

Bidding Document for Procurement of Works

Single-Stage: Two-Envelope Bidding Procedure

**Government of Odisha
Skill Development and Technical Education
Department
(ADB Loan No.3539)**

**PKG-0092: Engineering, Procurement and
Construction of Precision Engineering Building and
Facilities for Precision Engineering Complex at
Bhubaneswar (Odisha) India**

Issued on: 5 May 2022

Invitation for Bids No: OSDA/WSC/Works/M6(I)-2022

ICB No.: Package 0092

Employer: Odisha Skill Development Authority, Government of Odisha

Country: India

Preface

This Bidding Document for the Procurement of Works has been prepared by Odisha Skills Development Authority and is based on the Standard Bidding Document for the Procurement of Works (*SBD Works*) issued by the Asian Development Bank dated December 2016.

ADB's *SBD Works* has the structure and the provisions of the Master Procurement Document entitled "Bidding Documents for the Procurement of Works", prepared by multilateral development banks and other public international financial institutions, except where ADB-specific considerations have required a change.

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Section 1 - Instructions to Bidders

This Section specifies the procedures to be followed by Bidders in the preparation and submission of their Bids. Information is also provided on the submission, opening, evaluation of bids, and on the award of contract.

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Section 1 - Instructions to Bidders

A. General

- 1. Scope of Bid**

 - 1.1 In connection with the Invitation for Bids (IFB) indicated in the Bid Data Sheet (BDS), the Employer, as indicated in the BDS, issues this Bidding Document for the procurement of Works as specified in Section 6 (Employer's Requirements). The name, identification, and number of contracts of the international competitive bidding (ICB) are provided in the BDS.
 - 1.2 Throughout this Bidding Document,

 - (a) the term "in writing" means communicated in written form and delivered against receipt;
 - (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and
 - (c) "day" means calendar day.
- 2. Source of Funds**

 - 2.1 The Borrower or Recipient (hereinafter called "Borrower") indicated in the BDS has applied for or received financing (hereinafter called "funds") from the Asian Development Bank (hereinafter called "ADB") toward the cost of the project named in the BDS. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.
 - 2.2 Payments by the ADB will be made only at the request of the Borrower and upon approval by ADB in accordance with the terms and conditions of the Financing Agreement between the Borrower and ADB (hereinafter called "Financing Agreement"), and will be subject in all respects to the terms and conditions of that Financing Agreement. No party other than the Borrower shall derive any rights from the Financing Agreement or have any claim to the funds.
- 3. Fraud and Corruption**

 - 3.1 ADB's Anticorruption Policy requires Borrowers (including beneficiaries of ADB-financed activity), as well as Bidders, Suppliers, and Contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, ADB

 - (a) defines, for the purposes of this provision, the terms set forth below as follows:

 - (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;
 - (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

- (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;
 - (v) "obstructive practice" means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an ADB investigation; (b) making false statements to investigators in order to materially impede an ADB investigation; (c) failing to comply with requests to provide information, documents, or records in connection with an Office of Anticorruption and Integrity (OAI) investigation; (d) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (e) materially impeding ADB's contractual rights of audit or access to information; and
 - (vi) "integrity violation" is any act which violates ADB's Anticorruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standard.
- (b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;
 - (c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of ADB-financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation;
 - (d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines (both as amended from time to time), including declaring ineligible, either indefinitely or for a stated period of time, to participate¹ in ADB-financed, -administered, or -supported activities or to benefit from an ADB-financed, -administered, or -supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations; and

¹ Whether as a Contractor, Nominated Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document). A Nominated Subcontractor is one that either has been (i) included by the Bidder in its prequalification application or bid because it brings specific and critical experience and know-how that are accounted for in the evaluation of the bidder's prequalification application or the bid; or (ii) appointed by the Employer.

- (e) will have the right to require that a provision be included in bidding documents and in contracts financed by ADB, requiring Bidders, suppliers and contractors to permit ADB or its representative to inspect their accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by ADB.

3.2 Furthermore, Bidders shall be aware of the provision stated in Subclause 1.15 and 15.6 of the Conditions of Contract.

4. Eligible Bidders

4.1 A Bidder may be a natural person, private entity, or government-owned enterprise subject to ITB 4.5—or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture. In the case of a Joint Venture,

- (a) all partners shall be jointly and severally liable; and
- (b) the Joint Venture shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the Joint Venture during the bidding process and, in the event the Joint Venture is awarded the Contract, during contract execution.

4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of an eligible country, in accordance with Section 5 (Eligible Countries). A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.

4.3 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in the bidding process if any of, including but not limited to, the following apply:

- (a) they have controlling shareholders in common; or
- (b) they receive or have received any direct or indirect subsidy from any of them; or
- (c) they have the same legal representative for purposes of this bid; or
- (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to material information about or improperly influence the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
- (e) a Bidder participates in more than one bid in this bidding process, either individually or as a partner in a joint venture, except for alternative offers permitted under ITB 13 of the Bidding Document. This will result in the disqualification of all Bids in which it is involved. However, subject to any finding of a conflict of interest in terms of ITB 4.3(a)-(d) above, this does not limit the participation

of a Bidder as a Subcontractor in another Bid or of a firm as a Subcontractor in more than one Bid; or

- (f) a Bidder or any affiliated entity, participated as a Consultant in the preparation of the design or technical specifications of the works that are the subject of the Bid; or
- (g) a Bidder was affiliated with a firm or entity that has been hired (or is proposed to be hired) by the Employer or Borrower as Engineer for the contract.

4.4 A firm shall not be eligible to participate in any procurement activities under an ADB-financed, -administered, or -supported project while under temporary suspension or debarment by ADB pursuant to its Anticorruption Policy (see ITB 3), whether such debarment was directly imposed by ADB, or enforced by ADB pursuant to the Agreement for Mutual Enforcement of Debarment Decisions. A bid from a temporary suspended or debarred firm will be rejected.

4.5 Government-owned enterprises in the Employer's country shall be eligible only if they can establish that they (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) are not a dependent agency of the Employer.

4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

4.7 Firms shall be excluded if by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country or any payments to persons or entities in that country.

4.8 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.

5. Eligible Materials, Equipment and Services

5.1 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries as defined in ITB 4.2 above and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment, and services.

5.2 For purposes of ITB 5.1 above, "origin" means the place where the materials and equipment are mined, grown, produced, or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.

B. Contents of Bidding Document

- 6. Sections of Bidding Document**
- 6.1 The Bidding Document consist of Parts I, II, and III, which include all the sections indicated below, and should be read in conjunction with any addenda issued in accordance with ITB 8.
- PART I Bidding Procedures**
- Section 1 - Instructions to Bidders (ITB)
 - Section 2 - Bid Data Sheet (BDS)
 - Section 3 - Evaluation and Qualification Criteria (EQC)
 - Section 4 - Bidding Forms (BDF)
 - Section 5 - Eligible Countries (ELC)
- PART II Requirements**
- Section 6 - Employer's Requirements (ERQ)
- PART III Conditions of Contract and Contract Forms**
- Section 7 - General Conditions of Contract (GCC)
 - Section 8 - Particular Conditions of Contract (PCC)
 - Section 9 - Contract Forms (COF)
- 6.2 The IFB issued by the Employer is not part of the Bidding Document.
- 6.3 The Employer is not responsible for the completeness of the Bidding Document and their addenda, if they were not obtained directly from the source stated by the Employer in the IFB.
- 6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the bid.
- 7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting**
- 7.1 A prospective Bidder requiring any clarification on the Bidding Document shall contact the Employer in writing at the Employer's address indicated in the BDS or raise his inquiries during the pre-bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received no later than 21 days prior to the deadline for submission of bids. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ITB 8 and ITB 22.2.
- 7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
- 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the

Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.

- 7.4 The Bidder's designated representative is invited to attend a pre-bid meeting, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than 1 week before the meeting.
- 7.6 Minutes of the pre-bid meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting.
- 7.7 Nonattendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.

8. Amendment of Bidding Document

- 8.1 At any time prior to the deadline for submission of Bids, the Employer may amend the Bidding Document by issuing addenda.
- 8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Employer in accordance with ITB 6.3.
- 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 22.2

C. Preparation of Bids

9. Cost of Bidding

- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

10. Language of Bid

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

**11. Documents
Comprising the
Bid**

11.1 The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Bid containing the documents listed in ITB 11.2 and the other the Price Bid containing the documents listed in ITB 11.3, both envelopes enclosed together in an outer single envelope.

11.2 The Technical Bid shall comprise the following:

- (a) Letter of Technical Bid;
- (b) Bid Security or Bid-Securing Declaration, in accordance with ITB 19;
- (c) alternative Bids, if permissible, in accordance with ITB 13;
- (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2;
- (e) documentary evidence in accordance with ITB 17, establishing the Bidder's qualifications to perform the contract;
- (f) Technical Proposal in accordance with ITB 16;
- (g) Any other document required in the BDS.

11.3 The Price Bid shall comprise the following:

- (a) Letter of Price Bid;
- (b) completed Price Schedules, in accordance with ITB 12 and ITB 14;
- (c) alternative price Bids, at Bidder's option and if permissible, in accordance with ITB 13;
- (d) Any other document required in the BDS.

11.4 In addition to the requirements under ITB 11.2, Bids submitted by a Joint Venture shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful Bid shall be signed by all partners and submitted with the Bid, together with a copy of the proposed agreement.

**12. Letters of Bid and
Schedules**

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

13. Alternative Bids

13.1 Unless otherwise indicated in the BDS, alternative Bids shall not be considered.

13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the BDS, as will the method of evaluating different times for completion.

13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements of the Bidding Document must first price the Employer's design as described in the Bidding 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 lowest evaluated Bidder conforming to the basic technical requirements shall be considered by the Employer.

13.4 When specified in the BDS, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified in the BDS and described in Section 6 (Employer's Requirements). The method for their evaluation will be stipulated in Section 3 (Evaluation and Qualification Criteria).

14. Bid Prices and Discounts

14.1 The prices and discounts quoted by the Bidder in the Letter of Price Bid and in the Bill of Quantities shall conform to the requirements specified below.

14.2 The Bidder 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 Bidder will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.

14.3 The price to be quoted in the Letter of Price Bid, in accordance with ITB 12.1, shall be the total price of the Bid, excluding any discounts offered. . Absence of the total bid price in the Letter of Price Bid may result in the rejection of the Bid.

14.4 The Bidder shall quote any discounts and the methodology for their application in the Letter of Price Bid, in accordance with ITB 12.1.

14.5 Unless otherwise provided in the BDS and the Contract, the rates and prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract. In such a case, the Bidder shall furnish the indexes and weightings for the price adjustment formulas in the Tables of Adjustment Data included in Section 4 (Bidding Forms) and the Employer may require the Bidder to justify its proposed indexes and weightings.

14.6 If so indicated in ITB 1.1, bids are being invited for individual contracts or for any combination of contracts (packages). Bidders wishing to offer any price reduction for the award of more than one Contract shall specify in their bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or discounts shall be submitted in accordance with ITB 14.4, provided the Bids for all contracts are submitted and opened at the same time.

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 bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.

15. Currencies of Bid and Payment

- 15.1 The unit rates and the prices shall be quoted by the Bidder entirely in the currency specified in the BDS.
- 15.2 Bidders shall indicate the portion of the bid price that corresponds to expenditures incurred in the currency of the Employer's country in the Schedule of Payment Currencies included in Section 4 (Bidding Forms).
- 15.3 Bidders expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country and wishing to be paid accordingly may indicate up to three foreign currencies in the Schedule of Payment Currencies included in Section 4 (Bidding Forms).
- 15.4 The rates of exchange to be used by the Bidder for currency conversion during bid preparation shall be the selling rates for similar transactions prevailing on the date 28 days prior to the deadline for submission of bids published by the source specified in the BDS. If exchange rates are not so published for certain currencies, the Bidder shall state the rates used and the source. Bidders should note that for the purpose of payments, the exchange rates confirmed by the source specified in the BDS as the selling rates prevailing 28 days prior to the deadline for submission of Bids shall apply for the duration of the Contract so that no currency exchange risk is borne by the Bidder.
- 15.5 Foreign currency requirements indicated by the Bidders in the Schedule of Payment Currencies shall include but not limited to the specific requirements for
- (a) expatriate staff and labor employed directly on the Works;
 - (b) social, insurance, medical and other charges relating to such expatriate staff and labor, and foreign travel expenses;
 - (c) imported materials, both temporary and permanent, including fuels, oil and lubricants required for the Works;
 - (d) depreciation and usage of imported Plant and Contractor's Equipment, including spare parts, required for the Works;
 - (e) foreign insurance and freight charges for imported materials, Plant and Contractor's Equipment, including spare parts; and
 - (f) overhead expenses, fees, profit, and financial charges arising outside the Employer's country in connection with the Works.
- 15.6 Bidders may be required by the Employer to clarify their foreign currency requirements, and to substantiate that the amounts included in the unit rates and prices and shown in the Schedule of Payment Currencies are reasonable and responsive to ITB 15.3 above, in which case a detailed breakdown of its foreign currency requirements shall be provided by the Bidder.
- 15.7 Bidders should note that during the progress of the Works, the foreign currency requirements of the outstanding balance of the Contract Price may be adjusted by agreement between the Employer and the Contractor in order to reflect any changes in foreign currency requirements for the Contract, in accordance with Subclause 14.15 of

the Conditions of Contract. Any such adjustment shall be effected by comparing the percentages quoted in the bid with the amounts already used in the Works and the Contractor's future needs for imported items.

- 16. Documents Comprising the Technical Proposal**
- 16.1 The Bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule, and any other information as stipulated in Section 4 (Bidding Forms), in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work requirements and the completion time.
- 17. Documents Establishing the Qualifications of the Bidder**
- 17.1 To establish its qualifications to perform the Contract in accordance with Section 3 (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding information sheets included in Section 4 (Bidding Forms).
- 17.2 Domestic Bidders, individually or in joint ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility as described in ITB 35.
- 18. Period of Validity of Bids**
- 18.1 Bids shall remain valid for the period specified in the BDS after the bid submission deadline date prescribed by the Employer. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive.
- 18.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ITB 19, it shall also be extended 28 days beyond the deadline of the extended validity period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its Bid.
- 19. Bid Security/Bid-Securing Declaration**
- 19.1 Unless otherwise specified in the BDS, the Bidder shall furnish as part of its Bid, in original form, either a Bid-Securing Declaration or a bid security as specified in the BDS. In the case of a bid security, the amount and currency shall be as specified in the BDS.
- 19.2 If a Bid-Securing Declaration is required pursuant to ITB 19.1, it shall use the form included in Section 4 (Bidding Forms). The Employer will declare a Bidder ineligible to be awarded a Contract for a specified period of time, as indicated in the BDS, if the Bid-Securing Declaration is executed.
- 19.3 If a bid security is specified pursuant to ITB 19.1, the bid security shall be, at the Bidder's option, in any of the following forms:
- (a) an unconditional bank guarantee,
 - (b) an irrevocable letter of credit, or
 - (c) a cashier's or certified check,
- all from a reputable source from an eligible country as described in Section 5 (Eligible Countries). In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included

in Section 4 (Bidding Forms) or another form acceptable to the Employer. The form must include the complete name of the Bidder. The bid security shall be valid for 28 days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 18.2.

- 19.4 Unless otherwise specified in the BDS, any Bid not accompanied by a substantially compliant bid security or Bid-Securing Declaration, if one is required in accordance with ITB 19.1, shall be rejected by the Employer as nonresponsive.
- 19.5 If a bid security is specified pursuant to ITB 19.1, the bid security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's furnishing of the performance security pursuant to ITB 42.
- 19.6 If a bid security is specified pursuant to ITB 19.1, the bid security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required performance security.
- 19.7 The bid security may be forfeited or the Bid Securing Declaration executed,
- (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid, except as provided in ITB 18.2; or
 - (b) if the successful Bidder fails to
 - (i) sign the Contract in accordance with ITB 41;
 - (ii) furnish a performance security in accordance with ITB 42;
 - (iii) accept the arithmetical correction of its Bid in accordance with ITB 33; or
 - (iv) furnish a domestic preference security, if so required.
- 19.8 The Bid Security or Bid Securing Declaration of a Joint Venture shall be in the name of the Joint Venture that submits the Bid. If the Joint Venture has not been legally constituted at the time of bidding, the bid security or Bid-Securing Declaration shall be in the names of all future partners as named in the letter of intent mentioned in ITB 4.1.

20. Format and Signing of Bid

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

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

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

D. Submission and Opening of Bids

21. Sealing and Marking of Bids

- 21.1 Bidders may always submit their Bids by mail or by hand. When so specified in the BDS, Bidders shall have the option of submitting their Bids electronically. Procedures for submission, sealing, and marking are as follows:
- (a) Bidders submitting Bids by mail or by hand shall enclose the original of the Technical Bid, the original of the Price Bid, and each copy of the Technical Bid and each copy of the Price Bid, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL - TECHNICAL BID," "ORIGINAL - PRICE BID," and "COPY NO... - TECHNICAL BID" and "COPY NO.... - PRICE BID." These envelopes, the first containing the originals and the others containing copies, shall then be enclosed in one single envelope per set. If permitted in accordance with ITB 13, alternative Bids shall be similarly sealed, marked and included in the sets. The rest of the procedure shall be in accordance with ITB 21.2 and ITB 21.5.
 - (b) Bidders submitting Bids electronically shall follow the electronic bid submission procedures specified in the BDS.
- 21.2 The inner and outer envelopes shall
- (a) bear the name and address of the Bidder;
 - (b) be addressed to the Employer in accordance with BDS 22.1; and
 - (c) bear the specific identification of this bidding process indicated in the BDS 1.1.
- 21.3 The outer envelopes and the inner envelopes containing the Technical Bid shall bear a warning not to open before the time and date for the opening of Technical Bid, in accordance with ITB 25.1.
- 21.4 The inner envelopes containing the Price Bid shall bear a warning not to open until advised by the Employer in accordance with ITB 25.7.
- 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 Bid.

22. Deadline for Submission of Bids

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

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

23. Late Bids

23.1 The Employer shall not consider any Bid that arrives after the deadline for submission of bids, in accordance with ITB 22. Any bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.

24. Withdrawal, Substitution, and Modification of Bids

24.1 A Bidder may withdraw, substitute, or modify its Bid – Technical or Price – after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 20.2, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be

(a) prepared and submitted in accordance with ITB 20 and ITB 21 (except that withdrawal notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” “MODIFICATION”; and

(b) received by the Employer no later than the deadline prescribed for submission of Bids, in accordance with ITB 22.

24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders.

24.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiration of the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid or any extension thereof.

25. Bid Opening

25.1 The Employer shall open the Technical Bids in public at the address, on the date and time specified in the BDS in the presence of Bidders’ designated representatives and anyone who chooses to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 21.1, shall be as specified in the BDS. The Price Bids will remain unopened and will be held in custody of the Employer until the specified time of their opening. If the Technical Bid and the Price Bid are submitted together in one envelope, the Employer may reject the entire Bid. Alternatively, the Price Bid may be immediately resealed for later evaluation.

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

- 25.3 Second, outer envelopes marked "SUBSTITUTION" shall be opened. The inner envelopes containing the Substitution Technical Bid and/or Substitution Price Bid shall be exchanged for the corresponding envelopes being substituted, which are to be returned to the Bidder unopened. Only the Substitution Technical Bid, if any, shall be opened, read out, and recorded. Substitution Price Bid will remain unopened in accordance with ITB 25.1. No envelope shall be substituted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.
- 25.4 Next, outer envelopes marked "MODIFICATION" shall be opened. No Technical Bid and/or Price Bid shall be modified unless the corresponding modification notice contains a valid authorization to request the modification and is read out and recorded at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Price Bids, both Original as well as Modification, will remain unopened in accordance with ITB 25.1.
- 25.5 All other envelopes holding the Technical Bids shall be opened one at a time, and the following read out and recorded:
- (a) the name of the Bidder;
 - (b) whether there is a modification or substitution;
 - (c) the presence of a bid security or Bid-Securing Declaration, if required; and
 - (d) any other details as the Employer may consider appropriate.
- Only Technical Bids and alternative Technical Bids read out and recorded at bid opening shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Technical Bid are to be initialed by at least three representatives of the Employer attending bid opening. No Bid shall be rejected at the opening of Technical Bids except for late bids, in accordance with ITB 23.1.
- 25.6 The Employer shall prepare a record of the opening of Technical Bids that shall include, as a minimum, the name of the Bidder and whether there is a withdrawal, substitution, or modification; alternative proposals; and the presence or absence of a bid security or Bid-Securing Declaration, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.
- 25.7 At the end of the evaluation of the Technical Bids, the Employer will invite bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids. The date, time, and location of the opening of Price Bids will be advised in writing by the Employer. Bidders shall be given reasonable notice of the opening of Price Bids.

- 25.8 The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially nonresponsive to the requirements of the Bidding Document and return their Price Bids unopened.
- 25.9 The Employer shall conduct the opening of Price Bids of all Bidders who submitted substantially responsive Technical Bids, in the presence of Bidders' representatives who choose to attend at the address, on the date, and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.
- 25.10 All envelopes containing Price Bids shall be opened one at a time and the following read out and recorded:
- (a) the name of the Bidder;
 - (b) whether there is a modification or substitution;
 - (c) the Bid Prices, including any discounts and alternative offers; and
 - (d) any other details as the Employer may consider appropriate.

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

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

E. Evaluation and Comparison of Bids

26. Confidentiality

- 26.1 Information relating to the examination, evaluation, comparison, and postqualification of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on the Contract award is communicated to all Bidders.
- 26.2 Any attempt by a Bidder to influence the Employer in the evaluation of the Bids or Contract award decisions may result in the rejection of its Bid.
- 26.3 Notwithstanding ITB 26.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it may do so in writing.

- 27. Clarification of Bids**
- 27.1 To assist in the examination, evaluation, and comparison of the Technical and Price Bids, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the substance of the Technical Bid or prices in the Price Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Price Bids, in accordance with ITB 33.
- 27.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its Bid may be rejected.
- 28. Deviations, Reservations, and Omissions**
- 28.1 During the evaluation of Bids, the following definitions apply:
- (a) "Deviation" is a departure from the requirements specified in the Bidding Document;
 - (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and
 - (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
- 29. Examination of Technical Bids**
- 29.1 The Employer shall examine the Technical Bid to confirm that all documents and technical documentation requested in ITB 11.2 have been provided, and to determine the completeness of each document submitted.
- 29.2 The Employer shall confirm that the following documents and information have been provided in the Technical Bid. If any of these documents or information is missing, the offer shall be rejected.
- (a) Letter of Technical Bid;
 - (b) written confirmation of authorization to commit the Bidder;
 - (c) Bid Security or Bid-Securing Declaration, if applicable; and
 - (d) Technical Proposal in accordance with ITB 16.
- 30. Responsiveness of Technical Bid**
- 30.1 The Employer's determination of a Bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB11.
- 30.2 A substantially responsive Technical Bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,
- (a) if accepted, would:
 - (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
 - (ii) limit in any substantial way, inconsistent with the Bidding Document, the Employer's rights or the Bidder's obligations under the proposed Contract; or

(b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

30.3 The Employer shall examine the technical aspects of the Bid submitted in accordance with ITB 16, Technical Proposal, in particular, to confirm that all requirements of Section 6 (Employer's Requirements) have been met without any material deviation, reservation, or reservation.

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

31. Nonmaterial Nonconformities

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

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

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

32. Qualification of the Bidder

32.1 The Employer shall determine to its satisfaction during the evaluation of Technical Bids whether Bidders meet the qualifying criteria specified in Section 3 (Evaluation and Qualification Criteria).

32.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17.1.

32.3 An affirmative determination shall be a prerequisite for the opening and evaluation of a Bidder's Price Bid. A negative determination shall result into the disqualification of the Bid, in which event the Employer shall return the unopened Price Bid to the Bidder.

33. Correction of Arithmetical Errors

33.1 During the evaluation of Price Bids, 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.
 - (c) If there is a discrepancy between the bid price in the Summary of Bill of Quantities and the bid amount in item (c) of the Letter of Price Bid, the bid price in the Summary of Bill of Quantities will prevail and the bid amount in item (c) of the Letter of Price Bid will be corrected.
 - (d) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a), (b) and (c) above.
- 33.2 If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its Bid shall be disqualified and its bid security may be forfeited or its Bid-Securing Declaration executed.
- 34. Conversion to Single Currency** 34.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted into a single currency as specified in the BDS.
- 35. Margin of Preference** 35.1 Unless otherwise specified in the BDS, a margin of preference shall not apply.
- 36. Evaluation of Price Bids** 36.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.
- 36.2 To evaluate the Price Bid, the Employer shall consider the following:
- (a) the bid price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities, but including Daywork items, where priced competitively;
 - (b) price adjustment for correction of arithmetic errors in accordance with ITB 33.1;
 - (c) price adjustment due to discounts offered in accordance with ITB 14.4;
 - (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 34;
 - (e) adjustment for nonconformities in accordance with ITB 31.3; and
 - (f) application of all the evaluation factors indicated in Section 3 (Evaluation and Qualification Criteria).
- 36.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
- 36.4 If this Bidding Document allows Bidders to quote separate prices for different contracts, and the award to a single Bidder of multiple contracts, the methodology to determine the lowest evaluated price of the contract combinations, including any discounts offered in the Letter of Price Bid, is specified in Section 3 (Evaluation and Qualification Criteria).

36.5 If the Bid, which results in the lowest Evaluated Bid Price, is seriously unbalanced or front loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

37. Comparison of Bids

37.1 The Employer shall compare all substantially responsive Bids to determine the lowest evaluated Bid, in accordance with ITB 36.2.

38. Employer's Right to Accept Any Bid, and to Reject Any or All Bids

38.1 The Employer reserves the right to accept or reject any Bid, and to annul the bidding process and reject all Bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all Bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

F. Award of Contract

39. Award Criteria

39.1 The Employer shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated Bid and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.

40. Notification of Award

40.1 Prior to the expiration of the period of bid validity, the Employer shall notify the successful Bidder, in writing, that its Bid has been accepted.

40.2 At the same time, the Employer shall also notify all other Bidders of the results of the bidding. The Employer will publish in an English language newspaper or well-known freely accessible website the results identifying the bid and lot numbers and the following information: (i) name of each Bidder who submitted a Bid; (ii) bid prices as read out at bid opening; (iii) name and evaluated prices of each Bid that was evaluated; (iv) name of bidders whose bids were rejected and the reasons for their rejection; and (v) name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded. After publication of the award, unsuccessful Bidders may request in writing to the Employer for a debriefing seeking explanations on the grounds on which their Bids were not selected. The Employer shall promptly respond in writing to any unsuccessful Bidder who, after publication of contract award, requests a debriefing.

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

41. Signing of Contract

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

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

42. Performance Security

- 42.1 Within 28 days of the receipt of notification of award from the Employer, the successful Bidder shall furnish the performance security in accordance with the conditions of contract, subject to ITB 36.5, using for that purpose the Performance Security Form included in Section 9 (Contract Forms), or another form acceptable to the Employer.
- 42.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security or execution of the Bid-Securing Declaration. In that event, the Employer may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily.
- 42.3 The above provision shall also apply to the furnishing of a domestic preference security if so required.

Section 2 - Bid Data Sheet

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

A. General

ITB 1.1	The number of the Invitation for Bids (IFB) is: OSDA/WSC/Works/M6(I)-2022
ITB 1.1	The Employer is: Odisha Skill Development Authority, Government of Odisha, Bhubaneswar.
ITB 1.1	The name of the international competitive bidding (ICB) is: Engineering, Procurement and Construction of Precision Engineering Campus and Facilities (PKG-0092) The identification number of the ICB is: PKG-0092 The number and identification of lots comprising this ICB is: Not Applicable
ITB 2.1	The Borrower is: India
ITB 2.1	The name of the Project is: Odisha Skill Development Project

B. Contents of Bidding Documents

ITB 7.1	For clarification purposes only, the Employer's address is: Attention: Chief Executive Officer, Odisha Skill Development Authority (OSDA), Skill Development and Technical Education Department Street address: World Skill Center, Block B, Sector A, Tower, 2010 Floor/Room number: Mancheswar Industrial Estate City: Bhubaneswar ZIP code: 751007 Country: India Telephone: +91-674-2580079 E-mail: tenders@worldskillcenter.org
ITB 7.4	A Virtual Pre-Bid meeting shall take Place. Date: 20 May 2022

	<p>Time: IST 11 : 00 Hrs</p> <p>Place: World Skill Center, Block B, Sector A, Tower, 2010 ,Mancheswar Industrial Estate, Bhubaneswar -751007, Odisha, India.</p> <p>Note :Bidders interested in attending virtual Prebid Meeting, are required to send formal request to the E Mail of OSDA latest by 18.05.2022 at 17:00 Hours (IST). Link and other details shall be sent to their respective E-Mail ID.</p> <p>A site visit may be arranged by the Employer on prior written request from the prospective bidders.</p>
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C. Preparation of Bids

ITB 10.1	The language of the Bid is: English
ITB 11.2 (g)	<p>The Bidder shall submit with its Technical Bid the following additional documents:</p> <p>1) Check list with page number and details of documents as per the requirement of ITB 11.2.</p> <p>2) Work orders and experience certificates issued by the previous employer</p>
ITB 11.3 (d)	The Bidder shall submit with its Price Bid the following additional documents: Nil
ITB 12.1	<p>The units and rates in figures entered into the Price Schedules should be typewritten, if written by hand, must be in print form.</p> <p>Bill of Quantities and Day Work Schedule not presented accordingly may be considered "Non Responsive".</p>
ITB 13.1	Alternative Bids <u>Shall Not be</u> permitted.
ITB 13.2	Alternative time for completion <u>Shall Not be</u> permitted.
ITB 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: <u>Not applicable</u>
ITB 14.5	The prices quoted by the Bidder - shall not be adjustable.
ITB 15.1	The unit rates and the prices shall be quoted by the Bidder entirely in: INR

ITB 15.4	The rates of exchange shall be the selling rates on bid closing date by: Reserve Bank of India
ITB 16.1	<p>Technical Proposal shall also include a Health and Safety COVID-19 Plan, in accordance with the relevant government regulations and guidelines on COVID-19 prevention and controls as well as workplace safety requirements. Considerations for public health and social measures in the workplace in the context of COVID-19. Available here: https://www.who.int/publications-detail/considerations-for-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19. Also refer to ADB SDCC's advisory in relation to Health and Safety COVID-19 and international good practices. Also refer to Govt of Odisha Advisory on relevant COVID-19 & safety protocols.</p> <p>If a Bidder submits a Health and Safety COVID-19 Plan that does not provide sufficient information in accordance with the required submission information listed in the bidding document by the Employer, the Employer shall issue a clarification to request for further information from the Bidder. The Bidder must submit the requested information within 5 working days of receiving such a request. Failure to provide a satisfactory response to the request for further information within the prescribed period of receiving such a request shall cause the rejection of the Bid.</p>
ITB 18.1	The bid validity period shall be 180 days.
ITB 19.1	The Bidder shall furnish a bid security in the amount of INR 92 Lakhs
ITB 19.2	The ineligibility period will be: Not Applicable
ITB 19.4	Bid shall be rejected without compliant Bid Security.
ITB 20.1	In addition to the original Bid, the number of copies is: One
ITB 20.2	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: "An organizational document- (a) Power of Attorney (in case the Bidder is a partnership or a sole proprietorship or a joint venture); (b) Board Resolution (in case the Bidder is a corporation); (c) Letter of Authorization, written on the Bidder's letterhead, (in case the Bidder is a partnership, sole proprietorship or a joint venture) specifying the representative's authority to sign the Bid on behalf of, and to legally bind, the Bidder. If the Bidder is an intended or an existing joint venture, the power of attorney should be signed by all partners and specify the authority of the named representative of the joint venture to sign on behalf of, and legally bind, the intended or existing joint venture. If the joint venture has not yet been formed, also include evidence from all proposed joint venture partners of their intent to enter into a joint venture in the event of a contract award in accordance with ITB 16.1 (b)"
ITB 20.2	The Bidder shall submit an acceptable authorization within 3 days.

Single-Stage: Two-Envelope

D. Submission and Opening of Bids

ITB 21.1	Bidders donot have the option of submitting their Bids electronically.
ITB 22.1	<p>For <u>bid submission purposes</u> only, the Employer's address is: Attention: Chief Executive Officer, Odisha Skill Development Authority (OSDA), Skill Development and Technical Education Department Street address: World Skill Center, Block B, Sector A, Tower, 2010 Floor/Room number: Mancheswar Industrial Estate City: Bhubaneswar ZIP code: 751007 Country: India Telephone: +91-674-2580079 E-mail: tenders@worldskillcenter.org</p> <p>The deadline for bid submission is: Date: 21 June 2022 Time: 02:00 PM IST</p>
ITB 25.1	<p>The opening of the Technical Bid shall take place at: Street address: World Skill Center, Block B, Sector A, Tower, 2010 Floor/Room number: Mancheswar Industrial Estate City: Bhubaneswar Country: India Date: 21 June 2022 Time: 3.00 PM IST</p>
ITB 25.1	Electronic bid opening procedure shall be as follows: Not Applicable
ITB 25.5	The Letter of Technical Bid shall be initialed by three representatives of the Employer attending Bid opening.
ITB 25.10	The Letter of Price Bid and Bill of Quantities shall be initialed by three representatives of the Employer attending Bid opening.

E. Evaluation and Comparison of Bids

ITB 34.1	The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: INR The source of selling exchange rate shall be: Reserve Bank of India The date for the selling exchange rate shall be: Bid Closing date
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Section 3 - Evaluation and Qualification Criteria
- Without Prequalification -

This Section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders. In accordance with ITB 32 and ITB 36, no other methods, criteria and factors shall be used. The Bidder shall provide all the information requested in the forms included in Section 4 (Bidding Forms).

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1. Evaluation

In addition to the criteria listed in ITB 36.2 (a)–(e), other relevant factors are as follows:

1.1 Adequacy of Technical Proposal

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

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

1.2 Completion Time

An alternative Completion Time, if permitted under ITB 13.2, will be evaluated as follows:

Not Permitted

1.3 Technical Alternatives

Technical alternatives, if permitted under ITB 13.4, will be evaluated as follows:

Not Permitted

1.4 Quantifiable Nonconformities and Omissions

Subject to ITB 14.2 and ITB 36.2, the evaluated cost of quantifiable nonconformities including omissions, is determined as follows:

"Pursuant to ITB 31.3, the cost of all quantifiable nonmaterial nonconformities shall be evaluated, including omissions in Daywork where competitively priced but excluding omission of prices in the Bill of Quantities. The Employer will make its own assessment of the cost of any nonmaterial nonconformities and omissions for the purpose of ensuring fair comparison of Bids."

1.5 Domestic Preference

If a margin of preference is provided for under ITB 35.1, the following procedure shall apply:

Not Applicable

1.6 Multiple Contracts

Not Applicable

1.7 Other Criteria

The Employer will take into account the quality of the Health and Safety COVID -19 Plan ('the Plan') attached to the Technical Proposal in its evaluation of the Adequacy of the Technical Proposal.

- The bidder should demonstrate in the Plan the health and safety measures they will put in place on site in relation to COVID-19 prevention and controls, including but not limited to, Personal Protective Equipment (PPE) requirements, site set up, training, induction and mobilization of new personnel, equipment and plants cleaning and other hazard management measures while undertaking site work activities, site visitors health and safety protocols, as well as the approach to the monitoring and reporting of the Plan. The Plan should be fit for purpose for the particular construction works of this contract and be aligned with Odisha government regulations and guidelines on COVID-19 prevention and controls as well as workplace safety requirements. Considerations for public health and social measures in the workplace in the context of COVID-19. Available here: <https://www.who.int/publications-detail/considerations-for-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19>. Also refer to ADB SDCC's advisory in relation to COVID-19 health and safety and international good practices.

2. Qualification

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

2.1 Eligibility

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

2.1.1 Nationality

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

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

Not having been declared ineligible by ADB, as described in ITB Subclause 4.4.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
--	-----------------------	-----------------------	-----------------------	----------------	-------------------------

2.1.4 Government-Owned Entity

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

Not having been excluded by an act of compliance with a United Nations Security Council resolution in accordance with ITB Subclause 4.7.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
--	-----------------------	-----------------------	-----------------------	----------------	-------------------------

2.2 Pending Litigation and Arbitration

Pending litigation and arbitration criterion shall not apply

2.3 Financial Situation

2.3.1 Historical Financial Performance

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Submission of audited financial statements or, if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, for the last three (3) years to demonstrate the current soundness of the Bidder's financial position. As a minimum, the Bidder's net worth for the last three (3) year calculated as the difference between total assets and total liabilities should be positive.	must meet requirement	not applicable	must meet requirement	not applicable	Form FIN - 1 with attachments

2.3.2 Average Annual Construction Turnover

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Minimum average annual construction turnover of INR 35 Crores/USD 4.6 Million calculated as total certified payments received for contracts in progress or completed, under execution in any 3 years over the last 5 calender years from date of publishing (IFB) of the bid	must meet requirement	must meet requirement	must meet 25% of the requirement	must meet 40% of the requirement	Form FIN - 2

2.3.3 Financial Resources

Criteria Requirement	Compliance Requirements			Documents	
	Single Entity	Joint Venture		Submission Requirements	
		All Partners Combined	Each Partner	One Partner	
For Single Entities: The Bidder must demonstrate that its financial resources defined in FIN - 3, less its financial obligations for its current contract commitments defined in FIN - 4, meet or exceed the total requirement for the Subject Contract of INR 6.0 Crores / USD 0.8 Million	must meet requirement	not applicable	not applicable	not applicable	Form FIN – 3 and Form FIN – 4
For Joint Ventures: (1) One partner must demonstrate that its financial resources defined in FIN - 3, less its financial obligations for its own current contract commitments defined in FIN - 4, meet or exceed its required share of 40% from the total requirement for the Subject Contract. AND	not applicable	not applicable	not applicable	must meet requirement	Form FIN – 3 and Form FIN – 4
(2) Each partner must demonstrate that its financial resources defined in FIN - 3, less its financial obligations for its own current contract commitments defined in FIN - 4, meet or exceed its required share of 25% from the total requirement for the Subject Contract. AND	not applicable	not applicable	must meet requirement	not applicable	Form FIN – 3 and Form FIN – 4
(3) The joint venture must demonstrate that the combined financial resources of all partners defined in FIN - 3, less all the partners' total financial obligations for the current	not applicable	must meet requirement	not applicable	not applicable	Form FIN – 3 and Form FIN – 4

contract	commitments
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defined in FIN - 4, meet or exceed the total requirement for the Subject Contract of INR 6.0 Crores / USD 0.8 Million					
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2.4 Construction Experience

2.4.1 Contracts of Similar Size and Nature

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture		Submission Requirements	
		All Partners Combined	Each Partner		One Partner
<p>Participation in at least 1 Contract, that have been successfully or substantially completed within last 5 calendar years from the bid publishing (IFB) date, where the value of the bidder's participation exceeds USD 4.9 million/INR 36.80 Crores or at least 2 Contracts, that have been successfully or substantially completed within last 5 calendar years from the bid publishing (IFB) date; where the value of the bidder's participation exceeds USD 3.0 million/INR 23.0 Crores or at least 3 Contracts, that have been successfully or substantially completed within last 5 calendar years from the bid publishing (IFB) date; where the value of the bidder's participation exceeds USD 2.45 million/INR 18.4 Crores and that are similar to the proposed works.</p> <p>The similarity of the Bidder's participation shall be based on the physical size, nature of works, complexity, methods, technology or other characteristics as described in Section 6, Employer's Requirements.</p>	must meet requirement	must meet requirement	not applicable	not applicable	Form EXP - 1

2.4.2 Construction Experience in Key Activities

May be complied with by specialist subcontractors. The employer shall require evidence of the subcontracting agreement from the bidder. A specialist subcontractor is a specialist enterprise engaged for highly specialized processes, which the main contractor cannot provide.)

Criteria	Compliance Requirements			Documents	
	Single Entity	Joint Venture			
Requirement		All Partners Combined	Each Partner	One Partner	Submission Requirements
For the above or other contracts executed during the period stipulated in 2.4.1 above, a minimum construction experience in the following key activities:	must meet requirement	must meet requirement ^a	not applicable	not applicable	Form EXP - 2
1. Design of training or educational complex containing buildings of at least 5000 Sqm , which includes building,internal roads, pavements, drainage, electrification, street lighting, sewerage and water supply.					
2. Construction of training or educational complex containing buildings of at least 5000 Sqm , which includes building, internal roads, pavements, drainage, electrification, street lighting, sewerage and water supply					

Section 4 - Bidding Forms - Without Prequalification -

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

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Letter of Technical Bid

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

Date:

ICB No.:

Invitation for Bid No.:

To: [insert complete name of the Employer]

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) 8.
- (b) We offer to execute in conformity with the Bidding Documents the following Works: [insert narrative]
- (c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of [insert bid validity period as specified in ITB 18.1 of the BDS] days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- (d) Our firm, including any Subcontractors or Suppliers for any part of the Contract, have nationalities from eligible countries in accordance with ITB 4.2.
- (e) We, including any Subcontractors or Suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3.
- (f) We are not participating, as a Bidder, either individually or as partner in a Joint Venture, in more than one Bid in this bidding process in accordance with ITB 4.3(e), other than alternative offers submitted in accordance with ITB 13.
- (g) Our firm, Joint Venture partners, associates, parent company, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, are not subject to, or not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Asian Development Bank or a debarment imposed by the Asian Development Bank in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the Asian Development Bank and other development banks.¹

¹These institutions include African Development Bank, European Bank for Reconstruction and Development (EBRD), Inter-American Development Bank (IADB), and the World Bank Group. According to paragraph 9 of the Agreement, other international financial institutions may join upon the consent of all Participating Institutions and signature of a Letter of Adherence by the international financial institution substantially in the form provided (Annex B to the Agreement). Upon adherence, such international financial institution shall become a Participating Institution for purposes of the Agreement. Bidders are advised to check www.adb.org/integrity for updates

- (h) Our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the Contract, are not, or have never been, temporarily suspended, debarred, declared ineligible, or blacklisted by the Employer's country, any international organization, and other donor agency.

If so debarred, declared ineligible, temporarily suspended, or blacklisted, please state details (as applicable to each Joint Venture partner, associate, parent company, affiliate, subsidiaries, Subcontractors, and/or Suppliers):

- (i) Name of Institution: _____
 (ii) Period of debarment, ineligibility, or blacklisting [*start and end date*]: _____
 (iii) Reason for the debarment, ineligibility, or blacklisting: _____

- (i) Our firm's, Joint Venture partners, associates, parent company's affiliates or subsidiaries, including any Subcontractors or Suppliers key officers and directors have not been [*charged or convicted*] of any criminal offense (including felonies and misdemeanors) or infractions/violations of ordinance which carry the penalty of imprisonment.

If so charged or convicted, please state details:

- (i) Nature of the offense/violation: _____
 (ii) Court and/or area of jurisdiction: _____
 (iii) Resolution [*i.e. dismissed; settled; convicted/duration of penalty*]: _____
 (iv) Other relevant details [*please specify*]: _____

- (j) We understand that it is our obligation to notify ADB should our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers, be temporarily suspended, debarred or become ineligible to work with ADB or any other MDBs, the Employer's country, international organizations, and other donor agencies, or any of our key officers and directors be charged or convicted of any criminal offense or infractions/violations of ordinance which carry the penalty of imprisonment.

- (k) Our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers, are not from a country which is prohibited to export goods to or receive any payments from the Employer's country 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.

- (l) [We are not a government-owned enterprise] / [We are a government-owned enterprise but meet the requirements of ITB 4.5].¹

- (m) We have not been suspended nor declared ineligible by the Employer based on execution of a Bid-Securing Declaration in accordance with ITB 4.6.

- (n) We agree to permit ADB or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB.

¹Use one of the two options as appropriate.

- (o) If our Bid is accepted, we commit to mobilizing key equipment and personnel in accordance with the requirements set forth in Section 6 (Employer's Requirements) and our technical proposal, or as otherwise agreed with the Employer.

- (p) We understand that any misrepresentation that knowingly or recklessly misleads, or attempts to mislead may lead to the automatic rejection of the Bid or cancellation of the contract, if awarded; and may result in remedial actions, in accordance with ADB's Anticorruption Policy (1998, as amended to date) and Integrity Principles and Guidelines (2015, as amended from time to time).

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

Letter of Price Bid

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

Date:

ICB No.:

Invitation for Bid No.:

To:

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) 8.
- (b) We offer to execute in conformity with the Bidding Documents and the Technical Bid submitted for the following Works _____
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is:

[amount of foreign currency in words], [amount in figures], and [amount of local currency in words], [amount in figures] including Goods and Service Tax (GST)

The total bid price from the Summary of Bill of Quantities should be entered by the bidder inside this box. Absence of the total bid price in the Letter of Price Bid may result in the rejection of the bid.

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

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

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

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

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

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

Bid-Securing Declaration (Not Applicable)

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

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

Alternative No.: *[insert identification No if this is a bid for an alternative]*

To: *[insert complete name of employer]*

We, the undersigned, declare that:

We understand that, according to your conditions, Bids must be supported by a Bid-Securing Declaration.

We accept that we will automatically be suspended from being eligible for bidding in any contract with the Borrower for the period of time of 5 years starting on the date that we receive a notification from the Employer, if we are in breach of our obligation(s) under the bid conditions, because we

- (a) have withdrawn our Bid during the period of bid validity specified in the Letter of Bid; or
- (b) do not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or
- (c) having been notified of the acceptance of our Bid by the Employer during the period of bid validity, (i) fail or refuse to execute the Contract, if required; or (ii) fail or refuse to furnish the Performance Security, in accordance with the ITB; or (iii) fail or refuse to furnish a domestic preference security, if required.

We understand this Bid-Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) 28 days after the expiration of our Bid.

Signed: *[insert signature of person whose name and capacity are shown]*

In the capacity of *[insert legal capacity of person signing the Bid-Securing Declaration]*

Name: *[insert complete name of person signing the Bid-Securing Declaration]*

Duly authorized to sign the bid for and on behalf of: *[insert complete name of bidder]*

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

Corporate Seal *[where appropriate]*

-- Note --

In case of a joint venture, the Bid-Securing Declaration must be in the name of all partners to the joint venture that submits the bid.

Technical Proposal

Personnel

Equipment

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

COVID-19 specific Site Health and Safety Management Plan

Personnel

Form PER – 1: Proposed Personnel

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

1.	Title of position*
	Name
2.	Title of position*
	Name
3.	Title of position*
	Name
4.	Title of position*
	Name
5.	Title of position*
	Name
6.	Title of position*
	Name
etc.	Title of position*
	Name

-- Note --

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

Equipment

Form EQU: Equipment

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

Item of Equipment		
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 Bidder.

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

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

COVID-19 specific Site Health and Safety Management Plan

Bidders Qualification

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

Form ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	
In case of Joint Venture, legal name of each partner	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
Bidder's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	
<p>Attached are copies of the following documents.</p> <p><input type="checkbox"/> 1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2.</p> <p><input type="checkbox"/> 2. Authorization to represent the firm or Joint Venture named above, in accordance with ITB 20.2.</p> <p><input type="checkbox"/> 3. In case of Joint Venture, letter of intent to form Joint Venture or Joint Venture agreement, in accordance with ITB 4.1.</p> <p><input type="checkbox"/> 4. In case of a government-owned enterprise, any additional documents not covered under 1 above required to comply with ITB 4.5.</p>	

Form ELI - 2: Joint Venture Information Sheet

Each member of the Joint Venture and Specialist Subcontractor must fill out this form separately.

Joint Venture / Specialist Subcontractor Information	
Bidder's legal name	
Joint Venture Partner's or Specialist Subcontractor's legal name	
Joint Venture Partner's or Specialist Subcontractor's country of constitution	
Joint Venture Partner's or Specialist Subcontractor's year of constitution	
Joint Venture Partner's or Specialist Subcontractor's legal address in country of constitution	
Joint Venture Partner's or Specialist Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	
<p>Attached are copies of the following documents.</p> <p><input type="checkbox"/> 1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2.</p> <p><input type="checkbox"/> 2. Authorization to represent the firm named above, in accordance with ITB 20.2.</p> <p><input type="checkbox"/> 3. In the case of government-owned enterprise, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITB 4.5.</p>	

Specialist Subcontractor is a specialist enterprise engaged for highly specialized processes that cannot be provided by the main Contractor.

Form CON - 1: Historical Contract Non-performance

Each Bidder must fill out this form in accordance with Criteria 2.2.1 and 2.2.3 of Section 3 (Evaluation and Qualification Criteria) to describe any history of nonperforming contracts and pending litigation or arbitration formally commenced against it.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Table 1: History of Nonperforming Contracts			
<p>Choose one of the following:</p> <p><input type="checkbox"/> No nonperforming contracts.</p> <p><input type="checkbox"/> Below is a description of nonperforming contracts involving the Bidder (or each Joint Venture member if Bidder is a Joint Venture).</p>			
Year	Description	Amount of Nonperformer Portion of Contract (INR or equivalent)	Total Contract Amount (INR or 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 nonperformance: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>	<i>[insert amount]</i>

Form FIN - 1: Historical Financial Performance

Each Bidder must fill out this form.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

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

Information from Balance Sheet

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

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

Information from Income Statement

Total Revenues			
Profits Before Taxes			
Profits After Taxes			

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

Form FIN - 2: Average Annual Construction Turnover

Each Bidder must fill out this form.

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

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

Joint Venture Partner: _____

Annual Turnover Data for any 3 Years over the Last 5 Years (Construction only)			
Year	Amount Currency	Exchange Rate	INR or USD
Average Annual Construction Turnover			

Form FIN – 3: Availability of Financial Resources

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

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

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

Joint Venture Partner: _____

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

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

Form FIN- 4: Financial Requirements for Current Contract Commitments

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

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

Joint Venture Partner: _____

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

Form FIN - 5: Compliance Check of Financial Resources (Criterion 2.3.3 of Section 3)

Form FIN-5A: For Single Entities

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

Form FIN-5B: For Joint Ventures

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

- Note -

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

^a Requirement for the subject contract is defined in Criterion 2.3.3(b) of Section 3. Value A is the required percentage of the subject contract, which each partner must meet; and value B is the required percentage of the subject contract, which one partner must meet. A and B values are defined in Criterion 2.3.3 of Section 3 (Evaluation and Qualification Criteria).

^b $\sum (C - D)$ = sum of available financial resources net of current contract commitments (CCC) for all partners.

Form EXP – 1: Contracts of Similar Size and Nature

Fill out one (1) form per contract.

Contract of Similar Size and Nature		
Contract No of	Contract Identification	
Award Date	Completion Date	
Role in Contract	<input type="checkbox"/> Contractor <input type="checkbox"/> Management Contractor <input type="checkbox"/> Subcontractor	
Total Contract Amount	INR/US\$	
If partner in a Joint Venture or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer's name Address Telephone number Fax number E-mail		
Description of the similarity in accordance with Criterion 2.4.1 of Section 3		

Form EXP - 2: Construction Experience in Key Activities

Fill out one (1) form per contract.

Contract with Similar Key Activities		
Contract No of	Contract Identification	
Award Date	Completion Date	
Role in Contract	<input type="checkbox"/> Contractor <input type="checkbox"/> Management Contractor <input type="checkbox"/> Subcontractor	
Total Contract Amount	INR/US\$	
If partner in a Joint Venture or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer's name Address Telephone number Fax number E-mail		
Description of the key activities in accordance with Criterion 2.4.2 of Section 3		

Schedules

Schedule of Payment Currencies

Forinsert name of Section of the Works

Separate tables may be required if the various sections of the Works (or of the Bill of Quantities) will have substantially different foreign and local currency requirements. In such a case, the Employer should prepare separate tables for each Section of the Works.

	A	B	C	D
Name of Payment Currency	Amount of Currency	Rate of Exchange to Local Currency	Local Currency Equivalent C = A x B	Percentage of Net Bid Price (NBP) $\frac{100 \times C}{NBP}$
Local Currency		1.00		
Foreign Currency #1				
Foreign Currency #2				
Foreign Currency #				
Net Bid Price				100.00
Provisional Sums Expressed in Local Currency		1.00		
BID PRICE				

- Note -

The rates of exchange shall be the selling rates on Bid Closing date published by the source specified in BDS 15.

Tables of Adjustment Data

Table A - Local Currency

Index Code	Index Description	Source of Index	Base Value and Date	Bidder's Local Currency Amount	Bidder's Proposed Weighting
	Nonadjustable	—	—	—	A: <u>0.15</u> B: _____ C: _____ D: _____ E: _____
Total					1.00

Table B - Foreign Currency

Name of Currency:

If the Bidder wishes to quote in more than one foreign currency, this table should be repeated for each foreign currency.

Index Code	Index Description	Source of Index	Base Value and Date	Bidder's Currency in Type/Amount	Equivalent in FC1	Bidder's Proposed Weighting
	Nonadjustable	—	—	—		A: <u>0.15</u> B: _____ C: _____ D: _____ E: _____
Total						1.00

- Note -

As per GCC 1.1.3.1, "Base Date" means the date 28 days prior to the latest date for submission of the bid.

Tables of Adjustment Data shall only be included if prices are to be quoted as adjustable prices in accordance with ITB 14.5.

Bill of Quantity

[Schedule of Prices – Lump Sum Rates]

The Employer has indicated below the list of major activities comprising the works consistent with the description of works, drawings and specifications in Section 6 (Employer's Requirements). Each work has been described in sufficient details to provide a clear guidance to Bidders with respect to the type of works, their scope and complexity and compliance with the required standards.

Since this is a lump sum type of contract, Bidders are required to enter the prices against each work item on a lump sum rates, however, payments will be released on measurement basis as indicated in Section 8, Subclause 14.4 (Schedule of Payments). Work items against which no price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed covered by other work items against which the prices were entered. The sum of prices entered against each work item will represent the total bid price.

The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the Activity Schedule, and where no Items are provided, the cost shall be deemed to be distributed among the Amounts for the related Items of Work. It should be noted that the cost of work shall include compliance with the Environmental Management Plan (EMP), as well as the Environmental Monitoring Plan for all items of works including related provisions mentioned elsewhere in the contract and mainly consist of jobs as detailed in section-6 Scope of Work and as given below –

- i. Detailed survey of site of work and to make detailed contour plan, cross section of site including clearances of site from all hindrances for the purpose of surveying work.
- ii. Preparation of concept drawings along with 3 D presentation of project as per scope of work mentioned in the bid document for approval from the client department and user department.
- iii. Check the feasibility of concept drawings at site and get them approved from the Employer.
- iv. Preparation of detailed working drawings including all trade coordination drawings showing details specification of all material on the basis of approved concept drawings for execution of work, and get them approved by the Employer, and finally from local statutory bodies. The detailed working drawings shall elaborate all provisions such as internal furniture layout, temporary barricading along with safety signages, approach road including pedestrian paths, drop-offs, car parking, water drainage system, road marking and signages, site development, structural member detail, walls, floors, roof, water supply & sanitary installation, fix furniture such as internal almirahs/ cupboards/wardrobes, kitchen cabinets etc, rain water harvesting system & recharge wells including tanks of required capacity, external main water supply lines, sewerage lines, sewerage treatment plant (STP), overhead and underground tanks of required capacity, 2 number borewells, front boundary wall having required number of access along with security post, landscaping of complete campus along with vegetation, plantation and providing sitting benches etc, transformer including supply of power, HT and LT panels, caballing, DG sets, external lighting, fire detection/fire alarm, fire-fighting system including water tanks of required capacity, central air conditioning with humidity control (hot and cold), CCTV, Online time lapse camera with internet based live monitoring during entire project duration, along with all other Miscellaneous Items required for the successful completion of project.
- v. Soil Investigation of site of work by boring method by drilling bores, Standard Penetration Test (SPT), Trial Pit etc.
- vi. Detailed structural design, drawings along with soft copy of calculations on the basis of approved working drawings to be got approved from any Indian Institute of Technology.
- vii. Temporary barricading of site on all its boundary as per approved working drawings before starting of construction of work in such a manner that client approved advertisements can be displayed.
- viii. Fix signages and to adopt all safety measures at site of work before start of execution and during the execution of work till completion of project.
- ix. Execution of work as per approved Architectural, Structural, MEP drawings and all scope of work mentioned in the bid document to the entire satisfaction of employer.

- x. Approval of work from the Employer, after completion of work.
- xi. Submission of project closure dossier including as Built Drawings of each and every component of work, Operation and Maintenance Manuals, Quality Records, guarantees and warranties etc. after completion of work.
- xii. The whole campus and individual building should confirm to GRIHA 2015 minimum three-star rating.
- xiii. The bid price is inclusive of all Environmental, Health and Safety management and compliance cost

SCOPE OF WORK AND SCHEDULE OF RATES

Part A – Instructions

This scope of work should be read along with Section 6 and other provisions mentioned in the bid document.

Part B – Summary of Costs

Summary of Bills of Quantity for Engineering Procurement and Construction of Precision Engineering Facility

Sr. No.	Description	Amount in INR
1.	Subtotal -1 (Building Work)	
2.	Subtotal - 2 (Engineering Services)	
3.	Subtotal - 3 (Site Development)	
4.	Subtotal - 4 (Design and Drawings)	
5.	Subtotal- 5 (Environment Management and Monitoring)	
Grand Total (including Goods and Service Tax) without Provisional sum		
Provisional Sums		INR 10,000,000
Grand Total (including Goods and Service Tax) with Provisional sum in figures		
Grand Total (including Goods and Service Tax) with Provisional sum in words		

Duly authorized to sign the Bid for and on behalf of	Signature of Bidder
	Name
Date	In the Capacity of

ENGINEERING PROCUREMENT AND CONSTRUCTION OF PRECISION ENGINEERING FACILITY AT BHUBANESWAR

Sub head	1- Building Work	Amount in INR
1	Precision Engineering Block	
SUBTOTAL -1 FOR BUILDING WORK		

Sub head	2- Engineering Services	Amount in INR
2.1	Electrical Substation, changeover(with provision for solar panels), Installation of solar panels & all Equipments	
2.2	DG Sets	
2.3	External Electrification and Lighting	
2.4	Underground Water Tank	
2.5	Overhead Water Tank	
2.6	Fire Detection and Suppression Including Underground and Static Tanks & Pumps	
2.7	Central Air Conditioning (HVAC)	
Sub Total -2 for Engineering Services		

Sub head	3-SITE DEVELOPMENT	Amount in INR
3.1	Earthworks	
3.2	Entrance Gate ,Portal and Boundary wall, Signage	
3.3	Internal Roads and Pavement	
3.4	Rainwater Collection, Harvesting and Recycling	
3.5	External Sewerage and Sewage Treatment	
3.6	External Water Supply	
3.7	Landscaping	
Sub Total-3 For Site Development		

Sub head	4-Design and drawings	Amount in INR

4	Design and drawings	
Subtotal -4 for Design and Drawings		

Sub head	5-Environment Management and Monitoring	Amount in INR
5	Environment Management and Monitoring	
Subtotal -5 for Environment Management and Monitoring		

Part C – Details of each work**1. SCHEDULE OF RATES FOR BUILDING WORKS**

THE FOLLOWING BUT NOT LIMITED TO SHALL BE INCLUDED IN THE BUILDING RATE
The lumpsum or plinth area rate includes
All internal electrification, conduiting, cabling, switchboards, distribution boards, panels, changeover for essential supply, light and power convenience outlets, light and fan fittings and connections upto External Electrification (sub head- 2.1,2.2 and 2.3)
Cabling and conduiting, changeovers and panels for provision for solar photovoltaic systems. (not including photovoltaic systems)
Lightning protection , and all necessary earthing.
All supply and laying of conduiting required for LAN, CCTV, access control, intercom and TV cables.
All conduiting, cabling and distribution boards for UPS system, including the installation of UPS system .
All internal water supply, risers, valves and chambers, toilet and kitchen fixtures and fittings.
All internal sewerage, rainwater and waste disposal, through piping, stacks, chambers all complete with gulley traps and manholes to connect to the external sewerage.
Service shafts and ducts for water supply, rainwater and solid and waste stacks, which shall be counted fully in the plinth area.
All service connections in terms of water supply, rainwater drainage connection to storm water drains either through drains or piping, with necessary chambers, gate valves etc.
All sewage connections to the main sewerage by way of piping, with necessary chambers, manholes etc.
Plinth protection, apron, apron drain
Paving of internal courts as per approved design and material, with steps, ramp for access
Ramps and railings for differently-abled, barrier free architecture.
Catch water basins in open areas, connection to drains

1. SCHEDULE OF RATES FOR BUILDING WORKS(The quantities given in tables below are indicative and for bidding purpose only. Payments shall be made as per actual execution)

1-PRECISION ENGINEERING BLOCK					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
Plinth Area of one Block	Sq.M	7366			
Amount in Words					

2. SCHEDULE OF RATES FOR ENGINEERING SERVICES (The quantities given in tables below are indicative and for bidding purpose only. Payments shall be made as per actual execution)

3. ENGINEERING SERVICES					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
2.1 -ELECTRIC SUBSTATION					
Design, supply and erection of substation, transformers, breakers, earthing, metering, changeover (with provision for solar panels), panels and all equipment	Kva	2000			
2.2 -DG SETS					
Design, supply and erection of Diesel Generator sets, necessary cabling, earthing	Kva	1000			
2.3 -EXTERNAL ELECTRIFICATION AND LIGHTING					
External lighting, LED street lights and post top lighting for pathways and landscaped areas, external lighting of buildings, panels, cabling, earthing.	Lump Sum				
2.4- UNDERGROUND WATER TANK					
Design and construction of RC underground or surface water tank for domestic water supply, necessary pumps, piping, valves and associated electrical work.	litre	100000			
2.5-OVERHEAD WATER TANK					
Supply and installation of UPVC overhead water tank for domestic water supply, necessary pumps, piping, valves and associated electrical work, with	litre	20000			

Single-Stage: Two-Envelope

necessary MS supporting structure.					
2.6 -FIRE DETECTION AND SUPPRESSION INCLUDING UNDERGROUND AND STATIC TANKS & PUMPS					
Design, supply and construction of detection and suppression system, necessary pumps, piping, hydrants valves and associated electrical works, UG & static tanks all complete required as per National Building Code as well as local fire authority guidelines.	Lump Sum				
2.7- CENTRAL AIR CONDITIONING					
Central air conditioning with air/ water cooled system/ VRV as approved by Employer, including all insulation, piping , ducting , grilles, water softening, associated electrical and water supply works	TR	360			
The plinth area rate for building includes cost payable for supply and laying conduits for CCTV, access control and LAN					

3. Site Development: SCHEDULE OF RATES FOR SITE DEVELOPMENT (The quantities given in tables below are indicative and for bidding purpose only. Payments shall be made as per actual execution)

3.1-EARTHWORKS					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
Surface dressing, jungle clearance, shifting of utilities as required over the entire project site	Lump sum				
Supply and stacking of imported soil, fly ash, river sand or other approved material at site, including carriage, filling marked areas of the site to levels specified in the drawings including	Lump sum				

ramming and watering, in layers not exceeding 20 cm				
Amount in Words				

3.2 -ENTRANCE GATE, PORTAL & BOUNDARY WALL					
The scope of work shall include:					
RCC portal of approved size and design over entrance point spanning dual carriage way					
Cladding, lighting, signage and lettering of approved design.					
2 MS gates of minimum size 4.5m wide and 2m height.					
Pedestrian gate at entrance, 1.5m x 2m					
Guard house 3.6 m x 3.6m of approved design					
QUOTED RATE FOR ALL WORKS COMPETE AS IN SCHEDULE ABOVE.					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
RC portal at entrance including SS lettering over granite base	Lump sum				
Guard house	Sq. m	12			
Gates	Sq. m	22			
Boundary wall	Metre	670			
Amount in Words					

3.3-INTERNAL ROADS AND PAVEMENTS					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
Roads and Parking	Sq.M	2264			
Pavement	Sq.M	72			
Amount in Words					

3.4 -RAIN WATER COLLECTION, HARVESTING AND RECYCLING					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
Catch basins, open drains Grating, piping	Lump sum				
Rainwater recharge pit of Approved design and capacity	Lump sum				

RC rain water tanks- underground or surface	Litre	40000			
Amount in Words					

3.5-EXTERNAL SEWERAGE AND SEWAGE TREATMENT					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
Gully traps, waste and soil Manholes, piping and disposal To STP	Lump sum				
Design and construction of Sewage Treatment plant of Approved design and capacity	Lump sum				
Amount in Words					

3.6 -EXTERNAL WATER SUPPLY					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
Borewell and Pumps of approved design	No.	2			
Fresh water supply ring for horticulture pumps, Valves , chambers and associated works	Lump sum				
Recycled water supply main (riser from gate valve shall be included in building)	Lump sum				
Amount in Words					

4: SCHEDULE OF RATES FOR DESIGN AND DRAWING

4 -DESIGNS AND DRAWINGS					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
Complete Design and Drawings for the entire project components as described in Section 6 of the bid document	Lump Sum				
Amount in Words					

5. SCHEDULE OF RATES FOR ENVIRONMENTAL MANAGEMENT AND MONITORING

5 -ENVIRONMENTAL MANAGEMENT AND MONITORING					
Description of Work	Unit	Quantity	Rates (INR/USD)		Amount (INR/USD)
			In Figures	In Words	
Ambient Air quality covering parameters of SO ₂ , NO _x , PM ₁₀ , PM _{2.5} and Carbon monoxide at one location of maximum construction activity at ASU construction site -one sample in pre-construction phase (immediately after mobilization) and 9 samples (one season each season except monsoon-3 samples per year) during construction phase	Samples				
Ground Water quality /Drinking Water Quality at ASU site covering parameters of Total dissolved solids, total suspended solids , pH, hardness, biochemical oxygen demand, and fecal coliform - one sample in pre-construction phase (immediately after mobilization) and 9 samples (one season each season except monsoon-3 samples per year) during construction phase	Samples				
Noise Levels covering parameters of Leq(Day), Leq (Night), Lmax and Lmin at one location of maximum construction activity at Boundary Wall construction site – one sample in preconstruction phase (immediately after mobilization) and 9 samples (one season each season except monsoon-3 samples per year) during construction phase	Samples				
Amount in Words					

Section 5 - Eligible Countries

This Section contains the list of eligible countries.

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

SECTION 6 - EMPLOYER'S REQUIREMENTS

This Section contains the Scope of Work, Specifications, Drawings, Personnel Requirements, and Equipment Requirements.

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6.1. SCOPE OF WORK & SPECIFICATIONS

Scope of Work and Specifications

6.1.1. Name of Work – Detailed Design and Construction of two storey building and campus for Precision Engineering (campus development including landscape, horticulture,, water harvesting structure, internal roads, pavements, drainage, electrification, street lighting, sewerage, water supply, parking etc. and building works for precision engineering equipments), as per detailed scope of work.

6.1.2. Location – The site is located Mancheswar, having co-ordinates 20.305177, 85.860477 and is about 9 km from Bhubaneswar Airport. The site is about half a kilometer east of the existing World Skills Center. The site is connected by a 60 ft wide road, and is 1.2 km from the VSS Nagar road which is to the west.

6.1.3. Brief about Odisha Skills Development Project (OSDP) and the Precision Engineering Campus

ADB approved a loan for the Odisha Skills Development Project (OSDP) on 21 June 2017 in the amount of \$102 million from ordinary capital resources. The loan closing date is 31 December 2022. The impact of the project will be reduced unemployment and underemployment rates for female and male youth (aged 15–34) by 2025. The outcome will be increased skills and employment in priority sectors for the working-age population. The outcome will be achieved through the following outputs (i) equitable access to market-responsive skill development programs increased; (ii) quality and relevance of skill development programs improved; (iii) skills ecosystem strengthened; and (iv) institutional capacity strengthened. Skills Development and Technical Education Department (SDTED) is the executing agency (EA) and Odisha Skills Development Authority (OSDA) and Directorate of Technical Education and Training (DTET) are the implementing agencies (IAs).

The key feature of OSDP is to establish the World Skill Center (WSC), which will become the central hub operated by the Government of Odisha for all Industrial Training Institutes (ITIs). The WSC will improve the overall eco-system of skill development in Odisha by providing integrated services through an entrepreneurship incubation center, a career counselling and placement center, a curriculum design and development center and education technology deployment center. These will support a network of 71 ITIs and develop skills and capacity of polytechnics, college of engineering, and other private skilling centers.

OSDA has acquired a 5-acre campus in Mancheswar for the purpose of setting up an additional campus which will house the Precision Engineering Block and girls' and boys' hostels.

6.1.4. Brief about Precision Engineering

The establishment of “world skill center” was envisaged in the National Policy for Skill Development and Entrepreneurship 2015. The precision engineering block (PE Block) is going to be constructed for OSDA (Odisha Skill Development Authority) as a part of on-going WSC (World Skill Centre) development. This development is happening on separate plot which is nearby to WSC Tower at Mancheswar Industrial Estate, Bhubaneswar.

6.1.5. Scope of work – The scope of work is related to the following:

6.1.5.1. Submission of Layout plan including floor wise plan of Precision Engineering Building Block, associated Engineering Services and site development works (indicative dimensions are detailed below for reference; however the construction agency may submit better layout plan during contract execution)

6.1.5.2. Survey and Geo technical investigation of Precision Engineering Building Block

6.1.5.3. Planning, Designing and Construction of :

(a) Two storied building work-

At GF - facility includes CNC turning, grinding, milling, CNC milling, turning as well as CNC sheet metal

Engineering, Procurement, and Construction of Precision Engineering Campus and Facilities

fabrication CAD/CAM studio, CNC sheet metal fabrication laboratory, Multi-axis machining laboratory, space for elevators etc.

At FF- facilities includes Multi axis CAD/CAM studio, 3D CAD/CAM application library, PEG staff office, classrooms, meeting rooms, recreation area, Utility room, space for elevators etc.

(b) Other associated buildings

Utility Building - 130 Sqm

Security Cabin – 12 Sqm

6.1.5.4. Planning, Designing and Construction of Engineering Services:

Electric Sub station, Solar Panels and its changeover, Transformers and DG set

Sanitary system, sewerage treatment and recycling

OHT- 300 Sqm and RCC Under Ground Tank – 115 Sqm

Rain water harvesting

Firefigting system

Building Management system

PA and sound system

Other associated services

6.1.5.5. Planning, designing and Construction of Site Development works

Roads & Pavements - 2000 Sqm

Horticulture and Landscaping Works - 2000 Sqm

Parking Area- 900 Sqm (4 wheeler-Stack Parking & 2 wheelers)

Other associated services

6.1.5.6. Preparations and updation of Technical Specifications, Designs and Drawings of all Building, Engineering services and Site Development works

6.1.5.7. Environment Planning and Management such as planning, designing and execution of Solar panels, Water Harvesting structures, Use of recycled water etc. for developing entire complex on Green building concept.

6.1.5.8. The successful bidder will be required to set up well furnished site office for own staff , Consultant staff which contain a team of 10 persons and employer's staff along with fully equipped Quality Lab suitable to carry out the Scope of Work.

6.1.5.9.

The detail of each work is given in the following sections.

6.1.5.1. Submission of Layout plan including floor wise plan of entire Precision Engineering Building Block.

The indicative layout plan including floor wise plans of entire precision engineering Building block is provided in the bidding document to facilitate bidders in bidding. However, it is expected from the successful contractor to submit the modified layout plan as per the actual site conditions after undertaking required survey and geotechnical investigations. The modified layout plan should be prepared in such a manner so that optimum utilization along with economy, aesthetic, utility and green energy concept is achieved. Further, the successful contractor will be required to obtain necessary permissions and clearances from statutory authorities as per the requirements.

6.1.5.2. Survey and Geo technical investigation of PE complex (as per scope of work)

Tentative survey and geotechnical investigation reports are attached in the bidding document for facility of prospective bidders. However, it is expected from the successful contractor to confirm the survey and geo technical investigation of actual site.

6.1.5.3. Planning, Designing and Construction of :

- a. Two storied building work-
- b. Other associated buildings

Utility Building - 130 Sqm
Security Cabin – 12 Sqm

Table 1: Schedule of Floor areas (as per indicative layout plan)

Ground Floor						
S.no	Name of Room	Length in M	Breadth in M	Area in Sqm	Nos	Total floor area
1	Display & Visitor	11.33	11.01	124.74	1	124.74
2	Multi-Axis Machining Laboratory	31.80	13.77	437.89	1	437.89
3	Toilet Block-1	5.9	5.9	34.81	1	34.81
4	CNC Sheet Metal Fabrication Laboratory	31.77	18.77	596.32	1	596.32
5	AC Plant Room	6.18	9.27	57.29	1	57.29
6	Store and Maintenance	7.91	9.27	73.33	1	73.33
7	Electrical & Pump room	14.32	4.52	64.73	1	64.73
8	MUX	7.9	4.52	35.71	1	35.71
9	Compressor	6.18	4.52	27.93	1	27.93
10	BMS	4	4.52	18.08	1	18.08
11	First Aid	4	4.52	18.08	1	18.08
12	AHU	4	4.52	18.08	1	18.08
13	IT Hub	4	4.52	18.08	1	18.08
14	CNC Milling Section	31.77	18.77	596.32	1	596.32
15	Toilet Block-2	5.9	5.9	34.81	1	34.81
16	CNC Turning Section	31.8	13.77	437.89	1	437.89
17	Lift Well					
FIRST FLOOR						
1	Communication Lab	8.19	11.01	90.17	1	90.17
2	Library	8.25	11.01	90.83	1	90.83
3	Admin	7.83	13.77	107.82	1	107.82
4	Milling Section	23.77	13.77	327.31	1	327.31
5	Toilet Block-3	5.9	5.9	34.81	1	34.81
6	Turning Section	23.77	18.77	446.16	1	446.16
7	Class Room-1 & 2	7.77	9.27	72.03	2	144.06
8	Inspection Techniques Laboratory	7.77	9.27	72.03	1	72.03
9	Office-1 & 2	6.18	7.04	43.51	2	87.01
10	Meeting Room	6.18	9.27	57.29	1	57.29

Ground Floor						
S.no	Name of Room	Length in M	Breadth in M	Area in Sqm	Nos	Total floor area
11	AHU	4	4.52	18.08	1	18.08
12	IT Hub	4	4.52	18.08	1	18.08
13	Faculty	19.2	7.04	135.17	1	135.17
14	Grinding Section	23.77	18.77	446.16	1	446.16
		8	9.27	74.16	1	74.16
15	Toilet Block-4	5.9	5.9	34.81	1	34.81
16	Staff Common Room	5.14	3.77	19.38	1	19.38
17	CNC Sheet Metal Fabrication CAD/CAM Studio	7.77	9.77	75.91	1	75.91
18	3D Cad/Cam application Laboratory	7.77	9.77	75.91	1	75.91
19	Gents & Ladies Locker	5.14	3.77	19.38	2	38.76
20	Simulation Lab	7.83	13.77	107.82	1	107.82
21	Lift well					
	AREA OF PRECISION ENGINEERING BLOCK					5255.08
	Add wall thickness, stairs and corridor area					2025.92
	Total Plinth area on all floors					7281.00

SPECIFICATIONS

(Note:- Only latest specifications befitting the stature of WSC shall be used. The specifications given in subsequent sections are indicative in nature and shall be finalized during contract execution by the client)

6.1.5.3.1. Schedule of Building finishes.

6.1.5.3.1.1. Internal Finishes - Room wise schedule of internal finishes, are listed below in Table 2, the work shall be carried out as per specifications further elaborated in the relevant Clause number of CPWD DSR 2018 or latest and CPWD latest Specifications Vol 1 and 2.

TABLE 2 – SCHEDULE OF INTERNAL FINISHES

NOTE:						
1. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE TO CPWD SPECIFICATIONS UPTO DATE (CLAUSE NUMBER MENTIONED)						
2. SEE GENERAL SPECIFICATIONS FOR ALL BUILDINGS						
3. ALL CLASSROOMS AND LABORATORIES ON THE TOPMOST FLOOR SHALL HAVE FALSE CEILING.						
4. ROOMS WITH FALSE CEILING WILL NOT HAVE CEILING PLASTER.						
5. ALL INTERIOR ACRYLIC EMULSION AND DISTEMPER SHALL BE DONE OVER COAT OF CEMENT PUTTY (13.80)						
6. ALL KITCHENS AND TOILETS SHALL HAVE TILE DADO UPTO 1.5 M						
7. GROUND FLOOR LABS AND WORKSHOPS SHALL HAVE A MINIMUM 150MM THICK NOMINALLY REINFORCED UNDER LAYER - Is it required						
Ground Floor						
S. No	ROOM	FLOOR	DADO	CEILING	WALL FINISH	CEILING PAINT
1	All office rooms	Vitrified floor tile (11.46.2)	Vitrified wall tiles up to 100 mm (11.46)	False Ceiling (12.29)	Acrylic Emulsion (13.83)	Required if there's no false ceiling
2	Reception Lounge and office	Vitrified flooring (8.10.2)	Vitrified skirting (8.12)			
3	Conference rooms/ meeting rooms	Vitrified floor tile (11.41)	Vitrified wall tiles up to 100 mm (11.46)			
4	Stores and engineering services	62 mm CC floor (11.5)	100 mm CC Skirting (11.6.1)	6 mm plaster 1:3 (13.16.1)	White wash (13.39.1)	
5	Dining Hall	Vitrified floor (11.26.1)	Vitrified floor (11.27)	6 mm plaster 1:3 (13.16.1)	Acrylic Emulsion (13.83)	Acrylic Emulsion (13.83)

6	Pantry	Ceramic Glazed floor tile (11.38)	Ceramic Glazed wall tile (11.36)	6 mm plaster 1:3 (13.16.1)		White wash (13.39.1)
7	Class Rooms	Vitrified floor (11.26.1)	Vitrified floor (11.27)	False Ceiling(13.16.1)	Acrylic Distemper (13.81)	
8	Laboratories on Ground floor and workshops	3mm Epoxy flooring (11.5)	100 mm Epoxy Skirting (11.6.1)	6 mm plaster 1:3 (13.16.1)		
9	Other training labs	3mm Epoxy flooring (11.26.1)	Epoxy up to 100 mm (11.27)	False Ceiling/ 6 mm plaster 1:3 (13.16.1)	Acrylic Emulsion (13.83)	Acrylic Emulsion (13.83)
10	Library	Vitrified floor (11.26.1)	Vitrified Floor (11.27)	False Ceiling (12.29)	Acrylic Emulsion (13.83)	White wash
11	Computer rooms/IT lab/ Digital library	Raised flooring(11.41)	Vitrified wall tiles up to 100 mm (11.46)	False Ceiling (12.29)	Acrylic Emulsion (13.83)	White wash
12	Main stairs and Lobby	Granite stone flooring in stairs and Vitrified in lobby(8.10.2)	corresponding skirting (8.12)	6 mm plaster 1:3 (13.16.1)		Acrylic Emulsion (13.83)
13	All corridors and Stair cases other than main stair	Granite stone flooring in stairs and Vitrified in corridor (11.26.1)	corresponding skirting (11.27)	6 mm plaster 1:3 (13.16.1)	Acrylic Distemper (13.81) with dado 1.5 m of synthetic enamel	Acrylic Distemper (13.81)
14	All Toilets	Ceramic UnGlazed floor tile (11.38)	Ceramic Glazed wall tile (11.36)	6 mm plaster 1:3 (13.16.1)		Acrylic Distemper (13.81)

SUBSTATION, PUMPROOM AND STORE

S. No	ROOM	FLOOR	DADO	CEILING	WALL FINISH	CEILING PAINT
1	All rooms	62 mm CC floor (11.5)	100 mm CC Skirting (11.6.1)	6 mm plaster 1:3 (13.16.1)	White wash (13.39.1)	White wash (13.39.1)
RCC CORRIDOR						
SNo	ROOM	FLOOR	DADO	CEILING	WALL FINISH	CEILING PAINT
1	All corridors	CC Flooring (11.26.1)	100 mm CC Skirting (11.6.1)	6 mm plaster 1:3 (13.16.1)	Exterior Acrylic Emulsion (13.48A)	White wash (13.39.1)

- 6.1.5.3.1.2. **General external finishes** - External finishes are listed below in Table-3, the work shall be carried out as per specifications further elaborated in the relevant Clause number as also indicated in the architectural concept drawings.

S. No.	Item	Specification
1	Roofing	RC roof with waterproofing and heat resistant tiles as approved.
2	External cladding	ACP panel, GRC cladding wherever applicable, for all buildings, area of application not exceeding 300 sqm each.
3	External plaster	15 mm CM plaster 1:6 (13.2.2)
4	External Paint	Texture Paint and external acrylic emulsion.
5	White Cement based putty	All external walls (13.80)
6	CC Coping on parapet	CC band with reinforcement 1:2:3 (11.3.1)

6.1.5.3.1.3. **Door and window and fabrication specifications.**

- Laboratories and Class rooms shall have 1.2 m doors, 2 per room with vision panel, with fixed glass fanlight of 300mm height above. Workshops and engineering labs will have 1.8m width for one door and 1.2 m for the other door.
- Bath and WC doors shall be 800mm wide and entrance to Toilet block doors shall be 1000mm wide.
- Kitchen doors shall be 900mm wide.
- All other doors shall be 1000mm wide, with 300mm fixed glass fanlight wherever desired.
- External doors of specified laboratories and workshops shall have rolling shutter.
- Staircases shall be naturally lit and ventilated by openable glazing or masonry openings with SS Railings which shall be recessed and adequately protected from rain.
- Door and Window specifications are listed below in Table-4, the work shall be carried out as per specifications further elaborated in the relevant Clause number.

PE BLOCK		
S. No.	Item	Specification
	Entrance to PE Block	Spider glazing (25.8) with 12mm toughened glass, glass door (21.8) as indicated in plan.
	Other entrance doors	12mm toughened glass, glass door (21.8), with SS hardware
	PE block- doors	Hollock wood Door frame (9.13) with Commercial Flush Shutter 35 mm thick (9.21.1) and both side decorative veneer (9.20) as instructed, vision panel (9.24.1) and mortice lock
	Classrooms and labs, faculty block- doors	Hollock wood door frame (9.13) with Commercial Flush Shutter 35 mm thick (9.21.1) with vision panel (9.24.1)
	Windows	uPVC casement windows openable and fixed and open with friction hinges and hardware, single shutter Window sill insides finished with granite (8.2.2.1)
	Staircase Railings	SS railing (10.28) for main stairs MS (10.25.2) in others
	Rolling Shutter	MS Rolling shutter (10.60)
	Entrance steps and ramp	Granite (11.56) and flamed granite (11.55.1) for ramps
	Pantry counters	Cast in situ RC with granite top (8.2.2.2) and edge moulding
	Pantry cabinetnetwork	Hollock frame (9.13) with particle board shutter (9.130.2) and shelves (9.17.1)
	Paneling in Conference,	Hollock framework (8.27.1) with veneer plywood (8.28.1)

	lobby, Administration	
SUBSTATION, PUMPROOM AND STORE		
1	All doors	T iron door frame (10.13) with MS Sheet (10.5)
2	Windows	MS tubular frame (10.15.1) with steel windows (10.11) double shutters, one with 5mm float glass,
3	Staircase Railings	SS(10.25.2)
4	Rolling Shutter	MS Rolling shutter (10.60)
GENERAL NOTES		
1	Doors	All mummy doors shall be of MS sheet (10.5)
2	Collapsible shutters	Collapsible shutters will be provided where required (10.3)

Table 5 - General Specifications for Internal Electrification

S. No.	Item of Work	CPWD Code No.
1	Point Wiring with 1.5 sq.mm. FRLS PVC insulated copper cable with medium class PVC conduit with modular switches, plate etc.	1.10.1 1.10.2 1.10.3
2	Wiring for lights power plug with 2x4 & 4x4 sq.mm. FRLS PVC insulated copper cable with PVC conduit.	1.12 / 1.13 as per design
3	Wiring for circuit analog with earth wire with FRLS PVC insulated copper cable with PVC conduit.	1.14.1 to 1.14.11
4	Telephone Cable 0.5 mm dia. FRLS PVC insulated copper conductor cable with PVC conduit.	1.18.1 1.18.2 1.18.3
5	TV cable RG-6 grade 0.7 mm solid copper with PVC conduit.	1.19
6	Fan Regulator stepped type	1.25
7	3 pin 5/6 amp modular sockets	1.31
8	6 pin 15/16 amp modular sockets	1.32
9	Louvers / shutter for Exhaust Fan	1.51
10	LAN Cable UTP 4 pair CAT 6 with PVC conduit.	1.53
11	Ceiling fans as per approved sample	
12	Exhaust fans in all toilets 300 mm dia.	
13	Exhaust fans of required capacity in labs, Multipurpose hall	

Table 6- General Specifications for Light Fittings

S No	Location	Type of Fitting	Brief Description
1	In false ceilings in offices, labs, classrooms etc	Recessed LED	Recessed '600 x 600 luminaries, white powder coated CRCA body, high efficacy diffuser covering full face IP 20 Class 1 (36 to 50 Watts)
2		Recessed LED spotlight	7 w White colored ABS housing with extruded aluminum heat sink

3		Recessed LED	Recessed, 180 mm dia. aluminum die cast body, high efficacy diffuser IP 20 Class 1 (12 to 15Watts)
4	Corridors, lobbies, staircase, toilets	Surface mounted LED	Decorative surface/wall mounted round down light fixture with opal diffuser 10-12W LED
5	in labs, classrooms etc without false ceiling	Surface mounted CFL with mirror optics	surface mounted '600 x 600 luminaries, white powder coated CRCA body, high efficacy diffuser covering full face IP 20 Class 1 (36 to 50 Watts)
6	suspended fitting in labs with high ceilings	medium bay, down lighting	415 dia. spun aluminum housing, anodized, translucent acrylic refractor, bottom cover, 150 w LED
7	in rooms, classrooms, stair cases, corridors	wall mounted	1200 mm long 36-40watt LED batten light with acrylic diffuser
8	Mirror lights		T5, 8watt mirror light with acrylic diffuser
9	Street lights	LED	Single piece aluminum housing, LED 60-110 w suitable for 9 m pole
10	Post top lanterns	LED for 4.5 m post, and boundary wall	powder coated aluminum IP66, with 12-20 w LED
11	External walls	Bulkhead	LED bulkhead plastic housing with polycarbonate diffuser

Other associated buildings

Utility Building - 130 Sqm

OHT- 300 Sqm

Security Cabin – 12.0 Sqm

RCC Under Ground Tank – 115 Sqm

6.1.5.4. Planning, Designing and Construction of Engineering Services

- Bidders shall submit electrical load calculations and required configuration of transformers and DG sets.
- The successful Bidder shall on behalf of the Owner obtain permanent and temporary power connection, and the costs incurred in these shall be part of the bid cost.
- Emergency back up by a combination of DG sets(including necessary approvals from statutory authority) to provide for uninterrupted power for 100% lighting and power load and 50% of load for power equipment and air conditioning; after assuming appropriate diversity factors.
- There shall be provision for central air conditioning load in the areas which shall be through independent panels and cables.

6.1.5.4.1. ELECTRIC SUBSTATION- The work shall include electric transformers of required capacity, panels, circuit breakers, earthing and cabling, Solar Panels and its change over, including associated civil works. The drawings and specifications shall be approved by the Employer/Concern department and shall be constructed in accordance to the statutory requirements of the State Electricity Board.

6.1.5.4.2. Transformer - Design, -manufacturing, testing at works, supply, installation, testing and commissioning at site transformers of required capacity, 11KV/433V, 3Phase, 50Hz, delta/star connected ONAN cooled type copper wound transformer vector group DYN 11, with OFF LOAD TAP CHANGER with taps +5% to -10% in steps of 2.5%, floor channel with stoppers, bidirectional roller, diagram & rating plate, winding temperature indicator, oil temperature indicator lifting hooks, first fill of oil, cable termination of 1 Nos. 3.5 C x 300 sq.mm. LV side with HT and LT bushing, non-magnetic glad plate etc. complete as per specifications, as required. (The transformer shall be subject to all tests specified in the specifications and test certificates shall be produced).

6.1.5.4.3. Cabling - Supplying, Laying, testing & commissioning of the required sizes of XLPE Al. Conductor armored cables of 1.1KV grade on the surface of wall in Trench / ground with sand and brick protection covering including digging and refilling the trench proper clamps, fixing hardware etc. as required; including supplying, making, testing & commissioning of end termination with brass double compression glands

6.1.5.4.4. Panels - Design, fabrication, loading, unloading at store, installation, testing & commissioning as directed by Engineer-in-Charge, of LT Panels fabricated out of 2mm thick for structural members (Load bearing members) and 1.6mm thick for door and covers (Non load bearing members) CRCA sheet in cubicle compartmentalize free standing floor mounted, dust and vermin proof with reinforcement of suitable size angle iron, channel 'T' irons and / or flats wherever necessary, 16 gauge CRCA sheet steel shall be used for final distribution panels. Cable gland plates shall be provided on top as well as at the bottom of the panels. Panels shall be treated with all anticorrosive process before painting as per specifications with 2 coats of zinc chromate primer and final approved shade of enameled paint. 2 Nos. earthing terminals shall be provided for all distribution panels. Panels shall be suitable for 415V, 3-phase, 4-wire, 50Hz supply system and with 15% spare space, lifting hooks shall also be provided in case of large panels.

Approval shall be taken for each panel before fabrication. Galvanized hardware with zinc passivation shall be used in fabrication of panels. MCCBs shall be used with Thermal Magnetic Based releases upto 250A and microprocessor based Over Load, Short Circuit / Earth Fault release, above 250A. All MCCBs shall be

provided with rotary operating handle and ON/OFF lamps.

- All meters shall be digital type (unless otherwise specified)
- All MCBs shall be motor duty type.
- All current/voltage transformer shall be cast resin type.
- All indicating lamps shall be LED type.
- Current density for Al. bus bars shall not be more than 0.8A/Sq. mm. Rating of Bus bar is after considering all derating factors. (Bus bar sizing calculation to be submitted for approved.)
- All internal control wiring shall be heat resistant type.
- All incoming breakers in Main LT panel shall be electrically interlocked, as per inter locking scheme given in SLD.
- All TP feeders shall be provided with Isolable neutral link.
- Bus bar chamber & cable entry both shall be provided at top only.
- Bus couplers shall be provided with ON & OFF indicating lights but without releases.
- All feeders shall be provided with door interlocked with door defeat, pad lock facility.
- Live parts shall not be accessible after opening the door, Transparent acrylic sheet to be provided to cover the same.
- 20% spare control terminal to be provided.
- All incoming/outgoing cables shall be terminated on links/terminals.

6.1.5.4.5. Earthing - The specifications for earthing shall be under various categories as below:

Earthing with copper earth plate 600mm x 600mm x 3mm thick including accessories & making masonry enclosure on the top with C.I. Cover with locking arrangement, watering pipe and filling charcoal & salt etc as required.

- Earthing with GI earth plate 600mm x 600mm x 6mm thick including accessories & making masonry enclosure on the top with C.I. Cover with locking arrangement, watering pipe and filling charcoal & salt etc as required. (Body Earthing for HT Transformer & DG, Main Panel)
- Supply & fixing of 40 mm x 6 mm thick copper strip in 65mm dia. GI pipe (medium class) from earth electrode including providing and fixing of test link and connections etc. as required.
- 40mm x 6mm thick G.I. strip in 65mm dia. G.I. pipe (med) from earth electrode including providing and fixing test link and connections etc as required.
- Supply & fixing of 40mm x 6 mm thick Sleeved, Copper strip on wall with fixing hardware complete as required.
- 40mm x 6 mm thick G.I. strip on wall with fixing hardware complete as required.
- 8 SWG G.I. Wire on surface / recess/ground as required.

6.1.5.4.6. Distribution Boards- The distribution boards shall be wall mounted TPN/SPN distribution board of double door type design made out of 16-gauge MS sheet with supplying and fixing following accessories including painting, interconnections, painting, earthing and labeling etc. as required. (all MCBS shall be 10KA rupturing capacity)

6.1.5.4.7. DG SETS- Supply, Installation, Testing & Commissioning of AMF panel Indoor- type weather, dust and vermin proof, seven tank treatment process, 100-micron powder coating, suitable for 415 volt 3 phase 4 wire 50 Hz. system, fabricated out of CRCA 2.0mm thick sheet (1.6mm for doors and partition and 3mm for gland plate) with base frame of angle /channel iron, necessary support of slot angle/plates/MS plates, conduits as required duly compartmentalized for incomer, bus section, outgoing, cable alleys, energy meter etc. suitable cutout for ammeter, voltmeter, selector switch, frequency meter, phase indicating lamp, energy meter, push button etc. complete as required.

The rate include for supply and fixing switchgear, busbar, metering and protection accessories DMC/SMC supports, earthing terminals, detachable gland plate with knock out, door knob/industrial door lock, internal

control and power wiring with required size of copper cable, lugs, complete with nut, bolt, washer, providing name plates of all chambers etc. as per approved design, pattern and specifications consisting with following materials/accessories - The diesel generator sets accessories shall be suitable for the climatic condition - ambient 42 deg C max, 15 deg Min ,altitude-1000 meter above sea level. with all ancillary equipment, control cabling from to control panel and starting 24 volts alternator batteries,990 ltr capacity fuel tank. etc. complete as required.

Multi cylinder diesel engine Compression ignition, totally enclosed, 6 stroke cycle, cold battery starting, capable of developing suitable b.h.p. at 1500 r.p.m equipped with fly wheel, Electronic Governor Backed up by Mechanical as per ISO: 8528-5-G2.

The design and specifications to ensure auto load share and synchronizing, the set shall include lubricating oil system, turbo charging etc. continuous duty,10 % overload capacity for one-hour, electric start, direct radiator cooled, air temperature 40 deg. C average, 45 deg. C peak, humidity 30%-90% etc Safety controls-over speed governor lube oil temperature alarm, low oil, fuel failure, oil pressure gauge, lube oil, hour counter, r.p.m. meter etc. The design of DG Sets shall conform to the requirement of CPCB.

Design, manufacture, supply, erection, testing & commissioning of 4.85 mm thick exhaust piping conforming to IS:3589 with expansion joints, bends, support thermal insulation with 75mm thick glass wool /mineral wool, wire chicken mesh over insulation and 24-gauge aluminum sheet cladding over the exhaust pipes from silencer to atmosphere. The sizes are indicative only and the Contractor should furnish calculation for exhaust piping size for approval by the Consultant. The system should meet the performance of the engine without exceeding the back-pressure limit prescribed by engine supplier. Indicative exhaust pipe layout drawing is enclosed for reference. In case the selected size as per calculation of back pressure does not fall in the size specified above, the rate of pipe of size so selected shall also be indicated. Required MS structural works to support the exhaust shall also be provided and is included in the cost.

- 6.1.5.4.8. UPS SYSTEM** - The work shall include supply installation ,testing & commissioning of 60KVA UPS 3phase input / 3 Phase Output complete with Sealed maintenance free 60 nos. 12 volts 42 AH battery to provide 30 minutes back up for a total load of 60KVA with MS cabinet for Battery housing. The UPS shall be with Isolation transformer of suitable capacity and shall be of approved make.
- 6.1.5.4.9. EXTERNAL ELECTRIFICATION AND LIGHTING-** The work shall include all street lighting by way of LED street light fixtures on poles of required heights, post top lanterns with LED fixtures mounted on posts or boundary walls, external brackets, floodlighting of Academic and administration block, workshops, MP hall and community centres, as also for landscape features. The work will also include cabling, panels and earthing. All designs and drawings will be got approved by the Employer.
- 6.1.5.4.10. UNDERGROUND WATER TANK** - RCC underground water tanks shall be provided for collection of municipal water supply, bore well supply, rainwater catchment as well as for fire purposes. The tanks shall be designed with adequate integral waterproofing as well as external waterproofing as approved and shall be designed with top slab adequately raised to avoid flood water and shall have double sealed CI covers.
- 6.1.5.4.11. OVERHEAD WATER TANKS** - An RCC overhead water tank shall be provided for collection of municipal water supply, bore well supply, and treated recycled water. This water tank shall supply through gravity filtered as well as unfiltered water. The design shall be so done as to achieve required staging height, shall have access ladders, inspection covers, lighting, level indicators.
- 6.1.5.4.12. FIRE DETECTION AND SUPPRESSION**

- The successful Bidder shall design and get approved from Fire Authorities, a proposal for Fire Detection and Suppression comprising of Wet riser/down comer system with sprinklers, yard hydrants, manual detectors as per Part 4 of National Building code and in accordance with local Fire Authority.
- Underground tanks and pump room, static tanks as per Part 4 of National Building code and in accordance with local Fire Authority.
- All the works shall be executed as per these standards, and after successful commissioning and testing shall be got approved by the local Fire Authority

6.1.5.4.13. Manual call boxes - The call box shall be of 1.5mm thick welded sheet steel or 3mm thick cast aluminum. The front face shall have a glass area designed to break by a steady application of pressure or by impact. Suitable arrangement like scratching by a diamond bit shall be incorporated in the frangible element so that when it breaks upon application of pressure by a finger, it does not hurt the finger. The frangible element shall keep a push button pressed inside such that in the event of breaking of the frangible element, the push button is released to actuate an alarm in the control panel. The push button shall be partly depressed so as not to hinder breaking of the frangible element. The call box shall have suitable knock out for termination of a 20mm conduit. This shall also have suitable provision for being fixed on surface or semi recessed in wall. Where sheet steel is used for call box, this shall be thoroughly cleaned off dust, dirt, grease and rust if any and two coats of anti-rust primer shall be given both inside and outside followed by two coat of synthetic enamel paint in signal red color or epoxy or powder coated after seven tank process. In the case cast aluminum body for a call box, the surface shall be neatly finished with red color paint as in above. The words 'FIRE' shall be printed on the front of the call box in face of window. The glass surface shall be minimum 30 sq.cm. in area and glass thickness shall not exceed 2 mm.

Manual call boxes shall be installed at a height of 1400mm above the floor level. They shall be installed at easily accessible, well illuminated and conspicuous position, preferably in a contrasting background so that they are easily noticed from either direction. They should be semi-recessed so as to project minimum 10mm from wall surface. They shall be installed free from obstructions and shall not themselves obstruct exit way.

It shall be located on escape routes at (inside or outside) each floor to escape stairs preferably near entry to staircases at various level. It shall be located such a way that, no person in the premises needs to travel more than 30 meters to reach a manual call point to give an alarm. Where necessary, the travel distance may be reduced to less than 30 meters e.g. where there is difficulty in access or in potentially dangerous risk areas. Once the glass is broken the alarm shall sound on the floor as well as on control panel.

6.1.5.4.14. Heat and smoke detectors. Heat Detectors shall conform to IS-2175 - 1988 or BS-5445 (EN 54) Part 5 – 1977(VdS/LPCB approved) or NFPA72 (UL/ULC/FM approved) amended upto date. Smoke Detectors shall conform to IS-11360-1985 or BS 5446 Part I-1977 & Part VII –1985 (VdS/LPCB approved) or NFPA72 (UL/ULC/FM approved) amended up to date. For other detectors/devices relevant IS or BS (EN 54) (VdS/LPCB approved) or NFPA 72 (UL/ULC/FM approved) amended upto date 3.4 Governing Specifications: Heat Detectors shall conform to IS-2175 - 1988 or BS-5445 (EN 54) Part 5 –1977 (VdS/LPCB approved) or NFPA72 (UL/ULC/FM approved) amended upto date. Smoke Detectors shall conform to IS-11360-1985 or BS 5446 Part I-1977 & Part VII –1985 (VdS/LPCB approved) or NFPA72 (UL/ULC/FM approved) amended up to date. For other detectors/devices relevant IS or BS (EN 54) (VdS/LPCB approved) or NFPA 72 (UL/ULC/FM approved) amended upto date.

6.1.5.4.15. Control and Indicating Panels. These shall be provided as specified in the schedule of work.

(i) Main Control and Indicating Panel (C & I Panel) including Public Address System. (ii) Sector Panel. (iii) Zonal Panel. (iv) Repeater Panel.

The trigger devices shall be connected to the respective zonal panels. Where the zoning design in any work provides of areas as sector and further sub-division as zones, the trigger devices shall be connected to the sector panels, since no zonal panel is required in such a case. The sector/zonal panels shall in turn be

connected to the C&I Panel. The C&I panel shall provide necessary audio-visual alarm and actuate the sounders. This shall also initiate signals for any other operation specified in tender specification. Electric power supply to the entire FAS/ AFAS shall be fed through this panel. 4.3.2 C & I Panel including Public Address System All the sectors/zones connected to this panel shall be continuously monitored. Audio-visual alarm shall be provided in this panel to show the ZONE affected by fault in its wiring system or by fire. Such an alarm should be separate for fault and fire conditions. This shall be complete with necessary circuitry for providing power supply to the entire FAS/AFAS drawing power from the mains/standby battery. This shall transmit to its repeater panel if any, signal of alarm of fault and of fire.

- 6.1.5.4.16. Panels and P A system.** Public Address System shall be provided to enable transmission of announcements and instructions to the occupants in each zone in the event of a fire. Fire alarm sounders in the premises shall be designed to function as loud speakers for the purpose. The microphone, necessary amplification equipment and control switches shall be provided as a part of the C&I panel. The power rating and frequency response shall be as per the requirement of the individual installation.
- 6.1.5.4.17. Sector/zonal Panel:** A sector panel shall be provided where there is more than one zone in a floor under the control of a C&I panel, and zonal panel is not required in that floor. A zonal panel shall be provided where there is only one zone in that floor. The sector/Zonal panel shall provide visual indication of the ZONE where a fault or fire has occurred. Audio alarm in this panel shall be provided, where specified in tender specifications. This panels shall transmit to the C&I panel, alarm signals from any of the trigger devices and the wiring connected to it. This panel shall provide visual indication for the following: (a) System ON and healthy. (b) Fault in any zone connected to this panel. (c) Fire in any zone connected to this panel with double lamp arrangement. (d) Isolation of a zone for testing purposes from C&I panel.

Test switch shall be provided to test the lamps on this panel. Where audio alarm is specified in tender specifications in any work in this panel, panel sounder and its silencing switch shall be provided. The power supply to operate this panel shall be drawn from the C&I panel.

- 6.1.5.4.18. Spot Indicator:** This shall provide only a visual indication whenever any of the detectors connected to it triggers a fire alarm. The indication given out by these indicators shall be conspicuous under fire conditions. In case of recessed type, the design shall be such that the indicators are spotted easily. The cover of the spot indicators may be screwed type or snap-in-type. Spot indicators shall be installed on wall such that its top is at door level and by the side of the entrance to the respective premises. Spot indicators for detectors installed over a false ceiling in a corridor shall be installed directly under the false ceiling. Spot indicators for detectors installed under a false floor, shall be installed at a height of 1 meter above false floor level. Additionally, a marking or an arrow pointing downwards shall be made by the side of the spot indicator. The installation shall be such that the visual indication from the spot indicators are conspicuous and that the affected area is spotted without difficulty.
- 6.1.5.4.19. Repeater Panel:** A repeater panel where provided shall duplicate the alarm indications (audio as well as visual) of the C&I Panel. All indications, both visual and audio as shown on the C&I panel shall be indicated in the repeater panel, where provided. The power supply to operate the repeater panel shall be drawn from the C&I panel.

The various control and indicating panels shall be totally enclosed, dust and vermin proof and shall be suitable for the environmental conditions at the site of their installation. These shall be fabricated out of sheet steel of 1.6mm thickness and designed for wall or floor mounting. They shall be front openable type with hinged cover and lock. The C & I Panel shall be designed such that the equipment for power supply, battery charging and P.A system for FAS/AFAS are housed in independent compartments. Maintenance free batteries shall however not be accommodated inside the panel to avoid problems due to corrosion. Suitable knock outs shall be provided for the entry of cables and wiring into the panels. The panels after

fabrication shall be cleaned to remove any dust/dirt/grease/rust and phosphated. After two coats of anti-rust primer, the panels shall be finished with powder coating of fire red color. All components and their wiring shall be arranged so as to be conveniently attended to from the front of the panels. All indicating lamps, control switches and buttons and fuses shall be located in the front of the panels. These shall be suitable and unambiguously labeled. The indicating lamps should consist of LED confirming to relevant Indian standards, connected in parallel, of following colors:(a) Red to indicate FIRE condition - Two LED (b) Amber to indicate FAULT condition - only one LED i.e., for open & short circuit separately,(c) Green to indicate HEALTHY condition.

Test buttons to test the indicating lamps shall be provided. All control and indicating panels can be of either electro-mechanical type or of electronic type. Any printed circuit boards (PCBs) used in the panels shall be plug in type. The PCBs shall be suitably protected against atmospheric corrosion. If required, the panel should have additional capacity to operate auxiliary equipment like fire dampers, fire closers, ventilation and/or pressurizing fans, smoke exhaust fans etc.

Audio-visual indication shall be provided in this panel for the following:(a) Fire in any zone (b) Fault in any zone including fault in wiring to the sector/zonal panels and removal of any fire detector/disconnection of leads to detectors.(c) Fault in this panel itself.(d) Mains supply failure.(e) Low battery voltage.(f) A.C. Fuse blowout.(g) D.C. fuse blow out.

Only visual indication shall be provided in this panel for the following:(a) A.C. Power ON/OFF(b) Stand by battery supply ON/OFF. (c) Battery charger ON/OFF(d) Isolation of zone for testing purposes as per (iii) below, (e) Operation if silencing switch, when there is no alarm condition, (f) P.A. system ON. Facility shall be provided to test the zones individually by simulating fault or fire condition. Each zone shall be capable of isolation for maintenance or test purposes leaving the remaining zones in healthy condition so that fire detection in those zones is not affected. Visual indication of such isolation shall be available on the panel.

This panel shall also be provided with the following: (a) Necessary test switches for testing of circuits and C&I panel. (b) Panel sounder and silencing switch. (c) Switches to operate the fire alarm sounders zone wise and also collectively at all zones. (d) Changeover switch to P.A. System. (e) P.A. System equipment and panel microphone. (f) Voltmeters with protective fuses for both A.C. and D.C. Supplies. (g) Battery charger ammeter.

On clearance of a fault or a fire condition, as the case may be the system shall reset automatically. Where specified, the following provisions shall be incorporated in the design of the C&I panel: (a) Provision for automatic connection to Fire Brigade through external public telephone lines. (b) Provision for operation in conjunction with other Gas based Suppression System.

No control and indicating panel shall be located outside the building room in severe environmental conditions, unless precaution against the effects of the same have been taken. These panels shall not be provided inside any enclosed space and preferably be located somewhere on the ground floor / in fire control room. The C&I panel shall be conspicuously located so as to be visible without effort on entering a building. The sector/zonal panel shall be located in a conspicuous location at the entrance to a sector/zone, such as a lift lobby or a staircase lobby. This panel shall be in a common lobby or a corridor, which can be approached without passing through an occupied area. The repeater panel should be provided near the main entrance so that maintenance staff notices the fault condition or isolation if any for rectification.

6.1.5.4.20. Installation of Control and Indicating panels: The control and indicating panels shall be installed at the locations shown in the drawings approved by the Employer / Fire department. Mimic diagram shall be installed by the side of the C&I panel so as to be integral part of the same. Battery charger ON/OFF. Isolation of zone for testing purposes as per (iii) below. Operation if silencing switch, when there is no alarm condition. P.A. system ON. Facility shall be provided to test the zones individually by simulating fault or fire condition. Each zone shall be capable of isolation for maintenance or test purposes leaving the remaining zones in healthy condition so that fire detection in those zones is not affected. Visual indication of such isolation shall be available on the panel. This panel shall also be provided with the following:(a) Necessary test switches for testing of circuits and C&I panel.(b)

Panel sounder and silencing switch.(c) Switches to operate the fire alarm sounders zone wise and also collectively at all zones.(d) Changeover switch to P.A. System.(e) P.A. System equipment and panel microphone.(f) Voltmeters with protective fuses for both A.C. and D.C. Supplies.(g) Battery charger ammeter.

On clearance of a fault or a fire condition, as the case may be the system shall reset automatically. Where specified, the following provisions shall be incorporated in the design of the C&I panel: (a) Provision for automatic connection to Fire Brigade through external public telephone lines. (b) Provision for operation in conjunction with other Gas based Suppression System. The alarm should operate until silenced manually. The alarm should not be silenced automatically.

- 6.1.5.4.21. Sounders:** Panel sounder shall be provided in C&I Panels, sector/zonal panel specified and repeater panel if any so as to draw attention of the care taking personnel in a building to a fault in the FAS/AFAS wiring and a fire condition in the protected premises. Fire alarm sounder of low intensity type shall be installed to signal to the occupants of the building to evacuate in the event of a fire. Fire alarm sounders of high intensity type shall be installed to draw the attention of the firefighting personnel toward the main entrance of the premises where a fire has erupted. Fire alarm sounders shall not be used for any purpose other than for fire operations. Silencing facility shall be provided, only for panel sounders and not for fire alarm sounders.

Panel sounders shall be actuated from the respective panels except in repeater panel, in which this shall be actuated from the C&I Panels. Fire alarm sounders shall be actuated from the C&I Panel. The operation of sounders shall be independent of operation of any indication like lamps or flags in the panels. Depending on the size and design of these panels, they may be either wall mounting or floor mounting type. Installation shall be done using necessary foundation bolts etc. Any supports required for large panels shall be of sufficient strength so that installation is rigid and sturdy. Necessary provisions shall be made for conveniently receiving conduits or cables as the case may be. The panels shall be so installed that all the indicator lamps are easily visible and the switches in the panels are within easy reach for operation. A free working space of at least 1 meter shall be available in front of the panels.

Panel sounder shall be provided in C&I Panels, sector/zonal panel specified and repeater panel if any so as to draw attention of the care taking personnel in a building to a fault in the FAS/AFAS wiring and a fire condition in the protected premises. Fire alarm sounder of low intensity type shall be installed to signal to the occupants of the building to evacuate in the event of a fire. Fire alarm sounders of high intensity type shall be installed to draw the attention of the fire-fighting personnel toward the main entrance of the premises where a fire has erupted. Fire alarm sounders shall not be used for any purpose other than for fire operations. Silencing facility shall be provided, only for panel sounders and not for fire alarm sounders. Panel sounders shall be actuated from the respective panels except in repeater panel, in which this shall be actuated from the C&I Panels. Fire alarm sounders shall be actuated from the C&I Panel. The operation of sounders shall be independent of operation of any indication like lamps or flags in the panels.

Sounders and silencing switches-The panel sounders in the respective panels shall be actuated automatically as soon as fire alarm signal is initiated from any trigger device connected to them. These shall be sounded when there is a fault alarm signal within their areas of control. A silencing switch shall be provided in C&I Panel. Operation of this switch shall mute the audio output from the panel sounder in this panel and in its repeater panel, if any. Silencing switch shall also be provided in repeater panel which when actuated shall mute the audio output in the panel only. Silencing switch shall be provided in sector/zonal panels which may be specified to have audio indication in particular works, to mute the output of the same. Fire alarm sounders in a zone affected by a fire shall be actuated automatically as soon as fire alarm signal is initiated from any trigger device in that zone. All other fire alarm sounders shall be actuated only manually from the C&I Panel, individual zone wise and collectively for the entire installation. (Automatic operation of all the sounders in a building immediately after a fire alarm signal is initiated is likely to create panic). Such a manual operation of Fire alarm sounders be done after operating the silencing switch for the sounder in the C&I Panel, within a preset time.

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- 6.1.5.4.22. Silencing Switches:** Silencing switch shall be in the form of a switch or push button. This shall be located on the panel whose panel sounder is to be silenced. Operation of a silencing switch shall not affect any visual indication nor the output of fire alarm sounders in the building. Operation of a silencing switch shall not prevent the receipt of alarm from any sector/zone as the case may be, not already in an alarm condition.

Low intensity fire alarm sounders may be installed on surface of ceiling, suspended from ceiling or recessed in flush with the ceiling, depending on the construction of the sounder and ceiling height. These shall be installed at a height not lower than 2.4m except when recessed in a false ceiling of lower height. In such cases the sounders shall be recessed at false ceiling level. When installed flush with a false ceiling these shall match the ceiling surface. Necessary provisions for frame work to accommodate the sounders shall be made in the ceiling in advance. High intensity sounders shall be mounted on substantial supports. Provisions for terminating the electrical wiring cables shall be such as not to permit entry of rain water through the wiring conduits or cable runs.

The panel sounders in the respective panels shall be actuated automatically as soon as fire alarm signal is initiated from any trigger device connected to them. These shall be sounded when there is a fault alarm signal within their areas of control. A silencing switch shall be provided in C&I Panel. Operation of this switch shall mute the audio output from the panel sounder in this panel and in its repeater panel, if any. Silencing switch shall also be provided in repeater panel which when actuated shall mute the audio output in the panel only. Silencing switch shall be provided in sector/zonal panels which may be specified to have audio indication in particular works, to mute the output of the same. Fire alarm sounders in a zone affected by a fire shall be actuated automatically as soon as fire alarm signal is initiated from any trigger device in that zone. All other fire alarm sounders shall be actuated only manually from the C&I Panel, individual zonewise and collectively for the entire installation. (Automatic operation of all the sounders in a building immediately after a fire alarm signal is initiated is likely to create panic). Such a manual operation of Fire alarm sounders be done after operating the silencing switch for the sounder in the C&I Panel, within a preset time.

- 6.1.5.4.23. Mimic Diagram** - A clear indication of the locations of all the ZONES shall be provided in mimic diagram. Mimic diagram shall be provided near Main Control Panel and near repeater panels. A topographical representation of the premises shall be provided in the mimic diagram for the purpose. The construction shall be in a metal frame work wall mounted, with a facia of transparent acrylic sheet with lighted and labeled (or engraved) indications. The location shall be well lighted so that the mimic diagram is conveniently readable.

- 6.1.5.4.24. Main Power Supply** - Power supply at 230 V 50 Hz, A C. single phase shall be provided terminating directly into the incoming switch of the C & I panel. Earth wire shall be provided with the power supply. Rectification of the input AC supply into DC and further stabilization of the voltage as may be necessary shall from part of the FAS equipment.

- 6.1.5.4.25. Battery:** Standby battery supply, which shall be provided with C&I Panel. Battery supply shall be arranged to automatically feed the FAS/Automatic Fire Alarm System in the event of variation of input A.C. voltage beyond preset values on high and low sides. The battery shall be sealed maintenance free lead acid type or any other rechargeable type. The nominal voltage shall be as suitable for the FAS/AFAS. The capacity of the battery Shall be such that it should capable of maintaining the system in normal operation for a Period of not less than 24 Hours after failure of normal supply. Battery shall be located in a well ventilated space close to the C & I Panel, so as to be conveniently maintained. This shall be installed in a non corrosive enclosure, such as of wood, PVC or steel coated with epoxy paint

- 6.1.5.4.26. Battery Charger:** The battery shall be provided with a matching battery charger which shall form part of the C&I Panel. The battery shall be in continuous trickle/boost charge. The charging rate shall be such that after re-charging for a period of 8 hours, the battery shall be capable of

feeding load for the capacity specified in the schedule of work. The charger shall be complete with necessary voltmeter, ammeter, indicating lamps, fuses, etc.

- 6.1.5.4.27. Power Supply Equipment and Wiring:** The PVC insulated FRLS copper conductor cable having a minimum 1.5 mm cross sectional area conforming to IS-694 to be used. Armoured XLPE cables conforming to IS 7098 Part-1, 1988 with upto date amendments shall be used for connection with control panels & other areas wherever required. Wiring shall be laid in metallic/rigid conduit. Cables connected to detectors should be given 'S' loops on both the sides of the detectors which should be properly clamped to the ceiling. Loop should also be left, where wire/cables connect to sounders & all other accessories in the system. Appropriate glands should be provided where the cables enter the junctions box. Only 'red color' wire should be used for laying in conduit. No over-head lines should be used to connect different building. All the wires should be tagged for proper identification, should be identified by ferrules at junction & cable by color bands at every 3 meters distance. Multi-core cables and flexible cords shall not be used.

The electrical work connected with a FAS/ AFAS shall be carried out in conformity with CPWD General Specification for electrical work Part-I (Internal) 2013 and Part-II (External) 1994 both amended up to date. FAS/AFAS wiring shall be exclusive to the FAS/AFAS and be physically separated from wiring for any other service in the building. To minimize possible disruption due to fire or other cause, fire alarm circuits should be separated as much as possible from each other. Where practicable, the different fire alarm circuits shall be run through different routes. The metal body of all control and indicating panels shall be loop earthed using 2.5 sq.mm. copper wire and bonded to the earthing system in the building.

6.1.5.4.28. Sprinkler, Piping and accessories.

The work shall include providing, laying, jointing, testing and commissioning of various sizes of MS 'C' Class (Heavy duty) pipes conforming to IS-1239 with all accessories like orifice plate(of required dia.), all fittings (standard MS fitting with welded joint shall be used on the pipes) including tees, elbows, reducers, union, flanges, rubber gaskets, GI nuts bolts, washer including supporting/fixing the pipe on floor / wall / ceiling with clamps, hangers (using anchor fasteners) as per specification. G.I. pipe sleeve of suitable higher size shall be provided wherever the pipes are crossing the walls/floors and sealing the sleeves with glass wool in between & fire sealant compound at either end all as per Project Manager's / Consultants requirements including cutting holes and chases in brick, RCC work and making good the same to original conditions complete in all respects. All hangers, clamps, brackets etc. shall be of galvanized iron unless specified otherwise and then supply of the same shall also be included for rates under this head. Welding of any kind on the galvanized support / hanger shall not be permitted including synthetic enamel paint of approved shade over a coat of zinc primer. Note: Pipe up to 50 mm dia. shall be threaded joints, above 50 mm shall be welded joints. For wet riser System - MS 'C' Heavy class pipe

Providing two coats of synthetic enamel paint of approved shade over a coat of primer. Prior to application of primer the surface should be cleaned for any dirt, rusts, rough substance etc. Including painting of legends both direction arrow as per the approval of the Project Manager.

The work shall also include providing and fixing:

M.S. structural work fabricated from standard sections, (MS rounds, angles, channels etc.) including cutting to size, drilling, welding, including cost of fasteners, clamps in RCC structural members as directed, including two or more coats of synthetic paint over one coat of primer after surface preparation including cutting and making good walls.

Gunmetal fire hydrant single headed landing valve with 80 NB flanged inlet, brass spindle controlled 63 mm dia female instantaneous outlet type coupling, blank cap, chain, twist release type lug & all accessories. Conforming to IS standard. Including fixing with anchor fastener and flanged tapping from wet riser and providing pressure gauge with gun metal ball valve complete as required.

- 63 mm dia. 15 m long non-percolating flexible hose (RRL- type A) as per IS: 636. Type A with Gunmetal male & female instantaneous type coupling (IS 903) (For internal hydrant system).
- 63 mm dia. Gunmetal instantaneous pattern branch short pipe, 20 mm dia. nozzle conforming to IS 903, suitable for inter connection to hose pipe coupling complete as required.
- Standard Fireman's Axe with heavy insulated handle.
- Wall mounting swinging type first aid fire hose reel with drum, hanging bracket, 36.5 meter. length x 20 mm dia. high pressure hose reel tubing as per IS: 444 with gun metal (GM) shut off nozzle having 5 mm dia. orifice. The hose reel shall be conforming to IS: 884-1985. Rate shall include 25 mm dia. M.S. pipe connection from Riser to hose reel, sockets, nipples, elbows and ball valve (25 mm dia.). Drum shall be fixed on adjoining wall through anchor fasteners / cement concrete block as and when required.
- Fire authority approved M.S. shutter (size 1200 (L) x 2100 (H) mm) made out of 16-gauge M.S. sheet Angle frame capable of accommodating fire hose reel, fire hydrant, hose pipe, fittings & accessories. The box shall have a single- or double-glazed front glass door (with 4 mm thick glass) with lock & key arrangement & shall be painted with Fire red as per IS:5, shade no. 536. (For Internal Hydrant)
- Butterfly valve (Body: Grey Cast Iron, Shaft: SS, Disc: SG Iron (Rilson coated), Liner: HT - EPDM) (up to 150mm dia. with hand lever operation & above with gear box operation) with a working pressure not less than 16 Kg/Sq.cm. Including rubber gasket, flanges, nuts, bolts, washers & painting complete as required.
- Non - return valve with dual plate of C I body SS plates vulcanized NBR seal flanged end & PN 16 pressure rating as specified. Note: All valves shall be of minimum 16 Kg/sq.cm working pressure

6.1.5.4.29. Pipes and Pipe Work. All materials shall be of the best quality conforming to the specifications and subject to the approval of the Engineer-in-charge. Pipes shall be securely fixed to walls, and the ceiling by suitable suspenders and clamps at intervals not exceeding 1.5 meter. Valves and other accessories shall be so located that they are easily accessible for operations, repairs and maintenance. The piping system shall be capable of withstanding 150% of the working pressure including water hammer effects. For MS pipelines up to 50 mm dia. screwed jointing shall be adopted, while for pipelines above 50 mm dia. welded flanged construction is to be carried out. Flanged joints shall be used for connections to vessels, equipment, flanged valves etc. respective of the pipe size. Pipes shall be buried at-least one meter below ground level and shall have 230 mm x 230 mm masonry supports at-least 300 mm high at 3 m intervals. Masonry work to have plain cement concrete foundation (1 cement: 4 coarse sand: 8 stone aggregate) of size 380 x 380 x 75 thick resting on firm soil. Sluice valve shall be kept in open position and the scope of work includes provision of necessary leather strap and pad lock so as to prevent unauthorized closing of valve. The installation work include provision of all clamps, supports anchors etc. which will be as per drawing.

6.1.5.4.30. Protection. All pipes above ground and in exposed locations shall be painted with one coat of Red Oxide primer and two or more coats or synthetic enamel paint of approved shade. All MS pipes under floors or below ground shall be provided with protection against soil corrosion by applying two coats of coal tar hot enamel paint, polythene tape and finished with one coat of the above paint (80/95 grade bitumen). All M.S. pipes below ground shall be laid on a layer of 7.5 cm coarse sand (Zone IV) and filled up to 15 cm above the pipes.

6.1.5.4.31. Air Vessel and Air Release Valve. Air vessel on top of each wet riser piping shall be fabricated of at least 10 mm thick GI sheet to withstand the pressure, i.e (dished ends and supporting legs). This shall be of 450mm dia. and 2.0 m high. This shall be complete with necessary flange connection to the wet riser piping and air release valve with necessary piping to meet the functional requirement of the system. The air vessel shall be continuous welded construction. This shall be tested for twice the working pressure at the works and necessary test certificates shall be furnished.

- 6.1.5.4.32. Valves, Gauges and Orifice Plates.** Sluice valve above 65mm shall be of cast iron body and bronze/gunmetal seat. They shall conform to type PN 1.6 of I.S.: 780-1980, valves upto 65mm shall be of brass construction. Valve wheels shall be of right-hand type and have arrow head engraved or cast thereon showing the direction for turning open and closing. Non return valve shall be of cast iron body and bronze gunmetal seat. They shall conform to class I of IS: 5312 and have flanged ends. They shall be swing check type in horizontal runs and lift check type in the vertical runs of piping. They shall not be spring loaded type. Pressure gauge of suitable range shall be installed on the discharge side of each pump. Vacuum gauge shall be provided on suction side for pumps with negative suction. The dial size shall be 150mm. The gauge shall be with necessary cocks. Orifice plates shall be of 6mm thick stainless steel to reduce pressure on individual hydrants to operating pressure of 3.5 kg/sq.cm. Design of the same shall be given by the contractor as per location and pressure condition of each hydrant.
- 6.1.5.4.33. External Yard Hydrants.** External Yard Hydrants shall be of 'Stand Post' type conforming to IS: 908-1975 and comprise of stand post for single outlet, duck foot bend, flanged riser and single headed brass/gunmetal valve conforming to type A of IS. 5290-1977. The stand post column shall be cast iron, cast in one piece, conforming to Grade 20 of IS:210-1970. The internal diameter at the top shall be at least 80mm. External (yard) hydrants shall be located to have the outlet at about 1m above ground level. Where external hydrants below ground level are specifically indicated in tender specifications, there shall be enclosed in masonry or cast iron structure of size 75 cm square and 8 cm above ground level. The hydrant shall be within 8 cm from the top of the enclosure. The outlet of yard hydrants shall be angled to the ground with an instantaneous spring lock type gunmetal female coupling of 63mm dia. for connecting to the hose pipe.
- 6.1.5.4.34. Internal Hydrants.** The internal hydrant outlet shall comprise single headed single outlet gunmetal landing valve conforming to type 'A' of I.S. 5290-1977. On the head shall form part of the landing valve construction. Internal hydrants at each floor shall be located at about 1m above floor level.
- 6.1.5.4.35. First Aid Hose Reel Equipment.** First Aid hose reel equipment shall comprise reel, hose guide fixing bracket, hose tubing, globe valve, stop cock and nozzle. This shall conform to IS-884-1969. The hose tubing shall confirm to IS:1532-1969. The hose tubing shall be 20mm dia and 30m long. The nozzle and globe valve shall be of 20mm size. The fixing bracket shall be of swinging type. Operating instructions shall be engraved on the assembly.
- 6.1.5.4.36. Hose Pipes.** Hose pipe shall be of non-percolating type as per IS 636-1979 (Type B). With nominal size of 63mm and lengths of 15m, as per quantities specified for each. All hose pipes shall carry ISI marking on the body of the hose. The hose shall have instantaneous spring lock-type coupling on ends. The instantaneous coupling shall be as per IS: 903. It shall be fixed to each other by copper rivets and galvanized M.S. wires and leather bands. All coupling shall be interchangeable with each other and shall bear ISI markings.
- 6.1.5.4.37. Hose Reel.** The hose reel shall be directly tapped from the riser through a 25 mm dia. pipe, the drum and reel being firmly held against the wall by use of dash fasteners. The hose reel shall be swinging type (180°) and the entire drum, reel etc. shall be as per IS: 3876 and IS: 884. The rubber tubing shall be of best quality and the Gun Metal nozzle shall be 16 mm dia. shut off type as per IS 8090-1976 selected out of list of approved makes.

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- 6.1.5.4.38. Branch Pipes.** Branch pipe shall be of either gunmetal or aluminum and should conform to IS:903. One end of the branch pipe will receive the coupling while the other end shall have a nozzle screwed to it. It shall bear ISI marking.
- 6.1.5.4.39. Hose Cabinets.** Each hydrant shall be housed in a Hose cabinet of suitable size. The Hydrant Cabinet shall hold single headed hydrant 2 hoses and one branch pipe as required. Internal hydrants shall normally fit the niche made for it. The cabinet shall be of minimum 1.6mm sheet, glazed doors (clear glass of 4 mm thickness). The glass shall be firmly fixed by means of steel clips and screws with rubber beading. Hinges shall also be screwed and not welded. The steel work shall have one coat of primer and two coats of red enamel paint. The words "Yard Hydrant", "Hydrant' etc., should be painted in white or red on the glass in 75 mm high letters, The Hose Box shall be lockable.
- 6.1.5.4.40. Fire Brigade Inlet Connection.** A two-way fire brigade inlet connection with a non-return valve as per IS 904-1983 shall be provided to facilitate the fire brigade to pump water into the system by the use of their own equipment. This shall be housed in a M.S. cabinet with glass fronted door as per drawing.
- 6.1.5.4.41. Fire Brigade Inlet and Draw-off Connection.** Inlet connection – a four-way gun metal inlet connection as per IS 904-1983 shall be provided at the Fire Storage Tank for filling of the tank by the fire Brigade, through a 150mm dia. inlet Pipe. The connection will have the option to pressurize the building Fire System (by the Fire Brigade directly) by provision of sluice valves, tee and bend as per drawings. Draw off connection – a draw off connection for drawing the water from the Fire Tank would be provided next to the inlet connection to enable Fire Brigade to draw water from the Fire Tank. This shall consist of a gun metal stand draw off connection with a gunmetal blank cap and a chain. A 150mm suction pipe with a foot valve and strainer shall be provided as per drawings. M.S. cabinet, for enclosing both inlet and outlet connection shall be provided as per drawings.
- 6.1.5.4.42. Electric Pumps.** The electric fire pump shall be suitable for automatic operation complete with necessary electric motor and automatic starting gear. Electric motor shall be suitable for 415V + 10%, 3 phase, 50Hz, A.C. supply. The class of insulation shall be B.
- 6.1.5.4.43. Main/Sprinkler/Terrace Electrical Fire Pump.** The main electrical fire pump should be capable of delivering 150% of its rated discharge at least 65% of its rated head. Motor starter shall be automatic star delta type. The unit shall include suitable CT and ammeter on one line and shall not incorporate under voltage / no voltage trip, overload or SPP. The starter assembly shall be integrated in the power and control panel of the system.
- 6.1.5.4.44. Pressurization (Jockey) Pump.** The discharge of the pressurization pump shall be as per the schedule of quantities.
- 6.1.5.4.45. Portable Fire Extinguishers.** Providing & fixing of ISI marked (IS:15683) portable fire extinguisher, carbon dioxide type flat base including valve, discharge hose of not less than 10 mm dia. 1 M long & complete in all respects including initial fill with CO₂ gas conforming to IS:307-1966 filled to a filling ratio of not more than 0.667 of not more than 0.667 and wall suspension bracket capacity 4.5 kg 6 Kg. ABC Powder type fire extinguishers are manufactured and marked to Indian standard IS: 15683. Suitable first aid appliance for fighting fires in Class A, B & C fire that is wood, textile, flammable liquids & gases. Providing and fixing of carbon-di-oxide fire extinguishers (22.5 kg) trolley mounted with all accessories internal discharge tube, high

pressure discharge hose, discharge nozzle, ISI marked as per IS:2878 finished externally with red enamel paint and fixed to wall with brackets complete with internal charge.

6.1.5.4.46. Electrical Installations for Fire-fighting System

Control Cable: Supply and laying of 4C x 1.5 Sq.mm copper armored cable including termination. (Control cable shall be paid separately under control cable head). Supply and laying of 2C x 1 Sq.mm copper armored cable including termination. (Control cable shall be paid separately under control cable head).

6.1.5.4.47. LIFTS- Passenger lift shall be of approved make with following requirement and attached specifications.) 1) Type of lift - Passenger lift. 2) - Capacity of lift - 16 persons / 1088Kgs. 3) - No. of lifts - 2 Nos. 4) - Speed - 1.25 M/Sec. 5) - Drive - Variable voltage variable frequency drive. 6) - Leveling accuracy - +/-5mm. 7) - Type of control - Microprocessor based simplex Full selective collective control for single lift and double full selective for two lifts with or without attendant operation. 8) - Height of travel - 15 (approx..). 9) - No. of floors served - Ground + 3 upper floors. 10) - No. of landing doors: G + 03 = 04. 11) – minimum Lift well size: 2200mm x 2100mm. 12) - Car size (Inside): 1600mm x 1600mm. 13) - Clear entrance opening: 800 x 2000mm. 14) - Car enclosure: Enclosure shall be made of stainless-steel hair line finish and shall be provided with fan, fan grill, indirect fluorescent/CFL light arrangement along with false ceiling. The flooring shall be of granite tiles. 15) - Landing and car door: Power operated center opening automatic horizontal sliding stainless steel doors (Hairline finish) with provision for emergency key opening at all landings. The drive shall be through variable voltage variable frequency drive. 16) - Battery operated emergency light in the car and alarm bell in selected floors with maintenance- free battery and charger. 17) - UP / DOWN and floor level indicator in the lifts and at all Floors / landings. 18) - Micro touch push button with LED to indicate call registration.

6.1.5.4.48. External Lighting - The specifications for external lighting shall be as follows:

- 7.0/ 9.0 (as per layout) meter. Long street light G.I. pole 100 mm dia. medium class with 300 x 300 x 6 mm thick base plate with cement concrete enclosure 1:2:4, all around the pole extending 500 mm above ground, the pole shall be 1.0 meter. below ground and 6 meters above ground with following accessories.
- 200 mm x 150 mm x 100 mm deep (2 mm thick) sheet steel pole box duly painted, 2 nos. 6-way connectors for termination of incoming and outgoing cables. Box tube clamped to the pole and grouted in the CC around the pole.
- 1.25 meter. long G.I. pipe duty 32 mm dia. curved for incoming and outgoing cable up to the pole box as above.
- Top cap for the poles.
- 32 mm dia. G.I. pipe bracket 1.5 meters. Long duly bent at 15° from horizontal to receive the street light fixture including G.I. clamps, nuts bolts etc. as required.
- Wiring with 2x1.5 sq. mm. PVC insulated FRLS wire, from pole box to street light fixture.
- 2.4/ 3.6 meter. (as per layout) High (3 meters above ground and 0.06 meter. below ground) G.I. pole 65 mm dia. medium class with 250 x 250 x 6 mm thick base plate with cement concrete enclosure CC 1:2:4 all around the pole extending 500 mm above ground with following accessories.
- 150 mm x 125 mm x 75 mm deep (2 mm thick) sheet steel poll box duly painted supply and fixing
- 32 mm dia. 1.25-meter-long G.I. pipe duty curved for incoming and outgoing cable up to the pole box as above.
- Suitable reducer at the top with threaded G.I. pipe 100 mm long to mount post top lantern fixture.
- wiring with 1.5 sq.mm. PVC insulated FRLS wire, from pole box to the post top lantern in required.
- 32 mm dia. G.I. bracket 1.25 meter long duly bent at 15° from horizontal (750 mm straight and 500 mm bent portion) on surface of wall with G.I. clamps, for fixing the outdoor fixture ,a G.I. box 75 mm x 75 mm x 65 mm deep shall be recessed in with Hylam sheet cover and hole to extend the wires in box to the fixture.(Point wiring shall be directly terminated in fixture through G.I. box)

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- 6.1.5.4.49. CENTRAL AIR-CONDITIONING** - The scope of work shall include air AHUs, FCUs, filters, cooling towers, ducting, chilled water piping and associated civil, piping and electrical works (except pump room which shall be payable on plinth area basis)

This design concept proposal elaborates the HVAC system with 300 TRX 3 nos.(one standby) chilling machines with magnetic compressors which are oil free type and efficiency wise best in class, 3 nos. FRP Induced Draught type cooling towers of 375 TR shall be used with suitable Chilled water and condenser water Pumps and other associated items, reference standards, basis of design etc

REFERENCE STANDARDS

National Building Code of India (NBC)
 Energy conservation Building Code 2007 (ECBC)
 Bureau of Indian Standards (BIS) Codes:

- IS: 655-1963 (Reaffirmed 1991)- Metal air ducts
- IS: 659-1964 (Reaffirmed 1991)- Air-conditioning (Safety code)
- IS: 1239 (Part-1) -1990
- - Mild steel pipes

ASHRAE Standards
 ASHRAE Hand Book

- a. Fundamentals 2001
- b. Refrigeration 2002
- c. Applications 2003
- d. Systems & Equipment 2004
- e. Duct construction standards as per relevant BIS codes & SMACNA standards.
- f. Air Filters as per ASHRAE 52.1-1992
- g. Indoor Air Quality as per ASHRAE 62-2001
- h. Motors, cabling, wiring and accessories as per BIS codes. IE Rules / IS codes.

Basis of Design

Site Location : Mouza –Pandra Mancheswar Industrial Area (Bhubaneswar)
Geographic Location : (Latitude)/ (Longitude)
Altitude : 58 M from MSL
Daily Range : 11°F

Outside Conditions:

Summer:	DB	WB
	32.2° C (90° F)	25.6 ° C (78° F)
Monsoon:	DB	WB
	31.1° C (88° F)	27.8° C (82° F)

Winter: DB	WB
11.1° C (52° F)	8.3° C (47° F)

Indoor Design Conditions:

Indoor design conditions for all centrally air-conditioned and heating areas/spaces shall be taken as:

Summer/Monsoon/Winter:-

DB	:	24 ± 1 deg. C
RH	:	below 60%

- Exposed Glasses** : All glasses exposed in sun shall have suitable shading devices / Venetian blinds.
- Lighting Load** : 1.5 W per Square Ft
- Roof Insulation** : All the exposed roof/ ceiling to be insulated with 50mm thick EPS/ or Equivalent.

Mechanical Ventilation System

The following areas shall be provided with dedicated ventilation system with the number of air changes for each space as per National Building Codes (NBC) as identified hereunder:

- a) Toilets : 12 ACPH

Design Parameters

Water Cooled Chilling Machine with Oil Free Magnetic Compressors:

Performance rating of the water chilling machine shall be based on following design parameters:

Temperature of chilled water Entering chilling machine.	:	54 Deg. F (12.2 deg. C)
Temperature of chilled water Leaving chilling machine	:	44 Deg. F (6.7 deg. C)
Fouling factor for chiller in FPS unit	:	0.0005
Environmentally friendly Green Refrigerant	:	R-134A
Capacity of water chilling machine At above conditions:		300 TR X3 nos. (2W+1S)
Makes of Efficient magnetic oil free Compressor type water cooled chilling machines:		York/Trane/LG/Voltas/Daikin, or equivalent

Design parameters for selection of Air handling Unit and its Components shall be:

Maximum face velocity across Profiler media	:	350 Ft/Min. (100M /Min)
Maximum face velocity across Cooling coil	:	500 Ft/Min. (150M /Min.)
Maximum fan outlet velocity	:	2000 Ft/Min. (600 M/Min.)

Piping shall be sized for the following design parameters:

Maximum velocity	:	8 Ft/Sec (2.5 M/Sec.)
Maximum friction	:	5 Ft/100 Ft. Run (5 M/100 M Run)

Design parameters for duct design shall be:

Maximum flow velocity (Conditioned air)	:	1500 Ft/Min. (450 M/Min)
Maximum flow velocity For ventilation	:	1800 Ft/Min. (550 M / Min)
Maximum friction	:	0.1 in. WG/100 Ft. Run (1cm WG/100M Run)
Maximum velocity at Supply air outlets	:	500 Ft/Min. (150 M/Min.)

6.1.5.4.50. Brief Outline Specification for Major Equipment

Water Chilling Machines: These water chilling machines shall be centrifugal Oil free type per AHRI 550-590 and shall consist of most efficient magnetic compressor and motor, condenser, evaporator, microprocessor-based control panel, suitable VFDs and full charge of environment friendly green refrigerant R-134A. The chilling machine shall be supplied with Variable Speed Drive. These chilling machines shall be supplied with suitable automatic tube cleaning system as required.

Hot Water Generators: 2 nos. Electrically Operated Hot Water Generators (HWGs) with suitable heating capacity shall be used for winter heating as hot water (Water Into HWG-50°C and water out shall be 55°C) shall be supplied in AHUs in winters at suitable temperature to maintain comfort inside all spaces.

Chilled Water, Hot Water and Condenser Water Pumps: These shall be centrifugal Inline type to be mounted directly on pipes and suitable for specified duty as per BOQ. Motors shall be energy efficient IE4 type. Primary chilled water Pumps, secondary chilled water pumps, Hot water Pumps and condenser water pumps shall be provided with VFDs, mechanical seals so as to prevent leakage of water through glands.

Cooling Towers: shall be low noise- induced draft suitable for outdoor use. Cooling Towers shall be vertical, counter / cross flow type, FRP construction in rectangular / square shape complete with fan, IE4 motor, surface and spray section, eliminators, galvanized steel supports all mounted with in FRP basin. All cooling Towers shall be fitted with suitable VFDs for energy saving. Make up soft water to be used in the cooling towers shall be around 6000-6500 ltrs. per hour.

Air Handling Units: Air handling units shall be double skin construction type comprising of filter section, 6 Row chilled water coil and 2 Row hot water section and Direct driven Plug fans. Double skin panels shall be 23 mm thick made of galvanized steel, pressure. Injected with foam insulation, Outer sheet of panels shall be made of galvanized pre-plasticised sheet 0.6 mm thick and inner sheet of 0.6 mm plain GI sheet. The fan shall be Plug fans with IE4 motors and suitable VFDs, Coils shall be copper tube aluminium fin construction,

6 Rows deep for Cooling and 2 Row deep for heating. Condensate drain pan shall be 18 gauge stainless steel construction, generously sloped to have zero water retention. All AHUs shall have ultrasonic humidification system along with humidistats and thermostats for close control of temperature and humidity. All AHUs shall run on 4 pipe system.

Fan Coil Units (if required): FCU's shall be horizontal, blow-through type, each complete with 3 row deep chiller water cooling coil of copper tube aluminium fin construction, centrifugal blower, filter and condensate drain pan of stainless steel construction.

Piping: All chilled water/hot water and condensing water pipes shall be mild steel Class C (heavy duty) conforming to relevant BIS codes. All jointing in the pipe system shall be by welding. Various types of valves such as butterfly valve, Balancing Valves Ball valves and non-return valves shall be provided in water lines as required. PICV valves shall be used on AHUs in Chilled water and hot water lines for balancing water and avoiding a Reverse Return Piping System. All chilled water and hot water pipes shall be insulated. Air and dirt separators shall be used on Chilled and condenser water circuits.

Condensate drain piping: shall be galvanized steel Class B (medium class) with insulation and conforming to relevant BIS codes. All jointing in the condensates drain pipe system shall be screwed joints or by screwed flanges. All condensate drain water pipes shall be insulated. All condensate drain shall of AHUs shall be collected at HVAC plant Room Sump/tank and shall be recycled to AHUs to further enhance the efficiency of these towers and take advantage of low temperature of condensate drain water.

Air Distribution System: All ducts shall be fabricated from galvanized steel sheets of various thicknesses ranging from 24 gauges to 18 gauges according to duct sizes and in accordance with BIS Code. SMACNA standards may be used for factory fabricated ducts. Grills / diffuser shall be powder coated extruded aluminium construction and shall be provided as per the requirement of interior design. Cross linked closed cell Oxide Acetate Foam Thermal insulation on ducts having density of 19mmX30 to 33 Kg/ M³, having K value 0.029 W/m ° K at 40°C Deg temp and temp range of (-)70°C to (+)100°C and fire rating Class O as per BS 476 Part 6 from CBRI, Roorkee as per the approved specifications. Smoke & Toxicity index of material shall be passed as per IMO MSC 307 (88) 2010 Annex 1 Pt 2. Material shall be CFC/ HCFC free as per US EPA 5021 A (2014).

Smoke Dampers and Pressurization: Smoke dampers shall be provided in accordance with ASHRAE / NFPA with in supply air ducts and return air ducts / opening at all AHU room wall crossing and at fire rated wall crossings, to prevent spread of smoke to the adjoining areas. Smoke dampers shall be motorized and actuated by smoke sensors. Lift wells and Staircases shall be pressurized by supplying air from the top through the fan installed on terrace. These fans shall be actuated by smoke sensors in case of detection of fire on any affected floor.

Acoustic Lining of Ducts and AHU Rooms: All AHU Rooms shall be acoustically lined with Cross linked acoustic insulation for duct & AHU, having density of 30 to 55 Kg/ M³, having K value 0.029 W/m ° K at 40°C Deg temp and temp range of -70°C to +100°C and fire rating Class O as per BS 476 Part 6 from CBRI, Roorkee as per the approved specifications. Smoke & Toxicity index of material shall be passed as per IMO MSC 307 (88) 2010 Annex 1 Pt 2. Material shall be CFC/ HCFC free as per US EPA 5021 A(2014).complete with all adhesives, fixing arrangement and accessories etc Insulation to be fixed in 610mmx610mm frame work made of 25x50x50x50x25 mm made out of 0.6mm thick GI sheet U shaped channel and covered with insulation and finished with 0.8 mm Aluminum sheet as per drawings and specifications. Thickness shall be 15 mm for Duct acoustic insulation and 25mm for AHU room acoustic lining.

HRUs and Fresh air system: Heat Recovery Units in Double skin construction and with Plate to Plate type heat exchanger shall be used in AHU for recovering energy and maintaining indoor air quality. Fresh air shall be supplied thru HRUs to AHUs thru motorised fresh air suction dampers which shall be installed on the intake ducts and shall be regulated thru CO2 sensors. Efficiency of HRUs shall not be less than 70%.

UVGI: Ultra Violet Germicidal Disinfectant (UVGI) system shall be used as air disinfectant in AHUs Rooms as it is required to control air borne diseases, infections like Covid-19 etc.

Underdeck Insulation: Underdeck insulation at top floor shall be carried out to reduce the heat transmission inside the building. Material shall be cross linked closed cell Oxide Acetate Foam Thermal insulation on underdeck insulation having 19mmX 30 to 33 Kg/ M³ density, having K value 0.029 W/m ° K at 40°C Deg temp and temp range of -70°C to +100°C and fire rating Class O as per BS 476 Part 6 from CBRI, Roorkee as per the approved specifications. Smoke & Toxicity index of material shall be passed as per IMO MSC 307 (88) 2010 Annex 1 Pt 2. • Material shall be CFC/ HCFC free as per US EPA 5021 A(2014). Similarly Water proofing of HVAC plant room Roof shall be done to avoid seepage of water from cooling towers.

SIDE STREAM FILTRATION SYSTEM shall be used to remove unwanted solids from Condenser loop using a centrifugal-action vortex separator. Control of solids in the recirculated cooling water system shall be accomplished via a side-stream flow of 5-30% of the full-stream system flow through a completely assembled separation / filtration package. The package's pump shall provide sufficient pressure for the re-introduction of side-stream fluid back into system flow. the inter piping connection of pump & separator should be MS pipes with welding / grooved fittings. The side stream filtration unit shall have a suitable flow rate and pressure drop of 0.2 - 0.9 Bar, Maximum working pressure of 10.3 Bar and Maximum operating temperature of 38 deg. C. Estimated HVAC Load Requirements: Total 650 TR.

Proposed Air-Conditioning system with water cooled chilling machines:

The total air-conditioning load for the above areas works out to be **630 TR**. It is proposed to install central chilled water air-conditioning and heating system to provide year round thermal environmental control. The system configuration shall be as follows:

- 3nos X 300 TR Cooling Capacity centrifugal chilling machines with oil free magnetic type compressors (2 working +1 stand by)
- 2 nos. Hot water Generators for Winter Heating
- 3 nos. chilled water primary pumps (2W + 1S)
- 3 nos. chilled water secondary pumps (2W + 1S)
- 3 nos. condenser water pumps (2W + 1S)
- 3 nos Hot water pumps (2W + 1S)
- 3 nos. 375TR induced draught cooling towers (2W+1S)
- Air Handling Units with VFDs as per the requirements at various floors/ areas.

The Equipment shall be installed at the plant room as proposed and chilled water from this plant shall be supplied to various AHU's placed at various floors/ locations as per requirements. The system shall be complete with electrical panel boards, power cabling, control cabling, earthing and controls.

Pressurization:

Staircase well, elevator shaft and Lift lobby pressurization shall be carried as per BS/NBC norms. Mechanical Double skin fan section Units with suitable blowers shall be placed over Lift/ staircase mummies shall be actuated through smoke detection system and provide safe passage in case of fire/emergency.

Energy Conservation measures:

- Use of most efficient electric motors on chilling machine, pumps, AHUs and Fans.
- Use of primary and secondary pumping system. The secondary system works on the principle of reducing its speed and saving energy when the load is reduced.

- Use of most efficient oil free magnetic centrifugal compressor type chilling machines with environment friendly refrigerants of zero ozone depletion potential and minimum greenhouse gases effects.
- Entire floor in two Zones with one dedicated AHU in each Zone to save energy.
- Use of Variable Frequency Drives on Chilling machines, Pumps, Cooling Towers, AHUs motors to save energy. The motors with VFDs reduce their speed and save energy when the load in a certain zone is reduced.
- Building Automation to save man hours on operation and have other benefits as detailed below:

6.1.5.5. Planning Designing Construction of Site Development

- 6.1.5.5.1. EARTHWORKS** - The scope of works shall include cutting and filling as required as per design, supply and filling of imported earth and compaction, tree cutting where essential Filling of river sand so as to achieve an average of 1000 mm fill over the areas under development Phase 1
- Filling of river sand so as to achieve an additional (average of 1000 mm) fill under all buildings.
- 6.1.5.5.2. INTERNAL BOUNDARY WALL** - The scope of work includes the construction of masonry internal boundary walls sides and rear so as to enclose the Precision Engineering campus, with masonry wall 1.5m height minimum and 600 mm high barbed wire fencing over it, with cc coping, RC framed, plastered and painted both sides with acrylic emulsion
- 6.1.5.5.3. ENTRANCE GATE AND PORTAL-** The scope of work shall include:
- RCC portal of approved size and design over entrance point spanning dual carriage way, including cladding, lighting, signage and lettering of approved design.
 - 2 MS gates of minimum size 6m wide and 2m height and 2 Pedestrian gates at entrance, 1.5m x 2m
 - A guard house of minimum 3.6 m x 3.6m area of approved design.
 - Boundary wall at entrance of 24m length and 2.4 m high with signage and lettering over granite base, with decorative light fixtures.
- 6.1.5.5.4. INTERNAL ROADS AND PAVEMENT (ABOUT 2000 SQM area) with paver blocks of M40 grade-**
The designs shall demonstrate adequate width of roads, turning radius, appropriate gradients.
- Sidewalk of 1m width shall be provided along one/ both sides of roads, and of 3m width along selected sections of dual carriageway road.
 - Open paved vehicle parking shall be provided as per bye laws, but not less than what is indicted in the drawings.
- 6.1.5.5.5. RAINWATER COLLECTION, HARVESTING AND RECYCLING** - The scope of work shall include:
- Collection and storage of rainwater by means of drains, piping, rainwater catchment tanks and harvesting through natural water bodies.
 - Recycling of rainwater after filtration including supply to buildings for flushing purposes.
 - The design and construction shall provide chambers with gratings, filters, manholes as required to connect to buildings, rainwater tanks, water bodies, necessary pumps, piping and valves to ensure delivery.
- 6.1.5.5.6. EXTERNAL SEWERAGE AND SEWAGE TREATMENT** - The entire campus shall have a sewerage system with Sewerage treatment plants of adequate capacity to ensure the effluent is within the prescribed norms. The scope of work shall include:
- Waste and soil pipes, with gratings, manholes as required to connect to building, rainwater tanks, water bodies. The system shall be provided with necessary filters, gratings and necessary pumps, piping and valves to ensure adequate recycling where required.
 - Design and construction of Sewage Treatment plant
 - All designs and drawings shall be got approved by the Employer.
- 6.1.5.5.7. EXTERNAL WATER SUPPLY** - The campus shall be supplied with municipal water, borewell water and recycled water from rainwater and the STP. The cooling towers shall be supplied with recycled water, and it shall be used for flushing purposes by way of a 2-pipe system. The recycled water shall also be used for horticultural purposes. The scope of work shall include.
- Piping for water supply, from municipal inlet point to pump house, all risers and down comers to underground tank, overhead tanks, necessary pumps, piping and valves to ensure delivery. Adequate filtration systems shall be provided to ensure potable water in all outlets within the campus from the fresh water line.
 - Construction of 2 borewells with pumps of approved capacities and specifications

Table Specification for Internal & External Sanitary and Water supply			
S. No.	Item	Description	CPWD Code
1	Internal water supply in toilets / kitchen	Recessed CPVC pipe	18.7,18.8 &18.9
2	Internal water supply in shaft	Exposed GI pipe class B painted	18.10
3	Rainwater pipe	Rigid PVC pipe with accessories	12.41
4	Internal Soil & Waste pipe	Cast Iron with accessories, painted	17.37
5	External Soil pipe	Cast Iron with accessories, painted	17.37
6	External Waste & Rainwater pipe	Rigid PVC/SWR pipe with accessories	12.41
7	External water supply	G.I. pipe complete with G.I. fitting	18.12
8	Manhole FRP Cover	500 mm diameter FRP cover	

Toilet and Kitchen Specifications

S. No.	Toilets Requirement	CPWD Code
1	European WC (100%)	17.3
2	Urinals with flushing cistern	17.5
3	Wash Basin 540 x 400 mm with C.P. brass pillar tap	17.7.4
4	Mirror (453x357 mm)	17.32.2
5	PTMT Bottle trap	17.70.2
6	CP brass bib cock	18.49
7	Concealed stop cock	18.53.3
8	PTMT Shower rose and arm	18.64

6.1.5.5.8. LANDSCAPING - The scope of work about 2000 SqM area shall include:

- Peripheral plantation
- Grassing, shrubbery and ornamental trees
- Filling with sweet earth suitable for horticultural work
- Network of unfiltered water supply

6.1.5.5.9. PARKING - 900 Sqm (4 wheeler-Stack Parking & 2 wheelers)

6.1.5.6. Design and Drawing

6.1.5.6.1. ARCHITECTURAL DESIGN AND DRAWING

The architectural design shall be carried out on the basis of the concepts drawings attached which have been approved by the Employer. The drawings indicate the broad scope of the requirements of the Employer and the Contractor shall make such modifications as required to incorporate all aspects such as adherence to codes, by laws, structural safety and efficiency of building services designs.

Development of Employer's architectural design concept into final design, presentation with 3D designs, walkthrough and area statements. After approval from the Employer, the Contractor shall obtain clearances from Municipality, Town and Country Planning Department, environmental agencies; and all statutory/ regulatory bodies. Preparation of architectural and structural construction drawings, MEP, HVAC, landscape and other services designs and drawings. Obtain approval of structural design from IIT/REC engineering college in consultation with client, including payment of fee for the same (This payment will be reimbursed by the Employer under Provisional Sums). Conduct green building studies and obtain rating from GRIHA, including payment of fee for the same.

Architectural and structural detailed drawings, all engineering designs and drawings including but not limited to Mechanical-Electrical-Plumbing (MEP), Sewer line, rain water harvesting, HVAC, CCTV, fire access control, fire protection and detection systems, lift system, source and supply of power, yard lighting, landscaping and plantation, area planning with respect to material storage, labor huts and traffic movement, main water supply connection, approach road, etc. duly approved by the Employer.

- The architectural design concept focuses on a compact low-rise development of mostly 3 and 4 storied buildings. The zoning has been done so as to providing maximum frontage and easy access to the academic and administrative buildings.
- The buildings have been designed with singly loaded corridors grouped around open landscaped spaces maximizing natural lighting and ventilation.
- The detailed architectural design shall be carried out to meet the requirements specified in this document.
- The architectural design of the building shall provide sustainability policies to promote sustainable design and operation of campus functions; it shall
 - Maximize the utilization of ecological potential of the site in land use, energy, and resource generation;
 - Minimize the energy and resource consumption in compliance to ECBC Code;
 - Protect, harvest and conserve water;
 - Minimize waste;
 - Use environmentally friendly products and materials;
 - Enhance indoor environmental quality.
 - The building shall conform to the norms of GRIHA 3- star rating.
- Climate considerations shall be paramount in the design of building, ensuring maximum ventilation, avoiding solar ingress in summers and allowing the sun to heat the inside spaces in winters with appropriate design of sunshades.
 - The designs of stairs and corridors especially shall be such that no rainwater enters them, and sunshades, drop walls and recessed openings shall be used to ensure this. Antiskid strips should be used for safety against slipping hazards.
 - Use of any material should not violate law of land and legal compliance should be adhered to.
- The Architectural design shall also provide for Barrier Free access for Differently Abled Persons (DAP), and shall cater to but not limited to
 - Parking for differently abled, near the entrance to all buildings.
 - Ramps for easy access to ground floor.
 - Ramps at all level differences.
 - Handicapped toilets
 - Lift to access all floor levels
 - Tactile flooring and Signage's

Aesthetic Considerations

- Water supply, rainwater and drainage stacks shall be concealed in masonry pipe shafts, with inspection panels on each floor, which shall be covered with aesthetically designed Jali.
- No balcony/part roof, canopy shall drain through spouts, and shall have rainwater pipes of adequate diameter.
- All elevations and finishes, color schemes shall be in line with the instructions.

Approval of all designs and drawings - The Contractor shall be required to submit all design documents and detailed drawings for approval to the Employer and shall incorporate such modifications as are admissible within the terms stated above in Section 6: Employer's Requirements. The approval by the Employer however does neither limit nor dilute the primary responsibility of the Contractor in all matters pertaining to the design and construction.

6.1.5.6.2. STRUCTURAL DESIGN AND DRAWING

The contractor shall carry out structural design compliant to the requirements of architectural and engineering services design. The contractor shall produce the detailed design document including but not limited to detailed calculations of structural analysis in compliance to earthquake zone of the location, Indian standard codes of practices, National Building Code etc.

The brief specifications are mentioned in this contract document. The contractor shall develop the detailed specifications for each of the component of the project work including all the services, landscaping and area development. These specifications shall mention all the technical details, applicable area, list of material involved, list of manufactures applicable codes and standards detailed work procedures, MSDS and other safety data.

The contractor shall also produce Structural drawings showing complete details including but not limited to each and every structural component regarding reinforcement, grade of concrete, size of each component, sectional details at every important location, in line with various services drawings in a manner that all constructible details are mentioned in the drawings with detailed notes. Contractor shall also produce all trade coordination drawings for embedment of inserts, conduits, openings, in the structural components in a manner that the structural safety of all the structural components is adequate for overall safety of the building. **These drawings should be duly approved by any IIT or government engineering college, in consultation with Employer.**

NOTE: Payments to such institutions will be made by the contractor and reimbursed by the employer under provisional sums.

6.1.5.6.3. MEP DESIGN AND DRAWING (FOR BUILDING WORKS, ENGINEERING SERVICES AND SITE DEVELOPMENT WORKS)

The contractor shall prepare detailed specifications, drawings and details in accordance to the approved architectural and structural designs.

6.1.5.6.4. CONSULTANCY RELATED TO GRIHA

The designs shall be in conformity to the relevant codes and shall also meet the criteria required for GRIHA 3-star classification. The Contractor shall coordinate with the rating agencies, and accreditation consultants and prepare an execution strategy for design, construction and operating in order to achieve the necessary rating.

6.1.5.7. Environmental Planning and Management

6.1.5.7.1. General - The Contractor may acquaint himself with the provisions outlined in the Initial Environmental Examination (IEE) (Appendix 1) and Environment Management Plan (EMP) (Appendix 2), and shall be responsible for compliance of Environmental Impacts and Mitigation Measures as detailed in EMP. In addition, Contractor shall also adhere to environmental provisions in the applicable specifications for the works as part of good engineering practices.

All works undertaken towards protection of environmental resources as part of the EMP and as part of good engineering practices while adhering to relevant specifications will be deemed to be incidental to works being carried out and no separate payment will be made unless otherwise specified explicitly. The costs towards environmental management as per EMP unless otherwise provided as a separate head, will be deemed to be part of the BoQ of the project. The scope of works of the contractor towards the implementation of the environmental provisions shall be as follows:

- Abide by all existing Environmental regulations and requirements of the Government of Odisha, during implementation,
- Compliance with all mitigation measures and monitoring requirements set out in the Environmental Management Plan (EMP)
- Submission of a method statement detailing how the subproject EMP will be complied with. This shall include methods and schedule of monitoring.

Monitoring of project environmental performance and periodic submission of monitoring reports.

- Compliance with all measures required for construction activities in sensitive areas, including heritage monuments, in line with the regulatory requirements of these Protected / Heritage areas, and the guidelines set forth in the management plans for these areas, including the necessary archaeological surveys prior to commencement of works, obtaining clearances/permits to excavate & construct in protected areas around ASI sites.
- Compliance of all safety rules at work, and Provision of adequate health and safety measures such as water, food, sanitation, personal protective equipment, workers insurance, and medical facilities.

The detailed provisions for specific environmental issues shall be as outlined in the EMP table on impacts and mitigation measures. Key clauses are outlined in the following sections.

6.1.5.7.2. Debris Disposal - The contractor will prior to start of construction and dismantling operations identify potential sites for disposal of hazardous construction debris, sites for general construction wastes and domestic wastes from construction camps. The contractor will obtain approval on identified sites from the Engineer of Supervision Consultant and disposal will be only after consent letter from the Engineer.

6.1.5.7.3. Precautions for Protection of Environmental Resources -The Contractor shall ensure that construction activities do not result in any contamination of land or water by polluting substances. Unless otherwise provided in the specifications, the Contractor shall ensure that no trees or shrubs or waterside vegetation are felled or harmed except those required to be cleared for execution of the works. The Contractor shall protect trees and vegetation from damage to the satisfaction of the Engineer. In the conduct of cleaning activities and operation of equipment, the Contractor will utilize such practicable methods and devices as are reasonably available to control, prevent and otherwise minimize air/noise pollution.

6.1.5.7.4. Noise and Air Pollution -All works will be carried out without unreasonable noise and air pollution. Subject and without prejudice to any other provision of the Contract and the law of the land and its obligation as applicable, the Contractor will take all precautions outlined in the EMP to avoid the air and noise pollution. The Contractor shall monitor the environmental parameters periodically as specified in the monitoring plan and report to the Engineer. The Contractor shall indemnify and keep indemnified the Employer from and against any liability for damages on account of noise or other disturbance created

while carrying out the work, and from and against all claims, demands, proceedings, damages, costs, charges, and expenses, whatsoever, in regard or in relation to such liability.

6.1.5.7.5. Occupational Health and Safety During Construction and Covid-19 - The Contractor shall, in accordance with the safety and health provisions specified in the EMP, provide workers with a safe and healthy working environment, in the work areas, through application of preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. The borrower/client will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by

- providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;
- providing appropriate equipment to minimize risks and requiring and enforcing its use;
- training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment;
- documenting and reporting occupational accidents, diseases, and incidents; and
- having emergency prevention, preparedness, and response arrangements in place.

The occupational health and safety related impacts will include injury to the construction work force, chances of more accidents at site and adverse impacts on health of workers if proper measures are not adopted and necessary protection gadgets are not used. COVID-19 related impacts will cause chances of infections more if protection measures are not provided. The COVID-19 related measures should be taken up at site as per the guidelines issued by the Ministry of Health and Family Welfare and Government of Odisha for the construction projects.

6.1.5.7.6. Post Construction Clearance - On completion of work, wherever applicable, the Contractor shall clear away and remove from the sites all constructional plant, surplus materials, rubbish, scaffoldings, and temporary works of every kind and leave the whole of the sites and works in a clean condition to the satisfaction of the Engineer.

Construction camp sites and any other sites temporarily occupied during construction, shall be cleared as specified in the EMP and handed over to the Owner. It will be ensured by the contractor that the site handed over is in line with the conditions of temporary acquisition signed by both parties.

6.1.5.7.7. Implementation of Environmental Management Plan (EMP) - This cost will cover all components for EMP management such as Tree plantation and upkeep, landscaping development, remunerations for Environmental specialists at OSDA and DSC, Environmental safeguard training workshop/program expenses, travel expenses of environmental team, officials fees for obtaining permissions from statutory authorities pertaining to environment such as Odisha State Pollution Control Board (Consent to operate and establishment, Consent for biomedical and hazardous waste), environmental monitoring, actual expenses for dust suppression at site, etc. Note: Payments for EMP will be made by the contractor and based on actual expenses, reimbursement will be made by the employer under provisional sums.

Appendix -1

Initial Environmental Examination Report (Addendum)

March 2022

India: Odisha Skill Development Project (OSDP)

Prepared by the Skill Development and Technical Education Department, Government of Odisha for the Asian Development Bank

This addendum to Initial Environmental Examination Report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

ABBREVIATIONS

BMC	- Bhubaneswar Municipal Corporation
BDA	- Bhubaneswar Development Authority
CGWA	- Central Ground Water Authority
CO	- Carbon Monoxide
DG	- Diesel Generator
DPR	- Detailed Project Report
DTET	- Directorate of Technical Education & Training
EHS	- Environment, Health & Safety
EMP	- Environmental Management Plan
ESMC	- Environment and Social management Cell
Gol	- Government of India
GoO	- Government of Odisha
GRC	- Grievance Redressal Committee
IT	- Information Technology
ITC	- Industrial Training Centre
ITES	- Information Technology Enabled Service
ITI	- Industrial Training Institute
LPG	- Liquid Petroleum Gas
MoEFCC	- Ministry of Environment, Forest and Climate Change
MoSDE	- Ministry of Skill Development and Entrepreneurship
MSME	- Micro Small and Medium Enterprises
NCVT	- National Council for Vocational Training
NOC	- No Objection Certificate
NOx	- Oxides of Nitrogen
OSDA	- Odisha Skill Development Authority
OSDP	- Odisha Skills Development Project
OSDS	- Odisha Skill Development Society (now known as OSDA)
OSEM	- Odisha State Employment Mission
OSPCB	- Odisha State Pollution Control Board
PEC	- Precision Engineering Centre
RPL	- Recognition of Prior Learning
RSPM	- Respirable Suspended Particulate Matter
SDTED	- Skill Development and Technical Education Department
SDEC	- Skill Development and Employment Centre
SEIAA	- State Environment Impact Assessment Authority
SO ₂	- Sulphur dioxide
SPCB	- State Pollution Control Board
SPM	- Suspended Particulate Matter
SPS	- Safeguard Policy Statement
STP	- Sewage Treatment Plant
ToT	- Training of Trainers
WSC	- World Skill Center

CURRENCY EQUIVALENTS

(As of 09 March 2022)

Currency unit	–	Indian rupee/s (Re/Rs)
Re1.00	=	\$0.013
\$1.00	=	Rs 76.86

WEIGHTS AND MEASURES

dB(A) A-weighted decibel
ha - hectare.
km-kilometer
km²-square kilometer
µg-microgram
m - Meter
m²-square meter
MW (megawatt) -megawatt

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EXECUTIVE SUMMARY

1. Background. The Government of Odisha (GoO) has taken several initiatives to improve its skills development system and address skills shortages. It had set up a high-level Odisha State Employment Mission (OSEM) in 2005–2006 to specifically address the problems of youth unemployment and underemployment. It has established the Skill Development and Technical Education Department (SDTED)¹ to bring together Directorate of Technical Education and Training (DTET), OSEM, employment generation services, and labor regulation under one department. While the establishment of SDDTED improved coordination among different agencies, it has not necessarily enhanced the operational efficiency of its sub-units. DTET is unable to meet industry demands due to poor infrastructure and outdated standards, assessment, and certification processes.

2. The existing training capacity and quality in the state is inadequate to meet the 12th five-year plan target of training one million people. Recognizing weak institutional capacity for market-relevant training, the GoO has also established an autonomous implementation institution, the Odisha Skill Development Society (OSDS) in 2015 (now named as Odisha Skill Development Authority (OSDA)), to implement market-responsive skills programs. This institutional arrangement aims to train one million people and provide greater access to quality training in tribal interior areas of Odisha. In May 2016, the GoO also established the Odisha Skill Development Authority (OSDA) headed by an eminent industry leader with the aim of bringing OSEM and OSDS under one umbrella to ensure effective formulation, implementation and monitoring of skill development programs in Odisha. The Odisha Skill Development Project (OSDP) will help the GoO to streamline this arrangement. In Odisha, the Industrial Training Institutes (ITI) and Industrial Training Centers (ITC) have an estimated combined capacity of around 75,000 seats per year, far below to address the skill potential in the state. Hence, to assist in overcoming these challenges and to enhance the employability of the youth of Odisha and their productivity on employment, the Asian Development Bank (ADB) is supporting the GoO to foster the skill initiatives in the state. OSDP will provide training to about 151,000 working age population during the project period mainly in the age group of 15-34 years in the state of Odisha in higher level manufacturing and services skills aligned to human development strategies of the state. The project will reach out to the youth, disadvantaged groups, and workers in the unorganized, informal and formal sectors by adopting a menu-driven approach to build their skills and increase their employment potential.

3. The Initial Environmental Examination (IEE) report for OSDP was prepared and approved in April 2017. At that time there was a proposal to establish eight Advanced Skills Training Institutes (ASTIs) at different locations in the State. These ASTIs were to act as Hub for the nearby ITIs. But owing to some administrative difficulties and other reasons, GoO decided to establish a World Skill Center (WSC) at Bhubaneswar. Due to this, there were changes in project components, specially pertaining to infrastructure. Hence, environmental impacts and /or issues changed due to minor change of scope. On account of these facts, the ADB approved IEE report was updated in November 2019 and this report was approved by the ADB in January 2020. Later OSDP requested ADB for inclusion of damage training equipment in 4 selected ITIs namely Bhubaneswar, Puri, Cuttack and Berhampur. The IEE report was updated to reflect associated environmental impacts and mitigation measures due to inclusion of training equipment at above mentioned 4 ITIs. The updated IEE was approved by ADB in November 2020. Addendum to the IEE was prepared in June 2021 on account of addition of Precision Engineering Centre (PEC) for the study of Precision Engineering Trade. The addendum to the IEE was approved in June 2021. The

¹In 2012, Odisha established the Employment, Technical Education and Training Department, which was renamed as Skill Development and Technical Education Department (SDTED) in 2015

site for Precision Engineering Centre was adjacent to the site of World Skill Centre. The PEC is part of World Skill Centre. Due to space and structural constraints, it could not be accommodated in IDCO Tower 2010, where WSC is being established. Addendum to the IEE approved in June 2021 has been prepared due to change in location of Precision Engineering Centre (PEC) from the earlier proposed location. The new location of Precision Engineering Site is in Notified Mancheswar Industrial Area. It is about 2 km from WSC (World Skill Centre and old (proposed earlier) Precision Engineering Site). The WSC and Old Precision Engineering Site are also in Mancheswar Industrial Area.

4. **Project description:** The Precision Engineering Centre will be set up by Odisha Skill Development Authority (OSDA). The physical infrastructure involves construction of Precision Engineering Centre with a built-up area of 5027.84 sq m. This will be constructed on vacant land in the Mancheswar Industrial Estate, Bhubaneswar at a distance of 2 km from the World Skill Centre. All the project related infrastructure will be provided on the unencumbered land belonging to the IDCOL (Government of Orissa). The scope in this location includes construction of Precision Engineering Centre on 5.009 Acre land and the installation of laboratory Equipment. The civil works involve construction of a G+1 building entailing Built up area of 2554.42 sqm on the Ground floor and 2307 sqm on the First floor and 166.42 sqm on the Second floor. The Precision Engineering laboratories will be set up on the ground floor, while classrooms and IT laboratory will be set up on the First floor. There is an open terrace on the second floor.

5. **Precision Engineering Centre will have following laboratories/sections:**

- i. Inspection Techniques Laboratory
- ii. Turning Section
- iii. CNC Turning Section
- iv. Milling Section
- v. CNC Milling Section
- vi. 3D CAD/CAM Application Laboratory
- vii. CNC Sheet Metal Fabrication Laboratory
- viii. Multi-Axis Machining Laboratory
- ix. CNC Sheet Metal Fabrication CAD/CAM Studio
- x. Multi-Axis CAM Studio
- xi. Grinding Section

6. The major equipment to be included in the 11 laboratories of Precision Engineering Centre will be measuring instruments in inspection techniques laboratory, Centre Lathe in turning section, CNC Lathe in CNC turning section, Vertical milling machine in milling section, CNC milling machine in CNC milling section, Workstation computer in 3D CAD/CAM Laboratory, CNC Laser (CO₂) cutting machine with CNC controller in CNC Sheet Metal Fabrication Laboratory, Workstation Computers in CNC Sheet Metal Fabrication CAD/CAM Studio and Multi Axis CAM Studio, and Surface grinder with digital readout in Grinding Section. The detailed specifications of these equipment have been provided in Section III of the report.

7. **Approach for addendum Preparation:** The addendum to the IEE report (approved June 2021) has been prepared based on site visits that were done in the month of February 2022 by the Environment Safeguard Specialist of the PMC and the Technical team of the PMU. The observations made during the site visit, observations of environmental attributes and identification of sensitive receptors within vicinity of site were done. The information gathered during the site visit has been used to update the Rapid Environment Assessment (REA) checklist (**Annexure 1**).

8. Based on the field based due diligence, and the environmental investigations undertaken, the Environment Category of project remains 'B' (after including PEC) as per ADB's Safeguard Policy Statement (SPS) 2009. The layout plans for Precision Engineering

Centre and detailed bill of quantities for civil works are being finalized. The list and specifications of training equipment and machinery for the Precision Engineering Centre has been finalized and is under procurement process. The addendum to the initial environmental examination (IEE) report has been prepared considering the environmental implications due to the change in location of the Precision Engineering Centre site from the earlier proposed location. An environmental assessment and review framework (EARF) have been prepared separately in accordance with ADB's SPS, 2009 for OSDP. Accordingly, environmental assessment will be taken up as per the EARF, if any additional component is added for ADB funding in future.

9. **Implementation arrangements.** The SDTED will be the executing agency (EA) for the OSDP. The implementing agency (IA) will be Odisha Skill Development Authority (OSDA). A team of technical, administrative, and financial officials, including safeguards specialists, will be provided at the SDTED under a Project Management Unit (PMU) to implement, manage and monitor project implementation activities. An Environment and Social Management Cell (ESMC) will be established within PMU for management of safeguards. This ESMC cell will comprise of (a) Environmental Safeguard specialist, (b) Social Safeguard Specialist and (c) Gender Specialist. The PMU will be assisted by a Project Management Consultant (PMC). The Odisha State Industrial Infrastructure Development Corporation (IDCO) has been entrusted with the responsibility of civil works for the construction of Precision Engineering Centre.

10. **Description of the environment.** Since the new proposed location of the Precision Engineering Centre is about 2 km from WSC (World Skill Centre and OLD Precision Engineering Site) in the Mancheswar Industrial Area, hence the baseline environmental status remains the same. The baseline environmental status in and around the Precision Engineering Centre site has been defined based on the primary data generated for the WSC component, as the proposed site for Precision Engineering Centre is in close vicinity of the WSC site, secondary data available in public domain, site visits, discussion with various relevant government agencies and stakeholder consultations. The Precision Engineering Centre is proposed on a vacant plot 2 km from the WSC site in the Mancheswar Industrial Estate area which is within the urban limits of Bhubaneswar city in the state of Odisha. Nandan Kanan Zoological Park is beyond 10 km from the Precision Engineering Centre site. Site is vacant and there is no requirement for cutting of any trees or shrubs for the construction and operation of Precision Engineering Centre.

11. **Environmental management.** As the construction of building for educational institutions has been exempted from obtaining prior environmental clearance under the provisions of the EIA Notification, 2006 subject to sustainable environmental management (Guidelines of sustainable environmental management stipulated in the MoEFCC notification no, S.O. 3252 (E) of 22 December 2014), there is no requirement of prior environmental clearance for the construction of building for Precision Engineering Centre and the installation of equipment in the workshops and laboratories. The anticipated environmental risks and impacts during pre-construction, construction and operation phase have been presented in Chapter-V of the report. The environmental management plan (EMP) and the environmental monitoring plan including the budget during pre-construction, construction and operation stages have been presented in Chapter-VIII of the report. For the operation phase, the EMP has been prepared to address impacts of equipment and machinery operations as well as periodic scheduled maintenance. This EMP will be followed by the Precision Engineering Centre Administration. The Precision Engineering Centre will have septic tanks/sock pits of adequate capacity for waste water disposal. The municipal solid waste generated will be segregated and disposal will be integrated with Bhubaneswar city waste disposal. To take care of storm water runoff rainwater harvesting recharge pits have been planned in the building. The EMP will be made part of the bid and contract documents of

contractor. The EMP budget has been estimated INR 0.25 million. This budget will be part of approved cost of the project.

12. The construction waste generated will be maximum utilized in fill works in the campus while for the remaining waste generated during conducting of practical classes the waste disposal will be done as per regulatory requirements in consultation with concerned authorities.

13. To ensure compliance with the EMP for the Precision Engineering Centre the contractor shall prepare the diagrams of the facilities, which depict the location of the stockpiles, chemicals, fuel, sanitation facilities and other construction materials within building premises. The proper placing and storage of materials are important to ensure that no hazard originates from the storage facility onto nearby water bodies and the neighboring community. Necessary COVID-19 Protection measures will be taken at the Precision Engineering Centre site as per Gol and GoO guidelines.

14. **Public Consultation, information disclosure and grievance redress.** The stakeholder's consultations with respect to new location have been undertaken with stakeholders in the month of February 2022. In these consultations' opinions of stakeholders and their suggestions have been obtained and those feasible have been incorporated in sub-project design. In general stakeholders have welcomed the establishment of Precision Engineering Centre. This addendum to the IEE report once approved by ADB (in electronic version) will be disclosed at OSDA website and also the relevant sections of report will be translated in local language by OSDA. The copies of the addendum to the IEE report will be made available at Precision Engineering site office, OSDA office, Odisha Industrial Infrastructure Development Corporation Office, WSC site office and Bhubaneswar Municipal Corporation (BMC) office. In order to establish a documented and structured approach towards understanding community expectations and manage their concerns, a Grievance Redressal Mechanism (GRM) for the community has been formulated. The GRM outlines the process and steps to be taken and the time limit within which the issue would need to be resolved to the satisfaction of the complainant. The team of safeguards specialists with the site manager will endeavor to get all complaints recorded and addressed in a uniform and consistent manner. This grievance mechanism will respond to the concerns and grievances of local communities, NGOs and any other aggrieved party or stakeholder(s). OSDP will share information about these mechanisms to the stakeholders through locally appropriate communication tools.

15. **Monitoring and Reporting.** The OSDA will be responsible for environmental monitoring. The Odisha Industrial Infrastructure Development Corporation, the agency responsible for implementation of civil works at site, will submit semi-annual environmental monitoring reports (EMRs) to the ESMC at PMU. The ESMC will consolidate the semi-annual EMRs and submit to OSDA and SDTED for onward submission to ADB. ADB will review and disclose the EMRs on its website. The approved semi-annual EMRs will also be disclosed at OSDA website.

16. **Conclusions and recommendations.** All clearance(s) /NOC(s) /permission(s) /approval(s) as applicable for water withdrawal, power supply, layout plan of premises, will be obtained before start of construction activities. The establishment of Precision Engineering Centre is unlikely to cause any significant adverse impacts. The potential impacts that are associated with design, construction and operation can be mitigated without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures, SOPs and procedures. Based on the findings of this addendum to the IEE report, the environment category of OSDP continues to "B". No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS, 2009 or Government of India's EIA Notification, 2006.

I. INTRODUCTION

A. Project Background

1. With a total population of 42 million, Odisha's economy is shifting from agriculture to industry and services. However, Odisha's economic transformation has not generated equitable income growth for the state's population. Odisha has one of the highest poverty rates in India. More than half of the working population continues to be engaged in agriculture, while only 24% are employed in industry and another 25% in services. A mere 15% of households in Odisha report to have a regular salary earner². The core problem in Odisha is the low employability of its young workforce in the formal sector due to low education and skill levels. Nearly 34% of Odisha's population is in the ages of 15-34, yet 33% of this 15-34 age group have education just up to grade 8 and another 25% up to grade 10. Only about 7% have diploma or above certificate and exceedingly small proportion of the youth in Odisha have any formal vocational training (1.1% compared to 2.8% for India).

2. The Government of India (GoI) is emphasizing skilling the youth for quality jobs and higher wages in manufacturing and services sectors. However, states like Odisha, comprising a large tribal and disadvantaged population and a large young workforce with inadequate vocational training, face significant challenges in moving its workforce to more productive formal sectors from less productive agriculture and informal sectors. According to the 2012 skill-gap study commissioned by the National Skill Development Corporation for the State of Odisha, demand for semi-skilled and skilled workers will be increasingly high. It is estimated that the incremental demand-supply gap in its workforce for 2011-2026 will be around 4 million, mainly in healthcare, hospitality/tourism, information technology (IT) and IT enabled services, construction, transport/logistics, and food processing. Since Odisha is also a net exporter of workers to other parts of India and abroad, demand for skilled workers is likely to be even greater.

3. While Odisha aimed to train one million people by the end of 12th five-year plan i.e., 2017, the existing training capacity and quality could not meet this target. The state has only been able to train about 10.38 lakhs people in the last five years and now aims to train 15 lakhs people in next five years. The current skills development system of Odisha faces many constraints: (i) the system is fragmented with weak institutional coordination; (ii) access to training institutions is not geographically even and their capacity is insufficient to meet the 12th plan target; (iii) quality and relevance of training is weak due to outdated curriculum, inadequate equipment, and lack of industry experienced trainers, especially in ITIs; (iv) training programs are not closely linked to employers or labor market demand; (v) there is a lack of reliable labor market information system; (vi) a robust quality assurance system is lacking to benchmark training institutions to international standards; (vii) lack of mentor institutions makes it difficult for exiting ITIs to transform into more effective institutions; and (viii) lack of viable training models for higher-cost capital intensive manufacturing hampers the development of more advanced training programs (ix) lack of dedicated training centres for Precision Engineering trade

4. The GoO has taken several initiatives to improve its skills development system and address skills shortages. It had set up a high-level Odisha State Employment Mission (OSEM) in 2005-2006, chaired by the Chief Minister, to specifically address the problems of youth unemployment and underemployment. It has established the Skill Development and Technical Education Department (SDTED)³ to bring together Directorate of Technical

²National Sample Survey, 2011-12

³In 2012, Odisha established the Employment, Technical Education and Training Department, which was renamed as Skill Development and Technical Education Department (SDTED) in 2015

Education and Training (DTET), and labor regulation under one department. While the establishment of SDTED improved coordination among different agencies, it has not necessarily enhanced the operational efficiency of its sub-units. DTET is unable to meet industry demands due to poor infrastructure and outdated standards, assessment, and certification processes.

5. Recognizing weak institutional capacity for market-relevant training, the GoO established an autonomous implementation institution, the Odisha Skill Development Society (OSDS) in 2015 (now OSDA), to implement market-responsive skills programs. This institutional arrangement aims to train one million people and provide greater access to quality training in tribal interior areas of Odisha. In May 2016, the GoO also established the Odisha Skill Development Authority (OSDA) headed by an eminent industry leader with the aim of bringing OSEM and OSDS under one umbrella to ensure effective formulation, implementation and monitoring of skill development programs in Odisha. The Odisha Skill Development Project (OSDP) will help the government to streamline this arrangement.

6. The proposed OSDP will support the GoO to improve the employability, productivity, and income of its working-age population by enhancing the capacity to supply high-quality, market-responsive skills training in line with the state's development strategies in priority sectors, such as manufacturing, construction, and services. The project design incorporates emerging national and international good practices. The impact of OSDP will be increased employability and productivity of Odisha's working age population. The outcome will be increased skills and employment in priority sectors for males and females. With minor change of scope, now the OSDP will set-up and operationalize World Skill Center (WSC) in an existing 18 Storey building of the Government known as "Idco Tower 2010" at Bhubaneswar. The WSC will have hostel facility, house classrooms, laboratories, libraries, and other associated utilities. OSDP will also upgrade all Government Industrial Training Institutes (ITI), out of which, 49 are existing, 21 are under construction and remaining 01 will be newly constructed. OSDP will also establish a Precision Engineering Centre (PEC) with 11 laboratories for the study of Precision Engineering. The PEC is also a part of WSC. The WSC and Precision Engineering are in Mancheswar industrial area in Bhubaneswar. The PEC along with WSC will be operated by Odisha Skill Development Authority (OSDA) with support from an international knowledge partner. There are four outputs of the OSDP project:

7. **Output 1: Equitable access to market-responsive skills development programs increased-** This output will support a network of WSC as hub and all government ITIs as spokes under a hub-and-spoke model. The network will support changes in the skill ecosystem covering WSC training (19,000), ITI training (60,000), polytechnic training (32,000), Precision Engineering Training (10,000) Self-employment initiative (15,000) and RPL certification (25,000) across the state of Odisha. This output has four sub-outputs: (i) increased access to quality training through a hub-and-spoke model, with the provision of already constructed building for WSC⁴ and hostels, workshops, and laboratory equipment for WSC, Precision Engineering Centre and all government ITIs⁵ (ii) improved access to training for women and disadvantaged social groups; (iii) market-responsive training programs delivered for the state's priority sectors in collaboration with key industry players; and (iv) RPL systems established.

8. **Output 2: Quality and relevance of skills development programs improved-** This output focuses on ensuring the quality of training programs by supporting the following sub-outputs: (i) a robust quality assurance system established to ensure that training programs

⁴The ADB loan will finance WSC equipment and refurbishment for WSC.

⁵The Government will finance hostels, workshops, and laboratory equipment for the ITIs including WSC hostel.

meet acceptable standards and apply credible assessment and certification procedures; (ii) a pool of about 250 master trainers created and a mechanism developed to train about 6,000 trainers, including about 1,000 assessors; (iii) WSC, Precision Engineering Centre and all government ITIs benchmarked against a set of key performance indicators to be identified; and (iv) technology-enabled training and learning programs promoted.

9. **Output 3: Skills ecosystem strengthened-** In line with the national priority to consolidate and strengthen training programs within a common framework at the state level, this output comprises the following sub-outputs: (i) partnerships with international and national knowledge institutions and other government departments promoted; (ii) career counseling and placement centers established in WSC, Precision Engineering Centre and all government ITIs; (iii) self-employment initiatives piloted to train 15,000 people to demonstrate viable replication and scaling-up schemes; and (iv) a skill database and inventory developed to help recruit appropriate candidates and to link trainees with potential employers before training begins.

10. **Output 4: Institutional capacity strengthened-** This output aims to strengthen the capacity of institutions, including the SDTED, OSDA, DTET, and ITIs, to ensure the effective implementation of planned activities. There are four sub-outputs: (i) financial and administrative autonomy of OSDA strengthened; (ii) International knowledge partner engaged to build capacity and support OSDA set-up and operate the WSC; (iii) a robust and unified monitoring and evaluation system institutionalized; and (iv) a project management consultant (PMC) team engaged to support capacity building of ITI, OSDA, SDTED, and DTET.

11. OSDP will provide training to about 151,000 working age population during the project period mainly in the age group of 15-34 years in the state of Odisha in higher level manufacturing and services skills aligned to human development strategies of the state. The project will reach out to the youth, disadvantaged groups, and workers in the unorganized, informal and formal sectors by adopting a menu-driven approach to build their skills and increase their employment potential.

12. Skill Development and Technical Education Department (SDTED), Government of Odisha will be the executing agency (EA) and Odisha Skill Development Authority (OSDA) will be the implementing agency (IA). The executing and implementing agencies will hire project management consultant (PMC), contractors, and operators, and other expert agencies for various activities to be carried out during design, pre-construction, construction and operation phases.

13. The Initial Environmental Examination (IEE) report for OSDP was prepared and approved in April 2017 to establish eight Advanced Skills Training Institutes (ASTIs) at different locations in the State. The IEE was updated in the year 2019 for establishment of a World Skill Center (WSC) at Bhubaneswar instead of ASTIs. The IEE report was again updated for the equipment and machinery inclusion in existing workshops and laboratories of four ITIs namely Bhubaneswar, Cuttack, Puri and Berhampur. This report was approved in November 2020. An addendum to the approved IEE report was prepared for addition of component- Establishment of a Precision Engineering Centre equipped with 11 laboratories and Equipment for the study of Precision Engineering. Addendum was prepared in June 2021 to cover the additional environmental impacts due to the activity of Construction of PEC during project lifecycle (pre-construction, construction and operation phases) . This Addendum to the IEE report was approved in July 2021. **Now addendum to the IEE report is prepared due to change in location of the proposed Precision Engineering site.** The new location is 2 km from the earlier selected location of the PEC and WSC, within the Mancheswar Industrial Area. The addendum is prepared to cover and address any

environmental impacts due to siting of the PEC in new location and this has been covered in respective sections.

B. ADB Safeguard Policies and Environment Category of the Project

14. The Asian Development Bank has defined its Safeguard requirements under its *Safeguard Policy Statement 2009* (SPS 2009). The SPS 2009 requires environmental assessment, mitigation and commitment towards environmental protection. The prime objectives of SPS 2009 is to (i) avoid adverse impacts of projects on the environment and affected people, where possible; and (ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible. ADB as per SPS 2009 classifies a project into Environment Category⁶ A, B or C depending on potential adverse environmental impacts.

15. Based on the field based due diligence, and the environmental investigations undertaken, the OSDP Environment Category continues to be 'B' as per ADB's SPS 2009. The environmental impacts for retrofitting and refurbishment of the existing building for the equipment installation for 7 trades to be taken up at the WSC building, environmental impacts associated with the new equipment inclusion in laboratories and workshops at the four ITIs (Bhubaneswar, Puri, Cuttack and Berhampur) and environmental impacts associated with the establishment and operations of Precision Engineering Centre have been covered in the previously updated IEE report (Approved November 2020) and the addendum to the IEE report (Approved July 2021). This addendum to the IEE report includes mitigation and monitoring measures to address environmental impacts due to the change in location of the proposed Precision Engineering Centre. The land identified earlier for Precision Engineering Centre was close to the WSC site in the Mancheswar Industrial area in Bhubaneswar city. The location has been changed due to administrative reasons. The new location is 2 km from the WSC (World Skill Centre and OLD Precision Engineering Site) in the Mancheswar Industrial Area.

16. The environmental assessment for this new location for the Establishment and Operation of Precision Engineering Centre has been carried out in accordance with the Environmental Assessment and Review Framework (EARF) prepared for the project as per ADB's SPS, 2009. The environmental assessment for any additional subproject, if planned, will also be taken up as per EARF. The updated Rapid Environmental Impact Assessment (REA) checklist is given in **Appendix- 1**.

C. Report Structure

17. This addendum to IEE report contains ten sections including this introductory section: (i) Introduction; (ii) Legal Framework and Legislative Requirements (iii) Description of project; (iv) Description of the environment; (v) Environmental impacts and mitigation

⁶**Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required.

Category B. A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required.

Category C. A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

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measures; (vi) Institutional arrangements and responsibilities; (vii) Environmental management plan; (viii) Public consultation and information disclosure; (ix) Grievance redress mechanism; (x) Findings and conclusions.

II. LEGAL FRAMEWORK & LEGISLATIVE REQUIREMENTS

18. The legal framework and legislative requirements⁷ are covered in this chapter. The Ministry of Environment, Forest, and Climate Change (MoEFCC), Govt. of India (GoI) has the overall responsibility to set policy and standards for environment, flora & fauna protection in close coordination with the Central Pollution Control Board. This includes setting of air, noise, and water quality standards, and the requirements for environment clearance, forest clearance, and wildlife clearance and for other activities/projects to be taken up. The implementation of this project will be governed by the national, state and local level relevant acts, rules, regulations, and standards. The executing and implementing agencies will ensure that full compliance with statutory environmental requirements at the national, state, municipal, and local levels by the facility owners and the contractors in all stages of the project implementation including design, construction, operation and maintenance. Some of the major laws and acts that will be applicable during construction and operation phases are detailed below.

19. The Environmental Impact Assessment (EIA) notification, 2006 by the Ministry of Environment, Forests and Climate Change (MoEFCC, GoI) specifies the mandatory environmental clearance requirements. Accordingly, all projects and activities are broadly categorized into two categories⁸- Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and natural and man-made resources. Given that the sub-project is not covered in the ambit of the EIA notification, Environment clearance requirements from the GoI/GoO are not triggered.

The Environment (Protection) Act, 1986 and the Environmental Impact Assessment Notification, September 2006 and amendments thereof

20. The Environment (Protection) Act, 1986 (EPA Act, 1986) was enacted for the nationwide protection and improvement of environment which includes water, air and land and their interaction with human beings and other ecosystem. The Central Government may make rules in respect of quality of air, water or soil for various areas and purposes if it deems necessary. It can also specify maximum allowable limits of concentration of various environmental pollutants.

21. According to Environmental Impact Assessment (EIA) Notification, 2006 and amended thereof, developmental projects are classified as category A and Category B (Category B is further subdivided into B1 and B2 categories) based on their size, nature, location and possible environmental impacts. The Expert Appraisal Committee (EAC) will issue environmental clearance for Category 'A' projects. All the projects included in Category

⁷ SPS 2009 mandates all ADB-financed activities to be compliant with the host country environmental regulatory framework/regulations.

⁸ All projects or activities included as Category 'A' in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, will require prior environmental clearance from the Central Government in the Ministry of Environment, Forests and Climate Change (MoEFCC) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this notification; All projects or activities included as Category 'B' in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which fulfil the General Conditions (GC) stipulated in the Schedule, will require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this notification. In addition, General Condition (GC) of the notification specifies that any project or activity specified in Category 'B' will be treated as Category A, if located in whole or in part within 10 km from the boundary of: (i) Protected Areas notified under the Wildlife Protection) Act, 1972, (ii) Critically Polluted areas as notified by the Central Pollution Control Board from time to time, (iii) Notified Eco-sensitive areas, (iv) inter-State boundaries and international boundaries

B1 shall require prior Environmental Clearance from State/Union territory Environment Impact Assessment Authority (SEIAA), based on recommendations of a State level Expert Advisory Committee (SEAC). The list of projects or activities requiring environmental clearance and their categorization is given in schedule of this notification. According to this notification, all building/construction/infrastructure projects and townships are classified as Category B irrespective of their size, nature, location and possible environmental impacts.

22. As per MoEFCC notification (**Appendix 2**) dated 22 December 2014(S.O. 3252 (E))the educational institutes, college, hostel for educational institution shall not require any environmental clearance and shall ensure sustainable environmental management.

Applicability of legal framework

23. The legal framework with respect to environmental issues, relevant legislation, its applicability, enforcement agency and responsibility lies to have been listed in **Table 1**.

Table-1: The Legal Framework

Issues	Relevant Legislation	Applicability	Enforcement Agency	Responsibility
Environmental Clearance	EIA notification, 14 September 2006 and amendments thereof.	As per MoEFCC notification (Appendix 2) dated 22 December 2014 (S.O. 3252(E)) the schools, colleges, educational institutes and hostels for educational institutions shall not require any environmental clearance. Hence EIA Notification 2006 is not applicable ⁹ . There is no requirement of clearance for Establishment of PEC	OSPCB /MoEFCC / Local Urban Bodies and the Development Authorities	Contractor and Implementing agency as applicable.
Water	The Water (Prevention and Control of Pollution) Act, 1974 and amendments thereof	<ul style="list-style-type: none"> • Not Applicable • For the establishment of Precision Engineering Centre, no CTO or CTE required. The OSPCB circular showing exemption is appended in Appendix 3. • Water from municipal supply will be used and being educational activities to be taken up no water cess returns required. 	OSPCB	Contractor and Implementing agency as applicable
	The Water (Prevention and Control of Pollution) Cess Act, 1977 and amendments thereof			
Ambient Air	The Air (Prevention and Control of Pollution) Act,	<ul style="list-style-type: none"> • Applicable • CTE and CTO will be required for the installation and Operation of DG set 		

⁹Since building was earlier planned for commercial utilization so an environmental clearance was obtained. Since now building is planned to be utilized for education purposes, therefore, Odisha Industrial Infrastructure Development Corporation has submitted application to the State Level EIA Authority for the revision of environmental clearance and /or for information of Authority for the purpose of future directions.

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Issues	Relevant Legislation	Applicability	Enforcement Agency	Responsibility
	1981 and amendments thereof	of 800 kVA.		
Noise	The Environment (Protection) Second Amendment Rules, 2002 (Noise Limits for New Generator Sets) The Noise Pollution (Regulation and Control) Rules, 2000 and amendments thereof	<ul style="list-style-type: none"> • Applicable during construction phase- civil works for Precision Engineering Centre. • Noise limit standards for ambient noise level as prescribed under these act and rules. These rules will be applicable during construction of Precision Engineering Centre. 		Contractor and Implementing agency as applicable
Hazardous Substances &Wastes	The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	<ul style="list-style-type: none"> • Applicable • Small waste oil generated during operation phase will be disposed off through authorized recyclers. 	OSPCB	Contractor and Implementing agency as applicable
Batteries waste	The Batteries (Management and Handling) Rule, 2001 and amendments thereof	<ul style="list-style-type: none"> • Applicable • Disposal of battery waste through OSPCB authorized recyclers will be taken up during construction and operations of Precision Engineering Centre 	OSPCB	Contractor and Implementing agency as applicable
e-waste	The e-waste (Management and Handling) Rule, 2016 and amendments thereof	<ul style="list-style-type: none"> • Applicable • Disposal of e-waste through OSPCB authorized recyclers 	OSPCB	Contractor and Implementing agency as applicable
Groundwater withdrawal	Guidelines for ground water extraction prescribed by the Central Ground Water Authority (CGWA), 2012	<ul style="list-style-type: none"> • Not Applicable • Permission from the State Water Resource Department for extracting ground water in accordance with the conditions stipulated in the CGWA guidelines. This will not be applicable as water supply from PHED is planned for WSC operations. • Similarly, permission will be required, if the source of water is going to be municipal or river, from the municipality or irrigation department, respectively. 	Odisha State Water Resource Department.	Contractor and Implementing agency as applicable

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Issues	Relevant Legislation	Applicability	Enforcement Agency	Responsibility
		<p>This will not be applicable as water supply from Bhubaneswar Municipal Corporation and /or Public Health Engineering Department is planned to be used.</p> <ul style="list-style-type: none"> For the establishment and operations of Precision Engineering Centre, no ground water withdrawal required. 		
Labor	<ul style="list-style-type: none"> Building and Other Construction Workers Act, 1996 and amendments thereof. The Child Labor (Prohibition and Regulation) Act, 1986 and amendments thereof. Minimum Wages Act, 1948 and amendments thereof. Workmen's Compensation Act, 1923 and amendments thereof. The other labor related legislations applicable for the Project include the following: <ul style="list-style-type: none"> Equal remuneration Act, 1976 and amendments thereof The employees state insurance act, 1948 	<ul style="list-style-type: none"> Applicable Obtain "certificate of registration and Labor License " in case Twenty or more building workers or other construction workers will be employed and ensure issues related to building workers such as hours of work, welfare measures and other, safety and health, etc. Ensure that no child labor is engaged at site for construction or operation works either directly or by the sub-contractors. Ensure payment of minimum wages as fixed by the government. In case of any personal injury caused to workman during construction or operational phase, ensure the payment of compensation in accordance with the provisions of Act. Ensure equal remunerations to either of the gender. Ensure appropriate insurance cover is taken to cover un-skilled, semi-skilled and skilled laborers. 	District Labor Commissioner	Contractor and Implementing agency as applicable

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Issues	Relevant Legislation	Applicability	Enforcement Agency	Responsibility
	<ul style="list-style-type: none"> • The maternity benefit Act, 1961 and amendments thereof • The personal injuries (compensation insurance) act, 1963 and amendments thereof • The personal injuries (emergency) Provisions Act, 1962 and amendments thereof. • ESI (Employees State Insurance) Act, 1948 and amendments thereof • The Contract Labor (Regulation & Abolition) Act, 1970 and Rules and amendments thereof • The inter-state migrant workmen (Regulation of employment and conditions of service) Act, 1979 and amendments thereof • Employer's Liability Act, 1938 and amendments thereof • The Bonded Labor (Abolition) Act, 1976 	<ul style="list-style-type: none"> • Ensure implementation of all labor related acts/rules. • Ensure registration under the inter-state migrant workmen (Regulation of employment and conditions of service) Act, 1979 and amendments thereof, if migrant workers are more than 5. 		
Layout design, Occupancy certificate	<ul style="list-style-type: none"> • National Building Code -2005 and amendments 	<ul style="list-style-type: none"> • Wherever applicable • This code and its various provisions including, but not limited to, landscaping, 	<ul style="list-style-type: none"> • Respective Development Authority. • Respective 	Contractor and Implementing agency as applicable

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Issues	Relevant Legislation	Applicability	Enforcement Agency	Responsibility
	<p>thereof.</p> <ul style="list-style-type: none"> • Relevant district/city development authority and municipal corporation regulations 	<p>fire safety plan, structural design etc. will be followed during design and planning.</p> <ul style="list-style-type: none"> • Development Authority (ies) has delegated the power for approval of layout plan and issuing occupancy certificate to the Municipal Corporation in case the land is coming under Municipal Corporation otherwise approval shall be granted by respective Development Authority. • Approval of layout plan before commencing construction and Occupancy certificate before occupying constructed building will be required from respective municipal corporation/local development authority (as applicable). • Fire approval will be obtained at the time of issuing of occupancy certificate. 	<p>Municipal Corporation.</p> <ul style="list-style-type: none"> • Respective Chief Fire Officer. 	
Usages of designated forest land	<ul style="list-style-type: none"> • Forest Act 1980 and Rules 1981 and amendments thereof • The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 & Rules 2007 and amendments thereof 	Not applicable	MoEFCC, and State Forest Department	Contractor and Implementing agency as applicable
Presence of wildlife sanctuary within an area of 10 Km radius around the project	Wildlife (protection) Act 1972 and amendments thereof	Not Applicable as proposed Precision Engineering Centre is beyond 10 km from Chandraka Dampada Sanctuary and the Nandan Kanan Zoological Park.	National Wildlife Board	Contractor and Implementing agency as applicable

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Issues	Relevant Legislation	Applicability	Enforcement Agency	Responsibility
site				
Presence of wetlands	Wetlands (Conservation and Management) Rules, 2010 and amendments thereof	Not applicable	State Wetland Authority	Contractor and Implementing agency as applicable
Clearance for CRZ	Coastal Regulation Zone (CRZ) Notification, 2011 and amendments thereof	Not applicable	State Coastal Management Authority	Contractor and Implementing agency as applicable
Removal of trees	Relevant district/city development authority and municipal corporation regulations	Not applicable, no tree cutting required at Precision Engineering Centre site	City Forest Division	Contractor and Implementing agency as applicable
Natural Disaster	<ul style="list-style-type: none"> • National Disaster Management Act, 2005, and amendments thereof. • Odisha State Disaster Management Policy. • Odisha State Disaster Management Plan 	<ul style="list-style-type: none"> • Applicable Measures, as outlined in the State Disaster Management Plan, will be adopted for prevention and mitigation of disasters 	Odisha State Disaster Management Authority	Contractor and Implementing agency as applicable
Vehicular Movement	Motor Vehicles Act, 1988 and Rules, 1989 and amendments thereof	<ul style="list-style-type: none"> • Applicable • Project will follow up Central Motor Vehicle (CMV) rules for transportation of diesel or any other hazardous substance 	Local Transportation Authority	Contractor and Implementing agency as applicable

III. DESCRIPTION OF THE PROJECT

A. Preamble

24. The OSDP project components include WSC and ITI upgradation (through equipment procurement and installation with support infrastructure such as hostels) and Precision Engineering Centre for the study of Precision Engineering. This section covers brief description of project components:

B. Scope of OSDP

25. The scope of sub-projects under OSDP includes (i) setting up of WSC at Bhubaneswar(ii) support to existing 4ITIs (Bhubaneswar, Cuttack, Berhampur and Puri) through inclusion of equipment, machinery in the existing laboratories and workshops and (iii) setting up of Precision Engineering Centre in a vacant plot of 5.009 acre about 2 km from the WSC building. For the OSDP implementation OSDA has signed a memorandum of understanding with ITE Education Services (ITEES), Singapore.

26. The Precision Engineering Centre will be established on a 5.009 acre vacant plot at a distance of 2 km from the WSC site at Mancheswar Industrial Estate in the outskirts of Bhubaneswar city. Precision engineering is the discipline of designing a machine or instrument so it can maintain, measure, or move to a position or follow a path with a level of accuracy that is many orders of magnitude smaller than the size of the machine or instrument itself. The scope of work in the sub project entails civil works for the establishment of Precision Engineering Centre and the installation of machines and equipment in the laboratories. The location of the Precision Engineering Centre has been shown in **Figure-1** below. The site photographs where Precision Engineering Centre is to be established are given in **Appendix -4**.

27. The Precision Engineering Centre is envisaged to train students in Precision Engineering- applying and developing new manufacturing methods, and designing machines, equipment and systems for producing components within micrometer to nanometer tolerance ranges. Precision engineering deals with the design and building of complicated tools and instruments whose parts must be exactly right in size and position. The goals of Precision Engineering are:

- Creating a highly precise movement.
- Reducing the dispersion of the product's or part's function.
- Eliminate fitting and promote assembly, especially automatic assembly.
- Reducing the initial cost.
- Reducing the running cost.
- Extending the life span.
- Enabling the design safety factor to be lowered.
- Improving the interchange ability of components so that corresponding parts made by other factories or firms can be used in their place.
- Improving qualities control through higher machine accuracy capabilities and hence reduce scrap, rework, and conventional inspection.
- Achieving a greater wear/fatigue life of components.
- Making machine functions independent of one another.
- Achieving greater miniaturization and packing densities.
- Achieving further advances in technology and the underlying sciences
- Precision engineering is incredibly significant as it ensures a longer running life along with less wear or fatigue, giving a better lifespan compared to manually manufactured parts.

Having a longer running life reduces costs and means lower running costs overall, the whole production speed is faster and needs fewer inspections.

Figure-1: Location of Precision Engineering Centre



28. In the Precision Engineering Centre 11 laboratories will be established, which will help in providing training to students on modern day industry requirements. Training in Precision Engineering Trade will be imparted through following laboratories:

- i. Inspection Techniques Laboratory
- ii. Turning Section
- iii. CNC Turning Section
- iv. Milling Section
- v. CNC Milling Section
- vi. 3D CAD/CAM Application Laboratory
- vii. CNC Sheet Metal Fabrication Laboratory
- viii. Multi-Axis Machining Laboratory
- ix. CNC Sheet Metal Fabrication CAD/CAM Studio
- x. Multi-Axis CAM Studio
- xi. Grinding Section

29. Equipment will be procured and installed in the laboratories. Not all equipment procured will be required to be installed as some will be used as procured e.g., accessories kits. The installation will be of heavy machines e.g., CNC Turning machine. The equipment list for 11 laboratories (as in shown above), has been given in the **Table-2**.

Table-2: List of in Precision Engineering Laboratories

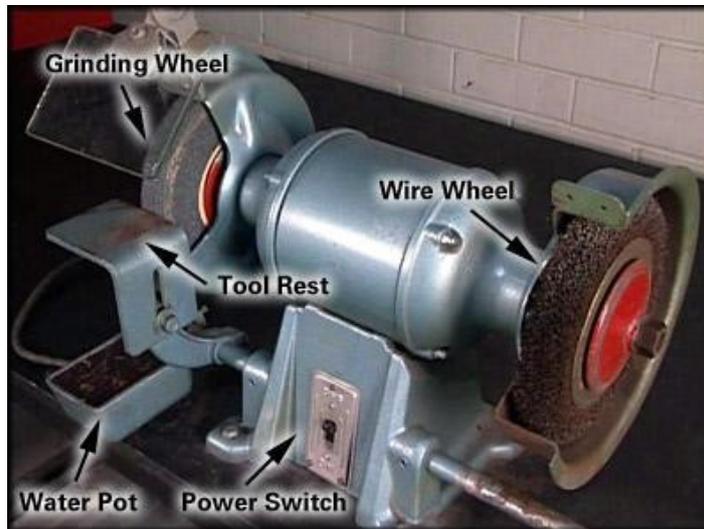
Laboratory-Equipment & Machines	Numbers
1. Inspection Techniques Laboratory	
Vernier Caliper 150 mm with metric/imperial scale - Accuracy 0.02mm	1 set
Digital Vernier Caliper 150 mm with metric/imperial scale - Accuracy 0.01mm	1 set
Vernier Height Gauge (0 ~ 200 mm)	1 set
Vernier Depth Gauge (0 ~ 150 mm)	1 set
External Micrometer (0 ~ 25 mm) - Accuracy 0.01mm	1 set
Digital External Micrometer (0 ~ 25 mm) - Accuracy 0.001mm	1 set
External Micrometer (25 ~ 50 mm) - Accuracy 0.01mm	1 set
Digital External Micrometer (25 ~ 50 mm) - Accuracy 0.001mm	1 set
Internal Micrometer Caliper Type (5 ~ 25 mm) - Accuracy 0.01mm	1 set
Digital Internal Micrometer Caliper Type (5 ~ 25 mm) - Accuracy 0.001mm	1 set
2. Turning Section	
Centre lathe with digital readout (X & Z axis)	20
Pedestal grinder c/w grinding wheel star dresser	1
3. CNC Turning Section	
CNC Lathe and equipped with basic tooling system and interlocking safety features	10
Mobile workstation/Notebook c/w CAD/CAM software and processors for CNC Turning - 2 seats license. - able to create part geometry and generate NC part program for CNC turning	2
4. Milling Section	
Vertical milling machine with digital readout (X, Y & Z axis) c/w standard tool kit and equipped with safety features and low voltage lamp	20
5. CNC Milling Section	
CNC Milling machine with 3-axis simultaneous functions and equipped with automatic tool changer and interlocking safety features	10

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Laboratory-Equipment & Machines	Numbers
Accessories to suit item 1	1
Mobile workstation c/w CAD/CAM software and processors for CNC milling - 4 seats license - able to create part geometry and generate NC part program for CNC machining	4
6. 3D CAD/CAM Application Laboratory	
Workstation computer	21
CAD software - 21 seats license (For 2D/3D surface, wireframe and solid modelling)	21
CAM software - 21 seats license (CAM Turn and CAM Mill with post processor)	21
7. CNC Sheet Metal Fabrication Laboratory	
CNC Laser (CO ₂) cutting machine with CNC controller, standard tool and equipped with safety features	1
CNC Turret Punching machine with CNC controller, standard tool and equipped with safety features	1
CNC Bending (press Brake) machine with CNC controller, standard tool and equipped with safety features	1
Air compressor with dryer Working pressure 1000 liter/min maintain at 6 Bar	1
8. Multi-Axis Machining Laboratory	
5-axis CNC Universal Machining Centre with simultaneous axes movement functions and equipped with basic tooling system and interlocking safety features	4
9. CNC Sheet Metal Fabrication CAD/CAM Studio	
Workstation computer	21
CAD/CAM software - 21 seats license (For 2D/3D sheet-metal working) for Laser, Turret Punch and Press Brake with post processor	1
Multi-Axis CAM Studio	
Workstation computer	21
10.Grinding Section	
Surface grinder with digital readout (Vertical down feed & Cross feed) and equipped with safety features	15
Universal cylindrical grinder with digital readout, equipped with safety features	5

30. The photographs of equipment proposed to be used in laboratories of Precision Engineering Trade have been shown below in **Figure-2**.

Figure-2: Photographs of Equipment Proposed to Use in the Precision Engineering Trade



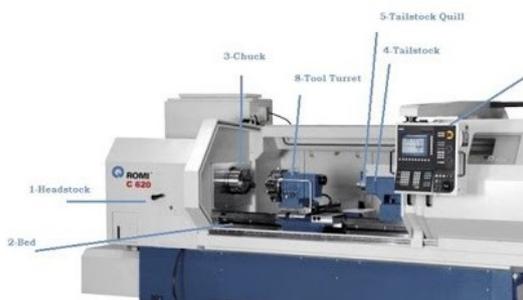
Grinding Machine



CNC Milling Machine



Vernier Calipers



CNC Lathe



Tool Set

31. The Precision Engineering Centre shall be constructed on a land of area approx. 5.009 acres. The total built up area is 5027.84 m². It will be a G+2 building with built up area of Ground floor 2554.42 sqm, First floor 2307 sqm and second floor 166.42 sqm. The Ground floor will have laboratories of CNC Turning Section, CNC Milling Section, Inspection Techniques laboratory, Multi Axis Machining Laboratory, CNC Sheet Metal Fabrication

Laboratory, CAD/CAM studio, Store and Electrical Panel Room and Admin Room. The First floor will have Milling Section, Grinding Section, Admin Room, Classrooms, Staff room, Store rooms, Multi Axis CAM studio, 3D CAD/CAM Application Library, IT room and Meeting room. Both Ground and First floor will have toilets. There is a provision of Machine Room and open terrace on the Second floor.

32. The layout plans of Precision Engineering Centre are given in **Appendix-5**.

C. Executing and Implementing Agencies

33. The SDTED will be the executing agency for the proposed OSDP. The OSDA is the implementing agency. A project management unit (PMU) will be established by the SDTED at OSDA. For the civil works component, it will be assisted by Odisha Industrial Infrastructure Development Corporation who is well aware of the states and India's building codes and environmental rules and regulations. The PMU will also have environmental safeguard specialist. PMU and Odisha Industrial Infrastructure Development Corporation will be responsible for overall planning and implementation of the civil works. They will ensure that the EARF is adhered to during project implementation. The Project Management Consulting (PMC) firm to be engaged under the proposed loan will have designated Environment and Social Safeguards specialists. They will assist PMU and Odisha Industrial Infrastructure Development Corporation in supervising the civil works, ensuring that the updated IEE and EMP are implemented properly. The PMC will also assist OSDA in preparing semi-annual safeguards monitoring reports. PMU will consolidate the semi-annual reports and submit them to ADB. ADB will post the environmental monitoring reports on its website.

D. Implementation Schedule

34. The implementation period for the Precision Engineering sub project is one year. The lay out plans and preliminary drawings have been prepared and these are in the process of approval. The bidding process will be started by April/ May 2022. The sub-project will be awarded for construction by July/ August 2022. The contractor is expected to be mobilized to site by October 2022 and construction works of sub-project are expected to be completed by October 2023.

IV. DESCRIPTION OF THE ENVIRONMENT

35. This section presents a brief description of the existing environment around the Precision Engineering Centre, in Mancheswar Industrial Estate area in Bhubaneswar. The description covers physical resources, ecological resources, socio-economic development and social and cultural resources of subproject area. Broad aspects on various environmental parameters such as geography, climate and meteorology, physiographic, geology, seismology, ecology, socio-cultural and economic development parameters that are likely to be affected by the proposed Precision Engineering Centre are presented. Secondary information was collected from relevant government agencies like the Forest Department, State Environment Department, and Odisha State Pollution Control Board, and India Meteorological Department.

A. Environmental Profile

Air and Noise Quality

36. The new site identified for Precision Engineering Centre is located at a distance of 2 km from the existing site of WSC in Mancheswar Industrial Estate. The site is located in built-up area (Mancheswar Industrial estate). The Latitude of Site is 20.30414° N and Longitude of Site is 85.86156° E. The Elevation from mean sea level is 69.05 m.

37. The subproject site is close to National Highway-16 which is 450 meter from site. The ambient air quality data generated for the WSC site is presented to reflect the ambient air Quality status. The Ambient air Quality data is given below in **Table-3** and noise levels are given in **Table-4**.

Table-3: Ambient Air Quality Data

Sl. No.	Location	Year	Parameter Value (µg/m ³)				
			SO ₂	NO _x	PM _{2.5}	PM ₁₀	CO
1	Pandra	January, 2021	9.4	14.8	37.2	71.2	0.26
2	Patrapada	January, 2021	9.8	17.6	33.8	64.6	0.3
Applicable Ambient Air Quality Standards		-	80	80	60	100	4.0
Source: Ambient Air Quality Monitoring for WSC site							

38. It is clear from the above tables that values of ambient air quality parameters are well within the limits. Ambient air quality monitoring for the Precision Engineering Centre will be conducted by the contractor prior to start of construction works with an aim of establishing baseline conditions.

Table-4: Ambient Noise Levels

Location	Noise Levels dB(A)	
	Day	Night
Pandra	54.8	44.6
WSC Site	55.2	45.8
Ambient Noise Level Standards	75	70
Source: Ambient Noise levels Monitoring for WSC site		

39. From the ambient noise levels monitoring results of WSC site which is at a distance of 2 km from the proposed site for Precision Engineering Centre, it was observed that noise levels are well within the limits of industrial area. Ambient noise level monitoring will be conducted by the Contractor prior to start of construction prior to establish baseline conditions.

Climate

40. The project site is located in Bhubaneswar, which is on the coastal plains of Odisha. The project area experiences typical tropical weather conditions and succumbs to the heat and cold waves that sweep in from north India. The summer months from March to May are hot and humid, and temperatures often shoot past 46°C in May. Pleasant weather conditions prevail during November, but December and January face the chilly winds from the North North-east at average speeds of 7 miles/hour. Temperatures drop to approximately 15°C during these months. The climatic data of Bhubaneswar is given below in **Table-5**.

Table-5: Climate Data of Project Area

Climate data for Bhubaneswar													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C	35.8	42.7	42.0	45.0	46.5	46.3	41.3	37.4	37.9	36.6	37.6	33.6	46.5
Average high °C	28.7	31.4	34.9	36.9	37.2	35.3	32.2	31.6	32.1	32.2	30.4	28.4	32.6
Daily mean °C	22.2	25.1	28.6	30.9	31.7	30.7	28.7	28.4	28.5	27.6	24.9	22.0	27.4
Average low °C	15.6	18.7	22.2	25.0	26.2	26.1	25.2	25.1	24.8	23.0	19.4	15.6	22.2
Record low °C	8.6	9.6	14.6	17.0	15.0	16.8	20.0	18.4	18.5	16.1	9.7	8.2	8.2
Average Precipitation (mm)	4	27	28	26	67	209	317	389	241	127	48	9	1,492
Average rainy days	0.4	2.3	2.8	3.1	5.1	12.0	18.0	19.1	14.6	8.8	2.1	0.7	89
Average relative humidity (%)	60	61	63	66	66	74	83	85	83	76	66	60	70

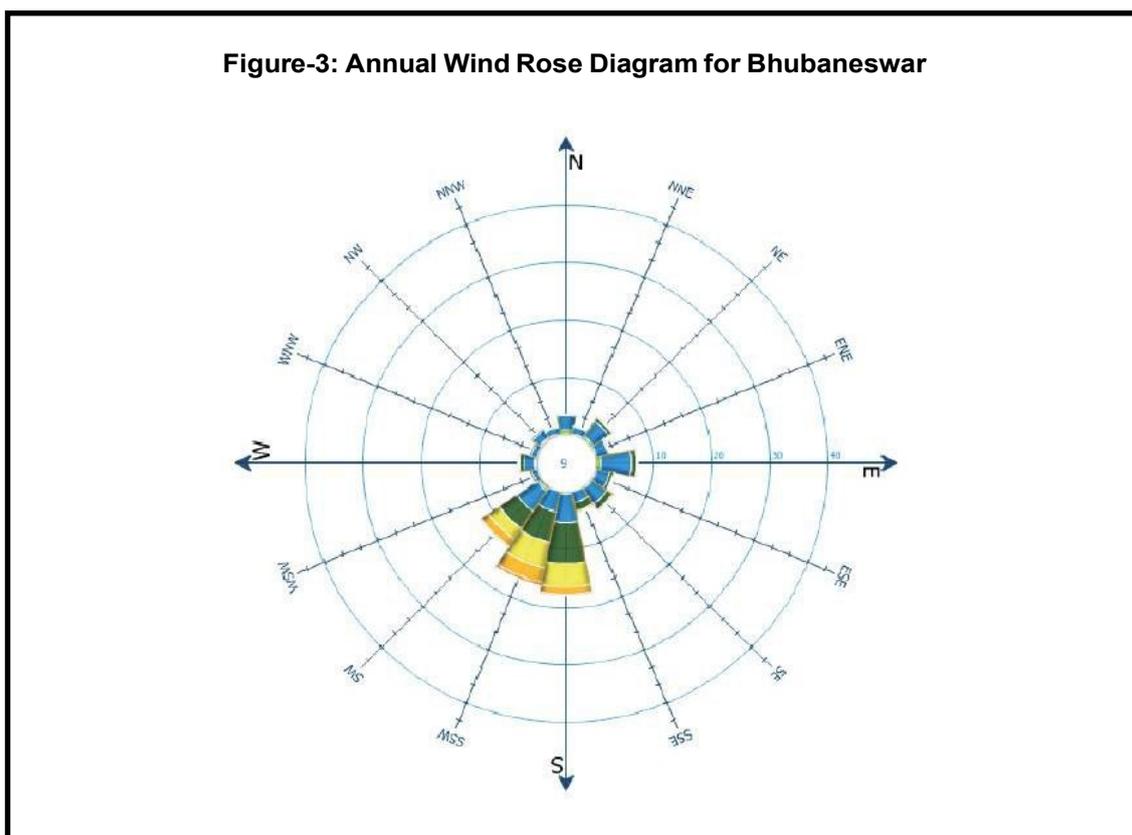
Source: India Meteorological Department Bhubaneswar (Year 2018)

41. **Temperature:** The temperature exhibits seasonal variation with minimum during the winter and higher during the summer. April, May, June and July are the hottest months while January, February and December are the cold months. The maximum temperature rises to about 46°C and the minimum temperature falls to about 8.0°C.

42. **Rainfall:** The sub-project area experiences maximum rainfall during Monsoon season from June to September while as least Rainfall is received in December and January. The average annual rainfall is 1449.10 mm.

43. **Humidity:** Based on long-term climatologically data of subproject region, it is found that relative humidity increases rapidly with the onset of monsoon and reaches maximum (around 85% in the morning and 70% in the evening) during August, when peak monsoon period sets in. Relative humidity is the minimum during the winter months (December and January). Skies are heavily clouded during the monsoon months. The monthly humidity variation for has been given in **Table-7** above.

44. **Wind Speed and Directions:** Two broad wind patterns are observed in the project area viz. South to North (January to May) and south westerly to north easterly (June to October). The average wind speed is in the range of 1-- 6 m/s at Bhubaneswar (maximum in April and minimum in December). The annual wind rose diagram has been given in **Figure-3** below:



Topography and Soils

45. The topography of Precision Engineering site is on plain land. The elevation of the site is around 45 m above mean sea level as Bhubaneswar lies on the western fringe of the

mid-coastal plain of Odisha with an average elevation of 45 m above the main sea level. The topography of project region lies on the low lateritic plateaus and the erosion has made its topography a valley-and-ridge one. The area can be divided into two broad physiographic divisions, namely (a) the Western Upland and (b) the Eastern Lowland.

46. It has been observed that the texture of soil is mostly sandy clay in the subproject area and surroundings. As per the secondary data /information the pH of the soil is in the range of 6.7 to 7.8. The ranges of electrical conductivity, phosphorus, nitrogen and potassium are 37.0 to 137.0 $\mu\text{S}/\text{cm}$, 1.7 to 40.50 kg/ha, 20.70 to 83.20 kg/ha, and 28.50 to 219.20 kg/ha respectively (Source: *Environmental Impact Assessment Report of Proposed Sea Food Park at Haripur and Haridamda Villages in Bhubaneswar Tehsil, Year 2017*).

Surface water and Ground water

Ground Water Resources

47. The dynamic ground water resource estimated by the Central Ground Water Board for Bhubaneswar Tehsil is given below in **Table-6**. It is clear that subproject region is not in exploited category of CGWA, and good quantity of ground water is available.

Table-6: Estimated Dynamic Ground Water Resource of Bhubaneswar Tehsil

Sl. No.	Particulars	Quantity (HAM)
1	Net Annual Ground Water Availability	6810
2	Existing gross ground water draft for irrigation	1243
3	Existing gross ground water draft for domestic and industrial water supply	2076.89
4	Existing gross ground water draft for all uses	3320
5	Allocation for domestic and industrial requirement supply up to next 25 years	3497
6	Net ground water availability for future irrigation development	2070
7	Stage of Ground Water Development (%)	48.75 (Safe)

Source: CGWB Report Khorda District May 2013

48. The baseline ground water quality data generated for the WSC site is given in **Table-7**. As the proposed site for Precision Engineering Centre is close to WSC site, the monitoring data generated in the month of January 2021 for WSC site is used. Parameters of ground water quality are found within the permissible limits. However, no usage of ground water is envisaged in the project during construction and Operation phases.

49. The surface water source close to the Precision Engineering Centre site is river Kuakhai (at about 1.65 km aerial distance). The water quality data of this river has also been obtained. This data has been given in **Table-8**. It may be mentioned that data is for Mancheswar where Precision Engineering Centre is to be established. It is clear that River water does not meet the drinking criterion of CPCB for surface water sources (Class A) but meets Class C limits (drinking water source after conventional treatment and disinfection). The ground and surface water quality monitoring will be conducted by the contractor prior to the start of construction works.

Table-7: Ground Water Quality in Sub-Project Area

Sl. No.	Parameter	Unit	IS:10500-2012 limits	GW1
1	pH	-	6.5-8.5	6.85
2	Color	Hazen	5	<5
3	Taste	-	AL	AL
4	Odor	-	AL	AL
5	Total Alkalinity as CaCO ₃	mg/l	200	44
6	Turbidity	NTU	1	<1
7	Total Dissolved Solids	mg/l	500	284
8	Total Hardness as CaCO ₃	mg/l	200	150
9	Total Coliform	MPN /100 ml	Absent in 100 ml	Absent
10	Calcium as Ca	mg/l	75	40.88
11	Magnesium as Mg	mg/l	30	11.66
12	Residual Chlorine as Cl ₂	mg/l	1	ND
13	Mercury as Hg	mg/l	0.001	<0.001
14	Chloride as Cl	mg/l	250	22.9
15	Sulphate as SO ₄	mg/l	200	12.8
16	Fluoride as F	mg/l	1.0	<0.05
17	Nitrates as NO ₃	mg/l	45	2.4
19	Aluminum as Al	mg/l	0.03	<0.01
20	Phenolic Compound as C ₆ H ₅ OH	mg/l	0.001	<0.001
21	Cyanides as CN	mg/l	0.05	ND
22	Anionic Detergents	mg/l	1	<0.05
24	Cadmium as Cd	mg/l	0.01	<0.003
25	Arsenic as As	mg/l	0.01	<0.001
26	Copper as Cu	mg/l	0.05	<0.03
27	Lead as Pb	mg/l	0.01	<0.01
28	Manganese as Mn	mg/l	0.10	<0.05
29	Iron as Fe	mg/l	0.30	0.15
30	Chromium as Cr+6	mg/l	0.05	<0.05
31	Selenium as Se	mg/l	0.01	<0.001
32	Zinc as Zn	mg/l	5	<0.05
33	E-coli		\$	Absent

Table-8: Surface Water Quality in Sub-Project Surroundings

Sl. No.	Parameter	Unit	CPCB Surface Water Quality Criteria (Class of Water C)	Result
1	pH	-	6.5-9.0	7.4
2	TSS	mg/l	\$	6.2
3	Total Dissolved Solids	mg/l	\$	164.8
4	Total Hardness as CaCO ₃	mg/l	\$	34
5	Total Alkalinity as CaCO ₃	mg/l	\$	54
6	Calcium as Ca	mg/l	\$	21
7	Magnesium as Mg	mg/l	\$	11
8	Chloride as Cl	mg/l	\$	6.6
9	Sulphate as SO ₄	mg/l	\$	1.80
10	Nitrates as NO ₃	mg/l	\$	0.41
11	BOD	mg/l	3 or less	2.40
12	COD	mg/l	\$	8.40
13	DO	mg/l	4 or more	8.50
14	Phosphates as PO ₄	mg/l	\$	0.007
15	Iron as Fe	mg/l	\$	1.38
16	Total Coliform	MPN/100 ml	5000	1100
17	Faecal Coliform	MPN/100ml	\$	800

Note: \$= Limits not specified
Source: Evaluation of Water Quality of River Kuakhai by KSIT Jatni, Year 2015

Drainage of Sub-project Region

50. The subproject falls in Khorda district, and this district is drained by a number of streams which are mostly tributaries and distributaries of the river Mahanadi and a few other streams discharging into Lake Chilika. The important distributaries of Mahanadi are the Kuakhai, Bhargabi, Kushabhadra and the Daya River. The tributaries of the Mahanadi are the Ran and Kalijiri. The streams draining the southern parts of the district are Sulia, Kharia and the Kusumi. All the streams are ephemeral and effluent in nature. Chilika, the largest saltwater lake of India is situated in the southeastern part of the district.

51. Although the Bhubaneswar city lies on the western side of the Mahanadi Delta on the bank of river Kuakhai, a distributaries of Mahanadi along with river Daya, branching off from Kathajodi that flows along the southern part of the city, 35% of water supply depends heavily on dug well and bore wells. The Bhubaneswar city is drained by the Mahanadi River basin.

Geology and Seismology

52. Geologically the sub-project district Khorda is formed from various geological formations namely Anorthosite, Garnetiferous Granite Gneiss, Granites, Charnokite, Kondalite/quartzite Granite Sill and Schist/Quartzite etc. of Pre-Cambrian. Athagarh formation of Sandstone, Shale, Silt stone and Conglomerate etc. of Mesozoic Laterite occur as capping over the country rocks with average thickness of 5 to 6 m and a maximum of 20 m. Unconfined Sediments are composed of Clay, Sand, Silt, Gravel Pebbles etc. and also calcareous and ferruginous concretions of Quaternary.

53. Geologically the Bhubaneswar region belongs to the Gondwana land mass, one of the oldest and most stable landmasses in the world. So, the rock ranges from the Archean to the recent period. But the major part of the area is covered with the quaternary alluvium and lateritic soil (*Source: International Journal of Current Engineering and Technology (Vol.4, No.1 (February 2014))*).

54. India's seismic code divides the country into five seismic zones (I to V). The project area comes under seismic zone III as defined by Urban Earthquake Vulnerability Project (UEVP) and the Atlas prepared by the Building Materials Promotion and Technology Council (BMTPC), Government of India and UNDP [IS 1893 (Part I: 2002)]. The Precision Engineering Centre has been designed considering seismic zone III. Even though the Bhubaneswar City¹⁰ is located on Earthquake Zone-III, it is the high density of residential buildings which makes its more vulnerable to damage and loss. The Local Resilience Action Plan (LRAP) says that about 34 percent residential built-up areas constituting about 33 percent of residential houses are in the extreme and high earthquake risk zones of the city. More than half of wards 30 and 38 of Bhubaneswar Municipal Corporation come under the extreme and high earthquake risk categories. Besides, the impact of an earthquake could be felt most in commercial areas which are concentrated in central parts while industries are in the fringe areas of Bhubaneswar.

B. Ecological Resources

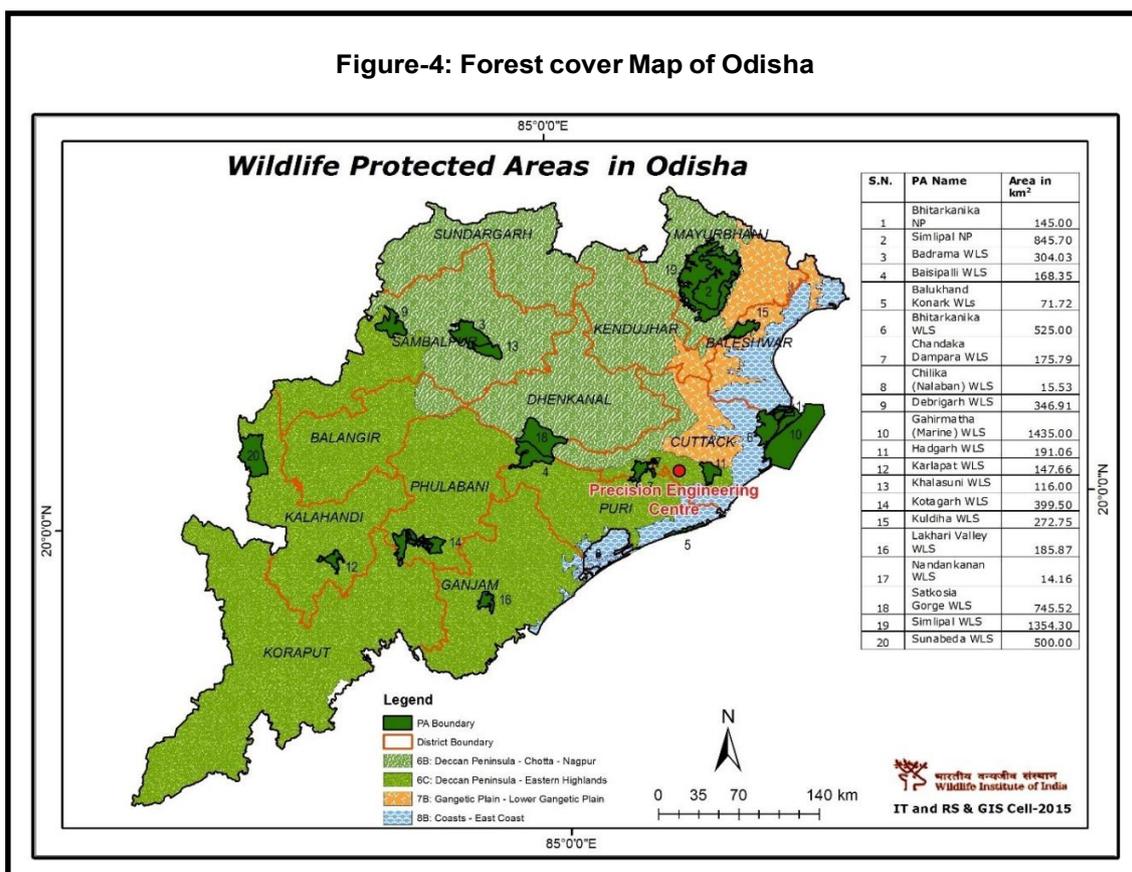
Forests

55. The forest cover in Odisha state¹¹ is 51345 sq. km of which 6967 sq. km is very dense forest. The moderately dense forest extends over 21,370 sq. km while open forest is over 23,008 sq. km. The forest cover in the state constitutes 32.98% of the geographical area. Besides this, there exists tree cover outside the forest over 2.85% of the geographical area of the State. Thus, the forest and tree cover in the state is 35.83% of the geographical area. Forest cover map is shown in **Figure -4**.

¹⁰<http://www.newindianexpress.com/states/odisha/Bhubaneswar-Cuttack-Fall-in-Moderate-Damage-Risk-Zone/2015/05/10/article2807609.ece>

¹¹ Forest and Tree Resources in States and Union Territories, 20017

Figure-4: Forest cover Map of Odisha



Source: Wildlife Institute of India

56. The Precision Engineering Centre site is located in Mancheswar industrial estate and within the Bhubaneswar city boundaries. There are no reserved, protected, or revenue forests in the surroundings. The common flora observed in the surroundings of Precision Engineering Centre Site is given in Table-9. There is no presence of any rare or endangered species of flora at PEC site or surroundings.

Table-9: List of Flora in Surroundings of Sub-Project Site

SI. No.	Scientific name	Common name	Family
1	<i>Acacia auriculiformis</i>	Ear leaf acacia	Mimosaceae
2	<i>Anacardium occidentale</i>	Kaju	Anacardiaceae
3	<i>Artocarpus heterophyllus</i>	Katahal	Moraceae
4	<i>Azadirachta indica</i>	Neem	Meliaceae
5	<i>Alstonia scholaris</i>	Devil tree	Apocynaceae
6	<i>Aegle marmelos</i>	Bel	Rutaceae
7	<i>Bridelia retusa</i>	Kasai	Phyllanthaceae
8	<i>Bauhinia variegata</i>	Kachnar	Caesalpinaceae
9	<i>Cassia fistula</i>	Amaltas	Cesalpinaceae
10	<i>Dendrocalamus strictus</i>	Male bamboo	Poaceae
11	<i>Mangifera indica</i>	Aam	Anacardiaceae
12	<i>Pongamia pinnata</i>	Karanj	Fabaceae

Sl. No.	Scientific name	Common name	Family
Shrubs			
13	<i>Lantana camara</i>	Lantana	Verbanaceae
14	<i>Calotropis gigantean</i>	Arka	Asclepiaceae
15	<i>Adhatodavasica</i>	Basaka	Acanthaceae
16	<i>Carissa spinarum</i>	DudhKoli	Apocynaceae
Herb & climbers			
17	<i>Tinosporacordifolia</i>	Guduchi	Menispermaceae
18	<i>Cuscutareflexa</i>	Dodder Plant	Convolvulaceae

Source: Consultant's Field Visits

57. The list of fauna observed in the surroundings of project sites at Bhubaneswar is given in **Table-10**. From this list it is clear that none of faunal species is rare and endangered.

Table-10: List of Fauna in Sub-project Surroundings

Sl. No.	Scientific name	Common name	WPA Schedule
Mammals			
1	<i>Funambulus palmarum</i>	Palm Squirrel	Sch-IV
2	<i>Presbytis entellus</i>	Common langur	Sch-II
3	<i>Macaca mulatta</i>	Rhesus monkey	Sch-II
4	<i>Herpestisedwardsii</i>	Common mongoose	Sch-IV
Reptiles & Amphibians			
1	<i>Calotes versicolor</i>	Garden Lizard	Sch-IV
2	<i>Pytasmucosus</i>	Rat Snake	Sch-II
3	<i>Najanaja</i>	Cobra	Sch-II
4	<i>Rana tigrina</i>	Indian Bullfrog	Sch-IV
AVES			
1	<i>Corvus splendens</i>	Common Crow	Sch-V
2	<i>Columba livia</i>	Blue Rock Pigeon	Sch-V
3	<i>Passer domesticus</i>	Common Sparrow	Sch-IV
4	<i>Merops orientalis</i>	Small Green Bee Eater	Sch-IV
5	<i>Vanellus indicus</i>	Red Wattled Lapwing	Sch-IV
6	<i>Bubulcus ibis</i>	Cattle Egret	Sch-IV
Insects			
1	<i>Papilio demoleus</i>	Lemon Butterfly	-

Source: Consultant's Field Visit and WSC Site Visit

58. River Kuakhai is at 1.65 km aerial distance from the PEC site.

Protected Areas

59. Odisha hosts rich biodiversity in variety of habitats. There are two National parks, 18 Sanctuaries and one Biosphere Reserve in the State. There are two notified and one proposed Tiger Reserves namely Similipal, Satkosia and Sunabeda (proposed). There are three elephant reserves in the State namely Mayurbhanj, Sambalpur and Mahanadi. The protected area for wildlife management constitutes 4.25% of the total geographical area of

the State. The wetland management in the State has received international accreditation. Chilika Ramsar site is the Asia's largest brackish water lagoon having rich estuarine and marine fauna including 152 Irrawaddy dolphins (as per 2013 Jan, census). The list of National Parks and Wildlife Sanctuaries in Odisha is given in **Table-11**. The proposed Precision Engineering Centre site is located in the Industrial area, beyond 10 km from the National Park/ Wildlife sanctuaries.

Table-11: National Parks and Wildlife Sanctuaries in Odisha

Sl. No.	Name of National Park and Wildlife Sanctuary	District	Area (Km. sq.)
NATIONAL PARK			
1	Similipal	Mayurbhanj	845.70
2	Bhitarkanika	Kendrapara	145.00
SANCTUARY			
1	Bhitarkanika	Kendrapara	672.00
2	Similipal	Mayurbhanj	2200.00 Core:845.70 Buffer :1924.30
3	Satkosia	Gorge Angul/Baudh/ Cuttack / Nayagarh	795.52
4	Hadgarh	Keonjhar	191.06
5	Nandankanan	Khorda	4.40
6	Baisipalli	Nayagarh	168.35
7	Kotagarh	Kondhmal	399.05
8	Chandaka-Dampara	Khorda/Cuttack	175.79
9	Khalasuni	Sambalpur	116.00
10	Balukhand-Konark	Puri	71.72
11	Kuldiha	Balasore	272.75
12	Debrigarh	Bargarh	346.91
13	Lakhari Valley	Gajapati	185.78
14	Chilika (Nalaban)	Puri	15.53
15	Badrama	Sambalpur	304.03
16	Sunabeda	Nuapada	500.00
17	Karlapat	Kalahandi	147.66
18	Gahiramatha (Marine)	Kendrapara	1435.00

Source: Odisha State Forest Department (Year 2017)

C. Economic Resources

Industries

60. There are 10 major and medium scale industries in Khorda district. There are 7113 small scale industrial units. The types of industries and employment have been shown in **Table-12**.

Table-12: Details of Existing Micro and Small Enterprises and Artisan Units in Khorda District

NIC Code No	Type of Industry	Number of Units	Investment (Lakh Rs.)	Employment
20&22	Agro and Soda based	673	10052.68	5293
23, 24, 25, and 26	Textile Based	415	1288.83	3102
27.	Wood/wooden based furniture	246	820.96	2020
28.	Paper & Paper products	282	2719.98	1927
29.	Leather based	15	40.99	106
31.	Chemical/Chemical based	233	2865.90	1873
30.	Rubber, Plastic & petro based	161	4304.11	1336
32.	Mineral based	385	3202.37	7969
33 and 35	Metal based (Steel Fab.) and Engineering Units	915	6167.18	6471
36.	Electrical machinery and transport equipment	261	2000.02	1995
97.	Repairing & servicing	3023	10919.77	12368
01.	Others	504	2840.53	3008
Total		7113	47223.32	47468

Source: Government of Odisha, District Industry Centre, Bhubaneswar (Year 2014)

Transportation

61. As 2010-11 Censuses, district Khorda has 166 km of National Highways (NH), 30 km of state highways (SH), 273 km major district roads (MDR), 673 km of other district roads (ODR), 833 km of rural roads, 3367 km of Gram Panchayat roads and 242 km of forest roads. Besides, 117.39 km of Railway lines with 23 nos. of railway stations including passenger halts are continuing in the district. Bhubaneswar International Airport is also operating in the district.

Land Use

62. A study of the land use (**Table-13**) shows that majority of the area of the project districts is under Agriculture and non-agriculture uses. The land under permanent pastures and grazing is not significant. The land use of the Precision Engineering site is industrial area and plot is in possession of Industrial Development Corporation of Odisha Ltd (IDCOL), Government of Odisha and in process of Transfer to Skill Development and Technical Education Department of Odisha (Appendix 6).

Table-13: Land Use Pattern of Khorda District

Land use	Khorda District
Geographical Area	281
Net Area Shown	108
Forests	62
Land put to non-Agriculture Use	46
Permanent Pastures	5
Culturable waste land	8

Source: Odisha Agriculture Statistics-2013-2014, Directorate of Agriculture, Government of Odisha

Agricultural Development.

63. During the year 2010-11, the net area sown was 105 thousand hectares against 5421 thousand hectares of the state. The production of paddy was 2560764 quintals and 23 quintals wheat, 1308 quintals maize, 200 quintals ragi, 29567 quintals mung, 5727 quintals biri, 2830 quintals kulthi, and 1374 quintals till, 9028 quintals groundnuts, 62 quintals mustard, and 25203 quintals potatoes and 370757 quintals sugarcane were also produced. During 2010-11, the total fertilizers used in Khorda district was about 10438 MT with a breakage of 6118 MT nitrogenous, 2976 MT phosphatic and 1344 MT potash and the consumption of fertilizer per hectare was 51 kg.

Electrification

64. Consumption of electricity in Khorda district during the year 2010-2011 Census, covered 1173.350 million units and villages electrified as on 2010-11 were 1358 which constituted 92.4 % to the total villages of the district.

Social and Cultural Resources

Population and Communities

65. The Khorda district has an area of 2813 sq.km and 22.52 lakhs of population as per 2011 census. The district accounts for 1.81 percent of the state's territory and shares 5.36 percent of the state's population. The density of population of the district is 800 per sq. km as against 270 persons per sq.km of the state. It has 1551 villages (including 193 uninhabited villages) covering 10 blocks. 10 Tehsils and 2 subdivisions. As per 2011 census the schedule caste population was 297472 (13.2 %) and schedule tribe population 115051 (5.1 %). The literacy percentage of the district was 86.9 against 72.9 of the state.

Health facilities

66. The medical facilities in the Khorda district are provided by different agencies like Government, private individuals and voluntary organizations. There were 178 numbers of the Allopathic medical institutions with 456 beds facilities, 27 numbers of Homoeopathic dispensaries and 22 numbers of Ayurvedic dispensaries in the district during the year 2010-11 Census.

Education facilities

67. There are good educational facilities in Khorda district and particularly in Bhubaneswar city. There were 1297 numbers of primary schools, 542 numbers of middle schools, 282 numbers of secondary schools and 55 numbers of general colleges in the district during 2010-11. Besides, there were 19 numbers of polytechnic schools and 84 numbers of engineering colleges in the district during year 2010-11 to impart technical education.

Archaeological Resources

68. There are no heritage sites notified by Archaeological Survey of India (ASI) within 300 m distance of the Precision Engineering site. Similarly, no common property resources such as public wells, water tanks, playgrounds, common grassing grounds or pastures, market areas and community buildings will be affected by the development and operations of Precision Engineering Centre.

V. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Environmental Impacts

69. Any project creating physical infrastructure will cause some impacts on the environment. This Addendum to the IEE report examines the potential impacts anticipated during the construction and operation of the Precision Engineering Centre, including:

- (i) **Location impacts:** Impact associated with site selection including effect on the environment and resettlement or livelihood related impacts on communities.
- (ii) **Design impacts and Pre-Construction Impacts:** Impact arising from project design, including the technology used, scale of operations, discharge standards, topographic survey, geotechnical survey, etc.
- (iii) **Construction impacts:** Impact resulting from construction activities including site clearance, earthworks, civil works, etc.; and
- (iv) **Operation and Maintenance impacts:** Impact associated with the operation and maintenance of the Precision Engineering Centre

70. ADB's REA checklist was used while screening the site and recommending mitigation measures for the component of Precision Engineering of OSDP.

B. Location Impacts

71. The Precision Engineering Centre is to be established on a vacant plot in the Mancheswar Industrial estate. The ownership of the land is of Government of Odisha (IDCOL). As the proposed subproject area is owned by the Government of Odisha, there is no land acquisition, impact on properties or involuntary resettlement issues. There are no significant ecological resources in the surroundings of the site as it is in the industrial estate in the outer skirts of Bhubaneswar, the capital city of Odisha State. There are no heritage sites notified by ASI or State Archaeological Department within the 300 m distance. No significant impacts can arise due to Precision Engineering Centre's location as the building components will not impinge upon any area of ecological, archaeological or historical importance. The site will also not require change in land use as being within industrial estate boundary. Hence Precision Engineering Centre activities will be in conformance with the master plan. The land for the Precision Engineering Centre is not in the immediate vicinity of national highway (approx. 450 m distance. Hence vehicular impacts (air and noise) are not anticipated.

72. The project site of the Precision Engineering Centre is located within seismic zone III and the building has been designed following seismic coefficient of Zone III as National Building Code 2005 (amended till date).

C. Impacts during Design and Pre-Construction Phase

73. Impacts arising from the inappropriate design include inadequate facilities at the Precision Engineering Centre which may result into inconvenience to the students and staff. There may be impacts on surrounding land if proper sanitation wastewater collection and treatment is not planned.

74. Anticipated Environmental impacts associated with the Pre-construction phase are: loss of land, properties and livelihood due to acquisition of properties; tree cutting, impacts on natural resources; etc. As the proposed subproject area is owned by the Government of Odisha, there is no land acquisition, impact on properties or involuntary resettlement issues.

No tree cutting is anticipated except clearing of the shrubs. During pre-construction stage there will be impact on account of establishment of construction camp if this is established outside the proposed Precision Engineering Centre site. Site photographs are shown in **Appendix4**.

75. Based on the environmental screening of the subproject area, there are no significant adverse environmental impacts during the design and Pre-construction phases.

D. Impacts during Construction Phase

76. All construction activities to be undertaken at the site for the Precision Engineering Centre will be approved by the PMU. The construction stage impacts due to the proposed project components are generic to the construction activities. The EMP emphasizes on the construction impacts and necessary mitigation measures to be strictly followed by the contractor and supervised by the Odisha Industrial Infrastructure Development Corporation and PMU. The key potential impacts are covered in the following paragraphs.

77. **Impact due to stockpiles of construction materials:** Improper stockpiling of construction materials in and around the Precision Engineering Centre site could obstruct movement along access roads and surrounding buildings of the area and obstruct drainage in the surroundings of site. Hence, due consideration will be given for proper materials storage at the site. Stockpiles will be covered to protect from dust and erosion. Waste materials will be disposed at identified and approved location. As far as possible all construction materials will be stored on a vacant area within the construction site. Stockpiles will be covered to protect from dust and erosion.

78. **Disposal of construction waste:** The construction waste could lead to untidy conditions at the site and surroundings and may find its way to local drains of the Mancheswar Industrial estate. It shall be mandatory for the contractor (s) to ensure proper disposal of the construction waste at the disposal sites identified and approved by Odisha Industrial Infrastructure Development Corporation and/ or local civic authorities.

79. **Quarry and Borrow pits operations:** All the construction materials will be procured from market as construction works are relatively small level. The construction activities do not require earthworks so operations of borrow areas is not anticipated. The sub project construction activities will also not require direct procurement of stone dust or sand from the quarries. It will be ensured that material suppliers source the construction materials from the approved quarries in compliant with environmental laws of GoO and MoEFCC.

80. **Increase in Noise and Vibration levels:** Noise levels in the immediate proximity of Precision Engineering site is expected to increase somewhat during construction. However, these will be largely imperceptible as civil works will be confined within relatively small area. The duration of construction will also be relatively brief (about a year). During construction phase, some noise will also be generated from the various construction activities like equipment and vehicles engaged in transportation of construction materials. However, transportation of construction materials will be confined to the requirement per day, depending upon extent of construction activity. Further the noise associated with the equipment shall be reduced with proper maintenance of construction equipment. The increase in noise levels is expected to be between 5 - 10 % of ambient noise levels. This increase will be felt up to 100-200 m only. This noise will be intermittent in nature and will last only till construction phase. This noise will be intermittent in nature and will last only during the construction phase. It is anticipated that noise levels will not exceed the specified limits of noise for the industrial areas. But necessary monitoring of noise levels will be taken up as part of environmental monitoring plan.

81. Minor vibrations on account of construction works are likely, but these vibrations will not be felt outside the plot boundary and is unlikely to cause any damage to the neighboring buildings.

82. **Impacts on biodiversity during construction works for Retrofitting and Refurbishment:** No impacts are expected on the biodiversity during the construction works as the site is in industrial area and there are no endangered or rare species of flora and fauna in the surroundings of the site.

83. **Disturbance to traffic during civil construction works for Retrofitting and Refurbishment:** At the time of construction works, there will be some temporary inconvenience for the movement of public and vehicles due to project construction activities. However, since the scale of civil works is relatively small, the inconvenience caused will be temporary in nature and limited only to the construction phase of about a year maximum.

84. **Impact on cultural properties:** The proposed Precision Engineering Centre sub-project will not have any impacts on any religious structure or any other structure of historical and/or cultural significance on account of construction works.

85. **Ground Water:** Ground water will not be extracted and used for construction purposes. The contractors will arrange for water from the Bhubaneswar Municipal Corporation/Public Health Engineering Department. The problem of ground water contamination is also not anticipated during the construction phase since there will be proper disposal of the wastewater.

86. **Ambient Air Quality:** Generation of dust is anticipated during transportation, material handling and construction activities. Some dust and gaseous emissions will also be generated during the construction period from machines such as mixers, and vehicles engaged in transportation of construction materials. Pollutants of primary concern at this stage include respirable (PM_{2.5}) and suspended particulate matter (PM₁₀) and gaseous emissions (NO_x, SO₂, CO, etc.). However, transportation of construction materials will be confined to a few trips per day depending upon extent of construction activity. Therefore, impact at this stage will be temporary and restricted to the close vicinity of the Precision Engineering site.

87. All vehicles and construction equipment operating for the contractor and the Odisha Industrial Infrastructure Development Corporation will obtain and maintain "Pollution under Control" (PUC) certificates. To control dust emissions, vehicles deployed for borrow materials, sand, and aggregate haulage, will be covered with tarpaulins to be prevent spillage. Regular sprinkling of water during loading, unloading, vehicular movement, and raw material transport will prevent spread of dust and other contaminants. Periodic air quality monitoring will be conducted to ensure that emissions to comply with the vehicle emission standards specified by the Government of India and ambient air quality standards specified by the Central Pollution Control Board. The contractor will submit emission monitoring results as a compliance with environmental monitoring plan.

88. **Construction Waste:** The construction waste will be generated due to excavated earth material and waste generated from construction Camp. Excavated earth material can be reused subject to the approval of the Engineer during the construction. Waste generated from the construction camp and demolition will be disposed off as per law to the satisfaction of the Odisha Industrial Infrastructure Development Corporation and PMU. The clean-up and restoration operations will be implemented by the contractor prior to demobilization. The contractor will clear all temporary structures and dispose off all garbage from construction camp site. All construction zones used/affected by the sub-project will be left clean and tidy

at the contractors' expense as per the satisfaction the Odisha Industrial Infrastructure Development Corporation and PMU.

89. The contractor is likely to engage local labor for various construction activities. However, in case of migrant labor must be engaged, the contractor will establish properly designed labor camp with all basic amenities such as potable drinking water supply and sanitation facilities. Dust bins will be placed in adequate numbers. The EMP lays down some measures to address likely adverse impacts associated with the labor camp. Since the Precision Engineering Centre site is within the urban area of Bhubaneswar city, so it is quite likely that contractor will hire a house for the accommodation of construction work force.

90. Besides construction of building for Precision Engineering Centre, there will be minor construction works for the installation of some heavy equipment such as motors, CNC Machines, compressors (in mini-Tool Room) and machines and equipment. The minor construction activities will include creation of foundations on the floors in CNC Tool Room, Lathe and milling machines.

91. **Safety Measures During Construction Phase:** During installation of equipment for Precision Engineering trade, following safety measures will be adopted:

- The foundations for all equipment and machinery mentioned will be constructed as per design specifications and at locations finalized in drawing.
- Necessary clear space for the movement will be kept between the equipment/machinery.
- All the moving equipment (motor, pump, cooling tower) shall be provided guards /enclosures, for this necessary space will be kept.
- Safe Operating procedures will be prepared for each equipment and displayed after installation of equipment.
- Workers during construction of foundations and installation of equipment will be provided proper personal protective equipment (PPE).
- Rubber mats shall be placed around electrical panel boards.
- Necessary spill tray will be provided at water storage tanks.
- Guards/enclosures will be provided around electrical motors.
- Safety measures specified by the manufacturers/suppliers of respective equipment and machinery shall be displayed and followed.
- Safe Operating procedures will be prepared for electric motors, and these shall be displayed.
- Oil drips if any shall be wiped with cotton or cloths rags.
- The installation of hydraulics systems, lifts, elevators, motors will be done at the specified locations in the layout.

E. Environmental Impacts during Operation Phase

92. Since only advance skill training programs for the Precision Engineering trade will be undertaken at the Precision Engineering Centre, adverse environmental impacts are not anticipated during operation phase. The Precision Engineering Centre has adequate parking. As evident from the equipment list provided in **Table-2** there will be no air emissions or effluent generation from any of the equipment as all the equipment will be electricity operated. The impacts have been identified related to solid waste generation during practical and demonstration classes of trainees. Operation phase impacts have been discussed in detail in this section.

□ **Ambient Air Quality**

93. The minor impacts on ambient air quality will include dust due to transportation, and air emissions (SO₂, NO_x, CO, PM₁₀ and PM_{2.5}) on account of DG set operations in the event of power failure. The DG Sets already installed in neighboring 'Idco Tower 2000' will be used in the event of power failure. No new DG set is planned in the Precision Engineering Centre. Regular environmental monitoring will be taken as per monitoring plan to ascertain any deterioration of ambient air quality. There will be no generation of air emissions from the equipment and machinery as these will be either manually driven or electricity operated.

□ **Noise and Vibration Levels**

94. The noise levels will be generated on account of vehicular movement in the complex and operations of equipment and machinery in Demonstration and Practical Classes. During operation of few Machines, the instantaneous noise levels may go up to 60-70 dB(A). Regular noise level monitoring will be taken up as part of EMP for the operation phase.

95. The vibrations are not expected to be generated during operation phase all equipment and machinery will be fitted on well laid foundations.

□ **Wastewater Generation**

96. The wastewater generation on account of operations of Precision Engineering laboratory and machinery operations except floor washings is not anticipated. The wastewater generation will be on account of sanitation facilities and floor washing. It has been estimated that there will be 300 persons in daytime and about 27 KLD wastewater will be generated. Septic tanks and soak pits of adequate capacity have been provisioned for disposal of wastewater.

□ **Waste Generation from Precision Engineering Trade**

97. Minor solid waste generation is foreseen during practical classes. This will be handled and disposed off as per prevailing law. The waste generation from the Precision Engineering Centre and possible disposal has been summarized below in **Table-14**. The laboratory specific waste generation from PEC has been provided in **Table 15** for better clarity and understanding.

Table-14: Summary of Total Waste Generation from Precision Engineering Centre

Sl. No.	Trade	Waste Generated	Planned Disposal /Mitigation Measure
1	Precision Engineering Centre*	<ul style="list-style-type: none"> • Machine Coolant from various machinery in laboratories about 5 liters per annum • Metal Scrap= 321-358kg/yr will be generated due to job works completed by students during practical at workshop equipment (Scrap generated from practical classes) • Waste Lubricating Oil from machines 19-27liters /annum 	<ul style="list-style-type: none"> • Used machine coolant will be collected by the supplier for recycle and re-use. It will be basically lubricating oil. So, it may also be sold to authorized recyclers. • Metal scrap will be collected by the supplier to recycle. • The waste lubricating oil will be stored in plastic containers and will be sold to authorized recyclers.
2	Conventional Municipal Solid Waste	About 60 kg/day	The waste will be segregated, and disposal will be integrated with Bhubaneswar city waste disposal
3	E-Waste	The e-waste generation will be from the operation and maintenance of computers and electronic gadgets in various sections.	The OSDA will have agreements with the maintenance partners to take away discarded peripherals, spare parts, discarded old computers for possible reuse and recycle.

*Specific generation from various laboratories of PEC detailed in Table-15.

Source: Odisha Skill Development Authority

Table-15: Waste Generation from Various Equipment of Precision Engineering Trade

Laboratory-Equipment & Machines	Numbers	Waste Generation from Equipment /Machines
1. Inspection Techniques Laboratory		
Vernier Caliper 150 mm with metric/imperial scale - Accuracy 0.02mm	1 Set	There is no generation of any solid and liquid waste from the usage of equipment of Inspection Techniques Laboratory. There will also not be any air emissions also due to usage of equipment
Digital Vernier Caliper 150 mm with metric/imperial scale - Accuracy 0.01mm	1 Set	
Vernier Height Gauge (0 ~ 200 mm)	1 Set	
Vernier Depth Gauge (0 ~ 150 mm)	1 Set	
External Micrometer (0 ~ 25 mm) - Accuracy 0.01mm	1 Set	
Digital External Micrometer (0 ~ 25 mm) - Accuracy 0.001mm	1 Set	
External Micrometer (25 ~ 50 mm) - Accuracy 0.01mm	1 Set	
Digital External Micrometer (25 ~ 50 mm) - Accuracy 0.001mm	1 Set	
Internal Micrometer Caliper Type (5 ~ 25 mm) - Accuracy 0.01mm	1 Set	
Digital Internal Micrometer Caliper Type (5 ~ 25 mm) - Accuracy 0.001mm	1 Set	

Laboratory-Equipment & Machines	Numbers	Waste Generation from Equipment /Machines
2. Turning Section		
Centre lathe with digital readout (X & Z axis)	20	Metal chips about 45-50 kg per annum will be generated. These will be stored in jerry canes and will be sold to vendors for recycle and re-use. There will be generation of about 2-3 liters per annum waste lubricating oil. This oil will be stored in plastic containers and will be sold to the authorized recyclers.
Pedestal grinder c/w grinding wheel star dresser	1	
3. CNC Turning Section		
CNC Lathe and equipped with basic tooling system and interlocking safety features	10	Metal chips about 45-50 kg per annum will be generated. These will be sold to vendors for recycle and reuse. These will be stored in jerry canes and will be and will be sold to vendors for recycle and re-use. There will be generation of about 2-3 waste lubricating oil per annum. This oil will be stored in plastic containers and will be sold to the authorized recyclers.
Mobile workstation/Notebook c/w CAD/CAM software and processors for CNC Turning – 2 seats license. - able to create part geometry and generate NC part program for CNC turning	2	No waste generation during practical classes. There will also not be any air emissions also due to usage of equipment
4. Milling Section		
Vertical milling machine with digital readout (X, Y & Z axis) c/w standard tool kit and equipped with safety features and low voltage lamp	20	There will be generation of 18-20 kg per annum of metal chips due to job works completed by the students during practical classes. These metal chips will be sold to the scrap vendors for recycle and re-use. There will be generation of about 2-3 liters per annum discarded lubricating oil. This oil will be stored in plastic containers and will be sold to the authorized recyclers.
5. CNC Milling Section		
CNC Milling machine with 3-axis simultaneous functions and equipped with automatic tool changer and interlocking safety features	10	There will be generation of 18-20 kg per annum of metal chips due to job works completed by the students during practical classes. These metal chips will be sold to the scrap vendors for recycle and re-use. There will be generation of about 2-3 liters per annum discarded lubricating oil. This oil will be stored in plastic containers and will
Accessories to suit item 1	1	
Mobile workstation c/w CAD/CAM software and processors for CNC milling – 4 seats license - able to create part geometry and generate NC part program for CNC machining	4	

Laboratory-Equipment & Machines	Numbers	Waste Generation from Equipment /Machines
		be sold to the authorized recyclers.
6. 3D CAD/CAM Application Laboratory		
Workstation computer	21	No waste generation during practical classes. There will also not be any air emissions also due to usage of equipment
CAD software - 21 seats license (For 2D/3D surface, wireframe and solid modelling)	21	
CAM software – 21 seats license (CAM Turn and CAM Mill with post processor)	21	
7. CNC Sheet Metal Fabrication Laboratory		
CNC Laser (CO2) cutting machine with CNC controller, standard tool and equipped with safety features	1	Metal chips about 90-100 kg per annum due to job works completed by the students during practical classes. These metal chips will be sold to the scrap vendors for recycle and re-use. Discarded lubricant around 5 liters per annum. This oil will be stored in plastic containers and will be sold to the authorized recyclers.
CNC Turret Punching machine with CNC controller, standard tool and equipped with safety features	1	
CNC Bending (press Brake) machine with CNC controller, standard tool and equipped with safety features	1	
Air compressor with dryer Working pressure 1000 liter/min maintain at 6 Bar	1	
8. Multi-Axis Machining Laboratory		
5-axis CNC Universal Machining Centre with simultaneous axes movement functions and equipped with basic tooling system and interlocking safety features	4	Metal chips about 90-100 kg per annum will be generated. These will be sold to vendors for recycle and re-use. There will be generation of about 3 liters of coolant and 5 liters of lubricant during annual maintenance. These will be stored in jerry canes and will be taken up by the maintenance vendor for recycle and reuse.
9. CNC Sheet Metal Fabrication CAD/CAM Studio		
Workstation computer	21	No waste generation during practical classes. There will also not be any air emissions also due to usage of equipment
CAD/CAM software - 21 seats license (For 2D/3D sheet-metal working) for Laser, Turret Punch and Press Brake with post processor	1	
10. Multi-Axis CAM Studio		
Workstation computer	21	No waste generation during practical classes. There will also not be any air emissions also due to usage of equipment
11. Grinding Section		

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Laboratory-Equipment & Machines	Numbers	Waste Generation from Equipment /Machines
Surface grinder with digital readout (Vertical down feed & Cross feed) and equipped with safety features	15	There will be generation of 15-18 kg per annum of metal chips due to job works completed by the students during practical classes. These metal chips will be sold to the scrap vendors for recycle and re-use. There will be generation of about 3-5 liters per annum discarded lubricating oil. This oil will be stored in plastic containers and will be sold to the authorized recyclers.
Universal cylindrical grinder with digital readout, equipped with safety features	5	

Source: Equipment suppliers and information from laboratories in operation at Industrial Training Institutes and Industries.

98. Toilet blocks have been included in both the floors in the building design of 'Precision Engineering Centre'. No impact is anticipated on the ground water quality and surface water quality during the operation phase as there will be proper disposal of wastewater. For this, toilet blocks with septic tank and soak pits have been proposed.

99. Given the relatively small size of the Precision Engineering Centre, there will not be any significant vehicular traffic increase on account of its functioning. Around 300 students and staff will be coming to the Precision Engineering Centre. The students will mainly be travelling through public transport.

100. **Safety Measures During Operation Phase:** The design of 'Precision Engineering Centre' includes structural and seismic safety measures required by India's latest building codes (in seismic zone III). The other safety features are explained below:

- The building will be equipped with fire-fighting systems with portable fire extinguishers and smoke detectors.
- During natural calamities, the operations will be stopped. The trainees and staff will be safely evicted as per Disaster Management plan of Odisha.
- Necessary first aid facilities will be provided at the Precision Engineering Centre building.
- Fire Fighting facilities have been planned as per National Building Code 2005

101. For operation phase, safe operating procedures will be developed as part of operation manuals by the suppliers and vendors of equipment and machinery of each trade. These safe operating procedures will be displayed at each equipment and machinery, and these will be followed by the students and faculty. General SOPs for operation of CNC machines in Precision Engineering is given below:

Specific Safety Precautions in Operating CNC Machines

- The operator/student should have received appropriate instructions and demonstrations on how to safely program, set up and operate a computer numerically controlled (CNC) machine tool. Since CNC equipment follows only programmed instructions, these safety instructions must be adhered to when operating any such machine in the Manufacturing Systems lab.
- Obtain instructor's permission.
- Do not alter or modify any machinery, tooling or accessory unless you contact an instructor and obtain permission.
- Review all CNC set up and operating procedures provided.
- Review all CNC programming instructions provided.
- Prepare and review your program carefully.
- Edit your program for safety, format, correctness, and clarity.
- It is highly recommended that all programs be verified before the actual trial on the machine. Verification can be by a dry run on the machine, or through a graphic display of the tool path on the controller's screen. Do not operate any machine tool unless you are thoroughly familiar with it.
- Wear safety shoes.
- Secure long hair or loose clothing that could become caught or tangled in the moving parts of machine. Long hair possess an extreme safety hazard around machine tools, and, therefore, must be netted for safety.
- Wear your safety glasses.
- Determine the tools needed and get them ready. Tool length should not protrude too much from the holder. Use only properly sharpened tools. Use caution when changing tools – no interference with fixture or work.
- Clamp all work securely before starting machine. Only approved materials can be machined. Abrasive dust-generating materials will wear machine components.
- Do not use compressed air to blow chips from parts, machine surfaces, cabinets, controls, or floor around machine.

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- Avoid bumping any NC machine or controls. Work must not be held by hand while machining. Clamp it properly and securely in the vise. Avoid using machine in wet, damp or poorly lighted work areas.
- Perform all setup work with spindle stopped. Always stop the spindle completely before changing or adjusting the work piece, fixture or tool. Wrenches, tools, and other parts should be kept off the machine and all its moving units. Do not use machine elements as a workbench.
- Do not remove any guards or shields from any piece of equipment.
- It is very unsafe to use gloves while operating rotating machinery.
- Press the green Power on button so you can load your program to the machine controller.
- Press the Power Up button to home the machine spindle.
- When installed the chip guard doors must be kept always locked during machining.
- With one hand very close to Emergency Stop button, press the Cycle Start button for machining to begin. Stop the machine immediately if you notice any irregularity! In all emergency situations, always push EMERGENCY STOP button.
- Keep hands clear! Machine operates automatically and may move unexpectedly.
- Never place any part of your body near moving parts of this machine. Do not machine flammable or toxic materials.
- Never place your hand on the tool in the spindle and press ATC, FWD, ATC REV, NEXT TOOL, or cause a tool change cycle. The tool changes will move in and crush your hand!
- Allow the machine to complete the machining cycle and return to its home position, before reaching in to unclamp and remove your part. Shut off machine when not in use.
- Never modify machine.
- Do not disable hold-to-run switch.
- Never open electrical compartment doors. Only qualified service personnel should open them.
- Always unplug machine from electrical power before servicing.
- The table, vise, work piece, ways and chip pan must be kept clean after machining.
- Use a brush (table brush or paint brush) to clear chips from machine tools; do not use your hands, or a rag.
- All dust and debris generated in machining should be vacuumed off daily. Never use fingers to remove chips. Use a brush instead.
- Load and unload work pieces with spindle stopped. Never place hands near a revolving spindle.
- Always ensure the spindle direction is correct. Check machine speed setting before starting machine to assure spindle is not started at an unsafe speed.
- No horseplay of any kind is allowed in the CNC lab.
- Any oil spill, coolant, or other fluid spill must be removed from the floor immediately. Use paper towels, wiping cloth, or a mop.
- Rags must be kept clear of the rotating parts of machinery. If for any reason a rag gets caught in a machine, switch off the machine and stand clear of it until it comes to a complete stop.
- All soiled rags must be stored in the covered metal containers provided.
- Remove burrs/sharp edges from parts immediately after they are machined to avoid cuts on your hands.
- If any equipment is found to be in need of repair, report it to the instructor immediately. Do not attempt to use the equipment or repair it.
- Students must clean the machines and area used during lab periods. Equipment must be returned at the close of the lab period. Students must sign out for any instrument, tool, or material they check out.
- Do not leave a machine unsafe for the next operator. Turn the power off when leaving a machine for an extended period.
- Do not attempt to lift heavy work. Use help, hoist, or shop lift.
- It is the responsibility of the operator to remove all chips, oil and residue from their machine, including the chip pan at the end of a shift, or when he/she is through using the machine. (No machine shall be left dirty for the next operator). Chips around a machine will be swept up and kept to a minimum by the operator. When cleaning a machine, use only a brush, rag, or towel. Use Of High-Pressure Air for Chip Removal or Machine Cleaning Is Prohibited. Do not alter OSHA approved air nozzles. Practice good housekeeping.

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- Do not dispose of oily paper towels in chip pans or rubbish receptacles. Use only the steel oil rag receptacles.
- Any unsafe or hazardous conditions should be reported to supervisor immediately.
- Smoking, eating food, drinking beverages, running or acting in a manner that might produce unsafe conditions should be prohibited in all laboratory and classroom areas. Environmental Monitoring Plan

102. **Socio-economic Impacts:** The Precision Engineering Centre will have positive socio-economic impacts since it will provide skilled youth better quality and higher starting salary jobs. It will be beneficial to industry also as this Centre will be a source of trained manpower to them.

103. **Flora and Fauna:** Since the Precision Engineering Centre will be constructed in an industrial area so no adverse impact on fauna and flora is anticipated due to its operations. Further, to enhance the natural look of the building and premises, plantation of shrubs and landscaping will be taken up along the pathways and vacant space. No tree cutting or vegetation removal is required. There is no existence of any wildlife park, bird sanctuary, national park or any other area notified by the GoO or MoEFCC for ecological importance within an aerial distance of 10 km from the site of Precision Engineering Centre

104. **Emergency Plan for Accident and Natural Hazards:** For operation phase onsite emergency plan will be prepared by the head/ Principal of the Precision Engineering Centre. For natural calamities, including COVID-19 Pandemic, the Disaster Management Plan prepared by SDTED/GoO will be followed.

F. Description of Planned Mitigation Measures

105. Screening of environmental impacts is based on the magnitude and duration of the impact. **Table-16** provides the potential environmental impacts and the mitigation measures including the institutional responsibilities for implementing the same. All sub-project activities including construction and operation will take place within available government land at the Mancheswar Industrial Area in Bhubaneswar.

Table-16: Summary of Environmental Impacts and Planned Mitigation Measures

Sl. No.	Potential Environmental Issues	Duration or Extent	Magnitude	Proposed Mitigation Measures	Institutional Responsibilities
1	Location Impacts				
1.1	Lack of sufficient planning to assure long term sustainability of the Precision Engineering Centre building and ensure protection specially from earthquake and other natural disasters	Permanent	Major	The design of Precision Engineering Centre has been completed considering earthquake coefficient of zone III. Building located on a plain land and sustainability principles such as rainwater harvesting, solid waste segregation, etc. have been incorporated in project design. No location impacts as the site is a vacant land owned by the GoO	OSDA PMU Odisha Skill Development Project (OSDP) Initial Environment Examination Report (Addendum)
2	Design and Pre-construction Impacts				
2.1	Permissions and NOCs and Environmental Clearance Modification	Permanent	Major	1-No environmental clearance is required. 2-Other requisite permissions to be obtained for PEC	OSDA through Odisha Industrial Infrastructure Development Corporation
2.2	Layout of components to avoid impact on the aesthetics of the Precision Engineering Centre building and surroundings	Permanent	Major	All the subproject components are planned within a vacant site in industrial area hence no adverse impacts on aesthetics of site. Hence, no mitigation measures are warranted.	Not Applicable
2.3	Increased storm water runoff from alterations of the site's natural drainage patterns due to landscaping, excavation works, construction of parking lots, and addition of paved surface.	Permanent	Moderate	Design of proposed Precision Engineering Centre will enable efficient drainage at the site and maintain natural drainage patterns	OSDA through Odisha Industrial Infrastructure Development Corporation
2.4	Integration of energy efficiency and energy conservation programs in design of WSC building	Permanent	Moderate	Following measures have been included in the design to enhance energy efficiency: <ul style="list-style-type: none"> • Usage of recyclable materials • Installation of BEE certified equipment • Usage of energy efficient lighting fixtures 	OSDA through Odisha Industrial Infrastructure Development Corporation

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Sl. No.	Potential Environmental Issues	Duration or Extent	Magnitude	Proposed Mitigation Measures	Institutional Responsibilities
				(LED).	
2.5	Impacts on Flora and Fauna	Permanent	Minor	No tree cutting or shrubs removal required as the site is vacant. Plantation along boundary and open space will be taken at the end of construction phase. No impact on flora and fauna anticipated as site is in industrial area.	OSDA through Odisha Industrial Infrastructure Development Corporation
3	Construction Impacts				
3.1	Construction Camps - Location, Selection, Design and Layouts	Temporary	Moderate	Construction camp at the Precision Engineering Centre site will be located within the site. Contractor may hire house also for accommodation of workers. Adequate sanitation facilities shall be provided at camp site, if planned and no wastewater will be discharged outside.	Contractor and Odisha Industrial Infrastructure Development Corporation
3.2	Impacts on flora and fauna	Temporary	Moderate	No impacts on flora and fauna are anticipated as the site is on a vacant land within Industrial area.	Contractor and Odisha Industrial Infrastructure Development Corporation
3.3	Land acquired for Temporary Usage, clearance activities	Temporary	Moderate	The commencement of site clearance activities for temporary acquired areas, if any will be undertaken with due permission from the Environment Specialist of the PMU to minimize environmental impacts. All areas used for temporary construction operations will be subject to complete restoration to their former conditions with appropriate rehabilitation procedures.	Contractor and Odisha Industrial Infrastructure Development Corporation
3.4	Basic amenities at camp and construction site	Temporary	Major	Sufficient supply of potable water will be provided and maintained at the construction site and construction camp. There shall be well ventilated house accommodation, arrangement for food, etc. at camp. If the drinking water is obtained from an intermittent public water supply, then storage tanks will be provided.	Contractor and Odisha Industrial Infrastructure Development Corporation
3.5	Waste disposal	Permanent	Major	The construction on waste will be utilized to the extent possible. For disposal of non-usable	Contractor and Odisha Industrial Infrastructure

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Sl. No.	Potential Environmental Issues	Duration or Extent	Magnitude	Proposed Mitigation Measures	Institutional Responsibilities
				waste location of disposal site for construction waste will be finalized by the Environmental Specialist of the PMU OSDA and Odisha Industrial Infrastructure Development Corporation. He/She will confirm that disposal of the material will not impact the surrounding areas, water body or any flora.	Development Corporation
3.6	Stockpiling of construction materials	Temporary	Moderate	Stockpiling of construction materials does not impact obstruct the drainage and Stockpiles will be covered to protect from dust and erosion.	Contractor and Odisha Industrial Infrastructure Development Corporation
3.7	Soil and Water Pollution due to fuel and lubricants, construction waste, and wastewater discharge	Temporary	Moderate	1-The vehicle cleaning and storage of fuel should be avoided at Precision Engineering Centre site as far as possible. In case of unavoidable circumstances, fuel storage and vehicle cleaning area at the site will be stationed such that water discharge does not drain into the local drain. Water pollution parameters will be monitored as per monitoring plan. 2- At the camp site sanitation facilities with septic tank will be provided so that there is no discharge of any wastewater either to drain or open area.	Contractor and Odisha Industrial Infrastructure Development Corporation
3.8	Siltation of water bodies due to spillage of construction wastes	Temporary	Moderate	No disposal of construction wastes will be carried out into any natural streams or local drains. Extraneous construction wastes will be transported to the pre-identified disposal sites for safe disposal.	Contractor and Odisha Industrial Infrastructure Development Corporation
3.9	Generation of dust	Temporary	Moderate	The contractor will take every precaution to reduce the levels of dust during construction and material handling. Environmental monitoring will be taken up as per monitoring plan.	-Contractor and Odisha Industrial Infrastructure Development Corporation
3.10	Emission from Construction Vehicles, Equipment and Machinery	Temporary	Moderate	Vehicles, equipment and machinery used for construction will conform to the relevant Standards (vehicular emission standards of	Contractor and Odisha Industrial Infrastructure Development

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Sl. No.	Potential Environmental Issues	Duration or Magnitude	Proposed Mitigation Measures	Institutional Responsibilities
				Government of India and CPCB specified standards for equipment and machinery) and will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements. Corporation
3.11	Noise and Vibrations	Temporary	Moderate	Noise limits for construction equipment used in this project will not exceed 75 dB (A). Monitoring in respect of noise levels will be taken up as per monitoring plan. All noise generating equipment and machinery will be properly maintained. As far as possible construction activities will be scheduled in daytime only. To mitigate vibration related impacts the equipment generating low vibrations will be used Contractor and Odisha Industrial Infrastructure Development Corporation
3.12	Material Handling at Site	Temporary	Moderate	Workers employed on mixing cement, lime mortars, concrete, etc., will be provided with protective footwear and protective goggles. Workers, who are engaged in welding works, will be provided with welder's protective eye-shields. Workers engaged in stone/floor breaking activities will be provided with protective goggles and clothing. The use of any chemical will be strictly in accordance with the manufacturer's instructions. A register of all chemicals delivered to the site will be kept and maintained up to date by the Contractor. Contractor and Odisha Industrial Infrastructure Development Corporation
3.13	Occupational Health and Safety	Temporary	Moderate	Adequate safety measures for workers during handling of materials at the site for Precision Engineering Centre will be taken up. The contractor has to comply with all regulations for the safety of workers. Precaution will be taken to prevent danger of the workers from fire, accidental injury, etc. First aid treatment will be made available for all injuries likely to be sustained during the course of work. Contractor and Odisha Industrial Infrastructure Development Corporation

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Sl. No.	Potential Environmental Issues	Duration or Extent	Magnitude	Proposed Mitigation Measures	Institutional Responsibilities
				The Contractor will conform to all anti-malaria instructions given to him by the PMU and Odisha Industrial Infrastructure Development Corporation.	
3.14	Safety Measures during installation of equipment and machinery	Temporary	Moderate	<p>The given safety measures will be followed during the civil works for installation of equipment and machinery.</p> <ul style="list-style-type: none"> • The foundations for all equipment and machinery mentioned will be constructed as per design specifications and at locations finalized in drawing. • Necessary clear space for the movement will be kept between the equipment/machinery. • All the moving equipment (motor, pump, cooling tower) shall be provided guards /enclosures, for this necessary space will be kept. • Safe Operating procedures will be prepared for each equipment and displayed after installation of equipment. • Workers during construction of foundations and installation of equipment will be provided proper personal protective equipment (PPE). • Rubber mats shall be placed around electrical panel boards. • Necessary spill tray will be provided at water storage tanks. • Guards/enclosures will be provided around electrical motors. • Safety measures specified by the manufacturers/suppliers of respective equipment and machinery shall be displayed and followed. • Safe Operating procedures will be prepared for electric motors, and these shall be 	Contractor, suppliers of equipment and machinery of Precision Engineering Trade and Odisha Industrial Infrastructure Development Corporation

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Sl. No.	Potential Environmental Issues	Duration or Extent	Magnitude	Proposed Mitigation Measures	Institutional Responsibilities
				<p>displayed.</p> <ul style="list-style-type: none"> • Oil drips if any shall be wiped with cotton or cloths rags. • The installation of hydraulics systems, lifts, elevators, motors will be done at the specified locations in the layout 	
3.15	Clearing of Construction of Camp and Restoration	Temporary	Major	<p>1-Contractor at the sub-project site will prepare site restoration plans for approval by the PMU and Odisha Industrial Infrastructure Development Corporation. These camp site restoration plans are to be implemented by the contractor prior to demobilization.</p> <p>2-On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the PMU and Odisha Industrial Infrastructure Development Corporation</p>	Contractor and Odisha Industrial Infrastructure Development Corporation
3.16	Onsite emergency plan for minor accidents and mishaps and Disaster Management Plan for Natural Calamities including COVID-19 Pandemic	Temporary	Major in case of natural calamity and minor in case of accidents or mishaps at construction site	<p>1-The onsite emergency plan will be prepared by the contractor in consultation with Odisha Industrial Infrastructure Development Corporation and PMU.</p> <p>2-For natural calamities, disaster management plan prepared by the Odisha Industrial Infrastructure Development Corporation under the provisions of Disaster Management Act 2005 will be followed.</p> <p>4- The COVID-19 Protection measures will be followed as per guidelines of GOI and GoO.</p>	Contractor
3.17	Employment and Socio-economic	Short Term	Minor and beneficial	The manpower envisaged for civil works at the Precision Engineering Centre site is about 80-100. As far as possible preference will be given to local vendors and workers.	Contractor and Supplier of Equipment

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Sl. No.	Potential Environmental Issues	Duration or Extent	Magnitude	Proposed Mitigation Measures	Institutional Responsibilities
				During installation of machinery and equipment, approx. 8-10 skilled personnel will be mobilized by the Equipment Supplier	
4	Operation and Maintenance Impacts				
4.1	Environmental Conditions (Ambient Air Quality, Water Quality and Noise Levels)	Temporary	Moderate	Air, water, and noise levels will be monitored periodically as per the Environmental Monitoring Plan prepared.	OSDA
4.2	Waste generation Operation of Equipment and Machinery in Precision Engineering Trade in the Precision Engineering Centre	Permanent	Moderate	The total estimated waste generation is as follows: (i) Metallic waste: The metallic waste generated (about 360 kg per annum). during job works of students in practical classes will be sold to the vendors for possible re-use/recycle. (ii) Lubricating Oil: Lubricating oil will be generated from PEC laboratories (about 27 liters per annum) during the practical and demonstration classes. The lubricating oil will be stored in tightly capped plastic containers/bottles and will be sold to authorized recyclers and records will be maintained. (iii) Coolant: Coolant generation due to annual maintenance of machines will be 5litersapproximately. This will be sold to authorized recyclers and records will be maintained.	OSDA
4.3	Solid Waste Disposal	Permanent	Major	The municipal waste (about 60kg/day) will be segregated and will be integrated with BMC waste disposal system.	OSDA
4.4	E- Waste	Permanent	Insignificant	The e-waste generation will be from the operation and maintenance of computers and electronic gadgets in various sections. The OSDA will have agreements with the maintenance partners to take away discarded peripherals, spare parts, discarded old	OSDA

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Sl. No.	Potential Environmental Issues	Duration or Extent	Magnitude	Proposed Mitigation Measures	Institutional Responsibilities
				computers for possible reuse and recycle.	
4.5	Unhygienic conditions due to poor maintenance of sanitation facilities and irregular solid waste collection	Temporary	Severe	The OSDA through a maintenance partner will carry out maintenance of the toilets and carry out the regular collection and disposal of wastes to the local disposal sites.	OSDA/ Precision Engineering Administration
4.6	Wastewater Treatment and Utilization	Permanent	Severe	The wastewater generated at Precision Engineering Centre to the extent of 27 KLD will be disposed in septic tanks/ soak pits in the Precision Engineering Centre.	OSDA
4.7	Onsite emergency plan for minor accidents and mishaps and Disaster Management Plan for Natural Calamities including COVID-19 Pandemic	Temporary	Major in case of natural calamity and minor in case of accidents or mishaps at construction site	The head of Precision Engineering Centre with the assistance of team working under him will prepare on site emergency plan for possible minor accidents and mishaps during operation phase. For natural calamities, the disaster management plan prepared by SDTED will be followed. For COVID-19 Pandemic Guidelines and protection measures announced by GOI and GoO will be followed.	
4.8	Fire and Toxic Hazards	Long Term	Severe	1-Fire plan approval will be obtained from Chief Fire Officer before occupying the buildings. 2-Occupancy certificate from municipal corporation/development authority shall be obtained before occupying building. 3- Firefighting system will be in place as per NBC-2005 4- Fire Fighting facilities shall be regularly maintained, and regular fire drills will be carried out.	OSDA
4.9	Safety Measures during operation phase	Long Term	Severe	The safe operating procedures (SOPs) during installation and commissioning of equipment and machinery shall be followed during practical classes by the faculty and students. The SOPs will be periodically updated based on experience and situations faced during the operation phase.	OSDA

VI. ANALYSIS OF ALTERNATIVES

106. Odisha accounts for 3.47% of the country's population; it is positioned to be one of the biggest contributors of the skilled workforce in the country. However, the core problem faced by the state is the low employability of the young workforce due to low level of skills, weak training capacity in terms of quality and numbers, fragmented skills ecosystem and poor industry linkages. Further, the current training capacity and quality is inadequate to meet the 12th five-year plan target of training one million people. In Odisha, the Industrial Training Institutes (ITI)/ Industrial Training Centers (ITC) combined has an estimated capacity of around 75,000 seats per year, far below to address the skill potential in the state. Hence, the proposed program is the necessity of today for Odisha. The Precision Engineering Centre will offer courses on higher level skills and will help Odisha youth in getting higher salary start and employment in industry of repute.

107. The Precision Engineering Centre is being established and developed on a vacant plot in Mancheswar Industrial Estate area of Bhubaneswar, so impact on flora and fauna will be minimal. Also, as it is Industrial area with already existing facilities like PHED supply for freshwater allocation, electricity and efficient road connectivity, so the consumption of natural resources has already been minimized. Also being in an already built-up urban area, no impacts on flora and fauna are seen in this component also.

108. Further, the impacts during the construction and operation phases will be minimized through the implementation of Environment Management and Monitoring Plan.

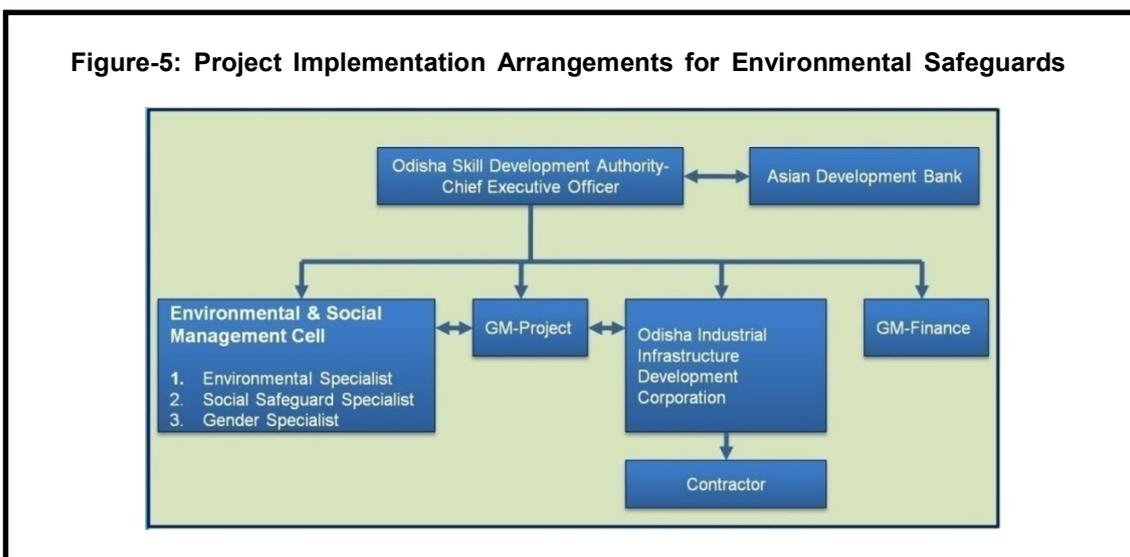
VII. INSTITUTIONAL ARRANGEMENT & RESPONSIBILITIES

109. The executing agency for the project will be the Government of Odisha (GoO) acting through the Skill Development and Technical Education Department (SDTED). A Project Management Unit (PMU) will be established in SdTED. The project will be implemented through the PMU and IA (OSDA).

110. The OSDA will be responsible for (a) establishing and operating the Precision Engineering Centre (b) managing project funds including but not limited to payments, accounting, auditing, etc.; (c) contracting civil works, Consultants, service providers, and Equipment Supply related contracts; and (d) coordinating with PMU for smooth implementation of the project. The PMU and OSDA will be supported by a team of project management consultant (PMC) who would be engaged by OSDA. There will be an Environment and Social Management Cell (ESMC) within OSDA. This ESMC will comprise of one environmental safeguard specialist, one social safeguard specialist and one Gender Specialist. Additionally, OSDA will also hire services of external agency (ies)/expert(s) as per requirement to meet the objectives of EMP.

111. Similarly, the civil works contractor at Precision Engineering Centre will also have one designated and qualified HSE officer having experience of 5 years. He/she will be responsible for implementing the proposed EMP. In case of non-availability of designated HSE officer, a suitable penal action will be taken against the contractor on recommendation of ESMC. The works and installation of equipment will be supervised by the OSDA through PMU.

112. The role of PMC in OSDP is of critical importance in not only providing technical and knowledge services through a dedicated cadre of professionals in different domains of the project but also assist the core team of OSDA in strengthening the eco-system of skills development in the state of Odisha and develop a pioneering example of support and capacity building services in skills development. The project implementation arrangements with respect to safeguards implementation has been shown in **Figure-5**. The environmental safeguard specialist, in PMU shall be responsible for environmental safeguards related issues at the Precision Engineering Centre site.



Appendix -2

VIII. ENVIRONMENT MANAGEMENT PLAN (EMP)

A. General

113. The Environmental Management Plan (EMP) is the key to ensure the minimum degradation in environmental quality and better socio-economic conditions within the local area and/or region due to the construction and operation of the proposed facility. The EMP with monitoring plan focuses on direct impacts, which are identified as having the potential to cause significant impacts on the environment aspects and identifies:

- Specific control measures that will be taken to prevent, reduce or manage the environmental and social impacts; and
- Where it is not possible to specify these at this stage, the level of environmental and social performance that will be expected.

114. It will be ensured that environmentally critical actions are undertaken as per the various relevant regulatory requirements. There will be an ESMC at PMU, overseeing all environment, safety and social responses to ensure that implementation of mitigation measures and monitoring program including findings from monitoring results.

115. The extent of monitoring activities, including their scope and periodicity, will be commensurate with the project's risks and impacts. The parameters to be monitored, frequency and duration of monitoring as well as the locations to be monitored will be as per the monitoring plan prepared as part of the EMP. Implementation of the EMP during construction will be done by the contractor and supervised by environmental specialist of PMU.

116. The budget for environmental monitoring will be included as part of civil works. This plan will require environmental monitoring mechanisms to be used to indicate the effectiveness of the EMP in mitigating negative impacts.

117. The EA has the overall responsibility of fulfilling environmental requirements of the GoO and monitoring the implementation of the EMP for Precision Engineering site.

118. During the design and pre-construction stage, monitoring will be the responsibility of OSDA supported by the EA. This is mainly in the form of review and verification of designs and incorporation of mitigation measures into design and contract documents. Mitigation measures to be taken during the construction stage will be mostly implemented by the main contractor.

119. The EMP for the Precision Engineering Centre for the project lifecycle (pre-construction, construction, and operation phases) has been given in **Tables-17 to 19**.

B. Responsibility for updating IEE during Pre-Construction and Construction

120. **Responsibility for monitoring.** During construction, the Environmental Specialist of the ESMC cell at OSDA PMU and the designated representatives' engineer of the Odisha Industrial Infrastructure Development Corporation at Precision Engineering site will monitor the contractor's performance. During the operation phase, monitoring will be the responsibility of the PMU. The Environmental specialist will prepare semi-annual reports.

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Responsibility for Reporting: OSDA will submit semi-annual reports on the implementation of the EMP to ADB. Any major lapses in adhering to the EARF and updated IEE and / or EMP should be reported to ADB immediately. The safeguard specialist of PMU will finalize environmental monitoring report. For any non-compliance observed, corrective actions will be taken in a time bound manner. The cost for mitigating noncompliance will be borne by the contractor as per contract provisions. In case of mitigation costs not coming in scope of contract, these will be met out of contingencies built in EMP cost and in overall project cost.

Table-17: Pre-Construction Phase Environmental Management Plan for Precision Engineering Centre at Bhubaneswar

Sl. No.	Environmental Issues	Mitigation Measures	Parameters (Indicators for Compliance)	Responsible for Implementation	Responsible for Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
1	Lack of sufficient planning to assure long term sustainability of the PEC and ensure protection specially from earthquake and other natural disasters	The design of Precision Engineering Centre building has been completed considering earthquake coefficient of zone III. Building located on a plain land and sustainability principles such as rainwater harvesting, solid waste segregation, etc. have been incorporated in project design.	Verification of design parameters	Odisha Industrial Infrastructure Development Corporation	PMU	Review after completion of DPR	Part of Odisha Industrial Infrastructure Development Corporation and PMC Professional Fee
2	Layout of components to avoid impact on the aesthetics of the Precision Engineering Centre building and surroundings.	The project components siting will avoid impacts on the aesthetics of the site and surroundings.	Precision Engineering Centre building's exteriors	Odisha Industrial Infrastructure Development Corporation	PMU	Review after completion of detailed design	Part of Odisha Industrial Infrastructure Development Corporation and PMC Professional Fee
3	Increased storm water runoff from alterations of the site's natural drainage patterns due to landscaping, excavation works, construction of parking lots, and addition of paved surface.	The design has taken care of storm water drainage. The storm water will be diverted to rainwater recharging pits.	Arrangement for proper diversion of storm water runoff to rainwater recharge pits and Specifications of rainwater harvesting structures	Odisha Industrial Infrastructure Development Corporation	PMU	After mobilization of contractor at the site and during establishment of construction camp at site	Incidental to construction cost

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Sl. No.	Environmental Issues	Mitigation Measures	Parameters (Indicators for Compliance)	Responsible for Implementation	Responsible for Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
4	Integration of energy efficiency and energy conservation programs in design of Precision Engineering Centre building	Following measures have been included in the design to enhance energy efficiency: <ul style="list-style-type: none"> • Usage of recyclable materials like wood substitutes. • Installation of BEE certified equipment • Usage of energy efficient lighting fixtures (LED) 	Electrical fixtures, details of water heating system	Odisha Industrial Infrastructure Development Corporation	PMU	During finalization of detailed design	Part of project cost
5	Permissions and NOCs	Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. Acknowledge in writing and provide report on compliance all obtained consents, permits, NOCs, etc..	Consents, permits, and NOCs. Records and communications	Odisha Industrial Infrastructure Development Corporation	PMU	check consent for establishment of construction camp, approval from civic authorities	Project cost
6	Establishment of baseline environmental conditions prior to start of civil works	<ul style="list-style-type: none"> • Conduct documentation of location of components, areas for construction zone (Camp, staging, storage, stockpiling, etc.) and surroundings (within direct impact zones). Include photos and GPS coordinates. • Carry out pre-construction phase environmental monitoring in respect of ambient air quality, water quality and noise levels as 	Records and Photographs	Contractor	Odisha Industrial Infrastructure Development Corporation	Once prior to start of construction works	Contractor

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Sl. No.	Environmental Issues	Mitigation Measures	Parameters (Indicators for Compliance)	Responsible for Implementation	Responsible for Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		per monitoring plan. This monitoring is to establish baseline environmental monitoring.					
7	Construction Camps - Location, Selection, Design and Layout	1-Construction camp at the Precision Engineering Centre site will be located within the vacant plot/site. The potential sites will be selected for labor camp, and these shall be visited by the environmental expert of safeguards cell and one having least impacts on environment will be approved. Alternatively, the Contractor may hire house also for accommodation of workers. Adequate sanitation facilities shall be provided at camp site, if planned and no wastewater will be discharged outside. 2-Locations for storage of construction materials shall be identified at a vacant spot in the site or at any building close to the site. 3-Sanitation facilities at construction camp shall be adequately planned	Construction Camp site, and locations of material storage areas, sanitation facilities	Contractor	Odisha Industrial Infrastructure Development Corporation, PMU environmental specialist	At the time of construction camp establishment and finalization of storage areas	Contractor
8	Sources of construction materials	Use quarry sites and sources licensed by the GoO. In case materials are sourced from	Permits issued to quarries and sources of	Contractor PMC and Odisha Industrial	PMU- Environmental Specialist,	On ongoing basis till physical completion of	Contractor and Odisha Industrial

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Sl. No.	Environmental Issues	Mitigation Measures	Parameters (Indicators for Compliance)	Responsible for Implementation	Responsible for Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		<p>market, ensure these are from licensed sources compliant with environmental regulations of India.</p> <p>Verify suitability of all material sources and obtain approvals from PMU.</p> <p>Submit to Odisha Industrial Infrastructure Development Corporation and PMU on a monthly basis documentation of sources of materials.</p>	materials	Infrastructure Development Corporation to verify sources (including permits)	Odisha Industrial Infrastructure Development Corporation and PMU	works	Infrastructure Development Corporation as part of contract fee
9	Occupational health and safety	<p>Comply with IFC EHS Guidelines on Occupational Health and Safety.</p> <p>Develop comprehensive site-specific health and safety (H&S) plan. The overall objective is to provide guidance to contractor on establishing a management strategy and applying practices that are intended to eliminate, or reduce, fatalities, injuries and illnesses for workers performing activities and tasks associated with the project.</p> <p>Include in H&S plan measures such as: (i) type of</p>	Health and safety (H&S) plan, Insurance coverage to workers	Contractor	PMU-Environmental Specialist, and Odisha Industrial Infrastructure Development Corporation	During Pre-construction phase	Contractor

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Sl. No.	Environmental Issues	Mitigation Measures	Parameters (Indicators for Compliance)	Responsible for Implementation	Responsible for Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		probable hazards (ii) corresponding personal protective equipment for each identified hazard; (iii) H&S training for all site personnel; (iv) procedures to be followed for all site activities; and (v) documentation of work-related accidents. Provide medical insurance coverage for workers.					
10	Stakeholder consultations	Continue information dissemination, stakeholder consultations, and involvement/participation of stakeholders during project implementation.	-Disclosure records - Consultations	PMU- Environmental Specialist and Odisha Industrial Infrastructure Development Corporation and Contractor	Odisha Industrial Infrastructure Development Corporation and PMU	<ul style="list-style-type: none"> • During updating of IEE Report (virtual due to COVID outbreak and lockdown) • During preparation of site- and activity-specific plans as per EMP • Prior to start of construction • During construction 	PMU and Contractor

Table-18: Construction Phase Environmental Management Plan for Precision Engineering Centre, Bhubaneswar

Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation Precision Engineering Centre	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
1	Basic amenities, well ventilated accommodation, Sanitation and drinking water facilities at construction Camp of Precision Engineering Centre	<p>1-The contractor shall provide sanitation facilities at the Precision Engineering Centre construction camp site. These facilities will include dust bins in adequate numbers for solid waste collection, drinking water facilities, and separate toilets for male and females. In case camp is established in nearby house, then the contractor will ensure that adequate facilities exist in the house. These toilets facilities shall be maintained. In case camp is established in open land, then septic tanks/soak pits shall be provided at the toilets. The dust bins shall be regularly emptied and waste from camp site shall be disposed off at designated locations. Drinking water quality shall be monitored as per monitoring plan.</p> <p>2- Accommodation facilities will be well ventilated.</p> <p>3- Sufficient supply of potable water to be provided and maintained. If the drinking water is obtained from an intermittent public water supply, then storage tanks will be provided. For this contractor will submit plans how availability of drinking water shall be assured.</p>	Construction camp sanitation and drinking water facilities	Contractor	PMU Environmental Specialist, and Odisha Industrial Infrastructure Development Corporation and PMU	Regularly during construction phase	Contractor
2	Land acquired for Temporary Usage, clearance activities	The commencement of site clearance activities for temporary acquired areas, if any will be undertaken with due permission from the Environment Specialist of the PMU to minimize	Pre-construction records of site and vegetation in area of construction	Contractor	PMU- Environmental Specialist, and Odisha Industrial	Duration of site preparation of temporary acquired	PMU and Odisha Industrial Infrastructure Development

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation Precision Engineering Centre	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		environmental impacts. Photographic records of original conditions of site will be maintained. All areas used for temporary construction operations will be subject to complete restoration to their former conditions with appropriate rehabilitation procedures.			Infrastructure Development Corporation	areas	Corporation
3	Waste disposal	The pre-identified disposal location shall be part of Comprehensive Waste Disposal Plan. Solid Waste Management Plan to be prepared by the Contractor in consultation with local civic authorities. The construction waste will be utilized to the extent possible. For disposal of non-usable waste location of disposal site for construction waste will be finalized by the Environmental Specialist of the PMU OSDA and Odisha Industrial Infrastructure Development Corporation. Contractor shall ensure that waste shall not be disposed off in the surroundings of site and along the access path Environment Specialist will confirm that disposal of the material will not impact the water body. It will also be ensured that no flora is damaged.	Waste Disposal sites, waste management plan	Contractor	PMU-Environmental Specialist and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase	Contractor
4	Stockpiling of construction materials	Stockpiling of construction materials should not impact or obstruct the drainage and Stockpiles will be covered to protect from dust and erosion.	Stockpiling sites at Precision Engineering Centre Building	Contractor	PMU-Environmental Specialist and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase	Contractor

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation Precision Engineering Centre	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
5	Arrangement for Construction Water	(i) The Contractor shall provide a list of locations and type of sources from where water for construction shall be acquired. (ii) To avoid disruption/ disturbance to other water users, the Contractor shall arrange water from Bhubaneswar Municipal Corporation /Public Health Engineering Department and consult Odisha Industrial Infrastructure Development Corporation before finalizing the source.	Water availability at identified water source locations	Contractor	PMU- Environmental Specialist and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase	Contractor
6	Soil and Water Pollution due to fuel and lubricants, construction waste, and wastewater discharge	1-The vehicle cleaning and storage of fuel should be avoided at the site as far as possible. In case of unavoidable circumstances, fuel storage and vehicle cleaning area at site will be stationed such that water discharge does not drain into the local drain. Water pollution parameters will be monitored as per monitoring plan. 2- Waste water from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be treated in an oil interceptor before discharging it on land or into surface water bodies or into other treatment system. 3-At the camp site sanitation facilities with septic tank will be provided so that there is no discharge of any wastewater either to drain or open area.	Precision Engineering Centre site	Contractor	PMU- Environmental Specialist and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase	Contractor

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation Precision Engineering Centre	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
7	Siltation of water bodies due to spillage of construction wastes	No disposal of construction wastes will be carried out into local drains or the river Kuakhai. Extraneous construction wastes will be transported to the pre-identified disposal sites for safe disposal.	Water bodies especially natural streams, river Precision Engineering Centre site	Contractor	PMU- Environmental Specialist, and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase	Contractor
8	Generation of dust	The contractor will take every precaution to reduce the levels of dust at construction site. The dust generation will also be avoided during material handling. All filling works to be protected/ covered in a manner to minimize dust generation. Environmental monitoring (ambient air quality) will be taken up as per monitoring plan.	Precision Engineering Centre site, air quality monitoring results	Contractor	PMU- Environmental Specialist, and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase	Contractor
9	Emission from Construction Vehicles, Equipment and Machinery	Vehicles, equipment and machinery used for construction will conform to the relevant Standards (vehicular emission standards of Government of India and CPCB specified standards for equipment and machinery) and will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements.	PUC certificates of vehicles and machinery	Contractor	PMU- Environmental Specialist and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase	Contractor
10	Noise and Vibrations	Noise limits for construction equipment used in this project will not exceed 75 dB (A). Monitoring in respect of noise levels will be taken up as per monitoring plan. All noise generating equipment and machinery will be properly maintained. As far as possible construction activities will	Certificates of vehicles conforming noise standards, noise monitoring results	Contractor	PMU- Environmental Specialist and Odisha Industrial Infrastructure Development	Regularly during construction phase	Contractor

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation Precision Engineering Centre	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		be scheduled in daytime only. To minimize impacts related to vibrations small and low vibration generating equipment will be used.			Corporation		
11	Impacts on flora and fauna	1- It will be ensured that there is no damage to shrubs, plantation and landscaping works 2- No impact foreseen on fauna as Precision Engineering Centre site is in an industrial area	Environmental monitoring reports, Trees and shrubs planted at Precision Engineering Centre site	Contractor	PMU- Environmental Specialist, and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase	Contractor
12	Material Handling at Precision Engineering Centre site	1-Workers employed on mixing cement, lime mortars, concrete, etc., will be provided with protective footwear and protective goggles. 2-Workers, who are engaged in welding works, will be provided with welder's protective eye-shields. 3-The use of any chemical will be strictly in accordance with the manufacturer's instructions. 4- A register of all chemicals delivered to the site will be kept and maintained up to date by the Contractor.	Data/ Records on available personal protective equipment	Contractor	PMU- Environmental Specialist and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase	Contractor
13	Occupational Safety and Health	Adequate safety measures for workers during handling of materials at the Precision Engineering site will be taken up. The contractor has to comply with all regulations for the safety of workers. Precaution will be taken to prevent danger of the workers from fire, accidental injury,	Records of availability of personal protective equipment, availability of first aid kits	Contractor	PMU- Environmental Specialist, and Odisha Industrial Infrastructure Development	Regularly during construction phase	Contractor

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation Precision Engineering Centre	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		<p>etc. First aid treatment will be made available for all injuries likely to be sustained during the course of work. The Contractor will conform to all anti-malaria instructions given to him by the PMU and Odisha Industrial Infrastructure Development Corporation</p>			Corporation		
14	Safety measures during installation of equipment and machinery	<p>Following safety measures will be followed during the installation of equipment in laboratories.</p> <ul style="list-style-type: none"> • The foundations for all equipment and machinery mentioned will be constructed as per design specifications and at locations finalized in drawing. • Necessary clear space for the movement will be kept between the equipment/machinery. • All the moving equipment (motor, pump, cooling tower) shall be provided guards /enclosures, for this necessary space will be kept. • Safe Operating procedures will be prepared for each equipment and displayed after installation of equipment. • Workers during construction of foundations and installation of equipment will be provided proper personal protective equipment (PPE). • Rubber mats shall be placed around electrical panel boards. • Necessary drip/spillage containing dyke /trays provisions will be kept around 	Safe operating procedures, daily supervision and adherence to the approved layout of floors	Contractor for civil works and suppliers of equipment	PMU- Environmental Specialist and Odisha Industrial Infrastructure Development Corporation	Regularly during construction phase of civil works and during installation of equipment and machinery	Contractor and suppliers of equipment and machinery

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation Precision Engineering Centre	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		<p>diesel storage tank planned at the floor.</p> <ul style="list-style-type: none"> • Necessary spill tray will be provided at water storage tanks. • Guards/enclosures will be provided around electrical motors. • Safety measures specified by the manufacturers/suppliers of Travellators and lifts shall be displayed and followed. • Safe Operating procedures will be prepared for lifts, escalators, travellators and electric motors and these shall be displayed. • Oil drips if any shall be wiped with cotton or cloths rags. • The installation of hydraulics systems, lifts, elevators, motors will be done at the specified locations in the layout 					
15	Onsite emergency plan for minor accidents and mishaps and Disaster Management Plan for Natural Calamities	The onsite emergency plan will be prepared by the contractor in consultation with PMU. For natural calamities, disaster management plan prepared by the Odisha Industrial Infrastructure Development Corporation under the provisions of Disaster Management Act 2005 will be followed.	Onsite emergency plan document and Disaster Management Plan document of Odisha Industrial Infrastructure Development Corporation	Contractor	PMU- Environmental Specialist and Odisha Industrial Infrastructure Development Corporation	Mock Drill every quarter	Contractor
16	Clearing of Construction of Camp and Restoration	Contractor at the Precision Engineering Centre site will prepare site restoration plan for approval by the PMU and Odisha Industrial Infrastructure Development	Restoration plan, and records of pre-construction of temporary	Contractor	PMU- Environmental Specialist, and Odisha	End of construction phase	Contractor

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		Corporation. These camp site restoration plans are to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the PMU and Odisha Industrial Infrastructure Development Corporation	sites		Industrial Infrastructure Development Corporation		
17	Employment and Socio-economic	The manpower envisaged for civil works is about 80-100. As far as possible preference will be given to local vendors and workers	List of vendors and workers	Contractor	PMU OSDP and Odisha Industrial Infrastructure Development Corporation	Entire duration of construction phase	Contractor

Table-19: Operation Phase Environmental Management Plan for Precision Engineering Centre Bhubaneswar

Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
1	Environmental Conditions (Ambient Air Quality, Water Quality and Noise Levels)	Air, water, and noise levels will be monitored periodically as per the Environmental Monitoring Plan prepared. The environmental monitoring will be taken through a NABL accredited laboratory	Monitoring results and relevant standards	OSDA through Pollution Monitoring Agency	PMU	As per monitoring Plan	OSDA

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
2	Waste Generation at Precision Engineering	The metallic waste (non-hazardous in nature) generated during practical and demo classes will be collected and sold to the recyclers /vendors	Metallic waste collection bins and storage, records of sale to vendors	OSDA through PEC Head	PMU	On Daily basis	OSDA
		Lubricating oil generated during usage of machines and practical job works will be stored in tightly capped plastic containers/bottles and will be sold to authorized recyclers and records will be maintained.	Bottles/cans storage of discarded lubricant bottles., records of sale of lubricating oil to authorized recyclers	OSDA through PEC Head	PMU	On Regular basis	OSDA
		Used machine Coolants from grinding, milling, and turning sections will be sold to authorized recyclers and records will be maintained.	Bottles/cans storage of discarded lubricant bottles., records of sale of lubricating oil to authorized recyclers				
4	Municipal Solid Waste	The municipal waste (about 60 kg/day) will be segregated and will be integrated with BMC waste disposal system	Segregation of construction waste	OSDA through PEC Head	PMU	Regularly	OSDA
5	E- Waste	The e-waste generation will be from the operation and maintenance of computers and electronic gadgets in various sections. The OSDA will have agreements with the	Storage facilities of e-waste and records of sale/lifting by the vendors	PEC Head	PMU	Regularly	OSDA

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		maintenance partners to take away discarded peripherals, spare parts, discarded old computers for possible reuse and recycle.					
6	Unhygienic condition due to poor maintenance of sanitation facilities and irregular solid waste collection	The OSDA through a maintenance partner will carry out maintenance of the toilets and carry out the regular collection and disposal of wastes to the local disposal sites.	Maintenance schedule of Precision Engineering Centre building and facilities created	OSDA through PEC Head /operating partner	PMU	Every Quarter	OSDA
7	Wastewater Disposal	The wastewater generated at Precision Engineering Centre to the extent of 27 KLD will be disposed in septic tanks/ soak pits of adequate capacity	Visible check	OSDA through PEC Head /operating partner	PMU	Regularly	OSDA
8	Onsite emergency plan for minor accidents and mishaps and Disaster Management Plan for Natural Calamities	The head of WSC-Precision Engineering with the assistance of team working under him will prepare on site emergency plan for possible minor accidents and mishaps during operation phase. For natural calamities, the disaster management plan prepared by SDTED will be followed.	Onsite Emergency plan document and Disaster Management Plan document	Head Precision Engineering	OSDA	Mock Drills every quarter	Precision Engineering Centre operation cost
9	Fire and Toxic Hazards	1-Fire plan approval will be obtained from Chief Fire Officer before occupying the buildings. 2-Occupancy certificate from	Fire plan approval, occupancy certificate, maintenance	Head - Precision Engineering	OSDA	Regularly	Precision Engineering-g Centre operation cost

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Sl. No.	Environmental Issues	Mitigation Measures	Parameter (Indicators for Compliance)	Responsible Implementation	Responsible Supervision	Frequency for Monitoring	Sources of Fund for Implementing Mitigation Measure
		municipal corporation/development authority shall be obtained before occupying building. 3- Firefighting system will be in place as per NBC-2005 4- Fire Fighting facilities shall be regularly maintained, and regular fire drills will be carried out.	schedule of firefighting system, records of fire drills				
10	Safety Measures during operation phase	The safe operating procedures (SOPs) during installation and commissioning of equipment and machinery shall be followed during practical classes by the faculty and students. The SOPs will be periodically updated based on experience and situations faced during the operation phase. Generic SOPs for Operation of CNC machines, during classes is given.	Updated safe operating procedures	Head - Precision Engineering	PMU	On Daily basis	OSDA
11	COVID-19 Management at Laboratories and Workshops	Safe Operating procedures announced by the State and Central Governments for education institutes will be followed.	COVID-19 SOPs	Head - Precision Engineering Administration	PMU	On Daily basis	Precision Engineering-Centre operation cost

121. Environmental monitoring (covers EMP implementation and compliance with all of the Government of Odisha's rules with respect to the environment, and handling of solid and liquid waste) at Precision Engineering Centre site will be undertaken by the contractor during pre-construction and construction Phases and will be supervised by Odisha Industrial Infrastructure Development Corporation and PMU. Environmental monitoring during operation phase will be undertaken by the PMU and monitored by OSDA. The Environmental Safeguards Specialists of the PMU will ensure that EMP and environmental monitoring plan are implemented.

122. To ensure the effective implementation of mitigation measures and EMP during construction and operation phase of Precision Engineering Centre, it is essential that an effective Environmental Monitoring Plan be followed as given in **Table 20**. In this monitoring plan, proposed monitoring of all relevant environmental parameters, with a description of the sampling stations, frequency of monitoring, applicable standards and responsible agencies are also presented.

Table-20: Environmental Monitoring Plan for Precision Engineering Centre for Pre-construction, Construction and Operation Phases

Sl. No.	Field (Environmental Attribute)	Phase	Parameters to be Monitored	Locations	Frequency	Responsibility	Cost (INR/US\$)
1	Air Quality	During pre-construction phase*	CO, NOx, PM ₁₀ , PM _{2.5} , and SO ₂	Precision Engineering Centre Site	Once in the pre-construction phase (Before commencement of works) to establish baseline	Contractor, Odisha Industrial Infrastructure Development Corporation, and PMU through approved Monitoring Agency	INR100,000/ US \$ 1329
		During* Construction Phase			Once in a season (except monsoon season) during construction phase (12 months construction phase)		
		Operation Phase*			Once in a season except monsoon season for first 2 years of operation phase		
2	Water quality	During pre-construction phase	Drinking water quality parameters specified in IS:10500	Precision Engineering Centre Site	Once in pre-construction phase (Before commencement of works) to establish baseline	Contractor, Odisha Industrial Infrastructure Development Corporation, and PMU through approved Monitoring Agency	INR100,000/ US \$ 1329
		During Construction Phase			Once in a season (except monsoon season) during construction phase (12 months)		
		Operation Phase			Once in a season except monsoon season for first 2 years of operation phase		
3	Noise Levels	During pre-construction phase	Leq (Day), Leq (Night), Lmin and Lmax	Precision Engineering Centre Site	Once in pre-Construction phase (Before commencement of works) to establish baseline	Contractor, PWD, PMU, and DOLE through approved Monitoring Agency	INR 30,000/ US \$ 398
		During Construction Phase			Once in a season (except monsoon season) during construction phase (12 months)		
		Operation Phase			Once in season except monsoon season for first 2 years of operation phase		

* During Pre- construction and construction phase environmental monitoring will be taken up by the contractor through approved monitoring laboratory.

Note: 1-For first year of operation phase also (under defect liability period) contractor will organize monitoring and for remaining one year PMU will organize monitoring through approved monitoring agency.

(1 US \$= 74.86 INR as on 22 Feb 2022)

C. Capacity Building

123. In addition to the primary objective of skills enhancement of OSDP, this project will also raise awareness about environmental conservation amongst trainees, implementing agencies, and local communities. The project will have the opportunity to build capacity in environment protection for the above-mentioned stakeholders.

124. The Environmental Specialists at PMU will provide the basic training required for environmental awareness. Specific modules customized for the available skill set will be devised after assessing the capabilities of the members of the Training Program and the requirements of the project. The training would cover basic principles of environmental assessment and management; mitigation plans and programs, implementation techniques, monitoring methods and tools. In case on site training programs are not possible due to outbreak of COVID pandemic, virtual training programs shall be organized. The proposed training program along with the frequency of sessions is presented in **Table 21** below.

Table-21: Training Modules for Environmental Management

Program	Description	Participants	Duration	Training Conducting Agency
A. Pre-Construction Phase				
Sensitization Workshop on Environment	Introduction to Environment: environmental assessment and social due diligence requirements in the project, Regulatory Clearances, and permission requirements in the project, and EMP Implementation, Introduction of ADB SPS 2009, and ADB Guidelines on Environmental considerations in planning, design and implementing projects	OSDA officials, PMU staff, Odisha Industrial Infrastructure Development Corporation officials associated with the project and contractor(s) staff associated with the project	½ Working Day	Environmental Specialist of the PMU
Session 1	Environmental impacts due to Precision Engineering Centre construction and operation phases, pollution generation activities during pre-construction and construction phases Environmental Management, Environmental Mitigation Provisions in the Contract, Implementation Arrangements, Methodology of Assessment Good engineering practices to be integrated into contract documents	OSDA officials, PMU staff, Odisha Industrial Infrastructure Development Corporation officials associated with the project and contractor(s) staff associated with the project	½ Working Day	Environmental Specialist of the PMU
B. Construction Phase				
Session 2	Roles and Responsibilities- Roles and Responsibilities of Implementing Agencies officials, associated contractor and consultants towards protection of environment. Implementation. Arrangements for EMP and Environmental Monitoring during	OSDA officials, PMU staff, Odisha Industrial Infrastructure Development Corporation officials	½ Working Day	Environmental Specialist of the PMU

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Program	Description	Participants	Duration	Training Conducting Agency
	construction phase	associated with the project and contractor staff associated with the project		
Session 3	Monitoring and Reporting System	All OSDA Staff	¼ Working Day	Environmental Specialist of PMU

D. Environmental Budget

125. Most of the mitigation measures require the contractor(s) to adopt good site practices, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. Only those items not covered under budgets for construction are included in the updated IEE budget. The summary budget for the environmental management costs for the Precision Engineering Centre is presented in **Table 22**.

Table-22: Environmental Management and Monitoring costs (INR)

Monitoring Component	Rate	Amount (INR)	Source of Fund
Pre-Construction and Construction Phase			
Air Quality - one location at Precision Engineering Centre construction site, thrice a year (one sample pre-construction and 3 samples during construction phase; total 4 samples)	10,000	40,000	Contractor
Water Quality- One drinking water sample from Precision Engineering Centre site thrice a year (one sample pre-construction and 3 samples during construction phase; total 4 samples)	10,000	40,000	Contractor
Noise Quality-One location at PEC Construction site, thrice a year (one sample pre-construction and 3 samples during construction phase; total 4 samples)	3000	12,000	Contractor
Training for Capacity Building of stakeholders	Lump sum		OSDA (as provisioned in the training cost in the Original IEE)
Total Pre-construction and Construction Phase Monitoring Cost (A)		92,000	
O & M Phase			
Air Quality - at Precision Engineering Centre, thrice a year for initial 2 years (3 samples per annum, total 6 samples)	10,000	60,000	Contractor (for first year)/PMU
Water Quality -one drinking water sample from Precision Engineering Centre, thrice a year for initial 2 years	10,000	60,000	Contractor (for first year)/PMU

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Monitoring Component	Rate	Amount (INR)	Source of Fund
(3 samples per annum, total 6 samples)			
Noise Quality- one location at Precision Engineering Centre building, thrice a year, for initial 2 years (3 samples per annum, total 6 samples)	3000	18,000	Contractor/ PMU
Total O&M Phase Monitoring Cost (B)		138,000.00	Contractor (during first year-defect liability period) and PMU (second year of operation)
Total Cost (A+B)		230,000.00	
Contingencies @ 5 %		11,500.00	
Total Budgeted Cost		241,500.00 (Approx. 250,000)	

E. Environmental Monitoring and Reporting

126. The PMU ESMC will monitor and measure the progress of EMP implementation during construction and operation phases. Odisha Industrial Infrastructure Development Corporation site engineer and contractor's designated HSE officer will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. Odisha Industrial Infrastructure Development Corporation will submit regularly information pertaining to EMP implementation to PMU at OSDA. Based on site visits and information submitted by the contractor and Odisha Industrial Infrastructure Development Corporation, PMU Environmental safeguard specialist will prepare semi-annual monitoring reports. The PMU will submit semi-annual monitoring reports to ADB. Monitoring reports will be posted in a location accessible to the public.

127. ADB will review project performance against the EA's commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the Project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued.

IX. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

128. The ADB SPS 2009 requires the project proponent to undertake consultation with concerned stakeholders and facilitate their informed participation in the project/programme. The primary objective of the consultation process is to understand stakeholder's concerns, apprehensions, and overall opinion and solicit recommendations to improve project design.

A. Stakeholder analysis

129. The stakeholders can be broadly classified into three different groups:
- i. Government players: Central and State Government departments and agencies directly or indirectly involved in the project. These include:
 - a) Skill Development and Technical Education Department (SDTED), Government of Odisha
 - b) Directorate of Technical Education & Training
 - c) Odisha Skill Development Society
 - d) National Council for Vocational Training
 - e) Government ITIs
 - f) Government Polytechnic and Engineering colleges
 - g) Regulatory agencies such as MoEFCC, OSPCB, CRZMA, NBWL, Labor commissioner, DFO and Wildlife officer, Water Resource Department, Civic Authorities, etc
 - ii. Private Players: These are the private agencies involved directly or indirectly in the project. These include:
 - a) Sector Skill Councils
 - b) Industry
 - c) Private Polytechnics and Engineering colleges
 - iii. Others: These cannot be categorized as either the government or the private player. These include:
 - a) NGOs
 - b) Contractors
 - c) Consultants
 - d) Local residents
 - e) Existing students and faculty of ITIs
 - f) Trainees

130. The detailed Stakeholder analysis depicting the involvement, influence and the key roles and responsibilities of the stakeholder for the project is given in the **Table 23**:

Table-23: Stakeholder analysis

SL. No.	Stakeholder	Influence	Involvement	Roles
Government				
1.	SDTED	High	High	<ul style="list-style-type: none"> • Executing agency • Policy level support for the project • Funds sanction for project activities • Overall project monitoring and guidance • Project support - linkages with different departments
2.	DTET	High	High	<ul style="list-style-type: none"> • Implementation support to OSD

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SL. No.	Stakeholder	Influence	Involvement	Roles
3.	OSDA	High	High	<ul style="list-style-type: none"> • Function as project management unit /implementing agency of OSDP. • Establishment of the Precision Engineering Centre and associated facilities • Establishing Management Contract with capable private partner(s) under the Public-Private Partnership (PPP) model • Monitor the functioning Precision Engineering Centre • Monitor ToT programs • Facilitate MoUs with international training providers and Sector Skill Councils (SSCs) • Setup quality standards for training and support strategy formulation • Development of linkages with various stakeholders in the skill sector including the industry, various assessment, and certification agencies. • Management of award of grants / scholarships budgeted under the program
4.	National Council for Vocational Training (NCVT)	High	Low	<ul style="list-style-type: none"> • Affiliation and Accreditation • Assessment and certification of the trainees
5.	Regulatory agencies such as OSPCB, CRZMA, Labor commissioner, Civic Authorities, Water Resource Department	High	High	<ul style="list-style-type: none"> • Granting permission/licenses/approvals for construction and operation phase.
6.	Industry	High	Low	<ul style="list-style-type: none"> • Providing opportunities for recruiting successful candidates • Support to course curriculum realignment as per the demand • Providing apprenticeship and internships to candidates
7.	SSCs	High	Low	<ul style="list-style-type: none"> • Assessment and certification of the trainees through Assessment Agencies

B. Stakeholder Consultations:

131. The summary of specific consultations for the establishment of PEC is given in **Table-24**. The photographs and attendance sheet of consultations for PEC are given in **Appendix 7**.

Table-24: Summary of Consultations with Stakeholders for Establishment of Precision Engineering Centre

Date of meeting	Person consulted/Stakeholders	Key points discussed
16 June 2021	<p>All stakeholders (OSDA PMU Officials, ITI faculty, Odisha Industrial Infrastructure Development Corporation officials, Industrial Area Workers, Locals)</p> <p>No. of Participants -10 Males -10 Female 0</p>	<ul style="list-style-type: none"> • All the participants welcomed the establishment of Precision Engineering Centre at Mancheswar. • One participant working in local industry suggested that in the Precision Engineering Centre, courses pertaining to metal industries particularly related to steel plants should be taken up so that employment is in major industries. The OSDA officials replied that suggestion has been noted and will be considered at the time of finalization of courses. • The General Manager Projects OSDA requested the participants to provide suggestions for environment protection during construction and operations of PEC. One participant from Odisha Industrial Infrastructure Development Corporation replied that effective drainage, wastewater collection and treatment and solid waste management should be taken care during construction and operation phases. The General Manager project replied that for wastewater collection and disposal septic tank of adequate size planned, the drainage of proposed PEC building complex planned based on rainfall and local topography. During construction, it will be implemented. The municipal solid waste during operation phase will be integrated with the Bhubaneswar City waste disposal system. Any waste generated from operation of PEC machinery from labs will be treated as per law and characteristics of waste. For construction phase to take care of overall environmental management, EMP prepared will be implemented and monitored. • One local participant suggested that tree plantation should be taken up and a proper access road to PEC should be constructed to facilitate movement. The OSDA officials replied that access roads to PEC will be strengthened in consultation with Odisha Industrial Infrastructure Development Corporation as PEC site is in an Industrial area. • One participant enquired about the implementation schedule of PEC sub-project. The General Manager Projects OSDA replied that design is in progress and project bidding is expected to be completed by December end and construction will be started early 2021 so target is to finish construction by December 2022. • One participant suggested that awareness about PEC courses availability should be taken up among the students at ITIs, polytechnic institutes, Engineering Colleges and industrial Centers of State so that enrolment is fast, and PEC is popular. The OSDA officials replied that suggestion has been noted and publicity of PEC will be planned at relevant educational institutes and industrial centers. • One participant suggested that PEC should have Persons with Disability (PWD) friendly access and movement. The OSDA officials replied that building design in PWD friendly and will provide hindrance free access and movement to PWDs.

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Date of meeting	Person consulted/Stakeholders	Key points discussed
10 February 2022	PMC Environment Specialist, GM OSDA, ITI faculty & Students, No. of Participants -17 Males -14 Female -3	<ul style="list-style-type: none"> • Joint Site visit was held by the Environment Specialist PMU & OSDA PMU Officials and Consultation was held with the OSDA officials, WSC faculty and students at the WSC. • The visit was held to assess the location and setting of the new site for PEC and baseline data collection for the preparation of Addendum to the IEE. Consultation was held with the Officials and WSC faculty and students to obtain their views on the project and incorporate them in the project design. • No significant impacts were ascertained due to the new location since it is within the Industrial area, at a distance of 2 km from the original site and the WSC. There are no sensitive receptors in the vicinity. • The participants welcomed the project and are looking forward to the project. One participant enquired about the execution timelines of the project. He was informed that bidding is under process and construction will start soon. • One participant enquired whether there are any changes in the earlier proposed courses. The General Manager Projects OSDA replied that there is no change in the proposed courses as of now.

C. Future Consultations and Information Disclosure

132. To ensure continued public and stakeholder participation in the subproject life cycle, periodic consultations and focus group discussion should be continued. A grievance redressal committee has been formed at WSC and at OSDA PMU Level to register grievances of the people regarding technical, social and environmental issues. Same Committee will be responsible for grievance redressal related to the Precision Engineering Centre also. Further, to ensure an effective disclosure of this Precision Engineering Centre subproject of OSDP to the stakeholders and the communities in the vicinity of site, a project awareness campaign will be carried out and consultations will be taken up in future also. These consultations and awareness programs will be documented in semi-annual environmental monitoring reports to be submitted to ADB.

Information Disclosure

133. Electronic version of this Addendum to the original IEE will be placed in the official websites of the OSDA and the website of ADB after approval of the documents by the GoO and ADB. On demand, any person seeking information can obtain a hard copy of the complete Addendum to the original IEE document by paying cost of photocopy from the office of the PMU and site office of Precision Engineering Centre, on a written request.

134. The PMU will issue notification on the disclosure mechanism on a notice board at Precision Engineering Centre subproject site ahead of the initiation of civil works for Precision Engineering Centre establishment. This notification will provide brief project details.

X. GRIEVANCE REDRESSAL MECHANISM

135. ADB 's SPS 2009 requires the executing agency/implementing agency to establish a mechanism in order to receive and facilitate resolution of people 's concerns, complaints and grievances about the project 's environmental performance. The mechanism shall use an understandable and transparent process that addresses the affected people 's concerns and complaints promptly.

136. The affected person(s)/aggrieved party can give their grievance verbally or in written to the local site office of Precision Engineering Centre. Grievances of affected person will first be brought to the attention of the construction manager, who can resolve the issue at the site level. If the matter is not solved within 7 days period by the site in charge/project manager of contractor, it will be brought to the Grievance Redress Committee constituted at subproject (Precision Engineering Centre) site level. This GRC shall discuss the issue in its monthly meeting and resolve the issues within one month of time after receiving the grievance. If the matter is not resolved by GRC at site level within stipulated time, it shall be referred to GRC at OSDA corporate office level by the Deputy Director Administration of OSDA, who will be member of GRC at Precision Engineering Centre site level.

137. GRC at OSDA corporate office shall discuss the issue and try to resolve it and inform the site in charge/construction manager. If the matter is not resolved by the GRC at corporate level within one month of time, it will be referred to the project steering committee at Government of Odisha level. This committee will resolve the complaint within one month time and will inform OSDA CEO who in turn will inform site in charge or complainant.

138. It may be mentioned that the aggrieved person/party can bring the matter to the Court of Law any time after filing the complaint either at site level or PMU level. The PIU and sub-project site office shall keep records of all grievances received including contact details of complainant, date of receiving the complaint, nature of grievance, agreed corrective actions and the date these were affected and final outcome. For this a complaint register will be maintained at Precision Engineering Centre site office. The cost for functioning of Grievance Redress Mechanism will be accounted for in project cost as part of project cost.

139. Further, person(s) / aggrieved party who are, or may be, adversely affected by the sub-project may submit complaints to ADB's Accountability Mechanism. The accountability mechanism provides an independent forum and process whereby people can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected person(s) / aggrieved party should first make a good faith effort to solve their problems by working with the ADB South Asia operations department including the India Resident Mission.

A. Composition and functions of GRC

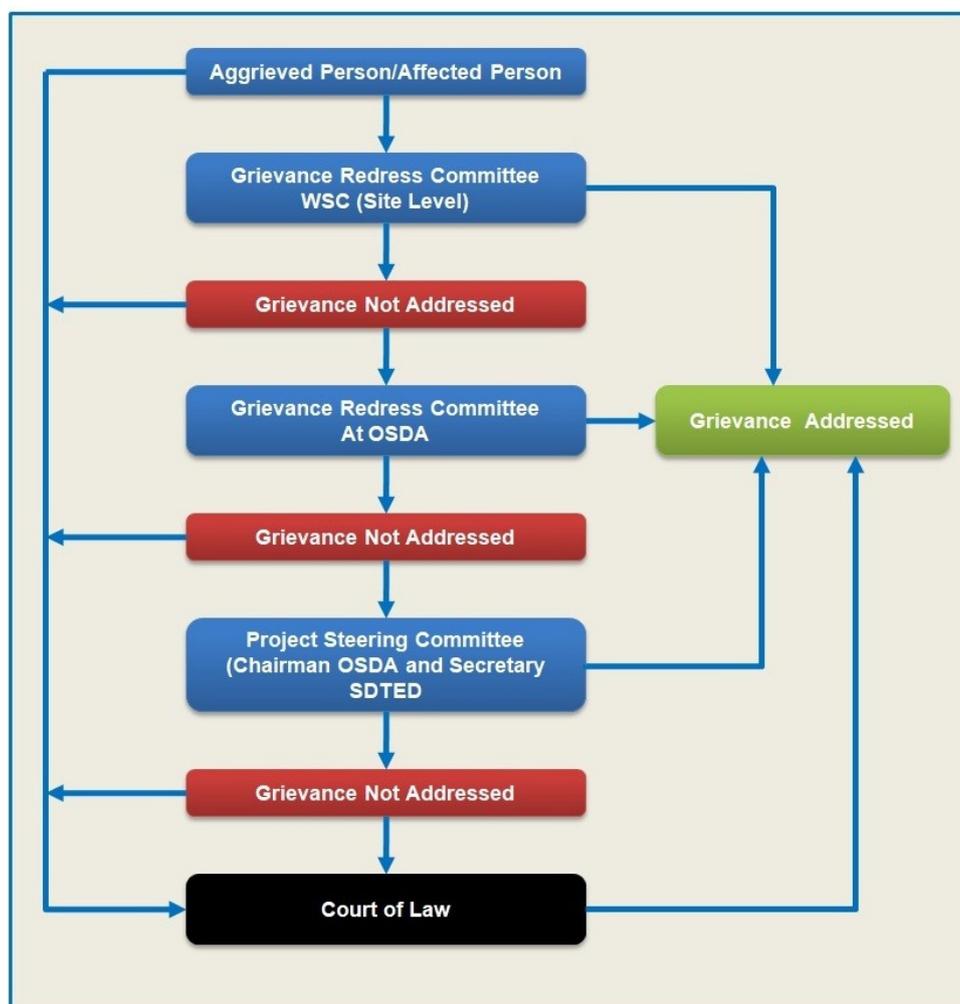
140. Subproject Site Level- Grievance Redress Committee (GRC- Site Level) – This committee will comprise of Construction Manager of Contractor, Deputy Director Administration OSDA, Odisha Industrial Infrastructure Development Corporation Site Incharge and Health, Safety and Environment Officer of contractor. The GRC at site level will be headed by the Deputy Director Administration, OSDA. It will meet at least once a month. The agenda of the meeting will be circulated to all the members and the affected persons/aggrieved party along with venue, date and time at least a week prior to the meeting. The matters shall remain with GRC at site level for one month. If the grievance is not resolved within this time period, then it will be referred to GRC at OSDA corporate office level.

141. **GRC at OSDA Corporate Office-** There shall be one GRC in OSDA Corporate office. The matters not resolved by the GRC at subproject site office within one month shall come under GRC at Corporate Office. GRC at Corporate office will include the Chief Executive Officer OSDA, safeguard specialists (Environmental and Social), General Manager Project and General Manager Finance. The Committee shall be headed by the OSDA CEO. This committee shall look into the matters, which are referred to and not resolved by GRC at subproject site level and will resolve the compliant within one month period. If the matter is not resolved by the GRC at Corporate Office level within one month of time, then the aggrieved person or party can bring the matter to Project Steering Committee, which is in-charge of the overall OSDP project. In case grievance is not readdressed by the Steering Committee within one month, then complainant can reach to the court of law.

142. **Approach to GRC-** Affected person or aggrieved party can approach the GRC for redress of his/their grievances through any of the following modes:

- Web based: A separate corner will be developed at the OSDA website so that public and affected person can register their complaints in the online column.
- Telecom based: A telephone number will be displayed at the web site of OSDA and at the Precision Engineering Centre site so that general public can register their complaint through telephone and mobile phone to the site office and Corporate Office. One complaint register will also be maintained at Precision Engineering Centre site office. The grievance redress mechanism for the OSDP for safeguards related issues has been shown below in **Figure-6**:

Figure-6: Grievance Redress Mechanism (OSDP Project)



Note:

SDTED: Skill Development and Technical Education Department, Government of Odisha
OSDA: Odisha Skill Development Authority

B. Processing of Complaint

143. Different problems will be addressed in different manners depending on the type of grievance; however, the generic approach to resolution of all grievances will include the following steps:

- The complaint received will be reviewed and screened for the factual details and will be considered for resolution at the Precision Engineering Centre site office level. The grievance will be assessed to determine if the issues rose in the complaint fall within the mandate of the grievance mechanism and the complainants have standing.

- If the complainant requires intervention, then it will be considered for resolution otherwise it will be rejected and the same will be communicated to the concerned. Complainant.
- The grievance will be evaluated to clarify the issues and concerns raised in the complaint, to gather information on how others see the situation, and to identify whether and how the issues might be resolved.
- All options for solving problems will be explored, with or without the assistance of independent and third parties:
 - Internal decision-making processes, whereby issues are handled by OSDA officials, using stated standards and criteria, to develop and propose a company response to the grievance and to allow for an appeals process.
 - Joint problem solving, in which OSDA officials and the complainant engage in direct dialogue.
 - Third-party decision making to offer a solution when a voluntary agreement is not possible.
- Grievance tracking, monitoring, and reporting to the community will be undertaken as soon as a mutual consent is arrived at.

C. Communication of Mechanism to Stakeholders

144. Formal information of Grievance Redressal Committee or GRM will be communicated to the respective stakeholders and nominated members of the committee. This communication can be made through official notification of OSDA CEO and also through the display board at Precision Engineering Centre site Office. At the display board name of site incharge, phone number, email address etc. will be clearly mentioned.

D. Meeting of Grievance Redressal Committee

145. The site committee will meet at least once every fortnight in the first 6 months of implementation, and thereafter once, every month. At every Grievance Redressal Committee meeting the issues raised in the last meeting and report on action taken, will be summarized. Issues that cannot be resolved at the GRC would be referred / directed to next designated levels. The Corporate Committee will convene their meetings as and when required.

E. Closing of Grievance

146. The complaints lodged in the GRC Register will be resolved amicably by the above mechanism and closed by informing to the complainant directly with closing signatures on the GRC Register or by sending registered post to the complainant in case he is not approachable. The resolution shall be informed to the local civic body office.

F. Information disclosure

147. The reviewed and approved Addendum to the IEE report for Precision Engineering Centre will be disclosed on ADB site.

148. The Addendum to the IEE report will also be translated in local language and disclosed at OSDA web site, local municipal office, and Precision Engineering Centre site.

149. The IA will also submit biannual EMR to ADB on the progress of implementation of the EMP. The ADB will review, approve, and disclose the EMR on ADB web site.

XI. FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

150. The proposed OSDP will support the GoO in increasing the employment and productivity of its working age population by strengthening the capacity to supply high quality, market-responsive skills training in line with the growth priorities and strategies of the state. The establishment of Precision Engineering Centre will enhance opportunities for the youth in the field of Precision Engineering, which is one of the most potential engineering trades. The state of art laboratories and equipment will further strengthen the quality of training. Based on the site visits and environmental investigations carried out during the preparation of Addendum to the IEE report, the establishment of Precision Engineering Centre equipped with laboratories and equipment at the new location, it has been concluded that category of OSDP remains to be “B”. This Addendum to the Initial Environment Examination report including environmental management plan has been prepared based on examination of new site and the latest details of Precision Engineering Centre components including design and drawings. There is no change in the project components and proposed courses in the Precision Engineering Centre.

151. The Addendum to the initial environmental examination process described in the earlier sections of this report assessed the environmental impacts of new location of Precision Engineering Centre, proposed under the OSDP. The potential negative impacts were identified related to design, location, construction and operations. Since the new proposed site is within the industrial area only, with no sensitive receptors in the vicinity, the negative impacts due to the design and location are assessed to be minimal. The potential adverse environmental impacts of the proposed Precision Engineering Centre are mainly related to the construction period which can be minimized by the proposed mitigating measures and environmentally sound engineering and construction practices. The impacts ascertained during the operation stage were mainly due to the waste generation during the functioning of laboratories during the Practical and demo classes for the students. However, due to the well-defined SOPs for the functioning of Equipment and Machinery, and very less quantity of waste generation which would be standard and due to efficient and minimal operational and maintenance activities, there are no major negative impacts of operation either.

152. The mitigation measures have been developed to reduce all negative impacts to acceptable levels. As stated above, most impacts are due to construction works involved in the establishment of Precision Engineering Centre. The main impacts identified are generation of dust and noise from construction activities; impacts due to disposal of construction waste; disturbance and inconvenience to local people and public safety during construction works. These impacts are mostly temporary in nature and can be effectively avoided or mitigated by observing appropriate mitigation measures. It is recommended to ensure preparation of a construction site management plan incorporating the suggested mitigation measures for ensuring site specific safeguard measures. An environmental monitoring plan has been developed to assess the environmental performance of subproject implementation. The mitigation measures proposed in the management plan will be incorporated in project design and implemented as part of the Precision Engineering Centre development.

153. This Addendum to the initial environmental examination has been prepared to identify and assess negative impacts due to the new location of Precision Engineering Centre. All components proposed under OSDP including the Precision Engineering Centre establishment involve straightforward construction works and equipment installation and simple operation. Not many environmental issues were noticed during this addendum preparation. In most cases, environmental issues identified are typical for the type of construction components, and a range of proven mitigation strategies exist to address them. This Addendum to the initial environmental examination has assessed all potential

**Odisha Skill Development Project (OSDP)
Initial Environment Examination Report (Addendum)**

environmental impacts associated with the new location for the component of Precision Engineering Centre establishment and equipment installation in the laboratories along with the operation phase impacts of functioning of few machinery/ equipment's. There are no impacts, which are significant or complex or which needs an in-depth study to assess the impact or to develop the mitigation measures. The environmental impacts identified are manageable, and the EA will implement the mitigation measures as stated in this addendum to the IEE. The OSDP therefore does not warrant environmental impact assessment (EIA).

APPENDIX-1: RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

Instructions:

- (i) The project team completes this checklist to support the environmental classification of a project.
- (ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
- (iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	INDIA / Odisha Skill Development Project (OSDP)
Sector Division:	SAHS

Screening Questions	Yes	No	Remarks
A. Project Sitting			
<ul style="list-style-type: none"> ▪ Is the Project area Adjacent to or within any of the following environmentally sensitive areas? 			OSDP will set-up a Precision Engineering Centre at Mancheswar Industrial Estate area of Bhubaneswar city. In this building skill development courses for Precision Engineering trade will be carried out. None of the sub project components are located within core, buffer and eco-sensitive zones of protected areas and within 100 meters from the boundary of protected archaeological monuments. If any subproject is taken up in future, it will not be located in the mentioned distances of environmentally sensitive areas and archaeological monuments.
<ul style="list-style-type: none"> ▪ Cultural heritage site 		√	
<ul style="list-style-type: none"> ▪ Legally protected Area (core zone or buffer zone) 		√	
<ul style="list-style-type: none"> ▪ Wetland 		√	
<ul style="list-style-type: none"> ▪ Mangrove 		√	
<ul style="list-style-type: none"> ▪ Estuarine 		√	
<ul style="list-style-type: none"> ▪ Special area for protecting biodiversity 		√	
B. Potential Environmental Impacts			
Will the Project cause...			

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Initial Environment Examination Report (Addendum)**

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to physical cultural resources? 		√	The Precision Engineering Centre will be established on a vacant plot located within the municipal limits of Bhubaneswar city in an Industrial area so it will not cause any impairment of historical /cultural areas or disfiguration of landscape and damage to physical resources.
<ul style="list-style-type: none"> Disturbance to precious ecology (e.g., sensitive or protected areas)? 		√	The component of Precision Engineering Centre will not cause any disturbance to precious ecology.
<ul style="list-style-type: none"> Alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site? 		√	Since all civil works related construction activities will be taken up on a vacant plot in industrial area of Bhubaneswar city, alteration of surface water hydrology, increased sediment in streams and soil erosion is not envisaged.
<ul style="list-style-type: none"> Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction? 		√	Preferably local labour will be hired. Camp if required to be located within the vacant site for Precision Engineering Centre, will have adequate sanitation facilities. So, no issue of any surface water getting affected.
<ul style="list-style-type: none"> Increased air pollution due to project construction and operation? 	√		The construction activities for Precision Engineering Centre are expected to generate dust on account of excavation and movement of construction material; and minor emissions of gaseous pollutants such as SO ₂ , and NO _x due to construction machinery. These will be mitigated through appropriate dust suppression methods and pollution control equipment fitted to machinery.
<ul style="list-style-type: none"> Noise and vibration due to project construction or operation? 	√		The construction activities and the operation of construction machinery are expected to generate noise. No heavy equipment is envisaged to be used that could cause vibrations. However, adequate mitigation arrangements will be made to control noise levels within regulatory norms. During operation phase of the Precision Engineering Centre, noise and vibration issues will not be there as equipment and machinery will be on properly constructed foundations and inside building (Workshops/laboratories)

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Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> ▪ Involuntary resettlement of people? (Physical displacement and/or economic displacement) 		√	Precision Engineering Centre is being developed in the GoO owned land, which is encumbrance free, so there is no question of involuntary resettlement.
<ul style="list-style-type: none"> ▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups? 		√	The activities of Precision Engineering Centre, during construction and operation will be confined within the vacant plot which is owned by the GoO. The activities of Precision Engineering Centre, during operation will be confined within the new constructed building. So, no question of impacts on poor, children, Indigenous Peoples and Vulnerable groups
<ul style="list-style-type: none"> ▪ Poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STD's and HIV/AIDS) from workers to local populations? 	√		Adequate arrangements will be made for proper disposal of sanitary waste. Awareness camps and medical check-up of labour will be carried out to control possible transmission of communicable diseases.
<ul style="list-style-type: none"> ▪ Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents? 	√		Suitable arrangements will be made to avoid creation of temporary breeding habitats of vectors.
<ul style="list-style-type: none"> ▪ Social conflicts if workers from other regions or countries are hired? 		√	During Construction of Precision Engineering Centre, preference will be given to local construction labour. In case workers from other regions are hired, requisite awareness programs will be held for such workers to avoid social conflicts.
<ul style="list-style-type: none"> ▪ Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? 	√		No population influx is envisaged during construction. During operation, about 200-250 students will be trained per annum. For these students, adequate hostel facilities are being planned. Adequate arrangements for water supply and sanitation systems will be made.
<ul style="list-style-type: none"> ▪ Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation? 	√		Adequate provisions will be included in the relevant contract and operation procedure related documents to address occupational health and safety hazards during project construction and operation.

**Odisha Skill Development Project (OSDP)
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Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> ▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation? 	√		Residential areas and roads exist near proposed site for Precision Engineering Centre. Adequate provisions will be included in the relevant contract and operation procedure related documents to address these community health and safety aspects.
<ul style="list-style-type: none"> ▪ Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? 	√		Residential areas and roads exist around the proposed site for Precision Engineering Centre. Adequate provisions will be included in the relevant contract and operation procedure related documents to address these aspects.
<ul style="list-style-type: none"> ▪ Generation of solid waste and/or hazardous waste? 	√		The solid and hazardous waste, generated during construction and operation will be managed as per the regulatory requirements.
<ul style="list-style-type: none"> ▪ Use of chemicals? 	√		Very limited use of chemicals is envisaged. Suitable mitigation arrangements will be made as per the regulatory requirements.
<ul style="list-style-type: none"> ▪ Generation of wastewater during construction or operation? 	√		Suitable arrangements will be made to manage the wastewater generated during construction activities and operation of these facilities.

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: India /Odisha Skill Development Project
Sector: Social
Subsector: Skills
Division/Department: SAHS

	Screening Questions	Score	Remarks ¹²
Location and Design of project	Is sitting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	0	The proposed OSDP component (Precision Engineering Centre is in Industrial area of Bhubaneswar. The location is not prone to floods, storms or landslides.
	Would the project design (e.g., the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	0	Not Applicable
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g., prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g., construction material)?	0	Weather conditions at proposed Precision Engineering Centre in Bhubaneswar do not demand usage of any specific construction material to counter act weather phenomenon.
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	No, weather conditions at Precision Engineering Centre in Bhubaneswar which require specific scheduling for maintenance.
Performance of project outputs	Would weather/climate conditions and related extreme events likely affect the performance (e.g., annual power production) of project output(s) (e.g., hydro-power generation facilities) throughout their design lifetime?	0	Not Applicable

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

¹² If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the sitting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

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Responses when added that provide a score of 0 will be considered low_risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium_risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): Low Risk

Other Comments: None

Prepared by:

**APPENDIX-2: MOEFCC NOTIFICATION ON EXEMPTION OF ENVIRONMENTAL
CLEARANCE FOR EDUCATIONAL INSTITUTIONS**

[भाग II-खण्ड 3(ii)]	भारत का राजपत्र : असाधारण	3		
MINISTRY OF ENVIRONMENT, FORESTS AND CLIMATE CHANGE				
NOTIFICATION				
New Delhi, the 22nd December, 2014				
<p>S.O. 3252(E).—Whereas, a draft notification further to amend the notification number S.O 1555(E), dated the 14th September, 2006 (hereinafter referred to as the principal notification), was published, as required under sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) vide number S.O. 2319, (E) dated the 11th September, 2014 (hereinafter referred to as the said notification), inviting objections and suggestions from all persons likely to be affected thereby within a period of sixty days from the date on which copies of Gazette containing the said notification were made available to the public;</p> <p>And whereas, copies of the said notification were made available to the public on 11th September, 2014;</p> <p>And whereas, no objections or suggestions have been received in response to the said notification within the specified period of sixty days;</p> <p>Now, therefore, in exercise of the powers conferred by Sub-section (1) and clause (v) of Sub-section (2) of Section 3 of the said Environment (Protection) Act, 1986 (29 of 1986) read with clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby makes the following amendments in the said notification, namely:—</p> <p>In the principal notification, in the Schedule, under Column (1), for item 8 relating to Building/Construction Projects/Area Development Projects and Townships and sub-items 8 (a) and 8 (b) and the entries relating thereto, specified there under, the following item, sub-items and entries shall be substituted, namely:—</p>				
(1)	(2)	(3)	(4)	(5)
"8	Building or Construction projects or Area Development projects and Townships			
8 (a)	Building and Construction projects	>20000 sq.mtrs and < 1,50,000 sq. mtrs. of built up area	<p>The term "built up area" for the purpose of this notification the built up or covered area on all floors put together, including its basement and other service areas, which are proposed in the building or construction projects.</p> <p>Note 1. The projects or activities shall not include industrial shed, school, college, hostel for educational institution, but such buildings shall ensure sustainable environmental management, solid and liquid waste management, rain water harvesting and may use recycled materials such as fly ash bricks.</p> <p>Note 2. "General Conditions" shall not apply.</p>	
8	Townships and Area Development Projects	Covering an area of > 50 ha and or built up area > 1,50,000 sq. mtrs	<p>A project of Township and Area Development Projects covered under this item shall require an Environment Assessment report and be appraised as Category 'B1' Project.</p> <p>Note. "General Conditions" shall not apply.</p>	
[F. No. 19-2/2013-IA-III]				
MANOJ KUMAR SINGH, Jt. Secy.				

Note: The principal rules were published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) *vide* Notification Number S.O. 1533(E), dated the 14th September, 2006 and was subsequently amended as follows:—

1. S.O. 1737 (E), dated the 11th October, 2007;
2. S.O. 3067 (E), dated the 1st December, 2009;
3. S.O. 695 (E), dated the 4th April, 2011;
4. S.O. 2896 (E), dated the 13th December, 2012;
5. S.O.674(E), dated the 13th March, 2013;
6. S.O. 2559 (E), dated the 22nd August, 2013 ;
7. S. O. 2731 (E), dated the 9th September, 2013;
8. S. O. 562(E), dated the 26th February 2014; and
9. S. O. 1599(E), dated the 25th June, 2014.

F. No. 19-2/2013-IA-III
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)

Indira Paryavaran Bhawan
Aliganj, Jor Bagh Raod
New Delhi-110 003

Dated: 09th June, 2015

OFFICE MEMORANDUM

Sub: Clarification regarding Gazette Notification No. S.O. 3252 (E) dated 22.12.2014 on applicability of Environment Clearance-reg.

Vide Gazette Notification No. S.O. 3252 (E) dated 22.12.2014, the Ministry of Environment, Forest and Climate Change has exempted the School, College and Hostel for educational institution from obtaining prior Environment Clearance under the provisions of the EIA Notification, 2006 subject to Sustainable Environmental Management.

The Ministry is in receipt of representation from various educational institutions regarding issuing clarification on status of universities, and other educational institutions. The matter has been further examined in the Ministry and it is clarified that the Notification No. S.O. 3252 (E) dated 22.12.2014 provides exemption to buildings of educational institutions including universities from obtaining prior Environment Clearance under the provisions of the EIA Notification, 2006 subject to sustainable environmental Management. In case of medical universities/institutes the component of Hospitals will continue to require prior Environment Clearance.

The Guidelines to be followed for building projects to ensure sustainable environmental management in pursuance of Notification No. S.O.3252 (E) of 22nd December 2014 under EIA Notification 2006 are at Annexure-I.

This issues with the approval of the Competent Authority.

Manoj
9.6.15
(Manoj Kumar Singh)
Joint Secretary

Copy to:-

1. All the officers of IA Division
2. The Chairperson/Member Secretaries of all the SEIAAs/SEACs.
3. The Chairman of all the Expert Appraisal Committees
4. The Chairman, CPCB
5. The Chairpersons/Member Secretaries of all SPCBs/UTPCCs.
6. IT Consultant, MoEFCC for uploading into the website.

Copy for information:

1. PS to MOS (Independent Charge).
2. PPS to Secretary (EF&CC).
3. All Divisional Head.
4. Website, MoEF&CC
5. Guard File.

ANNEXURE-I

**GUIDELINES TO BE FOLLOWED FOR BUILDING AND CONSTRUCTION PROJECTS
TO ENSURE SUSTAINABLE ENVIRONMENTAL MANAGEMENT
IN PURSUANCE OF NOTIFICATION No. S.O. 3252 (E) OF 22nd DECEMBER, 2014
UNDER ENVIRONMENT IMPACT ASSESSMENT NOTIFICATION, 2006**

[INDUSTRIAL SHED AND EDUCATIONAL INSTITUTIONS]

The Notification dated 22nd December, 2014 has taken out the industrial shed*, school, college, hostel for educational institution from the requirement of prior Environment Clearance (EC) under EIA Notification, 2006 and stipulated that such buildings shall ensure sustainable environmental management, solid and liquid waste management, rain water harvesting and may use recycled materials such as fly ash bricks. These Guidelines will be applicable to all buildings and constructions which come under the ambit of Notification No. S.O. (E) 3252 of 22nd. December 2014. To ensure sustainable environment management these guidelines as suited will be applicable on the projects under Item 8 (a) of EIA Notification in addition to the conditions stipulated in the EC.

Land, Air, Noise, Water, Energy, Biological, Socio-economic, and Solid & other Waste Management are the main environment facets to be considered in relation to pre, during & post building construction, therefore, it is necessary to ascertain the baseline data of these environmental facets.

The project proponent should file the information about description of project as per points described below prior to start of the project. Information pertaining to compliance on other points be filed at six monthly interval to the respective State Pollution Control Board and the Regional Office of the Ministry of Environment, Forests and Climate Change.

The compliance of the following will be ensured by the respective State Pollution Control Board before giving 'Consent-to-Operate' to industries and by the Local Urban Bodies and the Development Authorities while giving the 'Occupancy Certificate' to the buildings and constructions. These Certificates should be submitted by the above authorities to the Regional Office of MoEFCC. Ministry of Environment, Forest and Climate Change can assess/evaluate/monitor the compliance of conditions enumerated in the Guidelines through verification by Regional Offices or deputed organisations / person.

S. No.	Environmental Parameters	Implementation and monitoring parameters to be included in local by-laws.
a.	Pre-requisites	<p>Brief description of the project</p> <p>01.Name of the Project, Survey number, Village, Taluka, District, State to be mentioned with Google Earth Image and GPS Co-ordinates of the plot to be submitted.</p> <p>02.Location & distance from nearby landmark places / services to be mentioned.</p> <p>03.Total Built-up area (FSI and Non- FSI) should be mentioned with detailed calculations certified by local planning and sanctioning authority.</p> <p>04. Form 1, Form 1A and Consolidated statement as per Environment Notification dated September 14, 2006 to be submitted to local planning and sanctioning authority, Regional Office, MoEFCC and SPCB</p>
b.	Environment Impacts on Project Land	<p>05.The building layout, set-back/side margin, podium, basement ventilation etc. is prepared based on local building bye-laws and is approved by local competent authorities. The Project Proponent shall obtain all necessary clearance/ permission from all relevant agencies including Town Planning Authority before commencing the work.</p> <p>06.Provisional fire NOC to be obtained from local CFO (Chief Fire Officer)</p> <p>07. "Consent-to-Establish and Consent-to-Operate" shall be obtained as required from State Pollution Control Board as provided in the Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Control of Pollution) Act, 1974</p> <p>08.The project proponent shall put in place a credible enforcement mechanism for compliance of energy conservation measures with its allottees, as projected, in perpetuity. This would be monitored by the designated Energy Conservation/ efficiency Authority in the State.</p> <p>09. Soil and ground water samples will be tested to ascertain that there is no</p>

		<p>threat to ground water quality by leaching of heavy metals and other toxic contaminants.</p> <p>10. Top fertile soil to be preserved and to be later used in landscape</p> <p>11. The excavation/demolition debris must be disposed off in designated landfill areas or to be used within site for levelling purpose. Under no circumstance, the debris will be disposed in river bed/lakes etc.</p> <p>12. Undertaking to be given by project proponent that occupancy will be given only after drainage and water connections are in place.</p> <p>13. Dust/smoke prevention measures such as wheel washing, water sprinkler, screening, barricading and debris chute must be installed.</p> <p>14. This should comply with the provisions of eco-sensitive zone regulations, coastal zone regulations, heritage areas (identified in the master plan or issued separately as specific guidelines), water body zones (in such zones, no construction is permitted in the water-spread and buffer belt of 30 m minimum around the FTL [full tank level]), various hazard prone area regulations, and others if the site falls under any such area.</p> <p>15. The site planning should take into account heat island effect, size and density of the built-up areas cause heat island effect, wherein higher air temperatures are created in the dense urban areas as against the low-rise surrounding built-up areas. The solar access in the morphology of clusters can be understood in terms of utilization of direct (and not reflected or diffused) solar radiation, mainly for day lighting and heat gain. This defines the minimal distances between the buildings and the relations between built-up volume and open spaces.</p> <p>16. The proportion of open spaces and built-up edges should be designed such that it ensures winter solar access and summer ventilation.</p>
c.	Water	<p>17. Proponent shall obtain permission for ground water withdrawal from State Ground Water Authority.</p> <p>18. Storm water control and its re-use as per CGWB and BIS standards for various applications.</p> <p>19. The natural flow of existing storm water channel should not be altered or diverted.</p> <p>20. Keeping in view the use of large quantities of water in curing, measures for reducing water demand during construction should be followed. Curing water should be sprayed on concrete structures; free flow of water should not be allowed for curing. After liberal curing on the first day, all concrete structures should be painted with curing chemical to save water. Concrete structures should be covered with thick cloth/gunny bags and then water should be sprayed on them. This would avoid water rebound and will ensure sustained and complete curing. Ponds should be made using cement and sand mortar to avoid water flowing away from the flat surface while curing.</p> <p>21. The developer should ensure groundwater and municipal water meet the water quality norms as prescribed in the Indian Standards for various applications (Indian Standards for drinking [IS 10500-1991], irrigation applications [IS 11624-1986]).</p> <p>22. The use of potable water during construction should be minimized.</p> <p>23. Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.</p> <p>24. Source of water to be identified.</p> <p>25. Water treatment measures such as filtration, softeners, RO etc should be implemented.</p> <p>26. Low flow fixtures and sensors to be used to promote water conservation.</p> <p>27. Water meters to be installed to monitor consumption of water.</p> <p>28. Water balance table/chart should be prepared.</p>
d.	Waste Water Treatment	<p>29. Sewage treatment plant of capacity capable of treating 100% waste water to be installed on site.</p> <p>30. Tertiary treatment such as dual media filter, activated carbon filter and ozonization/ chlorination to be provided so that the treated water</p>

		characteristics are as per Central Pollution Control Board (CPCB) norms.
		31. If STP and pump room are installed in basement, adequate ventilation as per NBC air changes norms should be provided.
		32. Treated waste water to be recycled for flushing and gardening.
e.	Drainage Pattern	33. Excess treated water disposal plan to be submitted. 34. Total paved area of the site under parking, roads, paths or any other use should not exceed 25% of the site area or net imperviousness of the site not to exceed the imperviousness factor as prescribed by the NBC 2005 (BIS 2005b), whichever is more stringent. 35. The final disposal point for excess treated water discharge will be municipal sewer for areas where sewerage network is present. 36. In areas where sewerage network is absent, the excess treated water can be used for agriculture or can be disposed off as per CPCB rules. 37. Storm water disposal plan to be submitted. 38. The final disposal point for storm water will be municipal storm drain for areas where storm water network is present. 39. In areas where storm water network is absent, the storm water surface runoff can be disposed off in nearby natural water streams/ nallas.
f.	Ground Water	40. Hydro-geological survey for ground water analysis shall be submitted. 41. Aquifer capacity and Ground water yield shall be determined. 42. Rain water harvesting plan shall be submitted indicating the number of recharge pits and bores and total rain water to be harvested. 43. Rain water to be harvested and as a safety precaution, rainwater on-line filters be provided as per NBC norms.
g.	Solid Waste Management	A) During construction phase: 44. Disposal of muck during construction phase should not create any adverse effect on the neighbouring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority. The Rules on the Solid Waste Management including Construction Waste issued by the MoEFCC as amended will be applicable. 45. Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate watercourses and the dump sites for such material must be secured so that they should not leach into the ground water. 46. Any hazardous waste generated during construction phase, should be disposed off as per applicable rules and norms with necessary approvals of the State Pollution Control Board. 47. Miscellaneous site debris such as broken tiles etc shall be used on site for leveling /backfilling purpose. 48. Packaged STP /mobile toilets shall be provided for labour camp 49. Polymer bags used for cement and gypsum shall be handed over to authorized recyclers. 50. Cardboard boxes and other packaging material will be handed over to authorized recyclers. B) Post construction phase: 51. Organic waste composter (OWC) or Vermiculture pits shall be installed on site for biodegradable waste treatment (capacity calculated at 0.3kg/tenement/day) The manure generated shall be used for landscaping. 52. The non-biodegradable waste or e-waste shall be handed over to authorized recyclers. 53. STP sludge shall be removed using filter press or centrifuge mechanism. The dried sludge cakes shall be used as manure in landscaping. 54. Minimize waste generation, streamline waste segregation, storage, and

	<p>disposal; and promote resource recovery from waste.</p> <p>55. Resource recovery from waste: Employ resource recovery systems for biodegradable waste as per the Solid Waste Management and Handling Rules, 2000 of the MoEFCC. Make arrangements for recycling of waste through local dealers.</p> <p>56. Use of covering sheets should be done for trucks to prevent dust dispersion from the trucks and washing of tyres when trucks with soil / debris coming on road.</p> <p>57. Hazardous Waste Management: Products, such as paints, cleaners, oils, batteries, and pesticides that contain potentially hazardous ingredients require special care when being disposed. Improper disposal of household hazardous wastes can include pouring them down the drain, on the ground, into storm sewers, or in some cases putting them out with the trash.</p> <p>The hazardous wastes from construction and demolition activities are centering oil, formwork oil, tar and tar products (bitumen, felt, waterproofing compounds, etc.), wood dust from treated wood, lead containing products, chemical admixtures, sealants, adhesive solvents, Explosives and related products and equipment used in excavation, acrylics, and silica, etc.</p>
<p>h. Air Quality and Noise Levels.</p>	<p>A) During construction phase:</p> <p>58. The diesel required for operating DG sets shall be stored in underground tanks and clearance from Chief Controller of Explosives shall be taken, as applicable.</p> <p>59. Ambient noise levels should conform to residential standards both during day and night as per Noise Pollution (Control and Regulation) Rules, 2000. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB/ SPCB.</p> <p>60. Burning of waste to be banned.</p> <p>61. The construction site DG to be maintained regularly so that the smoke emission and noise levels are as per permissible norms.</p> <p>62. Regular P.U.C check for all construction machinery coming on site be done.</p> <p>63. Noise cancellation and insulation devices such as mufflers, barricades etc to be used to avoid noise propagation to adjoining areas.</p> <p>B) Post construction phase:</p> <p>64. DG to be regularly maintained so that the smoke emission and noise levels are as per permissible norms. It shall be at least 6 meters away from the boundary.</p> <p>65. Air quality monitoring to be done quarterly.</p> <p>66. STP and water pumps, air blowers etc should be installed with noise cancellation devices or suitable acoustical enclosures to be given so that the noise levels as per NBC norms are maintained.</p> <p>C) During Construction & Operation</p> <p>67. The provisions of the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981) and the rules made thereunder be complied for control of noise pollution during construction and operation.</p> <p>68. Setting up the barriers: National Building Code 2005 suggests that design solutions such as barrier blocks should be used to reduce external LA10 noise levels to at least 60-70 dB (A) at any point 1.0 m from any inward looking façade. Green belts and landscaping could act as an effective means to control noise pollution. In case of railway tracks, a minimum distance of 50m to 70m may be provided between the buildings and the tracks.</p>
<p>i. Energy</p>	<p>69. Appropriate processes and material be used to encourage reduction in carbon foot print.</p> <p>70. Use of glass be reduced by up-to 40% to reduce the electricity consumption and load on air-conditioning. If necessary, use high quality double glass with special reflective coating in windows.</p> <p>71. Solar water heater to be provided adequately.</p>

72. Common area lighting should be Solar / LED.
73. Install energy meters to monitor overall consumption, and timer-switch for all common area lighting, and other consumption of measurable energy.
74. Fly ash should be used as building material in the construction as per the provisions of Fly Ash Notification of September, 1999 and amended as on 27th August, 2003 and 3rd November, 2009.
75. Wherever possible recycled materials having low embodied energy be used.
76. Use of light coloured, reflective roofs having an SRI (solar reflectance index) of 50% or more should be promoted. The dark coloured, traditional roofing finishes have SRI varying from 5% to 20%.
77. Optimize use of energy systems in buildings that should maintain a specified indoor environment conducive to the functional requirements of the building by following mandatory compliance measures (for all applicable buildings) as recommended in the Energy Conservation Building Code (ECBC) 2007 of the Bureau of Energy Efficiency, Government of India. The energy systems include air conditioning systems, indoor lighting systems, water heaters, air heaters, and air circulation devices.
78. Use the concept of passive solar design of buildings using architectural design approaches that minimize energy consumption in buildings by integrating conventional energy-efficient devices, such as mechanical and electrical pumps, fans, lighting fixtures, and other equipment, with the passive design elements, such as building orientation, landscaping, efficient building envelope, appropriate fenestration, increased day lighting design, and thermal mass.
79. The building should be oriented optimally based on Sun-path and engineering analysis to curtail excessive solar radiations.
80. Lighting systems should comply with the ECBC 2007 and applicable to interior spaces of buildings, exterior building features, including facades, illuminated roofs, architectural features, entrances, exits, loading docks, and illuminated canopies, exterior building grounds etc. except emergency lighting and lighting in dwelling units.
81. All the point light sources installed in the building for general lighting shall be LEDs or LEDs or equivalent. All the linear light sources installed in the building for general lighting shall be T-5 or at least 4 Star BEE rated TFLs or equivalent. The installed interior lighting power shall not exceed the LPD (Lighting Power Density) value as recommended by ECBC 2007.
82. Automatic Lighting shutoff control be installed. Interior lighting/Exterior Lighting systems shall be equipped with an automatic control device in accordance with ECBC 2007. Occupancy sensors that shall turn the lighting off within 30 minutes of occupant leaving the space. It should also have option for manual turning on lights when the space is occupied. ECBC requires controls in day lit areas that are capable of reducing the light output from luminaries by at least half and Controlling of exterior lighting with photo-controls where lighting can be turned off after a fixed interval.
83. The tapping of renewable sources of energy for lighting, heating, cooling and ventilation needs, deserve special attention. For captive solar power generation, a minimum of 15 percent of sanctioned load is the requirement.
84. Solar photovoltaic (SPV) systems are direct energy conversion systems that convert solar radiation into electric energy. SPV systems should be installed to reduced use of conventional sources of energy. Roof tops of buildings as well as other exposed areas such as of parking shades should be utilized for installation of SPV systems.
85. Hot water requirement in buildings should be met through use of various types of solar water heating systems, viz. flat plate collector; single glazed double glazed; evacuated tube collectors; and Water heating with solar concentrators.
86. The Project Proponent should ensure regular energy audit.
 - i. To validate the predicted energy consumption, thermal comfort, and visual comfort criteria by an energy auditor approved by the BEE, Government of India.

**Odisha Skill Development Project (OSDP)
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		<p>ii. To ascertain continued safety in the operation of the electrical and mechanical systems of the building through proper maintenance by the owner or the occupants.</p> <p>87. This will be ensured in the contract document by providing for the commissioning of all electrical and mechanical systems by the respective supplier or builder. Moreover, the respective facility management group assigned by the owner or the occupants themselves, will carry out the maintenance facilities.</p> <p>88. Energy conservation measures like installation of CFLs/LEDs for the lighting the areas outside the building should be integral part of the project design and should be in place before project commissioning. Used CFLs and TFLs should be properly collected and disposed off /sent for recycling as per the prevailing guidelines/ rules of the regulatory authority to avoid mercury contamination. Use of solar panels may be done to the extent possible.</p>
j.	Traffic Movement System	89. Width of driveways, parking provision, ramp width and slope to be kept as per local bye laws.
k.	Provisions for Differently able	<p>90. The Project Proponent should provide at least the minimum level of accessibility for persons with disabilities.</p> <ul style="list-style-type: none"> • Ensure accessibility and usability of the facilities in the building by employees, visitors and clients with disabilities. • Ensure access to facilities and services by adopting appropriate site planning to eliminate barriers as per the recommended standards (NBC 2005 [BIS 2005f]). • Layout and designing of interior and exterior facilities as per principles of universal design such as prescribed by the National Building Code of India, building management policies and procedures, provision of auxiliary aids & appliances, and staff training in disability awareness.
l.	Green Belt/Green Cover	<p>91. Provide minimum 1 tree for every 80 sq.mt of plot area.</p> <p>92. Wherever trees are cut or transplanted, compensatory plantation in the ratio of 1:3 to be done in the premise.</p> <p>93. Native species of trees to be planted.</p> <p>94. Vegetation to provide as shading and promote evaporative cooling. In hot and dry climates, evaporative cooling through appropriately sized wet surfaces or fountains have a desirable effect. It should be planned for maximum benefit.</p> <p>95. The project should have detail proposal for tree plantation, landscaping, creation of water bodies etc along with a layout plan to an appropriate scale.</p>
m.	Disaster/Risk Assessment Plan	<p>96. Fire tender movement plan to be submitted.</p> <p>97. Firefighting system to be provided as per the fire NOC.</p> <p>98. Turning radius to be kept as per Fire NoC or as prescribed in the local by-laws.</p> <p>99. Public address system to be installed as per the Fire Safety norms.</p> <p>100. Place of assembly to be indicated.</p>
n.	Socio Economic Impact and CSR	<p>101. Biodegradable and non-biodegradable waste bins to be provided for every household to promote waste segregation at source.</p> <p>102. Importance of environment and various environment drives to be initiated.</p> <p>103. Importance of maintenance of environment infrastructure to be showcased by issuing pamphlets etc.</p> <p>104. Provision for health care, medical kit, crèche, First-Aid room shall be given during construction phase for the construction workers.</p> <p>105. Adequate shelter for resting hours, crèche, clean and potable drinking water to be provided to construction workers.</p> <p>106. All local labour welfare laws must be complied.</p> <p>107. Concerns of the communities being affected by the Project are to be responded on priority, and all possible CSR is to be rendered to make the responses effectively beneficial..</p>

**Odisha Skill Development Project (OSDP)
Initial Environment Examination Report (Addendum)**

- | | |
|--------------------------------------|--|
| o. Environment Management Plan (EMP) | 108. Detailed environment management plan comprising of estimated capital cost and O&M cost for the following environment infrastructure should be submitted: <ul style="list-style-type: none">a. Sewage Treatment Plantb. Landscapingc. Rain Water Harvestingd. Power backup for environment infrastructure.e. Environment Monitoringf. Solid Waste Managementg. Solar and Energy Conservation |
| | 109. Environment Monitoring Cell with defined functions and responsibility shall be set up and its details be submitted. |

END NOTE:
Industrial Shed*: The word 'industrial shed' implies building (whether RCC or otherwise) which is being used for housing plant and machinery of industrial units and shall include godowns and buildings connected with production related and other associated activities of the unit in the same premise.

Manoj

APPENDIX-3: CIRCULAR SHOWING EXEMPTION OF EDUCATIONAL INSTITUTES
FROM CONSENT



Tel : 0674-2564033
EPABX : 2561909/2562847
E-mail: paribesh1@ospcboard.org
Website: www.ospcboard.org

STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST & ENVIRONMENT, GOVERNMENT OF ODISHA]

Paribesh Bhawan, A/118, Nilakantha Nagar, Unit – VIII
Bhubaneswar – 751 012, INDIA

No. 16226 / IND-I-CON-(Misc)1505

Dt 16-12-17 /

By Speed Post

ORDER

WHEREAS, as per the guideline of CPCB revised classification of industries in the category of Red, Orange, Green and White was prepared and notified by the Board vide order No.15889, dtd. 31.10.2016. The order and the list of industrial units classified under Red (81 nos.), Orange (91 nos.), Green (73 nos.) and white (42 nos.) is also available in Board's website www.ospcboard.org;

AND WHEREAS, further several industrial units /projects which came to the notice of SPC Board later on for categorization were placed before the Board and revised classification of additional industrial units/ projects under Red, Orange, Green and White category was approved in 114th Board meeting held on 07.03.2017 Office order vide letter No. 6488, dtd. 08.05.2017 .

AND WHEREAS, further, some additional units were identified by the Board, which need to be classified/exempted under Red/Orange/Green/White categories. The mater was placed before the internal committee for evaluation and as per the recommendation of the committee following units have been placed under Red/ Orange / Green categories/exempted and was approved in 115th Board Meeting held on 13.11.2017 as per the following list.

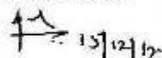
Sl.No.	Category
Red	
1.	Building and construction project $\geq 20,000$ Sq. meter to $\leq 1,50,000$ Sq. meter of built up area having Wastewater discharge >100 KLD. <i>NB: The project activities shall not include Industrial shed, University, Colleges, Hostel for educational institutions. Further, it is clarified that the residential building upto 1,50,000 Sq. meter does not require Consent to Establish and Operate from the SPCB as per MoEF& CC amended EIA Notification No. S.O. 3999(E), dtd. 09.12.2016. Accordingly Item No. Red -7 of Office order No. 15889, dtd. 31.10.2016 is modified.</i>
2.	Calcined Petroleum Coke
3.	Pyrolysis Process
4.	Aluminium ingot from Aluminium Dross

1/2/1

Orange Category	
1	Building and construction project $\geq 20,000$ Sq. meter to $\leq 1,50,000$ Sq. meter of built up area having Wastewater discharge up to 100 KLD. NB: <i>The project activities shall not include Industrial shed, University, Colleges, Hostel for educational institutions. Further, it is clarified that the residential building upto 1,50,000 Sq. meter does not require Consent to Establish and Operate from the SPCB as per MoEF& CC amended EIA Notification No. S.O. 3999(E), dtd. 09.12.2016. Accordingly Item No. Orange -6 of Office order No. 15889, dtd. 31.10.2016 is modified.</i>
Green Category	
1	Mineral slurry pipeline
2.	Mineral conveyor with closed conveying system.
3.	Concrete Sleeper/Hume pipes with or without steam curing (without using coal)
Exclusion of Project from Obtaining Consent of the Board:	
1.	Aquaculture projects : Aquaculture projects are excluded from consent administration, since the regulation of this type of projects are already covered under provision of Coastal Aquaculture Authority Act, 2005 and the Rules framed thereunder and also does not find place in the CPCB list for ROGW, dt. 07.03.2016.

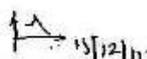
This order shall come into force w.e.f. the date of its issue.

By order of the Board


Member Secretary

Memo No. 16227 /dtd. 16-12-17

Copy forwarded to the Chairman, Central Pollution Control Board, Paribesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi -110 032 for kind formation with reference to the direction issued by CPCB.


Member Secretary
P.T.O

1/3//

Memo No. 16228 /dtd. 16-12-17

Copy forwarded to Principal Secretary, Forest and Environment Dept., Govt. of Odisha for kind information and necessary action.


15/12/17
Member Secretary

Memo No. 16229 /dtd. 16-12-17

Copy forwarded to Principal Secretary, Industries Department/ MSME Dept. / Steel & Mines Dept. / Energy Dept./ Housing and Urban Dept. / Health & Family Welfare Dept./ Agriculture Dept./ Works Dept./ Water Resources Dept./ F & ARD / Excise Dept./ Commerce & Transport / Textile & Handlooms/ CMD, IPICOL/ CMD, IIDCO/ Special Secretary P&C Dept./ Director, Factories and Boilers, Govt. of Odisha for information and necessary action.


15/12/17
Member Secretary

Memo No. 16230 /dtd. 16-12-17

Copy forwarded to EE-cum-System Administrator for information. She is requested to upload this order in the website of the Board.


15/12/17
Sr. Env. Engineer, L-I (C)

APPENDIX- 4: SITE PHOTOGRAPH



View of Proposed Site For Precision Engineering Centre Site in the Mancheswar Industrial Area and Boundary wall at site also seen



View of Precision Engineering Site showing levelled land

Appendix -5 : Layout Plan of Precision Engineering

(Kindly refer the layout drawings under **section 6.2. Drawings**)

APPENDIX-6: LAND RECORDS OF PRECISION ENGINEERING CENTRE SITE



Government of Odisha
General Administration & Public Grievance Department

File No. 5299 /CA Dtd 23rd February, 2022

GAD-CA4-ALLOT-0004-2022

From

Sri Manas Ranjan Samal, OAS (SAG)
Joint Director of Estates-cum-
Addl. Secretary to Government

To

The Chief Executive Officer
OSDA, Bhubaneswar

Sub: Regarding alienation of land measuring Ac. 5.000 dec. in Mz-Pandara in favour of SD&TE Department for Precision Engineering Facility of World Skill Centre.

Sir,

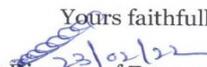
In inviting a reference on the subject cited above, I am directed to say that the proposal regarding alienation of land measuring Ac. 5.000 dec. in Mz-Pandara was placed before the Land Allotment Committee in the meeting held on 05.01.2022 under the Chairmanship of the Chief Secretary. The Land Allotment Committee have recommended the proposal for alienation in favour of SD & TE Deptt. for the purpose of Precision Engineering Facility of World Skill Centre out of the land measuring Ac. 25.000 dec. to be surrendered by IDCOL in favour of GA and PG Deptt. The recommendation of the Land Allotment Committee has been approved by the Government. The detail land particulars approved for alienation is indicated below:-

Mz-Pandara		Ps-New Capital	
Khata No.	Plot No.	Area in acre	Kissam
1330/4155 (IDCOL)	794	0.240	Gharabari-II
	792(pt.)	0.615	Biali Dofasali
	793	1.090	Gharabari-I
	795	0.220	Gharabari-I
	796	0.330	Patita
	813/5467	0.060	Biali Dofasali
	791(pt.)	0.140	Sarada-II
	790(pt.)	0.060	Sarada-II
	812(pt.)	0.210	Gharabrai-II
	797(pt.)	0.344	Biali Dofasali
	798(pt.)	0.190	Patita
	663/9586	0.020	Patita
	773(pt.)	0.350	Biali Dofasali
	774(pt.)	0.010	Sarada-II
	664/9585(pt.)	1.121	Gharabari-II
	Total		Ac.5.000 dec.

Alienation order will be issued after completion of the surrender process by IDCOL in favour of GA and PG Deptt.

This for favour of kind information.

Yours faithfully,


Joint Director of Estates-cum-
Addl. Secretary to Government

APPENDIX-7 CONSULTATION PHOTOGRAPHS AND ATTENDANCE SHEET

A. Consultation Photographs:



View of Stakeholder Discussion at Precision Engineering site



Another View of Stakeholder Discussion at Precision Engineering Site

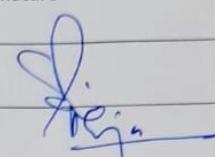
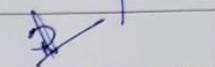
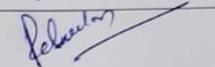
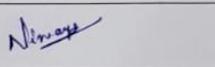
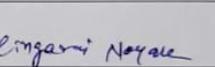
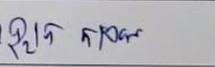
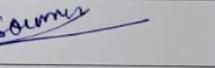


B. Consultation Attendance Sheet:

Loan-3539IND: Odisha Skill Development Project
Stakeholder Consultations

Date: 16.06.2021 Location: PRECISION ENGINEERING BUILDINGS

Planned Facility:

S. No.	Name	Designation	Phone Number	Signature
1	Sarjay Pathi	GM-R	993736311	
2	En. R.K. Dash	DH, BCDS IDCO	7008609014	
3	Debasix Nayak	Junior Engineer IDCO	9439924661	
4	Prakash ch. Sain	DSM BCBCL	8895179723	
5	Najeeb Khan	Project manager BCBCL	9438139313	
6	Nikhaya Mohanty	Elect. Engineer BCBCL	9337746986	
7	Lingaraj Nayak	Site Incharge BCBCL	9438543215	Lingaraj Nayak
8	Bipin Sahoo	Electrician BCBCL	8847894863	Bipin Sahoo
9	Prabhad Naik	Supervisor BCBCL	8658240303	
10	Soumya Lakshmi	Supervisor BCBCL	8847842824	
11				
12				
13				
14				

**Odisha Skill Development Project (OSDP)
Initial Environment Examination Report (Addendum)**

Loan-3539IND: Odisha Skill Development Project

Stakeholder Consultations

Date: 10/02/2022

Location: WSC Bhubaneswar
Precision Engineering Centre
and Hostel for GSS

Planned Facility: Precision Engineering Centre and Hostel Facilities
at Mancheswar

S. No.	Name	Designation	Phone Number	Signature
1	Sanyas Rishi	Gen	993736011	
2	Satya Prakash Rout	Trainer MES	9040012698	
3	Babul Samal	MES	9556566042	
4	B. MOHAR KUMAR	Trainer, MES	7008635848	
5	Dusmanta Kumar Biswal	Trainer MES	789487 7052	
6	Satyajit Sahoo	Trainer MES	9438675502	
7	Sanyas Himan Behena	student MES	6370079884	Sanyas Himan Behena
8	pravat Nayak	student MES	9692404360	pravat Nayak.
9	Suneta Rout	student MES	87634700 59	Suneta Rout
10	Sushama Singh	Student MES	7606074228	Sushama Singh
11	Sabitree Nayik	Student MES	8456055498	Sabitree Nayik
12	Sritam Patkorey	Student MES	8917406785	Sritam Patkorey.
13	Panchu Nayak	Student MES	9178545717	Panchu Nayak
14	Rudra Narayan ojha	Student MES	7978096881	Rudra o jha

15	Subham Mahasara	Student MES	9178146822	Subham
16	Sachin Danku	Student MES	9556287644	Sachin
17	Shreevishnu Vankar	Consultant Contract	9811224455	Sh
18				
19				
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6.1.5.8. SUMMARY

A. General

Construction at site of all buildings and facilities as per approved architectural, structural and services drawings, specifications including HSE requirements. The contractor shall be required to fulfill following requirements in relation to project construction work before, during and after the construction of various buildings as follows -

- The contract management of the entire construction work shall proceed in accordance with general and particular condition of the contract.
- It is imperative for the contractor to deploy well-qualified Project engineer, quantity surveyor, Quality Assurance engineer and safety professional, who are well versed with planning, quality and HSE processes and documentation, before the start of the construction work. QA & HSE professionals shall be reporting to contractor administratively only.
- The contractor shall provide, for entire construction duration, a well-equipped office facility for client, supervision authority, QA consultant, with proper ventilation, climate control, furniture and document storage facility. The contractor shall also construct and operate of the required size a fully equipped material testing lab during the entire duration of the project. The cost of such facility shall be deemed to have been included in the contract price. In case non-provision of the facility, supervision authority shall arrange the facility and deduct from the payments due to the contractor.
- The contractor shall submit the detailed resource loaded construction plan in the form of bar chart suitably made with approved computer software capable of showing progress bars, cash flow, resource planning etc.
- The contractor shall submit a detailed quality assurance plan with project execution methodology, HSE plan for the approval of supervising authority. The quality assurance plan must consist of list of method statement for each work component, inclusive of all the services. The detailed method statement shall consist of purpose, scope, applicable drawings, specifications and codes, resources to be deployed (Material, manpower, tools and equipment), detailed work procedure, HIRA (Hazard identification and risk analysis) and applicable checklists. The method statement shall have to be got approved from the supervising authority before the actual construction of particular component of the project.
- The contractor shall submit the Material Inspection Report (MIR) as per the approved format along with all necessary test reports as per the frequency prescribed in relevant codes of practices, shelf life, storage conditions and recommendations from the manufacture. The contractor shall get the material approved from supervisor authority before the use of the material for construction purpose.
- The construction of each component of project shall not proceed without prior approval of approving authority. The contractor shall be submitting "Request for Inspection" (RFI) to the supervision authority. The format of the RFI shall be approved from the supervision authority/ QA consultants. The request for inspection shall be accompanied with various construction checklists as per the particular component of work.
- It will be the responsibility of the contractor to make as built drawings incorporating all the approved changes.
- It is the responsibility of the Contractor to submit and get the project closure document approved from the supervising authority. The project closure document should contain the documentation as per the recommendation of supervising authority.

6.1.5.8.1. Compliances

- All designs shall comply with relevant byelaws, National Building Code, Fire and safety regulations.
- Such provisions as may be required by National Disaster Management Agency shall be met.
 - The submitted designs shall have area calculation charts and sufficient explanation to show Compliance with the above.
 - Location of transformers, meter room etc shall be in compliance with the State Electricity Board.
 - Shifting of electric poles, water lines etc shall be carried out if required, and no charges apart from those payable to municipality or utility companies shall be reimbursed on this account.
 - Sustainable building parameters as prescribed by statutory bodies shall be achieved, whether specifically mentioned elsewhere or not.

6.1.5.8.2. Specifications

- The contractor shall execute the whole and every part of the work in the most substantial and workman like manner both as regards materials and otherwise in every respect in strict accordance with the specifications as laid out in latest CPWD Specifications or equivalent State PWD specifications; in case of discrepancy the CPWD specifications shall take precedence. The Contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction.
- The specifications shall be read in conjunction with the architectural concept drawings as provided.
- In the case of any class of work for which there is no such specifications as referred to above, such work shall be carried out in accordance with the Bureau of Indian Standards Specifications.
- In case there are no such specifications in Bureau of Indian Standards, the work shall be carried out as per manufacturers' specifications, if not available then in accordance with the instructions and requirements of the Employer.

6.1.5.8.3. Statutory approvals

- It shall be the responsibility of the successful Bidder to obtain all approvals from all statutory bodies such as Municipality, Fire Authority, State Electricity Board; and deposit the required fee which shall be reimbursed by the Owner. The amount for same is included in the bid price as a Provisional Sum and will be reimbursed to the Contractor.

6.1.5.8.4. Provision for Construction water and power

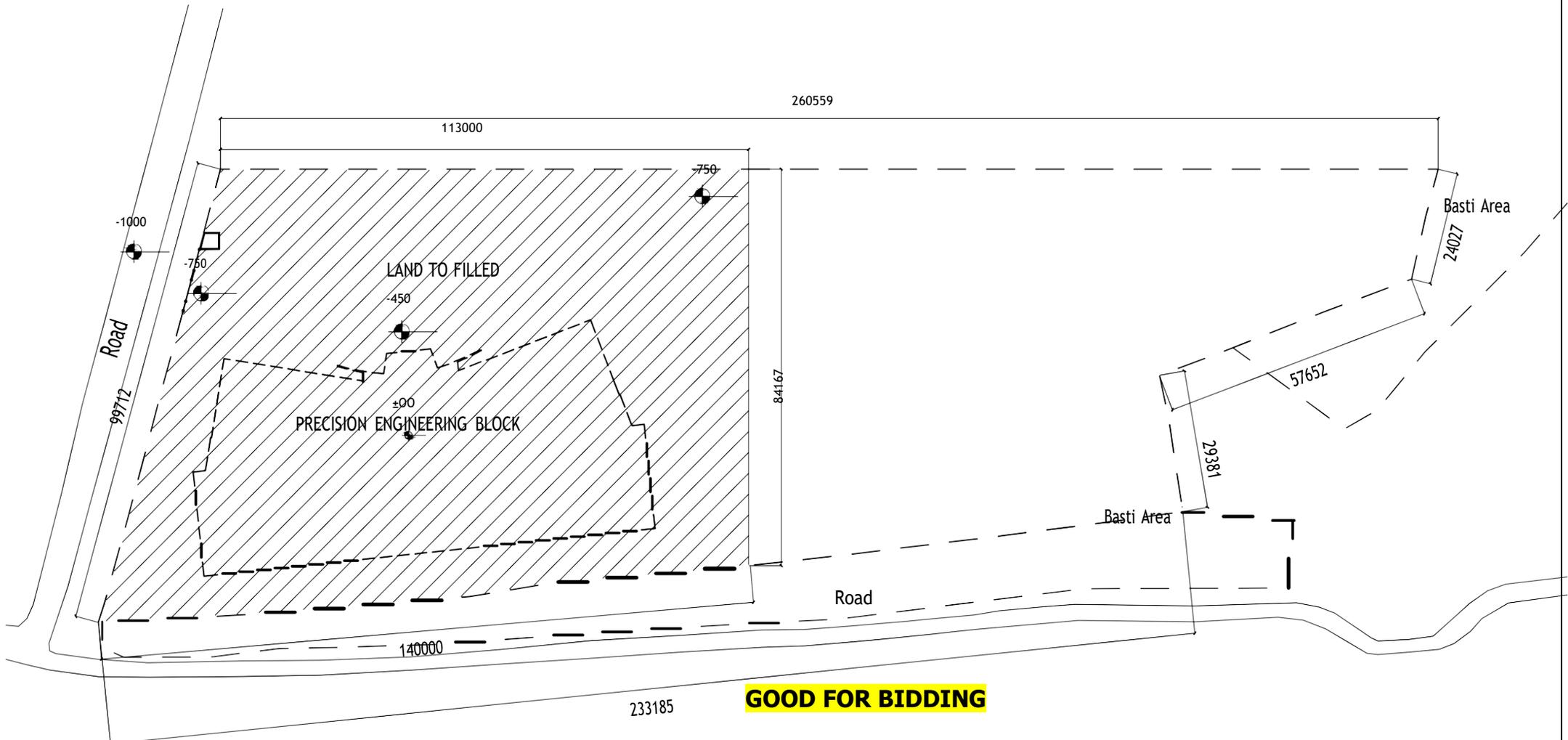
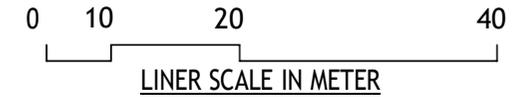
- The Contractor shall make his own arrangements for water required for the work by way of municipal connections, bore wells, temporary tanks and piping, and nothing extra will be paid for the same. This will be subject to the conditions that the water used shall be fit for construction purposes to the satisfaction of the Employer.
- The Contractor shall be responsible for arranging and maintaining by means of temporary electric connection and generators at his own cost; all electricity requirements for equipment and lighting and facilities for workers and all other services required for executing the work.

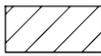
6.2. DRAWINGS

A. Drawings

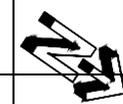
The attached drawings as summarized in the list below shall be read in conjunction with, and shall form a part of the bidding documents. (These are tender drawings issued for tendering only and no construction should be carried out on the basis of these drawings)

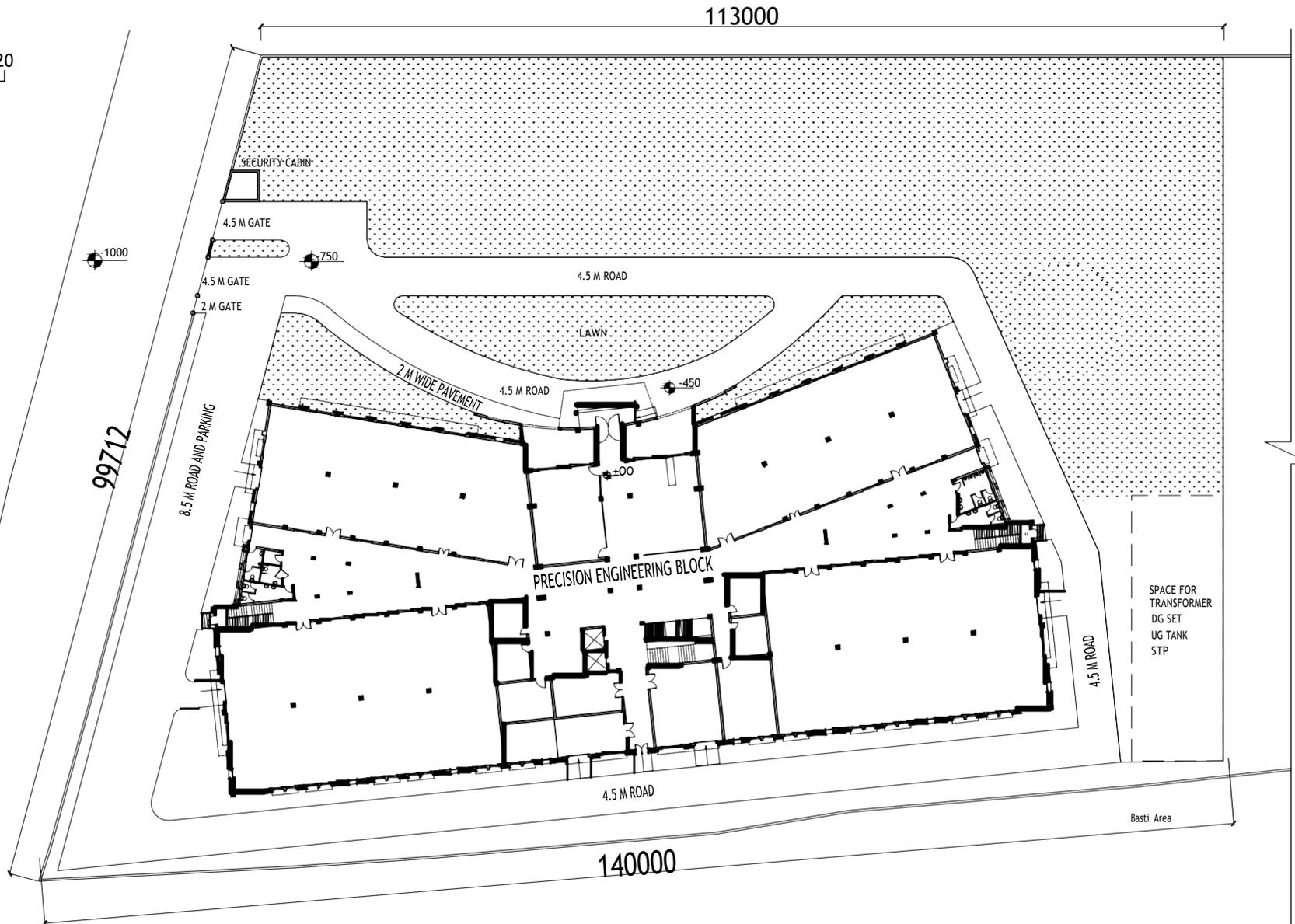
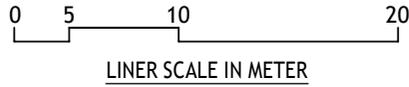
S. No.	Drawings Details	Drawings No.	Date
1	SITE PLAN	TD-01	21-03-2022
2	PART SITE PLAN	TD-02	21-03-2022
3	EXTERNAL LIGHTING PLAN	TD-03	21-03-2022
4	SCHEMATIC WATER SUPPLY	TD-04	21-03-2022
5	EXTERNAL ELECTRICAL	TD-05	21-03-2022
6	TYPICAL ROAD SECTION AND ENTRY PORTAL	TD-06	21-03-2022
7	BOUNDARY WALL PLAN & ELEVATION	TD-07	21-03-2022
8	BOUNDARY WALL SECTION	TD-08	21-03-2022
9	GROUND FLOOR PLAN	TD-09	21-03-2022
10	FIRST FLOOR PLAN	TD-10	21-03-2022
11	TERRACE PLAN	TD-11	21-03-2022
12	TERRACE SECTION	TD-12	21-03-2022
13	ELEVATIONS	TD-13	21-03-2022
14	ELEVATIONS AND SECTION	TD-14	21-03-2022
15	NOTES AND SPECIFICATIONS	TD-15	21-03-2022
16	KEY PLAN	TD-16	21-03-2022
17	KEY PLAN AREA CHART	TD-17	21-03-2022



- NOTES:
1. FULL SITE TO HAVE BE LEVELED AND CLEARED OF JUNGLE = 202701 sqm.
 2. LAND MARKED FOR PRECISION ENGINEERING (PE) TO BE FILLED WITH APPROVED MATERIAL TO A LEVEL OF 250 MM ABOVE THE LEVEL OF CENTRE POINT OF ROAD AT THE POINT OF ENTRANCE GATE CENTRE, AS MARKED LVL - -1000
 3. THE PLINTH LEVEL SHALL BE ONE METRE ABOVE THE LEVEL OF CENTRE POINT AND IS SHOWN AS LVL ±00
- — — — — PLOT AREA= 202701 Sqm.
 — — — — — PLOT BOUNDARIES
-  PE PLOT AREA= 11367 Sqm.
 MARKED AS HATCHED

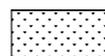
FOR TENDER ONLY		PRECISION ENGINEERING BLOCK	
ODISHA SKILL DEVELOPMENT PROJECT - ODISHA		SITE PLAN	
A3	DATE: 21-03-2022		
1:800	DRG NO:	TD-01	





GOOD FOR BIDDING

ROAD AREA= 2264 Sqm.
PAVEMENT AREA=72 Sqm.



LAWN AREA AS SHOWN NOT IN SCOPE OF WORK

FOR TENDER ONLY

ODISHA SKILL DEVELOPMENT PROJECT - ODISHA

PLOT AREA= 202701 Sqm.
PE PLOT AREA= 11367 Sqm.

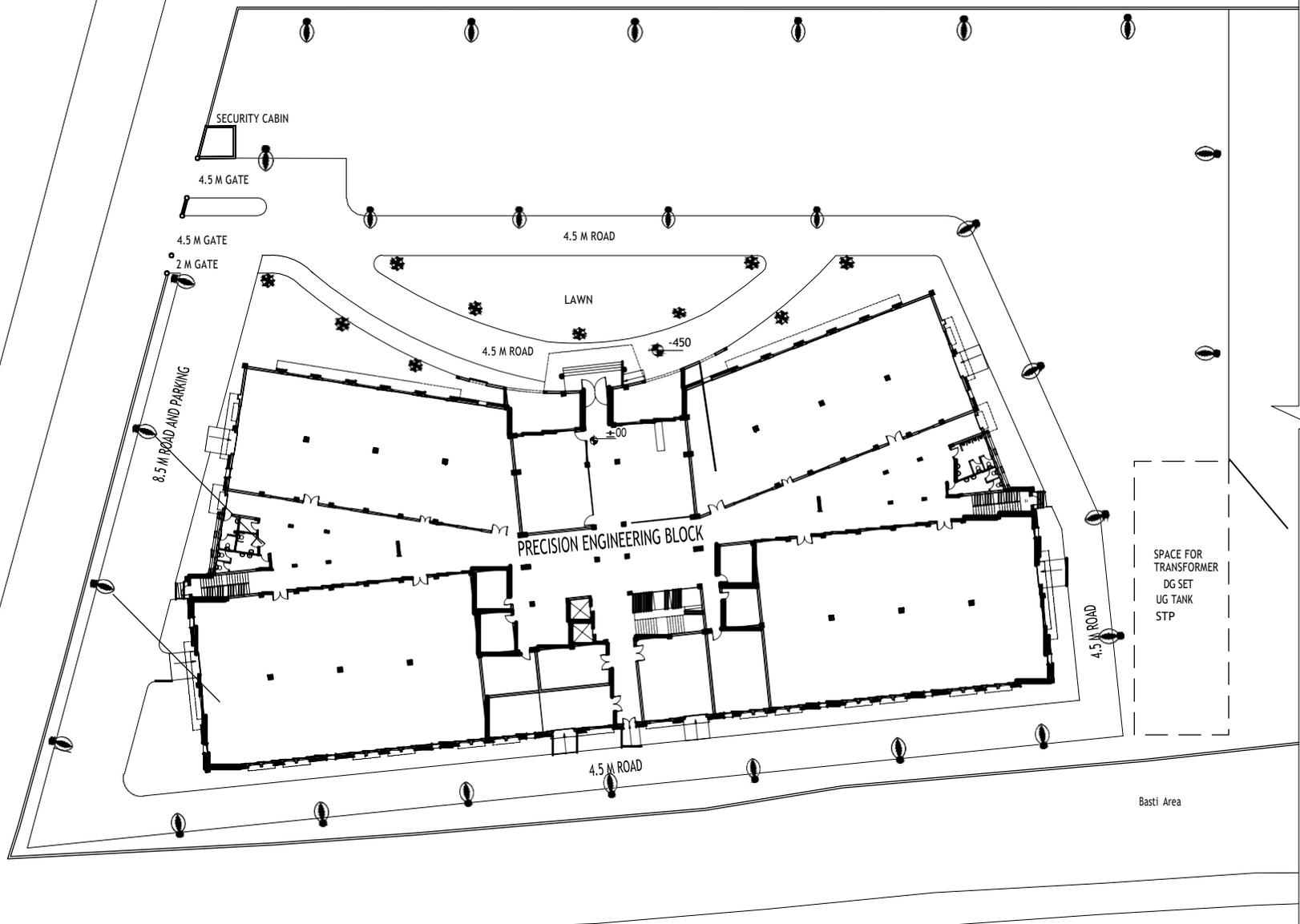
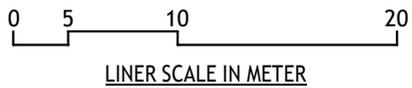


PRECISION ENGINEERING BLOCK

SITE EXTERNAL WORK

A3 DATE: 21-03-2022

1:500 DRG NO: **TD-02**



	7 M STREET LIGHT
	3 M POST TOP WITH REQUIRED LED FIXTURE

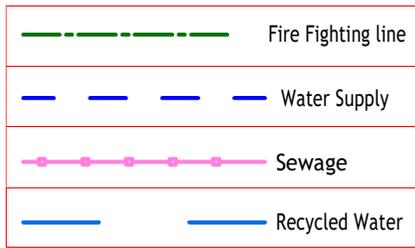
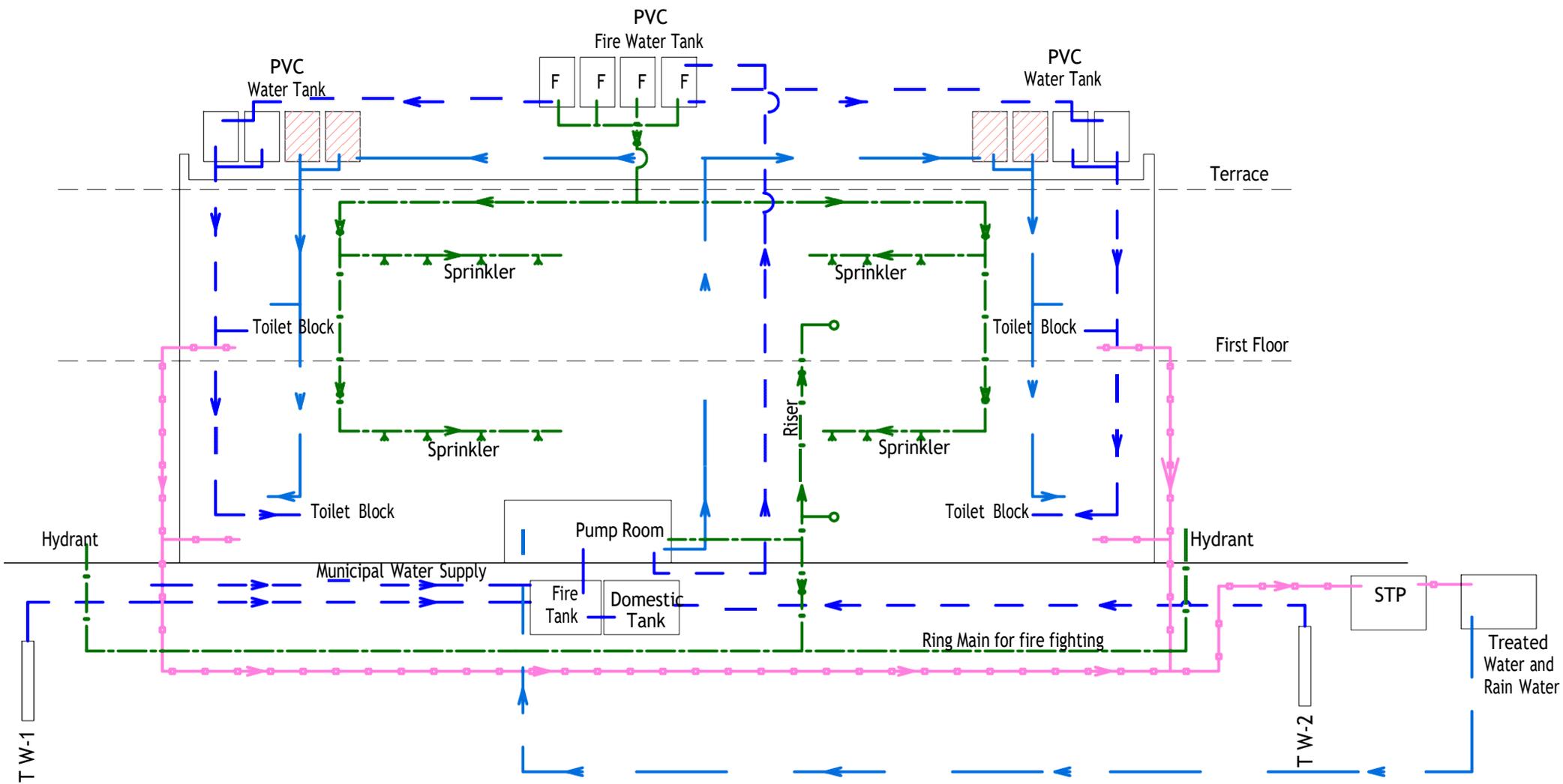
GOOD FOR BIDDING

FOR TENDER ONLY
**ODISHA SKILL DEVELOPMENT
PROJECT - ODISHA**

PRECISION ENGINEERING BLOCK
EXTERNAL LIGHTING PLAN



A3	DATE: 21-03-2022
1:500	DRG NO: TD-03



GOOD FOR BIDDING

FOR TENDER ONLY
**ODISHA SKILL DEVELOPMENT
 PROJECT - ODISHA**

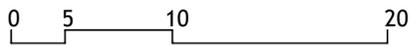
PRECISION ENGINEERING BLOCK

SCHMATIC WATER SUPPLY

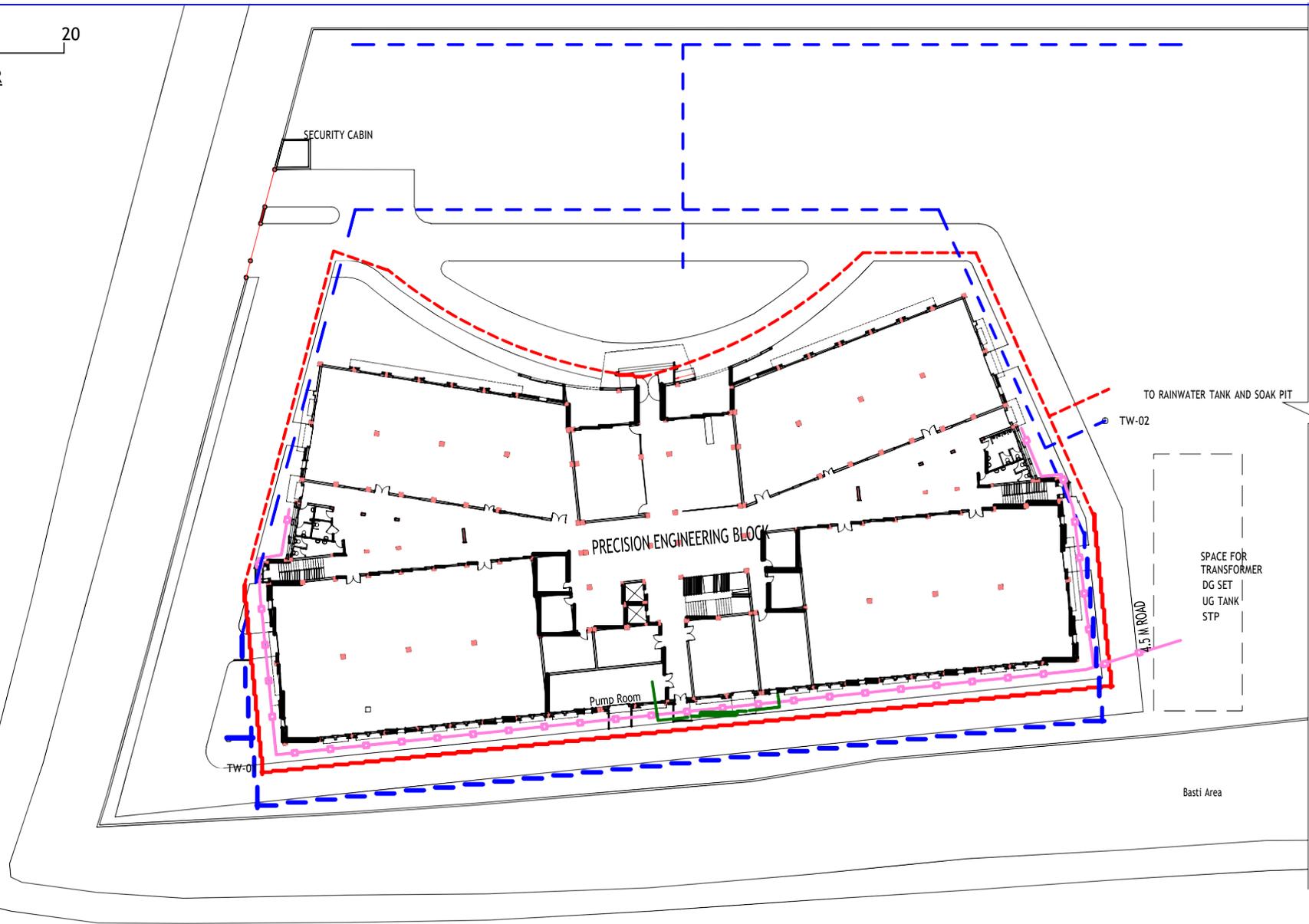
A3 DATE: 21-03-2022

DRG NO:

TD-04



LINER SCALE IN METER



NOTE: LAYOUT OF WATER SUPPLY, SEWERAGE, TUBE WELLS IS INDICATIVE, THE WORK SHALL BE CARRIED OUT ON BASIS OF APPROVED DESIGNS AND DRAWINGS.

LEGEND		Approx Length in M
	Water Supply for horticulture	470
	Sewerage	170
	Rainwater drainage	310
TW-1/ TW-2	Tube wells	

GOOD FOR BIDDING

FOR TENDER ONLY

ODISHA SKILL DEVELOPMENT PROJECT - ODISHA

PRECISION ENGINEERING BLOCK

**PART SITE PLAN
EXTERNAL WATER SUPPLY**

A3

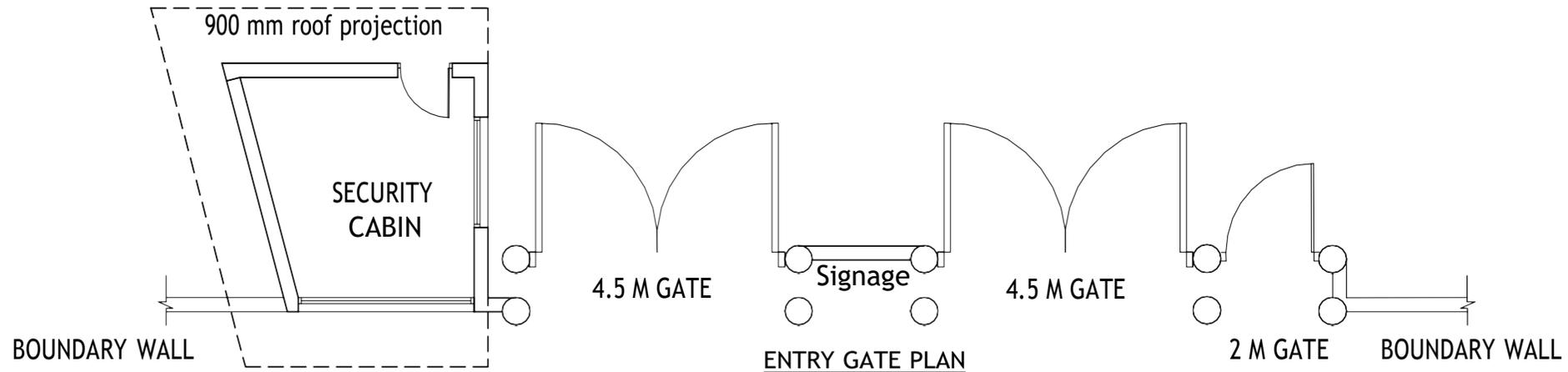
DATE: 21-03-2022

1:500

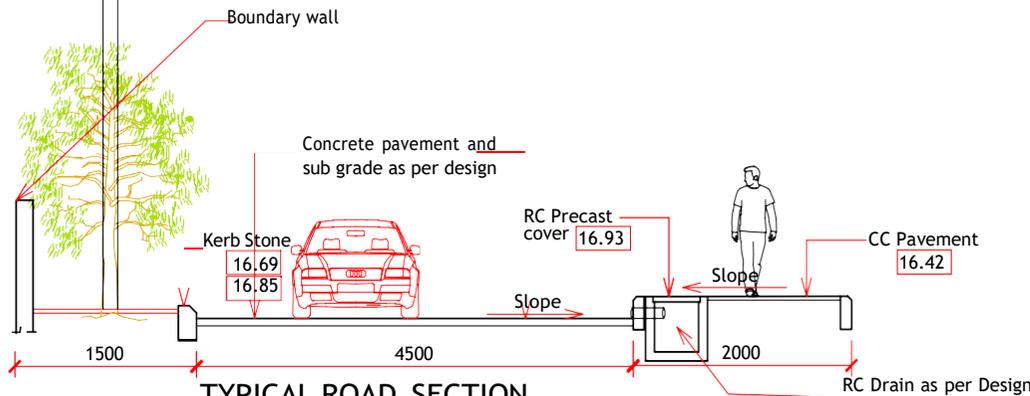
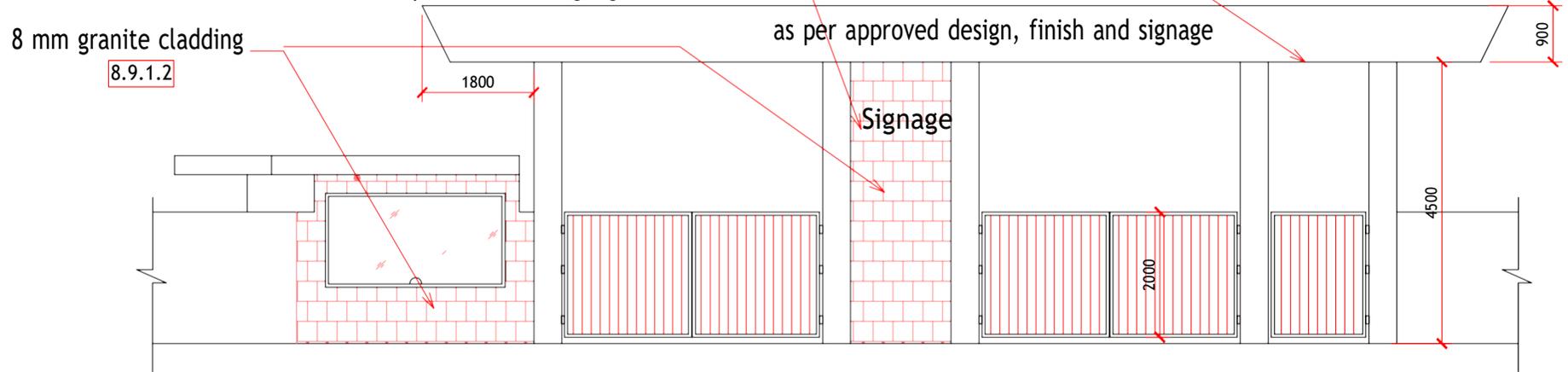
DRG NO:

TD-05





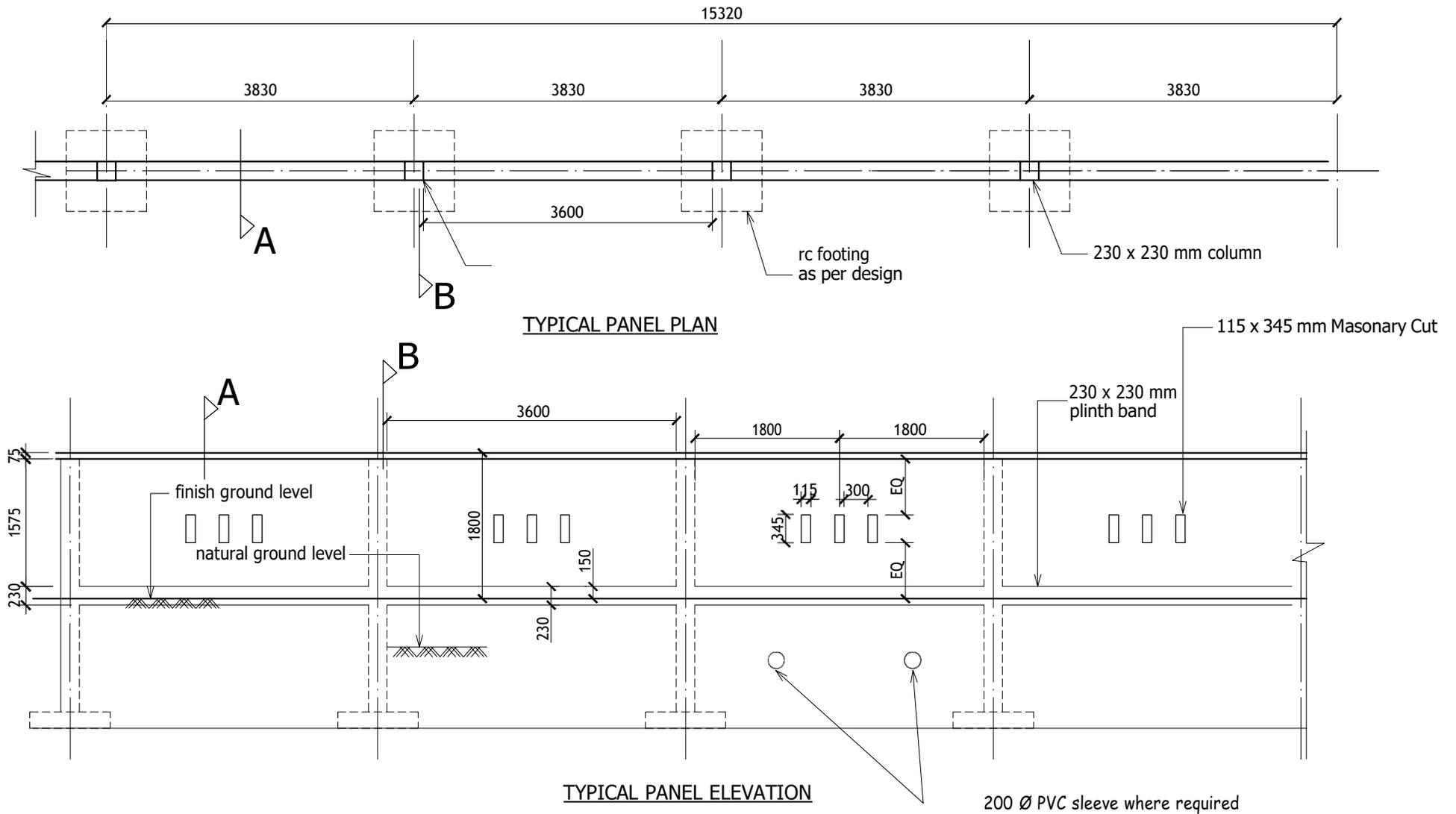
Electrification and approved light fittings below portal and on signage wall



NOTE: CONCRETE ROAD AND PAVEMENT SHALL BE AS PER CPWD SPECIFICATIONS
16.1 TO 16.5 FOR SUBGRADE AND 16.42 TO 16.43 FOR CONCRETE ROAD

GOOD FOR BIDDING

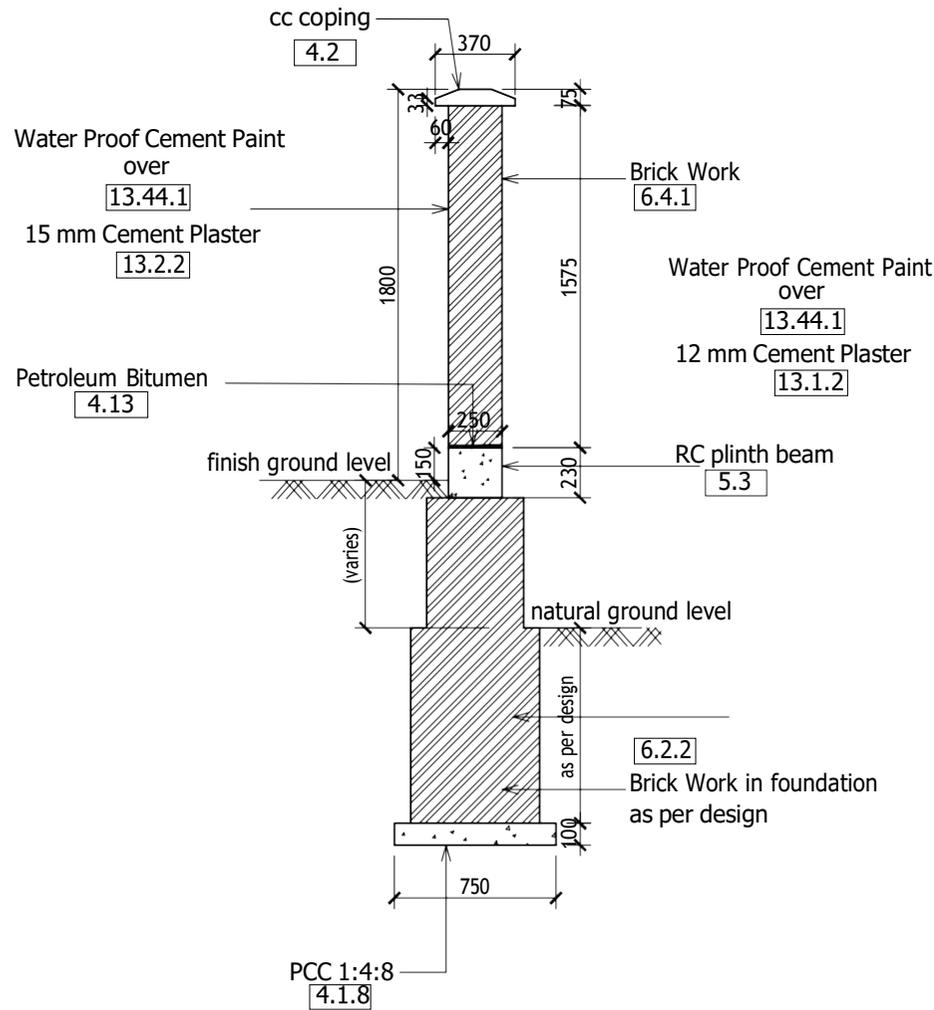
FOR TENDER ONLY		PRECISION ENGINEERING BLOCK	
ODISHA SKILL DEVELOPMENT PROJECT - ODISHA		TYPICAL ROAD SECTION AND ENTRY PORTAL	
A3	DATE: 21-03-2022		
1 : 500	DRG NO:	TD-06	



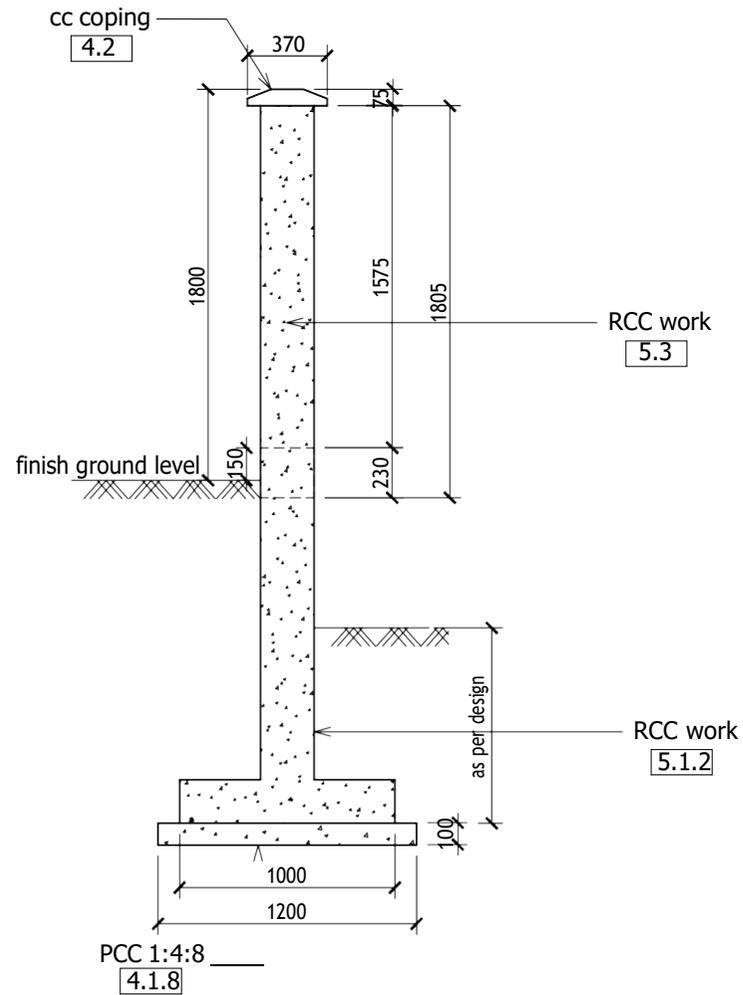
1. THIS DRAWING IS FOR TENDER PURPOSES AND IS NOT TO BE USED FOR CONSTRUCTION.
2. FOUNDATION DEPTH AND SIZES ARE INDICATIVE, ACTUAL CONSTRUCTION SHALL BE DONE ON THE BASIS OF APPROVED STRUCTURAL DESIGN.
3. FINISHED GROUND LEVEL INSIDE THE PLOT IS 250MM ABOVE CENTRE OF ROAD AT ENTRANCE POINT.

GOOD FOR BIDDING

FOR TENDER ONLY		PRECISION ENGINEERING BLOCK	
ODISHA SKILL DEVELOPMENT PROJECT - ODISHA		BOUNDARY WALL PLAN AND ELEVATION	
A3	DATE: 21-03-2022		
	DRG NO:	TD-07	



TYPICAL WALL SECTION-A

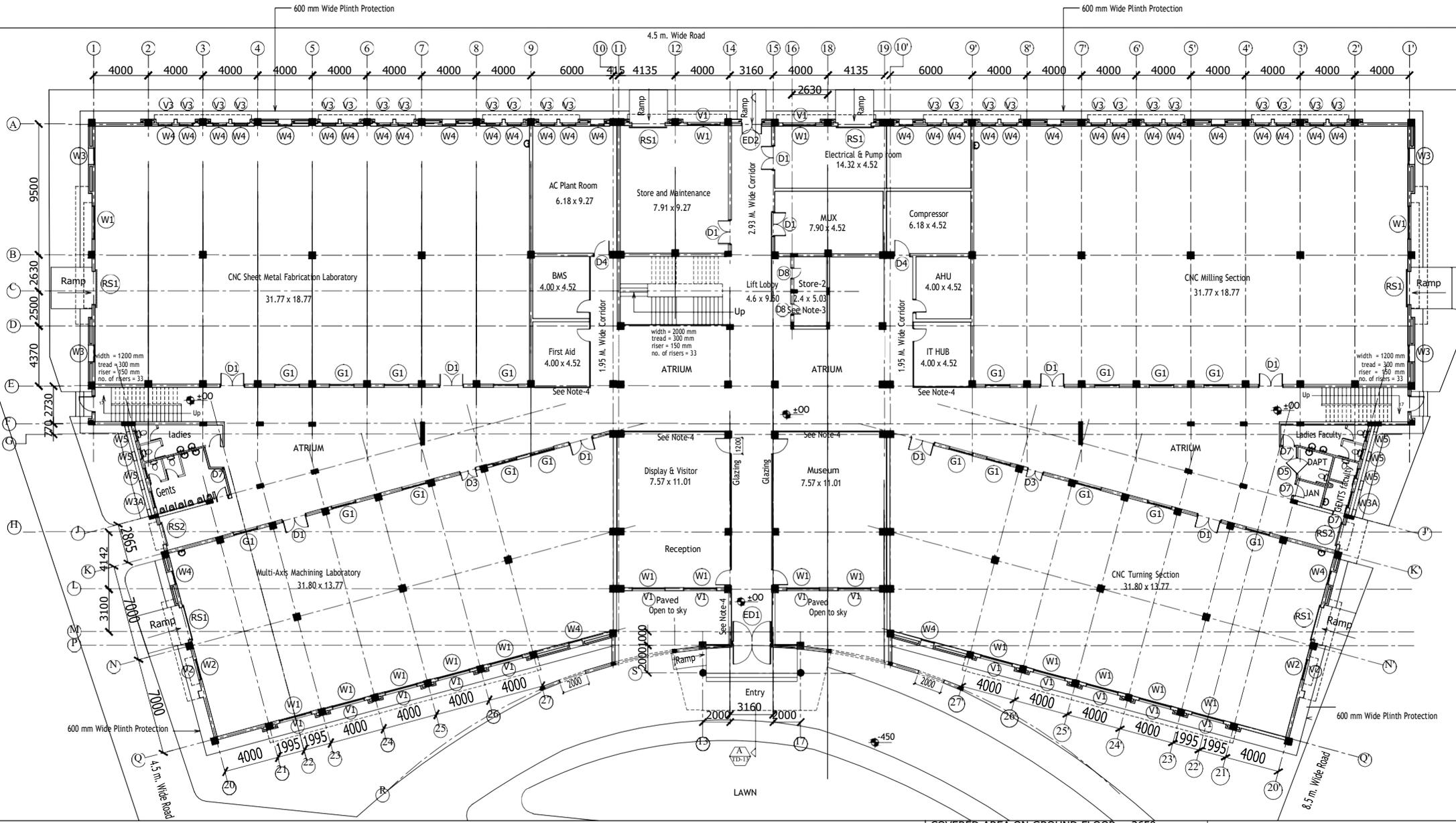


TYPICAL COLUMN SECTION-B

1. THIS DRAWING IS FOR TENDER PURPOSES AND IS NOT TO BE USED FOR CONSTRUCTION.
2. FOUNDATION DEPTH AND SIZES ARE INDICATIVE, ACTUAL CONSTRUCTION SHALL BE DONE ON THE BASIS OF APPROVED STRUCTURAL DESIGN.
3. FINISHED GROUND LEVEL INSIDE THE PLOT IS 250MM ABOVE CENTRE OF ROAD AT ENTRANCE POINT.

GOOD FOR BIDDING

FOR TENDER ONLY		PRECISION ENGINEERING BLOCK	
ODISHA SKILL DEVELOPMENT PROJECT - ODISHA		BOUNDARY WALL SECTIONS	
A3	DATE: 21-03-2022	DRG NO:	
		TD-01	



NOTES

1. DRAWING TO BE READ AND NOT MEASURED.
2. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
3. FUTURE LIFT SHAFT TO BE COVERED AT ALL LEVELS WITH MS STRUCTURE AND PRECAST SLAB.
4. GLAZED PARTITION SEE NOTE-4 WHERE SHOWN SHALL BE OF 12 MM TOUGHENED GLASS.
5. DOOR AND WINDOW SIZES ARE APPROXIMATE AND INDICATIVE.

GOOD FOR BIDDING

DOORS SCHEDULE				
MKD.	WIDTH	HEIGHT	CILL	REMARK
ED1	2930	3000	00	12mm glass toughened
ED2	1500	3000	00	
D1	1800	2700	00	
D2	1500	2700	00	
D3	1200	2700	00	Double Shutter
D4	1200	2700	00	Single Shutter
D5	1200	2100	00	DAP
D6	1000	2700	00	
D7	900	2100	00	
D8	800	2100	00	
RS1	2400	3000	00	Rolling Shutter
RS2	1500	3000	00	Rolling Shutter

WINDOWS SCHEDULE				
MKD.	WIDTH	HEIGHT	CILL	REMARK
W1	2400	2100	900	
W2	1500	2100	900	
W3	1200	2100	900	
W3A	1200	1800	1200	
W4	1000	2100	900	
G1	1800	1800	900	Fixed Glass
G1A	1800	1200	300	Fixed Glass
G2	1200	1800	900	Fixed Glass
V1	2400	950	3400	Fixed Glass
V2	1500	950	3400	Fixed Glass
V3	1000	950	3400	Fixed Glass

COVERED AREA ON GROUND FLOOR = 3650
 COVERED AREA ON FIRST FLOOR = 3525
 COVERED AREA ON SECOND FLOOR = 191

TOTAL COVERED AREA ON ALL FLOORS IN SQM
7366

FOR TENDER ONLY
ODISHA SKILL DEVELOPMENT

PROJECT - ODISHA

PRECISION ENGINEERING BLOCK

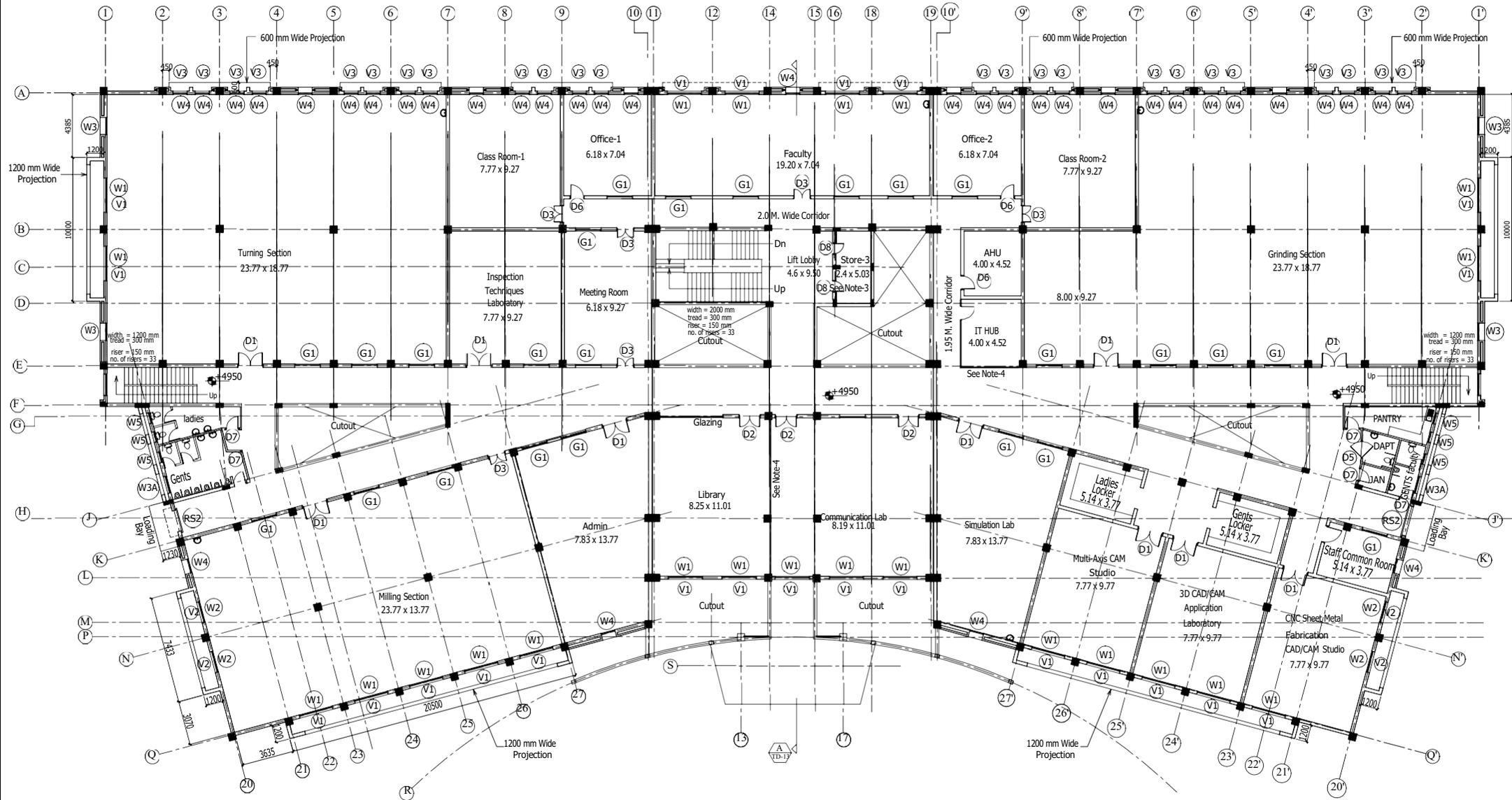
GROUND FLOOR PLAN

DATE: **21-03-2022**

DRG NO:



TD-09



NOTES

1. DRAWING TO BE READ AND NOT MEASURED.
2. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
3. FUTURE LIFT SHAFT SHALL BE COVERED AT ALL LEVELS WITH MS STRUCTURE AND PRECAST SLAB.
4. GLAZED PARTITION SEE NOTE-4 WHERE SHOWN SHALL BE OF 12 MM TOUGHENED GLASS.
5. DOOR AND WINDOW SIZES ARE APPROXIMATE AND INDICATIVE.

GOOD FOR BIDDING

DOORS SCHEDULE				
MKD.	WIDTH	HEIGHT	CILL	REMARK
ED1	2930	3000	00	12mm glass toughened
ED2	1500	3000	00	
D1	1800	2700	00	
D2	1500	2700	00	
D3	1200	2700	00	Double Shutter
D4	1200	2700	00	Single Shutter
D5	1200	2100	00	DAP
D6	1000	2700	00	
D7	900	2100	00	
D8	800	2100	00	
RS1	2400	3000	00	Rolling Shutter
RS2	1500	3000	00	Rolling Shutter

WINDOWS SCHEDULE				
MKD.	WIDTH	HEIGHT	CILL	REMARK
W1	2400	2100	900	
W2	1500	2100	900	
W3	1200	2100	900	
W3A	1200	1800	1200	
W4	1000	2100	900	
G1	1800	1800	900	Fixed Glass
G1A	1800	1200	300	Fixed Glass
G2	1200	1800	900	Fixed Glass
V1	2400	950	3400	Fixed Glass
V2	1500	950	3400	Fixed Glass
V3	1000	950	3400	Fixed Glass

COVERED AREA ON GROUND FLOOR = 3650
 COVERED AREA ON FIRST FLOOR = 3525
 COVERED AREA ON SECOND FLOOR = 191

TOTAL COVERED AREA ON ALL FLOORS IN SQM
7366

FOR TENDER ONLY
**ODISHA SKILL DEVELOPMENT
 PROJECT - ODISHA**

PRECISION ENGINEERING BLOCK

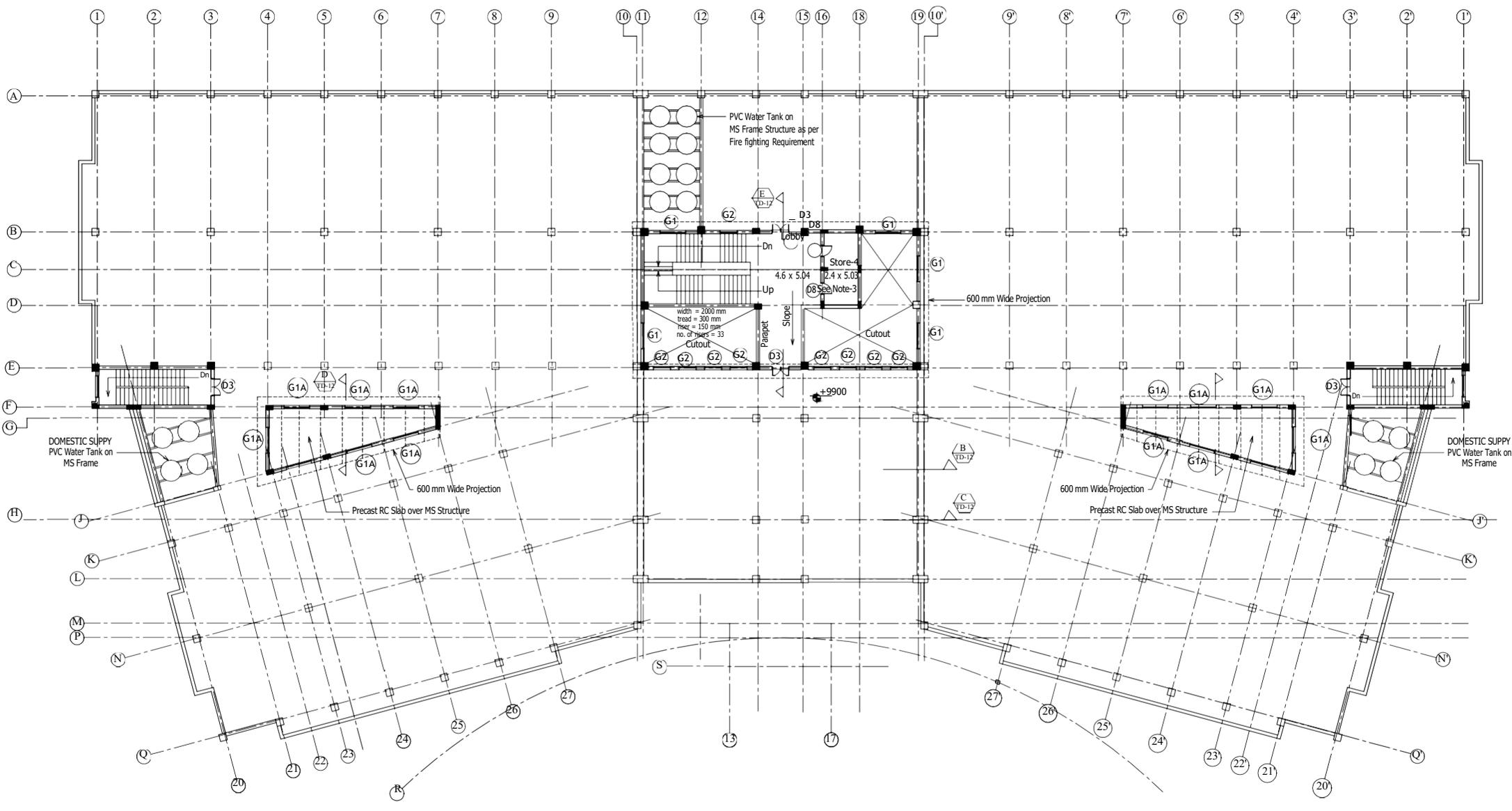
FIRST FLOOR PLAN

DATE: **21-03-2022**

DRGNO:

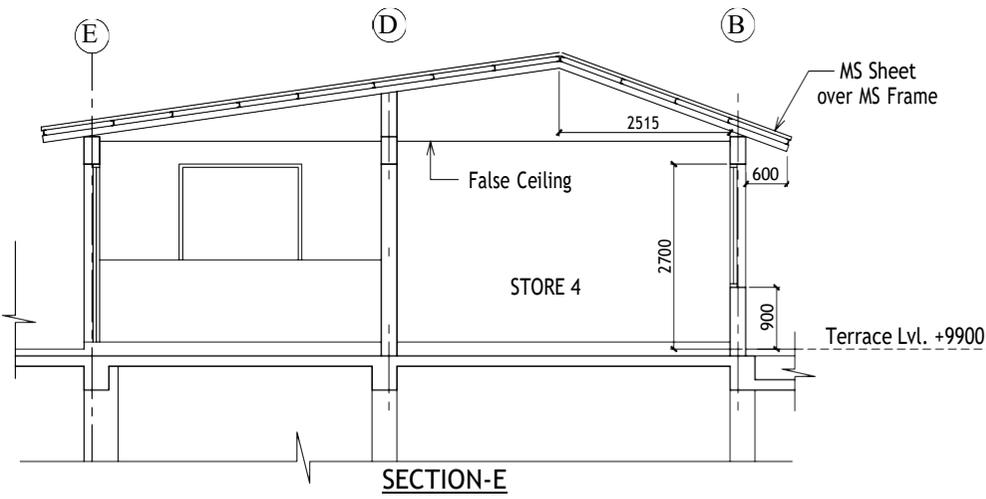
TD-10



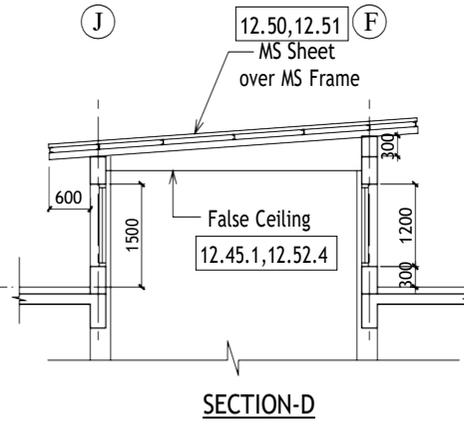


GOOD FOR BIDDING

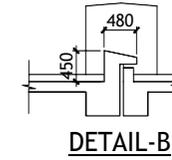
<p>COVERED AREA ON GROUND FLOOR = 3650 COVERED AREA ON FIRST FLOOR = 3525 COVERED AREA ON SECOND FLOOR = 191</p>	<p>PRECISION ENGINEERING BLOCK</p>	
	<p>TERRACE PLAN</p>	
<p>TOTAL COVERED AREA ON ALL FLOORS IN SQM 7366</p>	<p>DATE: 21-03-2022</p>	
<p>FOR TENDER ONLY</p>	<p>DRG NO:</p>	
<p>ODISHA SKILL DEVELOPMENT PROJECT - ODISHA</p>	<p>TD-11</p>	



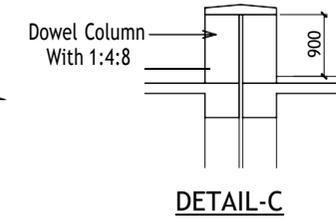
SECTION-E



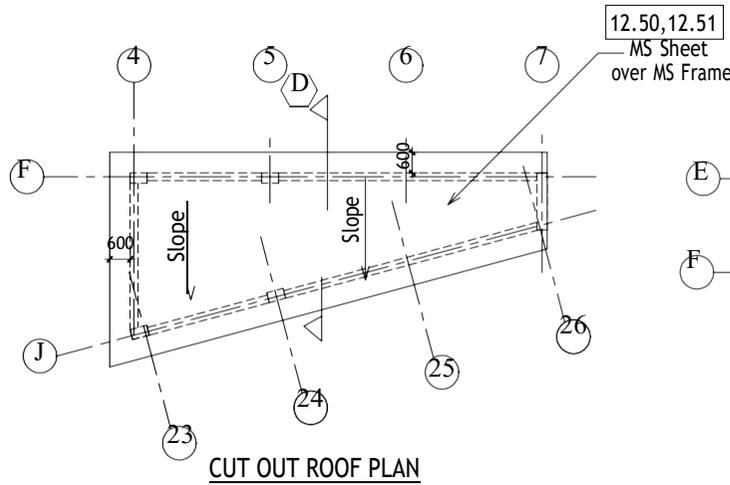
SECTION-D



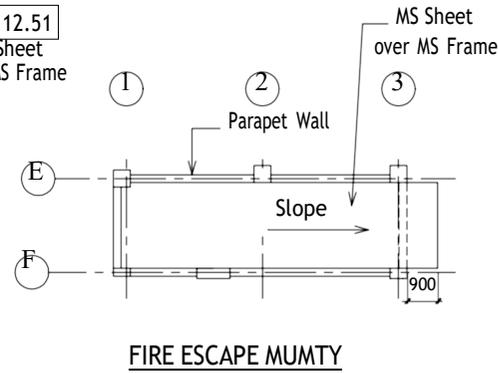
DETAIL-B



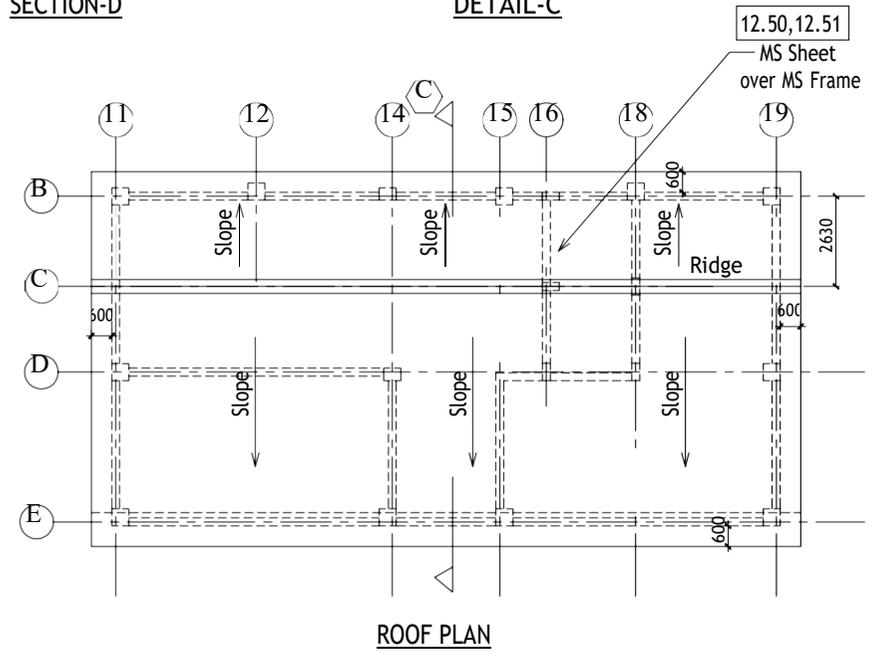
DETAIL-C



CUT OUT ROOF PLAN



FIRE ESCAPE MUMTY



ROOF PLAN

GOOD FOR BIDDING

PRECISION ENGINEERING BLOCK

TERRACE SECTIONS

FOR TENDER ONLY

ODISHA SKILL DEVELOPMENT
PROJECT - ODISHA

DATE: 21-03-2022

DRG NO.

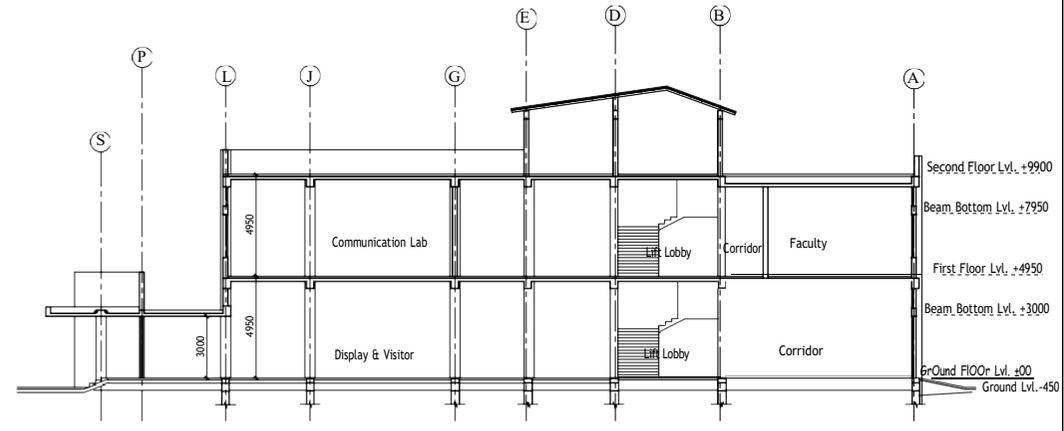


TD-12

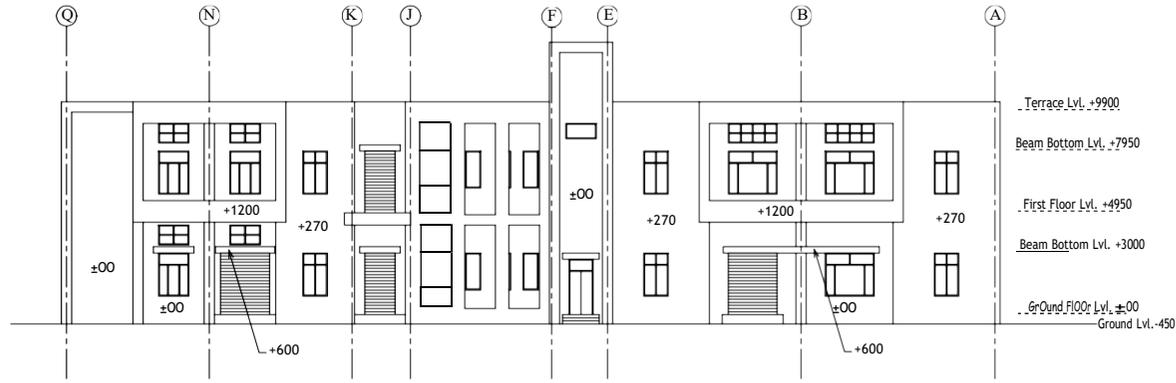


GRID- 1- NORTH WEST ELEVATION

GRID-20 NORTH WEST ELEVATION



SECTION- A



GRID - 20'- SOUTH EAST ELEVATION

GRID - 1'- SOUTH EAST ELEVATION

GOOD FOR BIDDING

FOR TENDER ONLY
**ODISHA SKILL DEVELOPMENT
 PROJECT - ODISHA**

BUILDING: PRECISION ENGINEERING BLOCK	
ELEVATIONS AND SECTION	
DATE:	21-03-2022
DRG NO:	TD-14

The Lumpsum or plinth area rate includes

- * All civil works as shown in the drawings and specifications , for buildings site works including internal and external electrification, sanitation and water supply, features indicated in the drawings such as skylights, curved feature wall etc.
- * All internal electrification, conduiting, cabling, switchboards, distribution boards, panels, changeover for essential supply, light and power convenience outlets, light and fan fittings and connections upto External Electrification (sub head- 2)
- * Cabling and coduiting, changeovers and panels for provision for solar photovoltaic systems. (not including photovoltaic systems)
- * Lightning protection, and all necessary earthing.
- * All supply and laying of conduiting required for LAN, CCTV, access control, intercom and TV cables.
- * All conduiting, cabling and distribution boards for UPS system, including installation only of UPS system.
- * All internal water supply, risers, valves and chambers, toilet and kitchen fixtures and fittings.
- * All roads and paths, kerbstones, drains, service crossing by way of RC hume pipes.
- * All internal sewerage, rainwater and waste disposal, through piping, stacks chambers all complete with gulley traps and manholes to connect to the external sewerage .
- * All service connections in terms of water supply, rainwater drainage connection to storm water drains either through drains or piping, with necessary chambers, gate valves etc to ring main/ main storm water drain.
- * All sewage connections to the main sewerage by way of piping, with necessary chambers, manholes etc
- * Plinth protection, apron , apron drain
- * Paving of internal courts as per approved design and material, with steps, ramp for access
- * Ramps and railings for diffently abled, barrier free architecture.
- * Catch water basins in open areas, connection to drains

GENERAL BUILDING SPECIFICATIONS

- * RC framed structure in accordance to relevant IS and National Building Code
- * Foundation as per structural design with provision for addition of 2 floors
- * Masonary foundation in coursed random rubble/ brick masonry
- * Laboratory and workshop ground floor shall be designed for a loading of 3T/ Sq m on ground floor and 1 T/ Sq m for entire first floor.

UNDER FLOOR

- * 150 mm sand fill over compacted fill required to bring upto Base concrete of 1:4:8 (1 Cement:4 coarse sand: 8 coarse aggregate)
- * A minimum of Nominally reinforced floor 150 mm thick in workshops and laboratories, but designed to cater to the loads stated.

SUPERSTRUCTURE (CLAUSE NUMBERS REFER TO CPWD DSR -21

- * Brick/ AAC masonry for internal and external walls Internal walls of Brick/AAC masonry as approved.
- * Partitions where indicated, and marked as Note 4 in plans shall be of 12mm toughened glass
- * All glazing shall be float glass, of 5.5 mm thickness in openable sections and 4mm in fixed sections.

ROOFING

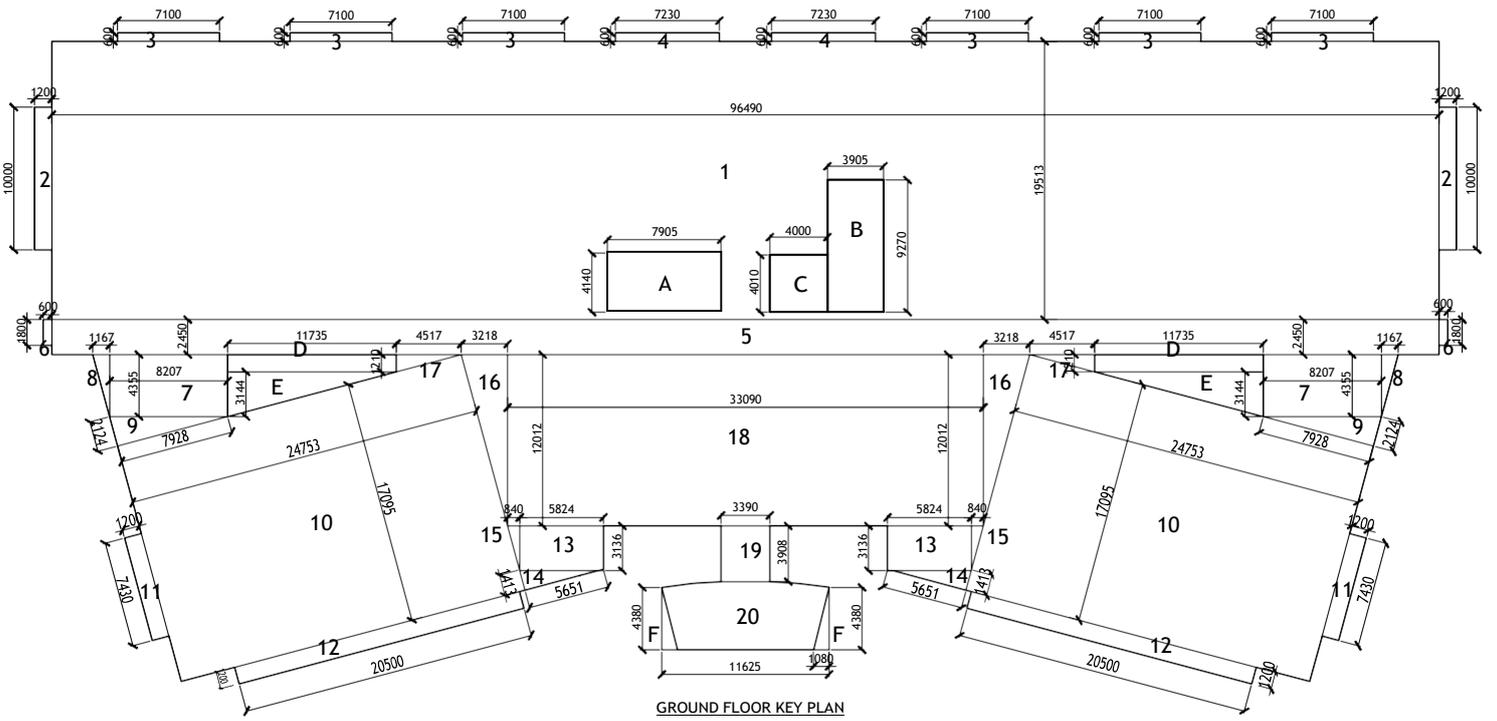
- * Flat RC roofs to have cement concrete screed laid to slope with approved waterproofing and finished with heat resistant tiles (12.55)
- * Where shown in drawings sloping roofs shall have precoated galavanised steel sheet roofing (12.50 and 12.51) with necessary accessories.
- * In air conditioned areas of the top floor under deck insulation shall be provided (12.34)
- * In all air conditioned areas false ceiling shall be provided with a combination of 12mm gypsum board (12.45.1) and perforated board (12.52.4)
- * In all rooms on the first floor false ceiling shall be provided with a combination of 12mm gypsum board (12.45.1) and perforated board (12.52.4)

NOTES

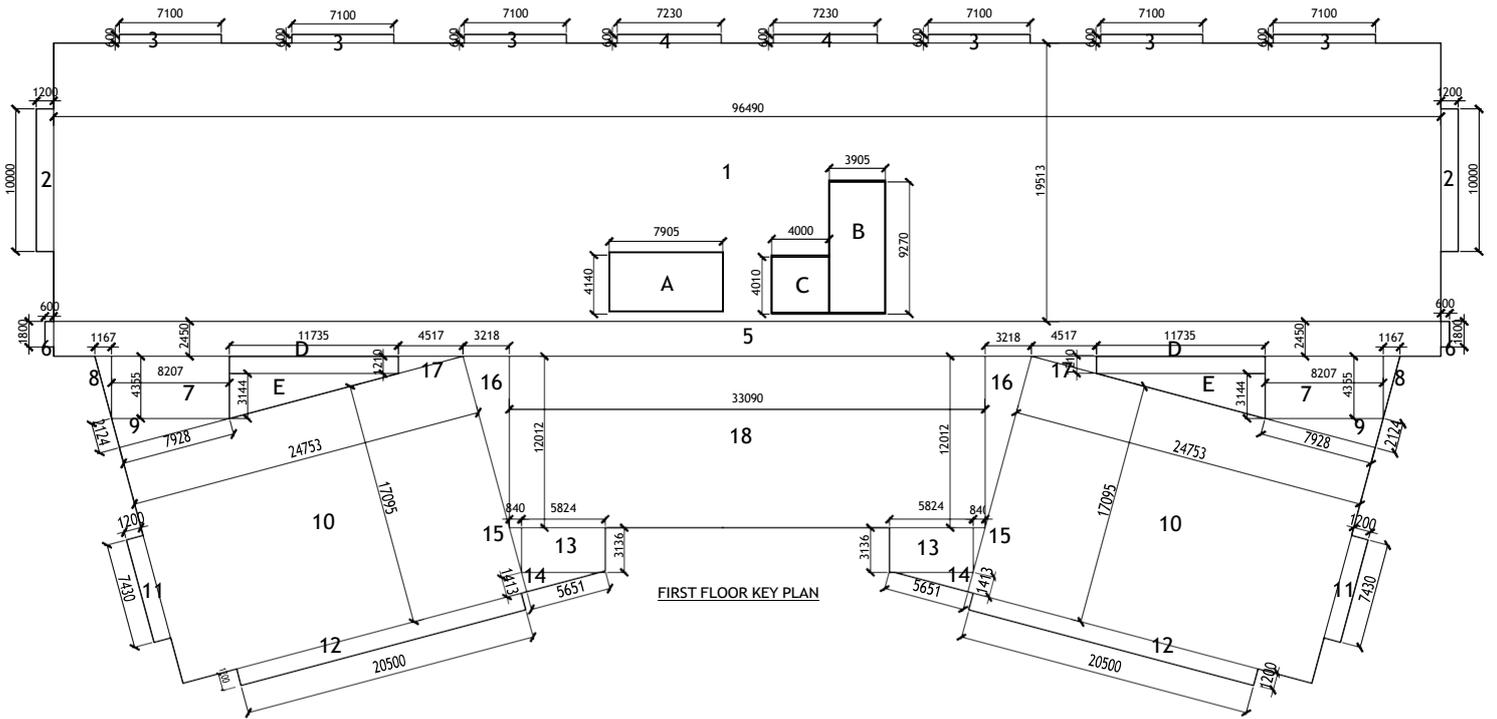
1. THE PLINTH AREA RATE SHALL BE PAYABLE ON MEASUREMENT OF COMPLETED BUILDING IN ACCORDANCE TO IS:3861
2. THE TOPOGRAPHIC SURVEY AND GEOLOGICAL SURVEY ARE INDICATIVE AND THE BIDDER SHALL CONDUCT THEIR OWN INVESTIGATIONS
3. ALL DESIGNS SHALL BE BASED ON SURVEYS AND SOIL INVESTIGATIONS CARRIED OUT BY THE SUCCESSFUL BIDDER AND APPROVED BY THE EMPLOYER.

GOOD FOR BIDDING

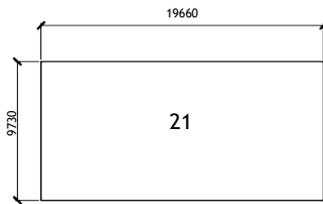
	BUILDING:	PRECISION ENGINEERING BLOCK
	NOTES AND SPECIFICATIONS	
FOR TENDER ONLY	DATE:	21-03-2022
ODISHA SKILL DEVELOPMENT PROJECT - ODISHA	DRG NO:	TD-15



GROUND FLOOR KEY PLAN



FIRST FLOOR KEY PLAN



SECOND FLOOR KEY PLAN

GOOD FOR BIDDING

COVERED AREA ON GROUND FLOOR = 3650
 COVERED AREA ON FIRST FLOOR = 3525
 COVERED AREA ON SECOND FLOOR = 191

TOTAL COVERED AREA ON ALL FLOORS IN SQM
7366

FOR TENDER ONLY

**ODISHA SKILL DEVELOPMENT
 PROJECT - ODISHA**

PRECISION ENGINEERING BLOCK

KEY PLAN

DATE: **21-03-2022**

DRG-NO.

TD-16

GROUND FLOOR PLINTH AREA						
S.No.	TAG	L	B	Shape	Nos.	Area (Sqm.)
1	1	96.49	19.513	1	1	1882.81
2	2	1.2	10	1	2	24.00
3	3	7.1	0.6	1	6	25.56
4	4	7.23	0.6	1	2	8.68
5	5	96.49	2.45	1	1	236.40
6	6	0.6	1.8	1	2	2.16
7	7	8.207	4.355	1	2	71.48
8	8	1.167	4.355	0.5	2	5.08
9	9	7.928	2.124	0.5	2	16.84
10	10	24.753	17.095	1	2	846.31
11	11	1.2	7.43	1	2	17.83
12	12	20.5	1.2	1	2	49.20
13	13	5.824	3.136	1	2	36.53
14	14	5.651	1.413	0.5	2	7.98
15	15	0.84	3.136	0.5	2	2.63
16	16	3.218	12.012	0.5	2	38.65
17	17	4.517	1.21	0.5	2	5.47
18	18	33.09	12.012	1	1	397.48
19	19	3.39	3.908	1	1	13.25
20	20	11.625	4.38	1	1	50.92
21	A	7.905	4.14	1	1	-32.73
22	B	3.905	9.27	1	1	-36.20
23	C	4	4.01	1	1	-16.04
24	F	1.08	4.38	0.5	2	-4.73
GROUND FLOOR PLINTH AREA						3649.56

FIRST FLOOR PLINTH AREA						
S.No.	TAG	L	B	Shape	Nos.	Area (Sqm.)
1	1	96.49	19.513	1	1	1882.81
2	2	1.2	10	1	2	24.00
3	3	7.1	0.6	1	6	25.56
4	4	7.23	0.6	1	2	8.68
5	5	96.49	2.45	1	1	236.40
6	6	0.6	1.8	1	2	2.16
7	7	8.207	4.355	1	2	71.48
8	8	1.167	4.355	0.5	2	5.08
9	9	7.928	2.124	0.5	2	16.84
10	10	24.753	17.095	1	2	846.31
11	11	1.2	7.43	1	2	17.83
12	12	20.5	1.2	1	2	49.20
13	13	5.824	3.136	1	2	36.53
14	14	5.651	1.413	0.5	2	7.98
15	15	0.84	3.136	0.5	2	2.63
16	16	3.218	12.012	0.5	2	38.65
17	17	4.517	1.21	0.5	2	5.47
18	18	33.09	12.012	1	1	397.48
19	A	7.905	4.14	1	1	-32.73
20	B	3.905	9.27	1	1	-36.20
21	C	4	4.01	1	1	-16.04
22	D	11.735	1.21	1	2	-28.40
23	E	11.735	3.144	0.5	2	-36.89
FIRST FLOOR PLINTH AREA						3524.83

SECOND FLOOR PLINTH AREA						
S.No.	TAG	L	B	Shape	Nos.	Area (Sqm.)
1	21	19.66	9.73	1	1	191.29
SECOND FLOOR PLINTH AREA						191.29
SUMMARY						
S.No.						Area (Sqm.)
1	GROUND FLOOR PLINTH AREA					3649.56
2	FIRST FLOOR PLINTH AREA					3524.83
3	SECOND FLOOR PLINTH AREA					191.29
TOTAL PLINTH AREA					7365.68	

GOOD FOR BIDDING

COVERED AREA ON GROUND FLOOR = 3650 COVERED AREA ON FIRST FLOOR = 3525 COVERED AREA ON SECOND FLOOR = 191	PRECISION ENGINEERING BLOCK	
TOTAL COVERED AREA ON ALL FLOORS IN SQM 7366	KEY PLAN AREA CHART	
FOR TENDER ONLY	DATE:	21-03-2022
ODISHA SKILL DEVELOPMENT PROJECT - ODISHA	DRG NO:	TD-17

6.3. PERSONNEL REQUIREMENTS

Personnel Requirements

Using Form PER - 1 and PER - 2 in Section 4 (Bidding Forms), the Bidder must demonstrate that it has personnel who meet the following requirements:(This the minimum number of personnel, actual number and duration can be decided during contract execution)

No.	Position	Total Work Experience [years]	Experience In Similar Work [years]
1	Project Manager (Civil)- Graduate from reputed institute	15 Years of civil engineering construction works	5 Years of multi storey building and associated works
2	Graduate/Diploma Civil Engineers from reputed institute (Min 04 Nos)	7/10 Years of civil engineering related construction works	5 Years of multi storey building and associated works
3	Graduate Electrical engineer from reputed institute (Min 02 Nos)	10 Years of electrical engineering works	5 Years of multi story and allied works
4	Post Graduate Public health engineer 1 no from reputed institute	10 Years of water supply and sewerage engineering related works	5 Years of multi storey and allied utility areas
5	Post graduate in HVAC - Air conditioning and refrigeration from reputed institute	10 Years of mechanical engineering works, Air conditioning, refrigeration related works	5 Years of Multi storey and allied works
6	Quality Engineer – 3 years diploma/ engineering graduate from reputed institute	10/7 Years of Quality and site management	5 Years of multi storey and allied works
7	Quantity surveyor – 3 years diploma/ engineering graduate from reputed institute	10/7 Years of estimation, bill of quantities, billing, variation etc	5 Years of multi storey and allied works
8	Safety engineer-3 years diploma in safety management/ engineering graduate from reputed institute	10/7 Years of Quality and site safety management	5 Years of multi storey and allied works
9	Post graduate Environmental engineer from reputed institute	7 Years of environment management	5 Years of multi storey and allied works
10	Survey engineer- 3 years diploma/ engineering graduate from reputed institute	10/7 Years of site survey works	5 Years of multi storey and allied works
11	Road and drainage Engineer- Civil engineering graduate from reputed institute	10/7 Years of highway, drainage, water harvesting related works	5 Years of multi storey and allied works
12	Architect cum landscaper – B Arch from reputed institute	7 Years of architectural and landscaping work	3 Years of multi storey projects
13	Post graduate M Tech in structural engineering- from reputed institute	10 Years of structural designing	5 Years of multi storey works

“For the key positions specified in the Form PER-1, the Contractor shall provide the personnel nominated for the key positions (key personnel) in his Tender, accepted by the Letter of Acceptance. If any of the nominated personnel are not provided or not intended to be provided, exclusively due to the reasons stated in paragraph (c) of this Sub-Clause, the Contractor shall submit details of proposed alternative personnel to the Engineer for approval and the proposed personnel shall not be fewer in number and shall be of equal or better quality and experience than the personnel being replaced.

For the key positions specified in the Form PER-1, the Contractor shall only employ the personnel nominated for the respective positions in his Tender and accepted by the Letter of Acceptance, or otherwise approved by the Engineer. The Contractor shall submit details of proposed key personnel or replacement key personnel (as the case maybe) to the Engineer for approval.

Except as otherwise stated in the Contract, personnel in those key positions shall not be replaced or removed from the Site during the Contract unless:

- (a) the Engineer approves the replacement or removal;
- (b) an instruction is given by the Engineer pursuant to Sub-Clause 6.9 [*Contractor's Personnel*];
- (c) that person dies, retires or resigns (other than to accept other employment with the Contractor or any associate of the Contractor) or otherwise suffers from ill health or some serious domestic problem; or
- (d) that section or part of the Works under the control of the key position has been completed.

The Contractor shall be responsible for ensuring the approval for and replacement of key personnel (if required) is arranged in due time so that the progress of the Works shall not be adversely affected. The Contractor shall not mobilize such personnel without the prior approval of the Engineer.

6.4. EQUIPMENT REQUIREMENTS

Equipment Requirements

Using Form EQU in Section 4 (Bidding Forms), the Bidder must demonstrate that it has the key equipment listed below: (This is indicative list of minimum equipment. The final list may be decided after due consultation with client)

No.	Equipment Type and Characteristics	Minimum Number Required
1	Excavators cum loader	2 No.
2	Tippers/Dumpers	5 No.

3	Transit Concrete mix plant	3 No.
4	Weigh batching plant	1 no
5	Concrete Pumps/Boom Placer	2 nos
6	Mechanical Concrete mixers	4 No.
7	Material Hoist	4 No.
8	Vibrators 40mm, 60mm and 100 mm needles	3 no each
9	Electrical automatic Barbending Machine	1 No.
10	Skid Loader	2 No.
11	Welding Machine sets	6 No.
12	Tower Crane	1 No.
13	Hydra Crane	1 No.
14	Dewatering Pumps	2 Nos
15	Total Station and other survey accessories	1 set
16	Equipment related to quality test at site (list will be finalized in consultation with Contractor and site engineer of Client)	1 set
16	Any other useful equipment as per requirement (list will be finalized in consultation with successful bidder and site engineer of Client)	1 set

Conditions of Contract for Construction

MULTILATERAL DEVELOPMENT BANK HARMONISED

EDITION GENERAL CONDITIONS

June 2010

For Participating Bank use only

Released 30 June 2010

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FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS
CONSULTORES

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APPENDIX: GENERAL CONDITIONS OF DISPUTE BOARD AGREEMENT

General Conditions

1 General Provisions

1.1 Definitions

In the Conditions of Contract (“these Conditions”), which include Particular Conditions, Parts A and B, and these General Conditions, the following words and expressions shall have the meanings stated. Words indicating persons or parties include corporations and other legal entities, except where the context requires otherwise.

1.1.1 The Contract

- 1.1.1.1 “Contract” means the Contract Agreement, the Letter of Acceptance, the Letter of Tender, these Conditions, the Specification, the Drawings, the Schedules, and the further documents (if any) which are listed in the Contract Agreement or in the Letter of Acceptance.
- 1.1.1.2 “Contract Agreement” means the contract agreement referred to in Sub-Clause 1.6 [Contract Agreement].
- 1.1.1.3 “Letter of Acceptance” means the letter of formal acceptance, signed by the Employer, of the Letter of Tender, including any annexed memoranda comprising agreements between and signed by both Parties. If there is no such letter of acceptance, the expression “Letter of Acceptance” means the Contract Agreement and the date of issuing or receiving the Letter of Acceptance means the date of signing the Contract Agreement.
- 1.1.1.4 “Letter of Tender” means the document entitled letter of tender or letter of bid, which was completed by the Contractor and includes the signed offer to the Employer for the Works.
- 1.1.1.5 “Specification” means the document entitled specification, as included in the Contract, and any additions and modifications to the specification in accordance with the Contract. Such document specifies the Works.
- 1.1.1.6 “Drawings” means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract.
- 1.1.1.7 “Schedules” means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Tender, as included in the Contract. Such document may include the Bill of Quantities, data, lists, and schedules of rates and/or prices.
- 1.1.1.8 “Tender” means the Letter of Tender and all other documents which the Contractor submitted with the Letter of Tender, as included in the Contract.
- 1.1.1.9 “Bill of Quantities”, “Daywork Schedule” and “Schedule of Payment Currencies” mean the documents so named (if any) which are comprised in the Schedules.
- 1.1.1.10 “Contract Data” means the pages completed by the Employer entitled contract data which constitute Part A of the Particular Conditions.

1.1.2 Parties and Persons

- 1.1.2.1 “Party” means the Employer or the Contractor, as the context requires.

- 1.1.2.2 “Employer” means the person named as employer in the Contract Data and the legal successors in title to this person.
- 1.1.2.3 “Contractor” means the person(s) named as contractor in the Letter of Tender accepted by the Employer and the legal successors in title to this person(s).
- 1.1.2.4 “Engineer” means the person appointed by the Employer to act as the Engineer for the purposes of the Contract and named in the Contract Data, or other person appointed from time to time by the Employer and notified to the Contractor under Sub-Clause 3.4 [Replacement of the Engineer].
- 1.1.2.5 “Contractor’s Representative” means the person named by the Contractor in the Contract or appointed from time to time by the Contractor under Sub-Clause 4.3 [Contractor’s Representative], who acts on behalf of the Contractor.
- 1.1.2.6 “Employer’s Personnel” means the Engineer, the assistants referred to in Sub-Clause 3.2 [Delegation by the Engineer] and all other staff, labour and other employees of the Engineer and of the Employer; and any other personnel notified to the Contractor, by the Employer or the Engineer, as Employer’s Personnel.
- 1.1.2.7 “Contractor’s Personnel” means the Contractor’s Representative and all personnel whom the Contractor utilises on Site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the Works.
- 1.1.2.8 “Subcontractor” means any person named in the Contract as a subcontractor, or any person appointed as a subcontractor, for a part of the Works; and the legal successors in title to each of these persons.
- 1.1.2.9 “DB” means the person or three persons appointed under Sub-Clause 20.2 [Appointment of the Dispute Board] or Sub-Clause 20.3 [Failure to Agree on the Composition of the Dispute Board]
- 1.1.2.10 “FIDIC” means the Fédération Internationale des Ingénieurs-Conseils, the international federation of consulting engineers.
- 1.1.2.11 “Bank” means the financing institution (if any) named in the Contract Data.
- 1.1.2.12 “Borrower” means the person (if any) named as the borrower in the Contract Data.

1.1.3 Dates, Tests, Periods and Completion

- 1.1.3.1 “Base Date” means the date 28 days prior to the latest date for submission of the Tender.
- 1.1.3.2 “Commencement Date” means the date notified under Sub-Clause 8.1 [Commencement of Works].
- 1.1.3.3 “Time for Completion” means the time for completing the Works or a Section (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 8.4 [Extension of Time for Completion]), calculated from the Commencement Date.
- 1.1.3.4 “Tests on Completion” means the tests which are specified in the Contract or agreed by both Parties or instructed as a Variation, and which are carried out under Clause 9 [Tests on Completion] before the Works or a Section (as the case may be) are taken over by the Employer.
- 1.1.3.5 “Taking-Over Certificate” means a certificate issued under Clause 10 [Employer’s Taking Over].

- 1.1.3.6 "Tests after Completion" means the tests (if any) which are specified in the Contract and which are carried out in accordance with the Specification after the Works or a Section (as the case may be) are taken over by the Employer.
- 1.1.3.7 "Defects Notification Period" means the period for notifying defects in the Works or a Section (as the case may be) under Sub-Clause 11.1 [Completion of Outstanding Work and Remedying Defects], which extends over 365 days except if otherwise stated in the Contract Data (with any extension under Sub-Clause 11.3 [Extension of Defects Notification Period]), calculated from the date on which the Works or Section is completed as certified under Sub-Clause 10.1 [Taking Over of the Works and Sections].
- 1.1.3.8 "Performance Certificate" means the certificate issued under Sub-Clause 11.9 [Performance Certificate].
- 1.1.3.9 "day" means a calendar day and "year" means 365 days.

1.1.4 Money and Payments

- 1.1.4.1 "Accepted Contract Amount" means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.
- 1.1.4.2 "Contract Price" means the price defined in Sub-Clause 14.1 [The Contract Price], and includes adjustments in accordance with the Contract.
- 1.1.4.3 "Cost" means all expenditure reasonably incurred (or to be incurred) by the Contractor, whether on or off the Site, including overhead and similar charges, but does not include profit.
- 1.1.4.4 "Final Payment Certificate" means the payment certificate issued under Sub-Clause 14.13 [Issue of Final Payment Certificate].
- 1.1.4.5 "Final Statement" means the statement defined in Sub-Clause 14.11 [Application for Final Payment Certificate].
- 1.1.4.6 "Foreign Currency" means a currency in which part (or all) of the Contract Price is payable, but not the Local Currency.
- 1.1.4.7 "Interim Payment Certificate" means a payment certificate issued under Clause 14 [Contract Price and Payment], other than the Final Payment Certificate.
- 1.1.4.8 "Local Currency" means the currency of the Country.
- 1.1.4.9 "Payment Certificate" means a payment certificate issued under Clause 14 [Contract Price and Payment].
- 1.1.4.10 "Provisional Sum" means a sum (if any) which is specified in the Contract as a provisional sum, for the execution of any part of the Works or for the supply of Plant, Materials or services under Sub-Clause 13.5 [Provisional Sums].
- 1.1.4.11 "Retention Money" means the accumulated retention moneys which the Employer retains under Sub-Clause 14.3 [Application for Interim Payment Certificates] and pays under Sub-Clause 14.9 [Payment of Retention Money].
- 1.1.4.12 "Statement" means a statement submitted by the Contractor as part of an application, under Clause 14 [Contract Price and Payment], for a payment certificate.

1.1.5 Works and Goods

- 1.1.5.1 “Contractor’s Equipment” means all apparatus, machinery, vehicles and other things required for the execution and completion of the Works and the remedying of any defects. However, Contractor’s Equipment excludes Temporary Works, Employer’s Equipment (if any), Plant, Materials and any other things intended to form or forming part of the Permanent Works.
- 1.1.5.2 “Goods” means Contractor’s Equipment, Materials, Plant and Temporary Works, or any of them as appropriate.
- 1.1.5.3 “Materials” means things of all kinds (other than Plant) intended to form or forming part of the Permanent Works, including the supply-only materials (if any) to be supplied by the Contractor under the Contract.
- 1.1.5.4 “Permanent Works” means the permanent works to be executed by the Contractor under the Contract.
- 1.1.5.5 “Plant” means the apparatus, machinery and other equipment intended to form or forming part of the Permanent Works, including vehicles purchased for the Employer and relating to the construction or operation of the Works.
- 1.1.5.6 “Section” means a part of the Works specified in the Contract Data as a Section (if any).
- 1.1.5.7 “Temporary Works” means all temporary works of every kind (other than Contractor’s Equipment) required on Site for the execution and completion of the Permanent Works and the remedying of any defects.
- 1.1.5.8 “Works” mean the Permanent Works and the Temporary Works, or either of them as appropriate.

1.1.6 Other Definitions

- 1.1.6.1 “Contractor’s Documents” means the calculations, computer programs and other software, drawings, manuals, models and other documents of a technical nature (if any) supplied by the Contractor under the Contract.
- 1.1.6.2 “Country” means the country in which the Site (or most of it) is located, where the Permanent Works are to be executed.
- 1.1.6.3 “Employer’s Equipment” means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Specification; but does not include Plant which has not been taken over by the Employer.
- 1.1.6.4 “Force Majeure” is defined in Clause 19 [Force Majeure].
- 1.1.6.5 “Laws” means all national (or state) legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority.
- 1.1.6.6 “Performance Security” means the security (or securities, if any) under Sub-Clause 4.2 [Performance Security].
- 1.1.6.7 “Site” means the places where the Permanent Works are to be executed, including storage and working areas, and to which Plant and Materials are to be delivered, and any other places as may be specified in the Contract as forming part of the Site.
- 1.1.6.8 “Unforeseeable” means not reasonably foreseeable by an experienced contractor by the Base Date.
- 1.1.6.9 “Variation” means any change to the Works, which is instructed or approved as a variation under Clause 13 [Variations and Adjustments].

1.1.6.10 "Notice of Dissatisfaction" means the notice given by either Party to the other under Sub-Clause 20.4 [Obtaining Dispute Board's Decision] indicating its dissatisfaction and intention to commence arbitration.

1.2 Interpretation

In the Contract, except where the context requires otherwise

- (a) words indicating one gender include all genders;
- (b) words indicating the singular also include the plural and words indicating the plural also include the singular;
- (c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing;
- (d) "written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record;
- (e) the word "tender" is synonymous with "bid" and "tenderer" with "bidder" and the words "tender documents" with "bidding documents".

The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

In these Conditions, provisions including the expression "Cost plus profit" require this profit to be one-twentieth (5%) of this Cost unless otherwise indicated in the Contract Data.

1.3 Communications

Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices, requests and discharges, these communications shall be:

- (a) in writing and delivered by hand (against receipt), sent by mail or courier, or transmitted using any of the agreed systems of electronic transmission as stated in the Contract Data; and
- (b) delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract Data. However:
 - (i) if the recipient gives notice of another address, communications shall thereafter be delivered accordingly; and
 - (ii) if the recipient has not stated otherwise when requesting an approval or consent, it may be sent to the address from which the request was issued.

Approvals, certificates, consents and determinations shall not be unreasonably withheld or delayed. When a certificate is issued to a Party, the certifier shall send a copy to the other Party. When a notice is issued to a Party, by the other Party or the Engineer, a copy shall be sent to the Engineer or the other Party, as the case may be.

1.4 Law and Language

The Contract shall be governed by the law of the country or other jurisdiction stated in the Contract Data.

The ruling language of the Contract shall be that stated in the Contract Data.

The language for communications shall be that stated in the Contract Data. If no language is stated there, the language for communications shall be the ruling language of the Contract.

1.5 Priority of Documents

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:

- (a) the Contract Agreement (if any),
- (b) the Letter of Acceptance,
- (c) the Letter of Tender,
- (d) the Particular Conditions – Part A,
- (e) the Particular Conditions – Part B,
- (f) these General Conditions,
- (g) the Specification,
- (h) the Drawings, and
- (i) the Schedules and any other documents forming part of the Contract.

If an ambiguity or discrepancy is found in the documents, the Engineer shall issue any necessary clarification or instruction.

1.6 Contract Agreement

The Parties shall enter into a Contract Agreement within 28 days after the Contractor receives the Letter of Acceptance, unless the Particular 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.

1.7 Assignment

Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party:

- (a) may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party, and
- (b) may, as security in favour of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.

1.8 Care and Supply of Documents

The Specification and Drawings shall be in the custody and care of the Employer. Unless otherwise stated in the Contract, two copies of the Contract and of each subsequent Drawing shall be supplied to the Contractor, who may make or request further copies at the cost of the Contractor.

Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Engineer six copies of each of the Contractor's Documents.

The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Specification, the Contractor's Documents (if any), the Drawings and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.

If a Party becomes aware of an error or defect in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect.

1.9 Delayed Drawings or Instructions

The Contractor shall give notice to the Engineer whenever the Works are likely to be delayed or disrupted if any necessary drawing or instruction is not issued to the Contractor within a particular time, which shall be reasonable. The notice shall include details of the necessary drawing or instruction, details of why and by when it should be issued, and the nature and amount of the delay or disruption likely to be suffered if it is late.

If the Contractor suffers delay and/or incurs Cost as a result of a failure of the Engineer to issue the notified drawing or instruction within a time which is reasonable and is specified in the notice with supporting details, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

However, if and to the extent that the Engineer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit.

1.10 Employer's Use of Contractor's Documents

As between the Parties, the Contractor shall retain the copyright and other intellectual property rights in the Contractor's Documents and other design documents made by (or on behalf of) the Contractor.

The Contractor shall be deemed (by signing the Contract) to give to the Employer a non-terminable transferable non-exclusive royalty-free licence to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This licence shall:

- (a) apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works,
- (b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor's Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing and demolishing the Works, and
- (c) in the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as envisaged by the Contract, including replacements of any computers supplied by the Contractor.

The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied or communicated to a third party by (or on behalf of) the Employer for purposes other than those permitted under this Sub-Clause.

1.11 Contractor's Use of Employer's Documents

As between the Parties, the Employer shall retain the copyright and other intellectual property rights in the Specification, the Drawings and other documents made by (or on behalf of) the Employer. The Contractor may, at his cost, copy, use, and obtain communication of these documents for the purposes of the Contract. They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.

1.12 Confidential Details

The Contractor's and the Employer's Personnel shall disclose all such confidential and other information as may be reasonably required in order to verify compliance with the Contract and allow its proper implementation.

Each of them shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out their respective obligations under the Contract or to comply with applicable Laws. Each of them shall not publish or disclose any particulars of the Works prepared by the other Party without the previous agreement of the other Party. However, the Contractor shall be permitted to disclose any publicly available information, or information otherwise required to establish his qualifications to compete for other projects.

1.13 Compliance with Laws

The Contractor shall, in performing the Contract, comply with applicable Laws. Unless otherwise stated in the Particular Conditions:

- (a) the Employer shall have obtained (or shall obtain) the planning, zoning, building permit or similar permission for the Permanent Works, and any other permissions described in the Specification as having been (or to be) obtained by the Employer; and the Employer shall indemnify and hold the Contractor harmless against and from the consequences of any failure to do so; and
- (b) the Contractor shall give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the Laws in relation to the execution and completion of the Works and the remedying of any defects; and the Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so, unless the Contractor is impeded to accomplish these actions and shows evidence of its diligence.

1.14 Joint and Several Liability

If the Contractor constitutes (under applicable Laws) a joint venture, consortium or other unincorporated grouping of two or more persons:

- (a) these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the Contract;
- (b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and
- (c) the Contractor shall not alter its composition or legal status without the prior consent of the Employer.

1.15 Inspections and Audit by the Bank

The Contractor shall permit ADB or its representative to inspect the Contractor's site, assets, accounts and records and other documents relating to the bid submission and contract performance of the Contract and to have them audited by auditors appointed by ADB, if so required by ADB.

"ADB's right to inspect the Site and/or the Contractor's accounts and records relating to the performance of the Contract stated in Sub-Clause 1.15 and 15.6 (e) shall survive termination and/or expiration of this Contract."

2 The Employer

2.1 Right of Access to the Site

"There shall be no work nor construction activities at the Site or any part thereof (as the case may be) unless the Employer has granted access to the Site or part thereof (as the case may be) in accordance with this Sub-Clause 2.1."

The Employer shall be responsible for acquiring and providing legal and physical possession of the Site or any part thereof (as the case may be) and access thereto, and for providing possession of, and access to, all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way.

Prior to, and as a condition of, granting the Contractor access to the Site or a relevant part thereof (as the case may be), for commencing work or any construction activities on the Site or part thereof, the Employer shall issue a notice to the Contractor (with a copy to ADB) confirming in writing ("Notice") all of the following with respect to the Site or part thereof:

(i) *the corresponding final Resettlement Plan ("RP") and/or the Due Diligence Report based on the detailed design of the Site or part thereof (as the case may be) have been submitted to, and accepted by, ADB;*

(ii) *due consultation, compensation payments and other entitlements have been provided to affected people fully in accordance with the RP for the Site or part thereof (as the case may be), and ADB has been duly notified of such provision in the Resettlement Plan Compliance Report accepted by ADB for the Site or part thereof;*

(iii) *completion of any other actions as required by the Employer; and*

(iv) *as a result of the confirmations contained above, the Employer accordingly grants the Contractor access to the Site or part thereof."*

2.2 Permits, Licences or Approvals

The Employer shall provide, at the request of the Contractor, such reasonable assistance as to allow the Contractor to obtain properly:

(a) copies of the Laws of the Country which are relevant to the Contract but are not readily available, and

(b) any permits, licences or approvals required by the Laws of the Country:

(i) which the Contractor is required to obtain under Sub-Clause 1.13 [Compliance with Laws],

(ii) for the delivery of Goods, including clearance through customs, and

(iii) for the export of Contractor's Equipment when it is removed from the Site.

2.3 Employer's Personnel

The Employer shall be responsible for ensuring that the Employer's Personnel and the Employer's other contractors on the Site:

- (a) co-operate with the Contractor's efforts under Sub-Clause 4.6 [Co-operation], and

- (b) take actions similar to those which the Contractor is required to take under sub-paragraphs (a), (b) and (c) of Sub-Clause 4.8 [Safety Procedures] and under Sub-Clause 4.18 [Protection of the Environment].

2.4 Employer's Financial Arrangements

The Employer shall submit, before the Commencement Date and thereafter within 28 days after receiving any request from the Contractor, reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the Contract Price punctually (as estimated at that time) in accordance with Clause 14 [Contract Price and Payment]. Before the Employer makes any material change to his financial arrangements, the Employer shall give notice to the Contractor with detailed particulars.

In addition, if the Bank has notified to the Borrower 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 notification, with a copy to the Engineer, within 7 days of the Borrower 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 his notice of the extent to which such funds will be available.

2.5 Employer's Claims

If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Notification Period, the Employer or the Engineer shall give notice and particulars to the Contractor. However, notice is not required for payments due under Sub-Clause 4.19 [Electricity, Water and Gas], under Sub-Clause 4.20 [Employer's Equipment and Free-Issue Materials], or for other services requested by the Contractor.

The notice shall be given as soon as practicable and no longer than 28 days after the Employer became aware, or should have become aware, of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Notification Period shall be given before the expiry of such period.

The particulars shall specify the Clause or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The Engineer shall then proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) the amount (if any) which the Employer is entitled to be paid by the Contractor, and/or (ii) the extension (if any) of the Defects Notification Period in accordance with Sub-Clause 11.3 [Extension of Defects Notification Period].

This amount may be included as a deduction in the Contract Price and Payment Certificates. The Employer shall only be entitled to set off against or make any deduction from an amount certified in a Payment Certificate, or to otherwise claim against the Contractor, in accordance with this Sub-Clause.

3 The Engineer

3.1 Engineer's Duties and Authority

The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract. The Engineer's staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.

The Engineer shall have no authority to amend the Contract.

The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as stated in the Particular Conditions. There will be no requirement for the Engineer to obtain the Employer's consent before the Engineer exercises his/her authority under Sub-Clause 3.5 [Determinations]. The Employer shall promptly inform the Contractor of any change to the authority attributed to the Engineer.

However, whenever the Engineer exercises a specified authority for which the Employer's approval is required, then (for the purposes of the Contract) the Employer shall be deemed to have given approval.

Except as otherwise stated in these Conditions:

- (a) whenever carrying out duties or exercising authority, specified in or implied by the Contract, the Engineer shall be deemed to act for the Employer;
- (b) the Engineer has no authority to relieve either Party of any duties, obligations or responsibilities under the Contract;
- (c) any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by the Engineer (including absence of disapproval) shall not relieve the Contractor from any responsibility he has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances; and
- (d) any act by the Engineer in response to a Contractor's request except as otherwise expressly specified shall be notified in writing to the Contractor within 28 days of receipt.

The following provisions shall apply:

The Engineer shall obtain the specific approval of the Employer before taking action under the following Sub-Clauses of these Conditions:

- (A) Sub-Clause 4.12: agreeing or determining an extension of time and/or additional cost.
- (B) Sub-Clause 13.1: instructing a Variation, except;
 - (i) in an emergency situation as determined by the Engineer, or
 - (ii) if authorized/allowed under the Borrower's procurement rules, please indicate a specific threshold, which will allow the Engineer to approve a variation (increase in the Accepted Contract Amount) without prior approval from the Employer to facilitate contract implementation..
- (C) Sub-Clause 13.3: approving a proposal for Variation submitted by the Contractor in accordance with Sub Clause 13.1 or 13.2.
- (D) Sub-Clause 13.4: specifying the amount payable in each of the applicable currencies

Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility 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 risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.

3.2 Delegation by the Engineer

The Engineer may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, and/or independent inspectors appointed to inspect and/or test items of Plant and/or Materials. The assignment, delegation or revocation shall be in writing and shall not take effect until copies have been received by both Parties. However, unless otherwise agreed by both Parties, the Engineer shall not delegate the authority to determine any matter in accordance with Sub-Clause 3.5 [Determinations].

Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in Sub-Clause 1.4 [Law and Language].

Each assistant, to whom duties have been assigned or authority has been delegated, shall only be authorised to issue instructions to the Contractor to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by an assistant, in accordance with the delegation, shall have the same effect as though the act had been an act of the Engineer. However:

- (a) any failure to disapprove any work, Plant or Materials shall not constitute approval, and shall therefore not prejudice the right of the Engineer to reject the work, Plant or Materials;
- (b) if the Contractor questions any determination or instruction of an assistant, the Contractor may refer the matter to the Engineer, who shall promptly confirm, reverse or vary the determination or instruction.

3.3 Instructions of the Engineer

The Engineer may issue to the Contractor (at any time) instructions and additional or modified Drawings which may be necessary for the execution of the Works and the remedying of any defects, all in accordance with the Contract. The Contractor shall only take instructions from the Engineer, or from an assistant to whom the appropriate authority has been delegated under this Clause. If an instruction constitutes a Variation, Clause 13 [Variations and Adjustments] shall apply.

The Contractor shall comply with the instructions given by the Engineer or delegated assistant, on any matter related to the Contract. Whenever practicable, their instructions shall be given in writing. If the Engineer or a delegated assistant:

- (a) gives an oral instruction,
- (b) receives a written confirmation of the instruction, from (or on behalf of) the Contractor, within two working days after giving the instruction, and
- (c) does not reply by issuing a written rejection and/or instruction within two working days after receiving the confirmation,

then the confirmation shall constitute the written instruction of the Engineer or delegated assistant (as the case may be).

3.4 Replacement of the Engineer

If the Employer intends to replace the Engineer, the Employer shall, not less than 21 days before the intended date of replacement, give notice to the Contractor of the name, address and relevant experience of the intended replacement Engineer. If the Contractor considers the intended replacement Engineer to be unsuitable, he has the right to raise objection against him by notice to the Employer, with supporting particulars, and the Employer shall give full and fair consideration to this objection.

3.5 Determinations

When carrying out his/her duties under this Sub- Clause, the Engineer shall act neutrally between the Parties and shall not be deemed to act for the Employer. Whenever these Conditions provide that the Engineer shall proceed in accordance with this Sub-Clause 3.5 to agree or determine any matter, the Engineer shall consult with each Party in an endeavour to reach agreement. If agreement is not achieved, the Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.

The Engineer shall give notice to both Parties of each agreement or determination, with supporting particulars, within 28 days from the receipt of the corresponding claim or request except when otherwise specified. Each Party shall give effect to each agreement or determination unless and until revised under Clause 20 [Claims, Disputes and Arbitration].

4 The Contractor

4.1 Contractor's General Obligations

The Contractor shall design (to the extent specified in the Contract), execute and complete the Works in accordance with the Contract and with the Engineer's instructions, and shall remedy any defects in the Works.

The Contractor shall provide the Plant and Contractor's Documents specified in the Contract, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required in and for this design, execution, completion and remedying of defects.

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.

The Contractor shall be responsible for the adequacy, stability and safety of all Site operations and of all methods of construction. Except to the extent specified in the Contract, the Contractor (i) shall be responsible for all Contractor's Documents, Temporary Works, and such design of each item of Plant and Materials as is required for the item to be in accordance with the Contract, and (ii) shall not otherwise be responsible for the design or specification of the Permanent Works.

The Contractor shall, whenever required by the Engineer, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Engineer.

If the Contract specifies that the Contractor shall design any part of the Permanent Works, then unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall submit to the Engineer the Contractor's Documents for this part in accordance with the procedures specified in the Contract;
- (b) these Contractor's Documents shall be in accordance with the Specification and Drawings, shall be written in the language for communications defined in Sub-Clause 1.4 [Law and Language], and shall include additional information required by the Engineer to add to the Drawings for co-ordination of each Party's designs;
- (c) the Contractor shall be responsible for this part and it shall, when the Works are completed, be fit for such purposes for which the part is intended as are specified in the Contract; and
- (d) prior to the commencement of the Tests on Completion, the Contractor shall submit to the Engineer the "as-built" documents and, if applicable, operation and maintenance manuals in accordance with the Specification and in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair this part of the Works. Such part shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [Taking Over of the Works and Sections] until these documents and manuals have been submitted to the Engineer.

"The Contractor has the obligation to notify the Employer of any changes in connection with the matters described in paragraphs (i), (k), (l), (m), (n), (o), (p) and (t) of the Letter of Bid.

If the Contractor is debarred or temporarily suspended by ADB, it shall inform the Employer of such debarment or suspension, and that the endorsement of ADB's Office of Anticorruption and Integrity is required for any variations, extensions or modifications to the Contract."

4.2 Performance Security

The Contractor shall obtain (at his cost) a Performance Security for proper performance, in the amount stated in the Contract Data and denominated in the currency(ies) of the Contract or in a freely convertible currency acceptable to the Employer. If an amount is not stated in the Contract Data, this Sub-Clause shall not apply.

The Contractor shall deliver the Performance Security to the Employer within 28 days after receiving the Letter of Acceptance, and shall send a copy to the Engineer. The Performance Security shall be issued by a reputable bank or financial institution selected by the Contractor, and shall be in the form annexed to the Particular Conditions, as stipulated by the Employer in the Contract Data, or in another form approved by the Employer.

The Contractor shall ensure that the Performance Security is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects. If the terms of the Performance Security specify its expiry date, and the Contractor has not become entitled to receive the Performance Certificate by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the Performance Security until the Works have been completed and any defects have been remedied.

The Employer shall not make a claim under the Performance Security, except for amounts to which the Employer is entitled under the Contract.

The Employer shall indemnify and hold the Contractor harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from a claim under the Performance Security to the extent to which the Employer was not entitled to make the claim.

The Employer shall return the Performance Security to the Contractor within 21 days after receiving a copy of the Performance Certificate.

Without limitation to the provisions of the rest of this Sub-Clause, whenever the Engineer determines an addition or a reduction to the Contract Price as a result of a change in cost and/or legislation, or as a result of a Variation, amounting to more than 25 percent of the portion of the Contract Price payable in a specific currency, the Contractor shall at the Engineer's request promptly increase, or may decrease, as the case may be, the value of the Performance Security in that currency by an equal percentage.

4.3 Contractor's Representative

The Contractor shall appoint the Contractor's Representative and shall give him all authority necessary to act on the Contractor's behalf under the Contract.

Unless the Contractor's Representative is named in the Contract, the Contractor shall, prior to the Commencement Date, submit to the Engineer for consent the name and particulars of the person the Contractor proposes to appoint as Contractor's Representative. If consent is withheld or subsequently revoked in terms of Sub-Clause 6.9 [Contractor's Personnel], or if the appointed person fails to act as Contractor's Representative, the Contractor shall similarly submit the name and particulars of another suitable person for such appointment.

The Contractor shall not, without the prior consent of the Engineer, revoke the appointment of the Contractor's Representative or appoint a replacement.

The whole time of the Contractor's Representative shall be given to directing the Contractor's performance of the Contract. If the Contractor's Representative is to be temporarily absent from the Site during the execution of the Works, a suitable replacement person shall be appointed, subject to the Engineer's prior consent, and the Engineer shall be notified accordingly.

The Contractor's Representative shall, on behalf of the Contractor, receive instructions under Sub-Clause 3.3 [Instructions of the Engineer].

The Contractor's Representative may delegate any powers, functions and authority to any competent person, and may at any time revoke the delegation. Any delegation or revocation shall not take effect until the Engineer has received prior notice signed by the Contractor's Representative, naming the person and specifying the powers, functions and authority being delegated or revoked.

The Contractor's Representative shall be fluent in the language for communications defined in Sub-Clause 1.4 [Law and Language]. If the Contractor's Representative's delegates are not fluent in the said language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer.

4.4 Subcontractors

The Contractor shall not subcontract the whole of the Works.

The Contractor shall be responsible for the acts or defaults of any Subcontractor, his agents or employees, as if they were the acts or defaults of the Contractor. Unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall not be required to obtain consent to suppliers solely of Materials, or to a subcontract for which the Subcontractor is named in the Contract;
- (b) the prior consent of the Engineer shall be obtained to other proposed Subcontractors;
- (c) the Contractor shall give the Engineer not less than 28 days' notice of the intended date of the commencement of each Subcontractor's work, and of the commencement of such work on the Site; and
- (d) each subcontract shall include provisions which would entitle the Employer to require the subcontract to be assigned to the Employer under Sub-Clause 4.5 [Assignment of Benefit of Subcontract] (if or when applicable) or in the event of termination under Sub-Clause 15.2 [Termination by Employer].

The Contractor shall ensure that the requirements imposed on the Contractor by Sub-Clause 1.12 [Confidential Details] apply equally to each Subcontractor.

Where practicable, the Contractor shall give fair and reasonable opportunity for contractors from the Country to be appointed as Subcontractors.

4.5 Assignment of Benefit of Subcontract

If a Subcontractor's obligations extend beyond the expiry date of the relevant Defects Notification Period and the Engineer, prior to this date, instructs the Contractor to assign the benefit of such obligations to the Employer, then the Contractor shall do so. Unless otherwise stated in the assignment, the Contractor shall have no liability to the Employer for the work carried out by the Subcontractor after the assignment takes effect.

4.6 Co-operation

The Contractor shall, as specified in the Contract or as instructed by the Engineer, allow appropriate opportunities for carrying out work to:

- (a) the Employer's Personnel,
- (b) any other contractors employed by the Employer, and
- (c) the personnel of any legally constituted public authorities,

who may be employed in the execution on or near the Site of any work not included in the Contract.

Any such instruction shall constitute a Variation if and to the extent that it causes the Contractor to suffer delays and/or to incur Unforeseeable Cost. Services for these personnel and other contractors may include the use of Contractor's Equipment, Temporary Works or access arrangements which are the responsibility of the Contractor.

If, under the Contract, the Employer is required to give to the Contractor possession of any foundation, structure, plant or means of access in accordance with Contractor's Documents, the Contractor shall submit such documents to the Engineer in the time and manner stated in the Specification.

4.7 Setting Out

The Contractor shall set out the Works in relation to original points, lines and levels of reference specified in the Contract or notified by the Engineer. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the Works.

The Employer shall be responsible for any errors in these specified or notified items of reference, but the Contractor shall use reasonable efforts to verify their accuracy before they are used.

If the Contractor suffers delay and/or incurs Cost from executing work which was necessitated by an error in these items of reference, and an experienced contractor could not reasonably have discovered such error and avoided this delay and/or Cost, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) whether and (if so) to what extent the error could not reasonably have been discovered, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent.

4.8 Safety Procedures

The Contractor shall:

- (a) comply with all applicable safety regulations,
- (b) take care for the safety of all persons entitled to be on the Site,
- (c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons,
- (d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 10 [Employer's Taking Over], and
- (e) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.

4.9 Quality Assurance

The Contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. The system shall be in accordance with the details stated in the Contract. The Engineer shall be entitled to audit any aspect of the system.

Details of all procedures and compliance documents shall be submitted to the Engineer for information before each design and execution stage is commenced. When any document of a technical nature is issued to the Engineer, evidence of the prior approval by the Contractor himself shall be apparent on the document itself.

Compliance with the quality assurance system shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract.

4.10 Site Data

The Employer shall have made available to the Contractor for his information, prior to the Base Date, all relevant data in the Employer's possession on sub-surface and hydrological conditions at the Site, including environmental aspects. The Employer shall similarly make available to the Contractor all such data which come into the Employer's possession after the Base Date. The Contractor shall be responsible for interpreting all such data.

To the extent which was practicable (taking account of cost and time), the Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Tender or Works. To the same extent, the Contractor shall be deemed to have inspected and examined the Site, its surroundings, the above data and other available information, and to have been satisfied before submitting the Tender as to all relevant matters, including (without limitation):

- (a) the form and nature of the Site, including sub-surface conditions,
- (b) the hydrological and climatic conditions,
- (c) the extent and nature of the work and Goods necessary for the execution and completion of the Works and the remedying of any defects,
- (d) the Laws, procedures and labour practices of the Country, and
- (e) the Contractor's requirements for access, accommodation, facilities, personnel, power, transport, water and other services.

4.11 Sufficiency of the Accepted Contract Amount

The Contractor shall be deemed to:

- (a) have satisfied himself as to the correctness and sufficiency of the Accepted Contract Amount, and
- (b) have based the Accepted Contract Amount on the data, interpretations, necessary information, inspections, examinations and satisfaction as to all relevant matters referred to in Sub-Clause 4.10 [Site Data].

Unless otherwise stated in the Contract, the Accepted Contract Amount covers all the Contractor's obligations under the Contract (including those under Provisional Sums, if any) and all things necessary for the proper execution and completion of the Works and the remedying of any defects.

4.12 Unforeseeable Physical Conditions

In this Sub-Clause, "physical conditions" means natural physical conditions and man-made and other physical obstructions and pollutants, which the Contractor encounters at the Site when executing the Works, including sub-surface and hydrological conditions but excluding climatic conditions.

If the Contractor encounters adverse physical conditions which he considers to have been Unforeseeable, the Contractor shall give notice to the Engineer as soon as practicable.

This notice shall describe the physical conditions, so that they can be inspected by the Engineer, and shall set out the reasons why the Contractor considers them to be Unforeseeable. The Contractor shall continue executing the Works, using such proper and reasonable measures as are appropriate for the physical conditions, and shall comply with any instructions which the Engineer may give. If an instruction constitutes a Variation, Clause 13 [Variations and Adjustments] shall apply.

If and to the extent that the Contractor encounters physical conditions which are Unforeseeable, gives such a notice, and suffers delay and/or incurs Cost due to these conditions, the Contractor shall be entitled subject to notice under Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

Upon receiving such notice and inspecting and/or investigating these physical conditions, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) whether and (if so) to what extent these physical conditions were Unforeseeable, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent.

However, before additional Cost is finally agreed or determined under sub-paragraph (ii), the Engineer may also review whether other physical conditions in similar parts of the Works (if any) were more favourable than could reasonably have been foreseen when the Contractor submitted the Tender. If and to the extent that these more favourable conditions were encountered, the Engineer may proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine the reductions in Cost which were due to these conditions, which may be included (as deductions) in the Contract Price and Payment Certificates. However, the net effect of all adjustments under sub-paragraph (b) and all these reductions, for all the physical conditions encountered in similar parts of the Works, shall not result in a net reduction in the Contract Price.

The Engineer shall take account of any evidence of the physical conditions foreseen by the Contractor when submitting the Tender, which shall be made available by the Contractor, but shall not be bound by the Contractor's interpretation of any such evidence.

4.13 Rights of Way and Facilities

Unless otherwise specified in the Contract the Employer shall provide effective access to and possession of the Site including special and/or temporary rights-of-way which are necessary for the Works. The Contractor shall obtain, at his risk and cost, any additional rights of way or facilities outside the Site which he may require for the purposes of the Works.

4.14 Avoidance of Interference

The Contractor shall not interfere unnecessarily or improperly with:

- (a) the convenience of the public, or
- (b) the access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the Employer or of others.

The Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.

4.15 Access Route

The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site at Base Date. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel. These efforts shall include the proper use of appropriate vehicles and routes.

Except as otherwise stated in these Conditions:

- (a) the Contractor shall (as between the Parties) be responsible for any maintenance which may be required for his use of access routes;

- (b) the Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions;
- (c) the Employer shall not be responsible for any claims which may arise from the use or otherwise of any access route;
- (d) the Employer does not guarantee the suitability or availability of particular access routes; and
- (e) Costs due to non-suitability or non-availability, for the use required by the Contractor, of access routes shall be borne by the Contractor.

4.16 Transport of Goods

Unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall give the Engineer not less than 21 days' notice of the date on which any Plant or a major item of other Goods will be delivered to the Site;
- (b) the Contractor shall be responsible for packing, loading, transporting, receiving, unloading, storing and protecting all Goods and other things required for the Works; and
- (c) the Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from the transport of Goods, and shall negotiate and pay all claims arising from their transport.

4.17 Contractor's Equipment

The Contractor shall be responsible for all Contractor's Equipment. When brought on to the Site, Contractor's Equipment shall be deemed to be exclusively intended for the execution of the Works. The Contractor shall not remove from the Site any major items of Contractor's Equipment without the consent of the Engineer. However, consent shall not be required for vehicles transporting Goods or Contractor's Personnel off Site.

4.18 Protection of the Environment

The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.

The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values stated in the Specification or prescribed by applicable Laws.

"The Contractor shall comply with all applicable national, provincial, and local environmental laws and regulations.

The Contractor shall also comply with all reasonable requests of the national and local authorities responsible for enforcing environmental controls.

Within 28 days of the Commencement Date the Contractor shall submit a detailed Site Specific Environmental Management Plan (SSEMP) for the Engineer's no objection showing how he/she intends to comply with environmental laws and regulations and other specific requirements prescribed in the Contract, addressing all the monitoring and mitigation measures set forth in the Environmental Impact Assessment ("EIA") and the Environmental Management Plan ("EMP") of the project attached in Section 6- Employer's Requirements. Work shall not commence on the Site until the no objection of SSEMP has been obtained from the Engineer and is being implemented.

The Contractor shall (a) establish an operational system for managing environmental impacts, (b) comply with the approved SSEMP and any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the project EMP through the SSEMP, (c) allocate the budget required to ensure that such measures, requirements and actions are carried out, (d) submit semi-annual reports on the compliance of such

measures to the Employer.

Where unanticipated environmental risks or impacts become apparent during the Contract, the Contractor is required to update the SSEMP to outline the potential impacts to site works and associated mitigation measures for the Engineer's approval."

4.19 Electricity, Water and Gas

The Contractor shall, except as stated below, be responsible for the provision of all power, water and other services he may require for his construction activities and to the extent defined in the Specifications, for the tests.

The Contractor shall be entitled to use for the purposes of the Works such supplies of electricity, water, gas and other services as may be available on the Site and of which details and prices are given in the Specification. The Contractor shall, at his risk and cost, provide any apparatus necessary for his use of these services and for measuring the quantities consumed.

The quantities consumed and the amounts due (at these prices) for such services shall be agreed or determined by the Engineer in accordance with Sub-Clause 2.5 [Employer's Claims] and Sub-Clause 3.5 [Determinations]. The Contractor shall pay these amounts to the Employer.

4.20 Employer's Equipment and Free-Issue Materials

The Employer shall make the Employer's Equipment (if any) available for the use of the Contractor in the execution of the Works in accordance with the details, arrangements and prices stated in the Specification. Unless otherwise stated in the Specification:

- (a) the Employer shall be responsible for the Employer's Equipment, except that
- (b) the Contractor shall be responsible for each item of Employer's Equipment whilst any of the Contractor's Personnel is operating it, driving it, directing it or in possession or control of it.

The appropriate quantities and the amounts due (at such stated prices) for the use of Employer's Equipment shall be agreed or determined by the Engineer in accordance with Sub-Clause 2.5 [Employer's Claims] and Sub-Clause 3.5 [Determinations]. The Contractor shall pay these amounts to the Employer.

The Employer shall supply, free of charge, the "free-issue materials" (if any) in accordance with the details stated in the Specification. The Employer shall, at his risk and cost, provide these materials at the time and place specified in the Contract. The Contractor shall then visually inspect them, and shall promptly give notice to the Engineer of any shortage, defect or default in these materials. Unless otherwise agreed by both Parties, the Employer shall immediately rectify the notified shortage, defect or default.

After this visual inspection, the free-issue materials shall come under the care, custody and control of the Contractor. The Contractor's obligations of inspection, care, custody and control shall not relieve the Employer of liability for any shortage, defect or default not apparent from a visual inspection.

4.21 Progress Reports

Unless otherwise stated in the Particular Conditions, monthly progress reports shall be prepared by the Contractor and submitted to the Engineer in six copies. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the period to which it relates.

Reporting shall continue until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

Each report shall include:

- (a) charts and detailed descriptions of progress, including each stage of design (if any), Contractor's Documents, procurement, manufacture, delivery to Site, construction, erection and testing; and including these stages for work by each nominated Subcontractor (as defined in Clause 5 [Nominated Subcontractors]),
- (b) photographs showing the status of manufacture and of progress on the Site;
- (c) for the manufacture of each main item of Plant and Materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:
 - (i) commencement of manufacture,
 - (ii) Contractor's inspections,
 - (iii) tests, and
 - (iv) shipment and arrival at the Site;
- (d) the details described in Sub-Clause 6.10 [Records of Contractor's Personnel and Equipment];
- (e) copies of quality assurance documents, test results and certificates of Materials;

- (f) list of notices given under Sub-Clause 2.5 [Employer's Claims] and notices given under Sub-Clause 20.1 [Contractor's Claims];
- (g) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and
- (h) comparisons of actual and planned progress, with details of any events or circumstances which may jeopardise the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome delays.

4.22 Security of the Site

Unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall be responsible for keeping unauthorised persons off the Site, and
- (b) authorised persons shall be limited to the Contractor's Personnel and the Employer's Personnel; and to any other personnel notified to the Contractor, by the Employer or the Engineer, as authorised personnel of the Employer's other contractors on the Site.

4.23 Contractor's Operations on Site

The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Engineer as additional working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land.

During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction, and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish and Temporary Works which are no longer required.

Upon the issue of a Taking-Over Certificate, the Contractor shall clear away and remove, from that part of the Site and Works to which the Taking-Over Certificate refers, all Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works. The Contractor shall leave that part of the Site and the Works in a clean and safe condition. However, the Contractor may retain on Site, during the Defects Notification Period, such Goods as are required for the Contractor to fulfil obligations under the Contract.

4.24 Fossils

All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer. The Contractor shall take reasonable precautions to prevent Contractor's Personnel or other persons from removing or damaging any of these findings.

The Contractor shall, upon discovery of any such finding, promptly give notice to the Engineer, who shall issue instructions for dealing with it. If the Contractor suffers delay and/or incurs Cost from complying with the instructions, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

5 Nominated Subcontractors

5.1 Definition of “nominated Subcontractor”

In the Contract, “nominated Subcontractor” means a Subcontractor:

- (a) who is stated in the Contract as being a nominated Subcontractor, or
- (b) whom the Engineer, under Clause 13 [Variations and Adjustments], instructs the Contractor to employ as a Subcontractor subject to Sub-Clause 5.2 [Objection to Notification].

5.2 Objection to Nomination

The Contractor shall not be under any obligation to employ a nominated Subcontractor against whom the Contractor raises reasonable objection by notice to the Engineer as soon as practicable, with supporting particulars. An objection shall be deemed reasonable if it arises from (among other things) any of the following matters, unless the Employer agrees in writing to indemnify the Contractor against and from the consequences of the matter:

- (a) there are reasons to believe that the Subcontractor does not have sufficient competence, resources or financial strength;
- (b) the nominated Subcontractor does not accept to indemnify the Contractor against and from any negligence or misuse of Goods by the nominated Subcontractor, his agents and employees; or
- (c) the nominated Subcontractor does not accept to enter into a subcontract which specifies that, for the subcontracted work (including design, if any), the nominated Subcontractor shall:
 - (i) undertake to the Contractor such obligations and liabilities as will enable the Contractor to discharge his obligations and liabilities under the Contract,
 - (ii) indemnify the Contractor against and from all obligations and liabilities arising under or in connection with the Contract and from the consequences of any failure by the Subcontractor to perform these obligations or to fulfil these liabilities, and
 - (iii) be paid only if and when the Contractor has received from the Employer payments for sums due under the Subcontract referred to under Sub-Clause 5.3 [Payment to nominated Subcontractors].

5.3 Payments to nominated Subcontractors

The Contractor shall pay to the nominated Subcontractor the amounts shown on the nominated Subcontractor’s invoices approved by the Contractor which the Engineer certifies to be due in accordance with the subcontract. These amounts plus other charges shall be included in the Contract Price in accordance with sub-paragraph (b) of Sub-Clause 13.5 [Provisional Sums], except as stated in Sub-Clause 5.4 [Evidence of Payments].

5.4 Evidence of Payments

Before issuing a Payment Certificate which includes an amount payable to a nominated Subcontractor, the Engineer may request the Contractor to supply reasonable evidence that the nominated Subcontractor has received all amounts due in accordance with previous Payment Certificates, less applicable deductions for retention or otherwise. Unless the Contractor:

- (a) submits this reasonable evidence to the Engineer, or

- (b) (i) satisfies the Engineer in writing that the Contractor is reasonably entitled to withhold or refuse to pay these amounts, and
- (ii) submits to the Engineer reasonable evidence that the nominated Subcontractor has been notified of the Contractor's entitlement,

then the Employer may (at his sole discretion) pay, direct to the nominated Subcontractor, part or all of such amounts previously certified (less applicable deductions) as are due to the nominated Subcontractor and for which the Contractor has failed to submit the evidence described in sub-paragraphs (a) or (b) above. The Contractor shall then repay, to the Employer, the amount which the nominated Subcontractor was directly paid by the Employer.

6 Staff and Labour

6.1 Engagement of Staff and Labour

Except as otherwise stated in the Specification, the Contractor shall make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, feeding, transport and, when appropriate, housing.

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.

6.2 Rates of Wages and Conditions of Labour

The Contractor shall pay rates of wages, and observe conditions of labour, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.

The Contractor shall inform the Contractor's Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances and any benefits as are subject to tax under the Laws of the Country for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

6.3 Persons in the Service of Employer

The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Employer's Personnel.

6.4 Labour Laws

The Contractor shall comply with all the relevant labour Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work.

6.5 Working Hours

No work shall be carried out on the Site on locally recognised days of rest, or outside the normal working hours stated in the Contract Data, unless:

- (a) otherwise stated in the Contract,
- (b) the Engineer gives consent, or
- (c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer.

6.6 Facilities for Staff and Labour

Except as otherwise stated in the Specification, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Specification.

The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.

6.7 Health and Safety

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

"The Contractor is responsible for establishment of preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks of the construction site work to the health and safety of local communities.

Within 28 days of the Commencement Date the Contractor shall submit a detailed Site Specific Health and Safety Management Plan (SSHSMP), based on the Environmental Health and Safety Management Plan submitted in the technical proposal, for the Engineer's no objection showing how he/she intends to comply with the local Health and Safety laws and regulations and other specific requirements prescribed in the Contract, taking into account the Supplementary Information in Section 6 - Employer's Requirements. Work shall not commence on the Site until the confirmation of no objection of the SSHSMP has been obtained from the Engineer and is being implemented.

Where unanticipated health and safety hazards or risks become apparent during the Contract, the Contractor is required to update the SSHSMP to outline the potential impacts to site works and associated mitigation measures for the Engineer's no objection.

The Contractor shall comply with the approved SSHSMP and any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the project EMP through the SSHSMP.

In particular, the Contractor is required to provide all personnel on site including Employer's Personnel and visitors with personal protective equipment, including protection for feet (safety boots), head, eyes, ears (safety helmets) and hands, etc., in accordance with the Contractor's SSHSMP. The Contractor should ensure that his Subcontractors comply with the SSHSMP and provide all such necessary equipment to their personnel.

The Contractor shall bear the costs to ensure that such measures, requirements and actions are carried out.

The Contractor shall submit semi-annual reports on the compliance of such measures to the Employer."

The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the

execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.

The Contractor shall send, to the Engineer, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Engineer may reasonably require.

“In the event of a significant injury involving medical treatment or hospitalization and fatal accident the Contractor shall notify the Engineer immediately by verbal communication and submit a formal report as soon as practicable after its occurrence. For all accidents, whether fatal or not, the Contractor shall also notify the appropriate local authorities in accordance with the Laws of the Country.”

HIV-AIDS Prevention. The Contractor shall conduct an HIV-AIDS awareness programme via an approved service provider, and shall undertake such other measures as are specified in this Contract to reduce the risk of the transfer of the HIV virus between and among the Contractor's Personnel and the local community, to promote early diagnosis and to assist affected individuals.

The Contractor shall throughout the contract (including the Defects Notification Period): (i) conduct Information, Education and Communication (IEC) campaigns, at least every other month, addressed to all the Site staff and labour (including all the Contractor's employees, all Subcontractors and any other Contractor's or Employer's personnel employees, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behaviour with respect to, of Sexually Transmitted Diseases (STD) - or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular; (ii) provide male or female condoms for all Site staff and labour as appropriate; and (iii) provide for STI and HIV/AIDS screening, diagnosis, counselling and referral to a dedicated national STI and HIV/AIDS programme, (unless otherwise agreed) of all Site staff and labour.

The Contractor shall include in the programme to be submitted for the execution of the Works under Sub-Clause 8.3 an alleviation programme for Site staff and labour and their families in respect of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS. The STI, STD and HIV/AIDS alleviation programme shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the programme shall detail the resources to be provided or utilised and any related sub-contracting proposed. The programme shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation this programme shall not exceed the Provisional Sum dedicated for this purpose.

6.8 Contractor's Superintendence

Throughout the execution of the Works, and as long thereafter as is necessary to fulfil the Contractor's obligations, the Contractor shall provide all necessary superintendence to plan, arrange, direct, manage, inspect and test the work.

Superintendence shall be given by a sufficient number of persons having adequate knowledge of the language for communications (defined in Sub-Clause 1.4 [Law and Language]) and 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.

6.9 Contractor's Personnel

The Contractor's Personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations. 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 if applicable, who:

- (a) persists in any misconduct or lack of care,
- (b) carries out duties incompetently or negligently,
- (c) fails to conform with any provisions of the Contract, or
- (d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment.

If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person.

6.10 Records of Contractor's Personnel and Equipment

The Contractor shall submit, to the Engineer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Engineer, until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

6.11 Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst the Contractor's Personnel, and to preserve peace and protection of persons and property on and near the Site.

6.12 Foreign Personnel

The Contractor may bring in to 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 his best endeavours 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.

6.13 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.

6.14 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.

6.15 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.

6.16 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 thereof by Contractor's Personnel.

6.17 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.

6.18 Festivals and Religious Customs

The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.

6.19 Funeral Arrangements

The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of his local employees who may die while engaged upon the Works.

6.20 Forced Labour

The Contractor shall not employ forced labour, which 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.

6.21 Child Labour

The Contractor shall not employ children in a manner that is economically exploitative, or 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. Where the relevant labour laws of the Country have provisions for employment of minors, the Contractor shall follow those laws applicable to the Contractor. Children below the age of 18 years shall not be employed in dangerous work.

6.22 Employment Records of Workers

The Contractor shall keep complete and accurate records of the employment of labour at the Site. The photographic records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized 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].

6.23 Workers' Organisations

In countries where the relevant labour laws recognise workers' rights to form and to join workers' organisations of their choosing without interference and to bargain collectively, the Contractor shall comply with such laws. 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. In either case described above, and where the relevant labour laws are silent, the Contractor shall not discourage the Contractor's Personnel from forming or joining workers' organisations of their choosing or from bargaining collectively, and shall not discriminate or retaliate against the Contractor's Personnel who participate, or seek to participate, in such organisations and bargain collectively. The Contractor shall engage with such workers' representatives. Workers' organisations are expected to fairly represent the workers in the workforce.

6.24 Non-Discrimination and Equal Opportunity

The Contractor shall not make employment decisions on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment relationship on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, promotion, termination of employment or retirement, and discipline. In countries where the relevant labour laws provide for non-discrimination in employment, the Contractor shall comply with such laws. When the relevant labour laws are silent on non-discrimination in employment, the Contractor shall meet this Sub-Clause's requirements. 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.

7 Plant, Materials and Workmanship

7.1 Manner of Execution

The Contractor shall carry out the manufacture of Plant, the production and manufacture of Materials, and all other execution of the Works:

- (a) in the manner (if any) specified in the Contract,
- (b) in a proper workmanlike and careful manner, in accordance with recognised good practice, and
- (c) with properly equipped facilities and non-hazardous Materials, except as otherwise specified in the Contract.

7.2 Samples

The Contractor shall submit the following samples of Materials, and relevant information, to the Engineer for consent prior to using the Materials in or for the Works:

- (a) manufacturer's standard samples of Materials and samples specified in the Contract, all at the Contractor's cost, and
- (b) additional samples instructed by the Engineer as a Variation.

Each sample shall be labelled as to origin and intended use in the Works.

7.3 Inspection

The Employer's Personnel shall at all reasonable times:

- (a) have full access to all parts of the Site and to all places from which natural Materials are being obtained, and
- (b) during production, manufacture and construction (at the Site and elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials.

The Contractor shall give the Employer's Personnel full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.

The Contractor shall give notice to the Engineer whenever any work is ready and before it is covered up, put out of sight, or packaged for storage or transport. The Engineer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Engineer does not require to do so. If the Contractor fails to give the notice, he shall, if and when required by the Engineer, uncover the work and thereafter reinstate and make good, all at the Contractor's cost.

7.4 Testing

This Sub-Clause shall apply to all tests specified in the Contract, other than the Tests after Completion (if any).

Except as otherwise specified in the Contract, the Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. The Contractor shall agree, with the Engineer, the time and place for the specified testing of any Plant, Materials and other parts of the Works.

The Engineer may, under Clause 13 [Variations and Adjustments], vary the location or details of specified tests, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested Plant, Materials or workmanship is not in accordance with the Contract, the cost of carrying out this Variation shall be borne by the Contractor, notwithstanding other provisions of the Contract.

The Engineer shall give the Contractor not less than 24 hours' notice of the Engineer's intention to attend the tests. If the Engineer does not attend at the time and place agreed, the Contractor may proceed with the tests, unless otherwise instructed by the Engineer, and the tests shall then be deemed to have been made in the Engineer's presence.

If the Contractor suffers delay and/or incurs Cost from complying with these instructions or as a result of a delay for which the Employer is responsible, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

The Contractor shall promptly forward to the Engineer duly certified reports of the tests. When the specified tests have been passed, the Engineer shall endorse the Contractor's test certificate, or issue a certificate to him, to that effect. If the Engineer has not attended the tests, he shall be deemed to have accepted the readings as accurate.

7.5 Rejection

If, as a result of an examination, inspection, measurement or testing, any Plant, Materials or workmanship is found to be defective or otherwise not in accordance with the Contract, the Engineer may reject the Plant, Materials or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the defect and ensure that the rejected item complies with the Contract.

If the Engineer requires this Plant, Materials or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and retesting cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [Employer's Claims] pay these costs to the Employer.

7.6 Remedial Work

Notwithstanding any previous test or certification, the Engineer may instruct the Contractor to:

- (a) remove from the Site and replace any Plant or Materials which is not in accordance with the Contract,
- (b) remove and re-execute any other work which is not in accordance with the Contract, and
- (c) execute any work which is urgently required for the safety of the Works, whether because of an accident, unforeseeable event or otherwise.

The Contractor shall comply with the instruction within a reasonable time, which shall be the time (if any) specified in the instruction, or immediately if urgency is specified under sub-paragraph (c).

If the Contractor fails to comply with the instruction, the Employer shall be entitled to employ and pay other persons to carry out the work. Except to the extent that the Contractor would have been entitled to payment for the work, the Contractor shall subject to Sub-Clause 2.5 [Employer's Claims] pay to the Employer all costs arising from this failure.

7.7 Ownership of Plant and Materials

Except as otherwise provided in the Contract, each item of Plant and Materials shall, to the extent consistent with the Laws of the Country, become the property of the Employer at whichever is the earlier of the following times, free from liens and other encumbrances:

- (a) when it is incorporated in the Works;
- (b) when the Contractor is paid the corresponding value of the Plant and Materials under Sub-Clause 8.10 [Payment for Plant and Materials in Event of Suspension].

7.8 Royalties

Unless otherwise stated in the Specification, the Contractor shall pay all royalties, rents and other payments for:

- (a) natural Materials obtained from outside the Site, and
- (b) the disposal of material from demolitions and excavations and of other surplus material (whether natural or man-made), except to the extent that disposal areas within the Site are specified in the Contract.

8 Commencement, Delays and Suspension

8.1 Commencement of Works

Except as otherwise specified in the Particular Conditions of Contract, the Commencement Date shall be the date at which the following precedent conditions have all been fulfilled and the Engineer's notification recording the agreement of both Parties on such fulfilment and instructing to commence the Work is received by the Contractor:

- (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.

If the said Engineer's instruction is not received by the Contractor within 180 days from his receipt of the Letter of Acceptance, the Contractor shall be entitled to terminate the Contract under Sub-Clause 16.2 [Termination by Contractor].

"The Contractor shall commence the execution of the Works as soon as is reasonably practicable after access to and possession of the Site or any part thereof have been given under Sub-Clause 2.1, and shall then proceed with the Works with due expedition and without delay."

8.2 Time for Completion

The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion for the Works or Section (as the case may be), including:

- (a) achieving the passing of the Tests on Completion, and
- (b) completing all work which is stated in the Contract as being required for the Works or Section to be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [Taking Over of the Works and Sections].

8.3 Programme

The Contractor shall submit a detailed time programme to the Engineer within 28 days after receiving the notice under Sub-Clause 8.1 [Commencement of Works]. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Each programme shall include:

- (a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage of design (if any), Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection and testing,
- (b) each of these stages for work by each nominated Subcontractor (as defined in Clause 5 [Nominated Subcontractors]),
- (c) the sequence and timing of inspections and tests specified in the Contract, and
- (d) a supporting report which includes:
 - (i) a general description of the methods which the Contractor intends to adopt, and of the major stages, in the execution of the Works, and
 - (ii) details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel and of each type of Contractor's Equipment, required on the Site for each major stage.

Unless the Engineer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the programme when planning their activities.

The Contractor shall promptly give notice to the Engineer of specific probable future events or circumstances which may adversely affect the work, increase the Contract Price or delay the execution of the Works. The Engineer may require the Contractor to submit an estimate of the anticipated effect of the future event or circumstances, and/or a proposal under Sub-Clause 13.3 [Variation Procedure].

If, at any time, the Engineer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Engineer in accordance with this Sub-Clause.

8.4 Extension of Time for Completion

The Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to an extension of the Time for Completion if and to the extent that completion for the purposes of Sub-Clause 10.1 [Taking Over of the Works and Sections] is or will be delayed by any of the following causes:

- (a) a Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 13.3 [Variation Procedure]) or other substantial change in the quantity of an item of work included in the Contract,
- (b) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions,
- (c) exceptionally adverse climatic conditions,
- (d) Unforeseeable shortages in the availability of personnel or Goods caused by epidemic or governmental actions, or
- (e) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors.

If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Engineer in accordance with Sub-Clause 20.1 [Contractor's Claims]. When determining each extension of time under Sub-Clause 20.1, the Engineer shall review previous determinations and may increase, but shall not decrease, the total extension of time.

8.5 Delays Caused by Authorities

If the following conditions apply, namely:

- (a) the Contractor has diligently followed the procedures laid down by the relevant legally constituted public authorities in the Country,
- (b) these authorities delay or disrupt the Contractor's work, and
- (c) the delay or disruption was Unforeseeable,

then this delay or disruption will be considered as a cause of delay under sub-paragraph (b) of Sub-Clause 8.4 [Extension of Time for Completion].

8.6 Rate of Progress

If, at any time:

- (a) actual progress is too slow to complete within the Time for Completion, and/or
- (b) progress has fallen (or will fall) behind the current programme under Sub-Clause 8.3 [Programme],

other than as a result of a cause listed in Sub-Clause 8.4 [Extension of Time for Completion], then the Engineer may instruct the Contractor to submit, under Sub-Clause 8.3 [Programme], a revised programme and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.

Unless the Engineer notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall subject to notice under Sub-Clause 2.5 [Employer's Claims] pay these costs to the Employer, in addition to delay damages (if any) under Sub-Clause 8.7 below.

Additional costs of revised methods including acceleration measures, instructed by the Engineer to reduce delays resulting from causes listed under Sub-Clause 8.4 [Extension of Time for Completion] shall be paid by the Employer, without generating, however, any other additional payment benefit to the Contractor.

8.7 Delay Damages

If the Contractor fails to comply with Sub-Clause 8.2 [Time for Completion], the Contractor shall subject to notice under Sub-Clause 2.5 [Employer's Claims] 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. 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.

These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 15.2 [Termination by Employer] prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or from any other duties, obligations or responsibilities which he may have under the Contract.

8.8 Suspension of Work

The Engineer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage.

The Engineer may also notify the cause for the suspension. If and to the extent that the cause is notified and is the responsibility of the Contractor, the following Sub-Clauses 8.9, 8.10 and 8.11 shall not apply.

8.9 Consequences of Suspension

If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions under Sub-Clause 8.8 [Suspension of Work] and/or from resuming the work, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, workmanship or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 8.8 [Suspension of Work].

8.10 Payment for Plant and Materials in Event of Suspension

The Contractor shall be entitled to payment of the value (as at the date of suspension) of Plant and/or Materials which have not been delivered to Site, if:

- (a) the work on Plant or delivery of Plant and/or Materials has been suspended for more than 28 days, and
- (b) the Contractor has marked the Plant and/or Materials as the Employer's property in accordance with the Engineer's instructions.

8.11 Prolonged Suspension

If the suspension under Sub-Clause 8.8 [Suspension of Work] has continued for more than 84 days, the Contractor may request the Engineer's permission to proceed. If the Engineer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Engineer, treat the suspension as an omission under Clause 13 [Variations and Adjustments] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under Sub-Clause 16.2 [Termination by Contractor].

8.12 Resumption of Work

After the permission or instruction to proceed is given, the Contractor and the Engineer shall jointly examine the Works and the Plant and Materials affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension after receiving from the Engineer an instruction to this effect under Clause 13 [Variations and Adjustments].

9 Tests on Completion

9.1 Contractor's Obligations

The Contractor shall carry out the Tests on Completion in accordance with this Clause and Sub-Clause 7.4 [Testing], after providing the documents in accordance with sub-paragraph (d) of Sub-Clause 4.1 [Contractor's General Obligations].

The Contractor shall give to the Engineer not less than 21 days' notice of the date after which the Contractor will be ready to carry out each of the Tests on Completion. Unless otherwise agreed, Tests on Completion shall be carried out within 14 days after this date, on such day or days as the Engineer shall instruct.

In considering the results of the Tests on Completion, the Engineer shall make allowances for the effect of any use of the Works by the Employer on the performance or other characteristics of the Works. 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 to the Engineer.

9.2 Delayed Tests

If the Tests on Completion are being unduly delayed by the Employer, Sub-Clause 7.4 [Testing] (fifth paragraph) and/or Sub-Clause 10.3 [Interference with Tests on Completion] shall be applicable.

If the Tests on Completion are being unduly delayed by the Contractor, the Engineer may by notice require the Contractor to carry out the Tests within 21 days after receiving the notice. The Contractor shall carry out the Tests on such day or days within that period as the Contractor may fix and of which he shall give notice to the Engineer.

If the Contractor fails to carry out the Tests on Completion within the period of 21 days, the Employer's Personnel may proceed with the Tests at the risk and cost of the Contractor. The Tests on Completion shall then be deemed to have been carried out in the presence of the Contractor and the results of the Tests shall be accepted as accurate.

9.3 Retesting

If the Works, or a Section, fail to pass the Tests on Completion, Sub-Clause 7.5 [Rejection] shall apply, and the Engineer or the Contractor may require the failed Tests, and Tests on Completion on any related work, to be repeated under the same terms and conditions.

9.4 Failure to Pass Tests on Completion

If the Works, or a Section, fail to pass the Tests on Completion repeated under Sub-Clause 9.3 [Retesting], the Engineer shall be entitled to:

- (a) order further repetition of Tests on Completion under Sub-Clause 9.3;
- (b) if the failure deprives the Employer of substantially the whole benefit of the Works or Section, reject the Works or Section (as the case may be), in which event the Employer shall have the same remedies as are provided in sub-paragraph (c) of Sub-Clause 11.4 [Failure to Remedy Defects]; or
- (c) issue a Taking-Over Certificate, if the Employer so requests.

In the event of sub-paragraph (c), the Contractor shall proceed in accordance with all other obligations under the Contract, and the Contract Price shall be reduced by such amount as shall be appropriate to cover the reduced value to the Employer as a result of this failure. Unless the relevant reduction for this failure is stated (or its method of calculation is defined) in the Contract, the Employer may require the reduction to be (i) agreed by both Parties (in full satisfaction of this failure only) and paid before this Taking-Over Certificate is issued, or (ii) determined and paid under Sub-Clause 2.5 [Employer's Claims] and Sub-Clause 3.5 [Determinations].

10 Employer's Taking Over

10.1 Taking Over of the Works and Sections

Except as stated in Sub-Clause 9.4 [Failure to Pass Tests on Completion], the Works shall be taken over by the Employer when (i) the Works have been completed in accordance with the Contract, including the matters described in Sub-Clause 8.2 [Time for Completion] and except as allowed in sub-paragraph (a) below, and (ii) a Taking-Over Certificate for the Works has been issued, or is deemed to have been issued in accordance with this Sub-Clause.

The Contractor may apply by notice to the Engineer for a Taking-Over Certificate not earlier than 14 days before the Works will, in the Contractor's opinion, be complete and ready for taking over. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section.

The Engineer shall, within 28 days after receiving the Contractor's application:

- (a) issue the Taking-Over Certificate to the Contractor, stating the date on which the Works or Section were completed in accordance with the Contract, except for any minor outstanding work and defects which will not substantially affect the use of the Works or Section for their intended purpose (either until or whilst this work is completed and these defects are remedied); or
- (b) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued. The Contractor shall then complete this work before issuing a further notice under this Sub-Clause.

If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.

10.2 Taking Over of Parts of the Works

The Engineer may, at the sole discretion of the Employer, issue a Taking-Over Certificate for any part of the Permanent Works.

The Employer shall not use any part of the Works (other than as a temporary measure which is either specified in the Contract or agreed by both Parties) unless and until the Engineer has issued a Taking-Over Certificate for this part. However, if the Employer does use any part of the Works before the Taking-Over Certificate is issued:

- (a) the part which is used shall be deemed to have been taken over as from the date on which it is used,
- (b) the Contractor shall cease to be liable for the care of such part as from this date, when responsibility shall pass to the Employer, and
- (c) if requested by the Contractor, the Engineer shall issue a Taking-Over Certificate for this part.

After the Engineer has issued a Taking-Over Certificate for a part of the Works, the Contractor shall be given the earliest opportunity to take such steps as may be necessary to carry out any outstanding Tests on Completion. The Contractor shall carry out these Tests on Completion as soon as practicable before the expiry date of the relevant Defects Notification Period.

If the Contractor incurs Cost as a result of the Employer taking over and/or using a part of the Works, other than such use as is specified in the Contract or agreed by the Contractor, the Contractor shall (i) give notice to the Engineer and (ii) be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to payment of any such Cost plus profit, which shall be included in the Contract Price. After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine this Cost and profit.

If a Taking-Over Certificate has been issued for a part of the Works (other than a Section), the delay damages thereafter for completion of the remainder of the Works shall be reduced. Similarly, the delay damages for the remainder of the Section (if any) in which this part is included shall also be reduced. For any period of delay after the date stated in this Taking-Over Certificate, the proportional reduction in these delay damages shall be calculated as the proportion which the value of the part so certified bears to the value of the Works or Section (as the case may be) as a whole. The Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these proportions. The provisions of this paragraph shall only apply to the daily rate of delay damages under Sub-Clause 8.7 [Delay Damages], and shall not affect the maximum amount of these damages.

10.3 Interference with Tests on Completion

If the Contractor is prevented, for more than 14 days, from carrying out the Tests on Completion by a cause for which the Employer is responsible, the Employer shall be deemed to have taken over the Works or Section (as the case may be) on the date when the Tests on Completion would otherwise have been completed.

The Engineer shall then issue a Taking-Over Certificate accordingly, and the Contractor shall carry out the Tests on Completion as soon as practicable, before the expiry date of the Defects Notification Period. The Engineer shall require the Tests on Completion to be carried out by giving 14 days' notice and in accordance with the relevant provisions of the Contract.

If the Contractor suffers delay and/or incurs Cost as a result of this delay in carrying out the Tests on Completion, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

10.4 Surfaces Requiring Reinstatement

Except as otherwise stated in a Taking-Over Certificate, a certificate for a Section or part of the Works shall not be deemed to certify completion of any ground or other surfaces requiring reinstatement.

11 Defects Liability

11.1 Completion of Outstanding Work and Remedying Defects

In order that the Works and Contractor's Documents, and each Section, shall be in the condition required by the Contract (fair wear and tear excepted) by the expiry date of the relevant Defects Notification Period or as soon as practicable thereafter, the Contractor shall:

- (a) complete any work which is outstanding on the date stated in a Taking-Over Certificate, within such reasonable time as is instructed by the Engineer, and
- (b) execute all work required to remedy defects or damage, 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).

If a defect appears or damage occurs, the Contractor shall be notified accordingly, by (or on behalf of) the Employer.

11.2 Cost of Remedying Defects

All work referred to in sub-paragraph (b) of Sub-Clause 11.1 [Completion of Outstanding Work and Remedying Defects] shall be executed at the risk and cost of the Contractor, if and to the extent that the work is attributable to:

- (a) any design for which the Contractor is responsible,
- (b) Plant, Materials or workmanship not being in accordance with the Contract, or
- (c) failure by the Contractor to comply with any other obligation.

If and to the extent that such work is attributable to any other cause, the Contractor shall be notified promptly by (or on behalf of) the Employer, and Sub-Clause 13.3 [Variation Procedure] shall apply.

11.3 Extension of Defects Notification Period

The Employer shall be entitled subject to Sub-Clause 2.5 [Employer's Claims] to an extension of the Defects Notification Period for the Works or a Section if and to the extent that the Works, Section or a major item of Plant (as the case may be, and after taking over) cannot be used for the purposes for which they are intended by reason of a defect or by reason of damage attributable to the Contractor. However, a Defects Notification Period shall not be extended by more than two years.

If delivery and/or erection of Plant and/or Materials was suspended under Sub-Clause 8.8 [Suspension of Work] or Sub-Clause 16.1 [Contractor's Entitlement to Suspend Work], the Contractor's obligations under this Clause shall not apply to any defects or damage occurring more than two years after the Defects Notification Period for the Plant and/or Materials would otherwise have expired.

11.4 Failure to Remedy Defects

If the Contractor fails to remedy any defect or damage within a reasonable time, a date may be fixed by (or on behalf of) the Employer, on or by which the defect or damage is to be remedied. The Contractor shall be given reasonable notice of this date.

If the Contractor fails to remedy the defect or damage by this notified date and this remedial work was to be executed at the cost of the Contractor under Sub-Clause 11.2 [Cost of Remedying Defects], the Employer may (at his option):

- (a) carry out the work himself or by others, in a reasonable manner and at the Contractor's cost, but the Contractor shall have no responsibility for this work; and the Contractor shall subject to Sub-Clause 2.5 [Employer's Claims] pay to the Employer the costs reasonably incurred by the Employer in remedying the defect or damage;
- (b) require the Engineer to agree or determine a reasonable reduction in the Contract Price in accordance with Sub-Clause 3.5 [Determinations]; or
- (c) if the defect or damage deprives the Employer of substantially the whole benefit of the Works or any major part of the Works, terminate the Contract as a whole, or in respect of such major part which cannot be put to the intended use. Without prejudice to any other rights, under the Contract or otherwise, the Employer shall then be entitled to recover all sums paid for the Works or for such part (as the case may be), plus financing costs and the cost of dismantling the same, clearing the Site and returning Plant and Materials to the Contractor.

11.5 Removal of Defective Work

If the defect or damage cannot be remedied expeditiously on the Site and the Employer gives consent, the Contractor may remove from the Site for the purposes of repair such items of Plant as are defective or damaged. This consent may require the Contractor to increase the amount of the Performance Security by the full replacement cost of these items, or to provide other appropriate security.

11.6 Further Tests

If the work of remedying of any defect or damage may affect the performance of the Works, the Engineer may require the repetition of any of the tests described in the Contract. The requirement shall be made by notice within 28 days after the defect or damage is remedied.

These tests shall be carried out in accordance with the terms applicable to the previous tests, except that they shall be carried out at the risk and cost of the Party liable, under Sub-Clause 11.2 [Cost of Remedying Defects], for the cost of the remedial work.

11.7 Right of Access

Until the Performance Certificate has been issued, the Contractor shall have such right of access to the Works as is reasonably required in order to comply with this Clause, except as may be inconsistent with the Employer's reasonable security restrictions.

11.8 Contractor to Search

The Contractor shall, if required by the Engineer, search for the cause of any defect, under the direction of the Engineer. Unless the defect is to be remedied at the cost of the Contractor under Sub-Clause 11.2 [Cost of Remedying Defects], the Cost of the search plus profit shall be agreed or determined by the Engineer in accordance with Sub-Clause 3.5 [Determinations] and shall be included in the Contract Price.

11.9 Performance Certificate

Performance of the Contractor's obligations shall not be considered to have been completed until the Engineer has issued the Performance Certificate to the Contractor, stating the date on which the Contractor completed his obligations under the Contract.

The Engineer shall issue the Performance Certificate within 28 days after the latest of the expiry dates of the Defects Notification Periods, or as soon thereafter as the Contractor has supplied all the Contractor's Documents and completed and tested all the Works, including remedying any defects. A copy of the Performance Certificate shall be issued to the Employer.

Only the Performance Certificate shall be deemed to constitute acceptance of the Works.

11.10 Unfulfilled Obligations

After the Performance Certificate has been issued, each Party shall remain liable for the fulfilment of any obligation which remains unperformed at that time. For the purposes of determining the nature and extent of unperformed obligations, the Contract shall be deemed to remain in force.

11.11 Clearance of Site

Upon receiving the Performance Certificate, the Contractor shall remove any remaining Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works from the Site.

If all these items have not been removed within 28 days after receipt by the Contractor of the Performance Certificate, the Employer may sell or otherwise dispose of any remaining items. The Employer shall be entitled to be paid the costs incurred in connection with, or attributable to, such sale or disposal and restoring the Site.

Any balance of the moneys from the sale shall be paid to the Contractor. If these moneys are less than the Employer's costs, the Contractor shall pay the outstanding balance to the Employer.

12 Measurement and Evaluation

12.1 Works to be Measured

The Works shall be measured, and valued for payment, in accordance with this Clause. The Contractor shall show in each application under Sub-Clauses 14.3 [Application for Interim Payment Certificates], 14.10 [Statement on Completion] and 14.11 [Application for Final Payment Certificate] the quantities and other particulars detailing the amounts which he considers to be entitled under the Contract.

Whenever the Engineer requires any part of the Works to be measured, reasonable notice shall be given to the Contractor's Representative, who shall:

- (a) promptly either attend or send another qualified representative to assist the Engineer in making the measurement, and
- (b) supply any particulars requested by the Engineer.

If the Contractor fails to attend or send a representative, the measurement made by (or on behalf of) the Engineer shall be accepted as accurate.

Except as otherwise stated in the Contract, wherever any Permanent Works are to be measured from records, these shall be prepared by the Engineer. The Contractor shall, as and when requested, attend to examine and agree the records with the Engineer, and shall sign the same when agreed. If the Contractor does not attend, the records shall be accepted as accurate.

If the Contractor examines and disagrees the records, and/or does not sign them as agreed, then the Contractor shall give notice to the Engineer of the respects in which the records are asserted to be inaccurate. After receiving this notice, the Engineer shall review the records and either confirm or vary them and certify the payment of the undisputed part. If the Contractor does not so give notice to the Engineer within 14 days after being requested to examine the records, they shall be accepted as accurate.

12.2 Method of Measurement

Except as otherwise stated in the Contract and notwithstanding local practice:

- (a) measurement shall be made of the net actual quantity of each item of the Permanent Works, and
- (b) the method of measurement shall be in accordance with the Bill of Quantities or other applicable Schedules.

12.3 Evaluation

Except as otherwise stated in the Contract, the Engineer shall proceed in accordance with Sub-Clause 3.5 [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-Clauses 12.1 and 12.2 and the appropriate rate or price for the item.

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, specified for similar work.

Any item of work included in the Bill of Quantities for which no rate or price was specified shall be considered as included in other rates and prices in the Bill of Quantities and will not be paid for separately.

However, a new rate or price shall be appropriate for an item of work if:

- (a) (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 other Schedule,
 - (ii) this change in quantity multiplied by such specified rate for this item exceeds 0.25% of the Accepted Contract Amount,
 - (iii) this change in quantity directly changes the Cost per unit quantity of this item by more than 1%, and
 - (iv) this item is not specified in the Contract as a "fixed rate item";
- or
- (b) (i) the work is instructed under Clause 13 [Variations and Adjustments],
 - (ii) no rate or price is specified in the Contract for this item, and
 - (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.

Each new rate or price shall be derived from any relevant rates or prices in the Contract, with reasonable adjustments to take account of the matters described in sub-paragraph (a) and/or (b), as applicable. If no rates or prices are relevant for the derivation of a new rate or price, it shall be derived from the reasonable Cost of executing the work, together with profit, taking account of any other relevant matters.

Until such time as an appropriate rate or price is agreed or determined, the Engineer shall determine a provisional rate or price for the purposes of Interim Payment Certificates as soon as the concerned work commences.

12.4 Omissions

Whenever the omission of any work forms part (or all) of a Variation, the value of which has not been agreed, if:

- (a) the Contractor will incur (or has incurred) cost which, if the work had not been omitted, would have been deemed to be covered by a sum forming part of the Accepted Contract Amount;
- (b) the omission of the work will result (or has resulted) in this sum not forming part of the Contract Price; and
- (c) this cost is not deemed to be included in the evaluation of any substituted work;

then the Contractor shall give notice to the Engineer accordingly, with supporting particulars. Upon receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine this cost, which shall be included in the Contract Price.

13 Variations and Adjustments

13.1 Right to Vary

Variations may be initiated by the Engineer at any time prior to issuing the Taking-Over Certificate for the Works, either by an instruction or by a request for the Contractor to submit a proposal.

The Contractor shall execute and be bound by each Variation, unless the Contractor promptly gives notice to the Engineer stating (with supporting particulars) that (i) the Contractor cannot readily obtain the Goods required for the Variation, or (ii) such Variation triggers a substantial change in the sequence or progress of the Works. Upon receiving this notice, the Engineer shall cancel, confirm or vary the instruction.

Each Variation may include:

- (a) changes to the quantities of any item of work included in the Contract (however, such changes do not necessarily constitute a Variation),
- (b) changes to the quality and other characteristics of any item of work,
- (c) changes to the levels, positions and/or dimensions of any part of the Works,
- (d) omission of any work unless it is to be carried out by others,
- (e) any additional work, Plant, Materials or services necessary for the Permanent Works, including any associated Tests on Completion, boreholes and other testing and exploratory work, or
- (f) changes to the sequence or timing of the execution of the Works.

The Contractor shall not make any alteration and/or modification of the Permanent Works, unless and until the Engineer instructs or approves a Variation.

13.2 Value Engineering

The Contractor may, at any time, submit to the Engineer a written proposal which (in the Contractor's opinion) will, if adopted, (i) accelerate completion, (ii) reduce the cost to the Employer of executing, maintaining or operating the Works, (iii) improve the efficiency or value to the Employer of the completed Works, or (iv) otherwise be of benefit to the Employer.

The proposal shall be prepared at the cost of the Contractor and shall include the items listed in Sub-Clause 13.3 [Variation Procedure].

If a proposal, which is approved by the Engineer, includes a change in the design of part of the Permanent Works, then unless otherwise agreed by both Parties:

- (a) the Contractor shall design this part,
- (b) sub-paragraphs (a) to (d) of Sub-Clause 4.1 [Contractor's General Obligations] shall apply, and
- (c) if this change results in a reduction in the contract value of this part, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine a fee, which shall be included in the Contract Price. This fee shall be half (50%) of the difference between the following amounts:
 - (i) such reduction in contract value, resulting from the change, excluding adjustments under Sub-Clause 13.7 [Adjustments for Changes in Legislation] and Sub-Clause 13.8 [Adjustments for Changes in Cost], and
 - (ii) the reduction (if any) in the value to the Employer of the varied works, taking account of any reductions in quality, anticipated life or operational efficiencies.

However, if amount (i) is less than amount (ii), there shall not be a fee.

13.3 Variation Procedure

If the Engineer requests a proposal, prior to instructing a Variation, the Contractor shall respond in writing as soon as practicable, either by giving reasons why he cannot comply (if this is the case) or by submitting:

- (a) a description of the proposed work to be performed and a programme for its execution,
- (b) the Contractor's proposal for any necessary modifications to the programme according to Sub-Clause 8.3 [Programme] and to the Time for Completion, and
- (c) the Contractor's proposal for evaluation of the Variation.

The Engineer shall, as soon as practicable after receiving such proposal (under Sub-Clause 13.2 [Value Engineering] or otherwise), respond with approval, disapproval or comments. The Contractor shall not delay any work whilst awaiting a response.

Each instruction to execute a Variation, with any requirements for the recording of Costs, shall be issued by the Engineer to the Contractor, who shall acknowledge receipt.

Each Variation shall be evaluated in accordance with Clause 12 [Measurement and Evaluation], unless the Engineer instructs or approves otherwise in accordance with this Clause.

13.4 Payment in Applicable Currencies

If the Contract provides for payment of the Contract Price in more than one currency, then whenever an adjustment is agreed, approved or determined as stated above, the amount payable in each of the applicable currencies shall be specified. For this purpose, reference shall be made to the actual or expected currency proportions of the Cost of the varied work, and to the proportions of various currencies specified for payment of the Contract Price.

13.5 Provisional Sums

Each Provisional Sum shall only be used, in whole or in part, in accordance with the Engineer's instructions, and the Contract Price shall be adjusted accordingly. The total sum paid to the Contractor shall include only such amounts, for the work, supplies or services to which the Provisional Sum relates, as the Engineer shall have instructed. For each Provisional Sum, the Engineer may instruct:

- (a) work to be executed (including Plant, Materials or services to be supplied) by the Contractor and valued under Sub-Clause 13.3 [Variation Procedure]; and/or
- (b) Plant, Materials or services to be purchased by the Contractor, from a nominated Subcontractor (as defined in Clause 5 [Nominated Subcontractors]) or otherwise; and for which there shall be included in the Contract Price:
 - (i) the actual amounts paid (or due to be paid) by the Contractor, and
 - (ii) a sum for overhead charges and profit, calculated as a percentage of these actual amounts by applying the relevant percentage rate (if any) stated in the appropriate Schedule. If there is no such rate, the percentage rate stated in the Contract Data shall be applied.

The Contractor shall, when required by the Engineer, produce quotations, invoices, vouchers and accounts or receipts in substantiation.

13.6 Daywork

For work of a minor or incidental nature, the Engineer may instruct that a Variation shall be executed on a daywork basis. The work shall then be valued in accordance with the Daywork Schedule included in the Contract, and the following procedure shall apply. If a Daywork Schedule is not included in the Contract, this Sub-Clause shall not apply.

Before ordering Goods for the work, the Contractor shall submit quotations to the Engineer. When applying for payment, the Contractor shall submit invoices, vouchers and accounts or receipts for any Goods.

Except for any items for which the Daywork Schedule specifies that payment is not due, the Contractor shall deliver each day to the Engineer accurate statements in duplicate which shall include the following details of the resources used in executing the previous day's work:

- (a) the names, occupations and time of Contractor's Personnel,
- (b) the identification, type and time of Contractor's Equipment and Temporary Works, and
- (c) the quantities and types of Plant and Materials used.

One copy of each statement will, if correct, or when agreed, be signed by the Engineer and returned to the Contractor. The Contractor shall then submit priced statements of these resources to the Engineer, prior to their inclusion in the next Statement under Sub-Clause 14.3 [Application for Interim Payment Certificates].

13.7 Adjustments for Changes in Legislation

The Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws) or in the judicial or official governmental interpretation of such Laws, made after the Base Date, which affect the Contractor in the performance of obligations under the Contract.

If the Contractor suffers (or will suffer) delay and/or incurs (or will incur) additional Cost as a result of these changes in the Laws or in such interpretations, made after the Base Date, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

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 13.8 [Adjustments for Changes in Cost].

13.8 Adjustments for Changes in Cost

In this Sub-Clause, "table of adjustment data" means the completed table of adjustment data for local and foreign currencies included in the Schedules. If there is no such table of adjustment data, this Sub-Clause shall not apply.

If this Sub-Clause applies, the amounts payable to the Contractor shall be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any rise or fall in Costs is not covered by the provisions of this or other Clauses, the Accepted Contract Amount shall be deemed to have included amounts to cover the contingency of other rises and falls in costs.

The adjustment to be applied to the amount otherwise payable to the Contractor, as valued in accordance with the appropriate Schedule and certified in Payment Certificates, shall be determined from formulae for each of the currencies in which the Contract Price is payable. No adjustment is to be applied to work valued on the basis of Cost or current prices. The formulae shall be of the following general type:

$$P_n = a + b L_n / L_o + c E_n / E_o + d M_n / M_o + \dots$$

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", ... are coefficients representing the estimated proportion of each cost element related to the execution of the Works, as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as labour, equipment and materials;

"L_n", "E_n", "M_n", ... are the current cost indices or reference prices for period "n", expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the date 49 days prior to the last day of the period (to which the particular Payment Certificate relates); and

"L_o", "E_o", "M_o", ... are the base cost indices or reference prices, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the Base Date.

The cost indices or reference prices stated in the table of adjustment data shall be used. If their source is in doubt, it shall be determined by the Engineer. For this purpose, reference shall be made to the values of the indices at stated dates for the purposes of clarification of the source; although these dates (and thus these values) may not correspond to the base cost indices.

In cases where the "currency of index" is not the relevant currency of payment, each index shall be converted into the relevant currency of payment at the selling rate, established by the central bank of the Country, of this relevant currency on the above date for which the index is required to be applicable

Until such time as each current cost index is available, the Engineer shall determine a provisional index for the issue of Interim Payment Certificates. When a current cost index is available, the adjustment shall be recalculated accordingly.

If the Contractor fails to complete the Works within the Time for Completion, adjustment of prices thereafter shall be made using either (i) each index or price applicable on the date 49 days prior to the expiry of the Time for Completion of the Works, or (ii) the current index or price, whichever is more favourable to the Employer.

The weightings (coefficients) for each of the factors of cost stated in the table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variations.

14 Contract Price and Payment

14.1 The Contract Price

Unless otherwise stated in the Particular Conditions:

- (a) the Contract Price shall be agreed or determined under Sub-Clause 12.3 [Evaluation] and be subject to adjustments in accordance with the Contract;

- (b) the Contractor shall pay all taxes, duties and fees required to be paid by him under the Contract, and the Contract Price shall not be adjusted for any of these costs except as stated in Sub-Clause 13.7 [Adjustments for Changes in Legislation];
- (c) any quantities which may be set out in the Bill of Quantities or other Schedule are estimated quantities and are not to be taken as the actual and correct quantities:
 - (i) of the Works which the Contractor is required to execute, or
 - (ii) for the purposes of Clause 12 [Measurement and Evaluation]; and
- (d) the Contractor shall submit to the Engineer, within 28 days after the Commencement Date, a proposed breakdown of each lump sum price in the Schedules. The Engineer may take account of the breakdown when preparing Payment Certificates, but shall not be bound by it.

Notwithstanding the provisions of sub-paragraph (b), Contractor's Equipment, including essential spare parts therefor, imported by the Contractor for the sole purpose of executing the Contract shall be exempt from the payment of import duties and taxes upon importation.

14.2 Advance Payment

The Employer shall make an advance payment, as an interest-free loan for mobilisation and cash flow support, when the Contractor submits a guarantee in accordance with this Sub-Clause. The total advance payment, the number and timing of instalments (if more than one), and the applicable currencies and proportions, shall be as stated in the Contract Data.

Unless and until the Employer receives this guarantee, or if the total advance payment is not stated in the Contract Data, this Sub-Clause shall not apply.

The Engineer shall deliver to the Employer and to the Contractor an Interim Payment Certificate for the advance payment or its first instalment after receiving a Statement (under Sub-Clause 14.3 [Application for Interim Payment Certificates]) and after the Employer receives (i) the Performance Security in accordance with Sub-Clause 4.2 [Performance Security] and (ii) a guarantee in amounts and currencies equal to the advance payment. This guarantee shall be issued by a reputable bank or financial institution selected by the Contractor and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer.

The Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount shall be progressively reduced by the amount repaid by the Contractor as indicated in the Payment Certificates. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.

Unless stated otherwise in the Contract Data, the advance payment shall be repaid through percentage deductions from the interim payments determined by the Engineer in accordance with Sub-Clause 14.6 [Issue of Interim Payment Certificates], as follows:

- (a) deductions shall commence in the next interim Payment Certificate following that in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds 30 percent (30%) of the Accepted Contract Amount less Provisional Sums; and
- (b) deductions shall be made at the amortisation rate stated in the Contract Data of the amount of each Interim Payment Certificate (excluding the advance payment and deductions for its repayments as well as deductions for retention money) in the currencies and proportions of the advance payment until such time as the advance payment has been repaid; provided that the advance payment shall be completely repaid prior to the time when 90 percent (90%) of the Accepted Contract Amount less Provisional Sums has been certified for payment.

If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 15 [Termination by Employer], Clause 16 [Suspension and Termination by Contractor] or Clause 19 [Force Majeure] (as the case may be), the whole of the balance then outstanding shall immediately become due and in case of termination under Clause 15 [Termination by Employer], except for Sub-Clause 15.5 [Employer's Entitlement to Termination for Convenience], payable by the Contractor to the Employer.

14.3 Application for Interim Payment Certificates

The Contractor shall submit a Statement in six copies to the Engineer after the end of each month, in a form approved by the Engineer, showing in detail the amounts to which the Contractor considers himself to be entitled, together with supporting documents which shall include the report on the progress during this month in accordance with Sub-Clause 4.21 [Progress Reports].

The Statement shall include the following items, as applicable, which shall be expressed in the various currencies in which the Contract Price is payable, in the sequence listed:

- (a) the estimated contract value of the Works executed and the Contractor's Documents produced up to the end of the month (including Variations but excluding items described in sub-paragraphs (b) to (g) below);
- (b) any amounts to be added and deducted for changes in legislation and changes in cost, in accordance with Sub-Clause 13.7 [Adjustments for Changes in Legislation] and Sub-Clause 13.8 [Adjustments for Changes in Cost];
- (c) any amount to be deducted for retention, calculated by applying the percentage of retention stated in the Contract Data to the total of the above amounts, until the amount so retained by the Employer reaches the limit of Retention Money (if any) stated in the Contract Data;
- (d) any amounts to be added for the advance payment (if more than one instalment) and to be deducted for its repayments in accordance with Sub-Clause 14.2 [Advance Payment];
- (e) any amounts to be added and deducted for Plant and Materials in accordance with Sub-Clause 14.5 [Plant and Materials intended for the Works];
- (f) any other additions or deductions which may have become due under the Contract or otherwise, including those under Clause 20 [Claims, Disputes and Arbitration]; and
- (g) the deduction of amounts certified in all previous Payment Certificates.

14.4 Schedule of Payments

If the Contract includes a schedule of payments specifying the instalments in which the Contract Price will be paid, then unless otherwise stated in this schedule:

- (a) the instalments quoted in this schedule of payments shall be the estimated contract values for the purposes of sub-paragraph (a) of Sub-Clause 14.3 [Application for Interim Payment Certificates];
- (b) Sub-Clause 14.5 [Plant and Materials intended for the Works] shall not apply; and
- (c) if these instalments are not defined by reference to the actual progress achieved in executing the Works, and if actual progress is found to be less or more than that on which this schedule of payments was based, then the Engineer may proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine revised instalments, which shall take account of the extent to which progress is less or more than that on which the instalments were previously based.

If the Contract does not include a schedule of payments, the Contractor shall submit non-binding estimates of the payments which he expects to become due during each quarterly period. The first estimate shall be submitted within 42 days after the Commencement Date. Revised estimates shall be submitted at quarterly intervals, until the Taking-Over Certificate has been issued for the Works.

14.5 Plant and Materials intended for the Works

If this Sub-Clause applies, Interim Payment Certificates shall include, under sub-paragraph (e) of Sub-Clause 14.3, (i) an amount for Plant and Materials which have been sent to the Site for incorporation in the Permanent Works, and (ii) a reduction when the contract value of such Plant and Materials is included as part of the Permanent Works under sub-paragraph (a) of Sub-Clause 14.3 [Application for Interim Payment Certificates].

If the lists referred to in sub-paragraphs (b)(i) or (c)(i) below are not included in the Schedules this Sub-Clause shall not apply.

The Engineer shall determine and certify each addition if the following conditions are satisfied:

(a) the Contractor has:

- (i) kept satisfactory records (including the orders, receipts, Costs and use of Plant and Materials) which are available for inspection, and
- (ii) submitted a statement of the Cost of acquiring and delivering the Plant and Materials to the Site, supported by satisfactory evidence;

and either:

(b) the relevant Plant and Materials:

- (i) are those listed in the Schedules for payment when shipped,
- (ii) have been shipped to the Country, en route to the Site, in accordance with the Contract; and
- (iii) are described in a clean shipped bill of lading or other evidence of shipment, which has been submitted to the Engineer together with evidence of payment of freight and insurance, any other documents reasonably required, and a bank guarantee in a form and issued by an entity approved by the Employer in amounts and currencies equal to the amount due under this Sub-Clause: this guarantee may be in a similar form to the form referred to in Sub-Clause 14.2 [Advance Payment] and shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration;

or

(c) the relevant Plant and Materials:

- (i) are those listed in the Schedules for payment when delivered to the Site, and
- (ii) have been delivered to and are properly stored on the Site, are protected against loss, damage or deterioration, and appear to be in accordance with the Contract.

The additional amount to be certified shall be the equivalent of eighty percent (80%) of the Engineer's determination of the cost of the Plant and Materials (including delivery to Site), taking account of the documents mentioned in this Sub-Clause and of the contract value of the Plant and Materials.

The currencies for this additional amount shall be the same as those in which payment will become due when the contract value is included under sub-paragraph (a) of Sub-Clause 14.3 [Application for Interim Payment Certificates]. At that time, the Payment Certificate shall include the applicable reduction which shall be equivalent to, and in the same currencies and proportions as, this additional amount for the relevant Plant and Materials

14.6 Issue of Interim Payment Certificates

No amount will be certified or paid until the Employer has received and approved the Performance Security. Thereafter, the Engineer shall, within 28 days after receiving a Statement and supporting documents, deliver to the Employer and to the Contractor an Interim Payment Certificate which shall state the amount which the Engineer fairly determines to be due, with all supporting particulars for any reduction or withholding made by the Engineer on the Statement if any.

However, prior to issuing the Taking-Over Certificate for the Works, the Engineer shall not be bound to issue an Interim Payment Certificate in an amount which would (after retention and other deductions) be less than the minimum amount of Interim Payment Certificates (if any) stated in the Contract Data. In this event, the Engineer shall give notice to the Contractor accordingly.

An Interim Payment Certificate shall not be withheld for any other reason, although:

- (a) if any thing supplied or work done by the Contractor is not in accordance with the Contract, the cost of rectification or replacement may be withheld until rectification or replacement has been completed; and/or
- (b) if the Contractor was or is failing to perform any work or obligation in accordance with the Contract, and had been so notified by the Engineer, the value of this work or obligation may be withheld until the work or obligation has been performed.

The Engineer may in any Payment Certificate make any correction or modification that should properly be made to any previous Payment Certificate. A Payment Certificate shall not be deemed to indicate the Engineer's acceptance, approval, consent or satisfaction.

14.7 Payment

The Employer shall pay to the Contractor:

- (a) the first instalment of the advance payment within 42 days after issuing the Letter of Acceptance or within 21 days after receiving the documents in accordance with Sub-Clause 4.2 [Performance Security] and Sub-Clause 14.2 [Advance Payment], whichever is later;
- (b) the amount certified in each Interim Payment Certificate within 56 days after the Engineer receives the Statement and supporting documents; or, at a time when the Bank's loan or credit (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
- (c) the amount certified in the Final Payment Certificate within 56 days after the Employer receives this Payment Certificate; or, at a time when the Bank's loan or credit (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].

Payment of the amount due in each currency shall be made into the bank account, nominated by the Contractor, in the payment country (for this currency) specified in the Contract.

14.8 Delayed Payment

If the Contractor does not receive payment in accordance with Sub-Clause 14.7 [Payment], the Contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of delay. This period shall be deemed to commence on the date for payment specified in Sub-Clause 14.7 [Payment], irrespective (in the case of its sub-paragraph (b)) of the date on which any Interim Payment Certificate is issued.

Unless otherwise stated in the Particular Conditions, these financing charges shall be calculated at the annual rate of three percentage points above the discount rate of the central bank in the country of the currency of payment, or if not available, the interbank offered rate, and shall be paid in such currency.

The Contractor shall be entitled to this payment without formal notice or certification, and without prejudice to any other right or remedy.

14.9 Payment of Retention Money

When the Taking-Over Certificate has been issued for the Works, the first half of the Retention Money shall be certified by the Engineer for payment to the Contractor. If a Taking-Over Certificate is issued for a Section or part of the Works, a proportion of the Retention Money shall be certified and paid. This proportion shall be half (50%) of the proportion calculated by dividing the estimated contract value of the Section or part, by the estimated final Contract Price.

Promptly after the latest of the expiry dates of the Defects Notification Periods, the outstanding balance of the Retention Money shall be certified by the Engineer for payment to the Contractor. If a Taking-Over Certificate was issued for a Section, a proportion of the second half of the Retention Money shall be certified and paid promptly after the expiry date of the Defects Notification Period for the Section. This proportion shall be half (50%) of the proportion calculated by dividing the estimated contract value of the Section by the estimated final Contract Price.

However, if any work remains to be executed under Clause 11 [Defects Liability], the Engineer shall be entitled to withhold certification of the estimated cost of this work until it has been executed.

When calculating these proportions, no account shall be taken of any adjustments under Sub-Clause 13.7 [Adjustments for Changes in Legislation] and Sub-Clause 13.8 [Adjustments for Changes in Cost].

Unless otherwise stated in the Particular Conditions, when the Taking-Over Certificate has been issued for the Works and the first half of the Retention Money has been certified for payment by the Engineer, the Contractor shall be entitled to substitute a guarantee, in the form annexed to the Particular Conditions or in another form approved by the Employer and issued by a reputable bank or financial institution selected by the Contractor, for the second half of the Retention Money. The Contractor shall ensure that the guarantee is in the amounts and currencies of the second half of the Retention Money and is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects, as specified for the Performance Security in Sub-Clause 4.2. On receipt by the Employer of the required guarantee, the Engineer shall certify and the Employer shall pay the second half of the Retention Money. The release of the second half of the Retention Money against a guarantee shall then be in lieu of the release under the second paragraph of this Sub-Clause. The Employer shall return the guarantee to the Contractor within 21 days after receiving a copy of the Performance Certificate.

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.

14.10 Statement at Completion

Within 84 days after receiving the Taking-Over Certificate for the Works, the Contractor shall submit to the Engineer six copies of a Statement at completion with supporting documents, in accordance with Sub-Clause 14.3 [Application for Interim Payment Certificates], showing:

- (a) the value of all work done in accordance with the Contract up to the date stated in the Taking-Over Certificate for the Works,
- (b) any further sums which the Contractor considers to be due, and

- (c) an estimate of any other amounts which the Contractor considers will become due to him under the Contract. Estimated amounts shall be shown separately in this Statement at completion.

The Engineer shall then certify in accordance with Sub-Clause 14.6 [Issue of Interim Payment Certificates].

14.11 Application for Final Payment Certificate

Within 56 days after receiving the Performance Certificate, the Contractor shall submit, to the Engineer, six copies of a draft final statement with supporting documents showing in detail in a form approved by the Engineer:

- (a) the value of all work done in accordance with the Contract, and
- (b) any further sums which the Contractor considers to be due to him under the Contract or otherwise.

If the Engineer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Engineer may reasonably require within 28 days from receipt of said draft and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Engineer the final statement as agreed. This agreed statement is referred to in these Conditions as the "Final Statement".

However if, following discussions between the Engineer and the Contractor and any changes to the draft final statement which are agreed, it becomes evident that a dispute exists, the Engineer shall deliver to the Employer (with a copy to the Contractor) an Interim Payment Certificate for the agreed parts of the draft final statement. Thereafter, if the dispute is finally resolved under Sub-Clause 20.4 [Obtaining Dispute Board's Decision] or Sub-Clause 20.5 [Amicable Settlement], the Contractor shall then prepare and submit to the Employer (with a copy to the Engineer) a Final Statement.

14.12 Discharge

When submitting the Final Statement, the Contractor shall submit a discharge which confirms that the total of the Final Statement represents full and final settlement of all moneys due to the Contractor under or in connection with the Contract. This discharge may state that it becomes effective when the Contractor has received the Performance Security and the outstanding balance of this total, in which event the discharge shall be effective on such date.

14.13 Issue of Final Payment Certificate

Within 28 days after receiving the Final Statement and discharge in accordance with Sub-Clause 14.11 [Application for Final Payment Certificate] and Sub-Clause 14.12 [Discharge], the Engineer shall deliver, to the Employer and to the Contractor, the Final Payment Certificate which shall state:

- (a) the amount which he fairly determines is finally due, and
- (b) after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled, the balance (if any) due from the Employer to the Contractor or from the Contractor to the Employer, as the case may be.

If the Contractor has not applied for a Final Payment Certificate in accordance with Sub-Clause 14.11 [Application for Final Payment Certificate] and Sub-Clause 14.12 [Discharge], the Engineer shall request the Contractor to do so. If the Contractor fails to submit an application within a period of 28 days, the Engineer shall issue the Final Payment Certificate for such amount as he fairly determines to be due.

14.14 Cessation of Employer's Liability

The Employer shall not be liable to the Contractor for any matter or thing under or in connection with the Contract or execution of the Works, except to the extent that the Contractor shall have included an amount expressly for it:

- (a) in the Final Statement and also
- (b) (except for matters or things arising after the issue of the Taking-Over Certificate for the Works) in the Statement at completion described in Sub-Clause 14.10 [Statement at Completion].

However, this Sub-Clause shall not limit the Employer's liability under his indemnification obligations, or the Employer's liability in any case of fraud, deliberate default or reckless misconduct by the Employer.

14.15 Currencies of Payment

The Contract Price shall be paid in the currency or currencies named in the Schedule of Payment Currencies. If more than one currency is so named, payments shall be made as follows:

- (a) if the Accepted Contract Amount was expressed in Local Currency only:
 - (i) the proportions or amounts of the Local and Foreign Currencies, and the fixed rates of exchange to be used for calculating the payments, shall be as stated in the Schedule of Payment Currencies, except as otherwise agreed by both Parties;
 - (ii) payments and deductions under Sub-Clause 13.5 [Provisional Sums] and Sub-Clause 13.7 [Adjustments for Changes in Legislation] shall be made in the applicable currencies and proportions; and
 - (iii) other payments and deductions under sub-paragraphs (a) to (d) of Sub-Clause 14.3 [Application for Interim Payment Certificates] shall be made in the currencies and proportions specified in sub-paragraph (a)(i) above;
- (b) payment of the damages specified in the Contract Data shall be made in the currencies and proportions specified in the Schedule of Payment Currencies;
- (c) other payments to the Employer by the Contractor shall be made in the currency in which the sum was expended by the Employer, or in such currency as may be agreed by both Parties;
- (d) if any amount payable by the Contractor to the Employer in a particular currency exceeds the sum payable by the Employer to the Contractor in that currency, the Employer may recover the balance of this amount from the sums otherwise payable to the Contractor in other currencies; and
- (e) if no rates of exchange are stated in the Schedule of Payment Currencies, they shall be those prevailing on the Base Date and determined by the central bank of the Country.

15 Termination by Employer

15.1 Notice to Correct

If the Contractor fails to carry out any obligation under the Contract, the Engineer may by notice require the Contractor to make good the failure and to remedy it within a specified reasonable time.

15.2 Termination by Employer

The Employer shall be entitled to terminate the Contract if the Contractor:

- (a) fails to comply with Sub-Clause 4.2 [Performance Security] or with a notice under Sub-Clause 15.1 [Notice to Correct],
- (b) abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract,
- (c) without reasonable excuse fails:
 - (i) to proceed with the Works in accordance with Clause 8 [Commencement, Delays and Suspension], or
 - (ii) to comply with a notice issued under Sub-Clause 7.5 [Rejection] or Sub-Clause 7.6 [Remedial Work], within 28 days after receiving it,
- (d) subcontracts the whole of the Works or assigns the Contract without the required agreement,
- (e) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events, or
- (f) gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward:
 - (i) for doing or forbearing to do any action in relation to the Contract, or
 - (ii) for showing or forbearing to show favour or disfavour to any person in relation to the Contract,

or if any of the Contractor's Personnel, agents or Subcontractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph (f). However, lawful inducements and rewards to Contractor's Personnel shall not entitle termination.

In any of these events or circumstances, the Employer may, upon giving 14 days' notice to the Contractor, terminate the Contract and expel the Contractor from the Site. However, in the case of sub-paragraph (e) or (f), the Employer may by notice terminate the Contract immediately.

The Employer's election to terminate the Contract shall not prejudice any other rights of the Employer, under the Contract or otherwise.

The Contractor shall then leave the Site and deliver any required Goods, all Contractor's Documents, and other design documents made by or for him, to the Engineer. However, the Contractor shall use his best efforts to comply immediately with any reasonable instructions included in the notice (i) for the assignment of any subcontract, and (ii) for the protection of life or property or for the safety of the Works.

After termination, the Employer may complete the Works and/or arrange for any other entities to do so. The Employer and these entities may then use any Goods, Contractor's Documents and other design documents made by or on behalf of the Contractor.

The Employer shall then give notice that the Contractor's Equipment and Temporary Works will be released to the Contractor at or near the Site. The Contractor shall promptly arrange their removal, at the risk and cost of the Contractor. However, if by this time the Contractor has failed to make a payment due to the Employer, these items may be sold by the Employer in order to recover this payment. Any balance of the proceeds shall then be paid to the Contractor.

15.3 Valuation at Date of Termination

As soon as practicable after a notice of termination under Sub-Clause 15.2 [Termination by Employer] has taken effect, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine the value of the Works, Goods and Contractor's Documents, and any other sums due to the Contractor for work executed in accordance with the Contract.

15.4 Payment after Termination

After a notice of termination under Sub-Clause 15.2 [Termination by Employer] has taken effect, the Employer may:

- (a) proceed in accordance with Sub-Clause 2.5 [Employer's Claims],
- (b) withhold further payments to the Contractor until the costs of execution, completion and remedying of any defects, damages for delay in completion (if any), and all other costs incurred by the Employer, have been established, and/or
- (c) recover from the Contractor any losses and damages incurred by the Employer and any extra costs of completing the Works, after allowing for any sum due to the Contractor under Sub-Clause 15.3 [Valuation at Date of Termination]. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor.

15.5 Employer's Entitlement to Termination for Convenience

The Employer shall be entitled to terminate the Contract, at any time for the Employer's convenience, by giving notice of such termination to the Contractor. The termination shall take effect 28 days after the later of the dates on which the Contractor receives this notice or the Employer returns the Performance Security. The Employer shall not terminate the Contract under this Sub-Clause in order to execute the Works himself or to arrange for the Works to be executed by another contractor or to avoid a termination of the Contract by the Contractor under Clause 16.2 [Termination by Contractor].

After this termination, the Contractor shall proceed in accordance with Sub-Clause 16.3 [Cessation of Work and Removal of Contractor's Equipment] and shall be paid in accordance with Sub-Clause 16.4 [Payment on Termination].

15.6 Corrupt or Fraudulent Practices

If the Employer determines, based on reasonable evidence, that the Contractor has engaged in corrupt, fraudulent, collusive or coercive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days notice to the Contractor, terminate the Contract and expel him from the Site, and the provisions of Clause 15 shall apply as if such termination had been made under Sub-Clause 15.2 [Termination by Employer].

Should any employee of the Contractor be determined, based on reasonable evidence, to have engaged in corrupt, fraudulent or coercive practice during the execution of the work then that employee shall be removed in accordance with Sub-Clause 6.9 [Contractor's Personnel].

[For contracts financed by the Asian Development Bank]

For the purposes of this Sub-Clause:

ADB requires Borrowers (including beneficiaries of ADB-financed activity) and their personnel, as well as firms and individuals participating in an ADB-financed activity, including but not limited to, Bidders, Suppliers, Contractors, agents, subcontractors, subconsultants, service providers, subsuppliers, manufacturers (including their respective officers, directors, employees and personnel) under ADB-financed contracts to observe the highest standard of ethics during the procurement and execution of such contracts in accordance with ADB's Anticorruption Policy (1998, as amended from time to time). In pursuance of this policy, ADB

- (a) *defines, for the purposes of this provision, the terms set forth below as follows:*
 - (i) *"corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;*

- (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
- (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
- (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;
- (v) "abuse" means theft, waste, or improper use of assets related to ADB-related activity, either committed intentionally or through reckless disregard;
- (vi) "conflict of interest" means any situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations; and
- (vii) "integrity violation" is any act, as defined under ADB's Integrity Principles and Guidelines (2015, as amended from time to time), which violates ADB's Anticorruption Policy, including (i) to (vi) above and the following: obstructive practice, violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standard.

- (b) will reject a proposal for award if it determines that the Bidder recommended for award or any of its officers, directors, employees, personnel, subconsultants, subcontractors, service providers, suppliers or manufacturers has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;
- (c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of ADB-financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation, including by failing to inform ADB in a timely manner at the time they knew of the integrity violations;
- (d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines, including declaring ineligible, either indefinitely or for a stated period of time, to participate¹ in ADB-financed, -administered, or -supported activities or to benefit from an ADB-financed, -administered, or -supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations; and
- (e) will have the right to require that a provision be included in bidding documents and in contracts financed, administered, or supported by ADB, requiring Bidders, suppliers and contractors, consultants, manufacturers, service providers and other third parties engaged or involved in ADB-related activities, and their respective officers, directors, employees and personnel, to permit ADB or its representative to inspect the site and their assets, accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by ADB.

All Bidders, consultants, contractors, suppliers, manufacturers, service providers, and other third parties engaged or involved in ADB-related activities and their respective officers, directors, employees and personnel, are obliged to cooperate fully in any investigation when requested by ADB to do so. As determined on a case by case basis by ADB, such cooperation includes, but is not limited to, the following:

- (a) being available to be interviewed and replying fully and truthfully to all questions asked;
- (b) providing ADB with any items requested that are within the party's control including, but not limited to, documents and other physical objects;
- (c) upon written request by ADB, authorizing other related entities to release directly to ADB such information that is specifically and materially related, directly or indirectly, to the said entities or issues which are the subject of the investigation;
- (d) cooperating with all reasonable requests to search or physically inspect their person and/or work areas, including files, electronic databases, and personal property used on ADB activities, or that utilizes ADB's Information and Communications Technology (ICT) resources or systems (including mobile phones, personal electronic devices, and electronic storage devices such as external disk drives);

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

- (e) *cooperating in any testing requested by ADB, including but not limited to, fingerprint identification, handwriting analysis, and physical examination and analysis; and*
- (f) *preserving and protecting confidentiality of all information discussed with, and as required by, ADB.*

All Bidders, consultants, contractors and suppliers shall require their officers, directors, employees, personnel, agents to ensure that, in its contracts with its sub-consultants, Subcontractors, and other third parties engaged or involved in ADB-related activities, such sub-consultants, Subcontractors, and other third parties similarly are obliged to cooperate fully in any investigation when requested by ADB to do so.

The Contractor undertakes that no fees, gratuities, rebates, gifts, commissions or other payments, other than those shown in the bid, have been given or received in connection with the procurement process or in the contract execution.²

² The undertaking also applies during the period of performance of the contract.
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16 Suspension and Termination by Contractor

16.1 Contractor's Entitlement to Suspend Work

If the Engineer fails to certify in accordance with Sub-Clause 14.6 [Issue of Interim Payment Certificates] or the Employer fails to comply with Sub-Clause 2.4 [Employer's Financial Arrangements] or Sub-Clause 14.7 [Payment], the Contractor may, after giving not less than 21 days' notice to the Employer, suspend work (or reduce the rate of work) unless and until the Contractor has received the Payment Certificate, reasonable evidence or payment, as the case may be and as described in the notice.

Notwithstanding the above, if the Bank has suspended disbursements under the loan or credit 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 Borrower having received the suspension notification from the Bank.

The Contractor's action shall not prejudice his entitlements to financing charges under Sub-Clause 14.8 [Delayed Payment] and to termination under Sub-Clause 16.2 [Termination by Contractor].

If the Contractor subsequently receives such Payment Certificate, evidence or payment (as described in the relevant Sub-Clause and in the above notice) before giving a notice of termination, the Contractor shall resume normal working as soon as is reasonably practicable.

If the Contractor suffers delay and/or incurs Cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

16.2 Termination by Contractor

The Contractor shall be entitled to terminate the Contract if:

- (a) the Contractor does not receive the reasonable evidence within 42 days after giving notice under Sub-Clause 16.1 [Contractor's Entitlement to Suspend Work] in respect of a failure to comply with Sub-Clause 2.4 [Employer's Financial Arrangements],
- (b) the Engineer fails, within 56 days after receiving a Statement and supporting documents, to issue the relevant Payment Certificate,
- (c) the Contractor does not receive the amount due under an Interim Payment Certificate within 42 days after the expiry of the time stated in Sub-Clause 14.7 [Payment] within which payment is to be made (except for deductions in accordance with Sub-Clause 2.5 [Employer's Claims]),
- (d) the Employer substantially fails to perform his obligations under the Contract in such manner as to materially and adversely affect the economic balance of the Contract and/or the ability of the Contractor to perform the Contract,
- (e) the Employer fails to comply with Sub-Clause 1.6 [Contract Agreement] or Sub-Clause 1.7 [Assignment],
- (f) a prolonged suspension affects the whole of the Works as described in Sub-Clause 8.11 [Prolonged Suspension],
- (g) the Employer becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events,
- (h) the Contractor does not receive the Engineer's instruction recording the agreement of both Parties on the fulfilment of the conditions for the Commencement of Works under Sub-Clause 8.1 [Commencement of Works].

In any of these events or circumstances, the Contractor may, upon giving 14 days' notice to the Employer, terminate the Contract. However, in the case of sub-paragraph (f) or (g), the Contractor may by notice terminate the Contract immediately.

In the event the Bank suspends the loan or credit from which part or whole of the payments to the Contractor are being made, if the Contractor has not received the sums due to him upon expiration of the 14 days referred to in Sub-Clause 14.7 [Payment] for payments under Interim Payment Certificates, the Contractor may, without prejudice to the Contractor's entitlement to financing charges under Sub-Clause 14.8 [Delayed Payment], take one of the following actions, namely (i) suspend work or reduce the rate of work under Sub-Clause 16.1 above, or (ii) terminate the Contract by giving notice to the Employer, with a copy to the Engineer, such termination to take effect 14 days after the giving of the notice.

The Contractor's election to terminate the Contract shall not prejudice any other rights of the Contractor, under the Contract or otherwise.

16.3 Cessation of Work and Removal of Contractor's Equipment

After a notice of termination under Sub-Clause 15.5 [Employer's Entitlement to Termination for Convenience], Sub-Clause 16.2 [Termination by Contractor] or Sub-Clause 19.6 [Optional Termination, Payment and Release] has taken effect, the Contractor shall promptly:

- (a) cease all further work, except for such work as may have been instructed by the Engineer for the protection of life or property or for the safety of the Works,
- (b) hand over Contractor's Documents, Plant, Materials and other work, for which the Contractor has received payment, and
- (c) remove all other Goods from the Site, except as necessary for safety, and leave the Site.

16.4 Payment on Termination

After a notice of termination under Sub-Clause 16.2 [Termination by Contractor] has taken effect, the Employer shall promptly:

- (a) return the Performance Security to the Contractor,
- (b) pay the Contractor in accordance with Sub-Clause 19.6 [Optional Termination, Payment and Release], and
- (c) pay to the Contractor the amount of any loss or damage sustained by the Contractor as a result of this termination.

17 Risk and Responsibility

17.1 Indemnities

The Contractor shall indemnify and hold harmless the Employer, the Employer's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of:

- (a) bodily injury, sickness, disease or death, of any person whatsoever arising out of or in the course of or by reason of the Contractor's design (if any), the execution and completion of the Works and the remedying of any defects, unless attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and
- (b) damage to or loss of any property, real or personal (other than the Works), to the extent that such damage or loss arises out of or in the course of or by reason of the Contractor's design (if any), the execution and completion of the Works and the remedying of any defects, unless and to the extent that any such damage or loss is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, their respective agents, or anyone directly or indirectly employed by any of them.

The Employer shall indemnify and hold harmless the Contractor, the Contractor's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of (1) bodily injury, sickness, disease or death, which is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and (2) the matters for which liability may be excluded from insurance cover, as described in sub-paragraphs (d)(i), (ii) and (iii) of Sub-Clause 18.3 [Insurance Against Injury to Persons and Damage to Property].

17.2 Contractor's Care of the Works

The Contractor shall take full responsibility for the care of the Works and Goods from the Commencement Date until the Taking-Over Certificate is issued (or is deemed to be issued under Sub-Clause 10.1 [Taking Over of the Works and Sections]) for the Works, when responsibility for the care of the Works shall pass to the Employer. If a Taking-Over Certificate is issued (or is so deemed to be issued) for any Section or part of the Works, responsibility for the care of the Section or part shall then pass to the Employer.

After responsibility has accordingly passed to the Employer, the Contractor shall take responsibility for the care of any work which is outstanding on the date stated in a Taking-Over Certificate, until this outstanding work has been completed.

If any loss or damage happens to the Works, Goods or Contractor's Documents during the period when the Contractor is responsible for their care, from any cause not listed in Sub-Clause 17.3 [Employer's Risks], the Contractor shall rectify the loss or damage at the Contractor's risk and cost, so that the Works, Goods and Contractor's Documents conform with the Contract.

The Contractor shall be liable for any loss or damage caused by any actions performed by the Contractor after a Taking-Over Certificate has been issued. The Contractor shall also be liable for any loss or damage which occurs after a Taking-Over Certificate has been issued and which arose from a previous event for which the Contractor was liable.

17.3 Employer's Risks

The risks referred to in Sub-Clause 17.4 [Consequences of Employer's Risks] below, insofar as they directly affect the execution of the Works in the Country, are:

- (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (b) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war, within the Country,
- (c) riot, commotion or disorder within the Country by persons other than the Contractor's Personnel,
- (d) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, within the Country, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity,
- (e) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
- (f) use or occupation by the Employer of any part of the Permanent Works, except as may be specified in the Contract,
- (g) design of any part of the Works by the Employer's Personnel or by others for whom the Employer is responsible, and
- (h) any operation of the forces of nature which is Unforeseeable or against which an experienced contractor could not reasonably have been expected to have taken adequate preventive precautions.

17.4 Consequences of Employer's Risks

If and to the extent that any of the risks listed in Sub-Clause 17.3 above results in loss or damage to the Works, Goods or Contractor's Documents, the Contractor shall promptly give notice to the Engineer and shall rectify this loss or damage to the extent required by the Engineer.

If the Contractor suffers delay and/or incurs Cost from rectifying this loss or damage, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be included in the Contract Price. In the case of sub-paragraphs (f) and (g) of Sub-Clause 17.3 [Employer's Risks], Cost plus profit shall be payable.

After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

17.5 Intellectual and Industrial Property Rights

In this Sub-Clause, "infringement" means an infringement (or alleged infringement) of any patent, registered design, copyright, trade mark, trade name, trade secret or other intellectual or industrial property right relating to the Works; and "claim" means a claim (or proceedings pursuing a claim) alleging an infringement.

Whenever a Party does not give notice to the other Party of any claim within 28 days of receiving the claim, the first Party shall be deemed to have waived any right to indemnity under this Sub-Clause.

The Employer shall indemnify and hold the Contractor harmless against and from any claim alleging an infringement which is or was:

- (a) an unavoidable result of the Contractor's compliance with the Contract, or
- (b) a result of any Works being used by the Employer:
 - (i) for a purpose other than that indicated by, or reasonably to be inferred from, the Contract, or
 - (ii) in conjunction with any thing not supplied by the Contractor, unless such use was disclosed to the Contractor prior to the Base Date or is stated in the Contract.

The Contractor shall indemnify and hold the Employer harmless against and from any other claim which arises out of or in relation to (i) the manufacture, use, sale or import of any Goods, or (ii) any design for which the Contractor is responsible.

If a Party is entitled to be indemnified under this Sub-Clause, the indemnifying Party may (at its cost) conduct negotiations for the settlement of the claim, and any litigation or arbitration which may arise from it. The other Party shall, at the request and cost of the indemnifying Party, assist in contesting the claim. This other Party (and its Personnel) shall not make any admission which might be prejudicial to the indemnifying Party, unless the indemnifying Party failed to take over the conduct of any negotiations, litigation or arbitration upon being requested to do so by such other Party.

17.6 Limitation of Liability

Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, other than as specifically provided in Sub-Clause 8.7 [Delay Damages]; Sub-Clause 11.2 [Cost of Remedying Defects]; Sub-Clause 15.4 [Payment after Termination]; Sub-Clause 16.4 [Payment on Termination]; Sub-Clause 17.1 [Indemnities]; Sub-Clause 17.4(b) [Consequences of Employer's Risks] and Sub-Clause 17.5 [Intellectual and Industrial Property Rights].

The total liability of the Contractor to the Employer, under or in connection with the Contract other than under Sub-Clause 4.19 [Electricity, Water and Gas], Sub-Clause 4.20 [Employer's Equipment and Free-Issue Materials], Sub-Clause 17.1 [Indemnities] and Sub-Clause 17.5 [Intellectual and Industrial Property Rights], shall not exceed the sum resulting from the application of a multiplier (less or greater than one) to the Accepted Contract Amount, as stated in the Contract Data, or (if such multiplier or other sum is not so stated) the Accepted Contract Amount.

This Sub-Clause shall not limit liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.

17.7 Use of Employer's Accommodation/Facilities

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).

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 his own cost, rectify the loss or damage to the satisfaction of the Engineer.

18 Insurance

18.1 General Requirements for Insurances

In this Clause, "insuring Party" means, for each type of insurance, the Party responsible for effecting and maintaining the insurance specified in the relevant Sub-Clause.

Wherever the Contractor is the insuring Party, each insurance shall be effected with insurers and in terms approved by the Employer. These terms shall be consistent with any terms agreed by both Parties before the date of the Letter of Acceptance. This agreement of terms shall take precedence over the provisions of this Clause

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 any terms agreed by both Parties before the date of the Letter of Acceptance. This agreement of terms shall take precedence over the provisions of this Clause.

If a policy is required to indemnify joint insured, the cover shall apply separately to each insured as though a separate policy had been issued for each of the joint insured. If a policy indemnifies additional joint insured, namely in addition to the insured specified in this Clause, (i) the Contractor shall act under the policy on behalf of these additional joint insured except that the Employer shall act for Employer's Personnel, (ii) additional joint insured shall not be entitled to receive payments directly from the insurer or to have any other direct dealings with the insurer, and (iii) the insuring Party shall require all additional joint insured to comply with the conditions stipulated in the policy.

Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify the loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage.

The relevant insuring Party shall, within the respective periods stated in the Contract Data (calculated from the Commencement Date), submit to the other Party:

- (a) evidence that the insurances described in this Clause have been effected, and
- (b) copies of the policies for the insurances described in Sub-Clause 18.2 [Insurance for Works and Contractor's Equipment] and Sub-Clause 18.3 [Insurance against Injury to Persons and Damage to Property].

When each premium is paid, the insuring Party shall submit evidence of payment to the other Party. Whenever evidence or policies are submitted, the insuring Party shall also give notice to the Engineer.

Each Party shall comply with the conditions stipulated in each of the insurance policies. The insuring Party shall keep the insurers informed of any relevant changes to the execution of the Works and ensure that insurance is maintained in accordance with this Clause.

Neither Party shall make any material alteration to the terms of any insurance without the prior approval of the other Party. If an insurer makes (or attempts to make) any alteration, the Party first notified by the insurer shall promptly give notice to the other Party.

If the insuring Party fails to effect and keep in force any of the insurances it is required to effect and maintain under the Contract, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub-Clause, the other Party may (at its option and without prejudice to any other right or remedy) effect insurance for the relevant coverage and pay the premiums due. The insuring Party shall pay the amount of these premiums to the other Party, and the Contract Price shall be adjusted accordingly.

Nothing in this Clause limits the obligations, liabilities or responsibilities of the Contractor or the Employer, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor and/or the Employer in accordance with these obligations, liabilities or responsibilities. However, if the insuring Party fails to effect and keep in force an insurance which is available and which it is required to effect and maintain under the Contract, and the other Party neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which should have been recoverable under this insurance shall be paid by the insuring Party.

Payments by one Party to the other Party shall be subject to Sub-Clause 2.5 [Employer's Claims] or Sub-Clause 20.1 [Contractor's Claims], as applicable.

The Contractor shall be entitled to place all insurance relating to the Contract (including, but not limited to the insurance referred to Clause 18) with insurers from any eligible source country.

18.2 Insurance for Works and Contractor's Equipment

The insuring Party shall insure the Works, Plant, Materials and Contractor's Documents for not less than the full reinstatement cost including the costs of demolition, removal of debris and professional fees and profit. This insurance shall be effective from the date by which the evidence is to be submitted under sub-paragraph (a) of Sub-Clause 18.1 [General Requirements for Insurances], until the date of issue of the Taking-Over Certificate for the Works.

The insuring Party shall maintain this insurance to provide cover until the date of issue of the Performance Certificate, for loss or damage for which the Contractor is liable arising from a cause occurring prior to the issue of the Taking-Over Certificate, and for loss or damage caused by the Contractor in the course of any other operations (including those under Clause 11 [Defects Liability]).

The insuring Party shall insure the Contractor's Equipment for not less than the full replacement value, including delivery to Site. For each item of Contractor's Equipment, the insurance shall be effective while it is being transported to the Site and until it is no longer required as Contractor's Equipment.

Unless otherwise stated in the Particular Conditions, insurances under this Sub-Clause:

- (a) shall be effected and maintained by the Contractor as insuring Party,
- (b) shall be in the joint names of the Parties, who shall be jointly entitled to receive payments from the insurers, payments being held or allocated to the Party actually bearing the costs of rectifying the loss or damage,
- (c) shall cover all loss and damage from any cause not listed in Sub-Clause 17.3 [Employer's Risks],
- (d) shall also cover, to the extent specifically required in the bidding documents of the Contract, loss or damage to a part of the Works which is attributable to the use or occupation by the Employer of another part of the Works, and loss or damage from the risks listed in sub-paragraphs (c), (g) and (h) of Sub-Clause 17.3 [Employer's Risks], excluding (in each case) risks which are not insurable at commercially reasonable terms, with deductibles per occurrence of not more than the amount stated in the Contract Data (if an amount is not so stated, this sub-paragraph (d) shall not apply), and
- (e) may however exclude loss of, damage to, and reinstatement of:

- (i) a part of the Works which is in a defective condition due to a defect in its design, materials or workmanship (but cover shall include any other parts which are lost or damaged as a direct result of this defective condition and not as described in sub-paragraph (ii) below),
- (ii) a part of the Works which is lost or damaged in order to reinstate any other part of the Works if this other part is in a defective condition due to a defect in its design, materials or workmanship,
- (iii) a part of the Works which has been taken over by the Employer, except to the extent that the Contractor is liable for the loss or damage, and
- (iv) Goods while they are not in the Country, subject to Sub-Clause 14.5 [Plant and Materials intended for the Works].

If, more than one year after the Base Date, the cover described in sub-paragraph (d) above ceases to be available at commercially reasonable terms, the Contractor shall (as insuring Party) give notice to the Employer, with supporting particulars. The Employer shall then (i) be entitled subject to Sub-Clause 2.5 [Employer's Claims] to payment of an amount equivalent to such commercially reasonable terms as the Contractor should have expected to have paid for such cover, and (ii) be deemed, unless he obtains the cover at commercially reasonable terms, to have approved the omission under Sub-Clause 18.1 [General Requirements for Insurances].

18.3 Insurance against Injury to Persons and Damage to Property

The insuring Party shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Sub-Clause 18.2 [Insurance for Works and Contractor's Equipment]) or to any person (except persons insured under Sub-Clause 18.4 [Insurance for Contractor's Personnel]), which may arise out of the Contractor's performance of the Contract and occurring before the issue of the Performance Certificate.

This insurance shall be for a limit per occurrence of not less than the amount stated in the Contract Data, with no limit on the number of occurrences. If an amount is not stated in the Contract Data, this Sub-Clause shall not apply.

Unless otherwise stated in the Particular Conditions, the insurances specified in this Sub-Clause:

- (a) shall be effected and maintained by the Contractor as insuring Party,
- (b) shall be in the joint names of the Parties,
- (c) shall be extended to cover liability for all loss and damage to the Employer's property (except things insured under Sub-Clause 18.2) arising out of the Contractor's performance of the Contract, and
- (d) may however exclude liability to the extent that it arises from:
 - (i) the Employer's right to have the Permanent Works executed on, over, under, in or through any land, and to occupy this land for the Permanent Works,
 - (ii) damage which is an unavoidable result of the Contractor's obligations to execute the Works and remedy any defects, and
 - (iii) a cause listed in Sub-Clause 17.3 [Employer's Risks], except to the extent that cover is available at commercially reasonable terms.

18.4 Insurance for Contractor's Personnel

The Contractor shall effect and maintain 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.

The insurance shall cover the Employer and the Engineer 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.

The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For a Subcontractor's employees, the insurance may be effected by the Subcontractor, but the Contractor shall be responsible for compliance with this Clause.

19 Force Majeure

19.1 Definition of Force Majeure

In this Clause, "Force Majeure" means an exceptional event or circumstance:

- (a) which is beyond a Party's control,
- (b) which such Party could not reasonably have provided against before entering into the Contract,
- (c) which, having arisen, such Party could not reasonably have avoided or overcome, and
- (d) which is not substantially attributable to the other Party.

Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:

- (i) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (ii) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war,
- (iii) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel,
- (iv) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and
- (v) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.

19.2 Notice of Force Majeure

If a Party is or will be prevented from performing its substantial obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.

The Party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.

Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract

19.3 Duty to Minimise Delay

Each Party shall at all times use all reasonable endeavours to minimise any delay in the performance of the Contract as a result of Force Majeure.

A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.

19.4 Consequences of Force Majeure

If the Contractor is prevented from performing his substantial obligations under the Contract by Force Majeure of which notice has been given under Sub-Clause 19.2 [Notice of Force Majeure], and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) if the event or circumstance is of the kind described in sub-paragraphs (i) to (iv) of Sub-Clause 19.1 [Definition of Force Majeure] and, in sub-paragraphs (ii) to (iv), occurs in the Country, payment of any such Cost, including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Force Majeure, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 18.2 [Insurance for Works and Contractor's Equipment].

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

19.5 Force Majeure Affecting Subcontractor

If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader force majeure events or circumstances shall not excuse the Contractor's non-performance or entitle him to relief under this Clause.

19.6 Optional Termination, Payment and Release

If the execution of substantially all the Works in progress is prevented for a continuous period of 84 days by reason of Force Majeure of which notice has been given under Sub-Clause 19.2 [Notice of Force Majeure], or for multiple periods which total more than 140 days due to the same notified Force Majeure, then either Party may give to the other Party a notice of termination of the Contract. In this event, the termination shall take effect 7 days after the notice is given, and the Contractor shall proceed in accordance with Sub-Clause 16.3 [Cessation of Work and Removal of Contractor's Equipment].

Upon such termination, the Engineer shall determine the value of the work done and issue a Payment Certificate which shall include:

- (a) the amounts payable for any work carried out for which a price is stated in the Contract;
- (b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery: this Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal;
- (c) other Cost or liabilities which in the circumstances were reasonably and necessarily incurred by the Contractor in the expectation of completing the Works;
- (d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and

- (e) the Cost of repatriation of the Contractor's staff and labour employed wholly in connection with the Works at the date of termination.

19.7 Release from Performance

Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises which makes it impossible or unlawful for either or both Parties to fulfil its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the Contract, then upon notice by either Party to the other Party of such event or circumstance:

- (a) the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract, and
- (b) the sum payable by the Employer to the Contractor shall be the same as would have been payable under Sub-Clause 19.6 [Optional Termination, Payment and Release] if the Contract had been terminated under Sub-Clause 19.6.

20 Claims, Disputes and Arbitration

20.1 Contractor's Claims

If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give notice to the Engineer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.

If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.

The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Engineer. Without admitting the Employer's liability, the Engineer may, after receiving any notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to keep further contemporary records. The Contractor shall permit the Engineer to inspect all these records, and shall (if instructed) submit copies to the Engineer.

Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Engineer, the Contractor shall send to the Engineer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:

- (a) this fully detailed claim shall be considered as interim;
- (b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Engineer may reasonably require; and
- (c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Engineer.

Within 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Engineer and approved by the Contractor, the Engineer shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within the above defined time period.

Within the above defined period of 42 days, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause 8.4 [Extension of Time for Completion], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

Each Payment Certificate shall include such additional payment for any claim as has been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

If the Engineer does not respond within the timeframe defined in this Clause, either Party may consider that the claim is rejected by the Engineer and any of the Parties may refer to the Dispute Board in accordance with Sub-Clause 20.4 [Obtaining Dispute Board's Decision].

The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause.

20.2 Appointment of the Dispute Board

Disputes shall be referred to a DB for decision in accordance with Sub-Clause 20.4 [Obtaining Dispute Board's Decision]. The Parties shall appoint a DB by the date stated in the Contract Data.

The DB shall comprise, as stated in the Contract Data, either one or three suitably qualified persons ("the members"), each of whom shall be fluent in the language for communication defined in the Contract and shall be a professional experienced in the type of construction involved in the Works and with the interpretation of contractual documents. If the number is not so stated and the Parties do not agree otherwise, the DB shall comprise three persons.

If the Parties have not jointly appointed the DB 21 days before the date stated in the Contract Data and the DB is to comprise three persons, each Party shall nominate one member for the approval of the other Party. The first two members shall recommend and the Parties shall agree upon the third member, who shall act as chairman.

However, if a list of potential members has been agreed by the Parties and is included in the Contract, the members shall be selected from those on the list, other than anyone who is unable or unwilling to accept appointment to the DB.

The agreement between the Parties and either the sole member or each of the three members shall incorporate by reference the General Conditions of Dispute Board Agreement contained in the Appendix to these General Conditions, with such amendments as are agreed between them.

The terms of the remuneration of either the sole member or each of the three members, including the remuneration of any expert whom the DB consults, shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.

If at any time the Parties so agree, they may jointly refer a matter to the DB for it to give its opinion. Neither Party shall consult the DB on any matter without the agreement of the other Party.

If a member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment, a replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause.

The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the DB (including each member) shall expire when the discharge referred to in Sub-Clause 14.12 [Discharge] shall have become effective.

20.3 Failure to Agree on the Composition of the Dispute Board

If any of the following conditions apply, namely:

- (a) the Parties fail to agree upon the appointment of the sole member of the DB by the date stated in the first paragraph of Sub-Clause 20.2, [Appointment of the Dispute Board]
- (b) either Party fails to nominate a member (for approval by the other Party), or fails to approve a member nominated by the other Party, of a DB of three persons by such date,
- (c) the Parties fail to agree upon the appointment of the third member (to act as chairman) of the DB by such date, or
- (d) the Parties fail to agree upon the appointment of a replacement person within 42 days after the date on which the sole member or one of the three members declines to act or is unable to act as a result of death, disability, resignation or termination of appointment,

then the appointing entity or official named in the Contract Data shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the DB. This appointment shall be final and conclusive. Each Party shall be responsible for paying one-half of the remuneration of the appointing entity or official.

20.4 Obtaining Dispute Board's Decision

If a dispute (of any kind whatsoever) arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works, including any dispute as to any certificate, determination, instruction, opinion or valuation of the Engineer, either Party may refer the dispute in writing to the DB for its decision, with copies to the other Party and the Engineer. Such reference shall state that it is given under this Sub-Clause.

For a DB of three persons, the DB shall be deemed to have received such reference on the date when it is received by the chairman of the DB.

Both Parties shall promptly make available to the DB all such additional information, further access to the Site, and appropriate facilities, as the DB may require for the purposes of making a decision on such dispute. The DB shall be deemed to be not acting as arbitrator(s).

Within 84 days after receiving such reference, or within such other period as may be proposed by the DB and approved by both Parties, the DB shall give its decision, which shall be reasoned and shall state that it is given under this Sub-Clause. The decision shall be binding on both Parties, who shall promptly give effect to it unless and until it shall be revised in an amicable settlement or an arbitral award as described below. Unless the Contract has already been abandoned, repudiated or terminated, the Contractor shall continue to proceed with the Works in accordance with the Contract.

If either Party is dissatisfied with the DB's decision, then either Party may, within 28 days after receiving the decision, give a Notice of Dissatisfaction to the other Party indicating its dissatisfaction and intention to commence arbitration. If the DB fails to give its decision within the period of 84 days (or as otherwise approved) after receiving such reference, then either Party may, within 28 days after this period has expired, give a Notice of Dissatisfaction to the other Party.

In either event, this Notice of Dissatisfaction shall state that it is given under this Sub-Clause, and shall set out the matter in dispute and the reason(s) for dissatisfaction. Except as stated in Sub-Clause 20.7 [Failure to Comply with Dispute Board's Decision] and Sub-Clause 20.8 [Expiry of Dispute Board's Appointment], neither Party shall be entitled to commence arbitration of a dispute unless a Notice of Dissatisfaction has been given in accordance with this Sub-Clause.

If the DB has given its decision as to a matter in dispute to both Parties, and no Notice of Dissatisfaction has been given by either Party within 28 days after it received the DB's decision, then the decision shall become final and binding upon both Parties.

If the decision of the DB requires a payment by one Party to the other Party, the DB may require the payee to provide an appropriate security in respect of such payment..

20.5 Amicable Settlement

Where a Notice of Dissatisfaction has been given under Sub-Clause 20.4 above, both Parties shall attempt to settle the dispute amicably before the commencement of arbitration. However, unless both Parties agree otherwise, the Party giving a Notice of Dissatisfaction in accordance with Sub-Clause 20.4 above should move to commence arbitration after the fifty-sixth day from the day on which a Notice of Dissatisfaction was given, even if no attempt at an amicable settlement has been made.

20.6 Arbitration

Any dispute between the Parties arising out of or in connection with the Contract not settled amicably in accordance with Sub-Clause 20.5 above and in respect of which the DB's decision (if any) has not become final and binding shall be finally settled by arbitration. Arbitration shall be conducted as follows:

(a) if the contract is with foreign contractors,

(i) for contracts financed by all participating Banks except under sub-paragraph (a) (2) below:

international arbitration (1) with proceedings administered by the arbitration institution designated in the Contract Data, and conducted under the rules of arbitration of such institution; or, if so specified in the Contract Data, (2) international arbitration in accordance with the arbitration rules of the United Nations Commission on International Trade Law (UNCITRAL); or (3) if neither an arbitration institution nor UNCITRAL arbitration rules are specified in the Contract Data, with proceedings administered by the International Chamber of Commerce (ICC) and conducted under the ICC Rules of Arbitration; by one or more arbitrators appointed in accordance with said arbitration rules.

(ii) for contracts financed by the Asian Development Bank:

international arbitration (1) with proceedings administered by the arbitration institution specified in the Contract Data and conducted under the rules of arbitration of such institution unless it is specified in the Contract Data that the arbitration shall be conducted under the rules of the United Nations Commission on International Trade Law (UNCITRAL) and if UNCITRAL Rules are so specified then the named arbitration institution shall be the appointing authority and shall administer the arbitration); or (2) if an arbitration institution is not specified in the Contract Data, with proceedings administered by the Singapore International Arbitration Centre (SIAC) and conducted under the SIAC Rules, by one or more arbitrators appointed in accordance with the said arbitration rules.

(b) if the Contract is with domestic contractors, arbitration with proceedings conducted in accordance with the laws of the Employer's country.

The place of arbitration shall be the neutral location specified in the Contract Data; and the arbitration shall be conducted in the language for communications defined in Sub-Clause 1.4 [Law and Language].

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.

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. Any decision of the DB shall be admissible in evidence in the arbitration.

Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties, the Engineer and the DB shall not be altered by reason of any arbitration being conducted during the progress of the Works.

20.7 Failure to Comply with Dispute Board's Decision

In the event that a Party fails to comply with a final and binding DB decision, then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under Sub-Clause 20.6 [Arbitration]. Sub-Clause 20.4 [Obtaining Dispute Board's Decision] and Sub-Clause 20.5 [Amicable Settlement] shall not apply to this reference.

In the event that a Party fails to comply with any decision of the DB, whether binding or final and binding, then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under Sub-Clause 20.6 [Arbitration] for summary or other expedited relief, as may be appropriate. Sub-Clause 20.4 [Obtaining Dispute Board's Decision] and Sub-Clause 20.5 [Amicable Settlement] shall not apply to this reference

20.8 Expiry of Dispute Board's Appointment

If a dispute arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works and there is no DB in place, whether by reason of the expiry of the DB's appointment or otherwise:

- (a) Sub-Clause 20.4 [Obtaining Dispute Board's Decision] and Sub-Clause 20.5 [Amicable Settlement] shall not apply, and
- (b) the dispute may be referred directly to arbitration under Sub-Clause 20.6 [Arbitration].

APPENDIX

A General Conditions of Dispute Board Agreement

1 Definitions

Each "Dispute Board Agreement" is a tripartite agreement by and between:

- (a) the "Employer";
- (b) the "Contractor"; and
- (c) the "Member" who is defined in the Dispute Board Agreement as being:
 - (i) the sole member of the "DB" and, where this is the case, all references to the "Other Members" do not apply, or
 - (ii) one of the three persons who are jointly called the "DB" (or "Dispute Board") and, where this is the case, the other two persons are called the "Other Members".

The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Board Agreement, which incorporates this Appendix. In the Dispute Board Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.

2 General Provisions

Unless otherwise stated in the Dispute Board Agreement, it shall take effect on the latest of the following
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dates:

- (a) the Commencement Date defined in the Contract,

- (b) when the Employer, the Contractor and the Member have each signed the Dispute Board Agreement, or
- (c) when the Employer, the Contractor and each of the Other Members (if any) have respectively each signed a dispute board agreement.

This employment of the Member is a personal appointment. At any time, the Member may give not less than 70 days' notice of resignation to the Employer and to the Contractor, and the Dispute Board Agreement shall terminate upon the expiry of this period.

3 Warranties

The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Engineer. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is:

- (a) experienced in the work which the Contractor is to carry out under the Contract,
- (b) experienced in the interpretation of contract documentation, and
- (c) fluent in the language for communications defined in the Contract.

4 General Obligations of the Member

The Member shall:

- (a) have no interest financial or otherwise in the Employer, the Contractor or Engineer, nor any financial interest in the Contract except for payment under the Dispute Board Agreement;
- (b) not previously have been employed as a consultant or otherwise by the Employer, the Contractor or the Engineer, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Board Agreement;
- (c) have disclosed in writing to the Employer, the Contractor and the Other Members (if any), before entering into the Dispute Board Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer or employee of the Employer, the Contractor or the Engineer, and any previous involvement in the overall project of which the Contract forms part;
- (d) not, for the duration of the Dispute Board Agreement, be employed as a consultant or otherwise by the Employer, the Contractor or the Engineer, except as may be agreed in writing by the Employer, the Contractor and the Other Members (if any);
- (e) comply with the annexed procedural rules and with Sub-Clause 20.4 of the Conditions of Contract;
- (f) not give advice to the Employer, the Contractor, the Employer's Personnel or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules;
- (g) not while a Member enter into discussions or make any agreement with the Employer, the Contractor or the Engineer regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Board Agreement;
- (h) ensure his/her availability for all site visits and hearings as are necessary;

- (i) become conversant with the Contract and with the progress of the Works (and of any other parts of the project of which the Contract forms part) by studying all documents received which shall be maintained in a current working file;
- (j) treat the details of the Contract and all the DB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor and the Other Members (if any); and
- (k) be available to give advice and opinions, on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members (if any).

5 General Obligations of the Employer and the Contractor

The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the DB's activities under the Contract and the Dispute Board Agreement. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel respectively.

The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members (if any):

- (a) be appointed as an arbitrator in any arbitration under the Contract;
- (b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract; or
- (c) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he is relieved from liability under the preceding paragraph.

Whenever the Employer or the Contractor refers a dispute to the DB under Sub-Clause 20.4 of the Conditions of Contract, which will require the Member to make a site visit and attend a hearing, the Employer or the Contractor shall provide appropriate security for a sum equivalent to the reasonable expenses to be incurred by the Member. No account shall be taken of any other payments due or paid to the Member.

6 Payment

The Member shall be paid as follows, in the currency named in the Dispute Board Agreement:

- (a) a retainer fee per calendar month, which shall be considered as payment in full for:
 - (i) being available on 28 days' notice for all Site visits and hearings;
 - (ii) becoming and remaining conversant with all project developments and maintaining relevant files;
 - (iii) all office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his duties; and
 - (iv) all services performed hereunder except those referred to in sub-paragraphs (b) and (c) of this Clause.

The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Board Agreement becomes effective; until the last day of the calendar month in which the Taking-Over Certificate is issued for the whole of the Works.

With effect from the first day of the calendar month following the month in which the Taking-Over Certificate is issued for the whole of the Works, the retainer fee shall be reduced by one third. This reduced fee shall be paid until the first day of the calendar month in which the Member resigns or the Dispute Board Agreement is otherwise terminated.

- (b) a daily fee which shall be considered as payment in full for:
 - (i) each day or part of a day up to a maximum of two days' travel time in each direction for the journey between the Member's home and the Site, or another location of a meeting with the Other Members (if any);
 - (ii) each working day on Site visits, hearings or preparing decisions; and
 - (iii) each day spent reading submissions in preparation for a hearing.
- (c) all reasonable expenses including necessary travel expenses (air fare in less than first class, hotel and subsistence and other direct travel expenses) incurred in connection with the Member's duties, as well as the cost of telephone calls, courier charges, faxes and telexes: a receipt shall be required for each item in excess of five percent of the daily fee referred to in sub-paragraph (b) of this Clause;
- (d) any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.

The retainer and daily fees shall be as specified in the Dispute Board Agreement. Unless it specifies otherwise, these fees shall remain fixed for the first 24 calendar months, and shall thereafter be adjusted by agreement between the Employer, the Contractor and the Member, at each anniversary of the date on which the Dispute Board Agreement became effective.

If the parties fail to agree on the retainer fee or the daily fee, the appointing entity or official named in the Contract Data shall determine the amount of the fees to be used.

The Member shall submit invoices for payment of the monthly retainer and air fares quarterly in advance. Invoices for other expenses and for daily fees shall be submitted following the conclusion of a Site visit or hearing. All invoices shall be accompanied by a brief description of activities performed during the relevant period and shall be addressed to the Contractor.

The Contractor shall pay each of the Member's invoices in full within 56 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Board Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the DB; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in Sub-Clause 14.8 of the Conditions of Contract.

If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is received, and/or (ii) resign his/her appointment by giving notice under Clause 7.

7 Termination

At any time: (i) the Employer and the Contractor may jointly terminate the Dispute Board Agreement by giving 42 days' notice to the Member; or (ii) the Member may resign as provided for in Clause 2.

If the Member fails to comply with the Dispute Board Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by notice to the Member. The notice shall take effect when received by the Member.

If the Employer or the Contractor fails to comply with the Dispute Board Agreement, the Member may, without prejudice to his other rights, terminate it by notice to the Employer and the Contractor. The notice shall take effect when received by them both.

Any such notice, resignation and termination shall be final and binding on the Employer, the Contractor and the Member. However, a notice by the Employer or the Contractor, but not by both, shall be of no effect.

8 Default of the Member

If the Member fails to comply with any of his obligations under Clause 4 (a) - (d) above, he shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members (if any), for proceedings or decisions (if any) of the DB which are rendered void or ineffective by the said failure to comply.

If the Member fails to comply with any of his obligations under Clause 4 (e) - (k) above, he shall not be entitled to any fees or expenses hereunder from the date and to the extent of the non-compliance and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses already received by the Member, for proceedings or decisions (if any) of the DB which are rendered void or ineffective by the said failure to comply.

9 Disputes

Any dispute or claim arising out of or in connection with this Dispute Board Agreement, or the breach, termination or invalidity thereof, shall be finally settled by institutional arbitration. If no other arbitration institute is agreed, the arbitration shall be conducted under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.

PROCEDURAL RULES

- 1 Unless otherwise agreed by the Employer and the Contractor, the DB shall visit the Site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor and the DB, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.
- 2 The timing of and agenda for each Site visit shall be as agreed jointly by the DB, the Employer and the Contractor, or in the absence of agreement, shall be decided by the DB. The purpose of Site visits is to enable the DB to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims, and, as far as reasonable, to endeavour to prevent potential problems or claims from becoming disputes.
- 3 Site visits shall be attended by the Employer, the Contractor and the Engineer and shall be co-ordinated by the Employer in co-operation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each Site visit and before leaving the site, the DB shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.
- 4 The Employer and the Contractor shall furnish to the DB one copy of all documents which the DB may request, including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the performance of the Contract. All communications between the DB and the Employer or the Contractor shall be copied to the other Party. If the DB comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.

- 5 If any dispute is referred to the DB in accordance with Sub-Clause 20.4 of the Conditions of Contract, the DB shall proceed in accordance with Sub-Clause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the DB shall:
- (a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case, and
 - (b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.
- 6 The DB may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.
- 7 Except as otherwise agreed in writing by the Employer and the Contractor, the DB shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer, the Contractor and the Engineer, and to proceed in the absence of any party who the DB is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.
- 8 The Employer and the Contractor empower the DB, among other things, to:
- (a) establish the procedure to be applied in deciding a dispute,
 - (b) decide upon the DB's own jurisdiction, and as to the scope of any dispute referred to it,
 - (c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Rules.
 - (d) take the initiative in ascertaining the facts and matters required for a decision,
 - (e) make use of its own specialist knowledge, if any,
 - (f) decide upon the payment of financing charges in accordance with the Contract,
 - (g) decide upon any provisional relief such as interim or conservatory measures, and
 - (h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Engineer, relevant to the dispute.
- 9 The DB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the DB shall make and give its decision in accordance with Sub-Clause 20.4, or as otherwise agreed by the Employer and the Contractor in writing. If the DB comprises three persons:
- (a) it shall convene in private after a hearing, in order to have discussions and prepare its decision;
 - (b) it shall endeavour to reach a unanimous decision: if this proves impossible the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
 - (c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless:
 - (i) either the Employer or the Contractor does not agree that they do so, or
 - (ii) the absent Member is the chairman and he/she instructs the other Members to not make a decision.

Section 7 - General Conditions of Contract

The Conditions of Contract comprise two parts, this Section 7 - General Conditions of Contract (GCC) and the following Section 8 - Particular Conditions of Contract (PCC).

The General Conditions shall be the Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer, Multilateral Development Bank Harmonized Edition, prepared by the Fédération Internationale des Ingénieurs-Conseil, or FIDIC (FIDIC MDB Harmonized Construction Contract) available at [FIDIC MDB June 2010](#). The FIDIC MDB Harmonized Construction Contract is exclusive for the use of ADB Borrowers and their project implementing agencies as provided under the License Agreement dated 9 June 2005, between ADB and FIDIC, and, consequently, no part of this publication may be reproduced, translated, adapted, stored in a retrieval system or communicated, in any form or by any means, whether mechanical, electronic, magnetic, photocopying, recording or otherwise, without prior permission in writing from FIDIC, except by the Employer identified in the contract and only for the exclusive purpose of preparing bidding documents for ADB-financed contracts.

The standard text of the General Conditions chosen must be retained intact to facilitate its reading and interpretation by Bidders and its review by ADB. Any amendments and additions to the GCC, specific to the contract in hand, should be introduced in Section 8 (Particular Conditions of Contract), Part A (Contract Data) and Part B (Special Provisions). Clause numbers in the PCC correspond to those in the GCC. As per GCC 1.5 (Priority of Documents), the PCC takes precedence over the GCC.

Part A (Contract Data) of the PCC includes data to complement the GCC in a manner similar to the way in which the Bid Data Sheet (BDS) complements the Instructions to Bidders (ITB).

Part B (Specific Provisions) is to be used to introduce country- or project-specific provisions, if so required. Whoever drafts the Specific Provisions should be thoroughly familiar with the provisions of the GCC and with any specific requirements of the Contract. Legal advice is recommended when amending provisions or drafting new ones.

The Conditions of Contract have been prepared for an ad measurement (unit price or unit rate) type of contract and cannot be used for other types of contract.

APPENDIX

General Conditions of Dispute Board Agreement

1. Definitions

Each "Dispute Board Agreement" is a tripartite agreement by and between:

- (a) the "Employer";
- (b) the "Contractor"; and
- (c) the "Member" who is defined in the Dispute Board Agreement as being:
 - (i) the sole member of the "DB" and, where this is the case, all references to the "Other Members" do not apply, or
 - (ii) one of the three persons who are jointly called the "DB" (or "dispute board") and, where this is the case, the other two persons are called the "Other Members."

The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Board Agreement, which incorporates this Appendix. In the Dispute Board Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.

2. General Provisions

Unless otherwise stated in the Dispute Board Agreement, it shall take effect on the latest of the following dates:

- (a) the Commencement Date defined in the Contract,
- (b) when the Employer, the Contractor, and the Member have each signed the Dispute Board Agreement, or
- (c) when the Employer, the Contractor and each of the Other Members (if any) have respectively each signed a dispute board agreement.

This employment of the Member is a personal appointment. At any time, the Member may give not less than 70 days' notice of resignation to the Employer and to the Contractor, and the Dispute Agreement shall terminate upon the expiry of this period.

3. Warranties

The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor, and the Engineer. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance, which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is

- (a) experienced in the work, which the Contractor is to carry out under the Contract;
- (b) experienced in the interpretation of contract documentation; and
- (c) fluent in the language for communications defined in the Contract.

4. General Obligations of the Member

The Member shall

- (a) have no interest, financial or otherwise, in the Employer, the Contractor or Engineer, nor any financial interest in the Contract except for payment under the Dispute Board Agreement;
- (b) not previously have been employed as a consultant or otherwise by the Employer, the Contractor, or the Engineer, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Board Agreement;
- (c) have disclosed in writing to the Employer, the Contractor, and the Other Members (if any), before entering into the Dispute Board Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer, or employee of the Employer, the Contractor or the Engineer, and any previous involvement in the overall project of which the Contract forms part;
- (d) not, for the duration of the Dispute Board Agreement, be employed as a consultant or otherwise by the Employer, the Contractor, or the Engineer, except as may be agreed in writing by the Employer, the Contractor, and the Other Members (if any);
- (e) comply with the annexed procedural rules and with Subclause 20.4 of the Conditions of Contract;
- (f) not give advice to the Employer, the Contractor, the Employer's Personnel or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules;
- (g) not, while a Member, enter into discussions or make any agreement with the Employer, the Contractor, or the Engineer regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Board Agreement;
- (h) ensure his/her availability for all site visits and hearings as are necessary;
- (i) become conversant with the Contract and with the progress of the Works (and of any other parts of the project of which the Contract forms part) by studying all documents received, which shall be maintained in a current working file;
- (j) treat the details of the Contract and all the Dispute Board's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor, and the Other Members (if any); and
- (k) be available to give advice and opinions, on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members (if any).

5. General Obligations of the Employer and the Contractor

The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the Dispute Board's activities under the Contract and the Dispute Board Agreement. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel

respectively.

The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member, and the Other Members (if any),

- (a) be appointed as an arbitrator in any arbitration under the Contract;
- (b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract; or
- (c) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he is relieved from liability under the preceding paragraph.

Whenever the Employer or the Contractor refers a dispute to the Dispute Board under Subclause 20.4 of the Conditions of Contract, which will require the Member to make a site visit and attend a hearing, the Employer or the Contractor shall provide appropriate security for a sum equivalent to the reasonable expenses to be incurred by the Member. No account shall be taken of any other payments due or paid to the Member.

6. Payment

The Member shall be paid as follows, in the currency named in the Dispute Board Agreement:

- (a) a retainer fee per calendar month, which shall be considered as payment in full for
 - (i) being available on 28 days' notice for all site visits and hearings;
 - (ii) becoming and remaining conversant with all project developments and maintaining relevant files;
 - (iii) all office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his duties; and
 - (iv) all services performed hereunder except those referred to in subparagraphs (b) and (c) of this Clause.

The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Board Agreement becomes effective; until the last day of the calendar month in which the Taking-Over Certificate is issued for the whole of the Works.

With effect from the first day of the calendar month following the month in which the Taking-Over Certificate is issued for the whole of the Works, the retainer fee shall be reduced by one third. This reduced fee shall be paid until the first day of the calendar month in which the Member resigns or the Dispute Board Agreement is otherwise terminated.

- (b) a daily fee, which shall be considered as payment in full, for
 - (i) each day or part of a day up to a maximum of 2 days' travel time in each direction for the journey between the Member's home and the site, or another location of a meeting with the Other Members (if

- any);
- (ii) each working day on Site visits, hearings, or preparing decisions; and
 - (iii) each day spent reading submissions in preparation for a hearing.
- (c) all reasonable expenses, including necessary travel expenses (air fare in less than first class, hotel and subsistence, and other direct travel expenses) incurred in connection with the Member's duties, as well as the cost of telephone calls, courier charges, faxes and telexes: a receipt shall be required for each item in excess of five percent (5%) of the daily fee referred to in sub-paragraph (b) of this Clause;
- (d) any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.

The retainer and daily fees shall be as specified in the Dispute Board Agreement. Unless it specifies otherwise, these fees shall remain fixed for the first 24 calendar months, and shall thereafter be adjusted by agreement between the Employer, the Contractor, and the Member, at each anniversary of the date on which the Dispute Board Agreement became effective.

If the parties fail to agree on the retainer fee or the daily fee, the appointing entity or official named in the Contract Data shall determine the amount of the fees to be used.

The Member shall submit invoices for payment of the monthly retainer and air fares quarterly in advance. Invoices for other expenses and for daily fees shall be submitted following the conclusion of a site visit or hearing. All invoices shall be accompanied by a brief description of activities performed during the relevant period and shall be addressed to the Contractor.

The Contractor shall pay each of the Member's invoices in full within 56 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Board Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the Dispute Board; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in Subclause 14.8 of the Conditions of Contract.

If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is received, and/or (ii) resign his/her appointment by giving notice under Clause 7.

7. Termination

At any time, (i) the Employer and the Contractor may jointly terminate the Dispute Board Agreement by giving 42 days' notice to the Member; or (ii) the Member may resign as provided for in Clause 2.

If the Member fails to comply with the Dispute Board Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by notice to the Member. The notice shall take effect when received by the Member.

If the Employer or the Contractor fails to comply with the Dispute Board Agreement, the Member may, without prejudice to his other rights, terminate it by notice to the Employer and the Contractor. The notice shall take effect when received by them both.

Any such notice, resignation and termination shall be final and binding on the Employer, the Contractor, and the Member. However, a notice by the Employer or the Contractor, but not by both, shall be of no effect.

8. Default of the Member

If the Member fails to comply with any of his obligations under Clause 4 (a)-(d) above, he shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members (if any), for proceedings or decisions (if any) of the Dispute Board which are rendered void or ineffective by the said failure to comply.

If the Member fails to comply with any of his obligations under Clause 4 (e) - (k) above, he shall not be entitled to any fees or expenses hereunder from the date and to the extent of the noncompliance and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses already received by the Member, for proceedings or decisions (if any) of the Dispute Board, which are rendered void or ineffective by the said failure to comply.

9. Disputes

Any dispute or claim arising out of or in connection with this Dispute Board Agreement, or the breach, termination, or invalidity thereof, shall be finally settled by institutional arbitration. If no other arbitration institute is agreed, the arbitration shall be conducted under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.

Procedural Rules

Unless otherwise agreed by the Employer and the Contractor, the Dispute Board shall visit the site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor, and the Dispute Board, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.

The timing of and agenda for each site visit shall be as agreed jointly by the Dispute Board, the Employer, and the Contractor, or in the absence of agreement, shall be decided by the Dispute Board. The purpose of site visits is to enable the Dispute Board to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims, and, as far as reasonable, to endeavor to prevent potential problems or claims from becoming disputes.

Site visits shall be attended by the Employer, the Contractor, and the Engineer and shall be coordinated by the Employer in cooperation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each site visit and before leaving the site, the Dispute Board shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.

The Employer and the Contractor shall furnish to the Dispute Board one copy of all documents which the Dispute Board may request, including Contract documents, progress reports, variation instructions, certificates, and other documents pertinent to the performance of the Contract. All communications between the DB and the Employer or the Contractor shall be copied to the other Party. If the Dispute Board comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.

If any dispute is referred to the Dispute Board in accordance with Subclause 20.4 of the Conditions of Contract, the Dispute Board shall proceed in accordance with Subclause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the Dispute Board shall

- (a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case; and
- (b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.

The Dispute Board may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.

Except as otherwise agreed in writing by the Employer and the Contractor, the Dispute Board shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer, the Contractor, and the Engineer, and to proceed in the absence of any party who the Dispute Board is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.

The Employer and the Contractor empower the Dispute Board, among other things, to

- (a) establish the procedure to be applied in deciding a dispute;
- (b) decide upon the Dispute Board's own jurisdiction, and as to the scope of any dispute referred to it;

- (c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Guidelines;
- (d) take the initiative in ascertaining the facts and matters required for a decision;
- (e) make use of its own specialist knowledge, if any;
- (f) decide upon the payment of financing charges in accordance with the Contract;
- (g) decide upon any provisional relief such as interim or conservatory measures; and
- (h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Engineer, relevant to the dispute.

The Dispute Board shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the Dispute Board shall make and give its decision in accordance with Subclause 20.4, or as otherwise agreed by the Employer and the Contractor in writing. If the Dispute Board comprises three persons:

- (a) it shall convene in private after a hearing, in order to have discussions and prepare its decision;
- (b) it shall endeavour to reach a unanimous decision: if this proves impossible, the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
- (c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless
 - (i) either the Employer or the Contractor does not agree that they do so, or
 - (ii) the absent Member is the chairman and he/she instructs the other Members to not make a decision.

Section 8 - Particular Conditions of Contract

The following Particular Conditions of Contract (PCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

Part A – Contract Data

Ref. GCC	Subject	Data
1.1.2.2 and 1.3	Employer's name and address	Odisha Skill Development Authority, Government of Odisha, Bhubaneswar. Chief Executive Officer, Odisha Skill Development Authority (OSDA), Skill Development and Technical Education Department Street address: World Skill Center, Block B, Sector A, Tower, 2010, Mancheswar Industrial Estate , Bhubaneswar, ODISHA ZIP code: 751007 Country: India
1.1.2.4 and 1.3	Engineer's name and address	Mr. Sanjay Padhi, General Manager – Projects Email – sanjay.padhi@worldskillcenter.org Phone number - 9937360311
1.1.2.11	Bank's name	Asian Development Bank (ADB)
1.1.2.12	Borrower's name	India
1.1.3.3	Time for Completion	730 days
1.1.3.7	Defects Notification Period	365 days.
1.3	Electronic transmission systems	E-mail is acceptable for use as communication .

1.4	Governing Law	The law of India
1.4	Ruling language	English
1.4	Language for communications	English
2.1	Time for access to the Site	Except for parts of the Site which the Contractor is responsible for arranging for the purpose of the Contractor's temporary facilities, including storage areas and the like. 07 days after Commencement Date
3.1(B)(ii)	Engineer's Duties and Authority	Each Variation resulting in variation by more than 10% within Accepted contract amount shall require approval of the Employer.
4.2	Performance Security	The performance security will be in the form of an unconditional bank guarantee in the amount(s) of 5% of the Accepted Contract Amount.
4.8	Safety Procedures	After bullet point (b), add the following: <i>"In particular, the Contractor is responsible for providing site workers with safe and healthy working conditions and establish an operating system to prevent accidents, injuries, and disease."</i>
6.5	Normal working hours	0800 hrs to 1700 hours, all working days

6.25	Respectful Work Environment	<p>The following sentence shall apply:</p> <p>The Contractor shall ensure that its employees and sub-contractors observe the highest ethical standards and refrain from any form of bullying, discrimination, misconduct and harassment, including sexual harassment and shall, at all times, behave in a manner that creates an environment free of unethical behavior, bullying, misconduct and harassment, including sexual harassment. The Contractor shall take appropriate action</p>
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		<p>against any employees or sub-contractors, including suspension or termination of employment or sub-contract, if any form of unethical or inappropriate behavior is identified.</p> <p>The Contractor shall conduct training programs for its employees and sub-contractors to raise awareness on and prevent any form of bullying, discrimination, misconduct and harassment including sexual harassment, and to promote a respectful work environment. The Contractor shall keep an up to date record of its employees and subcontractors who have attended and completed such training programs and provide such records to the Employer or the Engineer at their first written request.</p>
8.7 & 14.15(b)	Delay damages for the Works	0.1 % of the Contract Price per day, in the currencies and proportions in which the Contract Price is payable.
8.7	Maximum amount of delay damages	10 % of the Contract Price.
13.5.(b)(ii)	Provisional Sums	5%
13.8	Adjustments for Changes in Cost	Contract price shall not be adjustable
14.1	The Contract Price	The following sentence under Clause 14.1 shall <u>not</u> apply: <i>“Notwithstanding the provisions of sub-paragraph (b), Contractor’s Equipment, including essential spare parts therefor, imported by the Contractor for the sole purpose of executing the Contract shall be exempt from the payment of import duties and taxes upon importation.”</i>
14.2	Total advance payment	<p>10% of the Accepted Contract Amount payable in the currencies and proportions in which the Accepted Contract Amount is payable in two installments:</p> <p>1) First installment of 5% is payable within a week of contract signing and</p> <p>2) Second installment of 5% is payable after mobilization by contractor at site and setting up of office and test laboratory etc., which has to be certified by the engineer.</p>
14.2(b)	Repayment amortization of advance payment	Repayment of the Advance Payments shall be at a rate of 15% (fifteen percent) from each payment certificate and advance payment will be recovered before payment of the 80% of contract amount
14.3(c)	Percentage of Retention	10% from each claim bill till total retention equals to 5% of Accepted contract Amount
14.3(c)	Limit of Retention Money	5% of the Accepted Contract Amount.

14.4	Schedule of Payment	Stage	ACTIVITY	% PAYABLE
		Stage -1	Final Approval of Architectural and Structural design and drawings including permission and clearances from local bodies and other statutory bodies etc.	2
		Stage -2	Construction linked payments payable upon certification by the Engineer-in-Charge, as listed below for various major activities	87
		Stage -3	Completion of project to the satisfaction of Engineer-in-Charge and Authorized committee	5
		Stage -4	Upon issue of As Built drawings and obtaining completion certificate/ Occupancy certificate	1
		Stage -5	Release of bid performance security after successful completion of defect liability period	5
		TOTAL (Refer Clause 14.2,14.3)		100
		<p>87 % PAYMENT LINKED TO CONSTRUCTION - FOR 2 STORIED BUILDINGS</p> <ul style="list-style-type: none"> •Construction up to plinth level – 10% •Casting of Ground floor roof – 10% .Casting of First floor roof – 10% •Finishing work of Ground Floor including sanitary and electrical fittings, HVAC system, – 20% Finishing work of First Floor including sanitary and electrical fittings, HVAC system, – 25% •Completion of Engineering services – 6% • Completion of Site development works- 6% <p>87 % PAYMENT LINKED TO CONSTRUCTION - FOR ELECTRO MECHANICAL WORKS AND EQUIPMENT</p> <ul style="list-style-type: none"> •Upon delivery at site – 40% •Upon erection, successful testing and commissioning- 47% <p>87 % PAYMENT LINKED TO CONSTRUCTION - FOR UNDERGROUND WATER TANKS</p> <ul style="list-style-type: none"> •Upon Casting base slab/ foundations – 15% •Upon completion of structure - 60% •Upon successful testing and commissioning - 12% 		
14.5(b)(i)	Plant and Materials	Not Applicable		
14.5(c)(i)				

14.6	Minimum Amount of Interim Payment Certificates	<u>NA.</u>
15.2	Termination by Employer	<p>This sentence will apply as Subclause 15.2(g):</p> <p>(g) Violates any of the contract provisions on labor (including not employing or using children as labor, equal pay for equal work), Health, safety, welfare, sanitation and working conditions.</p> <p>The Engineer gives two consecutive Notices to update the Program and accelerate the works to ensure compliance with Subclause 8.2 (Time for Completion) and the Contractor fails to update the Program and demonstrate acceleration of the works within a reasonable period of time determined by the Engineer.</p>
17.6	Maximum total liability of the Contractor to the Employer	The product of 1.0 times the Accepted Contract Amount,
18.1, 18.2 (d) and 18.3	Insurance	Please ensure that insurance due diligence has been carried out by the Employer vis-à-vis the proposed amounts of deductibles and third-party insurance, in liaison with insurance specialists (local lawyers, brokers, and/or consultants) familiar with the insurance practices in the Employer's country. This is to ensure that what is stipulated can/must be implemented under the Contract, and at what acceptable terms.

¹ Whether as a Contractor, Nominated Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document). A Nominated Subcontractor is one which either has been (i) included by the Bidder in its prequalification application or bid because it brings specific and critical experience and know-how that are accounted for in the evaluation of the bidder's prequalification application or the bid, or (ii) appointed by the Employer.

18.1	Periods for submission of insurance: a. evidence of insurance. b. relevant policies	14 days 28 days
18.2(d)	Maximum amount of deductibles for insurance of the Employer's risks	<i>Nil</i>
18.3	Minimum amount of third party insurance	<i>INR 1,000,000 (Indian Rupee one million) per occurrence, with the number of occurrences unlimited.</i>
20.2	Date by which the Dispute Board shall be appointed	28 days after the Commencement
20.2	The Dispute Board shall be comprised of	Three Members
20.2	List of potential Dispute Board sole members	none
20.3	Appointment (if not agreed) to be made by	<i>Institute of Engineers, Bhubaneswar, Chapter Odisha</i>
20.6 (a)	International arbitration shall be administered by	International arbitration shall be (i) International arbitration shall be conducted in accordance with the rules of the Singapore International Arbitration Centre (SIAC). Arbitration shall be administered by the Singapore International Arbitration Centre (SIAC).
20.6	Place of Arbitration	<i>Singapore for International Bidder/ Bhubaneswar for National Bidder</i>

Summary of Sections of the Works

Section Name/Description (Subclause 1.1.5.6)	Time for Completion (Subclause 1.1.3.3) with reference to Contract start date	Damages for Delay (Subclause 8.7)
Completion of work	24 months from the date of Notice to Proceed (NTP)	@0.1% of the final contract price per day, in the currencies and proportion in which the Milestone - contract price is payable.
Stagewise Completion of work	Expected completion : from Contract start date	
Finalization of layout and floor plans	1 month	
Mobilization, Final Approval of Architectural and Structural design and drawings including permission and clearances from local bodies and other statutory bodies etc. Mobilization, setting up of site office and laboratory	2 months	
Construction up to plinth	4 months	
Complete detailed Design and Drawings	5 months	
Casting of GF roof	6 months	
Casting of FF roof	8 months	
GF finishing	16 months	
FF finishing	18 months	
Engineering Services	21 months	
Site development	22 months	
As built drawing, complete finishing and handing over after completing contract in all respect	24 months	

Part B – Specific Provisions

B1. Definitions

B.1.1	“ COVID-19 ” means that the Coronavirus disease (COVID-19) is infectious disease caused by the SARS-CoV-2.
B.1.2	“ Safety Regulations ” means the Employer’s safety regulations existing on the Site which the Contractor is required to follow and all Workplace Health and Safety laws applicable in the Country.
B.1.4	“ Site ” the definition of the Site in the GCC is extended to cover any temporary storage facilities, quarries and other facilities and works remote from the site of the Permanent Works.

Clause 1 General Provisions

1.1 Definitions

1.1.3.9 Day

At the end of this Sub-Clause add the following:
“Month” and **“year”** and all dates shall be calculated according to the Gregorian calendar, and time referred to shall be Indian Standard Time.

1.1.6.12

“Management Meetings” mean meetings called by either the Engineer or the Contractor under Sub-Clause 3.6 [*Management Meetings*] which the Engineer and the Contractor’s Representative or their delegated representatives must attend.

1.5 Priority of Documents

Delete the documents listed (a) to (i) inclusive and substitute with the following:

- (a) Letter of Acceptance,
- (b) Letter of Bid,
- (c) Addenda Nos. [insert addenda numbers if any]1
- (d) Particular Conditions of Contract – Part A,
- (e) Particular Conditions of Contract – Part B,
- (f) List of Eligible Countries that was specified in Section 5 of the Bidding Document,
- (g) General Conditions of Contract,
- (h) Specifications,
- (i) Drawings,
- (j) completed Schedules including Bill of Quantities, and
- (k) any other documents shall be added here.

1.13 Compliance with Laws

After the first paragraph (i.e. after sub-paragraph (b)) add the following paragraph:

“Notwithstanding the foregoing, the Employer will perform such duties in regard to the deductions of such taxes at source as per the

applic
able
Laws.”

**1.14
Joint and
Several Liability**

At the end of this Sub-Clause add the following paragraph:

1. "If the Contractor constitutes a Joint Venture (joint venture, consortium or other unincorporated grouping of two or more persons), he shall deliver to the Employer, within 21 days after receiving the Letter of Acceptance the final and binding and duly notarised Joint Venture Agreement. JV partners remain jointly and severally liable to the Employer under the Contract.
The Joint Venture Agreement shall include at least the following:
 - (a) the percentage and areas of sharing of the Works between the Joint Venture members;
 - (b) level of responsibility within the Joint Venture and nomination of the lead member; and
 - (c) other information requested by the Employer.

. The Contractor shall submit copies of all notarized changes to the said Agreement, as agreed to by the Employer, to the Employer and the Engineer within 14 days of their occurrence."

**1.16
Severability**

Add the following Sub-Clause 1.16

"If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract."

Clause 2 The Employer

Clause 3 The Engineer

**3.6
Management
Meetings**

Add the following Sub-Clause 3.6:

"Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

The Engineer shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting."

Clause 4 The Contractor

4.4 Subcontractors

At the end of the sentence in the first paragraph, add: *The Contractor shall not subcontract (i) works with a total accumulated value greater than the specified percentage of the Accepted Contract Amount, or (ii) any part of the Works for which subcontracting is not permitted as specified below;*

- (i) *Maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount): 20%*
- (j) *Parts of the Works for which subcontracting is not permitted: _____.*

At the end of sub-paragraph (a) add: "providing the Subcontractor has been accepted in the Letter of Acceptance".

In the third paragraph immediately after "Details]" add: "and Clause 6 [Staff and Labour]".

At the end of this Sub-Clause add the following paragraph:
"If requested by the Engineer, the Contractor shall submit a copy of each Subcontract agreement, excluding prices, in its original language together with a translation if the original language is not in the language for communications."

4.7 Setting Out

At the end of the second paragraph add the following: "For this purpose, before commencement of the work on the site, the Contractor shall carry out a check survey, in the presence of the Engineer, to verify the accuracy of the items of reference and submit the results of the verification survey to the Engineer for his acceptance."

*The Contractor shall comply with (i) the measures and requirements set forth in the related IEE and EMP, and the IPP as applicable, attached hereto as Appendix [1], and [2], respectively, to the extent they concern impacts on affected people during construction; and (ii) any corrective or preventive actions set out in Safeguards Monitoring Report that the Employer will prepare from time to time to monitor implementation of the resettlement plan.
The Contractor shall allocate a budget for all such environmental and social measures."*

**4.9
Quality Assurance**

After the first paragraph, add the following two paragraphs:

“The Contractor’s Quality Management System shall include all activities and functions which the Contractor is required to perform in execution of the Works and remedying of defects. The Quality Management System shall cover all of the Works.

After the second paragraph in the General Conditions add the following paragraph:

“To ensure the Contractor will be able to comply with his quality assurance obligations under the Contract, the Contractor shall translate into the language(s) used by local personnel, all documents, as deemed necessary, to ensure local Contractor’s Personnel understand the requirements for executing the Works in accordance with the Contract. If so requested, the Contractor shall also submit copies of the translated documents to the Engineer for his information and records.”

**4.12
Unforeseeable Physical
Conditions**

“In addition to notice of any Unforeseeable physical conditions, the Contractor shall provide the Engineer with a written notice of any unanticipated environmental risks or impacts that arise during construction, implementation or operation of Permanent Works, which were not considered in the Initial Environmental Examination, and the Environmental Management Plan attached hereto as Appendix 1 and Appendix 2.

**4.14
Avoidance of
Interference**

After the first paragraph of this Sub-Clause, add the following paragraph:

“Without in any way limiting the Contractor’s obligations and responsibilities under the Contract, because the Site or part thereof is used by the public, the Contractor shall programme and execute the Works to avoid inconvenience or disruption of the public. No work on any part of the Site used by the public shall be permitted until such time as alternate routes in the form of roads, diversions, footpaths, accesses and the like (whether permanent or temporary) have been provided by the Contractor, together with all necessary safety features and devices and appurtenant drainage, and the alternate route(s) have been deemed acceptable for public use by the Engineer.”

**4.16
Transport of Goods**

The Contractor shall adequately record the condition of roads, agricultural land and other infrastructure prior to the start of transporting materials, goods and equipment, and construction

**4.18
Protection of
the Environment**

At the end of this Sub-Clause, add the following paragraphs:

- (i) *“The Contractor shall comply with all applicable laws and regulations of the Borrower and the State relating to the environment.*

The Contractor shall (a) establish an operational system for managing environmental impacts; (b) carry out all of the monitoring and mitigation measures set forth in the Initial Environmental Examination (“IEE”) and the Environmental Management Plan (“EMP”); and (c) allocate the budget required to ensure that such measures are carried out. The Contractor shall submit semi-annual reports on the carrying out of such measures to the Employer.

More particularly, the Contractor shall comply with (i) the measures and requirements set forth in the IEE and the EMP attached hereto as Appendix [1] and [2], respectively; and (ii) any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor implementation of the IEE and the EMP.”

**4.21
Progress Reports**

“(i) monitoring of the obligations in Sub-Clauses 4.7, 4.13, 4.18, 6.4, 6.7, 6.20, 6.21, 6.23, and 6.24”

Clause 6 Staff and Labour

**6.4
Labour Laws**

After the second paragraph add the following paragraphs:

“The Contractor and his Subcontractors shall abide at all times by all existing labour enactments and rules made thereunder, regulations, notifications and bye laws of the State or Central Government or local authority of the Country and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the said State or Central Government or the local authority. Without in any way limiting the Contractor’s obligations and responsibilities under the Contract, some of the major labour laws (but not the only labour laws) that are applicable to the construction industry are:

- (a) Workmen Compensation Act 1923;
- (b) Payment of Gratuity Act 1972;
- (c) Employees P.F. and Miscellaneous Provision Act 1952;
- (d) Maternity Benefit Act 1951;

- (e) Contract Labour (Regulation & Abolition) Act 1970;
- (f) Minimum Wages Act 1948;
- (g) Payment of Wages Act 1936;
- (h) Equal Remuneration Act 1979;
- (i) Payment of Bonus Act 1965;
- (j) Industrial Disputes Act 1947;
- (k) Industrial Employment (Standing Orders) Act 1946;
- (l) Trade Unions Act 1926;
- (m) Child Labour (Prohibition & Regulation) Act 1986;
- (n) Inter-State Migrant Workmen's (Regulation of Employment & Conditions of Service) Act 1979;
- (o) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996;
- (p) Factories Act 1948.

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 any Act or rules made thereunder, regulations or notifications including amendments thereto. If the Employer is caused to pay or reimburse such amounts as may be necessary to cause observance or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments thereto, if any, on the part of the Contractor, the Contractor shall subject to Sub-Clause 2.5 [Employer's Claims] pay to the Employer the costs incurred by the Employer in paying or reimbursing the said amounts and the amounts so paid or reimbursed. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss of damage suffered by the Employer and any debts unpaid by the Contractor in this regard may be deducted from the Performance Security.

As part of the Contractor's obligations under this Sub-Clause, the Contractor shall provide all Contractor's Personnel and Employer's Personnel with personal protective equipment, including protection for feet, head, eyes, ears and hands, etc, in accordance with the Contractor's Site Safety Manual prepared in accordance with Sub- Clause 4.8. The Contractor shall ensure that his Subcontractors comply with the same manual and provide all such necessary equipment to their personnel

The Contractor shall (i) carry out HIV/AIDS awareness programs for labor and disseminate information at worksites on risks of sexually transmitted diseases and HIV/AIDS as part of health and safety measures for those employed during construction; and (ii) follow and implement all statutory provisions on labor (including not employing or using children as labor, equal pay for equal work), health, safety, welfare, sanitation, and working conditions. Breach of any of the foregoing provisions will be tantamount to contract termination.

The Contractor is encouraged (i) to engage women workers as wage labor depending on their skills; (ii) to the extent possible assign to women the bio-engineering works for road rehabilitation and maintenance; and (iii) ensure equal wages for equal work between men and women."

6.5 Working Hours

At the end of this paragraph, add the following paragraphs:

"The Contractor shall programme his work and provide sufficient resources to enable all of the works under the Contract to be completed within the normal working hours.

**6.8
Contractor's
Superintendence**

At the end of the second paragraph, add the following:

“For the avoidance of doubt, in this Sub-Clause, a sufficient number of persons means that each supervisor or foreman responsible for a work crew carrying out one work activity at one location on the Site shall have adequate knowledge of the language of communications.”

6.21 Child Labour

Delete the paragraph in the Sub-Clause and replace with the following paragraph:

“The Contractor shall not employ any child to perform any work, including work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child’s education, or to be harmful to the child’s health or physical, mental, spiritual, moral, or social development. Child means a child below the statutory minimum age (18 years) under laws of India.”

Clause 8 Commencement, Delays and Suspension

Clause 11 Defects Liability

**11.11
Clearance of Site**

At the end of the first paragraph, add the following:

“and shall reinstate and restore all areas disturbed by the Contractor (other than those covered by the Works) and shall leave the Site in a neat and tidy condition to the satisfaction of the Engineer.”

At the end of the Sub-Clause, add the following paragraph:

“Upon the completion of construction, the Contractor shall fully reinstate pathways, other local infrastructure, and agricultural land to at least their project condition as recorded by the Contractor in consonance with its obligation in Clause 4.16”

Section 9 - Contract Forms

This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.

Table of Forms

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Contract Agreement	9-3
Performance Security	9-5
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Notification of Award

[on letterhead paper of the employer]

Letter of Acceptance

..... date.

To: Name and address of the contractor

Subject: Notification of Award Contract No.

This is to notify you that your Bid dated date for execution of the.....*name of the contract and identification number, as given in the Bid Data Sheet* for the Accepted Contract Amount of the equivalent of*amount in words and figures and name of currency.....*, as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract, using for that purpose the Performance Security Form included in Section 9 (Contract Forms) of the Bidding Document.

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Attachment: Contract Agreement

Contract Agreement

THIS AGREEMENT made theday of,, between *name of the employer*. (hereinafter “the Employer”), of the one part, and *name of the contractor*. (hereinafter “the Contractor”), of the other part:

WHEREAS the Employer desires that the Works known as *name of the contract* should be executed by the Contractor, and has accepted a Bid 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) Letter of Acceptance,
 - (b) Letter of Bid,
 - (c) Addenda Nos. [insert addenda numbers if any]¹
 - (d) Particular Conditions of Contract – Part A,
 - (e) Particular Conditions of Contract – Part B,
 - (f) List of Eligible Countries that was specified in Section 5 of the Bidding Document,
 - (g) General Conditions of Contract,
 - (h) Specifications,
 - (i) Drawings,
 - (j) completed Schedules including Bill of Quantities, and
 - (k) any other documents shall be added here.
3. In consideration of the payments to be made by the Employer to the Contractor as indicated 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 *name of the borrowing country* on the day, month and year indicated above.

¹ Tables of Adjustment Data may be added if the contract provides for price adjustment (see GCC 13.8).

Signed by

Signed by

for and on behalf of the Employer
in the presence of

for and on behalf the Contractor
in the presence of

Witness, Name, Signature, Address, Date

Witness, Name, Signature, Address, Date

Performance Security

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

Beneficiary: *Name and address of the employer*

Date:

Performance Guarantee No.:

We have been informed that *name of the contractor*(hereinafter called "the Contractor") has entered into Contract No. *reference number of the contract*. dated.....with you, for the execution of *name of contract and brief description of works*. (hereinafter called "the Contract").

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

At the request of the Contractor, we *name of the bank*hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *name of the currency and amount in words*² (*amount in figures*.) such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the Day of,.....³, and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758 , except that The supporting statement under Article 15{a} and 15 {b} is hereby excluded .⁴

.....
Signature(s) and seal of bank (where appropriate)

Note to Bidder

If the institution issuing the performance security is located outside the country of the employer, it shall have a correspondent financial institution located in the country of the employer to make it enforceable.

¹ All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.
² The guarantor shall insert an amount representing the percentage of the contract price specified in the contract and denominated either in the currency(ies) of the contract or a freely convertible currency acceptable to the employer.
³ Insert the date 28 days after the expected completion date. 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 [6 months][1 year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."
⁴ Or the same or similar to this clause specified in the Uniform Rules for Demand Guarantees, ICC Publication No. 758 where applicable.

Advance Payment Security

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

Beneficiary: *Name and address of the employer*

Date:

Advance Payment Guarantee No.:

We have been informed that *name of the contractor*..... (hereinafter called "the Contractor") has entered into Contract No. *reference number of the contract*. dated..... with you, for the execution of *name of contract and brief description of works*. (hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum *name of the currency and amount in words*². (. *amount in figures*.....) is to be made against an advance payment guarantee.

At the request of the Contractor, we *name of the bank*..... hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of..... *name of the currency and amount in words*³. (. *amount in figures*.....) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number *Contractor's account number*. at *name and address of the bank*.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated 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 percent (90%) of the Contract Price has been certified for payment, or on the . . . day of ,⁴ , 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, ICC Publication No. 758.

.....
Signature(s) and seal of bank (where appropriate)

Note to Bidder

If the institution issuing the advance payment security is located outside the country of the employer, it shall have a correspondent financial institution located in the country of the employer to make it enforceable.

² All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.
³ The guarantor shall insert an amount representing the amount of the advance payment denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the employer.
⁴ Footnote 2.
⁵ 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 [6 months][1 year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."



GOOD FOR BIDDING





GOOD FOR BIDDING

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