Subject to ITT 43, the Employer shall award the Contract to the successful Tenderer. This is the Tenderer whose Tender has been determined to be the Most Advantageous Tender.

47. Notification of Award

47.1 Prior to the expiry of the Tender Validity Period and upon expiry of the Standstill Period specified in ITT 43.1 or any extension thereof, and, upon satisfactorily addressing any complaint that has been filed within the Standstill Period, the Employer shall notify the successful Tenderer, in writing, that its Tender has been accepted. The notification of award (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 of the Contract (hereinafter and in the Conditions of Contract and Contract Forms called “the Contract Price”).

47.2 Within ten (10) Business Days after the date of transmission of the Letter of Acceptance, the Employer shall publish the Contract Award Notice which shall contain, at a minimum, the following information:

- (a) name and address of the Employer;
- (b) name and reference number of the contract being awarded, and the procurement method used;
- (c) names of all Tenderers that submitted Tenders, and their Tender prices as read out at Tender opening, and as evaluated, and when rated criteria are used, the evaluated tender scores;
- (d) names of all Tenderers whose Tenders were rejected either as nonresponsive or as not meeting qualification criteria, or were not evaluated, with the reasons therefor;
- (e) the name of the successful Tenderer, the final total contract price, the contract duration and a summary of its scope; and
- (f) successful Tenderer's Beneficial Ownership Disclosure Form, if specified in TDS ITT 49.1.

47.3 The Contract Award Notice shall be published on the Employer's website with free access if available, or in at least one newspaper of national circulation in the Employer's Country, or in the official gazette. The Employer shall also publish the contract award notice in UNDB online and AIIB website.

47.4 Until a formal Contract is prepared and executed, the Letter of Acceptance shall constitute a binding Contract.

48. Debriefing by the Employer

48.1 On receipt of the Employer's Notification of Intention to Award referred to in ITT 44.1, an unsuccessful Tenderer has three (3) Business Days to make a written request to the Employer for a debriefing. The Employer shall provide a debriefing to all unsuccessful Tenderers whose request is received within this deadline.

48.2 Where a request for debriefing is received within the deadline, the Employer shall provide a debriefing within five (5) Business Days, unless the Employer decides, for justifiable reasons, to provide the debriefing outside this timeframe. In that case, the standstill period shall automatically be extended until five (5) Business Days after such debriefing is provided. If more than one debriefing is so delayed, the standstill period shall not end earlier than five (5) Business Days after the last debriefing takes place. The Employer shall promptly inform, by the quickest means available, all Tenderers of the extended standstill period.

48.3 Where a request for debriefing is received by the Employer later than the three (3)-Business Day deadline, the Employer should provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of Contract

Award Notice. Requests for debriefing received outside the three (3)-day deadline shall not lead to extension of the standstill period.

48.4 Debriefings of unsuccessful Tenderers may be done in writing or verbally. The Tenderer shall bear its own costs of attending such a debriefing meeting.

49. Signing of Contract

49.1 The Employer shall send to the successful Tenderer the Letter of Acceptance including the Contract Agreement, and, if specified in the **TDS**, a request to submit the Beneficial Ownership Disclosure Form providing additional information on its beneficial ownership. The Beneficial Ownership Disclosure Form, if so requested, shall be submitted within eight (8) Business Days of receiving this request.

49.2 The successful Tenderer shall sign, date and return to the Employer, the Contract Agreement within twenty-eight (28) days of its receipt.

50. Performance Security

50.1 Within twenty-eight (28) days of the receipt of the Letter of Acceptance from the Employer, the successful Tenderer shall furnish the Performance Security in accordance with the General Conditions of Contract, subject to ITT 40.3 (b) and ITT 41.2 (b), using for that purpose the Performance Security Form included in Section X, Contract Forms, or another form acceptable to the Employer.

50.2 Failure of the successful Tenderer to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Tender Security. In that event the Employer may award the Contract to the Tenderer offering the next Most Advantageous Tender.

51. Procurement Related Complaint

51.1 The procedures for making a Procurement-related Complaint are as specified in the **TDS**.

Section II - Tender Data Sheet (TDS)

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

A. General	
ITT 1.1	<p>The reference number of the SPN/Tender is: HORC/HRIDC/C-1/2021.</p> <p>The Employer is: Haryana Rail Infrastructure Development Corporation (HRIDC) Limited</p> <p>The name of the Tender is: Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works in Connection with laying of New BG Double Railway Line of HORC project from Km 49.7 to Km 55.6 and its connectivity (new BG single line) from proposed Manesar Station of HORC to existing Patli Railway Station of IR Network</p> <p>The number and identification of lots (contracts) comprising this Tender is: Contract Package (C-1)</p>
ITT 1.2	<p>Add new sub-paragraphs (f) and (g) after sub-paragraph (e) as follows:</p> <p>(f) “Joint Venture” shall be replaced with “Joint Venture or Consortium”</p> <p>(g) “JV” shall be replaced with “JV or Consortium”</p>
ITT 1.2(a)	<p>Electronic – Procurement System</p> <p>The Employer shall use the following electronic-procurement system to manage this Tendering process:</p> <p>E-procurement portal of Govt. of Haryana (https://etenders.hry.nic.in)</p>

ITT 1.3	<p>Add new sub-clause ITT 1.3</p> <p>Instructions for Online Tender Submission:</p> <p>The Tenderers are required to submit soft copies of their Tenders electronically on the e-procurement portal of Government of Haryana i.e. https://etenders.hry.nic.in, using valid Digital Signature Certificates. The instructions given below are meant to assist the Tenderers in registering on the e-procurement Portal, prepare their Tenders in accordance with the requirements and submitting their Tenders online on the e-procurement Portal.</p> <p>Registration:</p> <ol style="list-style-type: none">i) Tenderers are required to enroll on the above-mentioned e-Procurement portal by clicking on the link “Online Tenderer Enrollment” on the Portal which is free of charge.ii) As part of the enrolment process, the Tenderers will be required to choose a unique username and assign a password for their accounts.iii) Tenderers are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the e-procurement Portal. <p>A. Obtaining a Digital Certificate:</p> <ol style="list-style-type: none">i. The Tenders submitted online should be encrypted and signed electronically with a Digital Certificate to establish the identity of the Tenderer online. These Digital Certificates are issued by an Approved Certifying Authority, by the Controller of Certifying Authorities, Government of India.ii. A Digital Certificate is issued upon receipt of mandatory identity (i.e. Applicant’s PAN Card) and Address proofs and verification form duly attested by the Bank Manager / Postmaster / Gazetted Officer. Only upon the receipt of the required documents, a digital certificate can be issued. For more details please visit the website – https://etenders.hry.nic.iniii. The Tenderers may obtain Class-II or III digital signature certificate from any Certifying Authority or Sub-certifying Authority authorized by the Controller of Certifying Authorities or may obtain information, application format and documents required for the issue of digital certificate.iv. The Tenderer must ensure that he/she comply by the online available important guidelines at the portal https://etenders.hry.nic.in for Digital Signature Certificate (DSC) including the e-Token carrying DSCs.
----------------	--

For any queries related to e-tendering process (registration, online e-bid submission/withdrawal, uploading of documents), Tenderer may contact the below representative of NIC:

Ms. Manju Aggarwal
Technical Director,
Scientist-E, NIC.
Panchkula.

E - mail: a.manju@nic.in

Help Desk: 0172 – 584257, 94170-69017.

- v. Tender for a particular tender must be submitted online using the digital certificate (Encryption & Signing), which is used to encrypt and sign the data during the stage of Tender preparation. In case, during the process of a particular tender, the user loses his digital certificate (due to virus attack, hardware problem, operating system or any other problem) he will not be able to submit the Tender online. Hence, the users are advised **to keep a backup of the certificate** and also keep the copies at safe place under proper security (for its use in case of emergencies).
- vi. In case of online tendering, if the digital certificate issued to the authorized user of a firm is used for signing and submitting a Tender, it will be considered equivalent to a no-objection certificate/power of attorney/lawful authorization to that User. The firm has to authorize a specific individual through an authorization certificate signed by all partners to use the digital certificate as per Indian Information Technology Act 2000. Unless the certificates are revoked, it will be assumed to represent adequate authority of the user to Tender on behalf of the firm in the department tenders as per Information Technology Act 2000. The digital signature of this authorized user will be binding on the firm.
- vii. In case of any change in the authorization, it shall be the responsibility of management/ partners of the firm to inform the certifying authority about the change and to obtain the digital signatures of the new person/ user on behalf of the firm/ company. The procedure for application of a digital certificate however will remain the same for the new user.
- viii. 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 directors of the company.

B. Opening of an Electronic Payment Account:

For online payments guidelines, please refer to the Home page under tab “Guidelines for hassle free Bid Submission” of the e-procurement Portal of Government of Haryana, <https://etenders.hry.nic.in>

C. Pre-requisites for online Tendering:

In order to operate on the electronic tender management system, a user’s machine is required to be set up. A help file on system setup/Pre-requisite can be obtained from National Informatics Center or downloaded from the home page of the website - <https://etenders.hry.nic.in> the link for downloading required java applet & DC setup are also available on the Home page of the e-procurement Portal.

D. Online Viewing of Specific Procurement Notice (SPN):

The Tenderers can view the SPN and the time schedule (Key Dates) through the single portal e-procurement system on the Home Page at <https://etenders.hry.nic.in>

E. Downloading of Tender Documents:

The tender documents can be downloaded free of cost from the e-procurement portal <https://etenders.hry.nic.in>

F. Key Dates:

The Tenderers are strictly advised to follow dates and times as indicated in the online Specific Procurement Notice. The date and time shall be binding on all Tenderers. All online activities are time tracked and the system enforces time locks that ensure that no activity or transaction can take place outside the start and end dates and the time of the stage as defined in the online Specific Procurement Notice.

G. Online Payment of Tender Document Fee and e-Service Fee:

The online payment for Tender document fee and e-Service Fee shall be made using the secure electronic payment gateway by Tenderers online directly through Debit Cards & Internet Banking accounts.

The secure electronic payments gateway is an online interface between Contractors and Debit card/online payment authorization networks.

H. Preparation & Submission of online Applications/Tenders:

- a) Detailed Tender documents may be downloaded from e-procurement website (<https://etenders.hry.nic.in>) from **03.12.2021 at 1700 hrs** till

	<p>19.01.2022 at 1500 hrs and tender mandatorily be submitted online following the instruction appearing on the screen.</p> <p>b) Scan copy of Documents to be submitted/uploaded for Technical Part under online PQQ/ Technical Envelope: All documents shall be prepared and scanned in file formats PDF /JPEG/MS WORD format such that file size is not exceed more than 10 MB) and uploaded during the on-line submission of PQQ or Technical Envelope.</p> <p><u>Only Electronic Form (Refer Tender document):</u></p> <p>FINANCIAL PART shall be submitted mandatorily online under Commercial Envelope and original not to be submitted manually</p> <p>NOTE:</p> <p>(A) <i>Tenderers participating in online tenders shall check the validity of his/her Digital Signature Certificate before participating in the online Tenders at the portal https://etenders.hry.nic.in.</i></p> <p>(B) <i>For help manual, please refer to the ‘Home Page’ of the e-procurement website at https://etenders.hry.nic.in</i></p>
ITT 2.1	<p>The Recipient is: HRIDC through Government of Haryana</p> <p>The Bank Loan amount: USD 400 million</p> <p>The name of the Project is: Haryana Orbital Rail Corridor (HORC)</p>
ITT 4.1	<p>Maximum number of members in the JV shall be: Two (2)</p>
ITT 4.1	<p>Add the following after the last sentence of Clause 4.1</p> <p>Lead Member must have majority share participation in the JV. No change in constitution or percentage share shall be permitted at any stage after the Tender submission, failing which the Tenderer shall be treated as non-responsive.</p>

ITT 4.4	<p>Add the following after the last sentence of Clause 4.4</p> <p>In the event that the Contract is awarded to a foreign Tenderer or to a JV/Consortium having foreign lead Member, such foreign Tenderer/foreign lead Member shall be required to set up a project office in India in accordance with Applicable Laws in India, and shall be required to submit a proof of having opened a project office in India along with statutory approvals, if any, prior to submitting any interim payment certificate in accordance with the Contract, failing which no payment shall be made to the Contractor by the Employer (in accordance with the Contract) until such requirement has been complied with by the foreign Contractor. The aforesaid condition of establishing a project office in India shall not be applicable in case the selected Tenderer is a joint venture between an Indian entity and a foreign entity where Indian Member is lead Member.</p>
ITT 4.5	<p>A list of debarred firms and individuals is available on the Bank's external website: https://www.aiib.org/debarment/</p>
ITT 6.3	<p>Replace ITT 6.3 with the following:</p> <p>The complete tender document can be viewed/ downloaded by the Tenderer from e-procurement portal of Govt. of Haryana https://etenders.hry.nic.in. The Employer is not responsible for the completeness of the Tender Document and their addenda, if they were not obtained directly from e-procurement portal of Govt. of Haryana https://etenders.hry.nic.in .</p>
<p>B. Contents of Tender Document</p>	
ITT 7.1	<p>For <u>Clarification of Tender purposes</u> only, the Employer's address is:</p> <p>Attention: Mr. Shiv Om Dwivedi Designation: Chief Project Manager Street address: Haryana Rail Infrastructure Development Corporation Limited (HRIDC), Plot no.143, Railtel Tower, Sector-44 Floor: 5th floor City: Gurugram ZIP code: 122003 Country: India Telephone: +91 9311478893 E-mail: horc.etendering@gmail.com</p>
ITT 7.2	<p>Add the following at the end of Para 7.2: No Site visit will be arranged by the Employer.</p>
ITT 7.4	<p>Replace the entire Sub-Clause 7.4 with the following:</p>

A Pre-Tender meeting will take place through online Video conferencing (VC) as well as offline in the Conference room of HRIDC office, Plot No 143, 5th Floor, Railtel Tower, Sector-44, Gurugram, Haryana-122003 at the following date and time. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

Date: 21.12.2021

Time: 1100 hrs IST

The prospective Tenderers who have purchased Tender Documents and who wish to join the Pre-Tender meeting through VC shall send a request (giving details of the Company, its address, and the name, designation and email of the person attending the VC) through email along with an **editable soft copy (MS Word)** of the queries raised by them on the email id (*i.e. horc.etendering@gmail.com*) so that a link for Video Conferencing can be sent by HRIDC.

The Tenderers should use the following format for any Pre-Tender queries:

Query No.	Reference to Tender Document (Clause/ Para No. & Page No.)	Brief Description of Clause/ Para No.	Query Raised
1.			
2.			
3.			
4.			
5.			
etc.			

HRIDC will allow maximum of one email Id for one company to participate in the VC. Any request for VC received after the given date and time for sending the link for VC may not be entertained by HRIDC. Prospective Tenderers will be able to join the VC through the link provided to them on their Email ID.

ITT 7.5

Replace ITT 7.5 with the following:

The Tenderer is requested to submit any questions in writing, to reach the Employer not later than 2 days before the pre-tender meeting.

ITT 7.6	<p>Replace ITT 7.6 with the following:</p> <p>Minutes of the pre-Tender meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting will be uploaded on e-Procurement portal, https://etenders.hry.nic.in. Any modification to the Tender Document that may in the sole discretion of the Employer become necessary as a result of the pre-Tender meeting shall be made by the Employer exclusively through the use of an Addendum pursuant to ITT 8.</p>
ITT 8.2	<p>Replace ITT 8.2 with the following:</p> <p>Any addendum issued shall be part of the Tender Documents and shall be uploaded on e-Procurement portal, https://etenders.hry.nic.in.</p> <p>The onus is on the Tenderers to visit the e-Tendering portal to see the addenda published by the Employer.</p>
<p>C. Preparation of Tenders</p>	
ITT 10.1	<p>The language of the Tender is: English</p> <p>All correspondence exchange shall be in English language.</p>
ITT 11.1	<p>Replace ITT 11.1 with the following:</p> <p>The Tenderer shall submit their tender on-line on e-procurement portal https://etenders.hry.nic.in as mentioned in para ITT 21.</p> <p>The Tender shall comprise two parts submitted simultaneously, one called the Technical Part containing the documents listed in ITT 11.2 and the other the Financial Part containing the documents listed in ITT 11.3.</p>
ITT 11.2	<p>Replace the entire Sub-Clause 11.2 with the following:</p> <p>The Tenderer shall submit all the documents in its Technical Part as per the Checklist (Form CL) given in Section 4: Tendering Forms.</p>
ITT 11.3	<p>Replace the entire Sub-Clause 11.3 with the following</p> <p>The Tenderer shall submit all the documents in its Financial Part as per the Checklist (Form CL) given in Section 4: Tendering Forms.</p>
ITT 13.1	<p>Alternative Tenders shall not be considered.</p>
ITT 13.2	<p>Alternative times for completion shall not be permitted.</p>
ITT 13.4	<p>Alternative technical solutions shall not be permitted.</p>

ITT 14.2	Replace ITT 14.2 with the following: - The tenderer shall quote single percentage (%) above or below of the estimated rates for each bill unit i.e. Bill No.1 to Bill No. 9 in the prescribed place.
ITT 14.4	Replace ITT 14.4 with the following: - As there is no lot in this Contract Package, no discounts shall be quoted by the Tenderers.
ITT 15.1	The currency of the Tender and the payment currency shall be INR only.
ITT 18.1	The Tender validity period shall be 180 days after the Tender submission deadline date.
ITT 19.1	The Tenderer shall furnish a Tender Security for an amount of INR 89,40,200/- .
ITT 19.2	Not Applicable
ITT 19.3	Replace the ITT 19.3 with the following: The amount for Tender Security will only be paid online by eligible Tenderers on e-procurement Portal in favour of Haryana Rail Infrastructure Development Corporation Limited using the electronic payment gateway service.
ITT 20.1	Replace ITT 20.1 with the following: The Technical Part (comprising of documents specified in ITT 11.2) and Financial Part (comprising of documents specified in ITT 11.3) shall be submitted online on e-procurement portal of Government of Haryana (https://etenders.hry.nic.in) only in accordance with the requirements of the Tender Documents.
ITT 20.3	The written confirmation of authorization to sign on behalf of the Tenderer shall consist of: (a) In case of Private/Public Companies or Limited Liability Partnership (LLP) firms, a Power of Attorney from the Director of the Company who has been authorized by the Board of Directors through resolution to sign on behalf of the Company. Copy of Board Resolution shall also be submitted. (b) In case of Proprietary Tenderers, Power of Attorney by the Proprietor. (c) In case of Partnership firms, Power of Attorney duly signed by all the Partners.

	<p>(d) In case of Limited Liability Partnership (LLP) firms, a Power of Attorney issued by the LLP in favour of the individual to sign the tender on behalf of the LLP and create liability against the LLP.</p> <p>(e) In case of Joint Venture/Consortium, Power of Attorney duly signed by authorized representative of individual Member in favour of the Lead Member and Authorized representative of JV/Consortium.</p>
D. Submission of Tenders	
ITT 21	<p>Replace ITT 21 with the following:</p> <p>21.1 Tenderers shall upload their tender submission online on e-procurement portal (i.e. https://etenders.hry.nic.in) within the stipulated date and time as mentioned in ITT 22.1. The Tenderer shall ensure that they retain a copy of the receipt/ acknowledgement of their Tender submission which is generated by the system upon successful submission of Tender online.</p> <p>21.2 Tenders sent telegraphically or through any other means of transmission except as mentioned above shall be treated as invalid and shall stand rejected.</p> <p>21.3 No details about Financial Part shall be submitted/ disclosed directly or indirectly in the Technical Part failing which the employer has the right to reject the Tender.</p>
ITT 22.1	<p>Replace ITT 22.1 with the following:</p> <p>The Tender submission is through the e-procurement portal only (i.e. https://etenders.hry.nic.in) as specified in ITT 21.1</p> <p>The Tenderer shall submit its Tender before expiry of the date and time for tender submission as specified herein.</p> <p>The deadline for Tender submission is:</p> <p>Date: 19.01.2022</p> <p>Time: 1500 hrs IST</p>
ITT 23.1	<p>Replace ITT 23.1 with the following:</p> <p>Submission of Tenders shall be closed on e-procurement portal on the date & time of submission as prescribed in ITT 22.1 after which no tender can be uploaded.</p>
ITT 24	<p>Replace ITT 24 with the following:</p>

	<p>The Tenderer may modify, substitute or withdraw its e-Tender after submission prior to the deadline for submission of Tenders. For modification of e-Tender, Tenderer has to detach its old Tender from e-procurement portal (https://etenders.hry.nic.in) and upload/ resubmit digitally signed modified tender. For withdrawal of tender, Tenderer has to click on withdrawal icon at e- procurement portal and can withdraw its e-tender. Before withdrawal of a tender, it may specifically be noted that after withdrawal of a tender for any reason, Tenderer cannot re-submit e-tender again.</p>
<p>E. Public Opening of Technical Parts of Tenders</p>	
<p>ITT 25</p>	<p>Replace ITT 25 with the following:</p> <p>25.1 The Employer shall conduct the electronic opening of Technical Part on e-procurement portal on the date, time and place as specified below:</p> <p>Street Address: Haryana Rail Infrastructure Development Corporation Limited (HRIDC), Plot no.143, Railtel Tower, Sector-44</p> <p>Floor/ Room number: 5th floor</p> <p>City: Gurugram</p> <p>Zip code: 122003</p> <p>Country: INDIA</p> <p>Date: 19.01.2022</p> <p>Time: 1530 hrs</p> <p>The opening of the Technical Part and subsequent details can be viewed by the tenderers by logging on the e-procurement portal. Alternatively, any Tenderer who wish to attend the Technical Part opening can be present during the opening. The Tenderer’s representatives who are present shall be requested to mark their attendance on the format available with the Employer.</p> <p>25.2 The Financial Part submitted online on e-procurement portal will remain unopened in the e-procurement portal until the date and time of opening of Financial Part. The date and time of the opening of the Financial Part will be notified to all the Tenderers on e-procurement portal whose tender is found to be substantially responsive and qualified in technical evaluation as specified in ITT 34.2.</p> <p>25.3 At the time of opening of Technical Part, the following shall be read out and recorded:</p>

	<p>(a) the name of the Tenderer;</p> <p>(b) the presence of a Tender Security; and</p> <p>(c) any other details as the Employer may consider appropriate.</p> <p>Only Technical Part read out and recorded at Tender opening shall be considered for evaluation.</p> <p>25.4 The Employer shall prepare a record of the opening of Technical Part that shall include, as a minimum, the name of the Tenderer and the presence or absence of Tender Security. The Tenderers' representatives who are present shall be requested to sign the record available with the HRIDC. The omission of a Tenderer's signature on the record shall not invalidate the contents and effect of the record.</p> <p>25.5 At the tender opening the Employer shall neither discuss the merits of any Tender nor reject any Tender.</p>
F. Evaluation of Tenders – General Provisions	
ITT 27	<p>Replace ITT 27 with the following:</p> <p>27.1 To assist in the examination, evaluation and comparison of the Tenders, the Employer may, at its discretion, ask any Tenderer for a clarification of its Tender. Any clarification submitted by a Tenderer that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing and delivered to concerned Tenderers (by courier or e-mail through PDF attachment). The due date and time to respond to these queries will also be communicated. No change in the prices or substance of the tender shall be sought, offered, or permitted, except to confirm the correction of errors discovered by the Employer in the evaluation of the Financial Part, in accordance with ITT Clause 35.</p> <p>27.2 If a Tenderer does not provide clarifications of its Tender by the date and time set in the Employer's request for clarification, their Tender shall be evaluated as per the available information in the submitted Tender.</p>
ITT 29.3	Not Applicable
G. Evaluation of Technical Parts of Tenders	
ITT 30.2	ITT 30.2 does not apply

ITT 32.4	<p>Replace ITT 32.4 with the following:</p> <p>Only Tenders that are both substantially responsive to the Tender Document, and meet all Qualification Criteria, shall be notified on e-procurement portal for the public opening of “FINANCIAL PART”.</p>
ITT 33.1	At this time the Employer does not intend to execute certain specific parts of the Works by subcontractors selected in advance.
ITT 33.2	Not Applicable
ITT 33.3	Not Applicable
H. Public Opening of Financial Parts of Tenders	
ITT 34	<p>Replace ITT 34 with the following:</p> <p>34.1 Following the completion of the evaluation of the Technical Parts of the Tenders, and the Bank has issued its no objection (if applicable), the Employer shall notify in writing those Tenderers whose Tenders were considered non-responsive to the Tender Document or failed to meet the Qualification Criteria, advising them of the following information:</p> <ul style="list-style-type: none"> (a) the grounds on which their Technical Part of Tender failed to meet the requirements of the Tender document; (b) their “FINANCIAL PART” shall remain unopened on the e-procurement portal; (c) notify them of the date, time and location of the public opening of “FINANCIAL PART” on the e-procurement portal; <p>34.2 The Employer shall, simultaneously, notify in writing those Tenderers whose Tenders - Technical Parts have been evaluated as substantially responsive to the Tender Document and met all Qualifying Criteria, advising them of the following information:</p> <ul style="list-style-type: none"> (a) their Tender has been evaluated as substantially responsive to the Tender Document and met the Qualification criteria; (b) their “FINANCIAL PART” on e-procurement portal will be opened at the public opening of the Financial Parts; and (c) notify them of the date, time and location of the second public opening of the “FINANCIAL PART” as specified below: <ul style="list-style-type: none"> i. The Employer shall publish a notice of the public opening of the Financial Parts on e-procurement portal. ii. Any interested party who wishes to attend this public opening may contact: <p style="margin-left: 40px;">For the attention: Mr. Shiv Om Dwivedi</p>

	<p>Title/position: Chief Project Manager Employer: Haryana Rail Infrastructure Development Corporation Limited Email address: horc.etendering@gmail.com</p> <p>34.3 The “FINANCIAL PART” of Tenderers who met the Qualification Criteria and whose Tenders were evaluated as substantially responsive, will be opened on e-procurement portal at the second public opening. The Employer shall read out the names of each Tenderer, and the total Tender prices, per lot (contract) if applicable, including any discounts and any other details as the Employer may consider appropriate.</p> <p>34.4 The Employer shall neither discuss with Tenderer’s representative present, if any, the merits of any Tender nor reject any “FINANCIAL PART”.</p> <p>34.5 The Employer shall prepare a record of the Financial Part of the Tender opening that shall include, as a minimum:</p> <ul style="list-style-type: none"> (a) the name of the Tenderer whose Financial Part was opened; (b) the Tender price, per lot (contract) if applicable, including any discounts; and (c) if applicable, any Alternative Tender – Financial Part. <p>34.6 The Tenderer’s representatives who are present at the time of opening of Financial Part shall be requested to sign the record. The omission of a Tenderer’s signature on the record shall not invalidate the contents and effect of the record. A copy of the record (i.e. summary of rates quoted) can be viewed by all eligible Tenderers after opening of the Financial Part.</p>
I. Evaluation of Financial Parts of Tenders	
ITT 37.1	The currency that shall be used for tender evaluation and comparison purposes is Indian Rupees (INR) only.
ITT 38.1	Provisions for development of domestic industry (such as a margin of domestic preference shall not apply.
J. Award of Contract	
ITT 49.1	The successful Tenderer shall not submit the Beneficial Ownership Disclosure Form.
ITT 50.2	<p>Add the following to ITT 50.2</p> <p>The Tenderer will be declared ineligible for a period of Two (2) years for participation in any Tender invited by the Employer.</p>

ITT 51.1	<p>The procedures for making a Procurement-related Complaint are detailed in the Bank's Procurement Instructions for Recipients (Annex IV). A Tenderer may make a Complaint in writing, to:</p> <p>For the attention: Mr. Shiv Om Dwivedi Title/position: Chief Project Manager Employer: Haryana Rail Infrastructure Development Corporation Limited Email address: horc.etendering@gmail.com</p>
-----------------	--

Section III. Evaluation and Qualification Criteria

TABLE OF CONTENTS

A.	General Provisions	49
A.1	Evaluation Sequence	49
A.2	Clarification of Tenders.....	49
A.3	Tender Forms	49
Stage 1: Evaluation of Administrative Requirements.....		50
A.	General	50
B.	Result of Evaluation	50
Stage 2: Evaluation of Compliance and Responsiveness		51
A.	General	51
B.	Result of Evaluation	51
Stage 3: Evaluation of Compliance with the Qualification Requirements.....		52
A.	General	52
B.	Check Items.....	52
C.	Qualification Criteria.....	53
D.	Result of Evaluation	59
Stage 4: Technical Evaluation		60
A.	Procedure for Technical Evaluation	60
B.	Evaluation of Technical Part	60
i.	Site Organization:.....	60
ii.	Method Statement:	61
iii.	Work Execution Programme:.....	61
iv.	Contractor’s Representative and Key Personnel:.....	61
v.	Equipment:	62
C.	Result of Evaluation	62
STAGE 5: Financial Evaluation		63
A.	Evaluation of Compliance and Responsiveness	63
B.	Detailed Financial Evaluation	63

A. General Provisions

A.1 Evaluation Sequence

- (a) Tenders will be evaluated through the following five stages:
 - (i) Stage 1: Evaluation of Administrative Requirements
 - (ii) Stage 2: Evaluation of Compliance and Responsiveness
 - (iii) Stage 3: Evaluation of Compliance with the Qualification Requirements
 - (iv) Stage 4: Technical Evaluation
 - (v) Stage 5: Financial Evaluation

A.2 Clarification of Tenders

- (b) The Employer may request clarification of any Tender in accordance with the provisions of the Tender Documents (Part 1, Section-I: Instructions to Tenderers, Clause 27).
- (c) If clarification is required, the Employer will send written (Courier/email with PDF attachment) requests to the Authorized Representative for clarification, specifying the deadline for receipt of reply.
- (d) Replies to the above requests shall be sent by Tenderer through Courier/e-mail with PDF attachments and the same shall be solely to clarify and/or elaborate the items already included in the submitted Tenders for the purpose of evaluation.

A.3 Tender Forms

- (e) Tenderers should note that the information required to be inserted into the Tender Forms shall be comprehensive and detailed. The technical information shall be furnished in line with the requirements of Part 1, Part 2 and Part 3 of the Tender Documents.
- (f) All Forms contained in the Tender Documents must be fully and properly completed and all the forms must be returned, as they will be reviewed exactly as submitted and errors or omissions may count against the Tenderer.
- (g) Any Tenderer who is found to have intentionally submitted false or inaccurate statements/information shall be disqualified from the Tendering process.

Stage 1: Evaluation of Administrative Requirements

A. General

- (a) The Stage 1 Evaluation will consist of checking the Tenders to confirm whether they are substantially responsive to the administrative requirements of the Tender Documents.
- (b) The following administrative items will be checked:
 - (i) Whether the Technical Part is in accordance with ITT 11.2;
 - (ii) Whether the Power of Attorney for the Tender signatory is in the correct form [Ref. ITT 20.3 and ITT 20.4];
 - (iii) Whether all Tender Forms have been signed by the Authorized Representative [Ref. ITT 20.3 and ITT 20.4];
 - (iv) Whether all data to be entered by the Tenderer has been provided [Ref. ITT 12.1];
 - (v) Whether any alterations are initialed by Authorized Representative [Ref. ITT 20.5];
 - (vi) The duly filled Checklist of Submission of Documents for Technical Part [Ref. ITT 11.2(h)]

B. Result of Evaluation

All Tenders that have passed this stage of the evaluation will proceed to the next stage.

Stage 2: Evaluation of Compliance and Responsiveness

A. General

- (a) The Stage 2 Evaluation will consist of checking the Tenders to confirm whether they are substantially responsive to the requirements of the Tendering Documents.
- (b) This stage of the evaluation shall be on a “Pass” or “Fail” basis. Each of the items listed below will be checked and if any item is evaluated to “Fail” then the entire Tender will be failed under this stage of the evaluation.
- (c) The following items will be checked:
 - (i) The Tenderer’s responsiveness shall be checked as per ITT 31;
 - (ii) Whether only One Tender per Tenderer has been submitted as per ITT 4.2 (c);
 - (iii) Whether all Tender Forms have not been altered and are correctly filled in and signed as per ITT 12.1; and
 - (iv) Whether all relevant Addenda have been complied with.

B. Result of Evaluation

All Tenders that have passed this stage of the evaluation will proceed to the next stage.

Stage 3: Evaluation of Compliance with the Qualification Requirements

A. General

- (a) Tenders that have passed the Stage 1 and Stage 2 Evaluations will be reviewed to ascertain whether the Tender continues to comply with all of the minimum requirements as stipulated in the Sub-Clause C. Qualification Criteria below of Section-III of the Tendering Documents.
- (b) Evaluation of each item will be made on a Pass or Fail Basis.
- (c) If a Tenderer has failed to comply with any item during this Stage 3 review, the Tenderer shall be disqualified at this stage.

B. Check Items

The following requirements of the Instruction to Tenderers, Clauses 4, 11 & 17 will be checked to ensure compliance to the requirements of criteria given below:

- (a) Eligibility**
 - (i) Nationality: Form ELI-1.1 and ELI-1.2
 - (ii) Conflict Interest: Letter of Tender
 - (iii) Bank Eligibility: Letter of Tender
 - (iv) State-owned Enterprise or Institution of the Recipient country: Form ELI-1.1 and ELI-1.2
 - (v) United Nations resolution or Recipient's country law: Form ELI-1.1 and ELI-1.2
- (b) Historical Contract Non-Performance and Litigation**
 - (i) History of Non-Performing Contracts: Form CON-1
 - (ii) Suspension Based on Execution of Tender- Securing Declaration by the Employer: Letter of Tender
 - (iii) Pending Litigation: Form CON-1
 - (iv) Litigation History: Form CON-1
 - (v) Declaration: Environmental, Social, Health, and Safety (ESHS) past performance: Form CON-2
- (c) Financial Situation**
 - (i) Financial Performance: Form FIN-3.3.1
 - (ii) Average Annual Construction Turnover: Form FIN-3.3.2
- (d) Financial Resources**
 - (i) Financial Resources: Form FIN-3.3.3
 - (ii) Current Contract Commitments: Form FIR-3.3.4
- (e) Experience**
 - (i) General Construction Experience: Form EXP-3.4.1
 - (ii) Specific Construction Experience: Form EXP-3.4.2(a)

C. Qualification Criteria

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
3.1 Eligibility							
3.1.1	Nationality	Nationality in accordance with ITT 4.4	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
3.1.2	Conflict of Interest	No conflicts of interest in accordance with ITT 4.2	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Tender-Technical Part
3.1.3	Bank Eligibility	Not having been declared ineligible by the Bank, as described in ITT 4.5.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Tender-Technical Part
3.1.4	State-owned Enterprise or Institution of the Recipient country	Meets conditions of ITT 4.6	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
3.1.5	United Nations resolution or Recipient's country law	Not having been excluded as a result of prohibition in the Recipient's country laws or official regulations against commercial relations with the Tenderer's country, or by an act of compliance with UN Security Council resolution, both in accordance with ITT 4.8 and Section V.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
3.2 Historical Contract Non-Performance							
3.2.1	History of Non-Performing Contracts	Non-performance of a contract ² did not occur as a result of contractor default since 1 st January 2016 till 28 days prior to deadline of Tender submission.	Must meet requirement	Must meet requirements	Must meet requirement ³	N/A	Form CON-1
3.2.2	Suspension Based on Execution of Tender-Securing Declaration by the Employer	Not under suspension based on-execution of a Tender/Proposal Securing Declaration pursuant to ITT 4.7 and ITT 19.9	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Tender
3.2.3	Pending Litigation	Tenderer's financial position and prospective long-term profitability still sound according to criteria established in 3.3.1 below and assuming that all pending litigation will be resolved against the Tenderer	Must meet requirement	N/A	Must meet requirement	N/A	Form CON-1
3.2.4	Litigation History	No consistent history of court/arbitral award decisions	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Form CON-1

² Nonperformance, as decided by the Employer, shall include all contracts where (a) nonperformance 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. Nonperformance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Nonperformance 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 Tenderer have been exhausted.

³ This requirement also applies to contracts executed by the Tenderer as JV member.

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
		against the Tenderer ⁴ since 1 st January 2016 till 28 days prior to deadline of Tender submission.					
3.2.5	Declaration: Environmental, Social, Health, and Safety (ESHS) past performance	Declare any civil work contracts that have been suspended or terminated and/or performance security called by an employer for reasons related to the non-compliance of any environmental, or social, or health, or safety requirements or safeguard in the past five years ⁵ preceding 28 days prior to deadline of Tender submission	Must make the declaration.	N/A	Must make the declaration.	N/A	Form CON-2 ESHS Performance Declaration
3.3 Financial Situation and Performance							
3.3.1	Financial Capabilities	(i) The Tenderer 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 advance payment) sufficient to meet the construction cash flow requirements estimated as INR 350 million for the subject contract(s)	Must meet requirement	Must meet requirement	N/A	N/A	Forms FIN-3.3.1, FIN-3.3.3, FIN-3.3.4, with attachments

⁴ The Tenderer shall provide accurate information on the related Tender Form about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last five years. A consistent history of awards against the Tenderer or any member of a joint venture may result in failure of the Tender.

⁵ The Employer may use this information to seek further information or clarifications in carrying out its due diligence.

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
		net of the Tenderer's other commitments.					
		(ii) The Tenderers shall also 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.	Must meet requirement	Must meet requirement	N/A	N/A	
		(iii) The audited balance sheets or, if not required by the laws of the Tenderer's country, other financial statements acceptable to the Employer, for the last three years shall be submitted and must demonstrate the current soundness of the Tenderer's financial position and indicate its prospective long-term profitability.	Must meet requirement	N/A	Must meet requirement	N/A	
3.3.2	Average Annual Construction Turnover	Minimum average annual construction turnover of INR 2100 million , calculated as total certified payments received for contracts in progress and/or completed within the Financial Year 2017-18, 2018-19 and 2019-20 divided by three.	Must meet requirement	Must meet requirement	Must meet 25% <i>[Twenty-Five percentage]</i> of the requirement	Lead Member must meet 60% <i>[Sixty percentage]</i> of the requirement	Form FIN-3.3.2

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
3.4 Experience							
3.4.1	General Construction Experience	Experience under construction contracts in the role of prime contractor, JV member, starting 1 st January 2014 till 28 days prior to deadline of Tender submission.	Must meet requirement	N/A	Must meet requirement	N/A	Form EXP-3.4.1
3.4.2 (a)	Specific Construction & Contract Management Experience	<p>Participation, as a prime contractor, joint venture⁶ member, in</p> <p>i) one contract with a value of the Tenderer's participation of at least INR 1400 million (140 Cr.). The above contract must involve minimum 1.5 million Cum earthwork in formation and 15000 cum of PSC/RCC in bridge works;</p> <p>OR</p> <p>ii) two contracts each with a value of the Tenderer's participation of at least INR 1050 million (105 Cr.). Both the above contracts combined together must involve minimum 1.5 million Cum earthwork in formation and 15000 cum of PSC/RCC in bridge works.</p> <p>The contracts mentioned in (i) or (ii) must have been successfully</p>	Must meet requirement of either (i) or (ii)	Must meet requirement of either (i) or (ii)	N/A	Lead Member must meet the requirements of either (i) or (ii)	Form EXP-3.4.2(a)

⁶ Value of completed work done by a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her experience criteria mentioned in 3.4.2 (a)

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
		<p>completed or substantially completed⁷ since 1st January 2014 till 28 days prior to deadline of Tender submission, and that are similar to the proposed works.</p> <p>The similarity of the contracts shall be based on the following:</p> <p>a) Earthwork in formation in railway new line/doubling projects or in new/additional laning of highway/expressway projects;</p> <p>b) PSC/RCC bridge works involving at least one bridge on pile foundation in railway projects or highway/expressway projects;</p>					

⁷ Substantial completion shall be based on 80% or more of the original value of works completed under the contract.

Notes: Exchange Rate for Qualification Criteria

Wherever a Form in Section IV, Tendering Forms, requires a Tenderer to state a monetary amount, Tenderers shall indicate the INR equivalent as indicated in the respective form using the rate of exchange determined as follows:

- (i) For construction turnover or financial data required for each year – Exchange rate prevailing on the last day of the respective year.
- (ii) Value of single contract - Exchange rate prevailing on the date of the Contract Award i.e. Letter of Acceptance was issued.

Exchange rates shall be taken from reference rate of The Reserve Bank of India (RBI). Any error in determining the exchange rates may be corrected by the Employer. In the case where a Tenderer is required to convert a monetary amount from a currency other than for which the RBI reference rate is published, the INR equivalent shall be worked out using the rate of exchange as published by the central bank of the country issuing the said currency.

-

D. Result of Evaluation

All Tenders that have passed this stage of the evaluation will proceed to the next stage.

Stage 4: Technical Evaluation

A. Procedure for Technical Evaluation

- (a) The Stage 4 Evaluation will consist of checking the technical aspects of the Tenders to confirm whether they substantially conform to the requirements of the Tender Documents.
- (b) This Stage shall be evaluated on an entire “Pass” or “Fail” basis. In order to determine whether the Tender substantially conforms to the technical requirements of the Tender Documents, the technical proposal shall broadly cover the following items:

S. No.	Technical Evaluation Items	Relevant Forms
1	Site Organization	Technical Proposal
2	Method Statement	Technical Proposal
3	Works Execution Programme	Technical Proposal
4	Contractor’s representative and Key Personnel	Technical Proposal Form PER-1, Form PER-2
5	Equipment	Technical Proposal Form EQU

- (c) The Technical Part will be evaluated to examine the responsiveness and to assess the capability of the Tenderer in executing the proposed work.

B. Evaluation of Technical Part

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

The Tenderer’s preparedness along with technical capability will be judged by the quality of the Technical Part submitted. It is expected that the Tenderer visits the site and is fully aware of all the work requirements under this Tender, and then prepares the Technical Part. The Technical Proposal shall cover the following items with the minimum requirements for “Pass”.

i. Site Organization:

Evaluation of Site organisation will be carried out based on the information furnished in Section IV- Tender Forms.

ii. Method Statement:

Evaluation of method statement will be carried out based on the information furnished in Section IV- Tender Forms.

iii. Work Execution Programme:

Evaluation of the Work Execution Programme will be done by work breakdown, logical sequence, activity relationship, construction duration with proposed sets of equipment to meet specified Milestones, Sections (if any), Time for Completion on Critical path furnished in Section IV- Tender Forms.

iv. Contractor's Representative and Key Personnel:

The Tenderer must demonstrate that it will have a suitably qualified Contractor's Representative and suitably qualified (and in adequate numbers) Key Personnel, as described in the table below.

The Tenderer shall provide details of the Contractor's Representative and Key Personnel and such other Key Personnel that the Tenderer considers appropriate to perform the Contract, together with their academic qualifications and work experience.

The Contractor shall require the Employer's consent to substitute or replace the Contractor's Representative (reference General Conditions of Contract Sub Clause 4.3) and any of the Key Personnel (reference the Particular Conditions of Contract Sub Clause 1.1.2.7).

Item No.	Position/ specialization	Relevant academic qualifications	Total years of work Experience	Minimum years of relevant work experience
1	Contractor's Representative (Project Manager)	Graduation in Civil Engineering	15	8 years in infrastructure projects of railways
2	Contract & Planning Engineer	Graduation in Civil Engineering	6	3 years in infrastructure projects of railways/highways/ expressways
3	QA/QC Engineer	Graduation in Civil Engineering	6	3 years in infrastructure projects of railways/highways/ expressways
4	Safety and Health Expert	Engineering Graduate with Diploma/ Specialization in relevant fields	6	3 years working on railways/road projects in similar work environments
5	Environmental Expert	Graduate in Environmental Engineering/	6	3 years of experience of working on environmental aspects

		Master's degree in Environmental Engineering/Environmental Science		in railways/roads linear projects
6	Social Expert	Master's degree in Social Work/Sociology/Social Science	6	3 years of experience of working on social safeguard aspects in railways/roads linear projects

Note:

- i. *The Tenderers are advised NOT to submit more than one CV against each of the above-mentioned key positions. In case more than one CV is submitted for any key position, such additional CV(s) shall not be considered for evaluation purposes and only the first CV in the Tender shall be considered for evaluation.*
- ii. *The Contractor shall ensure that during the execution of the Works, the Key Personnel deployed shall continue to meet the experience criteria as mentioned above.*

v. Equipment:

The Tenderer must demonstrate that it has the key equipment listed in the table below:

No.	Equipment Type and Characteristics	Minimum Number required
A. EARTH WORK		
1	Excavator (75 Cum/hr)	03
2	Grader	01
3	Dozer (150 Cum/hr)	02
4	Vibratory Rollers (10Ton)	02
5	Pugmill (200 Ton/hr)	01
B. BRIDGES		
6	Concrete Batching Plant (60 Cum/hr)	01
7	Concrete Pump (36 Cum/hr)	02

C. Result of Evaluation

- (a) All Tenders which have passed this stage of the evaluation will proceed to the next stage.
- (b) Any Tender that is evaluated to "Fail", as determined above, will be considered as not substantially conforming to the requirements of the Tender Documents, will be rejected at this Stage and will not be considered for any further evaluation.

STAGE 5: Financial Evaluation

The activities in this Stage 5 will be in two (2) parts.

A. Evaluation of Compliance and Responsiveness

- (a) Under this Stage the following items will be checked:
 - (i) Whether the Letter of Financial Part is compliant (i.e. does not include any alteration to the basic terms and does not constitute an alternative offer).
 - (ii) Whether all Forms and Price Schedules have not been altered and are correctly completed and signed.

B. Detailed Financial Evaluation

- (a) After passing the above requirements, the Tender will then proceed for Financial Part evaluation in accordance with ITT 35.
- (b) In principle, the lowest evaluated Tender resulting from ‘A’ above will move to next stage as per ITT “J. Award of Contract”, described in ITT Clauses 46 to 50.

Section IV - Tender Forms

Table of Forms

Letter of Tender – Technical Part.....	66
Appendix A to Technical Part: Technical Proposal	69
1. Site Organization	70
2. Method Statement.....	70
3. Work Execution Programme.....	70
4. ESHS Management Strategies and Implementation Plans (ESHS-MSIP).....	71
Appendix B to Technical Part: Equipment	72
Form EQU: Equipment.....	72
Appendix C to Technical Part: Key Personnel	73
Form PER-1.....	73
Form PER-2:	75
Appendix D to Technical Part: Tenderer’s Qualification.....	77
Form ELI-1.1.....	78
Form ELI-1.2.....	79
Form CON-1.....	90
Form CON-2	92
Form FIN-3.3.1:	94
Form FIN-3.3.2:	97
Form FIN-3.3.3:	99
Form FIN-3.3.4:	101
Form EXP-3.4.1	103
Form EXP-3.4.2(a).....	104
Appendix E to Technical Part: Tender Security.....	106
Form of Tender-Securing Declaration.....	107
Letter of Tender – Financial Part.....	112
Appendix A to Financial Part	114
1. Schedule of Cost Indexation.....	114
2. Schedule of Adjustment Data	116
Table A. Local Currency	116
Table B. Foreign Currency (FC)	117

Table C. Summary of Payment Currencies.....118
Appendix B to Financial Part: Bill of Quantities.....119
Price Schedule124

Letter of Tender – Technical Part

INSTRUCTIONS TO TENDERERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

The Tenderer must prepare this Letter of Tender on stationery with its letterhead clearly showing the Tenderer's complete name and business address.

Note: All italicized text is to help Tenderers in preparing this form.

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

Tender No: HORC/HRIDC/C-1/2021

To:

Chief Project Manager,
Haryana Rail Infrastructure Development Corporation Limited (HRIDC),
Plot no.143, 5th floor,
Railtel Tower, Sector-44
Gurugram – 122003

We, the undersigned, hereby submit our Tender, in two parts sealed separately, namely: (a) the Technical Part; and (b) the Financial Part.

In submitting our Tender, we declare that:

- (a) **No Reservations:** We have examined and have no reservations to the Tender Document, including Addenda issued in accordance with ITT 8;
- (b) **Eligibility:** We meet the eligibility requirements and have no conflict of interest in accordance with ITT 4;
- (c) **Tender-Securing Declaration:** We have not been suspended nor declared ineligible by the Employer based on execution of a Tender-Securing or Proposal-Securing Declaration in the Employer's Country in accordance with ITT 4.7;
- (d) **Conformity:** We offer to execute in conformity with the Tender Document and in accordance with the implementation and completion specified in the construction schedule, the following Works: *[insert a brief description of the Works]*;

_____;

- (e) **Tender Validity Period:** Our Tender shall be valid for the period specified in TDS 18.1 (as amended, if applicable) from the date fixed for the Tender submission deadline specified in TDS 22.1 (as amended, if applicable), and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) **Performance Security** If our Tender is accepted, we commit to obtain a Performance Security in accordance with the Tender Document;
- (g) **One Tender Per Tenderer:** We are not participating, as a Tenderer, either individually or as a Joint Venture member, in more than one Tender in this tendering process, and meet the requirements of ITT 4.3;
- (h) **Suspension and Debarment:** We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment or any ineligibility imposed or recognized by the Bank. Further, we are not ineligible under the Employer's Country laws or official regulations or pursuant to a decision of the United Nations Security Council;
- (i) **State-Owned Enterprise or Institution:** *[select the appropriate option and delete the other] [We are not a state-owned enterprise or institution] / [We are a state-owned enterprise or institution but meet the requirements of ITT 4.6];*
- (j) **Binding Contract:** We understand that this Tender, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;
- (k) **Employer Not Bound to Accept:** We understand that you are not bound to accept the lowest evaluated cost Tender, the Most Advantageous Tender or any other Tender that you may receive;
- (l) **Prohibited Practice:** We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Prohibited Practice; and
- (m) **Inspection and Audit:** We agree to permit the Bank or its representative to inspect our accounts and records and other documents relating to the tender submission and to have them audited by auditors appointed by the Bank.

Name of the Tenderer: * *[insert complete name of person signing the Tender]*

Name of the person duly authorized to sign the Tender on behalf of the Tenderer: ***[insert complete name of person duly authorized to sign the Tender]*

Title of the person signing the Tender: *[insert complete title of the person signing the Tender]*

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

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

*: In the case of the Tender submitted by joint venture specify the name of the Joint Venture as Tenderer

** : Person signing the Tender shall have the power of attorney given by the Tenderer. The power of attorney shall be attached with the Letter of Tender.

Appendix A to Technical Part: Technical Proposal

- 1. Site Organization**
- 2. Method Statement**
- 3. Work Execution Programme**
- 4. ESHS Management Strategies and Implementation Plans**

1. Site Organization

The Tenderer shall propose and include his site organization in the tender which shall include the following:

- i) Organization chart of the project with the name of key personnel and description of designated duties and responsibilities of every key personnel.
- ii) Organization chart of the Head Office with the name of key personnel and description of designated duties and responsibilities of every key personnel. In case of JV, organization chart of the Head office of all members of the JV with the name of key personnel and description of designated duties and responsibilities of every key personnel.
- iii) Mobilization and demobilization program of key personnel in the form of bar chart in accordance with Tenderer's proposed Works Execution Program.

2. Method Statement

The tenderer shall propose and provide his proposed method statement of the work. The method statement shall describe every work and in accordance with the sequence of the works. The statement shall include proposed manpower, equipment schedule and program. The items to be included in the statement shall be as follows: -

- i) Initial Survey
 - a) setting out and site establishment including temporary arrangements.
 - b) Staking of center line of alignment of main line and connecting line.
- ii) Earthwork in formation
 - a) Location of borrow area, selection and transportation of fill material.
 - b) Filling and compaction
 - c) Slope Protection
- iii) Minor Bridge Works and sub-structure of 1 Major bridge
 - a) Source of aggregates
 - b) Arrangement of water supply
 - c) Method of manufacture of concrete- Site batching plant/RMC.
 - d) Method of curing.
- iv) Station building of Manesar

3. Work Execution Programme

The tenderer shall propose and provide in the tender his proposed Works Execution Programme which consists of (1) Construction Program, (2) Quality Assurance/Quality Control Program. The Tenderer shall note the following for the preparation of his proposal:

- i) The Construction Program may be in the form of a Bar Chart showing the relationship and timing of major items of works giving due consideration to climatic conditions pertaining to the Site.
- ii) Quality Assurance/Quality Control Program may brief the Tenderer's quality assurance/quality control plan and procedures, including practices and sequence of activities to be followed and resources to be provided to meet the quality administration requirements of Part II, Section VII (1) (General Specifications) of the Tender Documents.

4. ESHS Management Strategies and Implementation Plans (ESHS-MSIP)

The Tenderer shall submit comprehensive and concise Environmental, Social, Health and Safety Management Strategies and Implementation Plans (ESHS-MSIP) as required by ITT 11.2 of the Tender Data Sheet. These strategies and plans shall describe in detail the actions, materials, equipment, management processes etc. that will be implemented by the Contractor.

In developing these strategies and plans, the Tenderer shall have regard to the ESHS provisions of the contract including those as may be more fully described in the Works' Requirements in Section VII.

Appendix B to Technical Part: Equipment

Form EQU: Equipment

The Tenderer 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 Tenderer.

Item of equipment		
Equipment information	Name of manufacturer	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"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

Omit the following information for equipment owned by the Tenderer.

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

Appendix C to Technical Part: Key Personnel

Form PER-1

Contractor's Representative and Key Personnel Schedule

Tenderers should provide the names and details of the suitably qualified Contractor's Representative and Key Personnel to perform the Contract. The data on their experience should be supplied using the Form PER-2 below for each candidate.

Contractor' Representative and Key Personnel

1.	Title of position: Contractor's Representative	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
2.	Title of position: <i>[Environmental Specialist]</i>	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
3.	Title of position: <i>[Health and Safety Specialist]</i>	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
4.	Title of position: <i>[Social Specialist]</i>	
	Name of candidate:	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>

	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
5.	Title of position: <i>[insert title]</i>	
	Name of candidate	
	Duration of appointment:	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	Time commitment for this position:	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	Expected time schedule for this position:	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>

**Form PER-2:
Resume and Declaration
Contractor's Representative and Key Personnel**

Name of Tenderer

Position [#1]: [title of position from Form PER-1]		
Personnel information	Name:	Date of birth:
	Address:	E-mail:
	Professional qualifications:	
	Academic qualifications:	
	Language proficiency: [language and levels of speaking, reading and writing skills]	
Details	Address of employer:	
	Telephone:	Contact (manager / personnel officer):
	Fax:	
	Job title:	Years with present employer:

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

Project	Role	Duration of involvement	Relevant experience
<i>[main project details]</i>	<i>[role and responsibilities on the project]</i>	<i>[time in role]</i>	<i>[describe the experience relevant to this position]</i>

Declaration

I, the undersigned *[insert either "Contractor's Representative" or "Key Personnel" as applicable]*, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Tender:

Commitment	Details
Commitment to duration of contract:	<i>[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]</i>

I understand that any misrepresentation or omission in this Form may:

- (a) be taken into consideration during Tender evaluation;
- (b) result in my disqualification from participating in the Tender;
- (c) result in my dismissal from the contract.

Name of Contractor's Representative or Key Personnel: *[insert name]*

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Tenderer:

Signature: _____

Date: (day month year): _____

Appendix D to Technical Part: Tenderer's Qualification

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

Form ELI-1.1
Tenderer Information Form

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

Tenderer's name
In case of Joint Venture (JV), name of each member:
Tenderer's actual or intended country of registration: <i>[indicate country of Constitution]</i>
Tenderer's actual or intended year of incorporation:
Tenderer's legal address [in country of registration]:
Tenderer's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
<p>1. Attached are copies of original documents of</p> <p><input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITT 4.4</p> <p><input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with ITT 4.1</p> <p><input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITT 4.6, documents establishing:</p> <ul style="list-style-type: none"> • Operation on a commercial basis; • Financial and managerial autonomy; • Day-to-day management not controlled by the government; and • Not under the supervision of the Employer or its procuring agency. <p>2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership. <i>[If required under TDS ITT 48.1, the successful Tenderer shall provide additional information on beneficial ownership, using the Beneficial Ownership Disclosure Form.]</i></p>

Form ELI-1.2

Tenderer's JV Information Form

(to be completed for each member of Tenderer's JV)

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

Tenderer's JV name:
JV member's name:
JV member's country of registration:
JV member's year of constitution:
JV member's legal address in country of constitution:
JV member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITT 4.4. <input type="checkbox"/> In case of a state-owned enterprise or institution, documents establishing operation on a commercial basis; financial and managerial autonomy; day-to-day management not controlled by the government; and not under the supervision of the Employer or its procuring agency, in accordance with ITT 4.6. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership. <i>[If required under TDS ITT 48.1, the successful Tenderer shall provide additional information on beneficial ownership for each JV member using the Beneficial Ownership Disclosure Form.]</i>

Form ELI-1.3
Joint Venture/Consortium Agreement
 [Ref ITT Clause 4.1]

The Members of the Joint Venture/Consortium shall provide Joint Venture/Consortium Agreement for Joint Venture Participation in the name of M/s.....of which includes at least the followings: -

M/s having its registered office at (hereinafter referred to as) acting as the Lead Member of the first part,

and

M/shaving its registered office at (hereinafter referred to as `.....') in the capacity of a Joint Member of the other part.

The expressions of (i) ,..... (ii)(names of JV/Consortium Members) shall wherever the context admits, mean and include their respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as “ the Parties” and individually as “ the Party”

WHEREAS:

Haryana Rail Infrastructure Development Corporation Ltd. [hereinafter referred to as “Employer”] has invited tenders for “[Insert name of work].....”

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. The following documents shall be deemed to form and be read and construed as an integral part of this JV agreement.
 - i) Notice of Invitation for tender
 - ii) Tender document
 - iii) Any Addendum/ Corrigendum issued by Haryana Rail Infrastructure Development Corporation Ltd.
 - iv) The tender submitted on our behalf jointly by the Lead Member/ authorised representative.
2. The `Parties' have studied the documents and have agreed to participate in submitting a tender jointly in the name of-----.
3. M/sshall be the lead Member of the JV/ Consortium for all intents and purpose and shall represent the Joint Venture/Consortium in its dealing with the Employer. For the purpose of submission of tenders, the parties agree to nominate as the Lead Member duly authorized to sign and submit all documents and subsequent clarifications, if any, to the Employer. However M/s shall not submit any such tenders, clarifications or commitments before securing the written clearance of the other Member which shall be expeditiously given by M/s.....to M/s.....

4. The 'Parties' have resolved that the distribution of share and responsibilities between the JV/Consortium Members is as under:-

(a) Lead Member Name.....and share% ;

Responsibilities of Key Activities

i)

ii)

iii)

(b) Joint Venture /Consortium Member Name.....and share% ;

Responsibilities of Key Activities

i)

ii)

iii)

5. JOINT AND SEVERAL RESPONSIBILITIES

The Parties undertake that they shall be jointly and severally liable to the Employer in the discharge of all the obligations and liabilities as per the contract with the Employer and for the performance of contract awarded to their JV/Consortium.

6. ASSIGNMENT AND THIRD PARTIES

The parties shall co-operate throughout the entire period of this Joint Venture Agreement on the basis of exclusivity and neither of the Parties shall make arrangement or enter into agreement either directly or indirectly with any other party or group of parties on matters relating to the Project except with prior written consent of the other party and the Employer.

7. EXECUTIVE AUTHORITY

The said Joint Venture/ Consortium through its authorized representative shall receive instructions from the Employer. The management structure for the project shall be prepared by mutual consultations to enable completion of project to quality requirements within permitted cost and time.

8. PROPOSAL SUBMISSION

Each Party shall bear its own cost and expenses for preparation and submission of the tender and all costs until conclusion of a contract with the Employer for the Project. Common expenses shall be shared by all the parties in the ratio of their actual participation.

9. INDEMNITY

Each party hereby agrees to indemnify the other party against its respective parts in case of breach/default of the respective party of the contract works of any liabilities sustained by the Joint Venture/ Consortium.

10. For the execution of the respective portions of works, the parties shall make their own arrangements to bring the required finance, plants and equipment, materials, manpower and other resources.

11. DOCUMENTS & CONFIDENTIALITY

Each Party shall maintain in confidence and not use for any purpose related to the Project all commercial and technical information received or generated in the course of preparation and submission of the tender.

12. ARBITRATION

Any dispute, controversy or claim arising out of or relating to this Joint Venture agreement shall be settled in the first instance amicably between the parties. If an amicable settlement cannot be reached as above, it will be settled by arbitration in accordance with the Indian Arbitration and Conciliation Act 1996 or any amendments thereof. The venue of the arbitration shall be _____.

13. VALIDITY

This Joint Venture agreement shall remain in force till the occurrence of the earliest of any of the following, unless by mutual consent, the Parties agree in writing to extend the validity for a further period.

- a. The tender submitted by the Joint Venture/ Consortium is declared unsuccessful, or
- b. Cancellation/ shelving of the Project by the Employer for any reasons prior to award of work
- c. Execution of detailed JV /Consortium agreement by the parties, setting out detailed terms after award of work by the Employer.

14. This Joint Venture agreement is drawn in number of copies with equal legal strength and status. One copy is held by M/s and the other by M/s. and a copy submitted with the tender.

15. This Joint Venture agreement shall be construed under the laws of India.

16. NOTICES BETWEEN JV/CONSORTIUM MEMBERS

Notices shall be given in writing by fax confirmed by registered mail or commercial courier to the following fax numbers and addresses:

Lead Member.	Other Member
.....
.....
(Name & Address)	(Name & Address)

IN WITNESS WHEREOF THE PARTIES, have executed this MOU the day, month and year first before written

M/s..... M/s.....
.....
(Seal) (Seal)

Witness

- 1.....(Name & Address)
- 2..... (Name & Address)

Form ELI-1.4
Power of Attorney (POA) for Submitting Tender
(For Single Entity/Sole Tenderer only)

(To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper to be in the name of the company who is issuing the Power of Attorney)

Know all men by these presents, we..... (name and address of the registered office) do hereby constitute, appoint and authorise Mr/Ms..... (name and residential address) who is presently employed with us and holding the position ofas our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our tender for the work of(name of work), including signing and submission of all documents and providing information/ responses to Haryana Rail Infrastructure Development Corporation Ltd (HRIDC), representing us in all matters before HRIDC, and generally dealing with HRIDC in all matters in connection with our tender for the said project.

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

..... (Signature)
 (Name, Title and address) of the **Person Accepting the POA.**

..... (Signature)
 (Name, Title and address) of the **Person issuing the POA**

Notes:

- i. The tenderer should submit the notarised Power of Attorney. In case of Foreign Members, Power of Attorney(s) and Board Resolution confirming authority on the persons issuing the Power of Attorney for such actions shall be submitted duly notarized by the notary public of country of origin and should be either stamped by Embassy/High Commission or Member Countries of Hague convention may submit these document with “Apostille” stamp. Also, in case the documents are in foreign language the translation of the same shall be authenticated by Embassy/High Commission.
- ii. 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.

-
- iii. The tenderer should submit following additional document in support of the POA as case to case basis:
- a) Proprietorship Affidavit in case of Proprietary Tenderer.
 - b) Partnership Deed in case of Partnership Firms.
 - c) Board Resolution in case of a Public/Private limited company/LLP.
 - d) Incorporation Certificate and Memorandum & Article of Association in case of a Public/Private limited company.
 - e) Incorporation Certificate and Limited Liability Membership Agreement in case of Limited Liability Membership firms. Member

**Form ELI-1.5
Power of Attorney (POA) for Authorized Signatory of Joint Venture (JV)/ Consortium
Members**

POWER OF ATTORNEY*

(To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper to be in the name of the company who is issuing the Power of Attorney)

Know all men by these presents, we..... do hereby constitute, appoint and authorise Mr/Ms. who is presently employed with us and holding the position ofas our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our tender for the work of(name of work), including signing and submission of all documents, withdrawal, substitution and modification of tender and providing information/ responses to Haryana Rail Infrastructure Development Corporation Ltd, representing us in all matters, dealing with Haryana Rail Infrastructure Development Corporation Ltd. in all matters in connection with our tender for the said project.

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

Dated this the day of 20..

(Signature of authorised Signatory in token of **Acceptance of POA**

.....

(Signature and Name in Block letters of Signatory)

Seal of Company

Witness

Witness 1:

Name:

Address:

Witness 2:

Name:

Address:

Occupation:

Occupation:

**Notes:*

- i) To be executed by all the Members individually, in case of a Joint Venture/Consortium.
- ii) 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.

**Form ELI-6
Power of Attorney to Lead Member and Authorized Representative of Joint Venture
(JV)/ Consortium**

(To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper to be in the name of the company who is issuing the Power of Attorney)

POWER OF ATTORNEY¹

Whereas Haryana Rail Infrastructure Development Corporation Ltd. has invited Tenders for the work of

Whereas, the Members of the Joint Venture/Consortium comprising of

1. M/s.,

and

2. M/s.,

are interested in submission of tender for the work of[Insert name of work]... in accordance with the terms and conditions contained in the tender documents.

Whereas, it is necessary for the Members of the Joint Venture to designate one of them as the Lead Member as the authorized representative, with all necessary power and authority to do, for and on behalf of the Joint Venture/ Consortium, all acts, deeds and things as may be necessary in connection with the Joint Venture’s tender for the project.

NOW THIS POWER OF ATTORNEY WITNESSETH THAT:

We, M/s. (Lead Member) and M/s_____ hereby designate M/s., being one of the Members of the Joint Venture, as the Lead Member of the Joint Venture and designate Mr/Ms. _____ being authorized representative of the Joint Venture, to do on behalf of the Joint Venture, all or any of the acts, deeds or things necessary or incidental to the Joint Venture’s tender for the contract, including submission of tender, withdrawal, substitution and modification of tender, participating in conferences, responding to queries, submission of information/ documents and generally to represent the Joint Venture in all its dealings with the Employer or any other Government Agency or any person, in connection with the contract for the said work until culmination of the process of tendering till the contract agreement is entered into with the Haryana Rail Infrastructure Development Corporation Ltd. and thereafter till the expiry of the contract agreement.

We hereby agree to ratify all acts, deeds and things lawfully done by Lead Member, our said attorney, pursuant to this power of attorney and that all acts deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us/ Joint Venture.

Dated this the Day of 20.....

(Signature)

(Signature)

.....

.....

(Name in Block letters of all Executants with Seal of Company)

..... (Signature)

(Name, Title and address) of the **Person Accepting the POA**

Witness 1:

Witness 2:

Name:

Name:

Address:

Address:

Occupation:

Occupation:

Notes:

1. To be executed by all the Authorized POA holders of each Members of the JV/Consortium.
2. 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.

Form CON-1

Historical Contract Non-Performance, Pending Litigation and Litigation History

Tenderer's Name: _____

Date: _____

JV Member's Name _____

Tender No. and title: _____

Page _____ of _____ pages

Non-Performed Contracts in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> Contract non-performance did not occur since 1 st January 2016 specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.1.			
<input type="checkbox"/> Contract(s) not performed since 1 st January 2016/ specified in Section III, Evaluation and Qualification Criteria, requirement 3.2.1			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and US\$ 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 nonperformance: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
Pending Litigation, in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> No pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.3.			
<input type="checkbox"/> Pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.3 as indicated below.			

Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount (currency), USD Equivalent (exchange rate)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in dispute: _____ Party who initiated the dispute: _____ Status of dispute: _____	
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute: Party who initiated the dispute: Status of dispute:	
Litigation History in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.4. <input type="checkbox"/> Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.4 as indicated below.			
Year of award	Outcome as percentage of Net Worth	Contract Identification	Total Contract Amount (currency), USD Equivalent (exchange rate)
<i>[insert year]</i>	<i>[insert 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> Matter in dispute: <i>[indicate main issues in dispute]</i> Party who initiated the dispute: <i>[indicate "Employer" or "Contractor"]</i> Reason(s) for Litigation and award decision <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>

Form CON-2

Environmental, Social, Health, and Safety Performance Declaration

[The following table shall be filled in for the Tenderer, each member of a Joint Venture and each Specialized Subcontractor]

Tenderer's Name: *[insert full name]*

Date: *[insert day, month, year]*

Joint Venture Member's or Specialized Subcontractor's Name: *[insert full name]*

Tender No. and Title: *[insert Tender number and title]*

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

Environmental, Social, Health, and Safety Performance Declaration in accordance with Section III, Qualification Criteria, and Requirements			
<input type="checkbox"/> No suspension or termination of contract: An employer has not suspended or terminated a contract and/or called the performance security for a contract for reasons related to Environmental, Social, Health, or Safety (ESHS) performance since the date specified in Section III, Qualification Criteria, and Requirements, Sub-Factor 3.2.5.			
<input type="checkbox"/> Declaration of suspension or termination of contract: The following contract(s) has/have been suspended or terminated and/or Performance Security called by an employer(s) for reasons related to Environmental, Social, Health, or Safety (ESHS) performance since the date specified in Section III, Qualification Criteria, and Requirements, Sub-Factor 3.2.5. Details are described below:			
Year	Suspended or terminated portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and US\$ 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 suspension or termination: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
<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 suspension or termination: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>

...	...	<i>[list all applicable contracts]</i>	...
Performance Security called by an employer(s) for reasons related to ESHS performance			
Year	Contract Identification		Total Contract Amount (current value, currency, exchange rate and US\$ equivalent)
<i>[insert year]</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 calling of performance security: <i>[indicate main reason(s)]</i>		<i>[insert amount]</i>

Form FIN-3.3.1:**Financial Situation and Performance**

Tenderer's Name: _____

Date: _____

JV Member's Name _____

Tender No. and title: _____

Page _____ of _____ pages

1. Financial data

Type of Financial information in (currency)	Historic information for previous three Financial Years, (amount in currency, currency, exchange rate*, INR equivalent)		
	Year 1: 2017-18	Year 2: 2018-19	Year 3: 2019-20
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)			
Total Revenue (TR)			
Profits Before Taxes (PBT)			
Cash Flow from Operating Activities			

*Refer to Notes: Exchange Rate for Qualification Criteria, Section III- EQC

2. Sources of Finance

Specify sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.

No.	Source of finance	Amount (INR equivalent)
1		
2		
3		

Notes:

- (i) *The Tenderer is not required to submit any document as documentary evidence along with the Tender Documents. All information furnished in this Form shall be certified by a Chartered Accountant/Company Auditor/Statutory Auditor*
- (ii) *The above documents shall reflect the financial situation of the legal entity or entities comprising the Tenderer and not the Tenderer's parent companies, subsidiaries, or affiliates*

Tenderer's Representative

Signature:

Date:

Company stamp:

Chartered Accountant/Company Auditor/Statutory Auditor

Certified that the information furnished above is correct as per the audited balance sheets of the entity.

Signature:

Name:

Position:

Date:

Company:

Company stamp:

Membership No:

Address:

Contact No:

Email ID:

Form FIN-3.3.2:**Average Annual Construction Turnover**

Tenderer's Name: _____

Date: _____

JV Member's Name _____

Tender No. and title: _____

Page _____ of _____ pages

Annual Turnover Data for the Last Three (3) Years (Construction Only)			
Year	Amount Currency	Exchange Rate	INR Equivalent
2017-18**	<i>[insert amount and indicate currency]</i>		
2018-19**			
2019-20**			
Average Annual Construction Turnover *			

** In case, the Financial Year is the same as the Calendar Year, the turnover for the year 2017, 2018 and 2019 shall be furnished.

* See Section III, Evaluation and Qualification Criteria, Sub-Factor 3.3.2.

Notes:

- (i) *The Average Annual Construction Turnover shall be calculated by adding the turnover amount of FY 2017-18, 2018-19 and 2019-20 divided by three.*
- (ii) *The Tenderer is not required to submit any document as documentary evidence along with the Tender Documents. All information furnished in this Form shall be certified by a Chartered Accountant/Company Auditor/Statutory Auditor.*
- (iii) *The above documents shall reflect the financial situation of the legal entity or entities comprising the Tenderer and not the Tenderer's parent companies, subsidiaries, or affiliates.*

Tenderer's Representative

Signature:

Date:

Company stamp:

Chartered Accountant/Company Auditor/Statutory Auditor

Certified that the information furnished above is correct as per the audited balance sheets of the entity.

Signature:

Name:

Position:

Date:

Company:

Company stamp:

Membership No:

Address:

Contact No:

Email ID:

Form FIN-3.3.3:

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 (INR equivalent)
1		
2		
3		

Notes:

- (i) *The Tenderer is not required to submit any document as documentary evidence along with the Tender Documents. All information furnished in this Form shall be certified by a Chartered Accountant/Company Auditor/Statutory Auditor.*
- (ii) *The above documents shall reflect the financial situation of the legal entity or entities comprising the Tenderer and not the Tenderer's parent companies, subsidiaries, or affiliates.*

Tenderer's Representative

Signature:

Date:

Company stamp:

Chartered Accountant/Company Auditor/Statutory Auditor

Certified that the information furnished above is correct.

Signature:

Name:

Position:

Date:

Company:

Company stamp:

Membership No:

Address:

Contact No:

Email ID:

Form FIN-3.3.4:

Current Contract Commitments / Works in Progress

Tenderers and each member to a JV 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	Total Contract Value (INR equivalent)	Estimated Completion Date	Value of Outstanding Work (current INR equivalent)	Average Monthly Invoicing Over Last Six Months (INR/month equivalent)
1						
2						
3						
4						
5						

Notes:

- (i) *The Tenderer is not required to submit any document as documentary evidence along with the Tender Documents. All information furnished in this Form shall be certified by a Chartered Accountant/Company Auditor/Statutory Auditor.*
- (ii) *The above documents shall reflect the financial situation of the legal entity or entities comprising the Tenderer and not the Tenderer's parent companies, subsidiaries, or affiliates.*

Tenderer's Representative

Signature:

Date:

Company stamp:

Chartered Accountant/Company Auditor/Statutory Auditor

Certified that the information furnished above is correct.

Signature:

Name:

Position:

Date:

Company:

Company stamp:

Membership No:

Address:

Contact No:

Email ID:

Form EXP-3.4.1

General Construction Experience

Tenderer's Name: _____

Date: _____

JV Member's Name _____

Tender No. and title: _____

Page _____ of _____ pages

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

Form EXP-3.4.2(a)**Specific Construction and Contract Management
Experience**

Tenderer's Name: _____

Date: _____

JV Member's Name _____

Tender No. and title: _____

Page _____ of _____ pages

Similar Contract No.	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	
Total Contract Amount				INR
If member in a JV or sub-contractor, specify participation in total Contract amount				
Employer's Name:				
Address:				
Telephone/fax number				
E-mail:				
Description of the similarity in accordance with Sub-Factor 3.4.2(a) of Section III:				
1. Amount				
2. Quantity of earthwork in formation				
3. Quantity of RCC in bridge works and whether pile foundation work carried out				

Form UT**Undertaking for Downloaded Tender Document**

I/We hereby declare that, I/we have downloaded the tender documents/addendum/corrigendum/clarifications along with the set of enclosures hosted on e-procurement portal as mentioned in tender document. I/We verified the content of the document from the website and there is no addition, no deletion or no alteration to the content of the tender document. In case of any discrepancy noticed at any stage i.e. evaluation of tenders, execution of work or final payment of the contract, the master copy available with HRIDC shall be final and binding upon me/us.

Signature of Authorized Signatory of Tenderer with Seal

Appendix E to Technical Part: Tender Security

The amount for Tender Security will only be paid online by eligible Tenderers on e-procurement Portal of Government of Haryana.

Form of Tender-Securing Declaration

DELETED

FORM-CL**Checklist of submission of Documents/Forms online, duly filled**

(Reference to TDS-ITT 11.2 & 11.3, Section II, Part 1)

Tender No:**Name of Work:****A. TECHNICAL PART**

S.No.	Requirement of Tender Document	Ref. Clause of Tender documents	Tenderer's Name:	
			Yes/No	Ref Pg No. in the Technical Submittal
1.	Letter of Tender-Technical Part	ITT 11.2 (a) and Section IV		
2.	Technical Part signed by authorized representative of Single Entity/Joint Venture/Consortium	ITT 20.3		
3.	Tender Security	ITT 19.1		
4.	Form ELI – 1.1: Tenderer Information Form	ITT 17.1 and Appendix D of Section IV		
5.	Form ELI – 1.2: Tenderer's JV Information Form	ITT 17.1 and Appendix D of Section IV		
6.	Form ELI-1.3 – Joint Venture/Consortium Agreement	ITT 11.5 and Appendix D of Section IV		
7.	Form ELI-1.4: Power of Attorney (POA) for Submitting Tender	ITT 20.3 and Appendix D of Section IV		
8.	Board Resolution in case of a Public/Private limited company/LLP	TDS ITT 20.3		
9.	Incorporation Certificate and Memorandum and Articles of Association (MOA & AOA) (in case of Private/Public Limited Company)	Note (iii) (d) of Form ELI 1.4		
10.	Incorporation Certificate and Limited Liability Membership Agreement in case of Limited Liability Membership firms.	Note (iii) (e) of Form ELI 1.4		
11.	Proprietorship Affidavit (in case the Tenderer is Proprietorship Tenderer)	Note (iii) (a) of Form ELI 1.4		

S.No.	Requirement of Tender Document	Ref. Clause of Tender documents	Tenderer's Name:	
			Yes/No	Ref Pg No. in the Technical Submittal
12.	Partnership Deed (in case the Tenderer is Partnership Firm)	Note (iii) (b) of Form ELI 1.4		
13.	Form ELI-1.5: Power of Attorney (POA) for Authorized Signatory of Joint Venture (JV) Members	ITT 20.4		
14.	Form ELI-1.6: Power of Attorney to Lead Member and Authorised Representative of Joint Venture (JV)	ITT 20.4		
15.	In case of foreign tenderer, the Notarised POA/MOU/JV Agreement is notarised in the country of origin and stamped by India Embassy/ High Commission	Note (i) of Form ELI 1.4		
16.	Form CON - 1: Historical Contract Non-Performance, Pending Litigation and Litigation History	ITT 17.1 and Appendix D of Section IV		
17.	Form CON - 2: Environmental, Social, Health, and Safety Performance Declaration	ITT 17.1 and Appendix D of Section IV		
18.	Form FIN – 3.3.1: Financial Situation and Performance	ITT 17.1 and Appendix D of Section IV		
19.	Form FIN – 3.3.2: Average Annual Construction Turnover	ITT 17.1 and Appendix D of Section IV		
20.	Form FIN – 3.3.3: Financial Resources	ITT 17.1 and Appendix D of Section IV		
21.	Form FIN - 3.3.4: Current Contract Commitments / Works in Progress	ITT 17.1 and Appendix D of Section IV		
22.	Form EXP – 3.4.1: General Construction Experience	ITT 17.1 and Appendix D of Section IV		
23.	Form EXP – 3.4.2(a): Specific Construction and Contract Management Experience	ITT 17.1 and Appendix D of Section IV		
24.	Site Organization	ITT 16.1 and Appendix A of Section IV		
25.	Method Statement	ITT 16.1 and Appendix A of Section IV		

S.No.	Requirement of Tender Document	Ref. Clause of Tender documents	Tenderer's Name:	
			Yes/No	Ref Pg No. in the Technical Submittal
26.	Work Execution Programme	ITT 16.1 and Appendix A of Section IV		
27.	ESHS Management Strategies and Implementation Plans	ITT 16.1 and Appendix A of Section IV		
28.	Form EQU: Equipment	ITT 16.1 and Appendix B of Section IV		
29.	Form PER – 1: Proposed Personnel	ITT 16.1 and Appendix C of Section IV		
30.	Form PER – 2: Resumé of Proposed Personnel	ITT 16.1 and Appendix C of Section IV		
31.	Undertaking for Downloaded Tender Document	Form UT of Section IV		
Note:				
(i) The check list is indicative and not exhaustive. The tenderer must go through the complete tender documents and submit the required document accordingly.				
(ii) If any of the above form or criteria is not applicable to the Tenderer, then they can simply indicate N.A. against the relevant column				

B. FINANCIAL PART

The Financial Part is provided in the Tender Documents in the form of MS-EXCEL file. The percentage rate above or below against each bill shall be quoted in the MS-EXCEL file provided in the e-procurement portal. The Tenderer shall download the MS-EXCEL file and after quoting their percentage rate, upload the same on e-procurement portal accordingly. The percentage rate shall not be offered/quoted elsewhere in the Technical Part submission/ Tender submission. These prices should include all costs associated with the contract including GST. The Tenderer shall complete the Financial Part in accordance with the instructions given in the Financial Part.

Following information are required to be submitted by Tenderers in their Financial Part:

1. Letter of Tender – Financial Part
2. Appendix A to Financial Part: Schedule of Adjustment Data
 - Table A. Local Currency
 - Table B. Foreign Currency (FC)
 - Table C. Summary of Payment Currencies
- 2.1 Appendix B to Financial Part: Bill of Quantities
 - Price Schedule for quoting percentage rate against each Bill.
 - Bill No. 1: Indian Railways USSOR-2010 Items except Cement and Steel

- Bill No. 2: Indian Railways USSOR-2010 Items for Steel only
- Bill No. 3: Indian Railways USSOR-2010 Items for Cement only
- Bill No. 4: Indian Railways USSOR-2010 Items for Filter media only
- Bill No. 5: Non- Schedule Items
- Bill No. 6: Non-Scheduled Items (for Earthwork in Embankment)
- Bill No. 7: Non-Scheduled Items (for Blanketing)
- Bill No. 8: Non-Scheduled Items (RCC M-35 Grade Concrete)
- Bill No. 9: Non-Scheduled Items (Boring 1200mm Dia Pile)

I hereby confirm that:

- (i) I have checked the above list with our submittal. I am also aware that if our tender is not containing the above documents, the Employer has the right to reject our tender.
 - a. All the pages of tender submission are properly indexed and numbered.

Seal:

Date:

(Signature of Authorized representative of Tenderer)

Letter of Tender – Financial Part

INSTRUCTIONS TO TENDERERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

The Tenderer must prepare this Letter of Tender on stationery with its letterhead clearly showing the Tenderer's complete name and business address.

Note: All italicized text is to help Tenderers in preparing this form.

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

Tender No.: *[insert tender reference number]*

Alternative No.: *[insert reference number if this is a Tender for an alternative]*

To: *[insert complete name of Employer]*

We, the undersigned, hereby submit the second part of our Tender, the Tender Price and Bill of Quantities. This accompanies the Letter of Tender – Technical Part.

In submitting our Tender, we declare that:

- (a) **Tender Validity Period:** Our Tender shall be valid for the period specified in TDS 18.1 (as amended, if applicable) from the date fixed for the Tender submission deadline specified in TDS 22.1 (as amended, if applicable), and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (b) **Tender Price:** The total price of our Tender is: *[insert the total price of the Tender in words and figures in INR];*
- (c) **Commissions, Gratuities, Fees:** We have paid, or will pay the following commissions, gratuities, or fees with respect to the Tendering process or execution of the Contract: *[insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]*

Name of Recipient	Address	Reason	Amount

(If none has been paid or is to be paid, indicate "none.")

Name of the Tenderer: * *[insert complete name of person signing the Tender]*

Name of the person duly authorized to sign the Tender on behalf of the Tenderer: ***[insert complete name of person duly authorized to sign the Tender]*

Title of the person signing the Tender: *[insert complete title of the person signing the Tender]*

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

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

*: In the case of the Tender submitted by joint venture specify the name of the Joint Venture as Tenderer

** : Person signing the Tender shall have the power of attorney given by the Tenderer. The power of attorney shall be attached with the Letter of Tender.

Appendix A to Financial Part

1. Schedule of Cost Indexation

The formulae for price adjustment shall be as follows:

$$P_n = a + b \frac{L_n}{L_o} + c \frac{S_n}{S_o} + d \frac{C_n}{C_o} + e \frac{M_n}{M_o} + f \frac{PM_n}{PM_o} + g \frac{F_n}{F_o}$$

where:

“P_n” is the adjustment multiplier to be applied to the estimated contract value in the relevant currency of the work carried out in period “n”, this period being a month unless otherwise stated in the Contract Data;

“a” is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustable portion in contractual payments;

“b”, “c”, “d”, “e”, “f”, “g” are coefficients representing the estimated proportion of Labour, Steel, Cement, Materials other than Cement and Steel, Plant & Machinery and Fuel & Lubricants respectively related to the execution of the Works as stated in the relevant table of adjustment data;

“L_n”: Consumer Price Index for Industrial Workers – All India: Published in R.B.I Bulletin on the date 49 days prior to the last day of the period (to which the particular Payment Certificate relates);

“L_o”: Consumer Price Index for Industrial Workers – All India: Published in R.B.I Bulletin on the Base Date;

“S_n”: Wholesale Price Index for ‘MS Bright Bars’ individual commodity of group item (d) Mild Steel- Long products under (N) MANUFACTURE OF BASIC METAL, published by Office of Economic Adviser, Government of India, Ministry of Commerce & Industry Department of Industrial Policy & Promotion (DIIP) on the date 49 days prior to the last day of the period (to which the particular Payment Certificate relates);

“S_o”: Wholesale Price Index for ‘MS Bright Bars’ individual commodity of group item (d) Mild Steel- Long products under (N) MANUFACTURE OF BASIC METALS, published by Office of Economic Adviser, Government of India, Ministry of Commerce & Industry Department of Industrial Policy & Promotion (DIIP) on the Base Date;

“C_n”: Wholesale Price Index of Sub-Group “Cement, Lime & Plaster” as published in R.B.I Bulletin on the date 49 days prior to the last day of the period (to which the particular Payment Certificate relates);

“C_o”: Wholesale Price Index of Sub-Group “Cement, Lime & Plaster” as published in R.B.I Bulletin on the Base;

“M_n”: Wholesale Price Index - All Commodities as published in R.B.I Bulletin on the date 49 days

prior to the last day of the period (to which the particular Payment Certificate relates);

“Mo”: Wholesale Price Index - All Commodities as published in R.B.I Bulletin on the Base Date;

“PMn”: Wholesale Price Index for the category ‘k. Machinery for mining, Quarrying and Construction under (R) MANUFACTURE OF MACHINERY AND EQUIPMENT, published by Office of Economic Adviser, Govt. of India, Ministry of Commerce & Industry, Department of Industry Policy & Promotion (DIPP), on the date 49 days prior to the last day of the period (to which the particular Payment Certificate relates);

“PMo”: Wholesale Price Index for the category ‘k. Machinery for mining, Quarrying and Construction under (R) MANUFACTURE OF MACHINERY AND EQUIPMENT, published by Office of Economic Adviser, Govt. of India, Ministry of Commerce & Industry, Department of Industry Policy & Promotion (DIPP), on the Base Date;

“Fn”: Wholesale Price Index- By Groups and Sub-Groups for the group Fuel & Power as published in R.B.I Bulletin on the date 49 days prior to the last day of the period (to which the particular Payment Certificate relates) and

“Fo”: Wholesale Price Index- By Groups and Sub-Groups for the group Fuel & Power as published in R.B.I Bulletin on the Base.

Note:

Base Date is as defined in Sub-Clause 1.1.4 of GCC i.e. 28 days prior to the deadline for submission of Tender.

2. Schedule of Adjustment Data

Table A provides the coefficients/details to Local currency.

Table A. Local Currency

Index Code	Index Description	Source of Index	Base Value and Date	Weighting
A	Non-Adjustable	-	-	a: 0.15
L	Labour	As specified in Clause 1 of Appendix A to Financial Part	As specified in Clause 1 of Appendix A to Financial Part	b: 0.20
S	Steel	As specified in Clause 1 of Appendix A to Financial Part	As specified in Clause 1 of Appendix A to Financial Part	c: 0.10
C	Cement	As specified in Clause 1 of Appendix A to Financial Part	As specified in Clause 1 of Appendix A to Financial Part	d:0.05
M	Materials other than Cement and Steel	As specified in Clause 1 of Appendix A to Financial Part	As specified in Clause 1 of Appendix A to Financial Part	e:0.05
PM	Plant Machinery & Spares	As specified in Clause 1 of Appendix A to Financial Part	As specified in Clause 1 of Appendix A to Financial Part	f: 0.25
F	Fuel & Lubricants	As specified in Clause 1 of Appendix A to Financial Part	As specified in Clause 1 of Appendix A to Financial Part	g: 0.20
Total				1.00

Table B. Foreign Currency (FC)

Not applicable as Tenderer's are required to quote rates and prices only in INR.

Table C. Summary of Payment Currencies

Not applicable. The payment shall be made in INR only.

Appendix B to Financial Part: Bill of Quantities

1. Preamble

- 1.1 The Bills of Quantities (BOQ) shall be read in conjunction with the Instructions to Tenderers, the General Conditions of Contract, the Particular Conditions of Contract, the General Specifications, the Technical specifications, the Drawings and the Addenda (if any).
- 1.2 The quantities given in the Bills of Quantities are estimated and 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 Engineer and valued at the rates and prices in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.
- 1.3 The rates quoted in the priced Bill of Quantities are for complete and finished items of the work in all respects. The rates and prices shall, except in so far as it is otherwise provided under the Contract, shall include all necessary survey work, plants, tools, machinery, labour, compliance of labour laws, supervision, materials, transportation, handling, loading & unloading, storage, sampling, testing, fuel, oil, consumables, electric power, water, all leads & lifts, dewatering, all temporary works including temporary accesses, staging, form works and false works, stacking, provision and maintenance of all temporary works area, construction of temporary store and buildings, fencing, barricading, lighting, drainage arrangements, erection & maintenance of inspection facilities above and below ground such as brick, concrete and steel etc.), restatement, remedy of any defects during the Defects Notification Period, safety measures for workmen and road users, preparation of design and drawings pertaining to temporary works, & traffic diversion works, mobilisation and demobilisation, establishment and overhead charges, labour camps, insurance cost for labour and works, contractor's profit, all taxes including GST, insurance, royalties, duties, cess, octroi, other levies and other charges together with all general risks, liabilities and obligations set out or implied in the Contract.
- 1.4 The cost of all the items as detailed in the General Specifications and the Technical Specifications shall be deemed to have been included in the rates and prices in the priced Bill of Quantities unless otherwise specified in the Contract.
- 1.5 General directions and descriptions of work and materials are not necessarily repeated nor summarised in the Bills of Quantities. References to the relevant sections of the Contract Documents shall be made before entering rates and prices in the priced Bill of

Quantities.

- 1.6 Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer, except for the Provisional Sum for the cost of the DB which requires no prior instruction from the Engineer in accordance with Sub-Clauses 13.4 [Provisional Sums] and 13.5 [Daywork] of the General Conditions.
- 1.7 The basic rates used for the Daywork items shall be stated and payable in the local currency only.
- 1.8 The Tenderers shall quote price against total value of each Bill number.
- 1.9 The whole cost of complying with the provisions of the Contract shall be included in Bill Nos. in the priced Bill of Quantities.
- 1.10 The description of items in the BOQ are not exhaustive, and hence the Contractor shall be required to execute all necessary works required for completion of the concerned item of the BOQ in accordance with the Contract.
- 1.11 The rates and prices quoted in the Bill of Quantities shall be filled in with indelible ink or be type-written.

2. Provisional Sums including Provision Sum for Contingency

Provisional Sums shall be used as per Sub-Clause 13.4 [Provisional Sums] of the General Conditions.

3. Measurement and Payment

- 2.2 As already stated under 2.1, the prices and rates quoted shall be comprehensive and must include cost for complying in all respects with the Bill of Quantities, Instruction to Tenderers, the General Conditions, the Particular Conditions, Specifications and Drawings and for all matters and things necessary for the proper construction, completion, and making good of any defect in of the whole of the Works.
- 2.3 No claims for additional payment will be allowed for any error or misunderstanding by the Contractor of the work involved.
- 2.4 The measurement shall be made as per Bill of Quantities, the General Specifications, the Technical Specifications, the Drawings and other relevant provisions of the Contract. The least count of measurement for various quantities shall be taken as follows:

- i. Each linear dimension shall be measured to the nearest 0.01m
- ii. Areas shall be worked out to the nearest 0.01 m²
- iii. Cubical contents shall be worked out to the nearest 0.01 m³
- iv. Weight shall be measured to the nearest 0.001 MT.
- v. Month shall be measured to the nearest 0.01

4. Procedures for Payment

- 4.1 The Employer shall make interim payments to the Contractor in accordance with the provisions of Sub-Clause 14.7 [Issue of Interim Payment Certificates] of the General Conditions, as certified by the Engineer on the basis of the progress achieved for the items of works/stages of the works.
- 4.2 The Contractor shall base his claim for interim payment in accordance with Sub-Clause 14.3 [Application for Interim Payment Certificates] of the General Conditions for various items of work on the basis of actual progress of work executed till the end of the month for which the payment is claimed in relation to the Contractor's total executed quantity, supported with documents and updated programme in accordance with the Works Requirements.
- 4.3 The Employer may carry out necessary test checks, either directly or through an independent agency, of the Works done by the Contractor for which payment has been accepted and certified by the Engineer. The payment shall depend upon the outcome of such test checks.
- 4.4 Format for the Contractor's application for payment shall be agreed between the Engineer and the Contractor.
- 4.5 All necessary supplementary details to support progress claims, including all certified Request for Inspection in hard bound copy, shall be included with application for payment. Sketches, drawings, approvals, calculations, test reports etc. shall accompany an application for payment to be substantiated by the Contractor, certified by the Engineer and submitted to the Employer.
- 4.6 Even if no work is executed during the month, or the Contractor does not choose to issue an application for payment, a 'NIL' application shall be submitted.
- 4.7 The Employer may deploy external agencies, other than the Engineer, to cross check the work done by the Contractor. If at a later stage it is discovered that excess payment has been released to the Contractor or the work is found to be defective, suitable recoveries would be affected from the first available bill of the Contractor.
- 4.8 For the purposes of payment, the Contractor shall submit to the Engineer a detailed payment schedule indicating a further breakdown for each of the lump sum items

contained in the priced Bill of Quantities within twenty-eight (28) days after the receipt of the Letter of Acceptance. Such cost breakdowns shall be subject to approval of the Engineer who shall review and evaluate with comments and/or issue approval within twenty-one (21) days of receipt of same. The Contractor shall resubmit the cost breakdown structure corresponding to the Engineer's comments for review, if required.

- 4.9 The Engineer is not obliged to issue an Interim Payment Certificate until such breakdown structure of payment schedule has been submitted and accepted by the Engineer.

5. Methodology for Claiming Payment

- 5.1 The Contractor shall prepare his monthly application for payment in the agreed format in six hard copies and one soft copy. This shall be accompanied by supplementary details in accordance with Sub-Clause 14.3 [Application for Interim Payment Certificates] of the General Conditions. All hard copies shall bear the original signatures of the Contractor's Representative and be submitted to the Engineer.
- 5.2 If these are found in order, in accordance with Sub-Clause 14.6 [Issue of Interim Payment Certificates] of the General Conditions, then the Engineer shall forward two certified copies of the application along with certified supplementary details to the Employer, with his recommendation for payment; otherwise, all documents shall be returned to the Contractor for rectification and resubmission.

6. Work Items

The Bill of Quantities usually contains the following part Bills, which have been grouped according to the nature or timing of the work:

- Bill No. 1: Indian Railways USSOR-2010 Items except Cement and Steel
- Bill No. 2: Indian Railways USSOR-2010 Items for Steel only
- Bill No. 3: Indian Railways USSOR-2010 Items for Cement only
- Bill No. 4: Indian Railways USSOR-2010 Items for Filter media only
- Bill No. 5: Non- Schedule Items
- Bill No. 6: Non-Scheduled Items (for Earthwork in Embankment)
- Bill No. 7: Non-Scheduled Items (for Blanketing)
- Bill No. 8: Non-Scheduled Items (RCC M-35 Grade Concrete)
- Bill No. 9: Non-Scheduled Items (Boring 1200 mm Dia Pile)

Bill of Quantities

(Please refer BOQ on e-procurement portal)

Price Schedule

(Please refer BOQ on e-procurement portal)

Validate
Print
Help
Percentage BoQ

Tender Inviting Authority: Haryana Rail Infrastructure Development Corporation Ltd

Name of Work: C-1: Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works in Connection with laying of New BG Double Railway Line of HORC project from Km 46.5 to Km 52.5 and its connectivity (new BG single line) from prepared Menager Station of HORC to existing Patli Railway Station of IR Matmurk

Contract No: HORC/O-112021/01

Name of the Bidder/ Bidding Firm :

PRICE SCHEDULE
(This BOQ template must not be modified/replaced by the bidder and the same should be updated after filling the relevant columns, else the bidder is liable to be rejected. Bidders are allowed to enter the Bidder Name and Value only)

Sl. No.	Item Description	Estimated Amount (INR)	Excess(+)/Less(-) % At Per	Percentage quoted by Tenderer	TOTAL AMOUNT in Figures	AMOUNT in Words
1	Bill No. 1: Indian Railways USSOR-2010 Items except Cement and Steel	18,30,34,916.00				
2	Bill No. 2: Indian Railways USSOR-2010 Items for Steel	24,43,29,017.00			-	INR Zero Only
3	Bill No. 3: Indian Railways USSOR-2010 Items for Cement	5,05,39,697.01			-	INR Zero Only
4	Bill No. 4: Indian Railways USSOR-2010 Items for Filter media	9,57,00,770.28			-	INR Zero Only
5	Bill No. 5: Non-Scheduled Items	4,11,99,313.00			-	INR Zero Only
6	Bill No. 6: Non-Scheduled Items for Earthwork in Embankment	79,00,20,000.00			-	INR Zero Only
7	Bill No. 7: Non-Scheduled Items for Blanketing	18,14,68,500.00			-	INR Zero Only
8	Bill No. 8: Non-Scheduled Items for RCC (M-35) Grade Concrete	14,00,00,000.00			-	INR Zero Only
9	Bill No. 9: Non-Scheduled Items for Boring 1200mm DIA Piler, Initial Load test and PET test	25.00			-	INR Zero Only
Total of Bill: in Figures (A)					-	INR Zero Only
Add Provisional Sum including for Contingency (B)					17,00,00,000.00	INR Seventeen Crore Only
Tender Price (A + B) in Figures					17,00,00,000.00	INR Seventeen Crore Only
Tender Price in Words					INR Seventeen Crore Only	

Note: (i) All Provisional Sums shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with Sub-Clause 15.3 of the General Conditions of Contract. (ii) For tender items, Provisional Sum, other than Daywork, will be excluded.

Cover Page
BoQ1
Bill No.1
Bill No.2
Bill No.3
Bill No.4
Bill No.5

*Tenderer is only required to fill the information in the boxes highlighted with cyan colour in BOQ (Excel sheet)

Section V - Eligible Countries

Eligibility for the Provision of Goods, Works and Non-Consulting Services in Bank-Financed Procurement

In reference to ITT 4.8 and 5.1, for the information of the Tenderers, at the present time, firms, goods and services from the following countries are excluded from this Tendering process:

Under ITT 4.8 (a) and 5.1: *None*

Under ITT 4.8 (b) and 5.1: *None*

Section VI - Prohibited Practices

1. The Bank requires that the Recipient (and all other beneficiaries of the Bank financing), as well as tenderers, suppliers, contractors, concessionaires and consultants under Bank-financed contracts for the Project, observe the highest standard of transparency and integrity during the procurement, execution and implementation of such contracts.
2. Definitions. In pursuance of this policy, the Bank defines the terms set forth below as Prohibited Practices:
 - (a) “**coercive practice**” means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of a party to influence improperly the actions of a party;
 - (b) “**collusive practice**” means an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - (c) “**corrupt practice**” means the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
 - (d) “**fraudulent practice**” means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation.
 - (e) “**misuse of resources**” means improper use of the Bank’s resources, carried out either intentionally or through reckless disregard;
 - (f) “**obstructive practice**” means any of the following practices: (i) deliberately destroying, falsifying, altering or concealing of evidence material to a Bank investigation; (ii) making false statements to investigators in order to materially impede a Bank investigation into allegations of a Prohibited Practice; (iii) failing to comply with requests to provide information, documents or records in connection with a Bank investigation; (iv) threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to a Bank investigation or from pursuing the investigation; or (v) materially impeding the exercise of the Bank’s contractual rights of audit or inspection or access to information; and
 - (g) “**theft**” means the misappropriation of property belonging to another party.
3. Any occurrence, or suspected occurrence, of a Prohibited Practice in the procurement, award, or implementation of a Bank-financed contract is dealt with in accordance with the provisions of the Bank’s Policy on Prohibited Practices. Suppliers, contractors, service providers and consultants selected pursuant to the provisions of Section II and concessionaires selected pursuant to paragraph 14.3 of the Bank’s Procurement Instructions for Recipients, as well as the Recipient shall fully cooperate with the Bank (or a cofinancier undertaking an investigation pursuant to paragraph 6.1 of the Bank’s Procurement Instructions for Recipients) in any investigation into an alleged Prohibited Practice to be carried out pursuant to the Policy on

Prohibited Practices, and permit the Bank or its representative (including such co-financier) to inspect such of their accounts and records as may be relevant for such investigation and to have such records and accounts audited by the auditors appointed by the Bank.

4. Provisions to this effect are included in the Legal Agreements and the procurement contracts with such entities.
5. If the Project is financed by a sovereign-backed loan, the Bank (or, where relevant, a co-financier having undertaken an investigation pursuant to paragraph 6.1 of the Bank's Procurement Instructions for Recipients):
 - (a) may take any of the following additional actions in connection with a Prohibited Practice under the Project:
 - (i) reject a proposal for award if it determines that the tenderer recommended for award, or any of its personnel, or its agents, or its sub-consultants, subcontractors, service providers, suppliers or their employees, has, directly or indirectly, engaged in a prohibited practice in competing for the contract in question; and
 - (ii) cancel the undisbursed portion of the loan allocated to a contract (and require reimbursement of the disbursed portion of the loan allocated to the contract) if it determines at any time that representatives of the Recipient or of a recipient of any part of the proceeds of the loan engaged in a prohibited practice during the procurement, administration or implementation of the contract in question; and
 - (b) requires that a clause be included in tender documents and in contracts financed by the Bank loan, requiring tenderers, suppliers and contractors, and their subcontractors, agents, personnel, consultants, service providers, or suppliers, to permit the Bank (and a co-financier undertaking an investigation pursuant to paragraph 6.1 of the Bank's Procurement Instructions for Recipients) to inspect all accounts, records, and other documents relating to the submission of tenders and contract performance, and to have them audited by auditors appointed by the Bank.

Tender Document for Works

(Two-Envelope Tendering Process Without Prequalification)

Procurement of:

C-1: Priority Section - Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works in Connection with laying of New BG Double Railway Line of HORC project from Km 49.7 to Km 55.6 and its connectivity (new BG single line) from proposed Manesar Station of HORC to existing Patli Railway Station of IR Network

Summary

Specific Procurement Notice (SPN)

PART 1 – TENDERING PROCEDURES

- Section I - Instructions to Tenderers (ITT)
- Section II - Tender Data Sheet (TDS)
- Section III - Evaluation and Qualification Criteria
- Section IV - Tender Forms
- Section V - Eligible Countries
- Section VI - Prohibited Practices

PART 2 – WORKS' REQUIREMENTS

- Section VII - Works' Requirements

PART 3 – CONDITIONS OF CONTRACT AND CONTRACT FORMS

- Section VIII - General Conditions of Contract (GCC)
- Section IX - Particular Conditions of Contract (PCC)
- Section X - Contract Forms

PART 2 – Works' Requirements

Summary Table

Section VII-1: General Specifications

Section VII-2: Technical Specifications

Section VII-3: Drawings

Section VII-4: Reference Information/Reports

Section VII: Works' Requirements

VII-1 General Specifications

Table of Contents

Division 1000: Scope of Works	5
Division 2000: Works Related Information	10
Division 3000: Information and Communication Management	13
Division 4000: Works Administration	33
Division 5000: Contractor's Drawings and Documents	86
Division 6000: Site Management	93
Division 7000: Quality Administration	129
Division 8000: Environmental, Social, Health and Safety Management	149

Table of Summary Contents

- DIVISION 1000: SCOPE OF WORKS..... 6**
- 1010 PROJECT PROFILE AND BACKGROUND 6
- 1020 SCOPE OF WORK 6
- 1030 DETAILED DESCRIPTION OF THE SCOPE OF WORKS 8
 - 1. Earthwork in Formation 8
 - 2. Construction of Bridges 8
 - 3. Station building, other structures and services..... 9
 - 4. Retaining walls..... 9

Division 1000: Scope of Works

1010 Project Profile and Background

State of Haryana is strategically located bordering the National capital of Delhi. NCT, Delhi shares three fourth of its border with Haryana alone and remaining with Uttar Pradesh. The development of Haryana region, bordering Delhi is very important for balanced growth of NCR as it acts as buffer zone against rampant migration and other support infrastructure. At present on account of growth of Metro network in Delhi & NCR, there is radial movement of commuters to and fro, Delhi being in centre. This "Hub and Spoke" traffic planning has resulted in rapid growth of Noida, Greater Noida, Faridabad and Gurugram. However, for hub and spoke concept to sustain it is necessary to link the ends of spoke by ring connectivity. There will be natural demand for commuter movement within these towns like Gurugram, Faridabad, Ballabhgarh, Palwal, Sohna, Manesar etc. Peripheral roads have been commissioned recently, linking these towns around Delhi but Rail link provides economical, sustainable, eco-friendly and bulk freight transport option. The peripheral Rail link will also help in growth of other cities within the same distance from Delhi like Sonapat, Panipat, and Rohtak. Western DFC originating from Dadri station is passing through Asaoti Station on Delhi- Mathura route, providing connectivity to Haryana Orbital Rail Corridor (HORC). This will also help in easing the pressure on the transport network of Delhi as some of the commuter traffic moving on the radials will get shifted to HORC.

Apart from passenger traffic, substantial amount of freight traffic, which is entering the Delhi area of rail network but is not meant to be consumed in Delhi, will also get diverted via this corridor. Apart from this, there are major goods sheds in the heart of Delhi causing endless avoidable traffic jams. The goods sheds in west Delhi are Azadpur, Shakurbasti, Dayabasti, Sabzi Mandi which are located on prime commercial land and are black spots of the urban planning. Previously moving out commercial activity to other states had interstate taxation issues but now with GST in place, there is no reason of not shifting these activities to the peripheral region. In any case, if freight traffic movement through Delhi is restricted, then these goods sheds or alternatives will be serviced via the proposed HORC.

Haryana Orbital Rail Corridor (HORC) from Palwal to Sonapat Via Sohna, Manesar, Kharkhoda and Harsana Kalan is to be constructed as an Electrified (1X25KV AC-50Hz) double line track, capable of operating at a maximum train speed of 160 kmph. Embankment and cutting have been designed for 32.5T axle load. However, bridges substructure has been designed for 32.5T axle load whereas superstructure has been designed for 25T axle load.

1020 Scope of Work

1. The Package C-1 is the Priority Section of HORC i.e connectivity from Manesar station on HORC to Patli Station on Delhi-Rewari section of IR which includes construction of HORC Double line from Km 49.7 to Km 55.6 and its Single line connectivity from Manesar station of HORC to Patli Station of IR. This Package is for the "Construction of Building and Engineering Works designed by the Employer".

The details of the Works required to be executed in this Tender are defined in Sub-Division 1030 "Detailed description of Scope of Works".

2. The Works under the Contract shall include, but not limited to, the following major items:

Major Items of the Works under the Contract		
S.No.	Items of work	Description
1.	Earthwork in formation	a) Cutting/filling, subgrade, prepared subgrade and blanketing including compaction and slope protection. The Contractor shall arrange borrow areas and/or other sources of fill material at its own cost. b) Disposal of surplus and unsuitable material from the Site.
2.	Construction of Bridges	
a)	Minor Bridges including RUBs	Construction of 16 nos. of box culverts
b)	Major Bridge	Construction of substructure for 1 no. of major RUB over NH crossing on Pataudi road.
3.	Station building, other structures and services	Construction of Manesar station building, 2 Nos. passenger platforms, other services such as approach roads, boundary wall/fencing, water supply, drainage, sewerage of station building & platforms, landscaping and other allied works in accordance with the Drawings
4.	Retaining walls	Construction of retaining walls at the locations specified in the Drawings

3. The Work has to be carried out in a manner so as to permit the Interfacing Contractors to carry out construction of superstructure of major bridge over National Highway, ballast supply, track works, electrification, signalling & telecommunication works etc. The Contractor shall interface with the Interfacing Contractors and Interfacing Parties for construction of the Works as specified or as required. Refer Sub-Division 4040 of the General Specifications. In case Interfacing Contractors are not available because of any reason, the role of Interfacing Contractors shall be discharged by the Engineer in consultation with the Employer.
4. The Contractor shall carry out the Works as per the Milestones given in Table of Part A-Contract data of Section IX, Particular Conditions of Contract.
5. The Contractor shall refer the drawings/reports included in Section VII-4, Reference Information/Reports provided by Employer for carrying out the works.
6. When completed, the Works shall be fit for the purpose for which the Works are intended as defined in the Tender Documents.

1030 Detailed Description of the Scope of Works

For detailed requirements, respective Technical Specifications of the Works' Requirements in the Tender Documents shall be referred to:

1. Earthwork in Formation

The Contractor shall carry out the earthwork in formation as per the "Comprehensive Guidelines and specifications for Railway Formation-Specification No. RDSO/2020/GE: IRS-0004, Sept 2020" as shown in the Drawings and shall include earthwork in cutting/filling, subgrade, prepared subgrade and blanketing including compaction and slope protection works, longitudinal drains on berms including water chutes Manesar yard drainage works; protection on the approaches of bridges; etc.

2. Construction of Bridges

2.1 Minor bridges including RUBs

The Works include construction of 12 nos. of minor RUBs and 04 nos. of minor waterway bridges. The list of bridges is as follows:

S. No	Br. No.	HORC Ch:	Type of Crossing	Type of Bridge	Size of Box			SQ/SK
					Number of Span	Span (in m)	Height (in m)	
HORC Main Line								
1.	127	50079.38	Road Crossing (RUB)	RCC Box	1	4.0	2.9	SK
2.	128	50502.38	Road Crossing (RUB)	RCC Box	1	7.0	3.5	SQ
3.	129	50822.38	Water Crossing (Balancing Culvert)	RCC Box	1	2.0	3.0	SQ
4.	130	50912.38	Road Crossing (RUB)	RCC Box	1	4.0	4.5	SQ
5.	131	51672.38	Road Crossing & Pedestrian Subway	RCC Box	1	7.0	4.25 + 2.5	SQ
6.	132	52072.38	Road Crossing & Pedestrian Subway	RCC Box	1	7.0	4.9 + 2.5	SQ
7.	133	52762.38	Road Crossing (RUB)	RCC Box	2	5.0	6.0	SQ
8.	135	54619.38	Road Crossing (RUB)	RCC Box	1	5.0	6.0	SQ
Manesar-Patli Connectivity Line								
9.	135 A	3064	Road Crossing (RUB)	RCC Box	1	5.0	6.0	SK

10.	135 B	3503	Road Crossing (RUB)	RCC Box	1	5.0	5.0	SK
11.	135 C	4047	Road Crossing (RUB)	RCC Box	1	5.0	5.5	SQ
12.	135 D	4220	Road Crossing (RUB)	RCC Box	1	5.0	6.0	SK
13.	135 E	4382	Water Crossing (Balancing Culvert)	RCC Box	1	4.0	6.0	SQ
14.	135 F	4780	Water Crossing (Balancing Culvert)	RCC Box	2	3.0	3.15	SQ
15.	135 G	5283	Road Crossing (RUB)	RCC Box	1	5.0	4.0	SQ
16.	135 H	5577	Water Crossing (Balancing Culvert)	RCC Box	1	1.0	1.2	SQ

2.2 Construction of Substructure of 01 Major RUB over National Highway-352W on Pataudi road

The Works involve construction of 1 (One) Major RUB over National Highway-352W on Pataudi road. The Contractor shall construct the substructure and handover to the Interfacing Contractor as per the Milestones given in Table of Part A-Contract data of Section IX, Particular Conditions of Contract.

The location and other details are as follows:

S. No	Br. No.	HORC Ch:	Type of Crossing	Type of Bridge	Size of Box			SQ/SK
					Number of Span	Span (in m)	Height (in m)	
1	134	54500.38	NH-352W Crossing (RUB)	OWG (Only Substructure)	1	76.2	5.619	SK

3. Station building, other structures and services

The Contractor shall construct Manesar station building, 2 Nos. passenger platforms, other services such as approach roads, boundary wall/fencing, water supply, drainage, sewerage of station building & platforms, landscaping and other allied works in accordance with the Drawings.

4. Retaining walls

Construction of retaining walls at the locations specified in the Drawings.

Division 2000: Works Related Information

Table of Contents

2010	Natural Conditions	11
1.	Meteorological Information	11
2.	Hydrological Information	11
3.	Topographical Information	11
2020	Work Packages	12

2010 Natural Conditions

1. METEOROLOGICAL INFORMATION

The Project falls in subtropical region having hot and cold weather. In accordance with the definitions of the India Meteorological Department, on the Indian sub-continent, a year comprises the following seasons:

Summer (pre-monsoon)	March to May
Monsoon season	June to September
Post-monsoon season	October to November
Winter	December to February

Temperature:

During the summer months, the mean daily maximum temperature is around 40°C and the mean daily minimum temperature is around 25°C, although temperatures can reach peaks of 44-45°C. During the coldest month of January, the maximum temperature is normally below 30°C and the minimum temperature varies from 6°C to 18°C (with a mean of around 14°C). Occasionally the temperature dips to 1-4°C. From the month of March onwards the temperature starts rising, reaching a maximum in June of about 45°C.

Winds:

Winds are generally light to moderate, increasing in intensity during the late summer and monsoon.

Humidity:

The relative humidity in all parts of NCR is low. Generally, the lowest relative humidity is experienced during the months of January to March. Relative humidity increases as the temperature increases and reaches maximum during the months of June to August and varies from 40% to 70%.

Rainfall: The rainfall is moderate in Gurugram district. Average annual rainfall is 596mm.

2. HYDROLOGICAL INFORMATION

There are no major river crossings in the proposed alignment and there is no history of floods in this area.

3. TOPOGRAPHICAL INFORMATION

The topography of the Site of Package No. C-1-is undulating and the elevation varies approximately between 220 m and 256 m above the mean sea level (MSL).

2020 Work Packages

The entire Project for HORC has been divided into following Contract Packages:

Contract Package No.	Description
C-1	Priority section: Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works in Connection with laying of New BG Double Railway Line of HORC project from Km 49.70 to Km 55.60 and its connectivity (new BG single line) from proposed Manesar Station of HORC to existing Patli Railway Station of IR Network
C-2	Construction of Rail Flyovers (RFOs) over existing IR network, over National Highway Crossings and other major bridges having OWG/Composite Girder Superstructure from Prithla to Harsana kalan in connection with HORC project
C-3	Design and Construction of Viaduct and its approaches from Km 21.20 to 24.87 in connection with HORC project
C-4	Construction of Tunnel, Earthwork, Bridges, Retaining Walls and other miscellaneous Works from Km 24.87 to Km 45.100 in connection with HORC project
C-5	Design and Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works from Km 55.90 to Km 91.50 in Connection with HORC project
C-6	Design and Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works from Km 91.50 to Km 125.98 in Connection with HORC project
C-7	Design and Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works from Km -2.1 to Km 21.20 and Km 45.7 to Km 49.7 in connection with HORC project
T-1	Design, Supply and Laying of Track and Track related Works from Km -2.1 to Km 125.98 between Palwal and Harsanakalan in connection with HORC project including annual maintenance of track for a period of 1 year.
E-1	Design, Supply, Erection, Testing & Commissioning of 25 KV electrification works including high rise OHE & TSS from Km -2.1 to Km 125.98 between Palwal and Harsana Kalan in connection with HORC project including annual maintenance of OHE works, for a period of 1 year. The package shall exclude electrification works for yard remodelling of existing IR stations
ST-1	Design, Supply, Installation, Testing and Commissioning of Signaling & Telecom works from Km -2.1 to Km 125.98 between Palwal and Harsana Kalan in connection with HORC project including annual maintenance of signalling and telecom for a period of 1 year. The package shall exclude S&T works for yard remodelling of existing IR stations

** The above list is only tentative and has been provided for giving overview of the Project to the Tenderers. However, it may undergo change in future at the sole discretion of HRIDC.*

Division 3000: Information and Communication Management

Table of Contents

3010 Definitions and Abbreviations	14
1. Definitions.....	14
2. Abbreviations	20
3020 Correspondence, Communications and Submission	25
1. General	25
2. Submission Procedure	25
3. Engineer's Response	26
4. Document Control Procedure.....	27
5. Project Information and Communication System.....	27
3030 Format of Documents and Drawings	29
1. General	29
2. Language of Communication and Units	29
3. Photographs.....	29
4. Videos	30
5. CAD Standards.....	30

3010 DEFINITIONS AND ABBREVIATIONS

1. Definitions

In addition to the words and expressions defined in the General Conditions, following words and expressions shall have the meaning assigned to them except where the context otherwise requires:

- **“Availability”** shall mean the probability that an item will be in a state to perform a required function under given conditions at a given instant or over a given time interval assuming that the required external resources are provided.
- **“As-Built Drawings”** means those drawings produced by the Contractor and endorsed by its true records of construction of the Permanent Works and which have been given a consent from the Engineer.
- **“As-Built Documents”** mean the set of drawings and documents which are a true record of the construction of the Permanent Works prepared by the Contractor.
- **“CAD Standards”** means requirements for CAD, as specified in the Clause 5 in Sub-Division 3030 [Format of Document and Drawings] of the General Specifications by the Engineer.
- **“Chartered Utilities”** mean identified Utilities listed in the Reference Information/Reports, which may be affected by the execution of the Works under the Contract.
- **“Classified Distinction”** means a distinctive category of the Contractor's submission to obtain the Engineer's response for, as specified in the Clause 1 [General] under Sub-Division 3020 of the General Specifications by the Engineer.
- **“Commissioning Spares”** shall be kept on the Site by the Contractor throughout the construction/installation and testing and commissioning periods, sufficient stocks of Spare Parts to enable immediate replacement of any items in the Permanent Works found to be defective or in any way not in accordance with the Works Requirements shall be available during the construction/installation and testing and commissioning periods.
- **“Construction Environmental Management Plan”** means the plan including, as required, details of compliance with applicable laws and regulations for environmental protection and mitigation requirements, including the AIIB guidelines for environmental and social considerations.
- **“Construction Phase”** means the phase of the work during which construction/ installation of the Works shall be undertaken by the Contractor as per Works Requirements.
- **“Construction Management Plan”** means the plan that shall be co-ordinated with each other and shall collectively define, describe and encompass the Contractor's proposed methods, procedures, processes, organisation, sequencing of activities, etc. and shows how these combine together to assure that the Works fully meet the requirements of the Contract in respect of Clause 6 [Construction Management Plan] of Sub-Division 4020 of the General Specifications.
- **“Contract Spares”** means any Spare Parts recommended by the Contractor for the operation and maintenance of the Permanent Works following the Taking Over of the Works.
- **“Contractor's Project Plan”** means the plan to provide a clear overview of the

Contractor's organisation, management systems and the methods to be used for the execution and completion of the Works

- **“Contractual Works Programme”** shall supersede all other programmes previously submitted and shall be deemed to be the programme on which the Contractor has based his Accepted Contract Amount and in accordance with which it shall execute the Works within the specified time for completion for each Milestone as required in Sub-Clause 8.3 [Programme] of General Conditions
- **“Construction/Installation and/or Manufacture Documents”** means the document which contains all drawings, calculations, computer software, samples, patterns, models, operation / maintenance manuals and other information to be submitted by the Contractor and is approved by the Engineer.
- **“Consumables”** means those parts that are not repairable and usually have a relatively short life span.
- **“Critical Path Method”** means a schedule network analysis technique used to determine the amount of scheduling flexibility (the amount of float) on various logical network paths in the project schedule network, and to determine the minimum total project duration.
- **“Defects Notification Management Plan”** means the plan as set forth in Sub-Division 4140 of the General Specifications
- **“DN Line”** means the down line of the HORC double line track route from Sonipat to Palwal.
- **“Design Quality Management Plan”** means the document, submitted by the Contractor to the Engineer for consent, as specified in the Clause 3 [Design Quality Management Plan (DQMP)] under Sub-Division 7010; detailing provisions, for its management and control of design works, that are to be implemented and maintained effectively during the period of the Works
- **“Field Change Notice”** means changes incorporated in the Drawings depending upon the site conditions. The Contractor shall propose a solution and procedure through a Field Change Notice.
- **“Factory Testing Plan”** means the plan prepared by the Contractor for review of the Engineer, detailing and explaining how the Contractor will plan, perform, and document all inspections and tests that will be conducted to verify and validate Goods prior to their delivery to the Site.
- **“Factory Acceptance Tests”** means the tests to be performed on all Goods and systems manufactured to be used for execution of the Permanent Works at the place of manufacture prior to delivery to the Site to verify compliance with the Specifications and quality standards.
- **“First Article Inspection”** means the inspection to be performed on the first article of the manufacturing multiple product of the same type, shall be referred to Sub-Clause 5.2.6 of Sub-Division 4020.

- **“Interface Management Plan”** means the plan for all interface issues that may arise during the design, construction, testing and commissioning of the Works, in consultation with the Interfacing Contractors/ Interfacing Parties and the Engineer under, Sub-Division 4040 [Interface, Coordination and Cooperation with Other Parties Employed by the Employer] of the General Specifications.
- **“Isolation”** means isolating and earthing of the electrical equipment, by disconnection of the respective section from all incoming sources of electricity supply and also outgoing connections.
- **“Independent Laboratory”** means a laboratory, submitted by the Contractor to the Engineer for approval, as specified in the Sub-Clause 5.3 [Independent Laboratory] under Sub-Division 7020; that is free from outside control and not subject to direct or indirect influence or authority of the Employer, the Engineer, or the Contractor
- **“Inspection and Test Plan”** means a document, as specified in the Sub-Clause 2.8.2 [Reference to Inspection and Test Plan (ITP)] under Sub-Division 7010 of the General Specifications, that states inspection and testing requirements and actions provisioned for the Works, related process, Plant, or Materials. It is used to control, check, monitor and record; testing procedures that are required for quality assurance and to achieve the agreed quality requirements for the Works.
- **“Installation Tests”** means the tests to be performed to verify the conformity of completion of an installation/assembly to the design documents approved by the Engineer prior to the start of Commissioning, and they must be successfully completed before the Tests on Completion.
- **“Integrated Testing and Commissioning”** means those tests that demonstrate the integration of the complete system meeting the requirements of the Contract in an operating environment. Integrated Testing and Commissioning form part of the Tests on Completion to be performed by the Contractor in order to achieve Employer’s Taking Over of the Works or any Section.
- **“Interface Coordinator”** means the person who has the responsibility, and authority with substantial experience to resolve interface matters to the satisfaction of the Engineer and provide the necessary support team for the Interface Management System as specified in, Sub- Division 4040 [Interface, Coordination and Cooperation with Other Parties Employed by the Employer] of the General Specifications.
- **“Interfacing Contractor”** means the Contractor engaged by the Employer or other agencies having an interface issue with the Contractor for the Works.
- **“Interfacing Parties”** comprises the interfacing contractors / consultants / service providers, who are engaged in part of the works, relevant authorities and public utility agency.
- **“Interface Table”** means the table that describes the relationships between the Contractor and Interfacing Contractors / Interfacing Parties and their roles and responsibilities is a key document.
- **“ITP for Tests on Completion at Proposal Phase”** means the Contractor’s submission of proposed outline of ITP for each Tests on Completion; submitted by the Contractor to the Engineer for review, as specified in the Sub-Clause 3.2 [Proposal and Submittal Phase] under Sub-Division 7030 of the General Specifications.

- **“ITP for Tests on Completion at Submittal Phase”** means the Contractor’s submission of detailed ITP for each Tests on Completion; submitted by the Contractor to the Engineer for consent, as specified in the Sub-Clause 3.2 [Proposal and Submittal Phase] under Sub-Division 7030 of the General Specifications .
- **“Kick-Off Meeting”** means the meeting held by the Engineer under, Sub division 4030 [Meetings], which is formally to notify all parties concerned under the Contract that the project has commenced and to ensure that every party has a common understanding of their role from the Commencement Date up until issuance of the Performance Certificate.
- **“Lead Contractor”** means where the Contractor or an Interfacing Contractor is assigned a leading role, he is referred to as the “Lead Contractor”. The Lead Contractor shall take the lead in the management of the coordination for specific interface requirement(s), with the Contractor and Interfacing Contractors.
- **“Maintainability”** means a characteristic expressed as the probability that an item will be retained in or restored to a specified condition within a given period, when the maintenance is performed in accordance with prescribed procedures and resources.
- **“Maintenance Manuals”** means the manuals providing detailed instructions for the maintenance of infrastructure and maintenance facilities.
- **“Manufacturer’s Certificate”** means an official document from the manufacturer, attesting facts and test result about the quality characteristics of the manufactured product supplied by it and duly certified by the Contractor for acceptance of related product upon approval by the Engineer to the Contractor’s submission; as specified in the Sub-Division 7020 Clause4 [Contractor’s submission with reference to Approval for Plant and Materials] Sub-Clause (4).
- **“Method Statement”** means a document, as specified in the Sub-Clause 2.8.1 [Reference to Method Statement and Manufacturer’s Arrangement] under Sub-Division 7010, that states the way a particular work, task or process along with various associated aspects such as quality, safety, environment protection, time and resources; are planned to be directly controlled by the Contractor or its Subcontractor.
- **“Monthly Progress Meeting”** means the meeting specified under Sub-Division 4030 [Meetings] of the General Specifications.
- **“Monthly Progress Report”** means the report that the Contractor shall prepare and submit to the Engineer in accordance with the Sub-Division 4080 [Monthly Progress Report Requirements]
- **“Nonconformity Report”** means a report documenting non-fulfilment of a requirement, with objective evidence, the location and time of occurrence or detection, and provision for its proper resolution by the concerned responsible.
- **“Notice of No Objection”** means a category of Engineer’s response, issued by the Engineer to the Contractor as specified in the Clause 3 [Engineer’s Response] under Sub-Division 3020.
- **“Notice of No Objection with Comments”** means a category of Engineer’s response, issued by the Engineer to the Contractor as specified in the Clause 3 [Engineer’s Response] under Sub-Division 3020.
- **“Notice of Objection”** means a category of Engineer’s response, issued by the Engineer to the Contractor as specified in the Clause 3 [Engineer’s Response] under Sub-Division 3020.

- **“Not Reviewed”** means a category of Engineer’s response, issued by the Engineer to the Contractor as specified in the Clause 3 [Engineer’s Response] under Sub-Division 3020.
- **“On-Site Laboratory”** means Contractor’s own laboratory submitted by the Contractor to the Engineer for approval as specified in the Sub-Clause 5.2 [On-Site Laboratory] under Sub-Division 7020.
- **“Operation and Maintenance Manuals (O&M Manuals)”** means the manual that will be indicating the provisions which is required for maintenance of various assets created under the Contract by the Employer under their operation phase.
- **“Participating Contractor”** means the Contractor or an Interfacing Contractor who is assigned a cooperating role (referred to as the “Participating Contractor (Design)” or “Participating Contractor (Construction)” for specific interface requirement(s) by the Engineer.
- **“Priority Section”** means the section from Km 49.7 to Km 55.6 of HORC Main line and connectivity line from Manesar station on HORC and Patli station on Delhi-Rewari section of Indian Railway Network.
- **“Programme Analysis Report”** means the report submitted to the Engineer that shall, in narrative format, describe the basis and assumptions used to develop each programme as described in Division 4000 of Employer’s Requirement- General Specification.
- **“Project”** means the project named as “Haryana Orbital Rail Corridor (HORC)”.
- **“Project Management Plan”** refers to the plan that will be established by the Contractor for the management of activities related to design, procurement, manufacture, execution/construction, delivery, installation, testing and commissioning.
- **“Project Management Information System”** means a document, information and communication technology system (platform) that is to be implemented by the Contractor so that the management of information between the Contractor, Employer and the Engineer is efficient, reliable and secure, as specified in the Sub-Clause 5.2 [Project Management Information System (PMIS)] under Sub-Division 3020.
- **“Indian Railway”** means the rail tracks of the Indian Railway or any other organization and any ancillary areas of Indian Railway such as the depots, sidings, stations, terminus, traction power stations, etc.
- **“Request for Inspection”** means the form used to give notice by the Contractor to the Engineer as specified in the Clause 11 [Request for Inspection] under Sub-Division 7020 when any work is ready for inspection and test.
- **“Railway Representative”** means a person, or persons, nominated by the Employer / Engineer to liaise with the Contractor and the Engineer on matters affecting the operation of Indian Railway.
- **“Restriction”** means speed restriction, which is a limitation of the normal permitted speed of rail traffic over a specified length of the Railway.
- **“Reference Drawings”** means the drawings prepared by the Employer for reference purposes only and included in the Tender documents.

- **“Reliability”** means the probability that an item/equipment/system can perform a required function under given conditions for a given time interval.
- **“Routine Test”** means the test which is required to perform or undergo on each Plant, Contractor’s Equipment and Materials during or after manufacture to ascertain that it complies with specified criteria.
- **“Right of Way”** means the land area of the Project, either acquired by the Employer or for which the Employer has the permission of the Stakeholder to construct the embankment & bridges, etc. over their area.
- **“Environmental, Social, Health and Safety Management Plan”** means the plan in accordance with the requirements of Division 8000 [Environmental, Social, Health and Safety Management] of the General Specifications.
- **“Software Related Items”** comprises (but not limited to) erasable programmable read only memory (EPROM), digital versatile disc (DVD), other related items which are the most updated items used in relation to the Works, and those to be supplied by Subcontractors of any tiers
- **“Site Offices”** means the Sub Site Office and Site Huts for Employer's/Engineer’s Personnel constructed by the Contractor as specified in Clause 1 of Sub-Division 4060 [Facilities for Employer's Personnel].
- **“Site Quality Management Plan”** means the subsidiary document in the Works Quality Management Plan (WQMP), submitted by the Contractor to the Engineer for consent in the Clause 3 [Site Quality Management Plan (SQMP)] under Sub-Division 7010; detailing provisions, for its management and control of execution of the Works, that are to be implemented and maintained effectively during the period of the Works to be carried out on the Site.
- **“Spare Parts”** means those parts which are generally repairable and have normally a service life of several years.
- **“Submission Review Request”** means a document accompanying the Contractor’s submission, as specified in the Clause 2 [Submission Procedure] under Sub-Division 3020, to be used for the review.
- **“Temporary Benchmarks (TBM)”** means the benchmarks provided by the Employer, used to locate & confirm the Right of Way (ROW) and its co-ordinates including levels.
- **“Three Months Rolling Programme”** means the programme which the Contractor shall prepare and update monthly under Sub-Division 4070 [Works Programme and Schedule] of General Specification.
- **“Three Weeks Rolling Programme”** means the programme which the Contractor shall prepare and update weekly under Sub-Division 4070 [Works Programme and Schedule] of General Specification.
- **“Time Bar Chart”**, known as “Gantt Chart” too is a type of bar chart which illustrates a project schedule. i.e. the start and finish dates of the activities and summary elements of a project

- **“Uncharted Utilities”** mean Utilities other than Chartist Utilities which are identified during a survey conducted by the Contractor or encountered during excavation/ other works.
- **“UP Line”** means the up line of the HORC double line track route from Palwal to Sonipat.
- **“Utilities”** means the electricity, lighting, traffic control, telephone and/or communication cables, gas, water, sewage and drainage pipes, including all associated protection, supports, ancillary structures, fittings and equipment.
- **“Work Segment Programme”** means the programme dividing Contractual Works Programme into sub-programmes of work segments of manageable size, addressing in more detail certain specific segments of the Works as specified in Clause 4 of Sub-Division 4070 [Works Programme and Schedule] of General Specification.
- **“Working Drawing”** means additional drawings developed by the Contractor as necessary to supplement the Drawings and to specify additional details and procedures for construction of the Works, such as shop drawings, fabrication drawings, erection drawings, Temporary Works drawings, bar bending schedules, bar reference drawings. All such drawings shall comply with the requirements of the Contract.
- **“Works Areas”** means the areas of the Site within the Right of Way and any additional areas which may be obtained by the Contractor and agreed by the Engineer as additional working area.
- **“Works Programme”** means the time-scaled and resource-loaded critical path network, updated from time to time in accordance with the General Conditions of Contract and Works Requirements, depicting activities, durations, sequences and interrelationships that represent the Contractor’s work plan, work breakdown, schedule structure for constructing and completing the Works, distributed over the Time for Completion of the Contract.
- **“Works Quality Management Plan”** means the document in line with ISO 9001: 2015, submitted by the Contractor to the Engineer for consent, as specified in the Clause 2 [Works Quality Management Plan (WQMP)] under Sub-Division 7010; detailing its Quality Management System to be implemented and maintained effectively during the period of the Works.

2. Abbreviations

AC	:	Alternating Current
ACB	:	Air Circuit Breaker
AIIB	:	Asian Infrastructure Investment Bank
ASLI	:	Automatic Safe Load Indicator
BG	:	Broad Gauge
BIS	:	Bureau of Indian Standards
BOCW	:	Building or Other Construction Work
BSI	:	British Standards Institute
CAD	:	Computer Aided Design
CCTV	:	Closed Circuit Television
CD	:	Compact Disc
CE	:	EU Standard
CEM	:	Crane Erection Method
CEMP	:	Construction Environmental Management Plan

CIF	:	Cost, Insurance and Freight
CP	:	Contract Package
CPM	:	Critical Path Method
CRS	:	Commissioner of Railway Safety
CS	:	Curve to Spiral
CT	:	Circular to Transition
CV	:	Curriculum Vitae
CWC	:	Central Water Commission
Db	:	Decibel
D&B	:	Drill and Blast
DB	:	Distribution Box
DCN	:	Design Change Notice
DG	:	Diesel Generator
DGPS	:	Differential Global Positioning System
DIN	:	Deutsche Industrial Norms
DNP	:	Defect Notification Period
DPI	:	Dots per Inch
DPR	:	Daily Progress Report
DSS	:	Distribution Substation
DVD	:	Digital Versatile Disc
E&M	:	Electrical & Mechanical
EIA	:	Environmental Impact Assessment
ELCB	:	Earth Leakage Circuit Breaker
EMP	:	Environmental Management Plan
EPROM	:	Erasable Programmable Read Only Memory
ESHS	:	Environmental, Social, Health and Safety
FAT	:	Factory Acceptance Test(s)
FCN	:	Field Change Notice
FFL	:	Finished Floor Level
FL	:	Formation Level
GAD	:	General Arrangement Drawing
GCC	:	General Conditions of Contract
GDP	:	Gross Domestic Product
GFL	:	Ground Floor Level
GIS	:	Geographical Information System
GL	:	Ground Level
GNSS	:	Global Navigation Satellite System
GOI	:	Government of India
GPR	:	Ground Penetrating Radar
GPS	:	Global Positioning System
GRC	:	Grievance Redress Committee
GRM	:	Grievance Redress Mechanism
GS	:	General Specifications
HDPE	:	High Density Polyethylene
HFL	:	Highest Flood Level
HP/BHP	:	Horse Power / Brake Horse Power
HORC	:	Haryana Orbital Rail Corridor

HV	: High Voltage
HVAC	: Heating, Ventilation and Air Conditioning
IC	: Integrated Circuit
ID	: Identification
IISWBM	: Indian Institute of Social Welfare & Business Management
IMP	: Interface Management Plan
INR	: Indian Rupee
IP	: Point of Intersection
IPS	: Integrated Power Supply
IR	: Indian Railways
IRC	: Indian Road Congress
IRJ	: Insulated Rail Joints
IRS	: Indian Railway Standards
IS	: Indian Standards
ISO	: International Organization for Standardization
IT	: Information Technology
ITP	: Inspection and Test Plan
ITT	: Instruction to Tenderers
LAN	: Local Area Network
LCD	: Liquid crystal Display
LCX	: Leaky Coaxial Cable
LED	: Light Emitting Diode
LV	: Low Voltage
LWL	: Lowest Water Level
MC	: Municipal Corporation
MCB/LV	: Miniature Circuit Breaker / Low Voltage
MCCB	: Moulded Case Circuit Breaker
MDR	: Major District Roads
MOR	: Ministry of Railway
MPR	: Monthly Progress Report
MQR	: Monthly Quality Report
MS	: Method Statement
MSDS	: Material Safety Data Sheet
MSL	: Mean sea level
NABL	: National Accreditation Board for Testing and Calibration Laboratories
NATM	: New Austrian Tunnelling Method
NCR	: Nonconformity Report
NFPA	: National Fire Protection Association
NGO	: Non-Governmental Organization
NH	: National Highway
NHAI	: National Highway Authority of India
NONO	: Notice of No Objection
NONOC	: Notice of No Objection with Comments
NOO	: Notice of Objection
NR	: Not Reviewed
O&M	: Operation and maintenance

OCS	:	Overhead Catenary System
ODR	:	Other District Roads (ODR)
OEM	:	Original Equipment Manufacturer
OFC	:	Optical Fibre Cable
OHE	:	Over Head Electrification
OHSAS	:	Occupational Health and Safety Assessment Series
PCC	:	Particular Conditions of Contract
PDF	:	Portable Document Format
PMIS	:	Project Management Information System
PPE	:	Personal Protective Equipment
PQMP	:	Procurement Quality Management Plan
PR	:	Public Relation
PVC	:	Polyvinyl Chloride
PWD	:	Public Works Department
QA	:	Quality Assurance
RAP	:	Resettlement Action Plan
RC	:	Reinforced Concrete
RCC	:	Reinforced Cement Concrete
RDSO	:	Research Designs and Standards Organisation
RFI	:	Request for Inspection
RFO	:	Rail Fly Over
RINL	:	Rashtriya Ispat Nigam Limited
RL	:	Rail Level
ROM	:	Read Only Memory
ROW	:	Right of Way
ROB	:	Road Over Bridge
RUB	:	Road Under Bridge
S&T	:	Signalling and Telecommunication
SAIL	:	Steel Authority of India Limited
SAT	:	System Acceptance Test(s)
SH	:	State Highway
SI	:	International System of Units
SL	:	Slab Level
SOD	:	Schedule of Dimensions
SP	:	Sectioning Post
SQMP	:	Site Quality Management Plan
SRR	:	Submission Review Request
SSP	:	Sub-sectioning Post
ST	:	Straight to Transition
TC	:	Transition to Circular
TCP	:	Traffic Control Plan
TS	:	Transition to Straight
TSS	:	Traction Substation
UG	:	Under Ground
UPS	:	Uninterrupted Power Supply
USB	:	Universal Serial Bus
UTM	:	Universal Transverse Mercator

VN	:	Variation Notice
WGS84	:	World Geodetic System 84
WHO	:	World Health Organisation
WQMP	:	Works Quality Management Plan
XLPE	:	Cross Linked Polyethylene

3020 CORRESPONDENCE, COMMUNICATIONS AND SUBMISSION

1. General

- 1) Where the Contract requires communications for '*approval*', '*certification*', '*consent*', '*determination*', '*notice*', '*review*', '*application*', and '*request*', these communications shall be in writing. The Contractor shall issue communications in compliance with such Classified Distinctions, following which the Engineer's response to such communications shall generally be given or issued to each communication in the form (as applicable) of a "Notice of No Objection", "Notice of No Objection with Comments", "Notice of Objection", or "Not Reviewed".
- 2) The Engineer's responses to Contractor's submissions shall be given or issued in accordance with his authorized duties and shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract, including responsibility for errors, omissions discrepancies and non-compliance.
- 3) Unless otherwise stated in the Contract, each review period for an Engineer's response shall not exceed twenty-one (21) days. The Contractor shall make allowance for the Engineer's review period in his planning and programming of submissions under the Contract.

2. Submission Procedure

- 1) As outputs of the Contractor's activities, all submissions including detail arrangement of the Contractor's proposal, Contractor's proposals for Variation and adjustment, Statement, notices, and applications shall be submitted to the Engineer for a relevant Classified Distinction, such as for '*approval*', '*certification*', '*consent*', '*determination*', '*notice*', '*review*', '*application*', and '*request*' as specified in the Contract. The requirements of the Technical Specifications shall prevail over those of the General Specifications in the event of any discrepancy.
- 2) Each of Contractor's submission of Contractor's Documents shall include:
 - (a) a brief introduction to explain subsystem or part of the Works to which the submission refers,
 - (b) a list of the documents enclosed with the submission,
 - (c) an outline of how the submission meets all relevant requirements of the Works Requirements, and
 - (d) Submission Review Request.
- 3) The Submission Review Request (SRR), shall include the date of submission, the submission reference number, the submission title, the stage of submission, and the authorized signature of the Contractor's Representative, to confirm that, in the opinion of the Contractor, and where applicable, the submission:
 - (a) complies with all relevant requirements of the Contract;
 - (b) conforms to all interface requirements;
 - (c) contains, or is based on auditable and proven or verifiable calculations and designs, as applicable;
 - (d) has been properly approved by the Contractor, according to the Contractor's Quality Management System, to confirm its completeness, accuracy, adequacy and validity;
 - (e) has accounted for all necessary approvals and permissions required to be given by statutory bodies or similar organizations, and that, where required, such approvals and permits have been granted; and
 - (f) contains a review and reply sheet.

- 4) If, in the Engineer's opinion, following receipt of a submission there is a benefit to be gained from a meeting with the Contractor to clarify or discuss any of the contents of the submission, he shall notify the Contractor accordingly, giving not less than five (5) working days advance written notice. The Contractor shall attend at the time and place as notified by the Engineer. The Contractor shall record and endorse all relevant deliberations and conclusions of any such meetings and submit to the Engineer the records, duly endorsed by the Engineer, within seven (7) days after the meeting.
- 5) Unless otherwise specified in the Contract or agreed with the Engineer, all submissions shall comprise one (1) original set and five (5) hard copy sets accompanied with one (1) electronic set on CD or DVD including PDF files for the scanned original set.

3. Engineer's Response

- 1) Unless otherwise specified in the Contract, Engineer's responses shall be given within twenty-one (21) days of receipt of a Contractor's submission. The Engineer will respond in one of the following four ways:
 - (a) "Notice of No Objection" (NONO);
 - (b) "Notice of No Objection with Comments" (NONOC);
 - (c) "Notice of Objection" (NOO);
 - (d) "Not Reviewed" (NR).
- 2) If the Engineer, having reviewed the submission, has not discovered any non-compliance with the Contract, it will be returned endorsed with the Engineer's signature and the words "Notice of No Objection". Receipt of such "Notice of No Objection" entitles the Contractor to proceed to the next stage of the Works.
- 3) If the Engineer discovers minor non-compliance, discrepancies, omissions, or errors that, in his opinion, are not of a fundamental nature, he may return the submission endorsed with the Engineer's signature and the words "Notice of No Objection with Comments", and include details of the comments that are required to be incorporated in order for the submission to comply with the Contract. Issue of a "Notice of No Objection with Comments" entitles the Contractor to proceed to the next stage of the Works, provided all of the Engineer's comments are taken into account and implemented.
- 4) If the Engineer issues a "Notice of No Objection with Comments", the Contractor shall resubmit the affected part(s) of the submission, clearly demonstrating how the Engineer's comments have been taken into account, and resubmit amended or corrected material by the date specified by the Engineer or (if no such date has been specified) within fourteen (14) days of issue of the Engineer's comments.
- 5) If the Engineer discovers major non-compliance, discrepancies, omissions or errors that, in his opinion, are of a fundamental nature, he may return the communication endorsed with the Engineer's signature and the words "Notice of Objection", and include details of the amendments, inclusions or improvements required in order to comply with the Contract. The issuance of a "Notice of Objection" does not entitle the Contractor to proceed to the next stage of the Works.
- 6) If the Engineer issues a "Notice of Objection", the Contractor shall resubmit the complete submission, clearly demonstrating how the Engineer's comments have been taken into account and resubmit amended or corrected material by the date specified by the Engineer or (if no such date has been specified) within fourteen (14) days of issue of the Engineer's comments. If the Contractor proceeds with any Works without an Engineer's Notice of No Objection or Notice of No Objection with Comments having been issued, it does so at its own risk and responsibility.
- 7) If the Engineer discovers that submitted documents are incomplete and the Engineer could not carry out the required review, then the Engineer may return the submission endorsed

with the Engineer's signature and the words "Not Reviewed" and include details of the amendments, inclusions or improvements that are required in order to comply with the Contract. Issue of a "Not Reviewed" does not entitle the Contractor to proceed to the next stage of the Works until all of the Engineer's comments have been fully taken into account and a satisfactory resubmission has been made (meaning one which results in either a "Notice of No Objection" or "Notice of No Objection with Comments").

- 8) For the avoidance of doubt, any change or additional work arising out of or becoming necessary due to any errors, omissions, discrepancies, or non-compliances on the part of the Contractor in the preparation, submission or resubmissions of Contractor's Documents shall not constitute a Variation.

4. Document Control Procedure

- 1) Within twenty-eight (28) days after the Commencement Date, the Contractor shall submit the Method Statement for the control of document and management information to the Engineer for consent, which with regards to control of document shall include but not be limited to the following:
 - (a) identification and description such as title, date, authors (editor, reviewer, responsible person and reference number),
 - (b) format such as letter, submission, transmittal, request, notice, application, statement, software including their version, and media, and
 - (c) review and approval for conformity with the Contract, and adequacy of the submission or Contractor's proposal in case of Variation.
- 2) Unless otherwise defined in the Contract, the Contractor shall coordinate with sample forms to be utilized with some submission in its document control procedure which are provided by the Engineer at the Commencement Date.

5. Project Information and Communication System

5.1. Document Control System

- 1) Employer is in the process of implementing a document control system such that all drawings/documents related to the construction phase are well documented and archived, etc. The Contractor shall utilize the document control system being setup by the Employer such that all documents generated by the Contractor can be transmitted to the Engineer by electronic means (and vice versa) and that all documents generated by either party are electronically captured at the point of origin and can be reproduced later, electronically and in hard copy. In addition to the Contractor's submittals referenced in Sub-Division 3020, Sub-Clause 2.0 [Submission Procedure], Contractor shall also transmit all documents through Document Control system provided by the Employer.
- 2) Employer shall provide access from its system to the Contractor for communication and for storing the documents. The Contractor shall be responsible to maintain periodical backup of data/documents for his record.
- 3) The Method Statement for the control of document and management information as specified in the Clause 4 [Document Control Procedure] under Sub-Division 3020 shall also detail the uploading, maintaining, and archiving the following submittals, including but not limited to:
 - (a) Contractual Works Programmes, Work Segment Programmes and supporting reports (including plans) as per the format and using the software as defined in the Contract,
 - (b) drawings and designs created by the Contractor as per the construction asset (classification) and on the software platform defined in the Contract,
 - (c) records of measurement or Contractor's Statements or both, in a format defined in the Contract,

- (d) construction asset details needing to be updated in the Contractor's Monthly Progress Reports,
- (e) geo-referencing of the alignment,
- (f) geo-referencing co-ordinates of assets into a geographic information system (GIS) which the Contractor's Monthly Progress Report has utilised,
- (g) Contractor's Monthly Progress Reports, and
- (h) source files for submittal as required by the Engineer.

5.2. Project Management Information System (PMIS)

- 1) PMIS is a platform to monitor and track the progress of the whole project, tailored to match the specific needs of the project.
- 2) The aim is to provide the Employer and the Engineer with insights critical for the smooth and timely execution of the project. The Contractor will be required to submit the data and information for the PMIS as described by the Engineer.
- 3) The Method Statement for the control of document and management information as specified in the Clause 4 [Document Control Procedure] under Sub-Division 3020 shall also detail the PMIS.
- 4) The information shall include but shall not be limited to:
 - (a) Schedule related information
 - (b) Progress related information
 - (c) Issues related to the project
 - (d) Safety related information
 - (e) Quality related information
- 5) The integrated system will also take inputs from Primavera and project the possible delays and achievements of the various Contractors and also the overall project. The management team can review the overall health and synopsis of the entire project on the master dashboard.

3030 FORMAT OF DOCUMENTS AND DRAWINGS

1. General

A document may consist of document cover, revision history, table of contents, text, and attachment(s) in this sequence where applicable. The document control procedure to be submitted to the Engineer in accordance with Sub-Clause 4 of Sub-Division 3020 [*Document Control Procedure*] shall incorporate the requirements specified in this Sub-Division.

1.1. Cover format (Times New Roman)

- (a) Heading and name of client are on top, in capital, size 10.
- (b) Name of the project is in bold letters, size 22.
- (c) Content of document is in bold capitals, size 16.
- (d) Document reference number is in bold capitals, size 12
- (e) Company name: capitals, size 14.
- (f) Company logo is in size 35 x 40 (W x H) mm.
- (g) Address of the company is in regular letters, size 10.

1.2. Document format (Times New Roman)

(a) General regulations

Letter size: 12.

Paper size A4 (A3 is used for tables and figures)

Periods and semicolons shall be placed right after the preceding letter or number.

The space between paragraphs and headings shall be 1.15 lines.

Main headings: are placed in number order, with a period placed right after the number, followed by a space, with the heading text in bold capital letters. For example,

1. IN BOLD CAPITAL

Other headings: are placed in number order, with a period placed right after the number, followed by a space, with the heading in regular letters. For example,

1. In bold normal letter

(b) Notes

Notes relating to tables shall be included in the table; in case they are not able to be included, it shall be clearly specified that they are notes relating to a particular table reference.

The text of notes is usually given in italics.

2. Language of Communication and Units

The ruling language of the Contract shall be as stated in the Particular Conditions of Contract. If no language is stated, the language for communications shall be the English language. The Contractor shall utilize the SI system of measurement units.

3. Photographs

The Contractor shall take digital photographs of the Works on at least a monthly basis and include them in the Contractor's Monthly Progress Reports. These photographs shall be taken at locations agreed with the Engineer as appropriate to record progress, quality and other relevant aspects of the Works. The number of the photographs shall be sufficient to cover all

aspects of the Works in progress.

The digital photograph shall be colour jpeg image format with standard aspect ratio 4:3 and resolution of 300 DPI for all graphics in the printing. Read Only Memory (ROM) based electronic media of digital photographs shall be included as an integral part of the submittal. The locations and directions of the photographs taken shall be marked on a key plan of the Site, to be included in the submittal.

Each photograph shall be properly numbered and dated and include a brief explanatory note of the subject matter of the photograph, for ease of understanding.

Immediately before the issue of any Taking-Over Certificates for Works or Sections, the Contractor shall commission a professional photographer (or any person with equivalent skills) and take photographs of (where applicable, the interior to be taken by wide angle lenses) of exterior and all salient sections and features of the Works, for record purposes. The Contractor shall submit to the Engineer for approval as an integral part of the As-Built Documents, six (6) separately bound sets of colour prints of such record photographs, including one (1) set of Read Only Memory (ROM)-based electronic media containing an original jpeg image file of each photograph in accordance with the directory and naming convention agreed with the Engineer. The number of colour print images in a set shall not exceed 100, and each hard copy set of photographs shall be of A4 size with a cover page indicating information such as date, titles of the project and the Contract, and name of the Employer and the Contractor. Each of the photographs shall be properly numbered, dated and include a brief explanatory note of the subject matter.

4. Videos

On a monthly basis, or earlier if directed by the Engineer, the Contractor shall take digital video records to record the progress of the Works on Site (minimum duration of each to be ten minutes, covering all the areas of the Site where works are ongoing) as agreed with the Engineer, and submit the videos every month along with the Monthly Progress Report. The first video shall be made before the Commencement of the Works on the Site. The Contractor shall install CCTV cameras at Manesar station building and location of major bridge i.e. NH-352W on Pataudi road and provide access to the Employer and Engineer for monitoring the work on day-to-day basis.

Within twenty-eight (28) days of receipt of the Letter of Acceptance, but in no case later than the Commencement Date, the Contractor shall submit to the Engineer a proposal for the provision of digital video recordings along with commentary of the progress of the Works.

The videos shall be taken by a competent person from an approved professional service provider (or any person with equivalent skills). The video shooting locations are to be identified in the aforementioned proposal. This video should be submitted in a video format acceptable to the Engineer, with or without editing.

Immediately before the issue of the Taking-Over Certificate for the whole of the Works, the Contractor shall complete video recording and start editing the videos taken, to produce a 60-minute digital video-audio presentation with a suitable title. Each section of the video shall indicate the date on which it was taken. The presentation material shall have narration in English. The Contractor shall use a professional service provider to video, edit and produce the presentation material.

5. CAD Standards

5.1. General

The Contractor shall establish his own CAD operation team utilising Autodesk's AutoCAD 2016 or higher release. The Contractor's CAD manager shall request the Engineer to obtain CAD resource libraries and file naming conventions before commencement of the Works. In

addition to the Contractor's submittal of drawings and designs, the Contractor shall upload, maintain, and archive its source files utilising CAD software defined by the Contract into DCS in accordance with Sub-Paragraph 5 of Sub-Division 3020 [*Correspondence, Communications, and Submission*]. The Contractor shall also ensure its quality management of CAD drawings and design in accordance with the WQMP under Sub-Division 7010 [*Quality Management*].

5.2. CAD Resource Libraries

The Contractor shall utilise CAD resource libraries provided by the Engineer to execute routines and scripts for CAD workings. Resource libraries shall include and use references which include, but are not limited to, the following:

- (a) title block,
- (b) project co-ordination,
- (c) track horizontal alignment,
- (d) track alignment vertical profile reference,
- (e) geo-referencing for alignment,
- (f) existing utility base map,
- (g) batch processing script files,
- (h) layers and symbols,
- (i) plotting and pen table, and
- (j) printing size for each submittal.

5.3. File Naming Convention

The Contractor shall adopt the file naming convention provided by the Engineer for discipline drawings and designs. These conventions shall include, but are not limited to, the following:

- (a) file directories and folders structure,
- (b) sequence of characters for directories, folders, and files,
- (c) fields to comprise a name of directories, folders, and files, and
- (d) codes to interpret in the context of the field.

5.4. Drawings and Designs on Document Control System

The working files of drawings and design shall be in accordance with the Sub-Clauses 5.2 and 5.3 above. In addition to the Contractor's submittal of drawings and designs, the Contractor shall upload, maintain, and archive the related source files, created by utilising the CAD software specified in the Contract, in the document control system. The Engineer may also require the Contractor to upload his working CAD source files in the document control system before submission, so that the Engineer can access working files in order to observe progress.

5.5. CAD Quality Management

The Contractor shall ensure that the quality management of their CAD drawings and designs are in accordance with the WQMP. Where CAD drawings and designs have been specified as Contractor's Documents, the Contractor's policy in the WQMP shall be clearly identified. In addition, the process of data checking in the WQMP shall be determined by the Contractor.

This process shall include:

- (a) elimination of spurious data outside normal file extent or limits
- (b) checks on set-up parameters,
- (c) testing of container allocation within files including layers by switching on and off containers,

- (d) elimination of information which is not to scale,
- (e) purging all unnecessary data,
- (f) elimination of references to un-checkable (i.e. uncontrolled) files such as renditions,
- (g) formats that do not maintain dimensional integrity shall not be used,
- (h) CAD resource libraries,
- (i) file naming conventions,
- (j) other contents checks, and
- (k) data integrity through document control system.

Division 4000: Works Administration

Table of Contents

4010	Laws, Standards and Codes	35
1.	Compliance with the Laws:	35
2.	Relevant Documents	35
3.	Applicable Standards and Codes	35
4.	Other Standards and Codes	35
5.	Copy of Standards and Codes	36
4020	Works Management Planning	37
1.	General	37
2.	General Organization	37
3.	Project Management Plan.....	38
4.	Works Quality Management Plan	39
5.	Construction Management Plans.....	39
6.	Completion Management Plan	41
4030	Meetings.....	43
1.	Kick-Off Meeting	43
2.	Regular Meetings	43
3.	Monthly Progress Meeting	43
4.	Co-ordination Meeting	45
5.	Meetings Called by the Contractor.....	45
6.	Other Meetings	45
7.	Minutes of Meetings.....	46
4040	Interface, Coordination and Cooperation with Other Parties	47
1.	General	47
2.	Responsibilities of the Contractor	47
3.	Interface Administration System.....	49
4.	Construction Interface	50
5.	Preparation of Interface Documents.....	51
6.	Interface Table for Supply and Installation Items	51
7.	Coordination and Interfacing Programme	51
8.	Interface Management Plan (IMP)	52
9.	Employer's/ Engineer's Input	53
10.	Detailed Interface Description (DID).....	53
4050	Contractor's Obligations for Obtaining Authorities' Approvals.....	55
1.	Approvals from Public Authorities and Agencies.....	55
2.	Correspondence with Public Authorities and Agencies	55
4060	Facilities for Employer's/ Engineer's Personnel.....	56
1.	Site Offices	56
4070	Works Programme and Schedule	57
1.	General	57
2.	Methodology	57
3.	Contractual Works Programme	57
4.	Three Months Rolling Programme.....	62
5.	Three Weeks Rolling Programme	63
6.	Review and Monitoring of Programme.....	63
7.	Progress Monitoring	64
8.	Programme Analysis Report	64
9.	Progress Meetings and Programme Updates.....	65
10.	Revision of Programme.....	66
11.	Recovery Programme	67
4080	Monthly Progress Report Requirements	68
1.	General	68

2.	Executive Summary	68
3.	Programme Update and Status	68
4.	Three Months Rolling Programme Revisions and Updates	69
5.	Physical Progress.....	69
6.	Contractor's Personnel, Contractor's Equipment and Employer's Equipment.....	70
7.	Coordination and Interfacing	70
8.	Procurement	70
9.	Performance on Quality Management System.....	71
10.	Financial Status	71
11.	Other Items	71
4090	Work Area (Within Row) Access Dates	73
1.	General.....	73
2.	Work Area Access Schedule	73
4100	Milestones	74
1.	General.....	74
2.	Milestone Schedules	74
4110	Taking Over of Works / Sections	75
1.	Procedures	75
4120	Defects Notification Period	78
1.	General	78
2.	Final Inspection.....	78

4010 LAWS, STANDARDS AND CODES

1 Compliance with the Laws:

The Contractor shall familiarize themselves and conform in all aspects with:

- (a) the provision of any enactment in India of any authority having jurisdiction over any part of the Works, as applicable from time to time;
- (b) the Laws of local bodies and utilities applicable to the Works.

The Contractor shall give all notices required by the Laws, and pay all fees, taxes and bills payable in respect thereof. The Contractor will arrange necessary clearances and approvals to commence the Works on Site.

Ignorance of the Laws shall not constitute a basis for any claim at any stage of the Works.

The Contractor shall indemnify the Employer and the Engineer against all penalties and liabilities of every kind assessed because of breach of any such Laws.

2 Relevant Documents

- 2.1 The Bidding Documents include Reference Information/ Reports. The data provided in the Reference Information/ Reports is indicative and for reference only. The Employer bears no responsibility as to its accuracy and adequacy.

3 Applicable Standards and Codes

- 3.1 Where reference is made in the Works Requirements to a particular standard or code, the provisions of both these documents shall be considered a minimum level of the quality standard applicable to the Works under the Contract. These standards and codes shall be adopted by the Contractor unless the Contractor has submitted proposals to adopt alternative standards or codes and has received an approval from the Engineer.
- 3.2 Where reference is made to two (2) or more codes in parallel, the Engineer shall have the right to apply that which is more stringent, and the Accepted Contract Amount shall be deemed to have allowed for such decision of the Engineer. Where there is a conflict or discrepancy between the requirements of the referenced standards or codes, the Engineer shall determine the governing requirements on the principle that the higher or more stringent requirements shall govern.
- 3.3 For the purpose of the Contract, and where the applicable standards or codes are not described in the Works Requirements, the standards and codes used shall be in accordance with the following sequence:

Applicable Indian /International standards or codes which are equivalent to standards or codes specified in the Technical Specifications for the particular Plant, Materials, equipment, processes or systems proposed by the Contractor.

4 Other Standards and Codes

- 4.1 Other standards and codes may be acceptable as substitutes of the standards and codes referred to in the Contract, provided that the Contractor is able to demonstrate for the approval of the Engineer that the standard or code proposed by the Contractor as a substitute is equal to or better than the standard or code referred to in the Contract. The design, Materials and the workmanship of the Works meeting such approved substitutes shall in principle be acceptable under the Contract.
- 4.2 Whenever the Contractor wishes to propose a substitute to any standard or code referred to in the Contract, the Contractor shall at his own risk and responsibility submit a request for substitution to the Engineer, including all information and data necessary to demonstrate that the proposed substitute is equal to or better than the standard or code referred to in the Contract. Differences between the referred standard or code and the proposed substitute shall be fully and

clearly described in the proposal. Such request for substitution shall be submitted to the Engineer at least 28 days prior to the date when the Contractor requires the Engineer's consent and be sufficiently in advance so as to avoid causing delay to the progress of the Works. The information and data submitted with the Contractor's proposal shall include a copy of the substitute standard or code proposed by the Contractor, including where applicable an English language translation of same.

- 4.3 The Engineer shall review the Contractor's proposal documents and inform the Contractor of his decision whether the proposed substitute is acceptable or otherwise with comments. The Contractor may submit a second proposal should the first proposal not be accepted, provided that the agreed time schedule of the Works including Milestones (if any), and Time(s) for Completion will not be adversely affected. No third proposal will in principle be entertained by the Engineer.
- 4.4 The Engineer shall have the right to request the Contractor to submit supplementary information or data or both which he considers is required for determining the acceptability or otherwise of the Contractor's proposed substitute standards or codes. The Engineer, at the risk and responsibility of the Contractor, may defer response to a Contractor's request for substitution, unless and until the Engineer receives copies of such supplementary information or data or both.
- 4.5 Should the Engineer not respond to the Contractor's request for substitution within fifty-six (56) days after the Engineer's receipt of the complete proposal, the Engineer shall be deemed to have unconditionally accepted the proposed substitute.
- 4.6 In the event that the Engineer does not accept the Contractor's proposed substitute:
- (i) the Contractor shall comply with the standard or code referred to in the Contract;
 - (ii) Milestones (if any) and Time for Completion shall not be extended and the Contractor shall not be entitled to additional payment.

5 Copy of Standards and Codes

- 5.1 The Contractor shall provide and maintain in the Engineer's office two (02) hard copies, two (02) hard copies for Employer's office and two (02) licenses for online access where applicable, of each of all standards and codes specified or shown in the Contract, within fifty-six (56) days from the Commencement Date. Copies of any standards and codes subsequently consented to by the Engineer shall be added to the archive without delay.

4020 WORKS MANAGEMENT PLANNING

1 General

- 1.1 In order to organise the various submissions required by the Contract, and to ensure the Contractor's understanding and compliance with the requirements of the Contract, the Contractor shall develop a series of management plans. These management plans will serve to structure the Contractor's submissions in such a manner that the Contractor can develop and prepare the submissions and the Engineer can review and comment on them in a prescribed manner.
- 1.2 The management plans shall be configured as an integrated plan with associated documents, each covering one of the subjects listed below. These plans and documents shall be co-ordinated with each other and shall collectively define, describe and encompass the Contractor's proposed methods, procedures, processes, organisation, sequencing of activities, etc. and shall show how these combine to assure that the Works fully meet the requirements of the Contract with respect to the subjects listed. Unless otherwise stated in the Contract, all plans and documents shall be submitted in preliminary form within fifty-six (56) days after the Commencement Date, followed by detailed plans within fifty-six (56) days after the preliminary submission. Further submissions shall be made:
- (i) when required in accordance with the Contractual Works Programme;
 - (ii) whenever the development of the Contractor's planning allows the plan to be developed further;
 - (iii) in response to comments made by the Engineer in accordance with clause 3. [Engineer's Response] of Sub-Division 3020 [Correspondence, Communications and Submissions] of the General Specifications;
 - (iv) whenever any change occurs that invalidates the information contained in a previously submitted and reviewed document, within fourteen (14) days of occurrence of such change; and
 - (v) when requested by the Engineer from time-to-time.

2 General Organization

- 2.1 The Plans listed below shall be developed and submitted by the Contractor for the Engineer's review:
- (1) Project Management Plans
 - (i) Contractor's Project Plan
 - (ii) Interface Management Plan
 - (2) Works Quality Management Plan
 - (3) Construction Management Plans
 - (i) Construction Plan
 - (ii) Construction Environmental Management Plan
 - (4) Completion Management Plans
 - (i) Commissioning Plan
 - (ii) Defects Management Plan.

3 Project Management Plan

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

3.1 Contractor's Project Plan

- (a) The Contractor's Project Plan shall provide a clear overview of the Contractor's organisation, management systems and the methods to be used for the execution and completion of the Works.
- (b) The Contractor's Project Plan shall include a summary description of each and every stage of implementation of the Works, clearly showing the principal organisational interfaces both within the Contractor's own organisation (including Subcontractors of every tier) and with Interfacing Contractors and Interfacing Parties, defining how each of these interfaces is to be managed and controlled. An organisation chart shall be produced to illustrate the subdivision of the Works into elements for effective technical and managerial control, the reporting structure and the interface relationships among all parties involved. The names, addresses, telephone numbers and email addresses of all principal contacts shall be listed.
- (c) The Contractor's Project Plan shall contain structured organisation charts showing the hierarchical relationship of the Contractor's organisation (including Subcontractors of every tier). The organisation charts shall be produced in such a manner that the basic chart shows the overall organisation structure supported by the subsidiary charts detailing the internal structure of the various departments or sections of the overall organisation.
- (d) The Contractor's Project Plan shall include full details of the qualifications, experience, authority and responsibility of the personnel assigned to all key positions of the Contractor's organisation (including Subcontractors of every tier). As a minimum, this shall include all levels down to senior managers and shall include the personnel responsible for each individual department and functional group. A clear reference shall be given to the location of staff (e.g. site-resident, factory-based, etc.). The names, addresses, telephone numbers and email addresses of all principal contacts shall be listed.
- (e) The Contractor's Project Plan shall define the Contractor's management structure for the execution of the Works and for the control of the safety and quality of the Works and shall, without limitation, identify and set out:
 - (i) The procedure for audits;
 - (ii) The procedures for the control of receipt and issue of all Works-related correspondence so as to ensure traceability;
 - (iii) The procedures for the filing system to be implemented to maintain the Contractor's records during the course of the Works. The filing system used by the Contractor (and Subcontractors of any tier) shall be compatible with the Engineer's filing system;
 - (iv) The procedures for the identification, production, verification, internal approval, review (when required) by the Engineer, distribution, implementation and recording of changes to all drawings, reports, plans and specifications;
 - (v) The procedures for the evaluation, selection, engagement and monitoring of Subcontractors / suppliers together with the means of application of quality assurance to their works including audit and acceptance;

- (vi) The procedure for the regular review and revision of each type of quality plan and its supplemental individual specific quality plans to ensure their continuing suitability and effectiveness, in addition to the method to be used for revision and issue of revised documentation;
 - (vii) The procedures for the control, calibration and maintenance of inspection, testing and measuring equipment;
 - (viii) The procedures for the selection, indexing, disposition and maintenance for the archiving of project records. A list of items to be archived including their periods of retention shall be submitted to the Engineer for review;
 - (ix) The procedures for identifying training needs and for the provision of training of all personnel performing activities affecting quality; and
 - (x) The procedures for the control of non-conformities.
- (f) Contractor's Representative
- (i) The Contractor shall be responsible for the provision of all necessary supervision during the execution of the Works for as long as the Engineer considers necessary for the proper fulfilment of the Contractor's obligations under the Contract.
 - (ii) The Contractor shall ensure that he is at all times represented on the Site by competent and authorised English-speaking Contractor's Representative. Such Contractor's Representative shall be constantly on the Site and shall give his whole time to directing the Contractor's performance of the Works.
 - (iii) The Engineer shall have the authority to revoke consent to the Contractor's Representative at any time. If such consent is withdrawn the Contractor shall forthwith remove the Contractor's Representative from the Site and shall not thereafter employ him again on the Site in any capacity and shall forthwith replace him by another competent and qualified English-speaking Contractor's Representative, whose appointment shall be subject to the Engineer's consent.

3.2 Interface Management Plan

The Contractor shall submit to the Engineer for review a Interface Management Plan in accordance with the requirements of Sub-Division 4040 [Interface, Coordination and Cooperation with Other Parties] of the General Specifications.

4 Works Quality Management Plan

The Contractor shall submit to the Engineer for review a Works Quality Management Plan in accordance with the requirements of Sub-Division 7010 [Quality Management] of the General Specifications.

5 Construction Management Plans

The Construction Management Plans shall be configured as an integrated plans and associated documents, each covering one of the subjects listed below.

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

5.1 Construction Plan

- (a) The Contractor shall prepare plans for construction activities on and off the Site and shall ensure that these are properly co-ordinated with other relevant plans, including those for procurement, delivery, testing and commissioning activities.
- (b) The Construction Plan shall contain separate parts for the Contractor's and Subcontractors' on- and off-Site activities.
- (c) Each Construction Plan shall identify the scope of activity to be controlled. In relation to such scope of activity, it shall, without limitation, define:
 - (i) The organisation of the Contractor's staff directly responsible for the day-to-day management of the activity on or off the Site;
 - (ii) The specific allocations of responsibility and authority given to identified personnel for the day-to-day management of the Works with particular reference to the supervision, inspection and testing of the Works;
 - (iii) The interfacing and co-ordination required with the Contractor's other related plans;
 - (iv) The relevant method statements which are to be developed to a sufficient degree of detail for review by the Engineer;
 - (v) The list of procedures and work instructions to manage and control the construction and installation works, including without limitation:
 - The Contractor's arrangements for the security of the Site and the Works area(s);
 - The Contractor's accommodation, storage, car parking, other temporary works or facilities or both, etc.
- (d) The Contractor's arrangements for temporary traffic control, including but not limited to the following:
 - (i) Type and main specifications of traffic control devices and facilities;
 - (ii) Scale plan of the location/s, clearly identifying existing roads, proposed diversions of pedestrian and road traffic, locations of warning signs and traffic control measures;
 - (iii) Details of all lane widths, temporary surfaces, etc.;
 - (iv) Construction details of any proposed diversion(s);
 - (v) Safety measures including signage and staffing;
 - (vi) Programme for installation and erection of traffic control devices and facilities;
 - (vii) Traffic control measures during non-working times (including during holiday periods and at night);
 - (viii) Details of the personnel responsible for overseeing implementation of all aspects of the temporary traffic control measures.
- (e) The inspection and testing activities for construction or installation activities or both so as to ensure the specified requirements for the Works are met;

- (f) The construction processes including Temporary Works so as to ensure compliance with the Contract. In addition, any software to be used in the construction and installation process shall be identified;
- (g) The construction and installation process so as to ensure clear identification and traceability of Plant and Materials;
- (h) The identification of the inspection and test status of all Plant and Materials during all stages of the construction and installation process to ensure that only products that have passed the required inspections and tests are used in the construction or installation or both;
- (i) The review and disposition of any non-conforming Plant or Materials or both so as to avoid unintended use/installation;
- (j) The assessment and disposition of any non-conforming Plant or Materials or both and approval for reworking or rejection;
- (k) The identification of preventive action so as to prevent any recurrence of similar non-conformance; and
- (l) The handling, storage, packaging, preservation and delivery of Plant and Materials.
- (m) Drawings showing the layout within the Site of the Contractor's temporary facilities, including the Contractor's offices, temporary access roads and other facilities required early in the Contract shall be submitted to the Engineer for review within fourteen (14) days after the Commencement Date.
- (n) Drawings showing the location of stores, laydown/storage areas, workshops, work areas and other major facilities shall be submitted to the Engineer for review as early as possible, but in any case, not later than twenty eight (28) days before construction of any such facilities.

5.2 Construction Environmental Management Plan

- (a) Within twenty-eight (28) days of issue of the Letter of Acceptance but in no case later than the Commencement Date, the Contractor shall prepare and submit to the Engineer for review a draft Construction Environmental Management Plan (CEMP) which includes the Contractor's proposed means of complying with the obligations detailed in Division 8000 [Environmental, Social, Health and Safety Management] of the General Specifications. The CEMP shall include, as required, details of compliance with applicable laws and regulations for environmental protection and mitigation requirements, including the AIIB guidelines for environmental and social considerations.
- (b) The CEMP will set out in detail the Contractor's approach for dealing with each of the potential environmental impacts arising from the various construction, installation and other activities involved in the execution of the Works, both on- and off-Site.
- (c) The Contractor shall submit the final CEMP, for review by the Engineer, at least twenty eight (28) days prior to the commencement of construction activities.

6 Completion Management Plan

- 6.1 The Contractor shall detail the various services required under the Contract to bring the Works to completion into one plan. This co-ordinated approach shall allow the Engineer to review all aspects of completion in an integrated manner.

- (a) The Completion Management Plan shall be configured as an integrated plan with associated documents each covering one of the subjects described herein.
- (b) The Plans shall be co-ordinated with each other and shall collectively define, describe and encompass the Contractor's proposed methods, procedures, processes, organisation, sequencing of activities, etc. and shall show how these combine together to assure that the Works truly meet the requirements of the Contract with respect to the matters listed.

6.2 Commissioning Plan

The Contractor shall submit the first draft of the Commissioning Plan to the Engineer within one hundred and eighty (180) days after the Commencement Date.

The Commissioning Plan shall include the following:

- (i) Installation Tests Schedule

A comprehensive schedule of Installation Tests as required by Works Requirements - Technical Specifications and in accordance with the programme as described in Clause 5 [Inspection, Testing and Commissioning Programme] in Sub-Division 4070 [Works Programme and Schedule] of the General Specifications. The schedule shall be submitted within the period of time laid down in Works Requirements - Technical Specifications, or if none is given not later than fifty six (56) days in advance of the date for the commencement of the Installation Tests.

6.3 Defects Management Plan

The Contractor shall submit to the Engineer for review a Defects Management Plan for the repair, replacing or performance or both of such remedial actions as required to correct any defects in the Works, as may be notified by (or on behalf of) the Employer during the Defects Notification Period (DNP). The first submission of this Plan is required not less than one hundred and eighty two (182) days prior to the due date for issue of the Taking-Over Certificate for the Works or any Section. During the Defects Notification Period the Contractor shall:

- (i) endeavour to complete all necessary work in a timely and responsible manner;
- (ii) not proceed with any remedial work without the consent of the Employer and Engineer;
- (iii) submit a plan that details the methods and timing of any proposed work; and
- (iv) update the plan monthly, showing progress of the work and the time to completion.

4030 MEETINGS

1 Kick-Off Meeting

The Engineer shall hold Kick-Off Meeting within 7 calendar days from the Commencement Date. Purpose of the Meeting is formally to notify all parties concerned under the Contract that the project has begun, and every party has a common understanding and his role from the Commencement Date until issuance of the Taking-Over Certificate.

At the Kick-Off Meeting, followings will be, but not limited, discussed.

- (a) Outline of the Works
- (b) Communication rules (process, emails, approvals, etc.)
- (c) Other matters regarding proceeding and management of the Contract.
- (d) Profile of the Site
- (e) Time Schedule List of Contractual Events/Submissions, including Milestones, Time(s) for Completion and Defects Notification Period(s).
- (f) Introduction of key persons of the Contractor and Employer, with role, Function and authority of each person.
- (g) Role and responsibility of Emergency notification process.

2 Regular Meetings

- 2.1 The Engineer shall hold regular meetings with the Contractor as necessary for the proper management and co-ordination of the Works. The Contractor's representative and other personnel as considered necessary by the Engineer, shall attend such meetings.
- 2.2 Within twenty eight (28) days after the Commencement Date, the Engineer and the Contractor's Representative shall agree upon a programme for weekly and monthly meetings covering the first three (3) months after such twenty eight (28) days. The Contractor's Representative shall make sure that the Contractor's Personnel designated to attend meetings make themselves available for the meetings. The Engineer shall prepare the agenda for the meetings and the relevant documents to be submitted to the meeting, including as a minimum the minutes of the previous meeting. Thereafter, the programme for weekly and monthly meetings shall be updated monthly in the monthly progress meetings.
- 2.3 The Engineer may initiate ad-hoc meetings as and when the need arises, through prior consultation with the Contractor's Representative where possible, and the Contractor's Representative and other Contractor's Personnel designated by the Engineer and/or the Contractor's Representative shall attend such meetings. The Engineer shall prepare a proposed agenda of the meeting, for prior consultation with the Contractor's Representative where possible.

3 Monthly Progress Meeting

- 3.1 A Monthly Progress Meeting shall be called by the Engineer and shall be held every month within three (3) days following issuance of the Contractor's Monthly Progress Report as described in clause 1 of Sub-Division 4080 [Monthly Progress Report Requirements] of the General Specifications. If the day specified, is not a working day, then the meeting shall be held on the next working day after the specified date. The Engineer shall notify the Contractor of any change in the date or time, or both, of the meeting. The main purpose of the meeting is to discuss progress of the Works and if there is any delay in progress, being encountered by the Contractor, the Contractor shall indicate the cause of delay and present the method of recovery. The results of the discussions of the meeting shall be included in the Contractor's next Monthly

Progress Report to be provided as described in Sub-Division 4080 [Monthly Progress Report Requirements] of the General Specifications.

3.2 Meeting agenda

The meeting agenda shall include the following:

Progress planned, and progress achieved, along with the contractor's stated reasons for any delay and actions proposed to be or being taken to reduce or eliminate delays;

- (a) Actual returns of contractor's personnel and contractor's equipment assigned compared with the planned requirements, along with the contractor's stated reasons for any differences and actions proposed to be or being taken to improve the situation;
- (b) Any difficulties being encountered in the execution of the works, along with the contractor's proposed actions or solutions and any actions required of the engineer;
- (c) Any outstanding information/actions required of the employer, the engineer or authorities or all with jurisdiction; and
- (d) Any outstanding information/actions required of the contractor.

3.3 Meeting Procedure

The detailed procedure of the Meeting is as follows:

- (a) The Employer shall chair progress meetings every month with the Contractor and the Engineer. These meetings shall be held at dates and times to be advised by the Engineer. Progress meetings shall not be later than ten (10) days after the issue of the Contractor's Monthly Progress Report.
- (b) The Engineer shall convene at his discretion, at any time upon reasonable notice to the Contractor, any meeting, either on or off the Site, to discuss and address any aspect of the works or the Contract. The Contractor shall attend any such meetings convened by the Engineer.
- (c) On monthly basis, the Contractor shall arrange for its Project Manager, Superintendent, and Scheduler to meet at the site with the Engineer to review Contractor's Monthly Programme Update before Monthly Progress Meeting. A turnaround document as per the agreed computer software generated by the Contractor shall be marked-up to show the agreed upon progress, signed by the Contractor, and a signed copy issued to the Engineer. The Monthly Programme Update shall show up-to-date and accurate progress of the work and shall forecast the completion date for activities in progress based on the approved Contractual Works Programme. The Monthly Programme Update shall be prepared by the Contractor in co-ordination with all its principal subcontractors and suppliers and the other Contractors if necessary.
- (d) Monthly Programme Update shall include actual activity data for progress to date, but in the Monthly Programme Update, the Contractor shall not change the schedule logic, the activity relationships/dependencies, or planned activity durations and shall not add or delete activities. If the Contractor believes that any of these items should be changed, then a proposed revised Work Segment Programmes shall be submitted by the Contractor to the Engineer. Although activities shall not be added or deleted in the Monthly Programme Update, activities that have been recommended and consented by the Engineer shall be included in the next Monthly Programme Update.
- (e) The Contractor will be notified by the Engineer, in writing, as to acceptance, reasons for rejection, or any revisions required to the Programme. Changes to the Programme agreed upon by the Contractor and the Engineer and consented by the Employer shall be incorporated by the Contractor into the Programme within seven (7) calendar days

after such agreement. Changes on which the Contractor and the Engineer cannot agree shall be documented and shall be subject to the final decision of the Employer and which shall be binding.

- (f) The Contractor shall adjust the data date (“as of date”) to be the same as the end date for the invoicing period.
- (g) Monthly Programme Update shall show actual activity commencement and completion dates, the actual remaining duration in workdays and physical percent complete for those activities commenced and not complete. For the stored materials, the update shall show the amount of material stored, representing the total cost of the materials delivered and properly stored. The Monthly Programme Update shall also show a graphic comparison of the current status and the Contractual Works Programme for each activity in the network.
- (h) Each Monthly Programme Update shall continue to show all work activities including those already completed. These completed activities shall accurately reflect “as built” information by indicating when activities were actually started and completed.
- (i) Monthly Programme Updates shall also contain the following information for each activity:
 - (i) Activity identification number, description and estimated original duration in workdays;
 - (ii) Calculated early and late finish dates;
 - (iii) Actual start and actual finish dates, and remaining duration, in calendar, for those activities started and not completed;
 - (iv) Days ahead and/or behind schedule of milestones related to the Key Dates and the Times for Completion;
 - (v) Physical percent complete for each activity;
 - (vi) A float analysis of the longest path through the Programme detailing potential delays and areas for acceleration. Actual start and finish dates shall be indicated for each activity as appropriate. Completed activities shall be omitted from remaining float and late start sorts.
- (j) The deliberation of all meetings shall be recorded by the Engineer as Minutes of Meeting.

4 Co-ordination Meeting

The Contractor shall organise co-ordination meetings as required with related parties. Before conducting such co-ordination meetings with the related parties, the Contractor shall give prior notice and agenda of the meeting to the Engineer and the Employer.

5 Meetings called by the Contractor

The Contractor’s Representative may request the Engineer to meet him and other Contractor’s Personnel whenever necessary to discuss the issues pertaining to the Works and the Contract. The Engineer shall comply with the request where physically possible. The Contractor shall prepare a proposed agenda for the meeting and submit it to the Engineer when making request for the meeting.

6 Other Meetings

The Contractor’s Representative shall attend, and shall arrange for representatives of the Subcontractors, public departments, transportation companies, utility undertakings and other contractors employed by the Employer to attend, meetings when required by the Engineer. The Contractor shall inform the Engineer in 48 hours (or such a shorter period as agreed by the Engineer) before conducting meetings with the public departments, transportation companies, utility undertakings and/or the other contractors and shall give the Engineer an opportunity to attend such meetings.

7 Minutes of Meetings

The Engineer in principle shall be responsible for the preparation of the minutes of meetings, circulating it to the parties who attended the meeting before the next relevant meeting. The Engineer shall also be responsible for the minutes of ad-hoc meetings in a similar manner, unless otherwise agreed with the Employer. All minutes of meetings shall be prepared in the Language stipulated in the Particular Conditions. The Engineer shall submit six (6) copies of such minutes to the Employer, unless otherwise instructed by the Employer.

4040 INTERFACE, COORDINATION AND COOPERATION WITH OTHER PARTIES

1 General

- 1.1 The construction of Priority Section is to be done through several packages of works as defined in Clause 3 of Sub-Division 1020 of the General Specifications.
- 1.2 The careful coordination of all technical and programming matters between the relevant parties is a critical element in achieving a fully coordinated construction process. This Sub-Division describes the Contractor's responsibilities with regard to interface management and coordination and includes interfacing with other contractors employed by the Employer (referred to as "Interfacing Contractors" hereinafter), and Interfacing Parties including entities such as local authorities, statutory bodies, public utility companies, private service providers, consultants or contractors whether or not specifically mentioned in the Contract. This responsibility is not limited to a particular number of Interfacing Contractors and Interfacing Parties, and all interfaces as required in the Contract are the sole responsibility of the Contractor.
- 1.3 Interfaces internal to the Contract are the sole responsibility of the Contractor and are not covered by this Sub-Division.

2 Responsibilities of the Contractor

- 2.1 So as to ensure that the whole Project including Interfacing Contractors' works as well as the Contractor's Works shall be executed in the most efficient manner in the best interest of the Employer, the Contractor shall:
- a) Take the lead in the management of the coordination process with Interfacing Contractors and Interfacing Parties.
 - b) Accord access to the Site and/or services to any related party in the Contract including members of the Interfacing Contractors, Interfacing Parties and the Engineer/Employer.
 - c) Not impede the work of the Interfacing Contractors and Interfacing Parties and shall accord them all reasonable opportunities and facilities.
- 2.2 The Contractor shall, in accordance with the Works Requirements, coordinate and integrate the:
- a) Contractor's own Works under the Contract with the works of the Interfacing Contractors and Interfacing Parties.
 - b) Works of the Interfacing Contractors and Interfacing Parties.
- 2.3 The Contractor shall comply with any instruction which the Engineer may give. The Contractor's responsibilities shall neither be mitigated nor in any way affected by virtue of similar responsibilities being placed on the Interfacing Contractors. The Contractor shall be responsible for the detailed coordination of his manufacturing, installation, construction, testing and commissioning activities.
- 2.4 Where the Contractor or an Interfacing Contractor is assigned a leading role, he is referred to as the "Lead Contractor". The Lead Contractor shall take the lead in the management of the coordination for specific interface requirement(s), with the Contractor and Interfacing Contractors..
- 2.5 The Contractor shall carefully review any pertinent information made available by the Engineer relating to the nature and programming of all related parties' contracts and use such information in his planning of the Works.
- 2.6 The Contractor shall communicate and exchange information directly with the Interfacing Contractors and Interfacing Parties with a copy to the Engineer for information. Information as

- necessary to fulfil the Contractor's interface obligations shall be directly requested and obtained from the Interfacing Contractors and Interfacing Parties with a copy to the Engineer for information and receipt acknowledged.
- 2.7 The Contractor shall ensure that the Contractor's requirements, including any design inputs to other packages, are provided to all related parties of the Interfacing Contractors and Interfacing Parties before the cut-off dates as identified in the Interface Management Plan to be developed by the Contractor and consented to by the Engineer.
- 2.8 Where other contracts requiring interface are yet to be awarded, the Contractor shall proceed with coordination activities with the Engineer, until such time as the Interfacing Contractors are employed by the Employer.
- 2.9 The Contractor shall take all reasonable steps to ensure that the Works are integrated with the manufacture, installation, execution and testing of such other works and shall in particular but without limitation to:
- (a) Comply with any instruction which the Engineer may give for the integration of the Works with the design of any other part of the Project;
 - (b) Consult, liaise and cooperate with those responsible for carrying out such other works, including where necessary, in the preparation of the respective designs and drawings, the preparation of coordinated programmes, method statements, coordination drawings and specifications together with arrangements of service priorities and zoning to coordinate the priorities of tasks and division of the area together with the items mentioned previously; and
 - (c) Participate in the Integrated Testing and Commissioning of the Works with the Interfacing Contractors and Interfacing Parties and demonstrate to the satisfaction of the Engineer that the Works have been constructed in a manner compatible with the works of the Interfacing Contractors and Interfacing Parties.
- 2.10 There shall be a continuous requirement for coordination by the Contractor between Interfacing Contractors/Interfacing Parties.
- 2.11 During the Works the Contractor shall provide within the Site the facilities including, but not limited to, staging, storage and unloading, and temporary storage areas for the temporary use of Interfacing Contractors and/or Interfacing Parties, as may reasonably be required during the construction/installation and commissioning process. Where separate locations need to be provided for each of the Interfacing Contractors and/or Interfacing Parties, prior to construction commencing, specific details shall be coordinated and agreed between the Contractor and the Interfacing Contractors and/or Interfacing Parties.
- 2.12 The Contractor shall attend meetings with Interfacing Contractor and Interfacing Parties (if necessary) and raise/provide correspondence in this regard in accordance with the Works Requirements and/or as instructed by the Engineer. The identity of the Interfacing Contractor(s) and/or Interfacing Parties may not be known before the execution of the Contract but this shall not be a grounds for the Contractor to object to the subsequent appointment of any Interfacing Contractor and/or Interfacing Party.
- 2.13 The Contractor shall in accordance with the requirements of the Contract and instructions of the Engineer coordinate his own Works with the works of Interfacing Contractors and/or Interfacing Parties strictly adhering to the Coordination and Interfacing Programme as detailed in Clause 8 and Interfacing Parties [Coordination and Interfacing Programme] in this Sub-Division, and shall accord the Interfacing Contractors and/or Interfacing Party's all reasonable opportunities for carrying out their works.
- 2.14 If the Contractor suffers delay by reason of failure caused by any Interfacing Contractor/Interfacing Party to meet the specified installation interfacing and/or coordination

completion dates resulting in delay beyond the extent which could be reasonably foreseen by an experienced contractor at the time when the Coordination and Interfacing Programme is formulated and consented by the Engineer, then the Engineer shall take such delay into consideration in determining any extension of time to which the Contractor is entitled under the Contract.

- 2.15 If any act or omission of the Contractor, whether directly or indirectly, results in the delay in execution of the works of an Interfacing Contractor and/or Interfacing Party associated with the execution of the project, the matter shall be settled by the Engineer under Sub-Clause 3.7 [Determination] and Sub-Clause 20.1 [Claims] of the General Conditions of Contract.
- 2.16 The Contractor shall coordinate the access and delivery routes and ensure that all provisions for access and the delivery of Plant, Goods and Materials are coordinated with the delivery route drawings of Interfacing Contractors/Interfacing Parties. The Contractor shall coordinate with the Interfacing Contractors and Interfacing Parties with regard to the details to be provided by them for the provision of any access to the Works for the Contractor's Goods and Materials in accordance with the Coordination and Interfacing Programme.
- 2.17 All requests for information or clarification, acknowledgement of receipt of information and any official communication between the Contractor and Interfacing Contractors/Interfacing Parties shall be made in writing with a copy to the Engineer for information.
- 2.18 The Contractor shall notify the Engineer in writing of any problems encountered in obtaining necessary information and/or lack of cooperation from an Interfacing Contractor/Interfacing Party. In the event that the Engineer considers that the resolution of an interface is not proceeding satisfactorily, the Engineer shall review the matter and establish a coordinated plan directing the Contractor and the Interfacing Contractors/ Interfacing Parties regarding the required action.
- 2.19 The Contractor shall arrange meetings with the Interfacing Contractors and the Interfacing Parties to clarify particular aspects of interface requirements of the Works. The Contractor shall advise the Engineer in advance of the date, time and location of such meetings. The Engineer may elect to attend such meetings as he deems necessary.
- 2.20 The Contractor shall prepare minutes recording all the matters discussed and agreed at all the meetings.
- 2.21 The Contractor shall ensure that copies of all correspondence, drawings, meeting minutes, programmes, etc. relating to the Contractor's coordination and interfacing meetings with the Interfacing Contractors and Interfacing Parties or the sharing of correspondence, drawings, programmes, etc. are issued to all concerned parties and the Engineer no later than seven days from the date of such meetings and the date of issue of such correspondence, drawings, programmes, etc.
- 2.22 The Contractor shall, in carrying out his coordination and interfacing responsibilities, raise and provide sufficient information for the Engineer to decide on any disagreement between the Contractor and the Interfacing Contractors/Interfacing Parties. If the Contractor, despite having made all reasonable efforts, cannot resolve such disagreement with the Interfacing Contractor/Interfacing Party in the execution his interfacing duties, the Contractor shall then refer said disagreement to the Engineer. The Engineer shall then issue a final and binding decision on the Contractor and the Interfacing Contractors.
- 2.23 Should it appear to the Engineer that the Three Month Rolling Programme does not conform with the Coordination and Interfacing Programme, the Contractor shall be required to revise all such programmes so as to conform to the approved Contractual Works Programme.

3 Interface Administration System

- 3.1 The Contractor shall establish an Interface Administration System (the "IAS") and participate in the activities with the Interfacing Contractors and Interfacing Parties. The IAS shall include, but not be limited to, the following provision of:

- (a) An Interface Manager who shall be responsible for and the authority to resolve interface matters to the satisfaction of the Engineer;
- (b) The necessary support team for the IAS;
- (c) Procedures and details for response to, confirmation of and making written agreements with regard to interfaces;
- (d) Details of the arrangement for attendance at coordination and interface meetings (including those that may be arranged by Interfacing Contractors, Interfacing Parties or the Engineer). The representatives of Contractor, Interfacing Contractors and Interfacing Parties shall be empowered to make agreements on coordination and interfaces. The Contractor shall arrange regular meetings for the Engineer to monitor the status of coordination and interfaces and may arrange special coordination and interface meetings as may be necessary to resolve specific issues. The Engineer can require the Contractor to arrange a special coordination and interface meetings if necessary. The Contractor may request assistance from the Engineer to arrange coordination and interface meetings on particular subjects;
- (e) Details to the Engineer of regular status information and/or details of coordination and interfaces including copies of relevant correspondence and material; and
- (f) Details to the Engineer of access to information for the purpose of conducting audits on interface compliance and for confirming that interface coordination and interface management is proceeding consistently with the requirements of the Contract.

4 Construction Interface

- 4.1 Construction coordination and interface shall be required throughout the duration of the Contract and shall commence from the time of the LOA until the Taking Over of the Works.
- 4.2 The Contractor shall coordinate and interface with the Interfacing Contractors and Interfacing Parties to execute the respective construction activities efficiently.
- 4.3 The Contractor shall cooperate with Interfacing Contractors and Interfacing Parties on all Site-related matters including but not limited to Site access and occupation, safety, verification of work compatibility and survey control, etc. The Contractor shall advise the Interfacing Contractors and Interfacing Parties in advance when a construction item is ready for site inspection to verify compatibility with the Interfacing Contractors' and Interfacing Parties' needs and shall facilitate access to the Site for the Interfacing Contractors and Interfacing Parties.
- 4.4 At or near the completion of the construction of any interface-related element of the Contractor's Work, the Contractor shall:
 - (a) Advise the Interfacing Contractors and Interfacing Parties that the as-constructed interface-related Works can be inspected and provide the necessary access to the Site and its occupation.
 - (b) Agree in writing to the Interfacing Contractors and Interfacing Parties, and as consented by the Engineer, on the adoption of any Interfacing Contractors' and/ or Interfacing Parties' applicable comments on the constructed Works.
- 4.5 On advice from the Interfacing Contractor or Interfacing Party that an as-constructed interface-related element is ready for inspection, the Contractor shall:
 - (a) Conduct on-site inspections of the Works elements and give comments in writing to the Interfacing Contractor and/or Interfacing Party.

- (b) Agree in writing to the Interfacing Contractor or Interfacing Party that the as-constructed Works meet the coordination and/or interface requirements.

- 4.6 Prior to applying for a Taking-Over Certificate, the Contractor shall obtain written confirmation from each Interfacing Contractor and each Interfacing Party, that the interface elements meet the requirements of the Interfacing Contractors and Interfacing Parties. If any Interfacing Contractor or Interfacing Party withholds such confirmation, the Engineer shall decide on further action, as requested by the Contractor prior to the issue of a Taking-Over Certificate.
- 4.7 Where Contractor's Works are identified as failing to meet the requirements of the Contract and such shall impact the Interfacing Contractors' works or Interfacing Parties' works, the Contractor shall submit the proposed remedial measures to the Engineer for review and shall copy the same to the Interfacing Contractors and/or Interfacing Parties.
- 4.8 The Contractor shall coordinate and interface with the Engineer with respect to all construction/installation activities and shall follow the Engineer's instructions for requesting access for such activities.
- 4.9 The Contractor shall undertake construction/ installation in accordance with the approved (Contractual) Works Programme.
- 4.10 The Contractor shall coordinate and interface with Interfacing Contractors and/or Interfacing Parties for the planning and execution of the testing and commissioning activities.

5 Preparation of Interface Documents

- 5.1 The Contractor shall prepare as required the following coordination and interface documents which shall be used to completely define the Contractor's coordination and interface details:
- (a) Interface Table;
 - (b) Coordination and Interfacing Programme; and
 - (c) Interface Management Plan (IMP).
- 5.2 These coordination and interface documents shall be submitted for review by the Engineer in order to obtain the Engineer's Approval. For all subsequent updates, these documents shall be submitted to the Engineer for information, review and comment. A summary of principal issues with suitable solutions shall be included in each Monthly Progress Report.

6 Interface Table for Supply and Installation Items

- 6.1 The Interface Table shall include at least (but without limitation) the items related with the Contractor's Contract described in Appendix 4000-1 of Division 4000. The Interface Table, which describes the relationships between the Contractor and Interfacing Contractors and/or the Interfacing Parties and their roles and responsibilities, shall be submitted to the Engineer for consideration after further development of the above attached Interface Table.
- 6.2 The Interface Table shall indicate the demarcation of scope of responsibilities between the Contractor and the Interfacing Contractors and the Interfacing Parties.
- 6.3 Within sixty (60) days of notification from the Engineer of the identity of each Interfacing Contractor, the Contractor shall develop and submit to the Engineer an Interface Table that is mutually acceptable to both the Contractor and the Interfacing Contractors and Interfacing Parties.

7 Coordination and Interfacing Programme

- 7.1 The Contractor shall prepare and submit a Coordination and Interfacing Programme to the Engineer in accordance with the Works Requirements and/or as instructed by the Engineer as detailed below.

- 7.2 The Coordination and Interfacing Programme is one of the Works Programme (or Work Segment Programmes) as detailed in Clause 4 of Sub-Division 4070 [Works Segment Programme] of the General Specifications.
- 7.3 The Coordination and Interfacing Programme shall be submitted to the Engineer for consent within sixty (60) days from the Letter of Acceptance (LOA) to allow for checking and monitoring by the Engineer.
- 7.4 The Coordination and Interfacing Programme shall include detailed activities describing all aspects of the works of Interfacing Contractors and Interfacing Parties to meet all Sections or Milestones given in the Contract and be clearly linked to other programmes such as the (Contractual) Works Programme (or Work Segment Programmes) to streamline the Works and the works of the Interfacing Contractors and Interfacing Parties.
- 7.5 The Coordination and Interfacing Programme shall indicate the physical areas to which the Interfacing Contractors and Interfacing Parties require access, with access dates, durations required and the required degree of completion of the Works prior to the access dates by Interfacing Contractors and Interfacing Parties.
- 7.6 It is the Contractor's responsibility to ensure timely coordination with the Interfacing Contractors and Interfacing Parties to review, revise and finalise his Coordination and Interfacing Programmes so as not to affect the progress of the Works and/or the works of the Interfacing Contractors and Interfacing Parties.
- 7.7 The Contractor shall note that the following conditions apply to the works of the Interfacing Contractors and/or Interfacing Parties:
- (a) The Interfacing Contractors and/or Interfacing Parties shall not have exclusive access to any part of the Site except with the consent of the Engineer;
 - (b) The Contractor shall take note that concurrent time allocations for certain areas may be given to more than one Interfacing Contractors and or Interfacing Parties. The Contractor shall coordinate the Works in such areas with the works of the Interfacing Contractors and/or Interfacing Parties and report to the Engineer for his review and consent;
 - (c) The absence of a Coordination and Interfacing Programme date or construction/installation period for the Interfacing Contractors and/or Interfacing Parties in a specific area shall not prejudice the right of the Engineer to establish a reasonable Coordination and Interfacing Programme date or construction/installation period for that area;
 - (d) The Contractor and the Interfacing Contractors shall comply with the Sections or Milestones and other successive activities specified in the Coordination and Interfacing Programme

8 Interface Management Plan (IMP)

- 8.1 The Contractor shall develop and submit to the Engineer, within sixty (60) days from the LOA, an IMP for all interface issues that may arise during the construction, testing and commissioning of the Works, in consultation with the Interfacing Contractors / Interfacing Parties and the Engineer. The IMP shall allow adequate time periods for each of the Interfacing Contractors/ Interfacing Parties and the Contractor to install their Plant, equipment and Materials in the designated areas.
- 8.2 The IMP shall:
- (a) Identify all the systems and sub-systems and facilities with interfacing requirements;
 - (b) Define as far as possible the authority and responsibility of the contractor's, the Interfacing Contractor's and interfacing party's involved in interface management and development;

- (c) Identify the information to be exchanged, together with the management and technical skills required for the associated development of the works, at each phase of the contractor's and Interfacing Contractor's and Interfacing Parties' project life-cycles;
- (d) Address the Contractual Works Programme (or Work Segment Programmes) of the Contract to meet the Contractor's sections or Milestones and the Interfacing Contractors' sections or milestones and highlight any programme risks requiring the Engineer's attention;
- (e) Include relevant consideration of the requirements of "Safety, Health and Environment Management" as described in Division 8000 of the General Specifications;
- (f) Address the supply, installation, testing and commissioning programmes of the Contract to meet Interfacing Contractors' Sections or Milestones, and highlight any programme risks requiring management attention; and
- (g) Indicate dates for commencement and completion of each principal activity by the Contractor and those of the Interfacing Contractors and Interfacing Parties, including delivery and installation of Plant, equipment and Materials.

8.3 An example of the typical contents to be described in an IMP is included in Chapter I [Contents of Interface Management Plan], Appendix 4000-1 of Division 4000.

8.4 After the Engineer reviews and issues approval to the IMP, the Contractor shall execute the Works accordingly.

8.5 The Contractor shall raise and apprise the Engineer immediately of any difficulty in developing a mutually acceptable IMP.

9 Employer's / Engineer's Input

9.1 The Employer or Engineer or both will coordinate the activities of the Contractor with reference to interfacing with third parties during all the phases of the Contract.

9.2 The Employer or Engineer, within the scope of the relevant Contract provisions, may assist the Contractor in the following fields:

- (a) Coordination and interface with state and local authorities for the timely receipt of required permits, certificates and approvals related to the construction process;
- (b) Coordination and interface with state and local authorities for the implementation of acquisition procedures for any additional land areas that may be required by the Contractor; and
- (c) Any other fields or activities related to the Contract as may be required for the purposes of facilitating the Contractor's performance.

9.3 The Engineer shall conduct a coordination and interface meeting with the interfacing parties every fortnight with the Contractor which may be attended by the Employer. The primary objective of the meeting will be to review progress of the coordination and interface activities.

9.4 The support and assistance of the Employer and/or the Engineer shall not release the Contractor of any of his obligations under this Contract.

10 Detailed Interface Description (DID)

10.1 The DID is the document that provides a clear technical description of each of interface in the Interface Table.

10.2 Any revision to the DID shall be mutually acceptable to both the Interfacing Contractors and Interfacing Parties. Only then shall this be submitted to the Engineer for his review.

10.3 DID shall contain the following items:

Table 4.1: Detailed Interface Description

S.No.	Detailed Interface Description
1	Item number and name of interface in Interface Table
2	Name of the Contractor and Interfacing Contractor/Interfacing Party
3	Confirmation Table of both the Contractor and Interfacing Contractor/Interfacing Party
4	Creation date and modification date
5	Correction history
6	The following items shall be described: physical interface, functional interface, protocols, software and data interface, naming conversion, design constrains, environmental conditions, and drawings
7	Reference Documents

4050 CONTRACTOR'S OBLIGATIONS FOR OBTAINING AUTHORITIES' APPROVALS

1 Approvals from Public Authorities and Agencies

The Contractor shall make all necessary arrangements with and obtain all necessary approvals from public authorities and agencies, utility agencies and other relevant /competent authorities. Such public authorities and agencies will include the following:

- (a) NHAI (National Highway Authority of India);
- (b) HSIIDC
- (c) Public Works Department
- (d) Local Authorities and stake holders;
- (e) Local Municipal Corporation or Council;
- (f) Urban Local Bodies; and
- (g) Any other agency or stakeholder whose approval, consent or permit is necessary for the implementation of the Works.

The Contractor shall be responsible for obtaining all necessary approvals and permits from public authorities and Government or Private agencies and other relevant organizations necessary with respect to the construction activities and meetings with Public Authorities and Agencies. The Employer shall facilitate these activities to support the Contractor. Approvals from Northern railway for working near/on the railway track and traffic block will be taken by HRIDC. However, the requirement for the duration of working near the railway track or the traffic block required shall be submitted by the Contractor to HRIDC giving detailed justification for the same. The Contractor shall also be required to attend the meeting with Northern Railway along with HRIDC whenever required.

When the Contractor arranges meetings with Interfacing Parties including government departments, utility agencies or Interface Contractors, it shall inform the Engineer at least four (4) official working days (excluding general holidays) or such shorter period permitted by the Engineer, before they are to be held and shall give the Engineer and the Employer the agenda and the objective of the meetings. The Employer and Engineer may require that certain organizations are not contacted directly by the Contractor and that communication is initiated by the Employer, should this be necessary the Engineer shall provide a list of such organizations to the Contractor.

2 Correspondence with Public Authorities and Agencies

Both, hard (one (1) set) and soft copies of correspondence received from or dispatched to public authorities, utility undertakings, and other agencies shall be submitted to the Engineer and the Employer for information within two (2) days of receipt or dispatch.

4060 FACILITIES FOR EMPLOYER'S/ ENGINEER'S PERSONNEL

1 Site Offices

1.1 General

The Contractor shall construct Site Office and Site Huts as per the drawings provided by the Employer during the periods as specified hereafter for the use of the Employer's and Engineer's Personnel. The space for Site Offices will be provided by the Employer free of cost. Payment of all items of the works mentioned in Sub-Division 4060 shall be made under the relevant items of Bill of Quantities (BOQ). The Contractor shall construct, the Site Offices for the Employer's and Engineer's use within ninety (90) days after the Commencement Date:

1.2 Summary of Site Offices

Table 4.2: The Site Offices comprise the following:

Item No.	Description	Quantity	Location
1	Site Office	1 no.	Near Manesar Station
2	Site Hut	NIL	NA

4070 WORKS PROGRAMME AND SCHEDULE

1 General

The programme has the following three primary purposes in three respective phases of the contract procedure. The purpose for each of these respective phases is as set out below:

1.1 Programme in Technical Proposal

The Tender Programme submitted as a part or parts of the Tenderer's Technical Part, which is a part of this Contract, shall bind the Contractor until the Contractual Works Programme specified hereunder is consented to by the Engineer.

1.2 Work Segment Programmes and Supporting Reports

Based on the Contractual Works Programme, the Contractor shall submit sub-divided and detailed programmes with respect to all work segments, along with status reports of the Works, to the Engineer for checking and monitoring the Works. Each programme produced and submitted to the Engineer shall be a detailed time window of the Contractual Works Programme.

1.3 Contractor's Deliverables

The Contractor shall consider in his programme, time period for submission and revision by the Contractor and review and notice by the Engineer for the Contractor's deliverables.

2 Methodology

Unless otherwise instructed by the Engineer, the programme shall be in the form of a Critical Path Method (CPM) network showing the critical path, together with narrative statements. The programme shall also be submitted in the form of a time bar-chart showing a critical path and S-curve (cumulative progress in percentage). The time bar-chart programme shall list all the main activities and connected sub-activities

The network shall be prepared in accordance with current recognised and accepted good planning and programming practice and shall show graphically the chain of activities/sub-activities and their sequential relationship with each other from the Commencement Date to the date of issue of the Taking-Over Certificate of the whole of the Works. It shall include all activities with their durations and shall meet the provisions of the Contract in all respects. It shall be noted that the Contractor does not have an exclusive right to use free and total float without the consent of the Engineer.

In preparing the CPM network and the time bar-chart programme showing a critical path and S-curve, the Contractor shall make due allowances for delays, holidays, local working conditions, maintenance of equipment, trial runs, and similar items. Under no circumstances shall the CPM network or the time bar-chart programme show a date for the taking over of the Works date beyond the Time for Completion.

3 Contractual Works Programme

The Tender Programme in the Contractor's Technical Part shall be further developed by the Contractor into the detailed time programme referred to in Sub-Clause 8.3 of the General Conditions and shall be submitted to the Engineer within 28 days after the Commencement Date. Upon consented by the Engineer, this programme shall be referred to as the Contractual Works Programme and shall serve as the base against which the Contract progress shall be monitored. The Contractual Works Programme shall supersede all other programmes previously submitted and shall be deemed to be the programme on which the Contractor has based his Accepted Contract Amount and in accordance with which he shall execute the Works within the specified Time for Completion.

The Contractual Works Programme shall be the highest priority programme. Other programmes with respect to structure / priority, shall be a particular time window taken from the Contractual Works Programme and detailed in terms of their purpose.

If, at any time, actual progress is too slow to complete within the Time for Completion, or progress has fallen (or will fall) behind the planned progress indicated in the current Contractual Works Programme, or both, by a time of eight (8) weeks, then the Engineer shall instruct the Contractor to submit a revised Contractual Works Programme and supporting report describing the revised methods and resources which the Contractor proposes to adopt in order to expedite progress and to complete the Works within the specified Time for Completion as stipulated in Sub-Clause 8.2 of the General Conditions.

Any changes to the Contractual Works Programme shall be subject to the consent of the Engineer and shall not relieve the Contractor of his responsibility to complete the Works within the Time for Completion as per the Contract.

3.1 Work Segment Programmes

3.1.1 General

The Contractual Works Programme shall be divided into sub-programmes of work segments of manageable size, addressing in more detail certain specific segments of the Works, which shall collectively be referred to as Work Segment Programmes. The categories of Work Segment Programmes include but are not limited to the following:

- (i) Survey Programme;
- (ii) Site Investigation Programme;
- (iii) Temporary Facilities Programme;
- (iv) Procurement Programme;
- (v) Construction Programme;
- (vi) Co-ordination and Interfacing Programme;
- (vii) Inspection, Testing and Commissioning Programme;
- (viii) Programme of Tests on Completion and Taking Over.

The Work Segment Programmes shall be further substantiated by supplementary programmes upon request by the Engineer (such as a Three Months Rolling Programme) addressing a succeeding time window (weeks or months) in more detail. Further supplementary programmes shall be added as required to adequately plan and monitor specific Work Segments or sets of activities.

Unless otherwise specified, all the Work Segment Programmes shall be submitted to the Engineer for consent within fifty-six (56) days from the Commencement Date.

3.1.2 Programme Requirements

The Work Segment Programmes and all other programmes required to be provided in accordance with the Contract shall comply with the following requirements unless otherwise instructed by the Engineer:

- (a) All programmes submitted under this Contract shall be prepared, scheduled, executed and reported using the latest version of CPM scheduling software of Primavera P6 Project Planner.
- (b) All programmes shall be accompanied by a Programme Analysis Report as described hereinafter.
- (c) The Contractor is responsible for determining the sequence of activities, the time estimates for the design, procurement, construction, testing and commissioning, training and completion activities and the means, methods, techniques and procedures to be

employed. Programmes identified herein shall represent how the Contractor will execute the Works in compliance with the Contract requirements. The Contractor shall ensure that programmes are current and accurate and are properly monitored in a timely manner, updated and revised to accommodate current conditions of the Works and so as to be in compliance with the requirements in the Contract.

- (d) The Gregorian calendar shall be used for the planning and execution of the Works. All programme submissions shall include details of the Contractor's allowance for public holidays, recognized festivals, days of rest and other non-working periods. If a Milestone falls on a public holiday or non-workday, it shall be effective the next working day.
- (e) The planning unit for the duration of all programme activities shall be the day. Any activity having a duration of more than sixty (60) days shall be divided into sub-categories that shall not exceed sixty (60) days.
- (f) CPM programmes shall reflect status using remaining duration and percent complete;
- (g) All programmes shall be fully resource-loaded as appropriate or as required by the Engineer, covering all stages and aspects of the Contract and shall include, but not be limited to:
 - (i) Major manpower for design, construction, testing and commissioning and completion;
 - (ii) Number of itemized contractor's equipment;
 - (iii) Drawings and other design deliverables;
 - (iv) Principal quantities of components or parts;
 - (v) Principal quantities of bulk materials including, for example: cut/fill volumes, piles, concrete, steel reinforcement, cabling, piping, ducting, etc.; and
 - (vi) Subcontractor's deliverables.
- (h) Each activity shall be coded to indicate, as a minimum, the work group or entity responsible for the activity; the area, facility or location; when and which Interfacing Contractors, Interfacing Parties or other entities are involved.
- (i) All the activities including Milestones shall be coded so as to be separately identifiable. The Contractor shall be required to assign additional activity codes as required by the Engineer.
- (j) Respective Work Segment Programmes shall be identified and detailed in the categories as specified herein below.

3.1.3 Survey Programme

The Contractor shall prepare and submit to the Engineer for review and consent a detailed Survey Programme which shall include the durations required for:

- (a) The validation of data provided by the Employer; and
- (b) Any additional surveys considered necessary by the Contractor.

The Survey Programme shall indicate the physical areas to which the Contractor requires access, together with the access dates and durations required. A Survey Report shall also be submitted along with the Survey Programme, containing all survey data and results, and including any Site location plans and setting-out plans required in the Site Investigation Programme.

3.1.4 Site Investigation Programme

The Contractor shall prepare and submit to the Engineer for review and consent a detailed Geotechnical Investigation Programme based on his proposed design for Temporary Works and construction methods, giving sufficient consideration to the timings within the Contractual Works Programme.

The Site Investigation Programme shall include, but not necessarily be limited to, exploratory drillings, plate load tests, and pile load tests as specified in Works Requirements – Technical Specifications, giving due consideration to the reasonable time required by the Engineer for review of the investigation data.

3.1.5 Temporary Facilities Programme

The Contractor shall prepare and submit to the Engineer for review and consent a Temporary Facilities Programme, detailing all major temporary facilities to be provided by the Contractor, including but not limited to:

- (a) Temporary offices, stores, workshops, storage areas, accommodation, major items of Contractor's Equipment;
- (b) Associated temporary services, such as electricity, water, telephone, internet, drainage, sewerage, etc.
- (c) Temporary access roads to and within the Site;
- (d) Sources of natural materials, such as borrow pits and quarries;
- (e) Any other temporary facilities together with their associated temporary services.

The Temporary Facilities Programme shall include the duration(s) required to arrange land, if required by the Contractor, including land within the right-of-way (ROW) for temporary facilities and Temporary Works (if requested by the Contractor to the Engineer / Employer). The Temporary Facilities Programme shall also allow for any durations required for:

- (a) Making payments to landowners;
- (b) payment of royalty charges etc.;
- (c) the required approval process;
- (d) design and construction of temporary facilities and temporary works;
- (e) design, procurement, transportation and delivery of contractor's equipment;
- (f) demobilization and reinstatement.

3.1.6 Procurement Programme

Within fifty-six (56) days from the Commencement Date the Contractor shall prepare and submit to the Engineer for review and consent an initial Procurement Programme for items manufactured off-Site.

Not less than three (3) months prior to the first shipment of each category of manufactured Plant or Materials or both, the Contractor shall prepare and submit an updated Procurement Programme to the Engineer for review and consent. The Procurement Programme shall:

- (1) Show the interdependencies of the various Contractor's, Subcontractors' and suppliers' design disciplines;
- (2) Identify items produced or assembled within and outside the Country or both, together with the durations required for manufacture, shipping, inland transportation and off- and on-Site storage;

- (3) Separately identify any Plant and Materials which are subject to long lead times or component parts or items manufactured outside the country of assembly or testing or all;
- (4) Include relevant information for each major/significant item of Plant and Materials (including any major/significant components), which shall include, but not be limited to the following:
 - (i) Name and description detailing the supplier/sub-supplier;
 - (ii) Drawing information (where appropriate), title, drawing status, submission dates, shop drawings/ fabrication drawing preparation, etc.;
 - (iii) The manufacturing process, manufacturing of test pieces, testing programme (type tests and factory acceptance tests), trial production, monthly production and supply of components;
 - (iv) The assembly process, erection and assembly sequences (particularly for the first pieces) prior to shipment, test assemblies, monthly assembly requirements;
 - (v) Quality release from factory, factory storage, transportation and delivery to Site; and
 - (vi) Off-Site inspections and tests, which shall include details of factory inspections, tests and witnessing required for the Contractor's, Subcontractors' and suppliers' procurement and manufacturing activities.

From the base data above, the Contractor shall prepare and submit to the Engineer an exceptions report, detailing any Plant or Materials (including components) that are in delay. This report shall include the reason for each delay and indicate what action the Contractor is taking to recover the delay.

3.1.7 Construction Programme

The Contractor shall prepare and submit a Construction Programme to the Engineer for review and consent. The Construction Programme shall in general consist of separate Construction Programmes for earthwork, minor bridges, substructure of major bridge, Manesar station building, other structures & services and retaining walls for all Works Segments.

The Construction Programmes shall be identified by distinctive names and/ or numbers. Programmes for all major activities with respect to each segmented stretch of the alignment, as per the examples below, shall be submitted to the Engineer for consent:

- a) Construction Programmes for earthwork;
- b) Construction Programmes for construction of minor bridges;
- c) Construction Programmes for construction of substructure of major bridge.;
- d) Construction Programmes for construction of Manesar station building, other structures & services;
- e) Construction Programmes for construction of retaining walls;
- f) Construction Programme for any other items considered of importance by the engineer in order to carry out proper monitoring of the Works.

3.1.8 Coordination and Interfacing Programme

The Contractor shall prepare and submit a Coordination and Interfacing Programme to the Engineer for review and consent. The requirements for the Coordination and Interfacing Programme are set out in Clause 8 [Coordination and Interfacing Programme] of Sub-Division 4040 [Interface, Coordination and Cooperation with Other Parties] of the General Specification.

3.1.9 Inspection, Testing and Commissioning Programme

Within fifty-six (56) days from the Commencement Date the Contractor shall prepare and submit an initial Inspection, Testing and Commissioning Programme to the Engineer for review and consent.

Not less than three (3) months prior to the first inspection or test, the Contractor shall prepare and submit to the Engineer for review and consent an updated Inspection, Testing and Commissioning Programme.

The Inspection, Testing and Commissioning Programme shall include:

- a) Activities for the preparation, submittal, review and consent of the various inspection, testing and commissioning procedures;
- b) Demonstrate the sequencing and logical dependencies and correlations between the various on-Site inspection, testing and commissioning activities required for the Works.

Prior to accepting any manufactured Plant and Materials for use in the Permanent Works or Temporary Works to the extent required for safety considerations. The Engineer shall carry out an inspection and witness the testing carried out by the Contractor as prescribed in the respective standards and codes.

3.1.10 Programme of Tests on Completion and Taking Over

Within fifty-six (56) days from the Commencement Date the Contractor shall prepare and submit an initial Programme of Tests on Completion and Taking Over to the Engineer for review and consent.

Not less than three (3) months prior to the first test, the Contractor shall prepare and submit to the Engineer for review and consent an updated Programme of Tests on Completion and Taking Over.

The Programme of Tests on Completion and Taking Over shall be fully detailed and include, but not be limited to:

- (1) Activities for the preparation, submittal, review and consent of the various inspection, testing and commissioning procedures;
- (2) Demonstrate the sequencing and logical dependencies and correlations between the various on-site inspection, testing and commissioning activities required for the works.

4 Three Months Rolling Programme

The Three Months Rolling Programme shall be an expansion of the Work Segment Programmes, covering sequential periods of three months. The Three Months Rolling Programme shall provide more detail of the Contractor's plan, organization and execution of the work within these periods. In particular, the Contractor shall expand each activity planned to occur during the next three (3) month period, if necessary, to a daily or weekly level of detail.

The Three Months Rolling Programme shall be developed as a Critical Path Method (CPM) network and shall be presented in bar chart and time-scaled network diagram format. Bar charts shall be presented on an A3 size and time-scaled networks diagrams on an A1 size reproducible media. Tasks in the programme shall be derivatives of and directly related to tasks in the consented Work Segment Programmes.

The Contractor shall describe the discrete work elements and work element inter-relationships necessary to complete all Works and any separable parts thereof, including work assigned to Subcontractors and suppliers. Each activity in the Three Months Rolling Programme shall be coded or described so as clearly to indicate the corresponding activity in the Work Segment Programmes.

The Three Months Rolling Programme shall be issued on a monthly basis.

Within 14 days from the Commencement Date, the Contractor shall submit to the Engineer for consent an initial Three Months Rolling Programme. The initial submission shall show in detail

all activities that have commenced or are due to start within the first three calendar month period to meet Milestones and any other dates set out in the Contract. Thereafter, the Contractor shall submit a new Three Months Rolling Programme every month as part of the Monthly Progress Report.

The Three Months Rolling Programme shall, after the initial submittal:

- (1) Provide details of all activities that are in progress, or are due to start, within the forthcoming two (2) month period, and the previous one (1) month period shall also be shown;
- (2) Be updated every month and be submitted concurrent with the monthly progress report;
- (3) Highlight all required dates for transmittal or receipt of information to or from the engineer, subcontractors or interfacing contractors and interfacing parties; and
- (4) Consist of a three month time window extracted from the Works Segment Programme.

5 Three Weeks Rolling Programme

Prior to the start of the Site mobilization and each week during the construction and testing and commissioning phases, a time-scaled Three Weeks Rolling Programme shall be prepared and submitted to the Engineer for each section of the Works. The Three Weeks Rolling Programme shall show in detail the current week's progress, and the following two (2) weeks planned progress. All activities that are in progress or due to start or finish within two (2) weeks of its submission shall be shown. The programme shall clearly tie into the Three Months Rolling Program in all respects.

The activities shown on the Three Weeks Rolling Programme shall be an amplification of and compatible with the latest version of the Three Months Rolling Programme in all respects.

The Three Weeks Rolling Programme need not be computer-generated and does not require a detailed programme analysis report. Any activity exceeding one (1) week in duration shall be divided into sub-activities, the duration of which shall not exceed one (1) week.

6 Review and Monitoring of Programme

6.1 Programme Review

- (1) The Contractor shall submit all programmes as required in the Contract to the Engineer for review and consent.
- (2) The Engineer shall, within 28 days of receipt of the initial submission of any programme for consent, issue a response to the Contractor's submittal in accordance with Clause 2 [Submission Procedure] of Sub-Division 3020 [Correspondence, Communications and Submissions] of the General Specifications.
- (3) In the case of further re-submittals, the re-submission shall be made within 14 days after issue of the Engineer's response.

6.2 Work Segment Programme Revisions

- (a) The Contractor shall immediately notify the Engineer in writing of the need for any change in the Work Segment Programme, whether due to a change of intention or circumstances or for any other reason. Where such a proposed change affects the timely completion of the respective works, stretch or stage; the Contractor shall within 14 days of the date of notifying the Engineer, submit for the Engineer's consideration his proposed revised Work Segment Programme and accompanying Programme Analysis Report. The proposed revised Work Segment Programme shall show the sequence of any and all works related to the change and the impact of changed works or changed

conditions on the Works and the Interfacing Contractors and Interfacing Parties and their works.

- (b) If at any time the Engineer considers the actual or anticipated progress of the work reflects a significant deviation from the Work Segment Programme, he shall request the Contractor to submit a revised Work Segment Programme. Upon receipt of such a request the Contractor shall within 14 days submit a revised Work Segment Programme, together with an accompanying Programme Analysis Report and narrative statement, if any, including the reasons/repercussions of such deviations and the likely delays arising out of such deviations. The Contractor's re-submission of the programme shall demonstrate the means, including deployment of additional resources, etc., by which the Contractor shall eliminate the deviations and make good delays incurred or likely to be incurred due to the same.
- (c) Unless and until an amended version of the programme has received the Engineer's consent, the existing programme shall remain as the Work Segment Programme for all purposes of the Contract.
- (d) Consent by the Engineer to a Work Segment Programme shall not relieve the Contractor of any of his duties or responsibilities under the Contract, nor in the event that a Work Segment Programme indicates that a Milestone or any intermediate targeted date has not or will not be met, shall not constitute any form of acknowledgement that the Contractor is or may be entitled to an extension of time in relation to such Milestone/intermediate target date. In any such circumstance the Contractual Works Programme shall always prevail over other programmes and each of the other programmes shall be a detailed time window of the Contractual Works Programme
- (e) Notwithstanding the above, the Engineer may at any time during the course of the Contract require the Contractor to reproduce the computer-generated programme report described above to reflect actual activity dates and generate programmes based upon "what if" statements.

7 Progress Monitoring

The Contractor shall monitor the progress and his Subcontractors' performance against programmes to ensure compliance with the Contractor's obligations under the Contract. Monitoring of the Works shall include direct, daily monitoring of the progress of the Works and the preparation of written reports to be submitted to the Engineer. The reports shall include all necessary supporting data to appraise the Engineer of the status of completion of the Works. The Contractor shall prepare the Monthly Progress Reports covering all aspects of the execution of the Works.

8 Programme Analysis Report

The Contractor shall submit a Programme Analysis Report that shall, in narrative format, describe the basis and assumptions used to develop each programme. The Programme Analysis Report shall be prepared in a format which has received the Engineer's consent and contain as a minimum the following:

- (a) Cycle times and work sequences;
- (b) The deployment of contractor's equipment and labour;
- (c) The production rates used in determining durations;

- (d) The shifts assumed in determining durations;
- (e) The breakdown of labour requirements by trades;
- (f) Details of the quantities used in developing the programme, to the extent that such information is not provided elsewhere; and,
- (g) Interfaces with the engineer and interfacing contractors / interfacing parties and other constraints.

9 Progress Meetings and Programme Updates

- (1) The Employer shall chair progress meetings every month with the Contractor, along with the Engineer as described in Clause 3.3 [Meeting Procedure] in Sub-Division 4030 [Meetings] of the General Specifications.
- (2) On a monthly basis, the Contractor shall arrange for their Contractor's Representative, Construction Manager and Planning Manager to meet at the Site with the Engineer to review the Contractor's Monthly Programme Update. A turnaround document as per the agreed computer software generated by the Contractor shall be marked-up to show the agreed upon progress, signed by the Contractor, and a signed copy issued to the Engineer. The Monthly Programme Update shall show up-to-date and accurate progress of the Work and shall forecast the completion date for activities in progress based on the Contractual Works Programme. The Monthly Programme Update shall be prepared by the Contractor in co-ordination with all its principal Subcontractors and suppliers and the Interfacing Contractors and Interfacing Parties, if necessary.
- (3) The Monthly Programme Update shall include actual activity data for progress to date, but in the Monthly Programme Update, the Contractor shall not change the schedule logic, the activity relationships/dependencies, or planned activity durations and shall not add or delete activities. If the Contractor believes that any of these items should be changed, then a proposed revised Work Segment Programmes shall be submitted by the Contractor to the Engineer. Although activities shall not be added or deleted in the Monthly Programme Update, activities that have been recommended and received the consent of the Engineer shall be included in the next Monthly Programme Update.
- (4) The Contractor will be notified by the Engineer, in writing, as to the acceptance, reasons for rejection, or any revisions required to the Work Segment Programmes. Changes to the Programmes agreed upon by the Contractor and the Engineer and which have received the Engineer's consent shall be incorporated by the Contractor into the Programmes within seven (7) calendar days after such agreement. Changes on which the Contractor and the Engineer cannot agree shall be documented and shall be subject to the final decision of the Employer which shall be binding.
- (5) The Contractor shall adjust the data date ("as of date") to be the same as the end date for the invoicing period.
- (6) The Monthly Programme Update shall show actual activity commencement and completion dates, actual remaining durations in workdays and the physical percentage complete for those activities commenced and not yet complete. For the stored materials, the update shall show the amount of material stored, representing the total cost of the materials delivered and properly stored. The Monthly Programme Update shall also include a graphic comparison of the current status and the Work Programme for each activity in the network.
- (7) Each Monthly Programme Update shall continue to show all work activities including those already completed. These completed activities shall accurately reflect the "as built" information by indicating the dates when activities were actually started and completed.

- (8) The Monthly Programme Updates shall also contain the following information for each activity:
- (a) Activity identification number, description and estimated original duration in workdays;
 - (b) Calculated early and late finish dates;
 - (c) Actual start and actual finish dates, and remaining duration, in calendar, for those activities started and not completed;
 - (d) Days ahead or behind or both schedule of the Milestones representing the identified contracted Milestones and Times for Completion;
 - (e) Physical percentage complete for each activity;
 - (f) A float analysis of the longest path through the Programmes detailing potential delays and areas for acceleration. Actual start and finish dates shall be indicated for each activity as appropriate. Completed activities shall be omitted from remaining float and late start sorts.
- (9) The deliberation of all meetings shall be recorded by the Engineer as Minutes of Meeting.
- (10) Other Programme Meetings
- (i) The Engineer shall convene routine or ad-hoc review meetings or both.
 - (ii) Requirement of the meetings shall be provided by the Engineer

10 Revision of Programme

- (a) If at any time it is evident to the Engineer that the current Work Segment Programmes or Monthly Programme Update, no longer represents the actual progress or planned execution of the Work, and the Work is delayed by a period of four (4) weeks, the Engineer shall require the Contractor to submit a revised Work Segment Programmes within seven (7) days after the Engineer's instructions.
- (b) Revisions to the programme shall be made by the Contractor by:
- i) Modification of activities or activity durations or both;
 - ii) Modification in logic connections between activities;
 - iii) With a supporting report describing any additional resource loadings (e.g. Labour, equipment, material etc.) And / or revised construction methods / sequences from those included in the current work segment programmes or other sub-programmes, at the risk and cost of the contractor.
- (c) Any proposed revisions to the Work Segment Programmes and other sub-programmes shall be submitted to the Engineer for consent with the supporting reports as stated above. This submittal shall include, as a minimum, a written narrative with a full description and reasons for each revision to a Works activity, a full printout of the Contractual Works Programme, and an electronic copy of the revised Work Segment Programmes (and / or any sub-programme). For revisions affecting the sequence of the Works, the Contractor shall provide a programme diagram "fragment" which compares the original sequence to the revised sequence of work. This diagram shall maintain all the Milestones and Times for Completion and comply with the Contractual Works Programme.

11 Recovery Programme

- (1) Should an updated Work Segment Programme, sub-programme, Monthly Programme Update or Three Months Rolling Programme at any time during the Time for Completion show that the Contractor's progress is ten (10) or more calendar days in delay in relation to any forthcoming Milestone(s) or any other identified time(s) for completion on the Contractual Works Programme, the Contractor shall prepare a Recovery Programme separate from the updated Monthly Programme Update at no additional cost to the Employer (unless the Employer is responsible for the event or occurrence which has caused the progress slippage) explaining and demonstrating how the Contractor shall reschedule its Works in order to regain compliance with the Contractual Works Programme.
- (2) If a Recovery Programme is required as detailed above, the Contractor shall prepare and submit a Recovery Programme to the Engineer, incorporating the best available information from the Contractor, Subcontractors, Interfacing Contractors and Interfacing Parties, which shall permit the forecast completion date(s) to achieve the designated Milestone(s) or other identified time(s) for completion in the Contractual Works Programme. The Contractor shall prepare a Recovery Programme to the same level of detail as the originally consented-to Work Segment Programme(s), sub-programme(s), Monthly Programme Update or Three Months Rolling Programme or both.
- (3) The Contractor shall discuss and finalise their proposed Recovery Programme with the Engineer within seven (7) working days after the date of its initial submission by the Contractor. Once it has received the Engineer's consent, the Recovery Programme shall be implemented as the Revised Work Segment Programme(s), sub-programme(s) or Three Months Rolling Programme(s) or both as the case may be, for the remaining Works in the Contractor's scope.

4080 MONTHLY PROGRESS REPORT REQUIREMENTS

1 General

This Sub-Division is to provide detailed requirements for the Contractor's Monthly Progress Report in addition to those stipulated in Sub-Clause 4.20 of the General Conditions.

The Contractor shall submit a Progress Report to the Engineer on a monthly basis (referred to as the "Monthly Progress Report" or "MPR") in accordance with the Sub-Clause referenced in the previous paragraph above. This Monthly Progress Report shall be submitted by 7th day of next month and shall account for all work actually performed from the first (01st) day of the month up to and including the last day of the month of the MPR submission. This period shall be referred to as the 'Report Month'.

The Monthly Progress Report shall be submitted in a format to which the Engineer shall have given his consent, describing, but not limited to, the topics listed below.

2 Executive Summary

The Contractor shall provide an executive summary covering the major achievements made during the Reporting Month, the activities planned for the next month and any issues that are affecting or may in future affect the progress of the Works. These items shall be dealt with in full detail within the body of the MPR.

3 Programme Update and Status

The Contractor shall provide a programme update for the Works which shall include but not be limited to the following items:

- (a) A Monthly Programme Update, which shall be prepared by recording actual activity completion dates and percentage of activities completed up to the end of the Report Month, together with estimates of remaining durations and expected activity completion based on current progress. The Monthly Programme Update shall:
 - (i) Account for the actual progress of the Works;
 - (ii) Include updated Work Segment Programmes to reflect modifications in the design, construction and testing and commissioning programme'
 - (iii) Include the status of every activity in progress, its graphic representation (completed and remaining) with respect to the identified works in the Report Month, as well as for all the major works and relevant activities; and
 - (iv) Include a progress 'S' curve indicating the baseline 'S' curve for the accepted programme and physical progress.
- (b) The Monthly Programme Update shall be accompanied by an activity report and a narrative statement which shall explain the basis of the Contractor's submittal regarding:
 - (i) Work Segment Programmes – explaining the determination of activity durations and describing the Contractor's approach for meeting Milestones, other identified time(s) for completion and Time(s) for Completion as specified in the Contract;
 - (ii) Updated Work Segment Programmes – stating in the narrative the Works actually completed and reflecting along the critical path in terms of days ahead or behind allowable dates. Specific requirements for the narrative are:
 - Identification of causes of actual and potential delays (if any) with respect to Milestones, other identified time(s) for completion and Time(s) for Completion;
 - Provision of an explanation for any works affected by delays and proposed corrective actions / mitigation measures to achieve the Milestones, other

identified time(s) for completion and Time(s) for Completion and mitigate potential delays;

- Identification of any deviation from the previous month's critical path;
- Clear identification of every activity with a number and description for activities in progress and activities scheduled to be completed;
- Provision of time required to cater for any design changes or Variation, if any.

(iii) Programme Status presenting:

- The status of Work Segment Programmes up to and including the current Report Month, with cumulative progress to date and a forecast of remaining work;
- A programme bar-chart in A3 size and a time-related logic network diagram in A1 size, including activity listings.

(iv) Activity Variance Analysis - analysing activities planned to start prior to or during the Report Month but not started at the end of the Report Month, as well as activities started or completed in advance of the Work Segment Programmes or both.

4 Three Months Rolling Programme Revisions and Updates

The Three Months Rolling Programme shall be extended forward each month as described above. Each submission of the Three Months Rolling Programme shall be accompanied by a Programme Analysis Report, describing actual progress to date, and the forecast for activities occurring over the next three-month period.

If the Three Months Rolling Programme is at variance with the Work Segment Programmes, the Programme Analysis Report shall be accompanied by a supporting narrative statement describing the Contractor's plan for the execution of the activities to be undertaken over the three month period, including programme assumptions and methods to be employed in achieving timely completion.

The Contractor shall revise the Three Months Rolling Programme or propose revisions of the Work Segment Programmes, or both, from time-to-time as may be appropriate to ensure consistency between them.

5 Physical Progress

The MPR shall describe the status of the Works performed, significant accomplishments, including critical items and any problem areas, corrective actions taken or planned and other pertinent activities, with respect to all items/sub-items of the Milestones/cost centre in each Work Segment Programme and shall, in particular, address any interface issues, problems and resolutions, and including a representation of progress measured in percentage terms compared with percentage planned, as derived from the Work Segment Programmes.

The physical progress shall be reported including:

- (a) A listed description of all Works performed during the Reporting Period with quantified progress and updated Work Segment Programmes showing both the programmed and actual progress of each sub-item of the work corresponding to each Milestone / cost centre pertaining to each Work Segment;
- (b) The percentage of each main work activity completed, as well as the projected percentage thereof to be completed to the end of the Report Month;
- (c) The total overall percentage of the Works completed, as well as the projected percentage thereof to be completed with respect to each cost centre, each Work Segment and the

Works as a whole to the end of the Report Month, and with appropriate comments to explain any differences and how to regain any lost time or set-backs which may have occurred;

- (d) A list of quantities of each of the major items of the Works (including Temporary Works) performed during the month *vis-a-vis* the total estimated quantities to be executed, and illustrations showing the exact location of the work done, such as for example, a schedule of concrete lifts; and
- (e) A list of the major Works (including Temporary Works) activities to be started within the next two (2) months and estimated quantities thereof. If the expected start or completion dates are different from those shown on the updated programme or both, an explanation is to be given.

6 Contractor's Personnel, Contractor's Equipment and Employer's Equipment

A detailed description and record of Contractor's Personnel, Contractor's Equipment, and any equipment provided by the Contractor to the Employer and Engineer.

The Contractor's Equipment report shall include but not be limited to the following:

- (a) A list of all the construction equipment located at the Site *vis-à-vis* that required during the month to achieve targeted progress (segment wise);
- (b) The daily working and operation records of each item of equipment;
- (c) The inspection, repair and maintenance records;
- (d) Accident reports; and
- (e) A list of unserviceable equipment and action being taken to put back in operation.
- (f) Details of the construction equipment required at Site and the Contractor's proposed mobilization programme for the next three months.

7 Coordination and Interfacing

The status and any outstanding issues relating to coordination and interfacing activities with Interfacing Contractors and other entities as described in Sub-Division 4040 [Interface, Coordination and Cooperation with Other Parties] of the General Specifications. Items to be reported shall include:

- (1) A summary of the coordination and interfacing activities during the Report Month and details of any outstanding actions; and
- (2) A schedule of all submissions and consents/approvals outstanding, as well as those obtained.

8 Procurement

The procurement status of major items such of Plant and Materials shall be reported, including but not limited to:

- (1) A summary of all significant procurement activities during the Report Month, including actions taken to overcome any problems;
- (2) A list of major items with description detailing their manufacturer, date of letter of credit, status of manufacturing and its origin, transportation and date of arrival at Site (scheduled / actual), reasons for delay (if any) procured immediately and made available for the Works,
- (3) Delays in procurement (if any), including reasons therefore and the Contractor's mitigation measures

9 Performance on Quality Management System

The MPR shall include the Contractor's monitoring report on the performance of the Contractor's Quality Management System and shall include the following as a minimum:

- (1) The submission status and review status of the quality system documents;
- (2) An up-to-date audit schedule and status;
- (3) An up-to-date nonconformity register, providing the status of all non-conformities identified by the Engineer or the Contractor within the Report Period and those non-conformities not yet satisfactorily closed;
- (4) A narrative appraisal of the performance of the Quality Management System, including any non-conformities, short-comings or problem areas identified and the corrective and preventative action(s) taken or proposed; and,
- (5) All pending issues/references with the Engineer, Employer and the Contractor and the action(s) proposed.

10 Financial Status

The MPR shall include the following aspects of the financial status of the Works:

- (1) A narrative review of all significant financial matters, and actions proposed or taken with respect to any outstanding matters;
- (2) A spread sheet summarizing each major activity as defined in Sub-Division 4070 [Works Programme and Schedule] of the General Specifications, the budget, costs incurred during the period, costs to date, costs to go;
- (3) Details indicating the status of all payments due and made, including a list of the amount and date of each payment received and the amount of any monthly invoice which has been submitted but not yet paid;
- (4) An 'S' curve for the cashflow planned as per the Contract and the actual up to the end of the Report Month, including a description of any variance;
- (5) A report of the status of any outstanding claims, including a list of claims (if any) submitted during the month, with claimed amounts and details of any extension(s) of time;
- (6) The interim updated accounts of any continuing claims;
- (7) Any other information as required by the Engineer.

11 Other Items

The MPR shall also include but not be limited to the following:

- (a) A list of local workers (in man-days by trade classification) employed during the month and a statement concerning labour relations, including details of any shifts and hours of works executed and an explanation of any actual or potential problems;
- (b) A list of expatriate personnel (in man-months by position) employed during the month;
- (c) A table showing actual working hours of each item of construction equipment, a list of stand-by equipment and a list of unserviceable (inoperable) equipment, describing the actions being taken to return it to operation;
- (d) A list of the quantities of the contractor's construction materials consumed or used during the month and accumulated quantities thereof;
- (e) Photographs of progress of the site activities;
- (f) A summary of the quality control tests (routine tests and check tests) performed on materials and the products for the permanent works during the month, including results (in values) of performance for each test and contrasted fluctuations of the properties

with the specified range of their acceptability. The results of quality audits shall also be summarized in the contractor's monthly progress reports;

- (g) A general description of the weather, listing rainfall in mm, maximum and minimum temperatures, river water levels, for each day throughout the month;
- (h) A statement concerning the effectiveness of the contractor's safety/security activities, including a list of each accident involving the hospitalization or death or both of any person and a list of any major thefts. Also, a list of any accidents in which equipment was damaged to the extent that it become inoperable, and any fire which occurred;
- (i) A list of the amount and date of each payment received and amount of any monthly invoice which has been submitted but not yet paid;
- (j) A list of claims (if any) submitted during the month, including claim amounts and extension(s) of time;
- (k) A table of updated cash flow estimate;
- (l) A list of letters, drawings, and documents received from or submitted to the engineer or employer or both during the month;
- (m) Resources Mobilization: the status with respect to key personnel and major construction materials, indicating the resources already available at Site and the proposed mobilization programme for the next three months;
- (n) The status of all Temporary Works, including temporary facilities and utility services for the:
 - (i) Contractor's use; and
 - (ii) Use of the Employer and Engineer.
- (o) Details of any assistance required from the Employer.

4090 WORK AREA (WITHIN ROW) ACCESS DATES

1 General

- (a) The dates on which Work Areas (within ROW) are available to the Contractor for the commencement of the Works are defined as Work Area Access Dates (AD).
- (b) The Work Area Access Dates that apply to this Contract are stated in terms of days after the Commencement Date of the Works.
- (c) Where Work Areas are to be made available to the Contractor, they shall be available within the specified day. Where Work Areas are to be vacated, they shall be released not later than midnight on the specified day.

2 Work Area Access Schedule

The access to and possession of Works Area (within ROW) shall be made available as per Sub-Clause 2.1 of Part A Contract Data of Particular Conditions of the Contract (PCC).

4100 MILESTONES

1 General

- (a) The construction of the Works includes a number of Stages. These Stages, called Milestones, which are inter-related with and essential to the completion of the Project, are to be achieved in the respective stipulated Time for Completion.
- (b) Milestones are to be achieved in stipulated Time for Completion from the Commencement Date of the Works and all works to be achieved shall be constructed by midnight on the day given. Milestone shall be considered to be achieved on the date stated in the Milestone Certificate by the Engineer.
- (c) If a Milestone is not achieved by the stated Time for Completion, Delay Damages shall apply as set out in the Table: Summary of Milestones of Part A – Contract Data of Particular Conditions of the Contract (PCC).
- (d) If Time for Completion of a Milestone falls on a Public Holiday or non-working day, it shall be effective the next working day.
- (e) Handing over means “the Contractor allowing access and temporary occupation to Interfacing Contractors for their works.”
- (f) Descriptions of each Milestone together with the Interface Contractors to which the Milestone relates, are given below.

2 Milestone Schedules

For Milestone Schedules refer Table: Summary of Milestones of Part A – Contract Data of Particular Conditions of the Contract (PCC).

4110 TAKING OVER OF WORKS / SECTIONS

1 Procedures

1.1 Inspection

(a) General

Within seven (7) days of receipt of the Contractor's written application for a Taking-Over Certificate, pursuant to Sub-Clause 10.1 of the General Conditions of Contract, the Engineer, in the company of the Contractor, will inspect the Works or Section covered by the application, as per the requirements described in this Sub-Clause. During the joint inspection, the Works or Section will be examined and relevant documentation will be reviewed. The Engineer will prepare a written list of outstanding items, if any, to be completed or corrected before issuance of the Taking-Over Certificate and a separate written list of items to be completed or corrected during the remainder of the Contract or the Defects Notification Period. The list shall include an agreed date of correction for each deficiency.

The Contractor shall also obtain written confirmation from all applicable Interfacing Contractors that all interfacing matters have been concluded.

If there are no outstanding items to be completed or corrected before the Taking Over of the Works or a Section, the Contractor shall submit to the Engineer all guarantees, warranties, final certifications or similar documents or both as are required under the Contract.

(b) Static Inspection

The inspection listed in the following table shall be conducted by the Engineer, in coordination with Interfacing Contractors as necessary.

The Contractor shall prepare and submit for review and approval by the Engineer a Static Inspection Plan detailing and explaining how the Contractor will plan, perform and document all tests and inspections that shall be conducted to verify and validate the Works. The Static Inspection Plan shall consist of a narrative description supported by graphics, diagrams and tabulations as required.

Structure	Inspection Item		Inspection Method		
			Confirmation of "As-Built" Records	Visual Inspection	Measurement Test Check
Earthwork	Formation width	At every 100m on straight line, at every 20m on curved line, at each terminal point of structures	✓		✓
	Rail Road cross section	Drawings	✓		
	Retaining wall	List of location of retaining walls	✓	✓	
	Structure Gauge	Measurement by Profiler	✓		✓
	Construction	Soil compaction records, deformation	✓		

Structure	Inspection Item		Inspection Method		
			Confirmation of "As-Built" Records	Visual Inspection	Measurement Test Check
		modulus (Ev ₂) records, construction photos			
	Structures Crossing	List of structures crossing the Railway (earth cover, overhead clearance, etc.)	✓		✓
	Drainage system	Drainage works at embankment, drainage diagram	✓		✓
Bridges	Formation width	At each bridge	✓		✓
	Construction	Quality records of aggregate used, reinforcement, concrete quality control data, measurement records of cast-in-situ piles/ open foundation etc.	✓		
	Repairing of structures	Records of repaired parts of structures	✓	✓	
	Rebar cover	Records of measurement of rebar cover	✓		
	Clearance under girder/slab	Above roads	✓		✓
	Abutment/pier structures/RCC box etc.	All Structural drawings	✓	✓	
	Concrete strength	Schmidt hammer tests	✓		✓
	List of bridges	List of bridges	✓	✓	
	Pile load test	Pile load test parameters	✓		
	Load test	Load test parameters of skew RCC box	✓		
Station	Platform length, width	At every 10m on straight line, at every 5m on curved line, control points of curve	✓		✓
	Clearance of isolated and continuous structures on platform as per SOD	All structures	✓		✓

Structure	Inspection Item		Inspection Method		
			Confirmation of "As-Built" Records	Visual Inspection	Measurement Test Check
	Staircase and pavement	Results of stair width measurement	✓	✓	
	Drainage slope of platform	At every 20m	✓		✓
	Safety fence, etc.	List of facilities (clearance from platform end to fixed/movable fence, etc.)	✓	✓	
Protective facilities	Fire protection	Fire extinguisher layout and numbers	✓	✓	
	Abutment/Pier protection	Drawings	✓	✓	
	Slope protection works	List, location and Drawings of slope protection works	✓	✓	

After Static Inspection of the Works as mentioned above the Contractor shall submit the Inspection Report in the agreed format in six (6) signed copies to the Engineer for review and approval.

1.2 Remedial Action and Re-inspection

Within twenty-eight (28) days of receipt of a written application for a Taking-Over Certificate, the Engineer shall proceed in accordance with Sub-Clause 10.1 of the General Conditions of Contract.

1.3 Taking Over Certificate

If the Engineer does not issue a Taking-Over Certificate, but gives instructions in accordance with sub-paragraph (ii) of Sub-Clause 10.1 of the General Conditions of Contract, the Contractor shall, when he considers the work specified by the Engineer completed, give written notice to the Engineer and the Contractor and Engineer shall again follow the procedure in sub-clause 1.1 of this Sub-Division.

1.4 The Contractor shall submit documents required by Commissioner of Railway Safety (CRS) and shall accompany him during his inspection along with necessary records.

4120 DEFECTS NOTIFICATION PERIOD

1 General

- 1.1 The Contractor shall be responsible for the rectification of any defect, fault or failure in the Works that is attributable to the Contractor, as may be notified by (or on behalf of) the Employer on or before the expiry date of the Defects Notification Period for the Works or Section (as the case may be).
- 1.2 The Contractor shall carry out the rectification of any defect, fault or failure in the Works that is attributable to the Contractor in accordance with the Defects Management Plan specified in Sub-Clause 7.4 [Defects Management Plan] in Sub-Division 4020 [Works Management Planning] of the General Specifications and which has received the consent of the Engineer.

2 Final Inspection

- 2.1 Subject to having completed the works in Sub-Clause 2.5 below and all outstanding Works, no earlier than thirty (30) days prior to the expiry of the Defects Notification Period for the Works or Section (as the case may be), the Contractor may request the Employer and the Engineer to conduct a final inspection of the Works or Section.
- 2.2 The Employer, the Engineer and the Contractor will conduct a joint final inspection of the Works or Section (as the case may be). The final inspection will include Contractor clean-up and Site restoration requirements. The final inspection will be completed within twenty one (21) days from the Engineer's receipt of the Contractor's request for final inspection.
- 2.3 During the joint final inspection, the Employer and the Engineer will identify a list of any deficiencies and agree with the Contractor a programme for the rectification of each of any such deficiencies.
- 2.4 The Contractor shall correct every deficiency before the Engineer issues a Defects Correction Certificate for the Works or Section (as the case may be). After correction of any deficiencies identified during the joint final inspection, the Contractor shall request re-inspection by the Employer and the Engineer. The Employer and the Engineer shall re-inspect the Works or Section within seven (7) days from the Engineer's receipt of the Contractor's request for re-inspection.
- 2.5 The Contractor shall complete the following works prior to final inspection. In completing these works, the Contractor shall if necessary co-operate and co-ordinate with any Interfacing Contractors or Interfacing Parties and shall not interfere in their works.
- (a) works to be completed prior to the final inspection of any Section
- (i) any outstanding works or defects listed on the Taking-Over Certificate for the Section;
 - (ii) all Contractor's documentation required under the Contract has been submitted;
 - (iii) all interface work requirements have been completed, including but not limited to,
utilities, drainage and services;
 - (iv) touch-up, repair and remedy of any cosmetic deficiencies in the Works.
- (b) works required to be completed prior to the final inspection of the last Section
- (i) the items listed in Sub-Clause 2.5 (1) above;
 - (ii) restoration of the Site as follows:
 - removal of all Temporary Works;

- removal/restoring of all temporary facilities, including but not limited to temporary access roads, work areas, yards, stores, toilets, offices, workshops; except as may be specified in the Contract or ordered by the Employer to remain;
 - reinstatement of all topsoil and restoration of ground surfaces (to their original condition, if applicable; or as specified);
removal of any remaining surplus Plant and Materials;
 - removal of all debris, waste, garbage, etc. whether hazardous or otherwise and disposal of same in accordance with the Contract;
 - cleaning of all drains and waterways of construction debris, waste, garbage, etc.
- (iii) Plant is in good repair and good working condition and all requisite operation and maintenance manuals have been provided to the Employer.
- (iv) Any operation, test or other certificate(s) or the like, not previously provided, have been provided to the Employer enabling full and unrestricted use of the Works.
- (v) Ownership of or rights to/in any documentation as specified in the Contract has been transferred to the Employer.

Appendix 4000-1
Schedule of Interface, Coordination and Cooperation
with Other Parties

Table of Contents

1. Contents of Interface Management Plan.....	81
2. Assignment of Lead Contractor.....	82
3. Interface Table	83

1. Contents of Interface Management Plan

Interface Management Plan (IMP) should be prepared including necessary contents referring Table 1. The intention of each section is described by the text inside angle brackets.

Table 1: Sample Contents of Interface Management Plan

1	Introduction	
	1.1	Purpose of Document <Describe the methodology to be adopted by the Contractor in managing all interface issues >
	1.2	Overview <Project overview of the Contractor and the Interfacing Contractor>
2	Resource Management	
	2.1	Organization and Roles & Responsibilities
	2.2	Resource Requirement <Detailed description of the manpower, tools, logistics shall be included in this section>
3	Interface Requirements	
	3.1	Allocation of Interfacing Requirements <This is an introduction to Section 3.2>
	3.2	Interface Description between Contractors <Task Allocation Table (TAT) shall be included in this section>
	3.3	Areas of Concern <Process for managing the interface concern>
4	Process Management	
	4.1	Change of Interfacing Requirement <The process for the management of interface requirement change shall be addressed in this section.>
	4.2	Verification and Validation of Interfacing Requirements <The approach to be adopted by the Contractor to manage verification and validation of interfacing requirements shall be addressed in this section.>
	4.3	Testing and Commissioning on Interfaces <The approach to be adopted by the Contractor for the management of interface in the Testing and Commissioning stage shall be addressed in this section.>
	4.4	Quality Procedures <All Contractor's internal quality procedures applicable for the interface management shall be listed here.>
	4.5	Systems Assurance Plans <Considered requirement of the Systems Assurance.>
5	Document Management	
	5.1	Reference Documents <All applicable reference documents shall be listed in this section.>
	5.2	Structure of Reference Documents <The Structure of reference documents shall be addressed in this section.>

	5.3	Version Control of Interface Documents <Configuration management of interface documents shall be addressed in this section.>
	6	Communication
	6.1	Terms of Reference of Interface Meetings <The terms of reference of interface meetings shall be addressed here.>
	6.2	Exchange of Information between Contractors <The process for the exchange of information between the pair-wise contractors shall be stated here.>
	6.3	Submission to Employer <The approach to be adopted by the pair-wise contractors on the submission of the Interface Management Plan to Employer shall be described here.>
	6.4	Request for Employer Attention <The criteria and methodology on requesting for Employer attention shall be mentioned here.>
	7	Interface Hazard Management
	7.1	Strategy and Approach
	8	Programme
	8.1	Key Activities <Include schedule of meetings, schedule of exchange of information, etc.>
	8.2	Section and Milestone <Include Design Freeze Dates, Integrated Test Dates, Critical Items dates, etc. Should include reference to appropriate programmes so that any future changes in programme date need not result in resubmission of this plan for approval.>
	8.3	Critical Items/Critical Paths <This section shall highlight all the critical items and critical paths to the Employer.>

2. Assignment of Lead Contractor

The following shall be read in conjunction with Clause 3 of this Appendix.

ASSIGNMENT OF LEAD CONTRACTOR (CONSTRUCTION)

Assignment of Lead Contractor (Construction) and Participating Contractor (Construction) are described below:

No.	Description	Period	Lead Contractor (Construction)	Participating Contractor (Construction)
			C-1	C-4, BR-1

1.	Construction coordination between Civil Works Contractor and other Civil Works Contractors			
2.	Construction coordination between C-1, T-1, E-1 and ST-1 Contractor	During the period when C-1 Contractor has right of access to, and possession of the Site	C-1	T-1, E-1, ST-1
		During the period when T-1 Contractor has right of access to, and possession of the Site	T-1	C-1, E-1, ST-1
		During the period when E-1 Contractor has right of access to, and possession of the Site	E-1	C-1, T-1, ST-1

Any disagreement as to the scope and extent of the work specified in this table shall be referred to the Engineer.

This annexure shall be read in conjunction with the relevant Clauses of the Works Requirements. The Contractor and Interfacing Contractors shall be responsible for ensuring that all requirements of the Specification pertaining to interfaces are properly satisfied.

“Civil Work Contractor” means C-1, C-4 or C-2 contractor. T-1, E-1 and ST-1 have been defined in Division 2000 of the General Specifications.

3. Interface Table

3.1 Interface Table between C 1 and Electric Utility Shifting agency (Interfacing Party)

S.No	Description	Remarks
1	Handing/Taking over of site for construction of formation at the location of overhead electric line crossings	Interfacing Party shall complete the work of modification/shifting of overhead electric lines within the time schedule given in Sub-Clause 2.1 of Part A - Contract Data, Particular Conditions of Contract (PCC) and handover the site to C--1 Contractor for construction of formation

3.2 Interface Table between C-1 and C-2

S.No	Description	Remarks
1	Handing/Taking over of site for construction of superstructure of major RUB over NH-352W on Pataudi road	C-1 Contractor shall complete the work of Substructure within the Time for Completion for MS-1 given at the end of Part A - Contract Data, Particular Conditions of Contract (PCC) and hand over the bridge to BR-1 contractor for construction of superstructure.

3.3 Interface Table between C-1 and T-1

S.No	Description	Remarks
1	Handing/Taking over of site for carrying out track works	C-1 Contractor shall complete the formation & bridge works within the Time for Completion for MS-3 given at the end of Part A - Contract Data, Particular Conditions of Contract (PCC) and hand over the site to T-1 contractor for carrying out track works.

3.4 Interface Table between C-1 and E-1

S.No	Description	Remarks
1	Handing/Taking over of site for carrying out Overhead Electrification (OHE) works	C-1 Contractor shall complete the formation and bridge works within the Time for Completion for MS-3 given at the end of Part A - Contract Data, Particular Conditions of Contract (PCC) and hand over the site to E-1 contractor for carrying out OHE works.

3.5 Interface Table between C-1 and ST-1

S.No	Description	Remarks
1	Handing/Taking over of Manesar station building for carrying out Signalling and Telecommunication (S&T) works	C-1 Contractor shall complete the construction of Manesar station building within the Time for Completion for MS-2 given at the end of Part A - Contract Data, Particular Conditions of Contract (PCC) and handover the building to ST-1 contractor for carrying out S&T works.

3.6 Interface Table between C-1 and Delhi division of Northern Railway (Interfacing Party)

S.No	Description	Remarks
1	Working near to Indian Railway running track	C-1 Contractor shall interface with Interfacing Party for obtaining

		permissions/approvals/ possession of track for carrying out the Works near running IR track for earthwork in formation and bridge works
--	--	---

3.7 Interface Table between C-1 and NHAI (Interfacing Party)

S.No	Description	Remarks
1	Construction of substructure of major RUB NH-352W over Pataudi road	C-1 Contractor shall interface with Interfacing Party for obtaining permissions/approvals, if any, for construction of substructure of major RUB NH-352W over Pataudi road

3.8 Interface Table between C-1 and Road authorities (Interfacing Parties)

S.No	Description	Remarks
1	Construction of minor RUBs (Bridge No. 127, 128, 130, 131, 132, 133, 135, 135A, 135B, 135C, 135D & 135G)	C-1 Contractor shall interface with Interfacing Parties for obtaining permissions/approvals for construction of minor RUBs

Division 5000: Contractor's Drawings and Documents

Table of Contents

5010 CONTRACTOR'S DRAWINGS	87
1 GENERAL	87
5020 SHOP DRAWINGS AND COORDINATION DRAWINGS	88
1 General	88
2 Shop Drawings Schedule.....	88
3 Shop Drawings - Particular Requirements	89
4 Coordination Drawings	90
5030 AS-BUILT DRAWINGS AND DOCUMENTS	91
1 General	91
2 Detailed Requirements	91
3 Submittals.....	92

5010 CONTRACTOR'S DRAWINGS

1 GENERAL

- a) This section covers the drawings to be prepared and submitted by the Contractor.
- b) Approval of the Engineer of any drawing submitted by the Contractor shall not relieve the Contractor of any of his responsibilities or liabilities under the Contract.
- c) The Contractor's drawings specified herein shall include, but not be limited to, temporary works design drawings, shop drawings, fabrication drawings, coordination drawings and As-Built Documents forming part of the Contractor's Documents.
- d) The Contractor's drawings shall be provided as and when necessary for the proper procurement, execution, completion, testing and As-Built recording of the Works or any part thereof.
- e) The Contractor's drawings shall be prepared in a format acceptable to the Engineer. The Contractor shall submit the proposed format within twenty-eight (28) days of the Commencement Date.
- f) Upon receipt of further Drawings or documents from the Engineer and prior to the Contractor's use of the information contained therein for preparation of the Contractor's drawings or other Contractor's Documents, the Contractor shall examine them carefully and advise the Engineer in writing of any errors, discrepancies, ambiguities and the similar defects found therein.

5020 SHOP DRAWINGS AND COORDINATION DRAWINGS

1 General

The Contractor shall produce Contractor's drawings to supplement the Drawings and show further details for construction.

a) Working Drawings

The Working Drawings shall be additional drawings developed by the Contractor as necessary to supplement the Drawings and which specify additional details and procedures for construction of the Works, such as shop drawings, fabrication drawings, erection drawings, Temporary Works drawings, bar bending schedules, bar reference drawings.

- (i) Shop Drawings: These are supplementary detail drawings which expand and explain the information shown on the Drawings;
- (ii) Fabrication Drawings: These are supplementary drawings of specific elements of the Works shown on the Drawings and Shop Drawings for the purpose of manufacture or fabrication of those elements;
- (iii) Temporary Works Drawings: These drawings shall be prepared for all the items mentioned in Clause 2 of the Technical Specifications.
- (iv) Re-bar Drawings: These drawings shall show cutting, bending and reference schedules; and
- (v) All other drawings as deemed necessary by the Contractor for the accurate and safe construction of the Works in accordance with the Contract.

b) Construction Practicing Documents

The Contractor shall submit the following documents along with Working Drawings:

- (i) Updated Construction Method Statement;
- (ii) Construction Sequence Statement: The document illustrates the sequence of one cycle of a particular construction implementation in which such sequence is critical to maintain the quality, safety and/or any other important factors of the construction implementation;
- (iii) Temporary Works Design Report;
- (iv) Updated Construction Programme; and
- (v) Safety Risk Assessment: The analysis describes and evaluates the risks associated with the construction implementation anticipated in the course of the construction.

2 Shop Drawings Schedule

The "shop drawings" shall be understood to have included drawings for further development of the Drawings, manufacture/fabrication drawings to be prepared by the suppliers/manufacturers/fabricators, the Contractor's working drawings including those for the Temporary Works, and other detailed drawings of similar nature and/or purpose, wherever required. The Contractor shall note that, where necessary for the Engineer's comprehensive review of the shop drawings, the relevant coordination drawings as specified below shall be submitted together with the shop drawings.

- a) Within twenty-eight (28) days of the Commencement Date the Contractor shall submit to the Engineer, for review and comments, six (6) printed copies of a proposed schedule of shop drawings indicating at least the following:
 - (i) drawing categories;
 - (ii) section titles (e.g. civil);
 - (iii) drawing titles and numbers (preliminary);
 - (iv) planned submission date; and
 - (v) planned date for completion of the Engineer's review.
- b) In preparing the above schedule, the Contractor shall ensure that a minimum period of twenty-one (21) days for each submission is allowed for the Engineer's review, comment or approval. The Contractor shall also allow sufficient time for modification, correction and resubmission where so required by the Engineer. This process of resubmission shall continue until the drawing is accepted by the Engineer, provided that the Contractor may be allowed to proceed with the works upon the relevant drawings reaching the "Notice of No Objection" or "Notice of No Objection with comments" status.
- c) This schedule shall be updated on a monthly basis and submitted to the Engineer, in one (1) original and five (5) copies, for his review and comments. This submission should include where possible:
 - (i) the actual drawing title, number and revision number as and when they are known;
 - (ii) the Contractor's drawing preparation status;
 - (iii) revised planned dates for submission or re-submission; and
 - (iv) status of all submissions.
- d) Any failure of the Contractor to list any shop drawings in the Schedule will not relieve him of his responsibility to submit all required shop drawings in a timely manner.

3 Shop Drawings - Particular Requirements

- a) The Contractor shall submit shop drawings in a timely manner when and where the Contract considers it necessary or as instructed by the Engineer. The shop drawings shall accompany the relevant coordination drawings which are essential for the Engineer's understanding of the conditions or interface with the related works.
- b) The shop drawings shall be developed in strict accordance with the Works Requirements set out in the Drawings and the Specification, and the Contractor's documents to be submitted to a suitable approved scale and shall clearly show all working details for procurement, manufacture, fabrication, assembly and construction or installation for all elements and parts of the Works. The shop drawings shall include, but not limited to:
 - (i) plans, layouts, sections, elevations and details,
 - (ii) waterproofing details and penetrations of all structures,
 - (iii) connections, anchorages, fixings, hangers and supports.
- c) The respective shop drawings shall be submitted as early as possible to the Engineer for review, comment or approval, but in any event not later than the "planned date for submission" indicated in the shop drawings schedule accepted by the Engineer.
- d) All shop drawings shall be prepared in an approved CAD format and submitted to the Engineer in six (6), one (1) original and five (5) printed copies.

- e) All shop drawings submitted, including those produced by the manufacturers, fabricators or suppliers, shall be signed by the Contractor's Representative and a responsible person in the Contractor's Quality Assurance section on the Site, to warrant that the Contractor has verified the adequacy of the shop drawings submitted and accepts all responsibilities pertaining thereto. Any shop drawing which has clearly not been reviewed by the Contractor as set out below and/or does not bear the signatures as aforesaid may be returned to the Contractor without the Engineer's review.
- f) Shop drawings prepared by the manufacturers, fabricator, suppliers or the like, shall be thoroughly reviewed by the Contractor before submission to the Engineer. Such review by the Contractor shall include a study of all technical and dimensional aspects together with a review for coordination purposes to ensure that the work indicated on the shop drawings is correctly coordinated with all related works according to the constraints of these related works. The Contractor's requirements, comments or corrections, deriving from his review, shall be incorporated by the respective manufacturer, fabricator, supplier, etc, prior to submission by the Contractor to the Engineer.
- g) The submitted shop drawings shall be reviewed, commented, accepted by the Engineer or otherwise will be returned to the Contractor with comments within twenty-one (21) days after the Engineer's receipt of the submission.

4 Coordination Drawings

- a) Before the respective parts or elements of the Works are fabricated, manufactured, executed, constructed or installed on the site or elsewhere, the Contractor shall coordinate all parts and elements of the Works with each other or with the works of the Interfacing Contractors or Sub-Contractors and accordingly prepare and submit to the Engineer for his acceptance with all necessary coordination drawings along with any relevant shop drawings.
- b) The coordination drawings shall include plans, sections, elevations and the details to the appropriate scales for clear understanding of the required works or actions.
- c) The coordination drawings shall be provided in Six (6) hard copies, (1) original and five (5) copies, unless submission of additional copies is instructed by the Engineer for confirmation with the Interfacing Contractors or Subcontractors.
- d) The coordination drawings shall be submitted as early as possible in order that any required preparations and modifications can be arranged well in advance, without delaying the progress of the works and the works of the interfacing contractors or subcontractors. For each submission of coordination drawings, a minimum period of twenty-one (21) days shall be allowed for review, comment and/or approval by the Engineer.

5030 AS-BUILT DRAWINGS AND DOCUMENTS

1 General

- a) The Contractor shall prepare throughout the progress of the Works and keep up-to-date the "As-Built Documents" of the Works as part of the Contractor's Documents. These documents shall show all changes or revisions from the original documents and show the exact "As-Built" field-measured conditions of the Works.
- b) The master copy of these documents shall be kept by the Contractor at the Site for the inspection of the Engineer whenever needed and shall be used as a record set for ad hoc entering of the changes made to the Works. The originals of the "As-Built Documents" shall be promptly revised to reflect these entries made.
- c) At the end of every month, or such other times as the Engineer may instruct, three (3) hard copies of the originals of the "As-Built Documents" reflecting all entries made to the master copy shall be submitted to the Engineer for review.
- d) Prior to issue of the Taking-Over Certificate for the whole of the Works or any Section or part thereof, the Contractor shall submit to the Engineer, copies of the final version of the As-Built Documents for the approval of the Engineer. These documents shall have to be fully checked by the Contractor and certified. Most of the final version of the "As-Built Documents" shall be submitted to the Engineer progressively and at least twenty-eight (28) days before the date of the Taking-Over Certificate for the whole of the Works. Minor portion thereof may be submitted at least fourteen (14) days before the date of the Taking-Over Certificate.
- e) The Works shall not be considered to be complete for the purposes of Taking-Over Certificate until the final version of the "As-Built Documents" has been approved by the Engineer in writing and submitted to the Engineer.
- f) The final version of the "As-Built Documents" shall accurately show the Works as constructed incorporating the effect of all site changes, Variations and instructions and will particularly highlight and detail the locations, elevations, sizes, dimensions, the materials used and the workmanship applied in the Works including all Plant and equipment inclusive of pipes, ducts, cables, wires and the like, for the convenience of the operation and maintenance personnel. Accuracy of the As-Built Documents shall be certified by a responsible person in the Contractor's Quality Assurance department on the site.
- g) After approval by the Engineer, these documents shall be securely bound by the Contractor into separate volumes, with covers and contents pages added, as agreed with the Engineer. Final submission shall be made to the Engineer for transmission to the Employer.
- h) All As-Built Drawings and Documents shall be signed off by the Contractor's respective Construction Superintendent for different category of structures and the Contractor's Representative.

2 Detailed Requirements

As-Built Drawings and Documents shall show all the changes from the Drawings of the Permanent Works. The "As-Built" information shall include, but not be limited to, the following:

- a) Changes to dimension and detail from the Drawings;
- b) Components left in place including temporary support systems, concrete outside of neat lines of permanent structures and other such matters;
- c) Depths of all elements of foundations in relation to survey datum;
- d) Horizontal and vertical locations of public utilities related to the Works, including diverted public utilities and public utilities left in-place;

- e) Location of appurtenances and public utilities concealed within a structure;
- f) Changes due to variation orders;
- g) Records data, As-Built records, damage or settlement surveys, property surveys and similar final record information;
- h) Compiled project photographs;
- i) Geotechnical data and records;
- j) As-Built survey data and drawings as specified;
- k) Official letters regarding the design change acceptance;
- l) Certificates of acceptance between the Contractor and the Engineer;
- m) A construction diary; and
- n) Design Certificate for all Internal Authorizations carried out.

3 Submittals

The following copies of the final version of the As-Built Documents shall be submitted to the Engineer -

- a) Hard (printed) copy (As per Drawing Schedule): Six (6) sets
- b) Soft (electronic) copy both of "DWG" and "PDF" Formats on Compact Disks or DVD – R: Three (3) Sets.

Division 6000: Site Management

Table of Contents

6010	THE SITE	95
1	Location and Boundaries.....	95
2	Access to the Site	95
3	Contractor Operations Outside the Site.....	95
4	Site Security	96
5	Possession of Third Parties Facilities.....	96
6	Damage and Interference	97
7	Defined Area and Train Operation.....	98
8	Site Clearance	99
6020	SURVEYS AND SETTING-OUT.....	100
1	General.....	100
2	Horizontal and Vertical Control System.....	100
3	Requirements for Horizontal Control.....	101
4	Requirements for Vertical Control.....	102
5	Topographic Survey.....	102
6	Horizontal Alignment Staking	103
7	Setting Out	103
8	Auxiliary Works.....	103
6030	SITE SURVEYS/INVESTIGATIONS	105
1	Geotechnical/Geological Survey.....	105
2	Hydrological Survey	105
3	Other Related Surveys	105
6040	CONTRACTOR'S TEMPORARY FACILITIES	106
1	General.....	106
2	Location of Area for Temporary Facilities.....	106
3	Site Offices.....	107
4	Project Information Signboards	107
5	First Aid Station.....	108
6	Labour Accommodation Camps	108
7	Site Storage and Yards.....	108
8	Borrow Areas and Quarries.....	108
9	Stockpile Areas	109
10	Contractor's Plants.....	109
11	Material Testing Laboratories	109
12	Wheel Washing Facilities	110
13	Temporary Roads.....	110
14	Vehicles.....	111
15	Contractor's Equipment	111
16	Utilities for Temporary Facilities.....	112
17	Maintenance of Temporary Facilities	113
18	Damage to Existing Property	114

6050 MOBILIZATION AND DEMOBILIZATION.....	115
1 General.....	115
2 Engineer's Consents.....	115
3 Records	115
4 Mobilization.....	115
5 Demobilization.....	116
6060 UTILITIES AND FACILITIES.....	117
1 General.....	117
2 Utilities, Services and Facilities.....	117
3 Prevention of Damage and Interference.....	119
4 Drainage Systems.....	120
5 Building Service Connections.....	120
6 Street Furniture and Minor Service.....	120
6070 TRAFFIC MANAGEMENT	121
1 General.....	121
2 Temporary Traffic Control Plan (TCP).....	121
3 Extraordinary Traffic	123
4 Maintenance and Protection Of Traffic.....	123
5 Vertical Clearance.....	123
6 Materials	123
7 Construction Requirements.....	124
6080 PACKAGING, STORAGE, SHIPPING AND DELIVERY	125
1 General.....	125
2 Storage of Plant and Materials	126
3 Crating.....	126
4 General Precautions	126
5 Packaging Procedures	127
6 Shipping	127
7 Delivery.....	127

6010 THE SITE

1 Location and Boundaries

- 1.1 The Site for the Works is located from Km 49.7 to Km 55.6 of New BG Double Railway Line of HARC project and its connectivity (new BG single line) from proposed Manesar Station (HARC CH: 51872.38 m and Connectivity line CH: 0.00 m) of HARC to existing Patli Railway Station (Connectivity line CH: 5720 m) on Delhi-Rewari section of IR Network in the state of Haryana. The Site includes work areas within ROW as shown in the Drawings.

Except where an express permission in writing is obtained from the Engineer in advance, the Contractor shall limit the area of its construction activities to the area within the Site.

- 1.2 The Contractor shall be deemed to have inspected, examined and made himself fully familiar with the Site area. The Contractor shall be deemed to have been fully aware that the Site is not for the Contractor's exclusive use, that the Contractor shall allow the Interfacing Contractors and Interfacing Parties to have reasonable access thereto as a part of Contractor's management of the works, and that the areas may be subject to change in location and/or size during the execution of the works. The Contractor shall be responsible in all respects for these areas while they are in his possession or under his custody and control, even when others are working in these areas.

2 Access to the Site

- 2.1 The Contractor shall be deemed to have inspected, examined and made himself fully familiar with the access routes necessary for the proper execution of the Works and accounted for in the Accepted Contract Amount any costs arising in connection with the accessibility to the ROW. The Employer will not be responsible for any claims which may arise from the use of or otherwise in connection with any access route. The Employer does not guarantee the suitability or availability of any particular access route and will not entertain any claim for any non-suitability or non-availability of any such route for use (whether continuous or otherwise) during the Contract Period.
- 2.2 The Contractor shall make its own arrangements, subject to the consent of the Engineer, for access required to the Site. The Contractor shall negotiate with the landowners or other appropriate government agencies to seek temporary occupation of land and seeking necessary permission for construction of temporary access roads.

3 Contractor Operations Outside the Site

- 3.1 The Contractor shall be solely responsible for acquiring any additional land (land in addition to the Site) required by him for his Temporary Works areas outside the ROW, at his own expense, including maintaining and reinstating the same on completion of the Works to the entire satisfaction of the land owner and the Engineer.
- 3.2 The Contractor shall make the necessary arrangements with landowners and relevant government authorities for any work to be undertaken outside the Site. Two copies of all the relevant documents/ permissions/ agreements, etc., as required by the Engineer in respect of the land arranged by the Contractor outside the Site, shall be submitted to the Engineer. Before commencing operations, the Contractor shall also submit to the Engineer a detailed plan and a programme of the Works to be carried out in the works area, including areas outside the Site.
- 3.3 When using and/or occupying works areas on existing public roads, the Contractor shall undertake all necessary procedures and mitigation measures as per the requirements set by the relevant authorities.
- 3.4 The Contractor shall submit to the Engineer proposals for the use and occupation of such works areas. Any such proposal shall be submitted to the Engineer at least twenty-eight (28) days prior to the start of the programmed use of the specific works area.

- 3.5 On completion of the Works, the land arranged by the Contractor outside the Site shall be restored back to its original condition to the entire satisfaction of the land owner and the Engineer.

4 Site Security

- 4.1 The Contractor shall be wholly responsible for security on the Site and any other areas being used by him or any Subcontractors for the purposes of the Contract. The Contractor shall implement and cause Subcontractors to implement proper security management procedures in accordance with the approved security management plan described in Appendix 8000-1 [Environmental, Social, Health and Safety Management Manual] to Division 8000 [Environmental, Social, Health and Safety Management] of the General Specifications.
- 4.2 The Contractor shall assign on the Site an appropriate safety and security organisation headed by experienced and professionally qualified safety and security personnel, who shall be primarily responsible for the Contractor's security services and shall fully cooperate with the Employer's security organization throughout the Time for Completion.
- 4.3 The Contractor shall prepare and submit to the Engineer for approval a security management plan (it may be included in the Environment, Social, Health and Safety Management Plan) fully complying with not only the relevant applicable Laws but also the regulations of the Employer which may be imposed from time to time on the Project within twenty-eight (28) days after the Commencement Date or at least one week before commencing the Works on the Site or any other area being used by the Contractor (whichever is the earlier). The plan shall include detailed procedures for daily security management operations as described in Division 8000 (ESHS Management) of General Specifications.

5 Possession of Third Parties Facilities

- 5.1 The definition of "Possession" to be applied in this Clause is 'possession of a segment or stretch of the Works and/or Indian Railways (IR) track(s) and/or other related authorities required by the Contractor from the Employer and/or IR and/or other related authorities for execution of the Works during the Time for Completion and/or after issue of the Taking- Over Certificate and during the Defects Notification Period for maintenance / rectification of any defects in the Works.
- 5.2 While undertaking construction activities within an existing railway line or road under the Contractor's Possession, the Contractor shall abide by the rules/guidelines included within the relevant manuals of Indian Railways and/or the National Highways Authority of India (NHAI)/Public Works Department (PWD)/ Panchayats/ Municipal Corporations and/or any other authority.
- 5.3 The Contractor shall undertake any construction activities on existing 'live' or operating lines only after the grant of Possession by the relevant authorities.
- 5.4 An area under the Contractor's Possession is the sole responsibility of the Contractor and all issues relating to safe working within that area, including the movement of traffic, are his responsibility.
- 5.5 If the Contractor has more than one work front within the same Possession, one person shall be nominated by the Contractor as the person responsible for the coordination for all work fronts within the Possession.
- 5.6 The Contractor shall ensure that construction activities shall be undertaken strictly within the area which is under the Contractor's Possession.
- 5.7 The Contractor shall appoint a responsible person who shall coordinate with the Employer, IR/ relevant authorities, Interfacing Contractors and Interfacing Parties as applicable and who shall act as the Possession Coordinator for the Contractor. The person appointed shall have experience of IR/ relevant authorities operations and shall be fully aware of IR Rules and Regulations related to possession of track for construction of railway works and in accordance with IR/ relevant authorities regulations to issue Possession requests. For the purposes of the Works, such person shall be duly certified in accordance with the said Rules and Regulations, if required.

- 5.8 The Contractor shall use Possessions on the line as follows:
- a) For each particular Possession and depending on the duration and the location of the Possession, alternative route(s) may be required, such alternative diversion route(s) if required to be constructed, shall be at the Contractor's cost.
 - b) The normal alternative mode of transport will be proposed by the Contractor, and the route and timings of this alternative transport are to be agreed with the Engineer / IR / Road Authorities / Panchayat prior to obtaining Possessions.
- 5.9 The Employer shall provide assistance necessary to the Contractor to enable him to obtain the Possessions required by him, subject to being approved by IR, NHAI or relevant authorities. No claim shall be entertained by the Employer on this account.
- 5.10 The Contractor's request for Possession shall include a technical and organizational schedule and submit the same to the Engineer for his consent.
- 5.11 The Contractor shall submit his requests for Possessions well in advance as per requirements of relevant authorities.

6 Damage and Interference

6.1 General

6.1.1 Work shall be carried out in such a manner that there is no damage to or interference with:

- a) watercourses and drainage system,
- b) Utilities,
- c) Structures (including foundations), roads including street fixtures or other properties;
- d) Public or private vehicular or pedestrian access, and
- e) Monuments, graves or burial grounds other than to the extent that it is necessary for them to be removed and reinstated to permit the execution of the Works.

6.1.2 Heritage structures shall not be damaged or disfigured on any account. The Contractor shall inform the Engineer as soon as practicable of any items which are not stated in the Contract to be removed or diverted but which the Contractor considers necessary to be removed or diverted to enable the Works to be carried out. Such items shall not be removed or diverted until the approval of the Engineer has been obtained.

6.1.3 Assets/ items of the Employer, Indian Railway (IR), Other Contractors and any other entities and relevant authorities which include, but are not limited to, water, sewage, gas authority, electrical, OFC communication cables etc. carried out shall be replaced / reinstated by the Contractor to the same condition as existed before the Works started and to the satisfaction of the Engineer and the concerned entity.

6.1.4 In case of damage to the existing cables, the Contractor shall have suitable procedure for cable joining under the technical supervision of IR or the relevant authority.

6.1.5 The Contractor shall indemnify the Engineer, Employer, Indian Railway, Other Contractors and relevant authorities against any damages or any penal action, any claim or legal action as a result of the damages.

6.2 Utilities

The Contractor shall follow the requirements on care for utilities as specified in Sub-Division 6060 of the General Specifications.

6.3 Structures, Roads and Other Properties

6.3.1

The Contractor shall carry out a precondition survey of all roads and structures and drainage channels adjacent to the Site. Contractor originated deterioration of the roads and damage to

adjacent structures and drainage facilities shall be reported to the Engineer with appropriate records.

6.3.2 The Contractor shall maintain / replace / reinstate to the same condition as existed before the Works started and to the satisfaction of the Engineer and the concerned entity.

6.4 Access

6.4.1 Where existing access to premises either public or private is damaged or unusable, alternative access shall be provided by the Contractor to enable the Works to proceed. The arrangements for the alternative access shall be as agreed by the Engineer, the relevant authorities and the owners of the premises affected.

6.4.2 Unless agreed otherwise, the permanent access shall be reinstated as soon as practicable after the Works are complete and the alternative access shall be removed immediately when it is no longer required, and the ground surfaces reinstated. Proper signage and guidance shall be provided for traffic/ users diversions.

6.5 Trees

6.5.1 Materials, including excavated materials, shall not be banked around trees. Trees shall always be protected from damages.

6.5.2 Unless otherwise consented to by the Engineer, trees shall not be trimmed or cut as stated in Division 8000 [ESHS] of this Section.

6.6 Removal of monuments, graves, burial grounds and other obstruction

6.6.1 If any graves and other obstructions are required to be removed in order to execute the Works and such removal has not already been arranged, the Contractor shall draw the Engineer's attention to them in good time to make the necessary arrangement for authorization for removal.

6.7 Protection of the Other Adjacent Structures and Works

6.7.1 The Contractor shall take all necessary precautions during the construction to protect structures or works being carried out by others, adjacent to or within the Site from the effects of vibrations, undermining or any other earth movements or the diversion of water flow, arising from its work.

7 Defined Area and Train Operation

7.1 When the Project under construction has been made available for track and system related installation works, the area will be classified as a Defined Area for train movement. The defined area shall be controlled by the Lead Contractor (as nominated by Engineer) with regard to access.

7.2 All persons whose duties require them to work within a Defined Area must have been required to be examined for safety knowledge and to have been safety inducted. Evidence of safety induction must be exhibited whenever present or working in a defined area. All persons present in defined areas are required to observe safety rules and procedures to be defined by the Contractor and reviewed without objection by the Engineer.

7.3 The Contractor shall ensure that the necessary rules and procedures for all persons are published from time to time and communicated to the workers and/or agents and the Interfacing Contractors on the Site. The Contractor shall also ensure that all such rules and procedures are being followed during the course of all works and construction activities at the Site.

7.4 When overhead lines are energized, Train Sets/Cars may be moving in the Defined Area. No work shall be undertaken on the tracks when Train Sets/Cars are moving. Procedures for obtaining access to the energized tracks will be detailed in the rules. The Contractor shall make requests for obtaining access to the energized track or in the vicinity of the tracks as per the approved and notified rules and procedures.

7.5 After overhead lines are installed, the lines are energized, the Contractor shall comply with the rules / measures against electric shock.

8 Site Clearance

The contractor shall clear the Site as required by demolishing all buildings, structures (above and below ground such as brick, concrete, steel, etc.) and removing all rubbish as agreed by the Engineer. The Site shall also be cleared of vegetation, trees, stumps roots, etc. as mentioned in Appendix 8000-1 (ESHS Manual). All material so cleared from the site shall be disposed off by the Contractor outside the ROW as directed by the Engineer.

6020 SURVEYS AND SETTING-OUT

1 General

- 1.1 The Contractor shall plan and programme for the validation of any Site data provided by the Employer and develop a Survey Plan and Programme. The Contractor shall submit a Survey Plan and Programme to the Engineer for consent within 28 days after the Commencement Date. Generally, the contents of the Survey Plan and Programme shall comprise the following:
- a) The Contractor shall establish a horizontal and vertical control system (x, y, z) at the Site and establish Haryana Orbital Rail Corridor (HORC) benchmarks using the TBMs provided by the Employer and locate/ confirm the ROW marks given by the Employer. The scaling factor shall be as approved by the Engineer.
 - b) The Contractor shall carry out validation of the Site data provided by the Employer, and any additional topographic surveys considered necessary by the Contractor, in order to:
 - i. validate the Horizontal and Vertical Alignment with no change in alignment;
 - ii. prepare Alignment "Plan and Profile" Drawings; and
 - iii. review the data with which the Contractor shall eventually draw up the cross-section drawings at required locations.

The Contractor shall summarize the results of their validation of the Site data and any additional surveys carried out in a Survey Report and develop a Site Location Map, and a Structure Setting-Out Map and submit them to the Engineer for consent. Finally, the Contractor shall set out the Works to commence the construction with consistent accuracy and entirely throughout the construction stages.

2 Horizontal and Vertical Control System

- 2.1 A set of the benchmarks comprising a horizontal control system (x, y) and vertical control system (z) shall be established at the Site based on the Temporary Bench Marks which are established and maintained by the Employer and the Global Navigation Satellite System (GNSS) Survey, applying the Universal Transverse Mercator (UTM) coordinate system and World Geodetic System 84 (WGS 84). A description of the various benchmarks along the route alignment has been provided by the Employer along with their height above Mean Sea Level. The Contractor shall ensure that the horizontal and vertical position (x, y, z) of each HORC benchmark shall not be subject to any interference and that they shall not be affected by any of the Permanent and Temporary Works.
- 2.2 All pillars shall be of CC in dimensions of 450 mm x 450 mm x 900 mm with a projection of 300 mm above ground. The exposed surfaces of the pillars shall be appropriately painted with enamel paint of a colour as specified by the Engineer so as to be easily identifiable. The foundation shall be as indicated in the Reference Information/Reports. Details shall be developed by the Contractor and be submitted to the Engineer for review. Each pillar shall be protected by retractable fencing or other similar measures so as to prevent the occurrence of any movement, disturbance, interference and/or damage.
- 2.3 The Contractor shall establish additional benchmarks (x, y, z) which shall be staked and identified, and clearly painted in a different colour from the HORC benchmarks as approved by the Engineer. These temporary benchmarks shall be used for running a closed traverse for checking the HORC benchmarks. The pillars for additional benchmarks shall be staked at an interval of 500 m on both sides of the alignment at ROW and at abutment locations of major RUB.
- 2.4 The Contractor shall plan and programme to establish a horizontal and vertical control system at the Site by GNSS and correlate and adjust the system based on the benchmarks provided by the Employer or with reference to the existing control points as specified by the Engineer. The

Contractor shall develop such plan and programme as part of the Survey Plan and Programme and submit to the Engineer. The Survey Plan shall include, but not be limited to, details of survey methods, error adjustment/correction, accuracy achieved, means to maintain accuracy, and coordination with others with respect to consistent accuracy in entirety.

- 2.5 The Contractor shall summarize the Traverse Survey results with verification studies in a HORC Benchmark Establishing Report.
- 2.6 Upon establishing the HORC Benchmarks and completing all necessary adjustments, the final and detailed survey data of the HORC Benchmarks shall be submitted to the Engineer for consent. Upon receipt of the Engineer's consent to the HORC Benchmark Establishing Report, the system shall be the sole horizontal and vertical control system (x, y, z), with reference pillars provided with coordinates (x, y, z), as described herein and shall be referred to as the HORC Benchmarks which shall be consistently applied to the Works under this Contract. A HORC Benchmark Establishing Report containing Traverse Survey results shall also be included as part of the Survey Report.
- 2.7 The HORC Benchmarks shall be periodically checked (at such intervals as consented to by the Engineer) by running closed traverses and closed level works. The Contractor shall submit the results to the Engineer for review. The periodical checks shall include the nearest equivalent benchmarks established by Interfacing Contractor(s), with whom the Contractor shall communicate and coordinate. If any discrepancy deemed to be crucial is found, the Contractor shall carry out appropriate corrective measures under the instruction of the Engineer.
- 2.8 The equipment to be used in the survey to establish the horizontal control system shall be Static GNSS System (horizontal/vertical) and Total Stations of 1" accuracy and to establish the vertical control system shall be Digital Level (and/or auto levels) which have sufficient accuracy to meet the requirements given hereinafter. The Contractor shall submit a certificate from the manufacturer or his authorized service agent for the equipment and peripherals. The date of the calibration certificate shall not be more than one (1) month from the date of commencing the survey. The calibration shall be checked and re-validated at pre-determined intervals, and in any event before the expiry of the calibration certificate.
- 2.9 Universal Transverse Mercator & Global Coordinates of TBM are described in Reference Information/Reports for the Contractor's reference.

3 Requirements for Horizontal Control

- 3.1 The Contractor shall establish a horizontal control system at the Site by GNSS, providing each HORC Benchmark with a horizontal coordinate (x, y). The horizontal coordinate (x, y) shall be checked with reference to the existing control points, if available. The Contractor shall coordinate with adjacent Interfacing Contractor(s) to ensure that the HORC Benchmarks established by the Contractor and the equivalent benchmarks established by the Interfacing Contractor(s) are consistent. The Contractor shall include the survey results and the description in the Survey Report as described in the following paragraphs. Upon consent of the Engineer, the system shall be the sole horizontal control system for the Works under this Contract.
- 3.2 The horizontal control system shall be developed by GNSS and by running a closed traverse on the HORC Benchmarks and the temporary benchmarks along the alignment.
- 3.3 The maximum length of a traverse to be closed shall be around 5km and the number of azimuth courses within an azimuth check shall not exceed twenty-five (25). The Contractor shall compute angular closing error of the traverse followed by linear error. Limits of traverse for horizontal control shall have the following accuracy:

Angular error of closure:	$15'' (N)^{0.5}$ (N: number of angles measured) Where N shall not exceed twenty-five (25)
Total linear error of closure:	1 in 25,000 (after angular adjustment)

- 3.4 The error within the permissible limits of the traverse line shall be balanced by the Transit Method. In case the errors are beyond the above permissible limits, a traverse survey shall be carried out until the resulted error is within the permissible limits.
- 3.5 The Contractor shall summarize the established coordinates (x, y) with necessary adjustments of all HORC Benchmarks, along with raw observation data downloaded from the Total Station, together with the calculation process and descriptions of all HORC Benchmarks and submit them to the Engineer for his review.

4 Requirements for Vertical Control

- 4.1 The Contractor shall establish a vertical control system at the Site by Direct Levelling, providing each HORC Benchmark with a vertical coordinate (z). The vertical coordinate (z) shall be checked with reference to as many of the GTS Benchmarks of the Survey of India as practical, to ensure the entire vertical control system is consistent, including the equivalent system of adjacent Interfacing Contractor(s). The Contractor shall include the survey results and the description in the Survey Report as described in the following paragraphs. Upon consent of the Engineer the system shall be the sole vertical control system for the Works under this Contract.
- 4.2 The vertical control system shall be developed by running a closed level work on the HORC Benchmarks and the temporary benchmarks along the alignment. The Contractor shall close the level work at an appropriate interval and find out the closing error as described in the following paragraph.
- 4.3 Each level work shall be connected with the HORC Benchmarks which have consistent accuracy and entirety in the system and the system of adjacent Interfacing Contractor(s) and shall be properly maintained at the Site. The closing error of loop closure shall not exceed $12(K)0.5$ [mm], where K is the circuit length in kilometres, where K shall not exceed 5 kilometres. In case the accuracy of loop closure exceeds the limit defined herein, the entire loop shall be repeated until the desired accuracy is achieved.
- 4.4 The Contractor shall summarize the established coordinates (z) of all HORC Benchmarks with necessary adjustments along with raw observation data, calculation sheets and descriptions of all control marks in spreadsheet (MS Office Excel) format and submit to the Engineer for review.

5 Topographic Survey

- 5.1 The Contractor shall be responsible for carrying out validation of any Site data provided by the Employer and any additional surveys considered necessary by the Contractor for the execution of the Works, and shall ensure that the topography of the Site has been accurately recorded so that he can be fully satisfied to commence and proceed with the Works. The HORC Benchmarks as established by the Contractor shall be consistently used for surveys.
- 5.2 The Contractor shall confirm and locate all the Right of Way (ROW) marks given by the Employer at the Site and provide them with coordinates (x, y, z) so that both the Alignment and ROW are located based on the same horizontal control system.
- 5.3 The Contractor shall develop the documents including all reports, drawings, and maps. The Contractor shall summarise the results of Validation of Data, Additional Survey and Setting Out in the Survey Report. The submittals to be developed by the Contractor shall include but not be limited to the following and as described in Sub-Clause 5.2 above:
- 1) the HORC Benchmark Establishing Plan;
 - 2) the Survey Plan;
 - 3) the HORC Benchmark Establishing Report;
 - 4) the Survey Report;

- 5) the Site Location Map;
- 6) the Structure Setting-out Map;
- 7) the As-Built Alignment Plan and Profile Drawings; and
- 8) the Cross-Section Alignment Drawings (as required).

5.4 During the traversing of peripheral areas, the Contractor shall survey and record the broad alignment of important geographical and other features such as roads, watercourses and the locations of important buildings and facilities, etc., whenever considered necessary for development of the design.

6 Horizontal Alignment Staking

- 6.1 The Horizontal Alignment defined by the coordinates (x, y) of the centerline of the track of Priority Section shall be staked at an interval of twenty (20) meters in addition to TPTC, TP, TPCC points along the proposed alignment. While staking the Horizontal alignment at Site, the Contractor shall confirm the Right of Way (ROW) staking already done by the Employer at Site and provide and install any missing stakes. The Contractor shall ensure that staking of the ROW is carried out as per the relevant provisions of Indian Railways Engineering Code.
- 6.2 The Contractor shall consistently use the TBMs provided by the Employer in addition to the benchmarks established by the Contractor for staking the alignment. The proposed formation level shall also be also marked on stakes to indicate embankment height or excavation depth.
- 6.3 Upon completing the Horizontal Alignment staking and providing all the ROW marks with coordinates (x, y, z), the Contractor shall submit to the Engineer the final coordinates (x, y, z) data of the Vertical Alignment at an interval of twenty (20) meters, the ROW coordinates (x, y, z) at an interval approximately twenty (20) meters, horizontal alignment calculation report including curve details at every twenty (20) meters (transition curves, circular curves, IP coordinates (x, y, z) and direction).
- 6.4 The Contractor shall summarize the survey results of the Right of Way marks given to the Contractor by the Employer and the Centre Line Survey and the Right of Way staking and submit to the Engineer for his consent.
- 6.5 Upon the consent of the Engineer to the report, the confirmed Alignment and Right of Way marks, including maps and drawings which confirm the ROW as well as any control points established by the Centre Line and Right of Way staking, shall become the responsibility of the Contractor. The Contractor shall ensure that these marks and control points are protected and maintained and remain consistent throughout the Time for Completion.

7 Setting Out

- 7.1 The Contractor shall set out the Works at the Site. The Contractor shall ensure that all the Permanent Works are accurately set out.
- 7.2 The setting-out of the Works shall be carried out based upon the Drawings which have been issued with a approval and have been issued to the site 'For Construction'
- 7.3 The Contractor shall consistently apply the HORC Benchmarks to the setting-out.

8 Auxiliary Works

- 8.1 In addition to the requirements specified elsewhere in the Works Requirements and the Conditions of Contract, the Contractor shall follow good industry practice when carrying out surveying, setting out and associated activities, which includes but is not limited to the following:

- a) performing all necessary calculations accurately and presenting all computations and results clearly in order to facilitate verification by the Contractor and Engineer;
- b) removing machinery and obstructions from required sight-lines;
- c) prior to carrying out surveys, setting out or similar works, stopping or relocating any operating machinery, drilling, blasting, pile driving or the like which may cause ground or structure vibration; and stopping any activity which could generate smoke, dust, gas, etc., thereby obscuring clear views or causing refraction, which would thereby interfere with such survey works;
- d) restricting or stopping pedestrian and/or vehicular traffic near instruments or in sight-lines during instrument observations, as required;
- e) providing adequate equipment, labour and materials as deemed necessary and suitable to carry out control and any other surveys required.

6030 SITE SURVEYS/INVESTIGATIONS

1 Geotechnical/Geological Survey

1.1 Contractor's Surveys

The Contractor shall be responsible for carrying out validation of any Site data provided by the Employer and any additional geotechnical/geological or other surveys which, in the Contractor's opinion, are considered necessary for the execution of the Works.

1.2 Geotechnical Interpretative Report

The Contractor shall prepare and submit to the Engineer for review a Geotechnical Interpretative Report which includes site investigation results and the geotechnical interpretation of site investigation work including that undertaken by the Contractor in sufficient detail to confirm and justify parameters used in the design of temporary works. The report shall include full borehole logs, geological profile and descriptions of confirmatory boreholes drilled by the Contractor. The requirements for this Report are described in the Works Requirements.

2 Hydrological Survey

Not Applicable

3 Other Related Surveys

3.1 The Contractor shall be responsible for carrying out validation of any Site data provided by the Employer and any other surveys considered necessary by the Contractor for the execution of the Works. Such surveys may include, but are not limited to, the following:

- a) Topographic Survey (as detailed in Sub-Division 6020)
- b) Utilities Survey including Adjacent Structures and Works with Works Areas (as detailed in Sub-Division 6060 of Tender Document)
- c) Environmental Survey (as detailed in Division 8000).

6040 CONTRACTOR'S TEMPORARY FACILITIES

1 General

- 1.1 The Contractor shall be entirely responsible for the provision, erection, maintenance and removal on completion of all required temporary facilities, as part of the Temporary Works, which are required for the proper execution and completion of the Permanent Works. Such temporary facilities shall include the Contractor's offices, laboratories, workshops, stores, utilities, services, accommodation, canteens, recreational and welfare facilities, health, safety, security and environmental protection facilities and the like, whether on or off the Site.
- 1.2 The Contractor's Personnel shall not be allowed to live on the Site. A limited number of security personnel designated to secure the Contractor's facilities will be permitted to stay after working hours subject to the approval of the Engineer. The Contractor shall make all necessary arrangements for suitable off-Site accommodation and transportation for the Contractor's Personnel.
- 1.3 All of the Contractor's temporary facilities on the Site or elsewhere within the Project site shall be designed, provided, erected, maintained and removed to the satisfaction of the Engineer and in strict accordance with applicable Laws. The Contractor shall obtain all necessary approvals and permits from the relevant authorities having jurisdiction for the provision, erection, operation, maintenance and removal of the Contractor's temporary facilities.
- 1.4 All of the Contractor's temporary facilities, other than those designated to remain, are to be removed on the completion of the Works and the ground surfaces reinstated to the satisfaction of the Engineer.
- 1.5 When deemed essential for the preservation or maintenance of health, safety, security and/or environmental protection, the Engineer may instruct the Contractor to modify the Contractor's temporary facilities, regardless of any approvals or consents previously given, and the Contractor shall promptly comply with such instructions. These instructions shall not constitute Variations.

2 Location of Area for Temporary Facilities

- 2.1 The Contractor shall be aware that the area for temporary facilities is not for the Contractor's exclusive use, and the Contractor shall cooperate fully with the Interfacing Contractors if it becomes necessary for the efficient use of a limited area among the said Interfacing Contractors.
- 2.2 The precise locations of the Contractor's Temporary Works including the temporary facilities within and outside the Site area shall be proposed by the Contractor and approved by the Engineer.
- 2.3 The Contractor shall submit drawings showing the proposed locations and outlines of the proposed temporary facilities. Drawings and details of the Temporary Works for a particular part of the Permanent Works may be submitted as part of the shop or working drawings and/or the work method statements forming part of the Contractor's Documents. These locations and outline drawings for the temporary facilities shall be submitted twenty-eight (28) days before commencing the construction of any temporary facility or twenty-eight (28) days after the Commencement Date. These drawings and outlines shall be updated whenever addition or removal of any facility is planned. Detailed drawings for any particular temporary facility, showing all necessary utilities and services, shall be submitted at least fourteen (14) days before the planned commencement date of construction thereof.
- 2.4 The areas for the Contractor's temporary facilities may also be used for temporary storage of excavated material suitable for reuse in embankment or fill for the Works, or for use by the Employer in future projects or on other works packages.
- 2.5 The Contractor shall dispose of all surplus topsoil and all subsoil materials arising from the Works in the designated area wherever available within the ROW of the Project as agreed by

the Engineer. In case area for disposal of surplus soil is not available, the Contractor shall make his own arrangements outside the ROW and the Contractor shall bear all costs including royalty for using/disposing of excavated material unless otherwise specified in the Contract.

- 2.6 The Contractor is free to make his own arrangements for any additional areas required for the proper execution of the Works, and the costs of same shall be borne by the Contractor.

3 Site Offices

- 3.1 The Contractor shall be responsible for identifying and establishing suitable facilities for the Contractor's office facilities as approved by the Engineer.
- 3.2 The Contractor's Site offices and facilities shall be provided within or in the vicinity of the work site, with all necessary facilities including furniture, office equipment, office supplies, utility services, sanitary system and vehicle parking. Sub-Division 4060 of the General Specification indicates that the Engineer will have one (1) Sub-Site Office established for this Contract. The Contractor shall establish the same number of Sub-Site Office and Site Huts in close proximity to the Engineer's Offices.

4 Project Information Signboards

- 4.1 The Contractor shall provide one project profile sign board at each of the Site Offices of a size, minimum 1.5 m x 2.5 m, and maintain them in good condition. All information on the signboards will be written in English and local language for separate signboard. The signboards will be positioned on a steel frame as directed by the Engineer. The Contractor shall submit proposals for the signboard materials, the text layout (in English and local language) and installation of the signboards at the Site Offices of the Engineer and the Contractor for Engineer's approval. Each sign board shall show:
- (a) The name of the Project and the Works,
 - (b) The Location Map,
 - (c) The name of the Bank,
 - (d) The name of the Employer,
 - (e) The name of the Engineer,
 - (f) The name of the Contractor, and
 - (g) All other details as required by the Engineer

The Contractor shall maintain the sign boards and remove them on completion of the Works or when instructed by the Engineer. The Contractor shall clean, update, maintain and replace the signboards if damaged, throughout the duration of the Contract. No additional payment shall be applicable for damaged signs which are required to be replaced.

- 4.2 Within twenty eight (28) days from the Commencement Date, the Contractor shall provide and install a Project information sign, as per the requirements for signboards at the Employer's/Engineer's Site Offices, at each of the entrance points to each Site Office location (both the Contractor's and Employer's/Engineer's offices) and the Site entrances, or, as directed by the Engineer.
- 4.3 The Contractor shall maintain the signboards and remove them on completion of the Works or when instructed by the Engineer, so as to inform the public of the implementation of the Works and the Project and to advise road users of on-going construction.
- 4.4 The Contractor shall clean, update, maintain and replace the signboards if damaged, throughout the duration of the Time for Completion. No additional payment shall be applicable for damaged signs which are required to be replaced.

5 First Aid Station

- 5.1 The Contractor shall construct, equip, and maintain First Aid stations at a sufficient number of appropriate locations on the Site and at each labour camp.
- 5.2 The Contractor shall comply with all requirements specified in the Works Requirements (including Division 8000 [Environmental, Social, Health and Safety Management]) and the Conditions of Contract.

6 Labour Accommodation Camps

- 6.1 The Contractor shall supply, equip and maintain facilities as necessary for the living accommodation, feeding and welfare of its employees by providing, servicing, and maintaining a camp at appropriate location(s), as necessary.
- 6.2 The Contractor shall comply with all requirements specified in the Works Requirements (including Division 8000 [Environmental, Social, Health and Safety Management]) and the Conditions of Contract.

7 Site Storage and Yards

- 7.1 The Contractor's Site storage areas and yards shall be utilized for, among other things, material and equipment storage, casting of precast structural elements, workshops, warehouses and secure storage.
- 7.2 The Contractor shall erect a 2.0 metres high chained security fence around the Site storage areas and yards, complete with suitable lighting and lockable gates.
- 7.3 The location of each Site storage area and yard shall be determined prior to the commencement of the works and the Contractor shall propose the locations and details of same and submit to the Engineer for consent.

8 Borrow Areas and Quarries

- 8.1 It shall be the responsibility of the Contractor to arrange for borrow areas (for fill material) and quarry sites (for ballast, aggregate and rock material) using his own resources. The Contractor shall be responsible for carrying out his own investigations to verify the availability, sufficiency, quality and quantity of materials from such sources. The Contractor may also arrange any additional borrow areas and quarry sites as required by him, all at his own discretion. No claim whatsoever shall be entertained by the Employer in this regard.
- 8.2 All costs and charges, including but not limited to permits, royalties, duties, taxes, rental or other costs associated with land or the temporary use of same, etc. as applicable, for arranging borrow areas and quarry sites and access thereto, including for the extraction of material therefrom, shall be borne by the Contractor.
- 8.3 Before commencing operations in each of the borrow areas and quarry sites, the Contractor shall submit a detailed plan of his operations and demobilization/grading and finishing/reinstatement, etc. in respect of the same to the Engineer for his approval, together with relevant drawings.
- 8.4 The quality of fill material, aggregates, etc. extracted from borrow areas and quarry sites shall meet the Works Requirements and be subject to the consent of the Engineer.
- 8.5 Borrow areas, quarry sites and the installation of rock crushers shall not be permitted within the ROW.
- 8.6 On completion of the Works, the Contractor shall leave borrow areas in a safe and stable condition.
- 8.7 The Contractor shall indemnify the Employer against all claims in relation to borrow areas and quarry sites both during the Time for Completion and after the Works are completed and taken over.

9 Stockpile Areas

- 9.1 The land available, if any, within the ROW may be used by the Contractor for storage of materials required for the project, subject to the consent of the Engineer.
- 9.2 The Contractor may also arrange any additional stockpile areas as required by him at his own discretion and cost.
- 9.3 The location and size of stockpile areas proposed by the Contractor shall be subject to consent of the Engineer. The Engineer's consent may be withheld, if:
- a) in the opinion of the Engineer, a stockpile area or access thereto may be such as:
 - i) would have a detrimental effect on the natural and social environment;
 - ii) would disturb drainage system(s) around the stockpile areas;
 - iii) would constitute a danger to the public; or
 - b) at the Engineer's discretion, a stockpile would become too high.
- 9.4 Before commencing operations, the Contractor shall submit detail drawings of the proposed stockpile areas, together with the proposed method of operation, including stockpile heights, angles of repose, runoff / dust control measures, access road layouts, drainage, measures to be taken for restoration, all verified by appropriate calculations and analysis.
- 9.5 On completion of stockpiling operations, the Contractor shall reinstate stockpile area(s) to a safe and stable condition.
- 9.6 The Contractor shall indemnify the Employer against all claims in relation to stockpile area(s), both during the Time for Completion and after the Works are completed and taken over.

10 Contractor's Plants.

- 10.1 The Contractor shall plan, install, erect, maintain, dismantle and remove all plants required for the Works, including but not limited to major items such as concrete batching/mixing plants, rock crushers, casting yard, curing yard, stacking yard etc. of sufficient number and capacity to meet planned peak requirements during construction. The capacity of such plants shall be subject to consent by the Engineer. The location of concrete batching plants is subject to environmental approval from the appropriate authorities and shall not be able to operate until such approval is obtained. All control and measuring equipment shall be regularly checked and calibrated and the Contractor shall regularly submit calibration certificates for same to the Engineer.
- 10.2 The land available, if any, within the ROW may be used by the Contractor for storage of materials, concrete batching/mixing plants, casting yards, curing yard and stacking yards subject to the consent of the Engineer. The Contractor shall arrange any additional areas as required by him at his own discretion and cost.

11 Material Testing Laboratories

- 11.1 The Contractor shall design, construct, equip, maintain, dismantle and remove all required material testing laboratories and associated facilities on the Site and / or at work areas as are required for the sampling and testing of materials as required in the Works Requirements. The Engineer's consent shall be obtained to the location of material testing laboratories.
- 11.2 Laboratory buildings shall be supplied with adequate electricity, water, air-conditioning, etc., and shall have sufficient area(s) for storing samples.
- 11.3 The laboratory equipment to be supplied and the methods of testing shall be in accordance with relevant International, Indian and/or other standards and codes as detailed in the Works' Requirements. All apparatus and equipment shall be brand new and of the latest design and manufactured by a reputable manufacturer. The proposed type and number of items of laboratory equipment shall be submitted to the Engineer for review and consent prior to purchase.

- 11.4 The laboratory equipment and apparatus shall be checked and calibrated before testing starts and thereafter at regular intervals as specified by the manufacturer and as directed by the Engineer. The Contractor shall regularly submit calibration certificates for same to the Engineer.
- 11.5 The Contractor shall complete the design, construction and installation of the laboratory facilities for operation within one hundred and forty (140) days after the Commencement Date and operate and maintain the facilities until the issue of Taking-Over Certificate, unless otherwise authorized by the Engineer. The Contractor shall also make all facilities and services available to the Engineer as required. All sampling and testing to be undertaken shall be under the direct supervision of the Engineer. The material testing laboratory shall be staffed by Contractor's personnel fully experienced in the sampling and testing of materials, and quality control.
- 11.6 Any testing which may be required in accordance with the Works Requirements and which cannot be performed in the Contractor's laboratory due to lack of time or equipment shall be assigned to an independent organization having NABL accreditation and as duly consented to by the Engineer. The Contractor shall accept all results, instructions or restrictions stipulated by the Engineer based on such tests.

12 Wheel Washing Facilities

- 12.1 In and around residential and commercial area, the Contractor is required to install wheel washing area within ROW at the "Exit" points/gates of the construction area to ensure the removal of wheel/band dirt from construction vehicles and machines. Wheel washing area design shall be proposed in CEMP. As a part of the Contractor's method statement for the site preparation plans, wheel washing area shall be proposed and approved by the Engineer before the commencement of the work. The facilities are required to have access for cleaning out the sludge which collects together with provision for 2 high pressure hose connections and adequate water supply.

13 Temporary Roads

- 13.1 The Contractor at his own discretion construct and dismantle/alter/dispose of the temporary roads after the completion of Contract as directed by the Engineer.
- 13.2 Before constructing any temporary roads outside the ROW, the Contractor shall make all necessary arrangements, including payment if required, with the public authorities or landowners concerned, for the use of the required land and shall obtain the consent of the Engineer. Such consent will be dependent on the Engineer being satisfied with the Contractor's proposals for items such as capacity, signage, lighting and surface quality of the temporary road, together with proposed maintenance arrangements. Such consent shall not relieve the Contractor from any of its responsibilities under the Contract.
- 13.3 The Contractor shall note that temporary road shall not be for the Contractor's exclusive use and shall be subject to relocation or restrictions at his cost during the execution of the Works as and when such relocation or restriction is inevitable. Except in an emergency, the Contractor will be given a prior notice of any such relocation or restriction. The road layout and design proposal shall be revised and re-submitted to the Engineer for consent whenever road arrangements are to be modified for whatsoever reasons.
- 13.4 Within forty-two (42) days after the Commencement Date and consequent to the surveys performed by the Contractor in accordance with Sub-Division 6020 [Surveys and Setting-Out] of the General Specifications, the Contractor shall submit for the Engineer's review and approval of the proposed design, including layout, and details of the temporary road, fences, protection to underground pipes and culverts at road-crossing points and all additional temporary pipes and culverts that shall be provided by the Contractor, to sustain road traffic, irrigation and drainage flow in all existing streams, irrigation canals and ditches, drainage canals and ditches,

and utilities or services, whether buried or exposed, all of which, in the opinion of the Engineer, are necessary for the proper execution of the Works.

- 13.5 During the transportation of Goods and Contractor's Personnel, the Contractor shall be responsible for keeping all railways, roads, bridges, watercourses, utilities services, etc. free from damage and from spillage of construction materials, detritus, oils, etc. and shall repair any damage howsoever caused to any such structure or property (whether on or off the Site) by Contractor's Equipment (including that of any Subcontractor). In that respect the Contractor will be required to carry out a condition survey of all roads and other facilities in and adjacent to the works area which will show in detail the state of those items prior to the commencement of construction. The full records shall be submitted to the Engineer and the status monitored throughout the course of construction with further records maintained.
- 13.6 At the junction of temporary roads with existing roads, the Contractor shall provide suitable traffic marshals to warn and regulate the traffic as per the requirements.
- 13.7 The Contractor shall be responsible for upholding and protecting all slopes at the boundaries of the Site against slippage into adjacent properties. As adjacent areas may be irrigated, this requirement will also therefore include the provision of temporary coffering as appropriate.
- 13.8 All temporary roads, culverts, ditches and the like required for the Contractor's or Subcontractors' or any other Contractor's operations shall be provided and maintained by the Contractor, kept in good condition by cleaning, watering, rolling, grading, repairing and maintaining, all to the approval of the Engineer.
- 13.9 If the Engineer has provided drawings or details of any temporary works, then such drawings or details shall be understood to be indicative of the minimum required standard only. The Contractor shall remain responsible for the design of Temporary Works.
- 13.10 Unless otherwise approved by the Engineer, the demolition of any existing roads, culverts, etc. shall not commence until the replacement facilities therefore have been completed by the Contractor.
- 13.11 When any of the temporary approach roads are no longer required, or earlier if so directed by the Engineer, the Contractor shall carefully dismantle the temporary bridge or road, and remove and dispose of all surplus materials in compliance with the applicable Laws, and reinstate the area to its original condition to the approval of the Engineer.

14 Vehicles

- 14.1 The Contractor shall provide all necessary vehicles required for the transportation and movement of Goods and Contractor's Personnel, including but not limited to trucks, cranes, trailers, cars, motorcycles, etc.
- 14.2 The Contractor shall provide competent and licensed drivers and operators for all such vehicles. Vehicles shall be licensed and insured in accordance with the applicable Laws and the Contractor shall be responsible for all servicing, repairs and maintenance required.

15 Contractor's Equipment

- 15.1 The Contractor shall ensure that all Contractor's Equipment whether on or in the vicinity of the Site, including apparatus, machinery, vehicles and other similar things to be operated by him or his Sub-Contractors for the execution and testing of the Works, are maintained and operated in a good and safe condition.
- 15.2 All lifting and hoisting equipment shall be regularly certified in accordance with the applicable Laws, and the safe working load limits shall not be exceeded.
- 15.3 The Contractor shall operate and maintain an equipment repair facility within or in the vicinity of the Site, so that downtime of Contractor's Equipment can be minimized. Temporary fuel

and lubricant stores shall be properly designed, constructed, secured, fire- and spill-guarded, and be well ventilated so as to comply with the relevant applicable Laws.

16 Utilities for Temporary Facilities

16.1 Power Supply and Lighting:

- i. Electric power supplies for the Contractor's temporary facilities, including but not limited to Contractor's camps, offices, Site, work areas and other facilities as described herein, shall be arranged by the Contractor.
- ii. The Contractor shall install, operate and maintain its own electrical distribution systems for the electrical supply required for his temporary facilities as described in paragraph (1) above.
- iii. The Contractor shall also furnish, install and keep operational the diesel power generating facilities of such capacity as the Contractor considers necessary to prevent any interruption to the progress of the Works.
- iv. The Contractor shall ensure adequate lighting is provided for all his operations at the Site and the temporary facilities and camp according to the National Building Code of India (2016).

16.2 Water Supply

- i. The Contractor shall design, install, operate and maintain water supply systems including pumps, piping systems, valves, storage tanks etc., at the Site with respect to:
 - a) Industrial water supply system
For construction use the water quality shall meet the quality requirements in the Works Requirements.
 - b) Potable water supply system
For supply to all the Contractor's temporary facilities including but not limited to Contractor's camps, offices, Site, work areas and other facilities for human consumption and use.
- ii. In case the Contractor plans to install bore well(s) for water supply, he shall thoroughly investigate the relevant legislation and regulations imposed by the competent authorities and the installation shall be subject to approval by the said competent authorities and/or consent of the Engineer.
- iii. Throughout the Time for Completion the Contractor shall take samples from all water supplies at regular intervals and test it for suitability for the intended use.

16.3 Sanitation and Sewerage

- i. All operational parts of the Site, offices, workshops, fabrication yards, laboratory, camp and other facilities, etc. shall be provided with sanitation and sewage handling and disposal systems complying with the statutory requirements and applicable Laws, codes and standards.
- ii. If required, portable sanitary facilities including chemical toilets shall be provided and maintained by the Contractor for the use of all personnel at all work locations.
- iii. All the requirements of the Works Requirements (including Division 8000 [Environmental, Social, Health and Safety Management] of the General Specifications) and the Conditions of Contract shall also be complied with.

16.4 Waste and Garbage Disposal

- i. The Site and the work areas shall be kept clean and free of detritus at all times.

- ii. The Contractor shall collect waste material and garbage from Site, camp, offices, yards, workshops, etc. on a daily basis and dispose of same in an approved disposal area(s) and as per guidelines prescribed by local and governmental authorities having jurisdiction. No waste of any kind shall be deposited in any watercourses.
- iii. All the requirements of the Works Requirements (including Division 8000 [Environmental, Social, Health and Safety Management Management] of the General Specifications) and the Conditions of Contract shall also be complied with.

16.5 Fencing, Site Security and Safety

- i. The Contractor shall be responsible for the security and safety of the Site. Accordingly, the Contractor's temporary facilities including offices, workshops, fabrication yards and storage compounds, campsites, all construction areas, storage areas shall be adequately fenced, gated, lighted and guarded on a twenty-four hour, seven days a week basis. Firefighting equipment shall be provided in accordance with the applicable Codes and the requirements of local authorities.
- ii. Any storage facilities for explosives shall comply with the relevant Laws and regulations of India and shall be situated at locations approved by the competent authorities. Detonators and fuses shall be stored in facilities separate from explosives. In no case shall detonators and fuses be transported in the same vehicle as explosives. Storage facilities for explosives, detonators, fuses, etc. shall be secure, kept locked and the keys shall be accounted for at all times.
- iii. All the requirements of the Works Requirements (including Division 8000 [Environmental, Social, Health and Safety Management Management] of the General Specifications) and the Conditions of Contract shall also be complied with.
- iv. The Contractor shall be responsible for any losses occurring within the Site premises.

16.6 Inspection by the Employer or Engineer

The Employer and the Engineer have the right at any time to inspect any part of the Contractor's temporary facilities and to require immediate rectification to comply with the specified requirements.

16.7 Final Clean-Up

- i. Upon the completion of Works, or when any of the Contractor's Equipment and/or temporary facilities have fulfilled or completed their function, the Contractor shall dismantle and demobilize such Contractor's Equipment and/or temporary facilities and remove all equipment, machinery, materials, refuse, debris, objectionable material, and reinstate, including filling, grading and dressing all areas to their original condition prior to completion of the Works.
- ii. The Contractor shall not proceed with any demobilization and/or removal of temporary facilities and equipment without the prior consent of the Engineer.

17 Maintenance of Temporary Facilities

- 17.1 The Contractor shall provide all necessary maintenance requirements and shall keep the temporary facilities and other areas established for the Works, clean, tidy and litter-free.
- 17.2 The Contractor shall be responsible throughout the Time for Completion for keeping the Site and temporary facilities to the satisfaction of the Engineer.
- 17.3 The Contractor shall maintain all existing security fences required for the Works until completion of the Works. Existing fences which interfere with construction operations, shall not be relocated or dismantled, until written permission has been obtained from the fence owner.

18 Damage to Existing Property

- 18.1 The Contractor shall be responsible for any and all damage that may occur to any existing structures, works, materials, or equipment that is due to any operation(s) for which the Contractor is responsible, including any operation(s) of any Subcontractor.
- 18.2 The Contractor shall repair or replace any damaged structures, works, materials, or equipment to the satisfaction of the Engineer.
- 18.3 The Contractor shall be responsible for all damage to roads, railway infrastructure, curbs, sidewalks, highways, shoulders, embankment, ditches, drains, culverts, bridges, or other public or private property, which may be caused by their construction activities and shall indemnify for losses due to such damages.

6050 MOBILIZATION AND DEMOBILIZATION

1 General

- 1.1 The Contractor shall mobilize to the Site the Contractor's Equipment and the Contractor's Personnel as appropriate for the execution and completion of the Works in strict accordance with the requirements of the Contract.
- 1.2 The Contractor shall demobilize Contractor's Equipment and Contractor's Personnel from the Site as appropriate when they are no longer required to be on the Site.

2 Engineer's Consents

- 2.1 The Contractor shall inform the Engineer regarding mobilization of Contractor's Equipment, including that required for use by any Subcontractor, at least seven (7) days before the date planned for the mobilization of same to the Site. The Contractor should note that:
 - a) the Contractor shall be solely responsible for the consequence of any such mobilization;
 - b) the relevant insurances shall be in place as evidenced by insurance documents included in the application;
- 2.2 The Contractor's Equipment shall be mobilized to the Site complete with all necessary spare parts, consumables and the like indispensable for proper operation and maintenance thereof. The Contractor shall provide maintenance facility complete with qualified maintenance personnel on or in the vicinity of the Site.
- 2.3 The Contractor shall obtain a written consent from the Engineer before removing any of the Contractor's Equipment from the Site or any managerial person among the Contractor's Personnel mobilized exclusively for the Contract. Provided that the proposed demobilization is in accordance with the Contractual Works Programme to which the Engineer has given consent and that the Contractor shall be solely responsible for any consequences of such demobilization, the Engineer shall not unreasonably withhold consent.
- 2.4 Although they are deemed intended for exclusive use on the Works as set forth in Sub-Clause 4.17 of the General Conditions, the Contractor may divert any of the Contractor's Equipment to other uses within the Site, provided that the Contractor's written undertaking to return the same to the Works whenever needed is submitted to the Engineer and the Engineer's written consent to such diversion is granted.

3 Records

- 3.1 In addition to the Monthly Progress Reports described in Sub-Division 4080 [Monthly Progress Report Requirements] of the General Specifications, the Contractor shall submit to the Engineer, on a daily basis, details of the mobilization and demobilization of any of the Contractor's Equipment or any managerial person among the Contractor's Personnel.
- 3.2 Without undue delay after demobilization from the Site, the Contractor shall submit to the Engineer copies of certified evidence of lawful re-export from the Country of any Contractor's Equipment imported into the Country on a temporary basis exclusively for use on the Contract.

4 Mobilization

- 4.1 The Contractor shall mobilize to the Site the Contractor's Equipment and the Contractor's Personnel as appropriate for the execution of the design, construction and completion of the Works. An Initial Mobilization Plan for the 3 months following the Commencement Date shall be submitted to the Engineer within 7 days after the Letter of Acceptance has been received by the Contractor. An overall Mobilization Plan for the Works shall be submitted to the Engineer for his approval within 90 days after the Commencement Date.

- 4.2 In the event that manufacturing activities are to be carried out outside the Republic of India, the Contractor shall submit detailed organizational structure(s) for such manufacturing teams. This submission shall include the organization of such teams and details of the key personnel, including contact address, i.e., the addresses of the locations where such manufacturing activities are carried out and the e-mail address of each key personnel.
- 4.3 The Mobilization Plan shall include, but not be limited to the following:
- a) Details of each major item of Contractor's Equipment, i.e., the name, size and capacity etc. of each item.
 - b) The number of each equipment and the time of mobilization and duration of the use of each equipment.
 - c) The name and details of key personnel for each section of the Works and their responsibilities.
 - d) Details and time for installation of temporary facilities for the Works including temporary facilities for the Employer and the Engineer.
 - e) The numbers of Contractor's Personnel, including site engineers, administrative staff and labour in each trade category.

5 Demobilization

Demobilization shall be carried out in accordance with the provision of Sub-Clause 4.22 [Contractor's Operation on Site], and Sub-Clause 11.11 [Clearance of Site] of General Conditions. Upon receiving the Performance Certificate under Sub-Clause 11.9 [Performance Certificate], the Contractor shall carry out the Clearance of the Site and the Contractor shall inform in writing to the Employer the completion of Demobilization or Clearance of Site and obtain the consent of the Employer. In case the Clearance of Site has not been completed in a specified period by the Contractor, the Employer may carry out the Clearance of Site. The Employer shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to payment by the Contractor of the costs reasonably incurred in connection with, or attributable to, such sale or disposal and reinstating and/or cleaning the Site, less an amount equal to the moneys from the sale (if any). In case the Taking-Over is conducted section by section, the Contractor shall inform in writing to the Employer the completion of Demobilization of the section and obtain the consent of the Employer or the Engineer as a representative or on behalf of the Employer.

6060 UTILITIES AND FACILITIES

1 General

- 1.1 The Contractor shall at all times work with due diligence to ensure the safety of all personnel and property from injury and damage from known (“Charted Utilities”) and unknown utilities (“Uncharted Utilities”).
- 1.2 The Contractor shall always take care of concerning buried Charted and Uncharted Utilities and if any such Utilities infringe the work, the Contractor shall make the area affected safe and ensure that no unauthorised member of the workforce or members of the public shall enter such area.
- 1.3 Contractor shall be responsible for relocation/diversion/shifting/modification of all charted/uncharted utilities infringing the Works.
- 1.4 Contractor shall indemnify the Employer against any losses/claim/damage cost to any damage to utility/services during execution of Works.

2 Utilities, Services and Facilities

- 2.1 The Utilities are categorised as (i) Charted Utilities, which have been identified by the Employer and may be affected during the execution of the Works. and, (ii) Uncharted Utilities, which are not known and would get identified during the execution of the Works.

2.2 Charted Utility

The Charted Utilities identified by the Employer are enclosed in Reference Information/Reports. These are further categorised as discussed under:

i. Type A –Overhead Electrical Crossings

- a) These are Overhead Electrical Crossings, traversing the proposed HORC alignment and likely to infringe during execution of the work primarily due to inadequate ground clearance. The Employer has already taken action to remove these infringements by either raising or laying underground cables. The infringements due to LT and HT (up to 33 KV) utilities shall be removed by the Employer within 90 days of the award of Contract. The Crossings shifted underground shall normally be laid within ten (10) metres of the chainages given in the list of Overhead Electrical Crossings except at locations where stations and buildings of HORC are proposed. At the stations and HORC buildings, the utility will be shifted beyond the structure area. For cables crossing the HORC alignment, extra length of 3m to 5m is being provided on both sides, so that cable can be slewed if required during construction. The Contractor shall consider the effect of these shifted utilities in his work planning and price. The coordinates of the new locations where utilities have been shifted will be shared with the Contractor once the shifting is completed. Electrical utilities which have been laid underground, will be considered as charted utilities. The Contractor shall design the span in such a way that further utility shifting is avoided unless inescapable.
- b) The infringements due to EHT (above 33 KV) Utilities will be progressively removed and is likely to be completed within 12 months of the award of the Contract. However, these utilities will not infringe the working of Contractor. The Contractor shall plan his works taking this aspect into consideration.

ii. Type B – Overground Utility

These are various utilities which existed on ground at the time of acquiring the land by the Employer and may affect the execution of the work. The Employer takes the responsibility to dismantle these utilities up to ground level and hand over the land to the Contractor free

of these encumbrances. Removal of remaining portion below ground level, wherever required, shall be responsibility of the Contractor. The Accepted Contract Amount shall be deemed to include all such works and risks.

iii. Type C- Underground Utilities

These are various charted underground utilities which are existing and Contractor shall consider and take into account the effect of these in his price.

2.3 Uncharted Utility

The Uncharted Utilities will be those unknown utilities which get identified during execution of the Works. These may be identified during Ground Penetration Survey or anytime during execution of the Works.

2.4 The Contractor shall do a general survey and Ground Penetrating Radar (GPR) Survey of the Site after possession and notify the Engineer of Chartist & Uncharted Utilities, which may obstruct the works and need to be relocated.

2.5 For all Chartist & Uncharted Utilities requiring relocation identified by the Contractor in the Utilities survey, the Contractor shall inform the Engineer and provide relevant details, including but not limited to, the following:

- i. location of the Utility;
- ii. date on which Utility was encountered;
- iii. nature and size of the Utility;
- iv. condition of the Utility
- v. type of the Utility & its owner:
 - a) Electrical cables;
 - b) OFC & Telecom cables;
 - c) Gas pipelines;
 - d) Water/sewerage/drainage/storm water/hume pipelines;
 - e) Irrigation pipelines/channels;
 - f) Telecom towers;
 - g) Overhead Water tanks and others overhead tanks;
 - h) Others, if any
- vi. Reasonable estimate of time required for shifting of Uncharted Utilities.
- vii. The information shall also cover the details of the agency/department carrying out the utility shifting.

2.6 The trial trenching, arrangements and working methods to be employed in respect of such Chartist & Uncharted Utilities which warrants removal/relocation, including proposed protection measures, diversions, reinstatements in consultation with utility owner shall be done within 56 days after Handing Over of the Site by the Employer. The Contractor shall provide relevant justification for the identified utilities (Chartist & Uncharted) which require removal/diversion for proceeding with the works.

2.7 The Engineer will accord approval within 21 days to the Contractor for initiating required action for the utilities warranting removal/relocation/modification.

2.8 The Contractor shall be responsible for taking prompt necessary action for such identified utilities (Chartist & Uncharted) including the following but not limited to:

- i. Identification of the extent of the utility to be relocated
- ii. Coordinate and get permissions from utility owner & all relevant authorities.
- iii. Preparation and submission of relevant documentation to the authorities.

- iv. Mitigate the situation and re-arrange the work to minimise the effect on the timeline of the Works
- v. Continue with other related works in as much as possible to maintain the timeline of the Works.

Any relocation/removal/diversion of Charted Utility (including shifted utility as mentioned in sub-clause 2.2 above shall be entirely the Contractor's responsibility and any cost on this account shall be borne by the Contractor.

- 2.9 The relocation/removal/diversion of identified Uncharted Utilities shall be assigned to the Contractor to be carried out through the utility agencies, or their specified contractor or by the Contractor himself. The cost of relocation/removal/diversion of Uncharted Utility shall be paid by the Employer as mentioned below:
- i. If Uncharted Utility relocation/removal/diversion is carried out by Utility agency or their specified contractor, the Contractor shall make the payment to such agency or specified contractor. The Employer shall reimburse such amount as Specified Provisional Sum based on invoices.
 - ii. If Uncharted Utility relocation/removal/diversion is carried out by Contractor himself, then he shall be paid under Specified Provisional Sum.
- 2.10 The Contractor shall not divert, remove or relocate any such identified Charted & Uncharted Utilities without having first received the Engineer's consent to such diversion, removal or relocation.
- 2.11 The Contractor shall liaise and co-ordinate with the relevant Utilities Companies to ensure that all the above-mentioned works of relocation/diversion, support and protection are executed satisfactorily. Contractor shall obtain necessary clearances from the Utility company/owner prior to the start of any relocation/removal/diversion works of the utilities. The same shall be submitted to the Engineer prior to start of the works.
- 2.12 Throughout the execution of the Contract, the Contractor shall reasonably comply, in all respects, with the requirements of all the utility owners and authorities regarding the handling, protection and maintenance of the utility facilities. The responsibility in respect of diversion/modification/ relocation/ protection etc. of the Utilities (Charted or Uncharted) to facilitate safe construction lies with the Contractor. If required, the employer shall provide support to facilitate approvals/permits from utility owner/concerned department for the proposed diversion/relocation of utilities.
- 3 Prevention of Damage and Interference**
- 3.1 Temporary supports and protection methods proposed by the Contractor and agreed by the utility owner shall be provided to the utilities. The permanent supports and protection shall be provided wherever required for the safety and security of the utility service.
- 3.2 The Contractor shall not interfere in any manner with the Utility lines and services without prior approval of the Utility owner and Engineer. Whenever the interfering necessity arises, the Contractor shall submit a proposal to the Engineer for his approval. Any unintentional interference caused shall be immediately corrected without causing danger and trouble to any on-going operations or the existing utility lines or services. The Contractor shall immediately inform the Engineer and the utility agencies of:
- i) damage to utilities;
 - ii) leakage of utilities;
 - iii) discovery of utilities not previously identified; and
 - iv) Any hazardous material found during the excavation.

- 3.3 The Contractor shall inform the Engineer of the programme of all works of utility diversions and shall take all steps to enable the utility diversions to proceed in accordance with the programme. The Contractor shall maintain close liaison with the utility owners.
- 3.4 Records of the Charted & Uncharted utilities requiring diversion/relocation encountered shall be kept by the Contractor on the Site. The records shall contain the following details:
- i. location of utility
 - ii. date on which the utilities were encountered;
 - iii. nature and sizes of the utilities;
 - iv. condition of utility;
 - v. temporary or permanent supports provided; and
 - vi. diversions made –temporary or permanent

The Contractor shall include the details (plan, location, ownership, size and material) of all such utilities in the As-built Drawings.

4 Drainage Systems

- 4.1 All existing drainage systems that are affected by the Temporary and the Permanent Works shall be protected, relocated and/or diverted as required for the Works, by the Contractor.
- 4.2 Such protection, relocation or diversion works shall be carried out by the Contractor, and his designs shall be approved by the utility owners / relevant authorities and the Engineer.
- 4.3 Upon completion of the works, all the diverted or temporarily diverted drains/box culverts and canals shall be fully reconstructed to their original size or to a revised size as required by the utility owners /relevant authorities. However, if the utility owner or relevant authority requires to keep the Utility at the original location, the same shall be reconstructed at the original location.

5 Building Service Connections

- 5.1 Building service connections shall be maintained and protected or if required to be shifted, shall be informed to the Engineer during the execution of the works. The Contractor shall take necessary steps to ensure these services with the approval of utility owner and the Engineer.
- 5.2 Building service connections shall include the branch pipes from the main water pipe, water meter chambers/bulk meter, sewer and drainage discharge pipes, grease traps, etc.
- 5.3 Building service connections shall be identified by trial trenches or other methods approved by the relevant Utility Companies. Where these service connections interfere with the works, the Contractor shall follow the methodology as approved by the relevant Utility Companies and the Engineer.

6 Street Furniture and Minor Service

Where street furniture, including lamp posts, traffic lights, fire hydrants, signage, minor electrical cables, water services, etc. are required to be dismantled and stored or relocated temporarily or permanently, the Contractor shall propose such works to the Engineer and Utility Companies or relevant authorities for their approval.

6070 TRAFFIC MANAGEMENT

1 General

- 1.1 The Contractor shall thoroughly acquaint itself with existing traffic conditions and understand the importance of maintaining traffic safety and the avoidance of excessive traffic delay. The Contractor shall co-operate with the relevant agencies regarding traffic control and all details shall be subject to the Engineer's approval.
- 1.2 The requirements concerning temporary road works shall include, but not be limited to, construction of detours, temporary bridge approach roads, traffic control devices and services for the control and protection of traffic through areas of construction.
- 1.3 The Contractor shall be responsible for investigating and establishing the requirements for traffic control and ensuring safety at each site and shall submit such details in the form of a Temporary Traffic Control Plan for the Engineer's review and consent.
- 1.4 All temporary roadworks and traffic management shall be as specified in this Sub-Division, unless specified otherwise elsewhere in the Contract or local Indian regulations and standards, and the more onerous provision shall apply.

2 Temporary Traffic Control Plan (TCP)

2.1 Submission, Consent and Change

- 2.1.1 Within twenty-eight (28) days after the Commencement Date, the Contractor shall submit a Temporary Traffic Control Plan (TCP) to the Engineer for review and consent. The Engineer's consent shall be obtained prior to the start of Works on Site.
- 2.1.2 The Contractor shall comply with the TCP which has received the Engineer's approval and any Engineer's instructions issued concerning traffic control.
- 2.1.3 Should the Contractor propose any change to the TCP which has received the Engineer's approval, the Engineer shall be notified in writing at least seven (7) calendar days prior to the date planned for the implementation of any such proposed change. Changes proposed are subject to receipt of the Engineer's consent. If the Engineer makes any subsequent recommendations or issues instructions concerning the TCP in writing, the Contractor shall revise the TCP accordingly.

2.2 Contents of Temporary Traffic Control Plan

- 2.2.1 The main contents of the Temporary Traffic Control Plan shall include, but not be limited to, the following:
 - a) Type and main specifications of traffic control devices and facilities;
 - b) A scale plan of the location(s), clearly identifying existing road(s), proposed diversions of pedestrian and road traffic, locations of warning signs and traffic control measures;
 - c) Details of all lane widths, temporary surfaces, etc.;
 - d) Construction details of any proposed diversion(s);
 - e) Safety measures including signage and staffing;
 - f) Program for installation and erection of traffic control devices and facilities;
 - g) Traffic control means during non-working time and during night time;
 - h) Protection/diversion of any existing utilities;
 - i) Environmental measures to be implemented, e.g. dust suppression, noise abatement, watercourse diversion and the like; and
 - j) Person responsible for overseeing implementation of all aspects of the TCP.

- 2.2.2 In addition to the above and prior to the implementation of any Site-specific traffic control schemes, the Contractor shall obtain any necessary approval letters from relevant authorities who have jurisdiction over or ownership of the existing traffic way including the Traffic Police, NHAI, PWD and any other local government/authorities and other related parties having jurisdiction, as applicable and as required.
- 2.3 Number of Lanes for Traffic Control
- 2.3.1 The existing traffic on roads at the Site must be maintained at all times during the execution of the Works and if diversions are required these must be of the same traffic capacity as the original road. Notwithstanding the above, the Engineer may give consent to reductions in traffic capacity if the Contractor can demonstrate that such will not cause excessive delays to traffic flow. If such consent is given, the Engineer may specify the hours during the day when the reduction in capacity may be applied and it should be anticipated by the Contractor that these hours will not include any peak periods for the traffic movement.
- 2.3.2 The Contractor shall cooperate with relevant authorities having jurisdiction regarding traffic control and all details will be subject to receipt of the Engineer's consent.
- 2.4 Temporary Traffic Ramps and Speed Breakers
- 2.4.1 In locations where it is necessary (for example, pipeline crossing a road above ground), the Contractor shall construct and maintain temporary traffic ramps.
- 2.4.2 In cases where it is necessary (for example, requirement by an agency having jurisdiction) or required by the Engineer, the Contractor shall provide and maintain temporary speed breakers.
- 2.5 Traffic Control for Public Roads
- 2.5.1 The Contractor shall maintain close liaison with the Traffic Police, NHAI, PWD and any other local government/authorities and other related parties having jurisdiction, as applicable to traffic control requirements and shall comply with all approval and permit requirements from such authorities.
- 2.5.2 In order to facilitate traffic through or around the Works, or wherever ordered by the Engineer, the Contractor shall erect and maintain at prescribed points on Site roads and at approaches to the Works, a temporary fence made of corrugated metal sheet supported by hard posts with foundations and horizontal bars, traffic signs, lights, barricades, traffic cones with traffic warning lamps and other facilities for the direction and control of traffic. The fence is to be painted and maintained in good condition. Drawings and details of the fence are to be prepared and submitted to the Engineer for review and issue of a approval.
- 2.5.3 Where required, or as directed by the Engineer, the Contractor shall provide competent flagmen whose sole duties shall consist of directing the movement of traffic through or around the Works.
- 2.5.4 In addition to the requirements as described above, the Contractor shall furnish and erect, within or near Works areas, such warning and guide signs as may be ordered by the Engineer.
- 2.5.5 For all traffic safety precautions, the Contractor shall refer to Section VII-1, Appendix 8000-1, Traffic Management and Site Barricading. The Contractor shall refer to Section VII-4, Reference Information/Reports for details of barricading.
- 2.5.6 The repair of any existing roads that have been damaged by the Contractor during the execution of the Works (including any damage caused by Contractor's Equipment) shall be at the risk and cost of the Contractor.

3 Extraordinary Traffic

The Contractor shall be responsible for carrying out any necessary investigations and the obtaining of approvals, licenses, escorts and any other necessary facilities in order to enable extraordinary traffic to be moved on the roads in the Works area.

4 Maintenance and Protection of Traffic

4.1 During the execution of the Works the Contractor shall keep open to traffic existing roads, provided that where required or as directed by the Engineer, the Contractor shall arrange detours subject to the consent of the Engineer. The Contractor shall at all times keep roads and footpaths affected by its operations, free from obstruction and nuisance and suitable for public use.

4.2 The Contractor shall take necessary care at all times during the execution of the Works to ensure the convenience and safety of residents along and adjacent to public roads and highways that may be affected by the Works. Street lighting shall be relocated as necessary to maintain the same standard of lighting during the course of the Works, until new lighting facilities are brought into operation.

4.3 Any failure of the Contractor to meet these requirements will entitle the Engineer to carry out such works as he deems to be necessary and to charge the Contractor with the full cost thereof plus ten percent of such cost, which sum will be deducted from any money due or which may become due to the Contractor under the Contract.

5 Vertical Clearance

In general, any Temporary Works placed over roads or diversions used by public traffic shall maintain a vertical clearance of at least 5.5 metres unless otherwise directed by the Engineer. Where required by the Engineer the Contractor shall erect and maintain suitable check-gates, fitted with warning signs indicating the vertical clearance.

6 Materials

Materials and other specifications related to traffic control devices shall conform to IRC Standards unless otherwise specified elsewhere in the Contract.

6.1 Retro-reflective Material

Unless otherwise specified in the Contract, sign panels, barricades, traffic cones, vertical panels, and flagmans' paddles shall have retro-reflective sheeting, as consented to by the Engineer.

6.2 Sign Panels

Sign panels shall be yellow with black legend unless otherwise specified in the Contract or local Indian regulations and standards.

6.3 Sign Posts

Sign posts shall be fabricated from materials as acceptable to the Engineer. Signs shall be provided with suitable foundations and be designed so as to be capable of remaining in position during normal traffic flow and wind conditions.

6.4 Barricades

Barricades shall be constructed in accordance with the Drawings.

6.5 Traffic Cones

6.5.1 Traffic cones shall be capable of withstanding impact without damage to the cones or vehicles. All cones shall be orange with highly reflective white bands which is easily visible both in daylight and darkness. Traffic cones shall be capable of remaining visible and in position during normal traffic flow and wind conditions in the area where they are used. Lamps for cones shall be suitable for purpose.

- 6.5.2 Where traffic cones are used for the diversion of pedestrians the cones shall be fitted with yellow/black reflective cone bars to prevent pedestrians walking outside the protected walk area.
- 6.5.3 All cones shall be as above unless otherwise specified in the Contract or local Indian regulations and standards, whichever is more onerous.

6.6 Warning Lights (flashing or steady-burn)

High visibility traffic warning lights shall be provided and used at all locations where Works are being carried out and visible warnings are required, i.e. road works, excavations, pedestrian diversions, etc. The requirements for warning lights shall be:

- i. Lens colour shall be amber;
- ii. Lens diameter shall be not less than 185mm;
- iii. Flashing shall be 110 per minute;
- iv. Suitable for fitting to traffic cones;
- v. Battery operated; and
- vi. Continuous operation of more than 600 hours.

7 Construction Requirements

- 7.1 The Contractor shall keep the length of construction areas to manageable lengths such that traffic will be accommodated safely. Traffic control devices and services shall be provided and maintained both inside and outside the limits of work as required to facilitate traffic guidance, should this be necessary. The provision of traffic control devices and services shall comply with the provisions of the Works Requirements and the Conditions of Contract and local Indian regulations and standards.
- 7.2 Prior to the start of construction operations, the Contractor shall erect such signs, barricades, and other traffic control devices as may be required by the Works Requirements and the Conditions of Contract or as directed by the Engineer. Traffic control devices shall be operated only when required and only those devices that apply to conditions actually in existence shall be operable.
- 7.3 Wherever required or directed by the Engineer, temporary fences shall be placed to provide a visual barrier between the work area and adjacent traffic or buildings.
- 7.4 Any devices provided under this clause that are lost, stolen, destroyed, or deemed unacceptable while in use on the Works shall be replaced by the Contractor at the Contractor's risk and cost.
- 7.5 During non-working hours and following completion of a particular construction operation, all warning signs, except those necessary for the safety of the public, shall be removed or entirely covered with either metal or plywood sheeting so that the sign panel will not be visible.
- 7.6 Retro-reflective sheeting on signs, barricades, and other devices shall be kept clean. Stretches, rips, and tears in the sheeting shall be promptly corrected by the Contractor. Retro-reflective sheeting shall have a maintained retro-reflection.
- 7.7 Nighttime operations shall be illuminated by a lighting system which has received the Engineer's consent. The lighting system shall be positioned and operated to avoid glare to road users. The heat produced by any lighting system shall be considered and allowed for. The use of lights with flames (such as gas-powered lighting) will not be permitted.
- 7.8 The Contractor shall ensure that no Contractor's Equipment leaves the work sites with mud, debris or rock that may drop or be deposited on a public highway or private right-of-way, and the roads in the vicinity of the Site shall be kept clean. Suitable vehicle washing facilities shall be provided by the Contractor.

6080 PACKAGING, STORAGE, SHIPPING AND DELIVERY

1 General

- 1.1 Unless otherwise required by the Particular Conditions, Plant and the Materials shall be delivered to the Site at the most suitable time(s) in accordance with the Works Programme and Procurement Work Segment Programme, so as to avoid undue damage and/or deterioration due to a storage period of excessive duration.
- 1.2 All Plant and the Materials, if manufactured or assembled off-Site, shall be properly and securely packed at the point of origin, in order to prevent damage during transport to the Site and due to storage in the weather conditions to be encountered at the Site.
- 1.3 The Contractor shall securely crate or box all consignments for ocean shipment in a manner suitable to protect them from damage in transit and shall be responsible for and rectify any and all damage due to any improper packing. Crates shall have external markings identifying the Contract reference number, origin, destination, contents and consignee.
- 1.4 The Contractor may be required to furnish the Employer, by courier or other approved means with advance copies of shipping documents, invoices and other pertinent papers showing the date and origin of shipment, a description of the Goods, the shipping weight of each item, destination, name of the vessel and other pertinent information.
- 1.5 The Contractor shall also be responsible for the trans-shipment up till the delivery to the installation sites.
- 1.6 The Contractor shall ensure, prior to delivery of Plant or Material, that adequate storage facilities and/or areas are available on Site to properly store and protect the Plant or the Material so as to prevent any damage or deterioration. Air-conditioned or other controlled-environment storage shall be provided for Plant items sensitive to high humidity and/or temperature.
- 1.7 Materials of an inflammable, explosive, toxic or similarly hazardous nature shall be securely stored separately at approved locations. The Contractor shall provide adequate security and safety control at such locations throughout the storage period. Before delivery of such Materials to Site, all necessary permits and licenses shall have been obtained from the authorities having jurisdiction, all in accordance with the applicable Laws.
- 1.8 When Plant or Materials arrive on Site it shall as soon as practicable be inspected by the Contractor in the presence of the Engineer, for damage or deterioration. The Contractor shall be responsible for unpacking and re-packing in an appropriate manner and for provision of all necessary equipment, tools, materials and labour at his own expense. If damage or deterioration has occurred as determined by the Engineer, payment shall not be made for such damaged or deteriorated Plant or Materials, and such shall be removed from the Site and repaired or replaced according to the instructions of the Engineer, at the Contractor's risk and cost.
- 1.9 For the Plant or the material which is subject to deterioration after opening the packing, appropriate alternative inspection measures shall be determined on Site between the Engineer and the Contractor. No payment shall become due to the Contractor for those uninspected Plant or Material, unless otherwise determined by the Employer.
- 1.10 Packing materials shall remain the property of the Contractor and shall be removed from the Site immediately when no longer required on the Site, as determined by the Engineer.
- 1.11 The Contractor shall be responsible for the safe and secure storage and handling of Plant and Materials on Site until the issuance of the Taking-Over Certificate for the relevant part of the Works, regardless of any transfer of ownership thereof to the Employer.
- 1.12 Any action taken by the Engineer in inspecting Plant or Materials upon arrival on Site or any determination subsequently made by the Engineer shall not relieve the Contractor of any of his responsibilities under the Contract.

2 Storage of Plant and Materials

- 2.1 The Contractor shall provide and maintain storage facilities at acceptable locations in consultation with the Engineer, for the equipment and materials of all kinds intended for use in carrying out the Permanent Works or for incorporation into the Permanent Works.
- 2.2 The Contractor shall prepare, protect, provide security and store in an agreed manner for all Works, Contractor's Equipment, equipment and materials until the Project completion so as to safeguard them against any loss, damage and any other hazards arising during shipment, storage on/off the Site or climatic influences.

3 Crating

- 3.1 The Contractor shall provide all packing, crates and markings. In doing so, it shall comply with the following requirements:
- i. Each case, crate or package shall be waterproof, rot, insect and rodent proof. It shall be of robust construction and fit for its intended purpose. The Contractor shall, in determining the packaging materials to be used, take into consideration the climatic conditions likely to occur during the period of transport, shipment and storage.
 - ii. Each case, crate or package shall be legibly and indelibly marked in large letters with the Site address, Contract number, "right way up", opening points and other markings as necessary to permit materials to be readily identified and handled during transit and when received at the Site.
 - iii. Each case, crate or package shall contain a comprehensive packing list showing the number, mark, size, weight and contents, together with any relevant drawings. A second copy of the packing list shall be enclosed in a watertight enclosure on the outside of each case, crate or package. Distribution of additional copies of each packing list shall be in accordance with the Engineer's instructions.
 - iv. All items heavier than 100 kg shall be marked on the outside of the case, crate or package, indicating the gross and net weights, the points for slinging, and where the weight is bearing.
 - v. Care shall be taken to prevent movement of items within cases, crates or packages by the provision of bracing, straps and securing bolts as necessary. Bags of loose items shall be packed in cases and shall be clearly identified by well-secured metal labels on which the quantity and name of the parts and their index or catalogue number have been stamped.
 - vi. All packing shall be free from sharp edges to prevent injury to persons or other objects.
 - vii. Each bulky/heavy case, crate or package shall include wedge(s) for easy loading and unloading by mechanical handling equipment such as forklift truck.
 - viii. Electronic circuit boards, integrated circuits and the like shall be well protected by using appropriate packing, e.g. anti-static bubble wrap or similar.
 - ix. Rubber products and the like shall be suitably packed to avoid damage including but not limited to hardening, deformation and peel-off.

4 General Precautions

- i. Spare parts shall be tropicalized in their packing for prolonged storage in accordance with appropriate international/ Indian standards and shall be suitably and individually labelled to indicate:
 - a) Name of parts;
 - b) Shelf life and date of manufacture;
 - c) Type or condition(s) of storage and special handling information;
 - d) Description of item and relevant part number;

- e) Serial number, if applicable;
 - f) Inspection/test certificate number and batch number; and g) Contract number, order number and item number.
- ii. Tubes, cable, conductor and other similar openings shall be properly sealed and blanked off to prevent ingress of dirt or moisture.
 - iii. Spare ball and roller bearings and similarly protected items shall not be removed from the manufacturer's wrappings or packing.
 - iv. Fragile materials shall be packed in such a way that they shall not be damaged during transit and when they are properly unpacked for quality inspection. Glass items shall be capable of being easily re-packed without removing the original wrappings or packing for long-term storage within the same packing case.
 - v. Appropriate precautions in accordance with the Contractor's safety regulations, the regulations of the Employer, Division 8000 [Environmental, Social, Health and Safety Management] and statutory regulations in respect of all hazardous, toxic, inflammable, etc. materials.

5 Packaging Procedures

- 5.1 All required inspection/test certificates shall be supplied and packed together with individual materials. All packaging materials and procedures shall be subject to review by the Engineer.
- 5.2 All empty cases, crates or packages, whether or not returnable, shall be removed from the Site by the Contractor or stored by the Contractor in such a way that they do not interfere with the progress of the Works.

6 Shipping

- 6.1 The Contractor shall notify the Engineer at least fifteen (15) days in advance of any expected shipment date and give further notification of the actual shipment date and routing when such information is subsequently established. This shall complement the inspection requirements prior to delivery as specified herein.
- 6.2 Two (2) copies of packing lists and quality certificates shall be attached with each case or package to be shipped. One copy shall be placed inside the package and the second copy shall be enclosed in a watertight enclosure on the outside of each case or package. A copy of packing lists and quality certificates shall be sent to the Engineer after each package of the Works, the equipment, spare parts and other items have been shipped.
- 6.3 Without prejudice to any other provisions of the Contract, the Contractor shall be responsible for all legal requirements, insurance, customs, duties, dues, taxes and other such requirements and expenditures required for the plant, equipment, spare parts and other items to be supplied under the Contract.

7 Delivery

- 7.1 The Contractor shall deliver Plant and Materials required for the Works and all items to be supplied under the Contract to the Site.
- 7.2 The Contractor shall unload all items to be supplied under the Contract at the designated delivery point and place them in position or store them.
- 7.3 Any part of the Works or any item to be supplied under the Contract that is damaged in transit shall not be considered as delivered until repairs or replacements have been made and all necessary spare parts or items have been delivered to the Site.
- 7.4 All documents, manuals, drawings and other deliverables shall be delivered to an address to be designated by the Engineer in writing.

- 7.5 The Contractor shall store and secure Plant and Materials until the same have been inspected by the Engineer and are considered delivered at the designated point.
- 7.6 The Contractor shall remove temporary fittings required for shipment and re-assembly of Plant and Materials and shall complete this prior to the inspection of same and before they are considered delivered.
- 7.7 An item shall be considered delivered when all damage has been repaired and all documentation and post-delivery preparation has been completed.

Division 7000: Quality Administration

Table of Contents

7010	QUALITY MANAGEMENT	130
1	General	130
2	Works Quality Management Plan (WQMP)	130
3	Site Quality Management Plan (SQMP)	136
4	Procurement Quality Management Plan (PQMP)	137
7020	PLANT, MATERIALS AND WORKMANSHIP	139
1	General	139
2	Contractor's Submissions Relating to Consent for Subcontractors.....	139
3	Contractor's Submissions Relating to Consent for Contractor's Approach to the Works	140
4	Contractor's Submissions Relating to Approval for Plant and Materials.....	140
5	Contractor's Submissions Relating to Approval for Laboratories	141
6	Contractor's Submissions Relating to Approval for Procurement of Plant and Materials	143
7	Substitution of Plant or Materials.....	143
8	Delivery of Plant and Materials to the Site	144
9	Samples and Mock-Ups	144
10	Execution of Inspection and Test Plan (ITP)	145
11	Request for Inspection (RFI).....	145
12	Coordination for Plant and Materials installed by Interfacing Contractors.....	146
13	Rejection and Remedial Works.....	146
14	Spares, Special Tools and Consumables	146
7030	TESTS ON COMPLETION	147
1	General	147
2	Contractors Documents for Tests on Completion	147
3	ITP for Tests on Completion.....	147

7010 QUALITY MANAGEMENT

1 General

The Contractor shall establish and maintain a quality management system that shall remain in effect throughout the execution of the Works. The Contractor's quality management system shall be tailored specifically to the Contract and the Works in accordance with ISO 9001:2015. The Contractor shall submit for the Engineer's consent a Works Quality Management Plan (WQMP) as specified herein, detailing the quality management system to be implemented.

The WQMP may be supplemented by a number of subsidiary quality plans, which may include but is not limited to, the following:

- i. Site Quality Management Plan (SQMP) (see Clause 3 given below),
- ii. Procurement Quality Management Plan (PQMP) (see Clause 4 given below).

Within 28 days after the Commencement Date, the Contractor shall submit the WQMP to the Engineer for consent. The subsidiary quality management plans may also be submitted at the same time, but in any event these plans shall be submitted for the Engineer's consent a minimum of 28 days in advance of the date planned for the commencement of the works described in the particular subsidiary plan.

2 Works Quality Management Plan (WQMP)

The WQMP shall include the Contractor's quality policy, quality objectives, organisation, and processes to achieve the Contract requirements through planning, control and improvement.

2.1 Context of the Contractor

The Contractor shall determine its internal and external issues considering Contract requirements including the General Conditions, the Particular Conditions, and Annex to Particular Conditions – Contract Forms and the site conditions.

The Contractor shall determine the needs and expectations of interested parties whose activities, potentials and requirements will affect the quality management system. These interested parties may include the Employer, the Employer's Personnel, Subcontractor(s), the Contractor's Personnel, Interfacing Contractors and Interfacing Parties, including relevant authorities.

The Contractor shall determine the scope of its quality management system by describing each interested party, together with the boundaries and applicability of the system. Where the precise identity of a specific party has not been finalized by the due date for submission, the description used may indicate the function to be fulfilled by such party. Whenever such party has been identified, the relevant details shall be notified and submitted to the Engineer as a revision of or addendum to the WQMP.

The Contractor shall establish the processes of the quality management system, including its interactions by referring to Sub-Clause 0.3.1 General and Figure 1 [Schematic representation of the elements of a single process] of ISO 9001:2015.

2.2 Leadership and Commitment

The Contractor's Representative shall demonstrate his leadership and commitment with respect to the quality management system as assured and detailed in the WQMP.

2.3 Quality Policy

The Contractor's Representative shall determine the Contractor's quality policy to be included in the WQMP. The quality policy shall meet the requirements of ISO 9001:2015 and the relevant requirements of the Contract.

2.4 Organisation

The Contractor's Representative shall establish organisational departments, with the person-in-charge of each department being assigned the responsibility and authority for the implementation and management of the quality management system in their particular department. Each department shall be efficiently structured to implement and maintain the quality management system, and the Contractor's organisation chart shall illustrate each department together with the main tasks, lines of authority and interactions, including:

- i. Interfaces between the Contractor, the Engineer and the Employer,
- ii. Interface between the Contractor's departments, including the quality function,
- iii. Details of the person-in-charge of each of the Contractor's departments,
- iv. Interface between the Contractor and Subcontractor(s), including design consultants, suppliers and testing laboratories,
- v. Person-in-charge of each of the departments within each Subcontractor, and
- vi. Coordination between the Contractor, Interfacing Contractors and Interfacing Parties including relevant authorities.

The organisation chart in the WQMP, may be in a summary format where the ones in the subsidiary quality management plans provide further details of the above-referenced personnel, interfaces and coordination.

Job titles for each designated person in the organisation shall be given in a tabular format, together with their responsibilities. The Contractor's Representative may have the discretion to organise his personnel. However, directly controlled departments *viz.* safety, environment, and quality shall be ensured against influence from other departments. For each job title, the Contractor shall include details of the intended duration of the assignment on the Works. Any changes proposed to the organisation charts shall be submitted to the Engineer for review prior to implementation.

The resume of each person-in-charge shall demonstrate their experience and competence to conduct their designated responsibilities. The Contractor shall submit the resume of each person-in-charge to the Engineer for review, including certified true copies of any relevant academic certifications and qualifications, as applicable and provide complete and accurate details of the qualifications and experience of Key Personnel in accordance with the requirements, elsewhere in the Contract.

The organisation chart shall be updated where any amendment is required regarding interactions such as: interface between the Contractor's department and consented Subcontractors (if any); coordination between the Contractor, the authorities of jurisdiction, and Interfacing Contractor's or Interfacing Parties or both; and designation of each anticipated information.

The organisation chart, the job title table and the job descriptions may be appended to the WQMP. In this case, the Contractor may separately submit its revised organisation chart with amendment sheet for the Engineer's review.

2.5 Quality Objectives

The Contractor shall plan and programme to achieve the quality objectives for the Works within the Time for Completion by allocating its functions such as organisation, Contractor's Equipment and processes accordingly. The quality objectives shall be consistent with the quality policy and shall be achieved in time as per the programme.

The quality objectives shall be measurable. These may separately be established in the subsidiary quality management plans such as:

- i. Site Quality Management Plan (SQMP) (see Sub-Clause 3.1 (2) given below).
- ii. Procurement Quality Management Plan (PQMP) (see Sub-Clause 4.1 (2) given below).

In such case, measurability of quality objectives shall be demonstrated in each subsidiary plan. The Contractor shall recognise that achievement of the quality objectives shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract.

2.6 Planning

i. Actions to address risks and opportunities

The Contractor shall determine the opportunities for the Contractor to execute the Works in order to comply with the Specification and to improve the performance of its quality management system. It shall also determine the risks that may adversely impact its Works or its quality management system. The Contractor shall plan actions to address the determined opportunities and risks.

ii. Quality objectives and planning to achieve them

The Contractor shall plan, in accordance with ISO 9001:2015 its activities, resources, persons-in-charge, due dates and method of evaluation for achieving its objectives.

iii. Planning of changes

Whenever changes are necessary, the Contractor shall submit a revised WQMP to the Engineer for his consent. The Contractor shall ensure the integrity of its systems, the arrangement of resources and responsibilities for the effective adoption of any changes.

2.7 Support

i. Resources

The Contractor shall determine the required resources such as persons, facilities, monitoring equipment and knowledge for the execution of the Works. The resources that are required for the quality objectives in each subsidiary plan (see Clause 1) may be separately determined therein.

Where the Contractor is required to establish its own On-Site Laboratory in accordance with Sub-Division 6040 [Temporary Facilities of Contractor] of the General Specifications, or organises his own laboratory(ies) to carry out the tests specified in the Contract, the Contractor shall submit to the Engineer for consent a Method Statement (MS) for the operation of the On-Site Laboratory which shall include the requirements of Sub-Clause 7.1.5 [Monitoring and measuring resources] of ISO 9001: 2015 and shall especially ensure that the MS complies with the requirements of Sub-Clause 7.1.5.2 [Measurement traceability]. In addition, reference to this MS shall be included in the WQMP.

Where the Contractor proposes an Independent Laboratory(ies) to carry out its quality control, acceptance and conformity testing of the Works, the Contractor shall submit to the Engineer, for consent, a Manufacturer's Arrangement (MA) for Independent Laboratory(ies) that shall detail applicable quality assurance activities to be managed by the Contractor for the Independent Laboratory(ies). In addition, reference to this MA shall be included in the WQMP.

Where the Contractor intends to utilise a Manufacturer's Certificate(s) from a manufacturer or a supplier for its submission regarding Plant, Materials or for quality control in the Inspection and Test Plan (ITP) submitted in accordance with Sub-Paragraph (4), under Clause 4 of Sub-Division 7020 [Contractor's Submissions Relating to Approval for Plant and Materials] of the General Specifications, the Manufacturer's Certificate(s) shall be recognised as the Contractor's resources after obtaining Engineer's approval on each submission for Plant and Materials.

ii. Competence, awareness and communication

The job titles together with their respective responsibilities in the organisation as detailed in the Sub-Clause 2.4 [Organisation] are deemed to be the competence that is required for

the abilities to implement and maintain the quality management system. The Contractor shall ensure that employee performance is evaluated at least annually.

The Contractor shall plan and implement employee guidance and training so that the Contractor's Personnel acquire the awareness of the quality management system and maintain communications for the system with stakeholders such as the Employer, the Engineer, relevant authorities, subcontractors, manufacturers, suppliers and local communities adjacent to the Works. The WQMP shall document these communications and establish suitable formats for same.

The Contractor shall ensure that all persons under its control on the Works are made aware of the quality policy, relevant quality objectives, the benefits of improved performance and the consequences of not conforming with the quality management system requirements.

iii. Documented information

Documented information for the system and Works shall be controlled and managed in line with the Clause 4 [Document Control Procedure] and Clause 5 [Project Information and Communication System] of Sub-Division 3020 of the General Specifications. The Contractor shall establish relevant formats to manage the documented information following the Method Statement for the control of document and management system required at Sub-Division 3020 of the General Specifications.

2.8 Operation

Operations at the Works shall be executed in accordance with the WQMP and other subsidiary plans (see Clause 1) as follows:

- i. Site Quality Management Plan (SQMP) (see Clause 3 given below): Management plan related to the Contractor's execution of the Works and provision of Contractor's Equipment (excluding its procurement but including its installation) to be carried out on the Site under the Contract.
- ii. Procurement Quality Management Plan (PQMP) (see Clause 4 given below): Management plan related to the Contractor's procurement of any Plant and other major item of Goods, and its transportation to delivery places (excluding Goods manufactured by the Contractor) under the Contract.

The WQMP shall determine categories of each operation to be subsidiary. Where the Contract is deemed not to be adequate for establishing a subsidiary plan, the plan may be eliminated as "Not Applicable".

Each subsidiary plan shall be detailed in accordance with the relevant requirements of ISO 9001:2015. The WQMP shall detail the required process(es) for the Tests on Completion and the Tests after Completion (if any).

2.8.1 Reference to Method Statement and Manufacturer's Arrangement

The WQMP and other subsidiary plans may refer to the following:

- i. Method Statement (MS) means details of the methods to directly execute the Works by the Contractor or the Subcontractors or both, which shall specify the scope, the organisation including responsibilities, communications with the Engineer and other entities if any, resources, procedures, schematic diagrams, drawings, allocated ITPs, environmental precautions, and safety precautions including rail possession procedures (for Works adjacent to running railway lines) if any; and
- ii. Manufacturer's Arrangement (MA) means details of the arrangement to indirectly execute the Works by the Contractor or the Subcontractors or both, which should specify (as applicable) the scope, arranging of manufacturers, the organisation including responsibilities, communications with the Contractor and other entities if any, resources,

procedures, schematic diagrams, drawings, approved quality management plans and corrigendum, certification procedures by the Contractor including allocated ITPs, the endorsement procedure to be adopted by the Engineer, consented environmental plan, and consented safety plan including rail possession plan (for Works adjacent to running railway lines) if any.

The lists of Method Statements and Manufacturer's Arrangements shall be included as appendices in the WQMP and other subsidiary plans with the ID, title, revision number and their hierarchy. The Contractor shall promptly revise an appendix where another reference document is to be introduced or where a previously submitted reference document is to be removed.

2.8.2 Reference to Inspection and Test Plan (ITP)

The WQMP or other subsidiary plans may refer to Inspection and Test Plan (ITP), which means the detailed test and inspection plan for the Plant, Materials, and Works as the case may be. The ITP shall include all quality requirements considering the 'concept to commissioning stage' approach and also the complete supply chain stages with due diligence. The timely submission of inspection and test records shall be included in the ITP for the issuing of certification by the Contractor and endorsement (if required) by the Engineer.

The ITP shall include, but not limited to, the following information (as applicable):

- i. Quality level required in the Specification,
- ii. Particulars of the materials to be used in the manufacturing process,
- iii. Particulars of procurement,
- iv. Contractor's design, works specifications, and drawings,
- v. The requirements of ISO 9001:2015 and other compliance requirements of the Contract,
- vi. Scope of activities covered by the plan,
- vii. A sequence of the activities related to the Works in the scope,
- viii. Personnel responsible for undertaking the inspections and tests and the personnel responsible for certifying the inspections and tests,
- ix. Definition of inspection section,
- x. Inspections and test methods, their frequency and reference materials to the relevant standard of the inspections and the tests,
- xi. Compliance criteria of the inspections and tests with clear descriptions of the quality hold point and the quality control point,
- xii. Documents to be used for reporting the results of inspections and tests with sample documents and formats incorporated,
- xiii. Identification or referencing procedures for traceability of manufactured items,
- xiv. Identification of the inspection and test status of materials, procured items and the final manufactured item,
- xv. Handling, storage, packing, presentation and delivery of the manufactured and procured items,
- xvi. Procedure for monitoring and recording of the ordering, release before shipping, delivery and acceptance of the item,
- xvii. Methods of record keeping and document storage, documents to be maintained and stored and procedures for these to be acknowledged and filed,
- xviii. Procedure for monitoring and recording of the ordering, delivery and acceptance of procured items, and
- xix. Possibilities of other external bodies in the inspection.

ITPs shall be listed in the quality management plans as an appendix and list shall be tabulated with the ID, title, revision number and their hierarchy. The Contractor shall promptly revise an appendix where another reference document is to be introduced or where a previously-submitted reference document is to be removed.

2.9 Performance Evaluation

i. Monthly Quality Report (MQR)

The Contractor shall regularly monitor the performance of the quality management system and shall include the results of such performance monitoring in the Monthly Progress Report that is required as per Sub-Division 4080 [Monthly Progress Report Requirements] of the General Specifications.

The Contractor shall provide and maintain at all stages of the Works a quality control register(s) to identify the status of inspections, sampling and testing of the Works and all certificates. Such register(s) shall be updated by the Contractor to show all activities in previous months and shall reach the Engineer's office before the 7th working day of each month. Each register shall:

- a) Align with the relevant ITPs,
- b) Provide a summary of results of inspections and test activities, traceable to the test reports and work components and batches and shall be compared with ITP provisions with respect to frequency of performance, and
- c) Show the results of each report of inspection and test and any required analysis of these results and compare these results against the pass or fail criteria.

The test report may be submitted monthly as agreed with the Engineer.

The MQR shall also comprise of:

- a) A register of the NCRs that details and compiles the nonconformities at the Works, their close-out status and the number of "Open NCRs",
- b) A calibration and verification register that details overall calibration and verification plan, calibrations performed during the month and plans for the next month. It shall highlight any overdue calibration and verification with respect to calibration and verification plan,
- c) A section detailing key highlights and events in the Works with respect to quality management during the month and those planned for next month,
- d) A section on performance status on the quality objectives, and
- e) A section for highlighting quality improvements carried out during the month and improvements planned for the forthcoming period.

The Engineer shall submit the MQR to the Employer along with his observations and comments after receiving each Monthly Progress Report (MPR) from the Contractor.

ii. Quality Audit

The Contractor shall carry out internal quality audits on the Works at quarterly intervals, or at such other intervals as the Engineer may require, to ensure the continuing suitability and effectiveness of the quality management system. Reports of each such audit shall be submitted within 7 days after completion of the audit to the Engineer for review.

The Contractor shall submit details of the authority, qualifications and experience of personnel assigned for carrying out internal quality audit activities, for review by the Engineer before carrying out quality audits.

The Engineer may require quality audits on the Contractor and his Subcontractors (if any) of any tier to be carried out by his representative or the Employer's staff. In such case, the Contractor shall afford to such auditors all necessary facilities and access to the activities and records to permit such audit to be performed. The auditor shall notify the dates, time, criteria and scope of audit, which shall not be beyond the scope of the consented WQMP.

Upon receipt of the reports or findings issued by the Engineer as a result of quality audits carried out, the Contractor shall promptly investigate the causes of any non-conformities and within 14 days from the receipt of the audit report, submit to the Engineer for review

proposed corrective actions. The Contractor shall take timely corrective actions to rectify any non-conformity so as to prevent re-occurrence. Evidence to demonstrate the effective implementation of corrective actions shall be submitted by the Contractor to the Engineer for review and verification (if needed) and the Contractor shall close-out the results of any such audits after a specified surveillance period by the Engineer.

iii. Management Review

The WQMP shall specify details for the management review of the quality management system. The Contractor's quality manager shall arrange for the management reviews to be chaired by the Contractor's Representative and be attended by various department heads. He shall prepare inputs for the reviews and shall compile review outputs in accordance with the requirements of ISO 9001: 2015. A management review shall be held at least once in every twelve months and be timed to be held after an internal quality audit. Reports of each such management review shall be submitted to the Engineer for review within 7 days of the review meeting.

2.10 Quality Improvement

i. Nonconformity and corrective action

If, prior to the issue of the Taking-Over Certificate for the Works or any Section, the Contractor has used or proposes to use or repair any item of the Works which does not conform to the requirements of the Contract, the Contractor shall immediately submit for the Engineer's review any such proposal and supply full particulars of the nonconformity and, if appropriate, of the proposed means of correction.

If the Engineer issues a nonconformity report or similar document to notify the Contractor of any item of the Works which does not conform to the requirements of the Contract, the Contractor shall promptly investigate the matter and, within 14 days of notification by the Engineer, submit to the Engineer for review the remedial measures and necessary actions to be taken to rectify the item(s) and to prevent re-occurrence.

The Contractor shall maintain and update a nonconformity register to indicate the status of all nonconformities which are identified either by the Engineer or the Contractor. The Contractor shall submit the register for review upon request by the Engineer.

ii. Continual Improvement

The Contractor shall continually improve the quality management system in accordance with the result of quality audits, the output of its management reviews of the system and the identified nonconformities.

The Contractor shall, at quarterly intervals, submit to the Engineer for review the details of all such improvements made or to be made.

3 Site Quality Management Plan (SQMP)

3.1 General

The Contractor may submit a SQMP separately. It shall detail the quality management plan for Works on Site and Contractor's Equipment (excluding procurement but including installation) on the Site under the Contract. The SQMP shall be developed in line with the requirement at Paragraph 2 of Clause 1 and quality policy (see Sub-Clause 2.3) by the Contractor's Representative and shall, without limitation, specify the following:

- i. Organisation of the Contractor's construction department in accordance with the requirements of Sub-Clause 2.4 [Organisation] and the person(s) directly responsible for the day-to-day management of the construction and installation activities on Site. It shall also refer to the information that the WQMP has defined;

- ii. Quality objectives, in accordance with the requirement of Sub-Clause 2.5 [Quality Objectives], for carrying out construction and installation activities required for the execution of the Works in compliance with the Specification and Conditions of Contract. The SQMP may be cross-referenced with any relevant parts of WQMP;
- iii. Support, in accordance with the requirements of Sub-Clause 2.7 [Support], including a hierarchy of relevant quality management system documentation (in addition to drawings) for the; management and coordination of construction and installation of the Works; and management of Subcontractors of any tier so as to avoid conflicts in the execution of the Works; and
- iv. Processes, in accordance with the requirements of Sub-Clause 2.8 [Operation]. The SQMP shall particularly specify inputs from the design department; coordination with Interfacing Contractors; the allocation of responsibilities and authorities given to delegated Contractor's staff or Subcontractors for the construction and installation of particular elements of the Works; the sequences and interactions to be applied to manage, control and record the construction and installation of the Works.

3.2 References in SQMP

The processes detailed in the SQMP may refer to relevant Manufacturer's Arrangements (for external bodies) and Method Statements (for the Contractor's or Subcontractor's own activities), which are detailed procedures for particular construction and installation activities required for the execution of the Works on Site.

The processes detailed in the SQMP may also refer to quality manuals or plans or both, produced by other external bodies including Subcontractors. The Contractor shall submit such reference documents, which shall complement the SQMP, for the Engineer's review. If these are planned for separate submission, it shall be stated accordingly in the SQMP.

3.3 Reference to Inspection and Test Plan (ITP)

The processes detailed in the SQMP shall refer to relevant Inspection and Test Plans for possible controls and check points. The ITPs shall ensure that only delegated Contractor's Personnel (including approved Independent Laboratories) have the responsibility to execute works.

3.4 Nonconformity at Site

The SQMP shall detail or shall refer to the control procedure to be used for the nonconforming product on Site. The Contractor's construction and production departments shall be responsible for ensuring compliance to agreed corrective actions.

4. Procurement Quality Management Plan (PQMP)

4.1 General

The Contractor may submit a PQMP separately. It shall detail the quality management plan for procurement of any Plant, other major items of Goods (except those manufactured by it) and their transportation to the delivery places under the Contract.

The Contractor shall specify the criteria for the evaluation, selection, performance monitoring and re-evaluation of external providers in the PQMP. The Contractor shall keep documented information of such activities and of any actions arising from the evaluations.

The PQMP shall be developed in line with the requirement at Paragraph 2 of Clause 1 and quality policy (see Sub-Clause 2.3) by the Contractor's Representative; and shall, without limitation, specify the following:

- i. Organisation of the Contractor's procurement department, in accordance with the requirements of Sub-Clause 2.4 [Organisation]. It shall also refer to any other information that the WQMP has defined;

- ii. Quality objectives, in accordance with the requirements of Sub-Clause 2.5 [Quality Objectives] for carrying out procurement activities required to execute the Works in compliance with the Specification and Conditions of Contract. The PQMP may be cross-referenced with any relevant parts of the WQMP;
- iii. Support, in accordance with the requirements of Sub-Clause 2.7 [Support] including the documentation for managing; monitoring and recording the on-site receipt of general construction resources, such as construction materials, personnel, works, services, and Contractor's Equipment (e.g. Concrete batching and mixing plant, aggregate storage, and so on) at the places of delivery; and
- iv. Processes, in accordance with the requirements of Sub-Clause 2.8 [Operation]. The PQMP shall particularly specify inputs from the construction and manufacturing department (especially Plant and Materials which have received the Engineer's approval); coordination with Interfacing Contractors; delivery of the procured items to the site and manufacturing plants; the sequences and interactions to be applied to manage, control and record the procurement of the Works.

4.2 Reference to Inspection and Test Plan (ITP)

The processes detailed in the PQMP shall refer to relevant Inspection and Test Plans for possible controls and check points. The ITPs shall ensure that procedures are in place for the monitoring and recording of the ordering, delivery and acceptance of an item.

For the procurement of critical items, in addition to inspection and testing by the Contractor; the Engineer and the Employer may, at their own cost, delegate its representative or an independent inspection agency for the supervision of the processes and products at a production facility. To facilitate such an inspection, the Contractor shall provide a detailed production plan and timeline sufficiently in advance for the required logistics. These plans and timeline shall include a description of the inspections and tests proposed to be conducted on the products which have been ordered, along with their acceptance criteria.

4.3 Nonconformity of Procurement

The PQMP shall detail or shall refer to the control procedures to be used for the nonconformities encountered in any procured item on-site before their acceptance. The Contractor's procurement department shall be responsible for ensuring compliance to establish corrective actions.

7020 PLANT, MATERIALS AND WORKMANSHIP

1 General

Unless otherwise specified, all Plant (including components), Materials, workmanship, construction and installations for the Works, shall meet the specified standards. Where no such standard is specified, the standard shall be developed and submitted to the Engineer for consent.

Unless otherwise specified, the Works shall not commence before obtaining the Engineer's response in the form of either a NONO or NONOC as specified in Clause 3 in Sub-Division 3020 [Correspondence, Communications and Submission] of the General Specifications. The Contractor shall comply with the requirements specified or otherwise consented, which shall be one of the criteria for the acceptance of the Works. Unless specified otherwise, the Engineer shall send his response to submissions within 21 days.

The Engineer's response to the Contractor's submission for any Plant (including components), Materials or workmanship shall not relieve the Contractor of any of his responsibilities and liabilities under the Contract.

The Works shall be executed in a professional and workmanlike manner using such Contractor's Personnel and Contractor's Equipment as are necessary to achieve the requirements of the Contract and with due care in accordance with the Environmental, Social, Health and Safety (ESHS) requirements of the Contract. The workmanship shall attain the specified dimensions, lines, levels, alignment, tolerances, finish, features, functions, performance, reliability, durability, serviceability and aesthetics requirements.

The Works shall be carried out by competent persons, who shall be subject to evaluation by the Engineer, as specified in the Contract or if so directed. Persons declared unsuitable by the Engineer for the intended works shall not be utilised for those Works and the Contractor shall ensure compliance with the Engineer's instructions.

Unless specified otherwise in the Contract, the Plant and Materials for the Works shall be of the specified quality and new. The Plant and Materials shall have been used in similar types of works or functions or both specified elsewhere in the Contract. However, this requirement shall not apply where it is not specified so.

The Plant and Materials shall be transported, handled, stored and protected on the Site or elsewhere in such manner as to prevent shortages, damages and deterioration. The Plant and Materials shall display the approval and certification or compliance information, wherever practicable, along with identification information such as name plates, rating plates and labels. Unless otherwise specified in the Contract or approved by the Engineer such information shall be in the language of the Contract, easily readable, placed at a prominent position and tamper-proof.

The Contractor shall plan its procurement with due expedition considering the need for spares, lead time, training, shipping and transport, necessary clearances, Make in India objective (if applicable), coordination and administration. The Plant and Materials shall be made available sufficiently in advance at site taking into consideration the time required for the acceptance process on receipt, as no Plant and Materials shall be incorporated into the Works until the Engineer's response in the form of either a NONO or NONOC has been obtained.

2 Contractor's Submissions Relating to Consent for Subcontractors (if any)

This clause shall apply to all Subcontractors (if permitted in the Contract).

In accordance with the Conditions of Contract, the Contractor is not required to obtain the Engineer's consent to any subcontract for which the Subcontractor is named in the Contract. However, the Engineer's prior consent shall be obtained to other proposed Subcontractors. The Contractor shall submit to the Engineer such details of any proposed Subcontractors as the Engineer may reasonably require for review.

Before any such submission, the Contractor shall assess the Subcontractor's capability to carry out the part of the Works, manufacture or produce the Materials or Plant of the same or similar type to that to be manufactured or supplied for the Works. The Contractor shall, prior to any submission, assess the Plant and Materials to be supplied with regards to their compliance with the Contract requirements, as applicable and specified elsewhere in the Contract.

The proposed manufacturers and suppliers shall have achieved a quality level of the production output acceptable to the Engineer in their manufacturing of the Material or Plant of the same or similar type to that to be manufactured or supplied for the Works.

3 Contractor's Submissions Relating to Consent for Contractor's Approach to the Works under the Contract

The Contractor's submission of the Works Quality Management Plan (WQMP) including its subsidiaries (SQMP and PQMP), Inspection and Test Plans (ITP), Method Statements (MS), and Manufacturer's Arrangements (MA) in accordance with the Sub-Division 7010 [Quality Management] to be consented by the Engineer shall include criteria for the workmanship to be applied to the Works.

When the Contractor proposes to submit new materials or products or specialist works or propriety items for the Engineer's review, manufacturer's recommendations and specifications shall be assessed against the materials and workmanship standards specified in the Contract and the most suitable solution for the purpose shall be selected for submission. The Contractor shall then submit to the Engineer the full specifications together with a comparison with the materials and workmanship standards for the Works and the required inspections and tests.

3.1 Identification Labels on Equipment for Plant

Method Statements (MS) and Manufacturer's Arrangements (MA) for Plant shall include a labelling system in accordance with the asset identification in the Contract. The Contractor shall make due allowance for the Engineer's review period (at least 3 months before the planned delivery date to site of the shipment of the first individual item of equipment forming part of the Plant) in the submission of MS and MA. 'Individual item of equipment' refers to a complete assembly of components and to each removable sub-module within a complete assembly. Each identification label in the labelling system shall:

- i. Be permanent,
- ii. Not become detached or illegible during the lifetime of plant from any cause including wear, tear, environmental effects (such as rain and direct sunlight), or any other influence, and
- iii. Be easily cleaned to remove dirt and debris (including grease and oil) without affecting its legibility.

4 Contractor's Submissions Relating to Approval for Plant and Materials

Unless otherwise stated in the Contract, the Employer shall make no Employer's Equipment available for the use of the Contractor in the execution of the Works and supply no "free issue materials". The technical and other documents relating to Plant and Materials which the Contractor is required to submit to the Engineer for approval shall include, but not limited to, the following:

- i. A review by the Contractor of the Contract requirements and compliance listings, showing in a simple tabulated form a list of all the pertinent Contract requirements compared with the properties and specifications for the proposed item, indicating if compliant or non-compliant for each,
- ii. All relevant details along with manufacturer's original brochures, specifications and certificates,
- iii. The ITP and the results of latest testing to demonstrate compliance with the Contract,

- iv. The Manufacturer's Certificate (controlled copy of the certificate by the manufacturer or supplier may be substituted if the original cannot be obtained) which the Contractor intends to utilise for its acceptance and quality control in the ITP,
- v. A letter to the Contractor with the official seal of the manufacturer or supplier, stating that the Manufacturer's Certificate (if any) regarding the material to be delivered to the site,
- vi. Competent samples as applicable,
- vii. Shop drawings and coordination drawings, as applicable,
- viii. Sample of manufacturer's guarantee or warranty statement,
- ix. Programme and methodology for any related factory and on-site tests proposed,
- x. Spare parts list with interchangeability record and list of consumables including Indian equivalent of consumables and tools,
- xi. List and details of entities capable of providing maintenance and repair services and supply spare parts, consumables and tools, as applicable, and
- xii. Any other requirement, as specified in the Contract.

4.1 Mineral Resources (not used in other than civil works)

The mineral resources (such as coarse aggregates, fine aggregates, sand, gravel etc.) to be used in the Works shall be approved by the Engineer before their use in the Work.

The Contractor shall explore possible mineral resources with reference to the Specification and Conditions of Contract, including the quantities required and the programme of the Works and propose the potentiality of resources to the Engineer along with its priorities.

The Engineer shall confirm a suitable time for a joint visit with the Contractor for assessment of the proposed resource(s), and to witness the taking of samples of the proposed raw and processed materials from the proposed quarry.

The samples taken shall be sent to approved laboratories for testing, which, may be witnessed by the Engineer, as per the relevant applicable specifications and requirements in the Contract. Sealed laboratory test reports shall be sent to the Engineer for review with a copy to the Contractor.

The Contractor shall be responsible for all administrative and compliance requirements in accordance with the applicable Laws related to obtaining the materials from the approved source(s).

4.2 Material Substitution in the Plant Submission – Not Applicable.

5 Contractor's Submissions Relating to Approval for Laboratories

5.1 General

The Contractor shall be responsible for all on-site and off-site testing including any in-situ testing that is required. Both the calibration of testing equipment and the testing of Plant and Materials shall be carried out in approved and competent laboratories, details of which shall, prior to their commissioning, be submitted to the Engineer for approval. The requirements for such laboratories shall include, but is not limited to, the following:

- i. Shall be a legal entity, except for On-Site Laboratory, and be accredited to carry out each test specified in the Contract or be approved by the Engineer to carry out each test in which the entity is not accredited,
- ii. Maintain a management system appropriate to the scope of its activities,

- iii. Cooperate in clarifying any requests and in monitoring its performance in relation to the works performed,
- iv. Have a system for managing and resolving complaints including any made in regard to any aspect of its testing and calibration works which do not conform to its own procedures or the agreed requirements,
- v. Retain records of original observations and a copy of each test report or calibration certificate issued for a defined period and include the identity of personnel responsible for the sampling, performance of each test, calibration and checking of results,
- vi. Ensure the competence of all who operate specific equipment, perform tests and calibrations, evaluate results and sign test reports and calibration certificates,
- vii. Have equipment, environmental conditions and facilities for testing and calibration, to facilitate correct performance of the tests and calibrations,
- viii. Have restricted access and use of areas affecting the quality of the tests and calibrations,
- ix. Propose alternatives where no standard method is applicable to the tests and calibrations,
- x. Use calibrated equipment along with programme and procedure for the calibration of its equipment,
- xi. Ensure that calibrations and measurements made by the laboratory are traceable to the National or International System of Units (SI),
- xii. Report the results accurately, clearly, unambiguously and objectively and in accordance with any specific instructions in the test or calibration methods,
- xiii. Report results, usually in a test report or a calibration certificate that include all the information requested and that is necessary for the interpretation of the test or calibration results and all information required by the method used,
- xiv. Document the basis for any opinions and interpretations given, and
- xv. Transmit test or calibration results by telephone, email, facsimile, courier or other means also where so requested.

5.2 On-Site Laboratory

An On-Site Laboratory means a laboratory established by the Contractor to carry out the tests specified in the Contract. Unless otherwise specified, the Contractor shall establish the On-Site Laboratory in accordance with Sub-Division 6040 [Temporary Facilities of Contractor] of this General Specification, or may organise his testing resources (including apparatus, assistance, documents and other information, electricity, equipment, fuel, consumable, instruments, labour, material and suitable qualified and experienced staff) as the On-Site Laboratory.

The location of the laboratory shall be at or near the Contractor's work site and such location shall be subject to the consent of the Engineer.

Within 56 days after the Commencement Date, in accordance with the requirements of Sub-Clause 5.1 [General] and having due regard to the matters described below, the Contractor shall submit to the Engineer for approval details of any On-Site Laboratory to be provided. In the provision of an On-Site Laboratory, matters to be considered by the Contractor shall include, but not be limited to, the following:

- i. The detailed and overall inspection and testing requirements and plan,
- ii. The various categories of testing and adequacy of layout and size of working areas,
- iii. Standards of construction considering the quality and safety health and environment (she) requirements,
- iv. Infrastructure requirements such as equipment, electrical power, furnishings and fixtures, and

- v. The competency requirements for the personnel.

5.3 Independent Laboratory

Within 56 days after for the Commencement Date, in accordance with requirements of Sub-Clause 5.1 [General] and having due regard to the matters described below, the Contractor shall submit to the Engineer for approval details of any Independent Laboratory to be used.

The proposed laboratory shall be independent and impartial and shall implement a system to ensure that information related to the Work remains confidential.

5.4 Off-Shore Independent Laboratory (If applicable)

Within 56 days after the Commencement Date, in accordance with the requirements of Sub-Clause 5.1 [General] and having due regard to the matters described below, the Contractor shall propose to the Engineer for approval details of any Off-Shore Independent Laboratory to be used. Any such laboratory shall also meet the requirements of Sub-Clause 5.1 [General] and have accreditation at the country of origin or international accreditation for the services offered. The location shall have ease of access, in terms of legal or regulatory access and also logistics. Any such laboratory shall have no objection to any representative(s) of the Employer, the Engineer or any independent agency attending at the said laboratory to witness or inspect any inspection or test being carried out in connection with the Works.

6 Contractor's Submissions Relating to Approval for Procurement of Plant and Materials

The Contractor shall submit to the Engineer for approval a procurement timeline for the approved Plant and major items of other Goods to be procured from eligible source countries, including Country and domestic market to the Engineer for approval. The Engineer will lay down a detailed approval procedure to be followed by the Contractor.

The procurement timeline shall include the name of the Plant and Materials, source country, name and address of the supplier, planned dates of shipping (ex-factory) and arrival on the Site, locations of storage place and other information as appropriate.

The procurement timeline shall be compatible with the Contractual Works Programme and the Work Segment Programmes submitted by the Contractor in accordance with Sub-Division 4070 [Works Programme and Schedule] of the General Specification.

The monthly procurement status of the procurement timeline shall also be included in the Monthly Progress Report to be submitted to the Engineer in accordance with Sub-Division 4080 [Monthly Progress Report Requirement] of General Specifications.

Records of procurement such as each certificate for Plant and major items of other Goods, all reports (to comply with the Contract) of inspection and tests by the manufacturer or supplier, names and address of manufacturers, suppliers or vendors, and proofs of purchase for Plant and Materials shall be kept in the custody and care of the Contractor.

7 Substitution of Plant or Materials

Notwithstanding any Contractor's Technical Proposal in their Bid for Plant and Materials to be incorporated into the Works, or any subsequent approval by the Engineer for any such items, the Engineer shall have the right to instruct the Contractor, without any extra cost or impact to Programme or Time for Completion, to substitute any such items that the Engineer, upon subsequent examination, considers not to comply with the requirements of the Contract.

In exceptional circumstances acceptable to the Engineer, the Contractor may be allowed to the proposed substitution of Plant and Materials named in the Contract or included in the Specification or which have previously received the Engineer's approval, if they are equal to or better than the Plant and Material so named, included or approved, and there is no additional cost to the Employer or impact to the Programme and Time for Completion.

In the above circumstances, the Contractor shall submit his proposal to the Engineer in a timely manner, together with samples where necessary, including a full and detailed explanation of the

reason(s) for such substitution and a description of the advantages or benefits to the Employer. The proposal shall include full documentary evidence showing clearly that the substitute product equals or is better in all respects to the Plant and Materials so named, included or approved to.

Any proposal for substitution must also include a review of and proposals for substitution of all other related or affected parts of the Works and any modification(s) that are necessary to make them compatible with the proposed substitute Plant and Materials. This shall be supported with evidence of equivalent durability, functionality and appearance of the Works as a whole. If such substitution has received the Engineer's consent and before ordering any such substitute Plant and Materials, the Contractor shall provide revised design, shop and coordination drawings, specifications and manufacturer's guarantees as per the submission criteria specified in the Contract for review and consent by the Engineer.

8 Delivery of Plant and Materials to the Site

If Sub-Clause 14.5 [Plant and Materials intended for the Works] of the General Conditions of Contract applies, the records of the Plant and Materials kept by the Contractor in accordance with Sub-Clause 14.5(a) (i) shall be in such a form as is acceptable to the Engineer. The Contractor shall include all such records in its Statement.

9 Samples and Mock-Ups

9.1 Samples

The Contractor shall submit manufacturer's standard samples for Plant and Materials and those samples that are specified in the Contract, all (including transportation) at the Contractor's cost. Unless otherwise stated in the Contract, the Contractor shall provide a minimum of two samples for each item to the Engineer for information or consent. Following the Engineer's review, both shall be marked to indicate the review status and one shall be retained by the Engineer and one shall be retained on the site in the custody and care of the Contractor.

The Contractor shall propose quantity of the samples, in the submission, to be reverted that those samples are available on each site where the Engineer would reasonably access it for reference. If the Engineer is of the opinion that the Contractor's proposal does not include sufficient number of samples such as would ensure reasonable access, the Engineer may, at his sole discretion, request the Contractor to provide additional samples all at the Contractor's cost.

Each sample shall have an identification label affixed indicating the Contract reference number, name of the item (including its submittal reference), the referenced Drawing numbers, Specifications (Division – Sub-Division - Clause), the manufacturer's name, the model number, brand name, supplier's name and any other relevant data.

The Engineer may, at his sole discretion, reject any materials and goods which are inferior to the reference samples which have previously received his consent on the submission by the Contractor. The Contractor shall promptly remove any such materials and goods from the site and promptly provide replacements complying with the reference samples.

9.2 Constructional Mock-Ups

The Contractor shall construct, maintain, and remove (all at his cost) any mock-ups that are specified in the Contract. The Contractor shall maintain any such mock-ups in his custody and care until their removal is directed by the Engineer.

The Contractor shall, sufficiently in advance of the planned commencement date of subject part of the Permanent Works, be required to demonstrate his proposed standard of workmanship through the provision of mock-ups (of sufficient size as to permit the Engineer to observe constructability and appearance of the subject part) for various civil and building works such as plastering, tiling, painting, and other specified items in the Contract, all as may be reasonably instructed and consented by the Engineer. Where the Engineer has issued his approval, a mock-up to be used as reference for the Permanent Works may be constructed or installed as part of

the Permanent Works acceptable. Any such mock-ups may be termed as the reference mock-ups. Any such mock-ups which have received the Engineer's consent shall be deemed to indicate the minimum acceptable level of workmanship and appearance for the respective part(s) of the Works.

A minimum of 28 days before the start of the subject Works, the Contractor shall submit a Method Statement for the construction or installation of the mock-up(s). The programme shall be fully in compliance with the Contractual Works Programme and the Work Segment Programmes. The timeline of provision for mock-up(s) shall be updated as the case may be.

Subsequent to the Engineer's issue of consent to a mock-up, the subject Plant, Materials and part(s) of the Permanent Works, shall be delivered to the Site or executed in conformity with the said mock-up(s).

10 Execution of Inspection and Test Plan (ITP)

The Engineer shall have the right, at any time, to inspect the manufacturing of any Plant and Materials at the manufacturer's facilities.

Inspection and testing shall be carried out in accordance with the Inspection and Test Plan (ITP) which has received the Engineer's consent. The ITP shall be prepared in accordance with the requirements of Sub-Division 7010 [Quality Management] of the General Specifications and the Works Quality Management Plan which has received the Engineer's consent.

The ITP, amongst other information, shall also specify such Manufacturer's Certificate(s) as the Contractor intends to issue for acceptance without further confirmatory testing.

Following the completion of a test or inspection, the Contractor shall promptly forward the results to the Engineer for endorsement, using the consented forms and formats in the ITP, duly completed and certified. If Sub-Clause 14.5 of the General Conditions of the Contract applies, the Plant and Materials records kept by the Contractor shall include the relevant inspection and test records.

Inspection and testing carried out by an approved Independent Laboratory or Off-Shore Independent Laboratory or both, shall be effectively coordinated by the Contractor, taking into consideration the programme for the Works. The requirements for the Contractor's submission relating to laboratories shall be taken up in accordance with the provisions of Sub-Clause 5 [Contractor's Submissions Relating to Approval for Laboratories].

11 Request for Inspection (RFI)

The Contractor shall give an RFI to the Engineer whenever any parts of the Works are ready for inspection and test at the stages so designated in the Method Statements (MS) or Manufacturer's Arrangements (MA) or Inspection and Test Plans (ITP) which have received the Engineer's consent.

The RFI format shall either be that specified in the Contract, or if none is specified therein, the format which has been proposed by the Contractor and consented by the Engineer.

Each MS, MA, and ITP shall indicate the timing to issue each RFI as the Contractor's advance notice to the Engineer which, unless specified otherwise in the Contract, shall be not less than 24 hours after its receipt by the Engineer. The Contractor shall preferably give the Engineer notice of weekly schedule of RFIs in which the procedure shall be agreed with the Engineer and then report the updated RFI status in each Monthly Progress Report. The Contractor shall provide the necessary facilities, access, and arrangement of any specific permissions and resources that are required for the Engineer to carry out any requested inspection or witnessing of any test.

12 Coordination for Plant and Materials installed by Interfacing Contractors

Where there is a requirement for Interfacing, the Contractor shall refer to Sub-Division 4040 Interface, Coordination and Cooperation with Other Parties which shall take precedence if there is any conflict between Sub-Division 4020 and this Sub-Division 7020.

The Contractor shall coordinate, where plant and materials are to be installed by an Interfacing Contractor, in accordance with the relevant method statements or manufacturer's arrangements or both which are to be prepared by the Interfacing Contractor and consented by the Engineer.

13 Rejection and Remedial Works

If as a result of any inspection, examination or test, any Plant, Materials or workmanship is found to be defective or otherwise not in accordance with the requirements of the Contract, the Contractor shall promptly forward to the Engineer the relevant test report(s) in the forms and formats required by the related ITPs.

The Engineer may notify the Contractor that retests are required or reject such defective or non-compliant Plant, Materials and Works after receiving the above-referenced test reports. The Contractor shall propose rectification procedures for the Engineer's consent, including any Method Statements or Manufacturer's Arrangements that are required. Rectification works shall not commence before the Engineer's consent has been obtained to the Contractor's rectification proposals. Upon the Engineer's acceptance of the rectification proposal and following completion of the rectification works, the tests required by the Contractor shall be repeated under the same terms and conditions. Unless otherwise accepted by the Engineer, all inspection and testing shall be performed by an approved external testing laboratory or On-Site Laboratory.

In the event that the Engineer's response to the above rectification proposal is NOO or the Contractor fails to provide any rectification procedures, the Engineer may instruct the Contractor to comply with the provisions of Sub-Clause 7.6 [Remedial Work] of the Conditions of Contract.

The Engineer may notify the Contractor of any such nonconformity as described above by issuing a Nonconformity Report. In the event of receipt of such a Nonconformity Report, the Contractor shall proceed to close out such nonconformity in accordance with the provisions of their Works Quality Management Plan which has received the Engineer's consent.

14 Spares, Special Tools and Consumables (If applicable)

The Contractor shall propose the plans in which spares, special tools for operation and maintenance, or consumables shall be manufactured and be readily available for reasonable period and quantities, specified elsewhere in the Contract, from the date of the Taking-Over Certificate for the whole of the Works.

The Contractor shall submit the guarantee in support of those availabilities at the time of submission for the respective plans. The Contractor shall promptly supply the spares, special tools and consumables, as specified elsewhere in the Contract. The spares, special tools, and consumables shall be genuine. The Contractor shall propose spare part and interchangeability record for the Plant provided byhim.

The Contractor shall, in order to determine the spares required for the operation, consider the criticality of the equipment, the reliability, the maintenance capability and an understanding of the planned consumption as a minimum. Any unused commissioning spares shall be taken back, if, so decided by the Engineer

7030 TESTS ON COMPLETION

1 General

- i. The Contractor shall submit the necessary Contractor's Documents for each Tests on Completion in accordance with the requirements of the Contract. The Contractor shall have received a "Notice of No Objection" response from the Engineer before commencement of the Tests on Completion.
- ii. The Contractor shall propose each ITP for Tests on Completion at Proposal Phase in accordance with the Contract within 56 days after the Commencement Date.
- iii. The Contractor shall also submit each ITP for Tests on Completion at Submittal Phase in accordance with the Contract not less than 56 days in advance of the date from which the Contractor will be ready to carry out each of the Tests on Completion.
- iv. The Contractor shall co-operate with Interfacing Contractor when carrying out Tests on Completion.
- v. Each Contractor's application for a Taking-Over Certificate issued in accordance with Clause 10 [Employer's Taking Over] of the General Conditions of Contract shall include, for each Tests on Completion, a certified report of the results of these inspections and tests detailed in the ITP.

2 Contractors Documents for Tests on Completion

As-built documents and operation and maintenance manuals shall be in accordance with the requirements of Division 5000 [Contractor's Drawings and Documents] of the General Specification.

3 ITP for Tests on Completion

3.1 Additional Requirements

- i. In addition to the requirements for ITPs in Sub-Division 7010 [Quality Management] the following requirements shall also be applied.
- ii. If the Works are divided into Sections, the ITP for the Tests on Completion may be separated for each Section.
- iii. The ITP for the Tests on Completion may refer to other ITPs and the Engineer's endorsement to the Contractor's certified results of ITPs.
- iv. The Contractor shall clearly designate the location and expected duration for the Tests on Completion. If the Tests on Completion are conducted outside the Country, all costs and expenses for accommodation, travel and the services for the Employer shall be borne by the Employer and the same for the Engineer shall be borne by the Contractor.
- v. The ITP for the Tests on Completion shall include an evaluation procedure for the related "As-Built" documents and operation and maintenance manuals.
- vi. The ITP for the Tests on Completion shall include procedure(s) where the Contractor endorses the performance of works carried out by Interfacing Contractors. The endorsement shall refer to controls and checks in the ITP to monitor and measure performance.
- vii. If the Interfacing Contractor has a requirement for endorsements of its work by the Contractor for the Tests on Completion, the same shall be carried out by the Contractor.

3.2 Proposal and Submittal Phase

- i. ITP for Tests on Completion shall have two phases. Firstly, a proposal phase for review by the Engineer to declare the Contractor's intention for execution of the Works, and then a submittal phase for consent by the Engineer to execute the Works.
- ii. ITP for Tests on Completion at Proposal Phase shall identify in it any other ITPs that are related to it. The Engineer shall review the proposal and those other ITPs referred in it.

- iii. The ITP for Tests on Completion at Proposal Phase can be revised till the submittal phase sets in and actioned as set out in Clause 1 (c) above.
- iv. The Contractor shall give to the Engineer notice of the date after which the Contractor will be ready to carry out each of the Tests on Completion.
- v. The ITP for Tests on Completion at Submittal Phase must have the Engineer's Notice of No Objection before the date mentioned in the above notice otherwise it shall be considered as the failure of the Contractor for Test on Completion.

3.3 Sequence of Tests on Completion

- i. Unless otherwise stated in the Particular Conditions, both phases of ITP for the Tests on Completion shall contain the following sequence: pre-commissioning tests, commissioning tests, and trial operation.
- ii. The Contractor may declare in the ITP for the Tests on Completion at Proposal Phase that the pre-commissioning tests and commissioning tests are going to be provided separately during submittal phase.
- iii. In the trial operation sequence, ITP for Tests on Completion at Proposal Phase shall designate conditions in which the Contractor is going to give notice to the Engineer that the Works are ready for any other Tests on Completion, including performance tests to demonstrate whether the Works conform with criteria specified in the Specification and with the schedule of guarantees, if any.
- iv. No trial operation shall be conducted in this Contract (i.e. C-1).

3.4 Co-operation for Tests on Completion by Interfacing Contractors

- i. The Contractor shall co-operate with Interfacing Contractors whilst the latter are carrying out their tests on completion. The Contractor shall take care to protect the Interfacing Contractors' materials, plant and works from damages caused by the Contractor.
- ii. The Contractor shall give, as soon as practicable, notice to the Engineer where its execution of Works has caused damage or deterioration to the materials, plant and works of Interfacing Contractors. Any such damage or deterioration shall be remedied by the Contractor at his own cost. The Contractor shall submit to the Engineer for approval of its proposal in this regard, duly endorsed by the Interfacing Contractor, before commencement of any remedial works.

3.5 Execution of Tests on Completion

- i. The Contractor shall carry out procedures to endorse the performance of works by Interfacing Contractors before commencement of the Tests on Completion. If there is any non-conformance, in the works of an Interfacing Contractor, which prevents commencement of the Tests on Completion, this shall not be deemed to be caused by the Contractor.
- ii. The Contractor shall verify the test results by himself where the performance of works by an Interfacing Contractor prevents to the achievement of the specified criteria for the Tests on Completion.
- iii. As soon as the Works, or a Section, have passed any Tests on Completion, the Contractor shall submit a certified report of the results of these Tests in accordance with the Engineer's consented ITP for Tests on Completion at Submittal Phase.

Division 8000: Environment, Social Health and Safety Management

Table of Contents

8010 General Requirements of Environment, Social, Health and Safety(ESHS).....	150
1. General	150
8020 Environment, Social, Health and Safety.....	151
1. Contractor's Obligation.....	151
2. Site ESHS Management Plan.....	151
3. ESHS Management Manual	153
4. ESHS Facility and Equipment.....	153
8030 Staff and Labour.....	155
1. Engagement of Staff and Labour	155
2. Rates of Wages and Conditions of Labour.....	155
3. Persons in the Service/Retired of the Engineer	155
4. Labour Laws.....	155
5. Working Hours	156
6. Facilities for Staff and Labour	156
7. Safety and Occupational Health.....	156
8. Contractor's Superintendence.....	156
9. Provision of Efficient and Competent Staff	156
10. Preservation of Peace and Orderly Conduct	157
11. Labour to be Contractor's Employee.....	157
12. Report of Accidents to Staff and Labour	157
13. Claim on Account of Violation of Labour Laws.....	158
8040 Environment and Social.....	159
1. General	159
2. Frameworks for Environmental Management.....	160
3. Enforcement of Mitigation Measures.....	160
4. Monitoring and Reporting	161
8050 Publicity and Public Relations	162
1. General	162
2. Stakeholder Consultation (If required).....	162
3. Grievance Redress Mechanism	162

8010 General Requirements of Environment, Social, Health and Safety (ESHS)

1. General

- 1.1. The Contractor shall be wholly and solely responsible for Environment, Social, Health and Safety (ESHS) on the Site and any other areas being used by him for the purposes of the Contract. The Contractor shall ensure that all appropriate ESHS protection measures are implemented throughout the execution of the Works. The Contractor's attention is drawn to the relevant provisions regarding ESHS in the Contract Documents.
- 1.2. Costs for all necessary measures in Division 8000 [Environmental, Social, Health and Safety Management Plan] and Appendix-8000-1[Environmental, Social Health and Safety Management Manual] shall be deemed to have been included in the Accepted Contract Amount.

8020 Environment, Social, Health and Safety

1. Contractor's Obligation

- 1.1. Within twenty-eight (28) days of receipt of the Letter of Acceptance, but not later than the Commencement Date, the Contractor shall prepare and submit to the Employer/Engineer for Notice of No Objection (NONO) a ESHS Management Plan fully complying with not only the relevant applicable latest Laws of the land but also the regulations of the Employer which may be imposed from time to time on the Project. It is to be noted that the Employer (or the Engineer on its behalf) is entitled to amend environment, social, health and safety related terms and conditions and the same shall be binding on the Contractor to implement without any financial claim from the Contractor to the Engineer.
 - 1.2. The ESHS Management Plan shall contain adequate control measures and procedures in accordance with the relevant applicable latest Laws of the land and the Engineer's regulations imposed as per Conditions of Contract, ESHS Management Manual attached as Appendix 8000-1, State BOCW Acts and Rules, Indian Electricity Acts and Rules, BS:6164: 2011 and other applicable latest Indian Legislations, whichever is more stringent, as well as internationally accepted good practice for the prevention of contamination, food poisoning, epidemics, diseases, accidents, fires and public nuisance. The ESHS Management Plan shall be implemented by the Contractor and the Subcontractor properly and diligently throughout the execution of the Works.
 - 1.3. The Contractor is required to prepare a method statement for each activity. The method statement is required to cover the Hazard Identification and Risk Assessment, aspect and impacts in detail obtaining NONO from the Engineer.
 - 1.4. The Contractor shall identify the ESHS requirement related to each activity planned and in advance the Contractor will arrange the required safety gears and equipment to control the hazards and obtain the relevant licenses, permissions and fulfil the construction machine/equipment safety requirement.
 - 1.5. All accidents and dangerous occurrences must be investigated by the Contractor. On all such occurrences, the Contractor convene all the persons involved including workers and carry out re-induction about safety for half a day. In case a stop order is issued by the Engineer, the Contractor shall not resume the Works until the corrective action's compliance is accepted /NONO issued by the Engineer.
- 2. Site ESHS Management Plan** The ESHS Management Plan shall have NONO from the Engineer. In addition, this plan shall be made in accordance with the latest amendments/revisions/clauses as applicable, as per the Haryana Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2005 and its amendment vide notification dated January 25, 2018;

ISO45001:2018;ISO 14001: 2015; Bureau of Indian Standard Specifications; National Building Code and BS 6164: 2011, whichever is more stringent. The Contractor's ESHS Management Plan shall address the following:

- a) The Contractor's ESHS Management Policy;
- b) The Contractor's ESHS Management Organization Plan (Roles, Responsibilities and Powers of key members of the ESHS Organization);
- c) Compulsory ESHS Induction Training, Job Specific ESHS Training, the Contractors' engineers training as per Appendix 08000-1 (ESHs Management Manual);
- d) Applicable Laws of the land;
- e) Enforcement of ESHS regulations;
- f) System of warnings;
- g) Weekly, monthly and tool-box meetings;
- h) ESHS management reports including accident reports & statistics and investigation procedure;
- i) Corrective measures to improve unhealthy/unsafe conditions;
- j) Waste management plan;
- k) Accident prevention signs and notices;
- l) ESHS audits, inspection and compliance;
- m) Permits for work in dangerous or restricted work areas;
- n) Safety gears and protective equipment;
- o) Emergency procedures;
- p) First aid medical facilities and occupational health centre;
- q) Traffic management;
- r) Visitors/guests permit and control;
- s) Fire prevention and fire-fighting;
- t) Electricity leakage and electric shock;
- u) Oxygen/Acetylene/Fuel gases;
- v) Deep boring with hydraulic rigs, excavation and trench shoring;
- w) Excavation near underground utilities;
- x) Operations in confined spaces;
- y) Guard-railing, Hand-railing, Barricading and Opening Protecting;
- z) Scaffolding and Staging and Fall protection;

- aa) Elevated Work including roofing and structural steel erection;
 - bb) Craning and Hoisting – Testing, ASLI calibration, Trained lifting supervisor and rigger;
 - cc) Handling and Storing of Toxic Paints, explosive and blasting material, Harmful Chemical Material with (MSDS), Flammable Material;
 - dd) Hazard Identification and Risk Assessment;
 - ee) Housekeeping;
 - ff) Safety of Public & Public Property nearby Work Place;
 - gg) Provision of Identity Card for Workers & Supervisors
 - hh) ESHS Committee Management;
 - ii) Project Site and Labour Colony Hygiene, Living, Water Supply, Sanitation and Fumigation to control insects; and
 - jj) ESHS Submission of Contractor: Monthly ESHS Report as asked by the Engineer including ESHS Statistics, Audit, Inspection and Compliance Report, ESHS Committee Minutes, Management Audit Rating Score Report and Closing Report of the Engineer.
- 2.2. The ESHS Manager shall be responsible for fully implementing the ESHS Management Plan.
- 2.3. The Contractor shall ensure that the Contractor's Personnel on the Site are all fully aware of and trained in the ESHS practices set out in the ESHS Management Plan.
- 3. ESHS Management Manual**
- 3.1. The Contractor shall submit the ESHS Management Plan for all the above-mentioned items complying with Appendix 8000-1(ESHs Management Manual).
- 4. ESHS Facility and Equipment**The Contractor shall provide, operate and maintain the first aid facilities as needed to fully comply with the ESHS requirements. Maintenance of the first aid facilities shall include supply of appropriate disinfectants, medicines, bandages, equipment, transportation and nurses as may be required to treat type of injury and sickness that would usually be expected on the construction site of similar projects. The Contractor shall display clearly at the first aid stations, the locations and direction to the nearest hospital or medical centre where first-aided patients can be sent in accordance with the latest Haryana Building and Other Construction Workers (Regulation of Employment and Conditions of Services) Rules, 2005 and its amendment vide notification dated January 25, 2018.
- 4.2. The Contractor shall provide all guests and visitors on the Site with appropriate safety gears and protective clothing including hard hats with chin strap, retro-

- reflective jacket, safety shoes and make sure that the safety gears and protective clothing are worn by them while they are on the Site. No shoes other than proper safety shoes will be allowed on the Site. All safety helmets shall bear the sticker by which the category of the person wearing it could be identified.
- 4.3. The Contractor shall provide all his staff and the labour on the Site with appropriate safety gears and protective clothing including hard hats with chin strap, retro-reflective jacket and safety shoes, any other job specific safety gears, personal protective equipment (PPE) and make sure that the safety gears and protective clothing are worn by them while they are on the Site. No shoes other than proper safety shoes will be allowed on the Site. The Contractor shall give and ensure that his labour and staff using PPE/Safety Gears have got awareness training related to handling and usage of PPE/Safety Gears.

8030 Staff and Labour

1. Engagement of Staff and Labour

1.1. The Contractor shall make his own arrangements for the engagement of staff and labour.

2. Rates of Wages and Conditions of Labour Apart from compliance of statutory requirements, 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.

2.2. 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 his subcontractors of any tier in and for execution 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 Engineer 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 Engineer from the Contractor.

3. Persons in the Service/Retired of the Engineer The Contractor shall not recruit or attempt to recruit staff and labour from amongst the Engineer's personnel.

3.2. The Contractor either at the bidding stage or during construction stage shall not employ any retired employee of the Engineer in any capacity unless such employee has completed at least one-year post retirement period or has obtained the No Objection Certificate from the Engineer for being employed with the Contractor. It will be responsibility of the Contractor to collect the Engineer's No Objection Certificate from such retired employee and submit the same to the Engineer.

4. Labour Laws

4.1. In dealing with labour and employee, the Contractor and his subcontractors (including piece rate and petty contractors) shall comply fully with all the latest laws and statutory regulations pertaining to engagement, payment and upkeep of the labour in India.

4.2. The Contractor shall have a labour welfare organization headed by a Labour Welfare Officer (LWO; qualified as per the state BOCW Acts). The Contractor's Project Manager and the LWO 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 the latest Labour Welfare Fund Rules and comply with the same.

4.3. The Contractor shall prepare and submit compliance reports of adherence to labour

laws as and when desired by the Employer/Engineer.

5. Working Hours

- 5.1. The Contractor, if required, shall carry out work during night hours or in shift, unless specifically provided otherwise in the Contract. No increase in rates or extra payments shall be admissible for night work other than the Contract. The Contractor shall provide adequate lighting and safety arrangements.

6. Facilities for Staff and Labour

- 6.1. The Contractor shall provide and maintain at his own expense all necessary accommodation and welfare facilities as per prevailing labour and welfare laws for his (and his subcontractor's) staff and labour. All accommodation shall be maintained in a clean and sanitary condition by the Contractor.

7. Safety and Occupational Health

- 7.1. Precaution shall be taken by the Contractor to ensure the safety and occupational health of his staff and labour. The Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are always available at the accommodation and on the Site, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.
- 7.2. The Contractor shall maintain records and make reports concerning safety, occupational health and welfare of persons and damage to property as per the Employer/Engineer's requirement. The Contractor's ESHS Management Plan shall be developed from his outline safety plan as per the Works' requirements.
- 7.3. The Contractor shall appoint a member of his staff at the Site to be responsible for maintaining the safety and protection of personnel against accidents on the Site. This person shall be qualified for his work and shall have the authority to issue instructions and take protective measures to prevent accidents.

8. Contractor's Superintendence

- 8.1. The Contractor shall provide all necessary superintendence during execution of the Works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. Such superintendence shall be provided by sufficient persons having adequate knowledge of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents) for the satisfactory and safe execution of the Works.

9. Provision of Efficient and Competent Staff

- 9.1. The Contractor shall employ (or cause to be employed) only persons who are

careful and appropriately qualified, skilled and experienced in their respective trades or occupations. The Engineer can instruct the Contractor to remove (or cause to be removed) any person employed on the Site or the Works, including the Contractor's Representative, who in the opinion of the Engineer:

- a) persists in any misconduct;
- b) is incompetent or negligent in the performance of his duties; and
- c) fails to conform to any provisions of the Contract or persists in any conduct which is prejudicial to safety, health or protection of the environment.

10. Preservation of Peace and Orderly Conduct

- 10.1. The Contractor shall be responsible for preservation of peace and orderly conduct at the Site and its neighbourhood by the Contractor's employees, representatives, petty contractors, subcontractors, etc. In case deployment of a special police force becomes necessary at or near the Site during the tenure of the Works, the expenses for the same shall be borne by the Contractor.
- 10.2. The Contractor shall always take all reasonable precautions which will include that no labour or employee is permitted to work at the Site under the influence of alcohol or in an intoxicated state or under influence of drugs to prevent any unlawful, riotous or disorderly conduct by or amongst his staff and labour and to preserve peace and protection of persons and property in the neighbourhood of the Works against such conduct.

11. Labour to be Contractor's Employee

- 11.1. If the Contractor directly or through petty contractors or subcontractors supplies any labour to be used wholly or partly under the direct orders and control of the Engineer, whether regarding any work being executed by the Contractor or otherwise for the purposes of the Employer, such labour shall, for the purpose of this clause, be deemed to be persons employed by the Contractor.

12. Report of Accidents to Staff and Labour

- 12.1. The Contractor shall be responsible for safety of all persons, employed by him on the Works, directly or through subcontractors and shall report accidents to any of them, however and wherever occurring on the Works, to the Engineer or the Engineer's Representative and shall make every arrangement to render all possible assistance and to provide prompt and proper medical attention to the affected persons.
- 12.2. The compensation for affected workers or their relatives shall be paid by the Contractor in such cases with utmost expedition in accordance with the latest Workmen's Compensation Act.

13. Claim on Account of Violation of Labour Laws

- 13.1. The Contractor shall be solely accountable for violation of any labour law by it, its subcontractors and will pay any such claim/damage to the authorities forthwith on demand. If any money shall, as a result of any instructions, directions or decisions from the Authorities or claim or application made under any of the labour laws or regulations, be directed to be paid by the Engineer, such money shall be deemed to be money payable to the Engineer by the Contractor and he will pay the same to the Engineer forthwith on demand, without demur and without asking for any reasons/explanations from the Engineer. On failure of the Contractor to repay the Engineer any money paid or to be paid by it as aforesaid within seven days after the same shall have been demanded, the Engineer shall be entitled to recover the amount from any money due or accruing to the Contractor under this or any other contract with the Engineer.
- 13.2. Any violation (unsafe act or unsafe condition) of the ESHS requirements as mentioned above shall attract financial deductions to be withheld from the Contractor as per the provisions of Clause 7 of Appendix 8000-1 of the General Specification.

8040 Environment and Social

1. General

- 1.1. The Contractor shall avoid, minimize and mitigate, as per concerned laws and regulations and practicable good practices, the adverse effects of all its and the Subcontractors' activities on the natural and social environment throughout the execution of the Works. This project being a AIIB loan project, the Works must comply not only with regulatory requirements but also with AIIB Environmental and Social Framework, February 2016. (<https://www.aiib.org/en/policies-trategies/frameworkagreements/environmental-social-framework.html>).
- 1.2. After the award of contract within the period specified by the Sub-Division 4020 [Works Management Plan], the Contractor shall prepare and provide its ESHS Plan based on the Contractor's past experiences and good practices in India as given in the ESHS Management Manual (Appendix 8000-1). The Contractor shall propose construction methodologies/plans that shall demonstrate assurance of environmental protection, social safeguards measures and enforcement of necessary counter measures as required under the Contract. All potentially affected areas within and in the vicinity of the Site, as instructed by relevant authorities and the Engineer, shall be covered by the Contractor's ESHS Plan.
- 1.3. The Contractor shall obtain necessary approvals from competent authorities such as state pollution control board, central pollution control board, district agencies or panchayat/Gram Sabha in scheduled area by its own costs and efforts to establish and operate the work, use local resources including water, treat and discharge permissible exhaust and wastewater, and storage and disposal of all construction materials and wastes including hazardous waste by licenced/authorized management agencies (ex. batching plants, casting yard, DG set, etc.).
- 1.4. The Contractor shall prepare its work specific ESHS Plan considering the following main points:
 - i. Environmental and social impacts due to site preparation and construction activities;
 - ii. Acquisition of prior clearances from competent authorities and concerned local bodies if it is applicable and No Objection Certificates from concerned authorities/stakeholders;
 - iii. Compliance with applicable laws and regulations not only for environmental considerations but also for social considerations;
 - iv. Practical management programmes and institutional framework to adequately implement ESHS Plan;

- v. Public relation tools, which aims to build understanding of the Project and its construction activities by the Project affected communities and to provide an initial dispute resolution mechanism at the construction sites;
- vi. Reporting system (daily, weekly, monthly, quarterly, annually, completion); and
- vii. Appointment of a qualified Environmental Manager and Social Expert.

2. Frameworks for Environmental Management

- 2.1. An institutional framework for the appropriate environmental management and social safeguard will be established at the Project implementation units of the Employer. The ESHS Plan prepared by the Contractor shall be treated as the binding condition of the Contract between the Employer and the Contractor.
- 2.2. Before the Commencement of the Works, the Contractor shall prepare its own ESHS Plan covering "Overall" and "Construction specific" management strategies and clarifying responsibilities of the Contractor and shall be reviewed and given approval by the Engineer prior to the Commencement of the Works, and implemented during the course of the Works.

3. Enforcement of Mitigation Measures

- 3.1. The Contractor is responsible for implementing mitigation measures related to the listed items below (Refer to Appendix 8000-1):
 - General Conduct of the Works
 - Legislation
 - General Pollution Control
 - Water Quality Management
 - Air Quality Control
 - Noise Control
 - Vibration Control
 - Waste Management
 - Housekeeping
 - Prevention of nuisance
 - Landscape, Greenery and Aesthetics
 - Tree falling
 - Energy Management
 - Mosquito Breeding
 - Hazardous Waste Storage and Management

- Archaeological and Historic Resources
- Fly Ash
- Site inspections
- Environmental Audits
- Training
- Complaint Response
- Monitoring and Reporting

3.2. The Contractor shall be responsible for designing and implementing practical mitigation measures to comply with permissible disposal or emission norms and for appropriate management in and around the construction site and proposed in the ESHS Plan and/or the method statements for the Works.

4. Monitoring and Reporting

4.1. The Contractor shall monitor the items specified in accordance with the approved ESHS Plan.

4.2. The monitoring results shall be compared with the applicable permissible standards. Necessary counter measures to comply with the requirements shall be proposed by the Contractor if they are required. The monitoring reports shall be prepared as per the formats and submitted to the Engineer within the submission periods as specified.

8050 Publicity and Public Relations

1. General

- 1.1. In the case of dispute with the Project affected persons, project affected community representatives, the Contractor shall be principally responsible for making best efforts and solving the issues by himself. However, in the case of unresolved dispute, either the Contractor or those who claim the issues shall approach the Grievance Redress Mechanism (GRM) set by the Engineer.

2. Stakeholder Consultation (If required)

- 2.1. The Contractor shall carry out stakeholder consultation with the guidance of the Engineer, but not be limited to, the following stakeholder consultation works:

- i. The Contractor shall inform and consult the relevant government authorities concerning the Project, local residents, property management offices, shops, schools and sensitive receivers at least 15 days prior to the Commencement of the Works;
- ii. The Contractor (or the specialized subcontractor if hired) shall organize and participate in commissions and stakeholder consultations with relevant authorities concerning the civil, ecological and archaeological issues;
- iii. The Contractor shall gain support, ease concerns and minimize objections from the stakeholders affected by the Works during the stakeholder consultation; and
- iv. The Contractor shall address stakeholders' concerns and feedbacks as far as possible to minimize disturbance to the public during construction at the Contractor's own expenses.

- 2.2. The Contractor shall ensure proper communications to the public by establishing an effective communication channel. The communications shall be open and transparent in the form of mutual communication from both sides.

- 2.3. The Contractor shall post on-site notices with the consent of the Engineer with clear description of the Works and indication of anticipated completion advance notices shall be given in carrying out the Works with great impact on local residents. The design of this notice shall be well considered to be in harmony with the local landscape and surrounding features.

3. Grievance Redress Mechanism

- 3.1. A Grievance Redress Mechanism (GRM) will be independently established to receive and appropriately solve complaints among the Project affected individuals and representatives, the Contractor and other stakeholders by the Engineer.

- 3.2. The Contractor shall set up a 24-hour hotline with the consent of the Engineer to provide enquiry services to the public and the Contractor shall ensure queries and enquiries regarding the Project are taken seriously and dealt with swiftly. Whenever complaint/query is received, the Contractor's response shall be made available within 14 calendar days. If a longer processing time is needed, an interim reply shall be served to the complainant within 14 calendar days.

SECTION VII-2
TECHNICAL SPECIFICATIONS

Table of Contents

1. General.....	166
1.1 Scope of Specifications.....	166
1.2 Applicable Standards.....	166
1.3 Submittals.....	167
1.4 Training.....	167
2. Specifications for Items of work based on IRUSSOR 2010: Bill Nos. 1, 2, 3 & 4.....	168
3. Non-Schedule (NS) Items: Bill No. 5.....	168
3.1 NS Item No.1: Earthwork in excavation.....	168
3.2 NS Item No.2: Weep Holes.....	171
3.3 NS Item No. 3: Tactile Tile.....	171
3.4 NS Item No. 4: M.S. Grills for windows.....	172
3.5 NS Item No. 5: Stainless Steel.....	172
3.6 NS Item No. 6: Pre-cast concrete blocks	173
3.7 NS Item No. 7: Vertical Pile Load Test	174
3.8 NS Item No. 8: Lateral load testing.....	175
3.9 NS Item No. 9: Pulse Echo Test.....	175
3.10 NS Item No. 10 (Bill No. 6): Earthwork in Embankment.....	175
3.11 NS Item No. 11 (Bill No. 7): Blanketing material.....	177
3.12 NS Item No. 12 (Bill No. 8): Reinforced Cement Concrete.....	177
3.13 NS Item No. 13 (Bill No. 9): Bored cast in-situ Piling.....	178
Appendix-A: Technical Specifications for Plain and Reinforced Cement Concrete.....	194
Appendix – B: Reinforcement Steel.....	211

TECHNICAL SPECIFICATIONS

1. General

1.1 Scope of Specifications

This specification shall be applicable for carrying out item of works given in BOQ.

1.2 Applicable Standards

The applicable standards shall be as follows:

1.2.1 Indian Railway Standards (IRS)

- i. Concrete Bridge Code
- ii. Bridge Sub-structure Code
- iii. Specification No. RDSO/2020/GE: IRS-0004 Compressive Guidelines and Specifications for Railway Formation
- iv. Indian Railways Unified Standard Schedule of Rates - 2010
- v. Indian Railways Unified Standard Specification for Works and Material - 2010
- vi. Indian Railways Permanent Way Manual (IRPWM)
- vii. Indian Railways Works Manual (IRWM)
- viii. Indian Railways Bridge Manual (IRBM)
- ix. Indian Railways Engineering Code
- x. Manual on the design and construction of Well and Pile foundations
- xi. Indian Railways Schedule of Dimensions (IR SOD)

1.2.2 Indian Standards (IS)

- i. IS: 456 Plain and Reinforced Concrete
 - ii. IS: 280 Mild Steel Wire for General Engineering Purposes.
 - iii. IS: 383 Specification for Coarse and Fine Aggregates from Natural Sources for Concrete.
 - iv. IS: 516 Method of Test for Strength of Concrete.
 - v. IS: 1200 (All Relevant Parts) Method of measurement of Building and Civil Engineering works.
 - vi. IS:1786 High Strength Deformed Steel Bars and wires for concrete reinforcement.
 - vii. IS: 2386 Methods of Test for Aggregates for Concrete.
 - viii. IS: 2720 (All Relevant Parts) Methods of Test for Soils.
 - ix. IS: 9103 Concrete Admixtures – Specification.
 - x. IS:4082 Recommendation for stacking and storage of construction materials at site
 - xi. IRC:78 Standard specification and code of practice for Road Bridges
-

- xii. IS: 2911 Code of Practice for design and construction of Pile foundations
- xiii. National Building Code of India, 2016
- xiv. IS: 1893 (Relevant Parts) Criteria for Earthquake resistant design of structures.

1.3 Submittals

Before commencement of work the contractor shall submit following documents for approval of the Engineer. No work shall be started by the contractor unless a Notice of No Objection (NONO) from the Engineer is received by him.

1.3.1 Method Statement

The Contractor shall submit Method Statement for each major item of work to the Engineer for his approval before commencement of work at the Site. The Method Statement shall include all calculations, drawings, & information as may be relevant and shall consist of, but not limited to, the following:

- i. Main Material
- ii. Execution/Working Method
- iii. Inspection and test method including frequency of inspection
- iv. Any other details that may be considered necessary and/or required by the Engineer.

1.3.2 Resources Report

The Contractor shall submit to the Engineer a detailed list by trade classification, of manpower to be employed, list of all major construction plant and equipment to be deployed at site to ensure efficient and timely execution of the Works.

1.3.3 Quality Assurance and Quality Control Administration/Measures/Records

The Contractor shall submit list and a proforma of QA & QC records which he intends to use for ensuring quality of the Works in accordance with Division 7000 of the General Specifications.

1.4 Training

The Contractor shall arrange the following trainings for all his concerned persons and 15 persons of the Engineer and the Employer together:

- i. 3 days training for earthwork in formation including one day for practical demonstration at site.
- ii. 4 days training for concrete, scaffolding and formwork including one day for practical demonstration at site

The Contractor shall bear all the expenditure for training including boarding, lodging, airfare, transport and remuneration of trainers. The Contractor shall also bear the expenditure for arranging training place with all facilities, refreshments and meals for all the participants during the training period. The syllabus of training and the names of the trainers shall be submitted to the Engineer for approval. Training shall be imparted only by those trainers who are approved by the Engineer.

2. Specifications for Items of work based on Indian Railways Unified Standard Schedule of Rates -2010 (IRUSSOR): Bill Nos. 1, 2, 3 & 4

The scope of work, specifications, method of measurement and payment for items included in Bill Nos. 1, 2, 3 & 4 which are based on IRUSSOR shall be governed by IRUSSOR and Indian Railway Unified Standard Specifications for Works and Material - 2010, a copy of which can be obtained from the office of HRIDC at Plot No 143, 5th Floor, Railtel Tower, Sector-44, Gurugram-122003 on payment.

3. Non-Schedule (NS) Items: Bill No. 5

3.1 NS Item No.1: Earthwork in excavation

Excavation in all kinds of soil (excluding rocks) in foundation & floor, wing walls, toe walls, return walls, drop walls & curtain walls of bridges and retaining walls including site clearance, to a given profile including leveling and dressing to neat dimensions, upto the required depth in all conditions, backfilling and disposal of the surplus excavated earth/debris/muck outside ROW including all lead, lift, ascends, descends, loading, unloading handling, re-handling, crossing of stream, nallahs, railway track, level crossing, etc., bailing/pumping out sub-soil water/seepage water/ rain water, sheet piling if required to ensure safety of running trains on adjacent tracks of IR, with all labour, material, tools, plants, machinery and equipment, taxes, cess, etc. as a complete job in accordance with the Specification and the approved drawings.

3.1.1 Method Statement.

The Contractor shall submit Method Statement for carrying out the work of excavation with foundations and flooring, etc. suiting to local ground conditions and safety measures conforming to IS: 3764 (Safety Code for Excavation Work) to the Engineer for approval. The work shall be carried out strictly in accordance with the approved Method Statement, the Specification and the Drawings.

3.1.2 Site Clearance

Site clearance shall be done as per Division 6000 of the GS.

3.1.3 Setting Out

After the site has been cleared, the limits of excavation shall be set out true to lines, curves, slopes, grades and sections as shown on the drawings or as directed by the Engineer. The Contractor shall be responsible for the setting out of works and the establishment and maintenance of benchmarks, other marks & stakes as long as in the opinion of the Engineer, they are required for the work.

3.1.4 Excavation shall be carried out in all types of soil encountered at site and to the lines, levels and profiles shown on the Drawings that have NONO from the Engineer. The Work shall be carried out by the Contractor in such a way as to avoid soil erosion and groundwater pollution, accidents in habitational or frequented places, disturbance to the surrounding ground or structures, accident to workmen and any other untoward incident. Fencing, caution signages with red lights and other safety measures shall be employed to avoid accidents. Where necessary, signal men shall be employed to guide the movement of people, vehicles and equipment.

3.1.5 The work shall be carried out in a careful manner to ensure that the exposed surfaces are as sound as the nature of the material permits and that no point shall protrude inside the lines shown on the Drawings.

- 3.1.6 The Contractor shall be responsible for the safety and stability of all excavations performed by him or under his control. In case of any slips or blows in the excavation, the same shall be cleared by the Contractor at his own cost.
- 3.1.7 The Contractor shall notify the Engineer without delay of any permeable strata, joints, faults, fissures or unusual ground conditions encountered during excavation and any excavation instability and/or collapse.
- 3.1.8 The Contractor shall ensure that no air pollution takes place during excavation, storage and transportation of earth/spoil by providing suitable measures such as appropriate cover and the like.
- 3.1.9 The Contractor shall carry out ground stabilization measures without delay before and/or after excavation, if required.
- 3.1.10 The Contractor shall make provision for all shoring, de-watering, dredging, bailing out or draining water whether subsoil or rain or other water and the excavation shall be kept free of water while concrete work is in progress until the Engineer considers the work well set . The sides of trenches shall be kept vertical and the bottom level throughout or properly stepped as directed by the Engineer. No extra payment shall be made on this account.
- 3.1.11 De-watering shall be carried out by suitable means with adequate stand-by arrangements as may be approved by the Engineer. The Contractor shall be deemed to have satisfied himself with regard to feasibility of all aspects of de-watering including site constraints due to existing structures. Though the method of de-watering is left to the Contractor, he shall be required to submit method statement of de-watering scheme including requisite justifications to obtain approval from the Engineer.
- 3.1.12 Approval of the Engineer, however, shall not relieve the Contractor of the responsibility of adequacy and appropriateness of de-watering and protection arrangements for the quality and safety of the work.
- 3.1.13 The Contractor shall erect and maintain during progress of works temporary fences/ barricading around the work area with all safety measures as shown in Reference Information/Reports. The excavations near habitations, public movement areas and all works along the roads shall be provided with proper caution signs and marked with red lights, reflectors at night to avoid accidents. The Contractor shall take all adequate protective measures to see that excavation operations do not affect or damage adjoining structures.
- 3.1.14 Disposal of muck

The surplus excavated material (that cannot be used in the Works), shall be treated as contractor's property. The contractor shall be free to take away and make use of this surplus excavated material in the manner he wishes to, including disposal in spoil dumps or elsewhere as approved by the Engineer/concerned parties and regulating authorities. The employer takes no responsibility for the arrangement of dumping areas and these will have to be arranged by the Contractor at his own cost. The Contractor is required to carry out detailed survey to identify dumping areas, clearances required, leads involved etc. The quoted rates shall be deemed to have taken all these factors into account. The excavated material that can be used in the Works, shall be temporarily stockpiled, if required, in a dump site as proposed by the contractor and agreed by the Engineer and the concerned regulating authorities. Any royalty, if to be paid to local authorities on the excavated material, is to be borne by the Contractor at his own cost irrespective of whether the excavated material is used for the Works or being used for any other purpose or being disposed off as surplus. Truck drivers shall be trained and educated by the Contractor to follow the traffic rules.

3.1.15 The Contractor shall ensure that traffic management on roads and railways is carried out in accordance with Sub-Division 6070 of the General Specifications.

3.1.16 Excavation beyond True Lines and Levels

If due to any cause whatsoever excavations are carried out beyond their true line and level, the Contractor shall make good excavation at his own cost to the required line and level with the appropriate grade of filling or with concrete subject to the NONO from the Engineer.

3.1.17 Backfill to Structures

- a) Prior to commencement of backfill, the Contractor shall submit his proposals for carrying out work such that the optimum use may be made of excavated material and obtain approval from the Engineer. The proposals shall include details of the compaction plant and methods for adjusting the moisture content of the material.
- b) No filling shall commence until approval has been received from the Engineer.
- c) The Contractor shall not backfill around structures until the structural elements have attained adequate strength.
- d) The backfill material shall be selected excavated material, thoroughly compacted mechanically in layers not exceeding 300mm loose thickness to achieve a density of at least 90% of the maximum dry density.

3.1.18 Tolerance

Permissible Tolerance for excavation

Item	Standard value (mm)
Finished depth of excavation	+30 to -30
length/width	0 to +50

3.1.19 Method of Measurement

Measurement for payment for excavation in all kinds of strata will be the in-situ volume measured in cum from the levels recorded prior to excavation work and the lines and grades shown on the Drawings or established at the Site by the Engineer.

No extra measurement for payment or payment will be made for the following reasons, but not limited to:

- (a) Extra work caused by the Contractor's negligence in setting-out the structures and slopes.
- (b) Removal of the materials resulting from any slides or overbreak caused by Contractor's inappropriate working methods and for the additional materials required to fill the voids so created.
- (c) Excess excavation required for Contractor's convenience and the resulting additional backfilling with approved materials.
- (d) any temporary support required for the excavation

3.2 NS Item No. 2: Weep Holes

Providing and fixing weep holes in abutments, wing walls and return walls etc., of new bridges with 110mm dia UPVC pipe, Type A conforming to IS:13592 with all contractor's men, material, transportation, all taxes as per the Specification and as directed by the Engineer.

3.2.1 Method Statement.

The method statement for providing and fixing of weep holes shall be submitted by the Contractor to the Engineer for approval.

3.2.2 Execution

Pipe for weep holes shall be placed at the specified locations and spacing in abutment, return walls and retaining walls etc. as shown in the Drawings.

3.2.3 Method of Measurement

Measurement for payment for weep holes shall be in running metres as shown in the Drawings.

3.3 NS Item No. 3: Tactile Tile

Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8mm on passenger platform & other passenger amenity areas at railway station having water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades for outdoor floors such as platforms, ramps, access to utilities, footpath, court yard, multi modals location etc., laid on levelling course of cement mortar 1:4 (1 cement : 4 coarse sand) upto 20mm thick in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of the Engineer.

3.3.1 Method Statement.

The Contractor shall submit Method Statement for laying of tactile tile on passenger platform & other passenger amenity areas at Railway Station to the Engineer for approval. The work shall be carried out strictly in accordance with the approved Method statement.

3.3.2 Material

Tactile tiles shall be of size 300X300X9.8mm with water absorption less than 0.5 % and conforming to IS: 15622. Approval shall be taken from the Engineer before start of execution for shape, pattern, make, colour and shade.

3.3.3 Execution

Tactile tiles shall be placed at the locations such as platforms, ramps, access to utilities and locations specified in the Drawings. Tactile tiles shall be laid on levelling course of cement mortar 1:4 (1 cement: 4 coarse sand) upto 20 mm thick. Joints shall be grouted with cement mixed with matching pigments.

3.3.4 Method of Measurement

Measurement for payment for tactile tiles shall be in square metres.

3.4 NS Item No. 4: M.S. Grills for windows

Providing and fixing M.S. grills of required pattern in frames of windows etc. with M.S. flats and square or round bars including coat of zinc primer all complete either fixed to openings/wooden frames with rawl plugs and screws or fixed to steel windows by welding.

3.4.1 Method Statement.

The Contractor shall submit Method Statement for fixing M.S. grills for windows to the Engineer for approval. The work shall be carried out strictly in accordance with the approved Method statement

3.4.2 Execution

The grill shall be fabricated and fixed as per the Drawings. MS bars used in fabrication shall conform to IS:1732.

3.4.3 Method of Measurement

Steel grill shall be measured in Kg. This item includes the cost of labour and material involved in all the operations described above including fixing including coat of zinc primer.

3.5 NS Item No. 5: Stainless Steel

Providing and fixing stainless steel (Grade 304) railing made of hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, including fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of the Engineer, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)

3.5.1 Method Statement

The Contractor shall submit Method Statement for fixing of stainless steel (Grade 304) for railing in stair case, balconies, pedestrian subway, Enquiry/Reservation counters to the Engineer for approval. The work shall be carried out strictly in accordance with the approved Method statement and the Drawings.

3.5.2 Material

The stainless steel (304 grade) shall conform to IS 6911 : 2017. Fabrication of railing shall be done as shown in the Drawings. Fabrication of all stainless-steel sections should be done only with tools dedicated to stainless steel materials. Tooling and work surfaces must be thoroughly cleaned before use.

Following items shall be ensured:

- i. Removal of all moisture by blowing with dry air or heating with a torch.
 - ii. Elimination of organic contaminants like oil, paints, anti-spatter compounds, grease, pencil marks, cutting compounds, adhesive from protective paper, soap used for leak testing etc.
-

- iii. Plasma cutter to be used for cutting stainless steel.
- iv. Zinc contamination to be avoided.
- v. Brushes or tools previously used on galvanized steel not to be used.

3.5.3 Fixing

Railing shall be fixed with necessary accessories and stainless-steel dash fasteners & stainless steel bolts etc. of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of the Engineer.

3.5.4 Method of Measurement

Only weight of stainless-steel members shall be considered in kg for the purpose of measurement. Fixing accessories such as nuts, bolts, fasteners etc. shall be deemed to be included in this item and shall not be paid separately. The rate shall include the cost of materials and labour involved in all the operations described above. Nothing extra shall be paid for fixing arrangements i.e. drilling, providing nuts & bolts etc.

3.6 NS Item No. 6: Pre-cast concrete blocks

Casting, supplying and installing pre-cast concrete blocks of size 25X25X20 cm for protective works at bridges and slope of embankment using M-15 grade of concrete with 20mm aggregate size including shuttering, compaction & curing of concrete, leading to site from casting depot, including dressing and levelling of surface, laying & jointing blocks with cement mortar 1:3 with all material including cement, labour, lead & lift as directed by the Engineer

3.6.1 Method Statement

The Contractor shall submit Method Statement for casting, supplying and installing pre-cast concrete blocks for protective works at bridges to the Engineer for approval. The work shall be carried out strictly in accordance with the approved Method Statement and the Drawings.

3.6.2 Material

The work shall consist of pre cast cement concrete blocks in M-15 grade of size 25 cm x 25 cm x 20 cm in a casting yard. The Contractor shall establish a casting yard for manufacture of precast cement concrete blocks. The casting yard shall have facilities for casting, compaction, curing and loading of cement concrete block into trucks/tractor trollies. Concrete shall conform to Appendix-A of these Technical Specifications.

3.6.3 Execution

- a) Before laying the pitching, the sides of banks shall be trimmed to the required slope and profiles put up by means of line and pegs at intervals of 3 metres to ensure regular straight work and a uniform slope throughout. Depressions shall be filled and thoroughly compacted.
 - b) The lowest course of pitching shall be started from the toe wall and built up in courses upwards.
-

3.6.4 Method of Measurement

Measurement shall be in cubic meter based on quantity calculation of only the blocks used (i.e. number of blocks x volume of one block).

3.7 NS Item No. 7: Vertical Pile Load testing

Conducting vertical load testing of a single pile in accordance with IS 2911(Part IV) including installation of loading platform, preparation of pile head or construction of test cap and dismantling of test cap after test etc with all labour, material, tool & plants, equipment, machinery etc complete as directed by the Engineer .

- a) Initial load test above 100 ton capacity up to 250 ton capacity pile
- b) Extra for every increase of 50 ton in pile capacity or part thereof over 250 ton
- c) Routine Load Test above 50 ton capacity up to 100 ton capacity pile
- d) Routine Load Test above 10- ton capacity up to 250 ton capacity pile

A. Initial Pile load test

3.7.1 Method Statement.

The Contractor shall submit Method Statement for carrying out initial load test on test pile to the Engineer for approval.

3.7.2 Execution

The load testing shall be carried out in accordance with IS 2911 (part IV) as per approved Method Statement. The pile capacity mentioned in the description of the item is the maximum test load applied.

3.7.3 Method of Measurement

Measurement for payment of initial load test will be in number of load tests carried out.

B. Routine Pile load test

3.7.4 Method Statement.

The Contractor shall submit Method Statement for carrying out routine load test on working pile to the Engineer for approval.

3.7.5 Execution

The load testing shall be carried in accordance with IS 2911 (part IV) as per approved Method Statement.

3.7.6 Method of Measurement

Measurement for payment of routine load test will be in number of load tests carried out .

3.8 NS Item No. 8: Lateral load testing

Lateral load testing of single pile in accordance with IS:2911 (Part-IV) with all labour, material, tool & plants, equipment, machinery, etc complete as directed by the Engineer.

- a) Piles with lateral load capacity of up to 50 ton
- b) Piles with lateral load capacity of above 50 ton

3.8.1 Method Statement.

The Contractor shall submit Method Statement for carrying out lateral load test on test piles and working piles to the Engineer for approval.

3.8.2 Execution

The load testing shall be carried in accordance with IS 2911 (part IV) as per approved Method Statement. The pile capacity mentioned in the description of the item is the maximum test load applied

3.8.3 Method of Measurement

Measurement for payment for lateral load test will be in number of load tests carried out.

3.9 NS Item No. 9: Pulse Echo Test

Pulse Echo Test (PET) for integrity testing of piles with contractor's men, materials and machines. The rate includes cost of Inspection of site, preparation of pile head and any other unforeseen cost required for the test, submission of reports in triplicate as directed by the Engineer.

3.9.1 Method Statement.

The Contractor shall submit Method Statement for carrying out Pulse Echo Test (PET) on piles to the Engineer for approval.

3.9.2 Execution

The load testing shall be carried in accordance with IS 14893 as per approved Method statement.

3.9.3 Method of Measurement

Measurement for payment for Pulse Echo Test (PET) will be in number of tests carried out.

3.10 NS Item No. 10 (Bill No. 6): Earthwork in Embankment

Earthwork in embankment for 32.5 T axle load as per RDSO specification No. RDSO/2020/GE:004 September 2020 "Comprehensive Guidelines and Specification for Railway Formation" with contractor's own earth from borrow areas including all lead, lift, ascent, descent, royalty, taxes, cess, compensation, crossing of nallahs /stream and other obstructions including mechanical compaction in layers with watering, handling, re-handling, dressing of banks to the final profile with all labour, material, tools, plant, machinery and equipment, taxes, cess etc. as a complete job in accordance with the Specification and the Drawings. This item also includes dressing of existing

ground surface after removal of all vegetation and making up the surface (average excavation or filling upto 15 cm) in all kinds of soil upto 1m extra on either side of the proposed toe.

Note: 10% of payment shall be withheld till the slopes are dressed to the required profile and compacted mechanically with vibratory rollers as per RDSO guidelines.

3.10.1 Method Statement

The Contractor shall submit Method Statement for carrying out earthwork in embankment to the Engineer for approval.

3.10.2 Execution

- a) This item of work shall consist of the clearing and stripping of borrow pits, excavating and hauling, spreading and compacting of soil for constructing formation to the lines, levels, grades, dimensions and cross-sections shown on the Drawings and as required by the Engineer.
- b) The contractor shall arrange suitable borrow areas at his own cost and get them approved from the Engineer before using soil from such borrow areas.
- c) The work shall be executed as per provisions of Chapter 6 of RDSO specification No. RDSO/2020/GE:004 September 2020 "Comprehensive Guidelines and Specification for Railway Formation" (Herein after known as RDSO Guidelines).
- d) The suitability of sub-soil shall be ensured as per Sub-Clause 2.2 of RDSO Guidelines.
- e) Soils mentioned in Sub-Clause 3.7 (a) of the RDSO Guidelines shall not be used.
- f) SQ-1 type of soils shall not be used in prepared subgrade and top layer of subgrade.
- g) Quality control of earthwork in formation shall be ensured as per Clause 7 of RDSO Guidelines.
- h) Field Compaction Trial shall be carried out to determine suitable machinery, frequency, the number of passes and thickness of each layer to achieve required degree of compaction
- i) MDD in laboratory shall be determined by using Heavy Proctor test as per IS 2720 Part- 16.
- j) MDD achieved in the field compaction trial shall not be less than 98% of the MDD achieved in laboratory.
- k) Degree of compaction of soil in prepared subgrade/top layer of subgrade shall not be less than 98% of MDD achieved in field as a result of Field Compaction Trial.
- l) Degree of compaction of soil in lower layer of subgrade shall not be less than 97% of MDD achieved in field as a result of Field Compaction Trial
- m) Slope shall also be compacted with vibratory rollers of approved capacity and make as per RDSO guidelines. This would be done after dressing of the bank for final profile.
- n) The type of test, frequency and acceptance criteria for quality check of earthwork shall be as given in Chapter 7 of RDSO Guidelines.

3.10.3 Method of Measurement

Measurement for payment for earthwork in embankment will be the in-situ volume as measured in cubic meter (cum) from the levels recorded prior to any filling work and the lines and grades shown on the Drawings or established at the Site by the Engineer. 10% payment shall be withheld till the slopes are dressed to the required profile and compacted mechanically with vibratory rollers as per RDSO guidelines.

3.11 NS Item No. 11 (Bill No. 7): Blanketing material

Supplying and laying blanketing material produced through mechanical means using crushers and pug mill for 32.5 T axle load as per RDSO specification No. RDSO/2020/GE:004 September 2020 "Comprehensive Guidelines and Specification for Railway Formation" over the top of subgrade including all lead, lift, ascent, descent, royalty, taxes, cess, crossing of nallahs /stream and other obstructions including mechanical compaction in layers not exceeding 300 mm thick with vibratory rollers, watering, handling, re-handling and dressing of formation to the final profile with all labour, material, tools, plants, machinery and equipment, taxes, cess, etc. as a complete job in accordance with the Specification and the Drawings.

Note: 10% of payment shall be withheld till the slopes are dressed to the required profile and compacted mechanically with vibratory rollers as per RDSO guidelines.

3.11.1 Method Statement

The Contractor shall submit Method Statement for providing blanketing to the Engineer for approval.

3.11.2 Execution

- i. After conducting necessary tests and field trials the Contractor shall get the blanket material approved from the Engineer.
- ii. The work of blanketing shall be done in accordance with the Specification, the Drawings and RDSO specification No. RDSO/2020/GE:004 September 2020 "Comprehensive Guidelines and Specification for Railway Formation".

3.11.3 Method of Measurement

Measurement for payment of blanketing will be as per the cross section shown in the Drawings or established at the Site by the Engineer. 10% payment shall be withheld till the slopes are dressed to the required profile and compacted mechanically with vibratory rollers as per RDSO guidelines.

3.12 NS Item No. 12 (Bill No. 8): Reinforced Cement Concrete

Supplying and laying in position M-35 RCC in Pile Caps, RCC Box/Sub way, Piers, Abutments, Pier Cap, Abutment Cap, Pedestals, Retaining wall, wing walls, Return walls, drop walls, curtain walls & toe walls of all heights as per approved design mix with admixtures and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all lifts & leads, having continuous agitated mixer, pumping concrete from transit mixer to site of laying, compacting, finishing & curing, with all labour, material, tools, plants, machinery and equipment, taxes, cess etc., as a complete job including cement in accordance with the Specification and the Drawings, but excluding supplying & fixing form work (centering & shuttering) and excluding Reinforcement steel.

Note:

- i. *Cost of cement is included in the above item.*
 - ii. *Cost of Reinforcement steel is not included in the above item and will be paid separately under item no. 2(i) of Bill No.2 (USSOR item No. 045016)*
 - iii. *Cost of supplying & fixing form work (centering & shuttering) is not included in the above item and will be paid separately under relevant item of Bill No.1 (USSOR Chapter-19)*
-

3.12.1 Method Statement

The Contractor shall submit Method Statement for carrying out the work of RCC bridges to the Engineer for approval. The work shall be carried out strictly in accordance with the approved Method Statement, the Specification and the Drawings. RCC work shall comply with the provisions of Appendix-A of these Technical Specifications.

3.12.2 Traffic Management

The Contractor shall ensure that traffic management on roads and railways is carried out in accordance with Sub-Division 6070 of the General Specifications.

3.12.3 Method of Measurement

Measurement for payment of this item shall be the quantity of RCC worked out/ measured in cum from the Drawings.

3.13 NS Item No. 13 (Bill No. 9): Bored cast in-situ Piling

Boring 1200 mm diameter piles in all kinds of strata including boulder studded soil, underground structure like channel, sewer manholes, old foundation or any other obstruction, irrespective of sub-soil water level in all conditions whether dry or under water, shoe and temporary casing pipe, if required, with contractor plant, machinery & equipment for pile boring, use of bentonite slurry including all operations, cleaning of bore holes, supplying and laying in-situ with tremie pipe M-35 RCC in piles as per approved design mix with admixtures and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all lifts & leads, having continuous agitated mixer, pumping concrete from transit mixer to site of laying including supplying & fixing form work (centering & shuttering), compacting, finishing, curing, chipping off pile top to remove laitance concrete above cut off level, removal and disposal of surplus excavated earth/debris/muck outside ROW including all lead, lift, ascends, descends, loading, unloading handling, re-handling, crossing of stream, nallahs, railway track, level crossing etc. with all labour, material, tools, plants, machinery and equipment, taxes, cess etc. as a complete job in accordance with the Specification and the Drawings.

Note:

- i. Cost of cement is included in the above item*
- ii. Cost of Reinforcement steel is not included in the above item and will be paid separately under item no. 2(i) of Bill No.2 (USSOR item No. 045016)*
- iii. Cost of exploratory bore hole and GT parameters is not included in the above item and shall be paid separately under relevant items of Bill no.1 (USSOR Chapter -19)*
- iv. Cost of temporary casing pipe is included in the above item. However, cost of permanent casing pipe is not included in this item and shall be paid separately under item no.146 of Bill no.1 (USSOR item No 192080), if required and approved by the Engineer.*
- v. Cost of initial load test, routine load test, lateral load test and Pulse Echo Test (PET) are not included in the above item and shall be paid separately under relevant items of Bill no.5*

3.13.1 Method Statement

The Contractor shall submit Method Statement for carrying out the work of piling. The work shall be carried out strictly in accordance with the approved Method Statement and Manual on the design and construction of Well and Pile foundations.

3.13.2 Materials

i. Concrete

Piles shall be constructed in accordance with the details shown in the drawings using the grade of concrete indicated, produced and placed in accordance with provisions of Appendix - A of these Technical Specifications.

ii. Reinforcement Steel

Reinforcement steel shall comply with the provisions of Appendix-B of these Technical Specifications.

iii. Temporary Casings

Temporary casings, as approved by the Engineer, shall be used to maintain the stability of pile bore hole. Temporary casings shall be free of distortion and shall be of uniform cross-section throughout each continuous length. During concreting, they shall be free of internal projections and encrusted concrete which may prevent proper formation of the pile.

iv. Stabilizing Material

The stabilizing material to maintain the sides of pile bores shall preferably be natural drilling mud. If natural mud is not available, then stabilizing fluid having bentonite, controlled with a polymer like CMC (Carboxyl Methyl Cellulose), shall be used, and the bentonite content ratio, if used shall be less than 3 % by volume. The stabilizing material shall be approved by the Engineer. Bentonite, when used, shall conform to IS 2911 (Part 1/ Section 4): 2010.

3.13.3 Exploratory bore hole (150 mm diameter)

- i. Exploratory bore hole shall be made as per IS 1892 for determining termination level of piles and geotechnical investigation parameters before carrying out boring of piles.
- ii. Number of bore holes for determining termination shall vary depending on the site condition and as decided by the Engineer. In case of uniform strata, one borehole may be sufficient for 40-50 piles. In case of erratic strata, the number of boreholes may be 1 in 20 to 40 piles. However, at the location of initial load test piles, one such borehole shall be done at each location.

3.13.4 Pile Installation

i. General

- a) Bored cast-in-situ piles shall conform to IS 2911 (Part 1/ Section 2), where not contravening to the following provisions. Based on borehole reports and drawings, Installation of piles shall be carried out as per pile layout drawings, installation criteria, approved Method Statement and instructions of the Engineer. Any changes to the pile design, based on test-piles results, bore-hole data or soil conditions encountered during boring, shall be as instructed by the Engineer.
 - b) The equipment and accessories for installation of piles shall be selected giving the due consideration to the sub-soil conditions, ground water conditions and type of founding material. These shall be of standard type and shall have been approved by the Engineer.
 - c) Before installing the initial test pile, the Contractor shall finalise the pile testing arrangement and obtain approval of the Engineer.
 - d) It is envisaged that the working piles shall be installed after the successful completion of the initial pile load test.
 - e) In case the Contractor desires to install the working pile, pending successful completion of initial pile load test, he may be permitted to do so, provided he gives undertaking to the Engineer to bear all associated risks and costs involved to make up for the short falls in the pile capacity, in the event
-

of the failure of the initial pile load tests to establish specified 'Design Ultimate Load' carrying capacity of initial test pile.

- f) The Engineer reserves the right to reject any pile which in his opinion is defective on account of less carrying capacity, structural integrity, position, alignment, concrete quality etc. Piles that are defective shall be pulled out or left in place as judged convenient by the Engineer, without affecting the performance of adjacent piles. The Contractor shall install additional piles to substitute the defective piles, as per the directions of the Engineer, at no additional cost to the Employer. Further, the cost of additional piles and increase in the pile cap size, if any, on account of additional piles, shall be borne by the Contractor.
 - g) Each pile shall be identified with a reference number and shall be as shown in the drawing. The convenience of installation may be considered while scheduling the sequence of piling in a group.
 - h) In a pile group, the sequence of installation of piles shall normally be from the center to the periphery of the group or from one side to the other.
 - i) Level marks shall be accurately painted on each pile immediately after its installation. Subsequently, if any pile displays any tendency to heave up due to installation of other piles or due to any other reasons, the same shall be reinstalled firmly as per the directions of the Engineer without any additional cost.
 - j) The Contractor shall record all the information during installation of piles, including pile-bore observations as per Sub-Clause 3.2.4(c) before concreting each pile. The data sheet for recording pile data shall be as approved by the Engineer. On completion of each pile installation, pile record shall be submitted to the Engineer within two days of completion of concreting of the pile.
- ii. Control of Position and Alignment

Piles shall be installed as accurately vertical as possible. The permissible tolerances with respect to position and (inclination) alignment are as shown below:

Tolerances

No	Item	Permissible tolerance	Figure
1	Level of top i.e. Cut-off-Level (m)	-25mm to 25mm	
2	Position of the head in plan at Cut-off-Level (d)	75mm or less	
3	Embedded depth in bearing stratum (l)	Design value or more	
4	Diameter of the pile (D)	Design value or more	
5	Variation from vertical at Cut-off-Level (v)	1.5% or less	

iii. Pile Boring

1. Boring Operation:

- a) Boring operations shall be done by rotary hydraulic feed drilling rigs with reverse mud circulation or other suitable boring methods that have been approved by the Engineer. The boring or drilling equipment shall have suitable and adequate accessories for boring or drilling through all types of strata expected at site.

- b) The size of cutting tools shall not be less than the diameter of the pile by more than 75 mm. However, the pile bore shall be of the specified size.
- c) The boring centre shall be aligned with the pile centre and the boring machine shall be installed so as not to move or incline. The sides of the borehole shall be stable throughout.
- d) Working level shall be above the Cut-off-Level. After the initial boring of about 1.0 m, temporary guide casing of suitable length shall be lowered in the pile bore for vertical pile. The diameter of guide casing shall be such as to give the necessary finished diameter of the concrete pile. The centre line of the guide casing shall be checked before continuing further boring. Guide casing shall be minimum of 1.0 m length. Additional length of casing may be used depending on the condition of the strata, ground water level etc.
- e) The temporary guide casing (if provided) shall be withdrawn cautiously, after concreting is done up to the required level. While withdrawing the casing, concrete shall not be disturbed.
- f) For providing permanent MS liner, Clause 709.1.4 of IRC:78 shall be complied. Whenever stricter provision has been given in the drawings, the same shall be followed.
- g) If boring operation becomes difficult before reaching the predetermined depth, further plan of action shall be submitted by the Contractor and approval shall be obtained from the Engineer for the same. The piles shall be founded on rock or other suitable strata as approved by the Engineer.

2. Maintaining the bore hole:

- a) For maintaining bore hole wall while boring, a stabilizing material, as mentioned at Sub-Clause 3.2.2(d), according to the soil shall be used and the level of the stabilizing fluid shall be maintained at not less than 2.0 m above the ground water level or at such other level as will ensure that the fluid pressure is at all times in excess of pressures exerted by the soils and external groundwater. The stabilizing fluid shall be under constant circulation till start of concreting. The level of stabilizing fluid for all piles shall be recorded by the Contractor and reported to the Engineer, including the confirmation of the bore-hole wall shape after boring. Where temporary casings or an alternative method for maintaining stability of a boring are used, these shall be subject to the Engineer's approval.
- b) Consistency of the stabilizing material suspension shall be controlled throughout concreting operations in order to keep the bore stabilized, as well as to prevent concrete getting mixed up with the thicker suspension of the mud.
- c) When the boring is done by rotary drilling rigs, the verticality of Kelly bar shall always be maintained. In the soil layer such as sandy soil layer where the bore hole tends to collapse, care shall be taken to ensure the drilling bucket does not hit the hole wall. While boring in the founding soil layer, the drilling bucket shall be raised at appropriate speed to prevent loosening of the soil by suction.

3. Stabilizing material management:

In addition to the requirements that are already stated, the following shall be considered:

- a) The stabilizing material shall be controlled so as not to damage pile-bore wall collapse and the quality and shape of the concrete.
 - b) While boring, the Contractor shall periodically check the properties of the stabilizing material and control the management items (specific gravity, marsh funnel viscosity, pH, etc.) to be within the values set in the Method Statement that has been approved by the Engineer.
 - c) Stabilizing fluid shall comprise of bentonite, complying with the specifications of IS 2720, IS 2911 (Part 1/ Sec 4; ANNEX D) or otherwise approved by the Engineer, thoroughly mixed with clean fresh water along with the required Polymer like CMC, to form a suspension meeting the specification requirements as submitted to and consented by the Engineer.
-

- d) The Contractor shall obtain manufacturers' certificates of the bentonite powder consigned to the Site giving properties of each consignment and shall submit them to the Engineer prior to commencing the work and whenever required.
- e) The frequency of testing stabilizing material and the method and procedure of sampling shall be proposed by the Contractor and approved by the Engineer prior to the commencement of piling work. Such control tests on the bentonite suspension as required or as approved by the Engineer shall be carried out during the piling work.
- f) Prior to concreting a pile, the Contractor shall take measures to remove any heavily contaminated stabilizing material which could impair the free flow of concrete from the tremie pipe. Placing of concrete shall proceed only with due modification as per consent of the Engineer.
- g) All reasonable steps shall be taken to prevent the spillage of bentonite suspension in the Site in areas outside the immediate vicinity of boring.

4. Confirmation of bearing stratum for termination level:

- a) Confirmation of the support layer shall be carried out by boring depth and comparing excavated soil and soil survey material. Also, the pile designated as per approved Method Statement or by the Engineer shall receive necessary confirmation.
- b) The boring depth shall be measured at two or more places to the bottom of the hole immediately after completion of boring operations. The results shall be reported promptly.
- c) A protocol shall be maintained regarding the strata at the founding level, Standard Penetration Test (SPT) value, percent core recovery, Unconfined Compressive Strength (UCS) from the nearest borehole, socketing horizon, flushing of pile bore, time interval between end of boring and start of concreting, bentonite density prior to the commencement of concreting.

5. Cleaning of pile bore just after boring:

- a. After completion of the pile bore up to the required depth, the pile bore shall be cleaned of loose, disturbed or re-moulded soil from the base of the pile.
- b. The cleaning shall preferably be achieved by three stages flushing of slurry using airlift technique, as per approved Method Statement. The bottom of the pile bore shall be thoroughly cleaned by airlift technique. Cleaning shall ensure that the pile bore is completely free of sludge or bored material, debris of rock or boulder etc. Necessary checks shall be made to ensure the thorough cleaning of the pile bore.
- c. Concreting operations shall not proceed if the contaminated stabilizing material at the bottom of the pile bore possesses a density of more than 1250 kg/m³. The stabilizing material sample shall be collected from the bottom of pile bore. For this a solid cone shall be lowered by a string to the bottom of pile bore. A sampler tube closed at top with a central hole (hollow cylinder) is lowered over the cone, then a top cover shall be lowered over the cylinder. Care shall be taken for proper fittings of assembly to minimise the leakage, while lifting the cone assembly to the ground surface. The slurry collected in the sampler tube shall be tested for density and sand content.
- d. When the boring is done by rotary drilling rigs, cleaning-bucket attached to the Kelly shall be used for cleaning the bore. Wherever stabilizing material is used, after using the cleaning-bucket, the bore shall be flushed with fresh slurry.
- e. The Contractor shall measure the final depth after this cleaning and confirm its effect by comparing with the depth at the end of boring.

6. Cleaning of pile bore just before concreting:

- a. Pile bore shall be cleaned by fresh stabilizing material through tremie pipe or as specified in the Method Statement, before (in case delay in concreting after the completion of bore) and after placing the reinforcement cage and just before the start of concreting. Pile boring shall be inspected and approved by the Engineer, in accordance with approved Method Statement, before concreting.
- b. The Contractor shall measure the final depth after this cleaning, when there is a delay in concreting after completion of the bore, for knowing the casting pile length, and confirm its effect by comparing with the depth at the end of boring.

7. Other relevant considerations for pile boring:

- a. Care shall be taken not to harm a recently concreted pile due to driving the casing nearby before the concrete has sufficiently set in that pile. The danger of doing harm is greater in compact soils than in loose soils.
- b. For bored holes, the finishing and cleaning of the bore, lowering of reinforcement cage and concreting of the pile for full height must be accomplished in one continuous operation without any stoppage.
- c. Pumping from a boring shall not be permitted unless approval has been issued by the Engineer.
- d. A pile excavation shall be backfilled without delay where a rapid loss of drilling fluid occurs and no further excavation at the location of that pile shall be carried out until the Engineer's approval is obtained.
- e. After each pile has been cast, any empty bore which may remain shall be protected and carefully backfilled as soon as possible to the satisfaction of the Engineer.
- f. Carriage and Disposal: The bored spoil material and contaminated mud and bentonite slurry shall be disposed at the designated areas identified by the Contractor and as per the procedure approved by the Engineer and as mandated by other relevant Contract provisions.

iv. Concreting

- a. Cast-in-Situ pile concreting shall conform to provisions of Appendix – A of these Technical Specifications and the relevant provisions of IS 2911 (Part 1/ Sec 2), where not in contravention to the following provisions.
 - b. Concreting shall not be done until the Engineer is satisfied that the termination level of pile, is as per the installation criteria and the Method Statement that has been approved by the Engineer.
 - c. Concrete in the pile shall be coherent, rich in cement with high slump and restricted water cement ratio. The slump of concrete shall vary between 150 mm to 180 mm for bored piles. For long or large diameter piles, use of retarding plasticiser in concrete is desirable.
 - d. The time interval between the completion of boring and placement of concrete in pile bore shall not exceed 6 hours. In case the time interval exceeds 6 hours, the pile bore shall be abandoned. However, the Engineer may allow concreting provided the Contractor extends the pile bore by 0.5 m beyond the termination level and clean the pile bore. The entire cost of all operation and materials for this extra length shall be borne by the Contractor.
 - e. The concrete shall be properly graded, self-compacting and shall not get mixed with soil, excess water, or other extraneous matter. Special care shall be taken in silty clays and other soils which have the tendency to squeeze into the newly deposited concrete and cause necking. Adequate head of green concrete shall be maintained to prevent inflow of soil or water into the concrete.
-

- f. Concreting shall be done by tremie method. The operation of tremie concreting shall be governed by IS 2911 (Part 1/ Sec 2). Stabilizing material shall be maintained sufficiently above the ground water level, as specified elsewhere in this Specifications.
 - f. Concreting by tremie shall continue to allow the initial pours of concrete, mixed with stabilizing fluid, sludge and cut spoils from the bore to overflow and the consistency and quality of the overflowing concrete is comparable to that of design mix. The length of overflow shall be decided by the Engineer.
 - g. It shall be ensured that the volume of concrete poured is at least equal to the theoretically computed volume of the pile shaft being cast.
 - h. The tremie shall have uniform and smooth cross-section inside. The tremie shall be water-tight throughout its length and have a hopper attached at its head by a water-tight connection. All tremie tubes shall be scrupulously cleaned before and after use.
 - i. While concreting the tremie shall be withdrawn slowly ensuring adequate height of concrete outside the tremie pipe at all stages of withdrawal.
 - j. An adequate quantity of concrete within the pipe shall be maintained at all times to ensure that the pressure from it exceeds that from the water or drilling fluid.
 - k. The tremie pipe shall be lowered to the bottom of the bore-hole, allowing water or stabilizing material to rise inside it before pouring concrete. The tip of the tremie pipe shall not be separated from the bottom of the hole more than necessary (when plunger is used, it is about 0.2 m or less from the hole bottom)
 - l. The tremie pipe shall always be kept full of concrete and shall penetrate well into the concrete in the borehole, at least 2 m or more, with adequate margin of safety against accidental withdrawal if the pipe is surged to discharge the concrete.
 - m. During concreting, the cycle time of concreting, concreting volume, concrete placement height and the height of the tremie pipe tip in concrete shall be checked for all the piles and reported in a format that has been approved by the Engineer.
 - n. To prevent the reinforcement cage from floating during placement of concrete, appropriate countermeasures shall be made in advance, as per the Method Statement that has been approved by the Engineer. The same shall be monitored for all piles and reported.
 - o. Temporary casings, when used, shall be extracted carefully to the satisfaction of the Engineer, whilst the concrete is sufficiently workable to ensure it is not disturbed or lifted, and the reinforcement cage does not get disturbed. During extraction, sufficient quantity of concrete shall be maintained inside the casing to overcome the pressure from external water, soil or stabilizing material and to ensure that no reduction in section by way of necking or shearing of concrete and contamination of the pile takes place.
 - p. Segregation of the ingredients shall be prevented. The displacement or distortion of reinforcement during concreting shall be avoided. If the concrete is placed inside precast concrete tubes or consists of precast sections, subject to the approval of the Engineer, these shall be free of cracks or other damage before being installed.
 - q. While concreting uncased piles, voids in concrete shall be avoided and adequate head of concrete shall be maintained to prevent inflow of soil or water into the concrete. It is also necessary to take precautions during concreting to minimise the softening of the soil by excess water. Uncased cast- in-situ piles shall not be allowed where mudflow conditions exist.
 - r. Where concrete is placed in dry borings, measures, subject to approval of the Engineer, shall be taken to avoid segregation and bleeding and to ensure that the concrete at the bottom of the pile is not deficient in grout.
 - s. Where enlarged bases are required, as per site conditions and as approved by the Engineer, these shall be mechanically formed and shall be concentric with the pile shaft within a tolerance of 10% of the shaft diameter and shall not be smaller than the required dimension.
-

The sloping surface of the frustum forming the enlargement shall make an angle of not less than 55° to the horizontal.

- t. Grouting at base of pile shall be done wherever the results of proof coring (in case of rock), sonic logging and/or loading test etc. confirm that there is a void/ sludge at the pile base. The grouting shall be done with cement slurry under suitable pressure after concrete in the pile attains the desired strength, if required by the Engineer. For this purpose, conduit pipes with easily removable plugs at the bottom end shall be placed in the bore along with reinforcement cage before concreting

3.13.5 Top of Concrete in Pile, Cut-off-Level (COL):

- i. Cut-off-Level of piles shall be as indicated in the drawings.
- ii. The top of concrete in pile cast shall be above the Cut-off-Level by 1.0 m (minimum) and as per the Method Statement, to remove all laitance and weak concrete and to ensure good concrete at Cut-off-Level, for the proper embedment into the pile cap. Any exceptions, due to contingent situation, will be subject to the approval of the Engineer.
- iii. Preparation of pile head: The area surrounding the piles shall be excavated up to the bottom of the pile caps. After seven days of concreting of pile, the exposed part of concrete above the COL shall be removed or chipped off and made rough at COL. In case a part of extra-pile concrete before curing is handled, the Contractor shall obtain prior approval from the Engineer. The projected reinforcement above COL shall be properly cleaned and bent carefully, only where required, to the required shape and level to be anchored into the pile cap as per the drawing. While finishing the pile head, care shall be taken to ensure no harmful damage, such as cracks, occurs in the concrete. The pile top shall be embedded into the pile cap by 150 mm as per the Drawing and as agreed by the Engineer. All loose material on the top of pile head after chipping to the desired level shall be removed and disposed as per contractual procedure and as directed by the Engineer.

3.13.6 Reinforcement Steel

- i. Reinforcement steel, along with its inspection and testing shall conform to Appendix – B of these Technical Specifications, along with IS 2911 (Part 1/ Sec 2) and used as per the drawings.
- ii. The reinforcement shall be assembled before placing in the moulds and all hoops and links shall be of uniform length firmly wired into position. Ends of helical reinforcement, if used, shall be firmly secured. Diagonal fork spacers shall be of a pattern that has been approved by the Engineer.
- iii. Lap joints in main longitudinal bars will be permitted only when, in the opinion of the Engineer, each bar cannot be supplied in one complete length. Where permitted, joints shall be provided at agreed centres, designed to develop the full strength of the bar across the joint, provided with adequate links or stirrups and staggered in position from those of adjacent longitudinal bars or as indicated in the drawings, subject to the approval of the Engineer.
- iv. The 'L' bends in the reinforcements at the bottom of the piles shall not be provided to avoid the formation of soft toe.
- v. Jointing of Reinforcement Steel for Piles:
Only lap joints shall be provided as shown in the Drawings.
- vi. Lowering of the reinforcement cage:
 - a. The reinforcement cage shall be properly aligned with the pile core and kept vertical without collapsing the hole wall. In lowering of the reinforcement cage, it shall avoid deformations, damages, etc. by using reinforcing material as necessary. In the lap joint

part of the reinforcement cage, the upper and lower cages shall be in a straight line, with the joints tightly bound.

- b. Proper cover to reinforcement and central placement of the reinforcement cage in the pile bore shall be ensured by use of suitable concrete spacers or rollers cast specifically for the purpose, as directed by the Engineer. The longitudinal reinforcement shall project above Cut-off-Level as indicated in the drawing.
- c. After lowering of the reinforcement cage, the height of the top end of the reinforcement shall be measured and reported. The axes of the reinforcement cage and the pile core shall be matched, checked and reported.

3.13.7 Breaking off of Piles

If any pile already cast requires breaking due to subsequent change of Cut-off-Level, then the same shall be carried out, not before seven days of casting without affecting the quality of existing pile, such as loosening, cracking etc., and to the satisfaction of the Engineer.

3.13.8 Pile Caps

The ground shall be excavated, levelled, prepared and then layers of coarse aggregate and blinding concrete shall be constructed below pile cap. The pile cap shall then be cast as per the Drawings and conforming to Appendix A and Appendix -B of these Technical Specifications, subject to tolerances mentioned therein.

3.13.9 Tests on Piles

i. General

When preparing for conducting a pile test, the Contractor shall follow the requirements of the various acts, orders, regulations and other statutory instruments that are applicable to the work for the provision and maintenance of safe working conditions, and shall in addition make such other provision as may be necessary to safeguard against any hazards that are involved in the testing or preparations for testing.

ii. Load Test on Piles

- a. Sub-Clause 3.2.10(g) to Sub-Clause 3.2.10(h) of these Specifications covers the requirements for initial vertical load and routine vertical load tests on reinforced concrete single vertical piles of specified diameter to assess their vertical load carrying capacities. All pile load testing shall conform IS 2911 (Part 1/ Sec 4)
 - b. Full details of the equipment proposed to be used, the test setup and pile testing scheme along with detailed design, drawings shall be submitted to the Engineer, before making arrangements to carry out the tests, for obtaining his approval. Approval of the Engineer shall also be obtained after the test setup is complete, prior to commencement of loading.
 - c. The work shall include mobilization of all necessary equipment, kentledge, anchor piles and rock anchors, or combination of kentledge and anchor piles and rock anchors, providing necessary engineering supervision and technical personnel, skilled and unskilled labour as required, to carry out the complete pile testing and submission of test reports.
 - d. In all cases, the Contractor shall ensure that when the hydraulic jack and load measuring device are mounted on the pile head the whole system will be stable up to the maximum load to be applied.
-

- e. Necessary means shall be provided to enable dial gauges to be read from a position clear of the kentledge stack or test frame in conditions where failure in any part of the system due to overloading, buckling, loss of hydraulic pressure and so on might constitute a hazard to personnel.
 - f. The hydraulic jack, pump, hoses, pipes, couplings and other apparatus to be operated under hydraulic pressure shall be capable of withstanding a test pressure of one and a half times the maximum working pressure without leaking.
 - g. The maximum test load or test pressure expressed as a reading on the gauge in use shall be displayed and all operators shall be made aware of this limit.
 - h. Where kentledge is used, the Contractor shall construct the foundations for the kentledge and any cribwork, beams or other supporting structures in such a manner that there will not be differential settlement, bending or deflection of an amount that constitutes a hazard to safety or impairs the efficiency of the operation. The kentledge shall be adequately bonded, tied or otherwise held together to prevent it falling apart, or becoming unstable because of deflection of the supports. The weight of kentledge shall be greater than the maximum test load and if the weight is estimated from the density and volume of the constituent materials, an adequate factor of safety against error shall be allowed.
 - i. It is essential that all the equipment and instruments are properly calibrated both at the commencement and immediately after the completion of tests, so that they represent true values. If the Engineer desires, the Contractor at his own cost shall arrange for calibration of the instruments in presence of the Engineer, at a laboratory having Engineer's approval, and the test report and calibration certificate shall be submitted to the Engineer.
 - j. The complete jacking system including the hydraulic jack, hydraulic pump and pressure gauge shall be calibrated as single unit. The complete unit shall be calibrated over its complete range of travel for increasing and decreasing loads same as that of test loads. The calibration certificate shall be submitted to the Engineer.
 - k. The reaction load to be made available for the test shall be at least 25% greater than the maximum jacking force. The reaction system as relevant shall be designed for the total reaction load. All reaction loads shall be stable and balanced during all operations of testing. During testing, stability of reaction system shall be ensured.
 - l. The vertical displacement of pile shall be measured using dial gauges having a least count of 0.01 mm.
 - m. Load test shall be conducted at pile Cut-off-Level (COL). If the water table is above the COL, the test pit shall be kept dry throughout the test period by suitable dewatering methods.
 - n. In case of initial vertical load test, where the water table level is higher than the COL, the Contractor may use anchor piles and rock anchors for testing purposes. The Engineer, at his discretion, may decide to raise the COL above water table.
 - o. All operations in connection with pile load test shall be carried out in a safe manner to prevent exposure of the people to hazard and also to ensure the safety of manpower and material.
-

- p. Test record and report for pile load tests shall be as per IS 2911 (Part 1/ Sec 2) and as approved by the Engineer. The reports shall be submitted to the Engineer immediately on completion of each test.
 - q. Two fixed independent benchmarks shall be established as reference points at least 15 m from the test pile to monitor the settlements.
 - r. If any initial pile load test gets abandoned and is not successfully completed, then the Contractor shall install another test pile and repeat the initial test after correcting the fault, at his own cost.
 - s. On completion of a test all equipment and measuring devices shall be dismantled, checked and either stored so that they are available for use in further tests or removed from the Site.
- iii. Test Pile Installation
- a. Piles shall be installed as per Sub-Clause 3.2.4(d) herein above.
 - b. Pile installation data as applicable shall be furnished along with the load test results to the Engineer.
- iv. Types of Tests
- a. Initial vertical (compression) load test and lateral load test shall be carried out on test piles, which are not to be incorporated in the work, to assess the 'Ultimate Load Capacity of Pile' before the commencement of the installation of working piles.
 - b. The test piles shall have the same design details as of the working piles typically adopted in the predominant soil profile in that area.
 - c. Routine vertical (compression) load test and lateral load test shall be conducted to verify the load carrying capacity of working pile.
 - d. Pile integrity test shall be carried out on each pile by The Low Strain Method as per IS 14893 to verify the structural integrity, shape and continuity of pile as detailed in Sub-Clause 3.2.9(ix)
- v. Number of Tests:
- a. Initial pile-load tests: The frequency of load test will not be less than 0.5 percent of the total number of piles required but not less than one (1). Wherever the soil strata are erratic or there is change in structure type (such as river bridge, rigid frame), additional tests shall be required as directed by the Engineer.
 - b. Routine pile-load tests: The number of tests may generally be 0.5 percent of the total number of piles required but not less than one (1). Pile load tests shall be carried as per IS 2911 (Part 4).
 - c. Initial and routine tests may be suitably increased for important structures or cases with large variation in the subsurface strata as directed by the Engineer.
- vi. Testing-Piles
-

- a. The testing-piles for routine load test shall be identified by the Engineer. For initial load test, testing-pile shall be installed as a test-pile, separate from working piles, as directed by the Engineer.
 - b. A minimum time period of four weeks shall be allowed between the time of pile casting and testing. Testing-pile head shall be prepared for testing purposes only, one week after casting the pile.
 - c. Testing-piles shall be cut off at the proper level and provided with a proper cap, to provide a plane bearing surface for the test plate and for proper arrangements for seating of the jack and dial gauges.
- vii. Static Vertical Load Test
1. The tests shall conform to IS 2911 (Part 4)
 2. Equipment and Test Setup
 - i. A steel plate of adequate thickness and not less than 50 mm shall be centered on the pile cap to prevent it from getting crushed under applied load. The size of the circular test plate shall not be less than the pile size nor less than the area covered by the base of the hydraulic jack(s).
 - ii. The datum bars shall be supported on immovable supports, preferably of concrete pedestals or steel sections, placed sufficiently far away from the test pile. The distance shall not be less than 3 times the diameter of testing-pile and in no case less than 2 meters from the edge of testing-pile. These supports shall be placed at an adequate depth below ground to be unaffected by ground movements.
 3. Loading System

The test load on pile shall be applied in one of the following ways, as approved by the Engineer.

 - i. By means of hydraulic jack(s) which obtain reaction from kentledge heavier than the required test load. In principle, while using this method, care shall be taken to ensure that the centre of gravity of kentledge is on the axis of the pile. The load applied by the jack(s) shall also be coaxial with the pile. The nearest edge of the crib supporting the kentledge stack shall be at a distance of at least 3 times the testing-pile shaft diameter from the centre of the testing- pile, and in no case less than 1.5 meters to the edge of the testing-pile.
 - ii. By means of hydraulic jack(s) which obtain reaction from anchor piles (for initial pile load test) and/or suitable loading frame. In principle, while using this method, all anchor piles shall be at a centre to centre distance of at least 3 times the testing-pile shaft diameter from the testing-pile and in no case less than 2 meters. Care shall be exercised to ensure that the datum bar supports are not affected by heaving up of the soil.
 - iii. By means of hydraulic jack(s) which obtain reaction from suitable rock anchors (for initial pile load test). In principle, when this method is adopted, the anchor transferring the load to the ground
-

shall not be closer than 3 times the testing-pile shaft diameter from the centre of the testing-pile and in no case less than 1.5 m from the edge of the testing-pile.

- iv. By means of combination of kentledge, anchor pile and rock anchors.

The measurement of strains for load monitoring may also be done by load cell connected to a digital read out unit.

4. Test Procedure

- i. Application of Load: The test should be carried out by applying a series of vertical downward incremental load each increment being of about 20 percent of safe load on the pile. For testing of raker piles it is essential that loading is along the axis.

This is applicable for both initial and routine test. In this method application of increment of test load and taking of measurement or displacement in each stage of loading is maintained till rate of displacement of the pile top is either 0.1 mm in first 30 minutes or 0.2 mm in first one hour or till 2 h whichever occur first. If the limit of permissible displacement as given in 6.1.5 or 6.1.6 is not exceeded, testing of pile is not required to be continued further. The test load shall be maintained for 24 h.

- ii. Settlement:- Settlement shall be recorded with minimum 2 dial gauges for single pile and 4 dial gauges of 0.01 mm sensitivity for groups, each positioned at equal distance around the piles and normally held by datum bars resting on immovable supports at a distance of 3 D (subject to minimum of 1.5 m) from the edge of the piles, where D is the pile stem diameter of circular piles or diameter of the circumscribing circle in the case of square or non-circular piles.
- iii. The safe load on single pile for the initial test should be least of the following:
 - A. Two-thirds of the final load at which the total displacement attains a value of 12 mm unless otherwise required in a given case on the basis of nature and type of structure in which case, the safe load should be corresponding to the stated total displacement permissible.
 - B. 50 percent of the final load at which the total displacement equal 10 percent of the pile diameter in case of uniform diameter piles and 7.5 percent of bulb diameter in case of under-reamed piles.

- iv. Items to be measured:

The following items shall be measured:

- A. Time;
 - B. Applied pressure;
 - C. Applied load;
-

- D. Displacement at the pile head;
 - E. Movement of reaction devices;
 - F. Others, as decided by the Engineer.
- v. Sampling periods and intervals:

For the step-load method, the following standard sampling periods and intervals at each load step shall be followed:

Table - Standard sampling periods and intervals

Stage	Sampling periods and intervals
New loading steps	Data samplings are conducted at 0, 1, 2, 5, 10 and 15 min from start of load holding for each new loading step. Data samplings are repeated at 15 min intervals after the elapsed time of 15 min.
Unloading	Data samplings are conducted at 0 and 2 min from the start of load holding for each new unloading step, and at a time just before proceeding the next step. Unloading stage shall be maintained for at least 15 minutes and the subsequent elastic rebound in the pile should be measured accurately by dial gauges
Unloading to zero load	Data samplings are conducted at 0.5 and 5 min from the start of load holding zero load. Data samplings are repeated after the elapsed time of 15 min.

- vi. Commencement, interruption and completion of the test:
- A. The test shall be commenced after ensuring the conditions surrounding the site, preparations of all equipment and the suitability of the weather condition.
 - B. If any abnormal conditions are noticed during the test, the test shall be interrupted promptly. The test can only be resumed when the cause of the abnormal condition has been detected and rectified.
 - C. The test shall be completed when the objectives of the test shall have been achieved, or when it is judged that abnormal conditions make it impossible to continue the test.
- vii. Loading on the pile shall be continued till as given in IS 2911.
- viii. Lateral load tests – Lateral load tests shall be carried out on test pile as well as on working pile safe load capacity determined as per Clause 7 of IS 2911 (Part 4).
- ix. Pile Integrity Test on Working Piles (other than piles subjected to routine load test):

1. Pile integrity test shall be carried out on each pile by The Low Strain Method as per IS 14893:2001. In case of large diameter piles, the tests shall be conducted at 5-6 places to cover the entire section of the pile.
 2. The tests shall be conducted on piles whose length is correctly recorded or on test piles where available, to determine the value of stress wave velocity and characteristic or reference signal for comparing the signals for testing subsequent piles.
 3. The area surrounding the pile should be free from standing water and kept dewatered during the tests. The pile head should be accessible.
 4. Testing should be free of work likely to cause disturbance. The cast-in-situ piles should not be tested normally before 14 days of casting.
 5. The test piles, if available at site, can be used to determine the pulse velocity and characteristic or reference signal generated. Where no test pile is available information can be obtained from cast piles whose length is accurately recorded.
 6. Methodology for Low Strain Integrity test:
 - a) This is a system of assessing the integrity of piles by the use of low stress wave imparted to the pile shaft and is also known as Sonic Integrity or Sonic Echo Test. A small metal/hard rubber hammer is used to produce a light tap on top of the pile. The shock traveling down the length of the pile is reflected back from the toe of the pile and recorded through a suitable transducer/accelerometer (also held on top of the pile close to the point of impact) in a computer disk or diskette for subsequent analysis. The primary shock wave which travels down the length of the shaft is reflected from the toe by the change in density between the concrete and sub-strata. However, if the pile has any imperfections or discontinuities within its length these will set up secondary reflections which will be added to the return signal.
 - b) The reflected stress wave can be monitored using either processing technique, the observed signals are amplified and converted into digital display as velocity versus length or frequency versus mobility records, providing information on structural integrity of piles. The stress wave velocity and approximate pile lengths are provided as input for the integrity testing. The stress wave velocity is dependent on the Young's modulus and mass density of pile concrete. This value generally lies between 3000-4000 metre per second depending on the grade of concrete used (M15-M25).
- x. Sampling, Testing, Inspection, and Acceptance Criteria Including Construction Tolerances of Piles
1. Frequency of sampling, testing and quality assurance including the method of conducting the tests, acceptance criteria and construction tolerances shall be as mentioned herein above and included in the Method Statement that has been approved by the Engineer. The tests shall be performed and reported as per the Method Statement that has been approved by the Engineer.
 2. Forcible corrections for any deviations shall not be made to concrete piles.
-

3. Data Reporting and processing

- i. The assessment of structural integrity is based on two equally important aspects:
 - I. Quality of signals, and
 - II. Accurate analysis and interpretation of signal.
- ii. Piles requiring remedial measures should be so marked immediately on completion of the field integrity testing and rectification measures selected.
- iii. The final report should include signals of each integrity test and structural condition of piles.

4. Submission of Results

Immediately after testing, a signed copy of all the raw data of a pile shall be given to the Engineer. A test report shall be submitted to the Engineer within 3 days after testing.

3.13.10 Safety

The Contractor shall adopt appropriate method and practice conforming to IS 5121 (Safety Code for Piling Work) suiting to local ground characteristics:

3.13.11 Traffic Management

The Contractor shall ensure that traffic management on roads and railways is carried out in accordance with Sub-Division 6070 of the General Specifications

3.13.12 Method of Measurement

The method of measurement for payment of piles shall be the length of pile in running metres from founding level to bottom of pile cap as established at the Site by the Engineer.

Appendix-A

Technical Specifications for Plain and Reinforced Cement Concrete

1. Cement

1.1. Product and Materials for Cement

- (a) Cement to be used in the works shall conform to 53-grade OPC (IS: 12269) or blended cement such as Portland Pozzolana Cement (IS: 1489) or Portland Slag Cement (IS:455).
- (b) The Contractor shall submit to the Engineer the Manufacturer's Certificate to affirm that the cement complies with the relevant standard.
- (c) Samples of the proposed cement shall be taken and forwarded to an independent laboratory for analysis before the source is approved.
- (d) Prior to ordering cement, the Contractor shall submit details of the proposed supplier or manufacturer and information on the proposed methods of transport, storage and certification for the Engineer's approval and show that the quantity and quality required can be attained and maintained throughout the construction period. In exposed concrete elements, the cement used in the concrete for entire element shall preferably be from a single manufacturer to ensure uniform colour.
- (e) Subsequent to obtaining the Engineer's approval, the Contractor shall not change the agreed arrangements without the prior approval from the Engineer. Each delivery of cement shall be accompanied by a certificate which shall be submitted to the Engineer immediately after the delivery showing the place of manufacture and the results of standard tests carried out by the manufacturer.

1.2. Testing for Cement

- (a) Samples shall be tested from every batch of cement delivered on site or once for every 1000 bags whichever is more frequent. Samples shall be taken immediately on receipt of cement at site. The methods and procedures for sampling shall be in accordance with IS: 3535.
- (b) Tests shall be carried out for fineness, initial and final setting time and compressivestrength (IS: 4031) and results approved by the Engineer before use.
- (c) The Engineer may require any other form of sampling and tests including chemicalanalysis (IS: 4032) in case the cement supplied is of doubtful quality. The costs of such additional tests shall be borne by the Contractor.

1.3. List of Brands/Makes

Brands/makes of cement shall be got approved by the Engineer.

2. Aggregates

2.1. General

- (a) Aggregates shall conform to the provisions specified in IS 383. Prior to commencing any concrete work, the Contractor shall obtain the Engineer's approval of the proposed types and sources of aggregate. Sampling of aggregates shall be as per IS 2430.
- (b) Water absorption shall be less than 3% by weight, as per IRC: 15 CL. 3.3.4.

2.2. Fine Aggregates (Sand)

- (a) The grading of the sand shall conform to IS: 2386 (Part 1). Sand, if found too coarse, shall be suitably blended with finer sand obtained from approved sources to obtain the desired grading. The provision of two types of sand, their separate stacking and their mixing in the specified proportions shall be at the Contractor's own cost.
-

- (b) The sand shall not contain silt, shale, clay and other weak particles for more than a total of 3% by weight. In case of sand containing excess silt, clay and chlorides, the sand shall be washed in screw type mechanical washers in potable water to remove the same. The screening and washing of sand shall be completed at least one day before using it in concrete. The washed sand shall be stored on a sloping platform while ensuring that contamination is avoided.
- (c) The sand shall be screened on a 4.75 mm size screen to eliminate oversized particles. The Contractor shall carry out the following tests at Site and ensure that the appropriate provisions of Indian or other standards, as may be applicable, are complied with:
 - i. Proportion of clay, silt and fine dust by sedimentation method as per IS 383 and IS 2386 (Part II)
 - ii. Moisture content in fine aggregate as per IS 2386 (Part III)
 - iii. Water absorption as per IS 2386 (Part III) and IRC: 15 (CL. 3.3.4)
 - iv. Bulk Density or bulkage as per IS 2386 (Part III)
 - v. Grading of fine aggregate as per IS 383 and IS 2386 (Part I)

2.3. Coarse Aggregates

- (a) The nominal maximum size of the coarse aggregate shall be 20 mm, unless otherwise mentioned in the Drawings. Coarse aggregates used for the Works shall be crushed stone conforming to IS 383, obtained from approved sources by the Engineer. Only quarries having jaw crushers with choke feeding arrangements producing aggregates of nearly cubical shape shall be applied.
- (b) Coarse aggregate containing flat or flaky pieces or mica shall be rejected.
- (c) The Contractor shall carry out the following tests at site and ensure that the appropriate provisions of following Indian standards as may be applicable are complied with:
 - i. Moisture content in coarse aggregate as per IS 2386 (Part III)
 - ii. Water absorption as per IS 2386 (Part III) and IRC 15 (CL. 3.3.3)
 - iii. Bulk density and voids as per IS 2386 (Part III)
 - iv. Grading of coarse aggregate as per IS 383 and IS 2386 (Part I)

3. Water

Water used for mixing and curing shall conform to the provisions laid down in IRS: CBC (CL.4.3), if not in contravention to the provisions mentioned herein.

- (a) Water samples from the intended source of supply shall be taken for analysis before any concrete work commences, and at regular intervals throughout the duration of the Works, as approved by the Engineer. Whenever the source of water changes, the water shall be tested for its chemical and other properties or impurities to ascertain its suitability for use in concrete, subject to the approval of the Engineer. No water shall be used until tested and found satisfactory. Cost of all such tests shall be borne by the Contractor.
- (b) Mixing and curing with seawater shall not be permitted.

4. Reinforcement Steel

The Contractor shall refer to Appendix - B of these Technical Specifications.

5. Binding Wire

GI Binding wire shall conform to the provisions laid down in IS 280 and IS 2502.

6. Concrete Admixtures

- (a) Admixtures shall conform to the provision laid down in IRS: CBC (CL. 4.4).
- (b) Concrete admixtures are proprietary items of the manufacturer and shall be obtained only from established manufacturers with proven track record, quality assurance and full-fledged laboratory facilities for the manufacture and testing of concrete. Naphthalene or melamine-based admixtures that are approved by the Engineer only shall be used in the Works. The admixture shall be non-air entraining type. The Contractor shall provide the following information concerning each admixture after obtaining the same from the manufacturer:
- i. Normal dosage and detrimental effects, if any, of under dosage and over dosage.
 - ii. The chemical names of the main ingredients in the admixtures.
 - iii. The chloride content, if any, expressed as a percentage by weight of the admixture.
 - iv. Values of dry material content, ash content and relative density of the admixture which can be used for uniformity tests.
 - v. Whether or not the admixture leads to the entrainment of air when used as per the manufacturer's recommended dosage, and if so, to what extent.
 - vi. Where two or more admixtures are proposed to be used in any one mix, confirmation of their compatibility.
 - vii. Whether or not there would be an increase in risk of corrosion of the reinforcement or other embodiments as a result of using the admixture.
 - viii. Retardation achieved in initial setting time.
- (c) Physical and chemical requirements of admixtures shall conform to IS 9103. In addition, the following conditions shall be satisfied:
- i. Plasticizers and superplasticizers shall meet the requirements indicated for "Water reducing Admixture".
 - ii. The air content of freshly mixed concrete, in accordance with the pressure method given in IS 1199, shall not be more than 1% higher than that of the corresponding control mix.
 - iii. There shall be no chloride content in admixture when tested in accordance with IS 6925.
 - iv. Uniformity tests on the admixtures are essential to compare qualitatively the composition of different samples taken from batch to batch or from the same batch at different times.
 - v. All tests relating to the concrete admixtures shall be conducted periodically at an independent laboratory and compared with the data given by the manufacturer.
 - vi. While qualifying the admixture, the infrared spectrograph plot shall be given. Each batch of the supply shall be tested for IR spectrograph and prove the consistency of supply.

7. Storage of Materials

7.1. General

- i. Handling and storage of all material shall be as per IS 4082 and IRS: CBC.
- ii. All materials shall be stored at proper places to prevent their deterioration or intrusion by foreign matter and to ensure their satisfactory quality and fitness for the work. The storage space shall also permit easy inspection, removal and restoring of the materials. All such materials even though stored in approved storage places, will be subjected to acceptance test prior to their immediate use.
- iii. The procedures to be adopted for transportation and storage of the materials shall obtain prior approval from the Engineer.

7.2. Cement

- i. Handling and storage of cement shall conform to the provisions of IRS: CBC (CL.4.7.1).
- ii. Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination. Cement shall be stored above ground level in perfectly dry and watertight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used, it shall be ensured that their capacity is adequate to cater to the requirement at Site and they are cleaned at least once every 3 months. Cement older than 3 months from the date of manufacture shall normally not be used, unless the quality is confirmed by tests and the Contractor obtains an approval from the Engineer for the same.
- iii. Each consignment shall be stored separately so that it may be readily identified and inspected, and cement shall be used in the sequence in which it is delivered at Site. Any consignment or part of a consignment of cement which had deteriorated of any sort during storage, shall not be used in the Works and shall be removed from the Site by the Contractor, without adding any costs to the Employer.
- iv. The Contractor shall prepare and maintain proper records on site regarding delivery, handling, storage and use of cement. These records shall be available for inspection by the Engineer at all times.
- v. The Contractor shall make a monthly return to the Engineer on the date corresponding to the interim certificate date, showing the quantities of cement received and issued during the month and in stock at the end of the month.

7.3. Aggregates

- i. Storage of aggregates shall conform to the provisions of IRS: CBC (CL. 4.7.2).
 - ii. Aggregate stockpiles may be made on ground that is denuded of vegetation, is hard and well drained. If necessary, the ground shall be covered with 50 mm plank. Each size of aggregate shall be stored separately. Aggregate shall be stored in such a way that segregation of sizes is prevented and contamination with fines and other undesirable material is avoided.
 - iii. In the case of fine aggregates, these shall be delivered at the mixing site in not less than 8 hours before use and shall be tested by the Contractor and approved by the Engineer.
 - iv. Coarse aggregates, unless otherwise agreed by the Engineer in writing, shall be delivered to the site in separate sizes (2 sizes when nominal size is 25 mm or less and 3 sizes when the nominal size is 32 mm or more). Aggregates placed directly on the ground shall be used
-

from the stockpile above 30 cm of the ground. Aggregates within 30 cm of the ground shall be cleaned, and then only the clean aggregates will be permitted to be used.

8. Design Mix Concrete

8.1. General

- i) For all items of concrete, only design mix shall be used. Prior to the commencement of construction, the Contractor shall design the mix and submit the proportions of materials, including admixtures to be used to the Engineer for obtaining approval. Suitable water reducing admixtures or super-plasticizing admixtures shall be used for achieving desired workability and strength of the concrete only after obtaining prior approval from the Engineer. No extra payment shall be made for such admixtures.
- ii) Mix design shall conform to the provisions under IRS: CBC (CL. 5.5 and 8.7) and IS: 10262.
- iii) Drying shrinkage of concrete shall be 0.03% or less. Drying shrinkage of concrete shall be tested in accordance with IS 1199.
- iv) When non-bleeding high flow concrete is used, it shall be confirmed that no bleeding occurs under Concrete Bleeding Test specified in IS 9103. The Contractor shall submit the test results to the Engineer prior to the commencement of concrete works for obtaining approval.
- v) Mix design, once approved, must not be altered without obtaining prior approval of the Engineer. However, if the Contractor anticipates any change in quality and/or change in source of future supply of materials than that used for earlier mix design, the Contractor shall inform the Engineer well in advance and bring fresh samples sufficiently in advance, to carry out fresh trial mixes.
- vi) The total chloride content of all constituents of concrete in mix shall be limited to 0.43 kg/m³ for reinforced concrete works and prestressed concrete works as per IS:14959.

8.2. Workability of Concrete

- i) The mix shall have the consistency which allows proper placement and consolidation in the required position. It shall be ensured that uniform consistency is maintained.
- ii) Workability of concrete shall conform to the provisions of IRS: CBC (CL. 5.3).

(A) Durability of Concrete

- i Maximum water cement ratio for design mix shall conform to IRS: CBC (Clause 5.4.3) as follows:

Plain Concrete	Reinforced Concrete
0.45	0.40

- ii Minimum grade of concrete shall conform to IRS: CBC (Clause 5.4.4) as follows:

Plain Concrete	Reinforced Concrete
M-20	M-35

- iii Maximum and minimum permissible cementitious material shall conform to IRS: CBC(Claue 5.4.5) as follows:

Minimum (kg/cum)		Max
Plain Concrete	Reinforced Concrete	
250	350	500

8.3. Trial Mixes

- i) The Contractor is entirely responsible for the design of the concrete mixes. However, the design shall have approval from the Engineer. At least 8 weeks before commencing any concreting in the Works, the Contractor shall make trial mixes using samples of coarse aggregates, sand, water, superplasticiser and cement, typical of those to be used in the Works, and which have been tested in an approved laboratory. A clean dry mixer shall be used, and the first batch shall be discarded.
- ii) The mix shall be designed to produce the grade of concrete having the required workability, durability and a characteristic strength not less than appropriate value given in IRS: CBC (CL. 5.1, 5.3 & 5.4). Trial mixes shall be prepared under full-scale site conditions and tested in accordance with IS 10262.
- iii) Whenever there is a significant change in the quality of any of the ingredients for concrete, the Engineer, at his discretion, may order the carrying out of fresh trial mixes. All costs for trial mixes and tests shall be borne by the Contractor's and held to be included in the rates quoted in the priced Bill of Quantities.
- iv) Before commencing the Works, the Contractor shall submit full details of the preliminary trial mixes and tests to the Engineer for approval.

8.4. Size of Coarse Aggregate

The nominal size of coarse aggregates for concrete shall be as per the Drawings. The proportions of the various individual size of aggregates shall be so adjusted that the grading produces densest mix and the grading curve corresponds to the maximum nominal size adopted for the concrete mix.

8.5. Mixing Concrete

8.5.1. General

- i) Production and control of concrete shall conform to IRS: CBC (CL. 5.6).
- ii) Concrete shall be mixed in an automatic batching and mixing plant as per this Technical Specifications. Hand mixing shall not be permitted. The mixer or the plant shall be at an approved location that shall be selected considering the properties of the mixes and the transportation arrangements available with the Contractor. The mixer or the plant shall be approved by the Engineer. Unless permitted by the Engineer, all concrete shall be produced in computerised automatic weigh batching plant having printing facilities to print out records of each batch and installed at the Site.
- iii) Mixing shall be continued till materials are uniformly distributed and a uniform colour of the entire mass is obtained, and each individual particle of the coarse

aggregate shows complete coating of mortar containing its proportionate amount of cement.

- iv) Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed by the Engineer, the first batch of concrete from the mixer shall contain only two thirds of the normal quantity of coarse aggregate for cleaning purpose only, and the same shall not be used for concreting purpose. Mixing plant shall be thoroughly cleaned before changing from one type of mix to another.

8.5.2. Batching on site

- i) Batching of concrete shall conform to the provision of IRS: CBC (CL. 5.6.2) and IS 4925.
- ii) All weighing and measuring equipment shall be tested and calibrated as per IS 4926. The results of these tests and calibration shall be submitted to the Engineer.
- iii) Addition of water to compensate for slump loss shall not be resorted to nor shall the design maximum water content and maximum water-cement ratio be exceeded. If permitted by the Engineer, additional dose of retarder shall be used to compensate the loss of slump at the Contractor's cost. Re-tempering water shall not be allowed to be added to mixed batches to obtain desired slump.

8.5.3. Ready Mixed Concrete

The Contractor can use RMC, if approved by the Engineer. The source batching plant of RMC shall not change during the course of work. If RMC is used, it shall conform to the provisions laid down in IRS: CBC (CL. 5.7).

9. Transporting, Placing and Compaction of Concrete

Transporting, placing, compacting and curing of concrete shall be in accordance with IRS: CBC (CL. 8), IS 456 and IS 5892.

9.1. Transporting

- i) The method of transporting and placing concrete shall have approval from the Engineer.
- ii) Transportation of concrete shall conform to IRS: CBC (CL. 8.1, 5.7), if not in contravention to the following provisions.
- iii) The mix shall be transported by agitating transit mixers, buckets, pumps etc. or as per approval by the Engineer, without causing segregation and loss of cement slurry and without altering its desired properties with respect to water content, water cement ratio, slump, air content, cohesion and homogeneity.
- iv) 1 m³ of each mix shall be supplied to Site before it is required in the Works to enable the Contractor to carry out workability tests. Under no circumstances shall extra water be added to the concrete after the original mixing is completed.

9.2. Pumping

Pumping of concrete shall conform to IRS: CBC (CL.8.9), if not in contravention to the following provisions.

- i) The type of concrete pump, the diameter of transporting pipe, the route of piping etc. shall be determined considering the pumpability of the concrete to obtain the required quality of concrete after pumping.
- ii) The type and the number of concrete pumps shall be determined in consideration of the pumping pressure, the discharge amount, the pumping rate per hour, the environmental conditions of construction site etc.
- iii) Prior to pumping design mix concrete, pumping of mortar with the same proportion as of design mix concrete shall be done to prevent loss of mortar in pump due to adherence.
- iv) The mortar pumped prior to the concrete pumping shall not discharge into the formwork.

9.3. Placing

- i) Placing of concrete shall conform to the provisions laid down in IRS: CBC (CL. 8.2).
 - ii) Prior to concreting, detailed planning on the placing system, the arrangement and the number of pumping cars, the position of the inlet for concrete pump, lighting equipment and arrangements for power supply, the sequence and rate of placing, time interval between concrete lifts etc. shall be specified in the Method Statement and the same shall be submitted to the Engineer for approval. Due allowance shall be made to secure enough clear spacing of reinforcement bars which enables concrete to flow through the spaces between reinforcement bars.
 - iii) All formwork shall be thoroughly cleaned to remove debris etc. before concreting. In addition, the Engineer shall inspect that there is no debris etc. in the formwork before concrete is cast. It shall be examined that there is no abnormality in the formwork and falsework before and during concreting.
 - iv) No concrete shall be placed in any part of the structure until approval of the Engineer has been obtained. If concreting did not commence within 24 hours of issuance of approval, then it shall be obtained again from the Engineer. Concreting then shall proceed continuously over the area between the construction joints.
 - v) Except where otherwise agreed by the Engineer, concrete shall be deposited in horizontal layers to a compacted depth of not more than 300 mm.
 - vi) Concrete when delivered in the works shall be maintained at a temperature of not more than 35°C as far as possible.
 - vii) Clear spacing between reinforcements shall be secured adequately and lighting equipment shall be arranged adequately in order to visually check the position of inlet of the concrete pump and the filling situation of the concrete during concreting works. In addition, suitable measures shall be taken so that the reinforcement bars do not move and clear cover to the reinforcement bars does not change.
 - viii) The clear cover shall be uniform and as per the Drawings. Concrete cover blocks used shall be of the same concrete mix as the member and shall contain the binding wire to secure it to the reinforcement. All ends of binding wire shall be carefully turned inside so that they do not project out of concrete cover. Reinforcement bars shall be adequately
-

secured by chairs/ties/hangers so that it maintains its position during casting and vibrating concrete. Ends of the wires used to tie bars shall be bent into the member.

- ix) In case of concreting the horizontal member immediately after the concreting of vertical member is finished, the horizontal member shall be cast after any settlement of concrete of the vertical member ceases in order to prevent settling cracks.
- x) If bleeding water is present on the surface of concrete during concreting, the bleeding water shall be removed before the following concrete is placed.
- x) The Contractor shall ensure that the place where concreting is to be done shall be free of water.

9.4. Compaction

- i) Compaction of concrete shall conform to the provisions laid down in IRS: CBC (CL.8.3).
- ii) Additional vibrators in serviceable condition shall be kept at site so that they can be used in the event of breakdowns. Concrete shall be compacted before setting commences and shall not be subsequently disturbed.
- iii) Internal vibrators shall be inserted in an orderly manner. The distance between insertions shall be 500 mm or less. The vibrator shall be made to operate at a regular pattern of spacing. The effective radii of action will overlap approximately half a radius to ensure complete compaction.
- iv) The vibration shall be done till the tone of the vibrated concrete becomes uniform. To achieve an even and dense surface free of aggregate pockets, vibration shall be supplemented by tamping or rodding by hand in the corners of forms and along the form surfaces while the concrete is plastic.
- v) Form vibrators whenever used shall be clamped to the sides of formwork and shall not be fixed more than 450 mm above the base of the new formwork and concrete shall be filled not higher than 230 mm above the vibrator. The formwork must be made especially strong and watertight where this type of vibrator is used.
- vi) Care must be taken to guard against over vibration especially where the workability of the concrete mix is high as this will encourage segregation of the concrete.

10. Construction Joints

- (i) Construction joints shall be avoided as far as possible and in no case the locations of such joints shall be changed or increased from those shown in the drawings, unless otherwise approved by the Engineer.
 - (ii) Where provision of construction joint is unavoidable, the location, direction and construction method of construction joint shall be determined in consideration of the structural strength, durability and appearance of the structure. Concreting shall be carried out continuously up to the construction joints. Construction joints shall conform to the provisions laid down in IRS: CBC (CL. 8.5 and Appendix - A). The Contractor shall submit Method Statement on the construction joints which shall be subject to the consent of the Engineer prior to concreting works.
 - (iii) The location of the construction joints and their arrangement, procedure for surface preparation of construction joint and sequence of concreting shall be subject to the
-

consent of the Engineer. Construction joints shall be located at locations where the shear force is minimum. The joints shall be provided in a direction perpendicular to the member axis. Sequencing of concrete placement shall be organized in such a way that cold joints are totally eliminated. Properly designed reinforcement shall be provided prior to casting of the next lift for transfer of full tensile stress across the joints.

11. Concreting under Special Conditions

Concreting under special conditions shall conform to the provisions laid down in IRS: CBC (CL. 8.6).

12. Concreting in Extreme Weather Conditions

Concreting in extreme weather conditions shall conform to the provisions laid down in IRS: CBC (CL. 8.6.1).

13. Concreting under Water

- i) Concreting underwater and seawater shall conform to the provisions laid down in IRS: CBC (CL. 8.6.2 and CL. 8.6.3), where not contravening to the following provisions.
 - ii) When it is necessary to deposit concrete underwater, the methods, equipment, materials and proportions of mix to be used shall obtain approval of the Engineer, prior to the commencement of any work.
 - iii) Concrete shall not be placed in water having a temperature below 5 °C. The temperature of the concrete, when deposited, shall neither be less than 16 °C nor more than 35 °C.
 - iv) All underwater concreting shall be carried out by tremie method as described in IRS: CBC (CL. 8.6.2) only, using tremie of appropriate diameter. The number and spacing of the tremie shall be worked out to ensure proper concreting. The tremie concreting when started shall continue without interruption for the full height of the member being concreted. The concrete production and placement equipment shall be adequate to enable the underwater concrete to be completed uninterrupted within the stipulated time. Necessary standby equipment shall be available for emergency situation.
 - v) In case of withdrawal of tremie out of the concrete either accidentally or to remove a choke in the tremie with the approval of the Engineer, the tremie shall be reintroduced in the following manner to prevent impregnation of laitance or scum lying on top of the concrete deposited in the bore. The tremie shall be gently lowered on to the old concrete with very little penetration initially. A vermiculite plug shall be introduced in the tremie. Fresh concrete of slump between 150 mm and 175 mm shall be filled in the tremie which will push the plug forward and will emerge out of the tremie displacing the laitance or scum. The tremie shall be pushed further in steps making fresh concrete sweep away the laitance or scum in its way. When tremie is buried in for about 0.60 m to 1.0 m, concreting may be resumed.
 - vi) In case of concreting through tremie or such pipes which are subsequently withdrawn, the concrete shall be placed in adequate quantity to ensure that during withdrawal of the tube, a sufficient head of concrete is maintained to prevent the inflow of soil and water or bentonite slurry.
 - vii) No concrete shall be allowed to come in contact with seawater within 72 hours of casting.
-

14. Concreting under Aggressive Soils and Water

Concreting under aggressive soils and water shall conform to the provisions laid down in IRS: CBC (CL. 8.6.4).

15. Curing of Concrete

15.1. General

- i) Concreting operations shall not commence until adequate arrangements for curing of concrete have been made by the Contractor. Curing and protection of concrete shall commence after the concrete has set hard enough, to withstand stresses due to curing work and does not get damaged, in order to protect it from the following:
 - a. Premature drying out, particularly by solar radiation and wind.
 - b. High internal thermal gradients.
 - c. Leaching out by rain and flowing water.
 - d. Rapid cooling during the first few days after placing.
 - e. Low temperature.
 - f. Vibration and impact which may disrupt the concrete and interfere with its bond to the reinforcement.
- ii) Where members are of considerable size and length, with high cement content, accelerated curing methods may be applied, as approved by the Engineer.

15.2. Curing Procedure

- i) In order to ensure the required quality of concrete in terms of parameters such as strength, durability and permeability, concrete shall be cured adequately, being kept at a temperature and humidity necessary to be hardened within a certain period of time after concreting, in order not to be affected by harmful effects such as low or high temperature, rapid temperature change, drying, loading and impact loading.
- ii) Curing of concrete shall conform to the provisions laid down in IRS: CBC (CL. 8.4). Approved curing compounds shall be used in lieu of moist curing, with the approval of the Engineer, particularly for all vertical faces and inaccessible areas, conforming to IRS: CBC (CL. 8.4.2).

15.3. Finishing

Finishing shall conform to the provisions laid down in IRS: CBC (CL. 6.2.4), if not in contravention to the following provisions:

- (a) Immediately after removal of forms, exposed bars or bolt, if any, shall be cut inside the concrete member to a depth of at least 50 mm below the surface of the concrete and the resulting holes shall be filled with cement mortar of dry pack consistency.
 - (b) All construction and expansion joints in the completed work shall be left carefully tooled and free of any mortar and concrete. Expansion joint filler shall be left exposed for its full length with clean and true edges.
 - (c) The finished surfaces of concrete after removal of formwork shall be such that no touching up is required. All fins caused by form joints, if any, shall be ground using electric surface grinder.
 - (d) Immediately on removal of forms, before any defects are rectified, the concrete work shall be examined by the Engineer.
-

- i) Exposed concrete surfaces shall be smooth and even, originally as stripped, without any finishing or rendering. The Contractor shall exercise special care and supervision of formwork and concreting to ensure that the cast members are made true to their sizes, shapes and positions. The work that has sagged or contains honeycombing to an extent which is detrimental to structural safety or architectural appearance shall be rejected. Honeycombed parts of the concrete, including other surface defects in the concrete, shall be removed by the Contractor as per the methods which do not affect the strength of adjoining concrete and as per approval of the Engineer. In the final finish, no honeycombing is allowed.
 - ii) Part of defective concrete thus removed shall be recast using fresh concrete of same grade, as approved by the Engineer without any additional cost. For that purpose, the Contractor shall prepare a comprehensive work procedure and obtain approval of the Engineer. No additional payment shall be made for repair of the concrete. The Contractor shall ensure that no air bubbles are formed on the exposed surface. Concrete pouring sequence, vibration methodology etc. shall be planned to ensure that air bubbles are not formed. All materials, sizes and layouts of formwork including the locations for their joints shall have approval from the Engineer prior to the commencement of the works.
 - iii) After the finishing works, cracks which occurred in the surface of concrete until the concrete starts to set shall be removed by refinishing or tamping.
- (e) The top face of a slab intended to be surfaced with other material shall be left with a spaded finish.
 - (f) Chemical surface retarders, if approved by the Engineer, shall be used to produce an exposed aggregate finish, provided the Contractor demonstrates that the durability of the concrete surface is not reduced.

16. Inspection, Tests and Standards of Acceptance

- (a) The Contractor shall submit test certificates from the manufacturer or supplier of materials along with each batch of material(s) delivered to site.
 - (b) The Contractor shall set up a field laboratory with necessary equipment for testing of all materials, finished products to be used in the construction.
 - (c) The testing of all the materials shall be carried out by the Contractor at the field laboratory or from the laboratory approved by the Engineer and in the presence of the Engineer. The Contractor shall make all the necessary arrangements and bear the entire cost for the same.
 - (d) Tests which cannot be carried out in the field laboratory shall be done at the Contractor's cost at any recognized laboratory or testing establishments having NABL certification and duly approved by the Engineer.
 - (e) If materials are brought from abroad, the cost of sampling or testing, whether in India or abroad, shall be borne by the Contractor. The Contractor shall provide and maintain on site, until the works are completed, at all times the equipment and staff required for carrying out these tests.
-

17. Quality Control of Concrete

- (a) The Contractor shall carry out the following tests for concrete, at the site of placing, and ensure that they comply with appropriate provisions of Indian and/or other standards, as may be applicable:
- i) Slump test for concrete: The frequency of slump test shall be as follows:
 - ii) Case 1: If the site of placing is at the same area as the concrete plant installed, then it shall be conducted once in every hour, as per IS 1199 (CL. 5.0) and IS 7320.
 - iii) Case 2: Other than Case 1, it shall be conducted once in each delivery of transit mixer, as per IS 1199 (CL. 5.0) and IS 7320.
 - iv) Tolerance for slump shall conform to IS 4926 (CL. 6.2.1).
 - v) Compressive and Flexural strength of concrete: Sampling, Strength tests and Acceptance criteria of concrete shall conform to IRS: CBC (CL. 8.7) according to the type of concrete grade.
 - vi) Chloride ion content test: It shall be conducted as per IS:15949 once a week. Chloride ion content shall be 0.43 kg/m³ or less.
 - vii) Relative Density and pH value of plasticizer (if used): The test shall conform to IS 9103 (CL. 7.1, CL. 10.0, Annexure - E) and the tolerances shall be as specified in IS 9103 (CL. 9.0, Table-2).
 - viii) Temperature of concrete shall be verified once in each slump test.
 - ix) The concrete shall be verified for permeability and the test procedure along with tolerances shall conform to IRS: CBC (CL. 5.4.2, Appendix - G). The frequency of test shall depend upon the change in design mix or change in source of material used in the work. However, the Engineer shall select random batches of concrete for examination at his discretion, and any time during concreting. Sampling shall generally be done at the point of discharge from the mixer and at placing point. The concrete shall pass the permeability test if it is properly compacted and the water penetration depth in the broken core is less than 25 mm.
- (b) It is the complete responsibility of the Contractor to redesign the concrete mixes as per the standard methods that have been approved and to produce the reinforced concrete conforming to the specifications. The Contractor shall have competent staff to carry out this work.
- (c) After the completion of the quality control checks of concrete, the Contractor shall immediately report the test results to the Engineer by submitting quality control records of the concrete.

18. Inspection of Concrete

- (a) Inspection shall be carried out by the Contractor, after the removal of formwork. Also, additional inspection shall be carried out if instructed by the Engineer.
 - (b) Inspection shall be carried out as per approval of the Engineer for the Method Statement, incorporating the test procedures specified in Table 55 below:
-

Table 55: Inspection of Concrete Surface Condition

Measurement Items	Inspection Method	Place to be Inspected
Presence or absence of honeycombing, cold joint, discoloration, and cracking	Visual inspection at point-blank range	All parts
Presence or absence of cavity, float, and cracking	Hammering Inspection	As per approved Method Statement, and as directed by the Engineer
Clear cover to the outermost reinforcement	Non-destructive testing using a probe	

- (c) Additional non-destructive tests (NDT) on the hardened concrete in the structure as a whole or any finished part of the structure where necessary, or directed by the Engineer, shall be carried out as laid down in IRS: CBC (CL. 18.3).
- (d) The Contractor shall report the inspection results along with the location to the Engineer immediately after the inspection. The forms generated from the probes during the inspection shall be attached to the records.
- (e) If defects such as deleterious cracking, spalling, deformation and finishing defects or damages caused by the Contractor are noticed from the results of the inspection, no repair work shall be commenced without prior permission taken from the Engineer.
- (f) Countermeasures against the defects shall be subject to approval of the Engineer. In this case, "repair work" refers to all actions which make alterations to the surface of concrete after the removal of formwork (including plastering etc.). If repair work is required, the Contractor shall submit Method Statement on the repair work and shall obtain approval of the Engineer for the same, prior to the commencement of repair work. During the repair work, the Contractor shall record about the work, and shall report to the Engineer on the results of the work immediately after the repair work has finished.
- (g) If cracks develop in concrete construction, which in the opinion of the Engineer may be detrimental to the strength of the construction, the Contractor, at his own cost, shall dismantle the construction, carry away the debris, replace the construction and carry out all consequential work thereto.
- (h) If any cracks develop in the concrete construction, which in the opinion of the Engineer, are not detrimental to the stability of the construction, the Engineer shall decide whether such cracks are required to be grouted. The Contractor shall grout such cracks as decided by the Engineer with polymer cement grout of approved quality at his own risk and cost.
- (i) External crack width shall be restricted to 0.2 mm or less on all concrete structures, unless otherwise specified in the Drawings.

19. Tolerance

Tolerances for the finished concrete structures shall be as specified in the Contract.

20. Precast Concrete

20.1. Manufacture Off-Site

- (a) Casting of members shall not begin until a NONO has been given by the Engineer to the shop drawings, required computation and method of manufacture.
- (b) When the drawings and method of manufacture have been noticed, no changes shall be made without NONO from the Engineer
- (c) The Contractor shall inform the Engineer in advance of the date of commencement of manufacture and casting of each type of member.
- (d) Concrete reinforcement and workmanship shall be as per IS: 456.
- (e) A copy of all cube test results for the precast concrete works shall be sent to the Engineer as soon as these are available.
- (f) No members to which the tests relate shall be dispatched to the Site until the tests have been satisfactorily completed and noticed by the Engineer.

20.2. Forms

The design and fabrication of the forms and false work as well as their construction shall be the responsibility of the Contractor. Forms shall be inspected prior to authorizing casting operations. Details shown on the Drawings shall be built into the forms. Worn, damaged, or otherwise unacceptable forms shall be repaired before casting of any member is authorized. The forms may be made either of steel or of plywood. If the Contractor elects to use plywood forms, it shall be high quality plywood, 19mm minimum thickness marine grade subject to NONO from the Engineer. Forms shall be structurally adequate to support the members within permissible tolerances. Forms shall be coated with a noticed form-release agent prior to use. Anchor devices may be cast into the concrete for later use in supporting forms provided the arrangement has NONO from the Engineer

20.3. Curing

The curing shall be carried out as per approved Method Statement.

20.4. Storage

When members are stored, they shall be firmly supported only at the points specified.

- (a) The accumulation of trapped water and deleterious matter in the units shall be prevented.
- (b) Care shall be taken to avoid rust staining and efflorescence.
- (c) The area intended for the storage of pre-cast units should be surfaced in such a way that no unequal settlement can occur.
- (d) To prevent deformation of slender units, they should be provided with supports at fairly close intervals and should also be safeguarded against tilting. Lifting and handling positions should conform to the Engineer's directions and drawings. In addition, location and orientation marks shall be put on the members, as and where necessary.

20.5. Handling and Transport

- (a) Members shall be lifted or supported only at points specified or otherwise given a NONO from the Engineer and shall be handled and placed without impact.
- (b) The Contractor shall define the method of lifting, the type of equipment and transport to be used, and the minimum age of the members to be handled and shall submit to obtain approval from the Engineer.

20.6. Protection

At all stages of construction, pre-cast concrete units and other concrete associated therewith shall be properly protected to prevent damage to permanently exposed concrete surfaces, specially arises and decorative features.

20.7. Falsework and Formwork

20.7.1. General

Falsework and formwork shall conform to the provisions laid down in IRS: CBC (CL. 6.1 to 6.4) and IRC: 87, if not in contravention to the following provisions.

- i) Falsework shall be designed in consideration of appropriate raising (camber) against sinking and deformation due to the weight of the concrete during construction and after completion. Furthermore, the Contractor shall submit the plan of the camber to the Engineer prior to the commencement of works for obtaining approval.
- ii) Ties shall not be welded to the reinforcement bars with the exception of distribution reinforcement and other reinforcements which do not contribute to structural performance. Clear cover to the end of the ties shall not be less than 25 mm. Filling of tie locations after removal of formwork shall be carried out with dry pack cement mortar.
- iii) The formwork shall be of steel plates of proper thickness to give good finish.

20.7.2. Design of Formwork

- i) The Contractor shall submit the design and drawing of complete formwork (i.e. the forms as well as their supports) to the Engineer, before any erection work commences. If proprietary system of formwork is used, the Contractor shall furnish detailed information to the Engineer. However, the Contractor shall be entirely responsible for the adequacy and safety for formwork.
- ii) The foundation of all supports shall be designed to suit the bearing capacity of soil to support the designed loads without settlement.
- iii) The Contractor shall prepare detailed shop drawing showing the arrangement of formwork for structural members including shoring system, horizontal and diagonal bracing system, details of foundation etc. The sizes of individual members shall be as per the design calculations.

20.7.3. Finishing of Formwork

- i) Finishing shall conform to IRS: CBC (CL. 6.2.4 and CL. 6.2.5).
- ii) Formwork shall be made to produce a finished concrete true to shape, line, levels and dimensions.
- iii) Chamfers shall be provided at all angles of the formwork to avoid sharp corners. The chamfers, bevelled edges and mouldings shall be made in the formwork itself, conforming to the Drawings.

20.7.4. Cleaning and Treatment of Forms

Cleaning and treatment of forms shall conform to IRS: CBC (CL. 6.3).

20.8. Specialized Formwork

- i) Specialized formwork shall conform to the provisions laid down in IRC: 87 (CL. 10).
 - ii) Specialized formwork may be required in the case of slip formwork, underwater concreting etc. Such specialized formwork shall be designed and detailed by competent agencies and a set of complete working drawings and installation
-

instructions shall be supplied to the Engineer. The site personnel shall be trained in the erection and dismantling as well as operation of such specialized formwork. If proprietary equipment is used, the supplier shall supply drawings, details, installation instructions, etc. in the form of manuals along with the formwork. Where specialized formwork is used, close coordination with the design of permanent structure is necessary.

- iii) For slip form, the rate of slipping the formwork shall be designed for each individual case considering various parameters including the grade of concrete, concrete strength, concrete temperature, ambient temperature and concrete admixtures.
- iv) In order to verify the time and sequence of striking or removal of specialized formwork, routine field tests for the consistency of concrete and strength development are mandatory and shall be carried out before adoption.

20.9. Inspection of Formwork

- i) The Contractor shall inspect the formwork and shall submit inspection results by "Formwork Assembly Inspection Record" prior to concreting works.

"Formwork Assembly Inspection Record" describes the results of verification of inspection results of the formwork with design documents in which the shape and dimensions of the formwork, clear cover to the outermost reinforcement, effective height etc. are verified. The proposed form of "Formwork Assembly Inspection Record" shall be submitted by the Contractor for approval of the Engineer.

- ii) Concreting shall not be allowed unless approved for the formwork by the Engineer.

20.9.1. Stripping and Removal of Formwork

- i) Stripping time shall conform to the provisions laid down in IRS: CBC (CL. 6.4).
- ii) The scheme for removal of formwork (i.e., de-shuttering and decentring) shall be planned in advance and submitted to the Engineer for scrutiny and approval. No formwork or any part thereof shall be removed without prior approval of the Engineer.
- iii) The formwork shall be removed in such a manner that does not cause any damage to concrete. Centring shall be gradually and uniformly lowered in such a manner that it permits the concrete to take stresses due to its own weight uniformly and gradually to avoid any shock or vibration.
- iv) Where there are re-entrant angles in the concrete sections, the formwork shall be removed at these sections as soon as possible after the concrete has set to avoid cracking due to shrinkage of concrete.

20.9.2. Reuse of Forms

The Contractor shall not be permitted reuse of timber facing formwork brought new on the works for more than 5 times for exposed concrete formwork and 8 times for ordinary formwork. 5 or 8 uses shall be permitted only if forms are properly cared for, stored and repaired after each use. Use of different quality boards or the use of old and new boards in the same formwork shall not be allowed. If any other type of special or proprietary formwork is used, the number of times they can be used shall be given a NONO from the Engineer.

Appendix - B

Reinforcement Steel

1. General

- (i) High strength deformed steel bars for concrete reinforcement used in the works shall be Fe 500D TMT, conforming to IS 1786 and manufactured by SAIL/TATA STEEL /JSW STEEL/RINL/IISCO. No rerolled steel shall be used. The Contractor shall produce copy of original challan or voucher as a proof of having purchased the steel reinforcement from manufacturers or their authorised distributors having approval of the Engineer. Reinforcement steel shall be stored as per IS 4082.
- (ii) No work shall be commenced without the Engineer's approval for reinforcement bar bending schedule. The reinforcement bars shall be bent to conform to the dimensions and shape shown in the Drawings in a manner that will not damage the parent material. Bars shall be bent cold. Any reinforcement, which is bent, shall not be re-bent. However, when it is unavoidable to re-bend the reinforcement, the same shall have approval from the Engineer.
- (iii) Placement of reinforcement shall conform to the provisions laid down in IRS: CBC (CL. 7.1.3). Cover and spacing of steel shall be uniform and as specified in the specifications and as shown in the Drawings.
- (iv) Uncoated reinforcement steel shall be protected from rusting or chloride contamination. Reinforcements shall be free of rust, mortar, loose mill scale, grease, oil or paint.
- (v) Cover blocks shall be firmly placed at appropriate intervals to maintain specified concrete cover to the reinforcement. The number of cover blocks to be provided shall generally be about 4 pieces per m² for the bottom surface of the member and about 2-4 pieces per m² for the side surface of the member. Cover blocks shall be made of concrete or mortar having quality equal to or higher than that of the parent concrete.
- (vi) Procurement of reinforcement steel shall be so phased by the Contractor that the storage period before its actual use in the works is limited to the bare minimum as directed by the Engineer.

2. Inspection and Testing

- (i) Manufacturer's test certificate shall be submitted for each lot of supply brought at the Site by the Contractor. Physical tests shall conform to IS 1387, IS 1599, IS 1608 and IS 1786. Independent test on quality of steel from each lot shall be carried out as per IRS: CBC (CL. 4.5.2).
 - (ii) Specimens required for three tensile tests for each of the different size of bar for each consignment delivered shall be sampled and tested by the Contractor before use at Site. Test results shall be duly supported by graph with respect to stress and strain. If first test of three test samples does not give the specified results, two additional tests shall be carried out. Both retests shall conform to the requirements as specified in IS 1786. The steel shall be rejected otherwise.
 - (iii) Reinforcement steel shall be inspected prior to the commencement of works and assembly on Site. Defective, brittle or burnt bar shall be discarded. Cracked ends of bars shall be cut out. All reinforcement steel shall be free of loose small scales, rust and coats of paint, oil, mud etc.
 - (iv) The Contractor shall inspect the reinforcement works and submit inspection results by "Reinforcement Assembly Inspection Record". "Reinforcement Assembly Inspection Record" describes the results of verification of inspection results of the reinforcement
-

work with the Drawing in which the diameter, number and length of the reinforcements, the position of splices and joints, the position and interval of the bent reinforcement bar, the type and disposition of cover blocks are verified. The form of "Reinforcement Assembly Inspection Record" shall be proposed by the Contractor for approval of the Engineer.

- (v) The Contractor shall obtain approval of the Engineer for reinforcement work prior to the commencement of concrete work.

3. Tolerances and Criteria

Tolerances and criteria for reinforcement work shall be as specified in Table 56 below:

Table 56: Standard of Tolerances and Criteria for Reinforcement Work

Measurement Items	Tolerances and Criteria
Number of reinforcements	The number of reinforcement bars shall be the same as shown in the Drawings. The intervals of reinforcement bars and the actual placement shall not differ from that shown in the Drawings.
Clear cover to the outermost reinforcement	Tolerances: (Minus side) 0 mm(Plus side) + 20 mm
Effective depth	Tolerance (Minus side): 3% of design value or 30 mm, whichever is smaller

4. Lapping and Joints

(a) Lapped Splices

No splicing of bars shall be permitted without prior approval of the Engineer. Lengths of splice, wherever required, shall be as indicated on the shop drawings and approved by the Engineer. Lapped splices shall be staggered and located at points along the span where stresses are low.

(b) Mechanical Joints

No jointing of bars shall be permitted.

SECTION VII-3
DRAWINGS

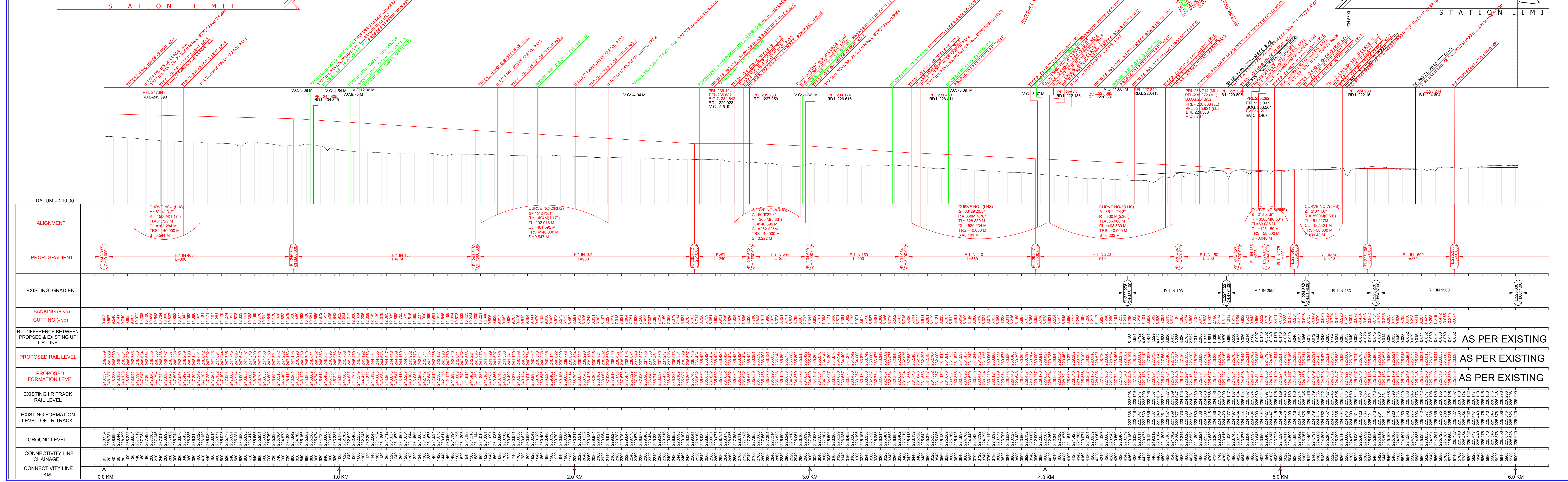
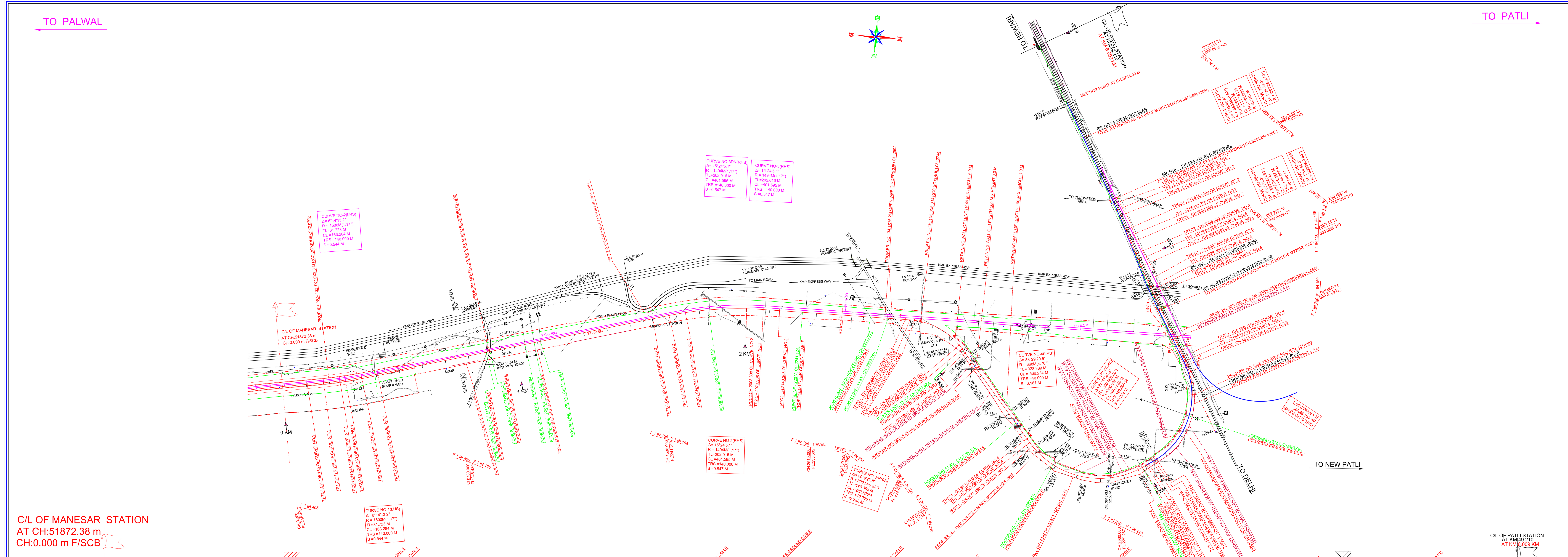
LIST OF DRAWINGS

S.No	Details	Name	Drawing No.
1	Alignment Drawings	Detailed Plan and Longitudinal Section from Chainage 49700m to Chainage 55000m	HRIDC/PS/LS-1
		Detailed Plan and Longitudinal Section from Chainage 0 to Chainage 5720m (Connectivity line)	HRIDC/PS/LS-2
2	General Arrangement Drawing of Bridges	GAD of Road Under Bridge No.127, 1X4X2.9m RCC BOX, at 50079.38m	HRIDC/PS/BR/GAD-1
		GAD of Road Under Bridge No.128, 1X7X3.5m RCC BOX, at 50502.38m	HRIDC/PS/BR/GAD-2
		GAD of Bridge no.129, 1X2X3.0 m RCC BOX (Balancing culvert), at 50822.38m	HRIDC/PS/BR/GAD-3
		GAD of Road Under Bridge No.130, 1X4X4.5m RCC BOX, at 50912.38 m	<u>HRIDC/PS/BR/GAD-4</u>
		GAD of Road Under Bridge cum Pedestrian subway No.131, 1X7X (4.25+2.50) m RCC BOX, at 51688.145 m	HRIDC/PS/BR/GAD-5
		GAD of Road Under Bridge cum Pedestrian subway No.132, 1X7X (4.90+2.50) m RCC BOX, at 52072.38 m	HRIDC/PS/BR/GAD-6
		GAD of Road Under Bridge No.133, 2X5X6 m RCC BOX, at 52762.38m	HRIDC/PS/BR/GAD-7
		GAD of Road Under Bridge No.134, 1X76.2 m OWG, at 54500m	<u>HRIDC/PS/BR/GAD-8</u>
		GAD of Road Under Bridge No.135, 1X5X6 m RCC BOX, at 54619.38 m	HRIDC/PS/BR/GAD-9
		GAD of Road Under Bridge No.135A, 1X5X6 m RCC BOX, at 3064 m (connectivity line)	HRIDC/PS/BR/GAD-10
		GAD of Road Under Bridge No.135B, 1X5X5.0 m RCC BOX, at 3503 m (connectivity line)	HRIDC/PS/BR/GAD-11

S.No	Details	Name	Drawing No.
		GAD of Road Under Bridge No.135C, 1X5X5.5 m RCC BOX, at 4047 m (connectivity line)	<u>HRIDC/PS/BR/GAD-12</u>
		GAD of Road Under Bridge No.135D, 1X5X6 m RCC BOX, at 4220 m (connectivity line)	HRIDC/PS/BR/GAD-13
		GAD of Bridge no.135E, 1X4X6 m RCC BOX (Balancing culvert), at 4382 m (Connectivity Line	HRIDC/PS/BR/GAD-14
		GAD of Bridge no.135F, 2X3X3.15m RCC BOX (Balancing culvert), at 4777 m (Connectivity Line	HRIDC/PS/BR/GAD-15
		GAD of Road Under Bridge No.135G, 1X5X4 m RCC BOX, at 5283 m (connectivity line)	HRIDC/PS/BR/GAD-16
		GAD of Bridge no.135H, 1X1X1.2 m RCC BOX (Balancing culvert), at 5575 m (Connectivity Line	HRIDC/PS/BR/GAD-17
4	<u>Retaining wall</u>	<u>GAD of Retaining Wall</u>	<u>HRIDC/PS/RW-1</u>
5	Yard Plan	Yard Plan of Manesar Station	HRIDC/PS/LP-1
6	Manesar Station Building	Ground, First floor Plan	HRIDC/PS/SB-1
		Second, Third floor plan	HRIDC/PS/SB-2
		Fourth, Fifth floor plan	HRIDC/PS/SB-3
		Section A	HRIDC/PS/SB-4
		Section B	HRIDC/PS/SB-5

TO PALWAL

TO PATLI

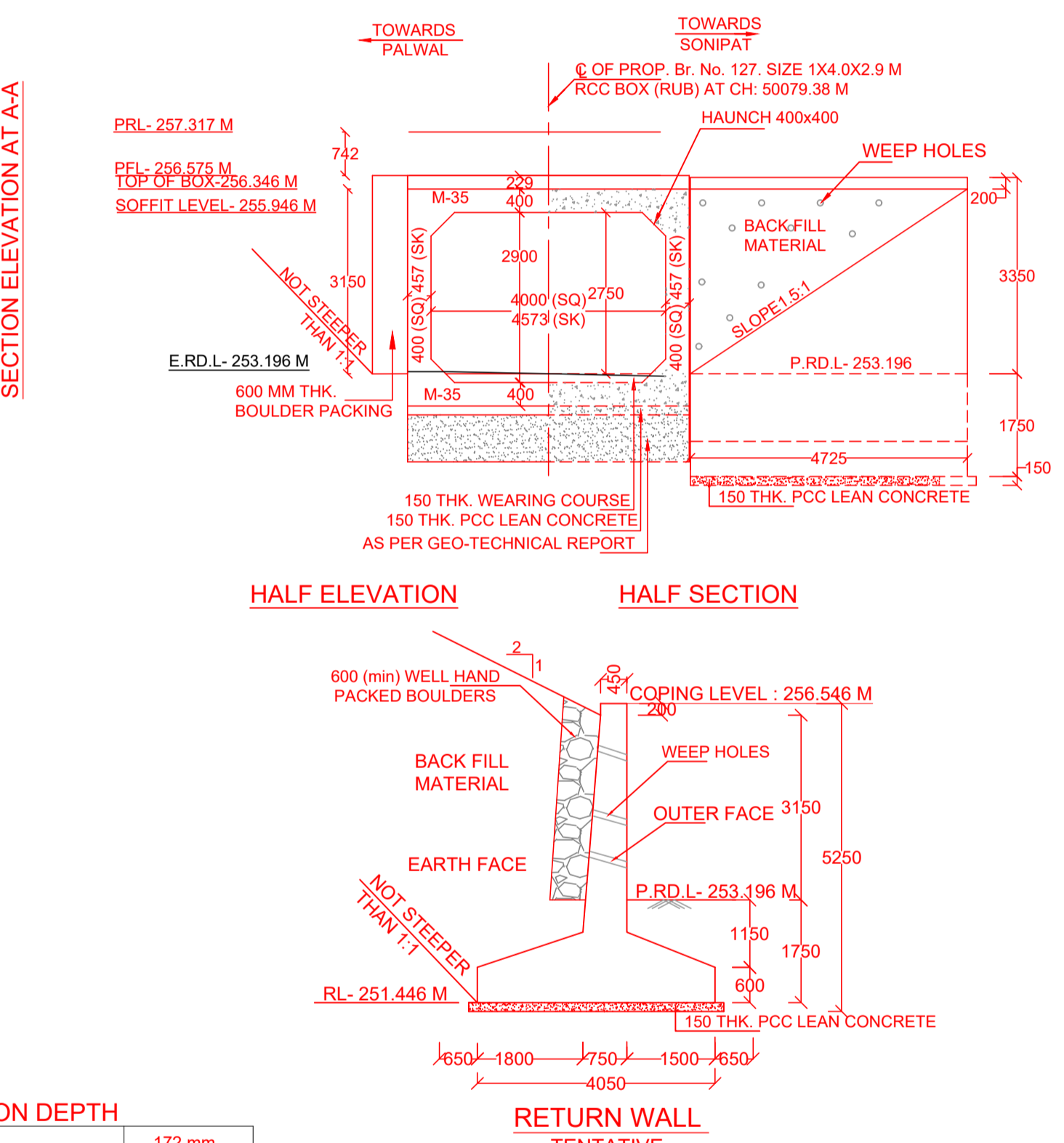
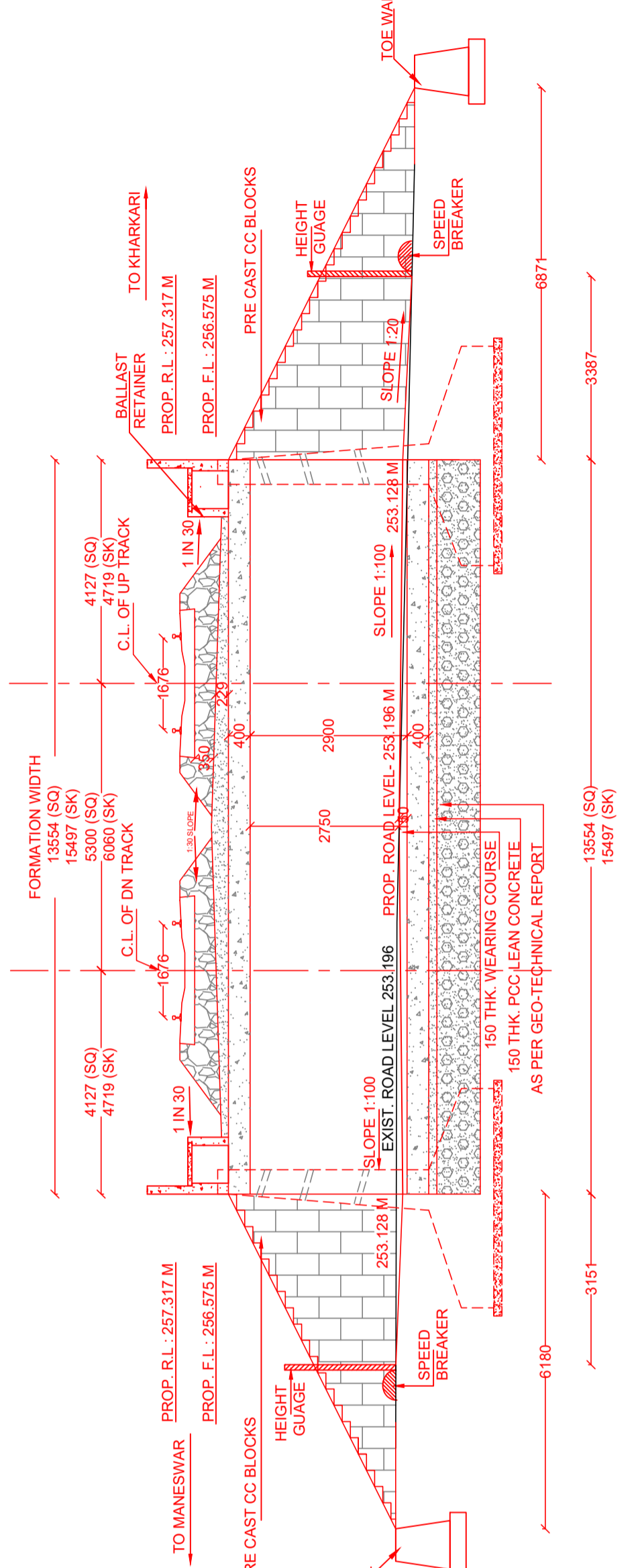
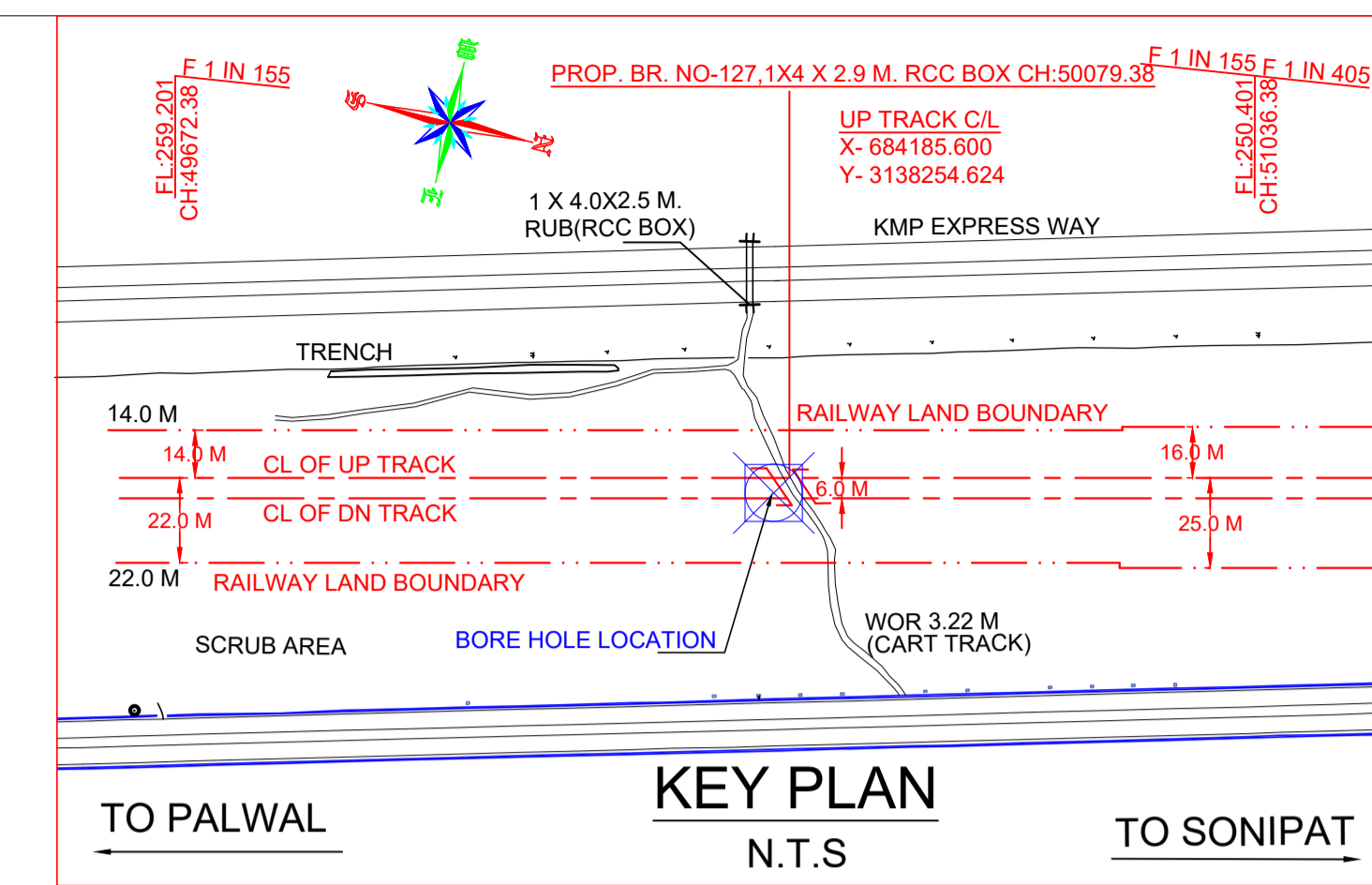
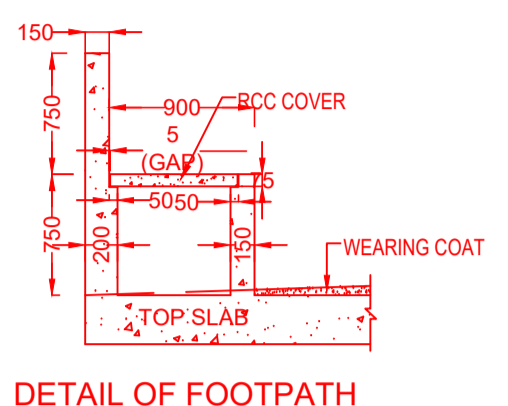
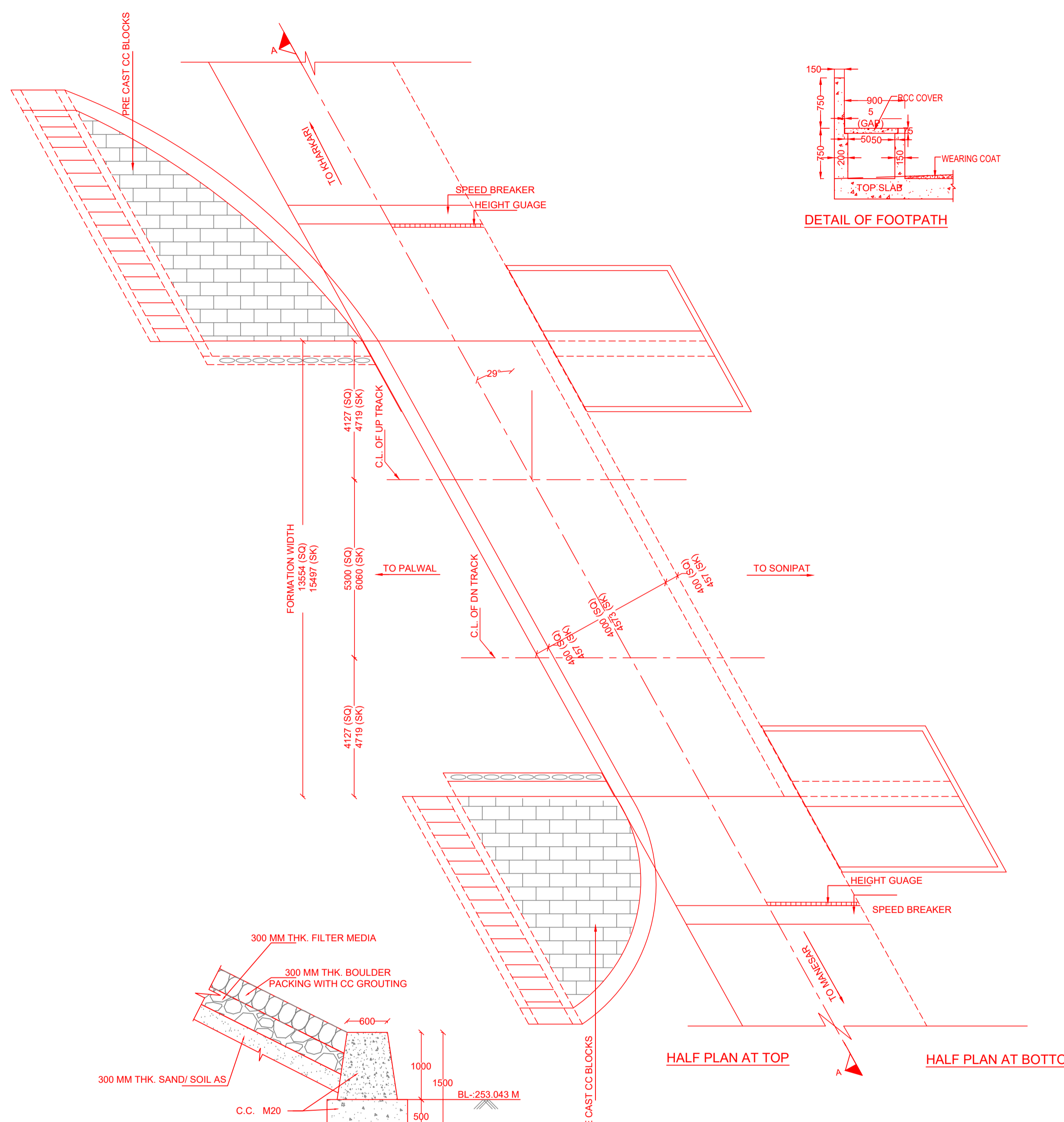


- NOTES :-
- EXISTING WORK SHOWN IN BLACK.
 - PROPOSED WORK SHOWN IN RED.
 - ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE SPECIFIED.
 - CHAINAGE IS RECKONED 0.00 FROM C.L. OF NEW PRITHLA STATION BUILDING.
 - RAIL LEVEL SHOULD BE 0.742m ABOVE FORMATION LEVEL FOR TRACK STRUCTURE.
 - 60KG NEW RAIL ON PSC SLEEPER (166/M) WITH 35mm BALLAST CUSHION.
 - RULLING GRADIENT IS 1 IN 150 OF THIS SECTION (COMPENSATED).
 - VERTICAL CURVE WILL BE PROVIDED AS PER IRPWPM PARA 419.
 - CROSS / LONGITUDINAL DRAINAGE ARRANGEMENT BET TRACK SHOULD BE PROVIDED WHEREVER REQUIRED.
 - TROLLEY REFUGE IN BANK / CUTTING SHALL BE PROVIDED AS PER PROVISION OF IRPWPM.
 - CRS SANCTION WILL BE OBTAINED BEFORE EXECUTION OF WORK FALLING UNDER PARA 130(2) OF IRPWPM.
 - STANDARD OF LOADING (FOR PROP. LINE) - 32.5 T LOADING-2008 & HIGH RISE OHE.
 - TELEPHONE CABLE TO BE LAID FOR TELECOMMUNICATION.

RETAINING WALL					
CONNECTING LINE					
From Ch.	To Ch.	Height Of Retaining Wall (m)	Length (m)	From Ch.	To Ch.
2884	2934	6	40	2918	3038
2934	3034	3	260	3038	3038
1342	1374	6	100	3240	3240
3246	3260	1.5	475	4000	4000
3260	3269	4.5	140	4000	4000
3009	3009	1.5	180	4300	4300
4009	4009	2.5	230	4350	4350
4016	4016	1.5	80		
Total Length			1495	Total Length	
				1075	

LEGEND	
EXISTING CENTRE LINE	—
PROPOSED CENTRE LINE	—
EXISTING TPTIC	—
PROPOSED TPTIC	—
TBM	—
KM-STONE	—
RAILWAY BOUNDARY	—
EXISTING BRIDGE	—
PROPOSED BRIDGE	—
NALA/CANAL/DRAIN	—
PERMANENT STRUCTURE	—
TEMPORARY STRUCTURE	—
PROPOSED GATE LOCK	—
LAND ACQUISITION	—
ROAD	—
POWER LINE WITH POLE	—
PYLON	—
EMBANKMENT / BUND	—
ROCKY AREA	—
COMPOUND WALL	—
DITCH / QUARRY	—
BARBED WIRE FENCING	—
GROUND LEVEL	—

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION
 HARYANA ORBITAL RAIL CORRIDOR
 GAUGE 1676 mm LENGTH 6 KM
 YEAR OF SURVEY 2020
 STANDARD OF CONSTRUCTION GROUP-A
 DETAILED PLAN AND LONGITUDINAL SECTION
 FROM CHAINAGE 0 TO CHAINAGE 5720 M (CONNECTIVITY LINE)
 HORIZONTAL 1:500 VERTICAL 1:500
 S.M. CONSULTANTS
 AN ISO 9001 Company
 RELEASED FOR PRELIMINARY APPROVAL TENDER CONSTRUCTION



- NOTES:**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRDC.
 - ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRDC AND FOR EXCLUSIVE USE OF HORC.

- B) TECHNICAL NOTES:**
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR DETAILS OF R.C.C BOX DETAILED DESIGN TO BE FOLLOWED.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES:
 - IRS BRIDGE RULE
 - IRS CONCRETE BRIDGE CODE
 - IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE- IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.4kg K.G/SQ.M.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE:
 - ALL RCC = M-35/DETAILED DESIGN DRG.
 - WEARING COURSE = M-20/DETAILED DESIGN DRG.
 - LEVELING COURSE/LEAN CONCRETE = M-20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE (FP) AND SAFE BEARING CAPACITY (SBC)
 - FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
 - FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER G1 REPORT.
 - IF BEARING CAPACITY AT SITE IS INADEQUATE, SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.



TRACK DETAILS

PROP R.L	257.317 M
PROP F.L	256.575 M
PROP RD.L	253.196 M
VERTICAL ALIGNMENT	150 F
HORIZONTAL ALIGNMENT	STRAIGHT

CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRDL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK.	THICKNESS
ERL	EXISTING ROAD LEVEL

LONGITUDINAL SECTION OF THE ROAD
NOT TO SCALE

CHAINAGES	80.000	60.000	40.000	20.000	0.000	8.161	20.000	40.000	60.000
PROP. ROAD LEVEL					253.196	253.114	252.254		
EXIST. ROAD LEVEL	253.186	253.461	253.253	253.212	253.196	253.028	252.725	252.651	252.814

BOREHOLE DETAILS

Br. No. 127									
0.00	G.L. 253.182	N VALUE	Classification as per LS	BH-1					
1.00		49	SM	SANDY SOIL					
2.50			SM						
4.00		36	SM						
5.50			SP-SM						
7.00		98	SM						

GC/HORC

SUDHIR AGRAWAL	DDP/CIVIL
REETU PATIAL	RE-CIVIL/DESIGN
PUSHPENDRA KUMAR SINGH	ARE-CIVIL/DESIGN

HRDC

SHIV OM DAVEDI	CPM/HRDC
UMAM. CHO	DGM/C-1
VIREET GUMBER	EXECUTIVE/CIVIL

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRDC)

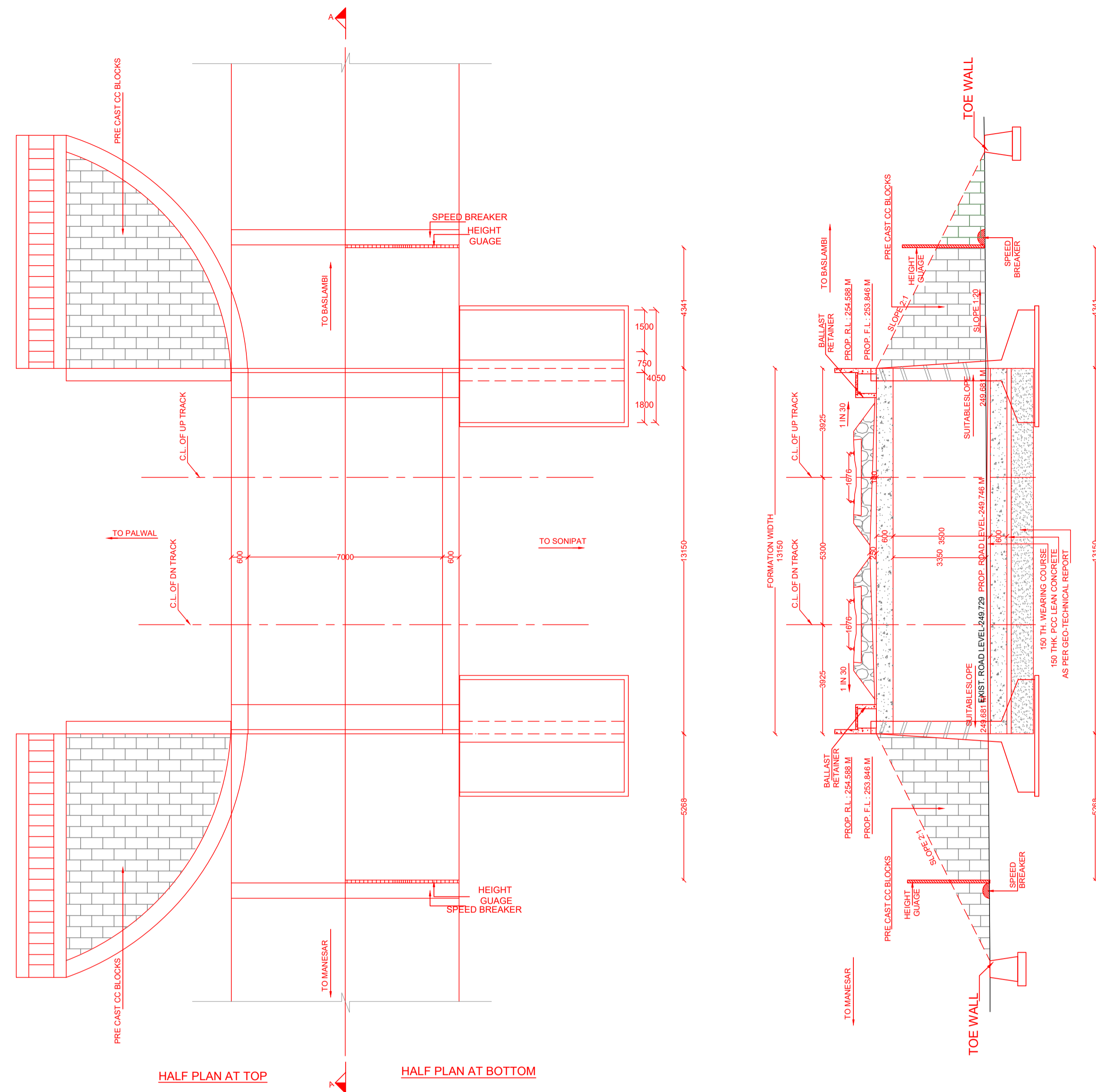
Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

GENERAL ARRANGEMENT DRAWING
FOR ROAD UNDER BRIDGE NO - 127, 1X4.0X2.9M RCC BOX, AT CH: 50079.38 M

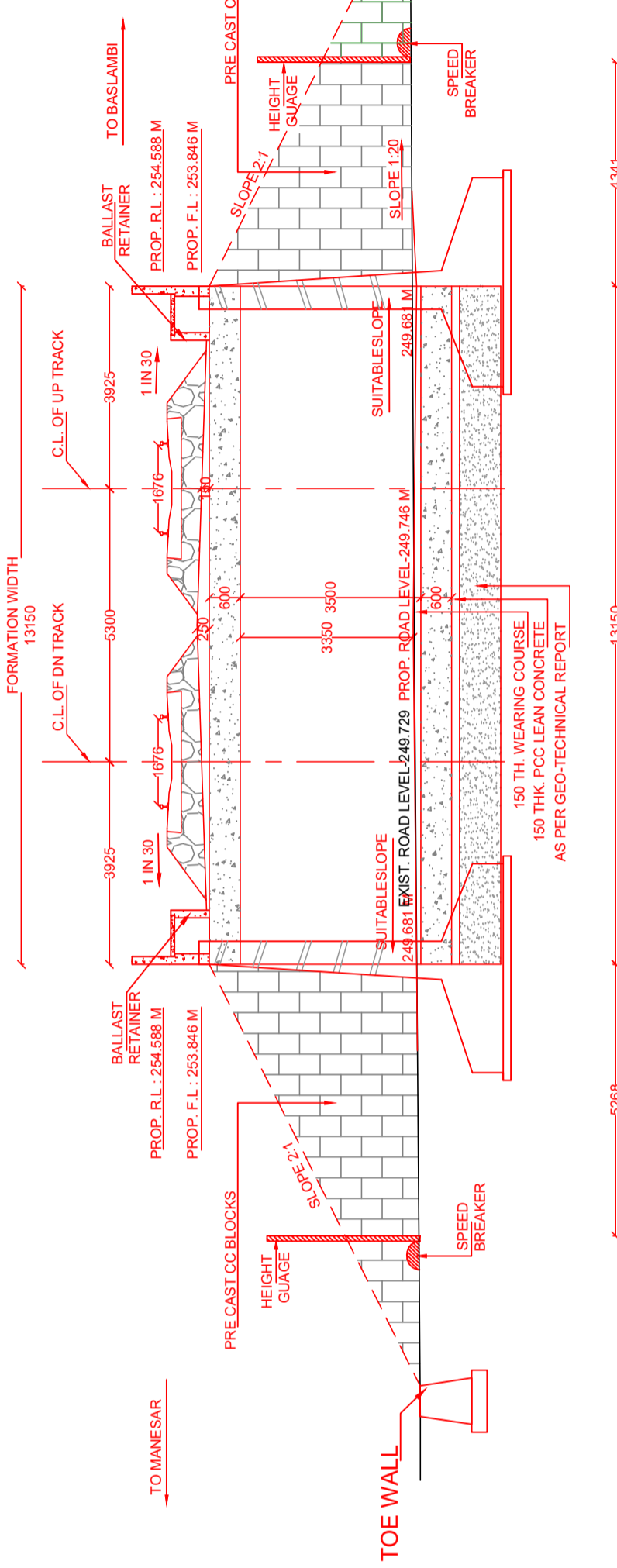
SCALE: N.T.S DRAWING NO- HRDC/PS/BR/GAD-1

S.M.C.
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcindia.com , E-Mail : support@smcindia.com

R. K. DAS	M. NAYAK	A. A. SAMANT	PROJECT INCHARGE
DRAWN BY	CHECKED BY	YEAR OF SURVEY	P. SIZE
RELEASED FOR	PRELIMINARY FOR APPROVAL	TENDER	CONSTRUCTION



SECTION ELEVATION AT A-A



X-684055.199
Y-3138655.380

Br. No. 128

0.00 G.L. - 249.659	N VALUE	Classification as per IS	BH-1
1.00	52	SP-SM	SANDY SOIL WITH GRAVEL
2.50		SM	
4.00	51	SM	
5.50		SP-SM	
7.00	>110	SP-SM	
8.50		SM	
10.00	>90	SM	
12.00			

BOREHOLE DETAILS

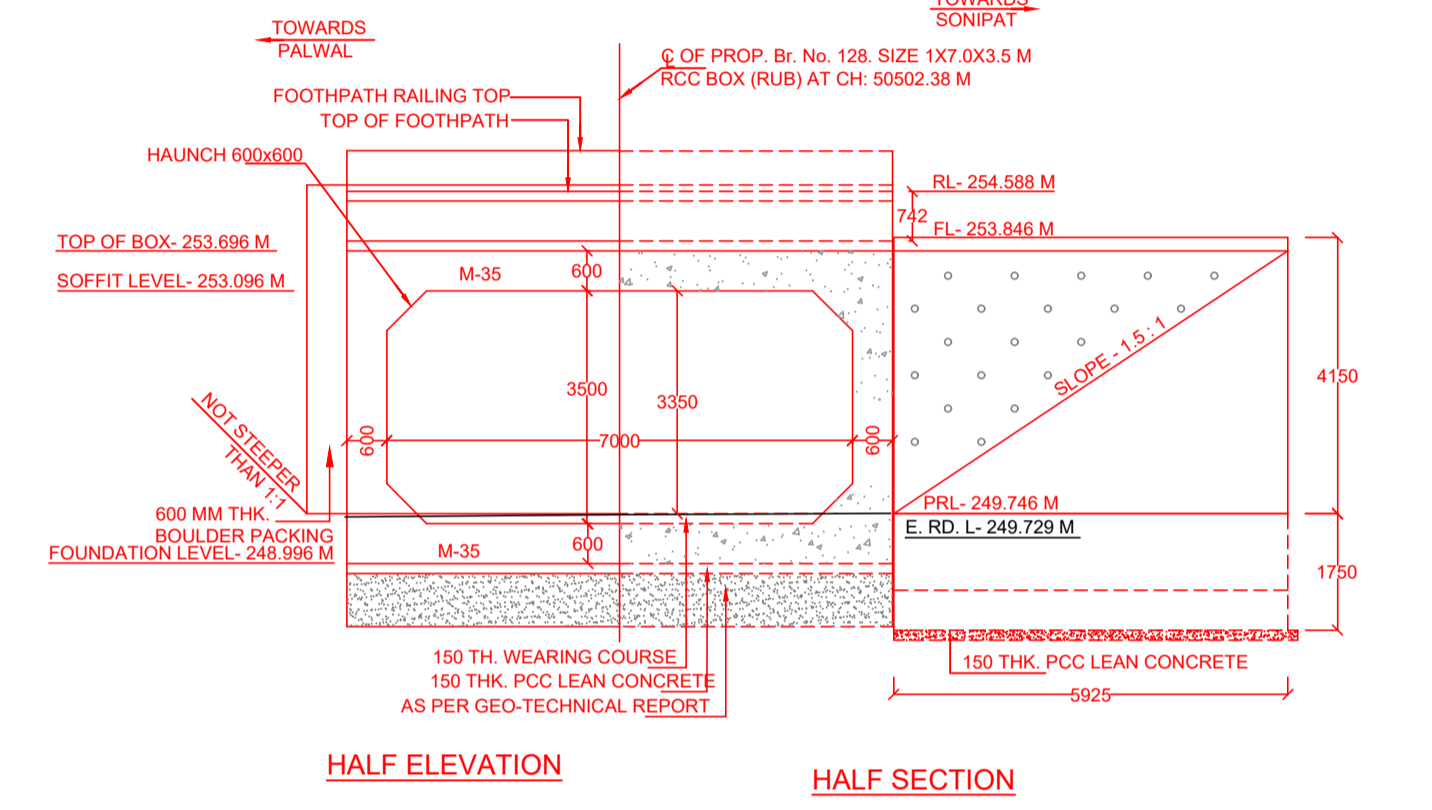
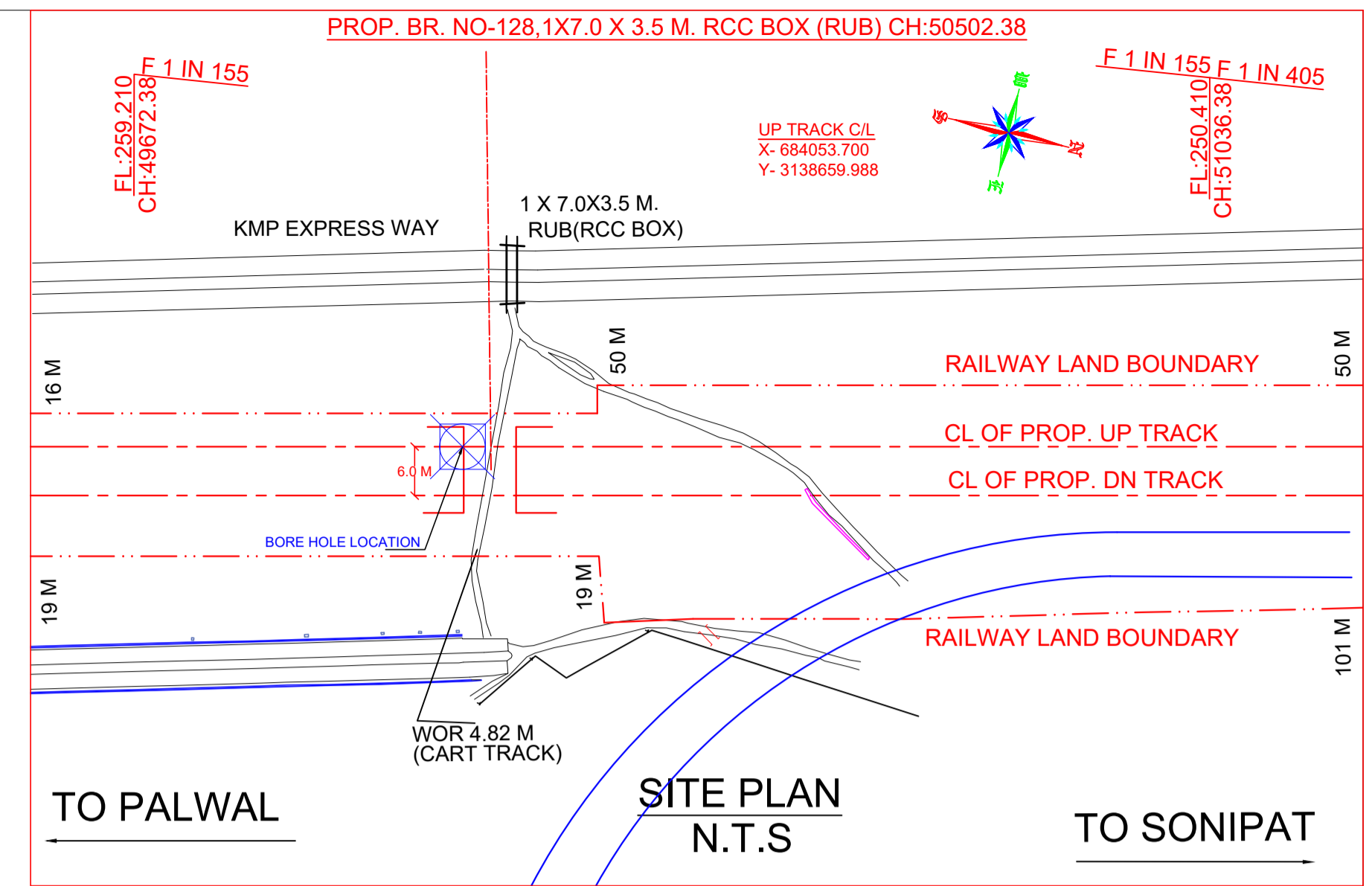
DATUM : 240

TOWARDS MANESAR

TOWARDS BASLAMBI

PROP. ROAD LEVEL	GROUND LEVELS	CHAINAGES
249.731	249.170	60.000
249.315	249.547	40.000
249.881	249.729	32.346
249.746	249.783	20.000
249.881	249.864	6.925
249.881	249.874	0.00
249.881	249.877	6.925
249.888	249.888	20.000
249.889	249.889	40.000
249.834	249.834	60.000
		80.000
		100.000

LONGITUDINAL SECTION OF THE ROAD
NOT TO SCALE



CONSTRUCTION DEPTH

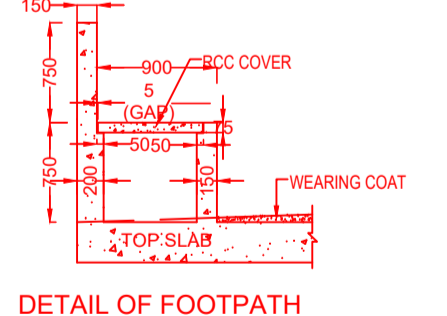
1) RAIL (60g)	172 mm
2) RUBBER PAD	10 mm
3) PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

TRACK DETAILS

PROP R.L	254.588 M
PROP F.L	253.846 M
VERTICAL ALIGNMENT	155 F
HORIZONTAL ALIGNMENT	STRAIGHT

LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK	THICKNESS
ERL	EXISTING ROAD LEVEL



- NOTES :
- A) GENERAL NOTES
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRIDC.
 - ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES :
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - THIS DRAWING IS ONLY TENTATIVE AND SUBJECT TO CHANGE AS PER DETAILED DESIGN.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
 - IRS BRIDGE RULE
 - IRS CONCRETE BRIDGE CODE
 - IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE-IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G./SQM.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE. GRADE OF CONCRETE :
 - ALL RCC =M:35/DETAILED DESIGN DRG.
 - WEARING COURSE =M:20/DETAILED DESIGN DRG.
 - LEVELING COURSE/LEAN CONCRETE =M:20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE(FP) AND SAFE BEARING CAPACITY(SBC)
 - FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
 - FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
 - IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

GC/HORC

SUDHIR AGRAWAL DPO/HRIDC	
REETU PRITAL RE-CIVIL/DESIGN	
PURHENDRA KUMAR SINGH PRE-CIVIL/DESIGN	

HRIDC

SHYAM DAVVEDI CPA/HRIDC	
Uma.n. CHO DGM/C-1	
VIJAY KUMAR EXECUTIVE/CIVIL	

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

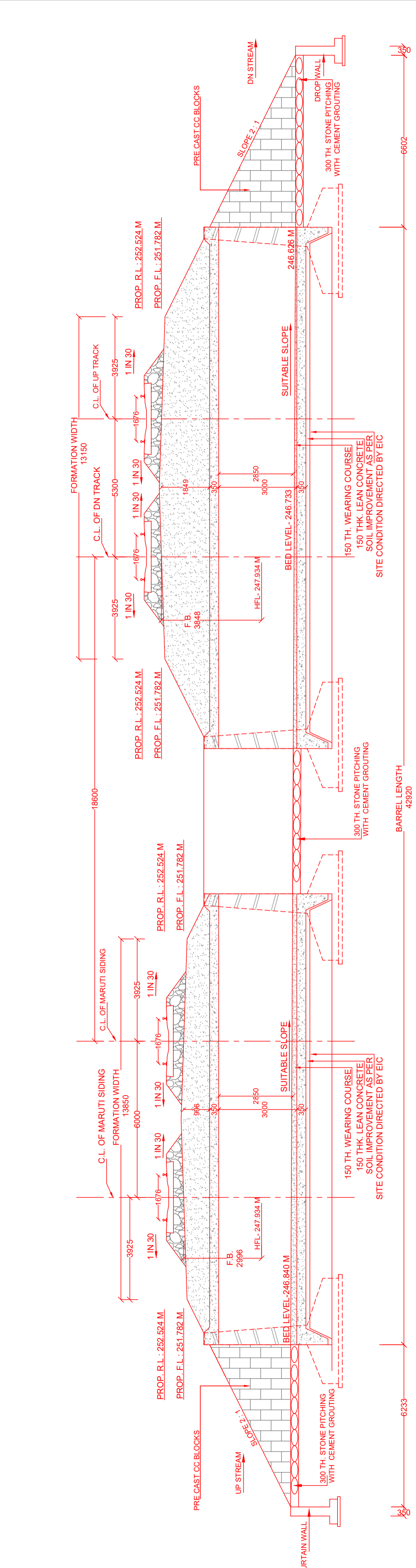
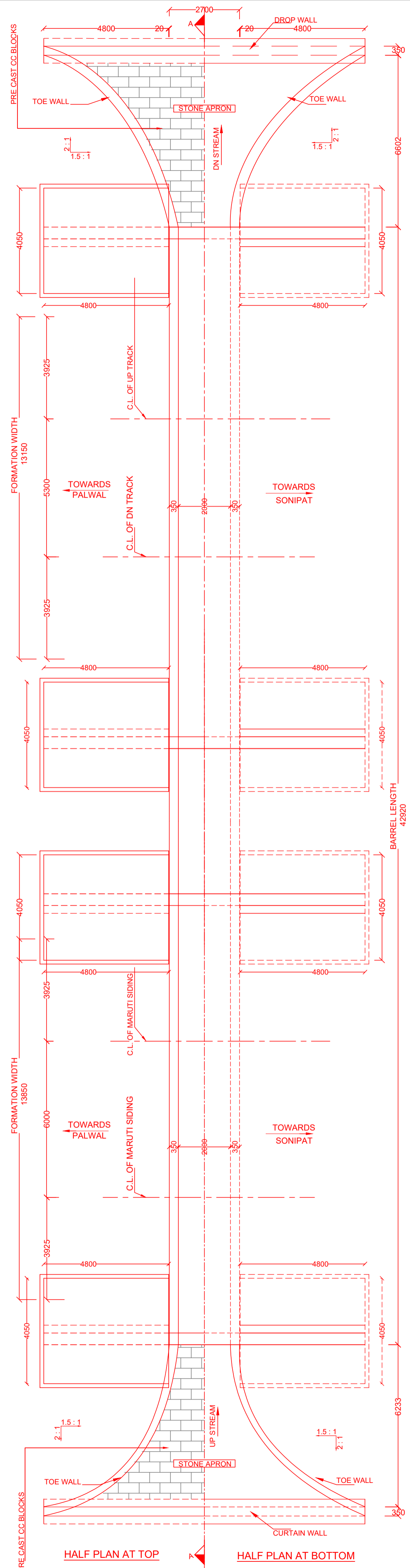
GENERAL ARRANGEMENT DRAWING
FOR ROAD UNDER BRIDGE NO.- 128,
1X7.0X3.5M RCC BOX, AT CH:50502.38 M

SCALE: N.T.S | DRAWING NO- HRIDC/PS/BR/GAD-2

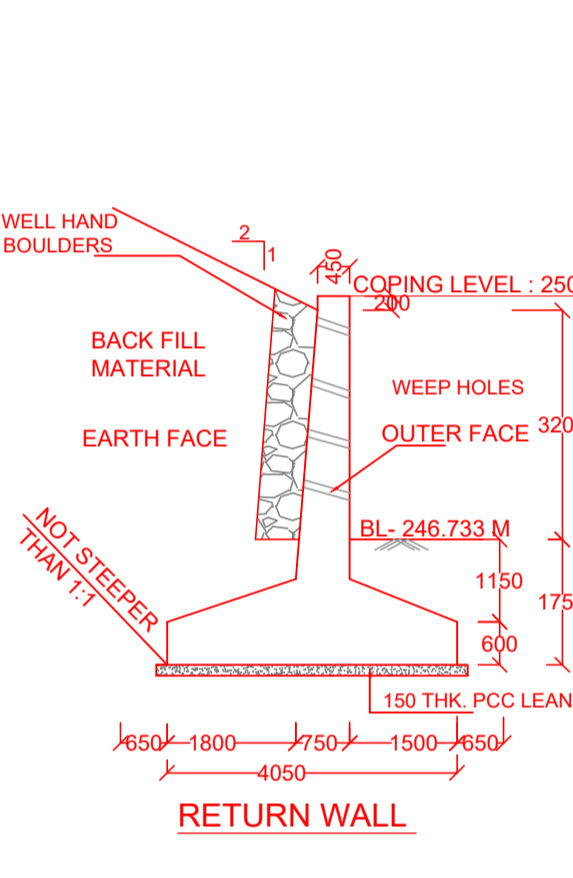
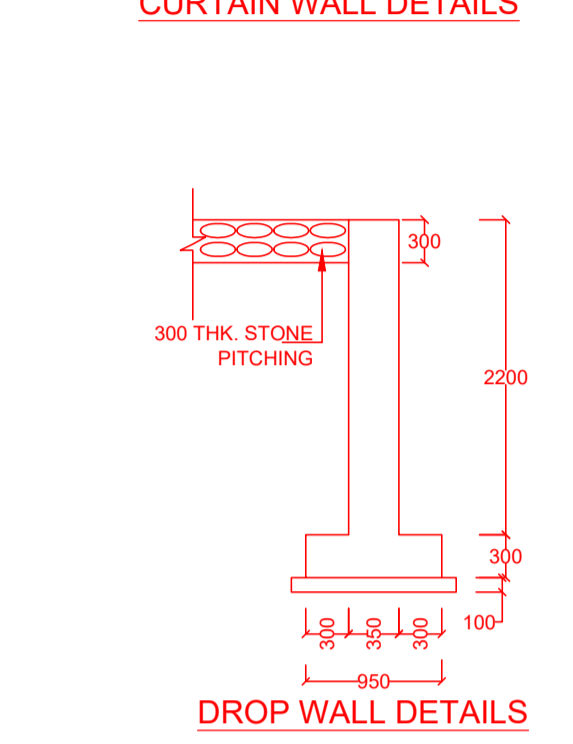
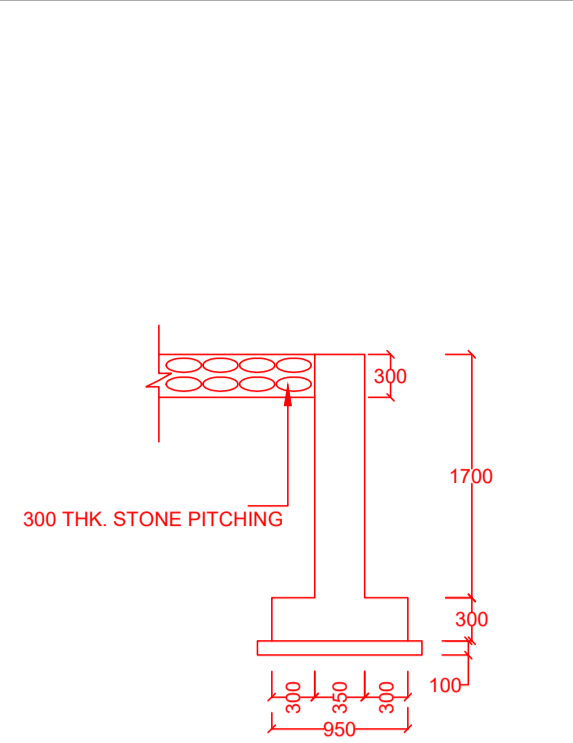
S.M.C. S.M. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcindia.com , E-Mail : support@smcindia.com

R. K. DAS	M. NAYAK	2020-2021	A1
DRAWN BY	CHECKED BY	YEAR OF SURVEY	P. SIZE
REVISION	REVISION	REVISION	REVISION

RELEASED FOR: PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION



SECTION ELEVATION AT X-Y



X-683954.664
Y-3138964.352

Br. No. 129			
0.00	G.L. - 246.527	N VALUE	Classification as per LS
1.00	47		BH-1 SW
2.50			GRAVEL
4.00	>50		ROCK
5.00			
6.00			

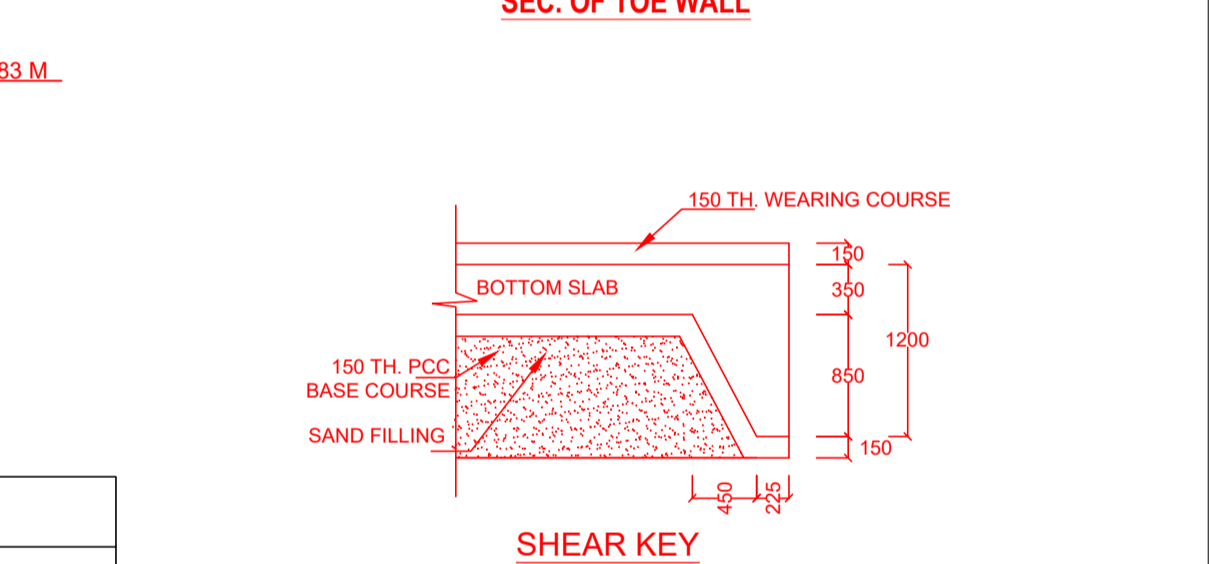
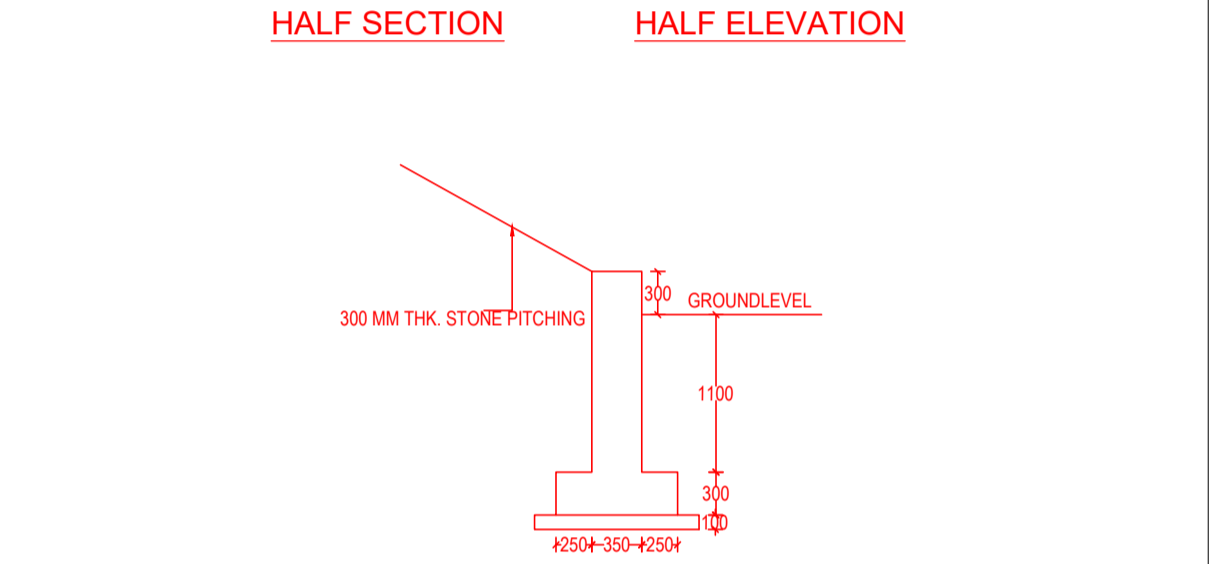
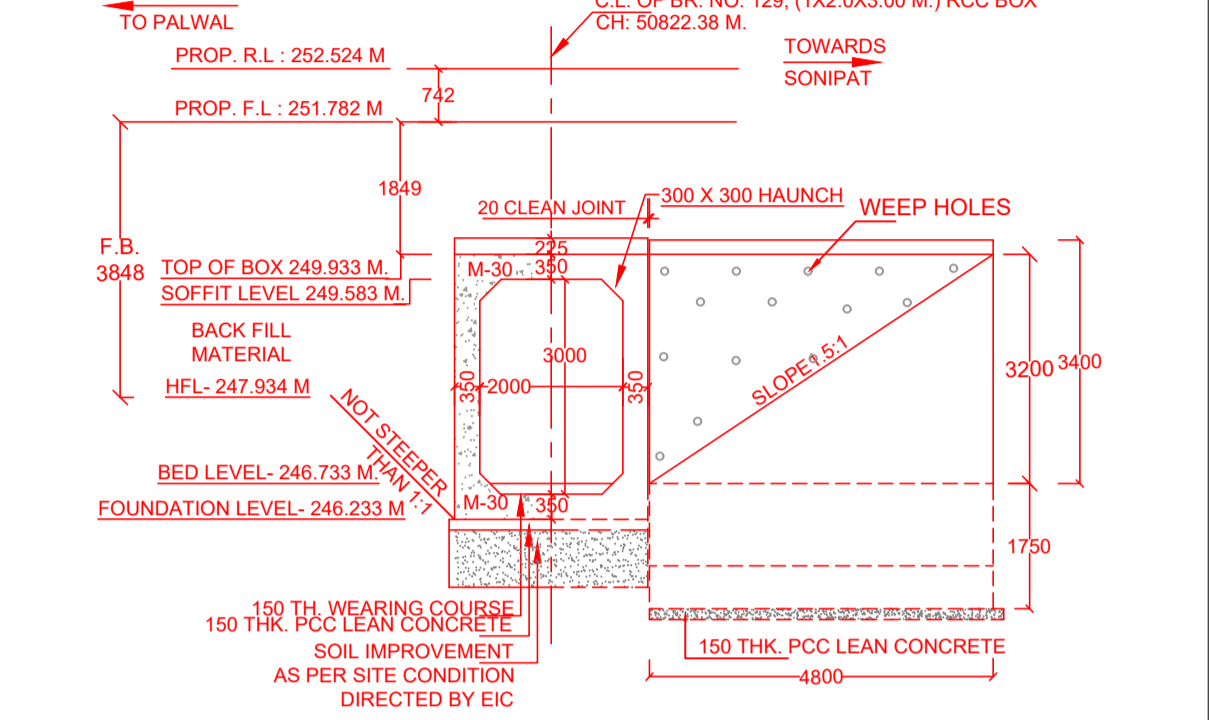
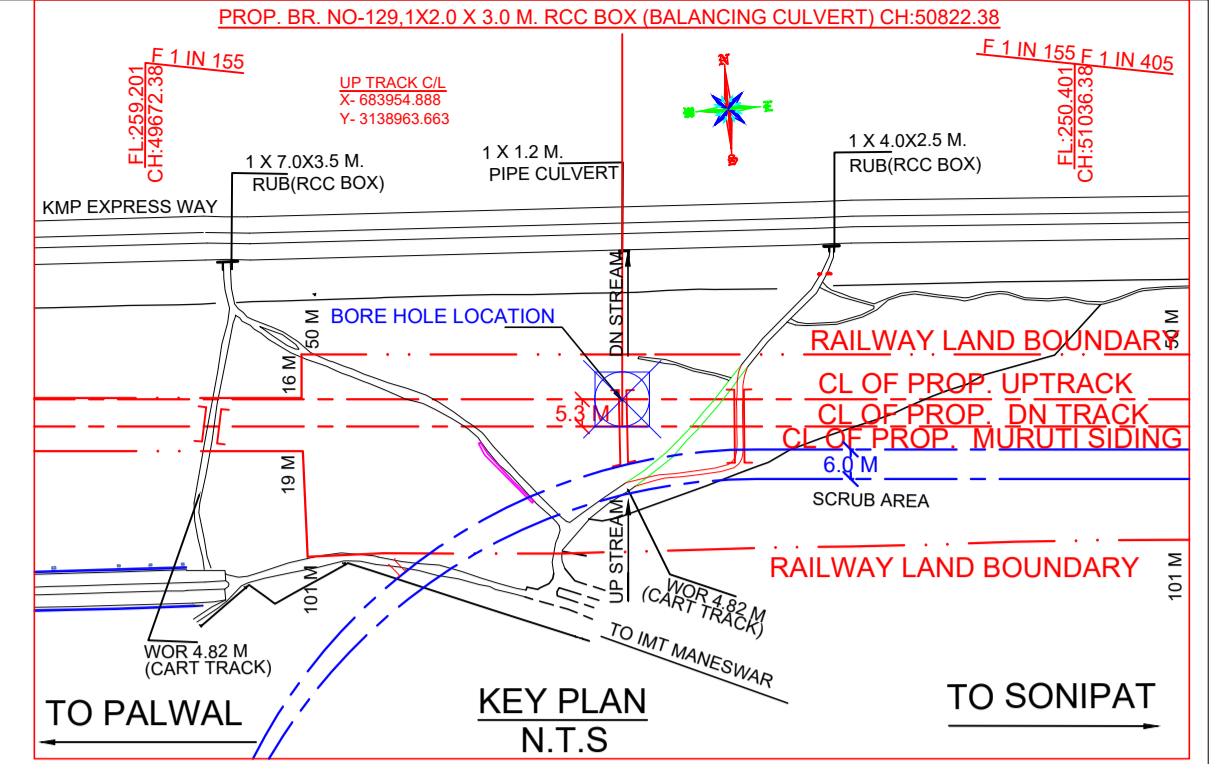
CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

TRACK DETAILS

PROP R.L.	252.524 M
PROP F.L.	251.782 M
PROP B.L.	246.733 M
HFL	247.934 M
FREE BOARD	3.848 M
VERTICAL ALIGNMENT	F 155
HORIZONTAL ALIGNMENT	STRAIGHT

GC/HORC		HRDC	
Subir Agrawal DPO/HRDC		Shiv Anand CPM/HRDC	
REETU PRITHI EG-CIVIL/DESIGN		Uma Ch Dentel-1	
Pushpendra Kumar Singh ARE-CIVIL/DESIGN		Vijay Kumar EXECUTIVE/HRDC	



LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
HFL	HIGHEST FLOOD LEVEL
GL	GROUND LEVEL
BL	BED LEVEL
CL	CENTER LINE
THK.	THICKNESS
F.B	FREE BOARD

TRACK DETAILS

PROP R.L.	252.524 M
PROP F.L.	251.782 M
PROP B.L.	246.733 M
HFL	247.934 M
FREE BOARD	3.848 M
VERTICAL ALIGNMENT	F 155
HORIZONTAL ALIGNMENT	STRAIGHT

GC/HORC		HRDC	
Subir Agrawal DPO/HRDC		Shiv Anand CPM/HRDC	
REETU PRITHI EG-CIVIL/DESIGN		Uma Ch Dentel-1	
Pushpendra Kumar Singh ARE-CIVIL/DESIGN		Vijay Kumar EXECUTIVE/HRDC	

- NOTES:
- A) GENERAL NOTES:
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/I OF PRITHALA STATION BUILDING TAKEN AS 0.00 M WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - THIS IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRDC.
 - ENGINEER IN CHARGE SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL, FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTION TO PREVENT DAMAGE OF S&T CABLE (O/R) DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SEIS/SIGADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES:
- WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THIS DRAWING.
 - FOR DETAILS OF RCC BOX DETAILED DESIGN TO BE FOLLOWED.
 - PROTECTION WORK SUCH AS PITCHING, CURTAIN WALL, DROP WALL ETC. SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES:
 - (i) IRS BRIDGE RULE
 - (ii) IRS CONCRETE BRIDGE CODE
 - (iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - (iv) SEISMIC ZONES IV
 - EXPOSURE CONDITION-MODERATE
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST.
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - WEEP HOLES SHALL BE OF 100 MM DIA PVC PIPES STAGGERED @ 1000 MM C/C HORIZONTALLY AND VERTICALLY ABOVE LOW WATER LEVEL IN RETURN WALL.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1464 K.G/SQM.
 - REINFORCEMENT SHALL BE P6 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE:
 - (i) ALL RCC WORKS = M-30/DETAILED DESIGN DRG.
 - (ii) WEARING COURSE = M-20/DETAILED DESIGN DRG.
 - (iii) LEVELLING COURSE/LEAN CONCRETE = M-20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE (FP) AND SAFE BEARING CAPACITY (SBC)
 - a. FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
 - b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
 - c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRDC)

Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

GENERAL ARRANGEMENT DRAWING
FOR BRIDGE NO - 129, 1X2.0X3.0M RCC BOX (BALANCING CULVERT), AT CH:50822.38 M

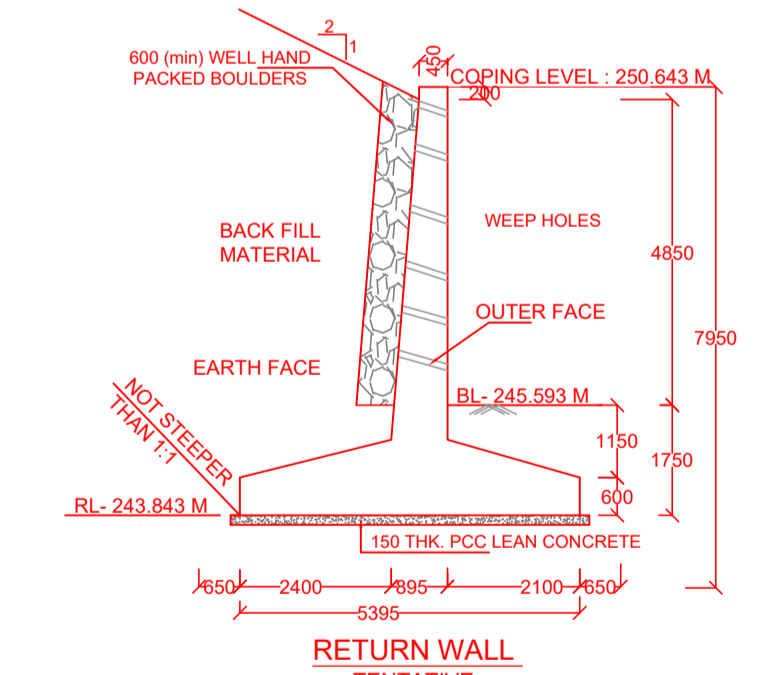
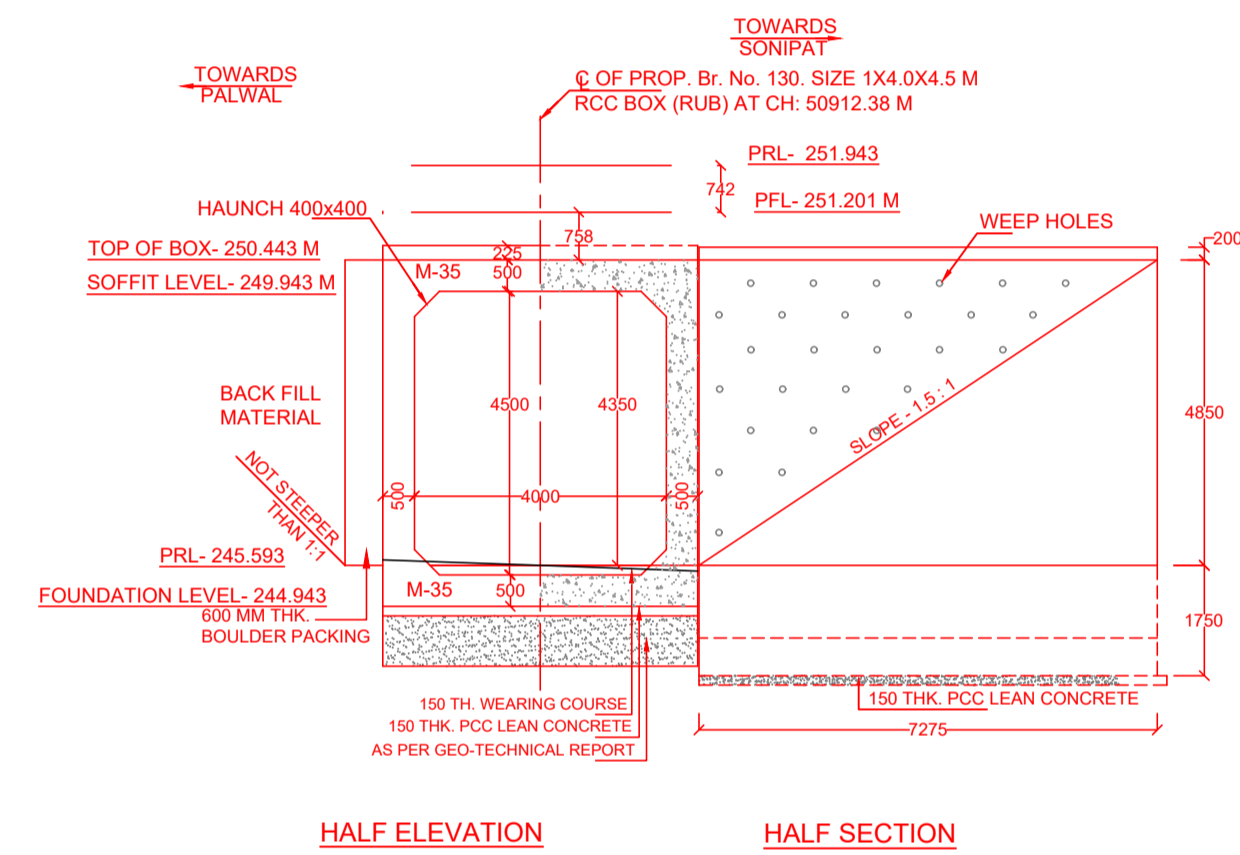
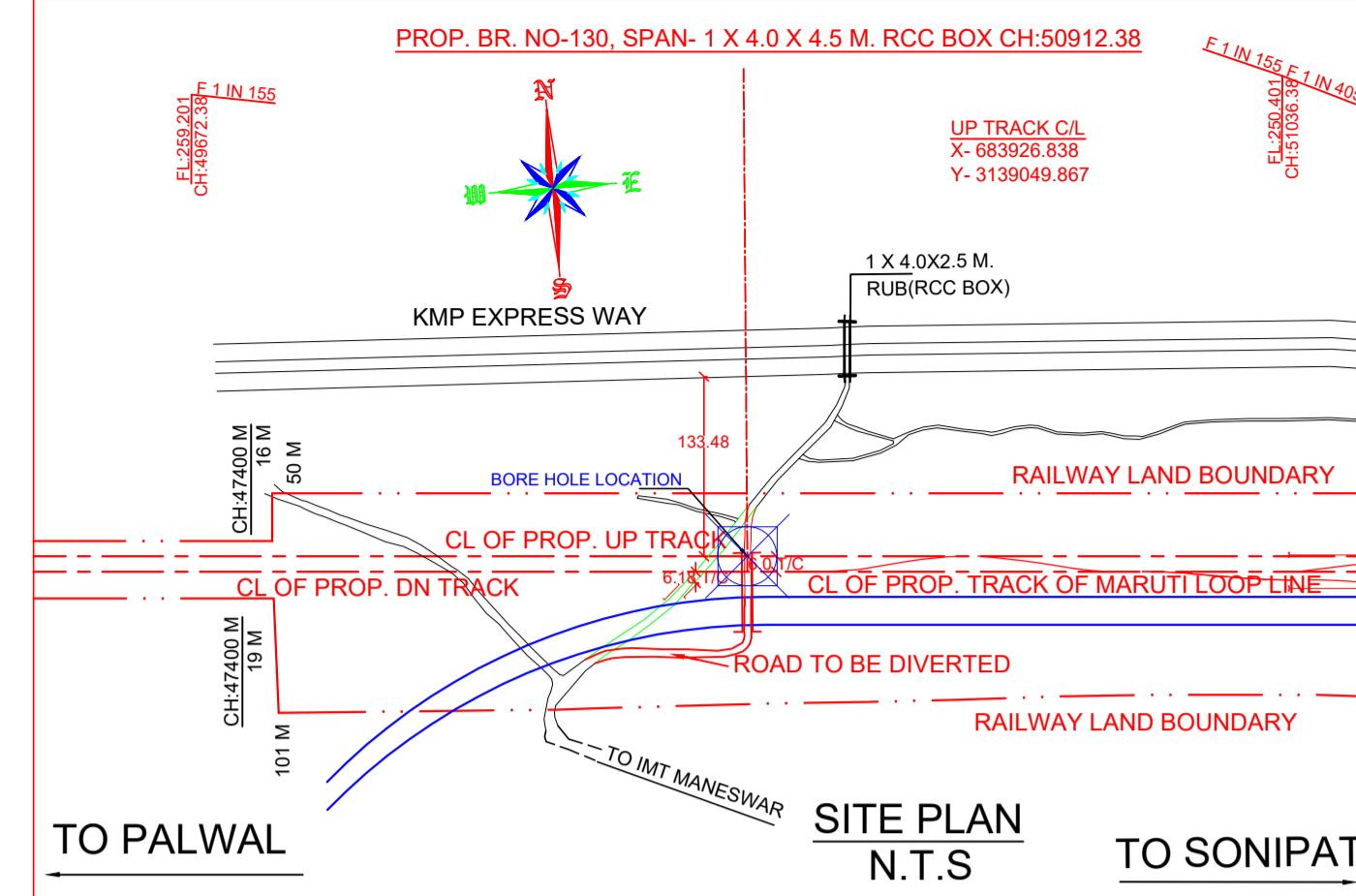
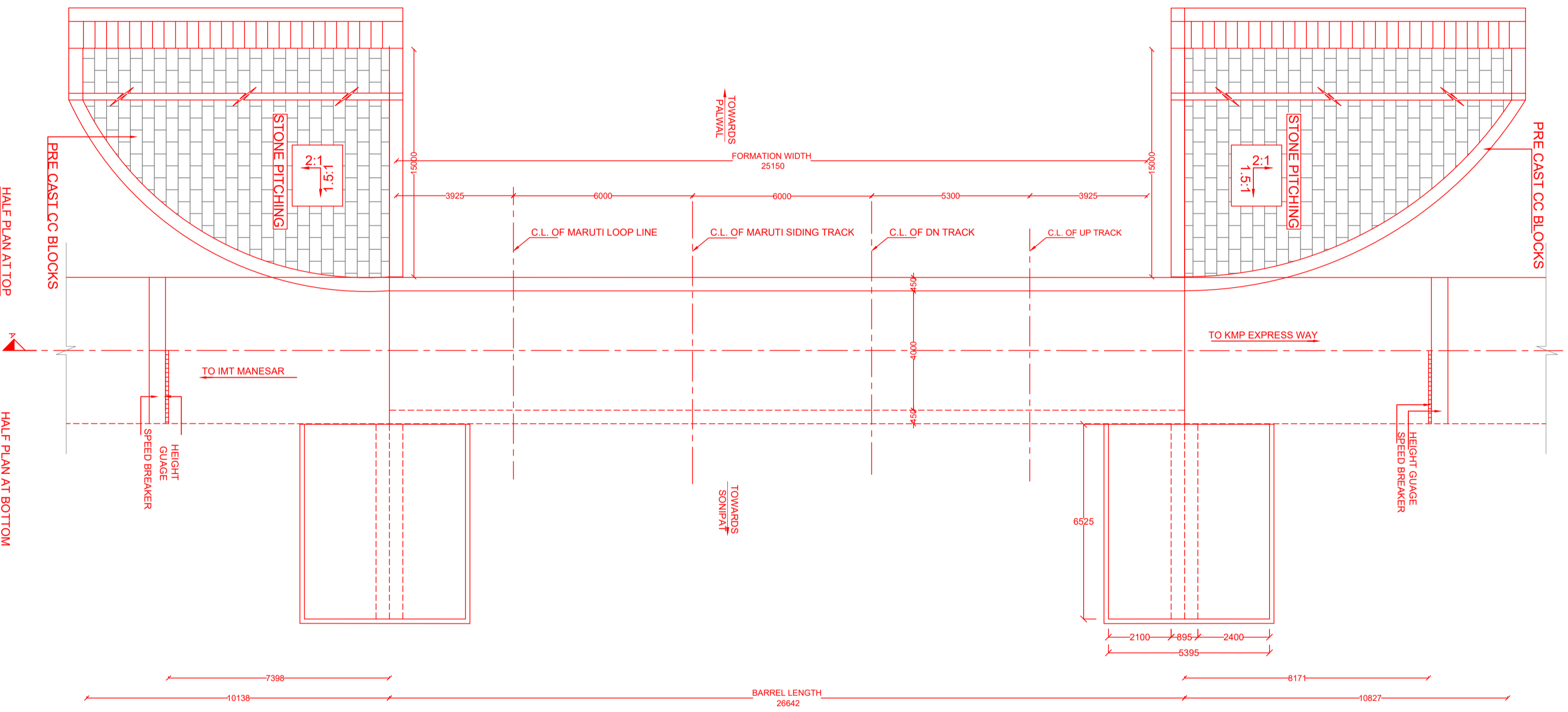
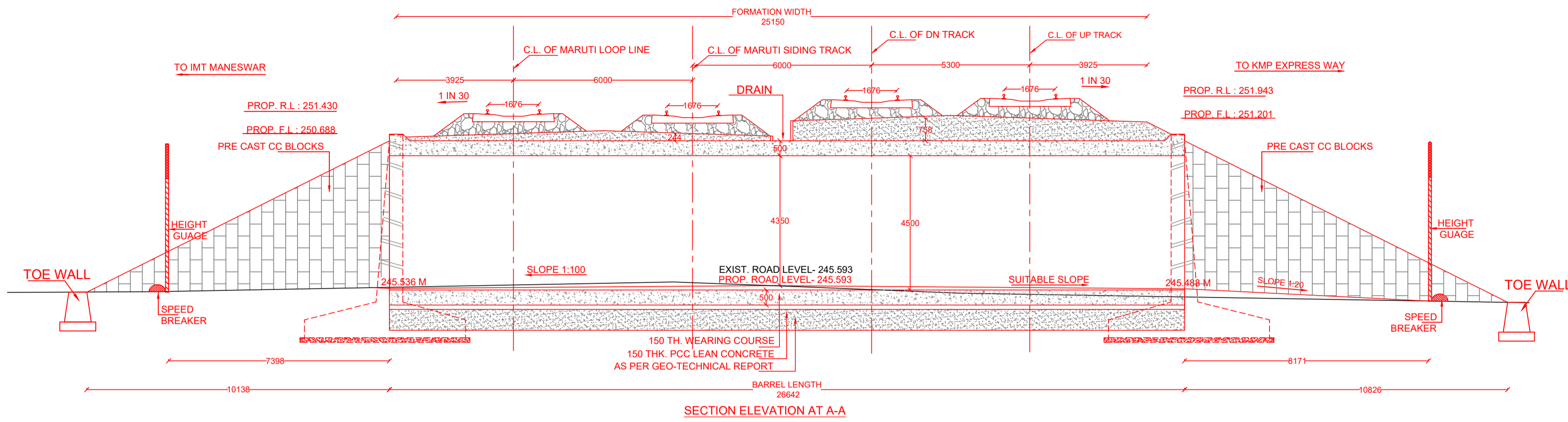
SCALE: N.T.S DRAWING NO: HRDC/PS/BR/GAD-3

S.M.C. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcindia.com , E-Mail : support@smcindia.com

R. K. DAS PROJECT INCHARGE
M. NAYAK PROJECT INCHARGE

2020-2021 A1
DRAWN BY CHECKED BY YEAR OF SURVEY P. SIZE REVISION

RELEASED FOR PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION



- NOTES :**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRDC.
 - ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES**
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR DETAILS OF RCC BOX REFER RDSO DRG. NO- 10157 & 10157/2.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
(i) IRS BRIDGE RULE
(ii) IRS CONCRETE BRIDGE CODE
(iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE- IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQ.M.
 - REINFORCEMENT SHALL BE Fe 500D (TM7) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE :
(i) ALL RCC =M.35/DETAILED DESIGN DRG.
(ii) WEARING COURSE =M.20/DETAILED DESIGN DRG.
(iii) LEVELING COURSE/LEAN CONCRETE =M.20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE(FP) AND SAFE BEARING CAPACITY(SBC)
a. FOR BOX & RETURN WALL -PLEASE REFER DETAILED DESIGN DRAWING.
b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK	THICKNESS
ERL	EXISTING ROAD LEVEL

CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

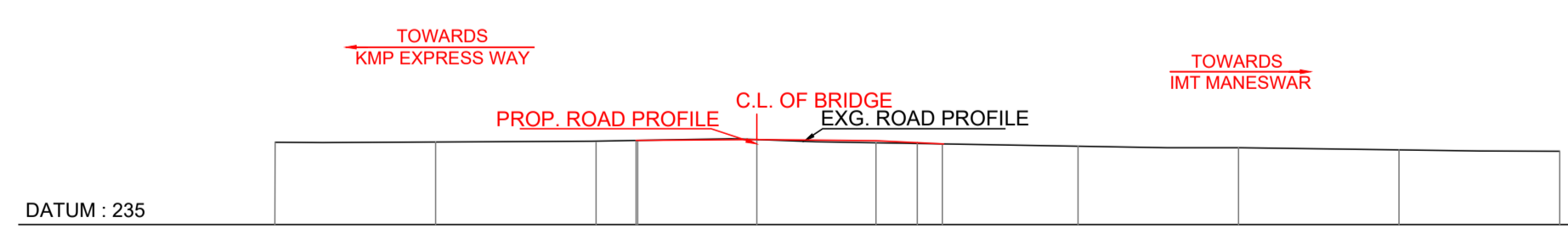
TRACK DETAILS

PROP R.L	251.943 M
PROP F.L	251.201 M
VERTICAL ALIGNMENT	F 155
HORIZONTAL ALIGNMENT	STRAIGHT

X-683026.816
Y-33132049.935

Br. No. 130

G.L	-245.810	N VALUE	34	Classification as per LS	BH-1
1.00				SP-SM	SANDY SOIL
2.50				SP-SM	
4.00			>100	SP-SM	ROCK
5.50					
7.00					



PROP. ROAD LEVEL	245.247	245.282	245.385	245.385	245.593	245.475	245.218	245.003	244.778	244.564	244.295	244.144
EXIST. ROAD LEVEL			245.385	245.488	245.593	245.475	245.218	245.003				
CHAINAGES	60.000	40.000	20.000	14.833	0.000	14.833	20.000	22.363	40.000	60.000	80.000	100.000

LONGITUDINAL SECTION OF THE ROAD
NOT TO SCALE

GC/HORC

SUDHA AGRAWAL RDS/CIVIL	
REETO PRITHAL RDS-CIVIL DESIGN	
PUNJENDRA KUMAR SINGH RDS-CIVIL DESIGN	

HRDC

SHYAM DAVEJI CIVIL/HRDC	
UNAK CHA BRIDGE-I	
VIJAY KUMAR RDS/CIVIL	

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRDC)

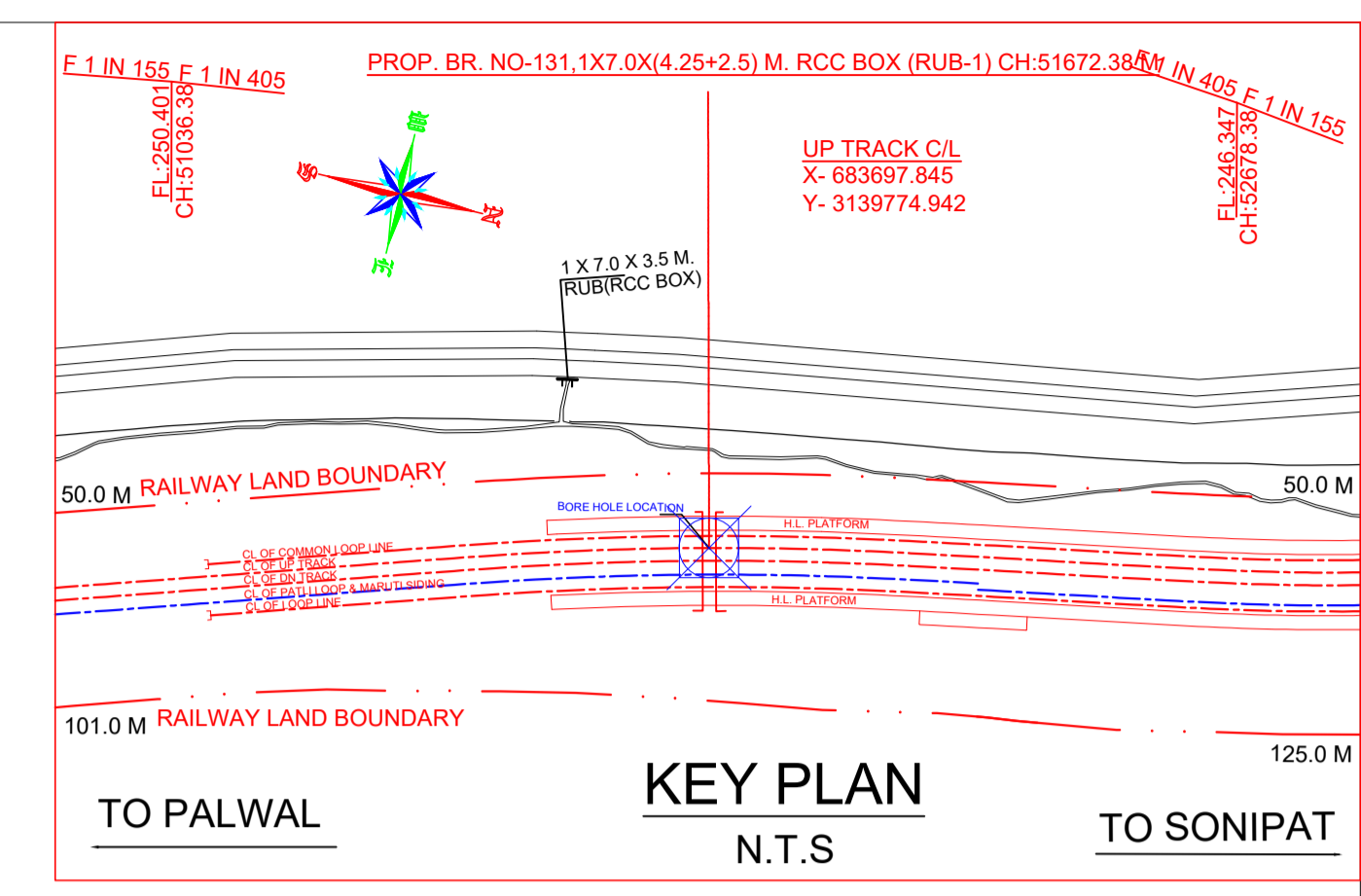
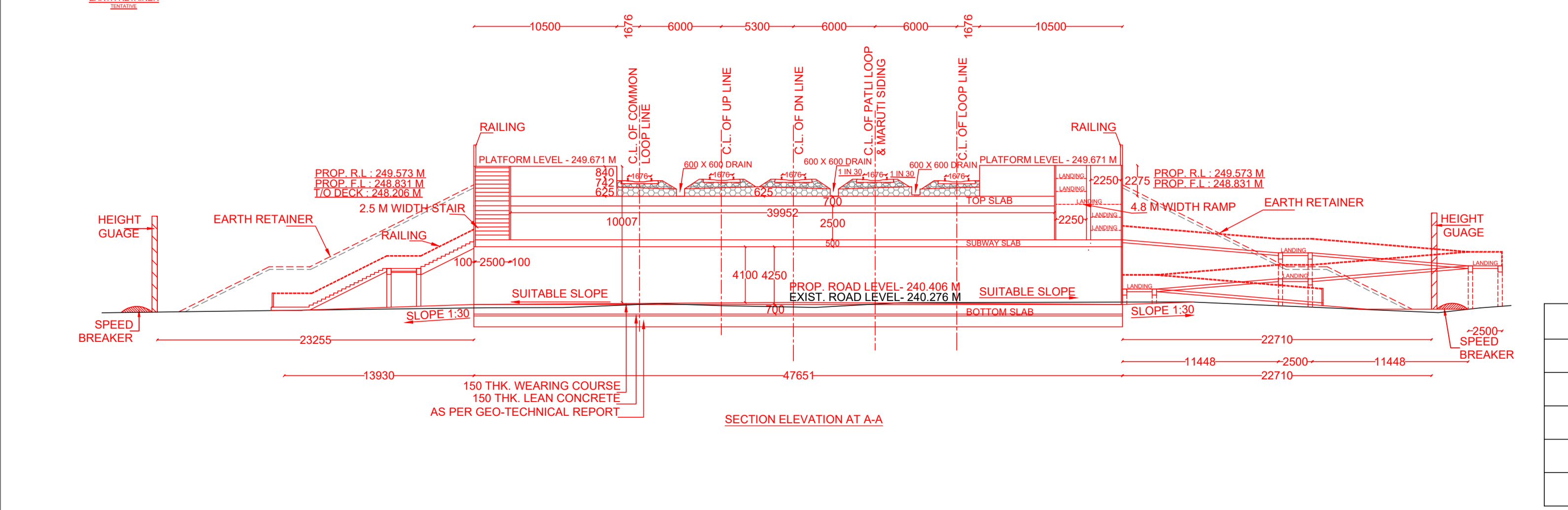
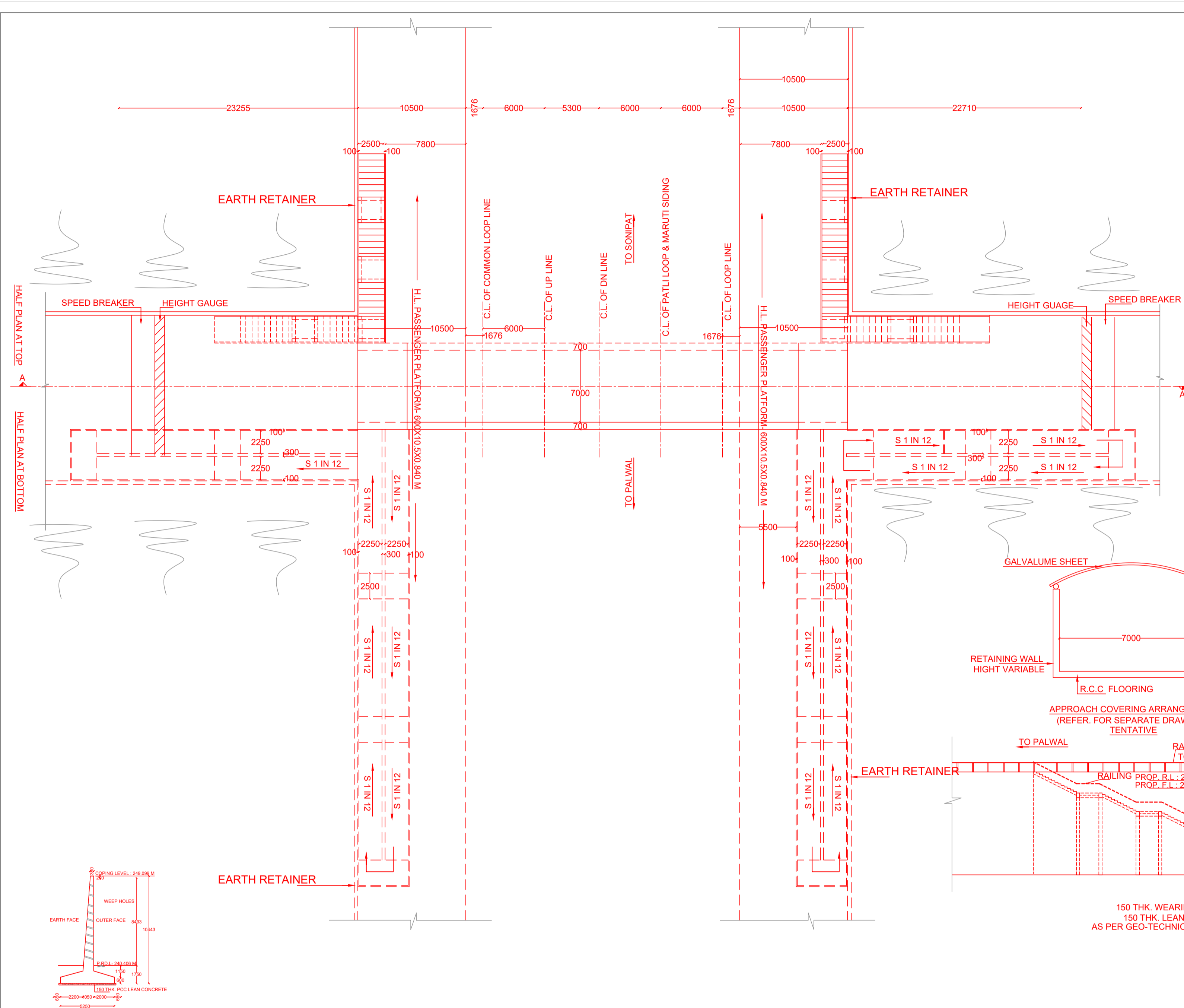
Project:- HARYANA ORBITAL RAIL CORRIDOR (HORC)

GENERAL ARRANGEMENT DRAWING
FOR ROAD UNDER BRIDGE NO.- 130,
1X4.0X4.5 M RCC BOX, AT CH:50912.38 M

SCALE: N.T.S | DRAWING NO: HRDC/PS/BR/GAD-4

S.M.C. S.M. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcindia.com , E-Mail : support@smcindia.com

R. K. DAS	M. NAYAK	A. A. SAMANT	PROJECT INCHARGE
DRAWN BY	CHECKED BY	2020-2021	A1
RELEASED FOR	PRELIMINARY FOR APPROVAL	YEAR OF SURVEY	P. SIZE
	<input checked="" type="checkbox"/>	TENDER	<input type="checkbox"/>
		CONSTRUCTION	



TRACK DETAILS

PROP R.L	249.573 M
PROP F.L	248.831 M
PROP RD.L	240.406 M
VERTICAL ALIGNMENT	405 F
HORIZONTAL ALIGNMENT	STRAIGHT

LEGEND

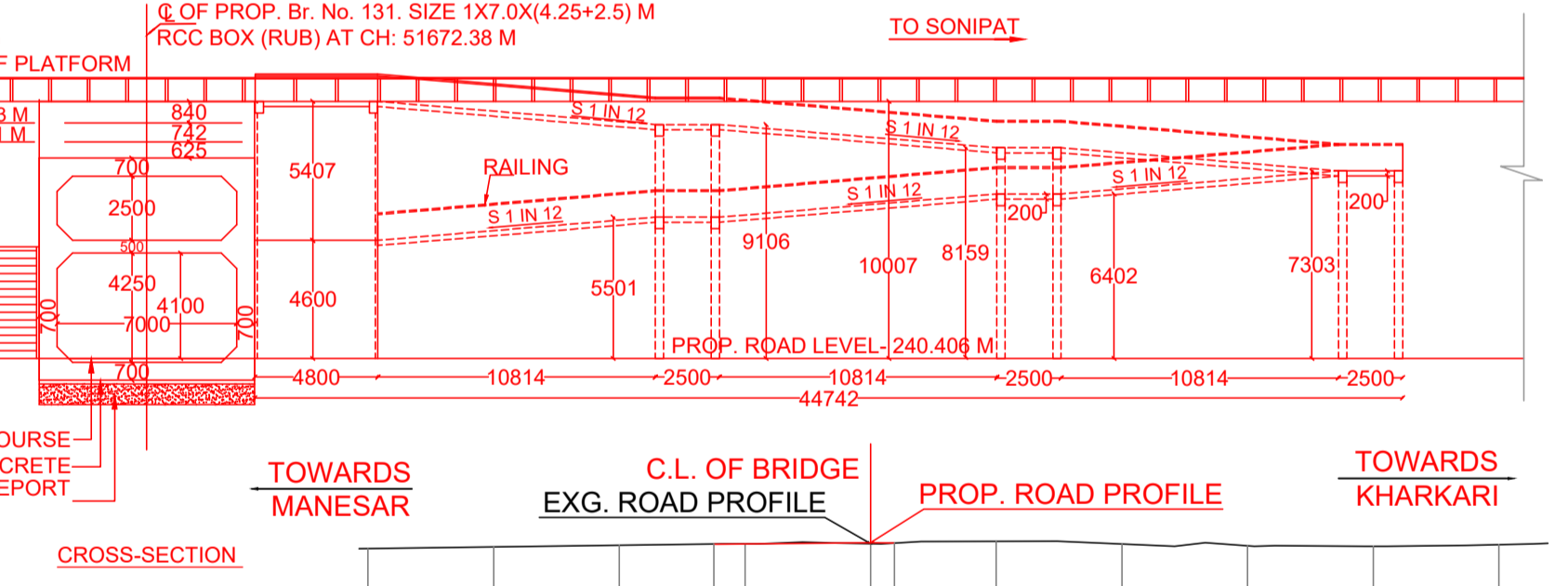
PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRDL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK	THICKNESS
ERL	EXISTING ROAD LEVEL

CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

Br. No. 131

0.00 G.L. 240.036 N VALUE	Classification as per LS	BH-1
1.00	SM	SANDY SOIL
2.50	SP-SM	
4.00	SP-SM	SANDY SOIL WITH GRAVEL
5.50	SP-SM	
7.00	SP-SM	SANDY SOIL WITH GRAVEL
8.50	SM	
10.00	SM	SANDY SOIL WITH GRAVEL
11.50	SM	



DATUM : 230

PROP. ROAD LEVEL	240.204	240.208	240.406	240.367	240.634	240.219	239.731	239.642	239.918
EXIST. ROAD LEVEL	239.302	239.542	240.010	240.204	240.229	240.276	240.367	240.634	240.219
CHAINAGES	80.000	60.000	40.000	24.945	20.000	0.000	3.088	20.000	40.000

LONGITUDINAL SECTION OF THE ROAD
NOT TO SCALE

GC/HORC		HRIDC	
SUDHIR AGARWAL SUDHAR		SUNIL DAVI SUNIL DAVI	
RETO PRADH RETO PRADH		UNNATI UNNATI	
PULKESH KUMAR SINGH PULKESH KUMAR SINGH		ANISH KUMAR ANISH KUMAR	

- NOTES :**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRIDC.
 - ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HRIDC.
- B) TECHNICAL NOTES :**
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR DETAILS OF R.C.C BOX DETAILED DESIGN TO BE FOLLOWED.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
(i) IRS BRIDGE RULE
(ii) IRS CONCRETE BRIDGE CODE
(iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE- IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST.
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G./SQM.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE :
(i) ALL RCC =M:35/DETAILED DESIGN DRG.
(ii) WEARING COURSE =M:20/DETAILED DESIGN DRG.
(iii) LEVELING COURSE/LEAN CONCRETE =M:20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE (FP) AND SAFE BEARING CAPACITY (SBC)
a. FOR BOX & RETURN WALL, PLEASE REFER DETAILED DESIGN DRAWING.
b. FOR SAFE BEARING CAPACITY OF SOIL, PLEASE REFER G1 REPORT.
c. IF BEARING CAPACITY AT SITE IS INADEQUATE, SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC OADING(32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

GENERAL ARRANGEMENT DRAWING
FOR ROAD UNDER BRIDGE CUM PEDESTRIAN SUBWAY NO.- 131,1X7.0X(4.25+2.5)M RCC BOX, AT CH:51672.38 M

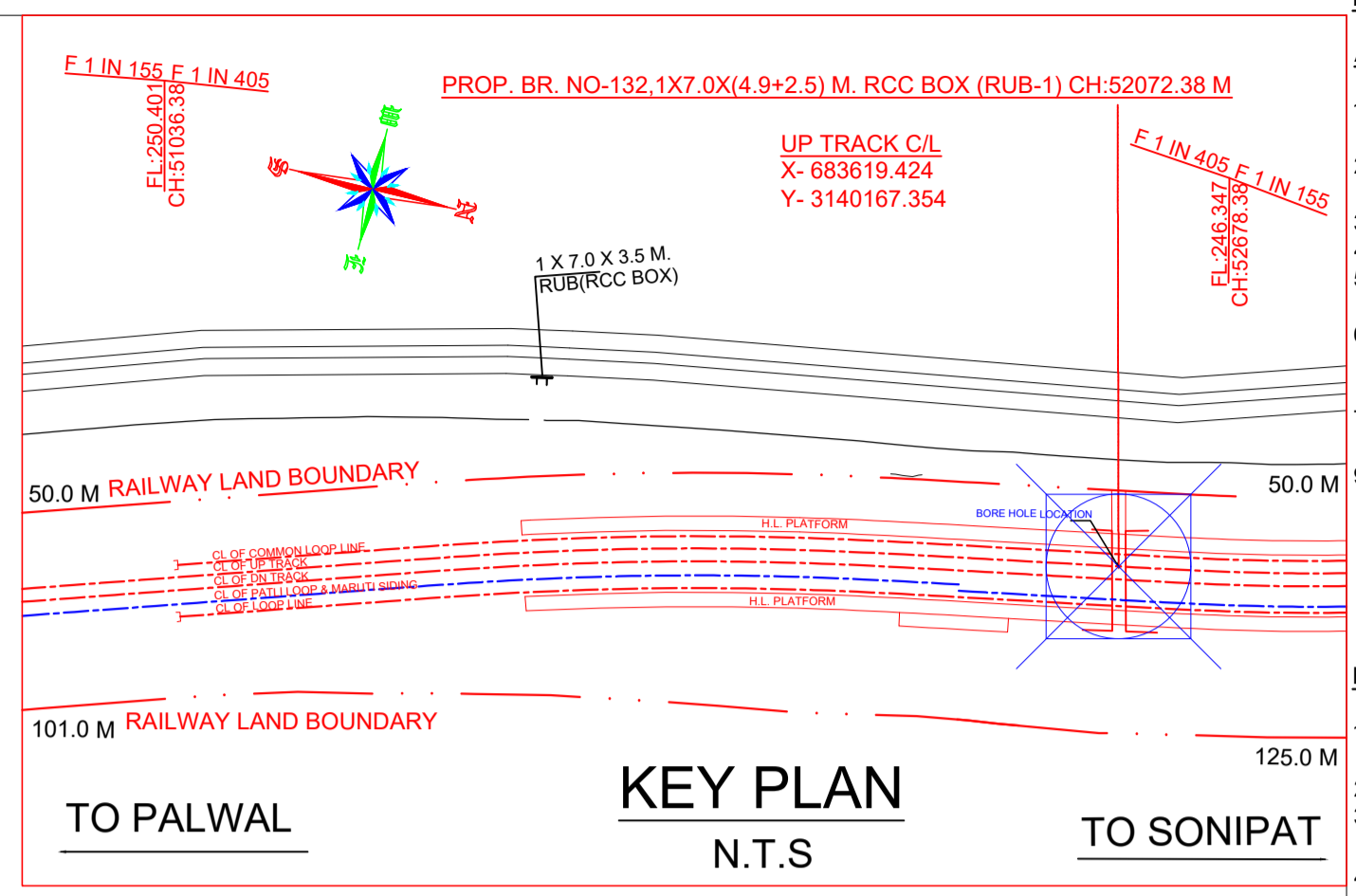
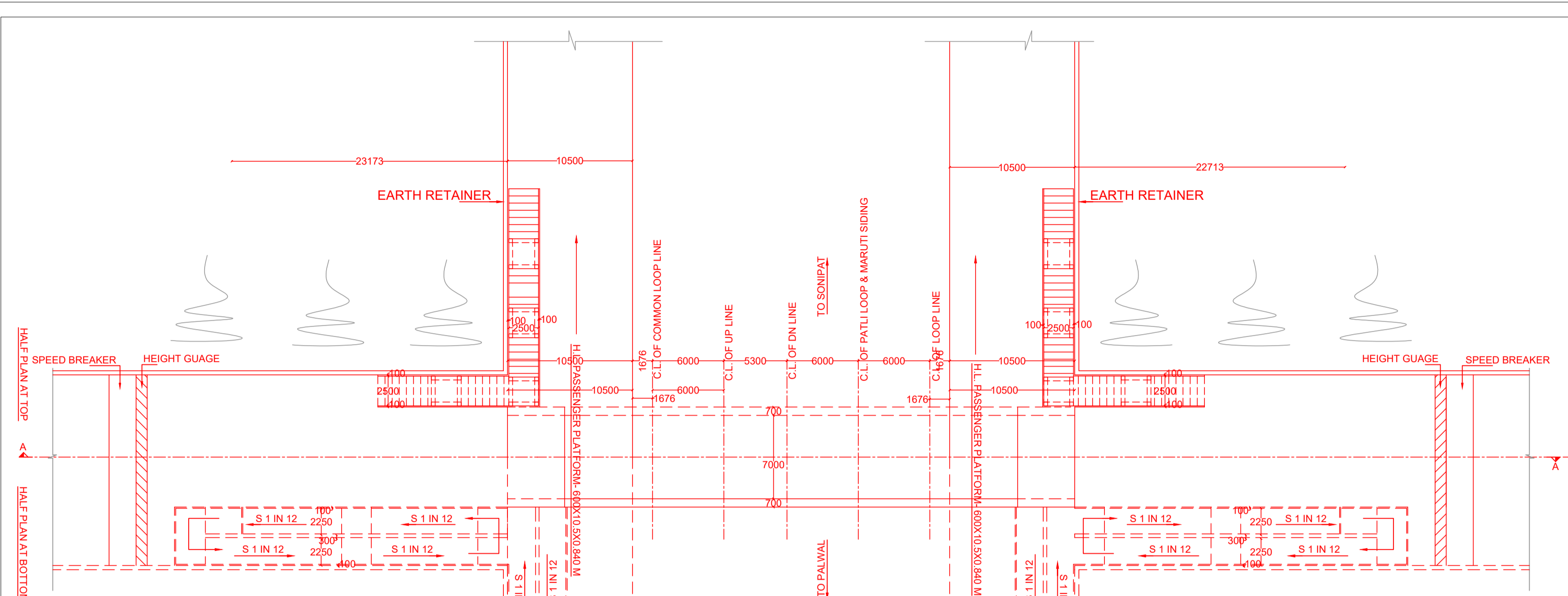
SCALE: N.T.S DRAWING NO- HRIDC/PS/BR/GAD-5

S.M.C. S.M. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smccindia.com , E-Mail : support@smccindia.com

R. K. DAS PROJECT INCHARGE
M. NAYAK PROJECT INCHARGE
2020-2021 A1

DRAWN BY CHECKED BY YEAR OF SURVEY P. SIZE REVISION

RELEASED FOR PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION

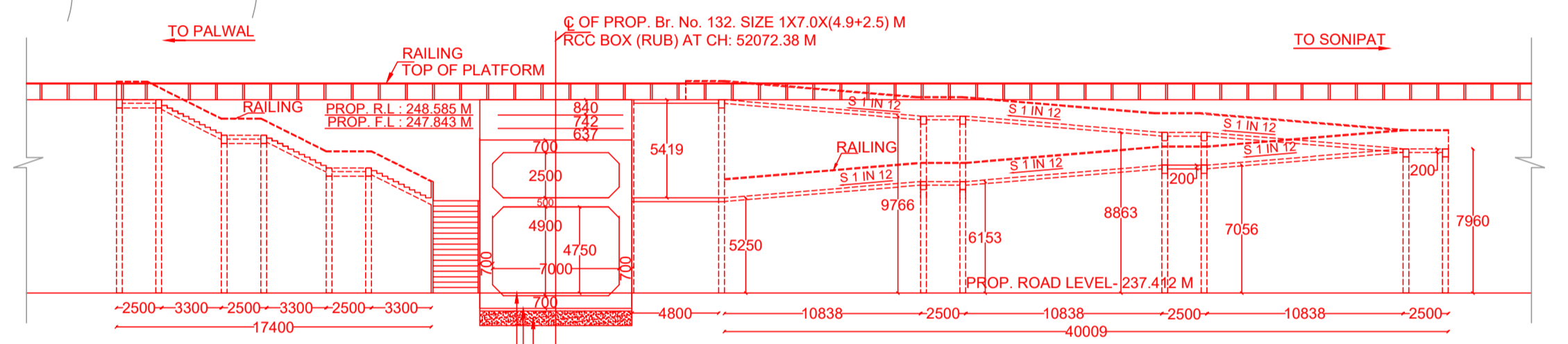


CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

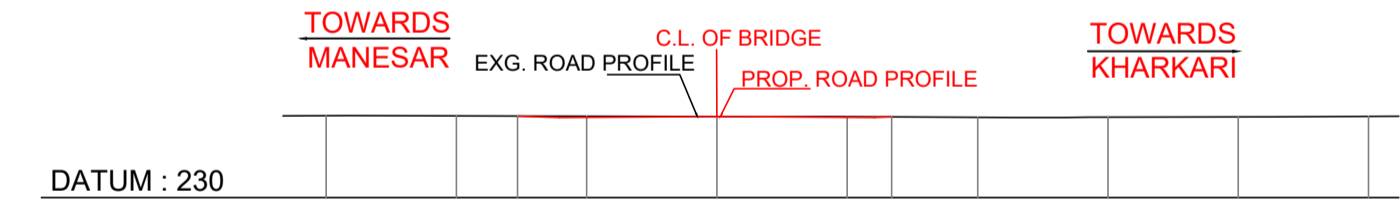
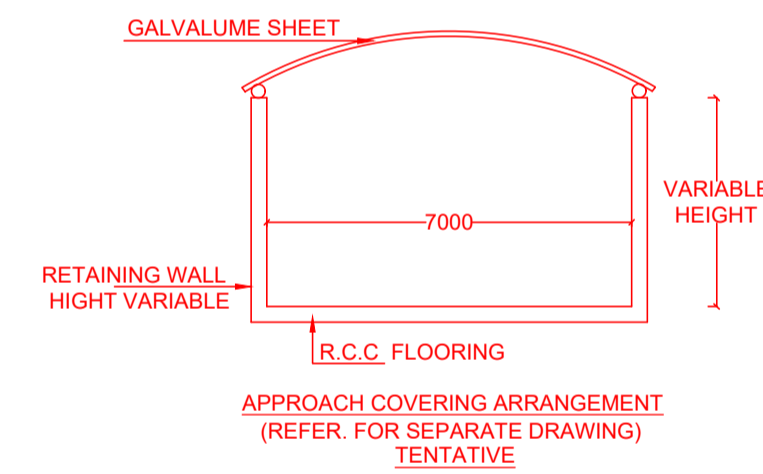
TRACK DETAILS

PROP R.L.	248.585 M
PROP F.L.	247.843 M
PROP RD.L.	237.412 M
VERTICAL ALIGNMENT	405 F
HORIZONTAL ALIGNMENT	STRAIGHT



LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRDL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK.	THICKNESS
ERL	EXISTING ROAD LEVEL

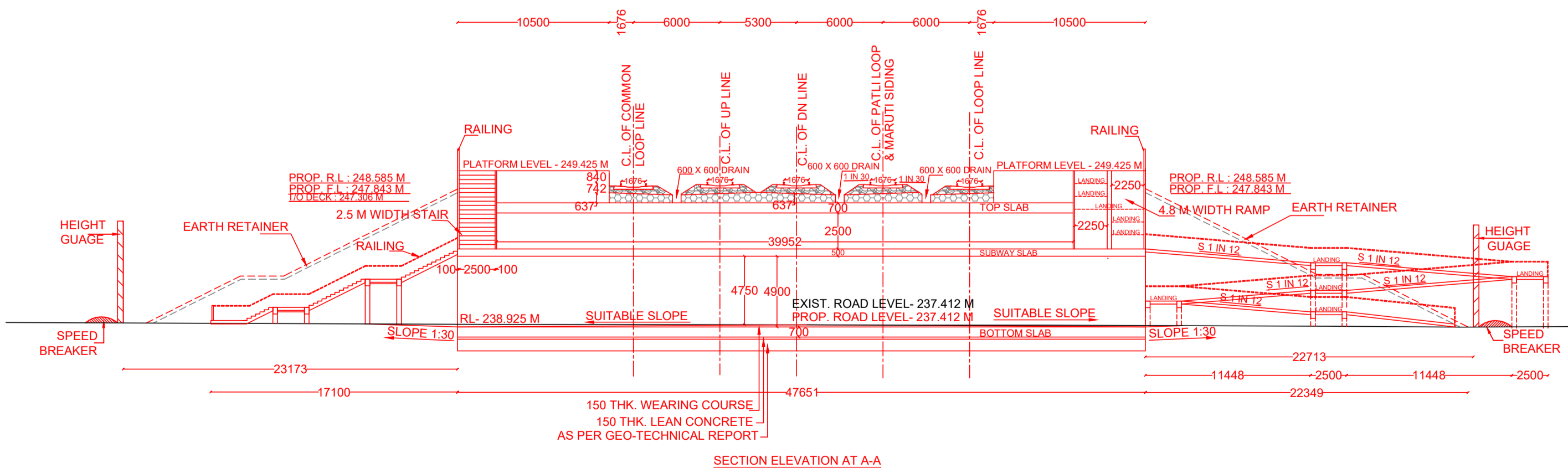


PROP. ROAD LEVEL	237.477	237.288	237.412	237.288	237.350						
EXIST. ROAD LEVEL	237.550	237.512	240.213	237.440	237.412	237.376	237.350	237.290	237.333	237.375	237.442
CHAINAGES	60.000	40.000	30.623	20.000	0.000	20.000	26.816	40.000	60.000	80.000	100.000

Br. No. 132

0.00 G.L. 237.326 N VALUE Classification as per LS BH-1

0.00	07	SP-SM	SANDY SOIL
1.00		SP-SM	
2.50		SP-SM	
4.00	21	SP-SM	
5.50		SP-SM	
7.00	55	SM	
8.50		SP-SM	
10.00	24	SM	
11.50		SM	
13.00	29	SM	
14.50		SM	
16.00	55	SM	
17.50		SM	
19.00	63	SM	
20.50		SM	
22.00	85	SM	
24.00		SM	



- NOTES:**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRDC.
 - ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE JOIC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES:**
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR DETAILS OF R.C.C BOX DETAILED DESIGN TO BE FOLLOWED.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
(i) IRS BRIDGE RULE
(ii) IRS CONCRETE BRIDGE CODE
(iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE- IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.48 K.G/SQM.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE. GRADE OF CONCRETE :
(i) ALL RCC =M:35/DETAILED DESIGN DRG.
(ii) WEARING COURSE =M:20/DETAILED DESIGN DRG.
(iii) LEVELING COURSE/LEAN CONCRETE =M:20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE(FP) AND SAFE BEARING CAPACITY(SBC)
a. FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC OADING(32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRDC)

Project- HARYANA ORBITAL RAIL CORRIDOR (HORC)

GENERAL ARRANGEMENT DRAWING
FOR ROAD UNDER BRIDGE CUM PEDESTRAIN
SUBWAY NO.- 132, 1X7.0X(4.9+2.5) M RCC BOX,
AT CH:52072.38 M

SCALE: N.T.S DRAWING NO- HRDC/PS/BR/GAD-6

S.M.C. S.M. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smindia.com , E-Mail : support@smindia.com

R. K. DAS **M. NAYAK**
A. A. SAMANT PROJECT INCHARGE
2020-2021 A1

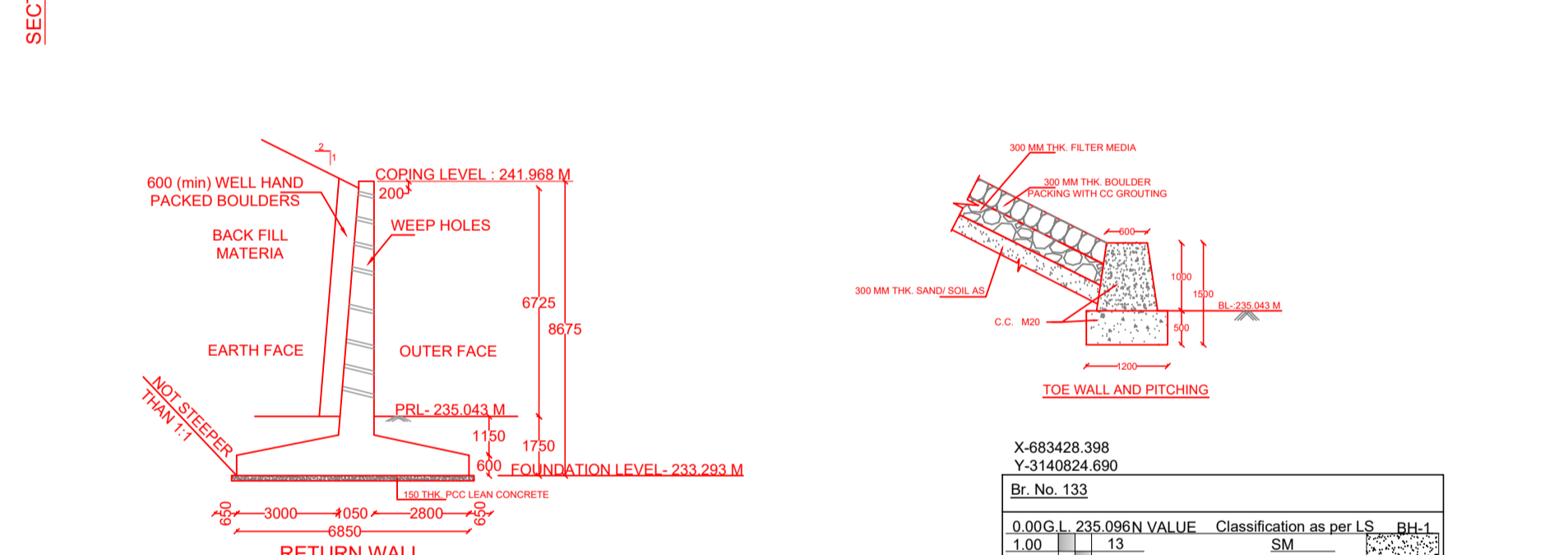
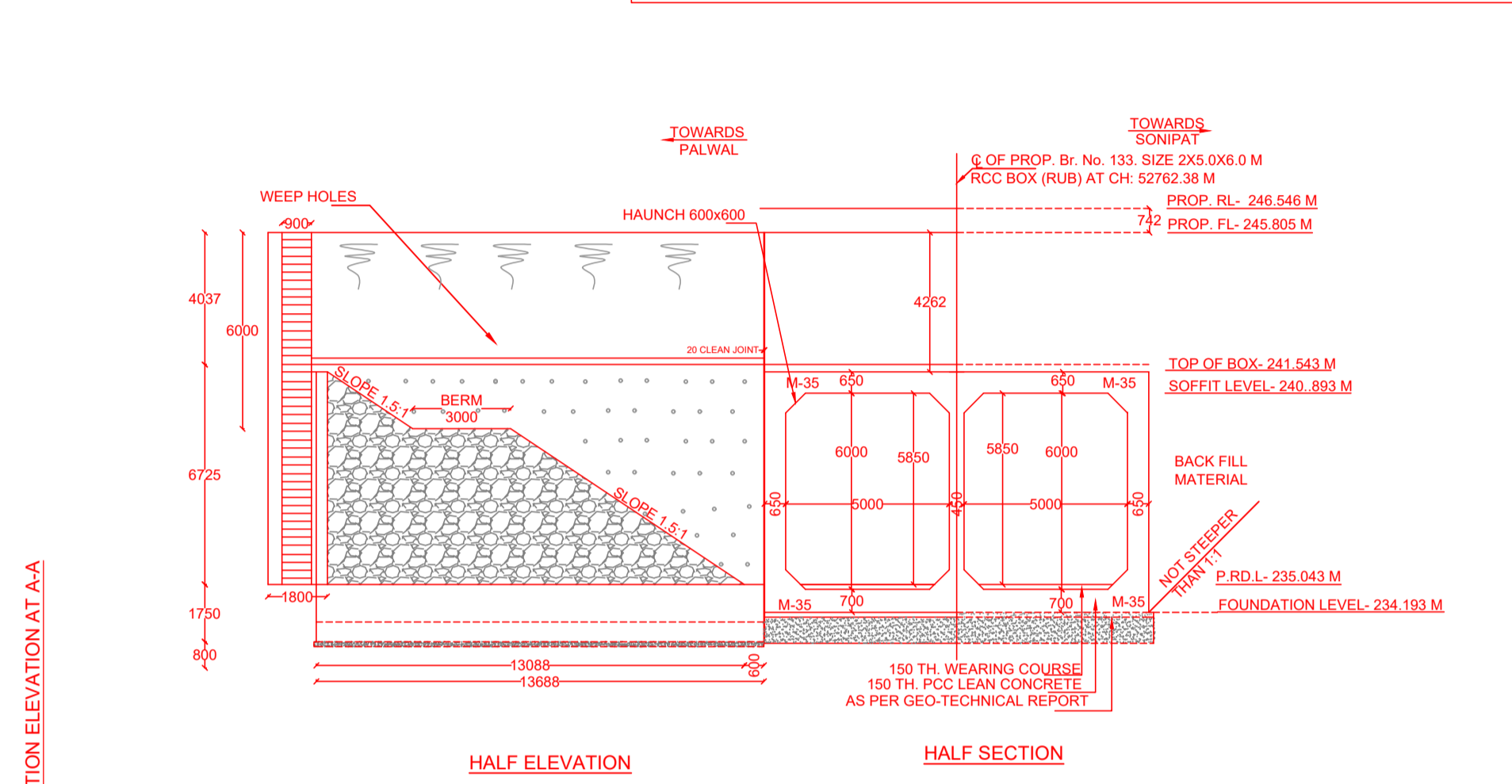
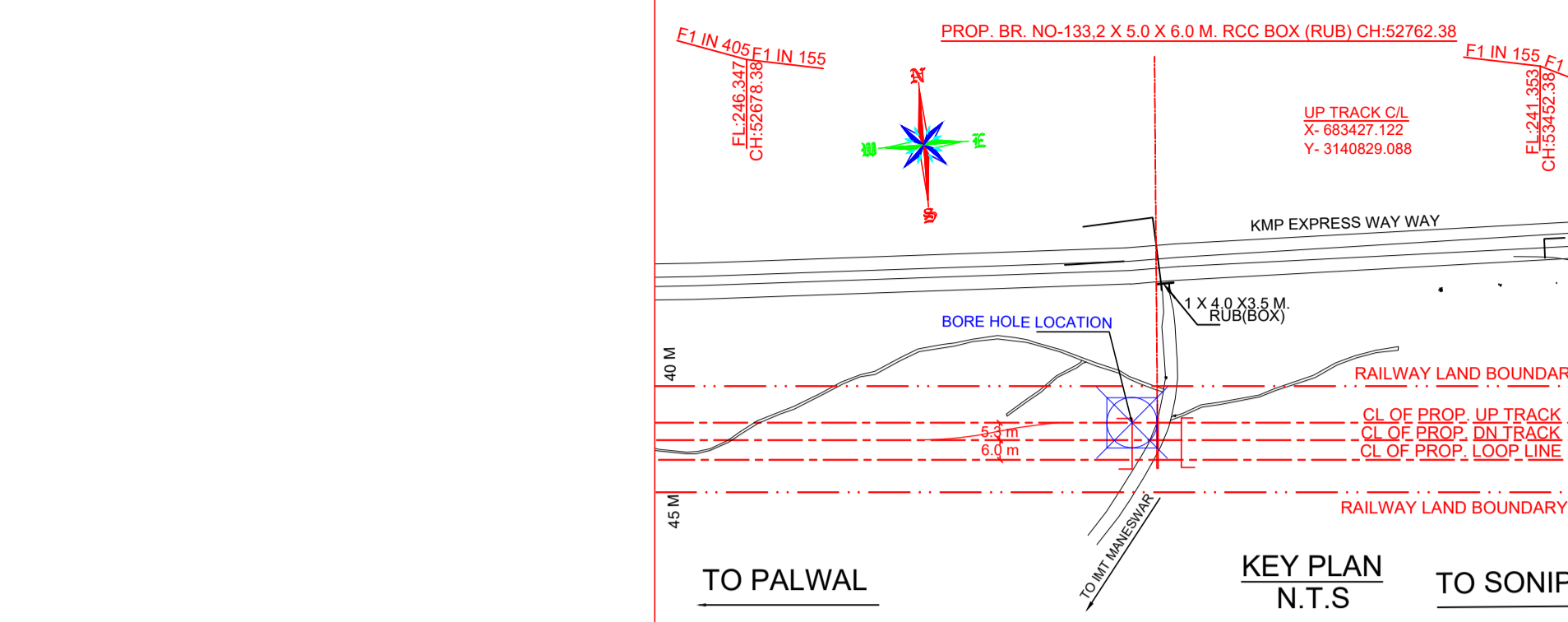
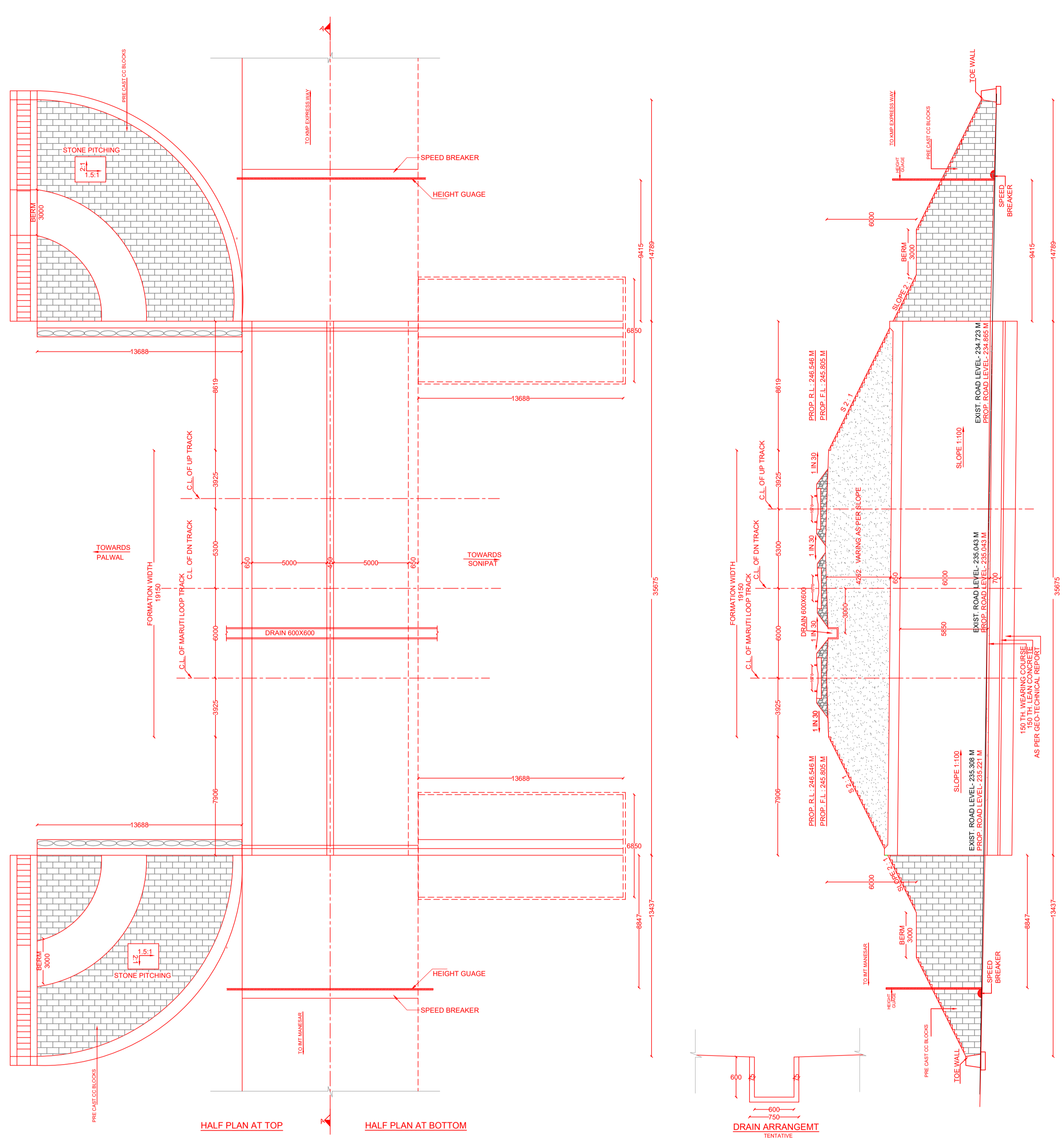
RELEASED FOR PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION

GC/HORC

SUBIR AGRAWAL DPS/ENR	
REETU PRICAL EE-CIVIL DESIGN	
PRANDEEP TOMBAR SINGH ARE-CIVIL DESIGN	

HRDC

SHYAM DAVEDI CPM/HRDC	
UNAM KHO DGM-C-1	
VIKAS KUMAR EXECUTIVE/ENR	



CONSTRUCTION DEPTH

1) RAIL (60g)	172 mm
2) RUBBER PAD	10 mm
3) PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK	350 mm
TOTAL	742 mm

TRACK DETAILS

PROP R.L	246.546
PROP F.L	245.805
VERTICAL ALIGNMENT	F 155
HORIZONTAL ALIGNMENT	STRAIGHT

BORE LOG DETAILS

0.00G L 235.096N VALUE	Classification as per I.S.	PH-1
1.00	SM	
2.50	SM	
4.00	SP-SM	SOIL
5.50	SM	
7.00	SM	
8.50	SM	
10.00	SM	
11.50	SP-SM	SANDY SOIL
13.00	SM	SOIL WITH GRAVEL
14.50	SM	
16.00	SM	
17.50	SP-SM	
19.00	SM	
20.50	SM	
22.00	SM	
24.00	SP-SM	

LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK	THICKNESS
ERL	EXISTING ROAD LEVEL

- NOTES:
- A) GENERAL NOTES
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/I OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRIDC.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES:
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR DETAILS OF RCC BOX REFER RDSO DRG. NO- 10157 & 10157/5.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
(i) IRS BRIDGE RULE
(ii) IRS CONCRETE BRIDGE CODE
(iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE- IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 KG/SQM.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE :
(i) ALL RCC =M-35/DETAILED DESIGN DRG.
(ii) WEARING COURSE =M-20/DETAILED DESIGN DRG.
(iii) LEVELING COURSE/LEAN CONCRETE =M-20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE (FP) AND SAFE BEARING CAPACITY (SBC)
a. FOR BOX & RETURN WALL PLEASE REFER DETAILED DESIGN DRAWING.
b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DATUM : 225

PROP. ROAD LEVEL	236.762	236.511	236.123	235.678	235.493	235.275	235.221	235.043	234.795	234.799	234.465	233.991	233.694	233.488	233.300
EXIST. ROAD LEVEL															
CHAINAGES	100.000	80.000	60.000	40.000	31.274	20.000	17.837	0.00	17.657	20.000	32.625	60.000	80.000	100.000	120.000

GC/HORC

SUDHAR AGRAWAL CIVIL/HRIDC	
REETU PRITHAL RE-CIVIL/DESIGN	
PUNJENDRA KUMAR SINGH RE-CIVIL/DESIGN	

HRIDC

SHYAM DAVEDI CIVIL/HRIDC	
UMA N. CHO DWM/C-1	
VIKASH KUMAR ENGINEER/HRIDC	

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

Project: HARYANA ORBITAL RAIL CORRIDOR (HORC)

GENERAL ARRANGEMENT DRAWING
FOR ROAD UNDER BRIDGE NO.- 133,
2X5.0X6.0M RCC BOX, AT CH:52762.38 M

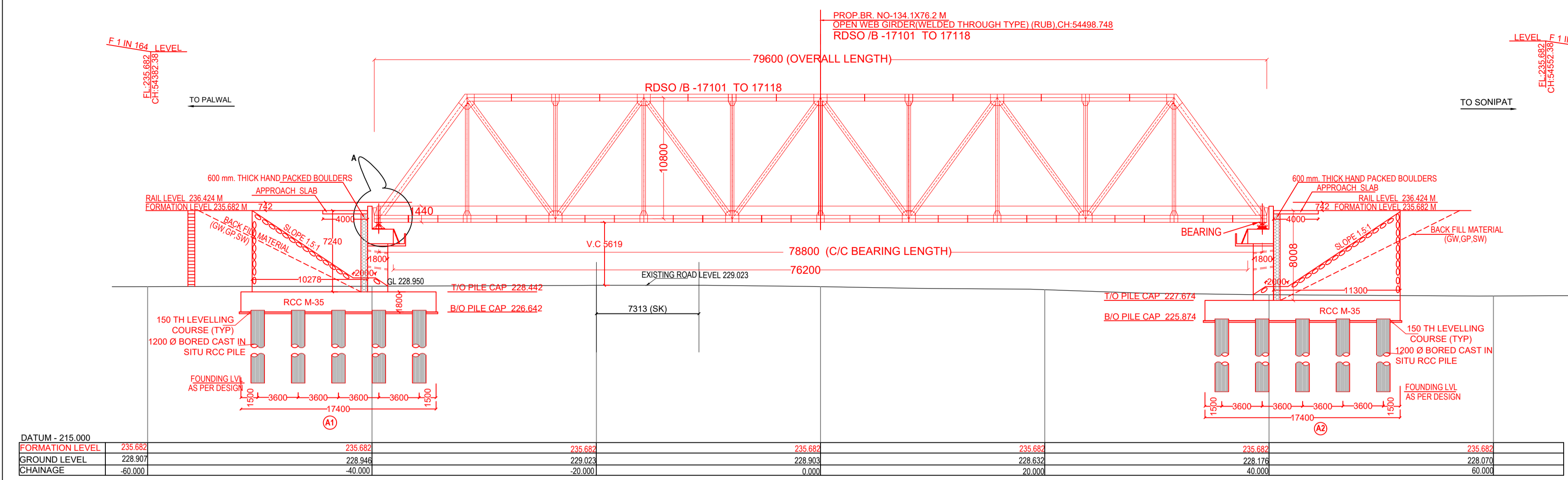
SCALE: N.T.S. DRAWING NO- HRIDC/PS/BR/GAD-7

S.M.C. S.M. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smccindia.com , E-Mail : support@smccindia.com

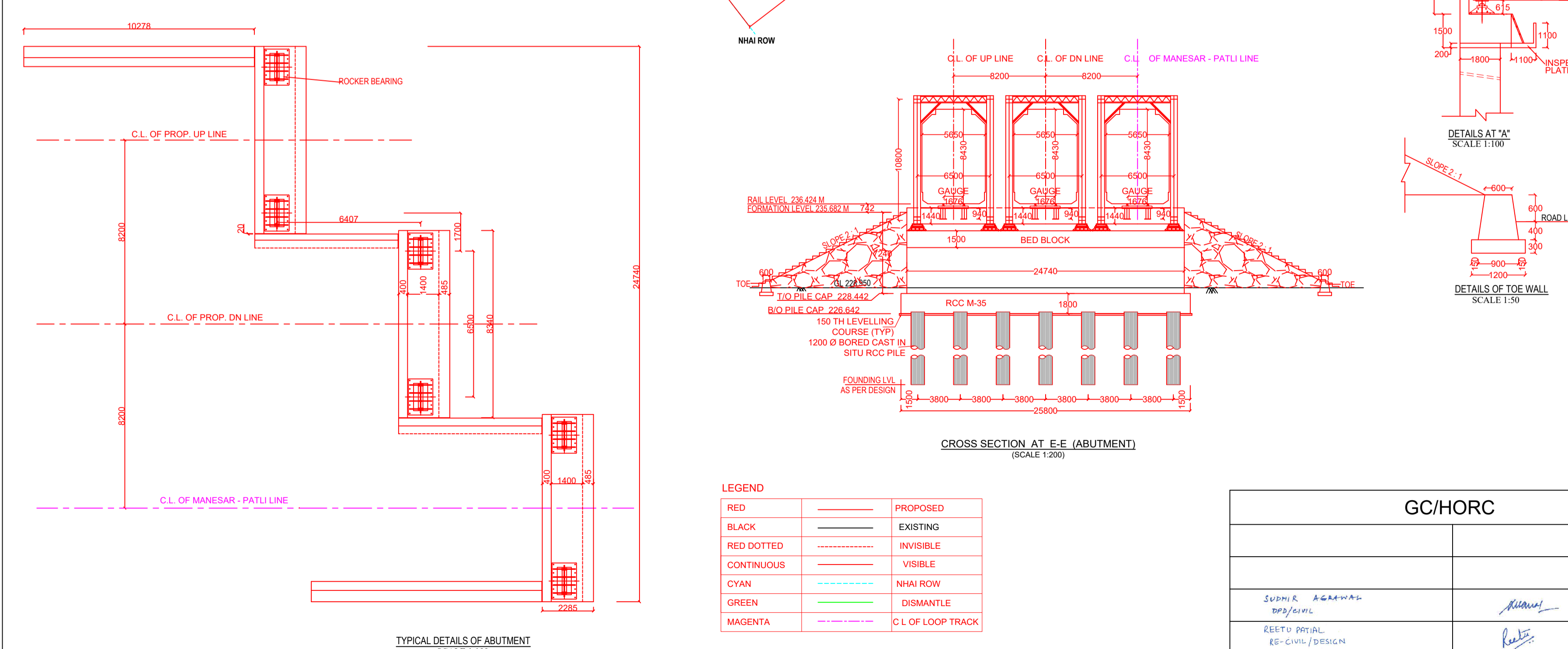
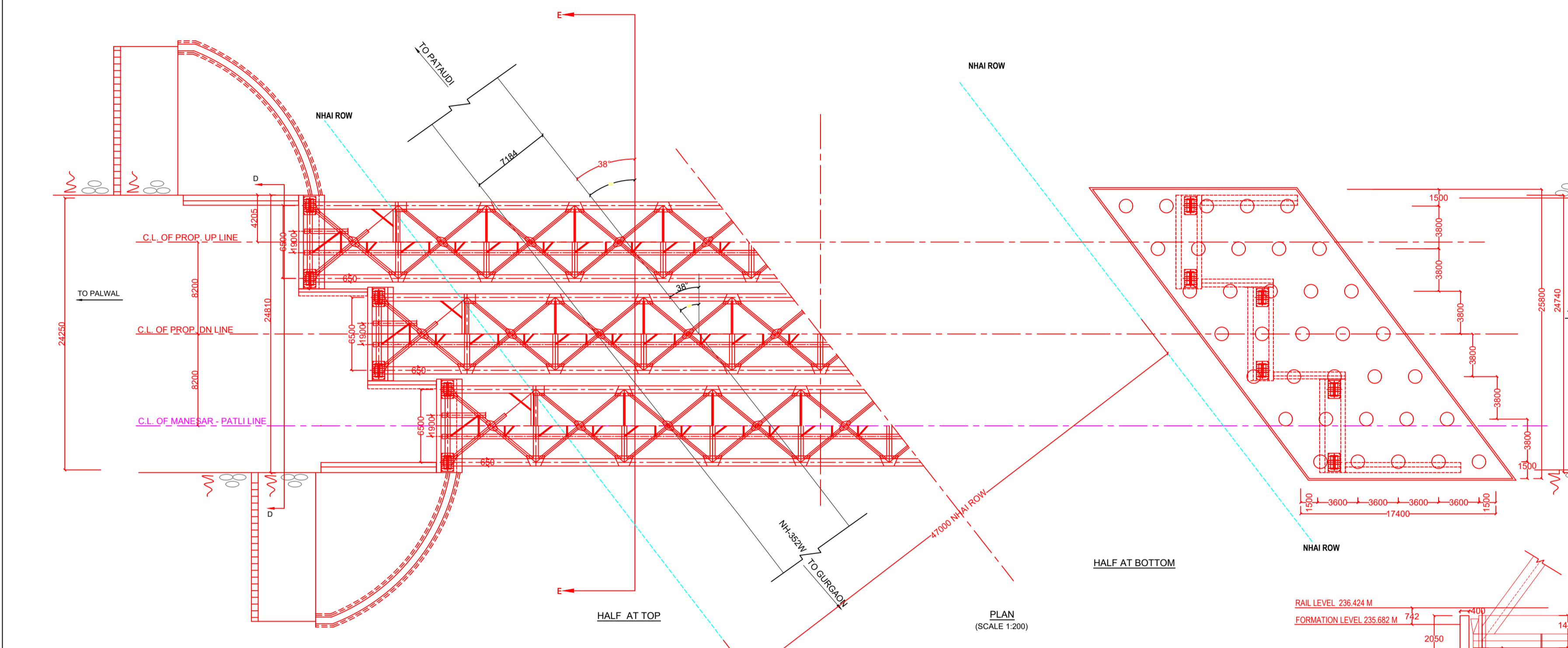
R. K. DAS MANJEET NAYAK A. A. SAMANT
2020-21 A1

DRAWN BY CHECKED BY YEAR OF SURVEY P. SIZE REVISION

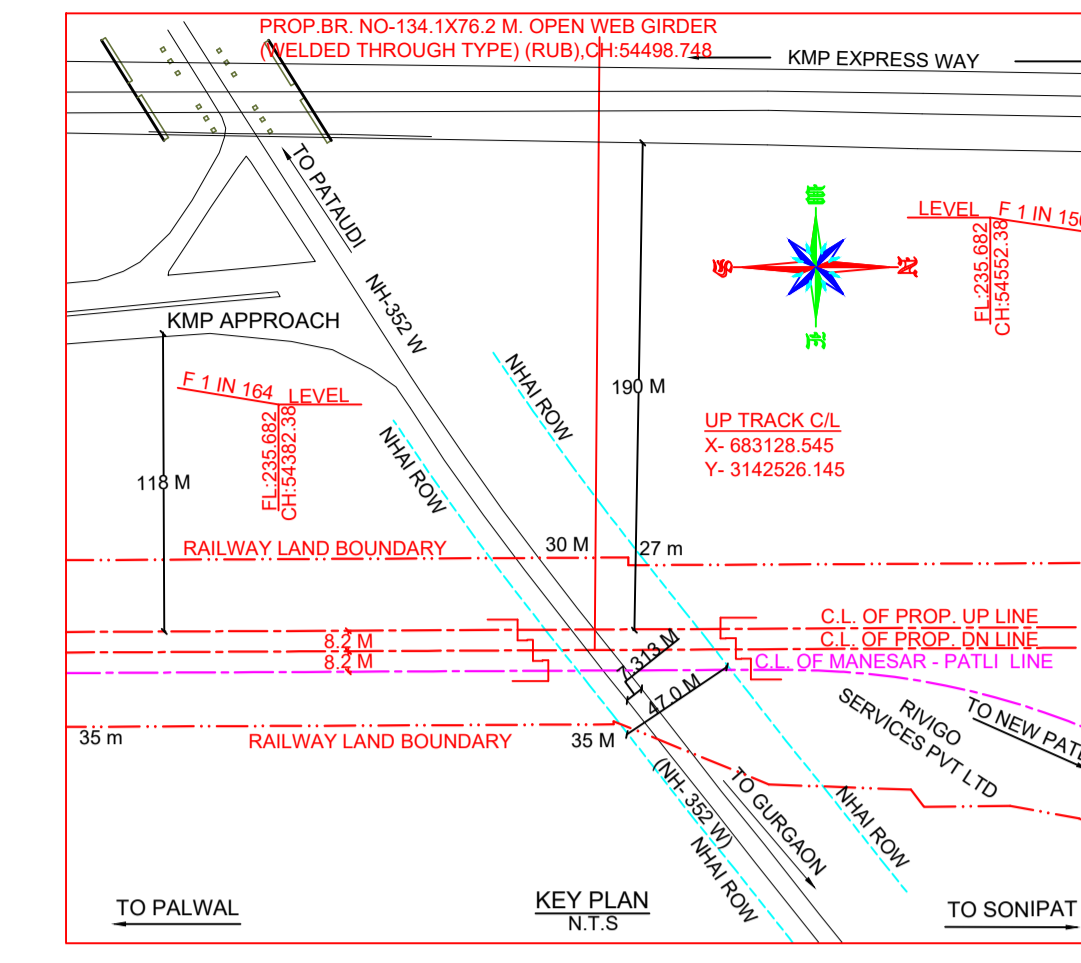
RELEASED FOR PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION



DATUM: 215.000										
FORMATION LEVEL	235.682	235.682	235.682	235.682	235.682	235.682	235.682	235.682	235.682	235.682
GROUND LEVEL	228.907	228.946	229.023	228.932	228.176	228.076	228.076	228.076	228.076	228.076
CHAINAGE	60.000	40.000	20.000	0.000	20.000	40.000	60.000			

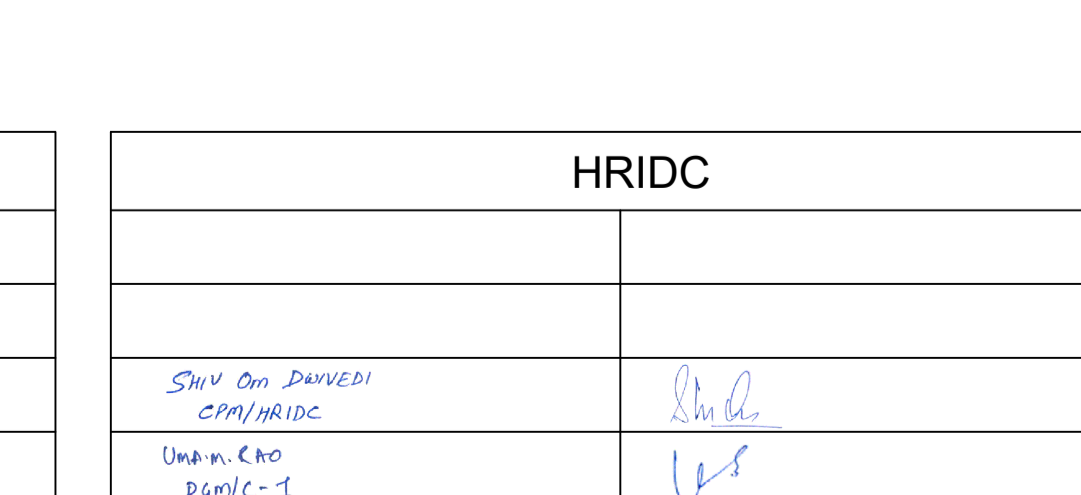
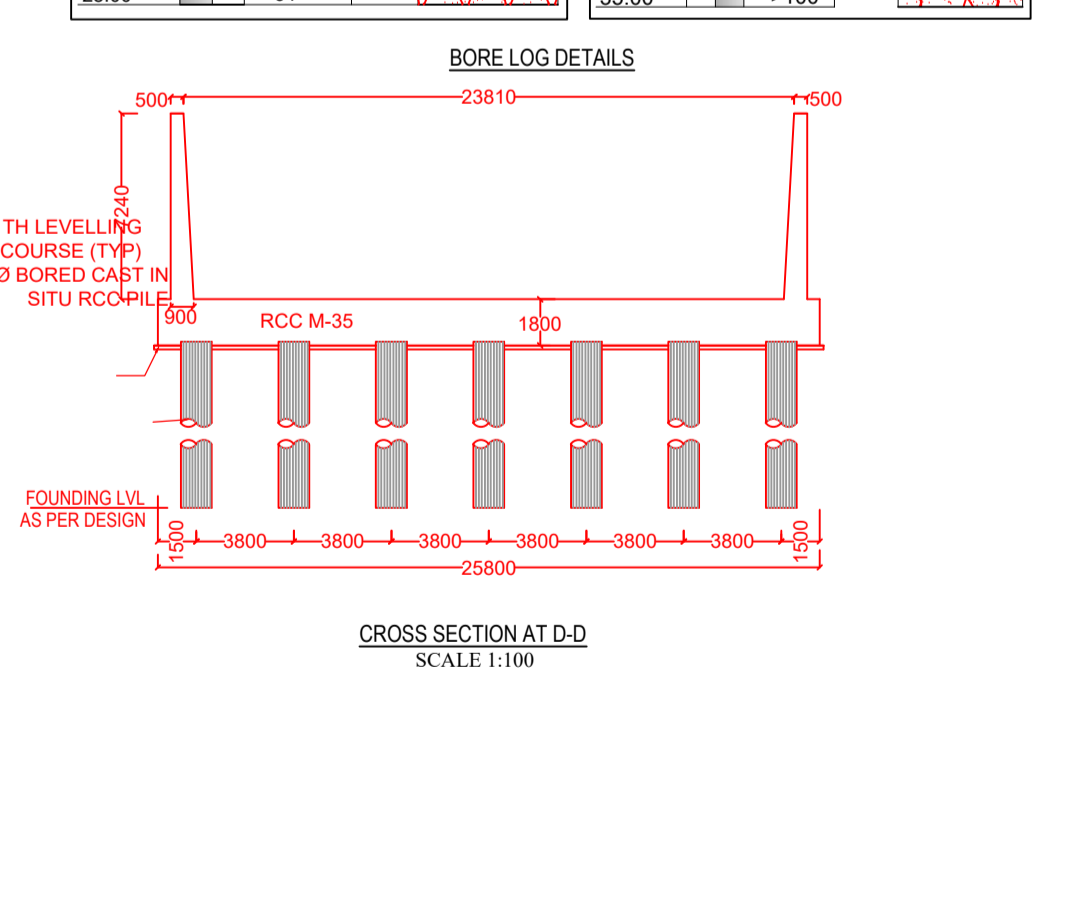


RED	PROPOSED
BLACK	EXISTING
RED DOTTED	INVISIBLE
CONTINUOUS	VISIBLE
CYAN	NHAI ROW
GREEN	DISMANTLE
MAGENTA	C L OF LOOP TRACK



DESCRIPTION OF BRIDGE	
1. CHAINAGE	51328
2. RAIL LEVEL	236.424 M
3. FORMATION LEVEL	235.682 M
4. VERTICAL ALIGNMENT	LEVEL
4. HORIZONTAL ALIGNMENT	STRAIGHT
5. SOFFIT LEVEL	234.642 M
6. ROAD LEVEL	229.023 M
7. OVERALL SPAN	79600 MM
8. EFFECTIVE SPAN	78600 MM
9. CLEAR SPAN	76200 MM
10. TYPE OF CROSSING	ROAD
11. VERTICAL CLEARANCE	5619 MM

CONSTRUCTION DEPTH	
1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) H-BEAM SLEEPER	200 mm
4) BEARING PAD BELOW SLEEPER	25 mm
5) STRINGER BEAM AS PER RDSO	1365 mm
5) BATTEN PLATE	10 mm
TOTAL	1782 mm



- NOTES:
- A) GENERAL NOTES:
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER. DIMENSION SHOWN ARE GENERALLY SKEW DIMENSIONS, WHERE REQUIRED SQUARE DIMENSIONS ARE PROVIDED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM DPR REFERENCE CHAINAGE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - SUB-STRUCTURE IS TO BE DESIGNED FOR 32.5 T AXLE LOADING.
 - SUPER STRUCTURE REFER RDSO DRG. NO. RDSO/B-17101 TO 17118.
 - ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL, FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTION TO PREVENT DAMAGE OF S&T CABLE/OFDC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/ARTEL/S&S/IGAD/STC ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL:
- DIMENSIONS AND SIZES OF SUBSTRUCTURE AND FOUNDATION ARE TENTATIVE AND MAY CHANGE AS PER STRUCTURAL DESIGN.
 - R.C.C. WORK & MASS CONCRETE WORK TO BE CARRIED OUT AS PER IRS CONC. BRIDGE CODE 1987 WITH UPDATED CORRECTION SLIPS.
 - WESP HOLES SHALL BE OF 75/100 DIA. PVC/AC PIPES STAGGERED @ 1000 C/C IN ABUTMENT/ FACE/ WING/ RETURN WALL.
 - DEPTH OF FOUNDATION SHALL BE DECIDED BY THE ENGINEER-IN-CHARGE AS PER SITE CONDITION & APPROVED DESIGN.
 - ISO/TMT BARS OF MIN. Fe 500D REINFORCEMENT CONFORMING TO IS-1786 OF 2008 SHALL BE USED AS REINFORCEMENT.
 - STANDARD OF LOADING FOR PROPOSED BRIDGE IS 32.5 T DFC LOADING STANDARD.
 - SAFE WORKING SHOULD BE ENSURED AS PER PARA 826 OF IRPWM WITH UPDATED CORRECTION SLIP.
 - SAFETY PRECAUTION AT WORK SITE SHOULD BE ENSURED AS PER NR H.Q's. LETTER NO.324- W/11/NCR/PT/PT-X DATED 30.05.2013.
 - INSPECTION PLATFORM WITH LADDER SHALL BE PROVIDED ON EACH ABUTMENT/ PIER AS PER RDSO DRAWING NO. CBS-0016.
 - ALL CONCRETE IS TO BE MECHANICALLY VIBRATED AND MIX DESIGN WILL BE APPROVED BY ENGINEER IN-CHARGE.
 - SAFE WORKING SHALL BE ENSURED BY ENGINEER IN CHARGE BY USE OF BARRICADING AS DIRECTED BY ENGINEER IN-CHARGE.
 - UNDERGROUND CABLES ETC SHALL BE SHIFTED/REALIGNED AS PER REQUIREMENT BEFORE TAKING UP THE WORK IN HAND.
 - BACK FILL MATERIAL SHOULD BE AS PER CLAUSE 7.5 OF I.R.S BRIDGE SUB STRUCTURE & FOUNDATION CODE WITH UPDATED CORRECTION SLIP.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN COAL-TAR OF APPROVED QUALITY.
 - INSPECTION PLATFORM & PEDESTAL FOR BEARING SHALL BE PROVIDED AS PER RDSO DRAWING NO. CBS-0016.
 - DESIGN CRITERIA: EXPOSURE CONDITION: MODERATE SEISMIC ZONE - IV IRS BRIDGE SUBSTRUCTURE AND FOUNDATION CODE 2013 IRS CONCRETE BRIDGE CODE 2014 IRS BRIDGE RULE 2014.
 - SIDE PATHWAY SHALL BE PROVIDED, AS PER RDSO DRAWING NO. CBS-0045 FOR OPEN WEB GIRDER.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO DRAWING NO. RDSO/M0001.

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

GENERAL ARRANGEMENT DRAWING FOR ROAD UNDER BRIDGE NO.- 134, (RUB) 1X76.2 M. OPEN WEB GIRDER(WELDED THROUGH TYPE), AT CH: 54498.748 M

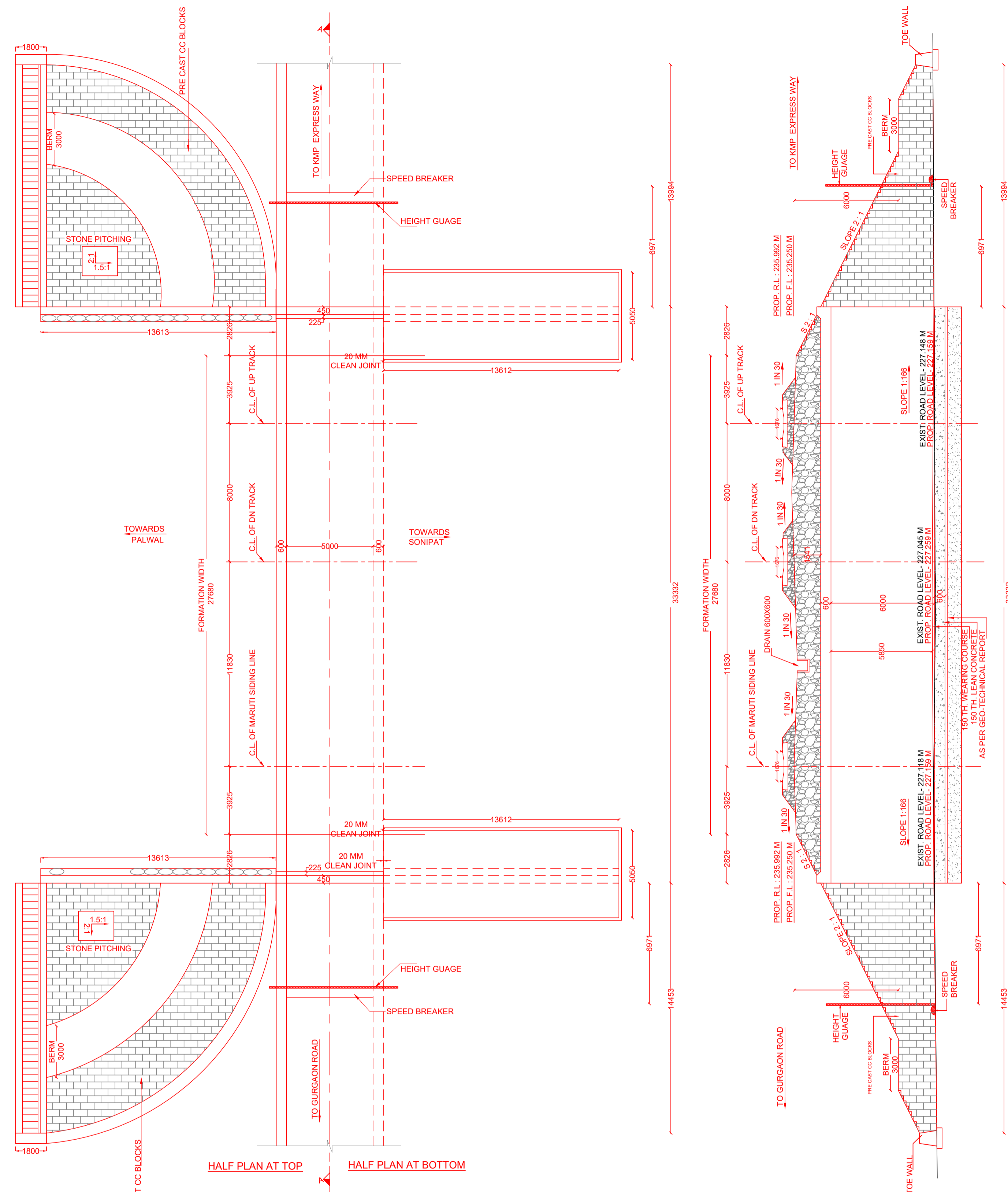
SCALE: AS SHOWN | DRAWING NO- SMC/HRIDC/PS/GAD- 08

S.M.C. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcindia.com , E-Mail : support@smcindia.com

Released For: PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION

Drawn By: R.K. DAS | Checked By: M. NAYAK | Year of Survey: 2020 | Sheet No: 1 | Revision: 1

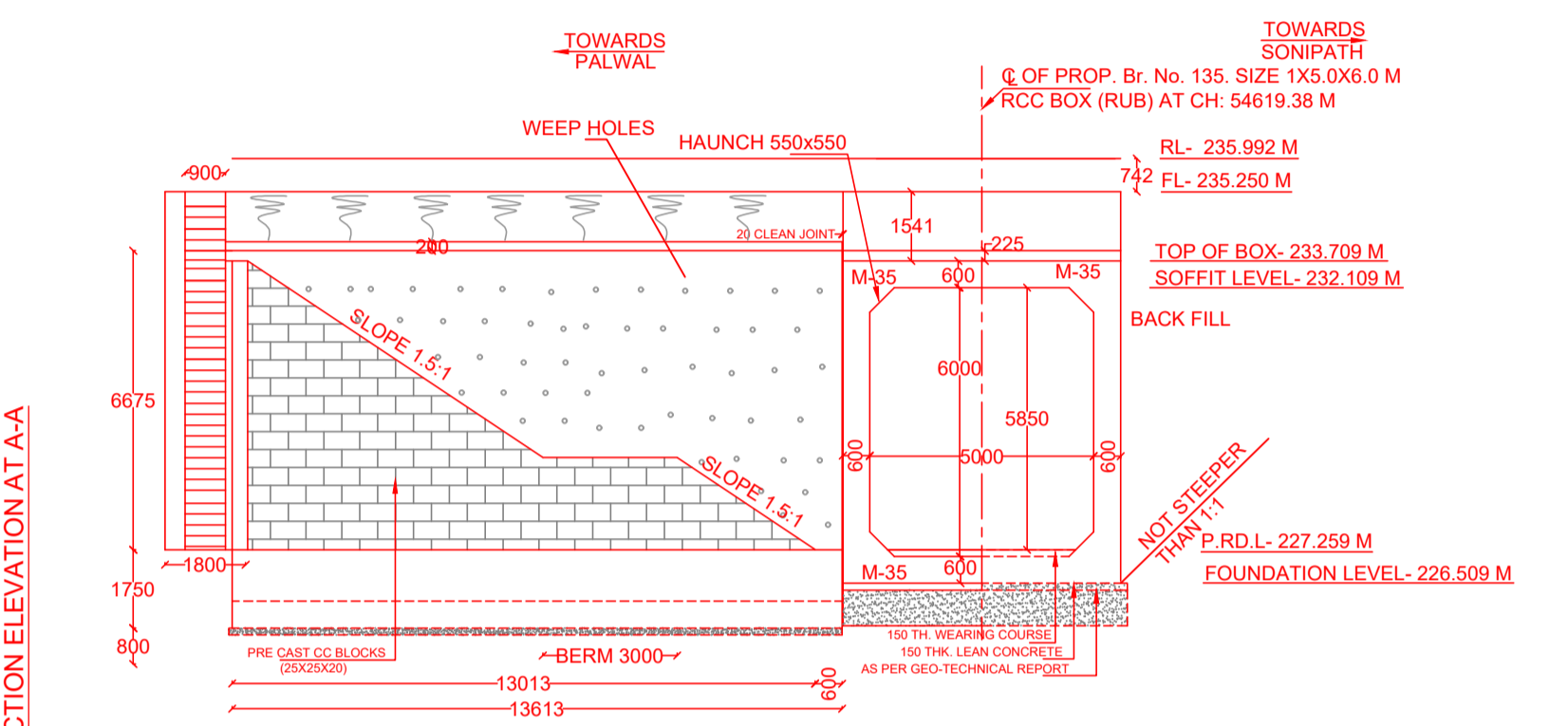
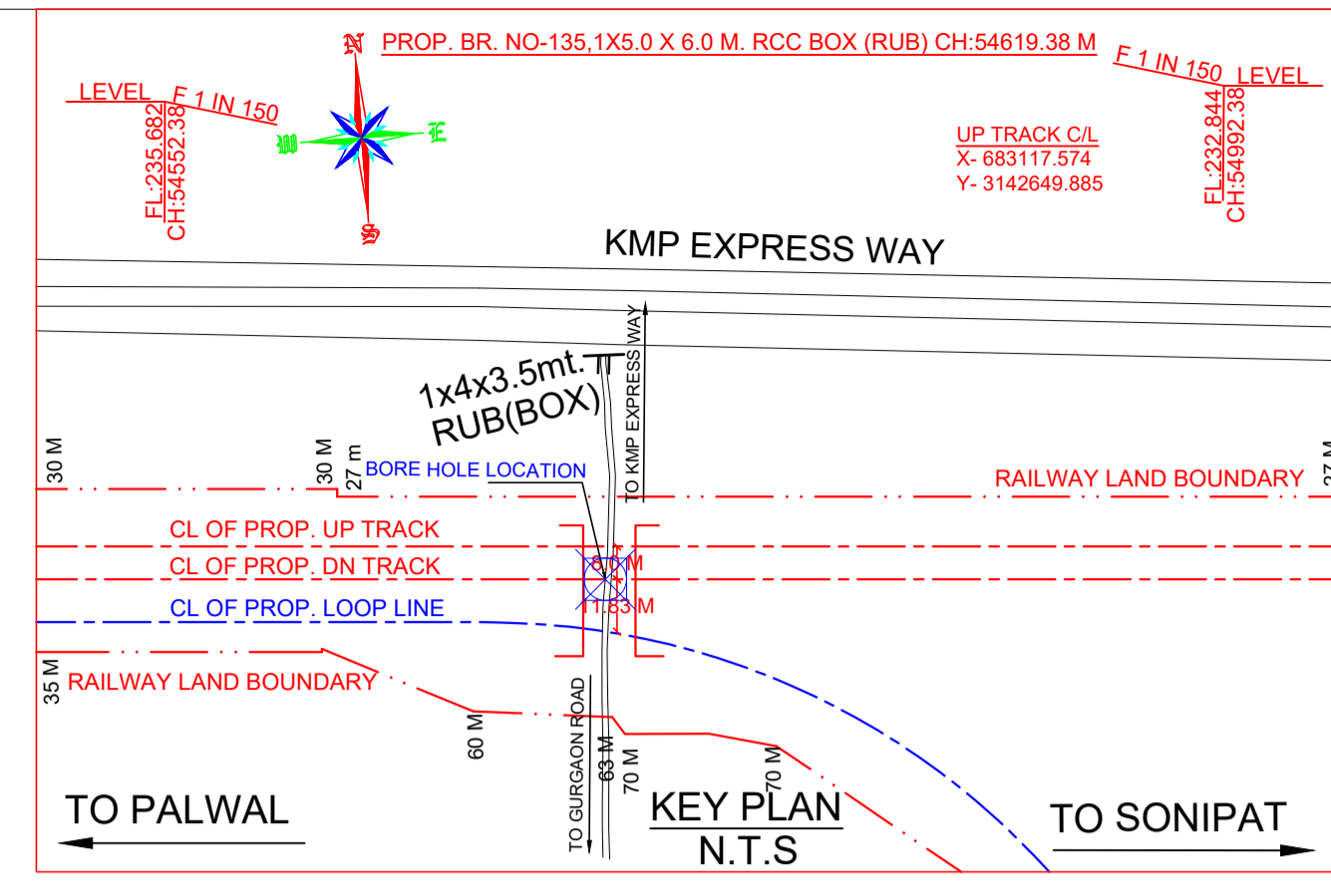
Project Incharge: A. A. SAMANT



LONGITUDINAL SECTION OF THE ROAD
NOT TO SCALE

CHAINAGES	100.000	80.000	60.000	40.000	31.119	20.000	0.000	30.660	40.000	60.000	80.000	100.000
PROP. ROAD LEVEL	226.652	226.635	226.973	227.074	226.982	227.168	227.259	227.045	227.212	227.450	227.415	227.415
EXIST. ROAD LEVEL												

GC/HORC	HRDC
SUSHIL AGARWAL DRY/HRDC	
ESHTI PRHAL EE-CIVIL/DESIGN	
PUNJINDER KUMAR SINGH DRY-CIVIL/DESIGN	



LEGEND

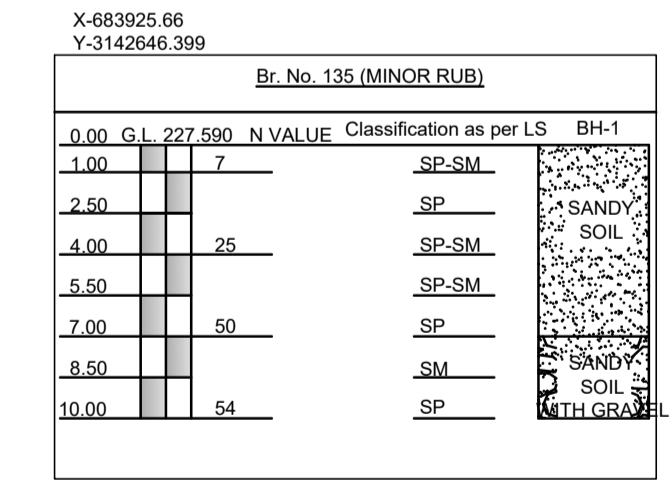
PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRDL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK.	THICKNESS
ERL	EXISTING ROAD LEVEL

TRACK DETAILS

PROP R.L	235.992 M
PROP F.L	235.250 M
VERTICAL ALIGNMENT	F 155
HORIZONTAL ALIGNMENT	STRAIGHT/CURVE

CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm



- NOTES:**
- A) GENERAL NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRDC.
 - ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACKROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES:**
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR DETAILS OF RCC BOX DETAILED DESIGN TO BE FOLLOWED.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
 - IRS BRIDGE RULE
 - IRS CONCRETE BRIDGE CODE
 - IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE- IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G./SQM.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE :
 - ALL RCC =M-35/DETAILED DESIGN DRG.
 - WEARING COURSE =M-20/DETAILED DESIGN DRG.
 - LEVELING COURSE/LEAN CONCRETE =M-20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE(FP) AND SAFE BEARING CAPACITY(SBC)
 - FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
 - FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER G.T REPORT.
 - IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC LOADIND (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRDC)

Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

GENERAL ARRANGEMENT DRAWING
FOR ROAD UNDER BRIDGE NO.- 135,
SIZE- 1X5.0X6.0 M RCC BOX, AT CH:54619.38 M

SCALE: N.T.S DRAWING NO- HRDC/PS/BR/GAD-9

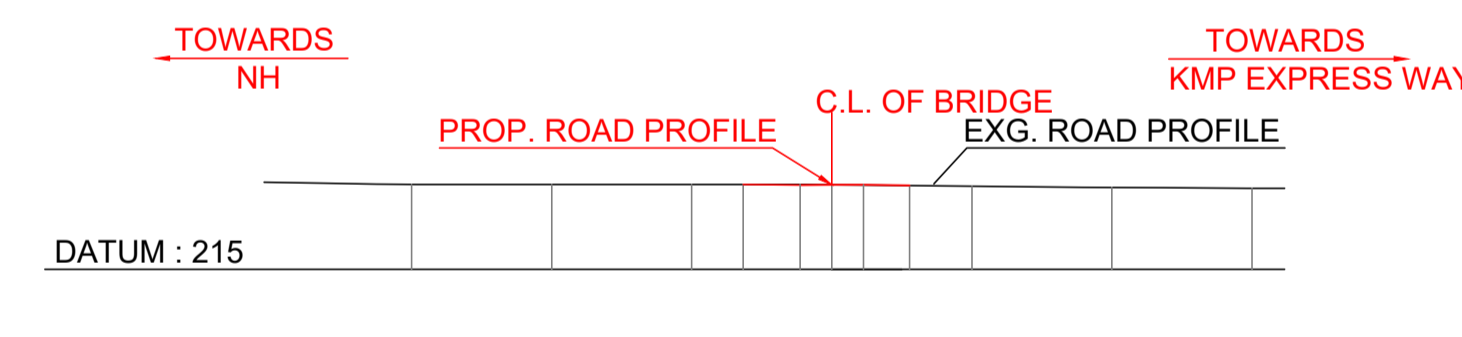
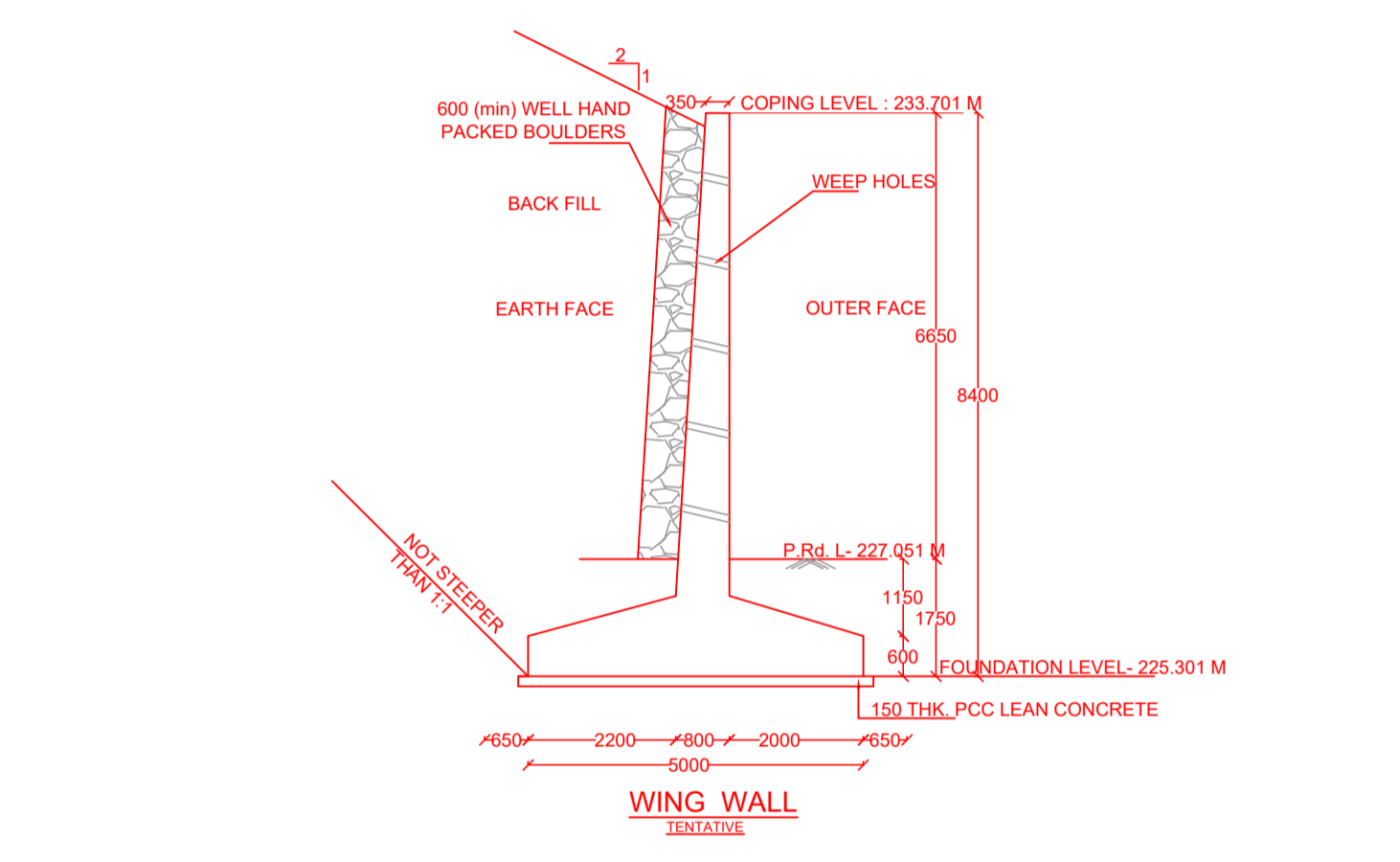
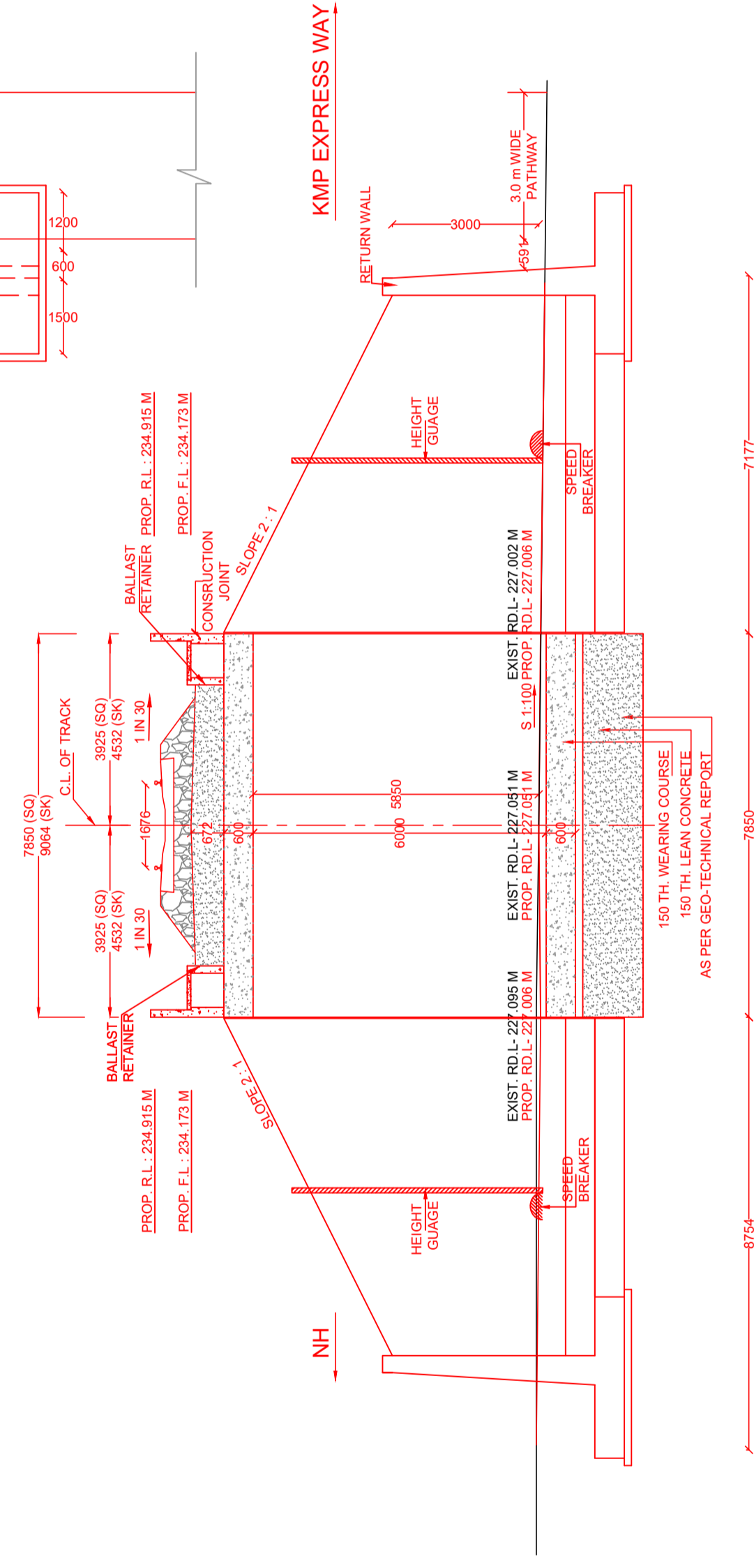
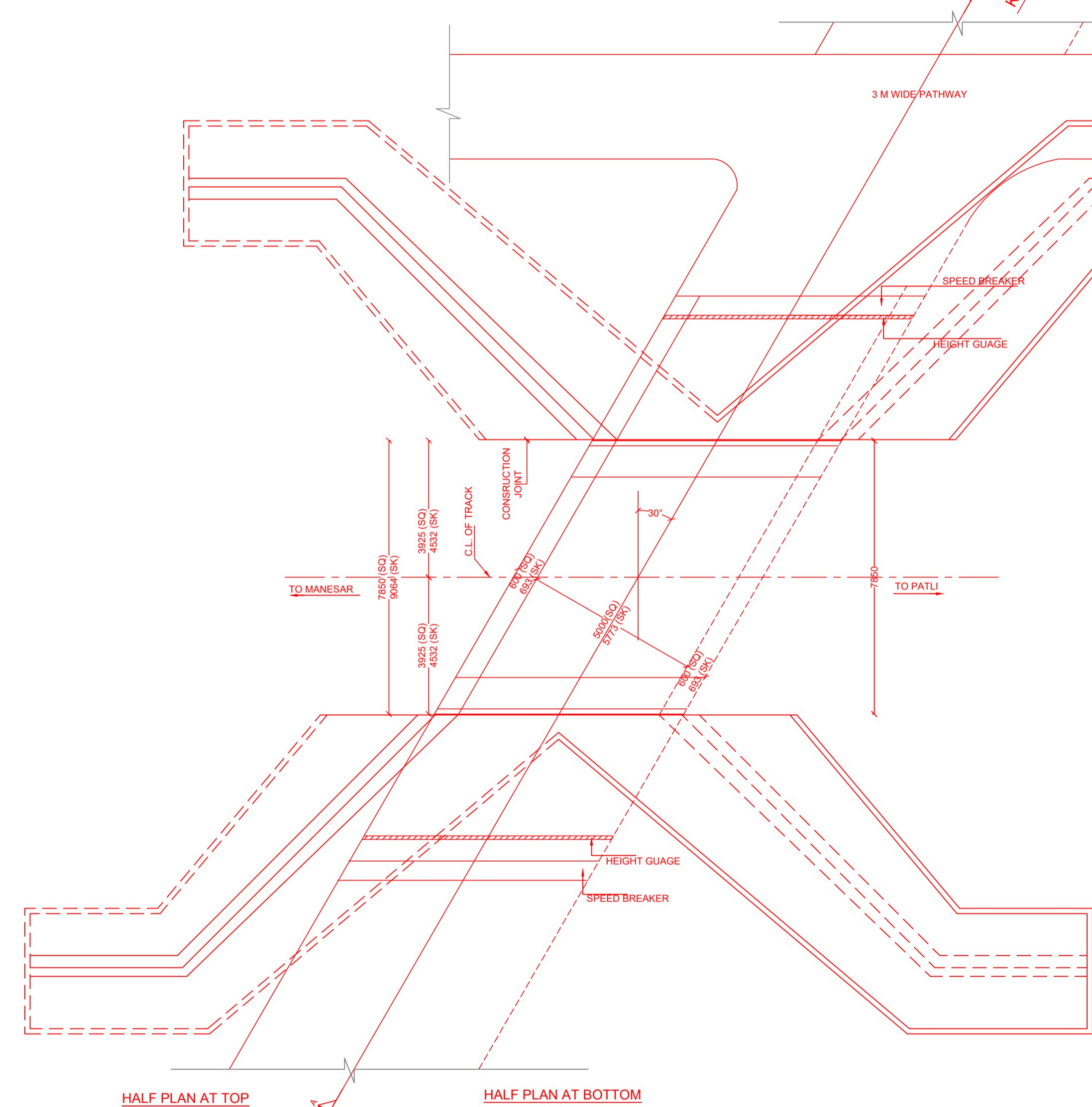
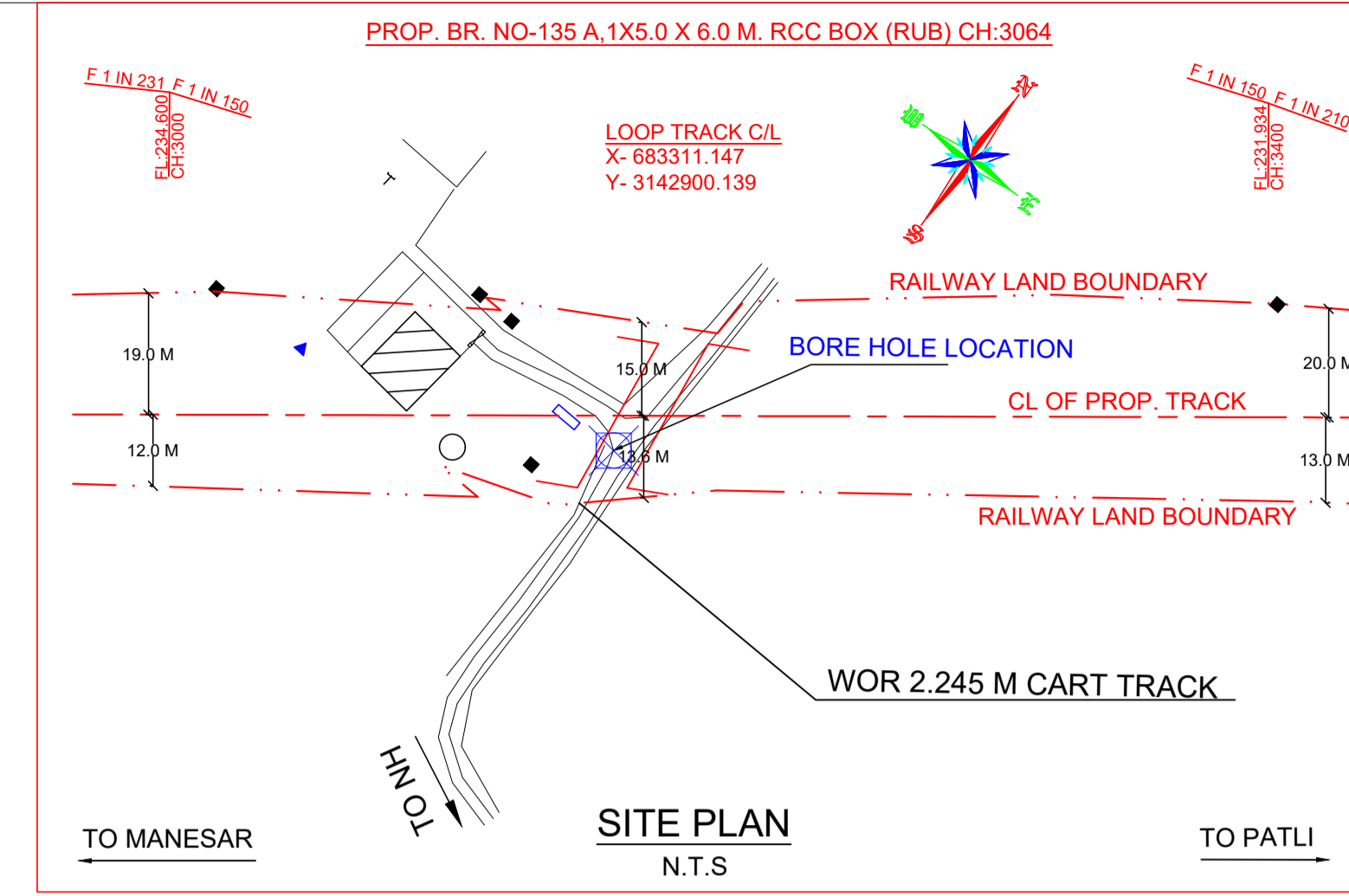
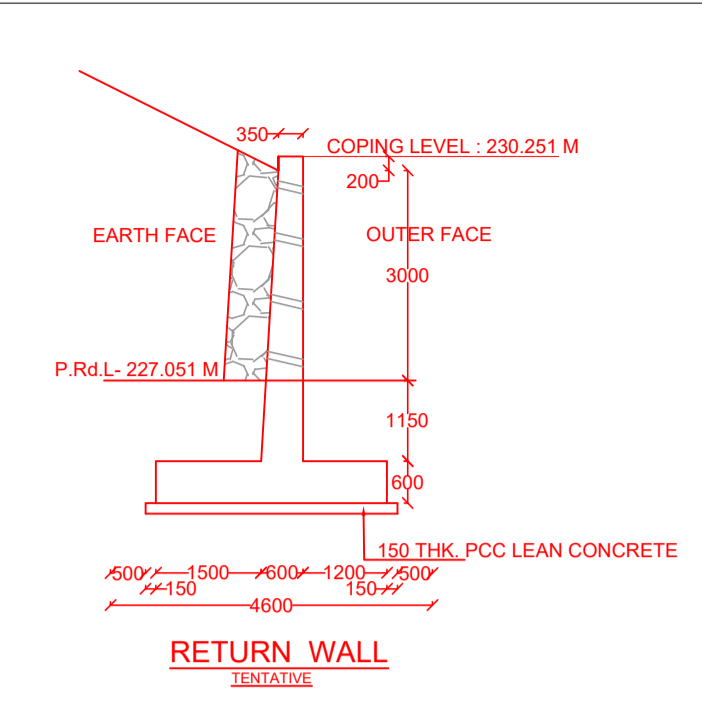
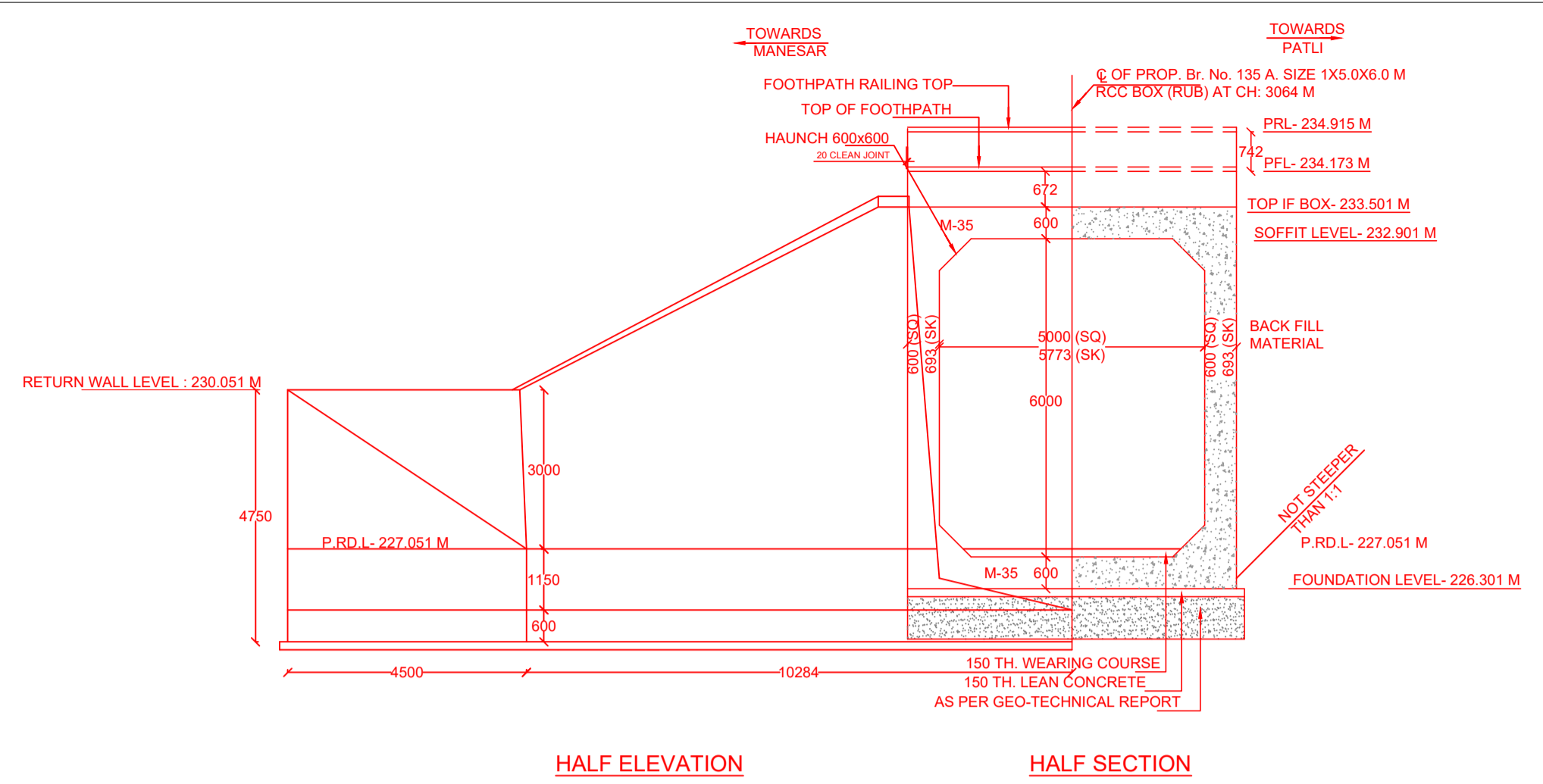
S.M.C. S.M. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smindia.com , E-Mail : support@smindia.com

R. K. DAS PROJECT INCHARGE
M. NAYAK PROJECT INCHARGE

2020-2021 A1

DRAWN BY CHECKED BY YEAR OF SURVEY P. SIZE REVISION

RELEASED FOR PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION



PROP. ROAD LEVEL	227.106	227.006	227.051	227.061	226.933	226.830	226.688	226.526			
EXIST. ROAD LEVEL	227.104	227.101	227.106	227.095	227.051	227.002	226.933	226.830	226.688	226.526	
CHAINAGES	60.000	40.000	20.000	12.679	4.533	0.000	4.533	11.102	20.000	40.000	60.000

LONGITUDINAL SECTION OF THE ROAD
NOT TO SCALE

X-683312.503
Y-3142890.406

Br. No. 135 (A)			
0.00	G.L. 227.405 N VALUE	Classification as per LS	BH-1
1.00	31	SP-SM	SANDY SOIL
2.50		SP	
4.00	24	SP	
5.50		SM	
7.00	53	SM	
8.50		SP-SM	SANDY SOIL WITH GRAVEL
10.00	>100	SM	

BORE LOG DETAILS

LEGEND

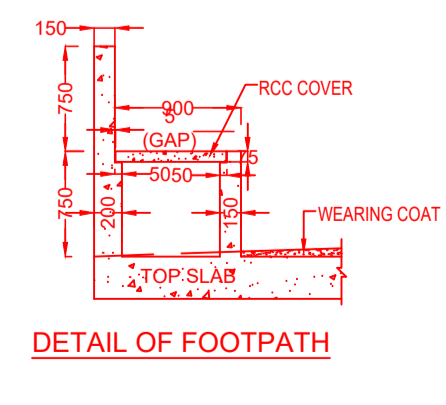
PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRDL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK	THICKNESS
ERL	EXISTING ROAD LEVEL

TRACK DETAILS

PROP R.L.	234.915 M
PROP F.L.	234.173 M
VERTICAL ALIGNMENT	150 F
HORIZONTAL ALIGNMENT	STRAIGHT

CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) WIDER PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm



NOTES:

A) GENERAL NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
- THE CHAINAGES SHOWN ARE RECKONED FROM C.I. OF PRITHALA STATION BUILDING TAKEN AS 0.00 M. WITH RESPECT TO UP MAIN LINE.
- FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
- RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
- THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRIDC.
- ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
- SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
- ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
- THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.

B) TECHNICAL NOTES:

- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
- FOR DETAILS OF R.C.C BOX DETAILED DESIGN TO BE FOLLOWED.
- WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
- FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
- ALL CLEAN EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHYDE SEALANT FILLING.
- PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
- DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
- FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
- DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
(i) IRS BRIDGE RULE
(ii) IRS CONCRETE BRIDGE CODE
(iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
- SEISMIC ZONE- IV
- EXPOSURE CONDITION- MODERATE.
- DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST.
- THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
- ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM.
- REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
- FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE. GRADE OF CONCRETE :
(i) ALL RCC = M-35/DETAILED DESIGN DRG.
(ii) WEARING COURSE = M-20/DETAILED DESIGN DRG.
(iii) LEVELING COURSE/LEAN CONCRETE = M-20/DETAILED DESIGN DRG.
- FOUNDATION PRESSURE(F/P) AND SAFE BEARING CAPACITY(SBC)
a. FOR BOX & RETURN WALL - PLEASE REFER DETAILED DESIGN DRAWING.
b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
- HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
- REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
- FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE CORPORATION LIMITED (HRIDC)

Project:- HARYANA ORBITAL RAIL CORRIDOR (HORC)

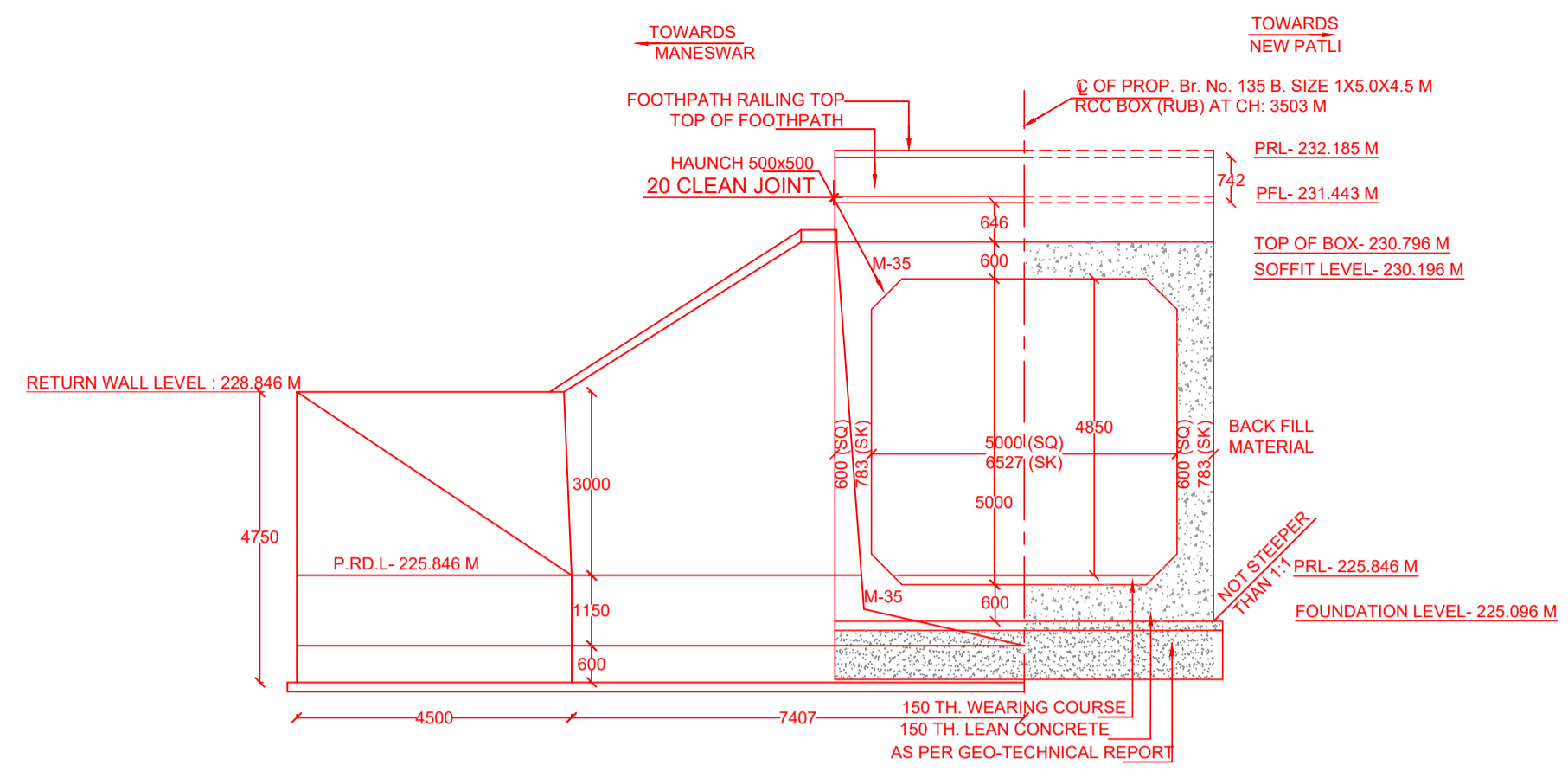
GENERAL ARRANGEMENT DRAWING FOR ROAD UNDER BRIDGE NO.- 135 A, 1X5.0X6.0M RCC BOX, AT CH:3064 M (CONNECTIVITY LINE)

SCALE: N.T.S DRAWING NO- HRIDC/PS/BR/GAD-10

S.M.C. S.M. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcdia.com , E-Mail : support@smcdia.com

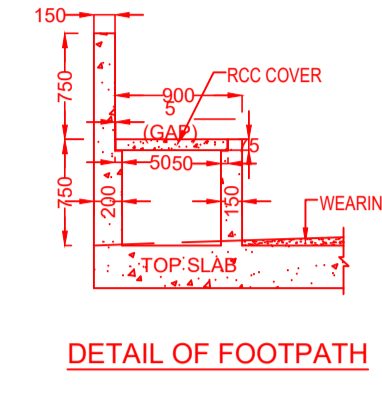
R. K. DAS **M. NAYAK**
DRAWN BY CHECKED BY
YEAR OF SURVEY 2020-2021 P. SIZE A1 REVISION

RELEASED FOR PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION

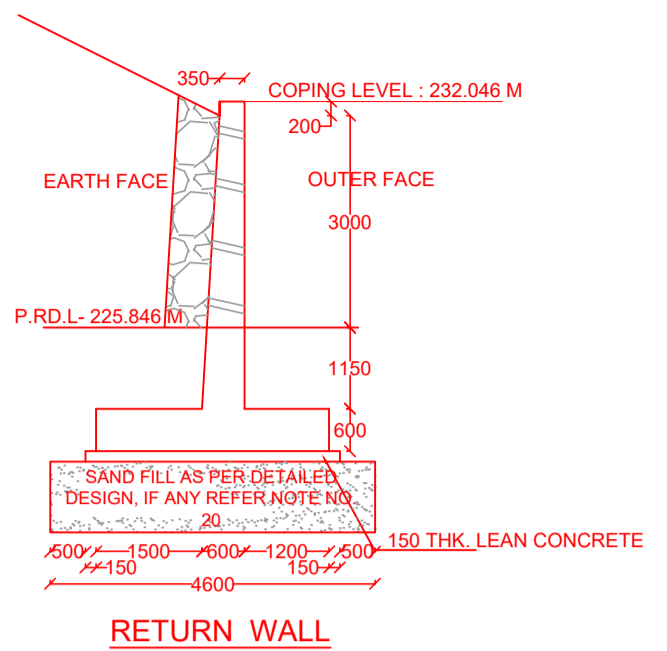


HALF ELEVATION

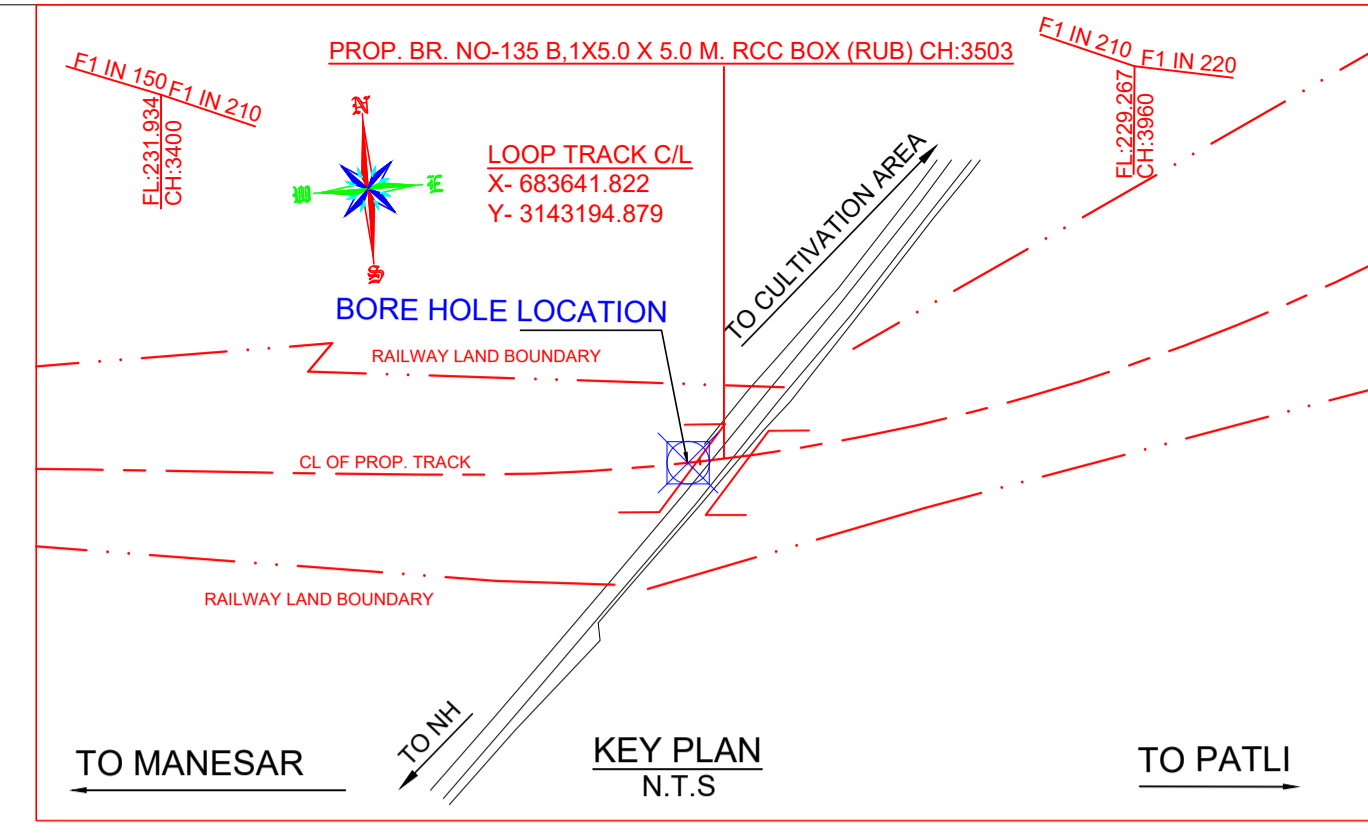
HALF SECTION



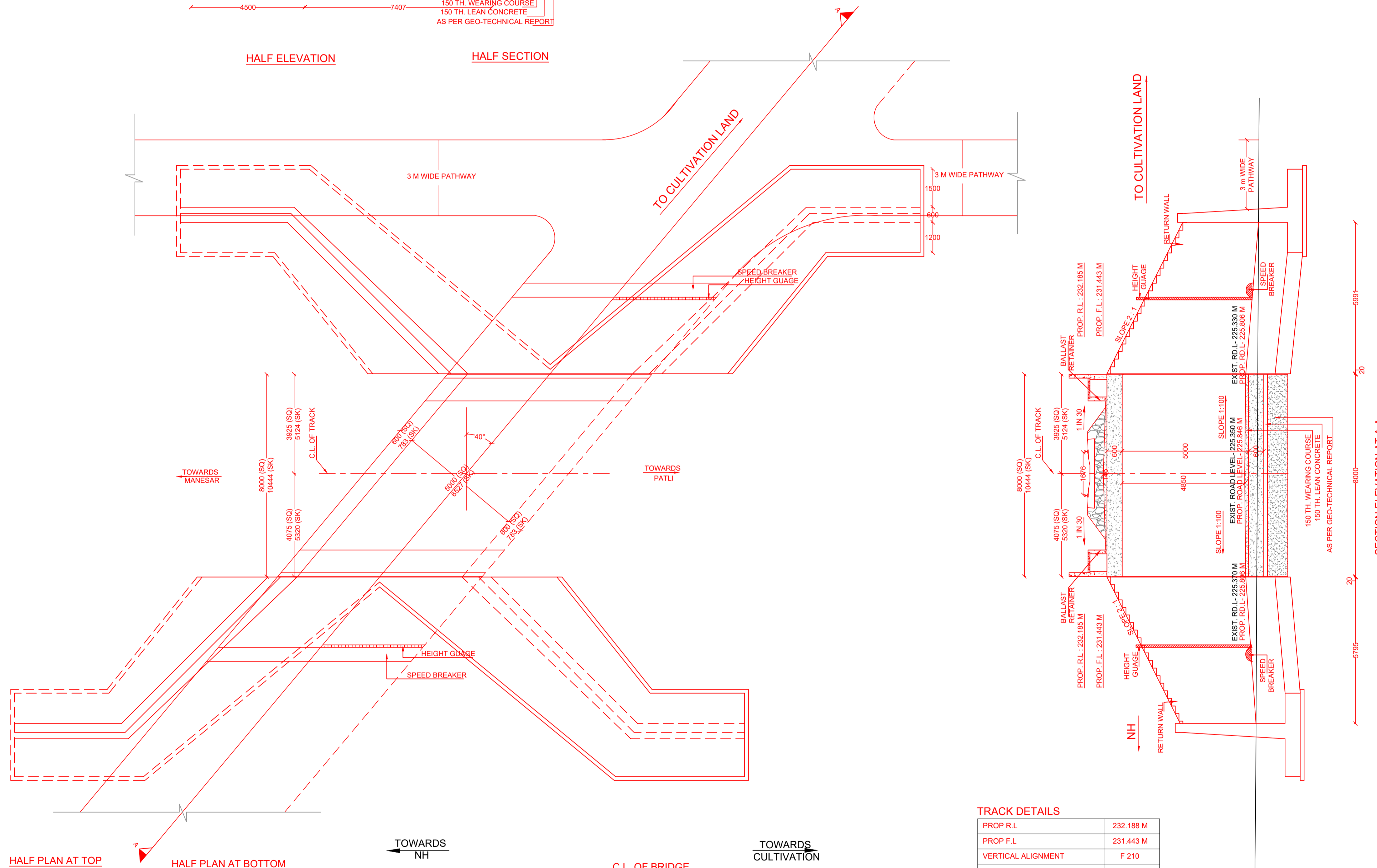
DETAIL OF FOOTPATH



RETURN WALL



KEY PLAN N.T.S.



HALF PLAN AT TOP

HALF PLAN AT BOTTOM

TRACK DETAILS

PROP. R.L.	232.188 M
PROP. F.L.	231.443 M
VERTICAL ALIGNMENT	F 210
HORIZONTAL ALIGNMENT	CURVE

CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) WIDER PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRDL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK.	THICKNESS
ERL	EXISTING ROAD LEVEL

BOREHOLE DETAILS

DEPTH (M)	G.L. - 224.900	N VALUE	Classification as per LS	BH-1
1.00		18	SM	SANDY SOIL CLAYISH SANDY SOIL
2.50			SM	
4.00		32	SP-SM	
5.50			SP-SM	
7.00		51	SM	
8.50			SM	
10.00		56	SM	
11.50			SM	
13.00		80	SM	

LONGITUDINAL SECTION OF THE ROAD

DATUM : 215

CHAINAGES	80.000	60.000	40.000	20.000	8.005	6.000	4.000	2.000	40.000	60.000	80.000	100.000
PROP. ROAD LEVEL				226.198	225.993	225.993	225.993	225.993	225.412			
EXIST. ROAD LEVEL	224.937	225.910	225.716	225.486	225.993	225.993	225.993	225.993	225.115	225.108	225.081	225.024

LONGITUDINAL SECTION OF THE ROAD NOT TO SCALE

GC/HORC

SUPR. AGRAWAL DPS/CIVIL	
REETU PRICAL EE-CIVIL/DESIGN	
PUSHPENDRA KUMAR SINGH ARE-CIVIL/DESIGN	

HRIDC

SHY AN DAVEDI CPM/HRIDC	
Uma M. CHO DPM/C-1	
Virend Kumar EXECUTIVE/CON.	

- NOTES:**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHANGES SHOWN ARE RECKONED FROM C.L. OF PRITHALA STATION BUILDING TAKEN AS 0.00 M. WITH RESPECT TO CL MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRIDC.
 - ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES:**
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR DETAILS OF R.C.C BOX DETAILED DESIGN TO BE FOLLOWED.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
 - IRS BRIDGE RULE
 - IRS CONCRETE BRIDGE CODE
 - IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE- IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST.
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.484 K.G/SQ.M.
 - REINFORCEMENT SHALL BE Fe 600 (TMT) CONFORMING TO IS 1786 - 2008. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE. GRADE OF CONCRETE :
 - ALL RCC =M:35/DETAILED DESIGN DRG.
 - WEARING COURSE =M:20/DETAILED DESIGN DRG.
 - LEVELING COURSE/LEAN CONCRETE =M:20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE (FP) AND SAFE BEARING CAPACITY (SBC)
 - FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
 - FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
 - IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RD50 STANDARD DRAWING NO. RD50/M/0001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE PROVIDED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC LOADING (32.5 T AXEL LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

Project:- **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

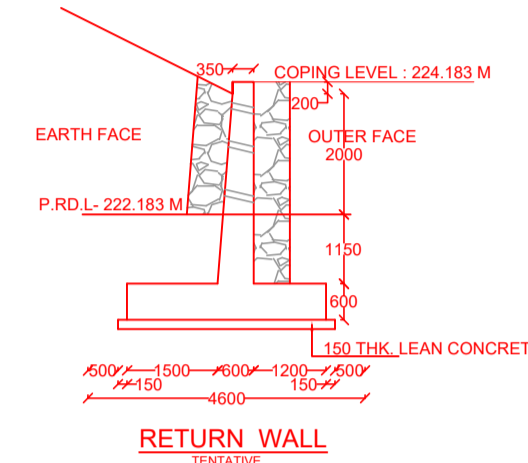
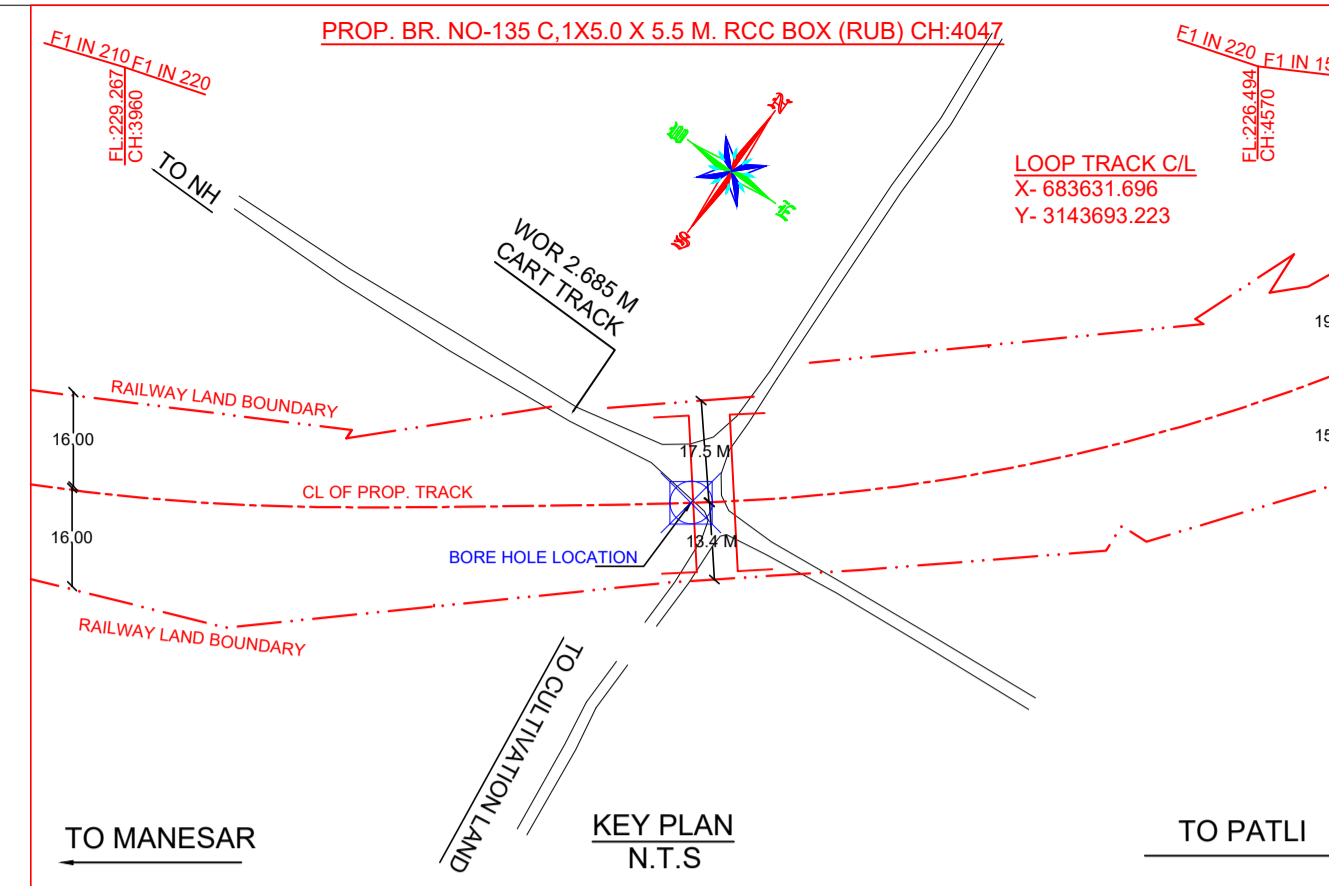
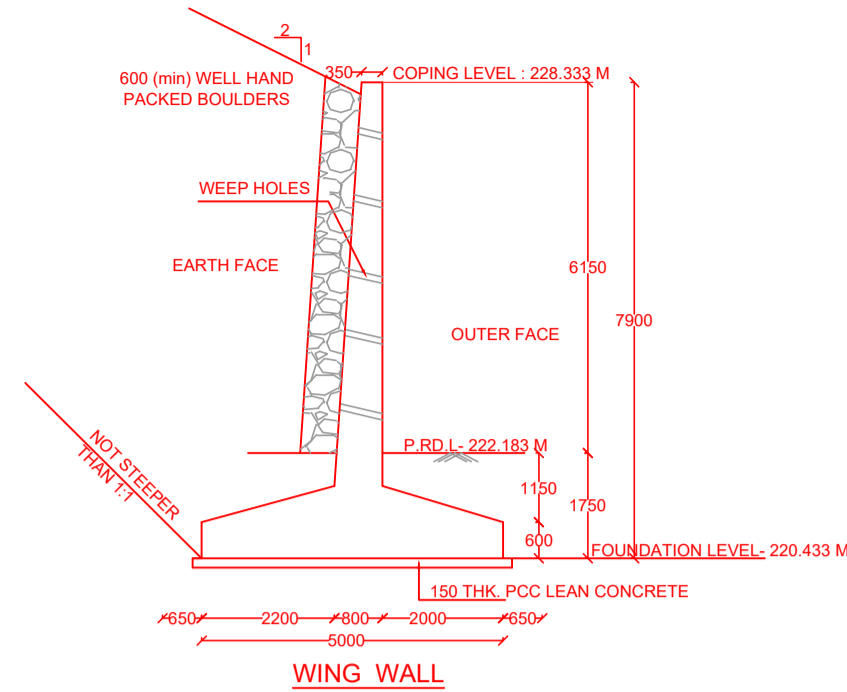
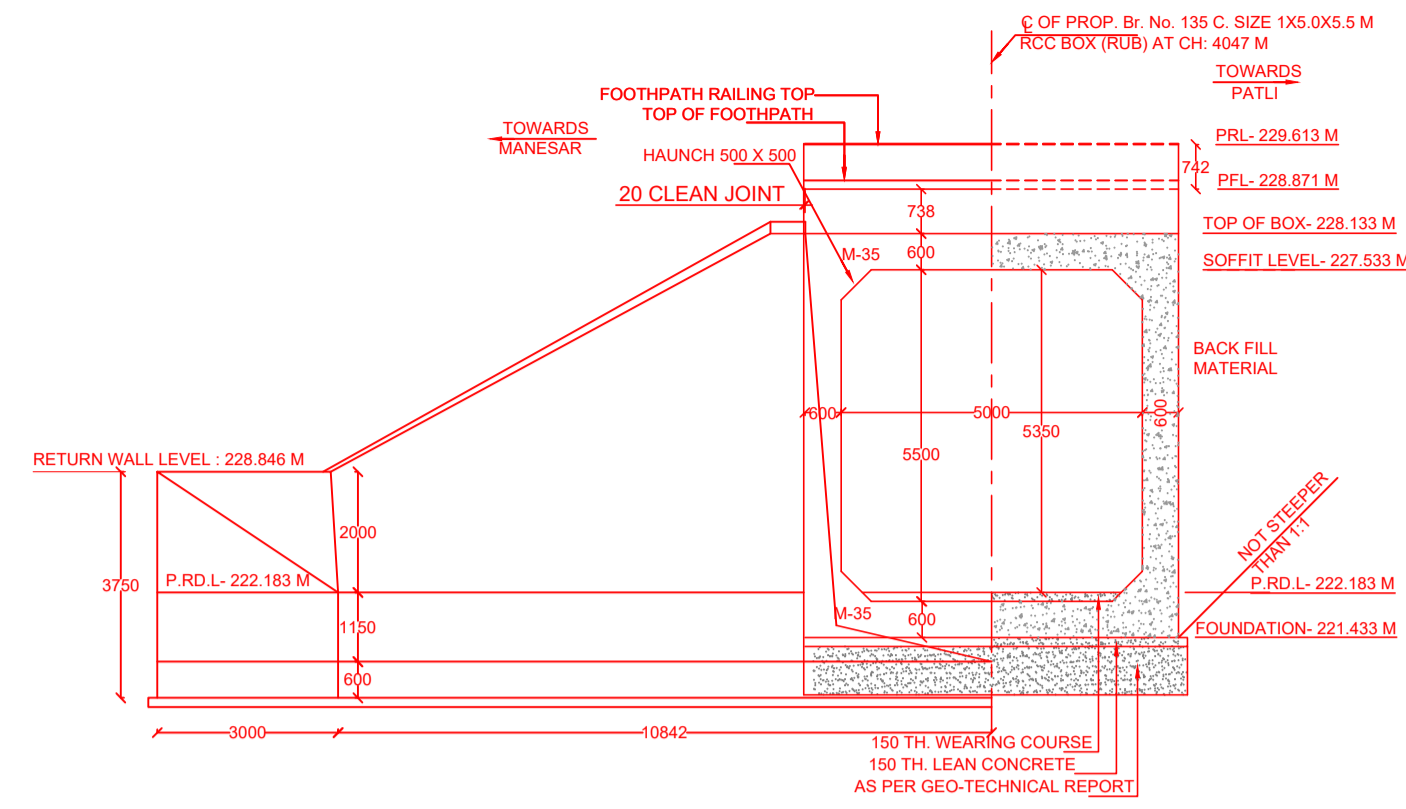
GENERAL ARRANGEMENT DRAWING FOR ROAD UNDER BRIDGE NO.- 135 B, 1X5.0X5.0 M RCC BOX, AT CH:3503 M (CONNECTIVITY LINE)

SCALE: N.T.S DRAWING NO- HRIDC/PS/BR/GAD-11

S.M.C CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smccindia.com , E-Mail : support@smccindia.com

R. K. DAS	M. NAYAK	A. A. SAMANT PROJECT INCHARGE	2020-2021	A1
DRAWN BY	CHECKED BY	YEAR OF SURVEY	P. SIZE	REVISION

RELEASED FOR PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION



CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) WIDER PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

TRACK DETAILS

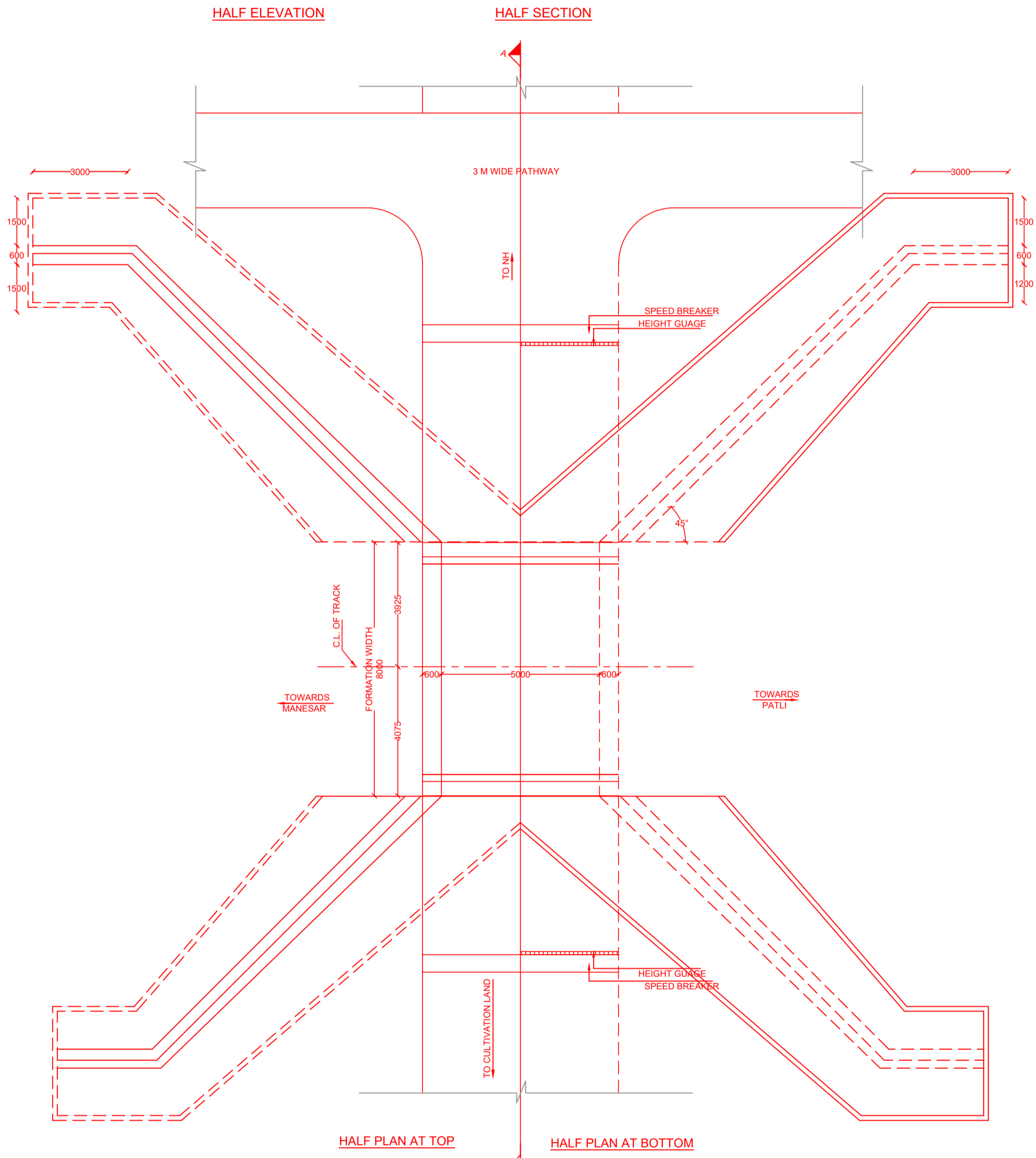
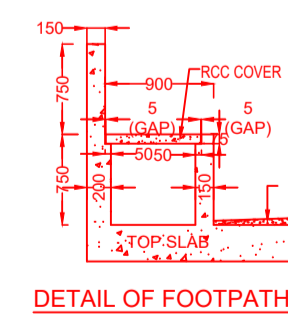
PROP R.L	229.613 M
PROP F.L	228.871 M
VERTICAL ALIGNMENT	F 220
HORIZONTAL ALIGNMENT	CURVE

LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRDL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK.	THICKNESS
ERL	EXISTING ROAD LEVEL

X-3143680.851
Y-683623.258
Br. No. 135 (C)

0.00 G.L. - 222.450 N VALUE		Classification as per LS BH-1	
1.00	12	SP-SM	SANDY SOIL
2.50		SM	
4.00	39	SM	SANDY SOIL WITH GRAVEL
5.50		SP-SM	
7.00	51	SM	
8.50		SP-SM	
10.00	83	SP-SM	



DATUM : 210

PROP. ROAD LEVEL	222.138														
EXIST. ROAD LEVEL	222.654	222.511	222.198	222.198	222.276	222.144	222.183	221.937	222.198	221.384	221.386	221.354	221.305	221.260	221.239
CHAINAGES	60.000	40.000	20.000	12.084	4.075	0.000	3.925	12.709	20.000	40.000	60.000	80.000	100.000	120.000	

LONGITUDINAL SECTION OF THE ROAD
NOT TO SCALE

GC/HORC	
SUBHJ AGRAWAL DR/SIVL	Asstt
REETO PRADL RS-CIVIL/DRS/EN	Asstt
PUNJABAN KUMAR SINGH MRD-CIVIL/DRS/EN	Asstt

HRIDC	
SUNAM DAVEJI CIVIL/HRIDC	Asstt
UNAM KAO DR/HRIC-I	Asstt
VIJAY KUMAR ENGINEER/HRIC	Asstt

NOTES :

A) GENERAL NOTES

- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
- THE CHAINAGES SHOWN ARE RECKONED FROM CL OF PRITHALA STATION BUILDING TAKEN AS 0.00 M. WITH RESPECT TO UP MAIN LINE.
- FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
- RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
- THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRIDC.
- ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
- SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
- ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE/OPC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SS/IS/AD/STC ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
- THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.

B) TECHNICAL NOTES :

- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
- FOR DETAILS OF R.C.C BOX DETAILED DESIGN TO BE FOLLOWED.
- WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
- FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
- ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
- PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
- DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
- FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
- DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
 - IRS BRIDGE RULE
 - IRS CONCRETE BRIDGE CODE
 - IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
- SEISMIC ZONE-IV
- EXPOSURE CONDITION- MODERATE.
- DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
- THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
- ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G./SQM.
- REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
- FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.

GRADE OF CONCRETE :

 - ALL RCC =M:35/DETAILED DESIGN DRG.
 - WEARING COURSE =M:20/DETAILED DESIGN DRG.
 - LEVELING COURSE/LEAN CONCRETE =M:20/DETAILED DESIGN DRG.
- FOUNDATION PRESSURE (FP) AND SAFE BEARING CAPACITY (SBC)
 - FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
 - FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
 - IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
- HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
- REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
- FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC LOADING (32.5 T AXEL LOAD)



HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

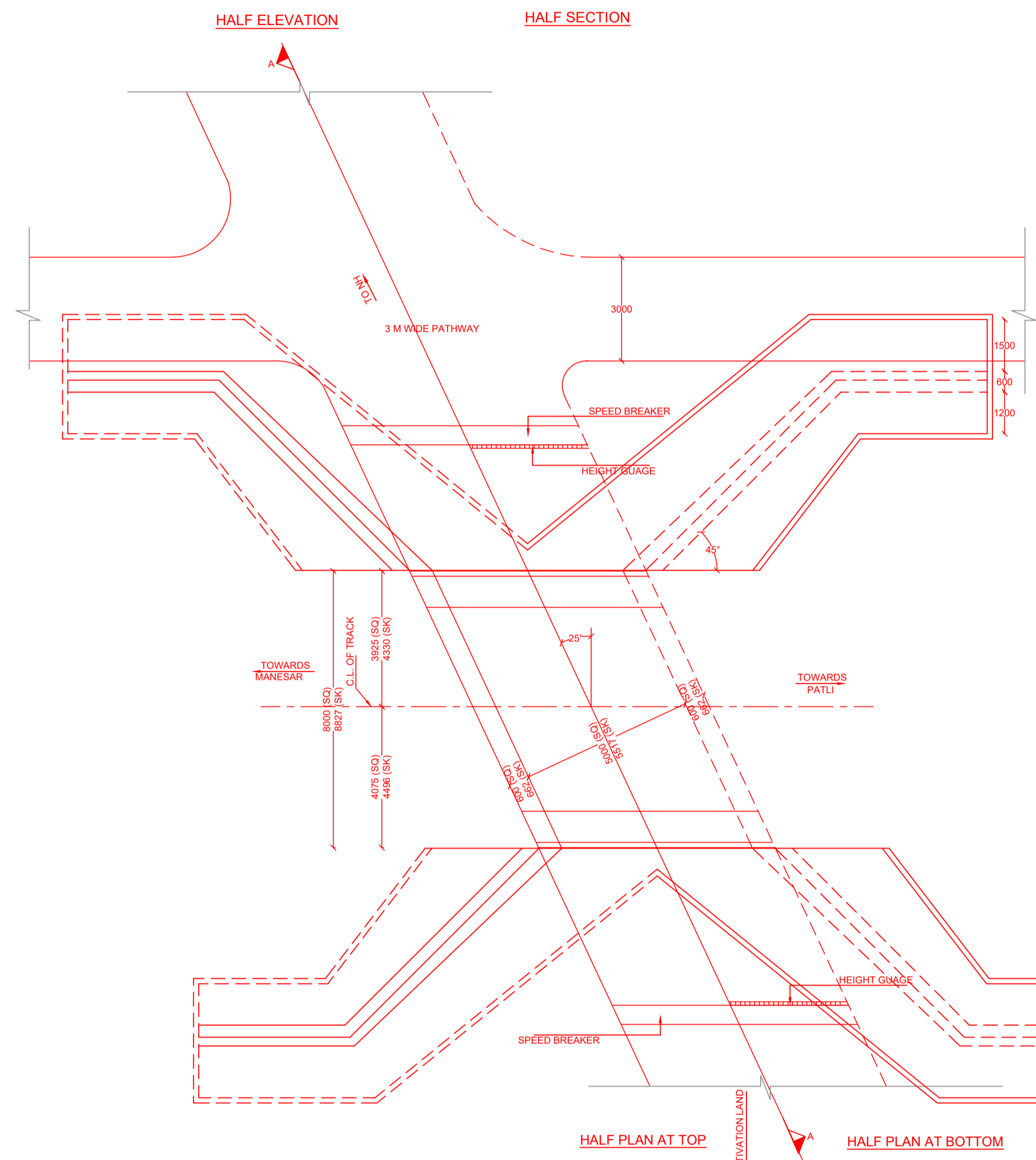
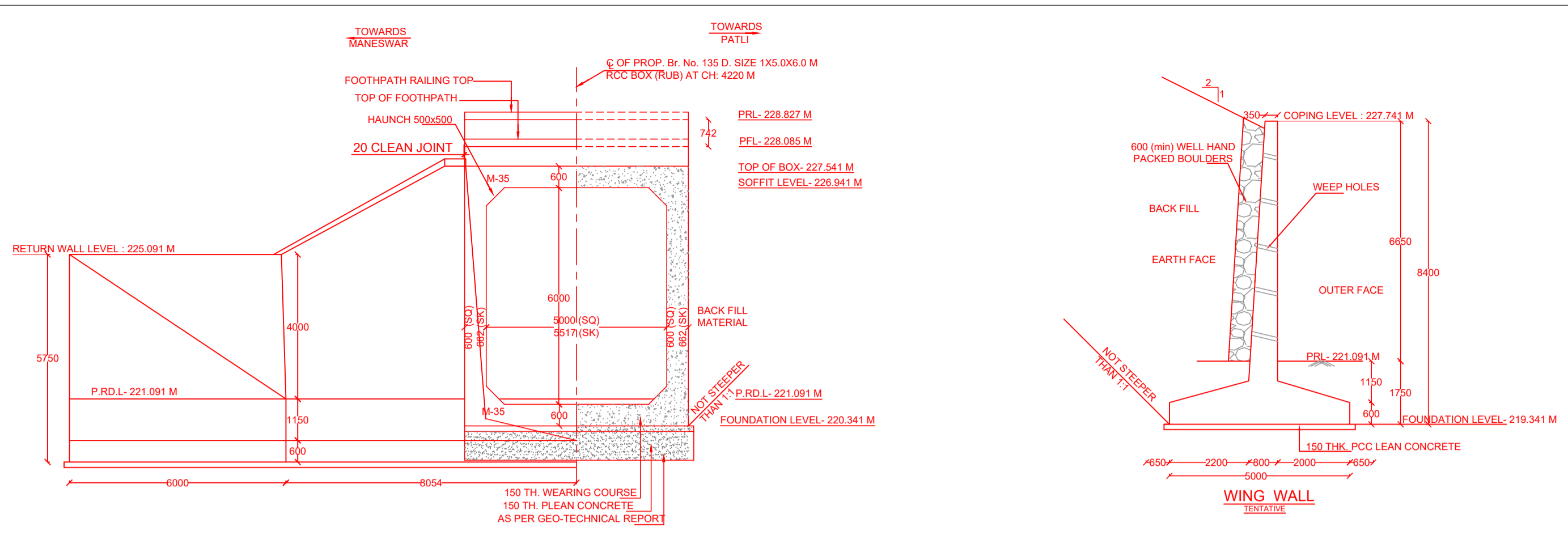
Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

GENERAL ARRANGEMENT DRAWING
FOR ROAD UNDER BRIDGE NO.- 135 C,
1X5.0X5.5 M RCC BOX, AT CH:4047 M (CONNECTIVITY LINE)

SCALE: N.T.S DRAWING NO- HRIDC/PS/BR/GAD-12

S.M.C. **S.M. CONSULTANTS**
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcindia.com , E-Mail : support@smcindia.com

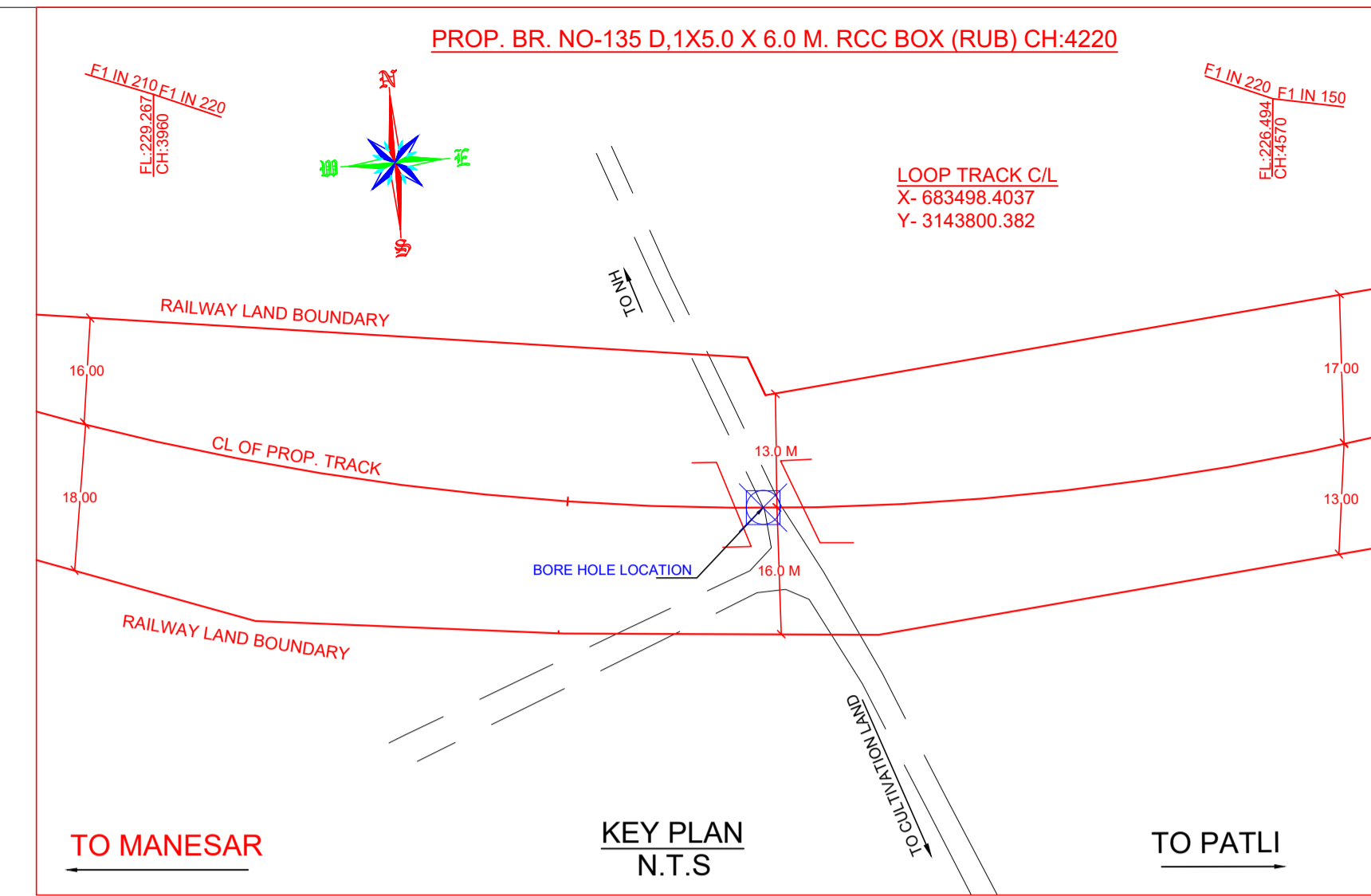
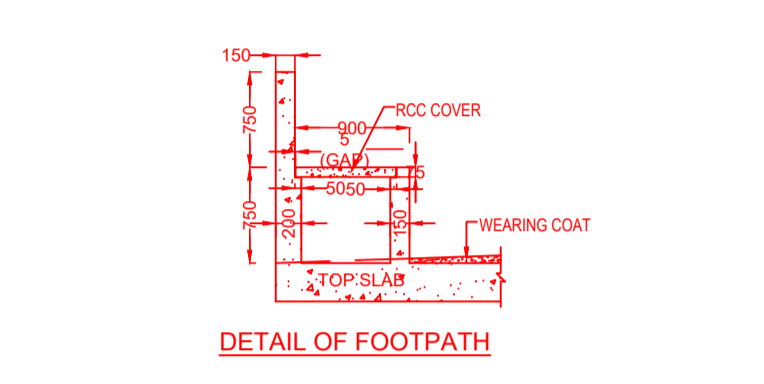
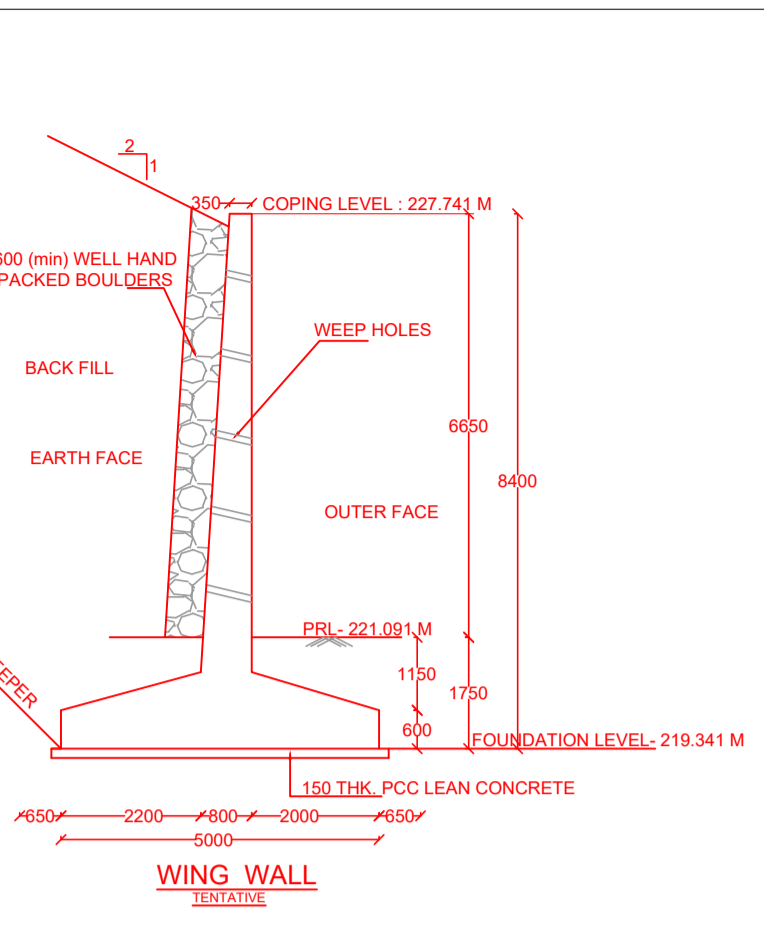
R. K. DAS	M. NAYAK	A. A. SAMANT PROJECT INCHARGE	
		2020-2021	A1
DRAWN BY	CHECKED BY	YEAR OF SURVEY	P. SIZE
RELEASED FOR	PRELIMINARY FOR APPROVAL	<input checked="" type="checkbox"/> TENDER	<input type="checkbox"/> CONSTRUCTION



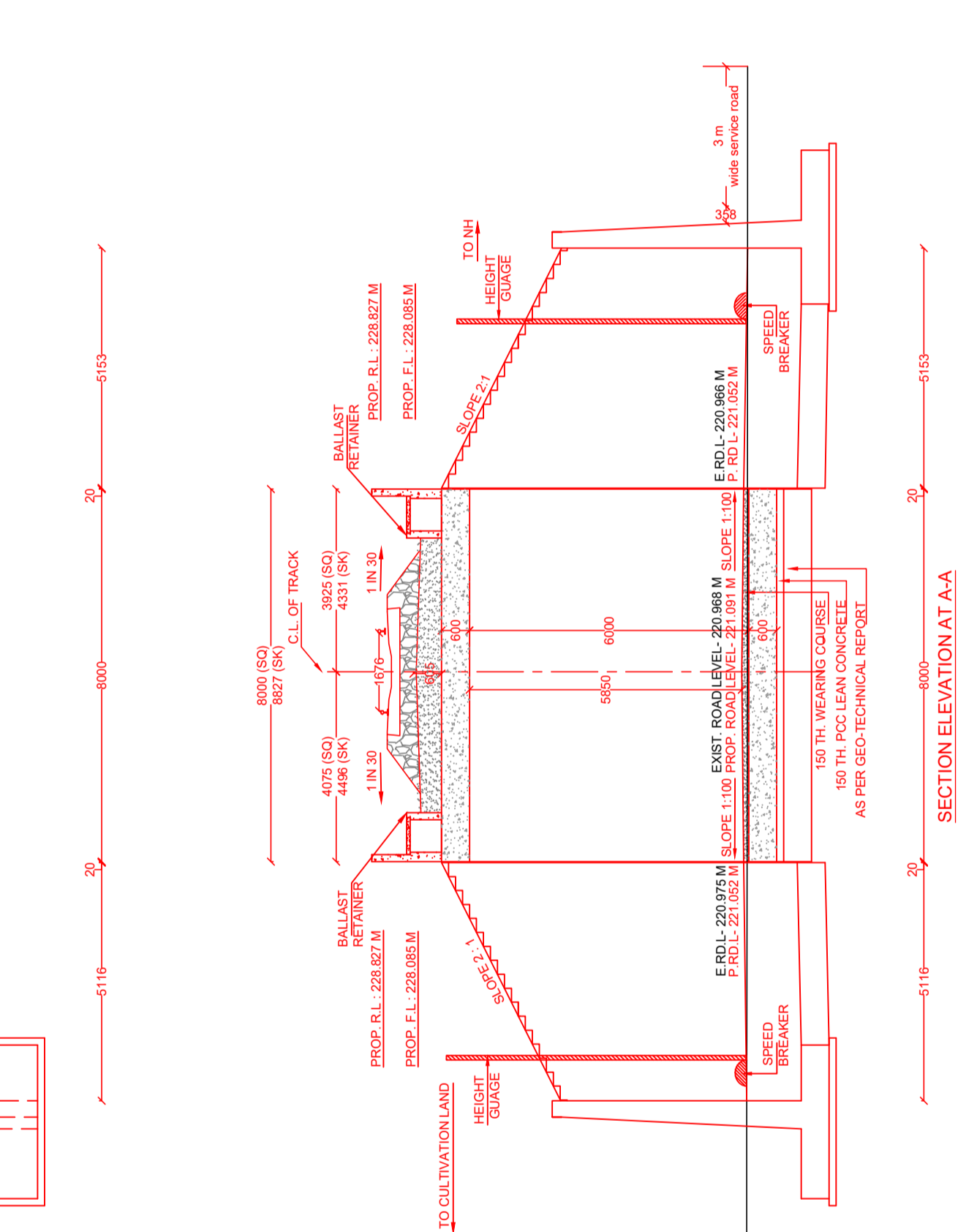
DATUM : 210

PROP. ROAD LEVEL	220.983 221.052 221.091 221.052 220.980														
EXIST. ROAD LEVEL	221.141	221.066	220.991	221.075	220.984	220.983	220.975	220.968	220.981	220.981	221.031	221.078	221.126	221.216	
CHAINAGES	100.000	80.000	60.000	40.000	20.000	9.136	4.000	0.000	4.000	9.173	20.000	40.000	60.000	80.000	100.000

LONGITUDINAL SECTION OF THE ROAD
NOT TO SCALE



KEY PLAN
N.T.S

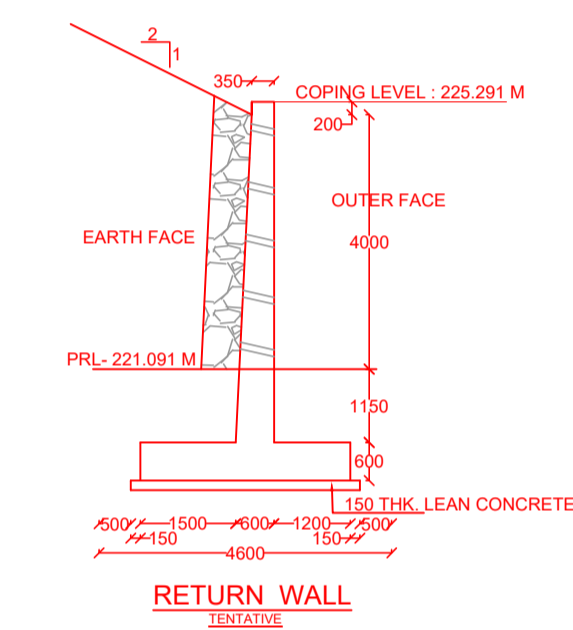


CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) WIDER PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

TRACK DETAILS

PROP R.L.	228.827 M
PROP F.L.	228.085 M
VERTICAL ALIGNMENT	F 220
HORIZONTAL ALIGNMENT	CURVE



RETURN WALL
DETAILS

LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRDL	PROPOSED ROAD LEVEL
CL	CENTER LINE
THK.	THICKNESS
ERL	EXISTING ROAD LEVEL

X-683499.233
Y-3143805.105

Br. No. 135 (D)

0.00 G.L. - 221.989 N VALUE	Classification as per IS	BH-1
1.00	17	SP-SM
2.50		SM
4.00	29	SM
5.50		SP-SM
7.00	56	SM
8.50		SM
10.00	73	SP
11.50		SP-SM
13.00	68	SM

BORE LOG

GC/HORC

Subir Kataria	HRIC
RETO PATIL	HRIC
Puneet Kumar Singh	HRIC

HRIC

Shiv Anand	HRIC
Uma K	HRIC
Shiv Anand	HRIC

- NOTES:**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION. RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRIC.
 - ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRIC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES:**
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR DETAILS OF R.C.C BOX DETAILED DESIGN TO BE FOLLOWED.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
(i) IRS BRIDGE RULE
(ii) IRS CONCRETE BRIDGE CODE
(iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE- IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE :
(i) ALL RCC =M:35/DETAILED DESIGN DRG.
(ii) WEARING COURSE =M:20/DETAILED DESIGN DRG.
(iii) LEVELING COURSE/LEAN CONCRETE =M:20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE(FP) AND SAFE BEARING CAPACITY(SBC)
a. FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIC)

Project:- HARYANA ORBITAL RAIL CORRIDOR (HORC)

GENERAL ARRANGEMENT DRAWING
FOR ROAD UNDER BRIDGE NO.- 135 D,
1X5.0X6.0 M RCC BOX, AT CH:4220 M (CONNECTIVITY LINE)

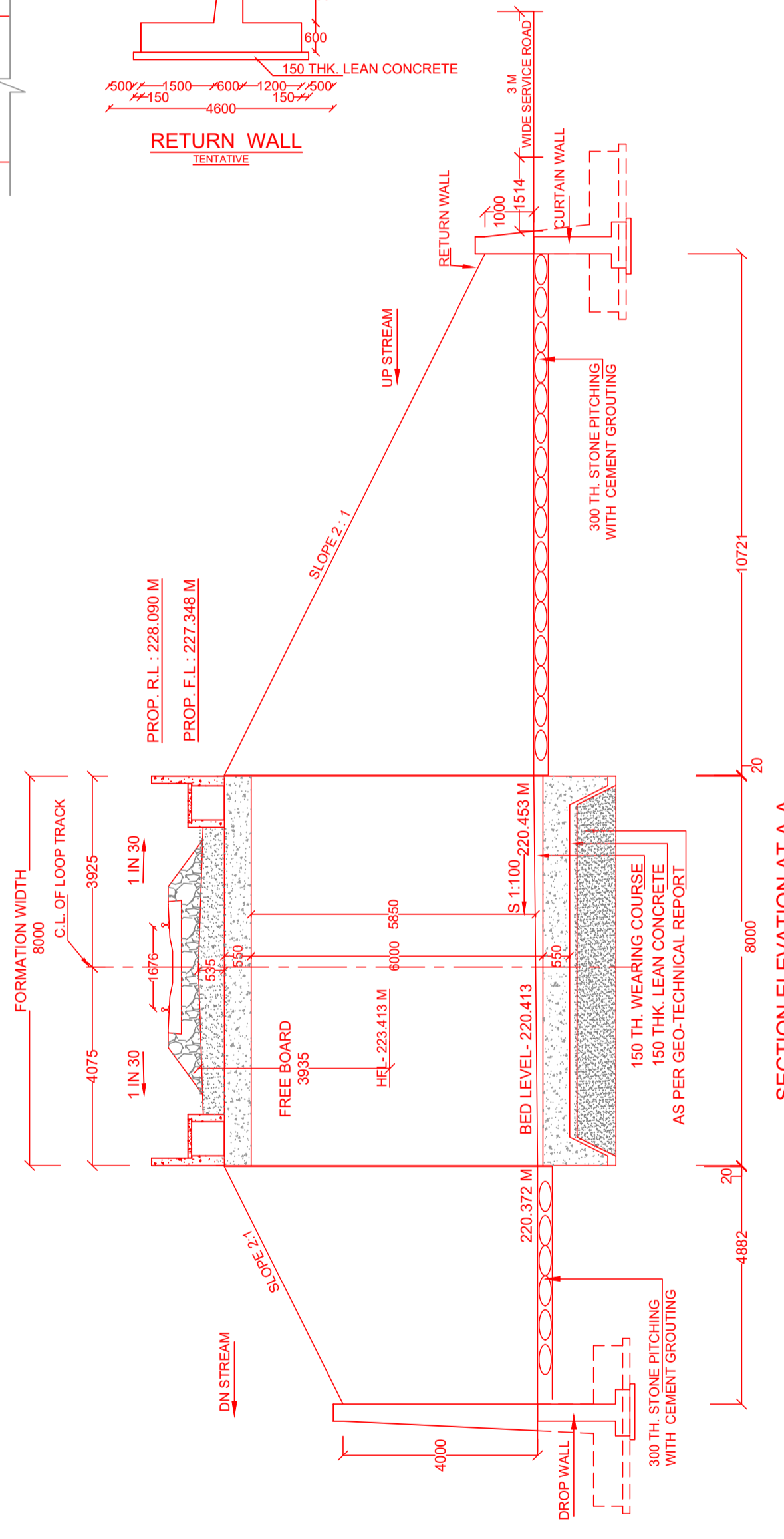
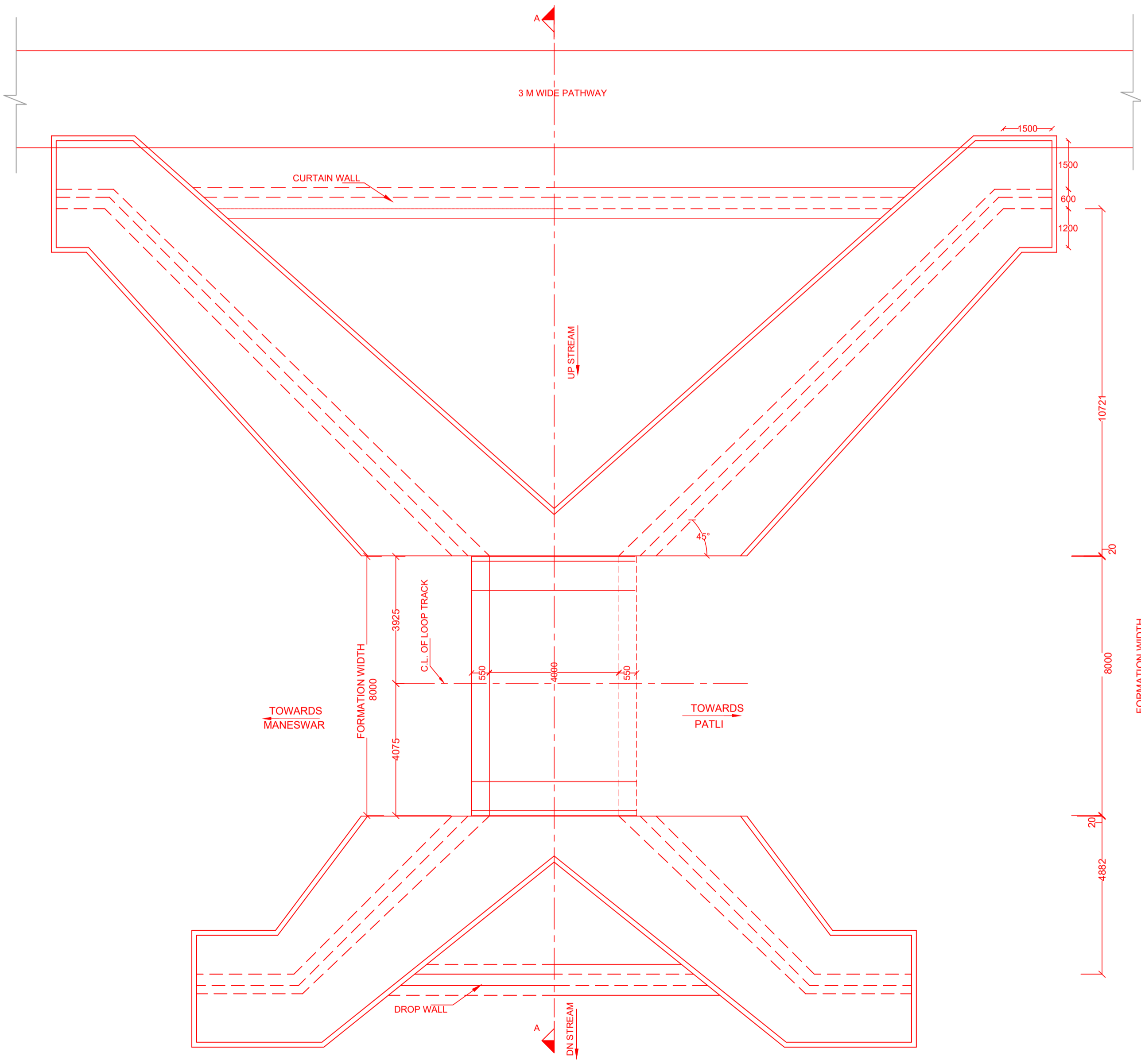
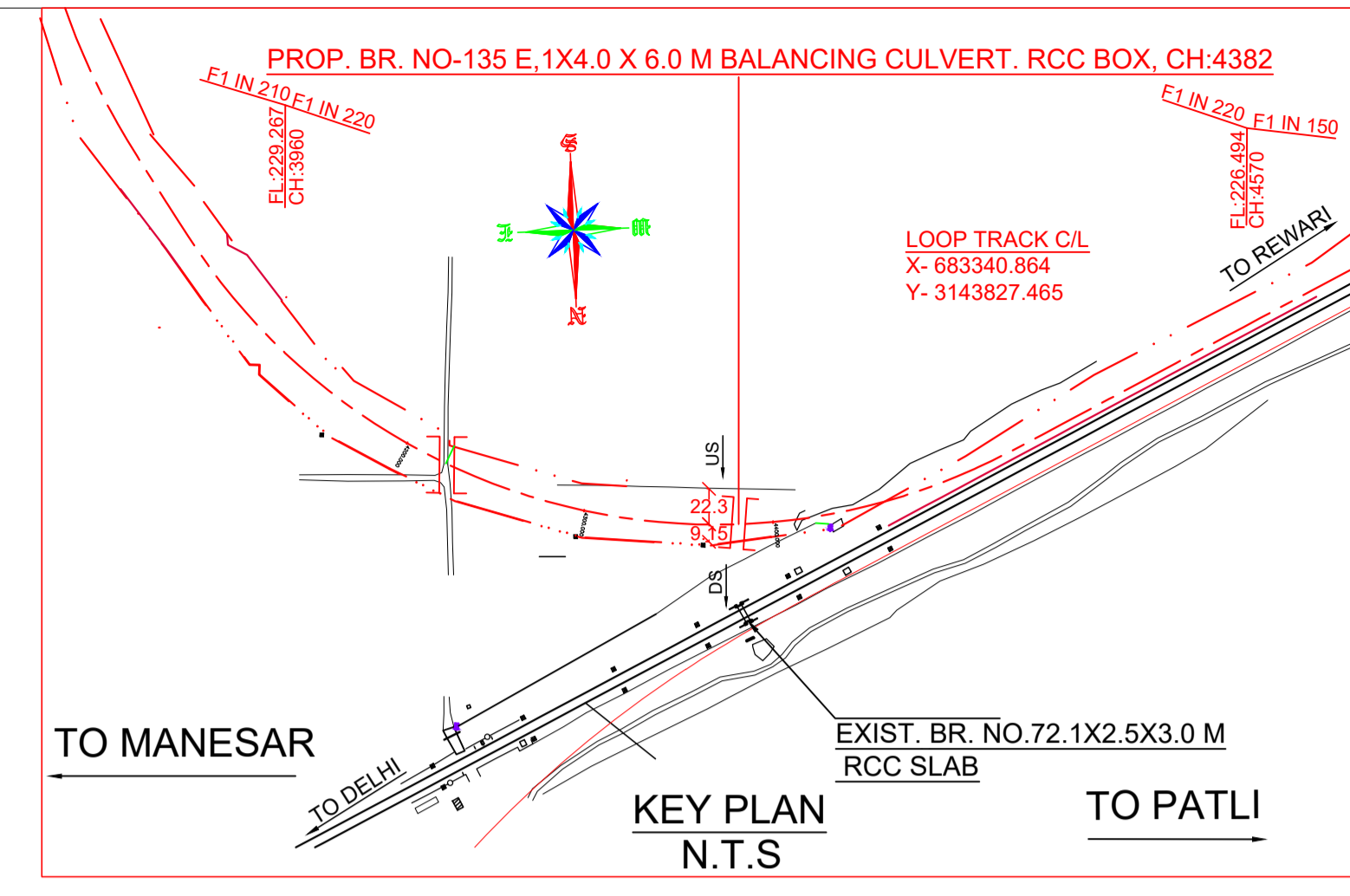
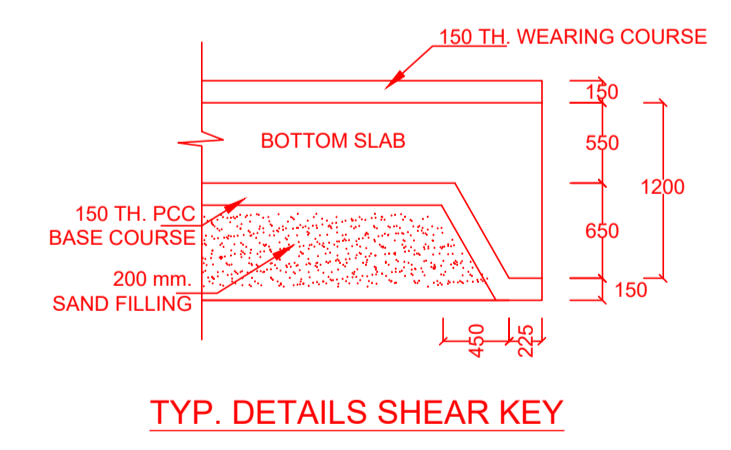
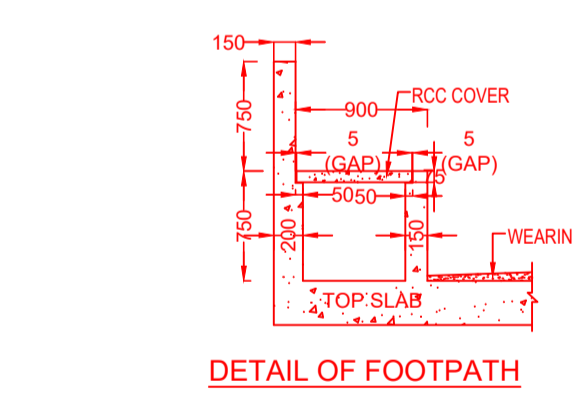
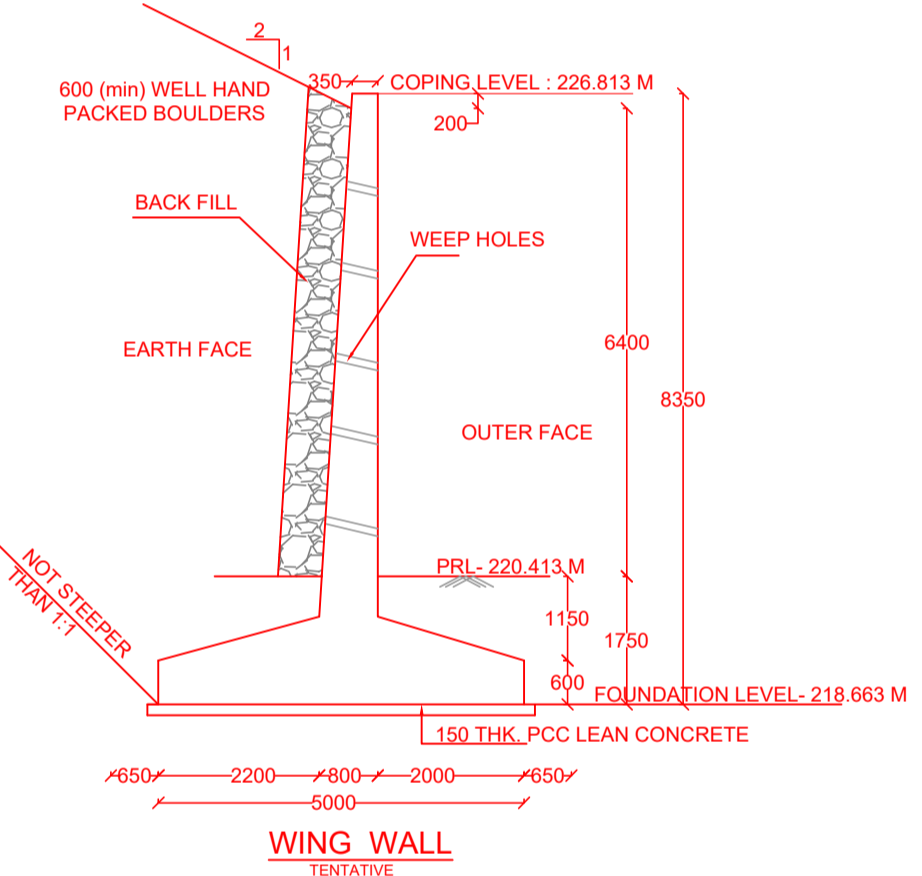
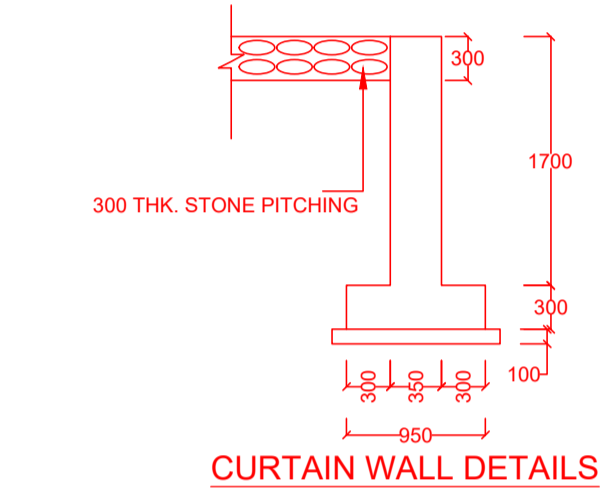
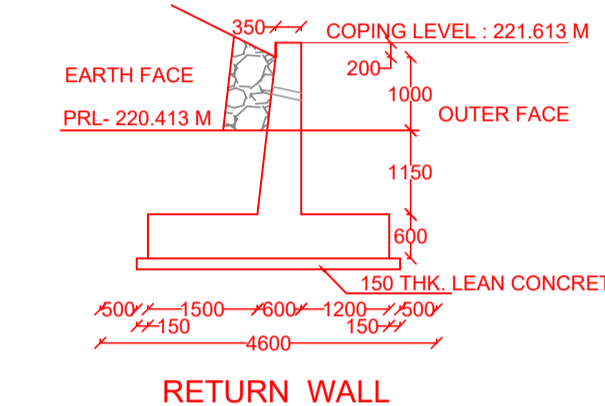
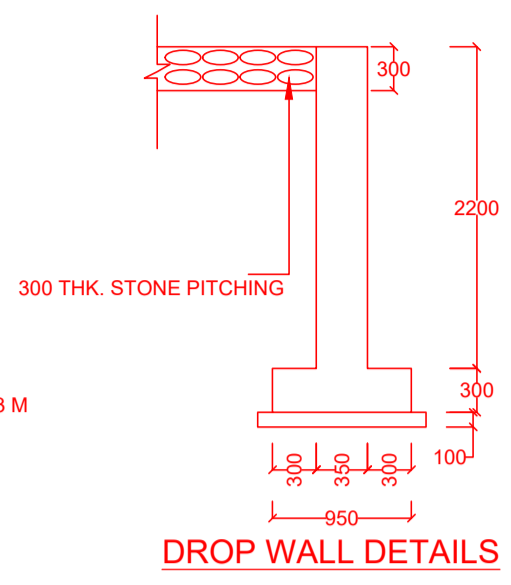
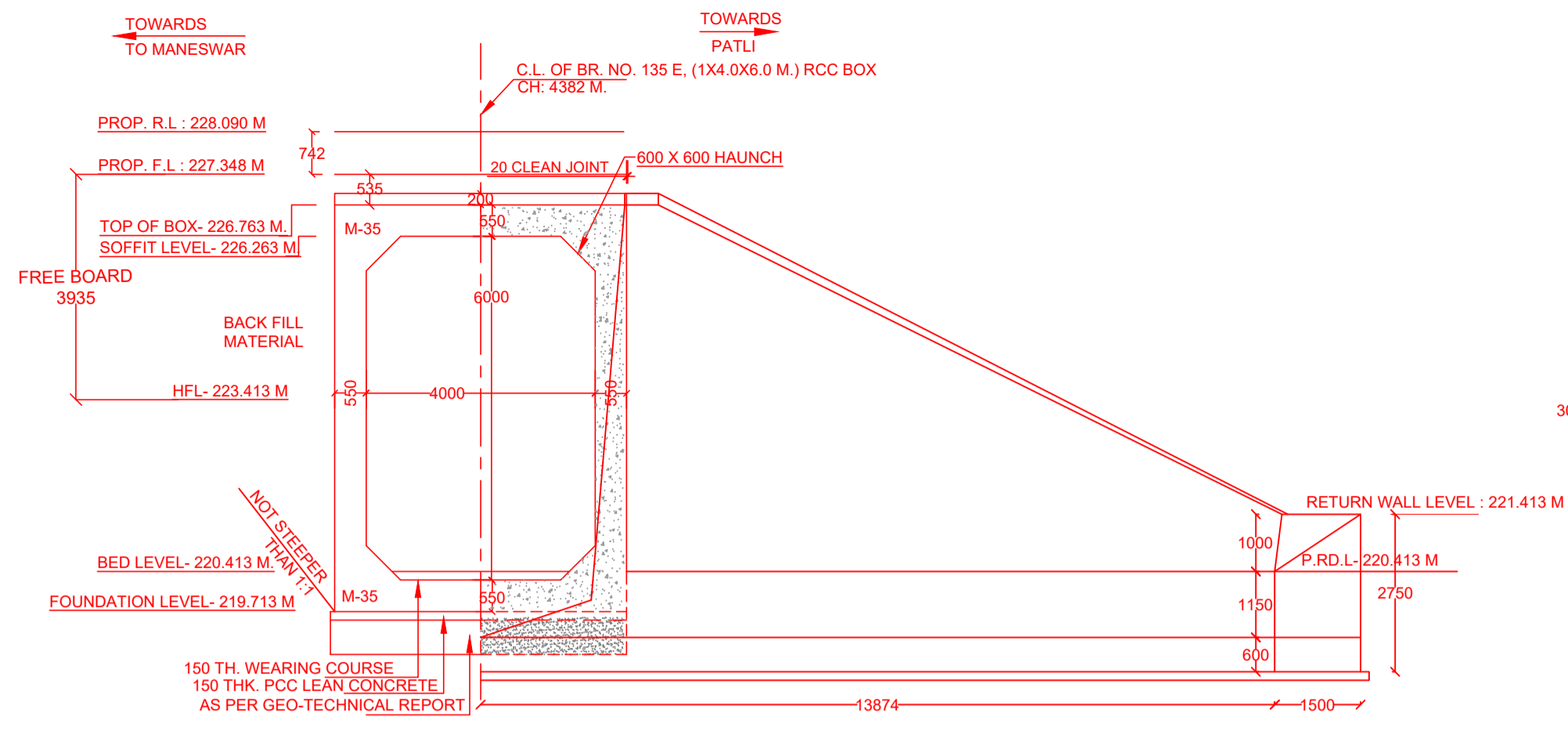
SCALE: N.T.S DRAWING NO- HRIC/PS/BR/GAD-13

S.M.C. S.M. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smccindia.com , E-Mail : support@smccindia.com

R. K. DAS PROJECT INCHARGE
M. NAYAK PROJECT INCHARGE

2020-2021 A1
DRAWN BY CHECKED BY YEAR OF SURVEY P. SIZE REVISION

RELEASED FOR PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION



- NOTES:**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION. THIS IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRDC.
 - ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL, FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTION TO PREVENT DAMAGE OF S&T CABLE DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SS/IS/GADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES:**
- WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THIS DRAWING.
 - FOR DETAILS OF R.C.C BOX REFER ROSSO DRG. NO. B- 10151/2R.
 - PROTECTION WORK SUCH AS PITCHING, CURTAIN WALL, DROP WALL ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES:
 - (i) IRS BRIDGE RULE
 - (ii) IRS CONCRETE BRIDGE CODE
 - (iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - (iv) SEISMIC ZONES IV
 - (v) EXPOSURE CONDITION-MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST.
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - WEEP HOLES SHALL BE OF 100 MM DIA PVC PIPES STAGGERED @ 1000 MM C/C HORIZONTALLY AND VERTICALLY ABOVE LOW WATER LEVEL IN RETURN WALL.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQ.M.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE:
 - (i) ALL RCC WORKS = M-35/DETAILED DESIGN DRG.
 - (ii) WEARING COURSE = M-20/DETAILED DESIGN DRG.
 - (iii) LEVELLING COURSE/LEAN CONCRETE = M-20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE (FP) AND SAFE BEARING CAPACITY (SBC)
 - a. FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
 - b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
 - c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

TRACK DETAILS

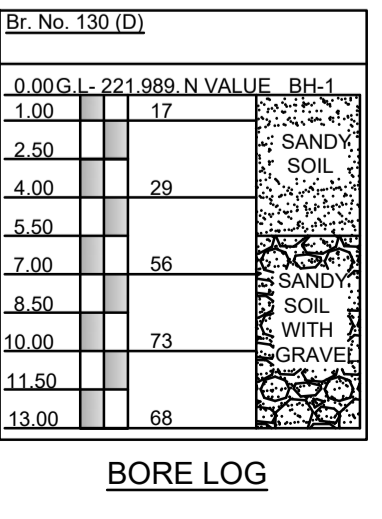
PROP R.L	228.090 M
PROP F.L	227.348 M
PROP B.L	220.413 M
HFL	223.413 M
FREE BOARD	3.935 M
VERTICAL ALIGNMENT	F 220
HORIZONTAL ALIGNMENT	STRAIGHT

CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) WIDER PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
BL	BED LEVEL
CL	CENTER LINE
THK.	THICKNESS



GC/HORC

SUBIR AGARWAL	DRP/INVL
RECTO PRJAL	RE-CAVL/DESIGN
PUNJENDRA KUMAR SINGH	PRE-CIVIL/DESIGN

HRDC

SUNU CHANVEDI	CON/HRDC
UNAKH KHO	DGM/K-1
VINEET KUMAR	EXECUTIVE/CON

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRDC)

Project:- **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

GENERAL ARRANGEMENT DRAWING
BALANCING CULVERT FOR BRIDGE NO.- 135 E, 1X4.0X6.0M RCC BOX, AT CH:4382 M (CONNECTIVITY LINE)

SCALE: N.T.S DRAWING NO- HRDC/PS/BR/GAD-14

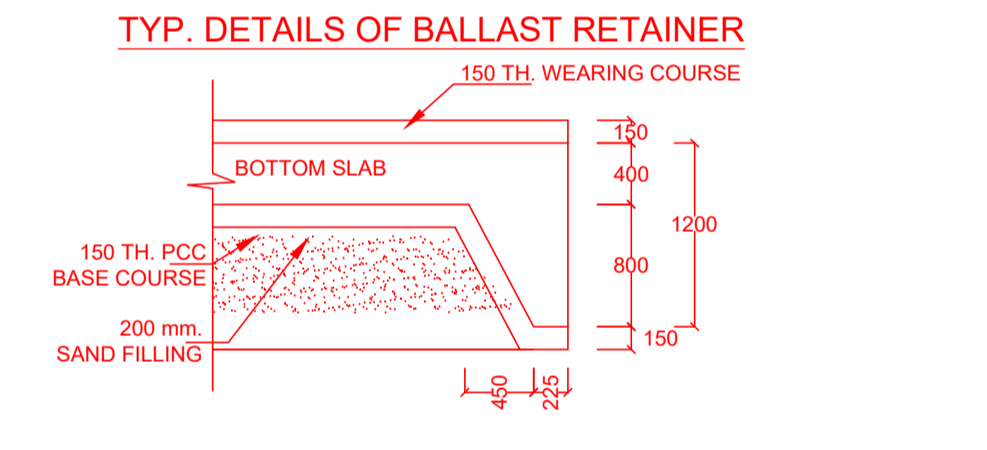
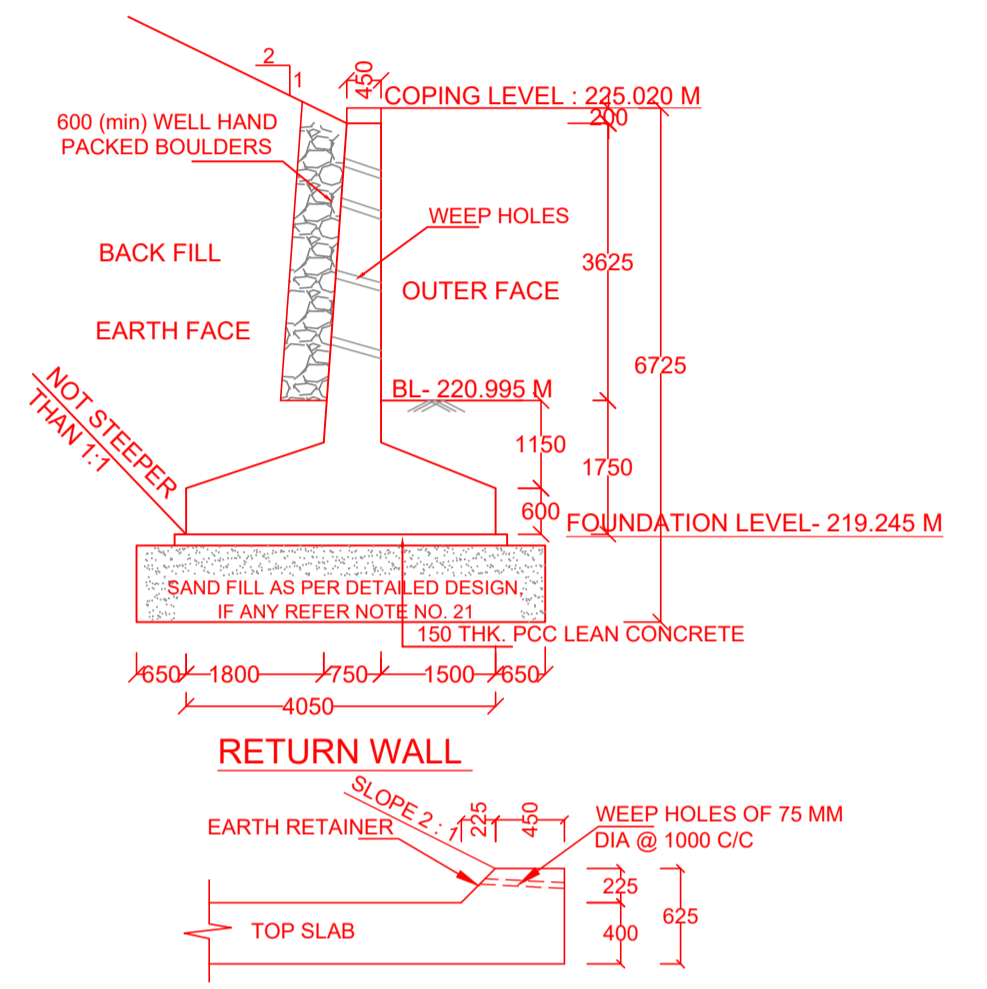
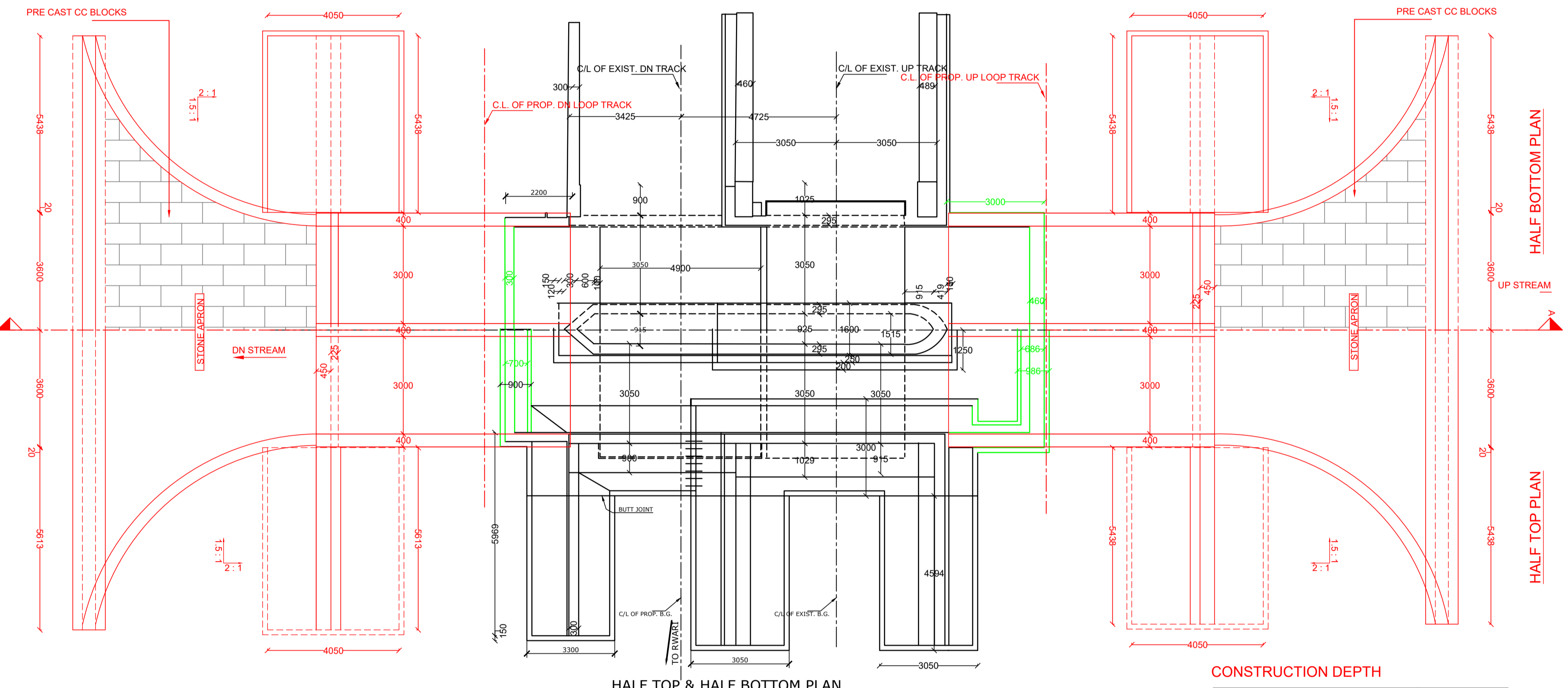
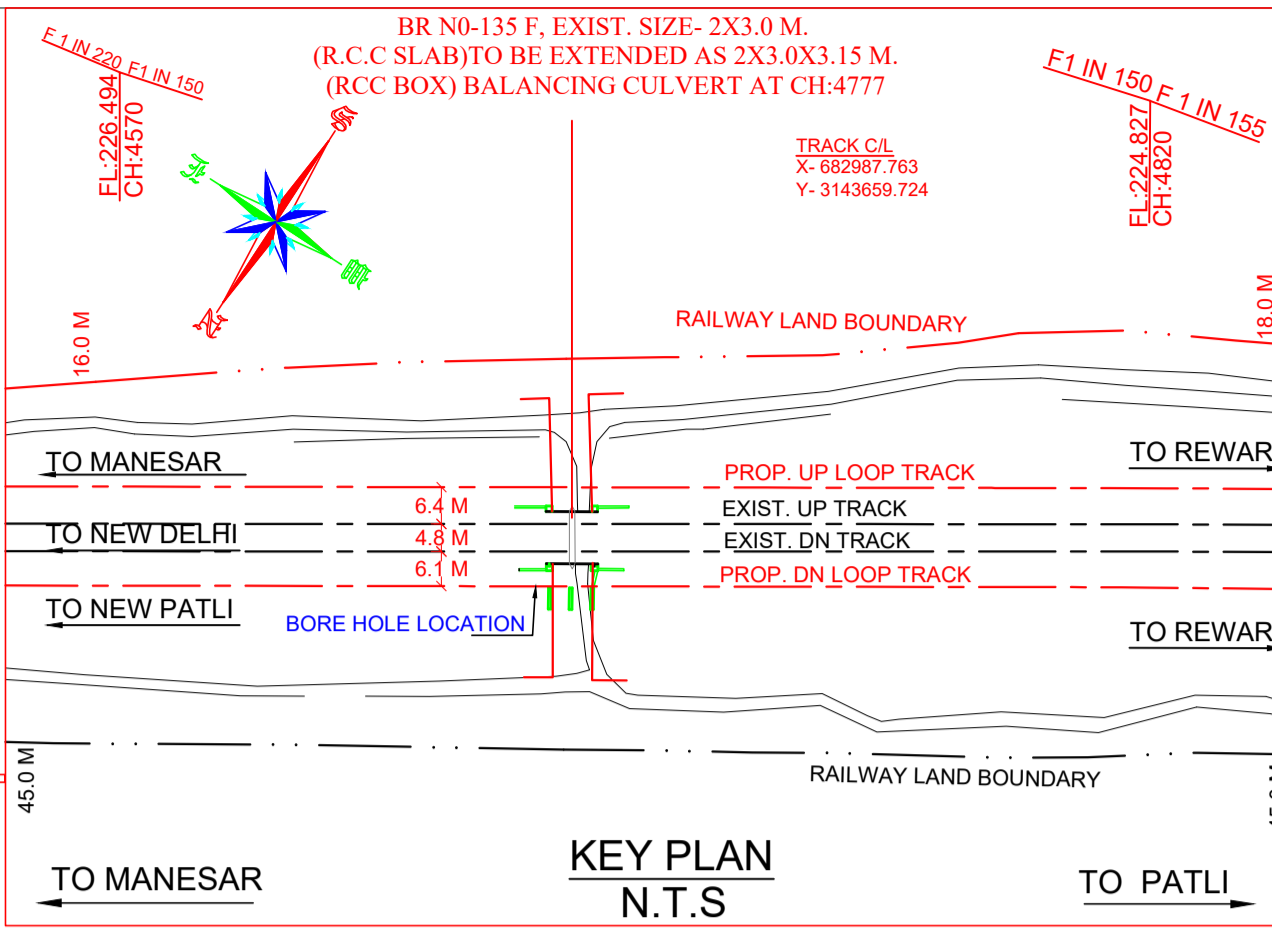
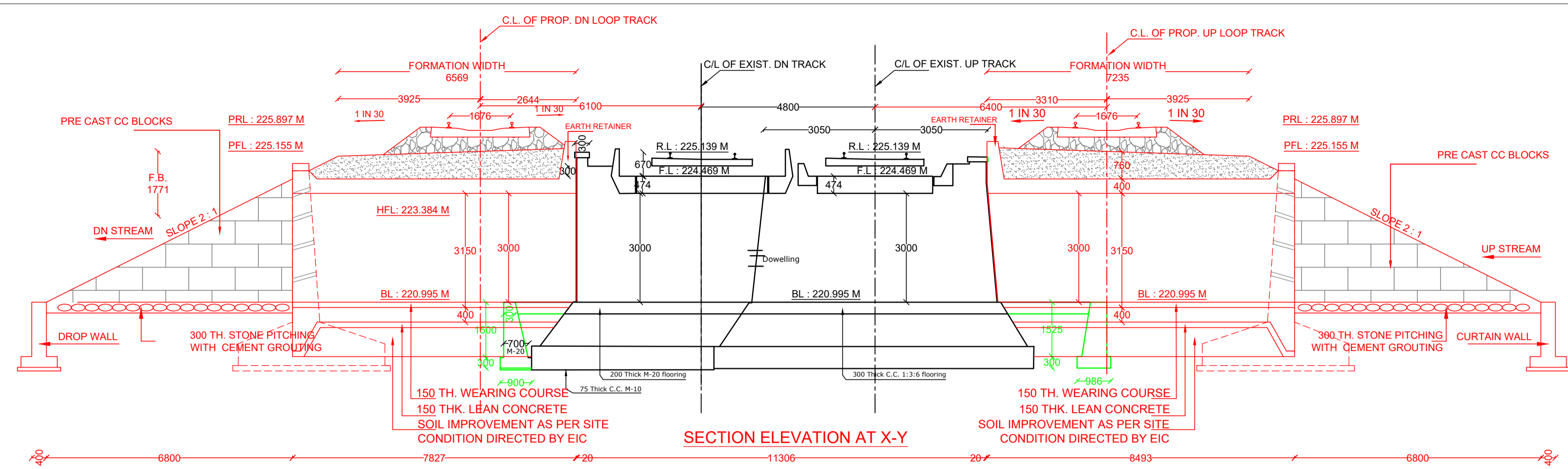
S.M.C. S.M. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcindia.com , E-Mail : support@smcindia.com

Project:- **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

Project Incharge: **A. A. SAMANT**

Drawn By: R. K. DAS	Checked By: M. NAYAK	Year of Survey: 2020-2021	P. Size: A1
Released For: [] PRELIMINARY FOR APPROVAL	[] TENDER	[] CONSTRUCTION	Revision: []

- NOTES :**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - THIS IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRIDC.
 - ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL, FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTION TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC
- B) TECHNICAL NOTES :**
- WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THIS DRAWING.
 - FOR DETAILS OF R.C.C BOX DETAILED DESIGN TO BE FOLLOWED.
 - PROTECTION WORK SUCH AS PITCHING, CURTAIN WALL, DROP WALL ETC. SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED ON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN TO BE REFERRED. DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
(i) IRS BRIDGE RULE
(ii) IRS CONCRETE BRIDGE CODE
(iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
(iv) SEISMIC ZONES IV
 - EXPOSURE CONDITION-MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST.
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - WEEP HOLES SHALL BE OF 100 MM DIA PVC PIPES STAGGERED @ 1000 MM C/C HORIZONTALLY AND VERTICALLY ABOVE LOW WATER LEVEL IN RETURN WALL.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQ.M.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE. GRADE OF CONCRETE :
(i) ALL RCC WORKS = M:35/DETAILED DESIGN DRG.
(ii) WEARING COURSE = M:20/DETAILED DESIGN DRG
(iii) LEVELLING COURSE/ LEAN CONCRETE = M:20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE (FP) AND SAFE BEARING CAPACITY (SBC)
a. FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.



Br. No. 135 (F)

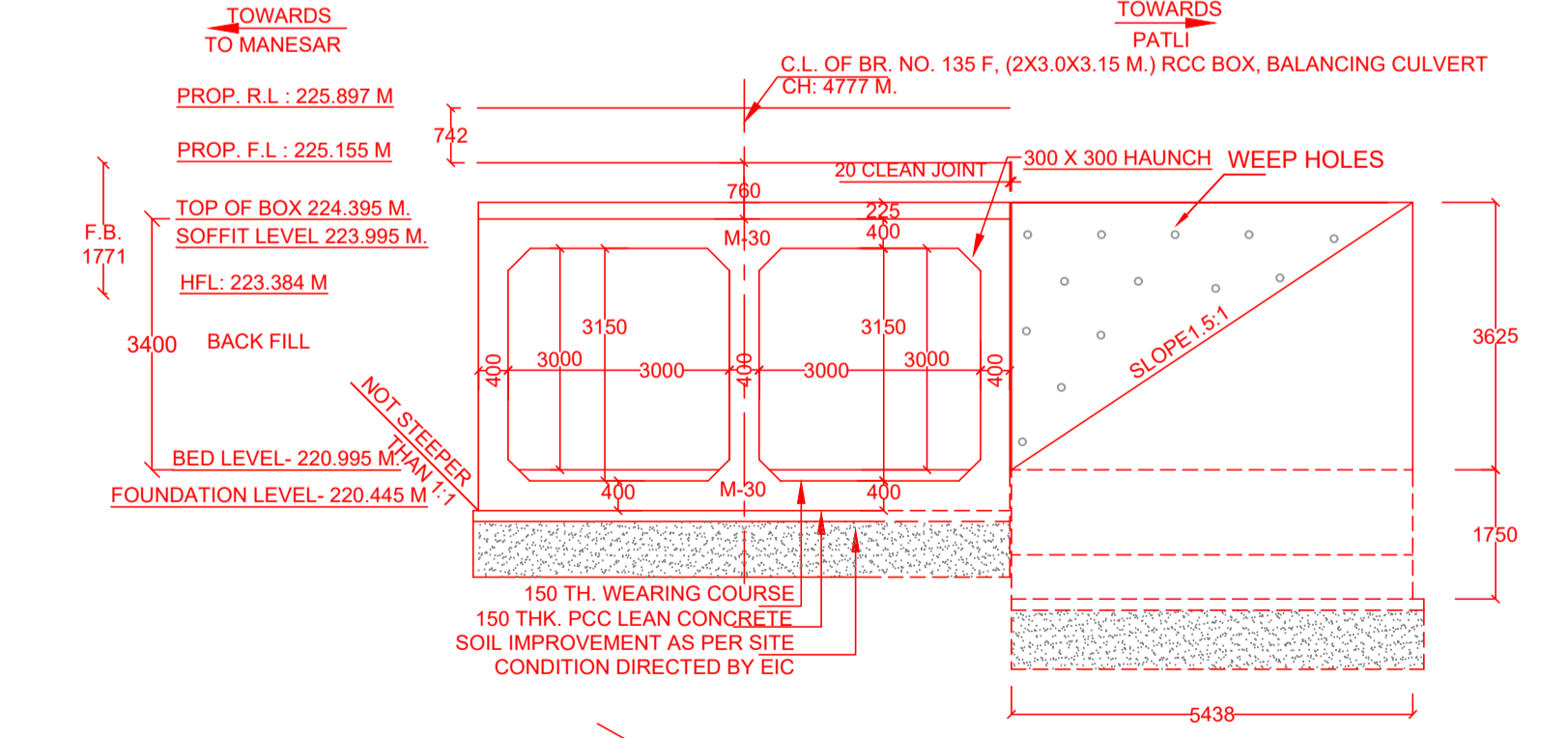
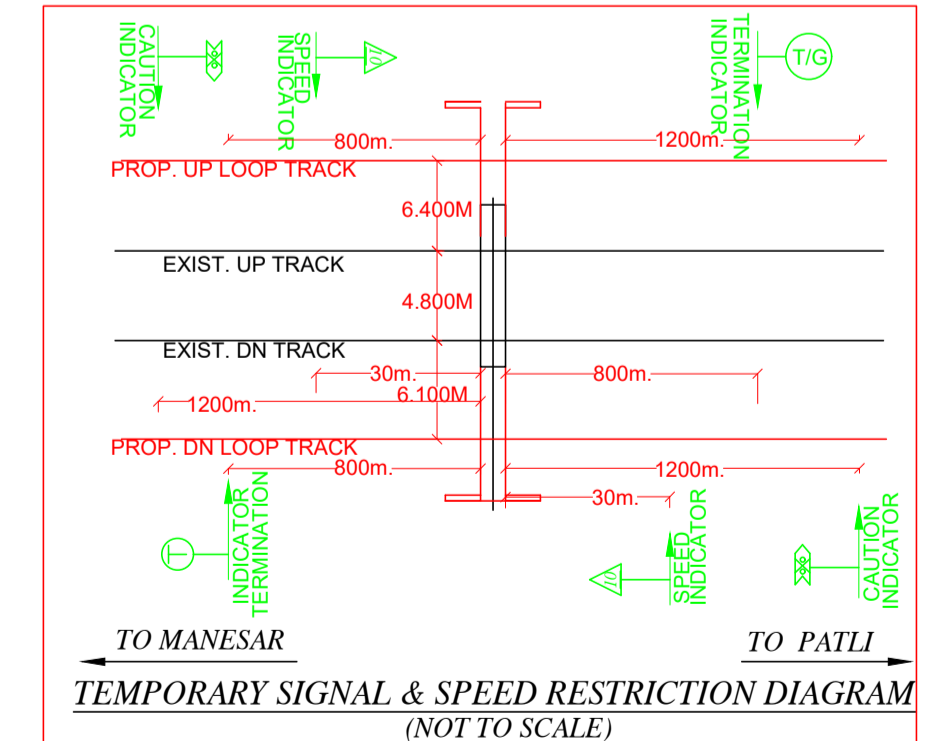
GL	N	VALUE	Classification as per LS	Rh-1
0.00	34		SP	
1.00	34		SP-SM	SANDY SOIL
2.50	33		SP-SM	
4.00	33		SP-SM	
5.50	63		SM	SANDY SOIL WITH GRAVEL
7.00	63		SM	
8.50	62		SM	
10.00	62		SM	
12.00			SM	

CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) WIDER PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

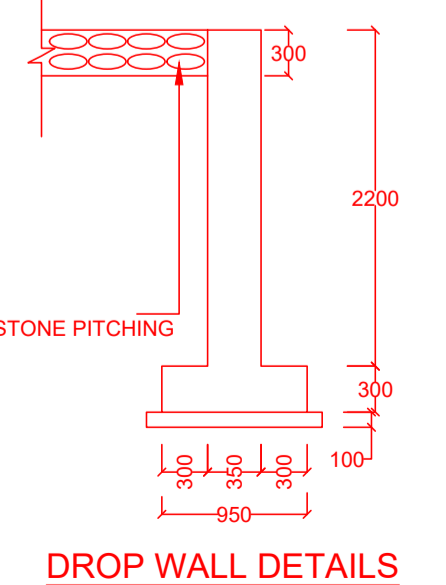
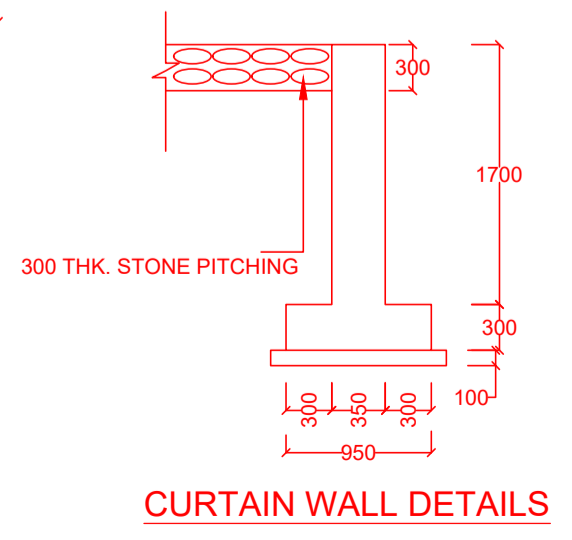
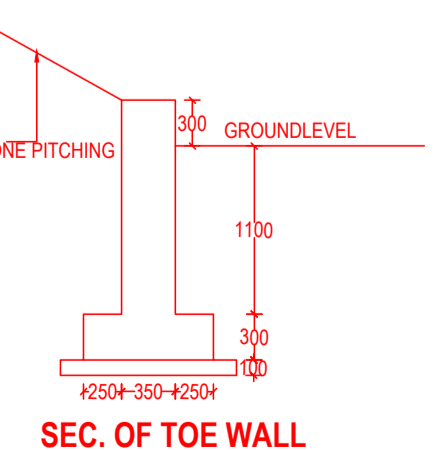
LEGEND

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
BL	BED LEVEL
CL	CENTER LINE
THK.	THICKNESS
F.B	FREE BOARD
EXIST. LINE	EXIST. LINE
PROP. LINE	PROP. LINE
DISMANTLED	DISMANTLED



TRACK DETAILS

	EXISTING	PROPOSED
SPAN	2X3.0X3.0 M	2X3.0X3.0 M
RAIL LEVEL	225.139 M	225.897 M
FORMATION LEVEL	224.469 M	225.155 M
BED LEVEL	220.995 M	220.995 M
HFL	223.384 M	223.384 M
FREE BOARD	1.085 M	1.771 M
GRADE	R 2595	F 150
ALIGNMENT	STRAIGHT	STRAIGHT



GC/HORC

SUSHIL AGRAWAL DR/GENL	
REETU PATIL RE-CIVIL/DESIGN	
PUNPENDRA KUMAR SINGH RE-CIVIL/DESIGN	

HRIDC

SHIV OM DAVEDI CPM/HRIDC	
UNAM KHO DGM/C-1	
VINEET KUMAR EXECUTIVE/ENR	

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

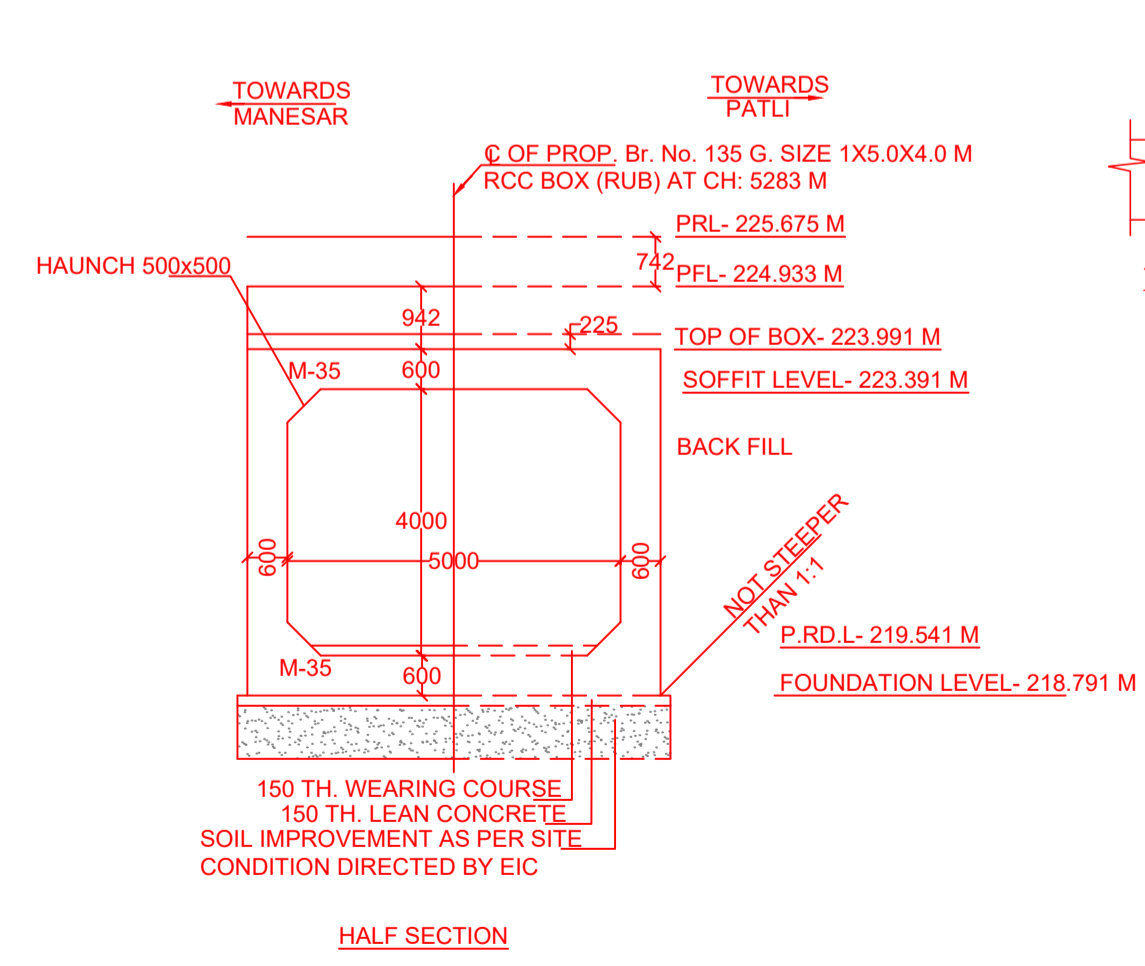
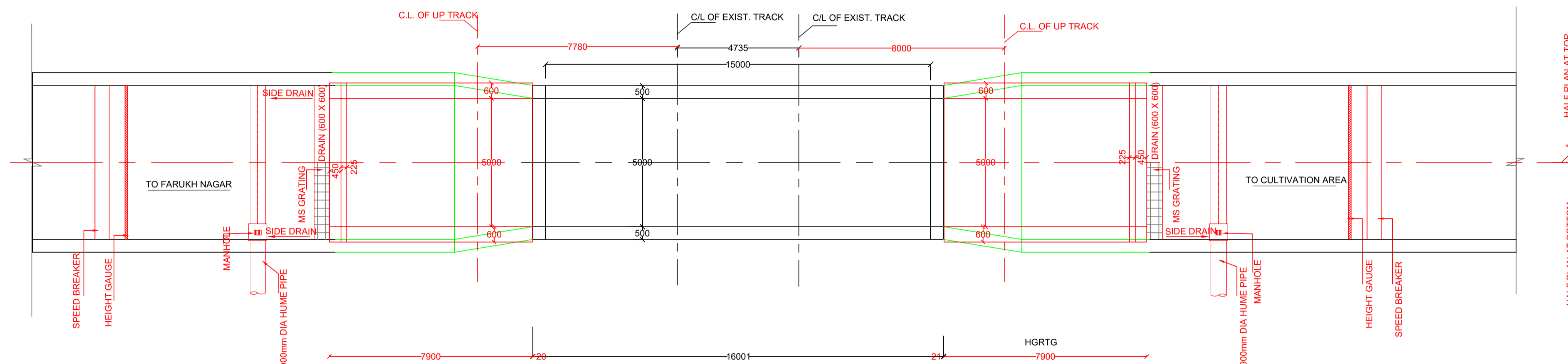
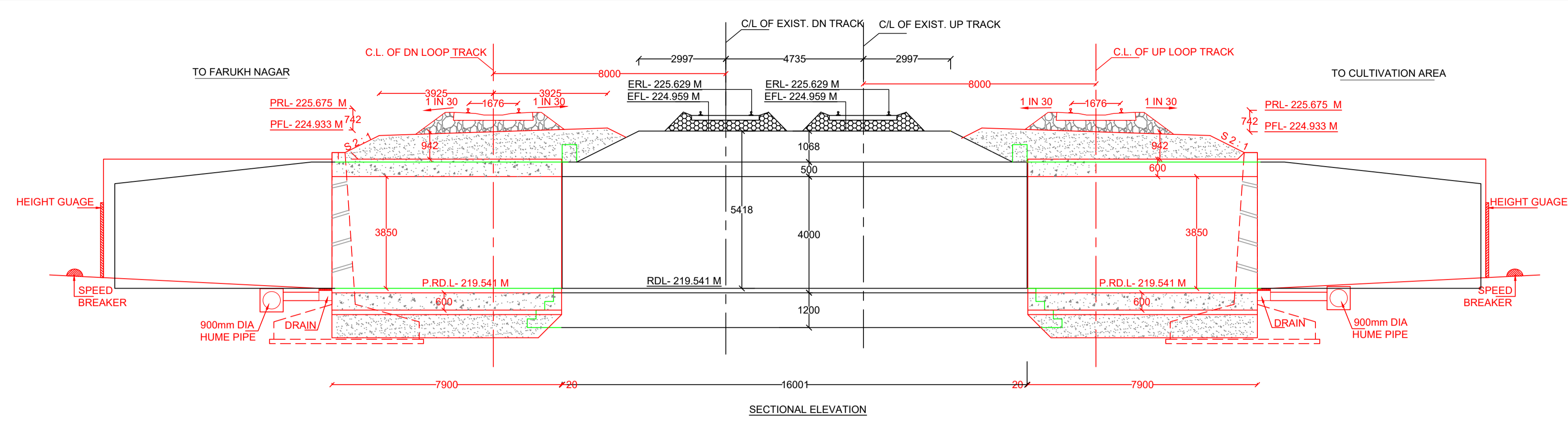
Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

GENERAL ARRANGEMENT DRAWING
BR NO-135 F, EXIST. SIZE- 2X3.0 M.
(R.C.C SLAB) TO BE EXTENDED AS 2X3.0X3.15 M.
(RCC BOX) BALANCING CULVERT,
AT CH:4777 (CONNECTIVITY LINE)

SCALE: N.T.S DRAWING NO- HRIDC/PS/BR/GAD-15

S.M.C. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcindia.com , E-Mail : support@smcindia.com

R. K. DAS	M. NAYAK	A. A. SAMANT PROJECT INCHARGE	2020-2021	A1
DRAWN BY	CHECKED BY	YEAR OF SURVEY	P. SIZE	REVISION
RELEASED FOR	PRELIMINARY FOR APPROVAL	<input checked="" type="checkbox"/> TENDER	<input type="checkbox"/> CONSTRUCTION	



LEGEND

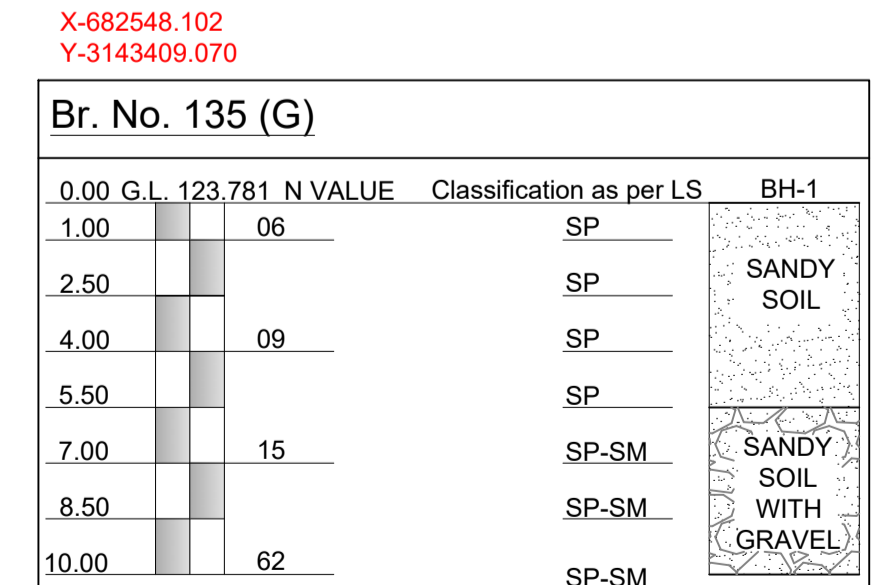
PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
BL	BED LEVEL
CL	CENTER LINE
THK.	THICKNESS
EXIST. LINE	EXISTING LINE
PROP. LINE	PROPOSED LINE
DISMANTLED	DISMANTLED

CONSTRUCTION DEPTH

1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) WIDER PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm

TRACK DETAILS

	EXISTING	PROPOSED
SPAN	1 X 5.0 X 4.0 M	1 X 5.0 X 4.0 M
RAIL LEVEL	225.629 M	225.675 M
FORMATION LEVEL	224.959 M	224.933 M
BED LEVEL	219.541 M	219.541 M
GRADE	R 463	R 503
ALIGNMENT	STRAIGHT	STRAIGHT

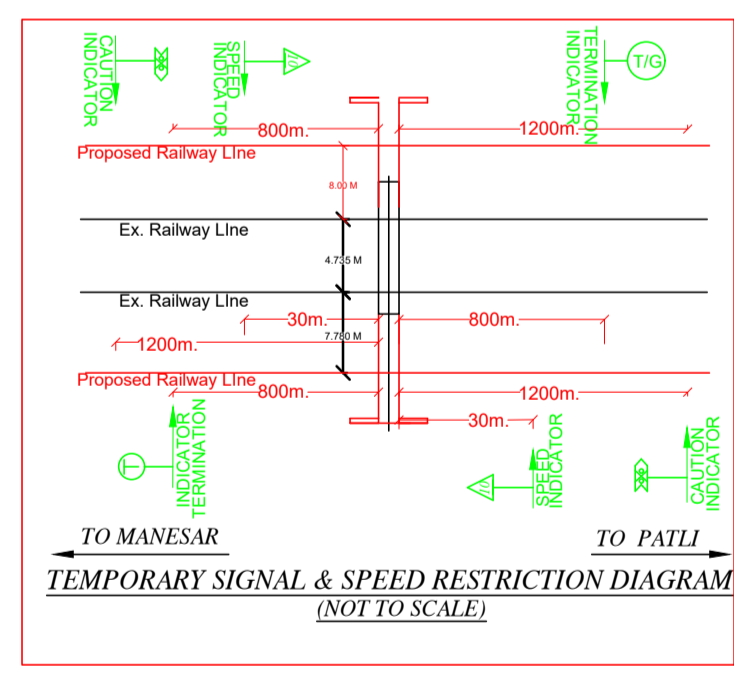
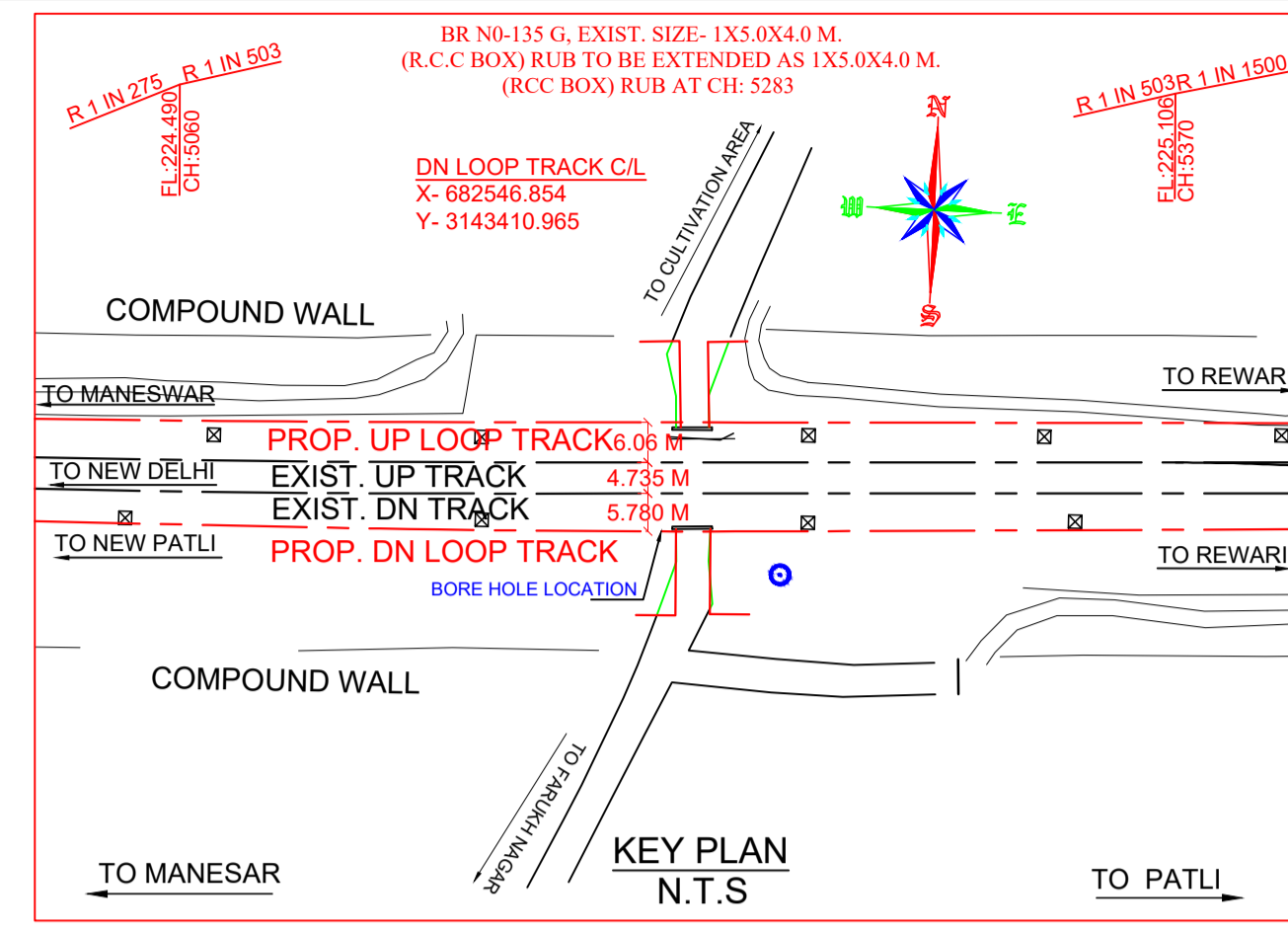


GC/HORC

SUDHIR AGARWAL DRA/DRWL	
REETU PATIL E-CIVIL/DESIGN	
PUNJABDEB KUMAR SINGH M.E.-CIVIL/DESIGN	

HRDC

SUNJAN DAVEDI CPM/HRDC	
Uma N. CHO DRA/C-1	
VINEET KUMAR EXECUTIVE/CPM	



- NOTES:**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
 - RUB IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRDC.
 - ENGINEER IN CHARGE/SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES:**
- PROTECTION WORK SUCH AS PITCHING ETC SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR DETAILS OF R.C.C BOX DETAILED DESIGN TO BE FOLLOWED.
 - WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THE DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAS IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN DRAWING TO BE REFERRED.
 - DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
(i) IRS BRIDGE RULE
(ii) IRS CONCRETE BRIDGE CODE
(iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
 - SEISMIC ZONE- IV
 - EXPOSURE CONDITION- MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008.
 - FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE :
(i) ALL RCC =M:35/DETAILED DESIGN DRG.
(ii) WEARING COURSE =M:20/DETAILED DESIGN DRG.
(iii) LEVELING COURSE/LEAN CONCRETE =M:20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE (FP) AND SAFE BEARING CAPACITY (SBC)
a. FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - HEIGHT GAUGE SHALL BE PROVIDED AS PER RDSO STANDARD DRAWING NO. RDSO/M001.
 - REFER SEPARATE DRAWING FOR GROUND IMPROVEMENT WHEREVER REQUIRED.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRDC)

Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

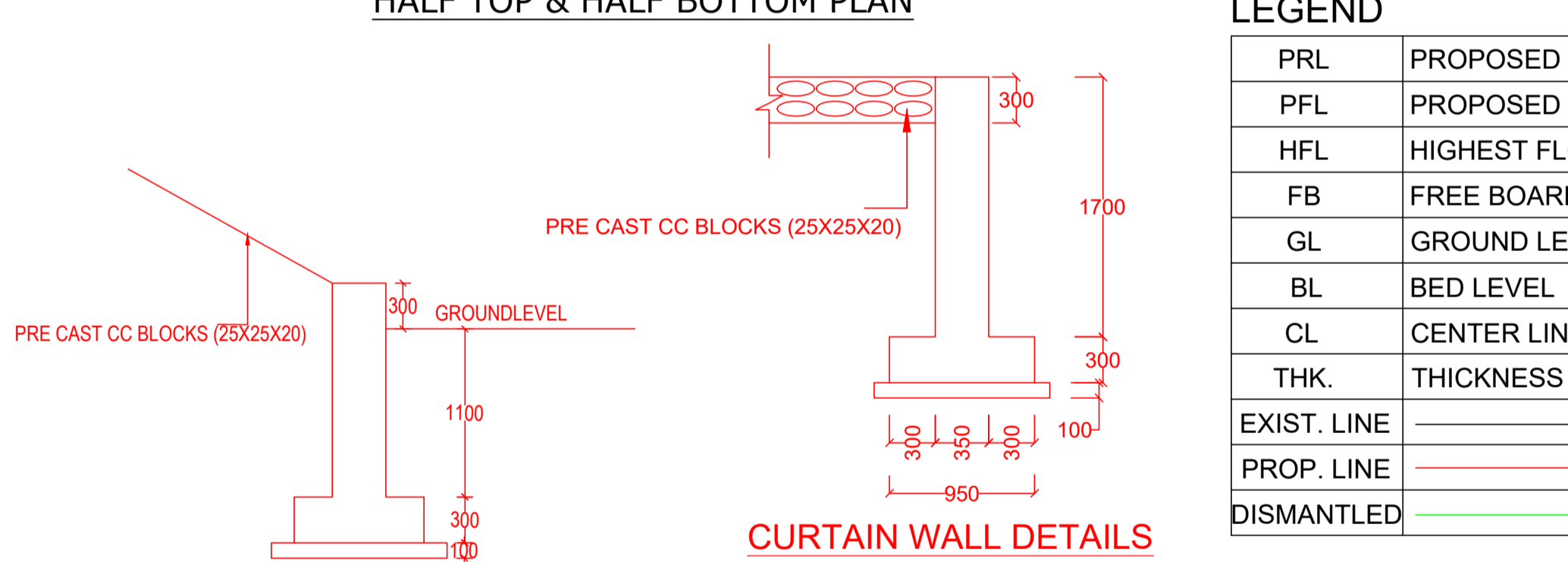
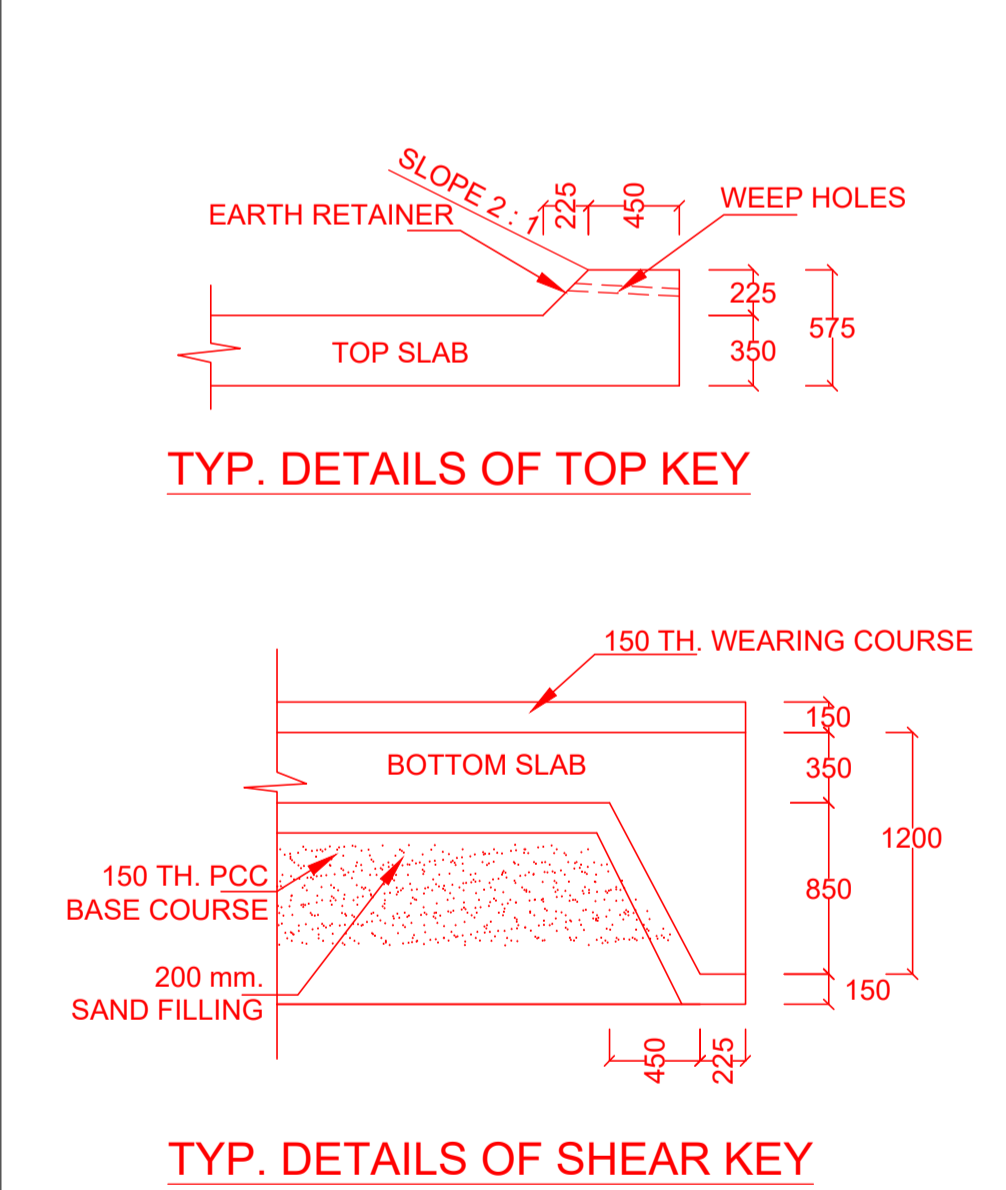
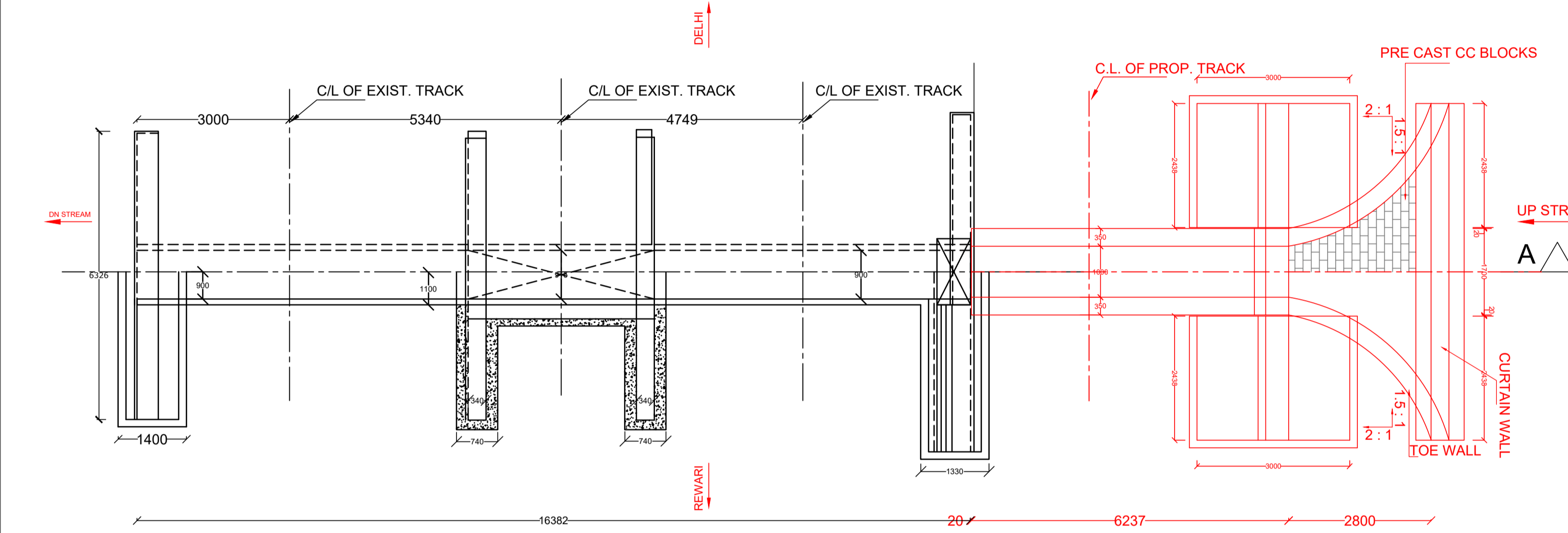
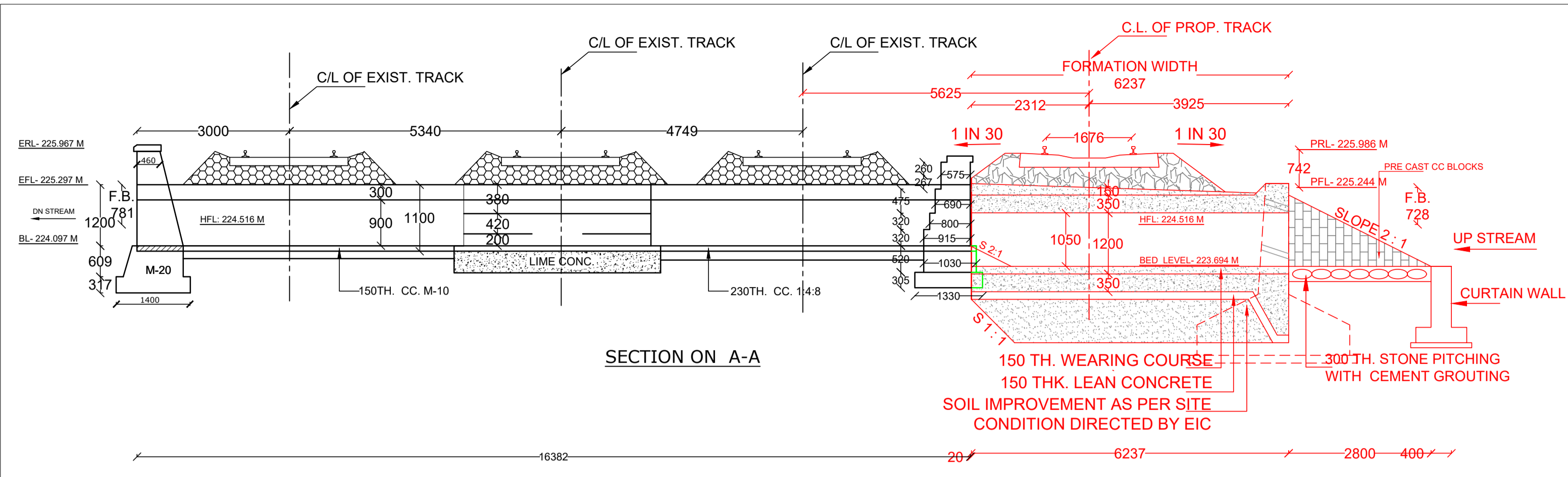
GENERAL ARRANGEMENT DRAWING

BR NO-135 G, EXIST. SIZE- 1X5.0 X 4.0 M.
(R.C.C BOX) RUB, TO BE EXTENDED AS 1X5.0X4.0 M.
(RCC BOX) RUB AT CH:5283.00

SCALE: N.T.S DRAWING NO- HRDC/PS/BR/GAD-16

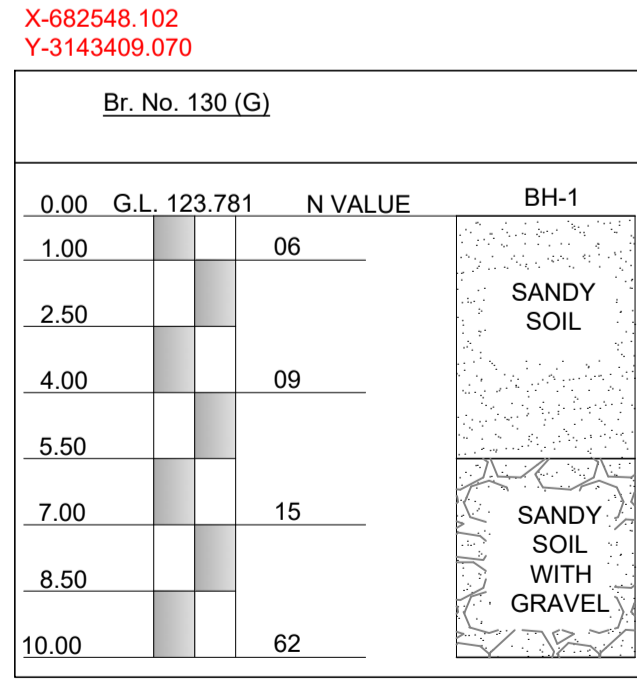
S.M.C. **S.M. CONSULTANTS**
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smcindia.com , E-Mail : support@smcindia.com

 R. K. DAS DRAWN BY	 M. NAYAK CHECKED BY	A. A. SAMANT PROJECT INCHARGE	
		2020-2021	A1
RELEASED FOR	<input type="checkbox"/> PRELIMINARY FOR APPROVAL	<input checked="" type="checkbox"/> TENDER	<input type="checkbox"/> CONSTRUCTION



CONSTRUCTION DEPTH

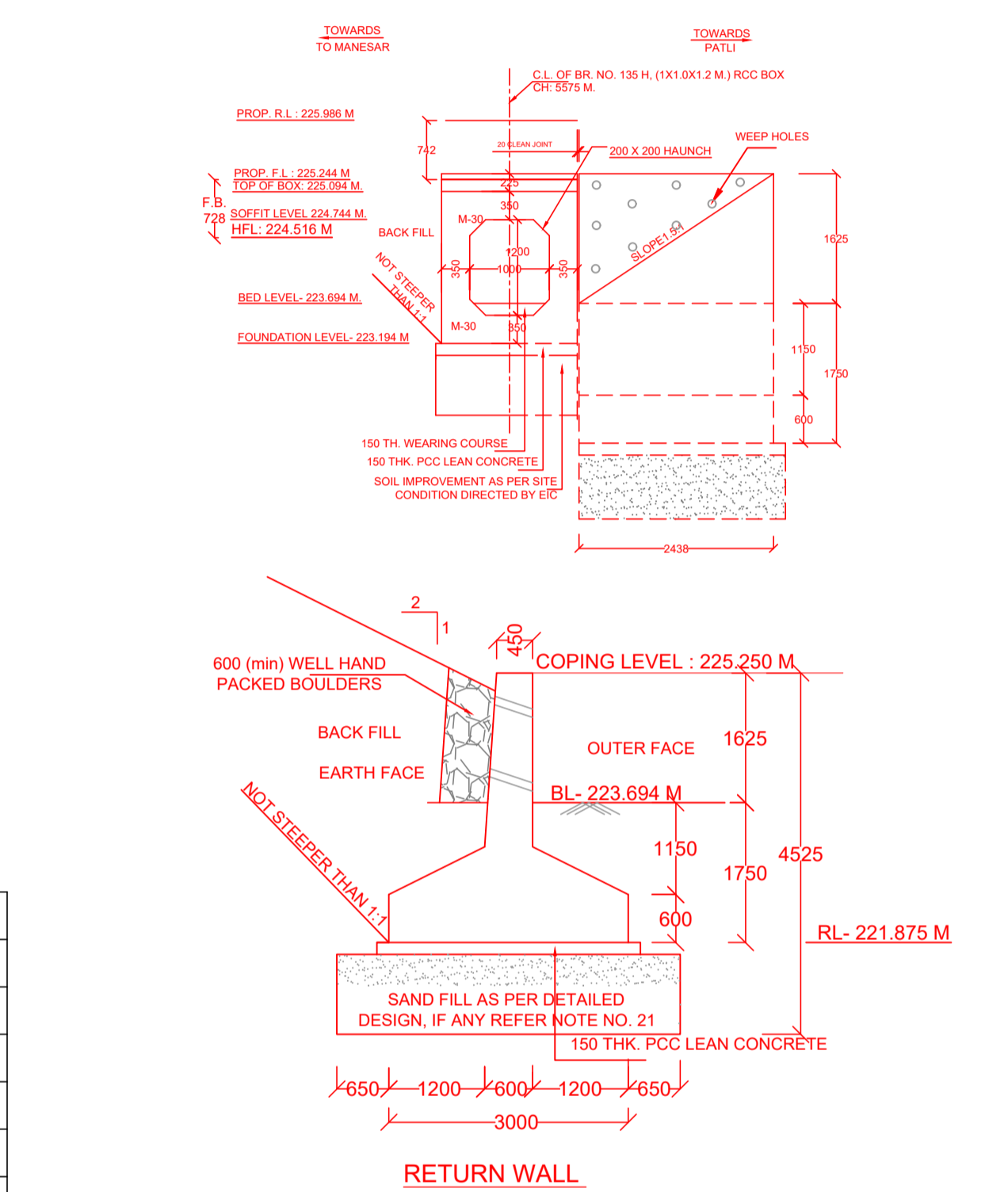
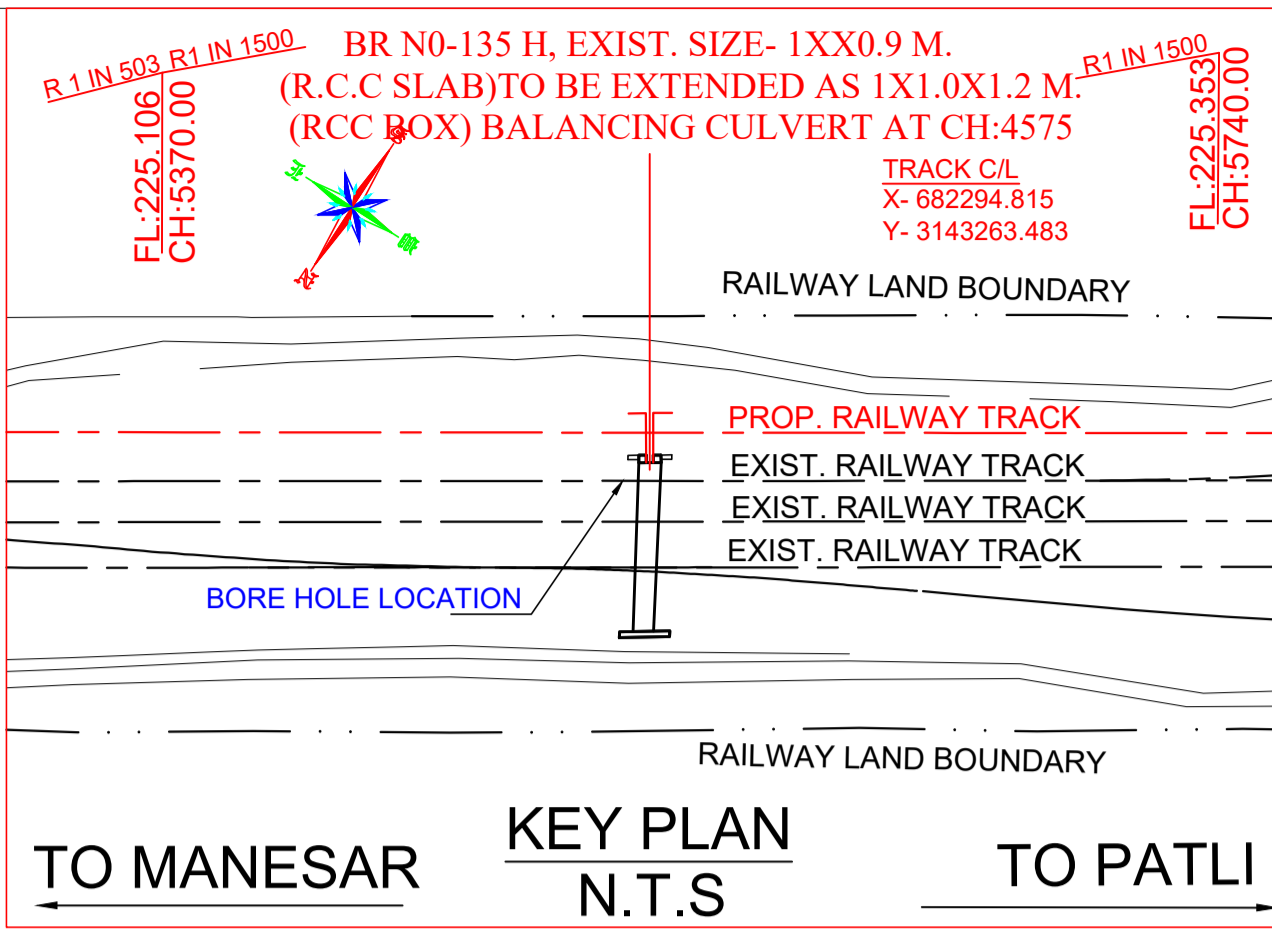
1) RAIL (60kg)	172 mm
2) RUBBER PAD	10 mm
3) WIDER PSC SLEEPER HEIGHT AT RAIL SEAT	210 mm
4) MINIMUM BALLAST THK.	350 mm
TOTAL	742 mm



TRACK DETAILS

	EXISTING	PROPOSED
SPAN	1 X 0.9 M	1 X 1 X 1.2 M
RAIL LEVEL	225.967 M	225.986 M
FORMATION LEVEL	225.297 M	225.244 M
BED LEVEL	224.097 M	223.694 M
HFL	224.516 M	224.516 M
F.B	0.781	0.728
GRADE	R 1500	R 1500
ALIGNMENT	STRAIGHT	STRAIGHT

GC/HORC		HRIDC	
SUDHIR AGRAWAL DPD/CIVIL		SHIV OM DAVEDI CPM/HRIDC	
REETU PATIAL RE-CIVIL/DESIGN		Uma.m. KRO Dgm/C-1	
PUSHPENDRA KUMAR SINGH PRE-CIVIL/DESIGN		VINEET BUMBER EXECUTIVE/CIVIL	



- NOTES :**
- A) GENERAL NOTES**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
 - THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M WITH RESPECT TO UP MAIN LINE.
 - FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION. THIS IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
 - THE EXISTING DETAILS ARE AS PER SITE SURVEY RECORDED BY THE CONSULTANT AND VERIFIED BY HRIDC.
 - ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL, FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
 - SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS.
 - ENGINEER IN CHARGE/SITE ENGINEER SHALL ENSURE THE SAFETY OF TRACK/ROAD AT ALL THE TIME AND SHALL TAKE NECESSARY PRECAUTION TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/SIG/ADSTE ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
 - THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
- B) TECHNICAL NOTES :**
- WEARING COURSE IS TO BE PROVIDED AS PER DETAILS SHOWN IN THIS DRAWING.
 - FOR DETAILS OF RCC BOX DETAILED DESIGN TO BE FOLLOWED.
 - PROTECTION WORK SUCH AS PITCHING, CURTAIN WALL, DROP WALL ETC. SHALL BE DONE AS PER DETAILED DESIGN DRAWING.
 - FOR PROPER DRAINAGE OF WATER, 50mm PCC M-20 WITH SUITABLE SLOPE TO BE USED ON TOP OF BOX SLAB.
 - ALL CLEAN EXPANSION JOINTS SHALL BE FILLED WITH BITUMINOUS BOARDS / POLYSULPHIDE SEALANT FILLING.
 - PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE AND DRAINAGE.
 - DIMENSION OF THE BOX MAY BE SUITABLY MODIFIED AS PER SITE REQUIREMENT.
 - FOR R.C.C DETAILS OF RETURN WALL DETAILED DESIGN TO BE REFERRED. DESIGN CRITERIA IS BASED ON FOLLOWING IRS CODES :
(i) IRS BRIDGE RULE
(ii) IRS CONCRETE BRIDGE CODE
(iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
(iv) SEISMIC ZONES IV
(v) EXPOSURE CONDITION-MODERATE.
 - DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST.
 - THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE.
 - WEEP HOLES SHALL BE OF 100 MM DIA PVC PIPES STAGGERED @ 1000 MM C/C HORIZONTALLY AND VERTICALLY ABOVE LOW WATER LEVEL IN RETURN WALL.
 - ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G./SQM.
 - REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786 - 2008. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
 - GRADE OF CONCRETE :
(i) ALL RCC WORKS = M:35/DETAILED DESIGN DRG.
(ii) WEARING COURSE = M:20/DETAILED DESIGN DRG
(iii) LEVELLING COURSE/ LEAN CONCRETE = M:20/DETAILED DESIGN DRG.
 - FOUNDATION PRESSURE(FP) AND SAFE BEARING CAPACITY(SBC)
a. FOR BOX & RETURN WALL- PLEASE REFER DETAILED DESIGN DRAWING.
b. FOR SAFE BEARING CAPACITY OF SOIL PLEASE REFER GT REPORT.
c. IF BEARING CAPACITY AT SITE IS INADEQUATE SUITABLE GROUND IMPROVEMENT MAY BE ADOPTED AS PER DETAILED DESIGN DRAWING.
 - FOUNDATION LEVEL SHOWN IN DRAWING IS TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.

DFC LOADING (32.5 T AXLE LOAD)

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

Project: **HARYANA ORBITAL RAIL CORRIDOR (HORC)**

GENERAL ARRANGEMENT DRAWING
BR NO-135 H, EXIST. SIZE- 1X0.9 M.
(R.C.C SLAB) TO BE EXTENDED AS 1X1.0X1.2 M.
(RCC BOX) BALANCING CULVERT, AT CH:4575.00

SCALE: N.T.S | DRAWING NO- HRIDC/PS/BR/GAD-17

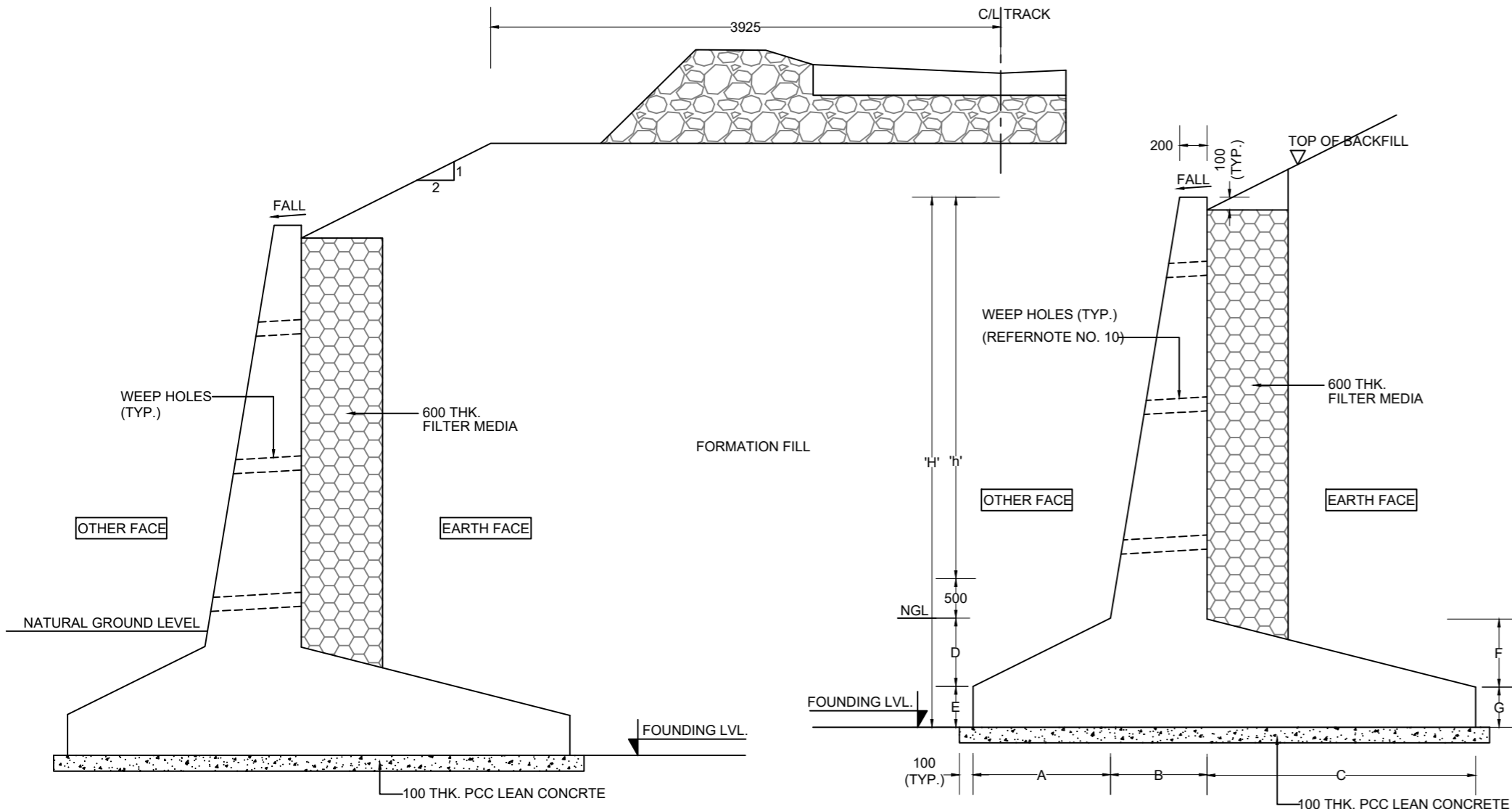
S.M.C. CONSULTANTS
An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman
Web : www.smccindia.com, E-Mail : support@smccindia.com

A. A. SAMANT
PROJECT INCHARGE

R. K. DAS | M. NAYAK
DRAWN BY | CHECKED BY

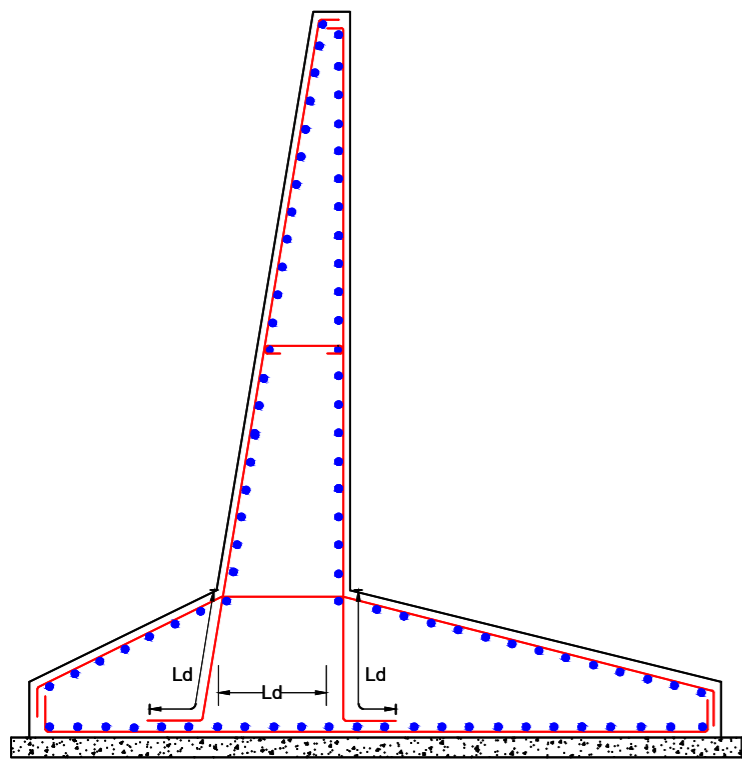
2020-2021 | A1

RELEASED FOR: PRELIMINARY FOR APPROVAL TENDER CONSTRUCTION

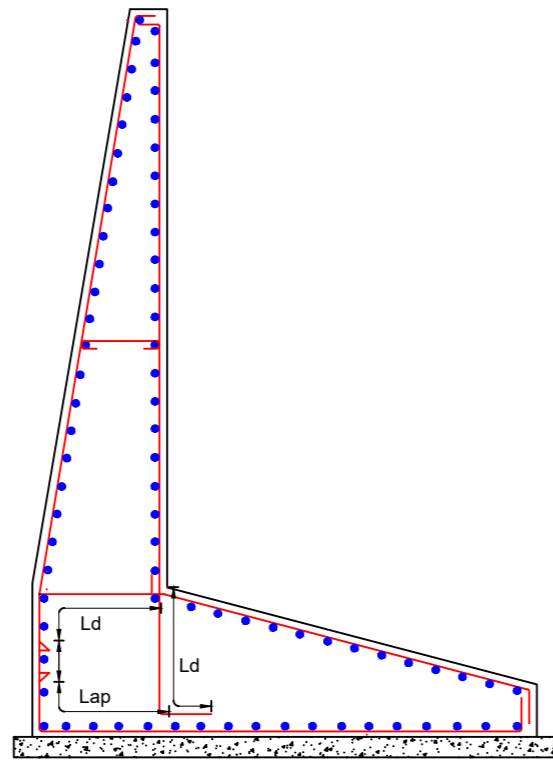


PLACEMENT OF WALL IN TYPICAL CROSS SECTION
(NOT TO SCALE)

TYPICAL DIMENSION DETAILS OF RETAINING WALL
(NOT TO SCALE)



TYPICAL REINFORCEMENT DETAILS OF RETAINING WALL
(AT LOCATIONS WITH TOE)
(NOT TO SCALE)



TYPICAL REINFORCEMENT DETAILS OF RETAINING WALL
(AT LOCATIONS WITHOUT TOE)
(NOT TO SCALE)

S. No.	HEIGHT ABOVE GROUND (mm)	HEIGHT 'H' (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)
1	1000	1800	-	200	1000	-	-	-	300
2	2000	2800	-	200	1800	-	-	-	300
3	3000	3800	-	300	2600	-	-	-	300
4	4000	5000	700	400	3600	200	300	200	300
5	5000	6100	700	500	2700	200	400	200	400
6	6000	7200	1000	600	3400	300	400	300	400

RETAINING WALLS							
HORC MAIN LINE							
LHS				RHS			
From Ch:	To Ch:	"h" Height Of Retaining Wall (m)	Length (m)	From Ch:	To Ch:	"h" Height Of Retaining Wall (m)	Length (m)
50038	50053	1.5	15	49892	50292	1	400
53453	53503	1.5	50	51842	51942	5	100
55292	55492	1.5	200	52610	52730	1	120
55492	55662	3	170	52972	53014	1	42
Total Length			435				260
				55242	55492	1.5	250
				55492	55662	3	170
				Total Length			1342

MANESAR - PATLI CONNECTIVITY LINE							
LHS				RHS			
From Ch:	To Ch:	"h" Height Of Retaining Wall (m)	Length (m)	From Ch:	To Ch:	"h" Height Of Retaining Wall (m)	Length (m)
2894	2934	6	40	2918	3098	3	180
2934	3194	3	260	3098	3238	2.5	140
3194	3294	4	100	3640	3740	2	100
3294	3769	1.5	475	4000	4200	1.5	200
3769	3909	4.5	140	4200	4300	2.5	100
3909	4089	1.5	180	4300	4400	5.5	100
4089	4309	2.5	220	4450	4705	1.5	255
4436	4516	1.5	80				
Total Length			1495	Total Length			1075

GENERAL NOTES

- ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE. ONLY WRITTEN DIMENSION SHALL BE FOLLOWED. NO DIMENSION SHALL BE SCALED.
- THE CONCRETE SHALL BE DESIGN MIX OF APPROVED GRADE AS PER DESIGN.
- CONCRETE EXPOSURE CLASSIFICATION MODERATE IN ACCORDANCE WITH IRS CONCRETE BRIDGE RULE.
- THE TOP OF FOUNDATION SHALL BE MINIMUM 500 MM BELOW NATURAL GROUND LEVEL. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR FOUNDATION LEVEL DURING EXECUTION.
- FOR ALLOWABLE BEARING CAPACITY AT THE FOUNDING LEVEL SHALL NOT BE LESS THAN THE MAXIMUM PRESSURES AS PER DESIGN.
- ASSUMED LIVE LOAD SURCHARGE IS AS PER IRS SUBSTRUCTURE AND FOUNDATION CODE.
- ANY LOOSE POCKETS/VOIDS AT FOUNDING LEVEL WILL BE REMOVED, COMPACTED AND FILLED WITH COMPACTED GRANULAR MATERIAL/PCC AS DIRECTED BY THE ENGINEER IN CHARGE.
- SELECTED BACK FILL SHALL COMPRISE OF COMPACTED MATERIAL HAVING THE FOLLOWING PROPERTIES.
C=0 KPa
φ > 30°
DRY DENSITY = 18 KN/m³.
- 100 mm DIAMETER WEEP HOLES SHALL BE PROVIDED IN A STAGGERED MANNER AT A SPACING OF 1000 mm C/C IN EITHER DIRECTION. THE SLOPE OF WEEP HOLES SHALL BE 1 VERTICAL TO 20 HORIZONTAL TOWARDS DRAINING FACE.
- REINFORCEMENT SHALL BE HYSD BARS CONFORMING TO IS : 1786 (GRADE- Fe500D) OR AS SPECIFIED IN DESIGN.
- CLEAR COVER TO REINFORCEMENT SHALL BE 50mm.
- THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUBSTRUCTURE AND FOUNDATION CODE.
- ALL RCC SURFACES COMING IN CONTACT WITH BITUMEN OR COAL TAR OF APPROVED QUALITY AT 1.464 Kg/m².
- ALL DIMENSIONS AND REINFORCEMENT DETAILS ARE TENTATIVE. DETAILED DESIGN DRAWING SHALL BE FOLLOWED FOR EXECUTION OF WORK.
- THE SLOPE FOR EXTENT OF BACK FILL SHOULD NOT BE STEEPER THAN 1:1.
- CONTRACTION/EXPANSION JOINTS SHALL BE PROVIDED AT 20m INTERVAL.

HRIDC

SHYAM PRAVEEN
CPM/HRIDC
Umapati
DGM/C-1
VINEET GUMBER
EXECUTIVE/CIVIL

GC

SUDHIR AGRAWAL
DPS/CIVIL
KEETU PATIL
RE-CIVIL/DESIGN
POSHANBHAI KUMAR SINGH
PRE-CIVIL/DESIGN



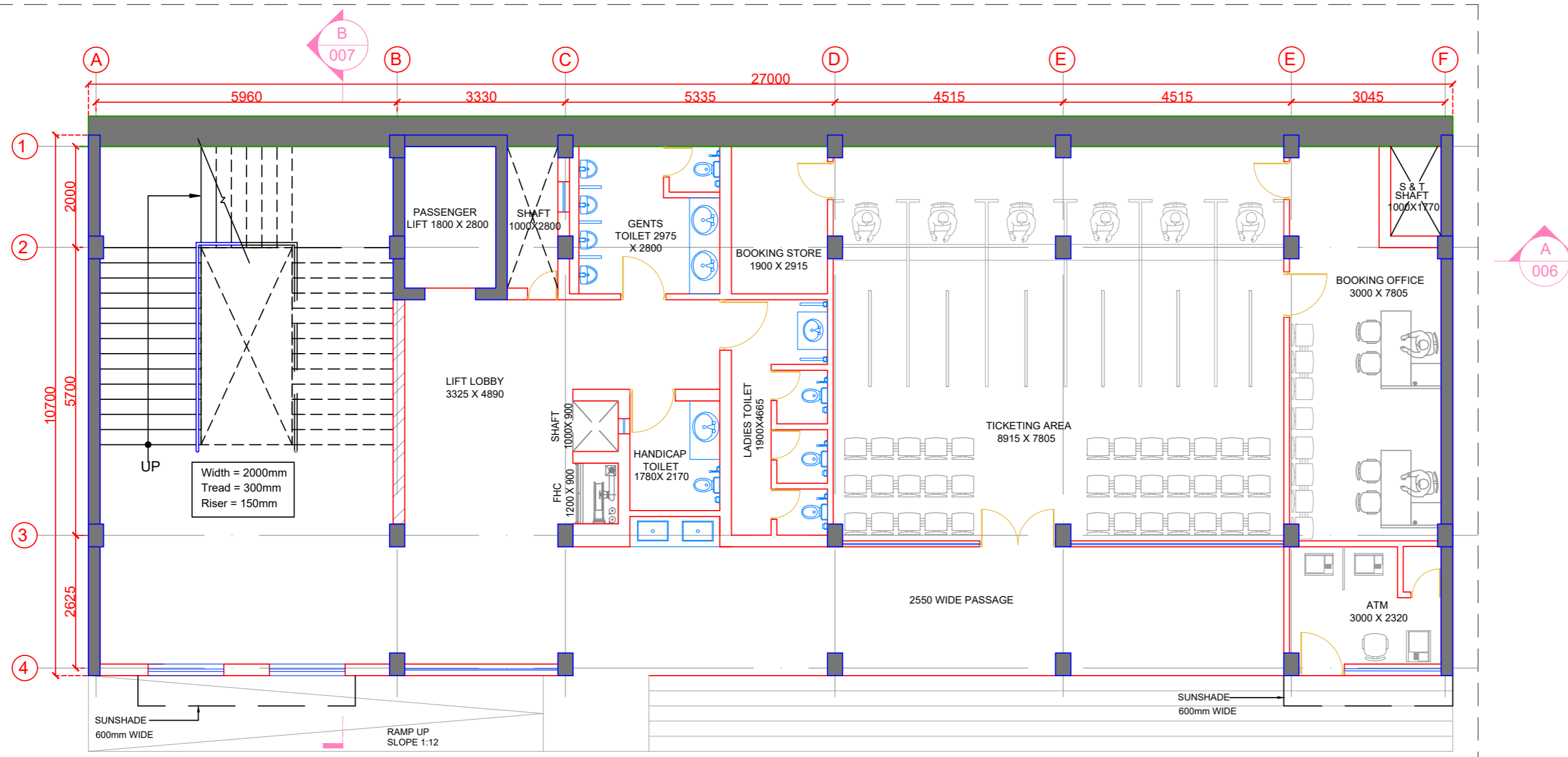
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

Project:- **HARIYANA ORBITAL RAIL CORRIDOR (HORC)**

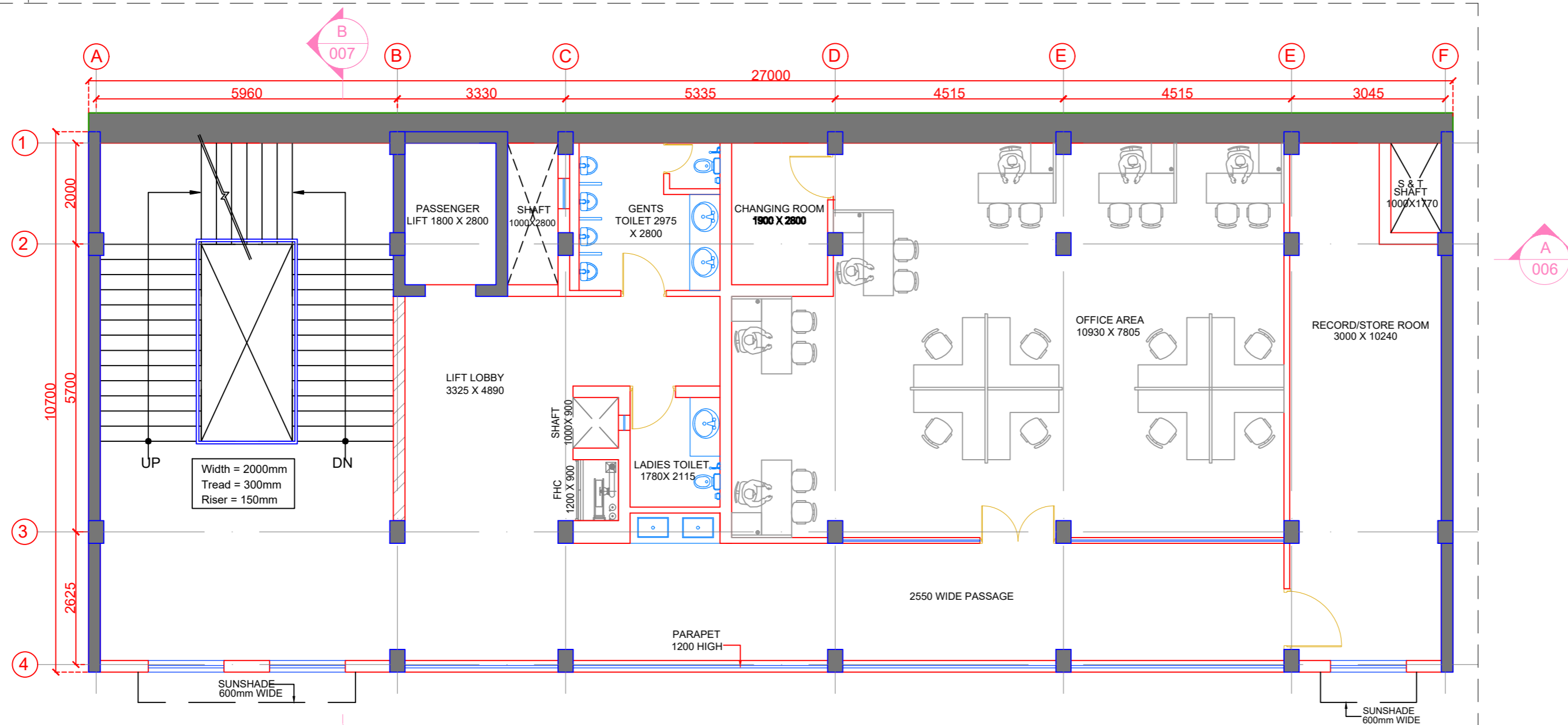
GENERAL ARRANGEMENT DRAWING
TYPICAL DIMENSION DETAILS OF
RETAINING WALL

SCALE: N.T.S

DRAWING NO. - HRIDC/PS/RW-1



1 GROUND FLOOR PLAN



2 FIRST FLOOR PLAN

GENERAL NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL, PLUMBING, ELECTRICAL DRAWINGS.

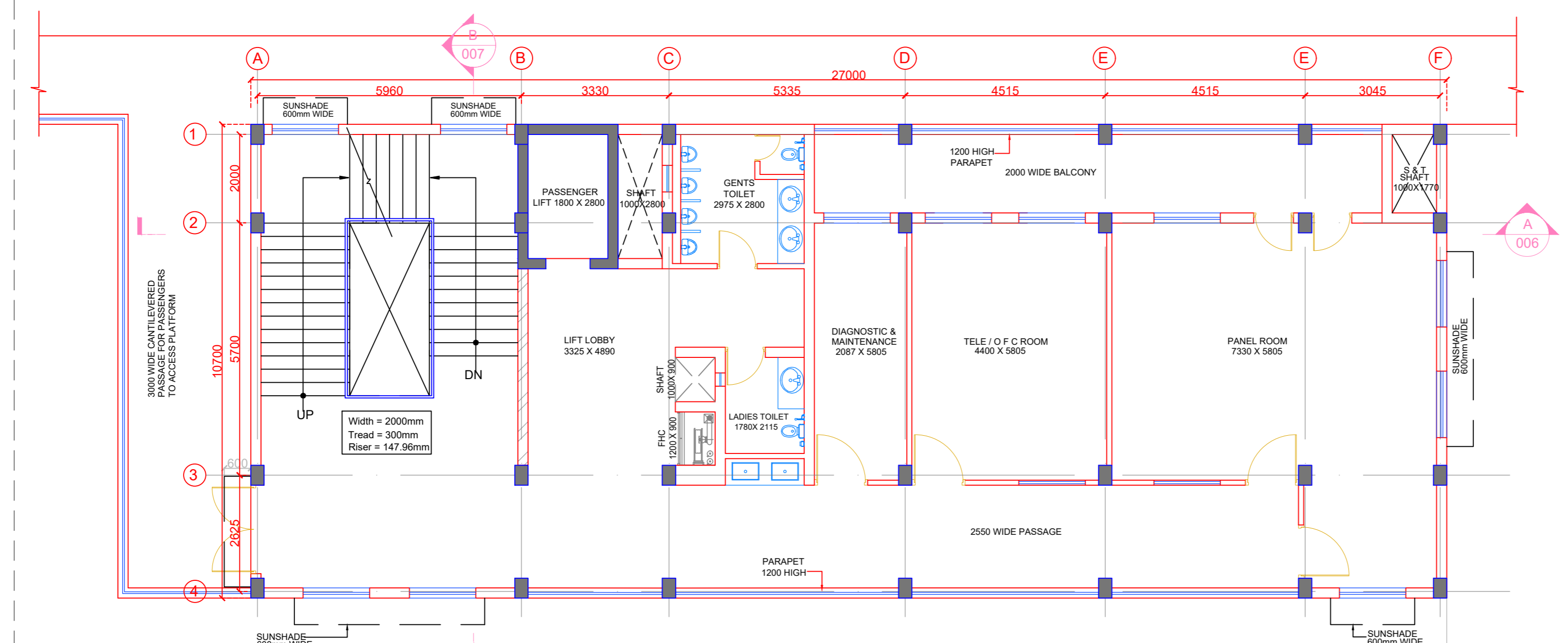
GC	
SUDHIR AGRAWAL DPD/CIVIL	<i>Sudhir</i>
REETU PATIAL RE-CIVIL/DESIGN	<i>Reetu</i>
PUSHPENDRA KUMAR SINGH ARE-CIVIL/DESIGN	<i>P.K. Singh</i>
HRIDC	
SHIV OM DAVEDI CPM/HRIDC	<i>Shiv</i>
M.S. MEER AGM/TP&ES	<i>M.S. Meer</i>
TIKU RAM CHAUDHARY JGM/ELECT/PROJECT	<i>T.R. Chaudhary</i>
MENDLEEF KATIYAR AM/ELECT	<i>M. Katiyar</i>
UMA.M. KAO DGM/C-1	<i>U.M. Kao</i>
VINEET GUMBER EXECUTIVE/CIVIL	<i>Vineet</i>

 HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

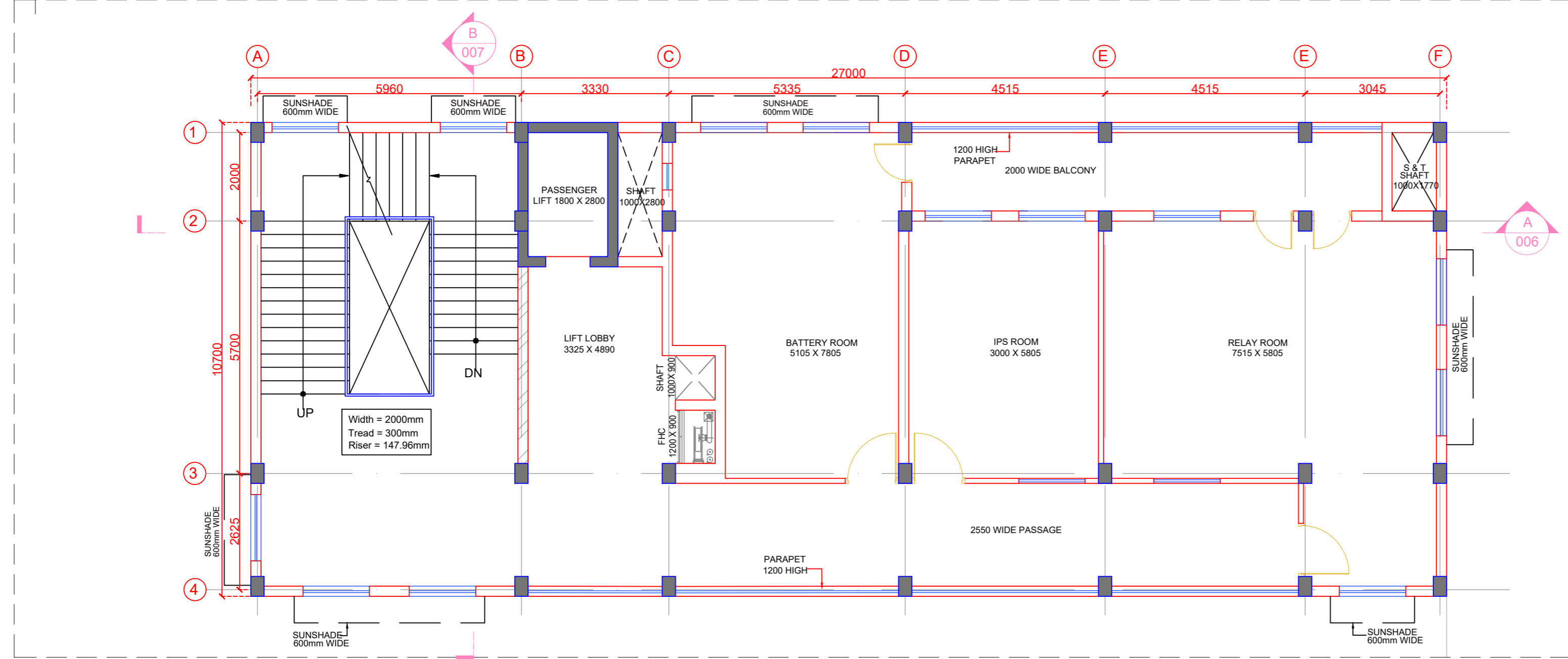
Project:- HARIYANA ORBITAL RAIL CORRIDOR (HORC)

MANESAR STATION BUILDING

DRAWING NO.- HRIDC/PS/SB-1



1 SECOND FLOOR PLAN



2 THIRD FLOOR PLAN

GENERAL NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL, PLUMBING, ELECTRICAL DRAWINGS.

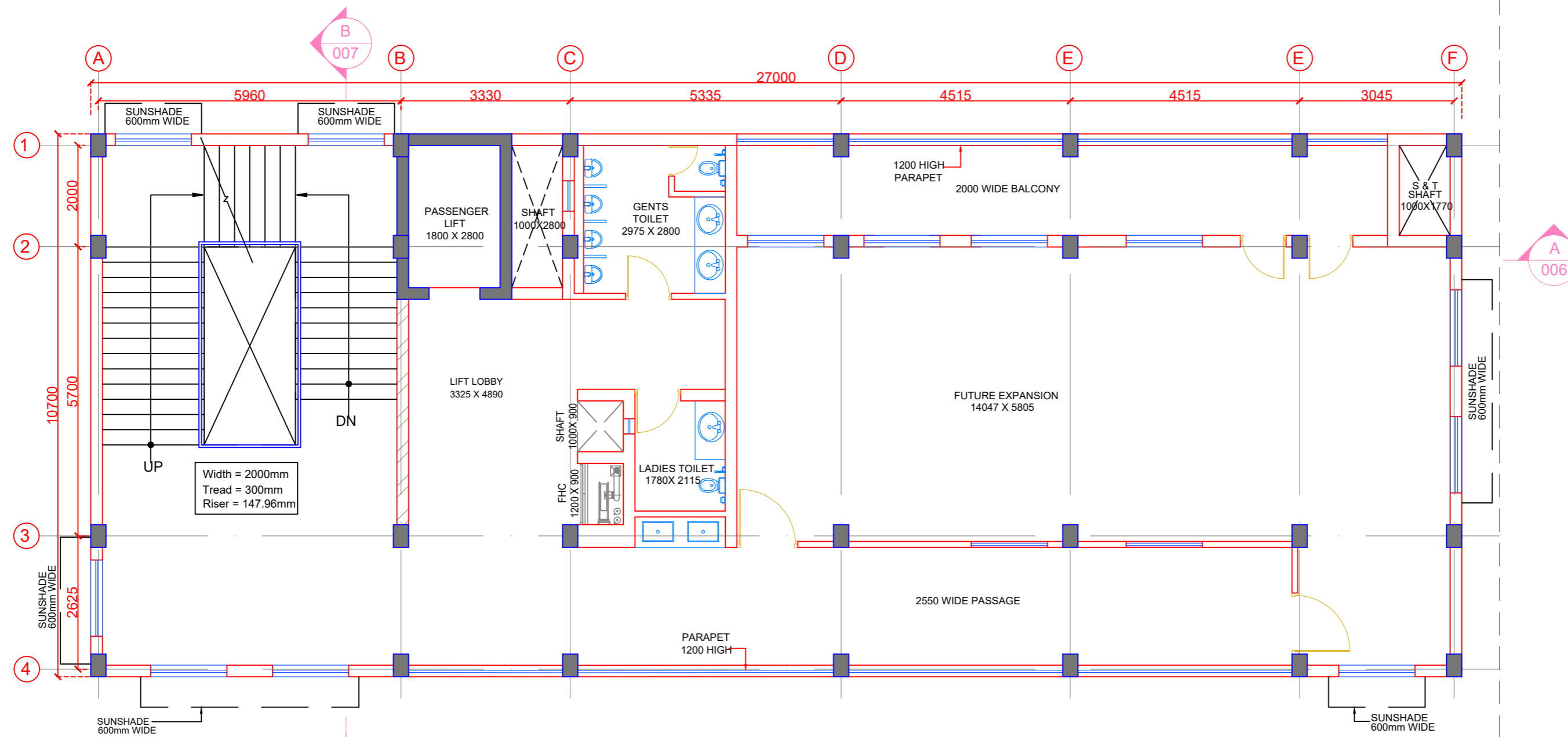
GC	
SUDHIR AGRAWAL DPD/CIVIL	<i>Sudhir</i>
REETU PATIAL RE-CIVIL/DESIGN	<i>Reetu</i>
PUSHPENDRA KUMAR SINGH PRE-CIVIL/DESIGN	<i>P.K. Singh</i>
HRIDC	
SHIV OM DAVEDI CPM/HRIDC	<i>Shiv</i>
M.S. MEER AGM/TP&ES	<i>M.S. Meer</i>
TIKU RAM CHAUDHARY JGM/ELECT/PROJECT	<i>T.R. Chaudhary</i>
MENDLEEF KATIYAR AM/ELECT	<i>M. Katiyar</i>
UMA.M. RAO DGM/C-1	<i>U.M. Rao</i>
VINEET GUMBER EXECUTIVE/CIVIL	<i>Vineet</i>

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)

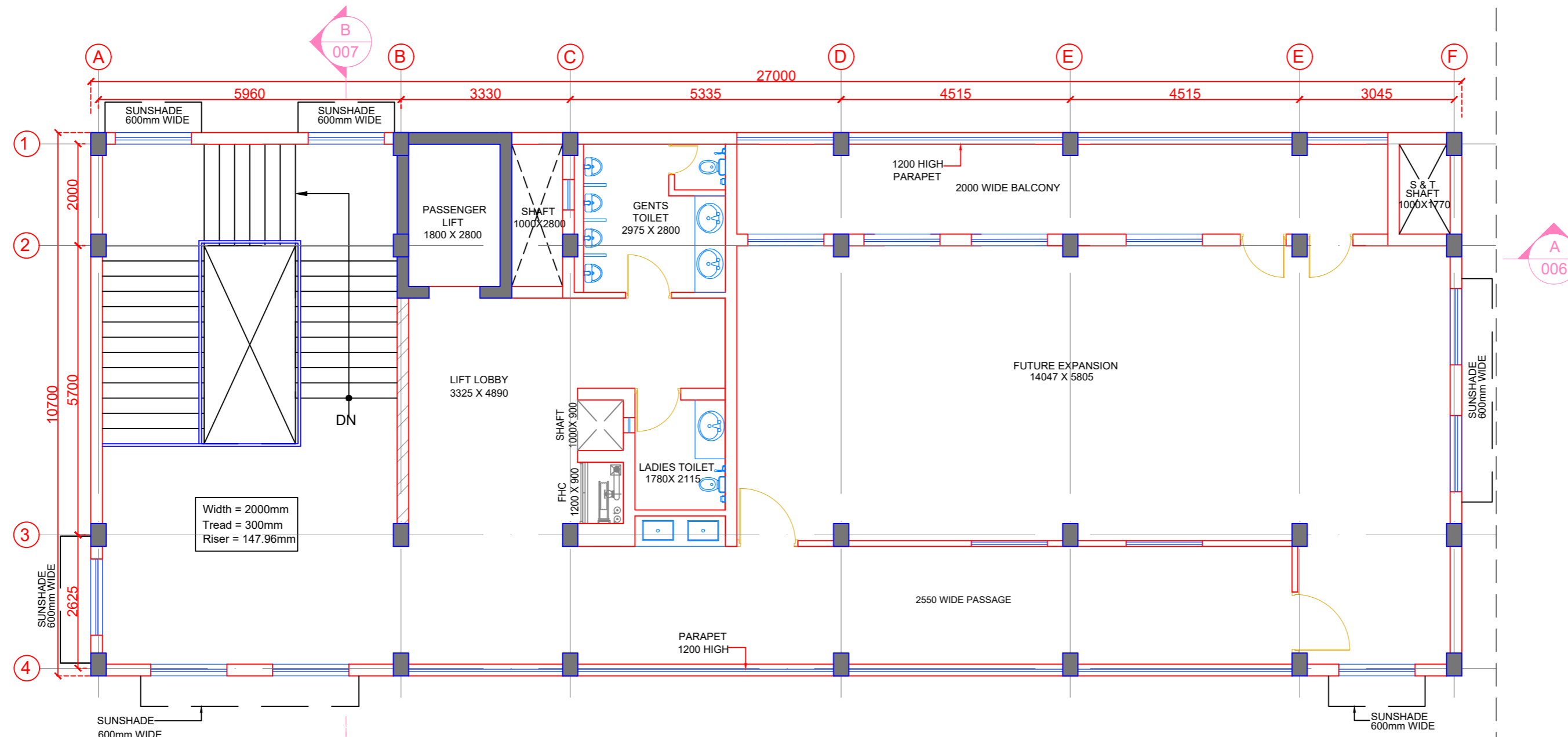
Project:- HARIYANA ORBITAL RAIL CORRIDOR (HORC)

MANESAR STATION BUILDING

DRAWING NO.- HRIDC/PS/SB-2




1 FOURTH FLOOR PLAN

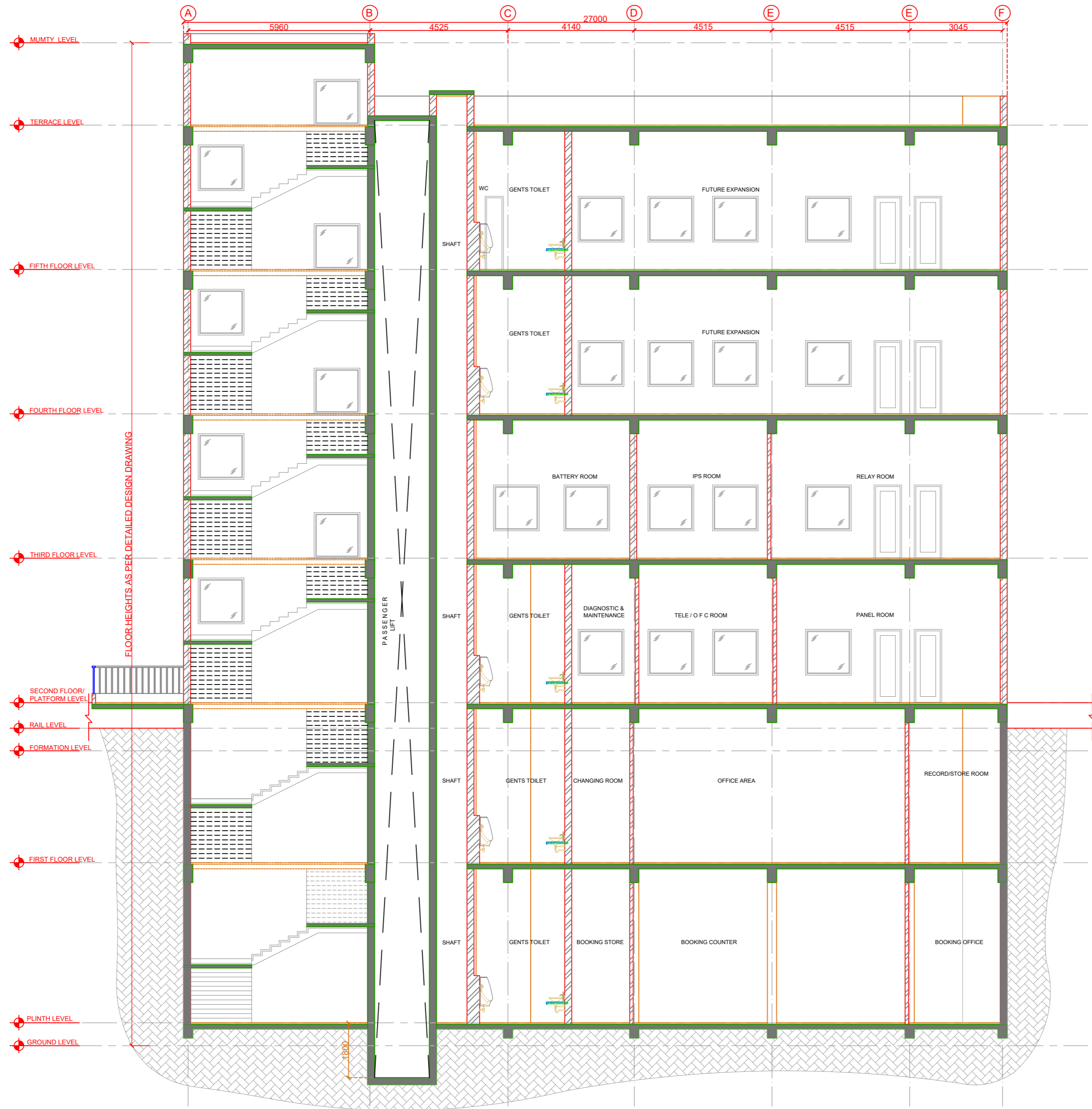


2 FIFTH FLOOR PLAN

GENERAL NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL, PLUMBING, ELECTRICAL DRAWINGS.


GC	
SUDHIR AGRAWAL DPD/CIVIL	<i>Sudhir</i>
REETU PATIAL RE-CIVIL/DESIGN	<i>Reetu</i>
PUSHPENDRA KUMAR SINGH PRE-CIVIL/DESIGN	<i>P.K. Singh</i>
HRIDC	
SHIV OM DAVEDI CPM/HRIDC	<i>Shiv</i>
M.S. MEER AGM/TP&ES	<i>M.S. Meer</i>
TIKU RAM CHAUDHARY JGM/ELECT/PROJECT	<i>T.R. Chaudhary</i>
MENDLEEF KATIYAR AM/ELECT	<i>M. Katiyar</i>
UMA.M. RAO DGM/C-1	<i>U.M. Rao</i>
VINEET GUMBER EXECUTIVE/CIVIL	<i>Vineet</i>
 HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)	
HARIYANA ORBITAL RAIL CORRIDOR (HORC)	
MANESAR STATION BUILDING	
DRAWING NO.- HRIDC/PS/SB-3	



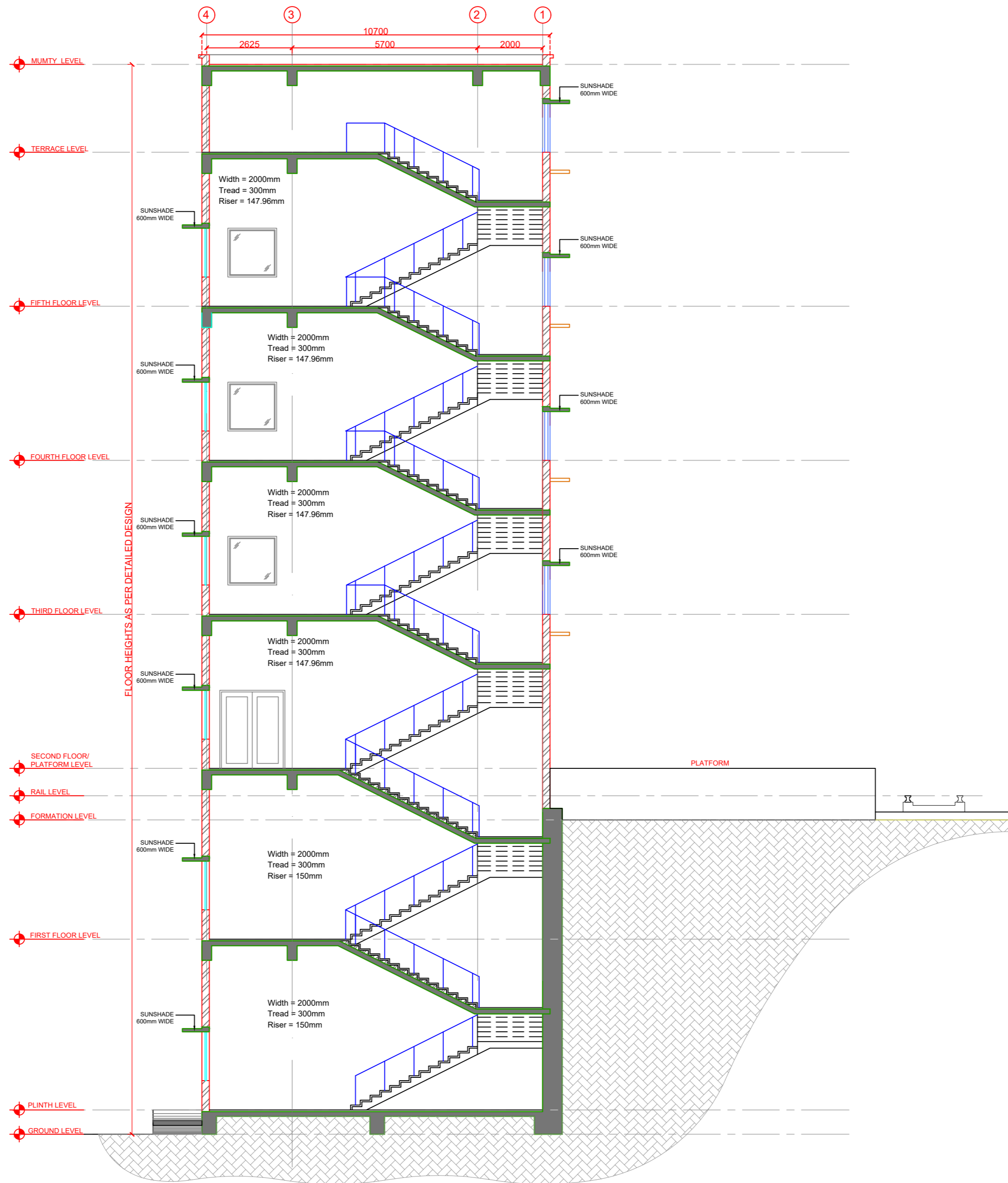
GENERAL NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL, PLUMBING, ELECTRICAL DRAWINGS.

GC	
SUDHIR AGRAWAL DPD/CIVIL	<i>Sudhir</i>
REETU PATIAL RE-CIVIL/DESIGN	<i>Reetu</i>
PUSHPENDRA KUMAR SINGH PRE-CIVIL/DESIGN	<i>P.K. Singh</i>
HRIDC	
SHIV OM DAVEDI CPM/HRIDC	<i>Shiv</i>
M.S. MEER AGM/TP&ES	<i>M.S. Meer</i>
TIKU RAM CHAUDHARY JGM/ELECT/PROJECT	<i>T.R. Chaudhary</i>
MENDLEEF KATIYAR AM/ELECT	<i>M. Katiyar</i>
UMA.M. CAO DGM/C-1	<i>Uma</i>
VINEET GUMBER EXECUTIVE/CIVIL	<i>Vineet</i>


HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)
HARIYANA ORBITAL RAIL CORRIDOR (HORC)
MANESAR STATION BUILDING
 DRAWING NO.- HRIDC/PS/SB-4


1 SECTION A



GENERAL NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL, PLUMBING, ELECTRICAL DRAWINGS.

GC	
SUDHIR AGRAWAL DPD/CIVIL	<i>Sudhir</i>
REETU PATIAL RE-CIVIL/DESIGN	<i>Reetu</i>
PUSHPENDRA KUMAR SINGH ARE-CIVIL/DESIGN	<i>P.K. Singh</i>
HRIDC	
SHIV OM DAVEDI CPM/HRIDC	<i>Shiv</i>
M.S. MEER AGM/TP&ES	<i>M.S. Meer</i>
TIKU RAM CHAUDHARY JGM/ELECT/PROJECT	<i>T.R. Chaudhary</i>
MENDLEEF KATIYAR AM/ELECT	<i>M. Katiyar</i>
UMA.M. RAO DGM/C-1	<i>U.M. Rao</i>
VINEET GUMBER EXECUTIVE/CIVIL	<i>Vineet</i>


HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED (HRIDC)
HARIYANA ORBITAL RAIL CORRIDOR (HORC)
MANESAR STATION BUILDING
 DRAWING NO.- HRIDC/PS/SB-5

1 SECTION B

SECTION VII-4
REFERENCE INFORMATION/REPORTS

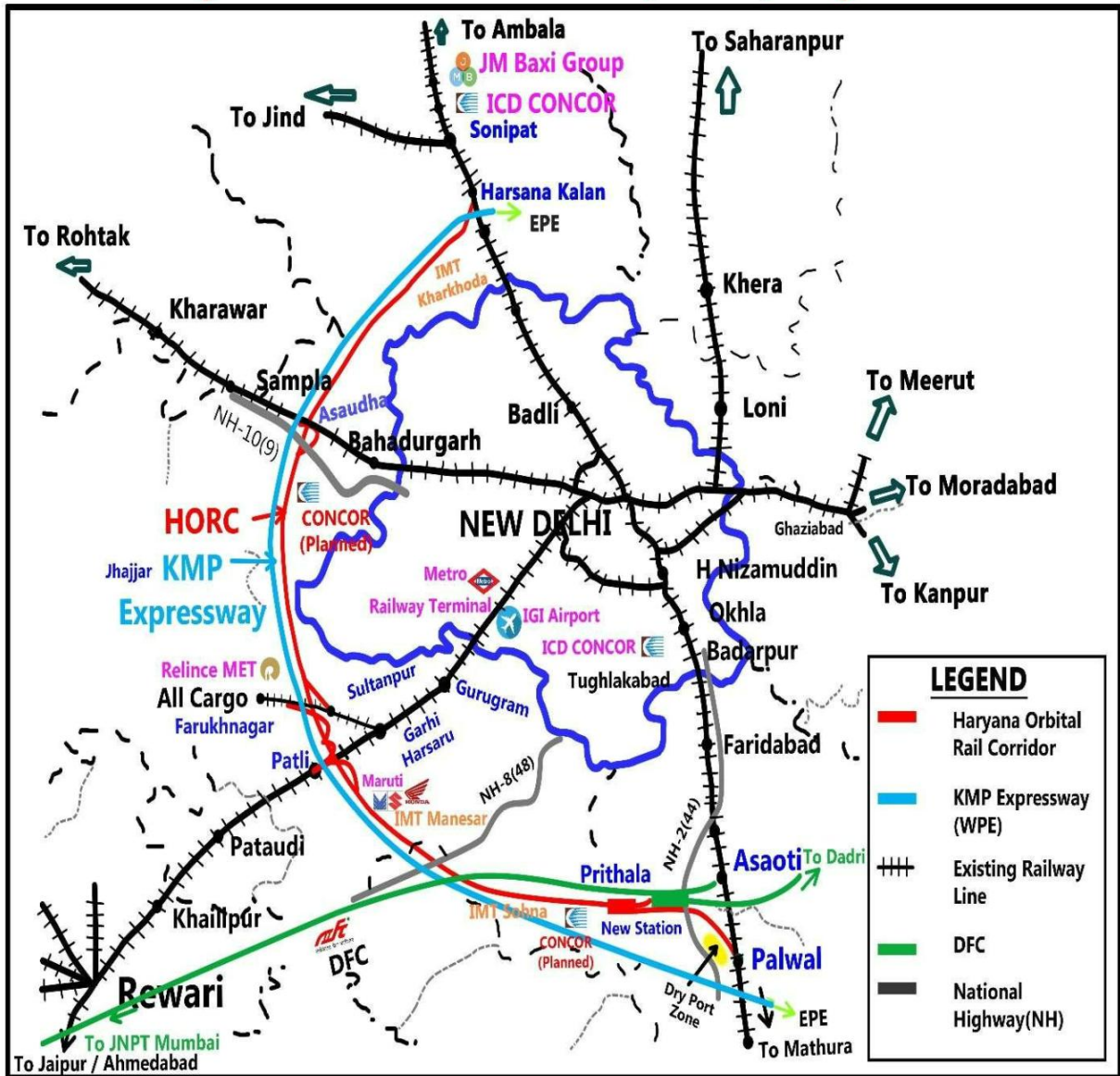
Table of Contents

Attachment-1 Alignment Plan of HORC Project
Attachment-2 Location map of Priority Section
Attachment-3 Geotechnical Investigation Report
Attachment-4 List of Temporary Benchmarks
Attachment-5 Typical Cross Sections of Earthwork
Attachment-6 Charted Utilities
Attachment-7 Drawing for Barricading at locations where diversion of road traffic is required

ATTACHMENT 1

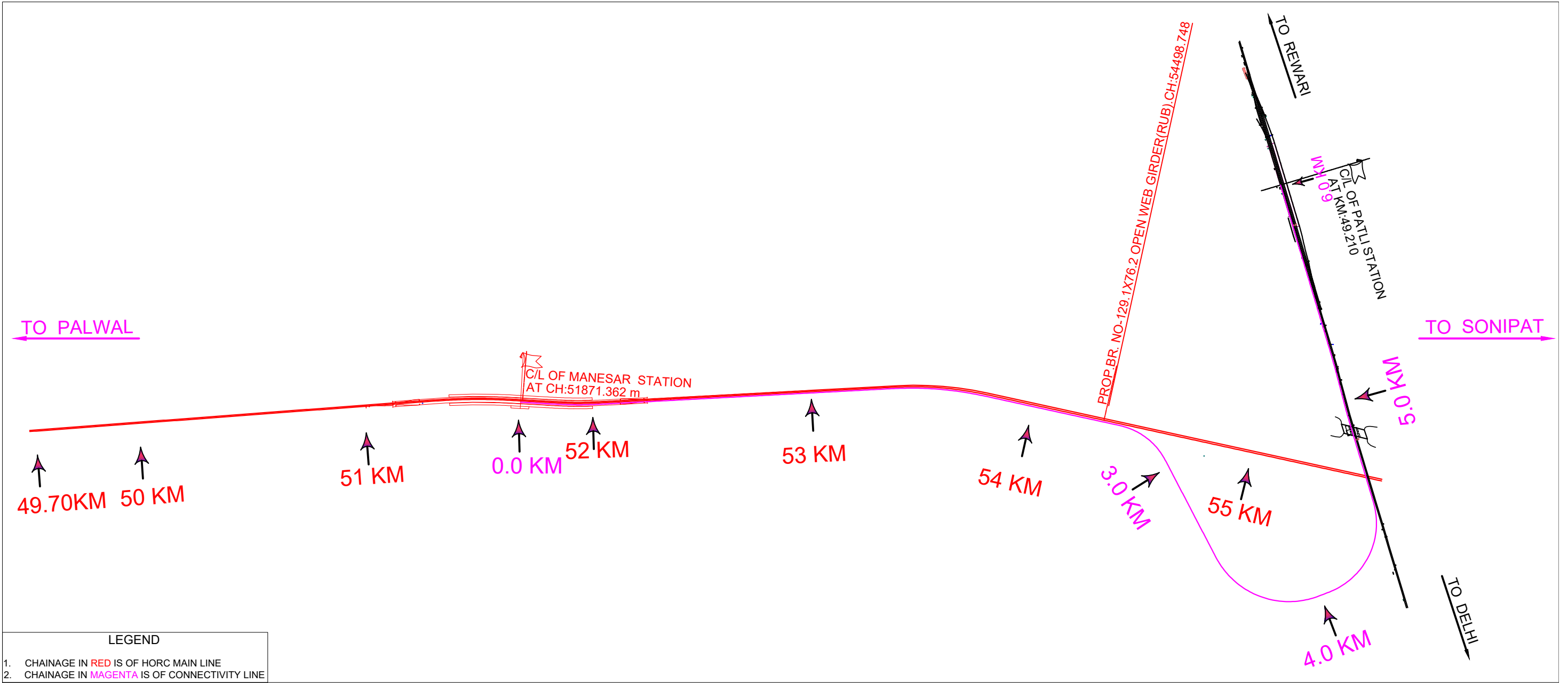
ALIGNMENT PLAN OF HORC PROJECT

Haryana Orbital Rail Corridor(HORC)-Alignment



ATTACHMENT 2

LOCATION MAP OF PRIORITY SECTION



ATTACHMENT 3

GEOTECHNICAL INVESTIGATION REPORT

BRIDGE NO. 127 CH: 50079.38m

Standard Penetration Test Result

Bore Hole at Bridge No. 127

Date of Field Test - 27-12-2020

Bore Hole NGL - 253.182

BH - Coordinates - E 3138253.596, N 684192.244

Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	49	76	Silty Sand	252.18	SM
2.50	UDS	-	Silty Sand	250.68	SM
4.00	36	39	Silty Sand	249.18	SM
5.50	UDS	-	Silty Sand	247.68	SP-SM
7.00	98	89	Clayish Sand with Kankars	246.18	SM

BH Terminates at 7.50m

Br. No. 127

0.00	G.L.	N VALUE	Classification as per I.S.	BH-1
1.00		49	SM	SANDY SOIL
2.50			SM	
4.00		36	SM	
5.50			SP-SM	CLAYISH
7.00		98	SM	SANDY SOIL

BRIDGE NO. 128 CH: 50502.38m

Standard Penetration Test Result

Bore Hole at Bridge No. 128

Date of Field Test - 27-12-2020

Bore Hole NGL -249.659

BH - Coordinates - E3138655.38, N 684055.199

Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	52	82	Silty Sand	248.66	SP-SM
2.50	UDS	-	Silty Sand	247.16	SM
4.00	41	45	Silty Sand	245.66	SM
5.50	UDS	-	Silty Sand	244.16	SP-SM
7.00	>100	-	Silty Sand	242.66	SP-SM
8.50	UDS	-	Silty Sand	241.16	SM
10.00	>100	-	Silty Sand	239.66	SM
12.00	UDS	-	Silty Sand	237.66	SM

BH Terminates at 12.50m

Br No 128				
0.00	G.L.	N VALUE	Classification as per I.S.	BH-1
1.00		52	SP-SM	SANDY SOIL
2.50			SM	
4.00		51	SM	
5.50			SP-SM	
7.00		110	SP-SM	MURRUM SOIL WITH GRAVEL
8.50			SM	
10.00		90	SM	
12.00			SM	

BRIDGE NO. 129 CH: 50822.38m

Standard Penetration Test Result

Bore Hole at Bridge No. 129

Date of Field Test - 27-12-2020

Bore Hole NGL - 246.527

BH - Coordinates - E 3138964.352, N 683954.664





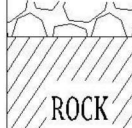


Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	47	73	Sandy Soil	245.53	SW
2.50	UDS	-	Boulder	244.03	
4.00	>100	-	Rock	242.53	
6.00	>100	-	Rock	240.53	

BH Terminates at 7.0m

Rock starts from 3.0m

Br No 129

0.00	GL	NVALUE	BH1
1.00		47	 GRAVEL
2.50			
4.00		>50	 ROCK
5.00			
6.00			

BRIDGE NO. 130 CH: 50912.38 M

Standard Penetration Test Result

Bore Hole at Bridge No 130

Date of Field Test - 04-01-2021

Bore Hole NGL - 245.810

BH - Coordinates - E 3139049.935, N 683926.816

Field Data

Depth below ground		N-values				BH Levels	Soil Classification
Level (m)	N	BH-1					
		Corrected	Description	CR%	RQD%		
1.00	25	39	Sandy Soil	-	-	244.81	SP-SM
2.50	UDS	-	Sandy Soil with	-	-	243.31	SP-SM
4.00	>50	-	Rock	-	-	241.81	Residual Soil
5.50	>50	-	Rock	26.67	10	240.31	Highly Weathered
7.00	>50	-	Rock	38	17.33	238.81	

BH Terminates at 7.0m

Rock starts from 4.0m

Br No 130

0.00	G.L	N VALUE		BH-1
1.00		34	SP-SM	SANDY SOIL
2.50			SP-SM	
4.00		>50	SP-SM	ROCK
5.50				
7.00				

BRIDGE NO. 131 CH: 51672.38m

Standard Penetration Test Result

Bore Hole at Bridge No. 131

Date of Field Test - 27-12-2020

Bore Hole NGL -240.036

BH - Coordinates - E 3139774.954, N 683697.842

Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	24	37	Sandy Soil	239.04	SM
2.50	UDS	-	Sandy Soil	237.54	SP-SM
4.00	39	42	Sandy Soil	236.04	SP-SM
5.50	UDS	-	Sandy Soil	234.54	SM
7.00	85	77	Sandy Soil	233.04	SP-SM
8.50	UDS	-	Sandy Soil	231.54	SM
10.00	>100	-	Sandy soil with Gravel	230.04	SP-SM
12.00	UDS	-	Sandy soil with Gravel	228.04	SM

Br No 131			Classification as per I.S.	
0.00	G.L.	N VALUE	BH-1	
1.00		24	SM	SANDY SOIL
2.50			SP-SM	
4.00		39	SP-SM	
5.50			SP-SM	
7.00		85	SP-SM	SANDY SOIL WITH GRAVEL
8.50			SM	
10.00		>100	SM	
11.50			SM	

BRIDGE NO. 132 CH: 52072.38m

Standard Penetration Test Result

Bore Hole at Bridge No. 132

Date of Field Test - 02-01-2021

Bore Hole NGL -237.326

BH - Coordinates - E 3140167.367, N 683619.422

Field Data

Depth below ground Level (m)	N-values			BH Levels	Soil Classification
	BH-1				
	N	Corrected	Description		
1.00	7	11	Sandy Soil	236.33	SP-SM
2.50	UDS	-	Sandy Soil	234.83	SP-SM
4.00	21	23	Sandy Soil	233.33	SP-SM
5.50	UDS	-	Sandy Soil	231.83	SP-SM
7.00	55	52	Sandy Soil	230.33	SM
8.50	UDS	-	Sandy Soil	228.83	SP-SM
10.00	24	19	Sandy soil with Gravel	227.33	SM
11.50	UDS	-	Sandy soil with Gravel	225.83	SM
13.00	29	21	Sandy soil with Gravel	224.33	SM
14.50	UDS	-	Sandy soil with Gravel	222.83	SM
16.00	55	36	Sandy soil with Gravel	221.33	SM
17.50	UDS	-	Sandy soil with Gravel	219.83	SM
19.00	63	38	Sandy soil with Gravel	218.33	SM
20.50	UDS	-	Sandy soil with Gravel	216.83	SM
22.00	85	47	Sandy soil with Gravel	215.33	SM
24.00	UDS	-	Sandy soil with Gravel	213.33	SM

**BH Terminates at 24.50m
Water Found at 17.0m**

BRIDGE NO. 133 CH: 52762.38m

Standard Penetration Test Result

Bore Hole at Bridge No 133

Date of Field Test - 01-01-2021

Bore Hole NGL -235.096

BH - Coordinates - E 3140824.69, N 683428.398

Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	13	20	Sandy Soil	234.10	SM
2.50	UDS	-	Sandy Soil	232.60	SM
4.00	15	16	Sandy Soil	231.10	SP-SM
5.50	UDS	-	Sandy Soil	229.60	SM
7.00	30	28	Sandy soil with Gravel	228.10	SM
8.50	UDS	-	Sandy soil with Gravel	226.60	SM
10.00	21	17	Sandy soil with Gravel	225.10	SM
11.50	UDS	-	Sandy soil with Gravel	223.60	SP-SM
13.00	25	18	Sandy soil with Gravel	222.10	SM
14.50	UDS	-	Sandy soil with Gravel	220.60	SM
16.00	24	15	Sandy soil with Gravel	219.10	SM
17.50	UDS	-	Sandy soil with Gravel	217.60	SP-SM
19.00	52	31	Sandy soil with Gravel	216.10	SM
20.50	UDS	-	Sandy soil with Gravel	214.60	SP-SM
22.00	62	34	Sandy soil with Gravel	213.10	SP-SM
24.00	UDS	-	Sandy soil with Gravel	211.10	SM

BH Terminates at 24.50m
Water Found at 16.0m Level

Br No 133

0.00	G.L.	N VALUE	Classificatuion as per I.S.	BH-1
1.00		13	SM	SANDY SOIL
2.50			SM	
4.00		15	SP-SM	
5.50			SM	
7.00		30	SM	SANDY SOIL WITH GRAVEL
8.50			SM	
10.00		21	SM	
11.50			SP-SM	
13.00		25	SM	
14.50			SM	
16.00		24	SM	
17.50			SP-SM	
19.00		52	SM	
20.50			SM	
22.00		62	SM	
24.00			SP-SM	

BRIDGE NO. 134 CH: 54500.38m

Standard Penetration Test Result

Bore Hole at Bridge No 134(1)

Date of Field Test - 20-12-2020

Bore Hole NGL -229.027

BH - Coordinates - E 3142457.998, N 683043.446

Field Data

Depth below ground Level (m)	N-values			BH Levels	Soil Classification
	BH-1				
	N	Corrected	Description		
1.00	15	23	Sandy Soil	228.03	SP
2.50	UDS	-	Silty Sand	226.53	SM
4.00	52	58	Sandy Soil	225.03	SP
5.50	UDS	-	Silty Sand	223.53	SM
7.00	58	54	Silty Sand	222.03	SM
8.50	UDS	-	Silty Sand	220.53	SP-SM
10.00	>100	-	Moorum with Gravel	219.03	SM
11.50	UDS	-	Moorum with Gravel	217.53	SP-SM
13.00	>100	-	Moorum with Gravel	216.03	SP-SM
14.50	>100	-	Moorum with Gravel	214.53	SM
16.00	78	51	Moorum with Gravel	213.03	SM
17.50	UDS	-	Sandy soil with Gravel	211.53	SM
19.00	83	49	Sandy soil with Gravel	210.03	SM
20.50	UDS	-	Sandy soil with Gravel	208.53	SM
22.00	85	46	Sandy Soil	207.03	SP-SM
23.50	UDS	-	Sandy Soil	205.53	SP-SM
25.00	97	49	Sandy Soil	204.03	SP-SM

Standard Penetration Test Result

Bore Hole at Bridge No 134(1)

Date of Field Test - 20-12-2020

Bore Hole NGL -229.027

BH - Coordinates - E 3142457.998, N 683043.446

Field Data

Depth below ground Level (m)	N-values			BH Levels	Soil Classification
	BH-1				
	N	Corrected	Description		
26.50	UDS	-	Sandy soil with Gravel	202.53	SM
28.00	37	17	Sandy soil with Gravel	201.03	SM
30.00	38	17	Sandy soil with Gravel	199.03	SM
31.00	>100	-	Sandy soil with Gravel	198.03	SM
34.00	>100	-	Sandy soil with Gravel	195.03	SM
35.00	>100	-	Sandy soil with Gravel	194.03	SM

Bore Hole Terminated at 35.50m

Water Found at 19.5m Level

Br No 134 (M)RUB)-1

0.00	G.L.	N VALUE	Classificatuion as per I.S.	BH-1
1.00		15	SP	SANDY SOIL
2.50			SM	
4.00		52	SP	
5.50			SM	
7.00		58	SM	
8.50			SP-SM	
10.00		>100	SM	MURRUM SOIL WITH GRAVEL
11.50			SP-SM	
13.00		>100	SP-SM	
14.50		>100	SM	
16.00		78	SM	SANDY WITH GRAVEL
17.50			SM	
19.00		83	SM	WATER
20.50			SM	
22.00		85	SP-SM	SANDY SOIL
23.50			SP-SM	
25.00		97	SP-SM	SANDY WITH GRAVEL
26.50			SP-SM	
28.00		37	SM	
30.00		38	SM	
31.50		>100	SM	
34.00		>100	SM	
			SM	
35.00		>100	SM	

Standard Penetration Test Result

Bore Hole at Bridge No 134(2)

Date of Field Test - 26-12-2020

Bore Hole NGL - 228.1

Field Data

Depth below ground Level (m)	N-values			BH Levels	Soil Classification
	BH-1				
	N	Corrected	Description		
1.00	16	25	Silty sand with Kankars	227.10	SP-SM
2.50	UDS	-	Silty sand with Kankars	225.60	SM
4.00	27	30	Silty sand with Kankars	224.10	SM
5.50	UDS	-	Silty sand with Kankars	222.60	SM
7.00	49	45	Silty sand with Kankars	221.10	SM
8.50	UDS	-	Silty sand with Kankars	219.60	SP-SM
10.00	45	36	Moorum with Gravel	218.10	SP-SM
11.50	UDS	-	Moorum with Gravel	216.60	SP-SM
13.00	46	33	Moorum with Gravel	215.10	SM
14.50	UDS	-	Moorum with Gravel	213.60	SP-SM
16.00	89	58	Moorum with Gravel	212.10	SM
17.50	UDS	-	Moorum with Gravel	210.60	SM
19.00	77	45	Moorum with Gravel	209.10	SP-SM
20.50	UDS	-	Moorum with Gravel	207.60	SP-SM
22.00	80	43	Moorum with Gravel	206.10	SP-SM
23.50	UDS	-	Sandy soil with Gravel	204.60	SP-SM
25.00	28	14	Sandy soil with Gravel	203.1	SM

Depth below ground	N-values				
	BH-1				
26.50	34	16	Sandy soil with Gravel	201.60	SP-SM
28.00	34	15	Sandy soil with Gravel	200.10	SM

**Bore Hole Terminated at 28.50m
Water Found at 18.5m Level**

Br No 134 (M)RUB)-2				
0.00	G.L.	N VALUE	Classification as per I.S.	BH-1
1.00		16	SP-SM	SANDY SOIL
2.50			SM	
4.00		27	SM	
5.50			SM	
7.00		49	SM	
8.50			SP-SM	
10.00		45	SP-SM	
11.50			SP-SM	
13.00		46	SM	
14.50			SP-SM	
16.00		89	SM	
17.50			SM	
19.00		77	SP-SM	SANDY SOIL WITH GRAVEL
20.50			SP-SM	
22.00		80	SP-SM	
23.50			SP-SM	
25.00		28	SM	
26.50		34	SP-SM	
28.00		34	SM	

BRIDGE NO. 135 CH: 54619.38m

Standard Penetration Test Result

Bore Hole at Bridge No.135(2)

Date of Field Test - 27-12-2020

Bore Hole NGL - 227.59

BH - Coordinates - E 3142646.399, N 683125.66

Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	7	15	Sandy Soil	226.59	SP-SM
2.50	UDS	-	Sandy Soil	225.09	SP
4.00	25	43	Sandy Soil	223.59	SP-SM
5.50	UDS	-	Sandy Soil	222.09	SP-SM
7.00	>50	-	Sandy Soil	220.59	SP
8.50	UDS	-	Clay sand with Murrum	219.09	SM
10.00	>50	-	Clay sand with Murrum	217.59	SP

BH Terminates at 10.50m

Br No 135 (Minor RUB)

0.00	G.L.	N VALUE	Classification as per I.S.	BH-1
1.00		7	SP-SM	SANDY SOIL
2.50			SP	
4.00		25	SP-SM	
5.50			SP-SM	
7.00		50	SP	
8.50			SM	
10.00		>50	SP	

BRIDGE NO. 135 (A) CH: 3064m connectivity line

Standard Penetration Test Result

Bore Hole at Bridge No.135(A)

Date of Field Test - 27-12-2020

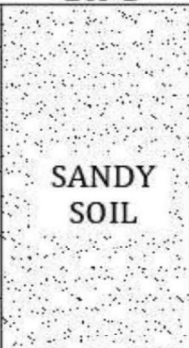
Bore Hole NGL - 227.405

BH - Coordinates - E 3142892.406, N 683312.503

Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	31	48	Sandy Soil	226.41	SP-SM
2.50	UDS	-	Sandy Soil	224.91	SP
4.00	24	26	Sandy Soil	223.41	SP
5.50	UDS	-	Sandy Soil	221.91	SM
7.00	53	48	Sandy Soil	220.41	SM
8.50	UDS	-	Sandy Soil with Gravel	218.91	SP-SM
10.00	>100	-	Sandy Soil with Gravel	217.41	SM

BH Terminates at 10.50m

Br. No 135 (A)				
0.00	G.L.	N VALUE	Classification as per I.S.	BH-1
1.00		31	SP-SM	
2.50			SP	
4.00		24	SP	
5.50			SM	
7.00		53	SM	
8.50			SP-SM	
10.00		100	SM	

BRIDGE NO. 135 (B) CH: 3503m connectivity line
Standard Penetration Test Result

Bore Hole at Bridge No 135(B)

Date of Field Test - 27-12-2020

Bore Hole NGL - 224.9

BH - Coordinates - E 3143191.596, N 683638.999

Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	18	28	Silty Sand	223.90	SM
2.50	UDS	-	Silty Sand	222.40	SM
4.00	32	36	Silty Sand	220.90	SP-SM
5.50	UDS	-	Silty Sand	219.40	SP-SM
7.00	51	48	Silty Sand	217.90	SM
8.50	UDS	-	Silty Sand	216.40	SM
10.00	56	46	Silty Sand	214.90	SM
11.50	UDS	-	Silty Sand	213.40	SM
13.00	80	58	Silty Sand	211.90	SM

BH Terminates at 13.50m

Br No 135 (B)					
0.00	G.L.	N VALUE	Classification as per I.S.	BH-1	
1.00		18	SM	SANDY SOIL	
2.50			SM		
4.00		32	SP-SM		
5.50			SP-SM		
7.00		51	SM		
8.50			SM		
10.00		56	SM		CLAYISH SANDY SOIL
11.50			SM		
13.00		80	SM		

BRIDGE NO. 135 (C)

CH: 4047m connectivity line

Standard Penetration Test Result

Bore Hole at Bridge No 135(C)

Date of Field Test - 30-12-2020

Bore Hole NGL - 222.450

BH - Coordinates - E 3143680.851, N 683623.258

Field Data

Depth below ground		N-values				BH Levels	Soil Classification
Level (m)	N	BH-1					
		Corrected	Description	CR%	RQD%		
1.00	12	19	Sandy Soil		221.45	SP-SM	
2.50	UDS	-	Sandy Soil		219.95	SM	
4.00	39	44	Sandy Soil		218.45	SM	
5.50	UDS	-	Sandy Soil		216.95	SP-SM	
7.00	51	48	Sandy Soil with Gravel		215.45	SM	
8.50	UDS	-	Sandy Soil with Gravel		213.95	SP-SM	
10.00	83	68	Sandy Soil with Gravel		212.45	SP-SM	

BH Terminates at 10.5m

Br. No. 135 (C)

0.00	G.L.	N VALUE	Classification as per I.S.	BH-1
1.00		12	SP-SM	SANDY SOIL
2.50			SM	
4.00		39	SM	
5.50			SP-SM	
7.00		51	SM	SANDY SOIL WITH GRAVEL
8.50			SP-SM	
10.00		83	SP-SM	

BRIDGE NO. 135 (D)

CH: 4220m connectivity line

Standard Penetration Test Result

Bore Hole at Bridge No 135(D)

Date of Field Test - 29-12-2020

Bore Hole NGL - 221.989

BH - Coordinates - E 3143805.103, N 683499.233

Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	17	27	Sandy Soil	220.99	SP-SM
2.50	UDS	-	Sandy Soil	219.49	SM
4.00	29	32	Sandy Soil	217.99	SM
5.50	UDS	-	Sandy Soil	216.49	SP-SM
7.00	56	52	Sandy soil with gravel	214.99	SM
8.50	UDS	-	Sandy soil with gravel	213.49	SM
10.00	73	59	Sandy soil with gravel	211.99	SP
11.50	UDS	-	Sandy soil with gravel	210.49	SP-SM
13.00	68	49	Sandy soil with gravel	208.99	SM

BH Terminates at 13.5m

Br. No. 135 (D)				
0.00	G.L.	N VALUE	Classification as per IS.	BH-1
1.00		17	SP-SM	SANDY SOIL
2.50			SM	
4.00		29	SM	
5.50			SP-SM	
7.00		56	SM	SANDY SOIL WITH GRAVEL
8.50			SM	
10.00		73	SP	
11.50			SP-SM	
13.00		68	SM	

BRIDGE NO. 135 (F)

CH: 4777m connectivity line

Standard Penetration Test Result

Bore Hole at Bridge No 135(F)

Date of Field Test - 29-12-2020

Bore Hole NGL - 220.710

BH - Coordinates - E 3143656.612, N 682991.664

Field Data

Depth below ground Level (m)	N-values BH-1		Description	BH Levels	Soil Classification
	N	Corrected			
1.00	34	53	Sandy Soil	219.71	SP
2.50	UDS	-	Sandy Soil	218.21	SP-SM
4.00	33	36	Sandy Soil	216.71	SP-SM
5.50	UDS	-	Sandy Soil	215.21	SP-SM
7.00	63	58	Sandy soil with gravel	213.71	SM
8.50	UDS	-	Sandy soil with gravel	212.21	SM
10.00	62	50	Sandy soil with gravel	210.71	SM
12.00	UDS	-	Sandy soil with gravel	208.71	SM

BH Terminates at 12.50m

Br No 135 (F)

0.00	G.L.	N VALUE	Classification as per I.S.	BH-1
1.00		34	SP	SANDY SOIL
2.50			SP-SM	
4.00		33	SP-SM	
5.50			SP-SM	
7.00		63	SM	
8.50			SM	SANDY SOIL WITH GRAVEL
10.00		62	SM	
12.00			SM	

BRIDGE NO. 135 (G)

CH: 5283 m connectivity line

Standard Penetration Test Result

Bore Hole at Bridge No 135(G)

Date of Field Test - 02-01-2021

Bore Hole NGL - 223.781

BH - Coordinates - E 3143409.07, N 682548.102

Field Data

Depth below ground Level (m)	N-values BH-1			BH Levels	Soil Classification
	N	Corrected	Description		
1.00	6	9	Sandy Soil	222.78	SP
2.50	UDS	-	Sandy Soil	221.28	SP
4.00	9	10	Sandy Soil	219.78	SP
5.50	UDS	-	Sandy Soil with	218.28	SP
7.00	15	14	Sandy Soil with Gravel	216.78	SP-SM
8.50	UDS	-	Sandy Soil with Gravel	215.28	SP-SM
10.00	62	52	Sandy Soil with Gravel	213.78	SP-SM

BH Terminates at 10.50m

Br No 135 (G)				
0.00	G.L.	N VALUE	Classification as per I.S.	BH-1
1.00		06	SP	SANDY SOIL
2.50			SP	
4.00		09	SP	
5.50			SP	
7.00		15	SP-SM	SANDY SOIL WITH GRAVEL
8.50			SP-SM	
10.00		62	SP-SM	

Embankment at CH: 52500m

0.00	G.L.	N VALUE	Classificatuion as per I.S.	BH-1
1.00		12	SM	SANDY SOIL
2.50			SM	
4.00		16	SM	
5.50			SM	
7.00		22	SM	
8.50			SP-SM	
10.00		40	SM	SANDY WITH GRAVEL
11.50			SM	
13.00		23	SM	
14.50			SM	
16.00		25	SM	SANDY SOIL
17.50			SM	
19.00		32	SM	SANDY WITH GRAVEL
20.50			SM	
22.00		31	SM	
23.50			SM	
25.00		32	SM	MURRUM SOIL WITH GRAVEL
26.50			SP-SM	
28.00		58	SM	
29.50			SM	SANDY WITH GRAVEL
31.00		27	SM	
32.50			SM	SANDY WITH GRAVEL
34.00		32	SP-SM	
35.50		20	SM	SANDY SOIL
37.00		18	SM	

ATTACHMENT 4

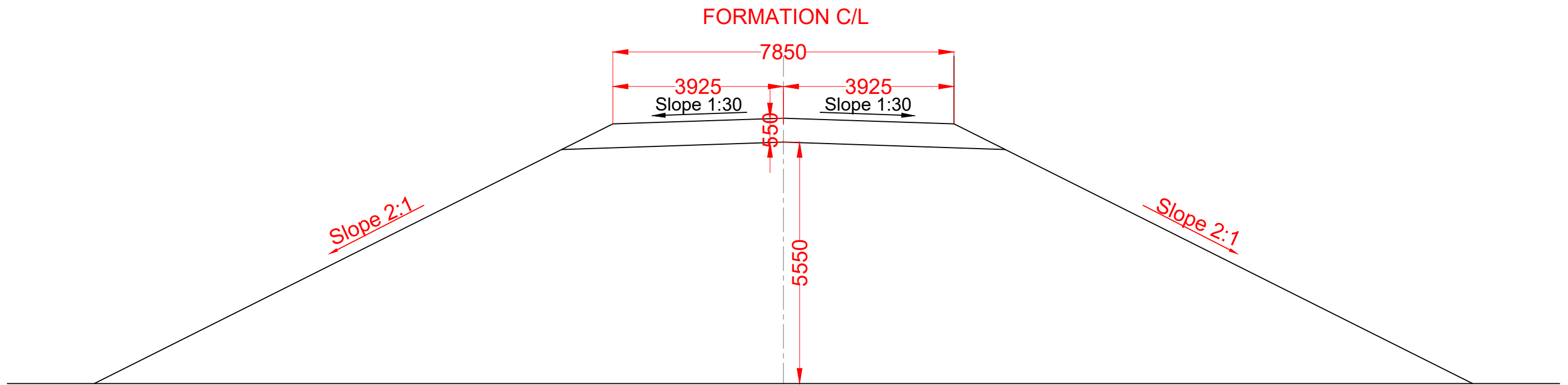
LIST OF TEMPORARY BENCHMARKS

Statement of Coordinates

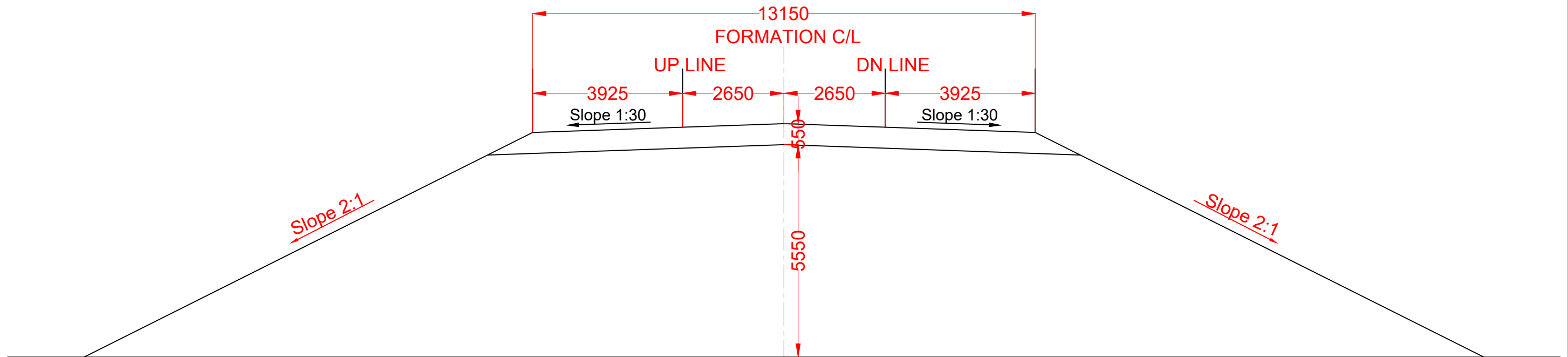
S. No	TBM Name	Easting	Northing	Elevation
<u>1</u>	<u>RVGPS 9</u>	<u>688085.513</u>	<u>3129064.772</u>	<u>260.096</u>
<u>2</u>	<u>RVGPS 9A</u>	<u>687994.520</u>	<u>3129177.028</u>	<u>259.339</u>
3	RVGPS 10	685831.109	3133749.484	263.413
4	RVGPS 10A	685717.761	3133673.446	270.127
5	RVGPS 11	684454.214	3137879.050	259.239
6	RVGPS 11A	684454.214	3137969.586	259.193
7	TBM46500	684273.931	3137854.137	257.601
8	TBM46500A	684354.501	3137841.645	259.330
9	TBM47100	684090.881	3138439.261	251.363
10	TBM47100A	684184.380	3138447.087	251.733
11	TBM48000	683774.272	3139269.482	242.820
12	TBM48000A	683892.224	3139307.889	242.440
<u>13</u>	<u>TBM49000</u>	<u>683529.869</u>	<u>3140243.843</u>	<u>237.168</u>
14	TBM49000A	683638.595	3140260.298	236.938
15	TBM50000	683264.993	3141236.179	232.403
16	TBM50000A	683370.331	3141194.426	232.446
17	TBM51000	683047.667	3142136.186	229.981
18	TBM51000A	683195.148	3142175.232	230.088
19	TBM51900	683074.137	3143136.503	224.918
<u>20</u>	<u>TBM52000</u>	<u>683072.516</u>	<u>3143197.349</u>	<u>224.265</u>
21	TBM52500	683052.993	3143665.302	219.585
22	TBM52500A	683153.406	3143710.537	219.317
23	TBM3840	683700.346	3143516.129	224.031
24	TBM3840A	683743.117	3143506.656	224.027
25	RVGPS 12	682842.763	3143578.579	244.631
<u>26</u>	<u>RVGPS 12A</u>	<u>682988.233</u>	<u>3143676.698</u>	<u>224.631</u>
27	RVGPS 13	682378.491	3149633.183	214.336
28	RVGPS 13A	682181.942	3149596.725	214.213

ATTACHMENT 5

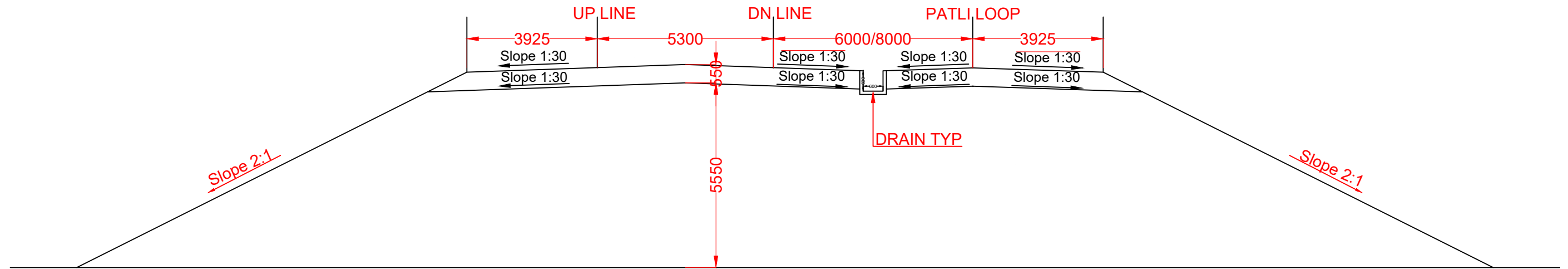
TYPICAL CROSS SECTIONS OF EARTHWORK



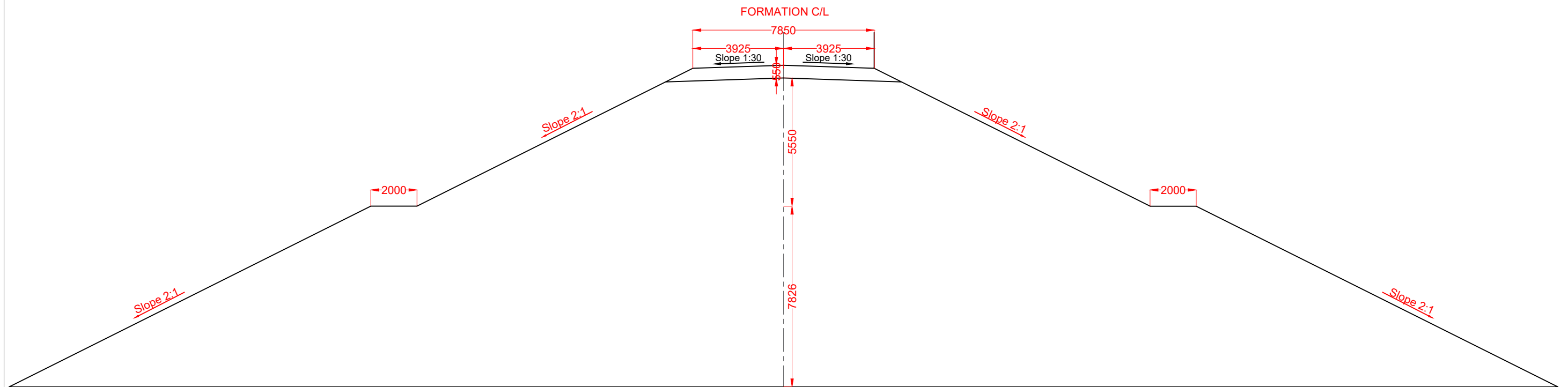
FOR SINGLE LINE



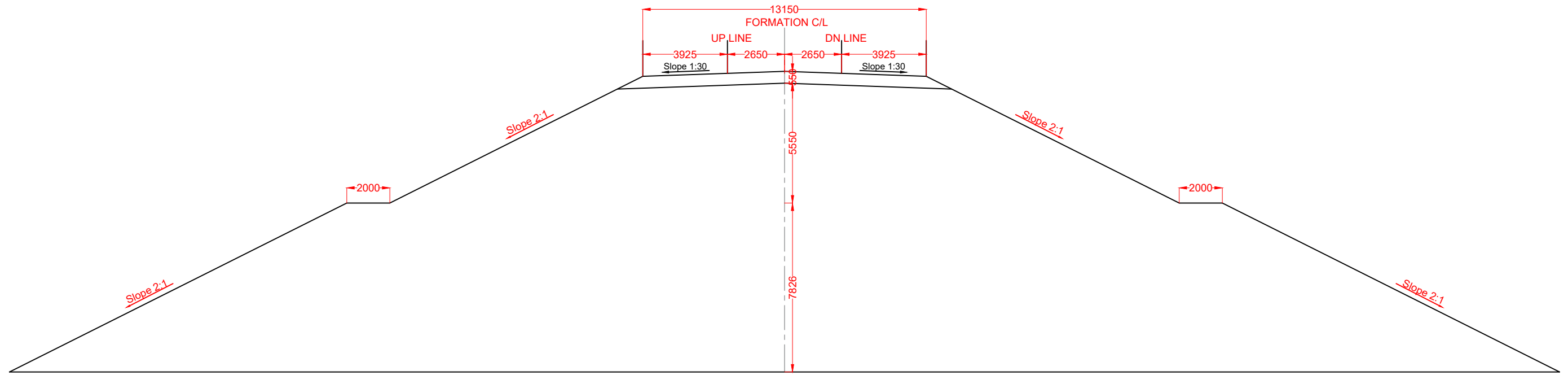
FOR 2 LINES



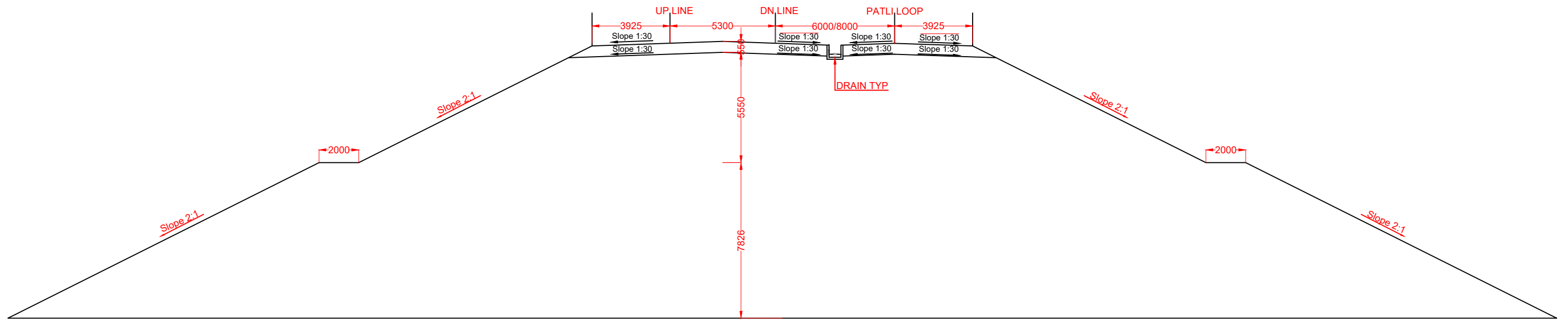
FOR 3 LINES



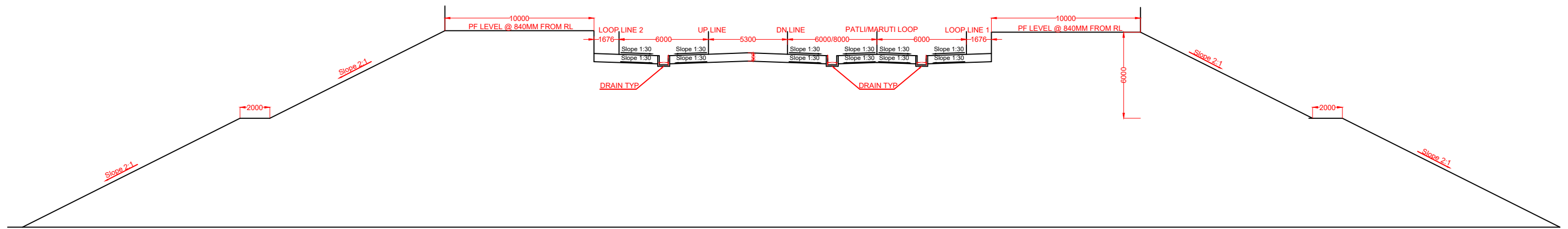
FOR SINGLE LINE



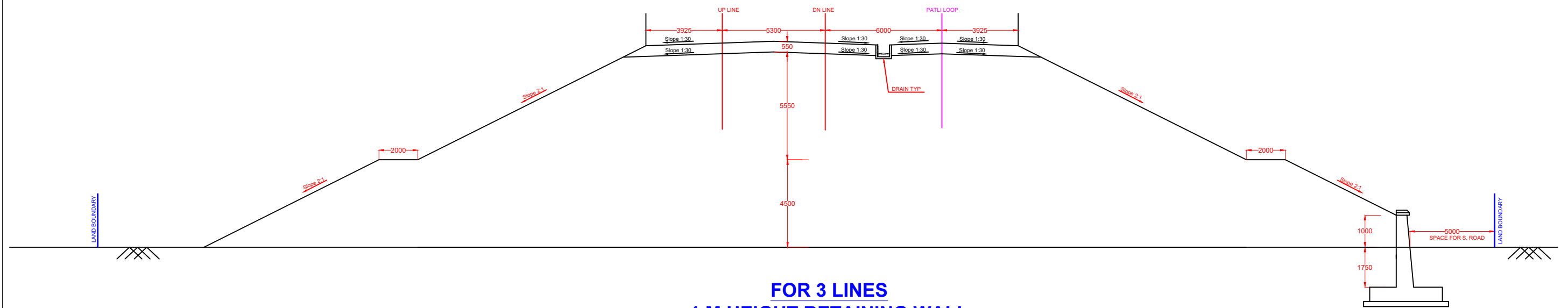
FOR 2 LINES



FOR 3 LINES



FOR YARD PORTION HAVING 5 LINES



**FOR 3 LINES
1 M HEIGHT RETAINING WALL**

ATTACHMENT 6

CHARTED UTILITIES

a) List of Electric Line crossings up to 11 KV

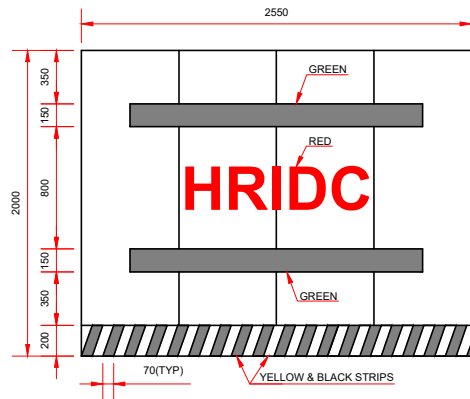
S.NO	HORC Chainage	Voltages (KV)
1	47860	11 KV
2	49700	11 KV
3	50720	11 KV
4	51380	11 KV
5	51820	11 KV

b) List of Electric Line crossings Above 11 KV

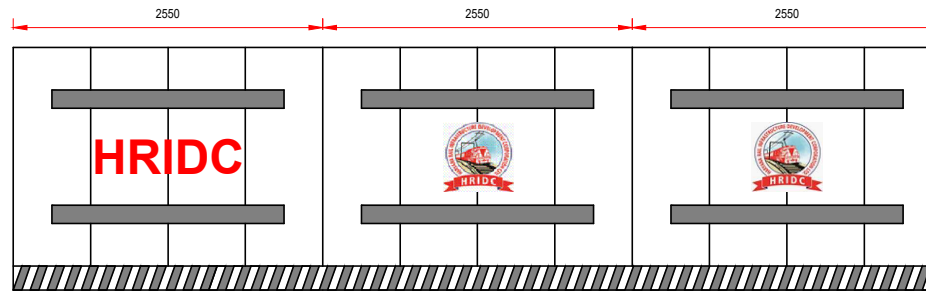
S.NO	HORC Chainage	Voltages (KV)
1	49815	220 KV
2	51180	66 KV
3	51590	220 KV

ATTACHMENT 7

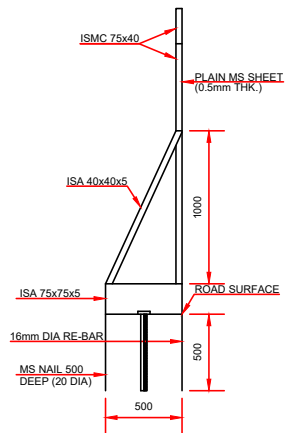
DRAWING FOR BARRICADING WHERE DIVERSION OF ROAD TRAFFIC IS REQUIRED



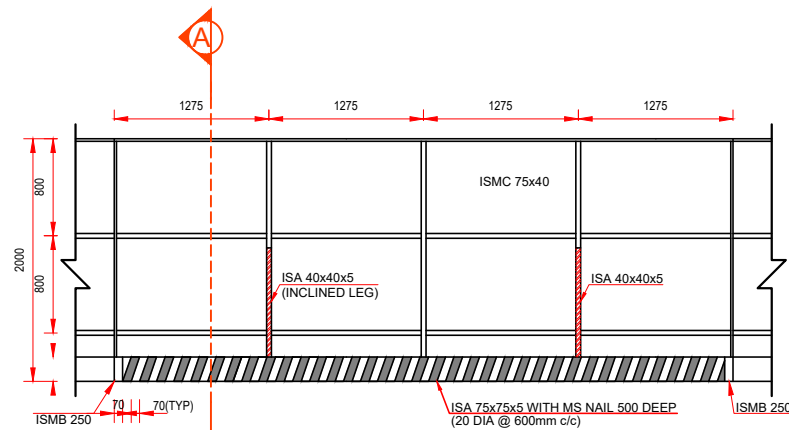
ELEVATION OF ONE SET OF TEMPORARY BARRICADING



ELEVATION OF ONE UNIT OF TEMPORARY BARRICADING



SECTION A-A



DETAIL OF TEMPORARY BARRICADING

1. ALL DIMENSION ARE IN MILIMETERS.



HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED

STEEL BARRICADING DRAWING

DWG TITLE:- STEEL BARRICADING DRAWING

DRAWING No : HRIDC-GGN-003-B

DATE : 09.07.2020

Revision: R0

PREPARED BY

DGM CIVIL

N. Singh

Prakash

Tender Document for Works

(Two-Envelope Tendering Process Without Prequalification)

Procurement of:

C-1: Priority Section - Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works in Connection with laying of New BG Double Railway Line of HORC project from Km 49.7 to Km 55.6 and its connectivity (new BG single line) from proposed Manesar Station of HORC to existing Patli Railway Station of IR Network

Summary

Specific Procurement Notice (SPN)

PART 1 – TENDERING PROCEDURES

- Section I - Instructions to Tenderers (ITT)
- Section II - Tender Data Sheet (TDS)
- Section III - Evaluation and Qualification Criteria
- Section IV - Tender Forms
- Section V - Eligible Countries
- Section VI - Prohibited Practices

PART 2 – WORKS' REQUIREMENTS

- Section VII - Works' Requirements

PART 3 – CONDITIONS OF CONTRACT AND CONTRACT FORMS

- Section VIII - General Conditions of Contract (GCC)
- Section IX - Particular Conditions of Contract (PCC)
- Section X - Contract Forms

PART 3 – Conditions of Contract and Contract Forms

Table of Contents

Section VIII - General Conditions of Contract (GCC)	5
Section IX - Particular Conditions of Contract (PCC)	6
Section X - Contract Forms	63

Section VIII - General Conditions of Contract (GCC)

The General Conditions of Contract governing this Contract shall be the “Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (“Red book”), Second Edition 2017”, published by the Federation Internationale Des Ingenieurs – Conseils (FIDIC).

An original copy of the above FIDIC publication i.e. “*Conditions of Contract for Building and Engineering Works Designed by the Employer*” must be obtained from the following address of FIDIC:

International Federation of Consulting Engineers (FIDIC)

FIDIC Bookshop – Box- 311 – CH – 1215 Geneva 15 Switzerland

Fax: +41 22 799 49 054

Telephone: +41 22 799 49 01

E-mail: fidic@fidic.org

www.fidic.org

FIDIC code: ISBN13: 978-2-88432-084-9

Section IX - Particular Conditions of Contract (PCC)

The following Particular Conditions of Contract (PCC) shall supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

The PCC consists of four parts:

- Part A – Contract Data
- Part B – Specific Provisions
- Part C – Prohibited Practices

The references to Clauses and Sub-clauses provided in the PCC given below are applicable to the General Conditions of Contract i.e. “Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (“Red book”), Second Edition 2017” published by the Federation Internationale Des Ingenieurs – Conseils (FIDIC).

Particular Conditions of Contract (PCC)

Part A - Contract Data

Conditions	Sub-Clause	Data
Defects Notification Period	1.1.27	365 days (one year)
Employer's name and address	1.1.31	Haryana Rail Infrastructure Development Corporation Limited (HRIDC), Plot No 143, 5th Floor, Railtel Tower, Sector-44, Gurugram, Haryana-122003 E-mail: gmphridc@gmail.com
Engineer's name and address	1.1.35	RITES Limited in Consortium with SMEC International Pty Ltd, 4th Floor, Plot No.144, RITES Limited, Sector-44, Gurugram, Haryana-122003
Sections	1.1.73	Nil
Time for Completion	1.1.84	460 days
Bank's name	1.1.89	Asian Infrastructure Investment Bank (AIIB)
Borrower/Recipient's name	1.1.90	HRIDC through Government of Haryana
Electronic transmission system	1.3 (a) (ii)	By e-mail
Address of Employer for communications:	1.3(d)	Plot No 143, 5th Floor, Railtel Tower, Sector-44, Gurugram, Haryana-122003 E-mail: gmphridc@gmail.com
Address of Engineer for communications:	1.3(d)	4th Floor, Plot No.144, RITES Limited, Sector-44, Gurugram, Haryana-122003
Address of Contractor for communications:	1.3(d)	To be filled in at the time of preparation of Contract Agreement
Governing Law	1.4	The laws of Republic of India
Ruling language	1.4	English
Language for communications	1.4	English
Time for the Parties to sign a Contract Agreement	1.6	35 days after receipt of the Letter of Acceptance
Number of additional paper copies of Contractor's Documents	1.8	One (1)

Conditions	Sub-Clause	Data																																																
Total liability of the Contractor to the Employer under or in connection with the Contract	1.15	Equal to the Accepted Contract Amount (Amount to be filled in at the time of preparation of contract agreement)																																																
Time for access to the Site	2.1	90% of the length of the formation shall be handed over to the Contractor within 7 days after the Commencement Date. The balance length at the following locations shall be handed over within 90 days after the Commencement Date: <table border="1"> <thead> <tr> <th>S.No.</th> <th>CH: Start</th> <th>CH: End</th> <th>Total (in M)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>50+930</td> <td>50+940</td> <td>10</td> </tr> <tr> <td>2.</td> <td>52+286</td> <td>52+334</td> <td>48</td> </tr> <tr> <td>3.</td> <td>52+770</td> <td>52+780</td> <td>10</td> </tr> <tr> <td>4.</td> <td>53+180</td> <td>53+820</td> <td>640</td> </tr> <tr> <td>5.</td> <td>54+355</td> <td>54+375</td> <td>20</td> </tr> <tr> <td>6.</td> <td>54+490</td> <td>54+500</td> <td>10</td> </tr> <tr> <td>7.</td> <td>54+755</td> <td>54+775</td> <td>20</td> </tr> <tr> <td>8.</td> <td>54+900</td> <td>54+910</td> <td>10</td> </tr> <tr> <td>9.</td> <td>2+770</td> <td>2+900</td> <td>130</td> </tr> <tr> <td>10.</td> <td>3+043</td> <td>3+053</td> <td>10</td> </tr> <tr> <td colspan="3">Total</td> <td>908</td> </tr> </tbody> </table>	S.No.	CH: Start	CH: End	Total (in M)	1.	50+930	50+940	10	2.	52+286	52+334	48	3.	52+770	52+780	10	4.	53+180	53+820	640	5.	54+355	54+375	20	6.	54+490	54+500	10	7.	54+755	54+775	20	8.	54+900	54+910	10	9.	2+770	2+900	130	10.	3+043	3+053	10	Total			908
S.No.	CH: Start	CH: End	Total (in M)																																															
1.	50+930	50+940	10																																															
2.	52+286	52+334	48																																															
3.	52+770	52+780	10																																															
4.	53+180	53+820	640																																															
5.	54+355	54+375	20																																															
6.	54+490	54+500	10																																															
7.	54+755	54+775	20																																															
8.	54+900	54+910	10																																															
9.	2+770	2+900	130																																															
10.	3+043	3+053	10																																															
Total			908																																															
Engineer's Duties and Authority	3.2	Variations resulting in an increase of the Accepted Contract Amount in excess of 5% shall require written consent of the Employer.																																																
Performance Security	4.2	The Performance Security will be in the form of a "demand guarantee" in the amount(s) of 5% of the Accepted Contract Amount and in the same currency (ies) of the Accepted Contract Amount.																																																
Period for notification of errors in the items of reference	4.7.2 (a)	28 Days																																																
Number of additional paper copies of progress reports	4.20	One (1)																																																
Maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount)	5.1(a)	Nil																																																
Parts of the Works for which subcontracting is not permitted	5.1(b)	Not applicable																																																
Normal working hours	6.5	From 8:00 AM to 5:00 PM																																																

Conditions	Sub-Clause	Data
Number of additional paper copies of program	8.3	One (1)
Delay Damages payable for each day of delay	8.8	0.05% of the Accepted Contract Amount, less Provisional Sum in the currencies and proportions in which the Contract Price is payable. For Delay Damages of Milestones, refer Table: Summary of Milestones given after Part A.
Maximum amount of Delay Damages	8.8	5% of the Accepted Contract Amount, less Provisional Sum.
Percentage rate to be applied to Provisional Sums for overhead charges and profit	13.4(b)(ii)	5%
Total advance payment	14.2	10% of the Accepted Contract Amount less Provisional Sum payable in the currencies and proportions in which the Accepted Contract Amount is payable
Number of additional paper copies of Statements	14.3(b)	One (1)
Percentage of retention	14.3(iii)	10%
Limit of Retention Money (as a percentage of Accepted Contract Amountless Provisional Sum)	14.3(iii)	5%
Plant and Materials	14.5(b)(i)	If Sub-Clause 14.5 applies: Plant and Materials for payment when shipped - NIL
	14.5(c)(i)	Plant and Materials for payment when delivered to the Site - Reinforcement steel under Bill No. 2.
Minimum Amount of Interim Payment Certificates	14.6.2	NIL
Period of payment of Advance Payment to the Contractor	14.7(a)	28 days
Number of additional paper copies of draft Final Statement	14.11.1(b)	Two (2)
Forces of nature, the risks of which are allocated to the Contractor	17.2(d)	Floods, rains, winds/storms

Conditions	Sub-Clause	Data
List of Exceptional Risks which shall not be excluded from the insurance cover for the Works	19.2.1(iv)	Earthquake
Amount of insurance required for injury to persons and damage to property	19.2.4	INR 2,000,000/ (Two million) per occurrence
Insurance required for injury to employees	19.2.5	INR 10,000,000/- (Ten million)
Time for appointment of DAAB	21.1	90 days after signature by both parties of the Contract Agreement
The DAAB shall be comprised of	21.1	One Sole Member
List of proposed members of DAAB	21.1	Nil
Appointment (if not agreed) to be made by	21.2	President of Indian Council of Arbitration, New Delhi, India
Rules of arbitration	21.6(a)	Sub-Clause 21.6 (a) of PART B – Specific Provisions shall not apply.
	21.6 (b)	Sub-Clause 21.6 (b) of PART B – Specific Provisions shall apply.

Table: Summary of Milestones

Milestone	Milestone Name/Description (Sub-Clause 1.1.94)	Time for Completion from the Commencement Date (Sub-Clause 1.1.84)	Delay Damagesfor not achieving Milestone (amount per day of delay) (Sub-Clause 8.8)
MS1	Substructure of major bridge including formation of 100m length on either side of the bridge to enable execution of work of C-2 Contractor (Bridges)	240	INR 2,00,000 (Two lakhs) per day
MS 2	Completion of Manesar station building to enable execution of work of ST-1Contractor (Signalling & Telecommunication)	365	INR 1,00,000 (One lakh) per day
MS 3	Completion of railway formation including minor bridges to enable execution of work of T-1Contractor (Track)and E-1 Contractor (Overhead Electrification)	425	INR 50,000 (Fifty thousand) per day

Particular Conditions of Contract (PCC)

Part B - Specific Provisions

Sub-Clause 1.1.10 Contract	“the Contractor’s Proposal” is deleted.
Sub-Clause 1.1.49 Laws	The Sub-Clause is replaced with: “ Laws ” means all national (or state) legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority.”
Sub-Clause 1.1.74 Site	The Sub-Clause is replaced with: “ Site ” means the places where the Permanent Works are to be executed, including storage and working area, and to which Plant and Materials are to be delivered, and any other places specified in the Contract as forming part of the Site.”
Sub-Clause 1.1.77 Statement	On the second line after “Payment Certificate under...”, add “Sub-Clause 14.2.1 [Advance Payment Guarantee] (if applicable),”.
Sub-Clause 1.1.81 Tender	“the Contractor’s Proposal” is deleted.
Sub-Clause 1.1.84 Tender	Replace the entire Sub-Clause 1.1.84 with the following: “ Time for Completion ” means the time for completing the Works, a Section (as the case may be) or a Milestone (as the case may be) under Sub-Clause 8.2 [Time for Completion], as stated in the Contract Data (with any extension under Sub-Clause 8.5 [Extension of Time for Completion]), calculated from the Commencement Date
Sub-Clause 1.1.89 to 1.1.95 are added after Sub-Clause 1.1.88	
Sub-Clause 1.1.89 Bank	“ Bank ” means the financing institution (if any) named in the Contract Data.
Sub-Clause 1.1.90 Borrower	“ Borrower ” or “ Recipient ” means the person (if any) named as the borrower/recipient in the Contract Data.
Sub-Clause 1.1.91 ESHS	“ ESHS ” means Environmental, Social, Health and Safety.

<p>Sub-Clause 1.1.92</p> <p>Sexual Exploitation and Assault (SEA)</p>	<p>“Sexual Exploitation and Assault” “(SEA)” stands for the following:</p> <p>Sexual exploitation is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another. In Bank financed operations/projects, sexual exploitation occurs when access to or benefit from a Bank financed Goods, Works, Non-consulting Services or Consulting Services is used to extract sexual gain.</p> <p>Sexual assault is defined as sexual activity with another person who does not consent. It is a violation of bodily integrity and sexual autonomy and is broader than narrower conceptions of “rape”, especially because (a) it may be committed by other means than force or violence, and (b) it does not necessarily entail penetration.</p>
<p>Sub-Clause 1.1.93</p> <p>Milestone Certificate</p>	<p>“Milestone Certificate” means the certificate issued by the Engineer under Sub-Clause 4.26 [Milestone].</p>
<p>Sub-Clause 1.1.94</p> <p>Milestone</p>	<p>“Milestone” means the date to achieve for a part of the Plant and/or a part of the Works stated in the Contract Data (if any), and described in detail in the Specification as a Milestone, which is to be completed by the time for completion stated in Sub-Clause 4.26 [Milestone] but is not to be taken over by the Employer after completion. If a Milestone is included within a Section, such Milestone shall not be included within other Sections.</p>
<p>Sub-Clause 1.1.95</p> <p>Control</p>	<p>“Control” in respect of a person shall mean the beneficial ownership directly or indirectly of 50% or more of the voting shares or securities of an entity or the power to control the majority of the composition of the Board of Directors of such entity or the power to direct the management or policies of such entity by contract or otherwise.</p>
<p>Sub-Clause 1.1.96</p> <p>Principal Employer</p>	<p>Principal Employer means ‘Haryana Rail Infrastructure Development Corporation Limited (HRIDC)’.</p>
<p>Sub-Clause 1.2</p> <p>Interpretation</p>	<p>Sub-paragraph (a) is replaced with the following:</p> <p>(a) “Words indicating one gender include all genders; “he/she” is replaced with “it”;</p>

	<p>“him/her” is replaced with “it”;</p> <p>“his” and “his/her” are replaced with “its”;</p> <p>“himself/herself” are replaced with “itself”.</p> <p>Further, “and” is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j).</p> <p>sub-paragraph (k) is added:</p> <p>(k) “The word “tender” is synonymous with “bid” or “proposal”, the word tenderer with “bidder” or “proposer” and the words “tender documents” with “bidding documents” or “request for bids documents” or “request for proposal documents”, as applicable.”</p>
<p>Sub-Clause 1.5 Priority of Documents</p>	<p>Replace subparagraphs from (a) to (k) with the following:</p> <p>the Contract Agreement, the Letter of Acceptance, the Record of Meeting on Contract Negotiation, the Addenda (the items of the Addenda shall have priority over the respective items of the related section of the Contract Documents), the Financial Part, the Technical Part, excluding the Contractor’s Technical Proposal, the Particular Conditions -Part A, the Particular Conditions -Part B, the Particular Conditions Part C- Prohibited Practices these General Conditions, the Specification - Technical Specifications, the Specification - General Specifications, the Drawings, the Contractor’s Technical Proposal, the Reference Information/ Report, and Any other documents forming part of the Contract.</p>
<p>Sub-Clause 1.6 Contract Agreement</p>	<p>Replace the entire Sub-Clause 1.6 with the following:</p> <p>The Parties shall sign a Contract Agreement within 35 days after the Contractor receives the Letter of Acceptance and submit Performance Security in accordance with the Tender Documents read with the Contract, unless the Particular</p>

	<p>Conditions establish otherwise. The Contract Agreement shall be based upon the form annexed to the Particular Conditions. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Employer.</p>
<p>Sub-Clause 1.12 Confidentiality</p>	<p>The following is added at the end of the second paragraph: “The Contractor shall be permitted to disclose information required to establish its qualifications to compete for other projects.”</p> <p>“or” at the end of (b) is deleted.</p> <p>“or” at the end of (c) is added.</p> <p>The following is then added as (d): “is being provided to the Bank .”</p>
<p>Sub-Clauses 1.17 and 1.18 are added after Sub-Clause 1.16</p>	
<p>Sub-Clause 1.17 Inspections & Audit by the Bank</p>	<p>“The Contractor shall permit and shall cause its agents (whether declared or not), subcontractors, subconsultants, service providers, suppliers, and their personnel, to permit the Bank and/or persons appointed by the Bank to inspect the site and/or the accounts, records and other documents relating to the procurement process, tender submission, proposal submission, and contract execution, and to have such accounts, records and other documents audited by auditors appointed by the Bank.”</p>
<p>Sub-Clause 1.18 Change in Control</p>	<p>The Contractor or its constituents shall inform the Employer about any change in “Control” during the execution of the Contract.</p>
<p>Sub-Clause 2.4 Employer’s Financial Arrangements</p>	<p>The first paragraph is replaced with: “The Employer shall submit, before the Commencement Date, reasonable evidence that financial arrangements have been made for financing the Employer’s obligations under the Contract.”</p> <p>The following sub-paragraph is added at the end of Sub-Clause 2.4: “In addition, if the Bank has notified to the Recipient that the Bank has suspended disbursements under its loan, which finances in whole or in part the execution of the Works, the Employer shall give notice of such suspension to the Contractor with detailed particulars, including the date of such</p>

	notification, with a copy to the Engineer, within 7 days of the Recipient having received the suspension notification from the Bank. If alternative funds will be available in appropriate currencies to the Employer to continue making payments to the Contractor beyond a date 60 days after the date of Bank notification of the suspension, the Employer shall provide reasonable evidence in its notice of the extent to which such funds will be available.”
Sub-Clause 3.1 The Engineer	The following is added at the end of the first sub-paragraph: “The Engineer’s staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.”
Sub-Clause 3.2 Engineer’s Duties and Authority	<p>The third paragraph of Sub-Clause 3.2 is replaced with:</p> <p>The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. However, the Engineer shall obtain the consent in writing of the Employer before taking action under the following Sub-Clauses of these Conditions:</p> <ul style="list-style-type: none"> (a) Sub-Clause 4.12 [Unforeseeable Physical Conditions]: agreeing or determining an extension of time and/or additional cost. (b) Sub-Clause 8.5 [Extension of Time for Completion]: agreeing or determining extension of time. (c) Sub-Clause 11.9 [Performance Certificate]: issue of Performance Certificate. (d) Clause 20.1: [Claims]: agreeing or determining extension of time and/or additional payment. <p>Notwithstanding anything to the contrary contained in this Sub-Clause 3.2, as set out above, if in the opinion of the Engineer, an emergency occurs which adversely affects safety of, (a) life, (b) Works, or (c) any adjoining property, the Engineer may, without obtaining prior approval of the Employer and without relieving the Contractor of any of its duties and responsibilities under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the aforesaid risk(s). The Contractor shall forthwith comply with such directions of</p>

	<p>the Engineer despite the absence of Employer’s specific approval in this regard. The Engineer shall determine an addition to the Contract Price, in respect of such instruction(s), in accordance with Clause 13 [Variations and Adjustments], and shall notify the Contractor accordingly, with a copy to the Employer.</p> <p>However, in case the concerned emergency as specified in the above para occurs on account of any failure by the Contractor to comply with the terms and conditions of the Contract, including but not limited to, (a) not adhering to the approved scheme of work (b) not taking adequate safety precautions, or (c) by any other reason attributable to the Contractor, no additional amounts shall be paid to the Contractor for attending to such emergencies and the Contractor shall be liable for Employer’s claims in this regard”.</p>
<p>Sub-Clause 3.3 Engineer’s Representative</p>	<p>The following is added at the end of Sub-Clause 3.3:</p> <p>“The Engineer shall obtain the consent of the Employer before appointing or replacing an Engineer’s Representative.”</p>
<p>Sub-Clause 3.4 Delegation by the Engineer</p>	<p>The following is added at the end of the second paragraph:</p> <p>“If any assistants are not fluent in this language, the Engineer shall make competent interpreters available during all working hours, in a number sufficient for those assistants to properly perform their assigned duties and/or exercise their delegated authority.”</p>
<p>Sub-Clause 3.6 Replacement of the Engineer</p>	<p>In the first paragraph, “42 days” is replaced with “21 days”;</p> <p>In the third para, “shall” is replaced with “should”.</p>
<p>Sub-Clause 4.1 Contractor’s General Obligations</p>	<p>The following is inserted after the second paragraph “The Contractor shall provide the Plant (and spare parts, if any)...”:</p> <p>“All equipment, material, and services to be incorporated in or required for the Works shall have their origin in any eligible source country as defined by the Bank.”</p> <p>The following is inserted after the fourth paragraph “The Contractor shall, whenever required by the Engineer...”:</p> <p>The Contractor shall not carry out mobilization to Site (e.g. limited clearance for haul roads, site accesses and work site establishment, geotechnical investigations or investigations to select ancillary features such as quarries and borrow pits) unless the Engineer gives consent, a consent that shall not be</p>

	<p>unreasonably delayed, that appropriate measures are in place to address environmental and social risks and impacts, which at a minimum shall include applying the Management Strategies and Implementation Plans (MSIPs) and Code of Conduct for Contractor’s Personnel submitted as part of the Tender and agreed as part of the Contract.</p> <p>The Contractor shall submit, to the Engineer for Review any additional MSIPs as are necessary to manage the ESHS risks and impacts of ongoing Works (e.g. excavation, earth works, bridge and structure works, stream and road diversions, quarrying or extraction of materials, concrete batching and asphalt manufacture). These MSIPs collectively comprise the Contractor’s Environmental and Social Management Plan (C-ESMP). The Contractor shall review the C-ESMP, periodically (but not less than every six (6) months), and update it as required to ensure that it contains measures appropriate to the Works. The updated C-ESMP shall be submitted to the Engineer for Review.</p> <p>The C-ESMP shall be part of the Contractor’s Documents. The procedures for Review of the C-ESMP and its updates shall be as described in Sub-Clause 4.4.1 [<i>Preparation and Review</i>].</p> <p>The following is added as (g); (g) and (h) of the Sub-Clause are then renumbered as (h) and (i) respectively.</p> <p>(a) if so stated in the Specification, the Contractor shall:</p> <ul style="list-style-type: none"> (i) design structural elements of the Works taking into account climate change considerations; and (ii) apply the concept of universal access (the concept of universal access means unimpeded access for people of all ages and abilities in different situations and under various circumstances. <p>The following is added at the end of the Sub-Clause:</p> <p>“The Contractor shall provide relevant contract- related information, as the Employer and/or Engineer may reasonably request to conduct Stakeholder engagements. “Stakeholder” refers to individuals or groups who:</p> <ul style="list-style-type: none"> (i) are affected or likely to be affected by the Contract; and (ii) may have an interest in the Contract. <p>The Contractor may also directly participate in Stakeholder engagements, as the Employer and/or Engineer may reasonably request.”</p>
<p>Sub-Clause 4.2 Performance Security</p>	<p>This clause stands amended and restated in its entirety as follows:</p>

4.2.1 The Contractor shall, within 28 days of the date of receiving the Letter of Acceptance, provide to the Employer, the Performance Security in a sum equal to the amount specified in the Contract Data, for the due observance and performance by the Contractor of the Contract. In the event the Contractor fails to provide the Performance Security within 28 days from the date of issue of the LOA, it may seek an extension of time for providing the performance security for a period not exceeding a further 14 days on payment of damages for such extended period in a sum calculated at the rate of 0.005% of the Accepted Contract Amount for each day until the Performance Security is provided. The Contractor shall maintain the said Performance Security at its own expense, so that it shall remain in full force and effect until the date set out in the Contract Data. In the event of a revision of the Contract Price, the value of the Performance Security shall be increased proportionately by the Contractor, if required by the Employer. The cost of obtaining the Performance Security shall be at the expense of the Contractor. The Contractor shall submit the Performance Security in any of the following forms:

(a) Unconditional and irrevocable Bank Guarantee from the specified banks in the form appearing in Section 9 [Contract Forms] as under:

- (i) a scheduled bank (excluding co-operative banks) in India, or
- (ii) a Foreign Bank having arrangement with a nationalized bank or scheduled banks (excluding co-operative banks) in India;

(b) Banker's Cheque or Demand Draft drawn on a scheduled bank (excluding co-operative banks) or nationalized bank in India.

The scheduled bank issuing the bank guarantee shall be on “Structure Financial Messaging System (SFMS)” platform. A separate advice of the bank guarantee shall invariably be sent by the issuing bank to Employer’s Bank through SFMS and only of the same by the Employer’s Bank, the bank

guarantee shall become operative and acceptable to the Employer. Further, the bank guarantees in original form along with a copy of “MT760COV (in case of bank guarantee message)/ MT767COV (in case of bank guarantee amendment message) Report” sent by the concerned issuing bank sealed in an envelope shall be submitted to the Employer.

The Issuing Bank shall send the SFMS to:

Beneficiary: Haryana Rail Infrastructure Development Corporation Limited”

Bank Name:

Account No.

IFSC Code:

Note: All the instruments mentioned in (a) & (b) above should be in favour of Chief Project Manager, Haryana Rail Infrastructure Development Corporation Limited, Plot No 143, 5th Floor, Railtel Tower, Sector-44, Gurugram.

4.2.2 The Contractor shall ensure that the Performance Security is valid and enforceable until the Contractor has executed and completed the Works and remedied defects, if any. If, (a) the Contractor does not complete the Works for any reasons whatsoever, and (b) the Contractor has not become entitled to receive the Performance Certificate by 28 days prior to the expiry date of the Performance Security, the Contractor shall be bound to extend the validity of the Performance Security until the Works have been completed and the defects have been remedied. If the Performance Security is or becomes invalid or unenforceable for any reason whatsoever, or if such security is withdrawn or expires, the Contractor must immediately notify the Employer and obtain within 3 days a replacement guarantee in the form appearing in Section X [Contract Forms] and which is acceptable to the Employer in its absolute discretion.

4.2.3 The provision, maintenance and renewal by the Contractor of the Performance Security in accordance with this Sub-Clause 4.2 [Performance Security] shall be a

	<p>condition precedent to any payment by the Employer to the Contractor under the Contract.</p> <p>4.2.4 If the Contractor fails to provide, maintain and renew the Performance Security in accordance with the Contract, the Employer shall, without prejudice to any other rights and remedies to which it may be entitled, shall have the right to invoke the Performance Security for the value equal to the damages to the Employer as a result of the Contractor's failure and/or by written notice terminate the Contract in accordance with Clause 15.</p>
<p>Sub-Clause 4.3 Contractor's Representative</p>	<p>The following is added at the end of the last paragraph: "If any of these persons is not fluent in this language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer."</p>
<p>Sub-Clause 4.6 Co-operation</p>	<p>On the second-last line of the first paragraph before "Contractor's", add "of the".</p> <p>The following is added after the first paragraph:</p> <p>"The Contractor shall also, as stated in the Specification or as instructed by the Engineer, cooperate with and allow appropriate opportunities for the Employer's Personnel to conduct any environmental and social assessment.</p>
<p>Sub-Clause 4.7 Setting out</p>	<p>In the second bullet-point of sub-paragraph (b) of Sub-Clause 4.7.3:</p> <p>before "if the items of reference", add: "when examining the items of reference within the period stated in sub-paragraph (a) of Sub-Clause 4.7.2" on the second and third lines, delete "and the contractor's Notice is given after the period stated in sub-paragraph (a) of Sub-Clause 4.7.2".</p>
<p>Sub-Clause 4.8 Health and Safety Obligations</p>	<p>The following are included after deleting "and" at the end of (f) and replacing "." with ";" at the end of (g):</p> <p>"</p> <ul style="list-style-type: none"> (i) provide health and safety training of Contractor's Personnel as appropriate and maintain training records; (ii) actively engage the Contractor's Personnel in promoting understanding, and methods for, implementation of health and safety requirements, as well as in providing information to Contractor's Personnel, training on occupational safety and health,

	<p>and provision of personal protective equipment without expense to the Contractor's Personnel;</p> <p>(iii) put in place workplace processes for Contractor's Personnel to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health.</p> <p>(iv) Contractor's Personnel who remove themselves from such work situations shall not be required to return to work until necessary remedial action to correct the situation has been taken. Contractor's Personnel shall not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal;</p> <p>(v) subject to Sub-Clause 4.6, where the Employer's Personnel, any other contractors employed by the Employer, and/or personnel of any legally constituted public authorities and private utility companies are employed in carrying out, on or near the site, of any work not included in the Contract, collaborate in applying the health and safety requirements, without prejudice to the responsibility of the relevant entities for the health and safety of their own personnel; and</p> <p>(vi) establish and implement a system for regular (not less than six-monthly) review of health and safety performance and the working environment.”</p> <p>The second and third paragraphs are replaced with the following:</p> <p>“Within 21 days of the Commencement Date and before commencing any construction on the Site, the Contractor shall submit to the Engineer for Review a health and safety manual which has been specifically prepared for the Works, the Site and other places (if any) where the Contractor intends to execute the Works. The procedures for Review of the health and safety manual and its updates shall be as described in Sub-Clause 4.4.1 [<i>Preparation and Review</i>].</p> <p>The health and safety manual shall be in addition to any other similar document required under applicable health and safety regulations and Laws.</p> <p>The health and safety manual shall set out all the health and safety requirements under the Contract,</p> <p>a) which shall include at a minimum:</p>
--	---

	<ul style="list-style-type: none">(i) the procedures to establish and maintain a safe working environment without risk to health at all workplaces, machinery, equipment and processes under the control of the Contractor, including control measures for chemical, physical and biological substances and agents;(ii) details of the training to be provided, records to be kept;(iii) the procedures for prevention, preparedness and response activities to be implemented in the case of an emergency event (i.e. an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons including failure to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning);(iv) remedies for adverse impacts such as occupational injuries, deaths, disability and disease;(v) the measures to be taken to avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases,(vi) the measures to be implemented to avoid or minimize the spread of communicable diseases (including transfer of Sexually Transmitted Diseases or Infections (STDs), such as HIV virus) and non-communicable diseases associated with the execution of the Works, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups. This includes taking measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent Contract-related labour;(vii) the policies and procedures on the management and quality of accommodation and welfare facilities if such accommodation
--	---

	<p>and welfare facilities are provided by the Contractor in accordance with Sub-Clause 6.6; and</p> <p>b) any other requirements stated in the Specification.</p> <p>The paragraph starting with: “In addition to the reporting requirement of...” is replaced with the following:</p> <p>“In addition to the reporting requirement of sub-paragraph (g) of Sub-Clause 4.20 [<i>Progress Reports</i>] the Contractor shall inform the Engineer immediately of any allegation, incident or accident in the Site, which has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer’s Personnel or Contractor’s Personnel. This includes, but is not limited to, any incident or accident causing fatality or serious injury; significant adverse effects or damage to private property; or any allegation of SEA. In case of SEA, while maintaining confidentiality as appropriate, the type of allegation (sexual exploitation, or sexual assault), gender and age of the person who experienced the alleged incident should be included in the information.</p> <p>The Contractor, upon becoming aware of the allegation, incident or accident, shall also immediately inform the Engineer of any such incident or accident on the Subcontractors’ or suppliers’ premises relating to the Works which has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer’s Personnel or Contractor’s, its Subcontractors’ and suppliers’ personnel. The notification shall provide sufficient detail regarding such incidents or accidents. The Contractor shall provide full details of such incidents or accidents to the Engineer within the timeframe agreed with the Engineer.</p> <p>The Contractor shall require its Subcontractors and suppliers (other than Subcontractors) to immediately notify the Contractor of any incidents or accidents referred to in this Sub-clause.”</p>
<p>Sub-Clause 4.10 Site Data</p>	<p>Add following (f) after existing Sub-Clause 4.10 (e) as under:</p> <p>“(f) damage to property adjacent to the Site and the risk of injury to the occupiers of such property due to execution of the Works.”</p>
<p>Sub-Clause 4.15 Access Route</p>	<p>The following is added at the end of Sub-Clause 4.15:</p> <p>“The Contractor shall take all necessary safety measures to avoid the occurrence of incidents and injuries to any third party</p>

	<p>associated with the use of Contractor’s Equipment on public roads or other public infrastructure.</p> <p>The Contractor shall monitor road safety incidents and accidents to identify negative safety issues and establish and implement necessary measures to resolve them.</p>
<p>Sub-Clause 4.18 Protection of the Environment</p>	<p>Sub-Clause 4.18 Protection of the Environment is replaced with:</p> <p>“The Contractor shall take all necessary measures to:</p> <ul style="list-style-type: none"> (a) protect the environment (both on and off the Site); and (b) limit damage and nuisance to people and property resulting from pollution, noise and other results of the Contractor’s operations and/ or activities. <p>The Contractor shall ensure that emissions, surface discharges, effluent and any other pollutants from the Contractor’s activities shall exceed neither the values indicated in the Specification, nor those prescribed by applicable Laws.</p> <p>In the event of damage to the environment, property and/or nuisance to people, on or off Site as a result of the Contractor’s operations, the Contractor shall agree with the Engineer the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The Contractor shall implement such remedies at its cost to the satisfaction of the Engineer.</p> <p>The Contractor shall comply with the Environmental and Social Management Plan, the Code of Conduct, and the Guidelines on Gender Based Violence as given in Appendix1 to Division 8000 (ESHS Manual) of the General Specifications, Part 2, Works’ Requirements.”</p>
<p>Sub-Clause 4.20 Progress Reports</p>	<p>Replace “4.20 (g) with: “the Environmental, Social, Health and Safety (ESHS) metrics set out in Appendix1 to Division 8000 (ESHS Manual) of the General Specifications, Part 2, Works’ Requirements”</p>
<p>Sub-Clause 4.21 Security of the Site</p>	<p>Sub-Clause 4.21 Security of the Site is replaced with:</p> <p>“The Contractor shall be responsible for the security of the Site, and:</p> <ul style="list-style-type: none"> (a) for keeping unauthorized persons off the Site; (b) authorized persons shall be limited to the Contractor’s Personnel, the Employer’s Personnel, and to any other personnel identified as authorized personnel (including

	<p>the Employer’s other contractors on the Site), by a Notice from the Employer or the Engineer to the Contractor.</p> <p>The Contractor shall, within 21 days of the Commencement Date, submit for the Engineer’s No-objection a security management plan that sets out the security arrangements for the Site.</p> <p>The Contractor shall (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards Contractor’s Personnel, Employer’s Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Specification.</p> <p>The Contractor shall not permit any use of force by security personnel in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.</p> <p>In making security arrangements, the Contractor shall also comply with any additional requirements stated in the Specification.”</p>
<p>Sub-Clause 4.22</p> <p>Contractor’s Operations on Site</p>	<p>On the third line of the second paragraph before “4.17”, “Sub- Clause” is added.</p>
<p>Sub-Clause 4.23</p> <p>Archaeological and Geological Findings</p>	<p>The first paragraph is replaced with the following:</p> <p>“All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural or religious interest found on the Site shall be placed under the care and custody of the Employer. The Contractor shall:</p> <ul style="list-style-type: none"> (a) take all reasonable precautions, including fencing-off the area or site of the finding, to avoid further disturbance and prevent Contractor’s Personnel or other persons from removing or damaging any of these findings; (b) train relevant Contractor’s Personnel on appropriate actions to be taken in the event of such findings; and

	(c) implement any other action consistent with the requirements of the Specification and relevant Laws.”
Sub-Clause 4.24 to 4.26 are added after Sub-Clause 4.23	
Sub-Clause 4.24 Suppliers (other than Subcontractors)	<p>4.24.1 Forced Labour</p> <p>The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage forced labour including trafficked persons as described in Sub-Clause 6.21. If forced labour/trafficking cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.2 Child labour</p> <p>The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage child labour as described in Sub-Clause 6.22. If child labour cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.3 Serious Safety Issues</p> <p>The Contractor, including its Subcontractors (if any), shall comply with all applicable safety obligations, including as stated in Sub-Clauses 4.8, 5.1 and 6.7. The Contractor shall also take measures to require its suppliers (other than Subcontractors) to introduce procedures and mitigation measures to address safety issues related to their personnel. If serious safety issues are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.4 Obtaining natural resource materials in relation to supplier</p> <p>The Contractor shall obtain natural resource materials from suppliers that can demonstrate, through compliance with the applicable verification and/ or certification requirements, that obtaining such materials is not contributing to the risk of</p>

	<p>significant conversion or significant degradation of natural or critical habitats such as unsustainably harvested wood products, gravel or sand extraction from river beds or beaches.</p> <p>If a supplier cannot continue to demonstrate that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to demonstrate that they are not significantly adversely impacting the habitats.</p>
<p>Sub-Clause 4.25 Code of Conduct</p>	<p>The Contractor shall have a Code of Conduct for the Contractor's Personnel.</p> <p>The Contractor shall ensure that each Contractor's Personnel is provided a copy of this Code of Conduct, written in a language comprehensible to that person, and shall seek to obtain that person's signature acknowledging receipt of the same.</p> <p>The Contractor shall also ensure that the Code of Conduct is visibly displayed in multiple locations on the Site and any other place where the Works will be carried out, as well as in areas outside the Site accessible to the local community and project affected people. The posted Code of Conduct shall be provided in languages comprehensible to Contractor's Personnel, Employer's Personnel and the local community.</p>

<p>Sub-Clause 4.26</p> <p>Milestone</p>	<p>Sub-Clause 4.26 Milestone</p> <p>If no Milestones are specified in the Contract Data, this Sub-Clause shall not apply.</p> <p>The Contractor shall complete the works of each Milestone (including all work which is stated in the Specification as being required for the Milestone to be considered complete) within the time for completion of the Milestone as stated in the Contract Data, calculated from the Commencement Date.</p> <p>The Contractor shall include, in the detailed time programme and each revised programme, under Sub-Clause 8.3 [Programme], the time for completion for each Milestone.</p> <p>The Contractor shall apply, by notice to the Engineer, for a Milestone Certificate not earlier than 14 days before the works of a Milestone will, in the Contractor’s opinion, be complete. The Engineer shall within 28 days after receiving the Contractor’s notice:</p> <ul style="list-style-type: none"> (a) issue the Milestone Certificate to the Contractor, stating the date on which the works of the Milestone were completed in accordance with the Contract, except for any minor outstanding work and defects (as shall be listed in the Milestone Certificate); or (b) reject the application, giving reasons and specifying the work required to be done and defects required to be remedied by the Contractor to enable the Milestone Certificate to be issued. <p>The Contractor shall then complete the work referred to in sub-paragraph (b) of this Sub-Clause before issuing a further notice of application under this Sub-Clause.</p> <p>If the Engineer fails either to issue the Milestone Certificate or to reject the Contractor’s application within the above period of 28 days, and if the works of a Milestone are complete in accordance with the Contract, the Milestone Certificate shall be deemed to have been issued on the date which is 14 days after the date stated in the Contractor’s notice of application.</p>
<p>Sub-Clause 6.1</p> <p>Engagement of Staff and Labour</p>	<p>The following paragraphs are added at the end of the Sub-Clause:</p>

	<p>The Contractor shall provide the Contractor’s Personnel information and documentation that are clear and understandable regarding their terms and conditions of employment. The information and documentation shall set out their rights under relevant labour Laws applicable to the Contractor’s Personnel (which will include any applicable collective agreements), including their rights related to hours of work, wages, overtime, compensation and benefits, as well as those arising from any requirements in the Specification; and shall also include the Code of Conduct for Contractor’s Personnel as set forth in Sub-Clause 4.25. The Contractor’s Personnel shall be informed when any material changes to their terms or conditions of employment occur.</p> <p>“The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labour with appropriate qualifications and experience from sources within the Country.”</p>
<p>Sub-Clause 6.2 Rates of Wages and Conditions of Labour</p>	<p>The following paragraphs are added at the end of the Sub-Clause:</p> <p>“The Contractor shall inform the Contractor’s Personnel about:</p> <ul style="list-style-type: none"> (a) any deduction to their payment and the conditions of such deductions in accordance with the applicable Laws or as stated in the Specification; and (b) their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances and any benefits as are subject to tax under the Laws of the Country for the time being in force. <p>The Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws. Where required by applicable Laws or as stated in the Specification, the Contractor shall provide the Contractor’s Personnel written notice of termination of employment and details of severance payments in a timely manner. The Contractor shall have paid the Contractor’s Personnel (either directly or where appropriate for their benefit) all due wages and entitlements including, as applicable, social security benefits and pension contributions, on or before the end of their engagement/ employment.</p> <p>If any amenity required to be provided under any Section of Contract Labour (Regulation and Abolition) Act of 1970 for the benefit of the contract labour employed in an</p>

	<p>establishment, is not provided by the Contractor within the time prescribed therein, such amenity shall be provided by the Principal Employer within such time as may be prescribed. All expenses incurred by the Principal Employer in providing the amenities will be recovered from the amount payable under the Contract.</p> <p>In case the Contractor fails to make payment of wages within the prescribed period or makes short payment, then the Principal Employer will make payment of wages in full or the unpaid balance due, as the case may be, to the contract labour employed by the Contractor and recover the amount so paid from the amount payable under the Contract.</p> <p>The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of applicable Laws. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/Regulations including amendments, if any, on the part of the Contractor, the Employer shall have the right to deduct any money due to the Contractor including his amount of Performance Security. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.</p> <p>For the avoidance of any doubt, the Contractor shall be responsible for payment of applicable cess and making timely filings under the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.”</p>
<p>Sub-Clause 6.5 Working Hours</p>	<p>The following paras are inserted at the end of the Sub-Clause:</p> <p>The Contractor shall provide the Contractor’s Personnel annual holiday and sick, maternity and family leave, as required by applicable Laws or as stated in the Specification.”</p> <p>The Contractor, if required, shall take approval of Engineer for carrying out work during night hours or in shifts subject to compliance with applicable Laws and shall be responsible for all necessary safety arrangements with respect to the work being undertaken. However, the Contractor shall not be entitled to any claim for increase in rates or any additional cost</p>

	and the same shall be deemed to be included in the Contract Price.
Sub-Clause 6.7 Health and Safety of Personnel	In the second paragraph, “The Contractor” is replaced with: “Except as otherwise stated in the Specification, the Contractor...”
Sub-Clause 6.9 Contractor’s Personnel	<p>The Sub-Clause is replaced with:</p> <p>“The Contractor’s Personnel (including Key Personnel, if any) shall be appropriately qualified, skilled, experienced and competent in their respective trades or occupations.</p> <p>The Engineer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor’s Representative and Key Personnel (if any), who:</p> <ul style="list-style-type: none"> (a) persists in any misconduct or lack of care; (b) carries out duties incompetently or negligently; (c) fails to comply with any provision of the Contract; (d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment; (e) based on reasonable evidence, is determined to have engaged in Prohibited Practice during the execution of the Works; (f) has been recruited from the Employer’s Personnel in breach of Sub-Clause 6.3 [Recruitment of Persons]; (g) undertakes behaviour which breaches the Code of Conduct for Contractor’s Personnel (ESHS). <p>If appropriate, the Contractor shall then promptly appoint (or cause to be appointed) a suitable replacement with equivalent skills and experience. In the case of replacement of the Contractor’s Representative, Sub-Clause 4.3 [<i>Contractor’s Representative</i>] shall apply. In the case of replacement of Key Personnel (if any), Sub-Clause 6.12 [<i>Key Personnel</i>] shall apply</p> <p>Subject to the requirements in Sub-Clause 4.3 [<i>Contractor’s Representative</i>] and 6.12 [<i>Key Personnel</i>], and notwithstanding any requirement from the Engineer to remove or cause to remove any person, the Contractor shall take immediate action as appropriate in response to any violation of (a) through (g) above. Such immediate action shall include removing (or causing to be removed) from the Site or other places where the Works are being carried out, any Contractor’s</p>

	Personnel who engages in (a), (b), (c), (d), (e) or (g) above or has been recruited as stated in (f) above.”
Sub-Clause 6.12 Key Personnel	The following is inserted at the end of the last paragraph: “If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer.”
The following Sub-Clauses 6.13 to 6.27 are added after sub-clause 6.12	
Sub-Clause 6.13 Foreign Personnel	The Contractor may bring into the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor’s personnel. The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.
Sub-Clause 6.14 Supply of Foodstuffs	The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor’s Personnel for the purposes of or in connection with the Contract.
Sub-Clause 6.15 Supply of Water	The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor’s Personnel.
Sub-Clause 6.16 Measures against Insect and Pest Nuisance	The Contractor shall at all times take the necessary precautions to protect the Contractor’s Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.
Sub-Clause 6.17 Alcoholic Liquor or Drugs	The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give, barter or otherwise

	dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.
Sub-Clause 6.18 Arms and Ammunition	The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.
Sub-Clause 6.19 Festivals and Religious Customs	The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.
Sub-Clause 6.20 Funeral Arrangements	The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.
Sub-Clause 6.21 Forced Labour	<p>The Contractor, including its Subcontractors, shall not employ or engage forced labour. Forced labour consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.</p> <p>No persons shall be employed or engaged who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harbouring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.</p>
Sub-Clause 6.22 Child Labour	<p>The Contractor, including its Subcontractors, shall not employ or engage a child (as defined in Child Labour (Prohibition & Regulation) Act, 1986).</p> <p>The Contractor, including its Subcontractors, shall not employ or engage a child between the minimum age and the age of 18 in a manner that is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.</p> <p>The Contractor including its Subcontractors, shall only employ or engage children between the minimum age and the age of 18 after an appropriate risk assessment has been conducted by the Contractor with the Engineer's consent. The Contractor shall be subject to regular monitoring by the Engineer that</p>

	<p>includes monitoring of health, working conditions and hours of work.</p> <p>Work considered hazardous for children is work that, by its nature or the circumstances in which it is carried out, is likely to jeopardize the health, safety, or morals of children. Such work activities prohibited for children include work:</p> <ul style="list-style-type: none"> (a) with exposure to physical, psychological or sexual abuse; (b) underground, underwater, working at heights or in confined spaces; (c) with dangerous machinery, equipment or tools, or involving handling or transport of heavy loads; (d) in unhealthy environments exposing children to hazardous substances, agents, or processes, or to temperatures, noise or vibration damaging to health; <p>or</p> <p>under difficult conditions such as work for long hours, during the night or in confinement on the premises of the employer.</p>
<p>Sub-Clause 6.23 Employment Records of Workers</p>	<p>The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked, and wages paid to all workers. These records shall be summarised on a monthly basis and submitted to the Engineer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [Records of Contractor’s Personnel and Equipment].</p>
<p>Sub-Clause 6.24 Workers’ Organisations</p>	<p>In countries where the relevant labour laws recognise workers’ rights to form and to join workers’ organisations of their choosing and to bargain collectively without interference, the Contractor shall comply with such laws. In such circumstances, the role of legally established workers’ organizations and legitimate workers’ representatives will be respected, and they will be provided with information needed for meaningful negotiation in a timely manner. Where the relevant labour laws substantially restrict workers’ organisations, the Contractor shall enable alternative means for the Contractor’s Personnel to express their grievances and protect their rights regarding working conditions and terms of employment. The Contractor shall not seek to influence or control these alternative means. The Contractor shall not discriminate or retaliate against the Contractor’s Personnel who participate, or seek to participate, in such organisations and collective bargaining or alternative mechanisms. Workers’</p>

	<p>organisations are expected to fairly represent the workers in the workforce.</p>
<p>Sub-Clause 6.25 Non-Discrimination and Equal Opportunity</p>	<p>The Contractor shall not make decisions relating to the employment or treatment of Contractor’s Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor’s Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.</p> <p>Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure non-discrimination and equal opportunity, including for specific groups such as women, people with disabilities, migrant workers and children (of working age in accordance with Sub-Clause 6.22).</p>
<p>Sub-Clause 6.26 Contractor’s Personnel Grievance Mechanism</p>	<p>The Contractor shall have a grievance mechanism for Contractor’s Personnel, and where relevant the workers’ organizations stated in Sub-Clause 6.24, to raise workplace concerns. The grievance mechanism shall be proportionate to the nature, scale, risks and impacts of the Contract. The mechanism shall address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned in a language they understand, without any retribution, and shall operate in an independent and objective manner.</p> <p>The Contractor’s Personnel shall be informed of the grievance mechanism at the time of engagement for the Contract, and the measures put in place to protect them against any reprisal for its use. Measures will be put in place to make the grievance mechanism easily accessible to all Contractor’s Personnel.</p> <p>The grievance mechanism shall not impede access to other judicial or administrative remedies that might be available, or substitute for grievance mechanisms provided through collective agreements.</p>

	<p>The grievance mechanism may utilize existing grievance mechanisms, providing that they are properly designed and implemented, address concerns promptly, and are readily accessible to such project workers. Existing grievance mechanisms may be supplemented as needed with Contract-specific arrangements.</p>
<p>Sub-Clause 6.27 Training of Contractor’s Personnel</p>	<p>The Contractor shall provide appropriate training to relevant Contractor’s Personnel on ESHS aspects of the Contract, including appropriate sensitization on prohibition of SEA, Gender Based Violence (GBV) and health & safety training referred to in Sub-Clause 4.8</p> <p>As stated in the Specification or as instructed by the Engineer, the Contractor shall also allow appropriate opportunities for the relevant Contractor’s Personnel to be trained on ESHS aspects of the Contract by the Employer’s Personnel.</p> <p>The Contractor shall provide training on SEA, GBV including its prevention, to any of its personnel who has a role to supervise other Contractor’s Personnel.</p>
<p>Sub-Clause 7.3 Inspection</p>	<p>The following is added in the first paragraph after “Employer’s Personnel” “(including the Bank staff or consultants acting on the Bank’s behalf, stakeholders and third parties, such as independent experts, local communities, or non-governmental organizations)”</p> <p>The following is added as (b) (iv):</p> <p>“(iv) carryout environmental and social audit, and”</p>
<p>Sub-Clause 7.7 Ownership of Plant and Materials</p>	<p>The following is added before the first paragraph:</p> <p>“Except as otherwise provided in the Contract,”</p>

<p>Sub-Clause 8.1 Commencement of Work</p>	<p>The Sub- Clause is replaced in its entirety with the following:</p> <p>“The Engineer shall give a Notice to the Contractor stating the Commencement Date, not less than 14 days before the Commencement Date.</p> <p>The Notice shall be issued promptly after the Engineer determines the fulfilment of the following conditions:</p> <ul style="list-style-type: none"> (a) signature of the Contract Agreement by both Parties, and if required, approval of the Contract by relevant authorities of the Country; (b) delivery to the Contractor of reasonable evidence of the Employer’s financial arrangements (under Sub-Clause 2.4 [Employer’s Financial Arrangements]); (c) except if otherwise specified in the Contract Data, effective access to and possession of the Site given to the Contractor together with such permission(s) under (a) of Sub-Clause 1.13 [Compliance with Laws] as required for the commencement of the Works; (d) receipt by the Contractor of the Advance Payment under Sub-Clause 14.2 [Advance Payment] provided that the corresponding bank guarantee has been delivered by the Contractor within 28 days from the date of signing of the Contract Agreement. If the Contractor fails to deliver the guarantee within such 28 days, this sub-paragraph (d) shall not be applied. <p>Subject to Sub-Clause 4.1 on the Management Strategies and Implementation Plans and the C-ESMP and Sub-Clause 4.8 on the health and safety manual, 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>
<p>Sub-Clause 8.2 Time for Completion</p>	<p>The following paragraph shall be added at the end of Sub-Clause 8.2:</p> <p>The Contractor shall complete each Milestone (if any) within the Time for Completion for the Milestone (as the case may be), including completing all work which is stated in the Contract as being required for the Milestone to be considered to be completed for the issuance of Milestone Certificate under Sub-Clause 4.26 [Milestone].</p>

<p>Sub-Clause 8.5 Extension of Time for Completion</p>	<p>Replace the entire first paragraph of Sub-Clause 8.5 with the following:</p> <p>The Contractor shall be entitled subject to Sub-Clause 20.1 [Claims] to an extension of the Time for Completion if and to the extent that completion for the purpose of Sub-Clause 10.1 [Taking Over of the Works and Sections] or for the issuance of Milestone Certificate under Sub-Clause 4.26 [Milestone] is or will be delayed by any of the following causes:"</p>
<p>Sub-Clause 8.8 Delay Damages</p>	<p>Replace the entire first paragraph of Sub-Clause 8.8 with the following:</p> <p>If the Contractor fails to comply with Sub-Clause 8.2 [Time for Completion], the Contractor shall subject to notice under Sub-Clause 20.2 [Claims for Payment and/or EOT] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Contract Data, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate or the Milestone Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Contract Data.</p>
<p>Sub-Clause 11.7 Right of Access after Taking Over</p>	<p>In the second paragraph, "Whenever the Contractor intends to access any part of the Works during the relevant DNP:" is replaced with:</p> <p>"Whenever, until the date 28 days after issue of the Performance Certificate, the Contractor intends to access any part of the Works:"</p>

<p>Sub-Clause 12.3 Valuation of Works</p>	<p>Replace the entire Sub-Clause 12.3 with the following:</p> <p>Except as otherwise stated in the Contract, the Engineer shall proceed in accordance with Sub-Clause 3.7 (Agreement or Determinations) to agree or determine the Contract Price by evaluating each item of work, applying the measurement agreed or determined in accordance with the above Sub-Clause 12.1 and 12.2 and the appropriate rate or price for the item.</p> <p>For each item of work, the appropriate rate or price for the item shall be the rate or price specified for such item in the contract or, if there is no such item, the appropriate rate or price specified for similar work.</p> <p>However, a new rate or price shall be appropriate for an item of work (For the purpose of deciding new rate or price of an item, cost of all the items based on IRUSSOR in Bill Unit No. 1 of BOQ shall be treated as one item) if:</p> <p>(A)</p> <p>(i) the measured quantity of the item is changed by more than 25% from the quantity of this item in the Bill of Quantities or the Schedule, and</p> <p>(ii) this change in quantity multiplied by such specified rate for this item exceeds 0.1% of the Accepted Contract Amount,</p> <p>OR</p> <p>(B)</p> <p>(i) the work is instructed under Clause 13 [Variations and Adjustments],</p> <p>(ii) no rate or price is specified in the Contract for this item, and</p> <p>(iii) no specified rate or price is appropriate because the item of work is not of similar character, or is not executed under similar conditions, as any item in the Contract.</p> <p>In this case, the rate may be decided on the following basis:</p> <p>(a) 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>(b) 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>(c) 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 the Site and other ancillary and incidental expenses on labour.</p> <p>(d) 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>(e) An amount of 15% of items (a), (b), (c) and (d) above to allow for Contractor's overheads, profits and corporate taxes.</p> <p>(f) In all cases where extra items of work are involved, for which there are no rates and not deemed to be included within 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>
Sub-Clause 13.2 Value Engineering	Not applicable
Sub-Clause 13.3.1 Variation by Instruction	Subparagraph 13.3.1 (a) is replaced with: "a description of the varied work performed or to be performed, including details of the resources and methods adopted or to be adopted by the Contractor, and sufficient ESHS information to enable an evaluation of ESHS risks and impacts;"
Sub-Clause 13.4 Provisional Sums	<p>The following is inserted as the penultimate paragraph:</p> <p>"The Provisional Sum shall be used to cover the Employer's share of the DAAB members' fees and expenses, in accordance with Clause 21. No prior instruction of the Engineer shall be required with respect to the work of the DAAB. The Contractor shall submit the DAAB members' invoices and satisfactory evidence of having paid 100% of such invoices as part of the substantiation of those Statements submitted under Sub-Clause 14.3.</p>
Sub-Clause 13.6	The following paragraph is added at the end of the Sub-Clause:

<p>Adjustments for Changes in Laws</p>	<p>“Notwithstanding the foregoing, the Contractor shall not be entitled to an extension of time if the relevant delay has already been taken into account in the determination of a previous extension of time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [Adjustments for Changes in Cost].”</p>
<p>Sub-Clause 14.2.1 Advance Payment Guarantee</p>	<p>Replace the Sub-Clause 14.2.1 with the following:</p> <p>The Contractor shall obtain (at the Contractor’s cost) an Advance Payment Guarantee or Security in amounts and currencies equal to the advance payment and shall submit it to the Employer with a copy to the Engineer. The Guarantee in accordance to the form attached to the Contract can be split up in four (4) Guarantees to be released on repayment. The Contractor shall submit the Advance Payment Guarantee in any of the following forms:</p> <p>(a) Unconditional and irrevocable Bank Guarantee from the specified banks in the form appearing in Section 9 [Contract Forms] as under:</p> <ul style="list-style-type: none"> (i) a scheduled bank (excluding co-operative banks) in India, or (ii) a Foreign Bank having arrangement with a nationalized bank or scheduled banks (excluding co-operative banks) in India; <p>(b) Banker's Cheque or Demand Draft drawn on a scheduled bank (excluding co-operative banks) or nationalized bank in India.</p> <p>The scheduled bank issuing the bank guarantee shall be on “Structure Financial Messaging System (SFMS)” platform. A separate advice of the bank guarantee shall invariably be sent by the issuing bank to Employer’s Bank through SFMS at the address given below and only after receipt of the same by the Employer’s Bank, the bank guarantee shall become operative and acceptable to the Employer. Further, the bank guarantees in original form along with a copy of “MT760COV (in case of bank guarantee message)/ MT767COV (in case of bank</p>

	<p>guarantee amendment message) Report” sent by the concerned issuing bank sealed in an envelope shall be submitted to the Employer.</p> <p>The Issuing Bank shall send the SFMS to:</p> <p>Beneficiary: Haryana Rail Infrastructure Development Corporation Limited”</p> <p>Bank Name:</p> <p>Account No.</p> <p>IFSC Code:</p> <p>Note: All the instruments mentioned in (a) & (b) above should be in favour of Chief Project Manager, Haryana Rail Infrastructure Development Corporation Limited, Plot No 143, 5th Floor, Railtel Tower, Sector-44, Gurugram.</p> <p>Such Advance Payment guarantee shall remain effective until the Advance Payment has been repaid pursuant to provision of this Sub-Clause 14.2, but the amount thereof shall be progressively reduced by the amount repaid by the Contractor as indicated in the Interim Payment Certificate issued in accordance with this Clause 14.</p> <p>In case, the Contractor is a Joint Venture/Consortium, the Advance Payment Guarantees shall be either in the name of Joint Venture/Consortium or in the name of Lead Partner of Joint Venture/Consortium.</p>
<p>Sub-Clause 14.3 Application for Interim Payment</p>	<p>The following is inserted at the end of (vi) after: <i>[Agreement or Determination]</i>: “any reimbursement due to the Contractor under the Dispute Avoidance/ Adjudication Agreement. (Appendix General Conditions of Dispute Avoidance/ Adjudication Agreement).”</p>
<p>Sub-Clause 14.3 Application for Interim Payment</p>	<p>Add the following at the end, below Sub paragraph ‘(x)’</p> <p>(xi) an amount to be deducted for the payments demanded by relevant competent authorities of the Central Government and/or State Government and/or local bodies from the Employer as due payments/ liability of the Contractor as mandated by relevant laws.</p>

<p>Sub-Clause 14.6.2 Withholding (amounts in) an IPC</p>	<p>“and/or” from subparagraph (b) is deleted.</p> <p>The following is then added as subparagraph (c) and subparagraph (c) of the Sub-Clause is renumbered as (d):</p> <p>“(c) if the Contractor was, or is, failing to perform any ESHS obligations or work under the Contract, the value of this work or obligation, as determined by the Engineer, may be withheld until the work or obligation has been performed, and/or the cost of rectification or replacement, as determined by the Engineer, may be withheld until rectification or replacement has been completed. Failure to perform includes, but is not limited to the following:</p> <ul style="list-style-type: none"> (i) failure to comply with any ESHS obligations or work described in the Works’ Requirements which may include: working outside site boundaries, excessive dust, damage to offsite vegetation, pollution of water courses from oils or sedimentation, contamination of land e.g. from oils, human waste, damage to archaeology or cultural heritage features, air pollution as a result of unauthorized and/or inefficient combustion; (ii) failure to regularly review C-ESMP and/or update it in a timely manner to address emerging ESHS issues, or anticipated risks or impacts; (iii) failure to implement the C-ESMP e.g. failure to provide required training or sensitization; (iv) failing to have appropriate consents/permits prior to undertaking Works or related activities; (v) failure to submit ESHS report/s (as described in general specifications, or failure to submit such reports in a timely manner; (vi) failure to implement remediation as instructed by the Engineer within the specified timeframe (e.g. remediation addressing non-compliance/s).”
<p>Sub-Clause 14.7 Payment</p>	<p>At the end of sub-paragraph (b): “and” is replaced with “or” and the following inserted as (iii):</p>

	<p>“(iii) at a time when the Bank’s loan (from which part of the payments to the Contractor is being made) is suspended, the amount shown on any statement submitted by the Contractor within 14 days after such statement is submitted, any discrepancy being rectified in the next payment to the Contractor; and”</p> <p>At the end of sub-paragraph (c): “.” is replaced with “;” and the following inserted:</p> <p>“or, at a time when the Bank’s loan (from which part of the payments to the Contractor is being made) is suspended the undisputed amount shown in the Final Statement within 56 days after the date of notification of the suspension in accordance with Sub-Clause 16.2 [Termination by Contractor].”</p>
<p>Sub-Clause 14.7 Payment</p>	<p>After the sub-paragraphs (c), add (d) with the following:</p> <p>(d) Provisional amount against the Statement specified in Sub-Clause 14.3:</p> <ul style="list-style-type: none"> i) The Employer shall pay 90% of such amount as provisional payment within 7 days from the receipt of evaluated statement from the Engineer. ii) It shall be the responsibility of the Contractor to claim an amount for the performed services as admissible as per the Contract. If at any time it is observed by the Engineer that the amount claimed in the Statement are higher than the actual admissible performance, the facility of provisional payment will be withheld until such time the excess payment paid is adjusted in the subsequent Interim Payment Certificate. In such a case, warning letter will be issued to the Contractor.
<p>Sub-Clause 14.9 Release of Retention Money</p>	<p>The following is added at the end of Sub-Clause 14.9:</p>

“Unless otherwise stated in the Contract, 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 of Contract or in another form approved by the Employer, for the second half of the Retention Money. The Contractor shall submit unconditional and irrevocable Bank Guarantee from the specified banks in the form appearing in Section X [Contract Forms] as under:

- (i) a scheduled bank (excluding co-operative banks) in India, or
- (ii) a Foreign Bank having arrangement with a nationalized bank or scheduled banks (excluding co-operative banks) in India;

The scheduled bank issuing the bank guarantee shall be on “Structure Financial Messaging System (SFMS)” platform. A separate advice of the bank guarantee shall invariably be sent by the issuing bank to Employer’s Bank through SFMS at the address given below and only after receipt of the same by the Employer’s Bank, the bank guarantee shall become operative and acceptable to the Employer. Further, the bank guarantees in original form along with a copy of “MT760COV (in case of bank guarantee message)/ MT767COV (in case of bank guarantee amendment message) Report” sent by the concerned issuing bank sealed in an envelope shall be submitted to the Employer.

The Issuing Bank shall send the SFMS to:

Beneficiary: Haryana Rail Infrastructure Development Corporation Limited

Bank Name:

Account No.

IFSC Code:

Note: Bank Guarantee should be in favour of Chief Project Manager, Haryana Rail Infrastructure Development

	<p>Corporation Limited, Plot No 143, 5th Floor, Railtel Tower, Sector-44, Gurugram.</p> <p>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 after the latest of the expiry dates of the Defects Notification Periods. 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>
<p>Sub-Clause 14.12 Discharge</p>	<p>On the seventh line of the first paragraph, “Sub-Clause 21.6 [Arbitration]” is replaced with: “Clause 21 [Disputes and Arbitration]”.</p>
<p>Sub-Clause 14.15 Currencies of Payment</p>	<p>Throughout Sub-Clause 14.15, “Contract Data” is replaced with: “Schedule of Payment Currencies”.</p>

<p>Sub-Clause 14.16 Payment to Joint Venture/Consortium</p>	<p>Add new Sub-Clause 14.16 after Sub-Clause 14.15 as follows:</p> <p>Sub-Clause 14.16 Payment to Joint Venture/Consortium</p> <p>The payment shall be made to the Joint Venture/Consortium. However, in case of Consortium, the direct payment to individual members of consortium can be made; on joint certification by the Representative of the Consortium and authorized representative of individual members of the Consortium, after making requisite recoveries/deductions from the gross payment. In this case, a notarized agreement jointly signed by authorized representatives of all the members of the consortium to this effect need to be submitted to the Employer on Commencement of the Works.</p>
<p>Sub-Clause 15.1 Notice to Correct</p>	<p>“and” is deleted from (b) and</p> <p>“.” is replaced by: “; and” in (c).</p> <p>The following is then added as (d)</p> <p>“(d) specify the time within which the Contractor shall respond to the Notice to Correct.”</p> <p>In the third para., “shall immediately respond” is replaced with: “shall respond within the time specified in (d)”. Further, in the third para., “to comply with the time specified in the Notice to Correct.” is replaced with: “to comply with the time specified in (c).”</p>
<p>Sub-Clause 15.2.1 Notice</p>	<p>Sub-paragraph (h) is replaced with:</p> <p>“based on reasonable evidence, has engaged in Prohibited Practice as defined in paragraph 2 of the Particular Conditions - Part C –Prohibited Practices, in competing for or in executing the Contract.”</p>
<p>Sub-Clause 15.8 Prohibited Practices</p>	<p>Add New Sub-Clause 15.8 “Prohibited Practices” after Sub-Clause 15.7;</p> <p>“</p> <p>15.8.1 The Bank requires compliance with the Bank’s Policy on Prohibited Practices as set forth in Particular Conditions - Part C- Prohibited Practices.</p> <p>15.8.2 The Employer requires the Contractor to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the tendering process or execution of the Contract. The</p>

	<p>information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.”</p>
<p>Sub-Clause 16.1 Suspension by Contractor</p>	<p>The following paragraph is inserted after the first paragraph:</p> <p>“Notwithstanding the above, if the Bank has suspended disbursements under the loan from which payments to the Contractor are being made, in whole or in part, for the execution of the Works, and no alternative funds are available as provided for in Sub-Clause 2.4 [Employer’s Financial Arrangements], the Contractor may by notice suspend work or reduce the rate of work at any time, but not less than 7 days after the Recipient having received the suspension notification from the Bank.”</p>
<p>Sub-Clause 16.2.1 Notice</p>	<p>Sub-paragraph (j) is deleted in its entirety.</p> <p>At the end of sub-paragraph (i): “; or” is replaced with: “.”</p> <p>sub-paragraph (f) is replaced with:</p> <p>“(f) the Contractor does not receive a Notice of the Commencement Date under Sub-Clause 8.1 [<i>Commencement of Works</i>] within 180 days after receiving the Letter of Acceptance, for reasons not attributable to the Contractor.”</p>
<p>Sub-Clause 16.2.2 Termination</p>	<p>The following is added at the end of Sub-Clause 16.2.2:</p> <p>“In the event the Bank suspends the loan 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>Sub-Clause 17.1 Responsibility for Care of the Works</p>	<p>On the fourth and fifth lines of the first paragraph, replace “Date of Completion of the Works” with “issue of the Taking-Over Certificate for the Works”.</p>

Sub-Clause 17.3 Intellectual and Industrial Property Rights	On the first line of the second paragraph, replace “notice” is replaced with “a Notice”.
Sub-Clause 17.7 Use of Employer’s Accommodation/Facilities	<p>The following Sub-Clause is added as 17.7:</p> <p>“The Contractor shall take full responsibility for the care of the Employer-provided accommodation and facilities, if any, as detailed in the Specification, from the respective dates of hand-over to the Contractor until cessation of occupation (where hand-over or cessation of occupation may take place after the date stated in the Taking-Over Certificate for the Works)</p> <p>If any loss or damage happens to any of the above items while the Contractor is responsible for their care arising from any cause whatsoever other than those for which the Employer is liable, the Contractor shall, at its own cost, rectify the loss or damage to the satisfaction of the Engineer.”</p>
Sub-Clause 18.1 Exceptional Events	<p>Sub-paragraph (c) is substituted with:</p> <p>“(c) riot, commotion, disorder or sabotage by persons other than the Contractor’s Personnel and other employees of the Contractor and Subcontractors;”</p>
Sub-Clause 18.4 Consequences of an Exceptional Event	<p>The following is added at the end of sub-paragraph (b) after deleting the “.”:</p> <p>“, including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Exceptional Events, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 19.2 [Insurance to be provided by the Contractor].”</p>
Sub-Clause 18.5 Optional Termination	In sub-paragraph (c), “and necessarily” is inserted after ““was reasonably”.
Sub-Clause 19.1 General Requirements	<p>The following paragraphs are added after the first:</p> <p>“Wherever the Employer is the insuring Party, each insurance shall be effected with insurers and in terms acceptable to the Contractor. These terms shall be consistent with terms (if any) agreed by both Parties before the date of the Letter of Acceptance.</p> <p>This agreement of terms shall take precedence over the provisions of this Clause.”</p>

<p>Sub-Clause 19.2 Insurance to be provided by the Contractor</p>	<p>The following is inserted as the first sentence in Sub-Clause 19.2:</p> <p>“The Contractor shall be entitled to place all insurances relating to the Contract (including, but not limited to the insurance referred to Clause 19) with insurers from any eligible source country.”</p>
<p>Sub-Clause 19.2.1 The Works</p>	<p>On the last line of the second paragraph, “Clause 12 [<i>Tests after completion</i>]” is deleted.</p>
<p>Sub-Clause 19.2.5 Injury to employees</p>	<p>The second paragraph is replaced with:</p> <p>“The Employer and the Engineer shall also be indemnified under the policy of insurance, against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor’s Personnel, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.”</p>
<p>Sub-Clause 20.1 Claims</p>	<p>In a): “any additional payment” is replaced with “payment”.</p>
<p>Sub-Clause 20.2 Claims for Payment and/or EOT</p>	<p>The first paragraph is replaced with:</p> <p>“If either Party considers that it is entitled to claim under 20.1 (a) or (b), the following claim procedure shall apply:”</p>

<p>Sub-Clause 21.1</p> <p>Constitution of the DAAB</p>	<p>Replace the entire first paragraph of Sub-Clause-21.1 with the following:</p> <p>Dispute shall be referred to a DAAB for decision in accordance with Sub-Clause 21.4 [Obtaining DAAB’s Decision]. The Parties shall appoint a DAAB by the date stated in the Contract Data. The date may be changed if both the Parties agree, in writing, to change the date, up to one hundred eighty (180) days after the Commencement Date.</p> <p>In the second paragraph, at the end of the first sentence after deleting: “.”, the following is added: “, each of whom shall meet the criteria set forth in Sub-Clause 3.3 of Appendix-General Conditions of Dispute Avoidance/ Adjudication Agreement.”</p> <p>After the second paragraph insert the following paragraph: “If the Contract is with a foreign Contractor, the DAAB members shall not have the same nationality as the Employer or the Contractor.”</p>
<p>Sub-Clause 21.2</p> <p>Failure to Appoint DAAB Member(s)</p>	<p>For both (a) and (b): “by the date stated in the first paragraph of Sub-Clause 21.1 [<i>Constitution of the DAAB</i>]” is replaced with: “within 42 days from the date the Contract is signed by both Parties”</p>

<p>Sub-Clause 21.6 Arbitration</p>	<p>This clause stands amended and restated in its entirety as follows:</p> <p>21.6.1 Disputes shall be settled by arbitration in accordance with the following provisions:</p> <p>(A) In case of the Contractor or the Lead member of the Contractor (in the case of a Joint Venture or Consortium) being of foreign origin</p> <p>If the efforts to resolve all or any of the disputes through amicable settlement fails, then such disputes or differences, whatsoever arising between the parties, arising out of the Contract or relating to effect of the Contract or the breach thereof shall be referred to Arbitration in accordance with the following provisions:</p> <p>1. Selection of Arbitrators -Each dispute submitted by a Party to arbitration shall be heard by a sole arbitrator or an arbitration panel comprising three (3) arbitrators, in accordance with the following provisions:</p> <p>(a) Where the Parties agree that the dispute concerns a technical matter, they may agree to appoint a sole arbitrator or, failing agreement on the identity of such sole arbitrator within thirty (30) days after receipt by the other Party of the proposal of a name for such an appointment by the Party who initiated the proceedings, either Party may apply to Singapore International Arbitration Centre (SIAC) for a list of not fewer than five (5) nominees and, on receipt of such list, the Parties shall alternately strike names therefrom, and the last remaining nominee on the list shall be the sole arbitrator for the matter in dispute. If the last remaining nominee has not been determined in this manner within sixty (60) days of the date of receipt of the list by the Parties, SIAC shall appoint, upon the request of either Party and from such list or otherwise, a sole arbitrator for the matter in dispute.</p> <p>(b) Where the Parties do not agree that the dispute concerns a technical matter, the Client and the Contractor shall each appoint one (1) arbitrator, and these two arbitrators shall jointly appoint a third arbitrator, who shall chair the arbitration panel. If the arbitrators named by the Parties do not succeed in appointing a third arbitrator within thirty (30) days after the latter of the two (2) arbitrators named by the Parties has been</p>
---	---

	<p>appointed, the third arbitrator shall, at the request of either Party, be appointed by SIAC.</p> <p>(c) If, in a dispute subject to paragraph (b) above, one Party fails to appoint its arbitrator within thirty (30) days after the other Party has appointed its arbitrator, the Party which has named an arbitrator may apply to the SIAC to appoint a sole arbitrator for the matter in dispute, and the arbitrator appointed pursuant to such application shall be the sole arbitrator for that dispute.</p> <p>2. Rules of Procedure - Except as otherwise stated herein, arbitration proceedings shall be conducted in accordance with the rules of procedure for arbitration of the United Nations Commission on International Trade Law (UNCITRAL) as in force on the date of this Contract.</p> <p>3. Substitute Arbitrators -If for any reason an arbitrator is unable to perform his/her function, a substitute shall be appointed in the same manner as the original arbitrator.</p> <p>4. Nationality and Qualifications of Arbitrators - The sole arbitrator or the third arbitrator appointed pursuant to paragraphs 1(a) through 1(c) above shall be an internationally recognized legal or technical expert with extensive experience in relation to the matter in dispute and shall not be a national of the Contractor's home country or of the home country of any of their members or Parties or of the Government's country. For the purposes of this Clause, "home country" means any of:</p> <p>(a) the country of incorporation of the Contractor or of any of their members or Parties; or</p> <p>(b) the country in which the Contractor's or any of their members' or Parties' principal place of business is located; or</p> <p>(c) the country of nationality of a majority of the Contractor's or of any members' or Parties' shareholders; or</p> <p>(d) the country of nationality of the Sub-Contractor concerned, where the dispute involves a subcontract.</p> <p>5. Miscellaneous - In any arbitration proceeding hereunder:</p>
--	---

	<p>(a) proceedings shall, unless otherwise agreed by the Parties, be held at Gurugram, India or such place as mutually agreed by both parties. The cost of Arbitration including the fees of the Arbitrator shall be borne equally by both the parties.</p> <p>(b) the English language shall be the official language for all purposes; and</p> <p>(c) the decision of the sole arbitrator or of a majority of the arbitrators (or of the third arbitrator if there is no such majority) shall be final and binding and shall be enforceable in any court of competent jurisdiction, and the Parties hereby waive any objections to or claims of immunity in respect of such enforcement.</p> <p>(B) In case of the Contractor or the Lead member of the Contractor (in the case of a Joint Venture or Consortium) being of Indian origin</p> <p>If the efforts to resolve all or any of the disputes through amicable settlement fail, then such disputes or differences, whatsoever arising between the parties, arising out of the Contract or relating to effect of the Contract or the breach thereof shall be referred to Arbitration in accordance with the following provisions:</p> <p>(a) The Arbitration proceedings shall be assumed to have commenced from the day, a written and valid demand for arbitration is received by Managing Director of the Employer (MD/HRIDC).</p> <p>(b) The disputes so referred to arbitration shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996 and amended by the Arbitration and Conciliation (Amendment) Act, 2015 and any statutory modification or re-enactment thereof. Further, it is agreed between the parties as under:</p> <p>Number of Arbitrators - The Arbitral tribunal shall consist of:</p> <ul style="list-style-type: none">(i) Sole Arbitrator (or)(ii) 3 (three) arbitrators <p>1. Procedure for Appointment of Arbitrators</p>
--	--

	<p>The arbitrators shall be appointed as per following procedure:</p> <p>(i) In case of Sole Arbitrator: Within 30 days from the day when a written and valid demand for Arbitration is received by MD/HRIDC, the Employer will forward a panel of 03(three) names to the General Consultant (GC). The GC shall have to choose one Arbitrator from the panel of three, to be appointed as Sole Arbitrator within 30 days of dispatch of the request by the Employer. In case the GC fails to choose one Arbitrator within 30 days of dispatch of the request by the Employer, then MD/HRIDC shall appoint any one Arbitrator from the panel of Arbitrators as sole Arbitrator.</p> <p>(ii) In case of 03 Arbitrators:</p> <p>a) Within 30 days from the day when a written and valid demand for Arbitration is received by MD/HRIDC, the Employer will forward a panel of not fewer than 5—five nominees to the GC. The GC will then give his consent for any one name out of the panel to be appointed as one of the arbitrators within 30 days of dispatch of the request by the Employer.</p> <p>b) The Employer will decide the second Arbitrator. MD/HRIDC shall appoint the two Arbitrators, including the name of one Arbitrator for whom consent was given by the GC, within 30 days from the receipt of the consent for one name of the Arbitrator from the GC. In case the GC fails to give his consent within 30 days of the request of the Employer, then MD/HRIDC shall nominate both the Arbitrators from the panel. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the parties out of the panel of Arbitrators provided to GC or from the larger panel of Arbitrators to be provided to them by the Employer at the request of two appointed Arbitrators (if so desired by them) and who shall act as presiding Arbitrator. In case of failure of the two appointed Arbitrators to reach upon consensus within a period of 30 days from their appointment, then, upon the request of either or both parties, the presiding Arbitrator shall be appointed by the MD/HRIDC within 14 days of receipt of request from either party or both parties.</p> <p>c) If one or more of the Arbitrators appointed as above refuses to act as Arbitrator, withdraws from his office as Arbitrator, or vacates his/their office/offices or is/are unable or unwilling to</p>
--	---

	<p>perform his functions as Arbitrator for any reason whatsoever or dies or in the opinion of the MD/HRIDC fails to act without undue delay, the MD/HRIDC shall appoint new Arbitrator/Arbitrators to act in his/their place except in case of new presiding Arbitrator who shall be chosen following the same procedure as mentioned in para ii(e) (b) above. Such reconstituted Tribunal may, at its discretion, proceed with the reference from the stage at which it was left by the previous Arbitrator(s).</p> <p>d) 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 Arbitrators nominated in the panel along with their professional experience, phone nos. and addresses to the GC. The minimum qualification and experience of the arbitrators which may be appointed by the Parties in accordance with the contract is set out below:</p> <ul style="list-style-type: none">(i) A working/retired officer (not below E-8 grade in a central public sector undertaking in India, with which the Employer has no direct business relationship), of engineering or accounts/finance discipline, having experience in management of construction contracts; or(ii) A retired officer (not below the SAG level in Indian Railways) of any Engineering Services of Indian Railways or Indian Railway Accounts Service, having experience in management of construction contracts; <p>2. Miscellaneous: In any arbitration proceeding hereunder:</p> <ul style="list-style-type: none">(a) The language of arbitration shall be English. This arbitration shall be governed in accordance with the laws of India.(b) The venue of the arbitration shall be Gurugram, India. The cost of Arbitration including the fees of the Arbitrator shall be borne equally by both the parties.(c) The decision of the sole arbitrator or of a majority of the arbitrators (or of the third arbitrator if there is no such majority) shall be final and binding and shall be enforceable in High court at Chandigarh, and the Parties hereby waive any objections to or claims of immunity in respect of such enforcement.
--	--

	<p>21.6.2 In the event that the Contractor wishes to refer a dispute to arbitration in accordance with this Sub-Clause, it shall be required to serve a notice in this regard to the Managing Director, of the Employer for commencement of arbitration.</p> <p>21.6.3 Pending the submission of and/or decision on a dispute and until the arbitral award is published, the Parties shall continue to perform their respective obligations under the contract without prejudice to a final adjustment in accordance with such award.</p> <p>21.6.4 The arbitrators shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of the Engineer, and any decision of the DB, relevant to the dispute. Nothing shall disqualify representatives of the Parties and the Engineer from being called as a witness and giving evidence before the arbitrators on any matter whatsoever relevant to the dispute. However, Conciliator cannot be present as a witness by either party in the arbitral proceedings.</p> <p>21.6.5 Neither Party shall be limited in the proceedings before the arbitrators to the evidence or arguments previously put before the DB to obtain its decision, or to the reasons for dissatisfaction given in its Notice of Dissatisfaction.</p> <p>21.6.6 Neither party shall be limited in the proceedings before such arbitrators to the evidence or arguments put before the Engineer to obtain his decision. No decision given by the Engineer in accordance with the contract shall disqualify him from being called as a witness and giving evidence before the arbitrators on any matter, whatsoever, relevant to dispute referred to arbitration.</p> <p>21.6.7 Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties, the Engineer and the DB shall not be altered by reason of any arbitration being conducted during the progress of the Works.</p>
--	--

Appendix- General Conditions of Dispute Avoidance/Adjudication Agreement

Title “General Conditions of Dispute Avoidance/Adjudication Agreement” is replaced with “General Conditions of DAAB Agreement”.

1. Definitions

Sub-Clause 1.2: In both the first and third lines, “DAA Agreement” is replaced with “DAAB Agreement”.

Sub-Clause 1.3:

-In the first line, “Dispute Avoidance/Adjudication Agreement” or “DAA Agreement” means” is replaced with: “DAAB Agreement” is as defined under the Contract and is”.

- In the first line of sub-paragraph (c), “DAA Agreement” is replaced with “DAAB Agreement”.

- In sub-paragraph (c)(ii), “chairman” is replaced with “chairperson”.

Sub-Clause 1.3 “DAAB Activities” is replaced with Sub-Clause 1.4 “DAAB Activities” and the subsequent Sub-Clauses under Clause 1 “Definitions” renumbered:

Sub-Clause 1.7 to 12: Replace all instances of “DAA Agreement” with “DAAB Agreement”.

In Sub-Clause 1.8 a(i):” authorised representative of the contractor or of the Employer” is replaced with: “Contractor’s Representative or authorised representative of the Employer”.

3. Warranties

Sub-Clause 3.3 is deleted and replaced with the following:

“When appointing the DAAB Member, each Party relies on the DAAB Member’s representations, that he/she;

- a) has at least a bachelor’s degree in relevant disciplines such as law, engineering, construction management or contract management;
- b) has at least ten years of experience in contract administration/management and dispute resolution, out of which at least five years of experience as an

arbitrator or adjudicator in construction-related disputes;

- c) has received formal training as an adjudicator from an internationally recognized organization;
- d) has experience and/or is knowledgeable in the type of work which the Contractor is to carry out under the Contract;
- e) has experience in the interpretation of construction and/or engineering contract documents;
- f) has familiarity with the forms of contract published by FIDIC since 1999, and an understanding of the dispute resolution procedures contained therein; and
- g) is fluent in the language for communications stated in the Contract Data (or the language as agreed between the Parties and the DAAB).”

7. Confidentiality

In Sub-Clause 7.3: “or” is deleted after sub-paragraph (b), and the following added:

“or (d) is being provided to the Bank.”

9. Fees and Expenses

In Sub-Clause 9.1 (c): “business class or equivalent” is replaced with: “in less than first class”.

In Sub-Clause 9.4: “and air fares” and “other” are deleted from the first and second sentences respectively.

10. Resignation and Termination

In Sub-Clause 10.3: “the DAA Agreement” is replaced with: “a DAAB member’s DAAB Agreement”.

Annex- DAAB Procedural Rules

Rule 4.2 On the fourth line, “chairman” is replaced with “chairperson”.

Rule 8.3 On the sixth line, “chairman” is replaced with “chairperson”.

Form of Dispute Avoidance/Adjudication Agreement

All instances of “DAA Agreement” are replaced with: “DAAB Agreement”.

In C (b): “chairman” is replaced with “chairperson”.

Particular Conditions of Contract (PCC)

Part C – Prohibited Practices

1. The Bank requires that the Recipient (and all other beneficiaries of the Bank financing), as well as tenderers, suppliers, contractors, concessionaires and consultants under Bank-financed contracts for the Project, observe the highest standard of transparency and integrity during the procurement, execution and implementation of such contracts.
2. Definitions. In pursuance of this policy, the Bank defines the terms set forth below as Prohibited Practices:
 - (a) “**coercive practice**” means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of a party to influence improperly the actions of a party;
 - (b) “**collusive practice**” means an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - (c) “**corrupt practice**” means the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
 - (d) “**fraudulent practice**” means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation.
 - (e) “**misuse of resources**” means improper use of the Bank’s resources, carried out either intentionally or through reckless disregard;
 - (f) “**obstructive practice**” means any of the following practices: (i) deliberately destroying, falsifying, altering or concealing of evidence material to a Bank investigation; (ii) making false statements to investigators in order to materially impede a Bank investigation into allegations of a Prohibited Practice; (iii) failing to comply with requests to provide information, documents or records in connection with a Bank investigation; (iv) threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to a Bank investigation or from pursuing the investigation; or (v) materially impeding the exercise of the Bank’s contractual rights of audit or inspection or access to information; and
 - (g) “**theft**” means the misappropriation of property belonging to another party.
3. Any occurrence, or suspected occurrence, of a Prohibited Practice in the procurement, award, or implementation of a Bank-financed contract is dealt with in accordance with the provisions of the Bank’s Policy on Prohibited Practices. Suppliers, contractors, service providers and consultants selected pursuant to the provisions of Section II and concessionaires selected pursuant to paragraph 14.3 of the Bank’s Procurement Instructions for Recipients, as well as the Recipient shall fully cooperate with the Bank (or a cofinancier undertaking an investigation

pursuant to paragraph 6.1 of the Bank's Procurement Instructions for Recipients) in any investigation into an alleged Prohibited Practice to be carried out pursuant to the Policy on Prohibited Practices, and permit the Bank or its representative (including such co-financier) to inspect such of their accounts and records as may be relevant for such investigation and to have such records and accounts audited by the auditors appointed by the Bank.

4. Provisions to this effect are included in the Legal Agreements and the procurement contracts with such entities.
5. If the Project is financed by a sovereign-backed loan, the Bank (or, where relevant, a co-financier having undertaken an investigation pursuant to paragraph 6.1 of the Bank's Procurement Instructions for Recipients):
 - (a) may take any of the following additional actions in connection with a Prohibited Practice under the Project:
 - (i) reject a proposal for award if it determines that the tenderer recommended for award, or any of its personnel, or its agents, or its sub-consultants, subcontractors, service providers, suppliers or their employees, has, directly or indirectly, engaged in a prohibited practice in competing for the contract in question; and
 - (ii) cancel the undisbursed portion of the loan allocated to a contract (and require reimbursement of the disbursed portion of the loan allocated to the contract) if it determines at any time that representatives of the Recipient or of a recipient of any part of the proceeds of the loan engaged in a prohibited practice during the procurement, administration or implementation of the contract in question; and
 - (b) requires that a clause be included in tender documents and in contracts financed by the Bank loan, requiring tenderers, suppliers and contractors, and their subcontractors, agents, personnel, consultants, service providers, or suppliers, to permit the Bank (and a co-financier undertaking an investigation pursuant to paragraph 6.1 of the Bank's Procurement Instructions for Recipients) to inspect all accounts, records, and other documents relating to the submission of tenders and contract performance, and to have them audited by auditors appointed by the Bank.

Section X - Contract Forms

Table of Forms

Notification of Intention to Award	64
Beneficial Ownership Disclosure Form	68
Letter of Acceptance	70
Contract Agreement	71
Performance Security	73
Advance Payment Security	75
Retention Money Security	77

Notification of Intention to Award

[This Notification of Intention to Award shall be sent to each Tenderer that submitted a Tender.]

[Send this Notification to the Tenderer’s Authorized Representative named in the Tenderer Information Form]

For the attention of Tenderer’s Authorized Representative

Name: *[insert Authorized Representative’s name]*

Address: *[insert Authorized Representative’s Address]*

Telephone/Fax numbers: *[insert Authorized Representative’s telephone/fax numbers]*

Email Address: *[insert Authorized Representative’s email address]*

[IMPORTANT: insert below the date that this Notification is transmitted to Tenderers. The Notification must be sent to all Tenderers simultaneously. This means on the same date and as close to the same time as possible.]

DATE OF TRANSMISSION: This Notification is sent by: *[email/fax]* on *[date]* (local time)

Notification of Intention to Award

Employer: *[insert the name of the Employer]*

Project: *[insert name of project]*

Country: *[insert country where Tender is issued]*

Loan No.: *[insert reference number for loan]*

Tender No.: *[insert Tender reference number from Procurement Plan]*

Contract Title: *[insert the name of the contract]*

This Notification of Intention to Award (Notification) notifies you of our decision to award the above contract. The transmission of this Notification begins the Standstill Period. During the Standstill Period you may:

- a) request a debriefing in relation to the evaluation of your Tender, and/or
- b) submit a Procurement-related Complaint in relation to the decision to award the contract.

1. The successful Tenderer

Name:	<i>[insert name of successful Tenderer]</i>
Address:	<i>[insert address of the successful Tenderer]</i>
Contract Price:	<i>[insert contract price of the successful Tender]</i>

2. List of all Tenderers **[INSTRUCTIONS: insert names of all Tenderers that submitted a Tender including the successful Tenderer, together with the corresponding Tender price**

as read out at tender opening and the evaluated Tender price (when rated criteria are not used).]

Name of Tenderer	Tender Price	Evaluated Tender Price (if applicable)
[insert name]	[insert Tender price]	[insert evaluated price]
[insert name]	[insert Tender price]	[insert evaluated price]
[insert name]	[insert Tender price]	[insert evaluated price]
[insert name]	[insert Tender price]	[insert evaluated price]
[insert name]	[insert Tender price]	[insert evaluated price]

Or

List of all Tenderers [*INSTRUCTIONS: insert names of all Tenderers that submitted a Tender including the successful Tenderer, together with the corresponding Tender price as read out at tender opening and the evaluated Tender price, respective technical and financial scores, combined technical and financial score (when rated criteria are used).]*

Name of Tenderer	Tender Price	Evaluated Tender Price	Technical Score	Financial Score	Combined Score
[insert name]	[insert Tender price]	[insert evaluated price]			
[insert name]	[insert Tender price]	[insert evaluated price]			
[insert name]	[insert Tender price]	[insert evaluated price]			
[insert name]	[insert Tender price]	[insert evaluated price]			
[insert name]	[insert Tender price]	[insert evaluated price]			

3. Reason/s why your Tender was unsuccessful

[INSTRUCTIONS: State the reason/s why this Tenderer's Tender was unsuccessful. Do NOT include: (a) a point by point comparison with another Tenderer's Tender, or (b) information that is marked confidential by the Tenderer in its Tender.]

4. How to request a debriefing

DEADLINE: The deadline to request a debriefing expires at midnight on [insert date] (local time).

You may request a debriefing in relation to the results of the evaluation of your Tender. If you decide to request a debriefing your written request must be made within three (3) Business Days of receipt of this Notification of Intention to Award.

Provide the contract name, reference number, name of the Tenderer, contact details; and address the request for debriefing as follows:

Attention: [insert full name of person, if applicable]

Title/position: [insert title/position]

Agency: [insert name of Employer]

Email address: [insert email address]

Fax number: [insert fax number] *delete if not used*

If your request for a debriefing is received within the 3 Business Days deadline, we will provide the debriefing within five (5) Business Days of receipt of your request. If we are unable to provide the debriefing within this period, the Standstill Period shall be extended by five (5) Business Days after the date that the debriefing is provided. If this happens, we will notify you and confirm the date that the extended Standstill Period will end.

The debriefing may be in writing, by phone, video conference call or in person. We shall promptly advise you in writing how the debriefing will take place and confirm the date and time.

If the deadline to request a debriefing has expired, you may still request a debriefing. In this case, we will provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of the Contract Award Notice.

5. How to make a complaint

Period: Procurement-related Complaint challenging the decision to award shall be submitted by midnight, [insert date] (local time).

Provide the contract name, reference number, name of the Tenderer, contact details; and address the Procurement-related Complaint as follows:

Attention: [insert full name of person, if applicable]

Title/position: [insert title/position]

Agency: [insert name of Employer]

Email address: [insert email address]

Fax number: [insert fax number] *delete if not used*

At this point in the procurement process, you may submit a Procurement-related Complaint challenging the decision to award the contract. You do not need to have requested, or received, a debriefing before making this complaint. Your complaint must be submitted within the Standstill Period and received by us before the Standstill Period ends.

For more information see the [Procurement Instructions for Recipients](#) (Annex IV, Complaint Monitoring).

6. Standstill Period

DEADLINE: The Standstill Period is due to end at midnight on [*insert date*] (local time).

The Standstill Period lasts ten (10) Business Days after the date of transmission of this Notification of Intention to Award.

The Standstill Period may be extended as stated in Section 4 above.

If you have any questions regarding this Notification, please do not hesitate to contact us.

For and on behalf of the Employer:

Signature: _____

Name: _____

Title/Position: _____

Telephone: _____

Email: _____

Beneficial Ownership Disclosure Form

INSTRUCTIONS TO TENDERERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE FORM

This Beneficial Ownership Disclosure Form (“Form”) is to be completed by the successful Tenderer. In case of joint venture, the Tenderer must submit a separate Form for each member. The beneficial ownership information to be submitted in this Form shall be current as of the date of its submission.

For the purposes of this Form, a Beneficial Owner of a Tenderer is any natural person who ultimately owns or controls the Tenderer by meeting one or more of the following conditions:

- *directly or indirectly holding 25% or more of the shares*
- *directly or indirectly holding 25% or more of the voting rights*
- *directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Tenderer*

Tender No.: *[insert number of Tender process]*

To: **Haryana Rail Infrastructure Development Corporation Limited**

In response to your request in the Letter of Acceptance dated *[insert date of letter of Acceptance]* to furnish additional information on beneficial ownership: *[select one option as applicable and delete the options that are not applicable]*

(i) we hereby provide the following beneficial ownership information.

Details of beneficial ownership

Identity of Beneficial Owner	Directly or indirectly holding 25% or more of the shares (Yes / No)	Directly or indirectly holding 25 % or more of the Voting Rights (Yes / No)	Directly or indirectly having the right to appoint a majority of the board of the directors or an equivalent governing body of the Tenderer (Yes / No)
<i>[include full name (last, middle, first), nationality, country of residence]</i>			

OR

(ii) *We declare that there is no Beneficial Owner meeting one or more of the following conditions:*

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Tenderer

OR

(iii) *We declare that we are unable to identify any Beneficial Owner meeting one or more of the following conditions. [If this option is selected, the Tenderer shall provide explanation on why it is unable to identify any Beneficial Owner]*

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Tenderer”

Name of the Tenderer: **[insert complete name of the Tenderer]* _____

Name of the person duly authorized to sign the Tender on behalf of the Tenderer: ***[insert complete name of person duly authorized to sign the Tender]* _____

Title of the person signing the Tender: *[insert complete title of the person signing the Tender]*

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

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

* In the case of the Tender submitted by a Joint Venture specify the name of the Joint Venture as Tenderer. In the event that the Tenderer is a joint venture, each reference to “Tenderer” in the Beneficial Ownership Disclosure Form (including this Introduction thereto) shall be read to refer to the joint venture member.

** Person signing the Tender shall have the power of attorney given by the Tenderer. The power of attorney shall be attached with the Tender Schedules.

Letter of Acceptance

[letterhead paper of the Employer]

[date]

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

This is to notify you that your Tender dated *[date]* for execution of the “**C-1: Priority Section - Construction of Earthwork, Bridges, Station Buildings, Retaining Walls** and other miscellaneous Works in connection with laying of New BG Double Railway Line of HORC project from Km 49.7 to Km 55.6 and its connectivity (new BG single line) from proposed **Manesar Station** of HORC to existing **Patli Railway Station** of IR Network” for the Accepted Contract Amount *[amount in numbers and words]* *[name of currency]*, as corrected and modified in accordance with the Instructions to Tenderers, is hereby accepted by our Agency.

You are requested to furnish (i) the Performance Security within 28 days in accordance with the Conditions of Contract, using, for that purpose, the Performance Security Form; and (ii) the additional information on beneficial ownership in accordance with TDS ITT 48.1, within eight (8) Business days using the Beneficial Ownership Disclosure Form, included in Section X, Contract Forms, of the Tender Document.

Authorized Signature: _____

Name and Title of Signatory: _____

Name of Agency: _____

Attachment: Contract Agreement

Contract Agreement

THIS AGREEMENT made the _____ day of _____, _____, between _____ of _____ [insert complete name of Employer and full business address] (hereinafter “the Employer”), of the one part, and _____ of _____ [insert complete name and nationality of Contractor as well as full business address] (hereinafter “the Contractor”), of the other part:

WHEREAS the Employer invited tenders for the execution of the Works, described as “C-1: Priority Section - Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works in connection with laying of New BG Double Railway Line of HORE project from Km 49.7 to Km 55.6 and its connectivity (new BG single line) from proposed Manesar Station of HORE to existing Patli Railway Station of IR Network”, and has accepted a Tender by the Contractor for the execution and completion of these Works and the remedying of any defects therein.

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. 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.
 - (a) the Letter of Acceptance;
 - (b) the Letter of Tender;
 - (c) the addenda Nos _____ (if any);
 - (d) the Particular Conditions of Contract;
 - (e) the General Conditions of Contract;
 - (f) the Specification;
 - (g) the Drawings; and
 - (h) the completed Schedules and any other documents forming part of the contract, including, but not limited to:
 - i. the ESHS Management Strategies and Implementation Plans; and
 - ii. Code of Conduct (ESH).

3. 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.

4. 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 _____ *[insert the name of the Contract governing law country]* on the day, month and year specified above.

For and on behalf of the Employer

Signed: *[insert signature]*
in the capacity of *[insert title or other appropriate designation]*
In the presence of *[insert identification of official witness]*

For and on behalf of the Contractor

Signed: *[insert signature of authorized representative(s) of the Contractor]*
in the capacity of *[insert title or other appropriate designation]*
in the presence of *[insert identification of official witness]*

Performance Security

Demand Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: Chief Project Manager,
Haryana Rail Infrastructure Development Corporation Limited,
Plot No 143, 5th Floor, Railtel Tower,
Sector-44, Gurugram,
Haryana-122003

Date: _____ *[Insert date of issue]*

PERFORMANCE GUARANTEE No.: _____

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

We have been informed that _____ (hereinafter called "the Applicant") has entered into Contract No. _____ dated _____ with the Beneficiary, for the execution of "C-1: Priority Section - Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous works in connection with laying of New BG Double Railway line of HORC Project from Km 49.7 to Km 55.6 and its connectivity (new BG single line) from proposed Manesar Station of HORC to existing Patli Railway Station of IR Network" (hereinafter called "the Contract" (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, hereby irrevocably 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 complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

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.

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)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

² *Insert the date twenty-eight days after the expected completion date as described in GC Clause 11.9. 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.”*

Advance Payment Security

Demand Guarantee

[Guarantor letterhead or SWIFT identifier code]

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: Chief Project Manager,
Haryana Rail Infrastructure Development Corporation Limited,
Plot No 143, 5th Floor, Railtel Tower,
Sector-44, Gurugram,
Haryana-122003

Date: _____ *[Insert date of issue]*

ADVANCE PAYMENT GUARANTEE No.: _____ *[Insert guarantee reference number]*

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

We have been informed that _____ (hereinafter called “the Applicant”) has entered into Contract No. _____ dated _____ with the Beneficiary, for the execution of “C-1: Priority Section - Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works in connection with laying of New BG Double Railway Line of HARC project from Km 49.7 to Km 55.6 and its connectivity (new BG single line) from proposed Manesar Station of HARC to existing Patli Railway Station of IR Network’ (hereinafter called “the Contract”). (hereinafter called “the Contract” (hereinafter called “the Contract”).

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum _____ () is to be made against an advance payment guarantee.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ ()¹ upon receipt by us of the Beneficiary’s complying demand supported by the Beneficiary’s statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

¹ *The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.*

- (a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or
- (b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number _____ at _____..

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that ninety (90) percent of the Accepted Contract Amount, less provisional sums, has been certified for payment, or on the ___ day of ____, 2___,² whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

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

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

² *Insert the expected expiration date of the Time for Completion. The Employer should note that in the event of an extension of the time 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."*

Retention Money Security

Demand Guarantee

_____ [*Guarantor letterhead or SWIFT identifier code*]

Beneficiary: Chief Project Manager,
Haryana Rail Infrastructure Development Corporation Limited,
Plot No 143, 5th Floor, Railtel Tower,
Sector-44, Gurugram,
Haryana-122003

Date: _____ [*Insert date of issue*]

RETENTION MONEY GUARANTEE No.: _____ [*Insert guarantee reference number*]

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

We have been informed that _____ [*insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture*] (hereinafter called "the Applicant") has entered into Contract No. _____ [*insert reference number of the contract*] dated _____ with the Beneficiary, for the execution of "C-1: Priority Section - Construction of Earthwork, Bridges, Station Buildings, Retaining Walls and other miscellaneous Works in connection with laying of New BG Double Railway Line of HORC project from Km 49.7 to Km 55.6 and its connectivity (new BG single line) from proposed Manesar Station of HORC to existing Patli Railway Station of IR Network" (hereinafter called "the Contract" (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, the Beneficiary retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when the Taking-Over Certificate has been issued under the Contract and the first half of the Retention Money has been certified for payment, payment of [*insert the second half of the Retention Money or if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money*], the difference between half of the Retention Money and the amount guaranteed under the Performance Security is to be made against a Retention Money 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 _____ [*insert amount in*

figures)(*amount in words*)¹ upon receipt by us of the Beneficiary’s complying demand supported by the Beneficiary’s statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary’s bank stating that the second half of the Retention Money as referred to above has been credited to the Applicant on its account number _____ at _____ *[insert name and address of Applicant’s bank]*.

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 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, except that the supporting statement under Article 15(a) is hereby excluded.

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

¹ *The Guarantor shall insert an amount representing the amount of the second half of the Retention Money or if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money, the difference between half of the Retention Money and the amount guaranteed under the Performance Security and denominated either in the currency(ies) of the second half of the Retention Money as specified in the Contract, or in a freely convertible currency acceptable to the Beneficiary.*

² *Insert the same expiry date as set forth in the performance security, representing the date twenty-eight days after the completion date described in GCC Clause 11.9. 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.”*