BIDDING DOCUMENT

for

THE PROCUREMENT OF

Construction of Senior Staff Quarter of Nirmal Lama Polytechnic Institute

National Competitive Bidding (NCB)

Single-Stage: Two-Envelope Bidding Procedure

Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur

Issued on: November, 2026

Invitation for Bids No.:

CTEVT/NLPI/083/84/NCB/Civil-01

NCB No.: 01

Contract Identification No.:

CTEVT/NLPI/083/84/NCB/Civil-01

Abbreviations

BD ... . Bidding Document

BDF ... . Bidding Forms

BDS ... . Bid Data Sheet

BOQ ... . Bill of Quantities

COF ... . Contract Forms

DP ..... . Development Partners

DoLI ... . Department of Local Infrastructure

e-GP .....Electronic Government Procurement

ELI .... Eligibility

EQC .... Evaluation and Qualification Criteria

EXP ... . Experience

FIN ... . Financial

GCC ... . General Conditions of Contract

GoN[1] .... Government of Nepal

ICC ... . International Chamber of Commerce

IFB ..... Invitation for Bids

ITB ... . Instructions to Bidders

JV .... Joint Venture

LIT .... Litigation

NCB ... . National Competitive Bidding

NRs. ..... Nepalese Rupees

PAN .... Permanent Account Number

PPA ... . Public Procurement Act

PPMO ..... . Public Procurement Monitoring Office

PPR .... Public Procurement Regulations

PL ... . Profit & Loss

PS..... .....Provisional Sum

SBD ... . Standard Bidding Document

SCC ... . Special Conditions of Contract

TS ... . Technical Specifications

VAT ... . Value Added Tax

WRQ ... . Works Requirements

[1] "GoN" word indicates all public entities according to Public Procurement Act, 2063

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Invitation for Electronic Bids

Council for Technical Education and Vocational Training (CTEVT)

Invitation for Bids No: CTEVT/NLPI/083/84/NCB/Civil-01

Date of publication: 2083/08/04

1. ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur*** has allocated funds from ***GoN*** towards the cost of ***Construction of Senior Staff Quarter of Nirmal Lama Polytechnic Institute*** and intends to apply part of the funds to cover eligible payments under the Contract for ***CTEVT/NLPI/083/84/NCB/Civil-01***. Bidding is open to all eligible as per Section V of bidding document.

2. ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur*** invites sealed bids or electronic bids from eligible bidders for the construction of ***Construction of Senior Staff Quarter of Nirmal Lama Polytechnic Institute*** under National Competitive Bidding – Single Stage Two Envelope Bidding procedures.

   Only eligible bidders with the following key qualifications should participate in this bidding:

   - Minimum Average Annual Construction Turnover of the best 3 years within the last 10 years: ***NRs 39.10 million***
   - Minimum Work experience of similar size and nature: ***at least One (1) Contract with a value of at least NRs 10.5 million***

3. Bidder must submit their bid electronically, Bidders are required to submit two separate bid response documents, one containing (i) the Technical Bid and the other (ii) the Price Bid, as per the provision of ITB 21 of the Bidding Document.

4. Eligible Bidders may obtain further information and inspect the Bidding Documents at the office of ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur, mailing address; info@ctevt.org.np, website; www.ctevt.org.np, Telephone: 01-6630408*** or may visit PPMO e-GP system www.bolpatra.gov.np/egp.

5. Bidders may download the bidding documents for e-submission from PPMO's e-GP system www.bolpatra.gov.np/egp at no cost.

6. Pre-bid meeting shall be held at ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur*** at ***2083/08/16 on 2:00 PM.***

7. Electronic bids must be submitted to the office ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur*** through PPMO's e-GP system www.bolpatra.gov.np/egp on or before ***12:00 hour*** on ***2083/08/25.*** Bids received after this deadline will be rejected.

8. The bids will be opened in the presence of Bidders' representatives who choose to attend at ***2:00 PM on 2083/08/25*** at the office of ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur.*** Bids must be valid for a period of ***90 days from*** the bid submission deadline and must be accompanied by a bid security or scanned copy of the bid security in pdf format in case of e-bid, amounting to a minimum of **Nrs 780000.00 (Seven lakh eighty thousand only)**, which shall be valid for 30 days beyond the validity period of the bid.

9. If the last date of purchasing and /or submission falls on a government holiday, then the next working day shall be considered as the last date. In such case the validity period of the bid and bid security shall remain the same as specified for the original last date of bid submission.

Part I: BIDDING PROCEDURES

Section I: Instructions to Bidders (ITB)

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, and evaluation of bids and on the award of contract.

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Section I: Instructions to Bidders

A. General	
1. Scope of Bid	1.1 In connection with the Invitation for Bids **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 VI (Works Requirements). The name, identification, and number of lots (contracts) / multiple contracts of the National Competitive Bidding (NCB) 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 through e-GP system or email or fax or courier; (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 GoN Funded: In accordance with its annual program and budget, approved by the GoN, the implementing agency **indicated in the BDS** plans to apply a portion of the allocated budget to eligible payments under the contract(s) for which this Bidding Document is issued. Or Public Entities' own Resource Funded: In accordance with its annual program and budget, approved by the public entity, the implementing agency **indicated in the BDS** plans to apply a portion of the allocated budget to eligible payments under the contract(s) for which this Bidding Document is issued. Or DP Funded: The GoN has applied for or received financing (hereinafter called "funds") from the Development Partner (hereinafter called "the DP") **indicated in the BDS** toward the cost of the project named in the BDS. The GoN intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.
	2.2 DP Funded: Payment by the DP will be made only at the request of the GoN and upon approval by the DP in accordance with the terms and conditions of the financing agreement between the GoN and the DP (hereinafter called the "Loan/Grant Agreement"), and will be subject in all respects to the terms and conditions of that Loan/Grant Agreement. No party other than the GoN shall derive any rights from the Loan Agreement or have any claim to the funds.
3. Fraud and Corruption	3.1 Procuring Entities as well as Bidders, suppliers and contractors and their sub-contractors shall adhere to the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this; (a) the Employer adopts, for the purposes of this provision, the terms as defined below: (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 investigation; (b) making false statements to investigators in order to materially impede an investigation; (c) failing to comply with requests to provide information, documents, or records in connection with an 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 GoN/DP's contractual rights of audit or access to information; and

vi) "integrity violation" is any act which violates Anticorruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of GoN/DP sanctions, retaliation against whistleblowers or witnesses, and other violations of Anticorruption Policy, including failure to adhere to the highest ethical standard.

(b) the Employer 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) DP will cancel the portion of the financing allocated to a contract if it determines at any time that representative(s) of the GoN/or of a beneficiary of DP-financing engaged in corrupt, fraudulent, collusive, or coercive practices or other integrity violations during the procurement or the execution of that contract, without the GoN having taken timely and appropriate action satisfactory to DP to remedy the situation.

d) DP will impose remedial actions on a firm or an individual, at any time, in accordance with DP's Anticorruption Policy and related Guidelines (as amended from time to time), including declaring ineligible, either indefinitely or for a stated period of time, to participate in DP-financed, -administered, or -supported activities or to benefit from an DP-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) The Contractor shall permit the GoN/DP to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the GoN /DP, if so, required by the GoN/DP.

3.2 The Bidder shall not carry out or cause to carry out the following acts with an intention to influence the implementation of the procurement process or the procurement agreement:

(a) give or propose improper inducement directly or indirectly,

(b) distortion or misrepresentation of facts,

	(c) engaging in corrupt or fraudulent practice or involving in such act, (d) interference in participation of other competing bidders, (e) coercion or threatening directly or indirectly to cause harm to the person or the property of any person to be involved in the procurement proceedings, (f) collusive practice among bidders before or after submission of bids for distribution of works among bidders or fixing artificial/uncompetitive bid price with an intention to deprive the Employer the benefit of open competitive bid price, (g) Contacting the Employer with an intention to influence the Employer with regards to the bids or interference of any kind in examination and evaluation of the bids during the period from the time of opening of the bids until the notification of award of contract.
	3.3 PPMO, on the recommendation of the Procuring Entity may blacklist a Bidder for a period of one (1) to three (3) years for its conduct including on the following grounds and seriousness of the act committed by the bidder: (a) if convicted by a court of law in a criminal offence which disqualifies the Bidder from participating in the contract, (b) if it is established that the contract agreement signed by the Bidder was based on false or misrepresentation of Bidder's qualification information, (c) if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for, or in executing, a GoN/DP-financed contract. (d) if the Successful Bidder fails to sign the Contract. (e) if the bidder fails to inform or informs after the specified time about the saturation of the maximum number of contracts as per ITB 4.10. (f) a Bidder requests for withdrawal or modification of its bid: (i) after the Bid Submission deadline and during the period of validity specified by the Bidder on the Letter of Technical Bid and Price Bid, in case of electronic submission; (ii) from the period twenty-four hours prior to bid submission deadline up to the period of bid validity specified by the Bidder on the Letter of Technical Bid and Price Bid, in case of hard copy submission. (g) if the bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification as per ITB 27.1. (h) a Bidder changes the prices or substance of the bid while providing information pursuant to ITB 27.1.
	3.4 A bidder declared blacklisted and ineligible by the GoN, Public Procurement Monitoring Office (PPMO), by a competent authority under the prevailing law for failure to repay a loan disbursed by a bank or financial institution, and/or the DP in case of DP funded project, shall be ineligible to bid for a contract during the period of time determined by the GoN, PPMO, the competent authority, and/or the DP.
	3.5 In case of a natural person or firm/institution/company which is already declared blacklisted and ineligible by the GoN, any other new or existing firm/institution/company owned partially or fully by such Natural person or Owner or Board of director of blacklisted firm/institution/company; shall not be eligible bidder.
	3.6 Furthermore, Bidders shall be aware of the provisions of GCC 28.3 and GCC 72.3(j).
4. Eligible	4.1 A Bidder may be a natural person, private entity, or government owned entity subject to

Bidders	ITB 4.5 or any combination of them in the form of a Joint Venture (JV) under an existing agreement, or with the intent to constitute a legally-enforceable joint venture. In the case of a JV: (a) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. Maximum number of JV shall be as **specified in the BDS** and (b) the JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV 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 V (Eligible Countries). A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed sub-contractors or suppliers for any part of the Contract including related services.
	4.3 A Bidder shall not have a conflict of interest. A Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in this bidding process, if any of, including but not limited to, the following apply: (a) they have controlling shareholders in common; or (b) they receive or have received any direct or indirect subsidy from any of them; or (c) they have the same legal representative for purposes of this bid; or (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to material information about or improperly influence the Bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or (e) a Bidder participates in more than one bid in this bidding process either individually or as a partner in a joint venture. 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 the same subcontractor in more than one bid; or (f) a Bidder or any of its 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 as Engineer for the Contract. (h) a Bidder that has a close business or family relationship with a professional staff of the Procuring Entity.
	4.4 A firm that is under a declaration of ineligibility by the GoN in accordance with ITB 3, at the date of the deadline for bid submission or thereafter, shall be disqualified. A firm shall not be eligible to participate in any procurement activities under an DP-financed, -administered, or -supported project while under temporary suspension or debarment by DP pursuant to the DP's Anticorruption Policy (see ITB 3), whether such debarment was directly imposed by the DP, or enforced by other DPs pursuant to

	the Agreement for Mutual Enforcement of Debarment Decisions. A bid from a temporary suspended or debarred firm will be rejected.
	4.5 Enterprises owned by Government shall be eligible only if they can establish that they are legally and financially autonomous and operate under commercial law, and that they are not a dependent agency of the GoN.
	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 in any of the cases, if (a) 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, Nepal prohibits any import of goods or contracting of works or services from that country or any payments to persons or entities in that country. Where Nepal prohibits payments to a particular firm or for particular goods by such an act of compliance, that firm may be excluded; (b) DP Funded: as a matter of law or official regulation, Nepal prohibits commercial relations with that country, provided that the DP is satisfied that such exclusion does not preclude effective competition for the supply of goods or related services required; (c) DP Funded: a firm sanctioned or temporarily suspended by the DP in relation to their guidelines or appropriate provisions on preventing and combating fraud and corruption in projects financed by them.
	4.8 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.
	4.9 The Bidder, including all parties constituting the Bidder, shall be ineligible to participate in the open competitive bidding process if it has already secured maximum number of construction contracts (in open competitive bidding) **as specified in BDS** and has not yet completed the work as stipulated in the respective contracts
	4.10 For the purpose of ITB 4.9 above, the bidder shall declare that the bidder, and all parties constituting the Bidder have not already secured maximum number of construction contract (in open competitive bidding) **as specified in BDS**. If the bidder, and all parties constituting the Bidder has participated in bidding processes of many public entities and during that period the maximum number of contracts have been attained as specified saturates due to issuance of letters of acceptance by a particular public entity, the bidder shall inform in writing to all other concerned public entities, where the bidder have participated in bidding process, within three days of issuance of last letter of acceptance that saturates the maximum number of contracts as specified.
5. Eligible Materials, Equipment and Services	5.1 The materials, equipment and services to be supplied under the Contract shall have their origin in any source countries as defined in accordance with Section V (Eligible Countries) 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 Documents	
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 I Instructions to Bidders (ITB) Section II Bid Data Sheet (BDS) Section III Evaluation and Qualification Criteria (EQC) Section IV Bidding Forms (BDF) Section V Eligible Countries PART II Requirements Section VI Works Requirements (WRQ) Section VII Bill of Quantities (BOQ) PART III Conditions of Contract and Contract Forms Section VIII General Conditions of Contract (GCC) Section IX Special Conditions of Contract (SCC) Section X Contract Forms (COF)
	6.2 The Invitation for Bids (IFB) issued by the Employer is not part of the Bidding Document.
	6.3 The Employer is not responsible for the completeness of the Bidding Document and their Addenda, if they were not obtained directly from the source stated by the Employer in the Invitation for Bids.
	6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document and to furnish with its bid all information and documentation as is required by the Bidding Documents. 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 of the Bidding Document shall contact the Employer in writing at the Employer's address **indicated in BDS** or raise any question or curiosity 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 within the period as mentioned in ITB 7.5. 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 risk and responsibility, all information that may be necessary for preparing the bid and entering into a Contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
	7.3 The Bidder and any of its personnel or agents will be granted permission by the

	Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express 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 as **mentioned in BDS.**
	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 addendum or several 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. However, the time available to submit bids shall not be less than five (5) days since amendment in bidding document.
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	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

Comprising the 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 in accordance with ITB 19; (c) alternative Technical Bid, at Bidder's option and 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) 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. The Joint Venture agreement, or letter of intent to enter into a Joint Venture including a draft agreement shall indicate at least the parts of the Works to be executed by the respective partners; (h) list of subcontractors, in accordance with ITB 34 (If any); and (i) Any other documents required in the **BDS.** 11.3 The Price Bid shall comprise the following: (a) Letter of Price Bid; (b) completed Bill of Quantities (BoQ), in accordance with ITB 12 and ITB 14, or as stipulated in the BDS; (c) alternative price Bids, at Bidder's option and if permissible, in accordance with ITB 13; (d) Table of Price adjustment (if applicable) ; and (e) Any other document required in the **BDS.**
	11.4 The Bidder is solely responsible for the authenticity of the submitted documents. 11.5 The Technical Bid shall not include any financial information related to the Price Bid. A Technical Bid containing such material financial information shall be declared non-responsive.
12. Letter of Bid and Schedules	12.1 The Letters of Technical Bid and Price Bid, Schedules, and all documents listed under ITB 11, shall be prepared using the relevant forms in Section IV (Bidding Forms) and in Section VII (Bill of Quantities). 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.
13. Alternative Bids	13.1 Unless otherwise **specified 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 When specified in the BDS pursuant to ITB 13.1, and subject to 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 evaluated Bidder whose Bid Price is closest to the Average Bid Price 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 VI (Works Requirements). The method for their evaluation will be stipulated in Section III (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 Schedules shall conform to the requirements specified below.
	14.2 The Bidder shall submit a bid for the whole of the works described in ITB 1.1 by filling in prices for all items of the Works, as identified in Section VII (Bill of Quantities). In case of Unit Rate Contracts, 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 shall be the total price of the Bid, excluding any discounts offered. Absence of the total price in the Letter of Price Bid may result in 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 If so indicated in ITB 1.1and ITB 35.4, bids are 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.
	14.6 Unless otherwise **provided in the BDS** and the Conditions of Contract, the prices quoted by the Bidder shall be fixed. If the 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, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the Table of Adjustment Data in Section IV (Bidding Forms) and the Employer may require the Bidder to justify its proposed indices and weightings.
	14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 30 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. Currency of Bid and Payment	15.1 The currency of the bid and payment shall be in Nepalese Rupees.
16. Documents Comprising the Technical Proposal	16.1 The Bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section IV (Bidding Forms), in sufficient detail to demonstrate the adequacy of the 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 III (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding information sheets included in Section IV (Bidding Forms).
18. Period of Validity of Bids	18.1 Bids shall remain valid for the period **specified in the BDS.** The bid validity period shall start from the bid submission deadline as prescribed by the Employer in accordance with ITB 22.1. If the prescribed bid submission deadline date falls on a government holiday, then the next working day shall be considered as the bid submission deadline date. In such case the validity period of the bids shall be considered from the original bid submission deadline date. In the case of electronic bid submission, if any technical issue arises in the handling of the e-GP system, the PPMO may extend the deadline for bid submission. However, the validity period of the bids shall still be counted from the original bid submission deadline. 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 30 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 and to include any additional conditions against the provisions specified in Bid Documents.
19. Bid Security	19.1 The Bidder shall furnish as part of its bid, in original form, a bid security as **specified in the BDS**. In case of e-submission of bid, the Bidder shall upload scanned copy of Bid security letter at the time of electronic submission of the bid. The Bidder accepts that the scanned copy of the Bid security shall, for all purposes, be equal to the original. The details of original Bid Security and the scanned copy submitted with e-bid should be the same otherwise the bid shall be non-responsive.
	19.2 The bid security shall be, at the Bidder's option, in any of the following forms: (a) an unconditional bank guarantee from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law or; (b) a cash deposit voucher in the Employer's Account as **specified in BDS**. In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section IV (Bidding

	Forms) or in another Form acceptable to the employer. The form must include the complete name of the Bidder. The bid security shall be valid for minimum thirty (30) days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 18.2. A bid security valid for a shorter period shall be rejected by the Employer as nonresponsive.
	19.3 The bid security issued by any foreign Bank outside Nepal must be counter guaranteed by Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal.
	19.4 Any bid not accompanied by an enforceable and substantially compliant bid security shall be rejected by the Employer as nonresponsive. In case of e- Submission, if the scanned copy of an acceptable Bid Security letter is not uploaded with the electronic Bid then Bid shall be rejected.
	19.5 The public entity shall return the bid securities except those that are to be forfeited as per ITB 19.6 to the respective bidders within three (3) days after the successful bidder has furnished the required performance security and signed the Contract Agreement pursuant, to ITB 40.1 and ITB 41.1.
	19.6 The bid security shall be forfeited if: **GoN funded:** (a) a Bidder requests for withdrawal or modification of its bid, except as provided in ITB 18.2: (i) during the period of bid validity specified by the Bidder on the Letter of Technical Bid and Price Bid, in case of electronic submission; (ii) from the period twenty-four hours prior to bid submission deadline up to the period of bid validity specified by the Bidder on the Letter of Technical Bid and Price Bid, in case of hard copy submission. (b)a Bidder changes the prices or substance of the bid while providing information pursuant to clause 27.1; (c) a Bidder involves in fraud and corruption pursuant to clause 3.1; (d) the successful Bidder fails to: (i) furnish a performance security in accordance with ITB 35.5, ITB 35.8 and ITB 40.1; or (ii) sign the Contract in accordance with ITB 41.1; or (iii) accept the correction of arithmetical errors pursuant to clause 33.1; (e) if the bidder fails to inform about the saturation of the maximum number of contracts as per ITB 4.10. **DP funded:** The bid security shall be forfeited (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid, except as provided in ITB 18.2; or (b) if the successful Bidder fails to (i) furnish a performance security in accordance with ITB 35.5 and ITB 40.1; or (ii) sign the Contract in accordance with ITB 41.1; or (iii) accept arithmetical corrections in accordance with ITB 33.1.

	19.7 The Bid Security 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 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 of the Price Bid comprising the Bid as described in ITB 11 and clearly mark it **"ORIGINAL – TECHNICAL BID"** and **"ORIGINAL – PRICE BID."** Alternative bids, if permitted in accordance with ITB 13, shall be clearly marked **"ALTERNATIVE".** In addition, the Bidder shall submit copies of the bid in the number specified in the BDS, and clearly mark each of them **"COPY."** In the event of any discrepancy between the original and the copies, the original shall prevail. In case of e-submission of bid, the Bidder shall submit his bid electronically in PDF or web forms files as specified in ITB Clause 21.1(b).
	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 un amended printed literature, shall be signed or initialed by the person signing 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 Unless otherwise **specified in BDS**, Bidders shall submit their bids by electronic or by mail/by hand/by courier. Procedures for submission, sealing and marking are as follows: (a) Bidders submitting bids by mail, by hand or by courier shall enclose the original of the Technical Bid, and the original of the Price Bid and each copy of the Technical Bid and Price Bid, including alternative bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as **"ORIGINAL TECHNICAL BID", "ORIGINAL – PRICE BID", "ALTERNATIVE" and "COPY No. – TECHNICAL BID" and "COPY NO. PRICE BID"** These envelopes containing the original and the copies shall then be enclosed in one single envelope. (b) Bidders submitting Bids electronically shall follow the electronic bid submission procedure specified in this clause. i. The bidder is required to register in the e-GP system https://www.bolpatra.gov.np/egp following the procedure specified in e-GP guideline. ii. Interested bidders may either purchase the bidding document from the Employer's office as specified in the Invitation for Bid (IFB) or bidders may download the IFB and bidding document from e-GP system. iii. The registered bidders need to maintain their profile data required during

preparation of bids.

iv. The bidder can prepare their technical and price bids using data and documents maintained in bidder's profile and forms/format provided in bidding document by Employer. The bidder may submit bids as a single entity or as a joint venture. The bidder submitting bid in joint venture shall have to upload joint venture agreement along with partner(s) Bolpatra ID provided during bidder's registration.

v. Bidders (all partners in case of JV) should update their profile data and documents required during preparation and submission of their technical bids.

vi. In case of bid submission in JV, the consent of the partners shall be obtained through the confirmation link sent to the registered email address and the partners shall have to acknowledge their confirmation.

The required forms and documents shall be part of technical bids.

No.	Document	Requirement	Remarks
1.	Letter of Technical Bid	Mandatory	PDF
2.	Bid Security / Bank Guarantee	Mandatory	PDF
3.	Firm or Company registration Certificate	Mandatory	PDF
4.	VAT and PAN registration Certificate	Mandatory (for domestic bidders only)	PDF
5.	Business Registration Licence	Mandatory	PDF
6.	Tax Clearance Certificate/Tax return submission evidence/evidence of time extension	Mandatory (for domestic bidders only)	PDF
7.	Power of Attorney of Bid signatory	Mandatory	PDF
8.	Joint venture agreement	Mandatory in case of JV Bids Only	PDF
9.	Qualification Documents	Mandatory	Using profile data (financial details, contract details etc.) and Technical Proposal
10.	Additional documents] specified in ITB 11.2 (i)	Mandatory (If any)	PDF

The required forms and documents shall be part of price bids.

No.	Document	Requirement	Remarks
1.	Letter of Price Bid	Mandatory	PDF
2.	Completed Bill of Quantities (BoQ)	Mandatory	Online Forms
3.	Price Adjustment Table	Mandatory (If applicable)	Online Forms
4.	Additional Documents specified in ITB 11.3 (e)	Mandatory (If any)	PDF

	Note: *a) The documents specified as "Mandatory" should be included in e-submission and non-submission of the documents shall be considered as non-responsive bid.* *b) Bidders (all partners in case of JV) should verify/update their profile documents as appropriate for the specific bid before submitting their bid electronically.* vii. After providing all the details and documents, two separate bid response documents i.e technical bids and price bids will be generated from the system. Bidders are advised to download and verify the response documents prior to bid submission. viii. For verifying the authentic user, the system will send one time password (OTP) in the registered e-mail address of the bidder. System will validate the OTP and allow bidder to submit their bid. ix. Electronically submitted bids can be modified and/or withdrawn through system. The bidder may modify their bids multiple times online within bid submission date and time specified in e-GP system. Once a Bid is withdrawn, bidder won't be able to submit another bid response for the same bid. x. The Bidder / Bid shall meet the following requirements and conditions for e-submission of bids; aa) The e-submitted bids must be readable through PDF reader. bb) The facility for submission of bid electronically through e-submission is to promote transparency, non-discrimination, equality of access, and open competition in the bidding process. The Bidders are fully responsible to use the e- submission facility properly in e-GP system as per specified procedures and in no case the Employer shall be held liable for Bidder's inability to use this facility. cc) When a bidder submits electronic bid through the PPMO e-GP portal, it is assumed that the bidder has prepared the bid by studying and examining the complete set of the Bidding documents including specifications, drawings and conditions of contract. 21.2. The inner and outer envelopes shall: (aa) bear the name and address of the Bidder; (bb) be addressed to the Employer as provided in BDS 22.1; (cc) bear the specific identification of this bidding process indicated in BDS 1.1; and 21.3 The outer envelope and the inner envelope containing Technical Proposal 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 envelope 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	22.1 Bids must be received by the Employer at the address and no later than the date and time indicated **in the BDS.** In case of e-submission, the standard time for e-submission is Nepal Standard Time as

of Bids	set out in the server. The e-procurement system will accept the e-submission of bid from the date of publishing of notice and will automatically not allow the e-submission of bid after the deadline for submission of bid.
	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, and Modification of Bids	24.1 A Bidder may withdraw, or modify its bid- Technical or Price - after it has been submitted either in hard copy or by e-submission. Once a Bid is withdrawn, bidder shall not be able to submit another bid for this bidding process. Procedures for withdrawal or modification of submitted bids are as follows: (i) **Bids submitted in Hard Copy** **GoN Funded:** a) Bidders may withdraw or modify its bids by sending a written notice in a sealed envelope, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 20.2. The corresponding modification of the bid must accompany the respective written notice. All notices must be:— (aa) prepared and submitted in accordance with ITB 20 and ITB 21, and in addition, the respective envelopes shall be clearly marked **"WITHDRAWAL", "MODIFICATION;"** and (bb) received by the Employer twenty; four hours prior to the deadline prescribed for submission of bids, in accordance with ITB 22. **DP Funded:** A Bidder may withdraw 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 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," and "MODIFICATION;" and (b) received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 22. ii) **E-submitted bids.** a) Bidder may submit modification or withdrawal prior to the deadline prescribed for submission of bids through e-GP system by using the forms and instructions provided by the system.
	24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall not be opened. In case of hard copy submission, the Bid will be returned unopened to the Bidders.
	24.3 The following provisions apply for withdrawal or modification of the Bids:

	GoN Funded: (i) In case of bids submitted in hard copy no bid shall be withdrawn or modified in the interval between 24 hours prior to the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof. (ii) In case of e-submitted bids no bids shall be withdrawn or modified in the interval between deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Technical Bid and Price Bid or any extension thereof. **DP Funded:** No Bid may be withdrawn 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.
	24.4 Except in case of any modification or correction in bid document made by procuring entity, Bidder may submit request for withdrawal or modification only one time.
	24.5 In case of hard copy bid, no bid may be withdrawn if the bid has already been modified; except in case of any modification or correction in bid document by procuring entity.
	24.6 Request for withdrawal or modification must be made through the same medium of submission. Request for withdrawal or modifications through different medium shall not be considered.
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 who choose to attend. 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 Price Bid are submitted together in one envelope, the Employer shall reject the Bid as nonresponsive.
	25.2 The Employer shall download the e-submitted Technical Bid. The e-GP system allows the Employer to download the e-submitted technical bid only after bid opening date and time after login simultaneously by at least two members of the Bid Opening Committee.
	25.3 Electronically submitted Technical Bid shall be opened at first in the same time and date as specified above. Electronic Bids shall be opened one by one and read out. The e-submitted technical bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files shall be considered incomplete.
	25.4 Thereafter, 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. Next, envelopes marked "MODIFICATION" shall be opened and read out with the corresponding bid. No Technical Bid and/or Price Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out and recorded at bid opening. Only the Technical Bid, both Original as well as Modification, are to be opened, read

	out, and recorded at the opening. Price Bids, both Original and Modification, will remain unopened in accordance with ITB 25.1.
	25.5 All other envelopes holding the Technical Bid shall be opened one at a time, reading out: the name of the Bidder; whether there is a modification; the presence of a bid security and any other details as the Employer may consider appropriate. Only Technical Bids read out and recorded at bid opening shall be considered for evaluation. No bid shall be rejected at 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, or modification; and the presence or absence of a bid security. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.
	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 at least 7 days' notice for 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; (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, modifications, and alternative offers read out and recorded during the opening of Price Bids shall be considered for evaluation. No Bid shall be rejected at the opening of Price Bids.
	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, modifications 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.
E. Evaluation and Comparison of Bids	
26.	26.1 Information relating to the examination, evaluation, comparison, and post-qualification

Confidentiality	of bids and recommendation of Contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.
	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. In case of e-submission of bid, upon notification from the employer, the bidder shall also submit the original of documents comprising the Technical and Price Bid as per ITB 11.2 and ITB 11.3 for verification of submitted documents for acceptance of the e-submitted bid.
	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 shall 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 Bid	29.1 The Employer shall examine the Technical Bid to confirm that all documents and technical documentation requested in ITB 11.2 have been submitted. If any of these documents or information (except alternative Technical Bid which is optional) is missing, the bid shall be rejected.
	29.2 In case of e-submission bids, the Employer shall confirm that all the documents and information requested in ITB 21.1 have been submitted. If any of these documents or information is missing, the bid shall be rejected.
30. Determination of 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 ITB 11.2.
	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 VI (Works Requirements) have been met without any material deviation, reservation or omission.
	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.
	30.5 In case of e-submission bids, the Employer evaluates the bid on the basis of the information in the electronically submitted bid files. If the Bidder cannot substantiate or provide evidence to establish the information provided in e-submitted bid through documents/ clarifications as per ITB Clause 27.1, the bid shall not be considered for further evaluation.
	30.6 Except in case of e-submission, the Price Bid of the bidder, which is evaluated as substantially non-responsive in technical bid, shall be returned to the respective bidders.
31. Non-conformities Errors, and Omissions	31.1 Provided that a bid is substantially responsive, the Employer may waive any non-conformities 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 methods indicated in Section III (Evaluation and Qualification Criteria).
	31.4 If the monetary value of such non-conformities is found to be more than fifteen percent of the Bid Price of the bidder pursuant to ITB **31.3**, such bid shall be considered nonresponsive and shall not be involved in evaluation.
32 Eligibility and Qualification of the Bidder	32.1 The Employer shall determine to its satisfaction during the evaluation of Technical Bids whether Bidders meet the eligibility and qualifying criteria specified in Section III (Evaluation and Qualification Criteria).
	32.2 The determination shall be based upon an examination of the documentary evidence

	of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17.1. If two or more companies or firms have been merged prior to the submission of the bid, the qualifications of the companies or firms existing prior to such merger shall be deemed to form part of the qualifications of the resulting merged firm or company.
	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) only for unit price Contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected; (b) 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 a Bidder does not accept the correction of arithmetical errors, its bid shall be disqualified and its bid security shall be forfeited.
34 Subcontractors	34.1 In case of Prequalification, the Bidder's Bid shall name the same subcontractor as submitted in the prequalification application and approved by the Employer. In case of Post-qualification, the Employer may permit subcontracting for certain specialized works as indicated in Section III When subcontracting is permitted by the Employer, the sub-contractor shall meet the qualifications criteria as indicated in section III. Sub-contractors' qualification and experience will not be considered for evaluation of the Bidder. The Bidder on its own (without taking into account the qualification and experience of the sub-contractor) should meet the qualification criteria. Bidders may propose subcontracting up to the percentage of total value of contracts or the volume of works as **specified in the BDS.**
35. Evaluation of Price Bids	35.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.
	35.2 To evaluate a Price Bid, the Employer shall consider the following: (a) the bid price, excluding Value Added Tax, and Provisional Sums, in the Summary Bill of Quantities, for Unit Rate Contracts, or Schedule of Prices for lump sum Contracts, but including Day work items, where priced competitively;

	(b) adjustment for correction of arithmetic errors in accordance with ITB 33.1; (c) adjustment due to discounts offered in accordance with ITB 14.4; (d) adjustment for nonconformities in accordance with ITB 31.3; (e) application of all the evaluation factors indicated in Section III (Evaluation and Qualification Criteria) If the evaluated Bid Price of the Bidder is more than 30 (thirty) percent below or substantially higher than the cost estimate, the Employer shall reject the Bid as non-responsive.
	35.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
	35.4 If this Bidding Document allows Bidders to quote separate prices for different lots (Contracts), and to award multiple Contracts to a single Bidder **as specified in BDS**, 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 III (Evaluation and Qualification Criteria).
	35.5 If the bid for a Unit Rate Contract, evaluated as per ITB 36.1, is front-loaded or has quoted abnormally high rate for any item believing that the item was underestimated, the Employer **shall** require the Bidder to provide clarification along with detailed rate analysis, for any or all items of the Bill of Quantities as per ITB 27.1. The rate analysis submitted shall be analyzed and compared against prevailing norms and rates, on the basis of the work execution methodology, technology, and management methods specified by the bidder. If the clarification is deemed unsatisfactory, the Employer shall require that the amount of the performance security be increased at the expense of the Bidder as **specified in BDS**.
	35.6 In case of e-submission bids, the Employer evaluates the bid on the basis of the information in the electronically submitted bid files. If the Bidder cannot substantiate or provide evidence to establish the information provided in e-submitted bid through documents/ clarifications as per ITB Clause 27.1, the bid shall not be considered for further evaluation.
	35.7 If all the Bids evaluated are substantially higher than the cost estimate, the employer may negotiate with the bidder who submitted the lowest evaluated substantially responsive Bid to propose a lump sum discount rate in order to bring the bid price within the approved cost estimate. However, no change in the substance of the bid is permitted during the negotiations.
	35.8 If no agreement can be reached as per ITB 35.7, the employer shall cancel the procurement proceedings.

36. Comparison of Bids	36.1 The Employer shall evaluate all the bid prices of the substantially responsive bids in accordance with ITB 35.2. The Employer shall determine the Average Bid Price of all the substantially responsive Bids. The Bid Price which is closest to the Average Bid Price AND is not substantially higher than the cost estimate shall be selected for awarding the contract. In case two or more Bid Prices are determined to be equally closest to the Average Bid Price, the Bid Price which is below the Average Bid Price shall be selected for awarding the contract.
	36.2 While evaluating the Bid Price as per ITB 36.1, if the Bid Price of two or more Bidders is found to be equal, the Employer shall select the bid for awarding the contract by drawing of lots in presence of Bidders' designated representatives who choose to attend in date, time and place as notified by the Employer in writing to the concerned bidders. The Bidders' representatives who are present shall be requested to sign a record evidencing their attendance. The omission of a Bidder's signature on the record or the absence of a Bidder during the drawing of lots shall not invalidate the contents and the effect of the record. The method of drawing of lots shall be determined by the Employer.
37. Employer's Right to Accept Any Bid, and to Reject Any or All Bids	37.1 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.
	37.2 The public entity shall give notice of the rejection of bids or the cancellation of the procurement proceedings pursuant to ITB 37.1, along with the reasons for such rejection or cancellation, to all bidders.
	37.3 Where any bidder requests, within thirty (30) days of the communication of the notice pursuant to ITB 37.2, the grounds for the rejection of all bids or the cancellation of the procurement proceedings, the public entity shall provide such information to that bidder.
F. Award of Contract	
38. Award Criteria	38.1 The Employer shall award the Contract to the Bidder whose Bid Price is selected as per ITB 35.7, ITB 36.1 or ITB 36.2 and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.
39. Letter of Intent to Award the Contract/Notification of Award	39.1 The Employer shall notify the concerned Bidder whose bid has been selected in accordance with ITB 38.1 within seven days of the selection of the bid, in writing that the Employer has intention to accept its bid and the information regarding the name, address and amount of selected bidder shall be given to all other bidders who submitted the bid.
	39.2 After issuance of the notice under ITB 39.1 if the concerned bidder provides information pursuant to ITB 4.10 regarding saturation of maximum number of contracts, the employer shall disqualify the bidder and shall select the next Bidder whose Bid Price is closest to the previously determined Average Bid Price in accordance with ITB 38.1 and notify accordingly as per ITB 39.1.
	39.3 If no bidder submits an application pursuant to ITB 42 within a period of seven days

	of the notice provided under ITB 39.1, the Employer shall, accept the bid selected in accordance with ITB 38.1 and Letter of Acceptance shall be communicated to the selected bidder prior to the expiration of period of Bid validity, to furnish the performance security and sign the contract within fifteen days.
	39.4 After communicating letter of acceptance under ITB 39.3, if the concerned bidder provides information pursuant to ITB 4.10 regarding saturation of maximum number of contracts, the employer shall reject the bid of that bidder and shall select the next Bidder whose Bid Price is closest to the previously determined Average Bid Price in accordance with ITB 38.1 and shall issue the notice accordingly as per ITB 39.1. In such case bid security of the rejected bidder shall not be forfeited.
40. Performance Security	40.1 Within Fifteen (15) days of the receipt of Letter of Acceptance from the Employer, the successful Bidder shall furnish the performance security in an amount equal to 5 (five) percent of the Bid Price in accordance with the Conditions of Contract and subject to ITB 35.5, from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal using Sample Form for the Performance Security included in Section X (Contract Forms), or another form acceptable to the Employer. The performance security issued by any foreign Bank outside Nepal must be counter guaranteed by Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal. The Bid Price shall be without VAT but including Provisional Sum.
	40.2 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. In that event the Employer may award the Contract to the next Bidder whose Bid Price is closest to the previously determined Average Bid Price in accordance with ITB 38.1 whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily. The process shall be repeated according to ITB 39.
41 Signing of Contract	41.1 The Employer and the successful Bidder shall sign the Contract Agreement within the period as stated ITB 40.1.
	41.2 At the same time, the Employer shall affix a public notice on the result of the award on its notice board and make arrangement for causing such notice to be affixed on the notice board also of the ***District Coordination Committee, District Administration Office, Provincial Treasury and Controller Office and District Treasury and Controller Office.*** The Employer may make arrangements to post the notice into its website, if it has; and if it does not have, into the website of the Public Procurement Monitoring Office, identifying the bid and lot numbers and the following information: (i) the result of evaluation of bid; (ii) date of publication of notice inviting bids; (iii) name of newspaper; (iv) reference number of notice; (v) item of procurement; (vi) name and address of bidder making contract and (viii) contract price
	41.3 Within thirty (30) days from the date of issuance of notification pursuant to ITB 39.1 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, requests for debriefing.
	41.4 If the bidder whose bid has been accepted fails to sign the contract as stated ITB 40.1, the Public Procurement Monitoring Office shall blacklist the bidder on recommendation of

	the Public Entity.
42. Complaint and Review	42.1 If a Bidder is dissatisfied with the Procurement proceedings or the decision made by the Employer in opening of the price bid or the intention to award the Contract, it may file an application to the Chief of the Public Entity within Seven (7) days of providing the notice under ITB 25.8 and ITB 39.1 by the Public Entity, for review of the proceedings stating the factual and legal grounds.
	42.2 Late application filed after the deadline pursuant to ITB 42.1 shall not be processed.
	42.3 The chief of Public Entity shall, within five (5) days after receiving the application, give its decision with reasons, in writing pursuant to ITB 42.1: (a) whether to suspend the procurement proceeding and indicate the procedure to be adopted for further proceedings; or (b) to reject the application. The decision of the chief of Public Entity shall be final for the Bid amount up to the value as stated in 42.4.
	42.4 If the Bidder is not satisfied with the decision of the Public Entity in accordance with ITB 42.3, or the decision is not given within five (5) days of receipt of application pursuant to ITB 42.1, it can, within seven (7) days of receipt of such decision, file an application to the Public Procurement Review Committee of the GoN, stating the reason of its disagreement on the decision of the chief of Public Entity and furnishing the relevant documents, provided that its Bid amount ,equal or more than Rupees Twenty Million (NRs. 20,000,000). The application may be sent by hand, by post, by courier, or by electronic media at the risk of the Bidder itself.
	42.5 Late application filed after the deadline pursuant to ITB 42.4 shall not be processed.
	42.6 Within three (3) days of the receipt of application from the Bidder, pursuant to ITB 42.4, the Public Procurement Review Committee shall notify the concerning Public Entity to furnish its procurement proceedings, pursuant to ITB 42.3.
	42.7 Within three (3) days of receipt of the notification pursuant to ITB 42.6, the Public Entity shall furnish the copy of the related documents to the Public Procurement Review Committee.
	42.8 The Public Procurement Review Committee, after inquiring from the Bidder and the Public Entity, if needed, shall give its decision within thirty (30) days of the receipt of the application filed by the Bidder, pursuant to ITB 42.4.
	42.9 The Bidder, filing application pursuant to ITB 42.4, shall have to furnish a cash amount or Bank guarantee from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law equivalent to ten percent (10 %) of amount of bid security in case of complaint against decision pursuant to ITB 25.8 and one percent (1%) of its quoted Bid amount in case of complaint against decision pursuant to ITB 39.1 with the validity period of at least ninety (90) days from the date of the filing of application pursuant to ITB 42.4.
	42.10 If the claim made by the Bidder pursuant to ITB 42.4 is justified, the Public Procurement Review Committee shall have to return the security deposit to the applicant, pursuant to ITB 42.9, within seven (7) days of such decision made.
	42.11 If the application submitted by the Bidder pursuant to ITB 42.4 is dismissed by the

	Public Procurement Review Committee, the security deposit (Cash or Bank Guarantee) submitted by the Bidder pursuant to ITB 42.9 shall be forfeited.
	42.12 If the Employer does not implement the decision of the Public Procurement Review Committee, the bidder may file an application to the Public Procurement Review Committee.

Section II: Bid Data Sheet

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

A. General	
ITB 1.1	The number of the Invitation for Bids is: **CTEVT/NLPI/083/84/NCB/Civil-01**
ITB 1.1	The Employer is: ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur***
ITB 1.1	**Multiple Contract or lots (contracts) is *"not applicable"***
ITB 2.1	The name of the Project is ***Construction of Senior Staff Quarter of Nirmal Lama Polytechnic Institute*** The DP is ***NA*** The implementing agency is ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur*** GoN Funded or DP Funded: ***GoN Funded***
ITB 4.1 (a)	**For GoN Funded:** Maximum number of partners in a joint venture shall be: **3 (Three)** **For DP Funded: NA**
ITB 4.4	*For GoN:* ***http://www.bolpatra.gov.np/egp*** *For DP: NA*
ITB 4.9 & ITB 4.10	**For GoN Funded:** The Bidder, including all parties constituting the Bidder, shall be ineligible to participate in the open competitive bidding process if it has already secured **five (5)** number of construction contracts (in open competitive bidding) and has not yet completed the work as stipulated in the respective contracts. Following Procurement of Works contracts shall not be counted for this purpose: a) The works for which tender were invited or contracts accepted before 2078-12-03 B.S (March 17, 2022 A.D). b) The works for which tender were invited and contracts accepted after 2078-12-03 B.S (March 17, 2022 A.D) but the work acceptance report has been approved according to Rule 117 of PPR. c) The works for which tenders were invited or contracts accepted under all types of foreign assistance. **For DP Funded: NA**
B. Bidding Document	

ITB 7.1	For clarification purposes only, the Employer's address is: Attention: ***Director of polytechnic division, Council for Technical Education and Vocational Training (CTEVT),*** Address: ***Sanothimi, Bhaktapur*** Telephone: 977-01-6630408 Facsimile number: _____ Electronic mail address: info@ctevt.org.np,
ITB 7.4	A Pre-Bid meeting ***"shall"*** held. Pre-Bid Meeting will **Take place at the following date, time and place:** Date: ***2083/08/16*** Time: ***2:00 PM.*** Place: ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur*** A site visit ***"shall not be"*** organized by the Employer.
ITB 7.5	Time for request: Requests for clarification should be received by the Employer no later than **10 days** prior to the deadline for submission of bids.
C. Preparation of Bids	
ITB 10.1	The language of the bid is: **English / Nepali**
ITB 11.2 (i)	The Bidder shall submit with its Technical Bid the following additional documents: ***Power of Attorney, Tax clearance Certificate of F/Y 2082/083, Technical Qualification Documents.***
ITB 11.3 (b)	In accordance with ITB 12 and ITB 14, the following schedules shall be submitted with the bid, including the priced Bill of Quantities for Unit Rate Contracts and Schedule of Prices for lump sum contracts: **Unit Rate Contract.**
ITB 11.3 (e)	The Bidder shall submit with its Price Bid the following additional documents: ***Letter of Price Bid***
ITB 13.1	Alternative bids ***"shall not be"*** permitted.
ITB 13.2	Alternative times for completion ***"shall not be"*** permitted.
ITB 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: **NA**
ITB 14.6	The prices quoted by the Bidder ***"shall not be"*** subject to adjustment during the performance of the Contract.
ITB 18.1	The bid validity period shall be: ***90 days.***
ITB 19.1	The Bidder shall furnish a bid security, from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal with a minimum of NRs ***780000 (seven lakh eighty thousand only)***, which shall be valid for 30 days beyond the validity period of the bid.
ITB 19.2 (b)	Office Name: ***CTEVT DHARAUTI***

	Bank Name: Rastriya Banijya Bank Bank Address: Sanothimi, Bhaktapur Account Number: 17301001021004O1 (KA 2.10.4)
ITB 20.1	In addition to the original of the bid, the number of copy/ies is/are: ***Not Applicable***
ITB 20.2	The written confirmation of authorization to sign on behalf of the Bidder shall indicate: (a) The name and description of the documentation required to demonstrate the authority of the signatory to sign the Bid such as a Power of Attorney; and (b) In the case of Bids submitted by an existing or intended JV, an undertaking signed by all parties (i) stating that all parties shall be jointly and severally liable, and (ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.
D. Submission and Opening of Bids	
ITB 21.1	Bidders shall have the option of submitting their bids ***"by electronic only".***
ITB 22.1	For bid submission purposes only, the Employer's address is: Attention: ***Director of Polytechnic Divisin, Council for Technical Education and Vocational Training (CTEVT),*** Address: ***Sanothimi, Bhaktapur*** The deadline for bid submission is: Date: ***2083/08/25*** Time: 12:00 Hr
ITB 25.1	The Technical Bid opening shall take place at: Address: ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur*** Date: ***2083/08/25*** Time: **2:00 PM**
E. Evaluation and Comparison of Bids	
ITB 34.1	Contractor's proposed subcontracting: Maximum percentage of subcontracting permitted is: **25%**
ITB 35.4	Bidders are ***"not permitted"*** to quote separate prices for lots (Contracts), and a single Bidder will be awarded multiple lots (Contracts) based on provision of ***Paragraph 1.2, Multiple Contracts Section III (Evaluation and Qualification Criteria):***
ITB 35.5	The amount of the performance security be increased by **Eight (8)** percent of the quoted bid price without VAT but Including PS.

Section III: Evaluation and Qualification Criteria

This Section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders by post-qualification exercise. GoN/DP requires bidders to be qualified by meeting predefined, precise minimum requirements. The method sets pass-fail criteria, which, if not met by the bidder, results in disqualification. In accordance with ITB 32 and ITB 35, no other methods, criteria and factors shall be used. The Bidder shall provide all the information requested in the forms included in Section IV (Bidding Forms).

1. Evaluation

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

Note:
Use the evaluation criteria listed below as appropriate and required for the project.

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 VI (Works Requirements).

Non-compliance with equipment and personnel requirements described in Section VI (Works Requirements) shall not be grounds for bid rejection and such non-compliance will be subject to clarification and rectification prior to contract award.

1.2 Multiple Contracts

Multiple Contracts, if permitted under ITB 35.4, will be evaluated as follows:

Award Criteria for Multiple Contracts [ITB 35.4]:

Bidders have the option to Bid for any one or more Contracts. Bids will be evaluated taking into account discounts offered, if any, for combined contracts. The contract(s) will be awarded to the Bidder or Bidders offering the lowest evaluated cost to the Employer for combined contracts, subject to the selected Bidder(s) meeting the required qualification criteria for combination of multiple contracts as the case may be.

Qualification Criteria for Multiple Contracts:

The criteria for qualification shall be the sum of the minimum requirements for respective individual contracts as specified under items 2.3.2, 2.3.3, 2.3.4 and 2.4.2 b.

With respect to the **Contracts of Similar Size and Nature** under item 2.4.2(a) of Section III, the evaluation shall be done as below:

N is the minimum number of contracts required as per Specific Construction Experience (2.4.2(a)).

V is the minimum value of a single contract as per Note (2)~~,~~ **or** (3) of 2.4.2 Specific Construction Experience.

i. Minimum requirements for combined contract(s) shall be the aggregate requirements for each contract for which the bidder has submitted bids as follows, and N1,N2,N3, etc. shall be different contracts:

Contract 1: N1 contracts, each of minimum value V1;
Contract 2: N2 contracts, each of minimum value V2;
Contract 3: N3 contracts, each of minimum value V3;
----etc.

Or

ii. Total number of contracts is equal or less than N1 + N2 + N3 +--but the total value of all such contracts is equal or more than N1 x V1 + N2 x V2 + N3 x V3 +---.

1.3 In Case, other than Multiple Contracts

Bidders have the option to Bid for any one or more Contracts. The contracts will be awarded to the Bidder or Bidders offering the **substantially responsive Bid closest to the Average Bid Price** to the Employer, subject to the selected Bidder(s) meeting the required qualification which shall be the sum of the minimum requirements for respective individual contracts. Under this case, the Contract shall be awarded based on Least Cost Combination to the Employer.

1.4 Completion Time

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

NA

1.5 Alternative Technical Solutions

Alternative technical solutions, if permitted under ITB 13.4, will be evaluated as follows:

NA

1.6 Quantifiable Nonconformities and Omissions

Subject to ITB 14.2 and ITB 35.2, the evaluated cost of quantifiable nonconformities including omissions, is determined as follows:

[***Insert in bidding document:*** "Pursuant to ITB 31.3, the cost of all quantifiable nonmaterial nonconformities shall be evaluated, but excluding omission of prices in the BoQ.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."]

2. Qualification

2.1 Eligibility

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
2.1.1 Nationality					
Nationality in accordance with ITB sub-clause 4.2	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid, Forms ELI –1; ELI – 2 with attachments
2.1.2 Conflict of Interest					
No conflicts of interest in accordance with ITB Sub-Clause 4.3.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
2.1.3 Government/ DP Eligibility					
Not having been declared ineligible by government /DP, as described in ITB Sub-Clause 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 Sub-Clause 4.5.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Letter of Technical Bid, Forms ELI - 1, ELI - 2, with attachments
2.1.5 UN Eligibility					

Not having been declared ineligible based on a United Nations resolution or Employer's country law, as described in ITB Sub-Clause 4.7.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
2.1.6 Bidder's Running Contracts					
Bidders have not yet secured five (5) number of construction Contracts[2] (in open competitive bidding) as described in ITB Sub-Clause 4.9.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Letter of Technical Bid, Form ELI-3
2.1.7 Other Eligibility					
Firm or Company Registration Certificate	must meet requirement	not applicable	must meet requirement	not applicable	Document attachment
Business Registration License	must meet requirement	not applicable	must meet requirement	not applicable	Document attachment
VAT and PAN Registration certificate ***(only for domestic bidders)***	must meet requirement	not applicable	must meet requirement	not applicable	Document attachment
Tax Clearance Certificate or Tax return submission evidence or evidence of time extension for the **F/Y 2082/083** ***(Only for domestic bidders)***	must meet requirement	not applicable	must meet requirement	not applicable	Document attachment
Additional requirements ***[Insert if any]***	.....	.....	.....	.....	.....

[2] Following Procurement of Works contracts shall not be counted for this purpose:

a) The works for which tender were invited or contracts accepted before 2078-12-03 B.S (March 17, 2022 A.D)

b) The works for which tender have been invited and contracts accepted after 2078-12-03 B.S (March 17, 2022 A.D) but the work acceptance report has been approved according to Rule 117 of PPR.

c) The works for which tenders were invited or contracts accepted under all types of foreign assistance.

2.2 Pending Litigation

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
2.2.1 Pending Litigation					
All pending litigation shall be treated as resolved against the Bidder and so shall in total not represent more than *50* percent of the Bidder's net worth.	must meet requirement by itself or as partner to past or existing JV	not applicable	must meet requirement by itself or as partner to past or existing JV	not applicable	Form LIT - 1

Note:

(1) The percentage should normally be within the range of 50% to 100% of the Bidder's net worth.

2.3 Financial Situation

2.3.1 Historical Financial Performance					
Submission of audited balance sheets and income statements, for the last 5 years to demonstrate the current soundness of the Bidder's financial position. As a minimum, a Bidder's net worth for the last 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

Note:

(2)The financial information provided by a Bidder should be reviewed in its entirety to allow a truly informed judgment, and the pass-fail decision on the financial position of the Bidder should be given on this basis. Balance sheet of the past three to five year's period which shall be decided according to the nature of the work.

2.3.2 Average Annual Construction Turnover					
Minimum average annual construction turnover of NRs 39.10 Million calculated as total certified payments received for construction contracts in progress or completed, within best three years out of last ten fiscal years.	must meet requirement	must meet requirement	must meet *25%* of the requirement	must meet *40%* of the requirement	Form FIN -2

Only the net amount shall be calculated after deducting the amount for VAT and such amount shall be adjusted to present value by applying wholesale price index of Nepal Rastra Bank.

Note:

(3) The amount stated should normally not be less than 1.5 x V/T, the estimated annual turnover in the subject contract based on a straight-line projection of the Engineer's estimated cost (V), over the contract duration (T) in year. The Engineer's estimated cost (V) is taken without VAT and contingencies but including provisional sum. Contract duration less than one year shall be considered one year. The multiplier of 1.5 may be reduced up to1 (one) in accordance with the size, nature and complexity of contracts.

(4) Usually not less than 25 %

(5) Usually not less than 40 %

2.3.3 Financial Resources					
Using Forms FIN - 3 and FIN - 4 in Section IV (Bidding Forms) the Bidder must demonstrate access to, or availability of, financial resources such as liquid assets[3], unencumbered real assets, and other financial resources, (other than any contractual advance payments) to meet the cash-flow requirement of NRs. *9.00 Million*	must meet requirement	must meet requirement	must meet *25%* of the requirement	must meet *40%* of the requirement	Form FIN - 3

Note:

[3] Liquid Assets mean cash and cash equivalents, short-term financial instruments, short term available-for-sale-securities, marketable securities, trade receivables, short-term financing receivables and other assets that can be converted into cash within ONE YEAR.

(6) Construction cash flow requirement for a number of months (to the nearest half-month), determined as the total time needed by the Employer to pay a contractor's invoice, allowing for (a) the actual time consumed for construction, from the beginning of the month invoiced, (b) the time needed by the Project Manager to issue the monthly payment certificate, (c) the time needed by the Employer to pay the amount certified, and (d) a contingency period of one month to allow for unforeseen delays. The total period should not exceed three months for estimated cost (without VAT and contingencies but including PS) more than NRs. 250 Millions and for estimated cost (without VAT and contingencies but including PS) less than NRs. 250 Millions, the total period should not exceed 5 months. The assessment of the monthly amount should be based on a straight-line projection of the estimated cash flow requirement over the particular contract period, neglecting the effect of any advance payment and retention monies, but including contingency allowances in the estimated contract cost.]

(7) Usually not less than 25 %

(0) Usually not less than 40 %

2.3.4 Required Bid Capacity					
The bidding capacity of the bidder should be equal to or more than the NRs 26.1 Million	must meet requirement	must meet requirement	must meet 25% of the requirement	must meet 40% of the requirement	Form FIN - 4 and Form FIN - 5

Note:

(9) The amount stated should be 80 % to 100 % of Engineer's Estimate (without VAT and Contingencies but including Provision Sum) in round figure

(10) Usually not less than 25 %

(11) Usually not less than 40 %

2.4 Experience

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirement
		All Partners Combined	Each Partner	One Partner	
2.4.1 General Construction Experience					
Experience under construction contracts in the role of contractor, subcontractor, or management contractor for at least the last 5 years prior to the applications submission deadline.	must meet requirement	not applicable	must meet requirement	not applicable	Form EXP - 1

Note:

(12) Insert number of years in words and figures. The time period is normally 5 years, but may be reduced to not less than 3 years, according to the nature of works.

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirement
		All Partners Combined	Each Partner	One Partner	
2.4.2 Specific Construction Experience					
(a) Contracts of Similar Size and Nature					
(i) For Works with Estimated value (without VAT & Contingency but including PS) up to NRs. 100 million					
Participation as Prime contractor, management contractor, or subcontractor, within the last ten (10) years, that have been successfully or are substantially[a] completed and that are similar to the proposed works. The similarity shall be based on the physical size, complexity, methods, technology or other characteristics as described; 1 Any educational, office, institutional, hostel, RCC buildings.	must meet requirement, in at least One (1) Contract with a value of at least NRs 10.5 Million	not applicable	not applicable	must meet requirement, in at least One (1) Contract with a value of at least NRs 10.5 Million	Form EXP – 2(a)

Only the net amount shall be calculated after deducting the amount for VAT and such amount shall be adjusted to present value by applying wholesale price index of Nepal Rastra Bank.

***Complex works means those works involving complex technology such as tunnel roads, roads (asphalt concrete, Rigid pavement with high strength concrete etc.), major bridges, special bridges (pre stress bridge, arch bridge, cable stayed bridge, suspension bridge etc.), airport, large water supply and wastewater projects, large irrigation projects and their components like Headworks, weir, Barrage, Tunnel works, hydropower projects and similar works. However, in case of complex works like tunnel roads, airports, railway lines, hydropower projects, flyover, viaduct etc. for which experienced domestic bidders may not be available in market, in order to enhance capability of domestic bidders, the qualification criteria may be specified in a similar manner for non-complex works i.e. each partner's requirement may be specified as "not applicable".*

[a] A contract for which a Taking-Over Certificate has been issued shall be considered as substantially completed.

Note:

(13) Insert amount in Nepalese rupees, which is 40% (in above round figure in thousand) of the estimated value (without VAT and contingencies but including provisional sum) of the subject contract.

(14) Insert amount in Nepalese rupees, which is 60% (in above round figure in thousand) of the estimated value (without VAT and contingencies but including provisional sum) of the subject contract.

(15) Only in case of complex works, insert amount which is 10% (in above round figure in thousand) of the estimated value (without VAT and contingencies but including provisional sum) of the subject contract.

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirement
		All Partners Combined	Each Partner	One Partner	
(b) Construction Experience in Key Activities*					
Participation as Prime contractor, management contractor, or subcontractor, within a last ten (10) years, For the above or other contracts stipulated in 2.4.2(a) above, a minimum annual production rate on construction experience in the following key activities that have been successfully or substantially[a] completed: *[list activities indicating number or rate of production as applicable; for the key activity (ies) in the subject contract. The rates should be about 80% of the estimated annual production rates of the key activity(ies) in the subject contract as needed to meet the expected construction schedule with due allowance for adverse climatic conditions. Contract duration less than one year shall be considered one year for calculation of annual production rates.]*	must meet all requirements	must meet all requirements	not applicable	not applicable	Form EXP - 2(b)

* *Under Criterion 2.4.2 (a), the specified requirements define the similarity of contracts, whereas the key activities or production rates to be specified under Criterion 2.4.2 (b) define the required capability of the Bidder to execute key components of the Works. There shall be no inconsistency or duplication of requirements between Criteria 2.4.2(a) and 2.4.2(b).*

* *For the rate of production, the rate of production shall be on the basis of the average during the entire contract period.*

* *Only the activities having weightage 10 percent or more of the total estimated amount that should be manufactured or built by contractor should be considered as key activities.*
* *Key activities or production rates to be specified shall not restrict innovation and better quality.*
* *Key activities or production rates of different contracts for a particular duration can be added while evaluating. The annual production rate of key activities can be converted to a monthly production rate during the overlap period for better interpretation and evaluation.*
* *While specifying key activities or production rates, it shall be assured and to be recorded by public entity so that sufficient bidders with required qualification are available in market for adequate competition.*
* *Key activities or production rates to be specified shall be unambiguous e.g. environmentally friendly, international/high standard, complex technology etc.*
* *While specifying Key activities or production rates, the similarity shall be based on the complexity, methods or technology to be adopted.*
* *The activities that can be sub-contracted or readily available in the market (e.g. lift, elevator, electrical works, special type of facilities etc.) shall not considered as key activities.*

2.5 Subcontractors

The experience and financial capacity of the sub-contractors shall not be added to those of the Bidder for purposes of qualification of the Bidder.

The sub-contractors proposed shall be fully qualified for their work proposed, and meet the following criteria:

2.5 (a) Nature of Works that can be sub contracted:

(i) Formwork, Plaster work, Electrical works, Sanitary Works

(ii) .....

Note: Employer should specify the nature of work, if sub-contracting is permitted.

2.5 (b) Qualification Criteria

The proposed sub-contractor shall meet the following requirements:

1) Within the last ten (10) years, completion of at least NRs. NRs 10.5 Million *for work of a similar nature to the work being subcontracted.*
2) Minimum average annual construction turnover for the work being sub contracted of NRs 39.10 Million, calculated as total certified payments received for construction contracts in progress or completed, within best three years out of last ten fiscal years.

Note: Delete 2.5(b) if 2.5(a) is not applicable

(5) 80% of the value in Nepalese Rupees (NRs).

*(6) The amount stated should not be less than 1.5 * V/T where V is the proposed value of sub contract works and T is estimated time in year for which the intended sub-contracting work is to be completed. For intended Sub contracting work duration of up to 1 year, T shall be "1".*

Section IV: Bidding Forms

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

Letter of Technical Bid

The Bidder must accomplish the Letter of Technical Bid in its letter head clearly showing the Bidder's complete name and address.

Date: .....

Name of the contract: .....

Invitation for Bid No.: .....

To: ***[Insert Complete name of 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) Clause 8.

(b) We offer to execute in conformity with the Bidding Documents the following Works: ***[Insert Description of the works]***

(c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of ***[insert 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 and meet the requirements of ITB 3.4,& ITB 3.5

(e) We are not participating, as a Bidder or as a subcontractor, 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.

(f) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible by DP, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council;

(g) [We are not a government owned entity] / [We are a government owned entity but meet the requirements of ITB 4.5];[1]

(h) We declare that, 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 and we have not been punished for an offense relating to the concerned profession or business.

(i) We declare that we are solely responsible for the authenticity of the documents submitted by us. The document and information submitted by us are true and correct. If any document/information given is found to be concealed at a later date, we shall accept any legal actions by the Employer.

(j) We agree to permit the Employer/DP 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 the Employer.

(k) If our Bid is accepted, we commit to mobilizing key equipment and personnel in accordance with the requirements set forth in Section VI (Works Requirement) and our technical proposal, or as otherwise agreed with the Employer.

(l) We declare that we have not yet secured five (5)[4] number of construction contract (in open competitive bidding) as described in ITB Sub-Clause 4.9.

Name: ***[insert complete name of the person signing the Bid]***.....

In the capacity of ***[insert legal capacity of person signing the Bid]***.....

Signed ***[signature of the person whose name and capacity are shown above]***.....

Duly authorized to sign the Bid for and on behalf of ***[insert complete name of the Bidder]***.....

Date ***[insert date of signing]***.....

[1] Note: Use one of the two options as appropriate.

[4] Note: Following Procurement of Works contracts shall not be counted for this purpose:

a) The works for which tender were invited or contracts accepted before 2078-12-03 B.S (March 17, 2022 A.D).

b) The works for which tender have been invited and contracts accepted after 2078-12-03 B.S (March 17, 2022 A.D) but the work acceptance report has been approved according to Rule 117 of PPR.

c) The works for which tenders were invited or contracts accepted under all types of foreign assistance.

Letter of Price Bid

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

Date: .....

Name of the contract: .....

Invitation for Bid No.: .....

To: ***[Insert Complete name of 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) Clause 8;

We offer to execute in conformity with the Bidding Documents the following Works: ***[Insert Description of the works]*** .

(c)The total price of our Bid, excluding any discounts offered in item (d) below is: ***[Insert one of the options below as appropriate]*** or when left blank is the Bid Price indicated in the Bill of Quantities.

Option 1, in case of single contract: Total price is: ***[insert the total price of the Bid in words and figures];***

Or

Option 2, in case of multiple lots (contracts): (i) Total price of each lot (contracts): ***[insert the total price of each lot in words and figures]***; (ii) Total price of subject contract [say Lot1] and Lot2 [another contract] ***[insert the total price in words and figures];*** (iii) Total price of subject contract [say Lot1]and Lot3 [another contract] ***[insert the total price in words and figures];*** Total price of subject contract [say Lot1], Lot2 [another contract], Lot3 [another contract], ...***[insert the total price in words and figures]***;

(d) The discounts offered and the methodology for their application for subject contract [single contract] are:..... [For Bidding Documents not provisioning multiple contracts]

Add following if Bidding Document provisions applicability of multiple contracts:

The discounts offered and the methodology for their application for subject contract [say Lot1] and Lot2 [another contract] are:.....

The discounts offered and the methodology for their application for subject contract [say Lot1] and Lot3 [another contract] are:.....

The discounts offered and the methodology for their application for subject contract [say Lot1], Lot2 [another contract] and Lot3 [another contract],.....,
are:.....

[Note:
1. Formulate possible combinations depending upon the number of lots under Bidding Process and modify accordingly Paragraph (c) and (d)]

(e) Our bid shall be valid for a period of ***[insert validity period as specified in ITB 18.1]*** 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 Document;

(g) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:[5]

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 bid closest to the Average Bid Price or any other bid that you may receive; and

(j) We declare that we are solely responsible for the authenticity of the documents submitted by us.

(k) We agree to permit the Employer/DP 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 the Employer.

Name: ***[insert complete name of the person signing the Bid]***.....

In the capacity of ***[insert legal capacity of person signing the Bid]***.....

Signed ***[signature of the person whose name and capacity are shown above]*** .....

Duly authorized to sign the Bid for and on behalf of ***[insert complete name of the Bidder]***.....

Date ***[insert date of signing]***..... .....

---

[5] If none has been paid or is to be paid, indicate "None".

Table of Price Adjustment Data[6]

[To be used if Price Adjustment is applicable as per GCC 53.1]

Code	Index Description	Source of Index*	Base Value and Date	Employer's Proposed Weighting Range (coefficient)	Bidder's Proposed Weighting (coefficient)**
1	2	3	4	5	6
	Non - Adjustable (A)			0.15	0.15
	Labor (b)				
	Materials (c)***				
	Equipment usage (d)				
		Total			1.00

*Normally following source of index shall apply. Public Entity shall choose applicable Index for each item.

(a) Labor: "National Salary and Wage Rate Index"- "Construction Labor" of Nepal Rastra Bank or rate fixed by District Rate Fixation Committee

(b) Material: "National Wholesale Price Index" - Construction Materials" of Nepal Rastra Bank

(c) Equipment usage: "National Wholesale Price Index" - Machinery and Equipment" of Nepal Rastra Bank or "Fuel" Price fixed by Nepal Oil Corporation.

** Bidders proposed weightings should be within the range specified by the Employer in column - 5

*** The materials can be broken down into major construction materials if necessary. In this case the source of index shall be the specified by Employer, preferably as per the published ex-factory price or published price from the sole authorized seller.

[6] Non-compliance of the data (stipulated by the bidder in this table) with requirements described here shall not be grounds for bid rejection and such non-compliance will be subject to clarification and rectification prior to contract award.

Table of Price Adjustment Data[7]

[To be used if Price Adjustment is applicable as per GCC 53.6]

Code	Construction Material*	Unit	Base Price (NRs/Unit) (Ex-factory)	Source (Factory)**
1	2	3	4	5

* Major construction materials to be specified by Employer in column - 2.

** Base Price and source normally to be specified by Employer (or alternatively informed to be proposed by bidder) in column 4 and 5.

Note:

The base prices of the construction materials shall be taken as of 30 days before the deadline for submission of the Bid as quoted by the Bidder and verified by the Employer. For the purpose of calculation of price adjustment, the Ex-factory price of the same source shall be taken into consideration.

[7] Non-compliance of the data (stipulated by the bidder in this table) with requirements described here shall not be grounds for bid rejection and such non-compliance will be subject to clarification and rectification prior to contract award.

Bid Security

Bank Guarantee

Bank's Name, and Address of Issuing Branch or Office

(On Letter head of the Bank)

Beneficiary: .....*[Insert name and address of Employer]* .....

Date: .....Bid Security No.: .....

We have been informed that. ..... *[insert name of the Bidder]* (hereinafter called "the Bidder")intends to submit its bid (hereinafter called "the Bid") to you for the execution of .....*[Insert name of Contract]* ..... under Invitation for Bids No. .....*[insert IFB No.]* ("the IFB").

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

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

(a) has withdrawn or modifies its Bid:

i) during the period of bid validity specified by the Bidder on the Letter of Technical and Price Bid, in case of electronic submission

(ii) from the period twenty-four hours prior to bid submission deadline up to the period of bid validity specified by the Bidder on the Letter of Technical Bid and Price Bid, in case of hard copy submission; or

(b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or

(c) changes the prices or substance of the bid while providing information pursuant to clause 27.1 of ITB; or

(d) having been notified of the acceptance of its Bid by the Employer during the period of bid validity, (i) fails or refuses to execute the Contract Agreement, or (ii) fails or refuses to furnish the performance security, in accordance with the ITB; or

(e) is involved in fraud and corruption in accordance with the ITB; or

(f) if the bidder fails to inform about the saturation of the maximum number of contracts as per ITB 4.10.

This guarantee will remain in force up to and including the date .....***number***.....days after the deadline for submission of Bids as such deadline is stated in the instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not letter than the above date.

This Bank guarantee shall not be withdrawn or released merely upon return of the original guarantee by the Bidder unless notified by you for the release of the guarantee.

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

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

Note:

The bid security of ..... has been counter guaranteed by the Bank ..... on ..... (Applicable for Bid Security of Foreign Banks).

Technical Proposal Format

Personnel

Equipment

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

Personnel

Form PER - 1: Proposed Personnel

Bidders should provide the names of suitably qualified personnel to meet the specified requirements for each of the positions listed in Section VI (Work Requirements). The data on their experience should be supplied using the Form below for each candidate.

No.	Name	Position*	Academic Qualification	Total Work Experience [Years]	Experience in Similar Works [years]
1.					
2.					
3.					
4.					
5.					

* As listed in Section VI (Work Requirements).

Form PER - 2: Resume of Proposed Personnel



The Bidder shall provide all the information requested below.

Position*		
Personal Information	Name	Date of Birth
	Professional qualifications	
Present employment	Name of employer	
	Address of employer	
	Telephone	Contact (manager/personnel officer)
	Fax	E-mail
	Job title	Years with present employer

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

From	**To**	**Company, Project, Position and Relevant Technical and Management Experience**

Equipment

Form EQU: Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section VI (Work Requirements). A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

(i) For the equipment under Bidder's ownership

No.	Equipment Type and Characteristics	Total Nos. of Equipment under Bidder's Ownership	No. of Equipment engaged/proposed for ongoing/committed contracts	Nos. of Equipment proposed for this contract
1.				
2.				
3.				
4.				
5.				

(ii) For the Equipment to be leased/hired

No.	Equipment Type and Characteristics	Total Nos. of Equipment under the ownership of lease/hire provider	No. of Equipment engaged/committed for other works	Nos. of Equipment proposed to be leased/hired for this contract
1.				
2.				
3.				
4.				
5.				

Type 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 ☐ Owned ☐ Rented ☐ Leased ☐ Specially manufactured	

The following information shall be provided only for equipment not owned by the Bidder.

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

The Bidder shall be solely responsible for the data provided. However, this shall not limit the right of Employer to verify the authenticity of submitted information.

Bidder's Information and Qualification Format

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

Bidder's Qualification

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

Form ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	
In case of JV, 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)	
Attached are copies of the following original documents.	
1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and 4.2. 2. Authorization to represent the firm or JV named in above, in accordance with ITB 20.2. 3. In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. 4. In case of a government-owned entity, any additional documents not covered under 1 above required to comply with ITB 4.5.	

Form ELI - 2: JV Information Sheet

Each member of a JV must fill in this form



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

Form ELI - 3: Bidder's Running Contracts[8]

Each member of a JV must fill in this form

	Bidder's Running Contracts				
Name of office	**Contract Identification no.**	**Source of Fund***	**Date of issuance of Letter of Acceptance**	**Status of contract****	**Date of Issuance of Taking Over Certificate*****

* Mention GON funded or DP funded or Other PE (Insert name) funded

** Mention "Yet to sign" if contract is not signed, "Running" if contract has been signed and contract is running and "Substantially completed" if taking over certificate has been issued.

** Insert date of issuance of taking over certificate if the awarded contract has been substantially completed and taking over certificate has been issued.

[8]:Note Following Procurement of Works contracts shall not be counted for this purpose

a) The works for which tender were invited or contracts accepted before 2078-12-03 B.S (March 17, 2022 A.D).

b) The works for which tender have been invited and contracts accepted after 2078-12-03 B.S (March 17, 2022 A.D) but the work acceptance report has been approved according to Rule 117 of PPR.

c) The works for which tenders were invited or contracts accepted under all types of foreign assistance

Form LIT - 1: Pending Litigation

Each member of a JV must fill in this form

Pending Litigation
☐ No pending litigation in accordance with Criteria 2.2 of Section III (Evaluation and Qualification Criteria) ☐ Pending litigation in accordance with Criteria 2.2 of Section III (Evaluation and Qualification Criteria)

Year	Matter in Dispute	Value of Pending Claim in NRS	Value of Pending Claim as a Percentage on Net Worth

Form FIN - 1: Financial Situation

Each Bidder or member of a JV must fill in this form

Financial Data for Previous 3 Years [in NRS]		
Year 1 :	**Year 2 :**	**Year 3 :**

Information from Balance Sheet

Total Assets			
Total Liabilities			
Net Worth			
Current Assets			
Current Liabilities			

Information from Income Statement

Total Revenues			
Profit Before Tax			
Profit After Tax			

- Attached are copies of financial statements (balance sheets including all related notes, and income statements) for the last three or above years, as indicated above, complying with the following conditions.
- All such documents reflect the financial situation of the Bidder or partner to a JV, and not sister or parent companies.
- Historic financial statements must be audited by a certified auditor.
- Historic financial statements must be complete, including all notes to the financial statements.
- Historic 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 or member of a JV must fill in this form

The information supplied should be the Annual Turnover of the Bidder or each member of a JV in terms of the amounts billed to clients for each year for work in progress or completed to NRs at the end of the period reported.

Annual Turnover Data for the Last 10 Years (Construction only)	
Year	Amount Currency

- **Average Annual Construction Turnover (Best three years within the last 10 years)**

Form FIN - 3: Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as indicated in Section III (Evaluation and Qualification Criteria).

Financial Resources		
No.	**Source of financing**	**Amount (in NRS)**
1		
2		
3		

Form FIN – 4: Bid Capacity

Each Bidder or member of a JV must fill in this form

Bid Capacity = [(5 x A) – B]

A = Average Annual Turnover of best three years out of last ten fiscal years.

B = Annual Value of the existing commitments and works (ongoing) to be completed, calculated from **FIN-4.**

SN	Name of Bidder	Pan No.	A, in Million	B, in Million	Bid Capacity, in Million
1					
2					
3					

Total Bid Capacity:

Signature of Bidder

Form FIN- 5: Current Contract Commitments / Works in Progress

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

Current Contract Commitments (For Calculation of B with reference of FIN-3)									
No.	**Name of Contract**	**Name of the Contractor/s**	**Employer's Contact Address, Tel, Fax**	**Contract Share in % (a)**	**Contract Amount in Millions (b)**	**Contract Date(yyyy-mm) (c)**	**Initial or Revised Contract Duration (months) (d)**	**Value of outstanding works [In Millions, NRS]# (e)**	**Estimated Time in Month to Complete the outstanding works (f) = (c) + (d) – Date of Invitation of Bid (f)**
1									
2									
3									
4									

Signature of Bidder

 # The Outstanding Works means Contract Price (excluding Vat) minus Work Evaluated by Employer till the reference date. Bidder shall have to submit the relevant documentary evidence to substantiate the facts/figures.

Note 1: "B" shall be calculated as : $B = \sum \left[\frac{(e) \times (a)}{(f)} \right] x12$ **, If (f) is less than 12, then value of (f) shall be taken as 12.**

Note 2: If Initial or Revised Contract Date is run out with respect to Date of Invitation of Bid, the Estimated Time in Month to Complete the outstanding works shall be taken equal to 12 months.

Form EXP - 1: General Construction Experience

Each Bidder or member of a JV must fill in this form.

General Construction Experience				
Starting Month Year	**Ending Month Year**	**Year**	**Contract Identification and Name and Address of Employer Brief Description of the Works Executed by the Bidder**	**Role of Bidder**

Council for Technical Education & Vocational Training
Sindhupalchowk

Form EXP - 2(a): Specific Construction Experience

Fill up one (1) form per contract.

Contract of Similar Size and Nature			
Contract No..... of.....	**Contract Identification**		
Award Date		**Completion Date**	
Role in Contract	☐ **Contractor**	☐ **Management Contractor**	☐ **Subcontractor**
Total Contract Amount	☐ **NRS .....**		
If Partner in a JV or subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**	
Employer's Name **Address** **Telephone/Fax** **Number** **E-mail**			
Description of the similarity in accordance with Criteria 2.4.2 (a) of Section III			
Note : ***The Employer should insert here contract size, complexity, methods, technology, or other characteristics as described in Section III (EQC), 2.4.2 (a) against which the bidder demonstrates similarity in the box on the right-hand-side.***			

Form EXP - 2(b): Specific Construction Experience in Key Activities

Fill up one (1) form per contract.

Contract of Similar Size and Nature			
Contract No..... of.....	**Contract Identification**		
Award Date		**Completion Date**	
Role in Contract	☐ **Contractor**	☐ **Management Contractor**	☐ **Subcontractor**
Total Contract Amount	☐ **NRS .....**		
If Partner in a JV or subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**	
Employer's Name **Address** **Telephone/Fax** **Number** **E-mail**			
Description of the similarity in accordance with Criteria 2.4.2 (a) of Section III			
Note : *The Employer should insert here production rate(s) for the key activity (activities) subject contract against which the bidder demonstrates in the box on the right-hand-side production rates achieved by him on previous contracts.*			

Section V - Eligible Countries

Council for Technical Education & Vocational Training
Sanothimi, Bhaktapur

[This section contains the list of eligible countries. Select one option, either GoN Funded or DP Funded.]

For GoN funded: *[with estimate up to NRs. 5 billion]*

For the purpose of ITB 4.2: **"Nepal"**; and

For the purpose of Country-of-Origin ITB 5.1 and GCC 79.2: **"all Countries"**

For DP funded: **[attach list as per their list of eligible countries]**



Part II: REQUIREMENTS

Table of Clauses

Council for Technical Education & Vocational Training
Sanothimi, Bhaktapur

Section VI: Works Requirements (WRQ)

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Section VI: Works Requirements



This Section contains the Scope of Work, Specification, the Drawings, supplementary information that describe the Works to be procured, Personnel Requirements and Equipment Requirements.

Scope of Work

Council for Technical Education & Vocational Training
Sunoshiri, Bhaktapur

Construction of Senior Staff Quarter of Nirmal Lama Polytechnic Institute, Khayarmara, Bardibas, Mahottari. The work is two story RCC structure with complete finishing of civil wors along with complete electrical and sanitary works with a septic tank and soak-pit.

Specifications



Notes on the Specifications

A set of precise and clear specifications is a prerequisite for Bidders to respond realistically and competitively to the requirements of the Employer without qualifying or conditioning their Bids. The specifications must be drafted to permit the widest possible competition and, at the same time, present a clear statement of the required standards of workmanship, materials, and performance of the goods and services to be procured. Only if this is done will the objectives of economy, efficiency and fairness in procurement be realized, responsiveness of Bids be ensured, and the subsequent task of bid evaluation facilitated. The specifications should require that all goods and materials to be incorporated in the Works be new, unused, of the most recent or current models, and incorporate all recent improvements in design and materials unless provided otherwise in the Contract.

Samples of specifications from previous similar projects are useful in this respect. The use of metric units is encouraged by the Funding Agency in case of funding assisted projects. Most specifications are normally written specially by the Employer or Project Manager to suit the Contract Works in hand. The available standard specification of works of Ministry of Physical Infrastructure and Transport, DoLI and Other line Ministries can be adopted for respective civil construction works.

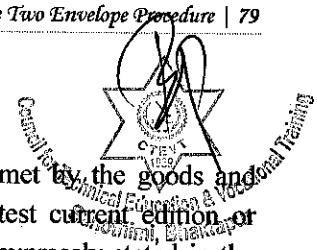
There are considerable advantages in standardizing General Specifications for repetitive Works in recognized public sectors, such as highways, urban housing, irrigation, and water supply, in the same country or region where similar conditions prevail. The General Specifications should cover all classes of workmanship, materials, and equipment commonly involved in construction; however, it may not necessarily be adequate to be used in a particular Works Contract and may necessitate preparation of Particular (Special) Specifications to amend and or supplement the provision of the General Specifications to meet the requirement of the particular Works.

Care must be taken in drafting specifications to ensure that they are not restrictive. In the specification of standards for goods, materials, and workmanship, recognized international standards should be used as much as possible. Where other particular standards are used, whether national standards of Nepal or other standards, the specifications should state that goods, materials, and workmanship that meet other authoritative standards, and which ensure substantially equal or higher quality than the standards mentioned, will also be acceptable.

Employers should decide whether technical solutions to specified parts of the Works are to be permitted. Alternatives are appropriate in cases where obvious (and potentially less costly) alternatives are possible to the technical solutions indicated in the Procurement Documents for certain elements of the Works, taking into consideration the comparative specialized advantage of potential bidders. For example:

The Employer should provide a description of the selected parts of the Works with appropriate references to Drawings, Specifications, Bill of Quantities, and Design or Performance criteria, stating that the alternative solutions if applicable shall be at least structurally and functionally equivalent to the basic design parameters and specifications.

Such alternative solutions shall be accompanied by all information necessary for a complete evaluation by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, proposed construction methodology, and other relevant details.



Sample Clause: Equivalency of Standards and Codes

Wherever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified will be accepted subject to the Project Manager's prior review and written consent. Differences between the standards specified and the proposed alternative standards shall be fully described in writing by the Contractor and submitted to the Project Manager at least 30 days prior to the date when the Contractor desires the Project Manager's consent. In the event the Project Manager determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the documents.

These Notes for Preparing Specifications are intended only as information for the Employer or the person drafting the Procurement Documents. They should not be included in the final documents.

[Detail Specifications is attached in additional documents sections]

Drawings

Note:

1. It is customary to bind the drawings in a separate volume, which is often larger than other volumes of the contract documents. The size will be dictated by the scale of the drawings, which must not be reduced to the extent that details are reduced illegible.

2. A simplified map showing the location of the Site in relation to the local geography, indicating major roads, posts, airports, and railroads, is helpful.

3. The construction drawings, even if not fully developed, must show sufficient details to enable bidders to understand the type and complexity of the work involved and the price the Bill of Quantities.

Drawings are provided in additional document section

Supplementary Information



[insert supplementary information if any]

Personnel Requirements

Using Form PER-1 and PER-2 in Section IV (Bidding Forms), the Bidder must demonstrate it has personnel that meet the following requirements:

SN.	Position	Required No.	Academic Qualification *[When position demands]*	Total Work Experience [Years]	Experience in Similar Works [years]
1.	Project Manager	1	BE Civil, NEC Registered	7 years	5 years
2.	Site Engineer	1	BE Civil / Civil diploma	5 Years	3 Years
3.	Quality Control Engineer	1	BE Civil,	3 years	2 years
4.	Safety Officer	1	Safety Training	3 years	2 years

Equipment Requirements

Using Form EQU in Section IV (Bidding Forms), the Bidder must demonstrate it has the key equipment listed below:

No.	Equipment Type and Characteristics	Min. Number Requirement
1.	Concrete Mixer	1 Nos
2.	Needle Vibrator	2 Nos
3.	Plate Compactor	1 Nos
4.	Auto Level / Total Station	1 Set
5.	Water Pump	1 Nos
6.	Generator Set	1 Nos
7.	Scaffolding and Formwork	Adequate Quantity

Section VII: Bill of Quantities[9]



Notes for Unit Rate Contracts:

Objectives

The objectives of the Bill of Quantities are

(a) to provide sufficient information on the quantities of Works to be performed to enable Bids to be prepared efficiently and accurately; and

(b) when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

In order to attain these objectives, Works should be itemized in the Bill of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and content of the Bill of Quantities should be as simple and brief as possible.

Content

The Bill of Quantities should be divided generally into the following sections:

(a) Preamble;

(b) Work Items (grouped into parts);

(c) Day works Schedule;

d) Provisional Sums; and

(d) Summary.

Preamble

The Preamble should indicate the inclusiveness of the unit prices, and should state the methods of measurement which have been adopted in the preparation of the Bill of Quantities and which are to be used for the measurement of any part of the works.

Work Items

The items in the Bill of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing, or any other special characteristics may give rise to different methods of construction, or phasing of the Works, or considerations of cost. General items common to all parts of the works may be grouped as a separate section in the Bill of Quantities.

Day work Schedule

A Day work Schedule should be included only if the probability of unforeseen work, outside the items included in the Bill of Quantities, is high. To facilitate checking by the Employer of the realism of rates quoted by the Bidders, the Day work Schedule should normally comprise the following:

(a) A list of the various classes of labour, materials, and Constructional Plant for which basic day work rates or prices are to be inserted by the Bidder, together with a statement of the conditions under which the Contractor will be paid for work executed on a day work basis.

[9]In lump sum contracts, delete "Bill of Quantities" and replace with "Schedule of Activities" throughout this section.

(b) Nominal quantities for each item of Day work, to be priced by each Bidder at Day work rates as bid. The rate to be entered by the Bidder against each basic Day work item should include the Contractor's profit, overheads, supervision, and other charges.

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Sanothimi, Bhaktapur

Provisional Sums

Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Project Manager in accordance with the Conditions of Contract.

Summary

The Summary should contain a tabulation of the separate parts of the Bill of Quantities carried forward, with provisional sums for Day work, for physical (quantity) contingencies, and for price contingencies (upward price adjustment) where applicable.

Preamble of Bill of Quantities

A. General

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Special Conditions of Contract, Technical Specifications, and Drawings.

2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Project Manager and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Project Manager may fix within the terms of the Contract.

3. For any item for which measurement is based on records made before or during construction the records shall be prepared and agreed between the Engineer and the Contractor. Should the Contractor carry out such work without the prior agreement of the Engineer, the Engineer may request the Contractor to carry out investigations to confirm the extent of the work and the quantity of work certified for payment shall be solely at the Engineer's discretion. The cost of any such investigation shall be borne by the Contractor.

4. The rates and prices bid in the priced Bill of Quantities shall, except as otherwise provided under the Contract, include all construction equipment, labor, supervision, materials, erection, maintenance, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.

5. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

6. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

7. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities. The Specification Clause references where given in the item description of the Bills of Quantities are for the convenience of bidders and generally refer to the principal relevant- specification clause but do not necessarily represent the whole of the specification requirements for the work required

within the item. The presence of a Specification clause reference shall not in any way reduce the Bidders obligation to complete work in accordance with all the requirements of the Specification.

8. Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Project Manager in accordance with the Conditions of Contract.
9. The method of measurement of completed work for payment shall be in accordance with the Specifications.
10. The abbreviations and symbols used in this Bill of Quantities are:*[Insert as applicable]*

B. Day work Schedule

a)General

1. Work shall not be executed on a day work basis except by written order of the Project Manager. Bidders shall enter basic rates for day work items in the Schedules. These rates shall apply to any quantity of day work ordered by the Project Manager. Nominal quantities have been indicated against each item of day work, and the extended total for day work shall, be carried forward as a Provisional Sum to the Summary Total Bid Amount. Unless otherwise adjusted, payments for day work shall be subject to price adjustment in accordance with the provisions in the Conditions of Contract.

b) Day work Labor

1. In calculating payments due to the Contractor for the execution of day works, the hours for labor will be reckoned from the time of arrival of the labor at the job site to execute the particular item of day work to the time of departure from the job site, but excluding meal breaks and rest periods. Only the time of classes of labor directly doing work ordered by the Project Manager and are competent to perform such work will be measured. The time of gangers (charge hands) actually doing work with the gangs will also be measured but not the time of foremen or other supervisory personnel.

2. The Contractor shall be entitled to payment in respect of the total time that labor is employed on day work, calculated at the basic rates entered by it in the " SCHEDULE OF DAY WORK RATES: 1. LABOR". The rates for labor shall be deemed to cover all costs to the Contractor including (but not limited to) i) the amount of wages paid to such labor, transportation time, overtime, subsistence allowances, ii) any sums paid to or on behalf of such labor for social benefits in accordance with Nepal law, iii) Contractor's profit, overheads, superintendence, liabilities and insurance and iv) charges incidental to the foregoing.

c) Day work Equipment

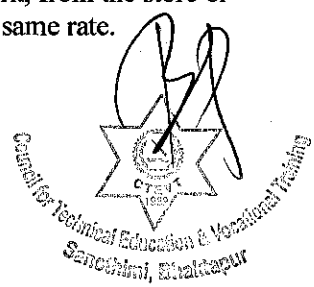
1. The Contractor shall be entitled to payments in respect of Constructional Plant already on site and employed on day work at the basis rental rates entered by him in the "SCHEDULE OF DAY WORK RATES:2 EQUIPMENT". The said rates shall be deemed to include due and complete allowance for depreciation, interest, indemnity and insurance, repairs, maintenance, supplies, fuel, lubricant, and other consumables and all overhead, profit and administrative costs related to the use of such equipment. The cost of drivers, operators and assistants also shall be included in the rate of the equipment and no separately payment shall be made for it.

2. In calculating the payment due to the Contractor for Constructional Plant employed on day work, only the actual number of working hours will be eligible for payment, except that where applicable and agreed with the Project Manager, the travelling time from the part of the Site where the Construction Plant was located when ordered by the Project Manager to be employed on day work and the time for return journey there to shall be included for payment.

d) Day work Materials

1. The Contractor shall be entitled to payment in respect of materials used for day work (except for materials for which the cost is included in the percentage addition to labor costs as detailed heretofore), at the rates entered by him in the "SCHEDULE OF DAY WORK RATES: 3 MATERIALS" and shall be deemed to include overhead charges and profit as follows;
   (i) the rates for materials shall be calculated on the basis of the invoiced price, freight, insurance, handling expenses, damage, losses, etc. and shall provide for delivery to store for stockpiling at the Site.

(ii) the cost of hauling materials for use on work ordered to be carried out as day work, from the store or stockpile on the Site to the place where it is to be used also shall be include in the same rate.



Provisional Sums

The estimated cost of specialized work to be carried out, or of special goods to be supplied, by other contractors should be indicated in the relevant part of the Bill of Quantities as a particular provisional sum with an appropriate brief description. A separate procurement procedure is normally carried out by the Employer to select such specialized contractors. To provide an element of competition among the Bidders in respect of any facilities, amenities, attendance, etc., to be provided by the successful Bidder as prime Contractor for the use and convenience of the specialist contractors, each related provisional sum should be followed by an item in the Bill of Quantities inviting the Bidder to quote a sum for such amenities, facilities, attendance, etc.

Bill of Quantities

[Bill of Quantities is provided in separate section]

Council for Technical Education & Vocational Training
Secretariat, Dhaka-1207

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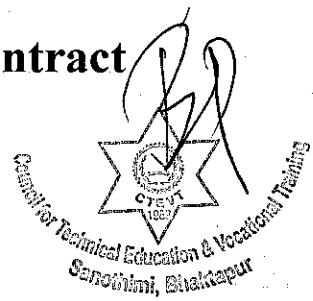
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Council for Technical Education & Vocational Training Sanothimi, Bhaktapur

Section VIII: General Conditions of Contract



Council for Technical Education and Vocational Training (CTEVT)

Construction of Senior Staff Quarter of Nirmal Lama Polytechnic Institute

Contract Identification Number: CTEVT/NLPI/083/84/NCB/Civil-01

General Conditions of Contract

This Section provides the General Conditions of Contract that will apply to the Contract for which the Biding document is issued.

Council for Technical Education & Vocational Training
Sanothimi, Bhaktapur

A. General	
1. Definitions	1.1 Boldface type is used to identify defined terms. (a) The **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. (b) The **Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events. (c) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid. (d) **Compensation Events** are those defined in GCC 50 hereunder. (e) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC 68.1. (f) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC 2.3 below. (g) The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer. (h) The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer. (i) The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract. (j) **Days** are calendar days; months are calendar-months. (k) **Dayworks** are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant. (l) A **Defect** is any part of the Works not completed in accordance with the Contract. (m) The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor. (n) The **Defects Liability Period** is the period calculated from the Completion Date where the Contractor remains responsible for remedying defects. (o) **Drawings** include calculations and other information provided or approved by the Project Manager for the execution of the Contract. (p) The **Employer** is the party who employs the Contractor to carry out the Works, as **specified in the SCC**.

(q) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

(r) **Force Majeure** means an exceptional event or circumstance: which is beyond a Party's control; which such Party could not reasonably have provided against before entering into the Contract; which, having arisen, such Party could not reasonably have avoided or overcome; and, which is not substantially attributable to the other Party.

(s) The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

(t) **In writing** or **written** means hand written, type written, printed or electronically made, and resulting in permanent record.

(u) The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is **specified in the SCC**. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.

(v) **Letter of Acceptance** means the formal acceptance by the Employer of the Bid and denotes the formation of the contract at the date of acceptance.

(w) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.

(x) **Party** means the Employer or the Contractor, as the context requires.

(y) **SCC** means Special Conditions of Contract

(aa) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.

(bb) The **Project Manager** is the person **named in the SCC** (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.

(cc) **Retention Money** means the aggregate of all monies retained by the Employer pursuant to GCC 54.1.

(dd) **Schedules** means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Bids, as included in the Contract. Such document may include the Bill of Quantities, data, lists, and schedules of rates and/or prices.

(ee) The **Site** is the area defined as such in the SCC

(ff) **Site Investigation Reports** are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.

(gg) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

(hh) The **Start Date** is given **in the SCC**. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.

(ii) A **Subcontractor** is a person or corporate body who has a Contract with

	the Contractor to carry out a part of the work in the Contract, which includes work on the Site. (jj) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works. (kk) A **Variation** is an instruction given by the Project Manager which varies the Works. (ll) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as **defined in the SCC**.
2. Interpretation	2.1 In interpreting these GCC, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.
	2.2 If sectional completion is **specified in the SCC**, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).
	2.3 The documents forming the Contract shall be interpreted in the following order of priority: (a) Contract Agreement, (b) Letter of Acceptance, (c) Letters of Technical Bid and Price Bid, (d) Special Conditions of Contract, (e) General Conditions of Contract, (f) Specifications, (g) Drawings, (h) Bill of Quantities (or Schedules of Prices for lump sum contracts), and (i) Any other document **listed in the SCC** as forming part of the Contract.
3. Language and Law	3.1 The language of the Contract and the law governing the Contract are **stated in the SCC**.
	3.2. Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer's country when (a) 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 Employer's Country prohibits any import of goods from, or any payments to, a particular country, person, or entity. Where the employer's country prohibits payments to a particular firm or for particular goods by such an act of compliance, that firm may be excluded.
4. Contract Agreement	4.1 The Parties shall enter into a Contract Agreement within 15 days after the Contractor receives the Letter of Acceptance, unless the Special Conditions establish otherwise. The Contract Agreement shall be based upon the attached Contract forms in Section X.
	4.2 Without altering the basic nature or scope of work, the contract may be

	amended upon mutual written consent as per prevailing Public Procurement Law.
5. Assignment	5.1 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 favor of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.
6. Care and Supply of Documents	6.1 The Specification and Drawings shall be in the custody and care of the Employer. Unless otherwise stated in the Contract, one copy 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.
	6.2 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.
	6.3 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.
	6.4 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.
7. Confidential Details	7.1 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 the Contractor's compliance with the Contract and allow its proper implementation.
	7.2 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.
	7.3 Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this Clause.
8. Compliance with Laws	8.1 The Contractor shall, in performing the Contract, comply with applicable Laws of Nepal.
9. Joint and	9.1 If the Contractor is a joint venture of two or more entities, all such entities

Several Liability	shall be jointly and severally liable to the Employer for the fulfillment of the provisions of the Contract, and shall designate one of such persons to act as a leader with authority to bind the joint venture. The contractor shall not handover the responsibility of the contract to any one member or some members of Joint Venture or any other parties, not involved in the contract. The composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.
10. Project Manager's Decisions	10.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.
11. Delegation	11.1 The Project Manager may delegate any of his duties and responsibilities to other people after notifying the Contractor, and may cancel any delegation after notifying the Contractor.
12. Communications	12.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices and requests, 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 SCC**; and (b) delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract. 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.
	12.2 A Notice shall be effective when delivered or on the Notice's effective date, whichever is later.
13. Subcontracting	13.1 **For GON Funded:** A list of approved Subcontractors including its value/works is included as Article 2 (k) of Contract Agreement Approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties, or responsibilities under the contract. **For DP Funded:** The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations. Bidders may propose subcontracting up to the percentage of total value of contracts as specified in the SCC. The Sub contractor shall meet the qualification requirement as specified **in SCC.**

	13.2 The contractor shall give prior notice to the Employer clearly specifying the nature, scope, and responsibilities of the work to be performed, to engage other subcontractors, material suppliers, equipment suppliers, service providers, or other persons or entities during the implementation of the contract. 13.3 Before notifying the Employer as per GCC 13.2, the contractor shall enter into a written agreement with the subcontractors, material suppliers, equipment suppliers, service providers, or other persons or entities clearly specifying the scope of work, responsibilities, quality requirements, duration, payment terms, security, labor-related obligations, and conditions relating to performance of the work. 13.4 Any subcontracting arrangement made in accordance with GCC 13.2 shall not relieve the Contractor of any of its obligations or liabilities under the Contract. 13.5 The contractor shall provide the Employer with details of the payments made to the subcontractors, material suppliers, equipment suppliers, service providers, or other persons or entities engaged under GCC 13.1 and/or GCC 13.2. 13.6 If the contractor is found not to have made payment to the subcontractor, material suppliers, equipment suppliers, service providers, or other persons or entities engaged under GCC 13.1 and/or GCC 13.2 in accordance with the terms of the agreement, the Employer may determine the amount payable to such subcontractor, material suppliers, equipment suppliers, service providers, or other persons or entities and make payment to them from any remaining dues to be paid to the contractor, retention money, or forfeited performance security.
14. Other Contractors	14.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, **as referred to in the SCC**. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification
15 Personnel and Equipment	15.1 The Contractor shall employ the key personnel and use the equipment identified in its Bid to carry out the Works, or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid.
	15.2 If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.
	15.3 If the Employer, Project Manager, or Contractor determines, that any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or other prohibited practices during the execution of the Works, then that employee shall be removed in accordance with Clause 15.2 above.
16. Employer's and	16.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are

Contractor's Risk	Contractor's risks.
17. Employer's Risks	17.1 From the Start Date until the Defects Liability Certificate has been issued, the following are Employer's risks: (a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or (ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor. (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.
	17.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to (a) a Defect which existed on the Completion Date, (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or (c) the activities of the Contractor on the Site after the Completion Date.
18. Contractor's Risks	18.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks are Contractor's risks.
19. Insurance	19.1 The Contractor shall provide insurance in the joint names of the Employer and the Contractor from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles **stated in the SCC** for the following events which are due to the Contractor's risks: (a) loss of or damage to the Works, Plant, and Materials; (b) loss of or damage to Equipment; (c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and (d) Personal injury or death.
	19.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the proportions of Nepalese Rupees required to rectify the loss or damage incurred.
	19.3 If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid

	from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.
	19.4 Alterations to the terms of insurance shall not be made without the approval of the Project Manager.
	19.5 Both parties shall comply with any conditions of the insurance policies.
20. Site Investigation Reports	20.1 The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to **in the SCC**, supplemented by any information available to the Contractor.
21. Contractor to Construct the Works	21.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.
22. The Works to Be Completed within intended Completion Date	22.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them within the intended Completion Date.
23. Design by contractor and Approval by the Project Manager	23.1 The contractor shall be responsible for the design of permanent works as **specified in SCC**.
	23.2 Contractor shall be responsible for design of the Temporary Works. The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, for his approval.
	23.3 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, shall be subject to prior approval by the Project Manager before their use.
	23.4 The Project Manager's approval shall not alter the Contractor's responsibility for design of temporary works.
24. Safety, Security and Protection of the Environment	24.1 The Contractor shall, throughout the execution, and completion of the works and remedying of any defects therein: a. Have full regard for the safety of all persons entitled to be upon the site and keep the site (so as the same is under his control) and the works (so far as the same are not completed or occupied by the Employer) in an orderly state appropriate to the avoidance of danger to such persons. b. Provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when necessary or required by the Project Manager or by any duly constituted authority, for the protection of the Works of for the safety and convenience of the public or others. c. Take all reasonable steps to protect the environment on and off the site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. d. Ensure that any cut or fill slopes are planted in grass or other plant cover as

	soon as possible to protect them from erosion. e. Any spoil or material removed from drains shall be disposed of to designated stable tipping areas as directed by the Project Manager. f. Shall not use fuel wood as a means of heating during the processing or preparation of any materials forming part of the works. g. The Project Manager shall have the power to disallow any working practice or activity of the Contractor or direct that such practices or activities be modified should the Project Manager consider, on the advice of the relevant Government Departments, that the practices or activities will be harmful to wildlife. h. Provide on the Site such lifesaving apparatus as may be appropriate and an adequate and easily accessible first aid outfit or such outfits as may be required by any government ordinance, factory act, etc., subsequently published and amended from time to time.
	24.2 The Contractor shall comply with the Employer's Occupational Health and Safety (OHS) Policy, Guideline and/or Operating Manual, if any, **as specified in the SCC.**
25. Discoveries	25.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.
26. Possession of the Site	26.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date **stated in the SCC**, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.
27. Access to the Site	27.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.
28. Instructions, Inspections and Audits	28.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.
	28.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and sub consultants to keep accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs.
	28.3 The Contractor shall permit the GoN/DP and/or persons appointed by the GoN/DP to inspect the Site and/or the accounts and records of the Contractor and its sub-contractors relating to the performance of the Contract, and to have such accounts and records audited by auditors appointed by the GoN/DP if required by the GoN/DP. The Contractor's attention is drawn to Sub-Clause 73.2 which provides, inter alia, that acts intended to materially impede the exercise of the GoN's/DP's inspection and audit rights provided for under this Sub-Clause constitute a obstructive practice subject to contract termination.
29. Dispute Settlement	29.1 The Employer and the Contractor shall attempt to settle amicably by direct negotiation any disagreement or dispute arising between them under or in connection with the Contract.
	29.2 Any dispute between the Parties as to matters arising pursuant to this Contract which cannot be settled amicably within thirty (30) days after

	receipt by one Party of the other Party 's request for such amicable settlement may be referred to Arbitration within 30 days after the expiration of amicable settlement period.
30. Procedures for Disputes	30.1 In case of arbitration, the arbitration shall be conducted in accordance with the arbitration procedures in accordance with law of Nepal at the place within the territory of Nepal **given in the SCC.**
B1. Staff and Labor	
31. Forced Labor	31.1 The Contractor shall not employ forced labor, which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labor, such as indentured labor, bonded labor, or similar labor–contracting arrangements.
32. Child Labor	32.1 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 national laws 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.
33.Non-discrimination and Equal Opportunity	33.1 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 national law provides for non-discrimination in employment, the Contractor shall comply with national law. When national laws are silent on nondiscrimination 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.
B. Time Control	
34. Program	34.1 Within the time **stated in the SCC**, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule.
	34.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.
	34.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period **stated in the SCC**. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount **stated in the SCC** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In

	the case of a lump sum contract, the Contractor shall Provide an updated Activity Schedule within 15 days of being instructed to by the Project Manager.
	34.4 The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.
35. Extension of the Intended Completion Date	35.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.
	35.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information at least 21 days prior to the intended completion date. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date. Along with full supporting information, the contractor shall also submit a revised work schedule and ensure that the Performance Security, Insurance, and Advance Payment Security (if any) remain valid. The contractor shall submit Performance Security, Advanced Payment Guarantee (if any) and Insurance Policy documents, as required with extended validity, within fifteen (15) days of receiving the Letter of Extension of Intended Completion Date from the Employer.
	35.3 If the contractor fails to submit Performance Security, Advanced Payment Guarantee (if any) and Insurance Policy documents, as required with extended validity within the prescribed time as per GCC 35.2, the Contractor shall pay a fine at the rate of 0.01% of the final contract price (without VAT but including PS) per day for a maximum of fifteen (15) days. The Employer may deduct the fine from payments due to the Contractor.
36. Acceleration	36.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.
	36.2 If the Contractor's priced proposals for acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
37. Delays Ordered by the Project Manager	37.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.
38. Management Meetings	38.1 Either the Project Manager 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.
	38.2 The Project Manager 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 Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
39. Early Warning	39.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.
	39.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.
C. Quality Control	
40.Identifying Defects	40.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.
41. Tests	41.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.
42. Correction of Defects	42.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at issuance of taking over certificate pursuant to GCC clause 69.2, and is **defined in the SCC**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
	42.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.
43.Uncorrected Defects	43.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.
D. Cost Control	
44. Contract Price	44.1 In the case of a Unit Rate contract, the Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.
	44.2 In the case of a lump sum contract, the Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for Materials on Site

	shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.
45. Changes in the Contract Price	45.1 In the case of a Unit Rate contract: (a) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 2 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. (b) If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.
	45.2 In the case of a lump sum contract, the Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.
46. Variations	46.1 All Variations shall be included in updated Programs, and, in the case of a lump sum contract, also in the Activity Schedule, produced by the Contractor.
	46.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.
	46.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.
	46.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.
	46.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.
	46.6 In the case of a Unit Rate contract, if the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in **GCC 45.1** or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.
47. Cash Flow Forecasts	47.1 When the Program, or, in the case of a lump sum contract, the Activity Schedule, is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast.
48. Payment Certificates	48.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified

	previously.
	48.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor within 30 days of submission by contractor.
	48.3 The value of work executed shall be determined by the Project Manager.
	48.4 The value of work executed shall comprise: (a) In the case of a Unit Rate contract, the value of the quantities of work in the Bill of Quantities that have been completed; or (b) In the case of a lump sum contract, the value of work executed shall comprise the value of completed activities in the Activity Schedule.
	48.5 The value of work executed shall include the valuation of Variations and Compensation Events.
	48.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.
49. Payments	49.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest as **indicated in the SCC** on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made.
	49.2 If an amount certified is increased in a later certificate or as a result of an award by an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.
	49.3 Items of the Works for which no rate or price has been entered in BOQ shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.
50. Compensation Events	50.1 The following shall be Compensation Events: (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC 26.1. (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract. (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time. (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects. (e) The Project Manager unreasonably does not approve a subcontract to

	be let. (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site. (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons. (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor. (i) The advance payment is delayed. (j) The effects on the Contractor of any of the Employer's Risks. (k) The Project Manager unreasonably delays issuing a Certificate of Completion.
	50.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.
	50.3 As soon as information demonstrating effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.
	50.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.
51. Tax	51.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 30 days before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC 53.
52. Currency	52.1 The currency of Contracts shall be Nepalese Rupees.
53. Price Adjustment	53.1 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for **in the SCC**. If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due.

53.2 Adjustment Formulae[10]: The formulae will be of the following general type:

$$pn = A + b\frac{Ln}{Lo} + c\frac{Mn}{Mo} + d\frac{En}{Eo} + etc.$$

Where:

pn is a price adjustment factor to be applied to the amount for the payment of the work carried out in the subject month, determined in accordance with Clause 49;

A is a constant, specified in the Bidding Forms- Table of Price Adjustment data, representing the nonadjustable portion in contractual payments;[11] b, c, d, etc., coefficients representing the estimated proportion of each cost element (labor, materials, equipment usage, etc.) in the Works or sections thereof, net of Provisional Sums, **as specified in the SCC;**

Ln, Mn, En, etc., are the current cost indices or reference prices of the cost elements for month "n," determined pursuant to Sub-Clause 53.4, applicable to each cost element; and

Lo, Mo, Eo, etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 53.4.

53.3 Sources of Indices and Weightings: The sources of indices shall be those listed in the Bidding Forms- Table of Price Adjustment data, as approved by the Project Manager and stated in SCC. Indices shall be appropriate for their purpose and shall relate to the Contractor's proposed source of supply of inputs on the basis of which his Contract shall have been computed. As the proposed basis for price adjustment, the Contractor shall have submitted with his bid the tabulation of Weightings and Source of Indices in the Bidding Forms, which shall be subject to approval by the Project Manager.

53.4 Base, Current and Provisional Indices: The base cost indices or prices shall be those prevailing on the day 30 days prior to the latest date for submission of bids. Current indices or prices shall be those prevailing on the day 30 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, provisional indices as determined by the Project Manager will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available.

53.5 Weightings: The weightings for each of the factors of cost given in the Bidding Forms shall be adjusted if, in the opinion of the Project Manager, they have been rendered unreasonable, unbalanced or inapplicable as a result of varied or additional work already executed or instructed under Clause 46 or for any other reason.

53.6 Where, price adjustment provision is not applicable pursuant to Sub-clause

[10] For complex Works involving several types of construction work with different inputs, a family of Formulae will be necessary. The various items of Day work may also require different formulae, depending on the nature and source of the inputs

[11] Insert a figure for factor A only where there is a part of the Contractors' expenditures which will not be subject to fluctuation in cost or to compensate for the unreliability of some indices. A should normally be 0.15. The sum of A, b, c, d, etc., should be one.

	53.1 then the Contract is subject to price adjustment only for construction material in accordance with this clause. If the prices of the construction materials stated in the contract is increased or decreased in an unexpected manner in excess of ten (10%) percent in comparison to the base price construction material stated in Section –IV, Bidding Forms-Table of Price Adjustment Data, then the price adjustment for the increase or decrease of price of the construction material beyond 10% shall be made by applying the following formulas: For unexpected increase in price $P = [R_1 - (R_0 \times 1.10)] \times Q$ For unexpected decrease in price P $= [R_1 - (R_0 \times 0.90)] \times Q$ Where: "P" is price adjustment amount "R_1" is the present price of the construction material (Source of indices shall be those listed in the Bidding forms) "R_0" is the base price of the construction material "Q" is quantity of the construction material consumed in construction during the period of price adjustment consideration If the Base price and source is to be proposed by the Bidder as per the provision made in Section –IV, Bidding Forms-Table of Price Adjustment Data then the Base price and source filled by Bidder for the construction material stated in the Bidding Form shall be subject to the approval of the Project manager and shall be as **stated in SCC.**
	53.7 The Price Adjustment amount shall be limited to a maximum of the initial Contract Amount **as specified in the SCC.**
	53.8 The Price Adjustment provision shall not be applicable for delayed period if the contract is not completed in time due to the delay caused by the contractor or the contract is a Lump sum Contract.
54. Retention	54.1 The Employer shall retain from each payment due to theContractor the proportion **stated in the SCC** until Completion of the whole of the Works.
	54.2 Upon the issue of a Defects Liability Certificate by the Project Manager, **in accordance with GCC** 70.1, half the total amount retained shall be repaid to the Contractor and half when the Contractor has submitted the evidence of submission of tax return to the concerned Internal Revenue Office.
	54.3 The Contractor may substitute retention money with an unconditional bank guarantee issued from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law if: (a) at least eighty (80) percent of the whole works have been completed, (b) progress of the works is satisfactory in accordance with the Contract as per approved work schedule, and (c) it can be assured that the works can be completed at the intended

	completion date. The validity of the bank guarantee under this sub-clause shall be at least 30 days beyond the end of Defect Liability Period.
	54.4 If retention money is substituted by bank guarantee in accordance with clause 54.3, the bank guarantee shall be submitted either using the Retention Money Security Form included in Section X (Contract Forms) or in another Form acceptable to the employer. The validity of the bank guarantee shall be at least one month more than the end of defect liability period.
55. Liquidated Damages	55.1 The Contractor shall pay liquidated damages to the Employer at the rate per day **stated in the SCC** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount **defined in the SCC**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.
	55.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC 49.
56. Bonus	56.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day **stated in the SCC** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.
57. Advance Payment	57.1 Unless otherwise **stated in SCC,** the Employer shall make advance payment to the Contractor of the amounts stated in the SCC in a separate bank account maintained for the contract in two equal installments by the date **stated in the SCC**, against provision by the Contractor of an unconditional bank guarantee from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal in a form acceptable to the Employer in amounts equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment. The validity of the bank guarantee under this sub-clause shall be at least 30 days beyond the end of intended completion date. The contractor shall submit the list of activities for which the Advance Payment for mobilization is to be used along with their time schedules.
	57.2 The Contractor is to use the advance payment only to pay for the purpose of construction site preparation, establishment of temporary camp facilities, construction of workers' housing, mobilization of labors, materials or equipment etc. required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been

	used in this way by supplying copies of invoices or other documents to the Project Manager.
	57.3 The advance payment shall be repaid by deducting proportionate amounts, **as stated in SCC**, from payments otherwise due Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.
	57.4 If the advance provided under GCC 57.1 is not repaid due to non-performance of the works under the contract, by the Contractor within the time period specified in the Contract, the Employer shall recover the advance by enforcing the bank guarantee as provided under GCC 57.1, and shall also recover interest on the advance amount from the Contractor at a rate **stated in SCC.**
58. Securities	58.1 The Performance Security, including any additional security required as per ITB 35.5, shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount **specified in the SCC,** by a Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal in accordance with the conditions of Contract using Sample Form for the Performance Security included in Section X (Contract Forms), or another form acceptable to the Employer, and denominated in Nepalese Rupees. The Performance Security shall be valid until a date 30 days beyond the end of the Defect Liability Period. However, any additional performance security required as per ITB 35.5 shall be valid until a date 30 days beyond the end of the intended completion date.
	58.2 The performance security issued by any foreign Bank outside Nepal must be counter guaranteed by Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal.
59. Dayworks	59.1 If applicable, the Dayworks rates in the Contractor's Bid shall be used for small additional amounts of work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.
	59.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.
	59.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.
60. Cost of Repairs	60.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.
F. Force Majeure	
61. Definition of Force Majeure	61.1 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.
	61.2 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: (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; (c) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel; (d) munitions of war, explosive materials, ionizing 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 (e) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.
62. Notice of Force Majeure	62.1 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.
	62.2 The Party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.
	62.3 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.
63. Duty to Minimize Delay	63.1 Each Party shall at all times use all reasonable endeavors to minimize any delay in the performance of the Contract as a result of Force Majeure.
	63.2 A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.
64. Consequences of Force Majeure	64.1 If the Contractor is prevented from performing its substantial obligations under the Contract by Force Majeure of which notice has been given under GCC 62, and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to GCC 30 to

	(a) an extension of time for any such delay, if completion is or will be delayed, under GCC35; and (b) if the event or circumstance is of the kind described in sub-paragraphs (a) to (d) of GCC 61.2 and, in the case of subparagraphs (b) to (d), occurs in the Country, payment of any such Cost, including the costs of rectifying or replacing the Works and/or Goods damaged or destructed by Force Majeure, to the extent they are not indemnified through the insurance policy referred to in GCC 19.
	64.2 After receiving this notice, the Project Manager shall proceed in accordance with GCC 10 to agree or determine these matters.
65. Force Majeure Affecting Subcontractor	65.1 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 nonperformance or entitle him to relief under this Clause.
66. Optional Termination, Payment and Release	66.1 If the execution of substantially all the Works in progress is prevented for a continuous period of 90 days by reason of Force Majeure of which notice has been given under GCC 62, or for multiple periods which total more than 150 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 GCC 72.5.
	66.2 Upon such termination, the Project Manager 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 Costs 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 labor employed wholly in connection with the Works at the date of termination.
67. Release from Performance	67.1 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 fulfill 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 GCC 66 if the Contract had been terminated under GCC 66.
G. Finishing the Contract	
68. Completion	68.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the work is completed.
	68.2 In addition to the other provisions, before acceptance of the completed works, Employer shall verify and assure that such works are within the set objective, quality and appropriate to operate and use.
69. Taking Over	69.1 In the contractor's Opinion, if the works are complete and ready for taking over, the contractor may apply by notice to the Project Manager for a Taking-Over Certificate. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section. 69.2 The Project Manager shall, within 30 days after receiving the Contractor's application: (a) issue the Taking-Over Certificate to the Contractor if physical progress of works is at least ninety (90) percent in accordance with the Contract except for any minor outstanding work and defects (as listed in the Taking-Over Certificate) 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. 69.3 If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 30 days, and if the Works or Section (as the case may be) are substantially completed in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.
70. Final Account	70.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 60 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 60 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.
71. Operating	71.1 If "as built" Drawings and/or operating and maintenance manuals are required,

and Maintenance Manuals	the Contractor shall supply them by the **dates stated in the SCC**.
	71.2 If the Contractor does not supply the Drawings and/or manuals by the dates **stated in the SCC** pursuant to **GCC 71.1,** or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount **stated in the SCC** from payments due to the Contractor.
72. Termination	72.1 The Employer may terminate the Contract at any time if the contractor; a. does not commence the work as per the Contract, b. abandons the work without completing, c. fails to achieve progress as per the Contract.
	72.2 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.
	72.3 Fundamental breaches of Contract shall include, but shall not be limited to, the following: a. the Contractor uses the advance payment for matters other than the contractual obligations, b. the Contractor stops work for 30 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager; c. the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 30 days; d. the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation. e. a payment certified by the Project Manager is not paid by the Employer to the Contractor within 90 days of the date of the Project Manager's certificate; f. the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager; g. the Project Manager gives two consecutive Notices to update the Program and accelerate the works to ensure compliance with GCC Sub clause 22.1 and the Contractor fails to update the Program and demonstrate acceleration of the works within a reasonable period of time determined by the Project Manager; h. the Contractor does not maintain a Security, which is required; i. the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, **as defined in the SCC**; and j. If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract, pursuant to GCC 73.1. k. If the Contractor fails to submit Performance Security, Advanced Payment Guarantee (if any) and Insurance Policy documents even after the time period indicated in GCC 35.3.
	72.4 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC 72.3 above, the Project Manager shall decide whether the breach is fundamental or not.
	72.5 Notwithstanding the above, the Employer may terminate the Contract for

	convenience.
	72.6 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.
73. Fraud and Corruption	73.1 If the Employer determines that the Contractor has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 15 days' notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site.
	73.2 Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the Works, then that employee shall be removed in accordance with GCC Clause 15. For the purposes of this GCC 73; (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party. (ii) "fraudulent practice"[5] is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation; (iii) "collusive practice"[6] is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party; (iv) "coercive practice"[7] is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party; (v) "obstructive practice" is (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (bb) acts intended to materially impede the exercise of the GON's/DP's inspection and audit rights provided for under GCC28.3.
	73.3 The contractor shall be prosecuted for offenses under prevailing criminal laws, if the contractor: (i) Misuses the Advance Payment or payments received from the Employer; (ii) Receives payment by submitting false information or documents; (iii) Abandons the works before completion; (iv) Commits a serious violation of the contract; or (v) Causes loss or damage to the Employer.
74. Black Listing	74.1 Without prejudice to any other rights of the Employer under this Contract, GoN, Public Procurement Monitoring Office (PPMO), on the recommendation of procuring entity, may blacklist a Bidder or contractor for its conduct for a period of one (1) to three (3) years on the following grounds and seriousness of the act committed by the bidder or contractor: (a) if it is established that the Contractor has committed substantial defect in implementation of the contract or has not substantially fulfilled its

	obligations under the contract or the completed work is not of the specified quality as per the contract. (b) If convicted from a court of law in a criminal offense liable to be disqualified for taking part in procurement contract, (c) If it is established that the Contractor has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.
75. Payment upon Termination	75.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.
	75.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.
	75.3 If the Contract is terminated because of fundamental breach of Contract or for any other fault by the Contractor, the Employer may: (a) withhold further payments to the Contractor until the costs of design, execution, completion and remedying of any defects, liquidated damages (if any), and all other costs incurred by the Employer, have been established, and/or (b) recover from the Contractor any losses and damages incurred by the Employer and any additional costs of completing the Works, after allowing for any sum due to the Contractor, as Government dues. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor. (c) forfeit the Performance Security. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.
76. Property	76.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.
77. Release from Performance	77.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.
78.Suspension of DP Loan/Credit/ Grant	78.1 In the event that the DP suspends the loan/ credit/grant to the Employer from which part of the payments to the Contractor are being made: a. the Employer is obligated to notify the Contractor of such suspension within 7 days of having received the DP's suspension notice; and b. if the Contractor has not received sums due him within the 30 days for payment provided for in GCC 49.1, the Contractor may immediately issue a 15-day termination notice.

79. Eligibility	79.1 The Contractor shall have the nationality of an eligible country as specified in Section V of the bidding document. The Contractor shall be deemed to have the nationality of a country if the Contractor is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.
	79.2 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries as specified in Section V of the bidding document and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, the Contractor may be required to provide evidence of the origin of materials, equipment, and services.
	79.3 For purposes of GCC 79.2, "origin" means the place where the materials and equipment are mined, grown, produced, or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.
80. Project Manager's Duties and Authorities	80.1 The Project Manager's duties and authorities are restricted to the extent as **stated in the SCC**.
81. Quarries and Spoil Dumps	81.1 Any quarry operated as part of this Contract shall be maintained and left in a stable condition without steep slopes and be either refilled or drained and be landscaped by appropriate planting. Rock or gravel taken from a river shall be removed over some distance so as to limit the depth of material removed at any one location, not disrupt the river flow or damage or undermine the river banks. The Contractor shall not deposit excavated material on land in Government or private ownership except as directed by the Project Manager in writing or by permission in writing of the authority responsible for such land in Government ownership, or of the owner or responsible representative of the owner of such land in private ownership, and only then in those places and under such conditions as the authority, owner or responsible representative may prescribe.
82. Local Taxation	82.1 The prices bid by the Contractor shall include all taxes that may be levied in accordance to the laws and regulations in being in Nepal on the date 30 days prior to the closing date for submissions of Bids on the Contractor's equipment, plant and materials acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the Contract shall relieve the Contractor from his responsibility to pay any tax that may be levied in Nepal on profits made by him in respect of the Contract.
83. Value Added Tax	83.1 The Contract is not exempted from value added tax. An amount specified in the schedule of taxes shall be paid by the Contractor in the concerned VAT office within time frame specified in VAT regulation.
84. Income Taxes on Staff	84.1 The Contractor's staff, personnel and labor will be liable to pay personal income taxes in Nepal in respect of their salaries and wages, as are chargeable under the laws and regulations for the time being in force, and the Contractor shall perform such duties in regard to such deductions as may be imposed on

	him by such laws and regulations.
	84.2 The issue of the Final Account Certificate pursuant to clause GCC 70 shall be made only upon submittal by the Contractor of a certificate of income tax clearance from the Government of Nepal.
85. Duties, Taxes and Royalties	85.1 Any element of royalty, duty or tax in the price of any goods including fuel oil, and lubricating oil, cement, timber, iron and iron goods locally procured by the Contractor for the works shall be included in the Contract rates and prices and no reimbursement or payment in that respect shall be made to the Contractor.
	85.2 The Contractor shall familiarize himself with GON the rules and regulations with regard to customs, duties, taxes, clearing of goods and equipment, immigration and the like, and it will be necessary for him to follow the required procedures regardless of the assistance as may be provided by the Employer wherever possible.
	85.3 The Contractor shall pay and shall not be entitled to the reimbursement of cost of extracting construction materials such as sand, stone/boulder, gravel, etc. from the river beds or quarries. Such prices will be levied by concerned Local Government as may be in force at the time. The Contractor, sub-contractor(s) employed directly by him and for whom he is responsible, will not be exempted from payment of royalties, taxes or other kinds of surcharges on these construction materials so extracted and paid for to the concerned Local Government.
86. Member of Government, etc, not Personally Liable	86.1 No member or officer of GoN or the Employer or the Project Manager or any of their respective employees shall be in any way personally bound or liable for the act or obligations of the Employer under the Contract or answerable for any default or omission in the observance or performance of any of act, matter or thing which are herein contained.
87. Approval of Use of Explosives	87.1 No explosives of any kind shall be used by the Contractor without the prior consent of the Employer in writing and the Contractor shall provide, store and handle these and all other items of every kind whatsoever required for blasting operations, all at his own expense in a manner approved in writing by the Employer.
88 Compliance with Regulations for Explosives	88.1 The Contractor shall comply with all relevant ordinances, instructions and regulations which the Government, or other person or persons having due authority, may issue from time to time regarding the handling, transportation, storage and use of explosives.
89. Permission for Blasting	89.1 The Contractor shall at all times maintain full liaison with and inform well in advance, and obtain such permission as is required from all Government authorities, public bodies and private parties whatsoever concerned or affected, or likely to be concerned or affected by blasting operation.
90. Records of Explosives	90.1 Before the beginning of the Defects Liability Period, the Contractor shall account to the satisfaction of the Project Manager for all explosives brought on to the Site during the execution of the Contract and the Contractor shall remove all unused explosives from the Site on completion of works when ordered by the Project Manager.
91.Traffic Diversion	91.1 The Contractor shall include the necessary safety procedures regarding and pedestrian traffic diversion that is needed in execution of the works. The Contractor shall include in his costing of works, any temporary works or diversion that are needed during the construction period. All traffic diversion should be designed for the safety of both the motoring public and the men at

	work. It shall ensure the uninterrupted flow of traffic and minimum inconvenience to the public during the period concerned. As such, adequate warning signs, flagmen and other relevant safety precautionary measures shall be provided to warn motorists and pedestrians well ahead of the intended diversion as directed by the Project Manager. All traffic devices used shall be designed in accordance with the instruction of Project Manager.
92 Social Security Fund	92.1 The contractor shall enroll the laborers, employees, or other workforce engaged in such work in the Social Security Fund in accordance with prevailing laws.
	92.2 The contractor shall be responsible to disburse the remuneration, benefits, and other payments of the laborers, employees, or workforce into the bank account of the concerned individual.
	92.3 The contractor shall be responsible for ensuring that the required work permit has been obtained in accordance with prevailing laws in respect of foreign personnel.,

Section IX: Special Conditions of Contract

The following Special Conditions of Contract shall supplement the GCC. Whenever there is a conflicts the provisions herein shall prevail over those in the GCC.

Council for Technical Education and Vocational Training (CTEVT)

Construction of Senior Staff Quarter of Nirmal Lama Polytechnic Institute

Contract Identification Number: CTEVT/NLPI/083/84/NCB/Civil-01

Special Conditions of Contract

A. General	
GCC 1.1 (p)	The Employer is ***Council for Technical Education and Vocational Training (CTEVT), Sanothimi, Bhaktapur***
GCC 1.1 (u)	The Intended Completion Date for the whole of the Works shall be: ***2084/02/15*** *[If different dates are specified for completion of the Works by section ("sectional completion" or milestones), these dates should be listed here]*
GCC 1.1(bb) & GCC10.1	The Project Manager is **Director of Polytechnic Division of CTEVT or person assigned by him.** The Project Manager and Engineer are synonyms.
GCC 1.1 (ee)	The Site is located at **Khayarmara of Bardiwas Municipality of Mahottari district**
GCC 1.1 (hh)	The Start Date shall be **within 7 days of Contract Agreement.**
GCC 1.1 (ll)	The Works consist of **Construction of staff quarter RCC building**
GCC 2.2	Sectional Completions are: ***Not applicable***
GCC 2.3(i)	The following documents also form part of the Contract: ***Not applicable***
GCC 3.1	The language of the contract is **ENGLISH/NEPALI** The law that applies to the Contract is the law of NEPAL
GCC 11.1	The Project Manager ***may*** delegate any of his duties and responsibilities.
GCC 12.1 (a)	The agreed electronic transmission shall be info@ctevt.org.np ***and*** ***[Insert E-mail or any other such means of Contractor.]***
GCC 13.1	**<u>For GoN Funded:</u>** **Maximum percentage of subcontracting permitted is 25% of the total contract amount** (without VAT but including PS). **Nature of Works that agreed to be subcontracted and Details of Sub-Contractors:** 1. ***Formwork, Plaster work, electrical works, sanitary work.*** **Qualification Criteria:** The proposed sub-contractor shall meet the following requirements: 1) Completion of 80% of the amount in NRs. with similar size and nature of the work being sub contracted 2) Average Annual Construction Turnover for the work being sub contracted should be at least 1.5 * V/T where V is the proposed value of sub contract and T is estimated time in year for which the intended sub-contracting work is to be

	completed. For intended Sub contracting work duration of up to 1 year, T shall be "1".
GCC 14.1	Schedule of other contractors: ***Not Applicable***
GCC 19.1	The minimum insurance amounts and deductibles shall be: 1. The minimum cover for loss of or damage to the Works, Plant and Materials is: **115%** of the Contract Amount. 2. The maximum deductible for insurance of the Works and of Plant and Materials is: ***as per the provision of Nepal Insurance Authority.*** 3. The minimum cover for loss or damage to **immovable** Equipment/**plants** is: ***100 % (i.e Replacement Cost).*** **4.** The maximum deductible for insurance of immovable Equipment/**plant** is: ***as per the provision of Nepal Insurance Authority.*** 5. The minimum **cover for loss of or damage to** other property is: Rs. ***100000*** with unlimited number of occurrences. **6.** The maximum deductible for insurance of other property is: ***as per the provision of Nepal Insurance Authority.*** 7. The minimum cover for personal injury or death insurance i. for the Contractor's employees is that specified in the Labor act of Nepal and ii. for other people is***: 1 million*** with an unlimited number of occurrences.
GCC 20.1	Site Investigation Reports are: ***Not Applicable.***
GCC 23.1	The following shall be designed by the Contractor: ***Not Applicable***
GCC 24.2	***OHS Policy, Guideline and/or Operating Manual, if any. Not Applicable***
GCC 26.1	The Site Possession Date(s) shall be: ***within7 daysof Contract Agreement.*** *[Note: If the Site is made available by section, the different dates should be listed here]*
GCC 30.1	The place of arbitration shall be: ***NEPCA.***
	C. Time Control
GCC 34.1	The Contractor shall submit for approval a Program for the Works within **15** days from the date of the Letter of Acceptance.
GCC 34.3	The period between Program updates is **90** days. The amount to be withheld for late submission of an updated Program is **NA**.
	D. Quality Control
GCC 42.1	The Defects Liability Period is: ***365*** days. *[The defects liability period is usually limited to 365 days, but could be less in very simple cases or could be more in special cases as defined by employer.]*
	E. Cost Control

GCC 49.1	***[insert the prevailing interest rate]: Not Applicable***
GCC 53.1	The Contract ***"is not"*** subject to price adjustment.
GCC 53.6	Base Price of Construction Materials applicable for price adjustment shall be as per the Table of Adjustment Data submitted by Bidder together with the Letter of Price Bid which is approved by the Project manager and attached as Annex-1.
GCC 53.7	The Price Adjustment amount shall be limited to a maximum of: ***Not Applicable***
GCC 54.1	The proportion of payments retained is: For GoN Funded: 5 (five) percent
GCC 55.1	The liquidated damages for the whole of the Works are 0.05 Percent of the final Contract Price (without VAT but including PS) per day. The maximum amount of liquidated damages for the whole of the Works is 10 Percent of the final Contract Price (without VAT but including PS).
GCC 56.1	The provision of bonus ***"Not Applicable"*** in the contract.
GCC 57.1	The provision of Advance Payments ***"Applicable"*** in the contract. If Applicable, the Advance Payments shall be: ***20 percent of initial contract amount*** (without VAT but including PS) and shall be paid in two equal installments and to the Contractor as; ***a. First installment of 10% after Submission of Insurance and Advance Payment Guarantee for the full amount.*** ***b. Second installment of 10% after Verification of Site mobilization.***
GCC 57.3	Deductions from Payment Certificates will commence in the first certificate in which the value of works executed exceeds 30% of the Contract Price. Deduction will be at the rate of ***20%*** of the respective Monthly Interim Payment Certificate until such time as the advance payment has been repaid; provided that the advance payment shall be completely repaid prior to the end of 80 % of the approved contract price.
GCC 57.4	Recover interest on the advance amount from the Contractor should be at a rate of **10 %.**
GCC 58.1	The Performance Security amount is: **5% of bid price.** ***[insert amount including an additional amount based on ITB 40.1 and/or ITB 35.5 if the Employer has increased the Performance Security amount]***
G. Finishing the Contract	
GCC 71.1	The date by which operating and maintenance manuals are required is; **Along with Final bill.**
GCC 71.2	The date by which "as built" drawings are required is: **Along with Final bill.** The amount to be withheld for failing to produce "as built" drawings and/or Operating and maintenance manuals is: **Nrs 20000.**
GCC 72.3 (i)	The maximum number of days is: **180**
GCC 80	The Project Manager has to obtain the specific approval of the Employer for taking any of the following actions:

	a. Approving subcontracting of any part of the works under General Conditions of Contract Clause 13; b. Certifying additional costs determined under General Conditions of Contract Clause 50; c. Determining start date under General Conditions of Contract Clause 1; d. Determining the extension of the intended Completion Date under General Conditions of Contract Clause 35; e. Issuing a Variation under General Conditions of Contract Clause 1 and 46, except in an emergency situation, as reasonably determined by the Project Manager; emergency situation may be defined as the situation when protective measures must be taken for the safety of life or of the works or of adjoining property. f. Adjustment of rates under General Conditions of Contract Clause 45;

Section X: Contract Forms

Council for Technical Education & Vocational Training
Supervising Council

This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and when required Advance Payment Security and Retention Money Security shall only be completed by the successful Bidder after contract award.

Letter of Intent

[on letterhead paper of the Employer]

Date: .....

To: .....*Name and address of the Contractor*.....

Subject: ..... Issuance of letter of intent to award the contract.....

This is to notify you that, it is our intention to award the contract .....*[insert date]* .....for execution of the .....*[insert name of the contract and identification number, as given in the Contract Data/SCC]* to you as your bid price Nepalese Rupees ..... *[insert amount of contract price in figures and words including taxes]* as corrected and modified in accordance with the Instructions to Bidders is hereby selected as substantially responsive evaluated bid closest to the Average Bid Price.

Authorized Signature: .....

Name: ... .

Title: .....

CC:
[Insert name and address of all other Bidders, who submitted the bid]

[Notes on Letter of Intent
The issuance of Letter of Intent is the information of the selection of the bid of the successful bidder by the Employer and for providing information to other unsuccessful bidders who participated in the bid as regards to the outcome of the procurement process. This standard form of Letter of Intent to Award should be filled in and sent to the successful Bidder only after evaluation and selection of substantially responsible evaluated bid closest to the Average Bid Price.]

Letter of Acceptance

[on letterhead paper of the Employer]

Date: .....

To: .....*Name and address of the Contractor*.....

Subject: .....*Notification of Award*

This is to notify that your Bid for the Invitation of Bids dated .....[***Insert date of bid invitation]*** .....for execution of the.....[***Insert name of the contract and identification number, as given in the Contract BDS/SCC]*** ..... for the Contract price of Nepalese Rupees ***[insert amount of contract price in figures and words including taxes],*** as corrected in accordance with the Instructions to Bidders is hereby accepted in accordance with the Instruction to Bidders.

You are hereby instructed to contact this office to sign the formal contract agreement within 15 days with Performance Security of **NRs.** ..... in accordance with the Conditions of Contract, using for that purpose the Performance security Form included in Section X (Contract Forms) of this Bidding Document.

Authorized Signature: .....

Name and Title of Signatory: .....

Contract Agreement

THIS AGREEMENT made the .....day 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 in the sum of NRs .....***[insert amount of contract price in words and figures including taxes]***(hereinafter "the Contract Price").

The Employer and the Contractor agree as follows:

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

2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
   (a) the Letter of Acceptance;
   (b) the Letters of Technical and Price Bid;
   (c) the Addenda Nos ..... ***Insert addenda numbers if any*** .....
   (d) the Special Conditions of Contract;
   (e) the List of Eligible Countries that was specified in Section V of the bidding document,
   (f) the General Conditions of Contract;
   (g) the Specification;
   (h) the Drawings;
   (i) Bill of Quantities (or Schedules of Prices for lump sum contracts), and
   (j) Table of Price Adjustment Data
   (k) List of Approved Subcontractors *[For GoN funded project]*
   (l) .....***[Specify if there are any other document]***

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 Nepal on the day, month and year indicated above.

Signed by .....
for and on behalf the Contractor in the presence of

Witness, Name Signature, Address, Date

Signed by.....
for and on behalf of the Employer in the presence of

Witness, Name, Signature, Address, Date

List of Approved Subcontractors

In accordance with GCC Sub-Clause 13.1, The following Subcontractors are approved for carrying out the work as specified below.

Name of Subcontractors	Description of Works	Value/Percentage of subcontract

Performance Security

(On letterhead paper of the Bank)



..... ***Bank's Name, and Address of Issuing Branch or Office*** .....

Beneficiary: ..... ***[insert Name and Address of Employer***].....

Date: .....

Performance Guarantee No.:.....

We have been informed that ... ... ***[insert name of the Contractor, which in the case of a joint venture shall be the name of the joint venture]*** (hereinafter called "the Contractor") has been notified by you to sign the Contract No. ..... ***[insert reference number of the Contract]***, for the execution of ..... ***[insert 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..... ***[insert name of the Bank]*** ....., hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of Nepalese Rupees.....***[insert amount in figures*and amount in words]*****.....** such sum being payable in Nepalese Rupees, 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.....***[[insert day].***Day of ***.....[[insert month, year]***, **, 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 (URDG), 2010 Revisions, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

.....

Seal of Bank and Signature(s)

Note:

All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

* *The Guarantor shall insert an amount representing the percentage of the Contract Price specified in the Contract in Nepalese Rupees.*

*** Insert the date thirty days after the date specified for the Defect Liability Period. 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.*

Advance Payment Security

(On letterhead paper of the Bank)



..... Bank's Name, and Address of Issuing Branch or Office.....

Beneficiary: .....*[insert Name and address of employer]*

Date : .....

Advance Payment Guarantee No.....

We have been informed that ..... ***[insert name of the Contractor, which in the case of a joint venture shall be the name of the joint venture]*** ..... (hereinafter called "the Contractor") has entered into Contract No. .....***[insert refrence number of the contract]*** dated .....***[date]***..... with you, for the execution of .....*[insert 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 Nepalese Rupees ..... ***[Insert amount in figures*and in words]*** is to be made against an advance payment guarantee.

At the request of the Contractor, we..... ***[insert name of the Bank]*** ....., hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of Nepalese Rupees .....***[insert amount in figures* and amount in words]*** 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:

(a).....Used the advance payment for purposes other than the costs of mobilization in respect of the Works; or

(b)... Has failed to repay the advance payment when it has become due and payable in accordance with the conditions of the contract, specifying the amount payable by the contractor.

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 eighty (80) percent of the Contract Price has been certified for payment, or on the .....***[date]***..... day of ...***[month],[year]***...**, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

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

.....

Seal of Bank and Signature(s)

Note:

All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

**The Guarantor shall insert an amount representing the amount of the advance payment in Nepalese Rupees of the advance payment as specified in the Contract.*

*** Insert the date Thirty days after the intended 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.*

Retention Money Security

(On letterhead paper of the Bank)

..... *Bank's Name, and Address of Issuing Branch or Office*.....

Beneficiary: _____ *[Insert name and Address of Employer]*

Date: _____ *[Insert date of issue]*

RETENTION MONEY GUARANTEE No.: *[Insert guarantee reference number]*

We have been informed that _____ *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Contractor") has entered into Contract No. _____ *[insert reference number of the contract]* dated _____ with the Beneficiary, for the execution of _____ *[insert name of contract and brief description of* **Works***]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, the Beneficiary retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when at least eighty (80) percent of the whole works have been completed, progress of the works is satisfactory in accordance with the Contract as per approved work schedule and it can be assured that the works can be completed at the intended completion date, payment of *[insert the amount of the Retention Money]* is to be made against a Retention Money guarantee.

At the request of the Contractor, we, .. . *[insert name of the Bank]* .....,as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of Nepalese Rupees _____ *[insert amount in figures and amount in words][1]]* upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.

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

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

_____

[Seal of Bank and signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

[1] *The Guarantor shall insert the amount of the Retention Money.*

[2] *Insert the same expiry date which is 30 days more than the end of Defect Liability Period. The Employer should note that in the event of an extension of this date for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee.*

Annex-1

Table of Price Adjustment Data
[SCC 53.1]

Code	Index Description	Source of Index*	Base Value and Date	Employer's Proposed Weighting Range (coefficient)	Bidder's Proposed Weighting (coefficient)**
1	2	3	4	5	6
	Non - adjustable (A)			0.15	0.15
	Labor (b)				
	Materials (c)				
	Equipment usage (d)				
	...				
		Total			**1.00**

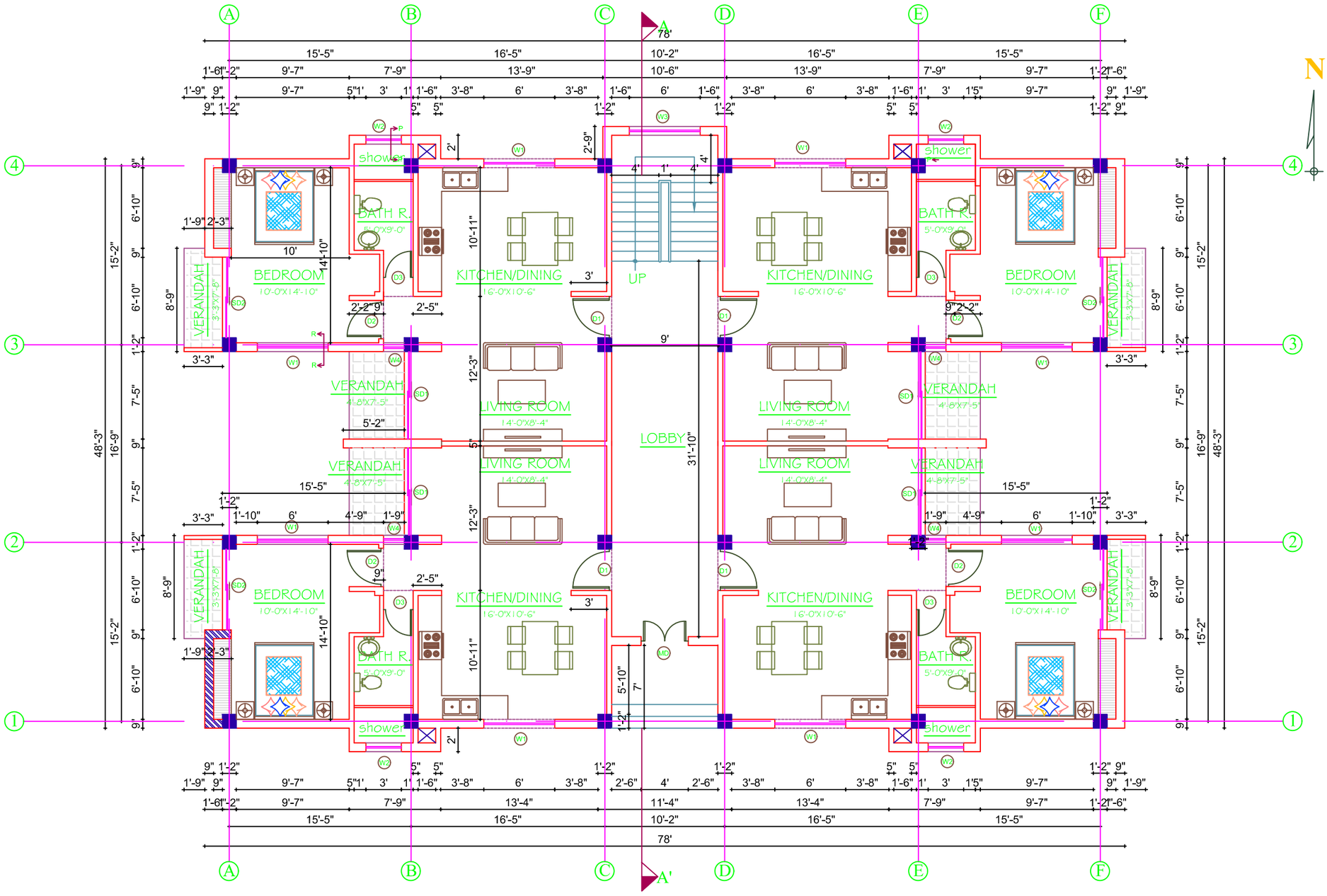
Note: Base value and Bidder's proposed weighting coefficient to be filled as per "Bid Form of Table of Price Adjustment Data" in Bidding Forms (Section-IV) after verification by the Employer in case of the alternative provision of Bidder proposed value and weighting coefficient.

Table of Price Adjustment Data
[SCC 53.6]

Code	Construction Material*	Unit	Base Price (NRs/Unit) ** (Ex-factory)	Source (Factory)**
1	2	3	4	5

** For the purpose of calculation of price adjustment, the Ex-factory price of the same source mentioned in the table shall be taken into consideration.

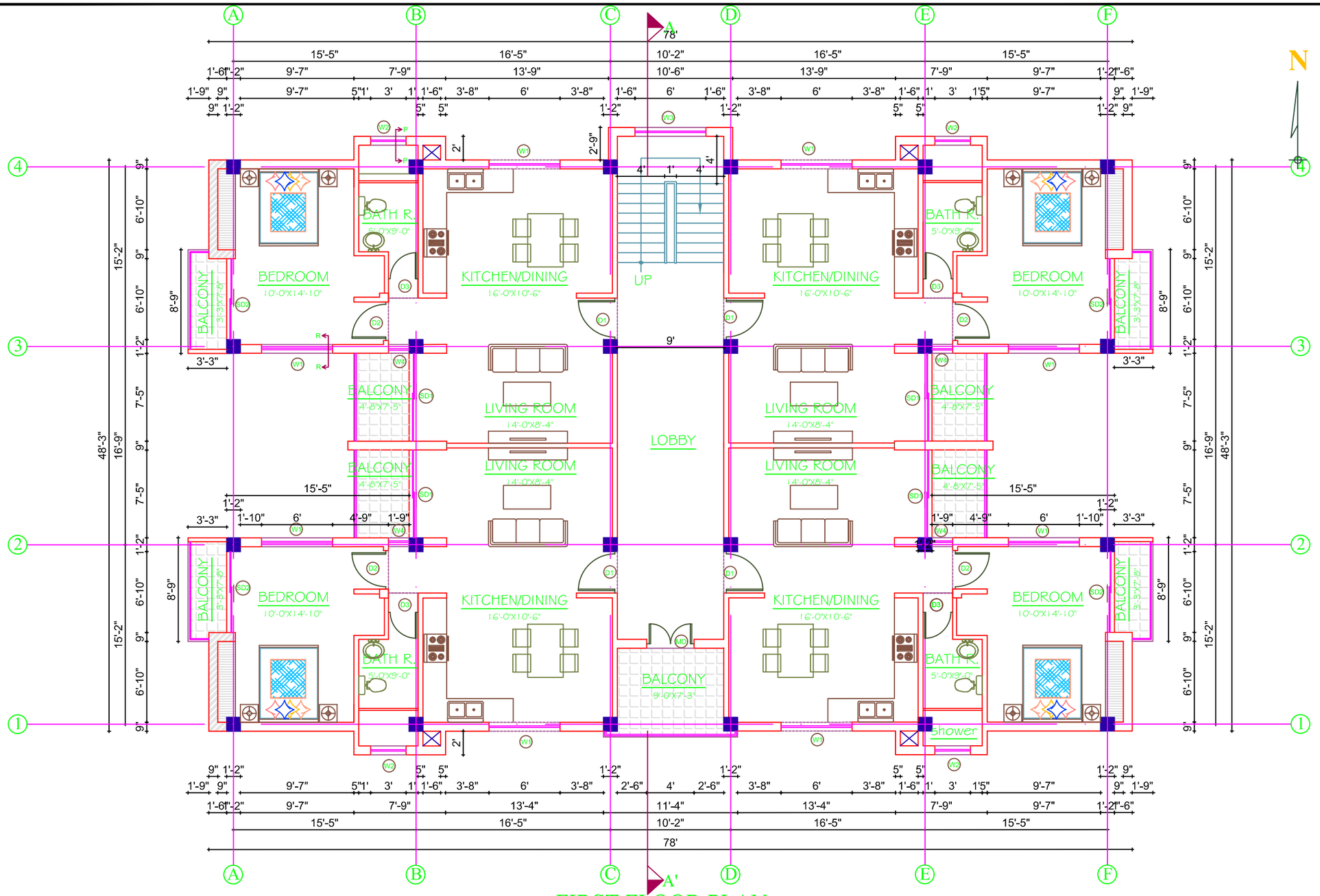
Note: Base Price and source to be filled as per "Bid Form of Table of Price Adjustment Data" in Bidding Forms (Section-IV) after verification by the Employer in case of the alternative provision of Bidder proposed source and base price.



GROUND FLOOR PLAN

3279.14 sq. ft.

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	GROUND FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	1
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



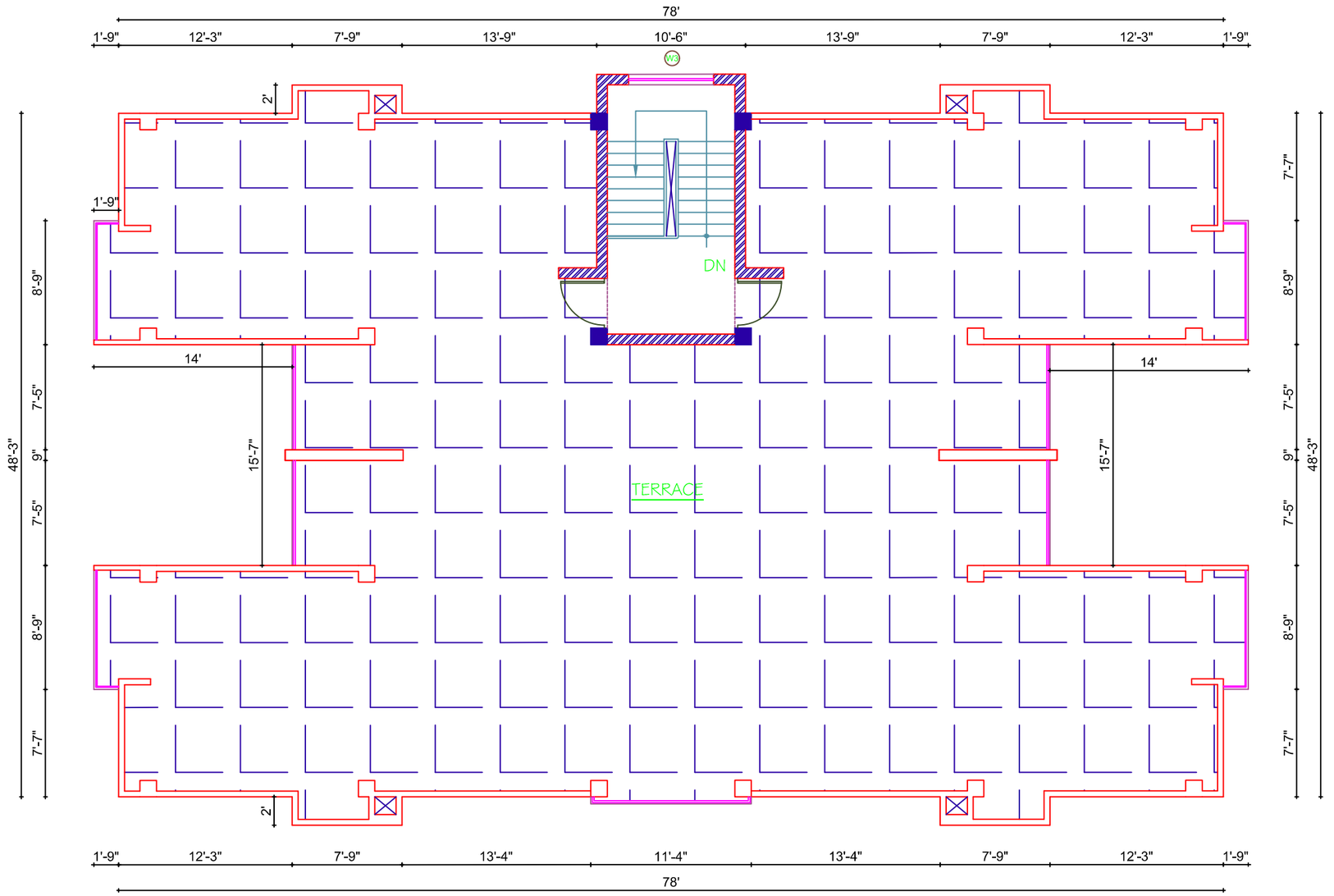
FIRST FLOOR PLAN

3279.14 sq. ft.

OFFICE NAME	PROJECT NAME		Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	SENIOR STAFF QUARTER	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	2
		FIRST FLOOR PLAN	Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

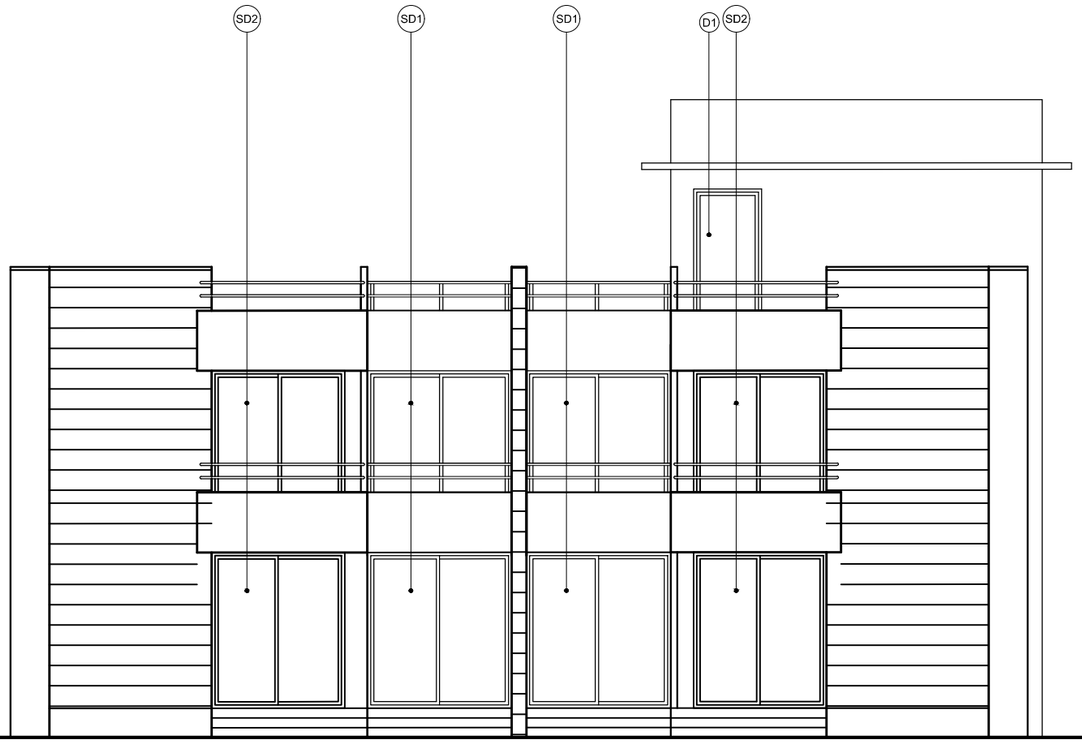
N

OFFICE NAME	PROJECT NAME		Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	SECOND FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						3

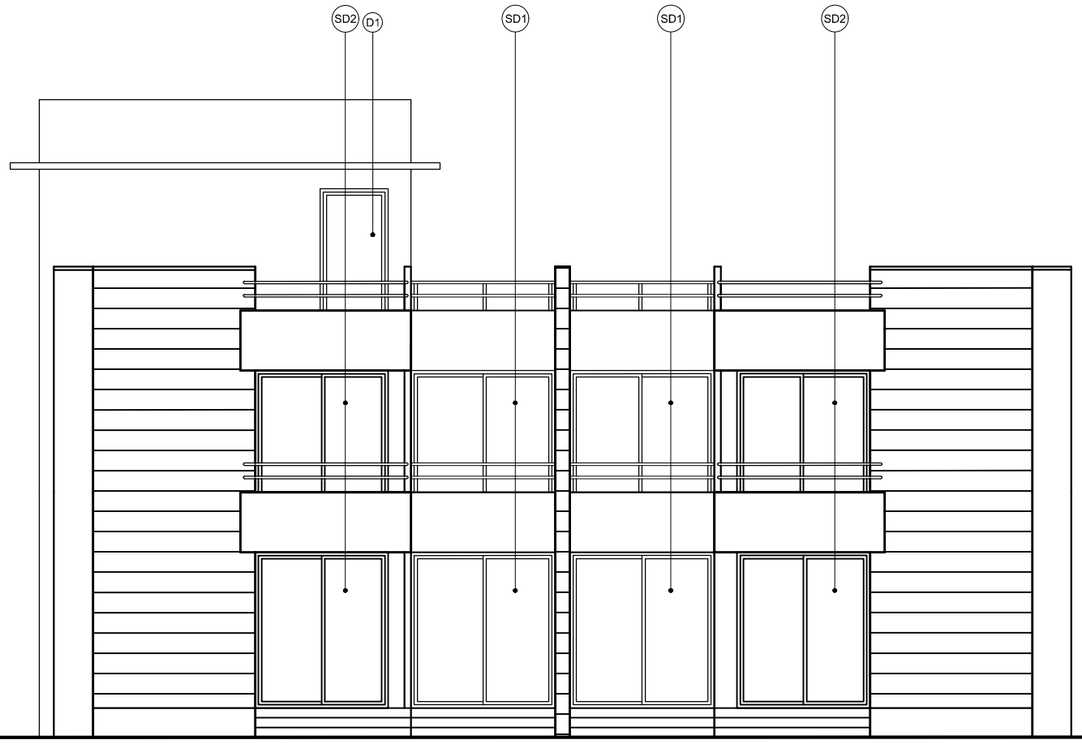


TOP FLOOR PLAN
Area : 216.27 sq.ft.

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR		TOP FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	4
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

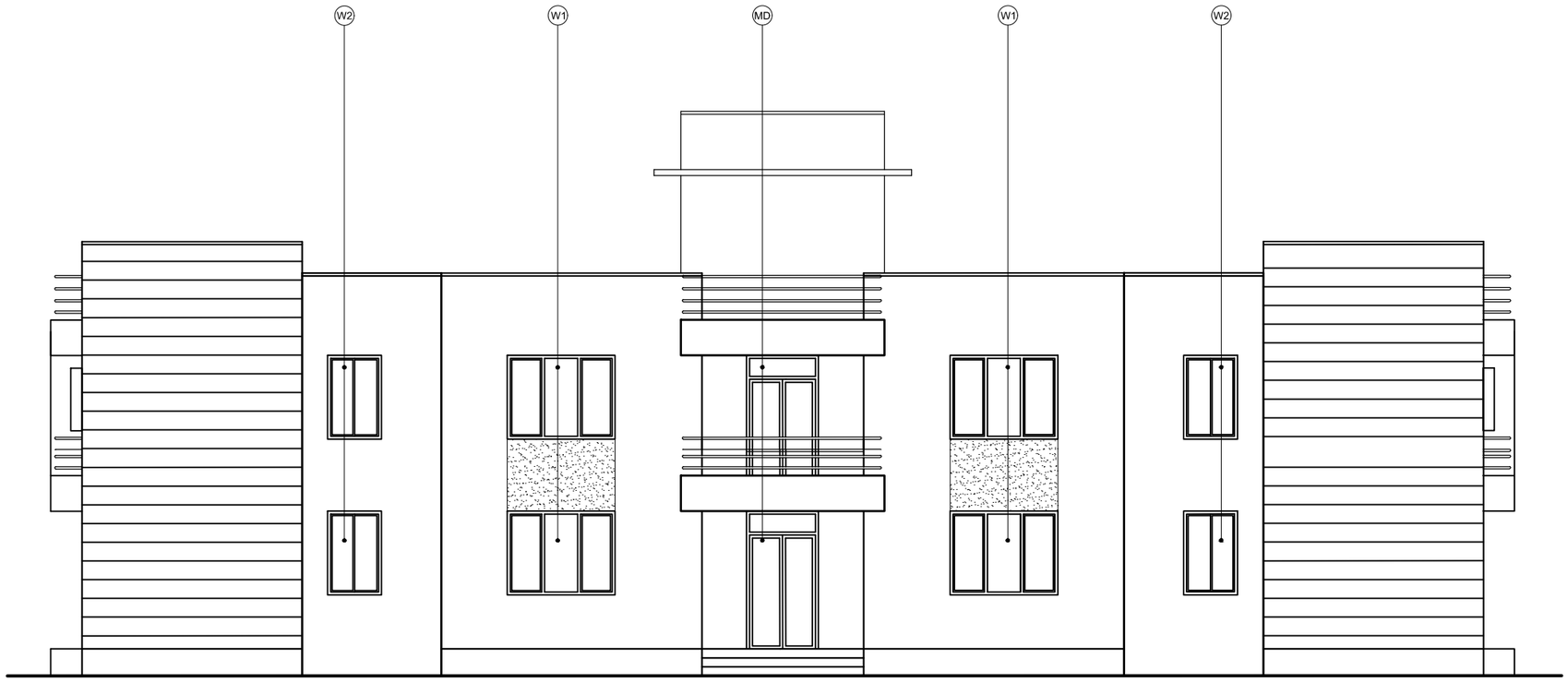


WEST ELEVATION



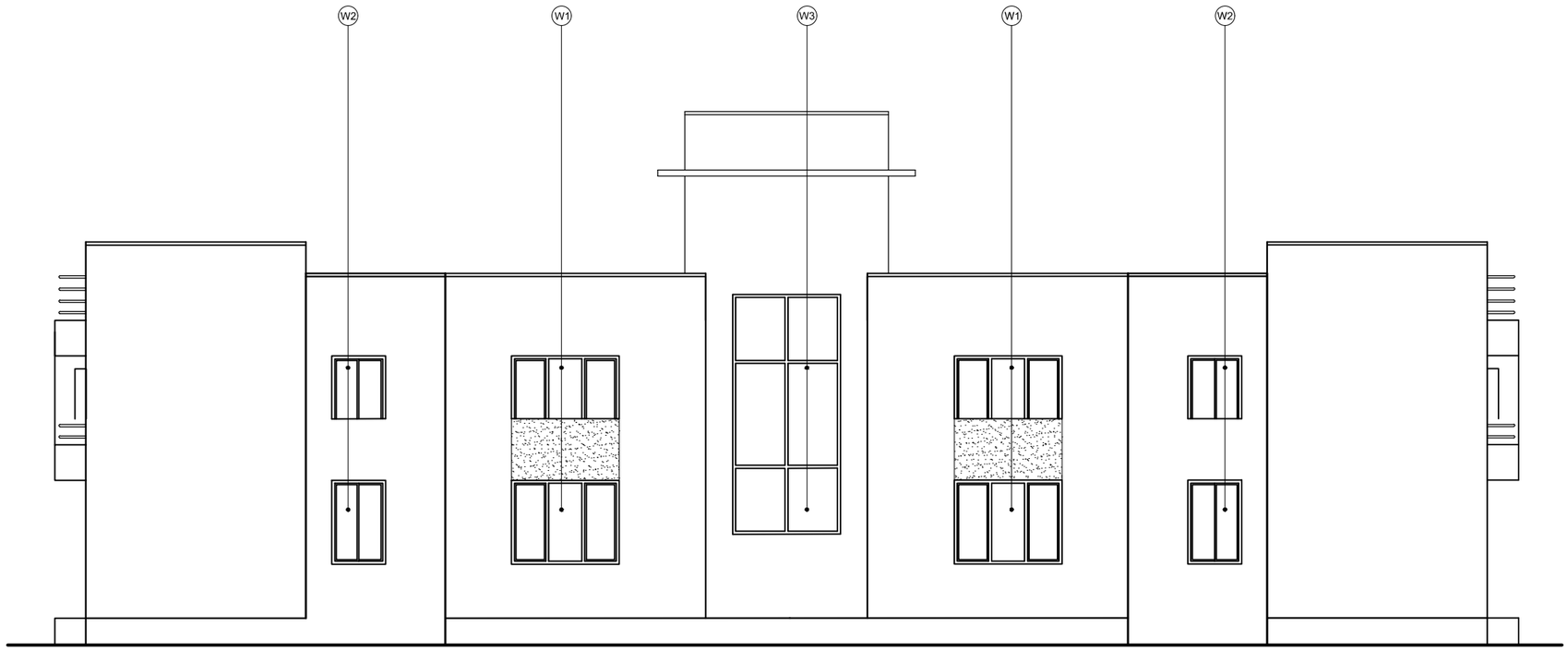
EAST ELEVATION

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	ELEVATIONS	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	5
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



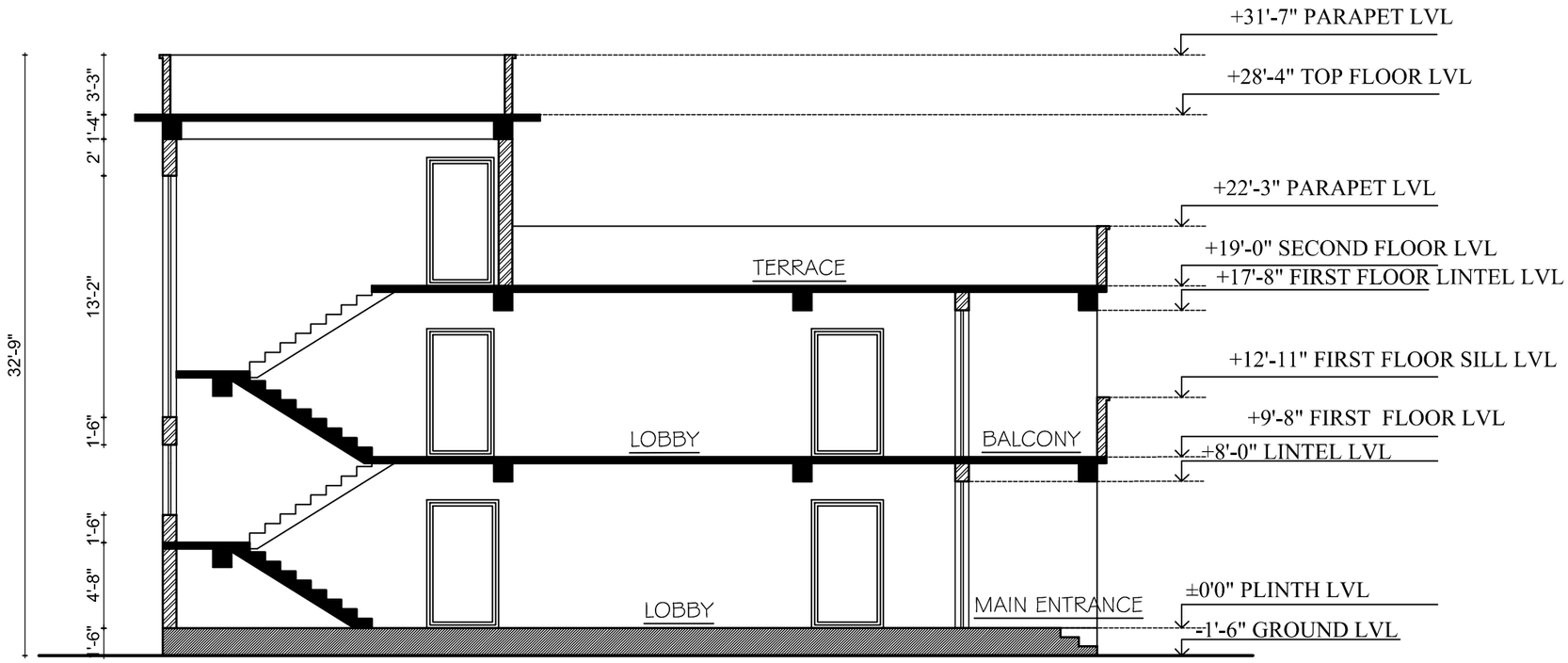
SOUTH ELEVATION

OFFICE NAME	PROJECT NAME		Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	SENIOR STAFF QUARTER	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	
		ELEVATIONS	Designation:				Designation:						6
			Signature:				Signature:						
			Date:				Date:						



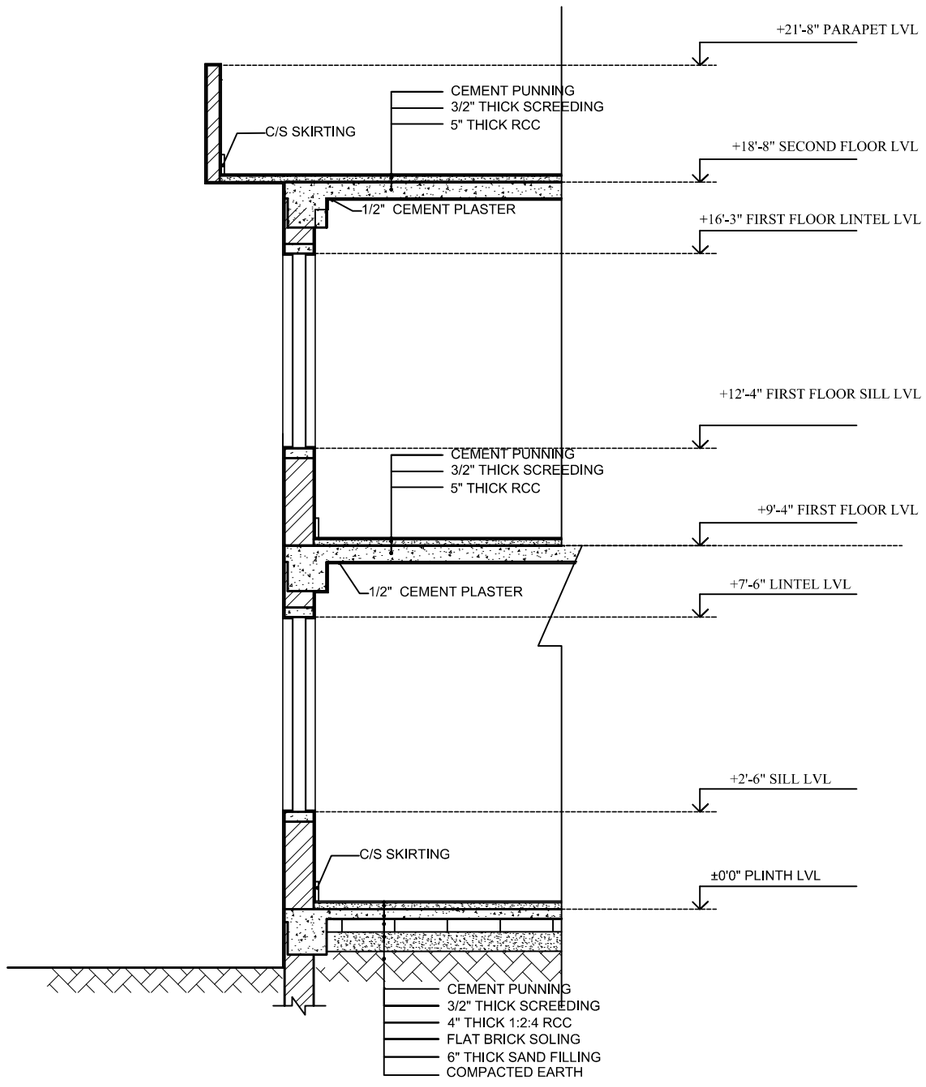
NORTH ELEVATION

OFFICE NAME	PROJECT NAME											
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME
		ELEVATIONS	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.
			Designation:				Designation:					
			Signature:				Signature:					
			Date:				Date:					

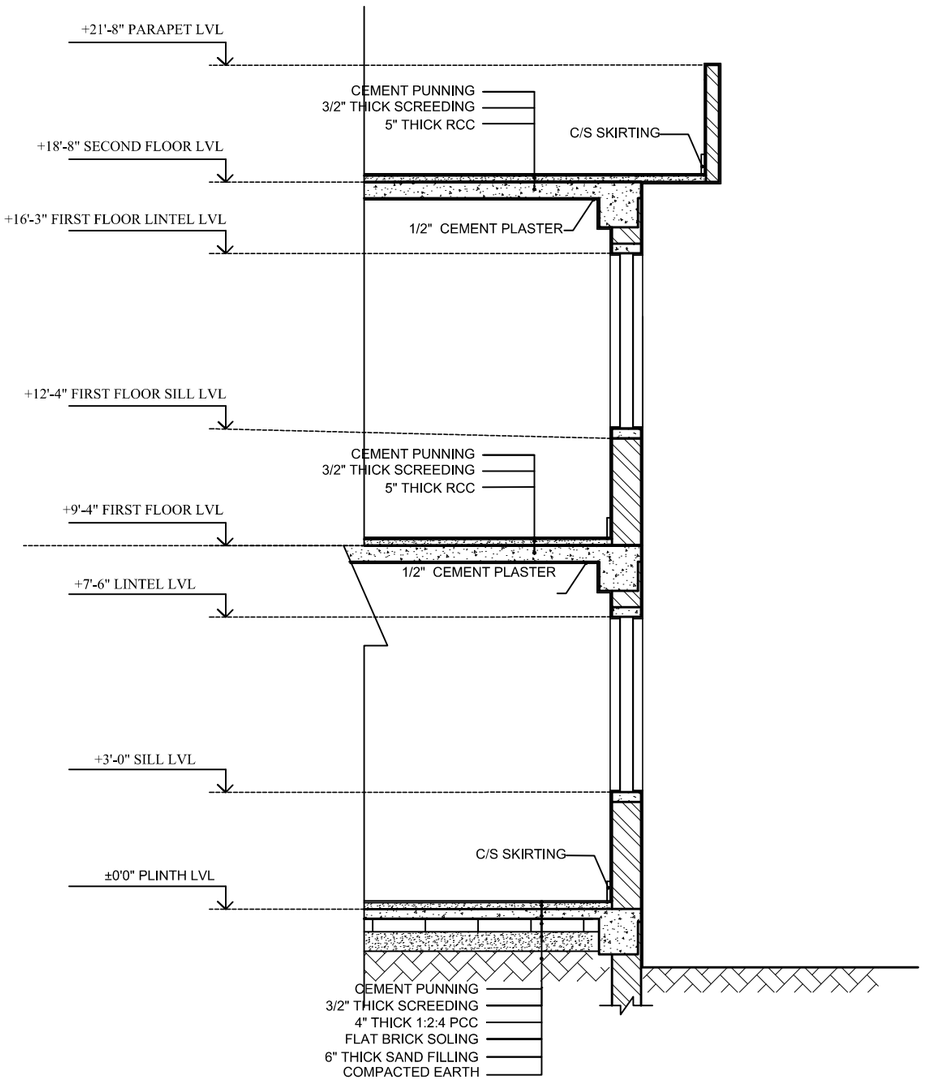


SECTION AT A-A'

OFFICE NAME	PROJECT NAME		Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	SENIOR STAFF QUARTER	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	8
		SECTION	Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

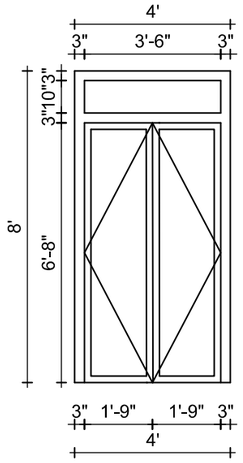


WALL SECTION AT R-R



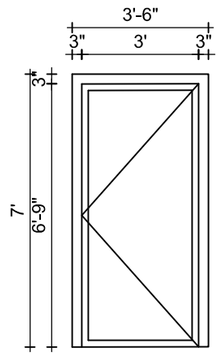
WALL SECTION AT P-P

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	WALL SECTIONS	Name:				Name:				0'-1" = 4'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	9
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



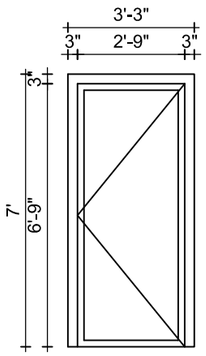
MD | 3 NOS

Scale :- 1" = 4'



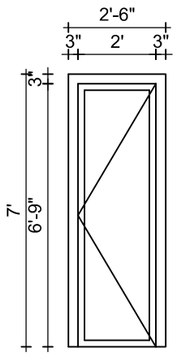
D1 | 14 NOS

Scale :- 1" = 4'



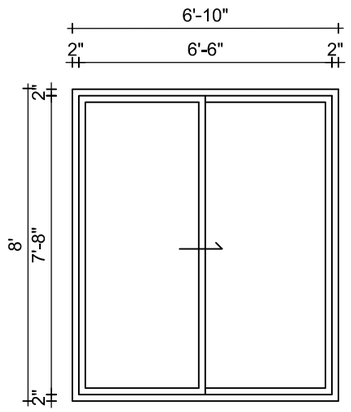
D2 | 12 NOS

Scale :- 1" = 4'



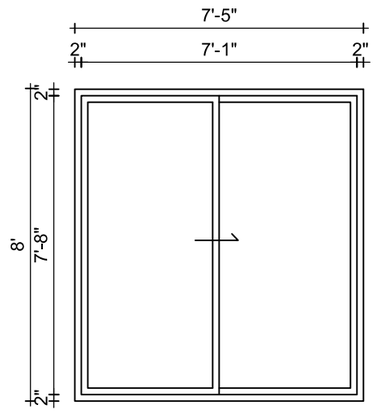
D3 | 12 NOS

Scale :- 1" = 4'



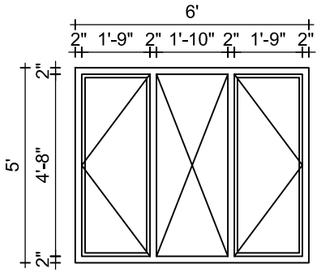
SD1 | 12 NOS

Scale :- 1" = 4'



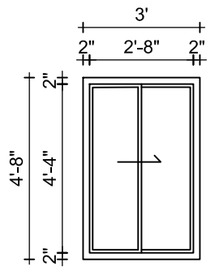
SD2 | 12 NOS

Scale :- 1" = 4'



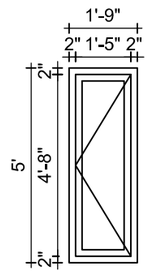
W1 | 24 NOS

Scale :- 1" = 4'



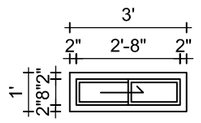
W2 | 12 NOS

Scale :- 1" = 4'



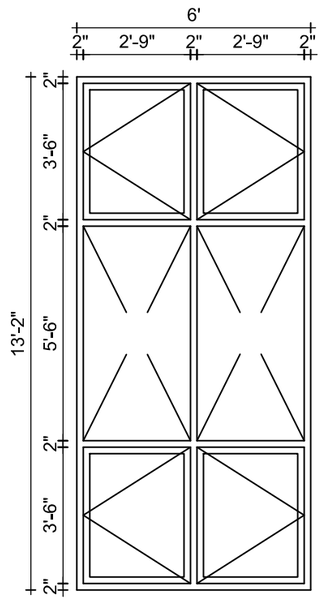
W4 | 12 NOS

Scale :- 1" = 4'



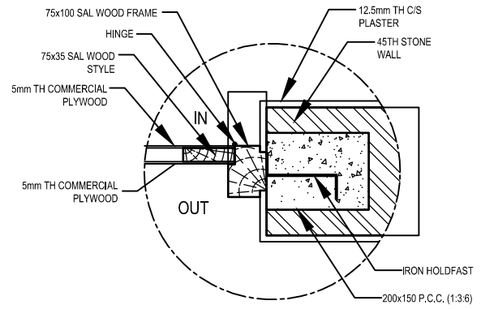
V1 | 12 NOS

Scale :- 1" = 4'



W3 | 2 NOS

Scale :- 1" = 4'



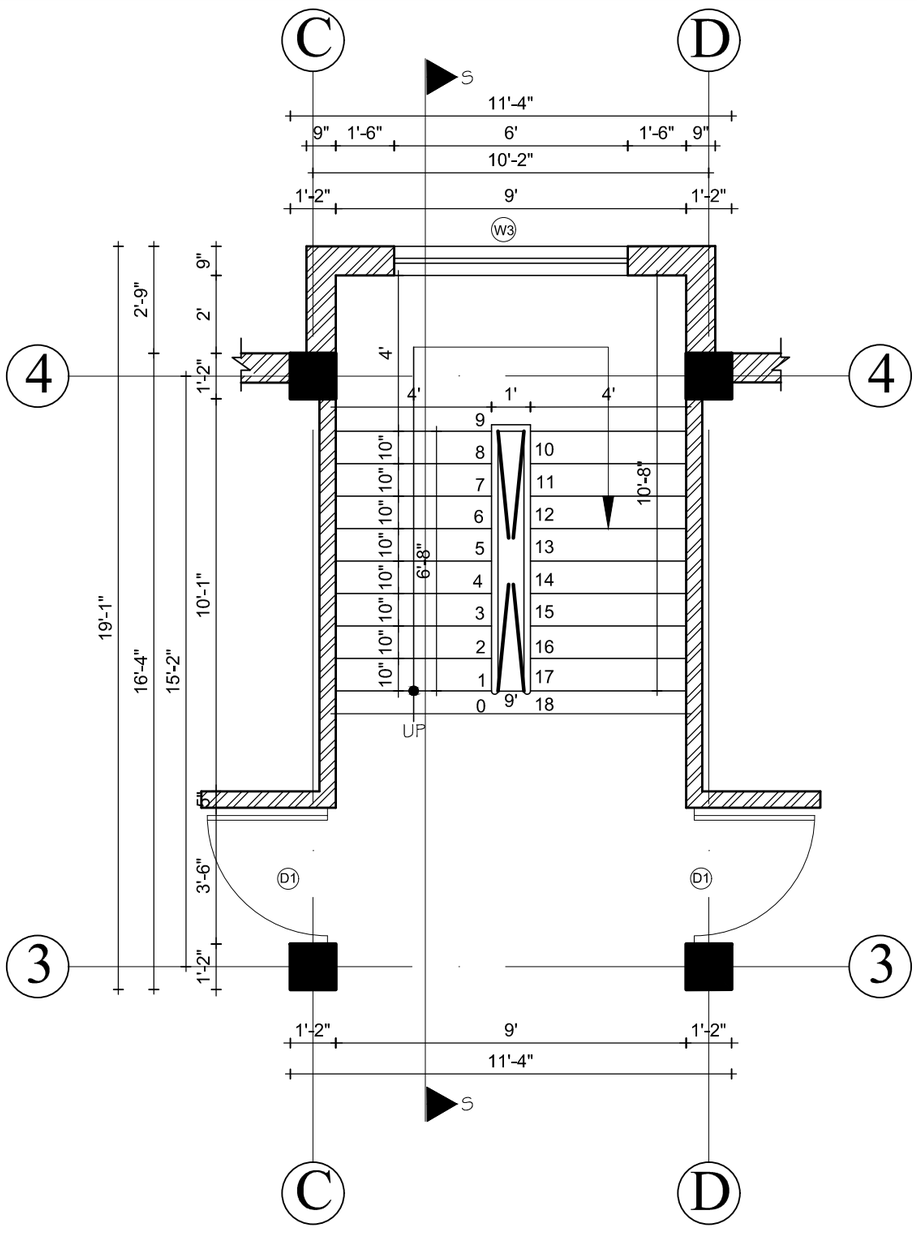
DETAIL AT A

scale :- 1" = 1'

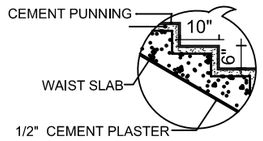
DOOR AND WINDOW SCHEDULE

S.NO.	DESCRIPTION	SYMBOL	SIZE	G.F.		S.F.	T.F.	TOTAL
1	MAIN DOOR	MD	3 4'-0"X8'-0"	1		1	-	2
2	DOOR	D1	14 3'-6"X7'-0"	4		4	2	10
3	DOOR	D2	12 3'-3"X7'-0"	4		4	-	8
4	DOOR	D3	24 2'-6"X7'-0"	4		4	-	8
5	SLIDING DOOR	SD1	12 7'-5"X8'-0"	4		4	-	8
6	SLIDING DOOR	SD2	12 6'-10"X8'-0"	4		4	-	8
7	WINDOW	W1	24 6'-0"X5'-0"	8		8	-	16
8	WINDOW	W2	12 3'-0"X4'-8"	4		4	-	8
9	WINDOW	W3	2 6'-0"X13'-2"	1		-	-	1
10	WINDOW	W4	12 1'-9"X5'-0"	4		4	-	8
11	VENTILATION	V1	12 3'-0"X1'-0"	4		4	-	8

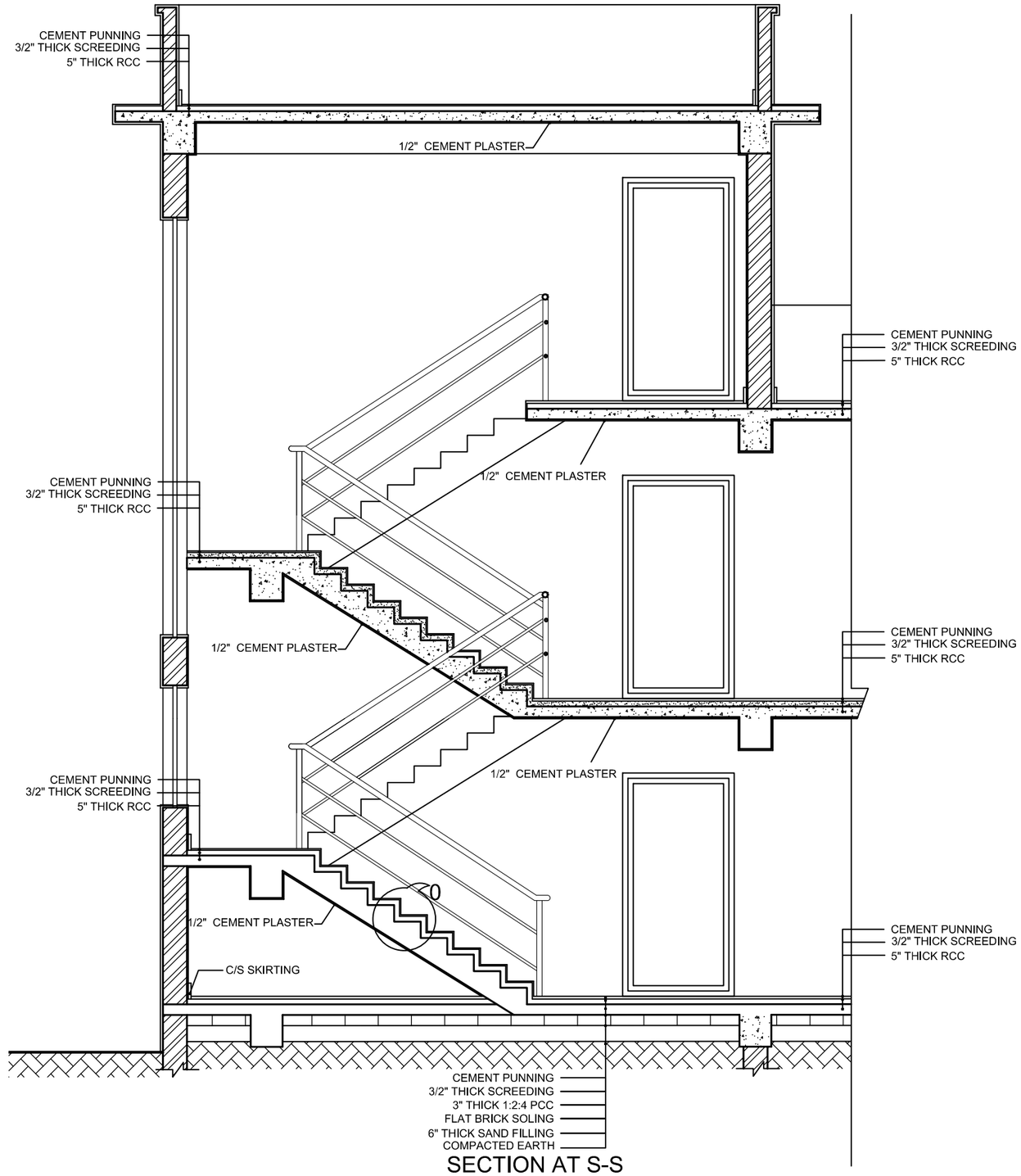
OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	DOOR/ WINDOW DETAILS	Name:				Name:				0'-1" = 4'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	10
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



STAIRCASE PLAN
Scale :- 1" = 4'

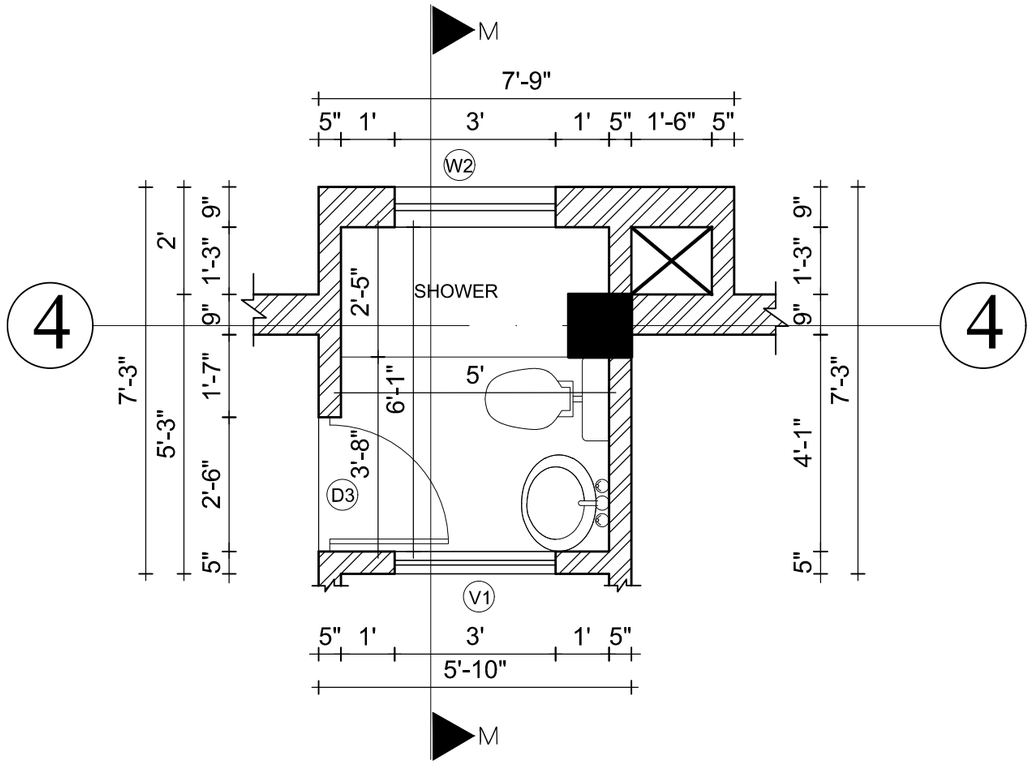


DETAIL AT A
Scale :- 1" = 2'



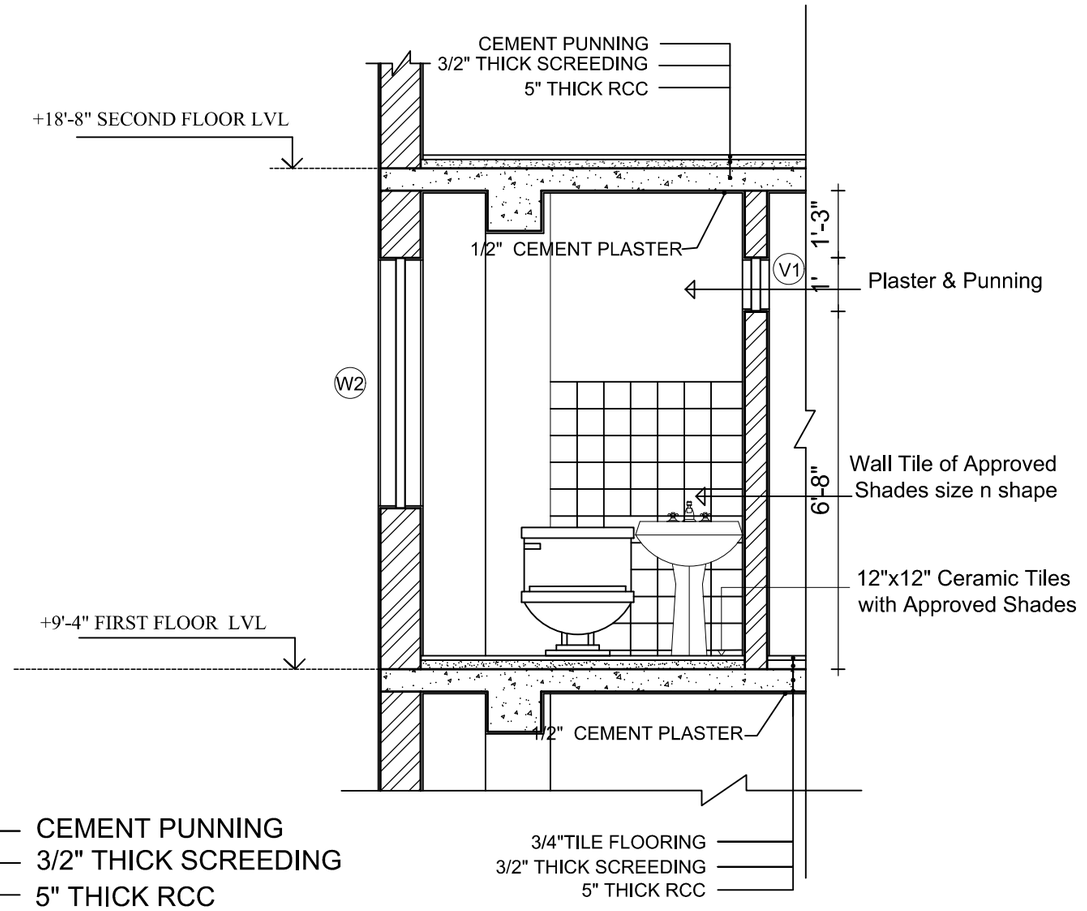
SECTION AT S-S

OFFICE NAME	PROJECT NAME											
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME
		STAIRCASE DETAILS	Name:				Name:				0'-1" = 4'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.
			Designation:				Designation:					
			Signature:				Signature:					11
			Date:				Date:					



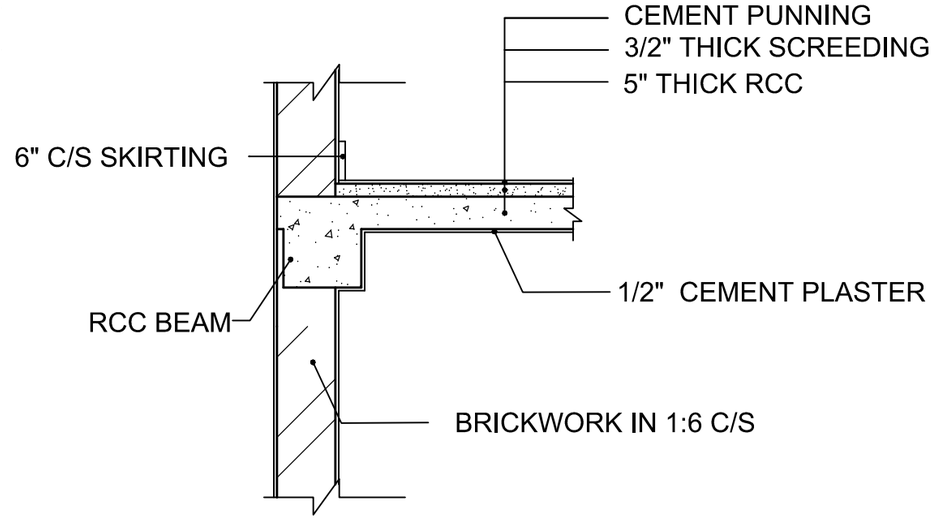
TOILET PLAN

Scale :- 1" = 4'



SECTION AT M-M

Scale :- 1" = 4'



FLOORING DETAILS
IN ALL FLOOR LEVEL

Scale :- 1" = 2'

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR		TOILET AND FLOORING DETAILS	Name:				Name:				0'-1" = 4'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	12
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING

(CTEVT)

SANOTHIMI, BHAKTAPUR

WORKING DRAWING

OF

SENIOR STAFF QUARTER

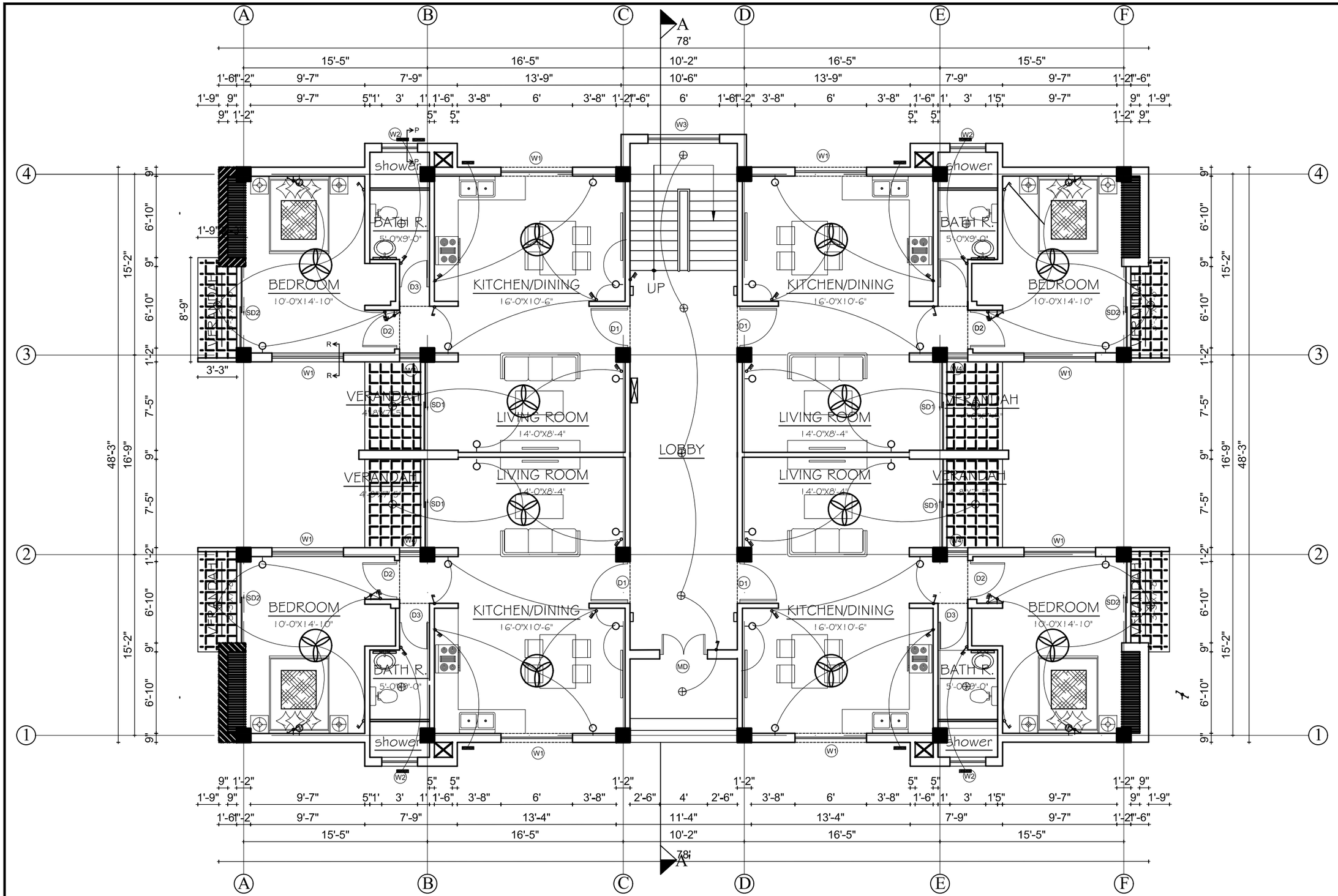
OF

NIRMAL LAMA POLYTECHNIC INSTITUTE

Bardiwash, Mahottari, Nepal

Contract Identification No: CTEVT/NLPI/083/84/NCB/Civil-01

November, 2026

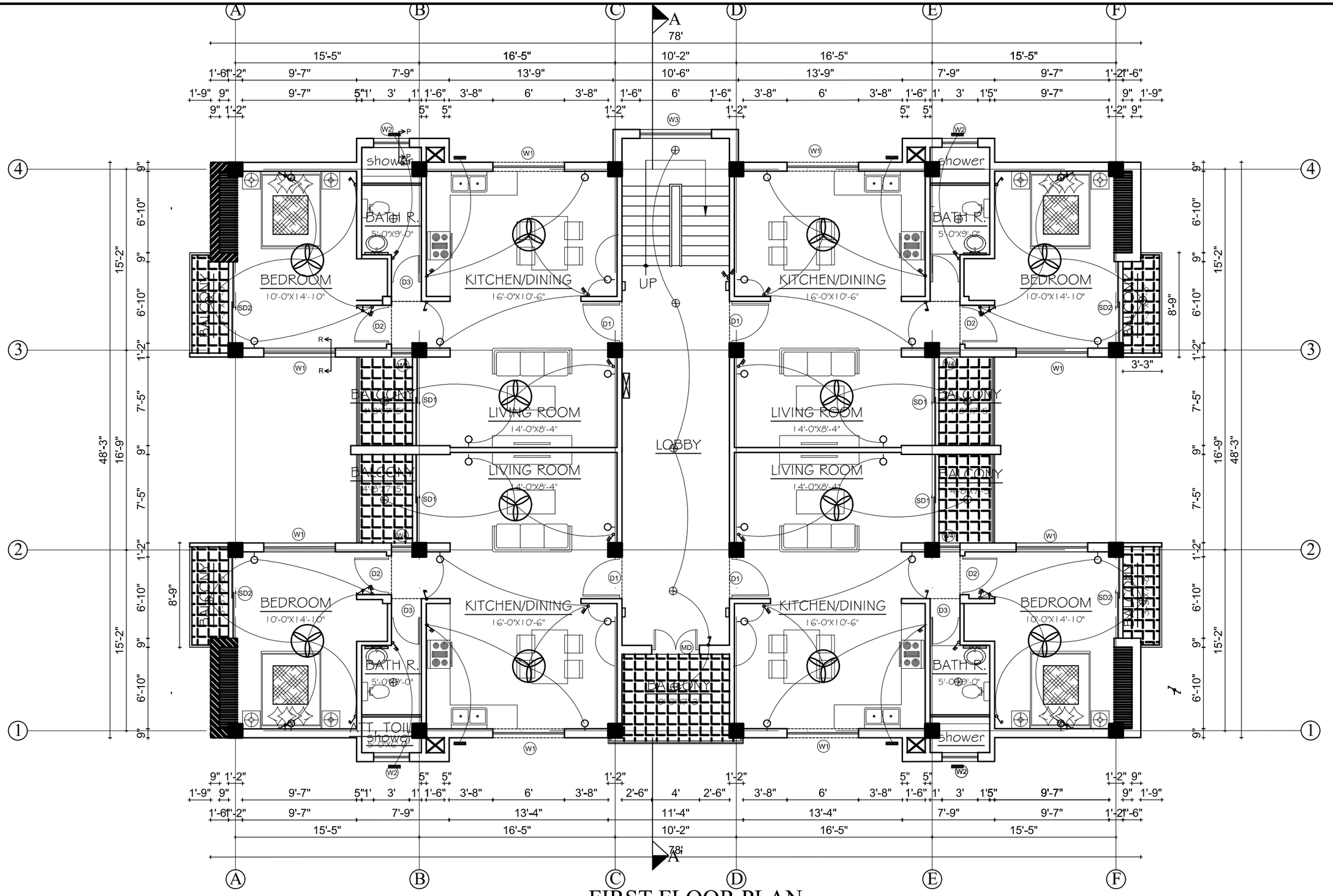


GROUND FLOOR PLAN

LIGHT, FAN POINT LAYOUT

OFFICE NAME	PROJECT NAME											
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	SENIOR STAFF QUARTER ELECTRICAL DRAWINGS LIGHT, FAN POINT LAYOUT GROUND FLOOR PLAN	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME
			Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.
			Designation:				Designation:					
			Signature:				Signature:					
			Date:				Date:					

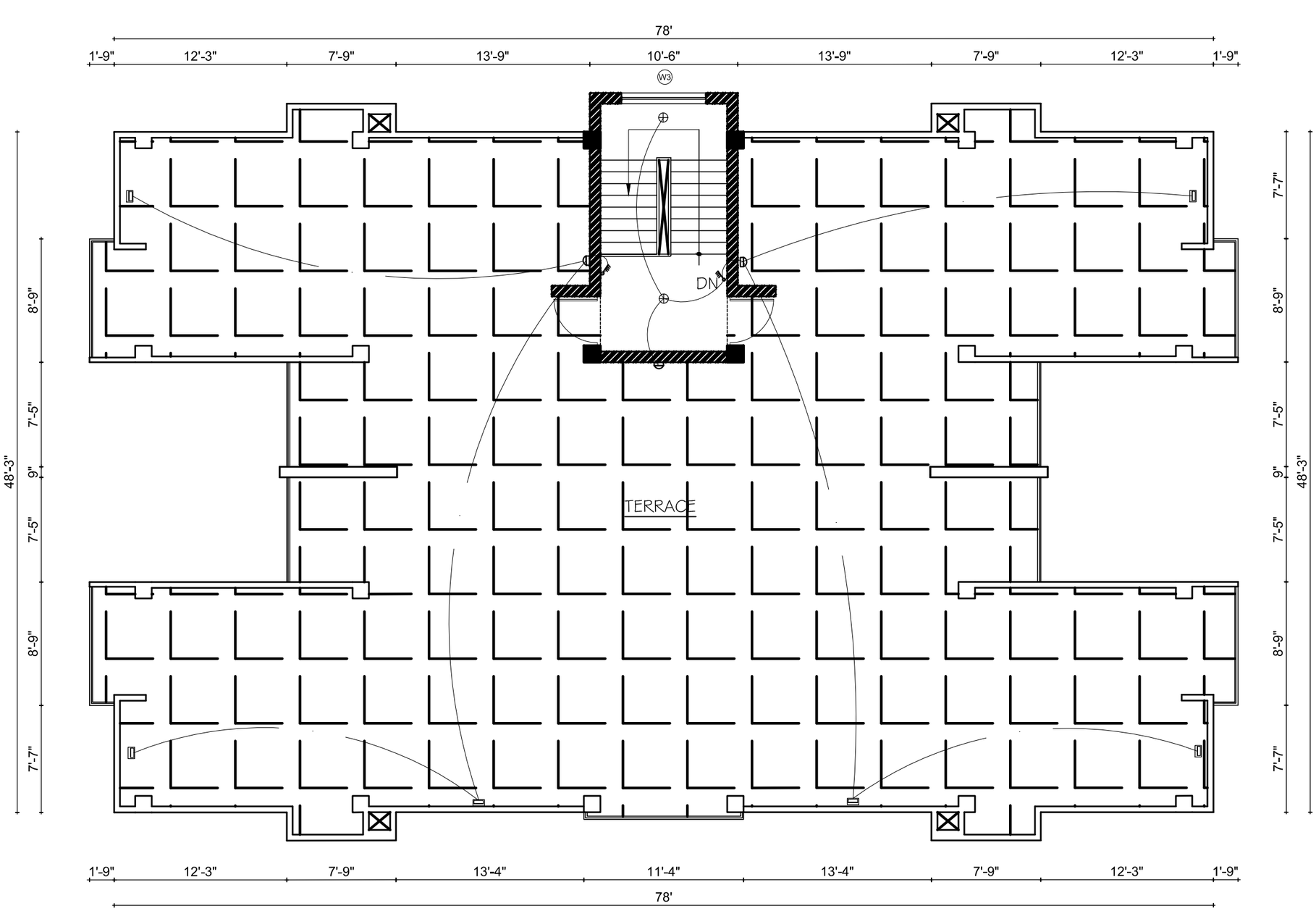
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FIRST FLOOR PLAN

LIGHT, FAN POINT LAYOUT

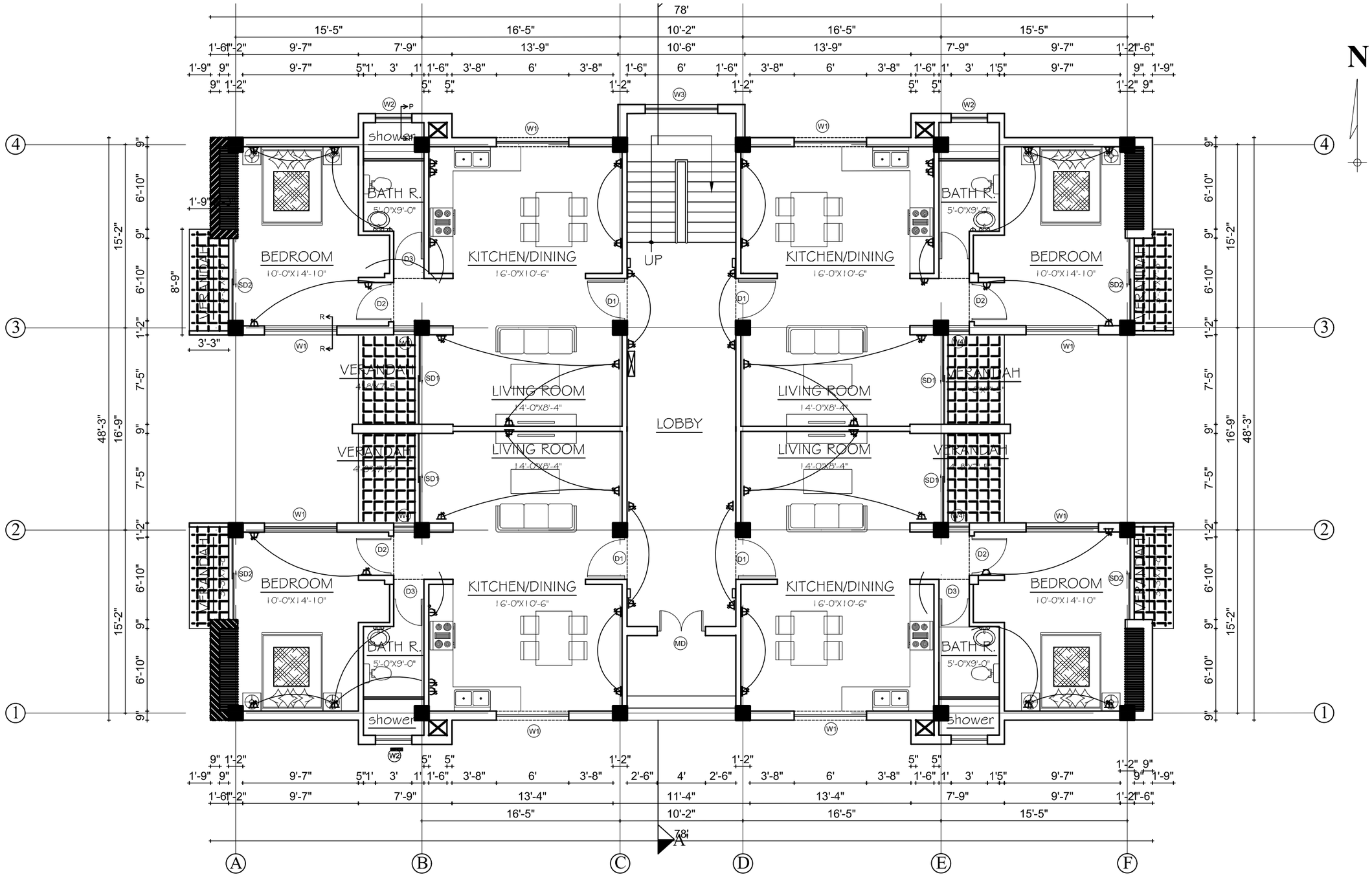
OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	ELECTRICAL DRAWINGS LIGHT, FAN POINT LAYOUT FIRST FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	2
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



TOP FLOOR PLAN

LIGHT, FAN POINT LAYOUT

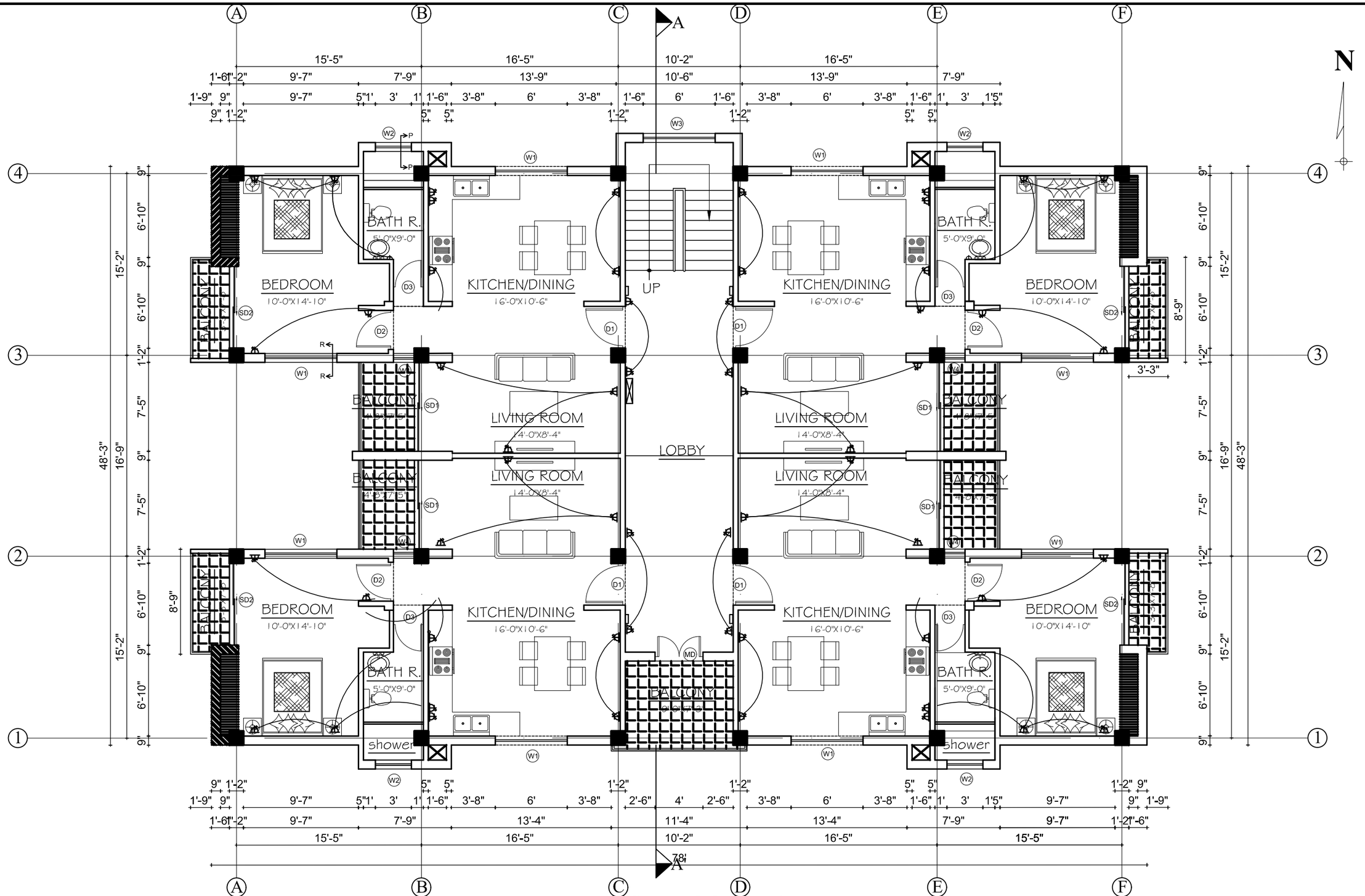
OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	ELECTRICAL DRAWINGS LIGHT, FAN POINT LAYOUT TOP FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	4
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



GROUND FLOOR PLAN

GENERAL & AIRCON POWER POINT LAYOUT PLAN

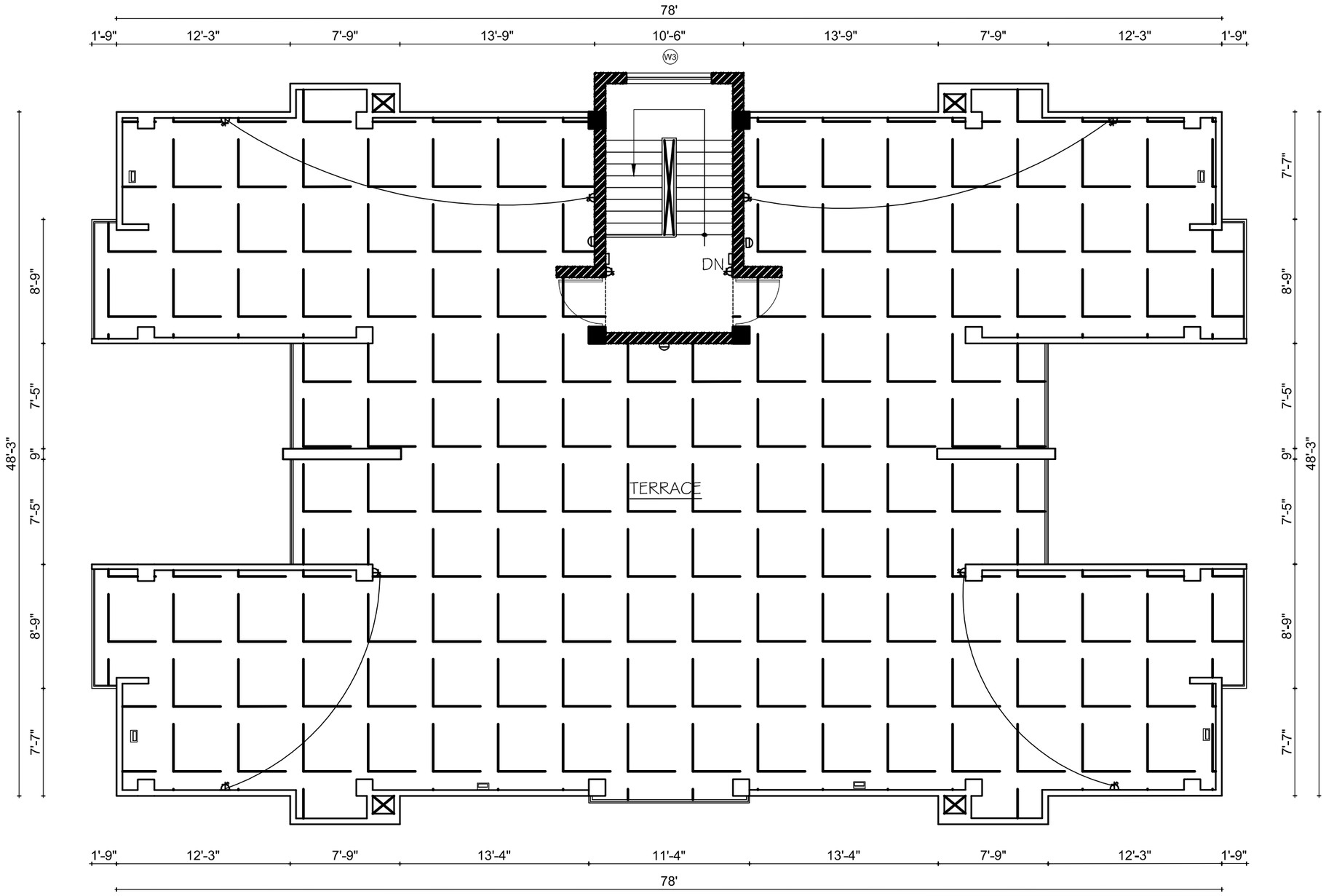
OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	ELECTRICAL DRAWINGS POWER POINT LAYOUT GROUND FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	5
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



FIRST FLOOR PLAN

GENERAL & AIRCON POWER POINT LAYOUT PLAN

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	ELECTRICAL DRAWINGS POWER POINT LAYOUT FIRST FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	6
			Designation:				Designation:						
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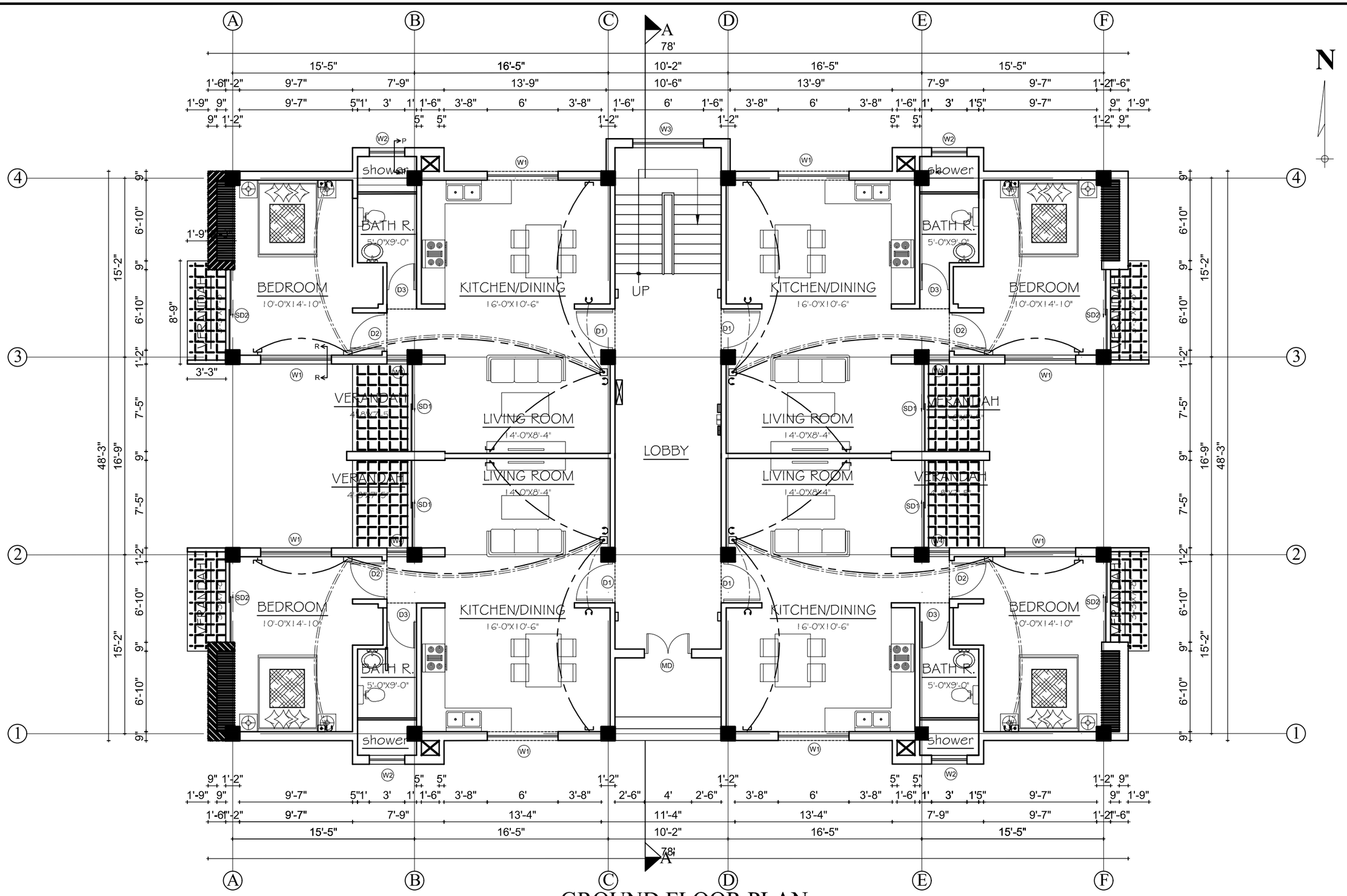


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TOP FLOOR PLAN

GENERAL & AIRCON POWER POINT LAYOUT PLAN

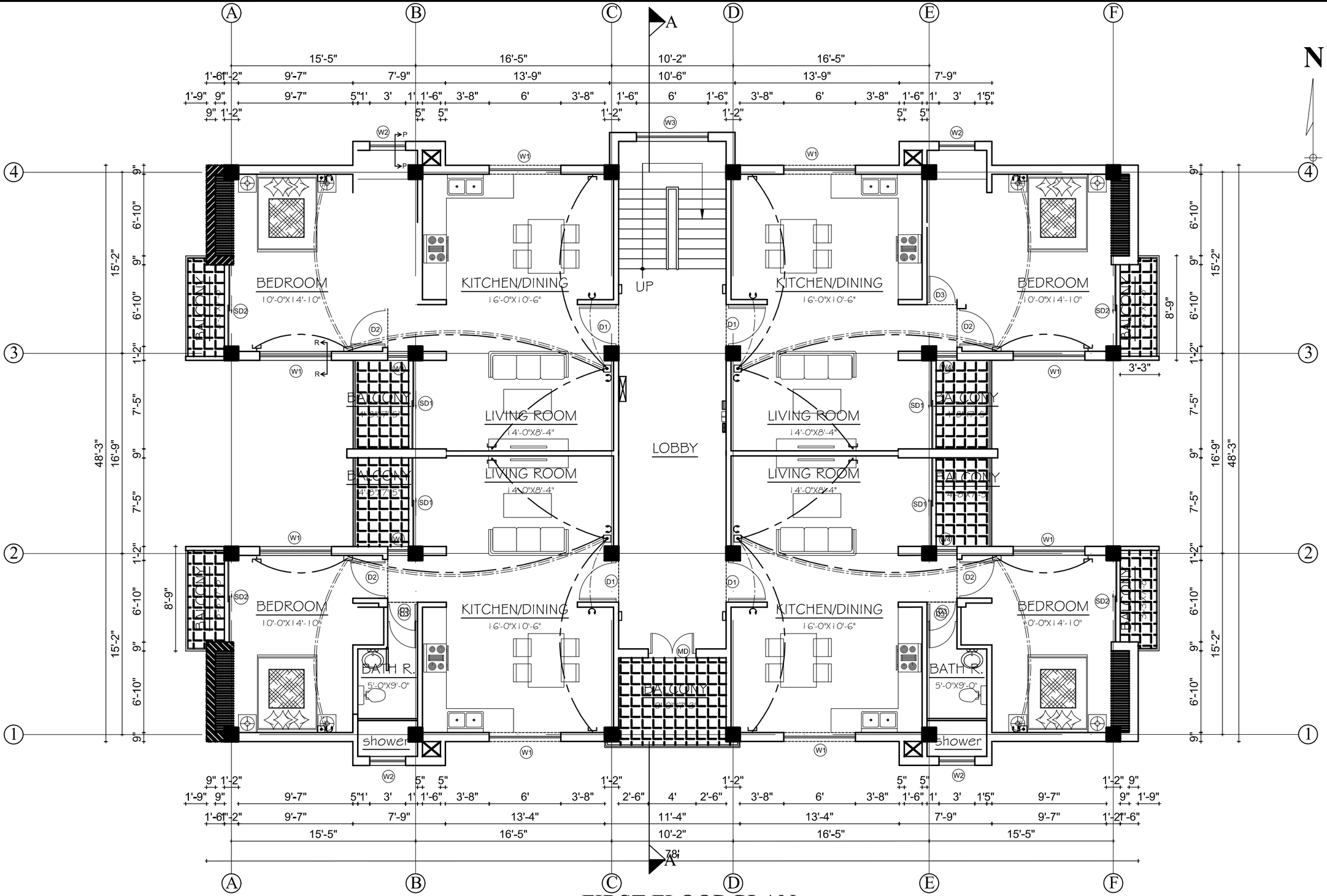
OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	ELECTRICAL DRAWINGS POWER POINT LAYOUT TOP FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	8
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



GROUND FLOOR PLAN

TELE, TV, LAN POINT LAYOUT PLAN

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	ELECTRICAL DRAWINGS TELE, TV, LAN POINT LAYOUT GROUND FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	9
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

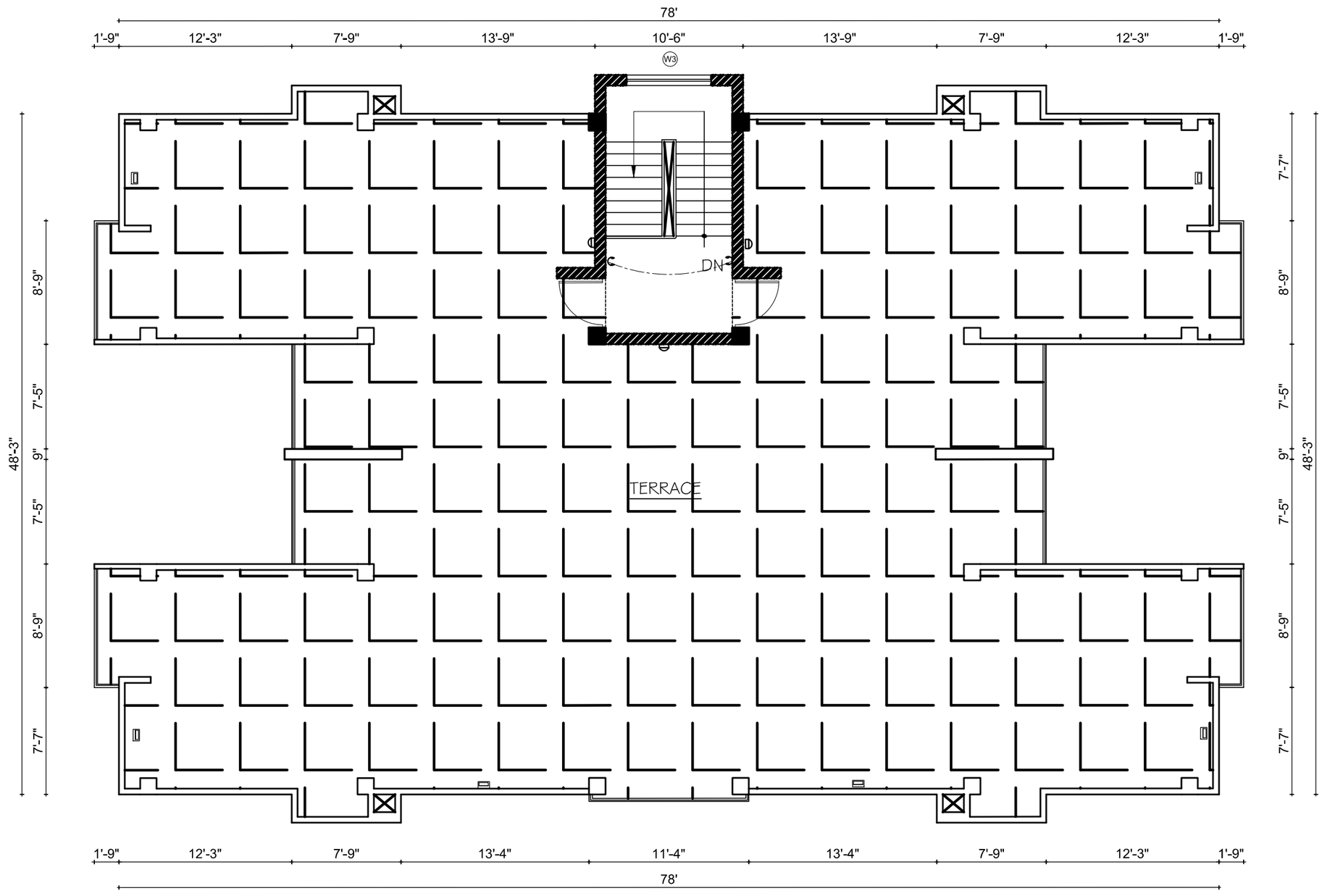


FIRST FLOOR PLAN

TELE, TV, LAN POINT LAYOUT PLAN

OFFICE NAME	PROJECT NAME											
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	SENIOR STAFF QUARTER ELECTRICAL DRAWINGS TELE, TV, LAN POINT LAYOUT FIRST FLOOR PLAN	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME
			Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.
			Designation:				Designation:					
			Signature:				Signature:					
			Date:				Date:					

10



TOP FLOOR PLAN

TELE, TV, LAN POINT LAYOUT PLAN

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	ELECTRICAL DRAWINGS TELE, TV, LAN POINT LAYOUT TOP FLOOR PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	12
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

	Ceilling Rose
	4" dia conceallled recessed downlighter with 1x11 W PLT
	6" dia Rec/Surface down lighters with frosted glass cover with 2 x11 W PLT
	6" dia recessed ceilling Metal Halide Type with 45 W MH lamps
	8" dia flat ceilling dome with 11 W PLT
	Wall lights with 1 x 11 W warmlight PL
	FootLight at ht of 2'6" ht with 1 x 11W warm color PLT
	Bulkheade Light at ht of 7'2" ht with 1 x 11W warm color PLT
	Picture Light at 6' ht from FF with 2 x 9 W PL
	Bathroom Mirror Light at 3" ht from top level of Mirror
	Surface Mounted Mirror Optic Fixture with 2 x 11 W PLT
	Recessed Mirror Optic Fixture with 2 x 11 W PLT
	2 x 36 W CFL , Recessed CAT II Mirror Optic Fixture with Low Loss electronic Ballast
	1 x 36 W Box type FLT with elelctronic Ballast
	2 x 36 W Surface Mounted Mirror Optic Fixture FLT with Electronic Ballast
	Exhaust Fan 9 " dia
	Room DB / Juntion Box

	42" dia ceilling fan
	8"/10" dia exhaust Fan
	1 Way Gang Light Switches
	2 Way Switches
	5 A, 2 pin socket at switch ht from FF
	15A, 3/15 pin socket at 15"(centre) ht from FF
	13/15A, 3/5 pin generator/UPS supply socket at 36"(centre) ht from FF
	20 A, Aircon power socket with starter at 7'6" ht from FF
	20 A, Geyser power socket with starter at 7'6" ht from FF
	Sub Distribution Board (SDB)
	Distribution Board (DB)
	Main Control Panel
	Conduit Light & Fan Point-city supply
	Conduit Light & Fan Point- Generator supply
	Conduit Power Point-city supply
	Conduit Power Point- Generator supply
	Mains Cable

N

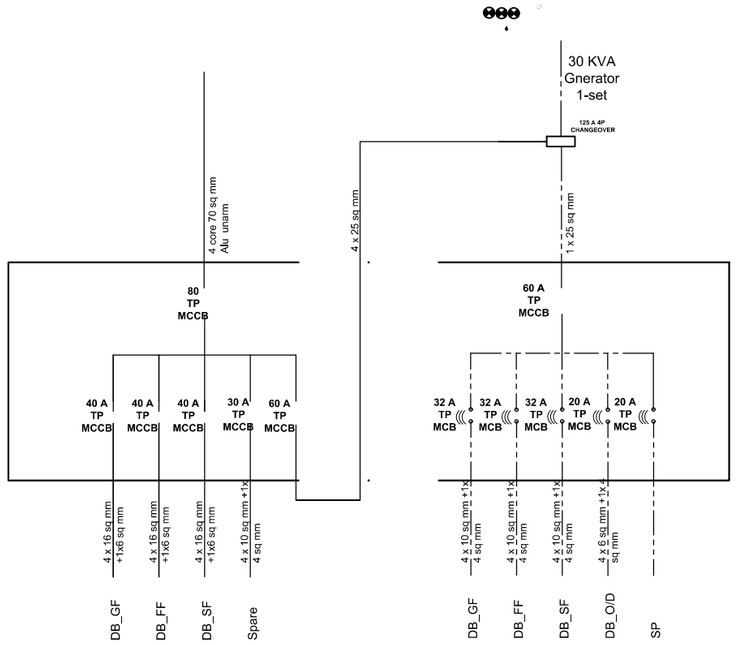
	Telephone point
	Sub Dist. Point (SDP)
	Dist. Point (DP) / MDF
	20 mm dia HDPE conduit with 3 pair telecom cable
	32 mm dia HDPE conduit with 2 x 20 pair communication cable
	TV point
	TV Splitter
	Main Distribution Frame (100 primary+ 100 Secondry)
	20 mm dia HDPE conduit with TV coaxial cable
	LAN point
	Switch/Hub
	20 mm dia HDPE conduit with CAT 6 cable
	Close Circuit Camera
	Splitter (Pool Box)
	coaxial camera cable and $2 \times \frac{3}{22}$ or twin RS cable for camera power in 20 mm dia conduit from the CCTV to the BOX/Monitor

S	Ionization Smoke Detector
P	Photo Detector
H	Heat Detector
M	Manual Call Point (MCP)
M	Manual Call Point (MCP)
A	Alarm/Hooter
	Repeater
	Fire Alarm Control Panel (FACP)
	2 x 1.5 sq mm FRLS Detector Detecor conduit
	2 x 1 sq mm FRLS Detector -Response Indicator Conduit
	2 x 1 sq mm FRLS Hooter panel conduit
	Earth Pit
	Copper Strip of 25 x 3 mm
	Cable Trunk
	Main Supply

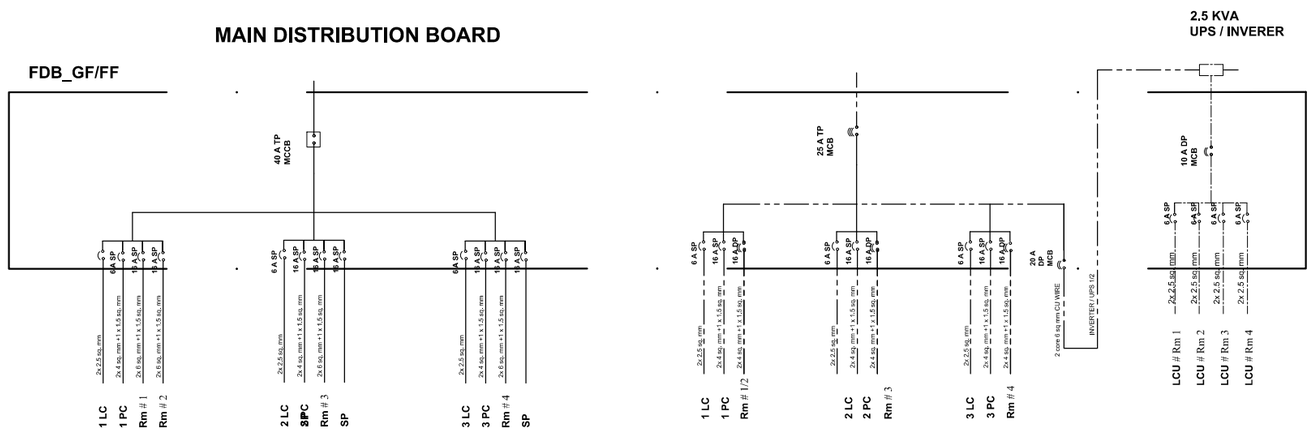
	20 A DP metal clad recessed type socket for air con connection
	20 mm dia Conduit with 2 x 4 sq mm + 1 x 1.5 Sq mm Cable (2x7/20+1 x3/20)
	Indoor Oudoor unit Linkin Pipe
	Drain out PEX pipe in natural gravity flow
	Wall Mount Type Split Aircon (Indoor)
	Ceilling Cassette type Split Aircon
	Ceilling Mount type Split Aircon
	Outdoor Unit

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	ELECTRICAL DRAWINGS LEGEND	Name:				Name:					BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	13
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

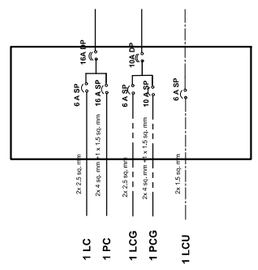
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MAIN DISTRIBUTION BOARD



FLOOR DISTRIBUTION BOARD - GR, 1ST FLOOR



Room Junction Box

OFFICE NAME	PROJECT NAME											
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	SENIOR STAFF QUARTER ELECTRICAL DRAWINGS	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME
			Name:				Name:					BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.
			Designation:				Designation:					14
			Signature:				Signature:					
			Date:				Date:					

N

COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING
(CTEVT)
SANOTHIMI, BHAKTAPUR

ELECTRICAL DRAWING

OF

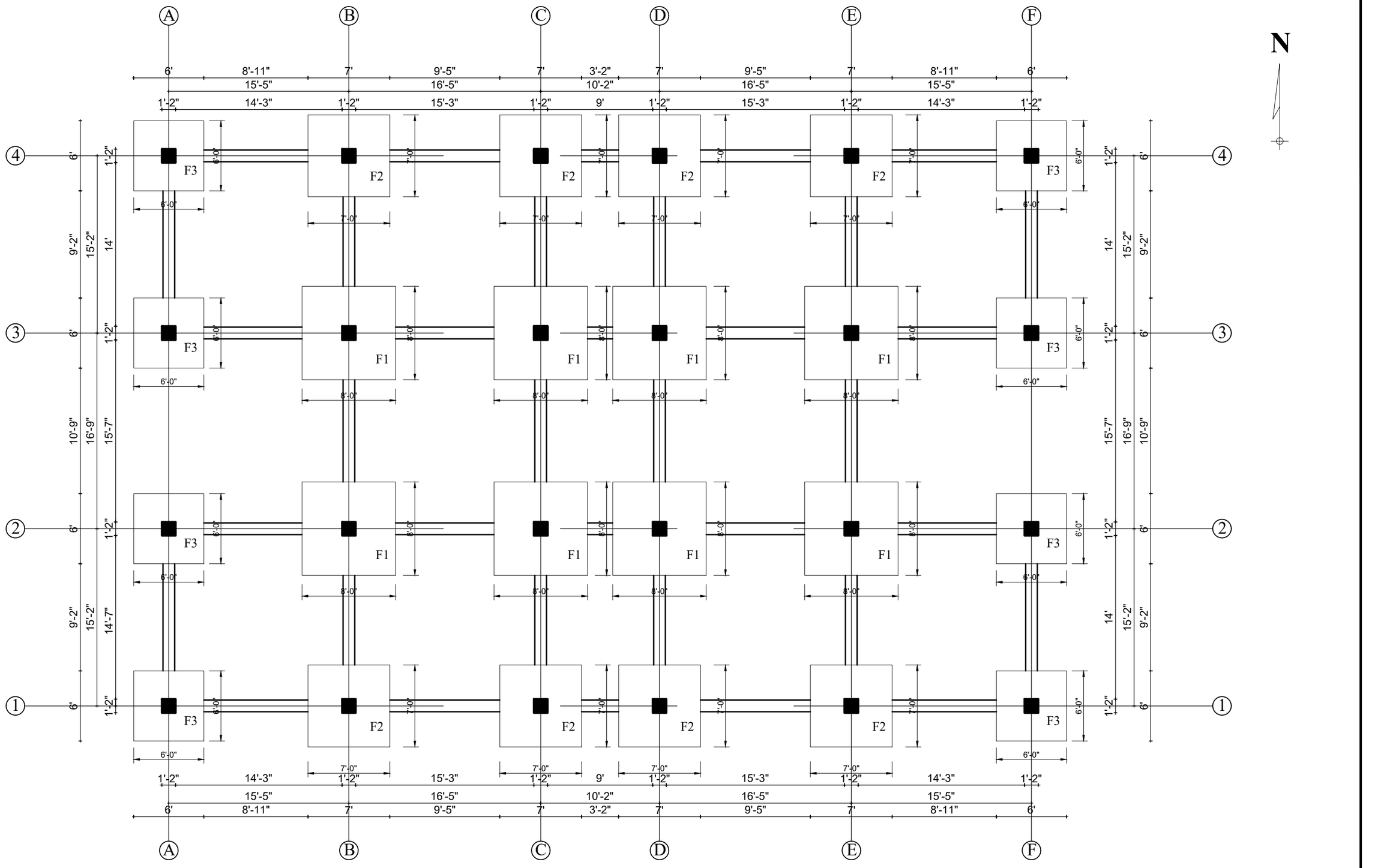
SENIOR STAFF QUARTER

OF

NIRMAL LAMA POLYTECHNIC INSTITUTE
Bardiwash, Mahottari, Nepal
Contract Identification No: CTEVT/NLPI/083/84/NCB/Civil-01

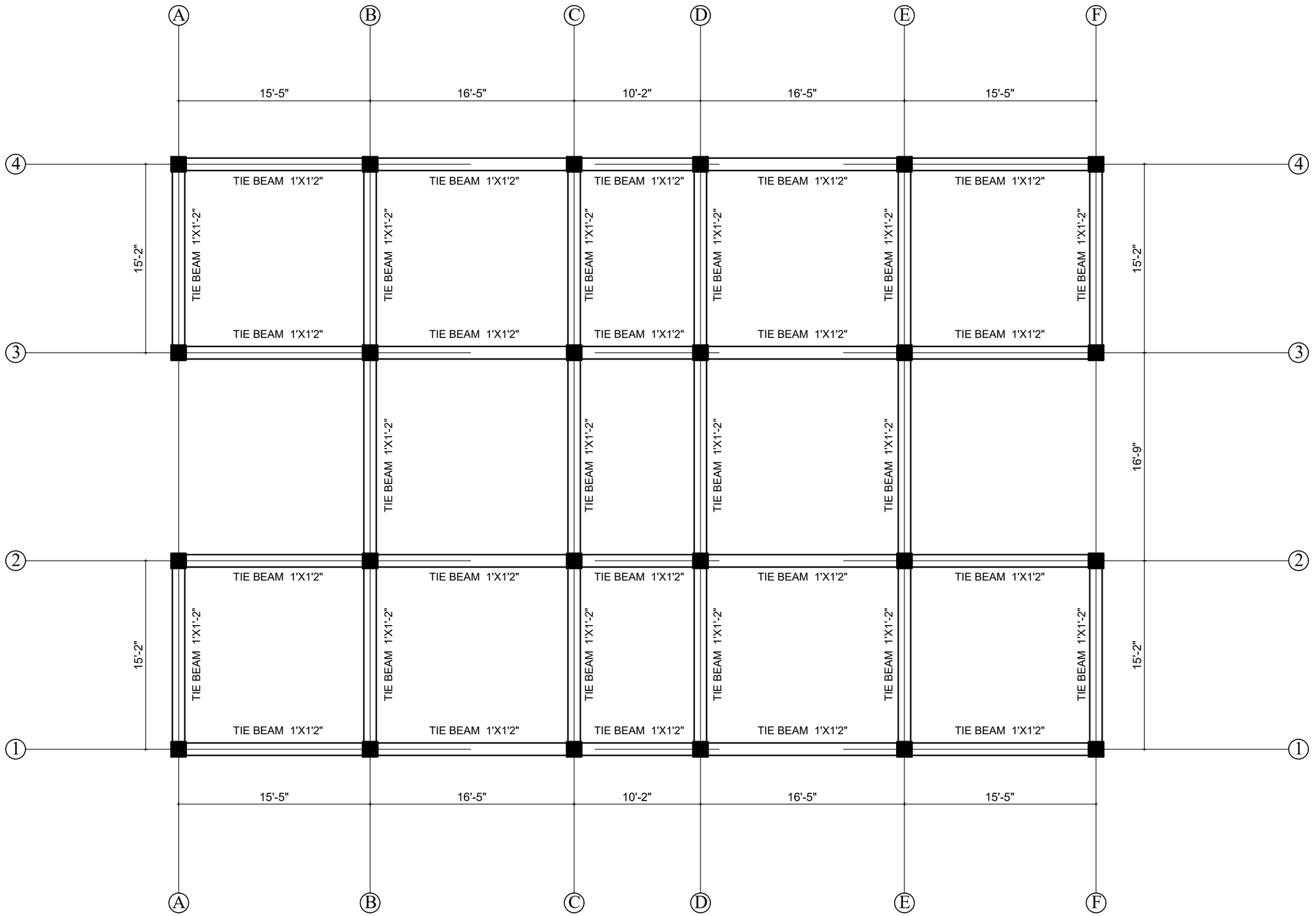
November, 2026

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF GORKHA POLYTECHNIC INSTITUTE PALUNGTAR, GORKHA	ELECTRICAL DRAWINGS COVER PAGE	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	0
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



TRENCH PLAN

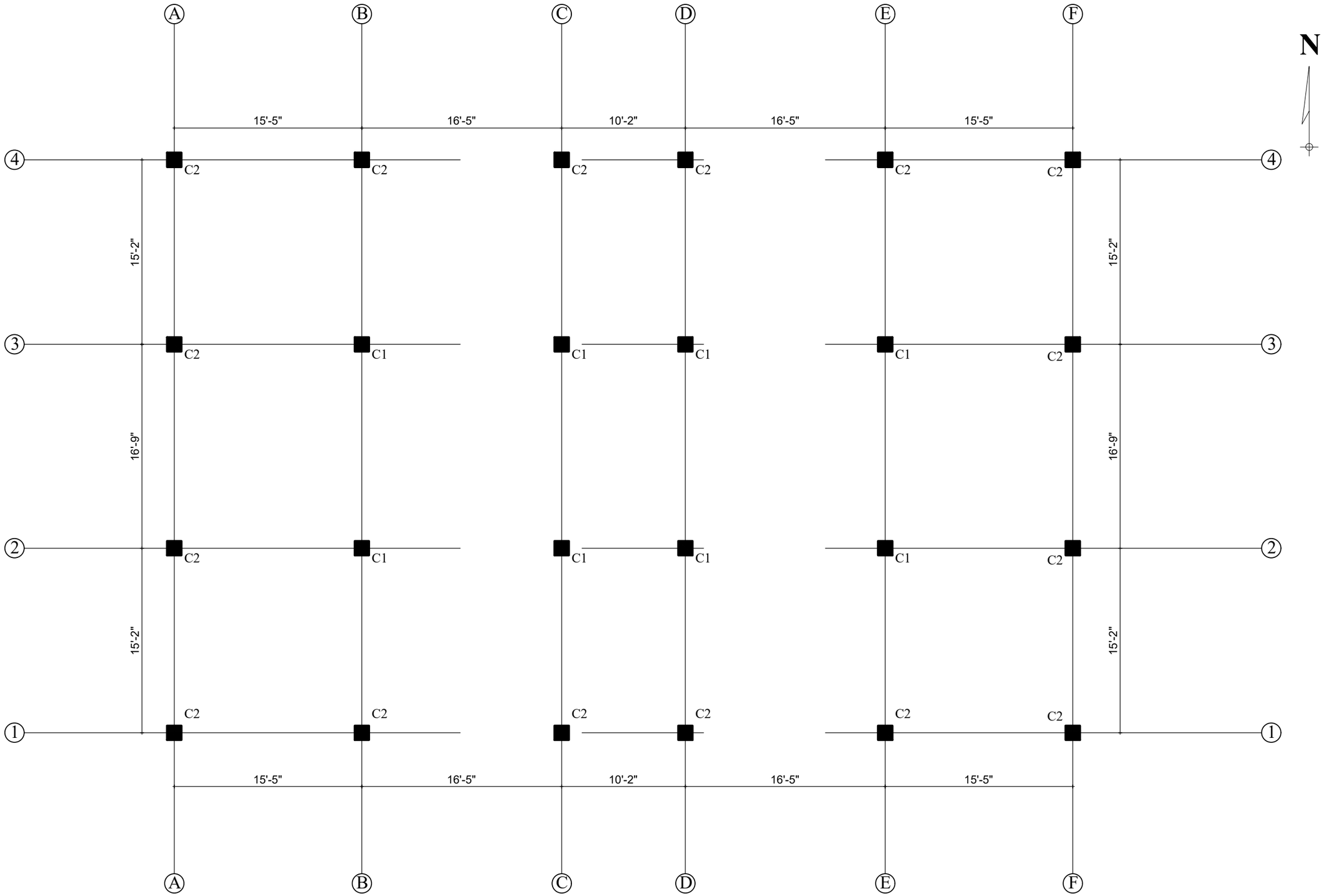
OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS TRENCH PLAN	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	1
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



TIE BEAM LAYOUT

OFFICE NAME	PROJECT NAME										
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE
		STRUCTURAL DRAWINGS TIE BEAM LAYOUT	Name:				Name:				0'-1" = 8'-0"
			Designation:				Designation:				
			Signature:				Signature:				
			Date:				Date:				

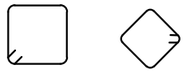
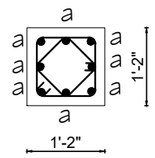
CONSULTANT'S NAME	
BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	2



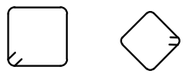
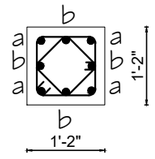
COLUMN NOTATION

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS COLUMN NOTATION	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	3
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

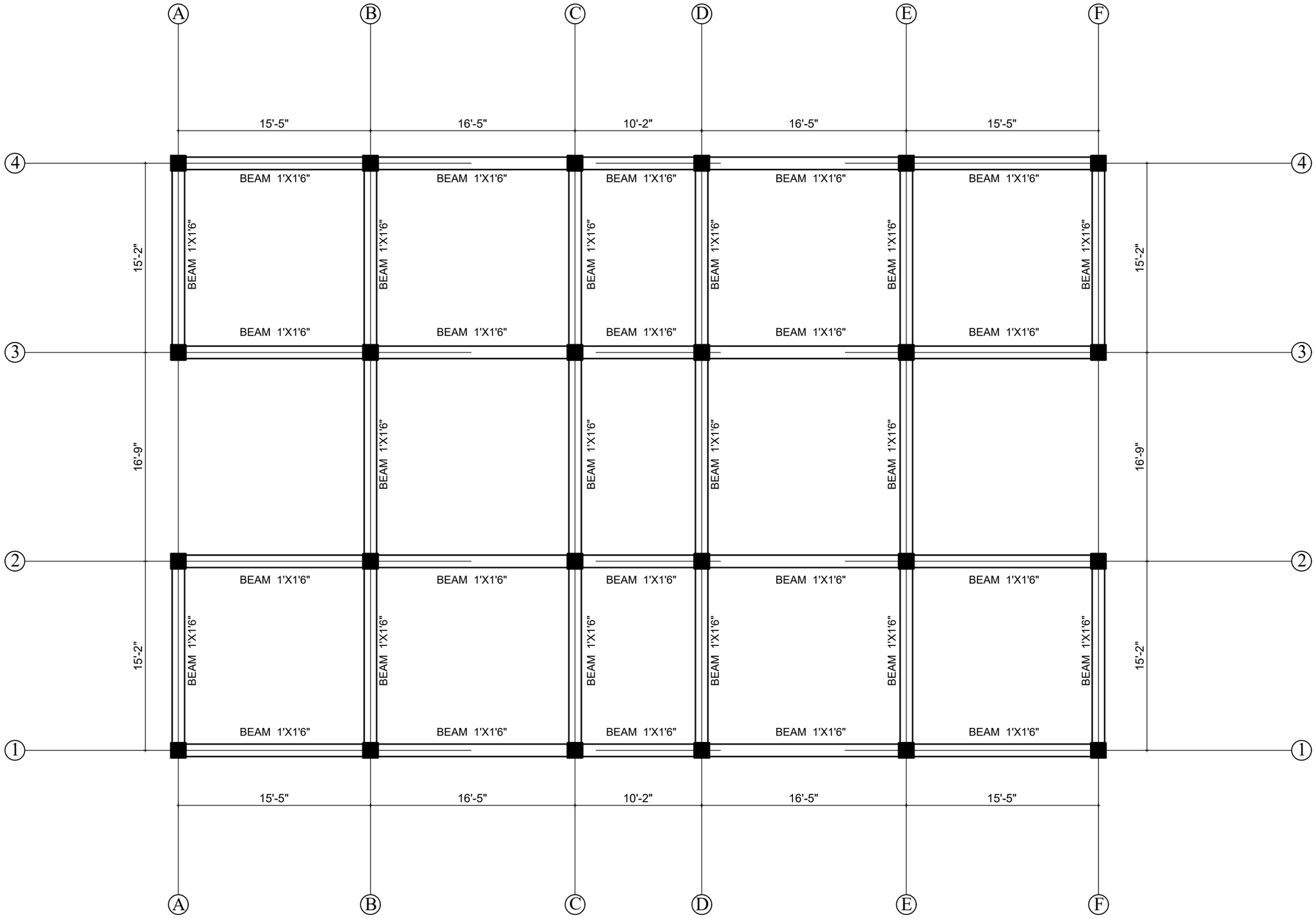
COLUMN TYPE -C1

TABLE OF COLUMN REINFOFCEMENT							
S.N.	SHAPE OF STIRRUP	STOREY	SECTION	SIZE	MAIN BAR	STIRRUPS(Lateral Ties)	
						IN (h+z) End Ties	IN (H-2h) Middle Ties
1.		ground, 1st, top		14" X14" M-20	a=8nos 20 mm. Ø	2L-8mmØ Stirrups @ 0'4"c/c.	2L-8mmØ Stirrups @ 0'6"c/c.

COLUMN TYPE -C2

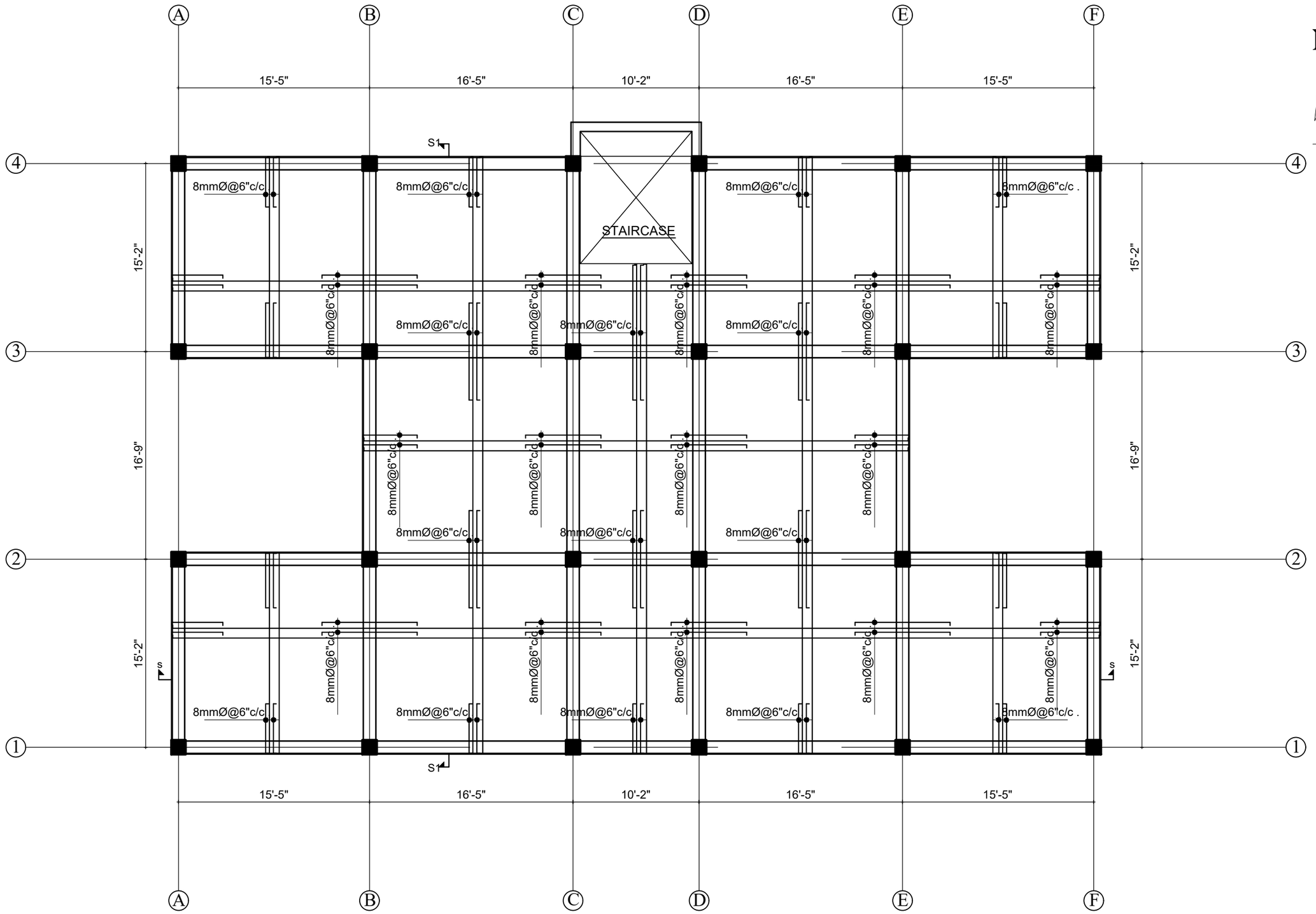
TABLE OF COLUMN REINFOFCEMENT							
S.N.	SHAPE OF STIRRUP	STOREY	SECTION	SIZE	MAIN BAR	STIRRUPS(Lateral Ties)	
						IN (h+z) End Ties	IN (H-2h) Middle Ties
1.		ground, 1st, top		14" X14" M-20	a=4nos 20 mm. Ø b=4nos 16 mm. Ø	2L-8mmØ Stirrups @ 0'4"c/c.	2L-8mmØ Stirrups @ 0'6"c/c.

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS COLUMN TYPES	Name:				Name:					BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	4
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



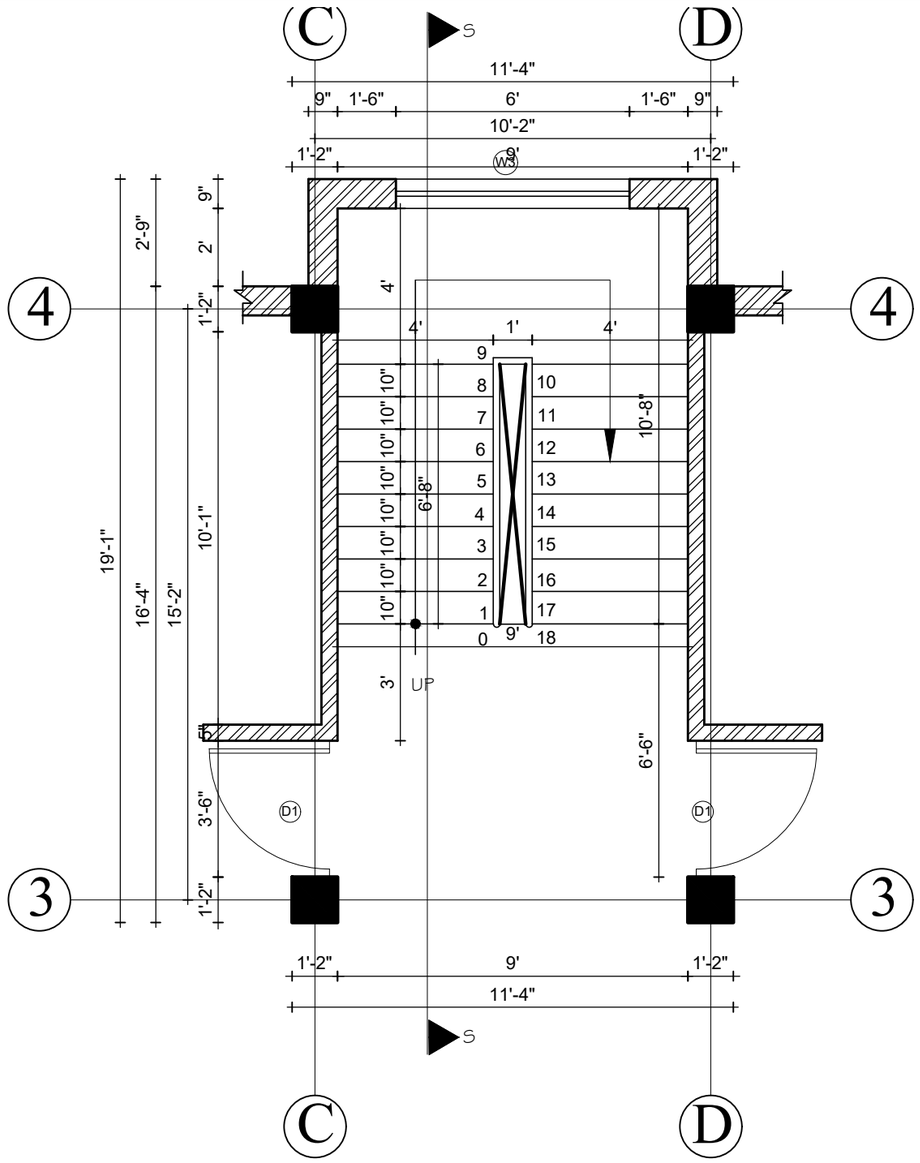
TYPICAL BEAM LAYOUT

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS TYPICAL BEAM LAYOUT	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	5
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

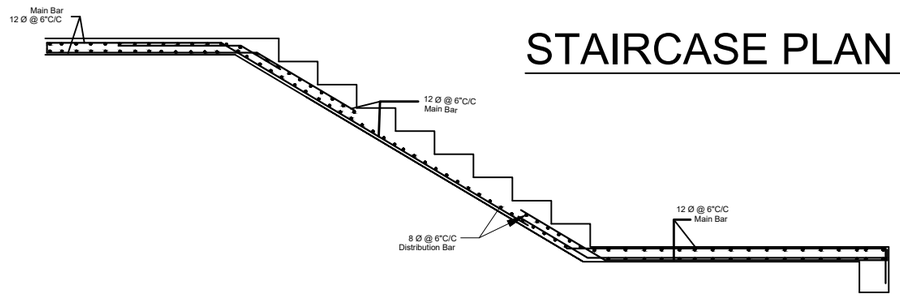


SLAB REINFORCEMENT DETAIL

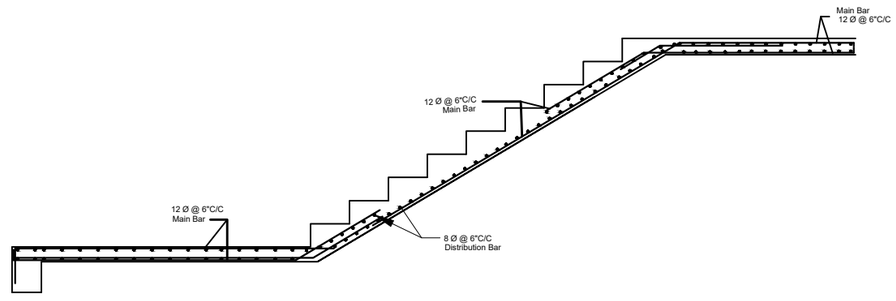
OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS SLAB REINFORCEMENT DETAILS	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	6
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



STAIRCASE PLAN DETAILS .

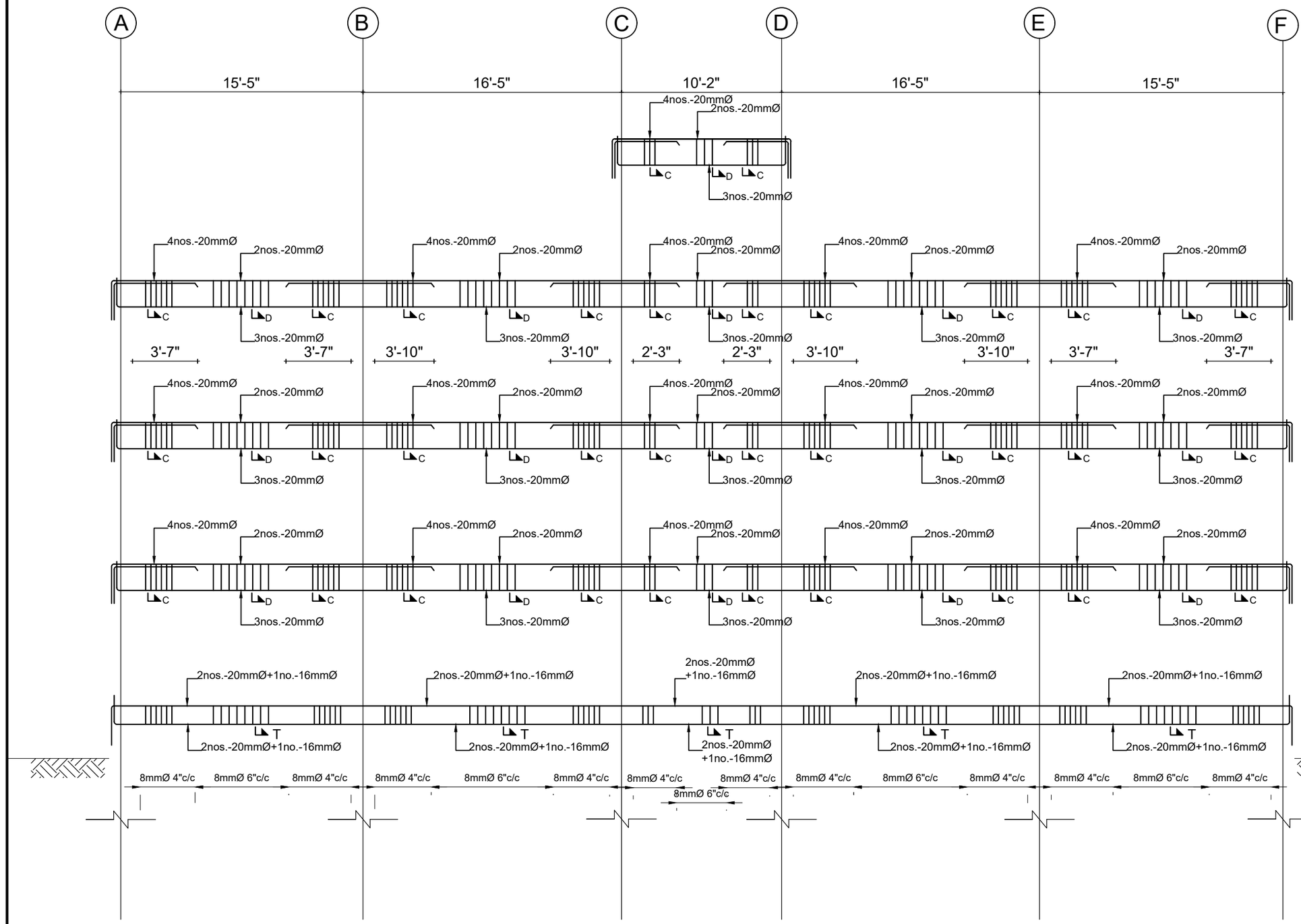


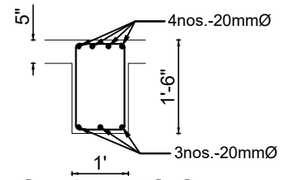
Staircase Section



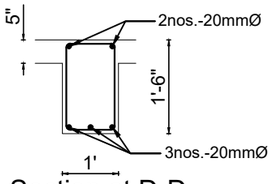
Staircase Section

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS STAIRCASE DETAILS	Name:				Name:				0'-1" = 4'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	7
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

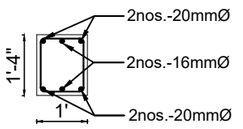




Section at C-C



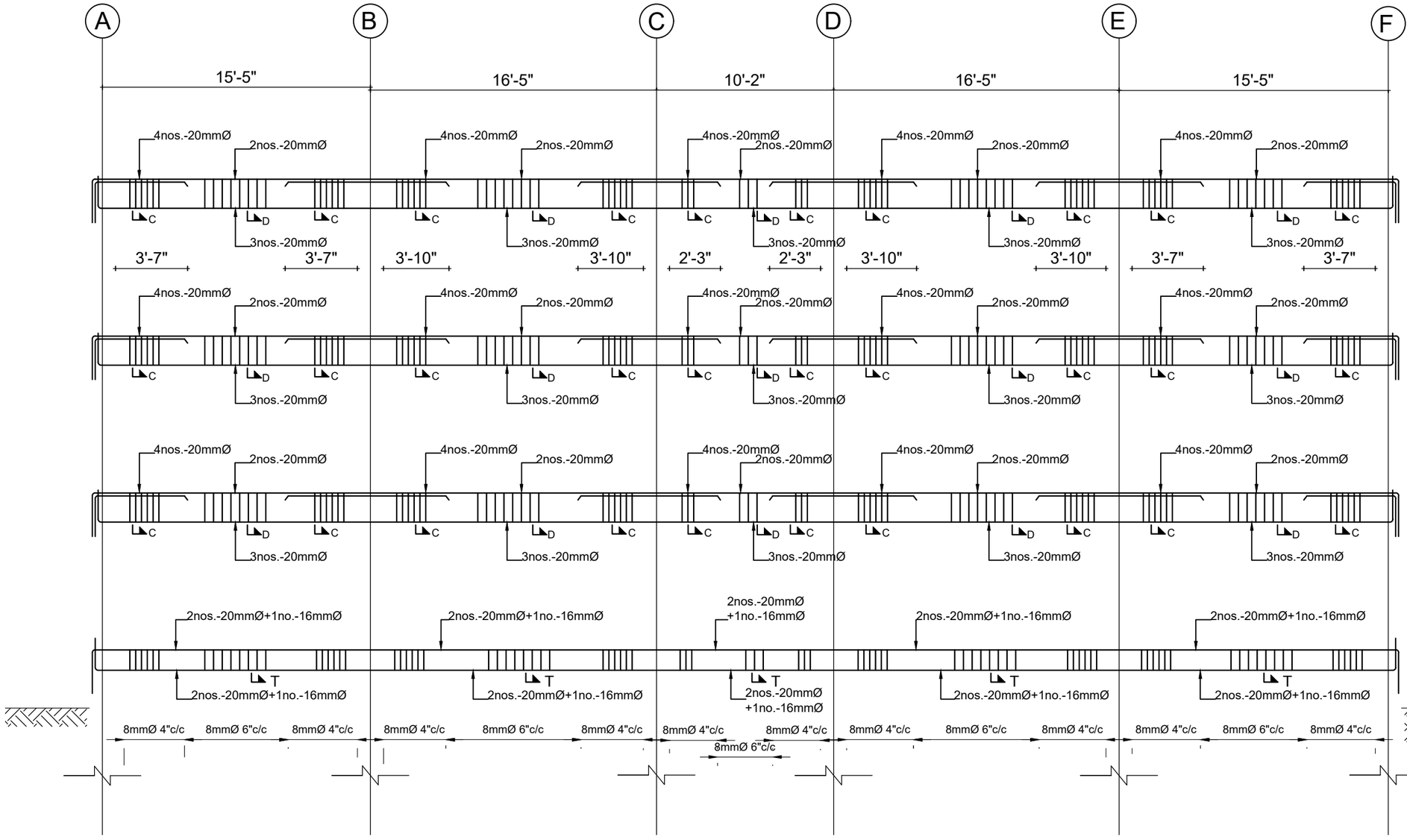
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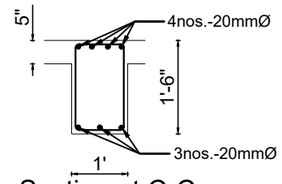


Section at T-T

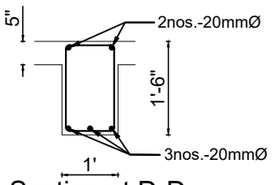
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OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS BEAM DETAILS	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	8
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

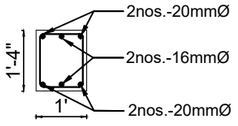




Section at C-C



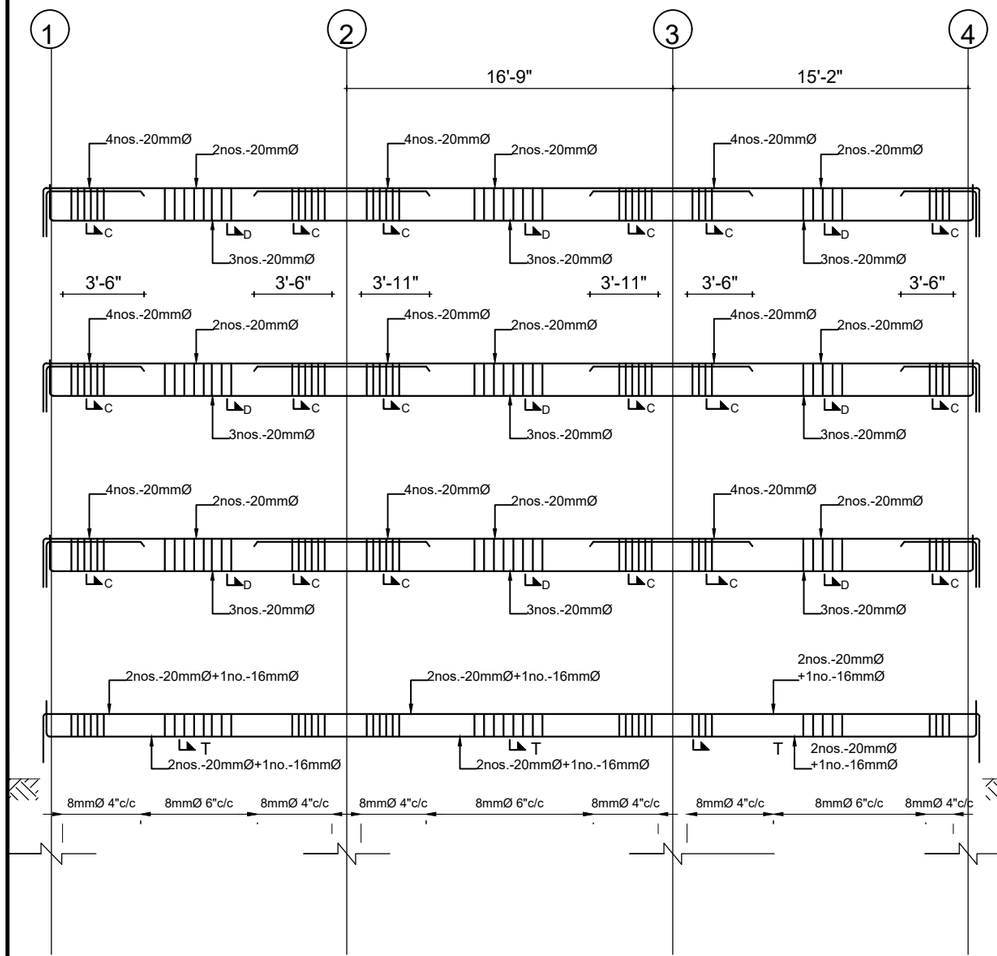
Section at D-D



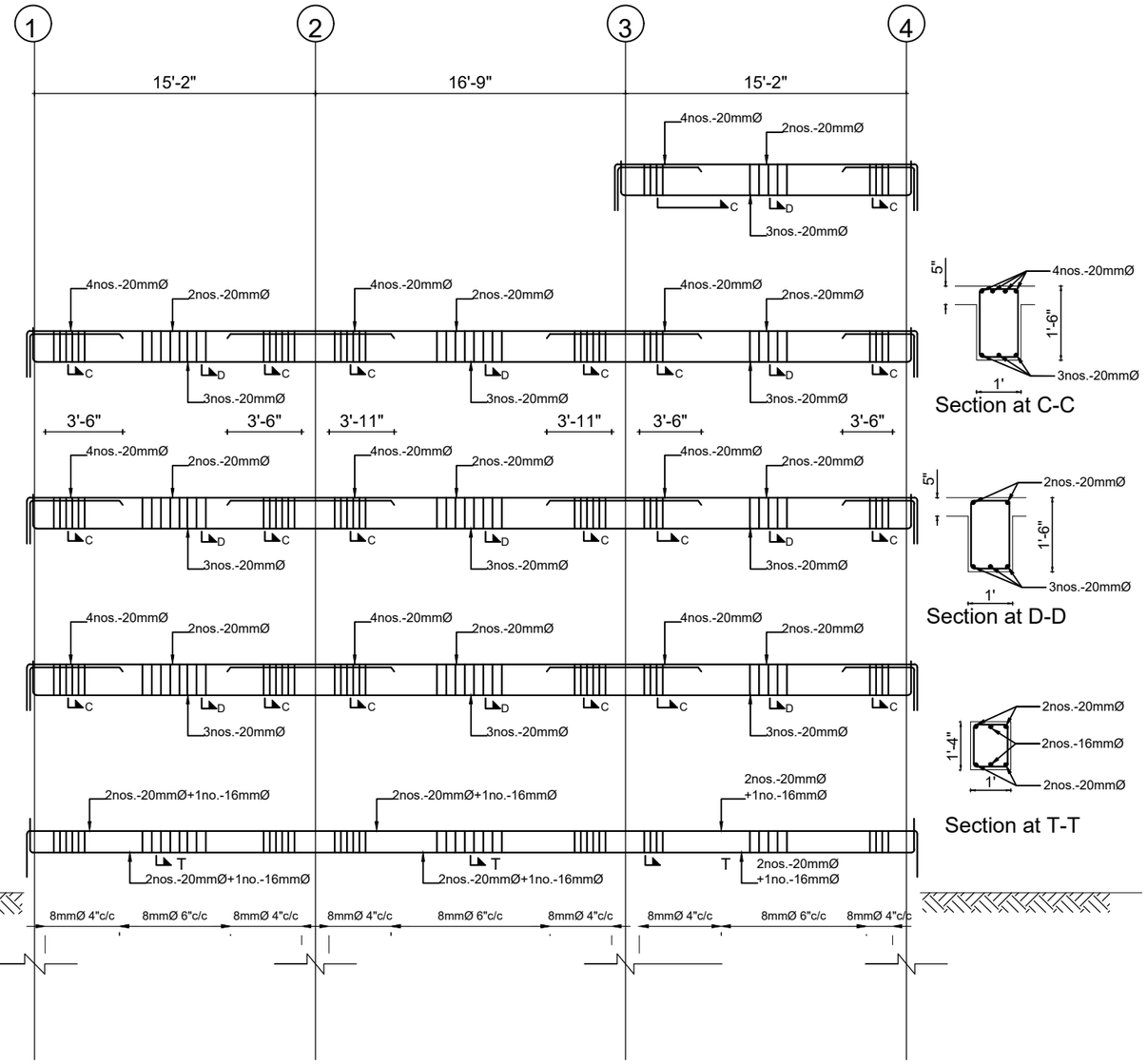
Section at T-T

BEAM GRID 1-1,2-2

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS BEAM DETAILS	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	9
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



BEAM GRID B-B, E-E



Section at C-C

Section at D-D

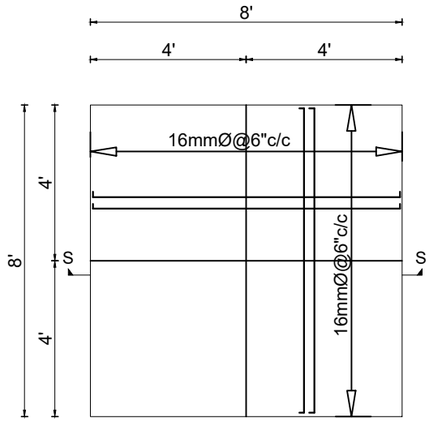
Section at T-T

BEAM GRID C-C,D-D

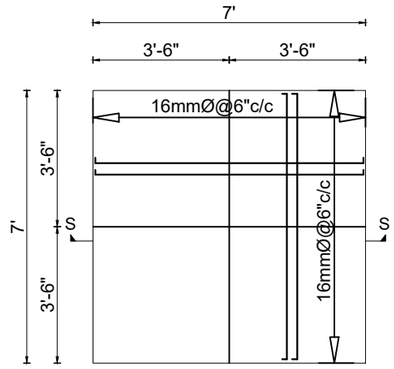
OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS BEAM DETAILS	Name:				Name:				0'-1" = 8'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	10
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						

FOOTING DETAIL

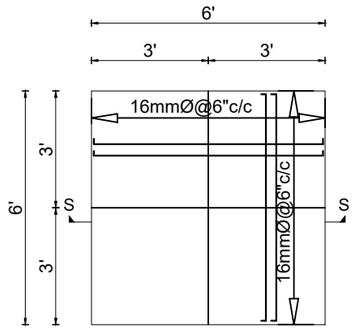
FOOTING (F1)		FOOTING (F2)		FOOTING (F3)	
SIZE	REINF. FOOTING NET	SIZE	REINF. FOOTING NET	SIZE	REINF. FOOTING NET
8'X8'	16 mmØ@6"c/c Both Way	7'X7'	16 mmØ@6"c/c Both Way	6'X6'	16 mmØ@6"c/c Both Way



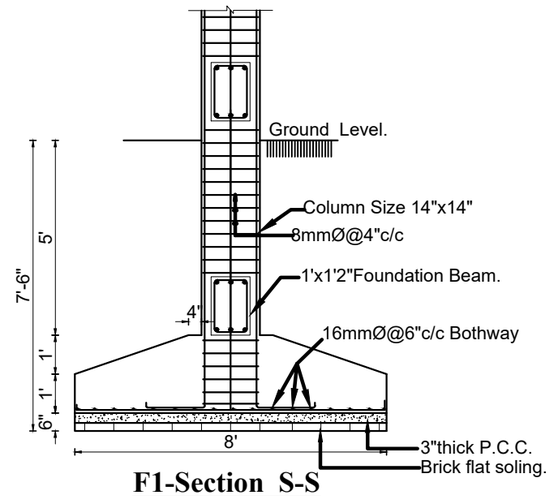
F1-FOUNDATION DETAIL



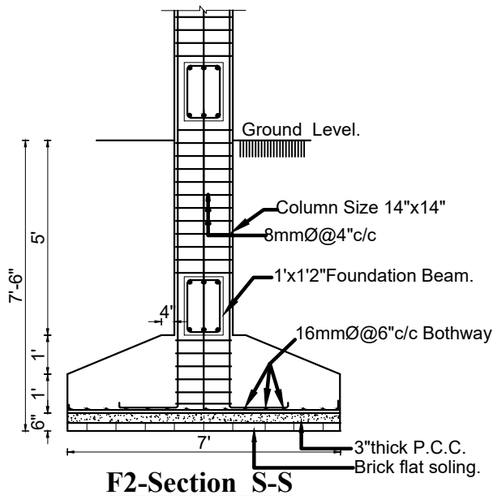
F2-FOUNDATION DETAIL



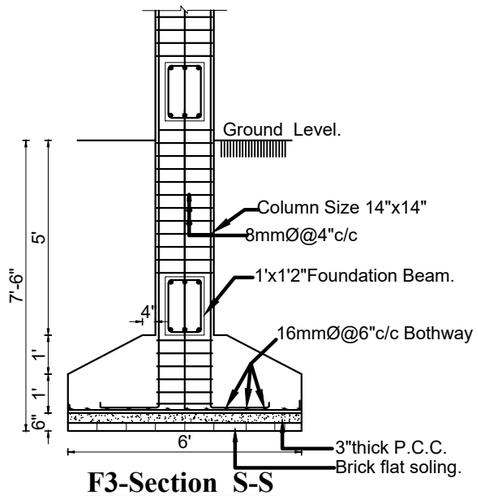
F3-FOUNDATION DETAIL



F1-Section S-S

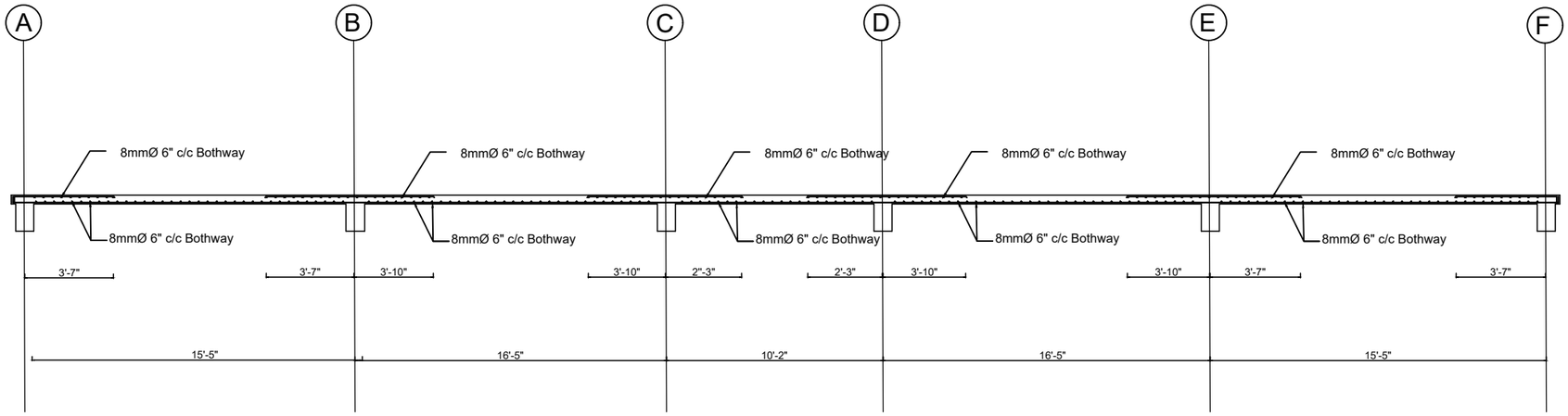


F2-Section S-S



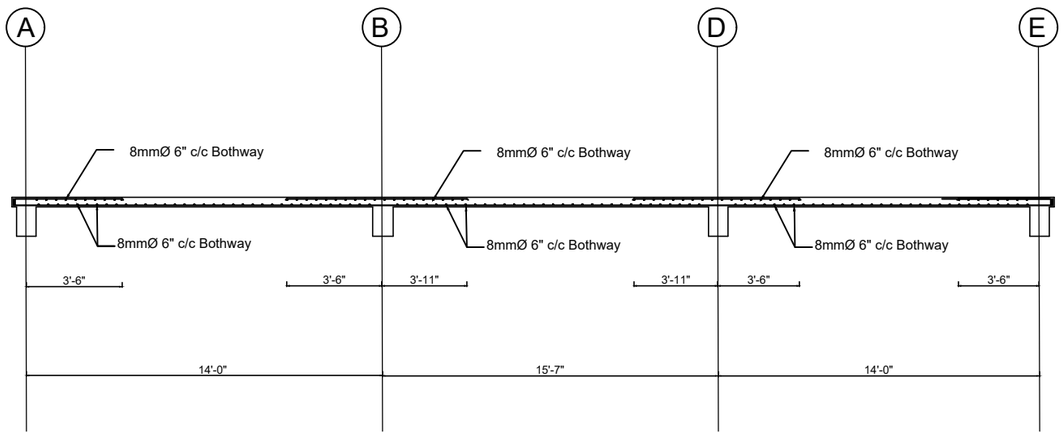
F3-Section S-S

OFFICE NAME	PROJECT NAME	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME	
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	STRUCTURAL DRAWINGS FOUNDATION DETAILS	Name:				Name:				0'-1" = 4'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.	11
			Designation:				Designation:						
			Signature:				Signature:						
			Date:				Date:						



SLAB SECTION AT S:S

SLAB THICKNESS = 5"



SLAB SECTION AT S1:S1

SLAB THICKNESS = 5"

OFFICE NAME	PROJECT NAME											
COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING SANOTHIMI, BHAKTAPUR	DETAILED A/E DESIGN OF NIRMAL LAMA POLYTECHNIC INSTITUTE BARDIWASH, MAHOTTARI	SENIOR STAFF QUARTER	Consultant	Designed By:		Approved By:	Dept. of Roads	Checked by:	Recommended by:	Approved By:	SCALE	CONSULTANT'S NAME
		STRUCTURAL DRAWINGS SLAB SECTIONS AND STAIRCASE DETAILS	Name:				Name:				0'-1" = 16'-0"	BEAM Consultant Pvt. Ltd. Sanepa, Lalitpur, Nepal.
			Designation:				Designation:					
			Signature:				Signature:					
			Date:				Date:					

COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING
(CTEVT)
SANOTHIMI, BHAKTAPUR

STRUCTURAL DRAWING

OF

SENIOR STAFF QUARTER

OF

NIRMAL LAMA POLYTECHNIC INSTITUTE
Bardiwash, Mahottari, Nepal
Contract Identification No: CTEVT/NLPI/083/84/NCB/Civil-01

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B. SPECIFICATION FOR CIVIL WORKS

B1. STANDARD CONSTRUCTION MATERIALS

1. WATER

Water for construction work shall not be salty or blackish and shall be clean drinking water, reasonably clear and free from objectionable quantities of silt and traces of oils, acid and injurious alkali, salts, organic matter and other deleterious material which will weaken the concrete. Water shall be obtained from the sources approved by the Engineer. Sources of water shall be maintained at such a depth and the water shall be withdrawn in such a manner as to exclude silt, mud, grass or other foreign materials. Containers for transport, storage and handling of water shall be clean.

2. CEMENT

Cement shall conform to I.S. 269-1976 / I.S. 8112-1989. The type of the cement as to whether it shall be ordinary Rapid Hardening or Low Heat shall be specified. When no type is specified, Ordinary Portland Cement shall be used.

The weight of Ordinary Portland Cement shall be taken as 1440 kg per cum and Rapid Hardening Portland Cement as 1210 kg per cum. The measurement of proportion of cement should normally be on the basis of weight and whole bags each undisturbed and sealed 50 kg. When part bag is required, cement shall be taken to see that each bag contain full quantity of cement.

Tests: when tests are considered necessary, they shall be carried out as indicated in I.S. 269-1958/I.S. 8112-1989. The contractor should ensure that the cement is of sound and required quality before using it.

Storage: cement required for use shall be as fresh as possible and stored on planks raised 15 to 20 cms above the storey and stacked 30 cms away from the walls in suitable closed weatherproof buildings at the work site or at the selected approved site in such a manner as to prevent deterioration by dampness or moist atmosphere or intrusion of foreign matter. Cement shall be stored in such a way as to allow the removal and use of cement in chronological order of receipt, i.e. first received being first used. Not more than 15 bags shall be stacked vertically in one pile and maximum width of the piles should not be more than 3 meters. Any cement which has deteriorated cracked or which has been damaged shall not be used. Cement concerning which there is doubt shall not be used pending testing and satisfactory results. Cement that is condemned shall be immediately removed from the work site. When temporarily stored in the open for use within 48 hours, it shall be kept on a platform of planks about 15 to 20 cm above ground and covered with a tarpaulin. Ordinary cement stored for more than 2 months from the date of receipt from the factory shall be subjected to test and used only if found satisfactory. The cost of test shall be borne by the Agency responsible for the storage after two months from receipt. Different kinds or brands of cement or cement of the same brand from different factory (mills) shall be stored in separate groups and shall not be mixed during use except when directed in writing by the Engineer. Cement shall be kept in a store under double locking arrangement so that it can be taken out or fresh stock admitted with the knowledge of supervising staff of the Works. A board indicating stock and daily transactions of cement shall be kept in each room of the cement store. The cement shall not be stored unduly long periods. It shall not be handled in such a way as to impair its strength or useful characteristics.

3. SAND

Sand shall consist of siliceous material having hard, strong, durable, uncoated particles, free from undesirable amounts of dust, lumbs, soft, or flaky particles or other deleterious substances. The amount of different undesirable substances shall not exceed the percentage limits by weight as specified in relevant I.S. Codes but in no case, the total amount of all undesirable substances shall exceed five percent by weight.

All fine aggregate (sand) shall conform to I.S. 383-1970.

Sand for use in concrete shall be natural sand. Sand shall be clean, well graded, hard, strong, durable and gritty particles free from injurious amounts of dust, clay, soft or flaky particles, shale, salts, organic matter, loam, mica or other deleterious substances and shall be approved by the

Engineer. When the quality of fine aggregate is doubtful, it shall be tested for clay, organic impurities and other deleterious substances as laid down in I.S. 383-1970.

The fine aggregate shall be of the sizes as specified below.

a. Cement concrete topping of thickness 40 mm and above - fineness modules between 2 and 3.

b. Cement concrete topping of thickness 10mm and above - fineness modules between 4 and 6.

4. REINFORCING BARS

Reinforcing steel shall be clean and free from loose millscales, dust, loose rust and coats of paints, oil, grease or other coating, which may impair or reduce bond. It shall conform to the following I.S. specifications.

1. Mild steel, Tor steel and medium tensile steel bars and hard-drawn steel wire conforming to IS:432, IS:456, latest revision.
2. Deformed bars conforming to IS:1139 latest revision.
3. Cold twisted steel bars ribbed Tor steel conforming to IS:1786 - latest revision.
4. Hard-drawn steel wire fabric conforming to IS:1566 - latest revision.
5. Structural steel section conforming to IS:226 - latest revision.

All steel reinforcement above 6mm diameter shall necessarily be of tested quality.

5. BRICKS

Bricks: Unless otherwise specified, burnt clay bricks shall conform to the requirement of I.S. 1077-1957. Specification for Common Burnt Clay Building Bricks and shall be first class quality. The bricks have been referred as local chimney made bricks and machine made brick for fair face. Bricks shall be of uniform deep red, thoroughly burnt, regular in shape and size and shall have sharp and square edges and parallel faces to ensure uniformity in the thickness of the courses of brick work.

Bricks shall be free from cracks, chips, flaws, stones or lumps of any kind. They shall be free from salt which effect the mortar of the masonry. Bricks shall not show any sign of efflorescence either dry or subsequent to soaking in water. Bricks shall be sound, hard, homogeneous texture and emit a clear ringing sound on being struck and water absorption shall be minimum. All bricks shall have to be approved by the Engineer/Resident Engineer. Any bricks not up to the specification must be removed from the site immediately at Contractor's own cost. Representative samples of bricks to be used shall be submitted to the Engineer and his approval taken before bulk purchase. The samples shall be kept with the Engineer for future reference and comparison. All bricks supplied shall conform to these approved samples in all respects.

Bricks shall not be dumped at site. They shall be stacked in regular layers even as they are unloaded. The supply of bricks shall be arranged that at least two weeks requirement of bricks are available at site at any time.

Bricks selected for different situation for use in the work shall be stacked separately.

6. COARSE AGGREGATE

Coarse aggregate shall consists of crushed or broken stone and be hard, strong, dense, durable, clean and of proper gradation and free from skin and coating likely to prevent proper adhesion of mortar. The aggregate shall generally be cubical in shape and as far as possible flaky, elongated pieces shall be avoided. It shall generally with the provision of I.S. 383-1970 and I.S. 515-1959. Unless special stones

from particular quarries are mentioned in the special provision, aggregates shall be broken from the best granite/quartzite/gneiss stones in that order available in the region and approved by the Engineer. Stone shall have no deleterious reaction with cement.

The coarse aggregate shall be of the following sizes:

a. Normal cement concrete of 100mm and above thickness - graded 20mm and below
b. Cement concrete topping thickness 40mm and above - graded from 12mm and below
c. Mass cement concrete of 500mm and above - graded 38mm and below

Aggregate other than crushed stone conforming to the provisions of this Specification may be used under special conditions, if permitted by the Engineer.

Grading tests shall be taken in the beginning and at change of source or material. Where required, by the Engineer, tests indicated in I.S. 383- 1970 and I.S. 456-2000 shall be carried out in an approved laboratory at the Contractor's cost to show the acceptability of the material.

Coarse aggregate of a porous nature where absorption of water after 24 hours immersion in water, is more than 5 percent by weight, shall not be used.

Limits of deleterious substances shall not exceed those prescribed in 2.3.1.1 and 2.3.1.2 of I.S. 515-1959.

The aggregates of different sizes shall be stored separately and handled in such a manner as to prevent intermixing of different sizes of aggregate required separately for grading purposes. No foreign matter shall be allowed to be mixed up with aggregates. If covered with dust etc. they shall be washed clean before use.

Sample of coarse aggregates required for the work shall be approved by the Engineer both regarding the quality and grading and shall be kept in the site office. The coarse aggregates to be used shall conform to these samples.

For controlled concrete, the aggregate shall be supplied in separate batches, consisting at least of coarse, medium and fine gradings. These will then be combined in proportions given by standard grading curves specified in relevant I.S. Codes. An average mix composition of 20mm (3/4") and 38mm (1.5") aggregates that will be obtained from the average standard aggregates grading curves is shown in Table - A.

Table - A

Type of Aggregate	Aggregate Size	Proportion Remarks of Total Mix. by Weight	Remarks
3/4" aggregate (20mm)	3/4" to 3/8" 3/8" to 1/4" Sand	61.5% 38.5% 35.0%	Passing 3/4" must 100%
1½" aggregate (38 mm)	1½" to 3/4" 3/4" to 3/8" 3/8" to 3/16" Sand	37.0% 16.0% 100.0% 34.0%	Passing 1 1/2" seive must be

Note: The above will NOT give a perfect grading. It can be expected, however, that the above grading will normally give good results.

Stone shall be hard, sound, far from decay, durable, tough, free from cracks and decaying. Stones with process matter or with boulder skin shall be rejected. It should be gravels / quartzite / gneiss stone in that order a preferably of similar quality and strength. It should in no case shall have any deleterious reaction with cement.

7. TIMBER

Quality: Timber to be used for the work shall be from the heart of a sound tree of mature growth, the sapwood being entirely removed. It shall be uniform in substance straight in fibre, free from large, loose,

dead or cluster knots, flaws, shakes, warp, cup, spring, twist bends or defects of any kind. It should be free from spongy, brittle flaky or brushy condition.

All timber shall be seasoned and be free from decay, rot, harmful fungi and insect attacks and from any other damage or harmful nature which will effect the strength durability, appearance or its usefulness for the purpose for which it is required.

Colour: The colour shall be uniform as far as possible, the darkness of colour amongst coloured species of timber being generally a sign of strength and durability.

Kind: The timber shall be of best from the locally available quality timber as specified in the item. The samples of the approved timber to be used shall be deposited in the office of the Engineer.

Moisture Content: The maximum permissible moisture content for timber shall be 12 percent of dry weight of timber.

Timber for the work shall not be brought until seen and approved by the Engineer, who may reject defective timber which shall be immediately removed from the site of work. Any effort like plugging painting, using, any adhesives or resinous materials to hide defects shall render the pieces, rejectable by the Engineer. Timber prepared for inspection shall be clean and free from dust and paint or other material which may conceal the defects.

Sawing: All scantlings shall be sawn in straight lines and plains and of uniform thickness and of full measurement from end to end and shall be sawn in the direction of the grain. They shall be sawn with such sufficient margin as to secure specified dimensions, lines and planes after being wrought.

Maximum slope of grain shall range between 1 in 10 and 1 in 20.

Any timber rejected shall at once be removed from site of work.

8. GLASS

All glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes, blisters and other defects. The kind of glass supplied by the contractor shall be as mentioned in the item or in the special provision or as shown on the detailed drawings.

When plate glass is specified, it shall be "polished patent plate glass" of the best quality. It shall have both the surfaces ground flat and parallel and polished to obtain clear undistorted vision and reflection. The plate shall be of the thickness mentioned in the item, shown in the detailed drawings or specified in the special provisions. In the absence of any specified thickness the thickness of the plate glass to be supplied shall be 5.5 mm. A tolerance of $\pm$ 0.5 mm shall be admissible on the nominal thickness of polished plate glass.

9. WOOD/VENEER

Ply wood/veneer shall be of 3 or 5 or 7 ply. All such ply wood shall be pressed properly to the required degree and to the required uniformity. They shall be of approved pattern and shall conform to I.S. 1328-1959.

Defective ply wood/veneer either the damaged corner or edge or by defective pressing shall not be used at all.

Storage of such boards shall be done in uniform layer above storey level in a dry platform. No edge shall be contacted with wall while storing.

10. STEEL SECTIONS

Structural steel section shall be as per IS specification and steel tubes used in the truss shall be hot finished tubes confirming to the requirements of specified in IS 1161 - 1968 and IS 807 - 1968. Tubes shall be of grade heavy or medium unless instructed.

11. STONES

The stone shall be of approved quality, sound, hard, dense and durable, free from segregation, seams, cracks, weathered portion and other structural defects as imperfections tend to affect their soundness and strength. The stone shall be compact grained and uniform in texture and color. The stones shall be free from rounded, wash or weathered surface or skin or coating which prevents the adherence of mortar. The stone shall be free from decay, flaws, veins and holes. The stone shall have a crushing strength of at least 100 kg/sq.cm.

The stone shall stand weathering well and when immersed in water for 24 hours shall not absorb more than 5 % of its dry weight.

The surface of freshly broken stone shall be bright, clean, sharp and shall have uniformity of texture without loose grains and be free from any dull chalky or earthy appearance. Stones showing molted color shall not be used for face work.

The stones shall be kept free from dust, dirt, oil and other injurious materials which may attack the stone or mortar and prevent adhesion of mortar.

Stones shall be properly seasoned by exposure to air before they are put into the structure, as stones increase in durability after quarrying especially limestones, sand stones and laterites. Stones newly quarried contain quarry sap and can more easily be worked in this condition.

Stones to be used as headers, pin headers quoin, copings etc. shall comply with the size and shape stipulated under the relevant item.

Different categories of stones such as face stones, headers, quoins etc. shall be collected in advance to suffice at least a month's requirements and shall be stacked separately category wise.

12. PAVING MATERIALS

12.1 Terrazzo Tiles

The terrazzo precast tiles of 300 mm x 300 mm size shall be from the standard manufacturers such as Siddico, Kathmandu Mosaic Tile or superior either prefinished or unfinished as per the requirements. The shape and size shall be true and perfect. The color shall be uniform and homogeneous.

13. PAINTING MATERIALS

Varnish, synthetic enamel paint, acrylic emulsion paint, waterproof cement paint, primers, distemper etc. shall be from new tins of reputed manufacturer like Asian Paints, Jenson and Nicholson, British Paints (India) Ltd., Snowcem, Berger, ICI Paints or equivalent as approved by the engineer.

B2. CONSTRUCTION WORKS

EARTH WORK

1. SCOPE

This specification covers the earth work in excavation for all types of foundation wet or dry.

2. CLEARING SITE

The site on which the structure is to be built as shown on the plan and the area required for setting out and other operations should be cleared and all obstructions, loose stones, materials and rubbish of all kinds, stumps, brush wood and trees removed as directed, roots being entirely grubbed up. The materials obtained will be the property of the Government and materials pronounced useful by the consultant will be conveyed and properly stacked as directed within the specified lead. Useless materials shall be burnt or otherwise disposed off as directed by the Engineers.

3. SETTING OUT

After clearing the site, the centre lines shall be given by the Engineers and it will be the responsibility of the Contractor to install substantial reference marks, bench marks etc. and maintain them as long as required true to line, curve, slopes and level. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the work. Labour, material etc. required for setting out and establishing Bench Marks and other reference marks shall be arranged by the Contractor at his own cost.

4. EXCAVATION

Foundation excavation shall include removal of all materials of whatever nature and whether wet or dry, necessary for the construction of foundation and substructure exactly in accordance with the lines, levels, grades and curves as shown on the plans or as directed by the Engineers. It shall be taken to the exact width of the lowest step of the footing and the sides shall be left plumb where the nature of soil admits it. Unless there is a specific extra provision in the contract for shoring or for cutting side slopes, contractor shall at his own cost do the necessary shoring or cutting of slopes to a safe angle or both as approved by the Engineers, when the strata need such treatment. The contractor shall notify the Engineers before starting excavation to enable him to take cross sectional level for purposes of measurements before the ground is disturbed.

5. PREPARATION OF FOUNDATION FOR FOOTING

The bottom of foundation shall be leveled both longitudinally and transversely or stepped as directed by the Engineers. Before footing is laid final surface shall be slightly watered and rammed. If any soft patches come to light on inspection or ramming, these shall be dug out and dealt with a directed by the Engineers. No filling shall be allowed to bring the foundation to level. If by contractor's mistake, excavation is made deeper than shown on the plans or ordered by the Consultant, the extra depth shall be made up with concrete or masonry of the foundation grade as directed by the Engineers, and at the cost of the contractor. All rock or other hard foundation shall be cleaned of all soft and loose material and out to a firm surface, either level, stepped or serrated as directed by the Engineers. The elevation of the bottom of foundation shown on the plan shall be considered as approximate only and the Consultant may order such changes in the dimensions and elevations of the foundation as may be deemed necessary to secure satisfactory foundation.

After each excavation is completed, the contractor shall notify the Engineers to that effect and no footing shall be allowed to be laid until the Engineers has approved the depth and dimensions of excavation and nature of the foundation material and the levels and measurements are recorded.

6. SHORING

Unless separately provided for in the contract, excavation of slopes to prevent falling in of sides or providing, fixing, maintaining and removing shoring, bracing etc. shall not be paid for. The Contractor shall be responsible for the design of shoring of sufficient strength to resist side pressure and ensure safety from steps and blows and to prevent damage to work and property and injury to persons. It shall be removed as directed after all the items for which it is required are completed.

7. PROTECTION

Near towns and all frequented places foundation pits, well pits and similar excavation shall be strongly fenced and marked with red lights at night placed in charge of watchman to avoid accidents. Adequate protective measures shall be taken to see that the foundation excavation does not affect or damage adjoining structures. All measures required for the safety of the excavation, the people working in and near the foundation trenches, property and the people in the vicinity shall be taken by the Contractor at his own cost, he being entirely responsible for any injury to life and damage to property caused by his negligence or accident due to his constructional operations.

8. DISPOSAL OF EXCAVATED MATERIALS

No materials excavated from the foundation trenches of whatever kind they may be, are to be placed even temporarily nearer than 1.5 meters or greater distance as directed by the Engineers from the outer edge of excavation. All materials excavated will remain the property of the Owner. Rate for excavation includes sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for back filling or other use shall be stacked in convenient places but not in such a way as to obstruct free movements of men, animals and vehicles or encroach on the area required for constructional purposes. It shall be used to the extent required to completely backfill the structure to original ground level or the elevation shown on the drawings or as directed by the Engineer. For backfilling, the materials shall be placed in 15 to 20 cm layers, moistened and well compacted. Materials not useful in any way shall be thrown as directed by the Engineers. If useful excavated rubble is required by the Contractor for the use in other items, it shall be paid for at the rate fixed in the tender and if not so provided, at the rate at which both parties mutually agree. The site shall be left clean of all debris on completion.

9. DEWATERING

Unless specially provided for as a separate item in the Contract, the excavation rate shall include pumping out all water which may accumulate in the excavation during the progress of the work either from seepage, springs, rain or any other cause and diverting surface flow if any, by bonds or other means. The bonds shall be removed after their purpose is served.

Pumping water from any foundation enclosure or trenches shall be generally in such a manner as to preclude the possibility of any damage to the foundation trenches, concrete or masonry or any adjacent structures. The excavation shall be kept free form water (i) during inspection and measurement, (ii) when concrete and / or masonry are in progress and till they come above the natural water level and (iii) till the consultant considers that the mortar is sufficiently set.

10. SLIPS AND BLOWS

If there are any slips or blows in the excavation, they shall be removed by the Contractor without any extra cost so as to provide correct dimensions required for the foundation.

11. BACK FILLING

All timber work and form work shall be removed after their necessity ceases and trash of any sort shall be cleaned out from the excavation. All space between foundation masonry or concrete and the sides of excavation must be refilled to the original surface with approved materials, in layers of 15 to 20 cm in thickness, watered and rammed to compact.

The filling shall be done after concrete or masonry is fully set and done in such a way as not to cause undue thrust on any part of the structure. Where suitable excavated material is to be used for refilling, it shall be brought from the place where it was temporarily deposited and used in refilling.

12. TYPES OF EXCAVATION

12.1 Ordinary Soil

Soils of all sort, sand, loose gravel, soft clay, black soil and other similar soft or loose materials etc. shall include all materials of earthy or sandy nature which can be easily ploughed or small shingle or gravel which can be easily removed.

12.2 Conglomerate

Gravel mixed soil / hard soil which is to be excavated by the help of pick, Jumper and lifted or removed by the help of shovel.

12.3 Rock / Hard Rock

Large boulder / stone or pebbles formally jointed / cemented which need chisel to brake / excavate.

13. RATE

The rate for the item of excavation shall include the following:

a) Cleaning site.
b) Setting out works, profiles etc. according to the sanctioned plan or as ordered by the Engineers and setting up Bench Marks and other reference marks.
c) Providing and subsequently removing shoring and shuttering or cutting slopes except when separately provided for in the Contract.
d) Bailing and pumping out water when separate provision does not exist for in the contract.
e) Excavation and removal of all materials of whatever nature dry or wet and necessary for the construction of foundation including materials like explosives, removal of blows and slip sand use of tools, plant and equipment necessary for satisfactory completion of the items and preparing bed for foundation.
f) Sorting out of useful excavated materials, conveying them up to the specified lead clear beyond the structure and stacking them neatly for backfilling or reuse and disposing useless materials as directed by the Engineers.
g) Backfilling the trenches alongside masonry or concrete with approved material up to the natural ground level.
h) Necessary protection including labour, materials and equipment to ensure safety and protection against risk or accident.
i) Supply of facilities for inspection and measurement at any time by the Engineers.
j) Compensation for injury of life and damage to property if any caused by the Contractor's operation connected with this item.
k) Small drill holes to explore the nature of substratum if necessary.

14. MEASUREMENT AND PAYMENT

The payment for respective class of excavation shall be made at the Contract rate per cubic meters (cubic foot) for the quantity acceptably excavated, limited to the dimension shown in the sanctioned

plan or as directed by the Engineer. The excavation to dimension in excess of the above shall not be measured nor paid for and if so ordered by the Engineers the Contractor shall have to fill up the excess depth with cement concrete or masonry of foundation grade without extra payment.

Driving of sounding bars or inserting small drill holes to explore the nature of substratum up to a total length of 1 meter distributed in 2 or 3 places in each foundation if necessary shall be considered incidental work and shall not be paid for separately.

Removal of slips and blows in the foundation trenches shall not be measured nor paid for. If it is necessary in the opinion of the Engineer to carry foundation below the levels shown on the plans, the excavation for the first 1.5 meters of the additional depth shall be included in the quantity for the particular classification at the tendered rate. The excavation below this additional depth of 1.5 meters shall be paid for as extra work at rate to be decided under general conditions of Contract unless the contractor is willing to accept payment at tendered rates. For all depths less than the designed depth plus 1.5 meters the excavation shall be paid for at tendered rates.

Dimension shall be measured nearest to one centimeter and individual quantity shall be calculated correct to two places of decimals of a cubic meter.

CEMENT CONCRETE WORK FOR GENERAL USE

1. SCOPE

This specification deals with the cement concrete, plain or reinforced for general use of specified proportion and flooring (I.S. Code of Practice IS:456 latest revision to be complied with unless permitted otherwise hereinafter).

2. MATERIALS

All required materials shall be as specified in "STANDARD CONSTRUCTION MATERIALS"

Admixtures: The use of admixtures in concrete for promoting workability improving strength, entraining air or for any other purpose may be used only with the prior approval of the Engineer.

3. GRADES OF CONCRETE

a. General:

Structural concrete shall be either ordinary or controlled and in three grades designated as M15, M20 and M25, as specified in IS:456 - latest provision.

Ordinary Concrete:

Ordinary concrete is recommended only when accurate control is impracticable and not necessary. However, if ordinary concrete is allowed by the Engineer, it shall be used only in the concrete of Grades M15, M20 and M25. Ordinary concrete does not require preparation of trial mixes.

Concrete mix proportions for ordinary concrete shall be as per IS:456 - latest revision - and as follows:

Mix Proportions (By Weight) Expected to Give Different Degrees of

Workability with Different Water Cement Ratios and A

Specified Strength

(For Guidance)

Workability	Water Cement Ratio	Compressive Strength in 28 days kg/cm²	Ratio by Weight of Cement to Gravel Aggregate		Ratio by Weight of Cement to Crushed Stone Aggregate	
			20 mm size	38 mm size	20 mm size	38 mm size
Very low	0.4	360	1:4.8	1:5.3	1:4.5	1:5.0
Slump	0.5	290	1:7.2	1:7.7	1:6.5	1:7.4
0-25 mm	0.6	220	1:8.5	1:8.6	1:7.8	1:8.4
	0.7	160	1:9.0	1:9.0	1:8.7	1:8.9
Low	0.4	360	1:3.9	1:4.5	1:3.5	1:4.0
Slump	0.5	290	1:5.5	1:6.7	1:5.0	1:5.5
25-50 mm	0.7	160	1:8.0	1:8.5	1:7.4	1:8.0
Medium	0.4	360	1:3.5	1:3.8	1:3.1	1:3.6
Slump	0.5	290	1:4.8	1:5.7	1:4.2	1:5.0
50-100 mm	0.7	160	1:6.8	1:7.9	1:6.2	1:7.0
High	0.4	360	1:3.2	1:3.5	1:2.9	1:3.3
Slump	0.5	290	1:4.4	1:5.2	1:3.9	1:4.6
100-175 mm	0.6	220	1:5.4	1:6.7	1:4.7	1:5.7
	0.7	160	1:6.2	1:7.4	1:5.5	1:6.5

Notwithstanding anything mentioned hereinbefore, the maximum total quantity of aggregates by weight per 50 kg of cement shall not exceed 450 kg except where otherwise specifically permitted by the

Engineer.

The minimum cement content for each grade of concrete shall be as follows:

Grade of Concrete	Minimum Cement Content per Cum of Finished Concrete
M 15	325 kg.
M 20	360 kg.
M 25	420 kg.

At least four trial batches are to be made and six test cylinders/cubes taken for each batch noting the slump on each mix. These cylinders/cubes shall be tested in a testing laboratory approved by the Engineer at 7 days and others at 28 days for obtaining the ultimate compressive strength. The test reports shall be submitted to the Engineer. The cost of the mix design and testing shall be borne by the Contractor.

On the basis of the above test reports, proportion of mix by weight and water-cement ratio will be approved by the Engineer, the proportions so decided for different grades of concrete shall be adhered to during all concreting operations. If, however, at any time, the Engineer feels that the quality of the materials being used, has been changed from those used for preliminary mix design, the Contractor shall have to run similar trial mixes design, the Contractor shall ascertain the mix proportions and water-cement ratio for obtaining the desired strength and consistency. It will be within the competency of the Engineer to reduce the number of trial batches and the number of test specimens mentioned above.

The mixes once approved must not be varied without prior approval of the Engineer.

In designing the mix proportions of concrete, the quantity of both cement and aggregate shall be determined by weight. The Engineer may allow the quantity of aggregates to be determined by equivalent volume basis after the relationship between the weight and volume is well established by trial and the same shall be verified frequently. Water shall be either measured by volume in calibrated tanks or weighted.

All measuring equipments shall be maintained in a clean and serviceable condition and their accuracy periodically checked.

To keep the water-cement ratio to the designed value, allowance shall be made for the moisture content in both fine and coarse aggregates and determination of the same shall be made as frequently as directed by the Engineer. The determination of moisture contents shall be according to IS: 2386 (Part III) - (latest revision).

4. STRENGTH REQUIREMENTS

Where ordinary portland cement conforming to IS: 269 - latest revision or Portland cement-Furhance Slag cement conforming to IS: 455 - (latest revision) is used, the compressive strength requirements for various grades of concrete shall be as shown in Table - IV and shall apply to both controlled concrete and ordinary concrete.

The acceptance of strength of concrete shall be as per clause 5.4 "Sample size and Acceptance Criteria" of IS: 456 - latest revision subject to the stipulations and/or modifications stated elsewhere in this specification.

Concrete work found unsuitable shall have to be dismantled and replacement to be done as per specification by the Contractor. No payment for the dismantled concrete, the relevant formwork and reinforcement embedded fixtures, etc shall be made. In course of dismantling, if any damage is done to the embedded items or adjacent structures, the same shall be made good free of charge by the Contractor to the satisfaction of the Engineer.

Compressive strengths for different grades of concrete as specified in Table - IV shall always refer to the cylinder/cubes strength based on test conducted on 15 cm diameter and 30 cm height.

Other requirements of concrete strength as may be desired by the Engineer shall be in accordance with IS:456 - (latest revision).

In exceptional circumstances, the Engineer may accept a concrete of lower strength than specified and which is otherwise unacceptable according to the "Acceptance Criteria" of IS:456 - (latest revision), provided the strength is never less than 80% of the specified strength. All concrete having a strength less than 80% of that specified shall always be rejected. Payment for concrete of lower strength than specified but accepted by the Engineer shall always be made at a reduced rate on prorata basis to the strength obtained.

Strength Requirement of Concrete

Grade of Concrete	Compressive strength of 15 cm. diameter and 30 cm. high cylinder or 15 cm cube at 28 days after mixing, conducting in accordance with IS: 456 - latest revision	
	Preliminary tests N/mm^2	Work test N/mm^2
M 15	20	15
M 20	26	20
M 25	32	25

With permission of the Engineer, for any of these above mentioned grades of concrete shall also be increased proportionately to keep the ratio of water to cement same as adopted in trial mix design for each grade of concrete. No extra payment for the additional cement will be made.

5. WORKABILITY

The workability of the concrete shall be checked at frequent intervals by slump test. Where facilities exist and if required by the Engineer, alternatively, the compacting factor test in accordance with IS: 1199 - (latest revisions), shall be carried out. The degree of workability necessary to allow the concrete to be well consolidated and to be worked into the corners of formworks and around on the type and nature of structure and shall be based on experience and tests within the preferred limits of consistency as specified in Table below for various types of structures.

Limits of Consistency

Degree of Workability	Slump in mm		Use of which concrete is suitable
	Min	Max.	
Low	20	40	Mass concrete foundations without vibrations, simple reinforced section with vibration.
Medium	50	100	Normal reinforced beams, columns, slabs without heavily reinforced section with vibration.
High	100	150	Section with congested reinforcement not normally suitable for vibration.

Note: However, the slump to be obtained for work in progress shall be as per direction of the Engineer.

6. WORKMANSHIP

a. General: All workmanship shall be according to the latest and best possible standards.

Concrete:

i Mixing of Concrete:

The proportion of fine and coarse aggregate, cement and water shall be as determined by the preliminary tests or according to fixed proportions in case of ordinary concrete and shall always be approved by the Engineer. The quantities of fine and coarse aggregates shall be determined by weight. The water shall be measured accurately after giving proper allowance for surface water present in the aggregates for which regular check shall be made by the Contractor. Due allowance shall be made for bulking in case of volume batching in accordance with I.S. 2386 (Part III) - (latest revision).

Concrete shall be always mixed in a mechanical mixer unless specifically approved by the Engineer for concrete to be used in unimportant structure. The water shall not be poured into the drum of the mixer until all the cement and aggregates constituting the batch are already in the drum and mixed for at least

one minute. Mixing of each batch shall be continued until there is a uniform in colour and consistency, but in no case shall mixing be done for less than two minutes and at least forty revolutions after all the materials and water are in the drum. When absorbent aggregates are used or when the mix is very dry, the mixing time shall be extended as may be directed by the Engineer. Mixer shall not be loaded above their rated capacity as this prevents thorough mixing.

The entire contents of the drum shall be discharged before the ingredient for the next batch are fed into the drum. No partly set or remixed or excessively wet concrete shall be used and it shall be immediately removed from site.

Each time the work stops, the mixer shall be thoroughly cleaned and when the next mixing commences, the first mix shall have 10% additional cement at no extra cost to the Employer to allow for loss in the drum.

When hand mixing is permitted by the Engineer for concrete to be used in unimportant structures, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. In case of hand mixing, extra cement @ 10% shall be added to each batch with no extra cost to the owner.

ii Conveying Concrete:

Concrete shall be handled and conveyed from the place of mixing to the place of final deposit as rapidly as practicable by approved means before the initial setting of the cement starts. Concrete should be conveyed in such a way as will prevent segregation or loss of any of the ingredients. If segregation does occur during transport, the concrete shall be remixed. During the very hot or cold weather, if directed by the Engineer concrete shall be transported in deep containers which will reduce the rate of loss of water by evaporation and loss of heat. Conveying equipment for concrete shall be well maintained and thoroughly cleaned before commencement of concrete mixing. Such equipment shall be kept free from set concrete.

iii Placing Concrete:

Form work and reinforcement shall be approved in writing by the Engineer prior to placing of concrete. Concrete shall be placed in its final position without segregation. The forms shall be well wetted and all shavings, dirt and water that may have collected at the bottom shall be removed before concrete is placed. The interval between adding the water to the dry materials in the mixer and the completion of the final placing inclusive of compaction of the concrete shall be not more than initial setting time of the cement, normally 30 minutes for ordinary portland cement. The concrete shall be well placed in the form work by means approved by the Engineer and shall not be dropped from a height or handled in a manner which may cause segregation. Any drop above 180 cm shall have to be approved by the Engineer. Once the concrete is placed in its final position, it shall not be disturbed. After the concrete has been placed, it shall be spread and thoroughly compacted by approved mechanical vibration to a maximum subsidence without segregation and thoroughly worked around reinforcement or other embedded fixtures into the correct form and shape. Vibration shall not be used for pushing and shoveling concrete. Vibrator must be operated by experienced men and over vibration shall not be permitted. Hand tamping in some cases may be allowed subject to the approval of the Engineer.

No concrete shall be placed in open, while it rains. If there has been any sign of separation of cement and sand by washing, the concrete shall be entirely removed immediately. Suitable precautions shall be taken in advance to guard against rains before leaving the fresh concrete at site. No accumulation of water shall be permitted on freshly laid concrete. Slabs, beams and similar members shall be poured in one operation normally. Bleeding of under layer, if any shall be effectively removed. Moulding, throating, drip coarse, etc. shall be poured as shown on the drawing or as directed by the Engineer. Holes shall be provided and bolts sleeves, anchors fastenings or other fixtures shall be embedded in concrete as shown on the approved drawings or as directed by the Engineer. Any deviation there from the drawing shall be set right by the Contractor at his own expense as instructed by the Engineer.

iv Construction Joints:

When the work is to be interrupted, the concrete shall be rebated at the joint to such shape and size as may be required by the Engineer or as shown on the drawing. All vertical construction joints shall be

made with step boards, which are rigidly fixed and slotted to allow for the passage of the reinforcing steel. If desired by the Engineer keys and/or dowel bars shall be provided at the construction joints. In the case of water retaining structure water stops of approved material shall be provided if so specified in the drawings or desired by the Engineer. Construction joints shall be provided in positions as described, the joints shall be in accordance with the followings:

In a column, the joint shall be formed about 75mm below the lowest soffit of the beams framing into it.

Concrete in a beam shall be placed throughout without a joint, but if the provision of a joint is unavoidable, the joint shall be vertical and at the middle of the span. A joint in a suspended floor slab shall be vertical at the middle of the span at right angle to the principal reinforcement. The locations of construction joint shall be planned by the contractor well in advance of pouring and will have to be approved by the Engineer.

Before fresh concrete is placed, the cement skin of the partially hardened concrete shall be thoroughly removed and surface made rough by hacking, sand blasting, water jetting, air jetting or any other method as directed by the Engineer. The rough surface shall be thoroughly wetted for about two hours and shall be dried and coated with 1:1 freshly mixed cement sand slurry before placing the new concrete. The new concrete shall be worked against the prepared surface before the slurry sets. Special care must always be taken to see that the first layer of concrete placed after a construction joint is cold. Joints during pour shall be treated with 1:1 freshly made cement sand slurry only after removing all loose materials.

v Protection and Curing of Concrete:

Newly placed concrete shall be protected by approved means from rain, sun and wind. As soon as the concrete has hardened sufficiently for the surface to be marked, it shall be covered either with sand, hessian, canvas or similar materials and kept continuously wet for at least fourteen days after final setting. This period may be extended at the discretion of the Engineer.

vi Control Tests on Concrete:

Six test cylinders/cubes for each type of work shall be taken by the Contractor for each 8 hours or less of concreting. If the value of concrete poured is less than 20 M3 on any day per mixing plant, the Engineer may exempt or reduce the number of test cylinders. The samples of concrete, shall be tested in an approved laboratory in presence of the Engineer and the test results shall be submitted in triplicate to the Engineer. The Contractor shall carry out the sampling and testing according to the provisions of this Specification at his own cost. No payment shall be made for the concrete used in specimens.

To control the consistency of concrete from every mixing plant, slump tests shall be carried out by the Contractor free of charge every two hours or as directed by the Engineer. The amount of mixing water shall not be changed without prior approval of the Engineer. Slumps corresponding to the test cylinders shall be recorded for reference. The Engineer if he so desires may order special tests to be carried out on cement, sand or coarse aggregates, water reinforcing steel, or traverse tests in accordance with I.S.I. recommendations. If the material tested is found to be suitable for the intended use, the cost of these special tests shall be borne by the Owner. If the material is found to be not suitable for the intended use, the cost of these special tests shall be borne by the Contractor. Further, during the progress of the work if the Engineer has doubt about the quality of any material in use he can instruct suspension of its use till the material is proved acceptable by test. Any consequent loss arising out of the suspension shall be borne by the Contractor.

b. Exposed Surface

Interior: - Imperfect surface, where strength is not required shall be patched and rubbed smooth with carborundum stone. Immediately the formwork is stripped off, fins and projections shall be removed and the concrete surface affected thereby shall be rubbed smooth to the satisfaction of the Engineer.

c. Anchor Bolts, Anchors, Openings, Sleeves, Insert and Other Built-in Fixtures

The Contractor shall leave all openings, grooves, chases etc. in concrete work as shown on the drawings or as specified by the Engineer. He shall build into concrete work all the materials noted below and shall embed and secure the same as and when required. The material is required to be supplied

by the Contractor, shall be of best quality available of approved manufacture and shall be up to the satisfaction of the Engineer.

Materials to be embedded:

I Inserts, hangers, anchors, opening frames, manholes, covers, floor clips, sleeves and conduits.
ii Anchor bolts and plates for machinery, equipment and for structural steel work.
iii Dowels bars, etc. for concrete work falling under scope of future works.
iv Lugs or plugs for door and window frames occurring in concrete work.
v Flashing and jointing in concrete work.
vi Any other built-in-fixtures as may be required.

Correct location, exact alignment, etc. of all these shall be entirely the responsibility of the Contractor.

d. Joints etc.

i. Expansion and Isolation Joints:

Expansion joints in concrete structures shall be provided at specified places as indicated on the drawings. The materials and types of joints shall be as specified below. In case of liquid retaining structures, additional precaution shall be taken to prevent leakage of liquids as may be specified on the drawings or as directed by the Engineer. The Engineer may demand test certificates for the materials and/or gt them tested.

ii. Bitumen Boards:

Bitumen impregnated fiber or approved manufacture as per IS: 1838 - latest revision shall be used as fillers for expansion joints. It must be durable and water proof. At the exposed end, the joint shall be sealed with approved sealing compound to a depth of 25mm after application of an approved primer. The sealing compound and the primer shall be applied as specified by the manufacturer.

iii. Bitumen Compound:

The gap for expansion joints shall be thoroughly cleaned and the bitumen compound laid as per manufacture specifications. The compound to be used shall be of approved manufacture and shall conform to the requirements of IS: 1834 - latest revision.

iv. Separation Joint:

Strong and tough alkathene sheet or equivalent of about 1mm in thickness as approved by the Engineer shall be used. It shall be stucked by an approved sticker to the cleaned surface of the already set concrete to cover it fully. Fresh concrete shall be laid against the sheet, care being taken not to damage the sheet in any way.

v. Rubber Pad:

Hard foundation quality rubber pads of required thickness and shape are to be put below machine or other foundations where required as shown on the drawings or as directed by the Engineer. The rubber shall be of best quality of approved manufactures, durable, capable of observing vibration and must be chemically insert in contact with moist or dry earth under normal conditions.

7. WATERPROOFING JOINTS

The materials shall conform to the respective I.S. Code - latest revision, where applicable. The Engineer's approval to the materials shall be obtained by the Contractor before procurements. If desired by the Engineer, test certificates for the materials shall be submitted by the Contractor. The materials shall be of best quality available indigenously, fresh and thoroughly clean.

a. Water Proofing Admixtures

i. In Concrete:

The admixture shall be of right variety and procured freshly. The admixture shall be approved by the Engineer. The method of application and other details shall exactly conform to the manufacturers specification. The concrete shall have the services of the manufacturers supervision at no extra expense to the Employer to supervise the work if desired by the Engineer.

ii. In Plaster:

The concrete surface to be plastered, to be hacked to the Engineer's satisfaction. The plaster shall be made of cement and sand as approved by the Engineer. If desired by the Engineer, the Contractor shall have the work supervised by the manufacturers supervisor at no extra cost to the Owner.

b. Other Admixtures in Concrete:

The Engineer may in his direction instruct the Contractor to use any admixture in the concrete.

Payment shall be made extra over the price on concrete on the actual quantity of admixture used at the landed cost of admixture plus 15% to cover extra labour, tools, plant, profit, etc.

8. RATES

The rates for items shall include cost of all materials consumed in the work at all levels, hire charges of materials, tools and plant, cost of labour, insurance, all transport, services, accommodation, supervision, storage, protection etc. complete.

9. MEASUREMENT AND PAYMENT

The payment for respective class of concrete shall be made at the Contract rate per cubic meters for the quantity acceptably executed limited to the dimension shown in the sanctioned plan or as directed by the Engineer. The concrete to dimension in excess of the above shall not be measured nor paid for. The dimensions for measurement shall be the concrete excluding any finishes. The size shall be measured correct up to 12 mm and content worked out in cubic meter. Deductions for reinforcement and conduits shall not be made.

NON STRUCTURAL CONCRETE (LEAN CONCRETE)

1. SCOPE

This specification deals with the plain cement concrete for lean concrete works for general use of specified proportion.

2. MATERIALS

All required materials shall be as specified in “STANDARD CONSTRUCTION MATERIALS”

3. WORKMANSHIP

All workmanship shall be according to the latest and best possible standards.

Non-structural concrete will be designated by their volume ratio 1:3:6. These concrete act only as platform and as such are assumed to have no structural strength. Concrete of this class are proportioned according to its volumetric ratios and may be hand mixed. The maximum size of aggregates for this type of concrete shall be 20 mm. Non-structural concrete shall be batched and mixed in the following manner:

Cement and aggregates shall be batched by volume and mixed together to a uniform consistency until the cement color can no longer be distinguished. Water shall be added by approved means while undergoing further mixing and within two minutes, the mix shall be worked up to a homogeneous mass to a workability approved by the Engineer.

Boxes for volume batching of non-structural concrete shall be filled without tamping, ramming, or consolidation of any kind (other than occurring naturally during filling process), and shall be screeded off level with their topmost edges.

Mix shall be prepared and used in quantities that no more than 30 minutes shall elapse between the first wetting and complete use. Under no circumstances shall any of the stiffened concrete be used. Fresh concrete shall not be mixed with those prepared earlier and all batches shall be used separately.

Non-structural concrete shall be placed and then compacted by gentle ramming with a metallic rammer so that work can commence on it within 24 hours. If work cannot commence as stipulated, it shall be cured as per provisions of structural concrete.

4. RATES

The rates for items shall include cost of all materials consumed in the work at all level, hire charges of materials, tools and plants, cost of labour, cost of side forms, insurance, all transport, services, etc, complete.

5. MEASUREMENT

Measurement of works will be made in cubic meter or as specified in bill of quantities.

CENTERING AND SHUTTERING FOR RCC WORK

1. SCOPE

This specification covers centering and shuttering works for RCC works of any size, shape etc. at only level including strutting, propping and removal thereof.

2. MATERIAL

Form work shall be composed of steel or shuttering plywood. Timber shall be free from knots and shall be of medium grain as far as possible. Hard woods shall be used as caps and wedges under or over posts. Plywood or equivalent shall be used where specified to obtain smooth surface for exposed concrete work. Struts shall generally be mild steel tubes and strong sal ballahs 150mm in diameter or above. Bamboos, small diameter ballahs, etc. shall never be used unless specially approved by the Engineer in specified cases.

3. SHOP DRAWING

The Contractor shall prepare, design and drawings for formwork and centering before commencement of actual work and get them approved by the Engineer. The form work and centering shall conform to the shape, lines and dimensions as shown on the drawings.

4. CONSTRUCTION

The centering shall be true and rigid and thoroughly braced both horizontally and diagonally. The forms shall be sufficiently strong to carry without undue deformation, the dead weight of the concrete as a liquid and working load. Where the concrete is vibrated, the formwork shall be strong enough to withstand the effects of vibration without appreciable deflection, bulging distortion or shall be sufficiently tight to prevent any leakage of mortar. The formwork shall be such as to ensure the concrete a smooth uniform surface free from honeycombs, air bubbles, fines and other blemishes.

Any blemishes or defect found on the surface of the concrete must be brought to the notice of the Engineer and immediately rectified free of charge as directed or approved by the Engineer. Where there are chances of fixtures being embedded, only mild steel or concrete of adequate strength shall be used.

For exposed interior and exterior concrete surface of beams, columns and walls, plywood or other approved forms, thoroughly created and tied together with approved corrosion-resident divides shall be used. Rigid care shall be exercised in ensuring that all columns are plumb and true and thoroughly cross braced to keep them so. All floor and beam centering shall be crowned not less than 8mm in all directions for every 5 meter span. Unless described in the drawing or elsewhere to the contrary, beveled strips 25mm by 25mm shall be provided without any extra charge, to form angles and in corners of column and beam boxes for chamfering of corners. Temporary openings for cleaning, inspection and for pouring concrete shall be provided at the base of vertical forms and at other places, where they are necessary and as may be directed by the Engineer. The temporary openings shall be so formed that they can be conveniently concerted.

5. CLEANING AND TREATMENT OF FORMS

All rubbish, loose concrete chippings, shavings, saw dust etc. shall be scrupulously removed from the interior of the forms before the concrete is poured. Wire brushes, brooms, etc. compressed air jet and/or water jet shall be kept handy for the cleaning if directed by the Engineer.

The form surface in contact with concrete shall be treated with approved non-staining composites, such as approved brand form oil. It shall not come in contact with reinforcing steel or existing concrete surface. They shall not be allowed to accumulate at the bottom of the shuttering.

The formwork shall be so designed and erected that the forms for slabs and the sides of the beams,

columns and walls may be removed first, leaving the shuttering to the soffits of beams and their support in position. If formwork for column is erected for the full height of the columns, one side shall be left open and built up in sections, as placing of concrete proceeds. Wedges, spacer bolts, clamps, or other suitable means shall be provided to allow accurate adjustment of the formwork and to allow it to be removed gradually without jarring the concrete.

6. REMOVAL OF FORMS

The Contractor shall record on the drawing or in some approved manner, the date on which the concrete is placed in each part of the work and the date on which the formwork is removed therefrom and have this record checked and countersigned by the Engineer. The Contractor shall be responsible for the safe removal of the formwork, but the Engineer may delay the time of removal, if he considers it necessary. Any work showing signs of damage through premature removal of formwork or loading shall be entirely reconstructed without any extra cost of the owner.

Forms for various types of structural component shall not be removed before the minimum periods specified below, which shall also be subjected to the approval of the Engineer.

Ordinary Portland Cement Concrete (Temp °C)				Rapid Hardening Portland Cement Concrete(Temp °C)	
Part of Structure	40 – 20 Days	20 – 5 Days		40 – 20 Days	20 – 5 Days
a. Columns & Walls	1	2	Do not remove forms unit	1/2	2
b. Beam Sides	2	4	Site cured test cylinders develop 50% of	1	3
c. Slabs 125 mm	7	14	28 days strength	4	7
d. Slab below 125 mm	14	21		8	14
e. Soffit of main beams	21	28		10	16

Where exposed surface of concrete can be effectively sealed to prevent loss of water, the periods specified for temperature above 40° C can be reduced to those for the temperature range of 20° C to 40° C subject to the approval of the Engineer. Before removing any form work the Contractor must notify the Engineer well in advance to enable him to inspect the concrete if he so desires.

7. TOLERANCE

The formwork shall be so made as to produce a finished concrete true to shape, lines, levels, plumb and dimensions as shown on the drawings subject to the following tolerance unless otherwise specified elsewhere in this specification or drawings or directed by the Engineer.

For:

a.	Sectional dimension	-	5 mm
b.	Plumb	-	1 in 1000 of height
c.	Levels	-	3 mm before any deflection has taken place.

8. RE-USE OF FORMS

Before re-use, all forms shall be thoroughly scraped, cleaned, joints etc. examined and when necessary repaired and inside surface treated as specified hereinbefore. Formwork shall not be used / re-used, if declared unfit or unserviceable by the Engineer.

9. CLASSIFICATION

Ordinary exterior grade plywood of good quality shall be used for formwork. Where a specially good

finish is required and shall be made mostly of approved brand of heavy quality plywood to produce a perfectly level, uniform and smooth surface. Re-use only may be permitted after special inspection and approval by the Engineer. He may also permit utilization of used plywood for the "ordinary" class.

Ornament - These shall be used where ornamental and curved surface are required and shall made of selected best quality well seasoned timber which can be shaped as required. Generally, the "ordinary" class formwork shall be used unless otherwise directed by the Engineer.

10. RATE

Rate shall include for all necessary material and labour to execute the formwork.

11. MEASUREMENT AND PAYMENT

The payment for respective type of formwork shall be made at the Contract rate per square meters for the quantity acceptably executed limited to the dimension shown in the sanctioned plan or as directed by the Engineer. The concrete to dimension in excess of the above shall not be measured nor paid for. The dimensions for measurement shall be the area contacting to concrete. The size shall be measured correct up to 2 decimal places and content worked out in square meter.

REINFORCING FOR RCC WORKS

1. SCOPE

This specification covers providing and fixing High Strength Steel and Mild steel reinforcement of various sizes in all type of R.C.C. works.

2. MATERIAL

The reinforcement shall be as specified in the STANDARD CONSTRUCTION MATERIAL and test certificate shall be submitted to the Engineer for approval. Each reinforcing bars shall be tested and any bar showing cracks or flows or scales shall not be used.

3. SHOP DRAWINGS: BAR BENDING SCHEDULES

The Contractor shall furnish to the Engineer bar bending schedules for all R.C.C. work in triplicate within one month of the receipt of the Letter of Intent or of the receipt of each design drawings whichever later. Upon receipt of the Engineer's final corrections as corrected, contractor shall submit six prints of the approved drawings/schedules. Approval of schedule/drawing by the Engineer shall not relieve the Contractor from responsibility for errors nor relieve him of any part of his obligation to meet all the requirement of the Contractor or of the responsibility for the correctness of his drawings.

4. CLEANING

All steel for reinforcement shall be free from loose rust, oil grease, paint or other harmful matters.

5. BENDING

Unless otherwise specified, reinforcing steel shall be bent in accordance with procedure specified in IS:2502 - (latest revision) or as approved by the Engineer. Bends and shapes shall comply strictly with the dimensions in the approved Bar Bending Schedule. Contractor shall be entirely responsible for its correctness. Bars correctly bent shall only be used. No reinforcement shall be bent when in position in the work without approval of the Engineer, whether or not is partially embedded in concrete. Bars shall not be straightened in a manner that will injure the materials. Re-bending can be done only if approved by the Engineer. Reinforcement bars shall be bent by machine or other approved means producing a gradual and even motion. All the bars shall be cold bent unless otherwise approved.

6. PLACING IN POSITION

All reinforcement shall be accurately placed in position as shown on the drawings. Bars intended to be in contact, at crossing points, shall be securely bound together at all such points by No. 20 BG annealed soft iron wire or by tack welding as may be directed by the Engineer .

Binders and the like shall be tightly embraced the bars with which they are intended to be in contact and shall be securely held. The vertical distance between successive layers of bars shall be placed by provision of mild steel spacer bars. They should be so spaced that the main bars do not sag perceptibly between adjacent spaces.

Welding by gas or electricity may be permitted by the Engineer under suitable conditions and with suitable safe guards in accordance with relevant I.S. But welding between ends of a bar in line whereby stress is transferred across the section may be allowed for mild steel bars only.

The placing of reinforcement bars shall be completed well in advance of concrete pouring. The reinforcement shall be checked by the Engineer for accuracy of placement and cleanliness and necessary corrections prior to pouring the cement. Concrete blocks shall be used for ensuring the cover and positioning of reinforcement, they shall be made of mortar of mix one part cement to two parts sand by volume and cured for at least seven days. The sizes and locations of concrete blocks shall be as

approved by the Engineer. Laps and anchorage lengths of reinforcing bars shall be in accordance with IS:456 - latest revision- unless otherwise specified. If the bars in a lap are of the different diameter the smaller will guide the lap length. The laps shall be staggered as far as practicable and as directed by the Engineer.

7. EXPOSED REINFORCEMENT

Reinforcement projecting from work being concreted or already concreted shall not bent out of its correct position for any reason unless they are protected from deformation or other damage. Reinforcement left projecting for bending with future extension shall be thoroughly coated with cement grout wash, encased in concrete or otherwise protected from corrosion as approved by the Engineer.

8. COVER TO THE REINFORCEMENT

Unless otherwise specifically stated anywhere in the contract, the following clear cover to the main reinforcement shall be strictly adhere to:

Column	- 40mm or size of the main bar whichever is greater
Beam	- 25mm or ,, ,, ,,
Slab	- 15mm or ,, ,, ,,

9. MEASUREMENT

The net reinforcement work shall be work out in term of weight as per the bar bending schedule approved by the Engineer, taking theoretical unit weight for various size of the bars. Lapping, chair, spacer bars shall be measured.

10. RATE

Rate shall include all material, labour and other incidental items for complete work.

BRICK MASONRY WORK

1. SCOPE

This specification covers the construction of brick work in general and the erection of half brick, full brick and above thick walls in foundation and superstructure.

2. MATERIALS

All required materials shall be as specified in the "STANDARD CONSTRUCTION MATERIALS".

3. MORTAR

Mortar shall be as specified in the drawing, Bills of quantities or schedule of items for the particular work which may differ from case to case and as per the size, shape and thickness of the wall.

a. Mix:

Cement and sand (or any binding and supporting materials) shall be mixed dry thoroughly on clean approved platform or in a mechanical mixer and water shall then be added to obtain a mortar of the consistency of a stiff paste. Care being taken to add just sufficient water for the purpose.

b. Use of Mortar:

Mortar shall be used as soon as possible, after mixing and within 1/2 hours after cement is mixed wet. Mortar unused for more than 1/2 hours shall be rejected and removed (mixes of lime putty and sand can be kept for a period of 72 hours, provided it is kept damp and not allowed to dry).

c. Transportation of Mortar:

The well mixed mortar shall be transported from the mixing platform to the site of work in such a manner as to prevent formation of laitance or segregation.

4. BOND

"English Bond" shall be used in the construction of full brick and thicker walls unless otherwise specified in the drawing. For half brick thick wall, "stretcher bond" shall be used throughout the length of the wall.

Quoin bricks shall be laid header and stretcher in alternative courses, bond being obtained by placing a closer next to the quoin header. The arrangement of quoin in a course shall generally be symmetrical. Holes for required size shall be left in the brick work during laying only, for fixing pipes, service lines, passage of water etc. After they are fixed, the extra hollow left in the holes shall be filled with 1:3 cement mortar or 1:3:6 cement concrete and the face neatly made up with bricks in cement mortar. When iron fixtures etc. are to be laid in the brick work, shall be entirely covered with not less than 10mm of 1:3 cement mortar.

5. THICKNESS OF JOINTS

The thickness of the joints in the brickwork shall be 8mm unless otherwise specified and uniform throughout the work.

6. SOAKING OF BRICKS

Bricks shall be soaked in water before use for a period that is sufficient for the water just to penetrate the whole depth of the bricks. Any dirt, sand and dust shall be removed from the surface of the bricks. Bricks shall not be too wet at the time of use, as they are likely to slip in the mortar bed and there will be difficulty in ensuring plumpness of the wall. When bricks are soaked, they shall be removed from the tank sufficiently early so that at the time of laying they are skin dry. Such soaked bricks shall be stocked on a clean place, where they are not again spoil by dirt, earth etc.

7. LAYING OF BRICKS FOR MASONRY

Bricks shall be laid on a full bed of mortar evenly applied on the wetted surface of the old brick work. If any dirt or earth is on the wall they shall be cleaned by wire brush and washed down with water jet. When laying, the bricks shall be slightly pressed so that the mortar can get into all the pores of the brick surface to ensure proper adhesion. Cross joints and wall joints shall be properly flushed and packed with mortar so that no hollow spaces are left. All brick work shall be in plumb, square and true to dimensions as shown in drawings. All brickwork shall be built tightly against columns floor slabs or other structural parts around window and door frames with proper distance to permit concealed joints.

8. RAKING OUT JOINTS

Joints of brick work shall be raked out to a depth of 6mm at the time of laying. The face of the brick work shall be kept clear of all mortar, the very day the brick work is laid.

9. REINFORCING AND ANCHORAGE

For external walls, the anchors in the form of flats or rods from beams and columns and any other anchoring and reinforcement as shown on drawing shall be adequately embedded in the masonry.

10. OTHER BRICK WORK

a. Half brick thick wall:

Two bars of 6mm (1/4") diameter shall be used longitudinally at every 5th course of brick work. The first reinforcement shall be placed on the top of the bottommost course. The bars shall be fully embedded in the mortar and the ends shall be properly bonded in the vertical joints of brick work or to the main wall as directed by the Engineer Laps for the reinforcement shall be provided of minimum length of 45 times the diameter of bar.

11. WORKMANSHIP

a. All loose materials, dirts, and set lump of mortars may be laying over the surface over which the brick work is to be freshly started, shall be removed with a wire brush.
b. All the bricks shall be thoroughly soaked in clean water before use.
c. The surface over which the brick work is to be started shall be slightly wetted.
d. The first course itself shall be made horizontal by providing enough mortar in the bed joint to fill up any undulations in the bed course.
e. Required quantity of water is mixed in the mixing platform itself and not over the courses.
f. The joint should be of uniform thickness as specified.
g. There shall be no thorough joints and the lap shall not be less than half the width of the brick, and all the vertical joints are properly filled with mortar.
h. The verticality and horizontality of the courses shall be checked very often with plumb bob and spirit level respectively.
i. The courses of brick work shall be aligned and care shall be taken to keep the perpends.
j. The brick work shall be built in uniform layers, corners and other advanced works shall be racked back. No part of the wall during its construction shall rise more than 1 metre above the general construction level, to avoid unequal settlement, and also improper jointing. Where the masonry of one part has to be delayed the work shall be racked back suitably at an angle not exceeding 45 degrees according to bond and not toothed.

12. ARCHITECTURAL FEATURES

All projecting architectural features, such as string courses, cornices etc. shall be effectively bonded by tailing into the brick work to ensure stability. Such architectural features shall be set straight and true as shown in the drawing with finished joints (as far as possible).

13. CURING AND PROTECTION

a. The brick work shall be kept wet for 7 days commencing from 24 hours after the course is laid.
b. at the end of the day's work the masonry construction shall be protected from harmful effects of rain, sun, and frost by suitable coverings such as tarpaulin or any other suitable coverings.
c. Care shall be taken during construction that edges of jambs, sills, heads etc. are not damaged.

14. SCAFFOLDING

Double scaffolding having two sets of vertical supports shall be provided as directed by the Engineer. The supports shall be sound and strong and of steel tubular construction unless otherwise by other approved means. The vertical posts shall be tied together with horizontal pieces over which the scaffolding planks be fixed. The three sides of the scaffolding should be covered with 1.0 m wide ply boards to protect the materials from dropping off while working.

15. RATES

Rates for item shall include necessary materials, labour and equipment for proper execution of work and that all auxiliary work is included. Rates shall include work at all the levels, double scaffolding, (special) conveyance of materials etc. Rates shall also include for curing.

16. MEASUREMENT AND PAYMENT

The payment for respective type of brickwork shall be made at the Contract rate per cubic meters for the quantity acceptably executed limited to the dimension shown in the sanctioned plan or as directed by the Engineer. The lift of brickwork in superstructure shall be upto 12 m above ground level. Deductions of all openings in the brickwork shall be done to arrive the net quantity. However nothing extra shall be paid for making such openings and scaffoldings. No deductions shall be made for holdfast. The size shall be measured correct up to 2 decimal places and content worked out in cubic meter.

WOODEN DOORS AND WINDOWS

1. SCOPE

This specification covers the preparation, supply and fixing of door and window frames and shutters glazed, flywiremesh, fixed or openable with or without ventilator of best quality specified timber as mentioned in the item. The door or windows sizes shown in the drawings shall be the clear unrebated openings of the frame. The frames and shutters shall be finished as specified in the item.

2. MATERIALS

All required materials shall be as specified in the "STANDARD CONSTRUCTION MATERIALS".

3. FIXTURES AND FASTENINGS

All fixtures and fastenings shall be of brass or oxidized brass or stedler aluminum (as specified in the item) and shall be new sound and strong. They shall be sectional and of the best quality and workmanship. The size, shape, design and finish shall be as shown on drawings or as directed by the Engineer and deposited in his office for reference.

All fixtures shall be fixed to the joining in a secure and efficient manner. Any of the fixtures damaged during fixing shall be removed and new ones fixed in their place and the surface of joinery made good where affected at the Contractor's expense. When the type of fixing is not mentioned on the drawing or the item it shall be hung or swung as directed by the Engineer. In case the ventilator is hung, 2 brass or steel butt hinges shall be fixed with brass screws unless otherwise mentioned in the drawing. A pair of 22.5 cms brass hooks and eyes shall be fixed to the ventilator frame and the shutter as directed. If the detailed drawings specify different type of fixtures the work shall be carried out according to the drawing.

If the ventilator is of the swung type, then hooks and eyes can be dispensed with. The ventilator shall swing about a central horizontal axis of a pair of brass pivots in sockets. One pair of such centres, chat hooks, one brass ring with screws attachment as per detailed drawings or directed by the Engineer (R.E.) and a good quality window hemp cord of adequate length for convenient operation of the ventilator shall be provided. A two pronged brass hook shall be embedded in the wall at the said height above floor level for tying the cord. All the fixtures shall be fixed as shown on the drawings or as directed by the Engineer.

4. CHAUKOT OR FRAME

The quality of the timber shall be as specified in the drawing or first class salwood / locally available wood if not specified. The timber shall be of best quality from the heart of matured trees, with permissible gradient of in grain. The timber shall be either seasoned in a seasoning plant or naturally sun dried in a shed for a period of two (2) years.

The work shall be as per drawings. The timber shall be properly planed wrought and dressed in a workman like manner. Joints shall be true to fit properly and of the kind directed by the Engineer.

When a ventilator is provided above a door, full length of frame shall be provided. Joints in the frame vertical style or horizontal rail shall not be allowed. The unrebated edges of the frame in the opening shall be rounded or beaded uniformly. Rebates and plaster key grooves shall be provided as shown in the drawings. Six (6) number 250mm long by 30mm wide by 6mm thick hold fasts shall be provided at each frame unless otherwise specified in the drawings.

5. PANELLED SHUTTER

Planned shutter shall be made in number of ways and can be of different varieties as enumerated in the specification for "paneling". The shutter may be paneled single, double, triple or so on. The design of panels and the number of panels to be used shall be as per the drawings and directed by the Engineer. The styles shall be continuous from the top to bottom.

Design of panels and the number of panels to be used shall be as per the drawings and directed by the Engineer. The styles shall be continuous from the top to bottom.

The rails and, muttons or mullions shall be jointed to the styles and the muttons or mullions shall be joined to the rails. The thickness of the frame for the shutters shall vary from 32mm to 50mm (1 1/4" to 2?) or as per the drawing, depending upon the size of the door, the situation, the thickness of the panels etc. The thickness of the panels shall be 12mm or as specified in the drawing. Grooves shall be made on all the inside faces of the frame to receive panels.

6. FULLY GLAZED OR PARTLY GLAZED SHUTTERS

These shall be as described in No. 6 but instead of panels glasses of various thickness as per drawings or item shall be as per "Glazing Work" specification.

7. IRON MONGER FOR SHUTTERS

Unless and otherwise specifically mentioned in the drawing or in the item, following iron monger shall be provided in each shutter.

a. Hinges

For window shutter up to 0.2 sqm area - 2 nos.50mm size.

For window shutter up to 0.3 sqm area - 2 nos. 65mm size.

For window shutter up to 0.7 sqm area - 2 nos. 90mm size.

For window shutter up to 0.5 sqm area - 2 nos. 75mm size.

For high shutters 3 nos. of respective size shall be provided.

For door shutters up to 1 sqm - 2 nos. 75mm size.

For door shutters up to 2 sqm - 3 nos. 100mm size.

For door shutters up to 3 sqm - 3 nos. 150mm size.

For door shutters of area more than 3 sqm.

Special provisions shall be made.

b. Tower Bolts:

in each window shutter or a pair of window shutter following tower bolts shall be provided.

For ventilator	:	Top hung type: 2 nos. 50mm size at bottom.
Bottom hung type	:	2 nos. 50mm size eye bolt at top.
Central pivot type	:	2 nos. 50mm size at bottom.
Window	:	Bottom 150mm size for all.

Top 230mm long for up to 178mm lintel height.

Top 300 mm for above.

c. Eye hooks : 75mm size for all window shutters.

150mm to 230mm (as approved) for top hung

ventilator for bottom hung ventilator.

d. Stoppers and Cleats

In doors, where the shutters dashes the wall or another door, a wall type door stopper shall be provided in each door shutter, so that the door shutter remains untouched in the surface of the wall.

Unless combined stop and holder is not provided to the doors a standard type of door holder or cleat shall be provided to each door shutter so that the door can be kept completely open when required.

e. Door Spring

Each door shutter shall consist of a 230 to 300 long door spring or approved type/make.

f. Locks

A knob type or mortice type door lock with latch and dead bolt or 7 lever pad lock with 9" to 12" aldrop (aluminum) shall be provided in each door shutter as per item. But for internal room doors such locks shall be replaced by tower bolts.

g. Handle

All window shutter shall be included with one 100mm size handle of approved make and type. In case of door wherever handled, knob type door lock is not provided handle/push plate of approved type and make shall be provided.

8. RATE

The unit rate shall include:

a) The cost of timber, required number of holdfast with concrete block, wood preservatives to the surface contacting to the masonry surface, all required laborers and materials to complete the work for door and window frame.

b) The cost of timber, infill panels, hinges, towerbolts, handles, eye-hooks etc. all required materials to complete the shutter works.

9. MEASUREMENT AND PAYMENT

Measurement for payment of timber doors and windows frame shall be made in cubic meter. The shutter of timber shall be measured net including the beading in square meter. Nothing extra shall be admissible for putty etc. The metal window, collapsible gate, rolling shutter etc. shall be measured in square meter for the opening provided inclusive of frame out to out.

ALIMINUM DOORS AND WINDOWS

1. SCOPE

This specification covers the preparation, supply, and installation of door and window frames and shutters glazed, fly-wiremesh, fixed or operable with or without ventilator of best quality specified aluminum as mentioned in the item. The door or windows sizes shown in the drawings shall be the clear unrebated openings of the frame. The frames and shutters shall be finished as specified in the item.

Aluminum windows and doors shall be obtained from a specialist manufacturer approved by the Engineer. They shall be of the appropriate sizes and thickness best suited for the types of the opening and/or sizes conforming to the details shown on the Drawings and shall comply with the following requirements.

This specification covers furnishing of all labor, materials, all required hardware, services and equipment necessary for aluminum doors, windows and ventilators in any level,

2. MATERIALS

2.1 General Requirement

Aluminum doors, windows etc. shall be of sizes, sections and details as shown in the drawings. The details shown in the drawings may be varied slightly to suit the standards adopted by the manufacturers of the aluminum work, with the approval of Engineer. Before proceeding with any fabrication work, the contractor shall prepare and submit, complete fabrication and installation drawings for each type of doors, windows, ventilators and partition etc. for the approval of Engineer and nothing extra shall be paid on this account.

Windows shall be made up of aluminum frame sections as required for heavy intermediate units where operating sash are indicated. For fixed units, use standard intermediate weight.

Materials and building components which the Contractor has to supply and build in, i.e. they go into the permanent works, must be new and unused. They must comply with standards and dimensions.

No products or suppliers are indicated in this Specification. The Contractor shall propose suitable materials and systems which comply with the intent and performance criteria stated, whilst remaining fully responsible for the detailed design / co-ordination of the works including all fixings and associated works to provide a safe and warranted installation.

2.2 Products

- **Anchors:** Lead-shield or toothed-steel, drill-in expansion bolt anchors shall be stainless steel.

- **Weather stripping:** Continuous wool, silicone treated, or type recommended by the manufacturer. It shall not be liable to shrink, expand, warp or lose adhesion to the frames to which it is attached and shall provide an effective seal against draughts without impairing the performance of the windows or doors in any way.

  The weather stripping shall be capable of being renewed without disturbing the glazing system and without removal of outer frames from the structure.

- **Glazing Gasket:** The EPDM Gaskets shall be of size and profile as shown in drawings and as called for, to render the glazing, doors, windows, ventilators etc. air and water tight. Samples of gaskets shall be submitted for approval and the EPDM gasket approved by Engineer shall only be used. The contractor shall submit documentary proof of using the above material in the work to the entire satisfaction of Engineer.

  The EPDM gasket shall meet the requirements as given in Table below:

S.No.	Description	Standard	Specification
1	Tensile strength Kg.f/cm^2	ASTM-D 412	70 Min.
2	Elongation at break %	ASTM-D 412	250 Min.
3	Modulus 100% kgf/cm^2	ASTM-D 412	22 Min.
4	Compression set % at 0º C 22 Hrs	ASTM-D 395	50 Max.
5	Ozone resistance	ASTM-D 1149	No visible cracks

- **Sealant:** The sealants of approved grade and color shall only be used. The silicone for perimeter joints (between Aluminum and RCC/Masonry) shall be of make approved by the Engineer.

- **Aluminum Profile:** Aluminum sections used for fixed/operable windows, ventilators, & doors etc. shall be suitable for use to meet architectural designs to relevant works and shall be subject to approval of the Engineer for technical, structural, functional and visual considerations. Alloy used for extrusion shall be 6063-T5 confirming to ASTM B 221. The aluminum profile shall be PVDF or powder coated and the thickness and profile sizes shall be as shown in the drawings or as mentioned in the description of items. It is mandatory that all aluminum members shall be wrapped with self adhesive non-staining PVC tape.

  In general the aluminum profiles sizes shall be as follows:

  Genuine Chinese/Thai profiles from Thailand, supplied in alloy number Temper 505-T5 (compatible with AA 6063-T5). The finishing is Pure Polyester Powder Coated, corro-coat (PE-F), 60-80 microns thickness.

Description of aluminum profiles	Size & Thickness
1. Fix Partition	76.2mm x 38.1mm x 1.8mm
2. Door	
2.1 Vertical shutter	36.5mm x 41.3mm x 1.5mm
2.2 Top shutter	34.5mm x 65.0mm x 1.5mm
2.3 Transom	34.5mm x 65.0mm x 1.5mm
2.4 Bottom shutter	34.2mm x 97.0mm x 1.5mm
3. Sliding Window	
3.1 Sliding frame with fly screen	81.5mm x 17.8mm x 1.5mm
3.2 -do- without fly screen	71.5mm x 17.8mm x 1.5mm
3.3 Sliding frame side track	71.5mm x 19.9mm x 1.5mm
3.4 Sliding frame top track	71.5mm x 26.8mm x 1.5mm
3.5 Sliding bottom sash	24.4mm x 60.0mm x 1.5mm
3.6 Sliding top sash	26.8mm x 35.0mm x 1.5mm
3.7 Sliding handle sash	26.0mm x 51.2mm x 1.5mm
3.8 Sliding interlock sash	32.1mm x 34.4mm x 1.5mm
4. Casement Window	
4.1 Casement frame section	36.6mm x 38.8mm x 1.5mm
4.2 Casement sash section	36.6mm x 40.2mm x 1.5mm
4.3 Casement mullion/transom	36.6mm x 35.4mm x 1.5mm
4.3 Bead	24.3mm x 22.7mm x 1.5mm
5. Fly screen section	12.60mm x 42.70mm x 1.5mm

  Accessories shall be the followings or superior:

  - Thai CENZA friction stays
  - Thai quality gaskets.
  - Thai Rollers
  - Thai weather piles.
  - Japanese “Reliance” hook locks.

- Bangkok "Polymate Co. Ltd." fibre net fly screen.
- Bangkok “CENZA” cam handle locks.
- Thai 'ADB 104' Silicone..
- Silicone backing foam seal.

- **Aluminum Sheet:** Aluminum Sheets for use as panels shall be 1.5 mm thick aluminum alloy sheet conforming to ASTM B 209. Aluminum alloy sheet for use in general paneling work shall be of types and thickness as specified and conforming to the requirement of ASTM B 209. Aluminum sheets shall be of approved make and manufacturer, Aluminum panel may be prefabricated units manufacture on modular or non-modular dimension.

- **Glass:** unless otherwise stated, the glass shall be clear float glass and should be approved by the Engineer. All glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes, blisters and other defects. The kind of glass supplied by the contractor shall be as mentioned in the item or in the special provision or as shown on the drawings. The float glass shall conform to the IS 14900.

  When plate glass is specified, it shall be "polished patent plate glass" of the best quality. It shall have both the surfaces ground flat and parallel and polished to obtain clear undistorted vision and reflection. The plate shall be of the thickness mentioned in the item, shown in the detailed drawings or specified in the special provisions. In the absence of any specified thickness the thickness of the plate glass to be supplied shall be 5.5 mm. A tolerance of 0.55 to 0.80mm shall be admissible on the nominal thickness of polished plate glass.

  When Annealed clear/tinted/coated float glass is specified shall meet the requirements of ASTM C 1036, Type 1, Class 1, Quality q3; with pyrolytic coating meeting the requirements of ASTM C 1376 "Specification for Pyrolytic and Vacuum Deposition Coatings on Glass".

- **Toughened Glass:** The toughened glass shall be highly elastic and safe against bending failure. Temperature variations shall not affect the stability; in case of breakage, glass shall not splinter.

  Glass shall be fixed by neoprene strip, and glazing beads of rectangular aluminium section screwed to the frame.
  Thickness of panes shall be as shown in Drawings or as specified in Bill of Quantities.

- **Safety and Narrow Lite Glass (Gergian Glass):** Wired plate glass, as well as wired float glass, wired ornamental glass, wired "difulite" glass, and corrugated wire glass shall be adequately resistant to fire. In the event of breakage of glass panes, the wire netting shall hold the splinters.

  If sectional wired building glass is cracked, its wire netting shall retain the glass fragments to the largest possible extent.

  Single-sheet safety glass, being pre-stressed, shall be highly elastic, safe against bending failure and resistant to temperature variations. In the event of breakage, the glass shall not splinter.

  The thickness of glass shall not be less than 6mm

- **Particle Board:** Synthetic resin bonded flat pressed three layers, multilayer and graded particle board defined in IS 3087 having superfine surface shall be used for production of prelaminated particle board. For ECO Marks the particle board shall also conform to the requirements of ECO Mark specified in IS 3087.

- **Fittings:** Handles, hinges, striking plates, crescent lock, friction ring centres, spring catches, stays etc. shall match the colour of the windows and / or doors, Bolts, nuts fixing screws and large pins shall be of stainless steel.

2.3 Delivery, Storage and Handling

Inspect materials delivered to the site for damage. Unload and store with minimum handling. Provide storage space in dry location with adequate ventilation, free from dust or water, and easily accessible for inspection and handling. Stack materials on nonabsorptive strips or wood platforms. Do not cover doors and frames with tarps, polyethylene film, or similar coverings. Protect finished surfaces during shipping and handling using manufacturer's standard method, except that no coatings or lacquers shall be applied to surfaces to which calking and glazing compounds must adhere.

All materials shall be delivered in manufacturer's original, unopened, undamaged packages or containers with manufacturer's label intact.

All materials shall be carefully stored in an area that is protected from deleterious elements in a manner recommended by the product manufacturer. Storage shall be in a manner that will prevent damage to the material or marring of its finish.

3. QUALITY ASSURANCE

Manufacturer: Provide products of manufacturer with no less than 10 years experience in manufacturing the aluminum profile and accessories for the required work. Manufacturers that cannot provide the performance test data specified herein will not be considered for the project.

Provide a complete aluminum profile and required accessories from single manufacturer specializing in the production of this type of work. For the purpose of designating type and quality for the work under this section, drawings and specifications are based on the Genuine Thai Powder Coated Section.

Fabricator/Installer: All fabrication and installation works shall be carried out with the fabricator/installer experienced to perform work of this section who has specialized in the fabrication and installation of work similar to that required for this project.

4. EXECUTION

4.1 General

Prior to the start of the work, all the shop drawings for each type of doors/windows/ventilators etc. shall be prepared by using suitable sections based on architectural drawings, adequate to meet the requirement/specifications and by taking into consideration varying profiles of aluminum sections being extruded by approved manufacturers. The shop drawings shall also show the details of fittings and joints. Before start of the work, all the shop drawings shall be got approved from the Engineer.

Actual measurement of openings left at site for different type of door/window etc. shall be taken. The fabrication of the individual door/windows/ventilators etc. shall be done as per the actual sizes of the opening left at site. The frames shall be truly rectangular and flat with regular shape corners fabricated to true right angles. The frames shall be fabricated out of section which have been cut to length, mitered and jointed mechanically using appropriate machines. Mitered joints shall be corner crimped or fixed with self tapping stainless steel screws using stainless steel cleats of required length and profile. All aluminum work shall provide for replacing damaged/ broken glass panes without having to remove or damage any member of exterior finishing material.

4.2 Fabrication

The windows and doors shall be constructed from clean extruded sections and shall be free from distortions and imperfections.

The outer frames of the windows shall have long or short flanges to suit the internal and external finishes detailed on the Drawings.

All frames shall be mechanically jointed and sealed at corners, the window frames being mitered, the door frames being butted. The joints shall be designed to withstand a wind load of 150 kg/m2. All

members shall be accurately machined and fitted to form hairline joints prior to assembly. The joints and accessories such as cleats, brackets, anchors, screws, etc. shall be of such material as not to cause any bimetallic action. The design of the joints and accessories shall be such that the accessories are fully concealed. The fabrication of doors, windows, etc. shall be done in suitable sections to facilitate easy transportation, handling and installation. Adequate provision shall be made in the doors and windows members for anchoring to support and fixing of hardware and other fixtures as approved by the Engineer.

All screws used for window or door assembly or fitted and for fixing shall be non-ferrous, countersunk stainless steel Phillips screws and if exposed shall match the finish of the surrounding metal.

After accurate fittings at the works, associated doors, windows and ventilators units shall be packed separately and clearly marked to indicate the manner in which they are to be assembled on site.

The Contractor shall be responsible for ensuring that manufacturers are fully informed of structural opening sizes to ensure that windows and doors will fit correctly with the necessary tolerances for composite assembly and building in.

4.3 Installation

All windows and doors shall be installed accurately, true to line and with all necessary tolerances as detailed.

Installation of the aluminum glazing shall conform to IS - 1081 – codes of practice for fixing and glazing of metal (sheet and aluminum) Doors, Windows and Ventilators. It shall be duty of the manufacture to make arrangements for proper fixing of the glazing which shall have to withstand a wind velocity of 157-km/hr. at height of 15 meter elevation as pressure in Kg/M^2 of 150.

Aluminum frames set in timber sub-frames or other rebated surrounds shall be bedded externally in a suitable non-setting mastic compound. The compound shall be such as will not react with adjacent materials and shall form a long lasting and flexible weather-tight seal under the local climatic conditions.

All windows and doors shall be protected from damage during the work of subsequent trades.

Window and door openings into which aluminum windows and doors have been fixed shall not be used for the passage of materials or men, except where unavoidable, and in these cases the frames shall be cased in plywood.

Extreme care shall be taken at the time of assembly and installation of aluminum works with a view to see that no damage is done to the work of other agencies. In case of any damage the same has to be made good to the satisfaction of the Engineer at no extra cost.

4.4 Doors, Windows and Ventilator Shutters

Material, fabrication and dimensions of aluminum doors, windows and ventilators manufactured from extruded aluminum alloy sections of standard sizes and designs complete with fittings, ready for being fixed into the building be as per IS 1948.

All in fill panels and shutters shall be as shown in the drawings or mentioned in Bill of Quantities.

4.5 Provision for Glazing

Windows and doors shall be fitted with approved clip-on glazing beads or solid glazing beads with countersunk screws, the beads sized and positioned to suit the particular types and thickness of glass required.

Clip on glazing beads shall not be used in exposed locations.

All beads shall be fixed internally.

4.6 Provision for Fixing

Window and door frames shall be supplied complete with all fixing components including lugs, cramps, straps, shims, woodscrews etc. and the Contractor shall be responsible for ensuring that full details of fixing requirements and spacing are supplied to site in time to allow for plugs, sockets, grounds and other fixing points to be located and built in where required.

Fixing components shall either be of non-ferrous metal or shall be suitably protected to prevent the risk

of electrolytic corrosion of the aluminum.

4.7 Infill Panels/Shutter (panelling Materials)

Infill panels or shutters in doors, windows and ventilator shall be as shown in the drawings or as mentioned in Bill of Quantities.

4.8 Weathering Stripping

Provide on stiles and rails of exterior doors. Fit into slots which are integral with doors or frames. Weatherstripping shall be replaceable without special tools, and adjustable at meeting rails of pairs of doors. Installation shall allow doors to swing freely and close positively. Air leakage of a single leaf weatherstripped door shall not exceed 1.25 cubic feet per minute of air per square foot of door area when tested in accordance with ASTM E 283.

4.9 Anchorage

On the backs of subframes, provide anchors of the sizes and shapes indicated for securing subframes to adjacent construction. Anchor transom bars at ends and mullions at head and sill. Reinforce and anchor freestanding door frames to floor construction as indicated on approved shop drawings and in accordance with manufacturer's recommendation. Place anchors near top and bottom of each jamb and at intermediate points not more than 635 mm apart.

4.10 Condensation Drainage

At the bottom of all external window and door frames provision shall be made for the collection of condensation, with drain holes or weepiness to lead it to the outside.

4.11 Protection from Dissimilar Materials

a. Dissimilar Metals: Where aluminum surfaces come in contact with metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact to dissimilar metals.

1. **Protection:** Provide one of the following systems to protect surfaces in contact with dissimilar metals:
   i. Paint the dissimilar metal with one coat of heavy-bodied bituminous paint.
   ii. Apply a good quality elastomeric sealant between the aluminum and the dissimilar metal.
   iii. Paint the dissimilar metal with one coat of primer and one coat of aluminum paint.
   iv. Use a nonabsorptive tape or gasket in permanently dry locations.

b. Drainage from Dissimilar Metals: In locations where drainage from dissimilar metals has direct contact with aluminum, provide protective paint to prevent aluminum discoloration.

c. Masonry and Concrete: Provide aluminum surfaces in contact with mortar, concrete, or other masonry materials with one coat of heavy-bodied bituminous paint.

d. Wood or Other Absorptive Materials: Provide aluminum surfaces in contact with absorptive materials subject to frequent moisture, and aluminum surfaces in contact with treated wood, with two coats of aluminum paint or one coat of heavy-bodied bituminous paint. In lieu of painting the aluminum, the Contractor shall have the option of painting the wood or other absorptive surface with two coats of aluminum paint and sealing the joints with elastomeric sealant.

5. RATE

The rate shall include the cost of materials, accessories, labour and other required accessories for all the operations described above. The rate shall also include the cost of respective types of shutter, frames, provision of all required fixing accessories handles, tower bolts, hinges, door locks, door closer, etc., all complete.

6. MEASUREMENT AND PAYMENT

Measurement for payments shall be made in square meter for the completed work as indicated in the Bill of Quantities. Dimensions shall be measured correct to the nearest 0.01 m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 sq. m. The elevation, height and width shall be measured out to out of the frame.

The completed aluminium door and window shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

ROLLING SHUTTER

1. SCOPE

This specification covers the providing and fixing of Mild Steel Rolling Shutter inclusive of all required fittings.

2. MATERIALS

All finished steel shall be well and cleanly rolled to the dimensions and weight specified by ISI subject to the permissible tolerances as per IS:1852-1973. The finished materials shall be reasonably free from defects. Steel sections shall be free from excessive rust, scaling and pitting and shall be well protected.

3. ROLLING SHUTTER CONSTRUCTION

General: Rolling shutters shall be obtained from a firm amongst the manufacturer approved by the Employer. These shall include necessary locking arrangement and handles etc. These shall be suitable for fixing in position as specified i.e. outside or inside or below lintel or between jambs of the opening. The door shall be either push and pull type or operated with chain and crank device supplied by the firm. Shutter upto 10 square meter shall be pushed and pull type and shutter with an area of over 10 square meter shall generally be provided with reduction gear operated by mechanical device with chain or handle.

Shutter: Shutter shall consist of M.S. laths 1.25 mm thick and 80 mm wide laths or as specified. The laths shall be machine rolled and straightened with an effective of 16 mm shall be interlocked together throughout their entire length and joined together at the end with end locks. These shall be mounted on specially designed shaft. Each laths shall be a continuous single strip piece without any joint.

The springs shall be , preferably of coiled type. The spring shall be manufactured from high tensile spring steel wire or strip os adequate strength to balance the shutter in all positions. The spring pipe shaft etc, shall be supported on strong mild steel brackets.

Guide Channels: The guide channels shall e of mild steel deep channel section and rolled, pressed or built-up (fabricated) construction. The thickness of the sheet used shall not be less than 3.15 mm.

The minimum depth for guide channels shall be as follows:

Clear width of shutter	Depth of Guide Channel
Upto 3.5 m	60 mm
3.5 m and above	75 mm

The gap between the two leg of guide channel shall be sufficient to allow the free movement of the curtain and at the same time close enough to prevent the rattling of the curtain due to wind.

Each guide channel shall be provided with a minimum of three fixing cleats or supported for attachment to the wall or column by means of bolts or screws. The spacing of cleats shall not exceed 750 mm. Alternatively, the guide channels may also be provided with suitable dowels, hooks or pins for embedding in the walls.

The guide channels shall be attached to the jambs, plumb and true, either in overlapping fashion, projecting fashion or embedded in grooves, depending on the method of fixing.

The top cover of shaft/spring etc, shall be of same material as that of lath.

4. FIXING

Brackets shall be fixed on the lintel or under lintel or beam or under beam as specified with rawl-plugs, and screw bolts etc. The shaft along with the spring shall then be fixed on the brackets.

The lath portion (shutter) shall be laid on ground and the side guide channels shall be bound with it with ropes etc. The shutter then be placed in position and top fixed with pipe shaft with bolts and nuts. The

side guide channels and the cover frame shall then be fixed to walls through the plate welded to the guides. These plates and brackets shall be fixed by means of steel screw bolts, and rawl-plugs drilled in the wall. The plates and screw bolts shall be concealed in plaster to make their location invisible. Fixing shall be done accurately in a workmen like manner that the operation of the shutter is easy and smooth.

5. RATE

The rate shall include all labour, materials and equipment necessary for all operations described above including the cost of top cover and spring etc to complete the works.

6. MEASUREMENT AND PAYMENT

Clear width and clear height of the opening for rolling shutter shall be measured correct to two decimal places. The area shall be calculated in square meter correct to two place of decimal and paid applying unit rate quoted n the item of work in bill of quantities.

GLAZIER'S WORK

1. SCOPE

This specification shall cover the glazier's work including the types of glasses, putty, methods of fixing the glass in wooden or steel frames, partitions etc.

2. MATERIALS

Glass: All glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes, blister and other defects. The kind of glass supplied by the Contractor shall be as mentioned in the item or in the special provisions or as shown on the detailed drawings. The thickness of glass panes shall be uniform. The specifications for different kinds of glasses shall be as under.

a. Putty. The putty to be used for fixing the glass in wood frames shall conform to IS. 419-1953.

   The putty may be coloured to suit the colour of door or window etc. For glazing in metal sashes, putty to be used shall conform to IS 420-1953.

b. Mastic. For glazing in metal sashes, patent mastic shall be used instead of putty when so specified in the special provisions or directed by the Engineer. Glass bricks shall be laid in mastic specified by the manufacturers of glass blocks or in 1:3 cement mortar if so specified in the special provisions.

3. FIXING

In wooden frames and sashes. The glass panes shall be properly cut to fit the rebates of the frames and sashes truly with a slight minus margin of about 1.5mm (about 1/16") on all sides. The rebates should not be less than 8mm (about 1/3") in the frames and sashes. Before glazing, the frames shall be primed and prepared for painting so that the wood may not draw oil out of the putty and the putty may adhere properly. The rebate shall be puttied first and glass pane is then pressed in to position and secured with glazier's springs and firmly back putied. The rebates shall be chamfered. The putty may be given a coat of oil paint or oil to match the side surfaces and also seal the edges of the putty to the glass. The putty shall be left for a week so before painting to ensure its setting.

When so specified, for better class of work and larger panes of glass, the glass shall be bedded in putty and fitted to the frames with wooden beads or mouldings and secured with brass countersunk or round headed screws or with brass screws and cups. For fixing plate glass or large sheets of glass, the glass shall be embedded in putty externally, but internally, wash leather, valvet, felt, rubber or some similar material approved by the Engineer shall be used before fixing the beads.

4. RATE

The rate shall include:

a. Providing the specified type of glass panes of the required dimensions and fixing material.
b. Fixing the glass in the frame as specified, including cutting and waste.
c. Cleaning the glazed work.
d. Repairing of any work damaged during glazing.
e. All labour, material, scaffolding and equipment to carry out the item.

5. MEASUREMENT AND PAYMENT

The glazed shutter shall be measured net including the beading in square meter. Nothing extra shall be admissible for putty etc.

FLYWIREMESH SHUTTER

1. SCOPE

This specification covers supply, fabrication and fitting of Flywire mesh shutter with timber frame / MS folded plate on door and window frames.

2. MATERIALS

Timber: All timber used for the work shall be seasoned and free from decay, free from any harmful fungies and insects attacks and from any other damage of harmful nature which will affect the strength, durability, appearance and usefulness for the purpose for which it is required.

Mild Steel Plate: Mild Steel Plate used for the work shall conform to the relevant IS specification and of size and section provided as per the drawing.

Fixers and fastening: Providing and fixing in position fixers and fastening per every leaf as per instruction of Engineer.

Wire gauge: Wire gauge shall be of woven wire webbing. It shall be of 14 to 16 mesh to liner 25 mm with 28 to 30 gauge GI wire or as approved by Engineer.

3. FABRICATION

The stiles, rails etc. shall be rebated 12 mm (½") along the side to receive the wire gauge. The galvanized iron fly proof webbing of 14 to 16 mesh to 25 mm linear length shall be used unless otherwise specified. The webbing shall be bent at 90° at 12 mm (½") along both side to rebate and fixed securely to stiles, rails and mountings by 12 mm (½") galvanized Iron staples at about 15 cm (6") intervals, staggered spacing. Fillet shall be of salwood or shishaum wood or specified timber of size 10 mm x 10 mm (3/8" x 3/8") which shall be securely and neatly fixed with small screws spaced at 75 mm (3") centres round the rebate for each hand of webbing after the filets are pressed well into the rebate to hold the wire mesh. The wire mesh shall be tightly stretched during fixing. The space between filet and the rebate where the webbing is bent shall be neatly finished with putty so that the cut ends of the webbing may not be visible. Each shutter shall be fitted with necessary fittings of approved quality as shown on the drawing.

4. RATE

The rate shall be inclusive of labour and all materials required.

5. MEASUREMENT AND PAYMENT

The flywire mesh shutter shall be measured net including the beading in square meter. Nothing extra shall be admissible for putty etc.

CEMENT FLOOR FINISH

(Ordinary or Colour Crete)

1. SCOPE

This specification covers cement concrete floor neatly finished in general and ordinary or colour create floor finish with or without cement concrete wearing coat and dado and skirting without concrete wearing coat in particular.

2. MATERIALS

Cement, sand, aggregates, water etc. as specified in plain cement concrete work.

Colour pigment: Colour pigment shall be of superior quality, confirming to BS or IS standards as approved by the Engineer.

3. MIXING

Cement concrete and cement sand shall be mixed as specified in plain cement concrete work and plastering work. Colour pigment with cement shall be mixed in an approved manner and the proportion shall be as directed by the Engineer but it should be between 1:3 to 1:12 (pigment and cement).

4. PREPARING BASE

The base where such flooring is to be laid shall be cleaned, brushed and watered properly. In structural slab or concrete surfaces the screw shall be removed by chisel and wire brush and cleaned properly. Such surfaces shall be wire brushed and watered for 3 to 4 hours.

5. LAYING OF CONCRETE

Form Work: Form work for concreting work shall be made in square or rectangular of suitable size but not exceeding 1.2m x 1.2m in any case. The ready finished form work shall then be coated with one coat of oiling before placing concrete. One layer of cement slurry shall be provided before placing concrete panels, alternatively. The alternate panels can be laid only after the final setting of the previous concrete work. Such concrete work shall be thoroughly tamped, struck off level and surface floated with a wooden float. The surface shall then be tested with a straight edge and mason's spirit level to detect any inequalities and undulations in surface which, if any, shall be made good immediately. The thickness of the concrete shall be 40mm unless otherwise specified. In case of integrated concrete work, the mix shall be as specified in bill of quantity, using light weight aggregate. The method of laying shall be as described above.

Joint: In the joints between concrete panels, coal tar shall be filled up to the half depth and rest shall be filled with cement sand mortar of weak proportion.

6. FINISHING COAT

Neat cement finish: One layer of cement sand plaster of specified proportion shall be used, which shall be cut in pattern, the joints shall be just above the joints of the concrete. Such plaster shall be followed by a thin coat of cement punning of specified mix which shall be in the approved pattern, trowelled and finished neatly. However, the thickness of such film shall not be less than 3mm. Curing of the finished work shall be done by covering the whole surface with damp jute bags and kept wet for one week or as directed by the Engineer. Wherever colour crete is specified, such work shall be applied only in the neat finish coat and finished similarly.

7. FINISHING

After laying final coat and final curing is over, the surface shall be grinded with various grades of carborandum stones to the smooth and plain surface. Steel and iron fleats shall not be used in coloured floors. The polishing and finishing shall be as mentioned hereunder.

When the finished surface is 3 to 4 days old, it shall be surfaced by hand or with a surface grinding machine, to remove laitance or loose materials and to produce smooth finish. The first grinding shall be done with a course carborundum **stone**, using water freely. All pores and holes are filled with cement mortar of the same as of floor surface. Second grinding shall be carried out after 5 days of first grinding with fixed grinding carborandum stone and patches if any shall similarly be filled and the 3rd grinding carried out. The floor is washed thoroughly after each grinding and in the final grinding washing should be done with hot water and pure soft soap. Final grinding is generally done after 10 days.

In the case of machine grinding, the first cut should not be made till coloured surface layer is 14 days old. After the final grinding oxalic acid is dusted over the surface (2/3 lbs per 100 sft) which must be sprinkled with water and rubbed hand with numdah blocks.

The following day the floor is wiped with a moist rag and dried with a soft cloth. A hot mixture of turpentine and beeswax (4:1 or 3:1) is then applied to the surface and thoroughly rubbed in with hand and later again with clean cotton waste for four hours. The rubbing must be continued until the floor/skirting ceases to be sticky. Best result is obtained with minimum of beeswax and a maximum of rubbing.

8. SLOPES

Unless shown in the drawing, all slopes of the floor shall be towards the outlet at the rate of 0.75 to 1.0%.

9. SKIRTING

Skirting shall be finished as finishing coat of the floor unless otherwise specified. The skirting work shall include racking and cleaning of base, watering, applying plaster work and neat finish. The level, line and corners shall be done carefully to get even, plumb and uniform surface through uniformity. The skirting work shall be done simultaneously with floor work or as directed by the Engineer. The top edge of the skirting shall be chamfered to prevent dust collection.

10. FLOOR HARDENER

Concrete floor hardener shall be of the quality approved by the engineer which shall be used as per manufacturer's instructions and specifications.

11. RATE

The rate shall include:

a) Laying wearing course after preparing base.

b) Providing ordinary or colour crete floor as per the item or drawings.

c) Cost of formwork for dividing such floors into the panels.

d) Curing and protections of the work.

e) Finishing of the laid surface including dividing into panels and polishing as required.

12. MEASUREMENT AND PAYMENT

Measurement of cement concrete floor finish shall be done in square meter as in item. Measurement shall be done nearest to 12 mm. Nothing extra shall be paid for the strip provided to lay the concrete in alternate panels.

FLOORING OTHER THAN CEMENT FLOOR

1. SCOPE

This specification covers floor finishes of terrazzo floor cast in site ordinary or colored, precast terrazzo floor ordinary or colored, ceramic tile glazed or non glazed, clay flooring tiles, dividing strips etc.

2. MATERIALS

i) Cement, sand, stone aggregate, lime, water etc. shall be a specified in concrete works.

ii) Terrazzo aggregates: The aggregates used in terrazzo topping shall be marble aggregate of the sizes as per finish requirement. The aggregates shall be mixed in proportion as specified of require colored and sizes.

iii) Colour cement: The colour cement shall be 'Colorcrete' of Snowcem India Ltd. Bombay or any other reputed company.

iv) Terrazo tiles shall generally conform to IS 1237-Edition 2.3. Unless otherwise specified, the tiles shall be supplied with initial grinding and grouting of wearing layer.

v) Ceramic tiles: The ceramic tiles shall be glazed or non-glazed or non-glazed of specified sizes, pattern and color from any reputed company. The sample of tiles is to be approved by the Consultant for color, pattern and size, which are to be kept for future reference.

vi) Clay flooring tiles: The Clay flooring tiles shall be wire cut machine made brick tiles from "MD Prajapat or superior. These shall be well burnt and of uniform color. Sample of tiles is to be approved by the Consultant, which are to be kept for future reference.

vii) Dividing strips: The dividing strips shall be glass or as specified 4 mm lesser than the depth of floor finish.

viii) Parquet flooring: This shall be of seasoned wood of specified size and thickness and of pattern as specified in the drawingsCement, sand, aggregates, water etc. as specified in plain cement concrete work.

3. SURFACE PREPARTION

Sub-grade concrete or RCC slab on which the tiles are to be laid shall be cleaned, wetted and mopped. Specified mortar bedding shall then be spread, tamped and corrected to proper levels and allowed to harden sufficiently to offer a fairly rigid cushion for the tiles to be set.

4. WORKMANSHIP

4.1 Terrazzo Floor Finish Cast-in-Situ

4.1.1 Under Layer

Cement concrete of specified mix shall be used and the specifications given under cement screed (Cement Floor Finish) shall apply. The panels shall be of uniform size, not exceeding 2 sqm in area or 2 m in length for inside situations. In exposed situations, the length of any side of the panel shall not be more than 1.25 metre. Cement slurry @ 2.00 kg per sqm shall be applied before laying of under layer over the base cement concrete/RCC base.

4.1.2 Fixing of Strips

4 mm thick glass strips or 2 mm thick PVC strips/aluminium strips/brass strips / stainless steel strips/copper strips unless otherwise specified shall be fixed with their top at proper level to required slope. Strips of stone or marble or of any other material of specified thickness can also be used if specifically required. Use of glass and metallic strips shall be avoided in areas exposed

to sun. 4 mm thick glass strips or 2 mm PVC strips or 2 mm aluminium or brass strips shall be fixed with their tops at proper level, giving required slopes.

4.1.3 Top Layer

4.1.3.1 Mortar : The mix for terrazo shall consist of cement with or without pigment, marble powder, marble aggregate (marble chips) and water. The cement and marble powder shall be mixed in the proportion of three parts of cement to one part marble powder by weight. For every part of cement marble powder mix, the proportion of aggregate by volume shall be as shown in Table below.

The marble chips shall be white or pink Makrana, black Bhainslana, Chittoor black, Jaisalmer Yellow, Baroda green, Dehradun white, Chittoor pink, yellow Patam cherala (Madras), grey Gadu (Surat), Chittoor green and yellow and Alwar black or as specified. It shall be hard, sound, dense and homogenous in texture with crystaline and coarse grains. It shall be uniform in colour and free from stains, cracks, decay and weathering. The maximum thickness of the top layer for various sizes of marble aggregates (marble chips) shall be as shown in Table below:

Thickness of top layer by chips size

Grade No.	*Size of Aggregates in (mm)*	*Proportion of Aggregates to Binder Mix*	*Minimum Thickness of Top Layer (mm)*
00	1 - 2	1.75 : 1	6
0	2 - 4	1.75 : 1	6
1	4 - 7	1.75 : 1	9
2	7 - 10	1.50 : 1	12

Where aggregate of size larger than 10 mm are used, the minimum thickness of topping shall not be less than one and one third times the maximum size of the chips. Where large size chips such as 20 mm or 25 mm are used, they shall be used only with a flat shape and bedded on the flat face so as to keep the minimum thickness of wearing layer.

Before starting the work, the contractor shall get the sample of marble chips approved from the Engineer. This shall be done in advance by mixing different colour marble chips and panel samples of minimum 1 m x 1 m size shall be prepared and got approved from the Engineer before laying of flooring. The cement to be used shall be ordinary grey cement, white cement, cement with admixture of colouring matter of approved quality in the ratio specified in the description of the item in the ratio to get the required shade as ordered by the Engineer. Colouring materials where specified shall be mixed dry thoroughly with the cement and marble powder and then marble chips added and mixed as specified above. The full quantity of dry mixture of mortar required for a room shall be prepared in a lot in order to ensure a uniform colour. This mixture shall be stored in a dry place and well covered and protected from moisture. The dry mortar shall be mixed with water in the usual way as and when required. The mixed mortar shall be homogenous and stiff and contain just sufficient water to make it workable.

The terrazo topping shall be laid while the under layer is still plastic, but has hardened sufficiently to prevent cement from rising to the surface. This is normally achieved between 18 to 24 hours after the under layer has been laid. A cement slurry preferably of the same colour as the topping shall be brushed on the surface immediately before laying is commenced. It shall be laid to a uniform thickness slightly more than that specified in order to get the specified finished thickness after rubbing. The surface of the top layer shall be trowelled over, pressed and brought true to required level by a straight edge and steel floats in such a manner that the maximum amount of marble chips come up and are spread uniformly over the surface.

4.1.3.2 Curing, Polishing and Finishing: The surface shall be left dry for air-curing for a duration of 12 to 18 hours depending on atmospheric temperature conditions. It shall then be cured by allowing water to stand in pools over it for a period of not less than 4 days.

The grinding and polishing may be commenced not before 2 days from the time of completion of laying for manual grinding and not before 7 days for maching grinding. For polishing by machines, the surface shall be watered and ground evenly with machine fitted with special rapid cutting grit blocks (carborundum stone) of coarse grade (No. 60) till the marble chips are evenly exposed and the floor is smooth. After the first grinding, the surface shall be thoroughly washed to remove all grinding mud and covered with a grout of cement and colouring matter in same mix and proportion as the topping in order to fill any pin holes that appear. The surface shall be allowed to dry for 24 hours and wet cured for 4 days and then rubbed with machine fitted with fine grit blocks (No. 120). Curing shall be done by ponding of water between panels formed with fine sand. The surface is cleaned and repaired as before and allowed to cure again for 3 to 5 days. Finally the third grinding shall be done with machine fitted with mere fine grade grit blocks (No. 320) to get even and smooth surface without pin holes. The finished surface should show the marble chips evenly exposed.

Where use of machine for polishing is not feasible or possible, rubbing and polishing shall be done by hand, in the same manner as specified for machine polishing except that carborundum stone of coarse grade (No. 60) shall be used for the 1st rubbing, stone of medium grade (No. 80) for second rubbing and stone of fine grade (No. 120) for final rubbing polishing.

After the final polish either by machine or by hand, oxalic acid shall be dusted over the surface @ 33 gm per square metre sprinkled with water and rubbed hard with Pad of Woolen rags. The following day, the floor shall be wiped with a moist rag and dried with a soft cloth and finished clean.

4.1.3.3 Wax Polishing: Wax polish shall be of approved brand and manufacture and in sealed containers. It shall be applied in uniform layer to the dry surface of the floor/skirting.

When the layer of the wax is stiffened and surface of floor is saturated with the polish, polishing shall be resorted with machine fitted with bobs (pad of rags) and shall be done until shades of all chips have appeared and glossy surface is obtained.

The fresh polished floor surface shall be protected using appropriate protective materials until the surplus wax has been absorbed and the floor shall be opened only after proper drying of wax polish.

4.2 Pre-Cast Terrazzo Floor Finish:

4.2.1 Terrazzo Floor Tiles

Terrazzo tiles shall generally conform to IS 1237-Edition 2.3. Unless otherwise specified, the tiles shall be supplied with initial grinding and grouting of wearing layer.

The size of tiles shall be as given in Table below or as shown in the drawings or as required by the Engineer. Half tiles for use with the full tiles shall be such as to make two half tiles when joined together, match with the dimensions of one full tile.

Length Nominal (mm)	*Breadth Nominal (mk)*	*Thickness not less than (mm)*
200	*200*	*20*
250	*250*	*22*
300	*300*	*25*

4.2.1.1 Tolerance: Tolerances on length and breadth shall be plus or minus one millimetre, and tolerance on thickness shall be plus 5 mm. The variation of dimensions in any one delivery of tiles shall not exceed 1 mm on length and breadth and 3 mm on thickness.

4.2.1.2 Tile Manufacturing: The tiles shall be manufactured in a factory under pressure process subjected to hydraulic pressure of not less than 140 kg per square centimeter and shall be given the initial grinding with machine and grouting of the wearing layer before delivery to site.

The wearing layer shall be free from projections, depressions, cracks, holes, cavities and other blemishes. The edges of wearing layer may be rounded.

The proportion of cement to aggregate in the backing of tiles shall be not leaner than 1:3 by weight. Where colouring material is used in the wearing layer, it shall not exceed 10 per cent by weight of cement used in the mix.

The finished thickness of the upper layer shall not be less than 5 mm for size of marble chips ranging from the smallest upto 6 mm and also, not less than 5 mm for size of marble chips ranging from the smallest upto 12 mm, and not less than 6 mm for size of marble chips varying from the smallest upto 20 mm.

4.2.2 Laying

Base concrete or RCC slab on which the tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the tiles shall be with cement mortar of specified proportion and in conformity with provisions in relevant sections of the specifications.

Cement mortar 1:4 (1 Cement : 4 coarse sand) bedding shall be used. Average thickness of the bedding mortar shall be 20 mm and the thickness at any place shall not be less than 10 mm.

Cement mortar bedding shall be spread, tamped and corrected to proper levels and allowed to harden for a day before the tiles are set. If cement mortar is laid in bedding the terrazzo tiles, these shall be set immediately after laying the mortar. Over this bedding neat grey cement slurry of honey like consistency shall be spread at the rate of 4.4 kg of cement per square metre over such an area as would accommodate about twenty tiles. Tiles shall be washed clean and shall be fixed in this grout one after another, each tile being gently tapped with a wooden mallet till it is properly bedded, and in level with the adjoining tiles. The joints shall be kept as thin as possible not exceeding 1 mm and in straight lines or to suit the required pattern. The joints shall be properly cleaned before filling with cement grout of matching colour.

The surface of the flooring during laying shall be frequently checked with a straight edge of length at least 2 metre, so as to obtain a true surface with the required slope.

Where full tiles or half tiles can not be fixed, tiles shall be cut (sawn) from full tiles to the required size and their edges rubbed smooth to ensure a straight and true joint.

Tiles which are fixed in the floor adjoining the wall shall enter not less than 12 mm under the plaster, skirting or dado. The junction between wall plaster and tile work shall be finished neatly and without waviness.

After the tiles have been laid, surplus cement grout that may have come out of the joints shall be cleared off.

4.2.3 Curing, Polishing and Finishing

The day after the tiles are laid all joints shall be cleaned of the grey cement grout with a wire brush or trowel to a depth of 5 mm and all dust and loose mortar removed and cleaned. Joints shall then be grouted with grey or white cement mixed with or without pigment to match the shape of the topping of the wearing layer of the tiles. The same cement slurry shall be applied to the entire surface of the tiles in a thin coat with a view to protect the surface from abrasive damage and fill the pin holes that may exist on the surface.

The floor shall then be kept wet for a minimum period of 7 days. The surface shall thereafter be grounded evenly with machine fitted with coarse grade grit block (No. 60). Water shall be used profusely during grinding. After grinding the surface shall be thoroughly washed to remove all grinding mud, cleaned and mopped. It shall then be covered with a thin coat of grey or white cement, mixed with or without pigment to match the colour of the topping of the wearing surface in order to fill any pin hole that appear. The surface shall be again cured. The second grinding shall then be carried out with machine fitted with fine grade grit block (No. 120).

The final grinding with machine fitted with the finest grade grit blocks (No. 320) shall be carried out the day after the second grinding described in the preceding para or before handing over the

floor, as ordered by the Engineer.

For small areas or where circumstances so require, hand grinding/polishing with hand grinder may be permitted in lieu of machine polishing after laying. For hand polishing the following carborundum stones, shall be used:

1st grinding — coarse grade stone (No. 60)

Second grinding — medium grade (No. 80)

Final grinding — fine grade (No. 120)

In all other respects, the process shall be similar as for machine polishing.

After the final polish, oxalic acid shall be dusted over the surface at the rate of 33 gm per square metre sprinkled with water and rubbed hard with a pad of woolen rags. The following day the floor shall be wiped with a moist rag and dried with a soft cloth and finished clean.

If any tile is disturbed or damaged, it shall be refitted or replaced, properly jointed and polished and the finished floor shall not sound hollow when tapped with wooden mallet.

4.2.4 ***Wax Polishing:*** Wax polish shall be of approved brand and manufacture and in sealed containers. It shall be applied in uniform layer to the dry surface of the floor/skirting.

When the layer of the wax is stiffened and surface of floor is saturated with the polish, polishing shall be resorted with machine fitted with bobs (pad of rags) and shall be done until shades of all chips have appeared and glossy surface is obtained.

The fresh polished floor surface shall be protected using appropriate protective materials until the surplus wax has been absorbed and the floor shall be opened only after proper drying of wax polish.

4.3 Ceramic Tiles

Cement slurry of paste like consistency shall be spread over the bedding at the rate of 3/4 cu.ft. of cement/100 sq. ft. over an area, which would accommodate about 25 tiles and the tiles, shall be washed clean before laying.

Tiles shall be fixed in the above cement grout one after another, each tile being gently tapped with a wooden mallet till it is properly bedded and in level the adjoining tiles. The joints between different tiles shall be kept as thin as possible and in perfect straight line and to suit the required pattern as shown in the drawings. The surface of the flooring as laid shall be true to levels and slopes. Tiles, which are fixed in the floor adjoining the wall, shall enter not less than 1/2" under the plaster, skirting or dado.

All joints shall be cleaned of the gray cement grout with a wire brush to a depth not exceeding 3/16" on the following day of laying the tiles and all the dust and loose mortar removed and cleaned. The joints shall then be flush pointed with non shrinkable grout to match the shades of the tiles and there after the floor shall be kept wet for a minimum period of 7 days.

The entire surface of the floor, after curing, shall be washed and finished clean. The finished floor shall not sound hollow when tapped with a wooden mallet.

4.4 Clay Floor Tiles

The clay floor tiles shall be laid over lime Surkhi green mortar of specified mixed and joints maintained properly shall be grouted with lime Surkhi. Broken or cracked tiles shall be rejected.

4.5 Parquet Timber Flooring

The parquet flooring of specified pattern and color shall be laid on smooth finished damp proofed dry surface. The tiles with wire cloth base shall be laid using parquet adhesive in approval pattern.

After completion of laying the tiles the top surface shall be smoothly finished which shall be stained and polished as approved.

4.6 Dividing Strips

The dividing strips shall usually be of glass. Each strip shall be of full length as that of a single panel. There shall be no joint of the strip except of junction only. The top edges of the strip shall be smoothly finished without projections. The strips in required pattern shall be laid to plane, slope, and level held in position by cement mortar. These shall be checked prior to laying of concrete in panels. Proper care shall also be exercised during laying of concrete to avoid any dislocation, breakage of the strips.

4.7 Marble Floor

The marble slabs shall be of as specified in the description of the item. The contractor shall get the samples approved by the Engineer before starting the work. The size of the Marble slabs shall be as specified or as shown in the drawings or as ordered by the Engineer. The thickness shall be 20-25 mm as specified in the description of the item. The slabs shall be hand or machine cut (as specified) to the required shape and dimensions. They shall be fine chisels dressed on all sides to the full depth so that a straight edge laid along the side of the stone shall be fully in contact with it. The top surface of each slab shall also be fine chisel dressed to remove all wariness. All sides and top surface of the slabs shall be machine rubbed or table rubbed with coarse sand before paving. All angles and edges of slabs shall be true, square and free from shipping and the top surface shall be perfectly true and plain.

The bedding for the slabs shall be with cement mortar 1:2 cement 2 sand) or as specified in the description of the item. The average thickness of bedding mortar shall be 12-18 mm the thickness at any place under the slabs shall not be less than 12 mm.

Cement slurry of paste like consistency shall be spread over the above bedding at the rate of 1cu.ft. of cement/100 sq. ft. of area. The edges of the slabs already paved shall be buttered with match the shade of the marble slab. The slab to be paved shall then be lowered gently back in position and tapped with wooden mallet till it is properly bedded in level with and closer to the adjoining slab with as fine a joint as possible. Subsequent slabs shall be laid in the same manner. After each slab has been laid, surplus cement on the surface of the slabs shall be cleaned off. The surface of the flooring as laid shall be true to levels and slopes and the flooring shall be cured for a minimum period of 7 days. Slabs, which are fixed in the floor adjoining the wall, shall enter not less than 12 mm under the plaster, skirting or dado.

If there is any unevenness at the meeting edges of slabs, the same shall be removed by fine chiseling in a slant. The surface shall then be polished and finished flushed except that cement slurry with or without pigments shall not be applied on the surface before each polishing.

4.8 Polished Machine Cut Stone Flooring

The stone flooring shall be of slabs of machine cut, machine polished and stone of specified thickness of approved quality free from cracks and flakes, of uniform color and shall have an even surface. The edges shall be straight. The stone shall be 30 cm. x 30 cm. and properly dressed square and laid as directed with fine joints not exceeding 1.0 mm. They shall be firmly bedded flush in cement mortar 25 mm. thick, cement floated with no hollows between. The floor shall be well washed and pointed with cement and sand (1 to 1) flush with the surface of the stone. After laying, the flooring shall be polished and all unevenness removed.

The surface of the base slab shall be struck off reasonably true at a level not less than 60 mm. (2 3/4") below the required finished level. The mortar base for the tiles shall be 20 to 30 mm. thick with cement float. Keeping required jointing thickness the slabs/ tiles shall laid to proper level and line work. The joints to be filled in by neat cement/color cement slurry, and allowed to set. The

stone for flooring shall be machine cut and machine polished. The Contractor shall submit samples for all the tiles for approval before using the same. The work must be protected from any kind of damage till handing over the building.

4.9 Granite Flooring

The granite slabs shall be of as specified in the description of the item. The contractor shall get the samples approved by the Engineer before starting the work.

The size of the marble slabs shall be as specified or as shown in the drawings or as ordered by the Engineer. The thickness shall be 20-25 mm as specified in the description of the item. The slabs shall be hand or machine cut (as specified) to the required shape and dimensions. They shall be fine chisels dressed on all sides to the full depth so that a straight edge laid along the side of the stone shall be fully in contact with it. The top surface of each slab shall also be fine chisel dressed to remove all wariness.

All sides and top surface of the slabs shall be machine rubbed or table rubbed with coarse sand before paving. All angles and edges of slabs shall be true, square and free from shipping and the top surface shall be perfectly true and plain.

The bedding for the slabs shall be with cement mortar 1:2 cement 2 sand) or as specified in the description of the item. The average thickness of bedding mortar shall be 12-18 mm the thickness at any place under the slabs shall not be less than 12 mm

Cement slurry of paste like consistency shall be spread over the above bedding at the rate of 1cu.ft. of cement/100 sq. ft. of area. The edges of the slabs already paved shall be buttered with match the shade of the granite slab. The slab to be paved shall then be lowered gently back in position and tapped with wooden mallet till it is properly bedded in level with and closer to the adjoining slab with as fine a joint as possible. Subsequent slabs shall be laid in the same manner.

After each slab has been laid, surplus cement on the surface of the slabs shall be cleaned off. The surface of the flooring as laid shall be true to levels and slopes and the flooring shall be cured for a minimum period of 7 days. Slabs, which are fixed in the floor adjoining the wall, shall enter not less than 12 mm under the plaster, skirting or dado. If there is any unevenness at the meeting edges of slabs, the same shall be removed by fine chiseling in a slant. The surface shall then be polished and finished flushed except that cement slurry with or without pigments shall not be applied on the surface before each polishing.

5. RATE

The rate shall include the cost of all materials, plant and labour involved in all the operations described above

6. MEASUREMENT AND PAYMENT

The work shall be measured in sq. metres. Length and breadth shall be measured between the finished faces of skirting, dado, or wall plaster correct to 0.01m. No deduction shall be made nor extras paid for any opening in the floor up to 0.01 Sq. m. Steps and treads of stairs paved with granite/marble stone slabs shall also be measured under the respective item.

The flooring works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

SLOPED CEMENT SCREED

1. SCOPE

This specification covers furnishing of all labor, materials, services and equipment necessary for the grading of roof to drain the rain water efficiently.

2. MATERIALS

Cement, Sand and aggregate shall confirm to “STANDARD CONSTRUCTION MATERIALS”.

The grading of coarse aggregate when determined by testing shall be within the limits as given for 10mm single sized coarse aggregate

3. WORKMANSHIP

Laying: Before laying cement concrete for grading, the level markings to the required slope/gradient shall be made only with the cement concrete on the surface of the slab at suitable spacing with the help of string and steel tape so that the mason can lay the concrete to the required thickness, slope/gradient easily in between the two level markings.

On getting the level marking approved by the Engineer, the surface should be sprinkled with thick cement slurry and the concrete should be laid carefully, without throwing from height, in predetermined strips.

The concrete should be consolidated by specially made wooden tamping. After the tamping is done, the surface should be finished to the required slope/gradient with wooden trowels without leaving any spots of loose aggregates etc.

The mixed cement concrete must be laid in position, within half an hour of its mixing. In case any quantity of concrete remains unused for more than half an hour the same should be rejected and removed from the site.

Finishing: The slope of the finished terrace shall be as shown in the drawings unless directed by the Engineer.

The minimum thickness of the concrete at its junction with parapets shall be 25 mm. The concrete shall be rounded at the junction of roof slab and parapet.

The finished concrete surface shall present a smooth surface with correct slope and uniform rounding. The concrete shall be free from cracks. Excess trowelling shall be avoided.

Curing: Curing shall be done either by spreading Hessian cloth over the graded surface, keeping the same wet for full 10 days or flooding the graded area with water by making beads with weak cement mortar for 10 days. Occasional curing by simply spraying water now and then shall not be permitted under any circumstances.

4. RATES

The rates for items shall include cost of all materials consumed in the work at all level, hire charges of materials, tools and plants, cost of labour, insurance, all transport, services, etc, complete.

5. MEASUREMENT

It shall be measured in square meter/cubic meter as specified in bill of quantities as per exact

dimensions shown in the drawing inclusive all materials, manpower, curing, etc, all complete.

PRESSED CLAY TILE PAVING

1. SCOPE

This specification covers supplying and laying of pressed fully fired clay tiles over sloped cement screed in roof deck and other areas as shown in the drawings and finishing schedule including furnishing of all labor, materials, services and equipment necessary to complete the works.

2. MATERIALS

Cement, Sand and aggregate shall confirm to “STANDARD CONSTRUCTION MATERIALS”.

Paving tiles shall be fully pressed and fully fired red clay tiles manufactured by M.D. Prajapath , India or superior. Unless otherwise specified the size of tile shall be 200 mm x 200 mm x 10 mm. All paving tiles shall be in regular size without variations in dimensions and shall be free from the cracks, pinholes, cavities, bowed surface, etc

3. WORKMANSHIP

Pressed clay tile should be laid on a solid base of concrete using thick bed method. A bed of semi-dry cement and sand of mix 1:4 (1 cement : 4 coarse sand) shall be spread over the concrete or screed base and packed to a thickness of 20 mm. The bed then shall be covered with a grout (wet mix) of cement and sand 1:1 (1 cement : 1 sand) into which the tiles shall be bedded, levelled and the joints grouted or filled with a mortar of 1:2 (1 cement : 2 sand) with 2% integral waterproofing compound.

The joints between the tiles shall be wide enough to allow the variation in the size of tiles. Joint width shall be 3 mm minimum and should not exceed 10 mm. The joint shall be filled with a mortar of cement and fine sand with integral waterproofing compound.

To take-up the possible expansion of tiles, an expansion joints shall be formed around the perimeter of tiled floor. For the large area of tiled floor, additional expansion joints should be formed both along and across the floor at interval not exceeding 6 meter. The expansion joint shall be filled with an elastic UV stabilized sealing compound.

The finished surface shall be cleaned in after completion of the works. Tiled surface shall be protected until completion of project by taking appropriate protection measures.

4. RATES

The rate shall include the cost of materials and labour required in all the operations described above. The rate shall also includes the cost of making and sealing expansion joints.

Roof grading works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

5. MEASUREMENT AND PAYMENT

Length and breadth shall be measured correct to a cm. Area shall be worked out to nearest 0.01 sq.m.

No deduction shall be made for either opening or recessed for chimney stacks, roof lights etc,. Nothing extra shall be paid either for any extra materials or labours involved in forming such opening or recess or in rounding the concrete function of roof with parapet walls, chimney stack or hunch etc.

Pressed Clay Tile Paving works shall be paid at their respective contract unit rate which shall be the full and the final compensation to the Contractor to complete the work as per these Specifications.

PLASTER WORK

1. SCOPE

This specification covers cement plaster finishes to walls, columns ceilings and similar surfaces on background normally wet with, such as brick, or concrete (plain or reinforced).

2. MATERIALS

All required materials shall be as specified in "STANDARD CONSTRUCTION MATERIALS".

3. CARE OF TOOLS AND ACCESSORIES

All tools shall be cleaned by scraping and working at the end of each day's work, or after use with different materials. Metal tools shall be cleaned and greased after each operation. All tools shall be examined and thoroughly cleaned before plastering begun.

4. SCAFFOLDING

Wooden ballies, planks, trestles, G.I. pipes, ply board and other scaffolding material shall be sound and erected in accordance with the specification given under Brick Work or as directed by the Construction Manager.

5. MORTARS

a. ***Cement Mortar:*** The mortar for cement plaster of specified proportion shall be mixed as specified in the specification for Brick Work.

b. ***Lime Mortar***: The mortar shall consist of such proportions of slaked lime and sand as may be specified in the item measured by volume. If moist sand is used, necessary, allowance shall be made for bulking. The lime mortar shall be prepared by wet process, in the power driven mill. The slaked lime is to be first placed in the mill in an even layer and ground for 180 revolutions with a sufficiency of water. Water shall be added as required during grinding, care being taken not to add more water than will bring the mixed material to a consistency of stiff paste. Thoroughly wetted sand in specified proportion and finely chopped jute fibre at the rate of one pound of jute fibre for every 0.1 cubic meter of lime sand mixture are then to be added evenly and the mixture ground for another 180 revolutions for each stone shall be 90 for each part of the grinding. The mortar shall be stirred continuously during the grinding process.

The hydraulic lime shall be ground second time. The mortar shall always be kept damp and protected from sun and rain till used up. All mortars shall be used as soon as after grinding and shall be used within the day on which it is prepared. In no case the mortar prepared earlier than 36 hours be permitted or remain at the site of work.

The mortar more than 36 hours old or damaged mortar or mortar which has once set or caked shall be condemned and removed from the site by the Contractor at his own expense. No retampering or rejected mortar shall be permitted.

c. ***Pure fat lime paste for finishing:*** Lime shall be slaked and mixed with sufficient water to form a thick paste. It shall be reduced to a fine paste by grinding. It shall then be passed through a fine sieve (3mm mesh) to remove all unslaked particles and foreign matters and allowed to mellow under water for at least 10 days in large slaking tanks. The surplus water on the top shall be allowed to run-off. The slaked lime paste thus formed shall be used for finishing.

6. PRELIMINARY WORK

a. All materials for plastering shall be kept readily available at the site.

b. Plastering operation shall not be started until and necessary fixings such as doors, windows,

and fittings of light and services etc. are completed and all pipe and conduits to be embedded in the wall or plaster are installed.

c. A preliminary inspection shall be made to ensure that the surfaces are in a suitable condition for plastering, particularly as regards their planeness and dryness. If dubbing out is necessary, it should be done in advance, so that an adequate time interval may be permitted before the application of the first under coat.

7. SEQUENCE OF OPERATIONS

a. For external plaster, the plastering operation shall be started from the top storey and carried downwards. For internal plaster, the plastering operation shall be started wherever the building frame and placing work are ready and the temporary supports of the ceiling resting on the wall or the storey have been removed.

b. The surfaces to be plastered shall first be prepared as follows:

i. Cleanliness:

The loose layer of dust on masonry shall be brushed away before the plaster is applied. A stiff bristle brush or wire brush may be used or to be more effective brushing may be combined with blowing of compressed air. A freshly cast concrete surface is often covered by laitance and this shall be removed. A concrete surface may also often be contaminated by the soap which is formed by the reaction of resins with calcium hydrate or is derived from mouls oils. The contaminated layer shall be removed by brush. Special care shall be taken in repairing for re- rendering an old plaster coat. Old layers of the plaster coats shall be completely removed and made good. Crumbled and frost- damaged parts shall be cut out and patched. Any trace of algae or moss formation shall be removed. If the background contains soluble salts, particularly sulphates, the application of plaster shall be done only after the efflorescence of the salt is complete, and efflorescence is thoroughly removed from the surface.

ii. Roughness:

The roughness of the background may generally improve the bond of the plaster. A smooth surface may be roughened by wire brushing, if it is not hard, or by hacking or bush-hammering if it is hard. Alternatively to obtain a rough surface, a mortar may be forcibly dashed on to the surface (spatterdash treatment) by suitable means or to a hard surface like concrete; on a soft smooth surface, a thin coat of cement slurry 1:1 (cement and fine sand) may be applied for the purpose. After roughening the surface, care shall be taken to moisten the surface sufficiently before plastering, as otherwise the freshly exposed surface may tend to absorb considerable amount of water from the plaster. In addition to general roughness in the masonry, the joints shall also be raked to a depth of about 3mm for providing key to plaster.

iii. The wall shall not be soaked but only damped before applying the plaster. If the surface becomes dry in the spot, such areas shall be moistened again to restore uniform suction. A fog-spray shall be used for this purpose.

iv. Evenness:

The background shall be even in order to avoid variations in the thickness of the plaster. Any unevenness must be leveled before the plaster is applied. Local projections in brick wood are serious from the point of view of plastering. For coat thick plaster work, the local projection shall not exceed 12mm of the general surface as determined by the periphery of the surface concerned and local depression shall not exceed 19mm. For two coats of plaster, a local projection shall not exceed 12mm and

local depression 12mm.

8. APPLICATION OF UNDERCOAT

a. The undercoat shall be approximately 12mm thick and carried to the full length of the wall or to the natural breaking points like doors, or windows. Before the undercoat hardens, it shall be deeply worked to provide mechanical key for the finishing coat.

Masonry walls on which plaster is to be applied directly, shall be clean and dry with the joints raked to a depth of at least 10mm. Before applying the undercoat, the surface shall be damped evenly to control suction. The undercoat shall be trowel had and tight, forcing it into surface depressions to obtain a permanent bond.

On monolithic walls, the undercoat shall be dashed on unless the surface is sufficiently rough to ensure adequate bond for it when applied with a trowel. Rough surfaces that permit successful application with the trowel are produced by mechanical roughening.

The dashing of the undercoat shall be done using a strong whipping motion at right angles to the face of the wall, or it may be applied with a plaster machine or cement gum.

The undercoat shall be kept damp for at least two days immediately following its application. It shall then be allowed to become thoroughly dry.

On metal reinforcements, the plaster shall completed, embed the metal. This is easily accomplished with the large mesh type of reinforcement, the openings of which are large enough to permit plaster readily to pass through them.

9. APPLICATION OF THE FINISHING COAT

a. Before starting to apply the finishing coat, the second coat shall be damped evenly. Whenever possible, textures shall be applied from top to bottom in one operation to eliminate joining marks. The finishing coat shall be applied with a trowel to a thickness or approximately 12mm and roughly leveled off.

b. When the surface has begun to harden, it shall be leveled off with a straight grained wood float. At a later period during drying out, when the face is quite stiff and there is no moisture on the surface, the float shall be worked with a circular movement bringing the sand in the plaster to the face and producing a uniform texture.

Alternatively the facing shall be tapped gently with a wood float after the setting has commenced but before the plaster is dry and care shall be taken that the tapping is even, uniform and is not overdue. As a final operation, to remove any float marks which may be left on the surface, a damp rubber sponge shall be applied with a circular motion on the face.

10. LIME PLASTERING

a. In all plaster work the mortar shall be firmly applied with somewhat more than required thickness and well pressed into the joints and on the surface and rubbed and leveled with a flat wooden rule to give required thickness. Long straight edges shall be freely used to ensure a perfectly plane and even surface. All corners shall be finished to their true angles or rounded as shown on the drawings. The surface shall be finished to plane or covered surfaces as shown on the drawings and shall present a neat appearance.

The mortar shall adhere to the masonry surface intimately when set and there should be no hollow sound when struck. The plastering shall be done in squares or strips as directed by the Construction Manager Plastering shall be done from top to downwards.

b. Finishing: In any continuous face of a wall, finishing treatment of any type shall be carried out continuously and dry to dry breaks made to coincide with architectural break in order to avoid unsightly junction.

The thick paste of lime prepared as specified above shall be applied to the prepared and partially set out somewhat plastic surface with steel trowel to a thickness slightly exceeding 5mm - 2mm and rubbed

down to 1.5mm thickness and polished to a perfectly smooth and even finish, working from top to bottom. While trowelling is going on, soap stone powder contained in thin muslin bags shall be dusted over the surface and worked in. Moistening shall be commenced as soon as the plaster has hardened sufficiently and is not susceptible to injury. Soaking of wall shall be avoided and only as much water as can be readily absorbed shall be used.

c. Moulding: All moulding shall be worked true to template and drawn neat, clean and level. All exposed angles and junctions with door frames etc. shall be carefully finished.

11. CEMENT PLASTER WITH NEAT CEMENT FINISH IN DADO

Whenever it is required, there shall be 3mm thick film of neat cement finish of 1:1 mix or specified proportion. The neat cement finish, if required, shall be mixed with 3-12% of colour create of specified colour and brand or as directed by the Construction Manager. The neat cement finish shall be applied after completely setting the final layer of cement plaster. The neat finishing layer or film shall be trowelled smooth.

12. DECORATIVE PLASTER WORK

The decorative plaster of specified proportion shall be applied as specified above, the design and workmanship quality should be same as that of existing finished decorative surface.

13. SAMPLE TO BE APPROVED

Samples of about 1 square meter of plaster of all types of plaster work shall be prepared for the approval of the Construction Manager prior to further execution.

When only one coat of plaster is specified, the base shall be prepared as specified for undercoat and directly apply one coat of plaster as finish coat.

14. CURING

Each coat shall be kept damp continuously for at least two days. Moistening shall commence as soon as the plaster has hardened sufficiently and is not susceptible to injury. The water shall be applied by using a fine fog-spray. Soaking of wall shall be avoided and only as much water as can be readily absorbed shall be used. Excessive evaporation on the sunny or windward sides of the building in hot dry weather, shall be prevented by hanging mattings or gunny bags on the plaster and keeping them wet.

After the completion of the finishing coat, the plaster shall be kept wet for seven days and shall be protected during that period as mentioned above.

If the work perish through the neglect of watering or any other default and if the work is not done as specified, the work shall be removed and redone at the Contractor's expense.

Curing of the plaster shall be so done as to avoid or minimize overflow or seepage to the existing surface below.

15. RATE

The rate include all labour, materials, erection and removal of scaffolding, preparation of background, finishing, curing etc.

16. MEASUREMENT AND PAYMENT

Measurement and payment shall be done in square meter as in item. Measurement shall be done nearest to two decimal places separately for various mixes and various thickness of the work for the net quantity executed. All openings shall be deducted and any jambs, soffits etc. measurements shall be allowed.

CEMENT POINTING

1. SCOPE

This specification covers supplying materials and executing the pointing works on stone work.

2. PREPARATION

The joints of the stone work shall be raked out to a depth of 3/4" and the wall surface washed and cleaned and kept wet for two days before pointing

3. SCAFFOLDING

See plaster work.

4. MATERIALS

The materials for mortar-cement and sand as specified shall be of standard specifications as mentioned in the beginning, (see concrete works). The materials shall be first mixed by measuring with boxes to give the required proportion as specified (1:2 or 1:3); and then mixed by adding water slowly and gradually to give a working consistency.

5. OPERATIONS

The mortar shall be pressed into the raked, cleaned and wet joints and a groove of shape and size of 5 to 6 mm deep shall be formed running a forming tool of steel along the centre line of the joint. The vertical joints also shall be finished in a similar way at right angles to the horizontal lines. The finished work shall give a neat and clean appearance with straight edges.

6. CURING

The finished work surface shall be cured for seven days and shall be protected by hanging mattings or gunny bags on the pointing keeping them wet.

Curing shall be done in a way to avoid or minimize overflow or seepage to the existing surface below.

7. RATE

The rate includes all labour, materials, erection and removal of scaffolding, preparation of background, finishing etc.

8. MEASUREMENT AND PAYMENT

Measurement and payment shall be done in square meter as in item. Measurement shall be done nearest to two decimal places separately for various mixes of the work for the net quantity executed. All openings shall be deducted and any jambs, soffits etc. measurements shall be allowed.

CEMENT SAND PUNNING

1. SCOPE

This specification deals with the Cement Sand punning in floor or vertical surface.

2. MATERIALS

Cement and Sand shall confirm to “STANDARD CONSTRUCTION MATERIALS”

3. WORKMANSHIP

All workmanship shall be according to the latest and best possible standards.

Cement sand punning l used shall be in the ratio of 1:1 over and including 20 mm base screed 1:4, it shall placed on floor, skirting, dado etc. The entire surface, in advance, shall be thoroughly cleaned of any loose materials, mortar and other foreign materials. Surface shall be thoroughly wetted with water. Laying & rubbing shall be carried out with steel trowel to a hard, smooth & shining surface. Curing shall be carried out for at least seven days

Before applying cement sand punning, the surface shall be cleaned of any dust or loose particles. The average thickness of punning shall not be less than 3mm .The pattern of the surface should be as per instruction of the Engineer. The surface shall be finished by rubbing with a steel trowel & any depression shall be filled in & rubbed to a shining surface. All corners & edges shall be rounded. The contractor shall prepare a 3 square feet of the punning as per instruction of the Engineer, after which all punning executed shall confirm with the respective approved sample. All punning shall be finished smooth, even & truly level. It shall be kept wet for 7 days.

4. RATES

The rates for items shall include cost of all materials consumed in the work at all level, hire charges of materials, tools and plants, cost of labour, insurance, all transport, services, etc, complete.

5. MEASUREMENT

It shall be measured in square meter or as specified in bill of quantities as per exact dimensions shown in the drawing inclusive all materials, manpower, curing , etc, all complete.

PAINTING WORKS

1. SCOPE

This specification covers different type of paintings in different surface in general and application of cement paint, enamel paint. Dry or oiled distemper, plastic emulsion paint etc. in wall/ceiling surface in particular with a petroleum base/water base paint in roof.

2. MATERIALS

All required materials shall be as specified in the "STANDARD CONSTRUCTION MATERIALS".

3. SCAFFOLDING

The scaffolding shall be double or single according to requirements and shall be provided by the contractor at his own expense. The scaffolding shall be erected with steel section or pipes, or bamboos of adequate strength to safe for all operation. The Contractor shall test all measures to ensure the safety of the work and working people. Any instruction of the Engineer in this respect shall also be compiled with. The Contractor shall be entirely responsible for any damage to property, or injury to persons resulting from ill erected scaffolding, defective ladders and materials or otherwise arising out of his default in this respect. Proper scaffolding shall be provided to allow easy approach to every part of the work. Overhead work shall not be allowed.

4. PREPARATORY WORK

The surface to be painted shall be prepared as specified by the manufacturer of the paint. The surface shall be thoroughly sand papered and cleaned from dirt, dust etc. by brushing and washing down with clean water. Any grease, oil paint or any other foreign material shall be removed by approved method.

Rough coat and pebble dash surface shall be thoroughly sand papered brushed and washed to remove dirt and dust.

5. CEMENT PAINT

5.1 Mixing

The dry cement paint shall be thoroughly mixed with clean fresh water so as to produce paint of required consistency which for normal work shall be that of ordinary paint. In mixing and application, the Contractor shall follow the manufacture instructions. Paint for application by brush shall be stained through paint strainer. The paint shall be kept stirred and used within the specified time of the manufacture. Hardened or damaged paint shall not be used.

5.2 Application of Cement Paint

The paint shall be applied by means of brushes and in the manner specified by the manufacturer. The number of coats shall be as mentioned in the item. The subsequent coats shall be applied after the preceding coat is properly cured and has thoroughly hardened, inspected and approved and as per manufacturer's specification.

Absorbent surface shall be evenly damped so as to give even suction. In dry weather, freshly painted surfaces shall be kept damp for at least two days and protected from direct sun. The minimum consumption rate of materials or coverage area per unit quantity shall be as specified by the manufacturer.

6. ACRYLIC EMULSION PAINT

6.1 Paint and Primer

The acrylic emulsion paint shall be of British paints India Ltd., Jenson and Nicolson, India or any other superior brand in sealed tins as approved by the Construction Manager.

6.2 Preparation of Surface

The surface where paint is to be applied shall be cleaned and smoothly sand papered, all dust being removed. If the paint is to be applied on a wooden surface a suitable filler materials shall be applied and sanded off to achieve a clean and smooth surface. When painting a metal surface, all loose scales, rust, etc. shall be removed by the use of suitable sand paper.

6.3 Primer

Two coats of cement primer, wood primer or metal primer as required shall be applied. Each coat shall be approximately 20-30 microns when applied by brush. The primed surface shall be neatly and smoothly sand papered and cleaned.

6.4 Application of Paint

The paint of approved shade shall be applied as per manufacturer's printed instruction by suitable brush. A minimum of two (2) coats shall be applied to achieve a uniform painted surface. The minimum consumption rate of materials or coverage area per unit quantity shall be as specified by the manufacturer.

7. SYNTHETIC ENAMEL PAINT

7.1 Paint

The paint shall be of British Paints India Ltd., Jenson and Nicolson India or any other superior brand approved by Construction Manager. It shall be in sealed tins and its type and use for exterior and interior surface shall be as per the manufacturer's printed instructions.

7.2 Preparation of surface shall be as for Acrylic paints (clause 6.2).

7.3 Primer

When synthetic enamel paint is to be applied onto a cement plastered surface or concrete surface, two coats of suitable cement primer shall be applied to the clean prepared surface. When the paint is to be applied to a wooden surface two coats of wood primer shall be applied to the cleaned prepared surface.

7.4 Application of the Paint

Following the preparation of the surface and the application of the primer a top coat shall be applied. A second coat shall be applied after the first coat has dried. Care should be taken that dust or other foreign materials do not settle or otherwise disfigure the various coats. The minimum consumption rate of materials or coverage area per unit quantity shall be as specified by the manufacturer.

The same brand and same batch of materials shall be used for all coats. The paint shall be used and applied as per manufactures' printed instruction. The paint shall be applied with bristle brushes. Once

the paints shall be applied in the thinnest possible layers with parallel drawings, no flow down shall be allowed.

8. OIL BOUND AND DRY DISTEMPER

8.1 Paint

The distemper shall be of British paints India Ltd., Jenson and Nicolson, India or any other superior brand approved by the Engineer. It shall be in sealed tins. Generally synthetic washable distemper is available in paste form and dry distemper in powder form.

8.2 Preparation of Surface

The preparation of surface shall be as specified for Acrylic paints (clause 6.2). Oil bound distemper is not to be applied to freshly plastered surface.

8.3 Mixing

The paste of synthetic washable distemper shall be thinned by adding 700 ml of cold water to every kg of distemper paste. Water should be added gradually to mix them properly to get uniform consistency.

The dry distemper powder shall be mixed with 300-400 ml of clear warm water to a kg. of distemper to obtain a creamy paste. The paste shall be kept aside for sometime. Then after 700-1000 ml of water shall be added to obtain a proper brushing consistency.

8.4 Application

As described for synthetic enamel paint (clause 7.4).

9. SAMPLE TO BE APPROVED

Sample of approximately 1 sqm of painting work of all types of paint work shall be prepared, to be approved by the Engineer before further execution.

10. MEASUREMENT

Measurement shall be done in square meter. The measurements shall be as follows:

	Description of Work	How Measured	Multiplying Factor
a.	Paneled or Framed	Measured flat (not girthed) end of frame to frame	1.50 for each side
b.	Flush doors	- do -	1 for each side
c.	Fully glazed or wire gauged	- do -	0.50 for each side
d.	Part paneled and par glazed or gauged	- do -	1 for each side
e.	Fully ventianed or		

louvered	- do -	1.50 for each side

Nothing extra shall be paid for short width and surface of any shape, size. This shall include for two or more coats inclusive of materials, scaffolding and labour complete.

11. RATE

The rate shall include all labour, materials and use of tools to carry out the operation described as above.

MILD STEEL GRILL

1. SCOPE

This specification deals with the Mild Steel Grill for windows.

2. MATERIALS

The Mild Steel grills shall be fabricated from Mild Steel flats, angles and channel confirming to BS 15 or equivalent. The welding shall be fillet-welding confirming to the requirements of BS-449 or equivalent. For fixing grill frame to structure the grips shall be of plastic or metal. The screws shall be steel screws.

3. WORKMANSHIP

All workmanship shall be according to the latest and best possible standards.

The mild steel grill shall be made according to pattern given in the drawings. Welded joints shall be neatly made, filled, smooth and left clean. The site in-charge shall be informed when the welded work is ready for inspection and such work must left unprimed until the site in-charge gives his approval. The contractor shall furnish at his own expense all necessary tools and all materials, which he may require for the safe erection of the work and remove the same when the work is completed. The contractor shall be solely responsible for any damage due to structure during erection.

The grill work shall be finished with two coats of metal primer followed by three coats of enamel paint and fixed to the opening.

4. RATES

The rates for items shall include cost of all materials consumed in the work at all level, hire charges of materials, tools and plants, cost of labour, insurance, all transport, services, etc, complete.

5. MEASUREMENT

Measurement of works will be made in square meter or as specified in bill of quantities.

RAILING WORKS

1. SCOPE

This specification covers supply, fabrication, and installation of railing works in stairs as well as verandah portion of different building complexes.

2. MATERIALS

Mild steel pipes, stainless steel pipes and fittings as specified shall comply with relevant IS code specification.

3. FABRICATION AND INSTALLATION

Mild Steel pipe railings are fixed with overall fittings as bends, Tees etc. which are welded as per drawing and instruction of Engineer. Welded joints shall be neatly made, filed smooth and left cleaned; and adequate means shall be employed for temporarily fastening the parts to be welded together until the joints are leveled.

4. PAINT

The railing shall be finished with one coat of red lead followed by one coat of aluminum paint and fixed in position as per instruction of Engineer.

5. RATE

The rate for the item shall include all labour, materials, use of tools and machinery inclusive.

6. MEASUREMENT AND PAYMENT

Measurement and payment shall be done in square meter or linear unit as in item. Measurement shall be done nearest to two decimal places separately for various types of the work for the net quantity executed.

C. SPECIFICATIONS FOR ELECTRICAL WORKS

General Specifications

Scope

The scope of works covered shall include supply of all materials, labor, equipment and services in connection with the Electrical works, consulting drawings, bill of quantities and specifications of followings:

a. Transformer, 11 KV HT substation works, Terminal boards etc.

b. Generator sets including the ATS panels works and earthings

c. Control Panel, Block Distribution Boards, Distribution Boards.

d. Earthing works of electrical installation and general lightening protection.

e. Outdoor Lighting and arrangements.

f. Internal wiring and electrification though UPVC based hard conduit, Cable tray, Cable trench/laid under ground, riser mains etc and provide light points, fan points, socket outlets etc including supplying, installation testing and commissioning of the light fixture.

g. The conduits are to be laid in straight line with necessary elbo, T's and 4 way circular ensuring that the line of lay is straight.

h. Testing and commissioning of complete electrical installed system.

i. Prepare shop drawing prior to installation works for approval; prepare "As Built" drawing after testing and commissioning of complete electrical system.

The Contractor shall consult drawings, bill of quantities, and specifications all together, which gives the total scope of the work.

Rates

a. The rates given in the electrical installation scheme are all inclusive of labour and materials required for breaking brick work, concrete work, earth work in excavation etc., as and where required for carrying out the implementation of the complete electrical installation scheme.

b. The rates given in the electrical installation scheme are all inclusive of any labour and materials required for reinstating general civil works with all finishes and trench filling in the exterior inclusive of levelling to approved level and distribution or removal of surplus soil, or according to specifications.

c. The rates are also inclusive of painting work of all exposed parts of the installation consisting of one or two coats of anti-corrosive paints on any metal part plus 2 or more coats of approved finishing / paint in colours to be instructed by the Consultants.

d. The rate quoted in the tender shall include all charges for scaffoldings, centring materials, water and electricity charges, tools and equipment, sheds for material, transferring all materials from place of availability to the site of work, etc. The tender rates shall also include Contractor's temporary establishment and services he may require for the successful completion of the work. The rates shall be inclusive of sales tax / value added tax, or any other fees or duty levied by any government or public bodies.

Quantities

The calculations made by the Bidder should be based upon probable quantities of the several items of work which are furnished for the Bidder's convenience in schedule of probable quantities, but it must be clearly understood that the schedule of quantities is liable to alteration by omission, deletion or addition at the discretion of the Consultants without vitiating the contract and the contract is not a lump sum contract, and neither the probable any way assure the Bidder or guarantee that the said probable quantities are correct or that the quantity of work would correspond thereto.

Drawings

a. It is the intent of the specifications, along with bill of quantities and accompanying drawings to provide a complete workable facility. The drawings, specifications and bill of quantities are complimentary and what is called for by one shall be as bidding as if called for by all. Items shown on the drawings or bill of quantities are not necessarily included in the specification.

b. The drawings provided are design drawings and generally are diagrammatic. They do not show offsets, bends, elbows, or junction boxes which may be required for the installation in the space provided. The Contractor shall follow the drawings as closely as is practicable to do so and shall install bends, offsets, junction boxes, pull boxes, etc. where required, by local conditions from measurements taken at the building, subject to approval and without additional cost.

c. The contract drawings shall serve as working drawings for the general layout of lighting, outlets, cables, and various items of equipment. The Contractor shall prepare and submit for approval [up to 5 sets or as required] detailed shop drawings of all installations not detailed on the drawings provided. Any change or amendment made during installation or erection shall be noted in the working drawing. The preparation and submission of detailed as built in drawings after completion of the works, shall be the responsibility of the Contractor. The submission of the final as built in drawing is obligatory prior to the issuance of the Completion Certificate.

Shop drawings shall include, but are not limited to :-

- Control system,
- Conduit layouts with location of junction boxes and number of wires
- External and internal cables pipes, anchors, supports, loops, building entrances
- Electrical distribution boards, wire or cable ways, etc.,

- Lighting fixture catalogue sheets for all fixtures to be installed, with fixture type indicated for each item.

d. Submit for approval, manufacturer's detailed shop drawings, specifications and data sheets for all equipment.

Cutting, Patching and Repairing

Cutting, patching and repairing required for the proper installation and completion of the work including plastering, masonry work, concrete work, carpentry work and painting shall be performed by skilled craftsmen in their respective trades. Holes which are cut over size shall be filled, so that the equipment fit tightly.

Equipment Protection

Keep all cables and conduit opening closed by means of plugs or cover to prevent entrance of foreign matters. Protect all cables, conduits, raceways, fixtures, equipment or apparatus. Any such item damaged prior to final acceptance of the work shall be restored to its original condition or replaced at no extra cost to the client.

Inserts and Sleeves

Layout inserts and sleeves necessary to complete the work in advance of pouring of slabs or construction of walls. Cost of cutting or patching made necessary as a result of this operation shall be at no extra cost.

Cleaning

a. Electrical switch boards, receptacles, equipment shall be vacuum cleaned of dust and debris.
b. Painted surface which have been scratched or marred shall be cleaned of rust or other foreign matters and painted with matching colour of industrial enamel.

Operation

The Contractor shall instruct thoroughly the Owner or his representative in the efficient operation and maintenance of the entire system.

Guarantee

The Contractor shall make good the following guarantee requirements within six months following date of final acceptance without additional cost to the Owner:-

a. All work and apparatus shall be so built and installed as to deliver its full rated capacity at the efficiency for which it was designed.
b. All work and apparatus shall be free from defects of material or workmanship. Any defective material due to defective manufacture, or bad workmanship, or wrong installation shall be replaced free of cost during this period.

c. The entire electrical and mechanical apparatus shall operate at full ratings without objectionable noise or vibration.

Equipment Connections

Provide electrical connections as required to all equipment like light fixtures, fans, outlets etc., include all incidental wiring, materials, devices, and labour necessary for a finished working installation.

Safety and Disconnect Switches

Provide safety and disconnect switches as per IS / BS specifications of quick-make, quick break type, suitably rated and having electrical characteristics as required for the load served. Provide cover, interlock for switches and install required disconnect switches as per the code, whether or not specifically shown.

Codes, Rules, and Regulations

Unless otherwise specified, electrical equipment, materials and workmanship shall conform to the applicable current standard rules, and BS specifications. All products shall bear the mark of Indian / British Standards Institutions and acceptable to Regional Fire Insurance Council. The following Indian Standard specification will apply to the equipment to be used under this contract.

1)	Transformer	-	IS 2026, 1962
2)	Distribution boards	-	IS 2675, 1966
3)	Low Voltage Moulded Case Circuit Breaker	-	IS 2516, 1977
4)	Miniature Circuit Breakers for AC circuits	-	IS 8828 : 1978
5)	Degrees of Protection provided by enclosures for low voltage switchgear	-	IS 2147 : 1962
6)	Installation and maintenance of switchgear not exceeding 1000 volts	-	IS 10118 : 1982
7)	General requirements for switchgear and Control gear for voltages not exceeding 1000 volts	-	IS 4237 : 1982
8)	Marking of Switchgear busbar	-	IS 11353 : 1985
9)	Degree of Protection of Enclosures for low voltage switchgear.	-	IS 2147: 1962
10)	Electrical relays for power system protection	-	IS 231: 1986
11)	Code of Practice for selection, installation And Maintenance of switchgear & control gear	-	IS10118: 982

12)	Low voltage switchgear & control gear assemblies	-	IS 623 : 1993
13)	Current Transformer	-	IS 2705 (part -I, II and III)
14)	Potential transformer	-	IS 3156 (Part-I,II and III)
15)	Earthing	-	IS 3043, 1966
16)	Earth Resistivity	-	IS 3043.
17)	Protection against lightning.	-	IS: 2309 - 1989
18)	Wiring installation	-	IS 732, 1963
19)	PVC conduits for electrical wiring.	-	IS9537 : Part III 1980
20)	Switch socket outlets	-	IS4615 : 1990\
21)	Plugs and socket outlets of rated voltage upto and including 250 volts and rated current upto and including 16 amperes.	-	IS: 1293- 1988
22)	Switches for domestic and similar purposes	-	IS : 3854 : 1997
23)	PVC Cable	-	IS : 554, 1964
24)	Flexible steel conduits for electrical wiring	-	IS: 3480 : 1990
25)	Boxes for the enclosure of electrical accessories-		IS : 5133:Parts I&II 1969
26)	660/1100 V grade PVC insulated wires.	-	IS : 694 : 1990
27)	Rigid steel conduits for electrical wiring. -	-	IS : 9537 : Part I 1980 IS : 9537 : Part II 1981
28)	Accessories for rigid steel conduits 1990	-	IS 3837 :
29)	personal hazard fire safety of buildings 1998	-	IS 1644:
30)	electrical installation fire safety of buildings 1997	-	IS 1646 :
31)	electrical wiring installations	-	IS 732 : 1989
32)	Conduits for electrical installations:	-	IS: 9537 (Part - 1) - 1980
33)	PVC insulated heavy duty cables	-	IS 1554 - 1988
34)	Cross link polyethylene insulated PVC (sheathed XLPE cables)	-	IS 7098 - 1985
35)	Code of practice for installation and maintenance of power cables	-	IS 1255 - 1983
36)	Conductors for insulated electrical cables	-	IS 8130 – 1984
37)	Drums for electrical cable	-	IS 0418 - 1982
38)	Methods of test for cables	-	IS 0810 - 1988
39)	Recommended current rating	-	IS 3961 - 1987
40)	Recommended short circuit rating of high voltage PVC cables	-	IS 5891 - 1970
41)	Short circuiting Rating of cable	-	IS 1554 Part-I.
42)	Bus Bars and Bus Chamber	-	IS 375, 1963
43)	FTL for general lighting service:	-	IS: 2418 (Part-1) – 1977
44)	HP mercury vapour lamps:	-	IS: 9900 (Part-1) – 1981
45)	HP sodium vapour lamps:	-	IS: 9974 (Part-1)-1981
46)	Interior illumination: Principles for good lighting and aspects of design.	-	IS: 3646 (Part-1) 1966
47)	Hospital lighting	-	IS: 4347- 1967
48)	Library lighting.	-	IS: 2672 – 1966
49)	Luminaries: General requirements.	-	IS: 10322 (Part-1) - 1982
50)	Luminaries: Constructional requirements.	-	IS: 10322 (Part-2) - 1982

51)	Luminaries: Particular requirements: Recessed luminaries. 1987	-	IS:10322(Part-5/Sec-1)
52)	Flame-proof electric lighting fittings: Well glass and bulkhead types.	-	IS: 2206 (Part-1)1984
53)	Luminaries for hospitals	-	IS:8030- 1976
54)	Emergency lighting units.-	-	IS: 9583- 1981
55)	Electric call bells and buzzers for indoor use	-	IS: 2268- 1988
56)	Electric ceiling type fans and regulators	-	IS: 374 - 1979.
57)	Exhaust & Ventilating fans.	-	IS: 2312 – 1967

Samples

- The Contractor shall supply samples of the materials, which may require Consultant's approval prior to the use. These samples shall be supplied at the Contractor's own expenses and without delay.

- Whenever required by the Consultant in consultation with the Employer, the Contactor, at his own expense shall provide all facilities to have the stores or materials tested at any time during the works electrification or prior to the expiry of maintenance period, that the stores or materials provided by the Contractor are sound or of a satisfactory quality or meeting the specified standard, or in accordance to the Contract. In the event that the test results are otherwise, the Contractor shall remove such unsatisfactory stores and materials within 24 hours upon the written instructions of the Consultant. Such decision of the Consultant shall be final, binding and conclusive even though such stores or materials may have been inadvertently passed, certified and paid for.

Technical Specifications

Power Distribution Panels

Scope

The scope of this section covers manufacture, supply, installation, testing and commissioning of Power Distribution Panels including MCCB panels and Capacitor Panels rated up to 1000 volts.

Electrical Characteristics of Factory Built Assemblies

The electrical characteristics of component parts of factory built assemblies shall be as indicated and shall apply when the components are mounted in their enclosures, appropriate derating factors having been allowed for effect of enclosures, other components and interconnections.

Enclosures of Factory Built Assemblies

a. Unless otherwise indicated enclosures shall provide a minimum degree of protection of IP 42 when located within buildings.

b. Door shall have adequate fastenings with provision for locking in the closed position. Covers requiring tools for their removal are excluded from this requirement.

c. Fixing holes for equipment inside buildings may be inside or outside the enclosure.

d. Earthing terminals shall be fitted to each enclosure, suitable for internal and external connection, to enable the exposed conductive parts of the protective conductor. Where the enclosure has a painted finish, provision shall be made for earthing terminal to be electrically connected to the enclosure without need to remove any paint from ferrous metal.

e. Cable terminals shall be suitable for the number, size and type of cables as indicated. Adequate spacing shall be allowed for spreading of cable tails to avoid stress on the insulation or terminals; if necessary, extension boxes shall be fitted to standard enclosures. Terminals for neutral conductors for three phase and neutral circuits shall be the same size as for phase conductor, except where reduced section neutral cable cores are indicated.

f. Gland plates shall be provided for all multi-core cables of 35 Sq. mm and larger. For all sizes of single-core cable non ferrous gland plates shall be provided and there shall be a clearance of not less than 25 mm between cable glands and ferrous metal.

g. Metallic enclosures for location within buildings shall have a stove dried painted finish of the manufacturer's standard colour, unless otherwise indicated. Ferrous parts shall be degreased and adequately rust protected immediately prior to painting.

Construction

a. All electrical panels shall be fabricated from 2 mm and 1.6 mm MS sheets properly supported with angles and channels.

b. The cubicle shall be floor/wall surface/wall flushed type unless specified otherwise.

c. The door shall be provided with internal hinges and panel locks of superior quality. The hinges shall be union joint type to facilitate easy removal of the doors when necessary.

d. The doors shall be provided in a similar fashion as generally provided for the outdoor cabinet, where water cannot enter in the cabinet from the door.

e. The door shall be provided with strengthening arrangement to avoid wobbling and distortion.

f. Wherever the doors are opened on horizontal hinges, an arrangement shall be provided to latch the doors in an open condition for inspection of the wiring.

g. Generally push buttons, signal lamps and control components shall be provided on hinged door, hinged at the top, with suitable latching arrangement to hold the door in open position. These components i.e. push buttons, lamps etc. will be at approximately 1400 mm height.

h. The cabinet shall be welded construction and not of jointing construction.

i. The channel frame of 300 mm height fabricated from minimum section of channel 75mm x 6 mm x 40mm will be provided at the bottom of each cabinet. This is required to make the cabinet stable and space for cable bends. The foundation holes with grouting bolts will be provided in the channel frame.

j. Sectionalized cable entry plates of 16 SWG MS sheets at the bottom complete with cable glands and cable lugs for both the end terminations of each cable should also be supplied in sizes as specified in the panel details.

k. The circuit components will be mounted on sectionalized 16 SWG MS sheet with suitable threading in the sheets to facilitate easy maintenance, future addition etc.

l. The circuit components will be mounted on sectionalized 16 S.W.G. M S sheet with suitable threading in the sheets to facilitate easy maintenance, future addition etc.

Lockout/Tag Out Features

a. Lockout or tagout of energy isolating devices shall be used to ensure that the machines or Equipment are isolated from all potentially hazardous energy, and are locked out or tagged out before employees perform any servicing or maintenance activities where the unexpected energization, start-up or release of stored energy could cause injury.

b. Servicing and/or maintenance which takes place during normal operations is covered only if an employee is required to:
   - remove or bypass a guard or other safety device;
     Or
   - place any part of the body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle.

c. **Capable of Being Locked Out** - An energy isolating device will be considered to be capable of being locked out either if it is designed with other attachment or integral part to which, or through which, a lock can be affixed, or if it has a locking mechanism built into it. Other energy isolating devices will also be considered to be capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

d. **Energy Isolating Device** - a mechanical device that physically prevents the transmission or release of energy including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a slide gate; a slip blind; a line valve; a block; and any similar device used to block or isolate energy. The term does not include a push button, selector switches, and other control circuit type devices.

e. **Lockout** - the placement of a lockout device on an energy isolating device, in accordance with an Established procedure, ensures that the energy isolating device and equipment being controlled cannot be operated until the lockout device is removed.

f. **Tagout Device** - a prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Dimensions

The height of the panel shall be as per the drawing but not be more than 2200 mm. Depth of the panel shall not be more than 400 mm and width of the panel shall be given in the particulars of panel specifications. Width of the door shall be restricted to 600 mm. Shop drawings shall have to be approved by the consultant before fabrication is taken up by hand.

Adaptor Chambers for all cable entries

Wherever necessary, sheet metal adaptor chambers with angle frame and minimum depth of 300 mm shall be supplied with panel. All the covers of adaptor box shall be removable type. The box can be mounted horizontally or vertically. The pattern of cable entry, wherever not specified shall have to be confirmed by the manufacturer in writing after placement of order.

Powder Coating Treatment

The cubicle shall undergo the process of Powder Coating treatment to the satisfaction of the consultant.

Bus-bars

The Bus-bars shall be tinned and made of copper designed to have a current density of 1.25 amps per sq. mm. The Bus-bars will be covered with PVC color sleeves and properly supported. The Bus-bar supports will be designed to withstand short circuit current equivalent to 25 MVA at 415 volts. The Bus-bars will be adequately insulated and protected to prevent accidental contact during operation and maintenance.

Insulation

The insulation between phases and between phases and ground of the power conductors will be made of synthetic resin board/molding, resistant to dust and dampness. All insulating material shall be non-hygroscopic, fungus-proof and treated with suitable synthetic varnishes.

Terminals

Up to 35 sq. mm cables, the terminal will be provided of clip-on type generally manufactured by M/s Elmex or M/s Technoplast and above 35 sq. mm, cable end terminals will provide of brass stud type designed of rugged construction.

Wire Ways

PVC extruded wire ways of required size shall be provided for wiring in the control panel.

Ferruling and Colour Code

Cabling for power circuit should be red, yellow and blue or otherwise proper coloured sleeving will be provided at both ends of cables. For control cables every conductor will be provided with the identification ferrule matching with the one in the drawing.

Cable Termination

Every cable, either for control or power duty shall be provided with crimped type of lugs of suitable size as specified.

Cables (Internal Wiring)

All the cables shall be PVC insulated of NS approved and reputed make. The cables shall be copper conductor only and shall be stranded and minimum number of strands shall be three. The ratings shall confirm to IEE regulations. PVC flexible conductor, if used, shall have minimum size of 2.5.sqmm.

Earthing

The earth Bus-bars should be of tinned copper as specified, G.I. bolts and nuts. Bolts to be of cadium plated with washer earth Bus-bars will be provided all around the cubicle at the bottom and it will be of the same size as neutral Bus-bar but the maximum size will be 75 x 6 mm with duplex external earth connection arrangement.

Cable Glands and Lugs

The cable glands will be of brass cone grip type. These glands will be provided for all the outgoing connections at both the ends for power as well as control circuits provided in the panel and also for the incoming cable or cables. Lugs will be crimped for termination of outgoing cable at both ends (i.e. load end and panel end) with each outgoing feeder.

Feeder Units

a. The feeder units shall be of compartmental design comprising of cubicles assembled together and shall incorporate cubicle MCCB and MCB having rupturing capacity of 25/35 KA and 10 KA at 440 volts respectively.

b. The MCCB shall be quick break, double break system and trip free type with magnetic thermal release and under voltage release protection against overload and short circuit and under voltage. The MCCB should be able to provide distant fault indication in event or short circuit / over load.

c. Individual MCCB should have rotary type external handle for with the clear indications of ON & OFF position. The connections to MCCBs from the Bus-bars and cables should be terminated in pressure bolted joints inside the switch contacts.

d. The MCCB shall have ratings: 100A, 200 A, 250A, 400A, 50 A, 40 A, 32 A, 20 A with 25/35 KA (minimum) rupturing capacity. ACB SHALL BE OF 50 KA.

e. Bus bar should have sufficient mechanical strength to withstand the effects of short circuit until it can be cleared by appropriate protecting device. All Bus-bars should be clearly marked with appropriate colour code to enable immediate identification of the phase and neutral & MCCB/MCB should have adopter terminals for proper termination.

f. Bus bar bushing shall be placed at a interval of 200 mm fixed with brass nuts and bolts and connections should be well managed in reference to the available space of cable allay.

g. Arrangements should be provided to receive PVC cables either from the topside or from the bottom (as specified). End plates should be mounted inside the Bus-bar at unit level for cables from above or below.

h. All sheet-steel parts used in the construction of a cubicle board should have undergone rigorous rust proofing process which must comprise of alkaline degreasing descoaling in dilute sulphuric acid and a recognized phosphate process. The steel work shall be finished with powder coating paint.

i. The equipment when assembled shall form a neat and compact unit and shall be complete with supporting framework, mounting channels, and foundation bolts etc. and shall be designed so as to ensure complete interchangeability of components.

j. All major components like ACB & MCCB should to have total discrimination & Manufacturer should provide a back up printed document along with curves in support of that. Following features shall also be incorporated in ACB & MCCB's.

- All MCCB/ACBs should have Rating Plug, Zone Selective Interlock, Ready to Close Indication & communication capable release.
- All ACBs & MCCBs should have provision for release replacement for system up gradation in future.

- All MCCBs should have positive isolation as well as Class II Front Face for operator's safety.
- All MCCBs should have line load reversibility & should be able to mount in any orientation.
- In event of any change in ratings / models on account of ensuring discrimination, the same will be in account of the bidder only.

Capacitor Bank and Panel (Provisional)

1) This specification covers requirements of Medium Voltage Capacitors and Control Panel to be used for power factor improvement of the electrical system and shall be connected to Main L.T. Panels. Automatic Power Factor Correction Panel shall function to improve power factor of the system in which it is connected. It shall improve power factor upto 0.95 from initial power factor of 0.70.

2) The design, manufacture and performance of power capacitors and accessories shall comply with all currently applicable statutes, regulations and safety codes for power installation as prescribed in relevant IS codes and to requirement of Local Electricity Supply Authority to which the equipment shall be installed.

3) Unless otherwise specified the capacitor and control panel shall conform to following:

   - IS : 2834 - Shunt capacitors for power systems.
   - IS : 2147 - Degree of protection provided by enclosures for low voltage switchgear and control gear.
   - IS : 4237 - General requirements for switchgear and control gear for voltages not exceeding 1000V.
   - IS : 8623 - Specification for factory built assemblies of switchgear and control gear (Upto 1000 volts).
   - IS : 2208 - HRC cartridge fuse links upto 650 volts.
   - IS : 4064 - Specification for Fuse Switch and Switch Fuse switchgear and control gear.
   - IS : 2959 - AC contactors for voltage not exceeding 1000 volts.

4) Capacitor bank shall be suitable for operation on 415 volts 3 phase, 4 wire, 50 c/s, solidly earthed AC supply system. The capacitor shall be connected to the 415 V Switchgear bus and shall be manually as well as automatically switched in and out in steps so as to correct the power factor to be required value depending on the actual KVAR requirement of bus.

5) The capacitor bank shall be complete with the required capacitor units with the supporting post insulators, sheet steel cubicles, bus-bars, connecting strips, foundation channels, fuses, corrosion proof rating plate etc.

6) Each basic unit is to be built up with a number of elements. These elements should be wounded with high-grade metalized polypropylene film. These metalized film capacitors should be self healing, having very low loss factor. Capacitor element to be completely sealed with epoxy resins to provide maximum humidity protection and highest insulation. The capacitor elements are to be given adequate outside insulation and should be put in all welded surface treated MS containers. These capacitors shall be impregnated with special grade of capacitor oil under high vacuum. The metal case shall be equipped with porcelain bushings to permit connection between power lines and active capacitors.

7) Externally each capacitor unit shall have two separate earthing points, name plate conforming to the requirements of IS: 2834 (amended up to date), discharge resistance etc.

8) The capacitor bank may comprise suitable number of single phase self cooled hermetically sealed units in series parallel combination to achieve required KVAR rating. However, failure of one unit shall not create an over voltage on other units connected in parallel to avoid failure of parallel units.

9) Each capacitor unit/bank shall be provided with directly connected continuously rated, low loss discharge device built into the unit to reduce the residual voltage to a safe value within the specified time as recommended in the relevant standard after the capacitor has been disconnected from the supply.

10) All capacitors shall be suitably protected against over current by means of suitable over current protection (other than fuses) which are adjusted to interrupt the circuit when the current exceeds the safe permissible limit.

11) Capacitor units shall also be protected against internal faults and the effected units/banks shall be automatically and immediately isolated in the event of such fault.

12) Each capacitor unit shall continuously operate at the following overload conditions separately.

- Over voltage up to 10% of the rated RMS voltage.
- Over current upto 15% of the rated current.
- Maximum reactive output upto 30% over the rated reactive output.

13) Each capacitor unit shall be individually protected by HRC fuses with visual indication for operation.

14) The control panel shall be indoor, cubicle type, floor mounted, dust and vermin proof conforming to degree of protection IP54 excepting the enclosure enclosing capacitor bank which shall be of protection class IP-41.

15) Cubicle shall comprise rigid structural frame enclosed by 3mm thick cold rolled sheet steel, doors and covers shall be from 2mm thick cold rolled sheet steel. Structural frame-work with foundation bolts etc. shall be provided at the bottom to mount control panel directly on concrete/floor/steel channel base.

16) All doors, removable covers shall be gasketed all around preferably with neoprene gaskets.

17) The capacitors control panel shall, in general, comprise of the following and shall be housed in well-ventilated panels. Capacitors and their control elements may be installed in different compartments of the same panel to minimize space requirement.

- Power factor correction relay.
- Step controller with reversing motor.
- Time delay and No-volt relays.
- Protection fuses.
- Contactors for individual capacitors banks.

- Change-over switch for either automatic operation or manual operation with push button control.
- Visual indication for capacitor IN-OUT.
- Incoming fuse switch unit.
- 4 pole auxiliary switch for power supply to APFC relay.
- Ammeter with selector switch & CT's.
- Voltmeter with selector switch, protection fuse, indicating lamps.

18) Switches shall be triple pole, air break AC-23 duty. The switch shall have a quick make, quick break mechanism operated by a suitable external handle complete with position indicator.

19) The compartment door shall be interlocked mechanically with the switch so that the door cannot be opened unless the switch is in OFF position. Means shall be provided for releasing this interlock at any time.

20) Fuses shall be HRC, preferably link type, with a minimum interrupting capacity equal to the listed short circuit current. Fuses shall be complete with fuse base and fitting of such design as to permit easy and safe replacement of fuse element. Visible indication shall be provided on blowing of the fuse.

21) The Contactors shall be three pole, air break type designed for duty class III category AC3 with non bouncing silver/silver alloy contacts. Each Contactor shall be provided with 2 NC and 2 Nos. auxiliary lamps contacts rated at 10 amp. Indicating lamps shall be low watt filament type with series register. Lamp and lens shall be replaceable form front.

22) The main buses and connection shall be of high conductivity aluminium/aluminium alloy, sized for specified current rating shall be limited to $105^{O}C$ and $100^{O}C$ for silver plated copper joints and aluminium joints respectively.

23) Bus-bars and connections shall be fully insulated for working voltage with adequate phase/ground clearance. Insulating sleeves for bus-bars and shrouds for joints shall be provided. Shrouds for Bus-bar joints and tapping points shall be of two part epoxy resin cast/fibre glass moulded. Minimum clearance of 25mm is required between phases and between phase and earth irrespective of sleeve/shrouds provided for Bus-bar. Insulating shrouds shall be of moulded type.

24) All buses and connections shall be supported and braced to withstand the stresses due to maximum short-circuit current and also to take care of any thermal expansion.

25) Bus bars shall be colour coded for easy identification and so located that the sequence R-Y-B shall be from left to right, top to bottom or front to rear, when viewed from the front to panel assembly.

26) The horizontal Bus-bar chamber shall be separate and totally enclosed.

27) Gland plate shall be minimum 3mm thick & shall be removable.

28) Screws of corrosion resistant material shall be furnished on all ventilating louvers to prevent the entry of insects.

29) All internal wiring inside the cubicle shall be carried out with 650 V grade, PVC insulated copper wires duly ferruled at either end. The power wiring above 100A shall be carried out with PVC insulated aluminium links.

30) Separate labels shall be provided for relay, instruments, switch, indicating lamp etc. Approval for the type of label shall be taken from the consultant.

31) Painting shall include emulsion cleaning, pickling with dilute acid, washing and rinsing by water, phosphating and oven drying. One (1) coat of stoving type zinc chromate primer and two (2) coats of synthetics enamel.

32) Automatic control relay with necessary taps shall be provided.

MCB Distribution Board

Miniature Circuit Breaker Type Sub- Distribution Boards

1) Miniature circuit breaker boards shall comply with relevant Indian standards. They shall have a fault withstand classification of class 1 unless otherwise indicated. Miniature circuit breakers shall comply with all required standards.

2) These distribution boards shall be used for control of all lighting/power circuits and shall consist of single pole/double pole/triple/four pole miniature circuit breakers mounted in double cover design, dust tight, heavy gauge sheet steel enclosures preferably zinc coated with powder coating finish. Distribution Boards shall be flush or surface pattern according to the requirements of their location and shall incorporate isolators and circuit switches as specified in bill of quantities. All MCBs shall be connected to the electrolytic copper Bus-bars with direct bolted connections. Earthing line and neutral bars shall be provided having sufficient ways to enable each cable to be connected to a separate terminal. Neutral connections shall be corresponding in position to phase connections. Distribution boards shall have phase barriers and PVC ducts for all interior wiring. All distribution boards shall have removable end plates at top and bottom and handles with provision for locking.

3) Phase barriers shall be provided in the 3 phase distribution Boards.

4) In TP&N distribution boards, neutral bus-bars shall have one outgoing terminal for each outgoing circuit.

5) Size of SDB shall be selected to cater to extra space on the bus for mounting ELCBs in addition to outgoing No. of specified MCBs.

6) A multi-terminal bar for the circuit protective conductors shall be provided for both insulated and metal cased boards, with one terminal for each outgoing circuit. It shall be directly connected to the earthing terminal without dependence on the exposed conductive parts of the enclosure.

7) Identification of each MCB way shall be by numbering. Identification in the neutral Bus-bar and protective conductor bar shall clearly relate each terminal to its respective MCB way.

8) Spare MCB ways shall be provided as indicated. Where specific ratings are indicated, MCB shall be incorporated otherwise, the ways shall be left blank but suitable for future additions.

9) A separate Junction box of min. height of 150 mm shall be provided for extra lengths of outgoing circuit wires on Top/Bottom (as required) to avoid jumbling of wires within the main section of SDB.

10) Each distribution board shall be fitted with an isolating switch/MCB.

11) Miniature circuit breakers shall be designed and tested strictly in accordance with the relevant parts of Indian standard shall consist of spring accelerated quick-make and quick break action mechanism fitted in moulded cases of high di-electric strength plastic or urea. Fixed and moving contacts shall have silver tungsten contacts. The breakers shall incorporate hydraulic devices for over current tripping and magnetic devices for short circuit tripping calibrated and sealed during manufacture and arc extinction shall be fitted with coupled tripping mechanisms to ensure disconnections of all poles and hydraulic magnetic tripping for each phase of the supply.

12) The MCBs shall be tested as per relevant standards. Copies of Tests to be furnished before supply.

13) Miniature circuit breakers shall have a rupturing capacity of 10 KA at 415 V.

The electrical power system shall be of AC three phase / single phase with 400/231 volt, 50 hertz system. Three phase system shall be 3-phase, 4-wire with neutral solidly earthed.

Un-Interrupted Power Supply System

Scope

The scope of this section covers manufacture, supply, installation, testing and commissioning of Un-interrupted Power Supply (UPS) System.

Technology

- The offered UPS system should be based on True On–line; Double conversion technology with IGBT modules (Line interactive and Delta Conversion technology is not accepted).
- UPS should have inbuilt isolation transformer for total isolation between input and output.
- Offered UPS should have a built in battery charger as a standard design to accommodate higher capacity batteries for longer back-up.
- All wiring and electronics should be accessible from the front for ease of maintenance and repair.
- UPS status monitoring should be provided through user friendly, LCD display for input/output voltage, frequency, battery level etc.
- UPS power/status monitoring software should be available for all operating systems.
- Offered UPS system should be able to work on low/high input voltage preferably from 295 volts AC 3 Phase to 520 Volts AC 3 phase situations without an input voltage stabilizer.

- The offered UPS system should have an isolated bypass with inbuilt Automatic Voltage Regulator (AVR) as standard design.
- UPS offered should have good overload handling capabilities.
- UPS should have a good crest factor to handle heavy inrush currents (minimum 3:1).
- Auto re-transfer if the UPS system trips to bypass due to an over load situation; it should automatically sense and transfer the load from by pass to UPS when the overload is cleared.
- The offered UPS system should be compact and light so that to ensure that minimum space is occupied

Power Distribution Cables

Scope

The scope of this section covers the supply, laying, testing and commissioning of underground/surface mounted/ LT cables as specified in Bill of Quantities.

LV Cables

a. Cables shall be PVC insulated and shall be of 600/1000 volts grade or as specified and shall have been manufactured confirming to BS 6346, NS and Indian Standard Specifications IS-694 and IS-1554 as applicable. These shall be of approved types accepted by the Fire Insurance Association of India for use in industrial risks and to the following specifications. The contractor shall submit the Manufacturer's catalogues giving electrical characteristics of the cables.

b. The fire retardant (LHHO) cables shall be 650/1100V grade multicore having annealed tinned copper wires, insulated with special polymeric material suitable to withstand 150 degree for 30 minutes, cores laid up melinex taped, special low halogen and low smoke elastometric material inner sheathed black, armoured with G.I. Wires/cast steel strips, melinex taped outer sheathed with special low halogen and low smoke elastomeric material.

Mutli-core Cables

These shall be as specified and small comprise of plain, circular, solid or stranded copper conductors. PVC insulated and having an inner sheath of PVC compound armoring and PVC sheath overall and shall comply with IS:.1554-1961.

Flexible Cables

Twin flexible cables used for pendants and connections to other lighting fixtures shall have cross-section area or should be of 0.001sq. Inch (equivalent to 23/0.0076) or larger and be insulated in accordance with relevant IS specifications. The metric equivalent size for 23/0.0076 wherever mentioned may be noted as 23/0.20mm.

Jointing and Terminating Cables

a. Joints and terminations shall comply as appropriate to the type of cable. The consultant shall be informed where it is proposed to install joints that are not indicated.

b. The consultant shall be given evidence that the joint or termination manufacturer has stated the materials to be employed are suitable for the type of cable to be jointed or terminated.

c. Cable shall not be cut until the jointing or terminating commences and the work shall precede continuity until it is completed. All necessary precautions shall be taken to prevent damage and ingress of moisture and impurities; cable ends shall be free from moisture before jointing commences. Where circumstances prevent, completion the cable ends shall sealed. In the case of lead sheathed cables this shall be by plumbing and for aluminum sheathed cables by hermetically sealing.

d. The Contractor shall employ for this work, staff who is fully qualified and competent for the types of joints and terminations to be made.

e. Core identification shall be matched at each joint without twisting or crossing of the cores. Where numbered cores are jointed to coloured all cable runs and on sites with existing installations consistent with the system already in use.

f. For joints in armoured cables, a bonding conductor shall be connected across the armouring. A spilt ferrule shall be placed under the armouring to prevent deformation of the cable by the clamp.

g. At terminations, armouring and metal sheaths shall be connected directly to the external earthing terminal of the equipment by a bonding conductor. For LV cables the bonding conductor shall have a cross sectional area in accordance with IEE wiring Regulations. Metal sheaths of single core cables shall be bonded and earthed at one point only, as indicated; insulated glands shall be used at the open- circuit end or ends.

h. At terminations, cable tails shall be formed by separating and bringing out the cores. Each tail shall be long enough to connect to the terminals of the equipment.

i. At the terminations of single core cables, gland plates shall comply with for three phase circuits the phase conductors shall be arranged, if possible, in trefoil formation where they pass through the enclosure of equipment.

j. Core identification at terminations shall be by coloured or numbered plastic stretch or shrink ferrules.

k. Continuity of spare cores shall be maintained at joints and at terminations, the cores shall be connected to spare terminals.

l. Solder shall be used only for connecting or terminating paper-insulated cables. All other connections and terminations shall be by means of compression fittings or mechanical clamps.

m. Compression connectors and associated dies for compression tools shall be of correct type and size. Tools shall be so designed that the correct compression must be applied before it can be released.

Cable Indentification

a. For multi core cables, PVC ferrule type indicators or tags shall be provided at both ends for core identification. For phase identification of 2/3/3.5 core cables, coloured PVC tapes shall be used at both ends.

b. All cables shall be provided with aluminium tags of approved design, spaced not less than 7.5 meters. Apart and these shall contain the following:

- Feeder No.
- Size
- No. of Cores

Sleeves, Tapes and Sealing Compound

a. Sleeves shall be of the shrink type applied cold by mechanical device or by the use of heat, they shall provide a sufficient thickness of insulation to suit the particular application.

b. Insulating tapes used in joints and terminations shall be compatible with and have a temperature rating and insulating property not less than the cable insulation. They shall be complying with BS 3925.

c. Impregnated cotton tapes shall be double selvedge.

d. All tapes shall be stored in sealed containers until required.

e. Resin filling should be, as far as is reasonably practicable, safe and without risk to health. Each pack shall include warnings as to any hazards in its use, e.g. dermatic or toxic properties with details of precautions, which the user must take to minimize these.

f. Hot pouring sealing compound shall be hard setting and comply with BS 1858:1973(1986). Selection of the compound shall take account of the ambient temperature of installation as well as characteristics of the joint.

g. Care shall be taken to prevent voids occurring in consequence of too rapid cooling.

h. Resin filling shall be used with PVC/ XLPE type cables and hot poured compound shall be used with paper insulated lead covered cables.

Cable Support

a. Unless otherwise indicated the type of cable supports used shall be selected by the Contractor to suit the circumstances of the installation, but they shall comply with given standard.

b. Unless otherwise indicated all ferrous metal for cable tray, cable racks, and cable ladder, cable hangers and their fixings and suspensions shall have a galvanized finish.

c. For general use inside buildings the galvanized finish shall be a coating equivalent to and not less than type G275 to BS 2989, but manufacturer's standard finishes will be accepted for slotted angles. All metal exposed during fabrication shall be given a coat of zinc-rich paint, brushed on or finished to match the manufacturer's finish.

d. Metal cable tray shall be used unless otherwise indicated and it shall comply with IS code where cables are laid in the cable tray they shall be secured by ties, each tie securing the cables of only one circuit. The ties shall be of a proprietary type not requiring screws or bolts for fixing the use of wire or similar material will not be permitted. Ties shall be spaced at not greater than 600 mm along each cable and within 100 mm of each bend or set.

e. Where cable tray is installed in the veritable plane, cables shall be supported by cable cleats.

f. Cable tray shall be fixed at regular intervals not exceeding 1200 mm and at 225 mm from bends and intersections. A minimum clear space of 20 mm shall be left behind all cable trays.

g. Sub-mains cable shall be drawn into surface or recessed type PPR pipes of 10 Kg pressure made out of pure virgin PPR resin having the melting point of 120 degree.

Cable Saddles

a. Cable saddles shall be made from materials, which are resistant to corrosion without the need for treatment of special finish.

b. Cable saddles shall be of a size such that they can be tightened down to grip the cables without exerting undue pressure or strain on them. For vertical cable two bolt cable cleats shall be used which shall grip the cables firmly enough to prevent them slipping.

c. The spacing of cable saddle shall be complying with the IEE/IS Wiring Regulations. At bends in the cable, cleats shall be located immediately on each side.

Cable Tray

a. Ladder Type Cable Tray

Ladder type cable tray shall be fabricated out of double bended channel section longitudinal members with single bended channel section runs of cross members welded to the base of the longitudinal members at a centre to centre spacing of 250 mm. The channel sections shall be supplied in convenient lengths and assembled at site to the desired lengths. These shall be galvanized to the desired lengths.

Alternatively, this shall be fabricated from 2 nos. of 50mm L-section ms channel (3mm thick) separated at 12" wide with 3 mm ms flat as spacer (at least 8" difference) welded with L-section ms channels. The channel and the flat shall be thoroughly cleaned by the sand paper before applying two coats of red oxide primer and then two final cost of enamel of Grey color shall be painted. Every pieces of cable tray shall be connected to the protective earthing with proper screws and 4 sq mm copper cable with cable shoe. A single length of L-section channel shall not be less than 3 or 4 m without joints. The cable tray shall be clamped by down rod at an interval of 1m in horizontal as well as in vertical run.

The down rod shall be fixed to concrete ceiling or wall with the help of expansion bolts. No right angle turning shall be made in cable tray. At such turning, mild curvature shall be provided so that the cable can be turned without damage.

b. Perforated Type Cable Tray

The cable tray shall be fabricated out of perforated galvanized Sheet as channel section single or double bended. The channel section shall be supplied in convenient length and assembled at site to the desired lengths. These shall be of galvanized steel as per design.

The jointing between the sections shall be made with coupler plates of the same material and thickness as the cable tray section. Two coupler plates, each of minimum 200mm length, shall be bolted on each of the two sides of the channel section with 8mm dia round headed bolts, nuts and washers. Earth continuity shall be maintain properly on the contact surface between the coupler plates and cable tray.

Cable Hangers

Cable hangers shall be used only where indicated. They shall be made from mild steel flat bar.

Suspensions and Fixings

a. It is preferred that proprietary suspension systems comprising channel sections with return lips and compatible fixing accessories or slotted angles should be used, Where necessary fixing may be fabricated from mild steel flat bar. Metal arc welding shall comply with BS 5135.

b. Unless otherwise indicated fixing to the building fabric shall comply with table below:

TABLE-FIXING FOR CABLE SUPPORTS

Building fabrics	Type Fixing
Structural Steel work	Purpose made clamps (Type to be approved by consultant)
Non-structural steel work	Bolts, Washers and nuts.
Expanding anchors	Concrete brick or building Blocks
Timber	Coach bolts

Note: Where cable cleats are fixed direct to concrete, brick or building block, fiber plugs and screws may be used as appropriate.

c. No shot firing shall be used and no drilling or welding of structural steel shall be done without approval of the consultant.

d. Suspensions and fixings shall be comply with BS wiring regulations.

e. Bolts, nuts, washers and screws shall be cadmium or zinc Electroplated or passivated.

Bonding

Supplementary bonding shall be installed between component parts of cable trays, racks or ladders where the method of mechanical connection does not provide permanent and reliable metal to metal joints of negligible impedance.

Cable Installation

a. Unless the routes of cables are indicated on drawings, they shall be determined by the contractor and approved by the consultant before work is started.

b. Cable installation on the surface shall be parallel with the lines of building construction and properly aligned.

c. A minimum clearance of 150mm shall be allowed from any equipment, pipe work or duct work. The distance shall be measured from external surface of any lagging.

d. In the event of difficulty in achieving these requirements, consultant shall be informed and decision will be made as per site condition.

e. Spacing between cables shall comply with relevant table, but where indicated account must be taken of any grouping necessary to maintain the current carrying capacities of cables.

f. Space shall be allowed along cables routes for future additions where indicated and cable supports shall be of adequate size for the ultimate load.

g. Adequate space shall be left between cable runs, the building fabrics and other services to allow for future removal or installation of cables.

h. Cables shall be adequately supported by one of the methods specified in the drawing throughout cable ducts or are buried direct in the ground. Fixing direct to building fabric by cable cleats may be adopted for single runs subject to the approval of consultant where indicated.

i. Cables shall be supported within 30mm of their termination at equipment; the weight of the cable shall not be carried by the terminal box gland.

j. where cables cross expansion and settlement joints in the building structure, they shall be fixed 300 mm each side of the joint and sufficient slack left between to allow for movement. Where the cables are buried in the building fabric suitable provision shall be made to allow for movement of the structure. The contractor shall submit his proposals for approval of consultant.

Handling of Cables

Cables shall be handled with care and every effort made to avoid damage to the cables, to other services and to building fabric. Recommendations or instructions available from the cable manufacturers concerning the installation of cables shall be taken into account. In particular co-axial cable shall not be bent in radius less than six times the overall diameter. Any damage shall be immediately replaced as per consultant's instructions.

Marking of Cables

a. Cables located in switch rooms, ducts and spaces designated solely for electrical services or have orange over sheaths, they shall be identified by adhesive bands coloured orange, complying with BS 1711. The bands shall not be less than 100 mm long, located at least once within each separate compartment through which the cables pass at intervals not exceeding 12 m.

b. Except where cables are buried or enclosed in conduit, trunking or ducting, they shall be permanently identified by discs. Discs shall be of laminated plastic materials with black characters on white: characters shall be not less than 3 mm high. The inscription shall indicate nominal voltage, designation of load, number and cross sectional area of cores and rated voltage of cable.

c. Cable identification discs shall be attached to the cables with ties. Discs shall be located within 500 mm of terminations and joints, at least once within each separate compartment through which cables pass and at intervals not exceeding 24 m, they shall coincide with the colour bands.

Luminaires, Lamps, Light Fixtures, Fan and Switch/Socket Outlets

Scope

a. The scope of this section comprises the supply, erection, testing and commissioning of lighting fixtures for internal lighting of service areas wherever required of the specified models.

b. Without restricting to the generality of the foregoing, this section shall include luminaires, lamps and accessories necessary and required for the installation.

c. Whether specifically mentioned or not, the luminaires and lamps shall be provided with all fixing devices, terminal blocks, holders etc. as required.

General Requirements

a. All the luminaires and lamps shall be of best quality and as per approved makes. Wherever alternative makes are specified the choice of selection shall remain with the Engineer-in - charge .

b. The luminaires and lamps shall be fixed in a neat workman like manner, true to level and in accordance with manufacturer's instructions.

c. The luminaire and lamps shall be provided with such accessories as are required to complete the item in working condition whether specifically mentioned in the specifications, drawings or not.

Luminaires

a. Luminaries shall comply with relevant Indian Standards.

b. Unless otherwise indicated, enclosure of luminaires shall provide a minimum degree of protection of IP44 when located within buildings and IP 65 when located outside buildings, but luminaires mounted externally; and less than 2 M above finished ground or paved level shall be IP 65.

c. Unless otherwise indicated, luminaires, both with and without built-in ballast or transformers shall be suitable for direct mounting on normally flammable surface.

d. Where specific requirements related to flame propagation and flammability of translucent covers are indicated, certificates of tests shall be submitted to the consultant .The tests shall comply with relevant Indian Standards.

e. Terminal blocks for connection of the supply cables shall be of adequate size for the size of conductors forming the loop in wiring. Unless separate tails are required as in clause 18.3.5. Where indicated, terminal blocks shall incorporate a fuse of suitable type and rating.

f. Ballasts for tubular fluorescent lamps shall have a maximum value of harmonics complying with the colour headed “without H Marking" in Table VII of BS 28116. Power factor correction shall be provided and this shall be not less than 0.85 lagging unless otherwise indicated.

g. Translucent covers and reflective surfaces shall be clean at the completion of the works.

Lamps

a. Lamps shall be of the type and ratings as indicated.

b. All lamps shall be installed by the contractor.

c. Lamp caps shall be suitable for the lamp holders listed socket by means of a locking ring.

Support and Fixing

a. Where fluorescent luminaires 1200 mm or more in length are supported directly by the conduit system, they shall be fixed to two circular conduit boxes both of which shall form an integral part of the conduit system.

b. Where the weight of a luminaire is supported by a conduit box or cable trunking, the fixing of the conduit box or trunking shall be adequate for the purpose and approved by Engineer-in - charge .

c. Luminaires fitted with tungsten filament lamps and having metal back plates shall not be fixed directly to conduit box in which thermoplastic material is the principal load bearing member.

d. Support of luminaires from cable trunking shall be by means of proprietary clamps or brackets.

e. Where luminaires are supported from the structure other than by the conduit system, the supports shall comply with clause 18.12.1.

f. Luminaires mounted on or recessed into suspended ceilings shall not support luminaires unless specifically shown and approved.

g. For wall mounted luminaires, the mounting height shall be 1900 MM above finished floor level, measured to the centre of the conduit box, unless otherwise indicated.

Wiring Connections

a. Where luminaires, other than those are fixed direct to circular conduit boxes or are supported by pedants or chains, the final circuit wiring shall terminate at a terminal block in the conduit box.

b. Where luminaires having flourescent tubes are fixed direct to circular conduit boxes, the final circuit wiring may be terminated within the luminaire unless otherwise indicated. The wiring shall enter each luminaire at the conduit entry nearest to the terminal block and where a loop

in wiring system is used, leave by the same entry; wiring shall not pass through a luminaire unless the approval of the consultant.

c. Where luminaires are mounted on or recessed into a suspended ceiling, connection shall be by flexible cord from a plug-in ceiling rose unless otherwise indicated. The plug-in ceiling rose shall be located not more than 500 mm from the access in the ceiling and shall be firmly supported, unless otherwise approved by the consultant.

d. Cables and flexible cords for final connections to luminaries shall be suitable for the operating temperature of the luminaire.

e. The size of final connection cables or flexible cords shall be as indicated.

f. Cables and cords passing close to a ballast within a luminaire shall be suitable for the operating temperature of the ballast.

g. A protective conductor shall connect the earthing terminal or earthing contact of each luminaire to an earthing terminal incorporated in the adjacent conduit box. Where the final connection is by flexible cord, the protective conductor shall form part of the cord.

h. The scope of this section covers the supply, installation, inter connection, testing, commissioning and putting into operation of specified types and rating light fixtures/luminaries as mentioned in BOQ. All types of light fixtures are subjected to the prior approval of the consultant. The contractor shall submit the actual sample of the fixtures with manufacturers catalogues. The light fixtures must be delivering at site in a factory pack complete with all accessories, lamps and fixing and connecting materials.

Light Fixtures

a. **2x36 and 2x18 watt CFL Paralite:** These luminaries shall be made of CRCA powder coated housing integrated with parabolic shaped pre-anodized purity aluminum reflector and Paralit P5 louver system with spring loaded plastic toggles to fix the louver, pre-wire up to the terminal with electronic ballast. The fixtures shall be suitable for both surface and recessed mounting type as per site conditions. The anticipated physical dimension of 2x36 watt is 595x595 mm with the recessed depth of 55 mm and for 2x18 watt is 300x300 mm with recessed depth of 55 mm.

b. **2x 9 watts CFL down Light:** This type of light fixtures shall be made out of CRCA powder coated rim and housing integrated with super high purity textured aluminum reflector and double parabolic cross louver. The fixture shall be connected with electronic ballast and lamps shall be in horizontal configuration. The anticipated cut out of the ceiling is 168 mm Dia and recessed height is 108 mm.

c. **1x40 Box type fluorescent light:** This light fixture is made out of high quality polyester pre-coated galvanized steel sheet consisting twist lock lamp holders interconnected with electronic ballast.

d. **1x 15 watts CFL down Projected wall light:** Having cast housing, fitted with 250 mm dia milky white glass diffuser and 3 Nos stainless steel screws. The fixture shall be of 200 mm width, 270 mm height and 270 mm extension. Color as approved.

e. **External Bulkhead: (HL-1160):** The fixture shall have cast aluminium housing, stainless steel screw fitted sand blasted glass diffuser integrated with rubber gasket. The entire external part of the fixture shall have corrosion resistant coating of black color.

f. **5 watt Recessed LED Light:** The single shaped recessed LED down light shall be made of CRCA white powder coated rim and housing with super high purity aluminium reflector housing efficient heat sink system. The fixture shall have enclosed driver and wires with the heat proof wire up the terminal.

g. **Notice Board/display board light: (Decon Trim Tube)** The light fixture is Trim Tube made out of MS Sheet protected against corrosion by white color powder coating suitable for 1x36 W true tube with electronic ballast. The length shall be 1260, height 85 and projection 195 mm.

h. **Picture light:** 600 mm long rectangular base to mount the 200 mm projected light bar suitable for 1x14 Watt T5 lamp with electronic ballast. The light bar in adjustable independently without any strain in the connecting cable.

i. **15 W CFL Ceiling Dome light having Spun:** Steel housing with corrosion resistant coating integrated with lockable sand blasted galas diffuser. The diameter of the diffuser shall be 315 mm with the extension of 5 mm.

j. **Exist Light:** Low energy consumption wall mounted or ceiling suspended Exit light as a acrylic signage on green background color. The alluminated edge lit shall be 10 mm thick. The overall size of building Exit Light shall be 340x290 mm including battery box. The battery shall be of 12V 1.2 AH self maintained type.

k. **Toilet Mirror Light:** Shall be 4' ling T5 lamp fixture enclosed in a acrylic enclosure complete with electronic ballast and fixing and connecting materials.

Sweep Ceiling Fan

The sweep ceiling fan shall be of 1400 mm dia in 4 blades and 1200 mm dia for 3 blades with the center distance of 4 and 2.5 meter respectively. The external finish shall be white elegant look enameled finish. The fan shall function with double ball bearing and soundless motor fixed with aerodynamically balanced blades. The speed shall be 275 rpm for 1400 mm and 310 for 1200 mm with the air displacement of 305 & 240 CMM. The fan hanging rod could be shorten and extended as per site conditions. The ceiling mounting details are given in the drawing.

The speed regulator shall be stepped type electronic type integrated in modular plate of light control switches. The speed regulator will be active after ON of a switch designated for single fan only.

Switches and Socket Outlets

All switches/dimmers and socket outlets are to be I modular formation and flush type. All types of switches and sockets (3- pin round pin/ flat pin/ computer/ TV/Telephone) stall be made of corrosion resistant, heat resistant and impact resistant polycarbonate. The data socket with patented integrated shutter. Electrical socket with reinforced nylon protective shutter. All switches are electric are encapsulated are tested 80000 times. Sockets tested to 150;00 cycles and complying IEC or IS. The flushing GI Box shall be of 1.6 mm thick fully rust proof.

Four Components Floor Recessed Box

Rectangular shaped floor recessed box suitable for data, telephone and 2 No 13 A 3-pin flat switch sockets made our of rust proof steel sheet with stainless steel open able cover at finish floor level. Separate cable entry for power communication with sufficient cable space radius. The recommended size of the box is 140 mm deep 400 mm long and 250 mm wide with IP 32 rated.

Metal Clad Plug & Socket

The plug and socket shall be made out of non-corroding die cast aluminum alloy having high strength and anti tracking properties. The design must avoid accidental contact while inserting /removing the plug. The cable grip to the plug shall be made very strong by providing compression gland and by protecting it at the point of entry by strong rubber guard. The socket box shall be integrated with 20 A DP MCB for local protection. The rating of the plug and socket shall be 20 A single phase 220 volt AC supply.

Emergency Exit Light

Low watt, hybrid IC controlled self contained emergency exit light with fluorescent lamp. The IC controlled shall have high efficiency current feed push – pull sine wave inverter for the full utilized the battery power and to prevent the frequent blackening the tube. The general specification shall be as follows:

TECHNICAL CHAPRACTERISTICS

INPUT VOLTAGE	**:** 230Vac 50/60Hz±10% or 115Vac 50/60Hz±10%or others
BATTERY	: 2.4V 2AH/4AH High temp rated Nickel Cadmium cells or others
LAMP USED	: Fluorescent tube 1x8 W daylight 30 cm
RATED PERIOD	: > 1 hr, 2 hrs, 3 hrs or others
MODE	: Maintained
OPERATION TEMPERATURE	: to 40^{o}C

POWER CONSUPTION	: < 12 VA
CHARGE MONITOR	: Super bright red LED 5mm Ø
RECHARGE PERIOD	: 16- 24 hrs
EMERGENCY LUMINANCE	: >8 cd/m^2
ELECTROMAGNETIC FIELD	: 6 m gause @ 0.1 m
CHARGER	: Hybrid controlled charger
PROTECTION	: Low volt cut off to percent battery over discharge
	Incoming AC fuse and Battery DC fuse
	Tropical climate protection coating on hybrid control circuit
CONSTRUCTION	: Electrode galvanized sheet steel with epoxy powder coating
	20 mm Ø K/0 hole, Fire Retardant Acrylic Opal diffuser
DIMENSION	: 468 mm(L) x 74 mm (W) x 266 mm (H)
WEIGHT	: 2.70 kg(Net)
COMPLIANCE	: CP 19, ss263 : part 2, IEC 598-2-33, AS 2293
INGRESS PROTECTION	: IP 30

Wiring

Scope

The scope of this section covers the supply, erection, testing and commissioning of conduits & wiring for lighting; power, telephones, and P.A. system. Wiring shall be carried out in accordance with relevant I.S. rules and regulations.

System of Wiring

a. All lights and power wiring shall be carried out in surface conduits/PVC pipes/on cable trays as specified.

b. NS/IS/I.E.E. regulations shall be applicable for all material and workmanship.

c. The wiring to be carried out on such that specified 'Power' wiring shall be in ring mains system and kept separate and distinct from 'Lighting' wiring. The wiring shall be done on the distribution system with main and branch distribution boards at convenient physical and electrical centers as shown in drawings. All conductors shall be run as far as possible along the walls and ceiling and above false ceiling so as to be easily accessible and capable of being thoroughly inspected. In all types of wiring, due consideration shall be given for neatness and good appearance.

d. The balancing of circuits in three wire or poly phases installations shall be arranged before hand to the satisfaction of consultant. Circuits on opposite side of a three wire system or on different phase of poly phase system shall be kept apart at a minimum distance of 2m (5.5.ft) unless they are enclosed in earthed metal casing suitably marked to indicate the risk of dangerous shock due to voltage between the conductors contained in them. In large or important areas, light and socket outlet points shall be distributed over more than one circuit as directed.

e. Medium pressure wiring and associated apparatus shall comply in all respects with the requirements of IEE rules.

Joints & Looping Back

a. The wiring shall be done in a 'looping System'. Phase or live conductors shall be looped at the switch box and neutral conductor can be looped either from the light, fan outlet.

b. No bare or twist joints shall be made at intermediate points in the through run of cables, unless the length of final sub circuit or sub-main or main is more than the length of the standard coil given by the manufacturer of the cable.

Cables

a. The type and size of cables shall be as specified in BOQ those which will be used most commonly.

b. PVC insulated non-sheathed cables shall comply with BS 6005. They shall have copper conductors unless otherwise indicated.

c. Rubber insulated non-sheathed cables shall comply with relevant Indian Standards.

d. Core identification colours shall extend throughout the length of PVC insulated cables. Core identification for sound distribution or public address systems shall be in grey colour. For other Category 2 systems, the colours shall be as indicated.

e. Cables shall be protected throughout their length by trunking, ducting, conduit and equipment enclosures. Framework or partitions may be used, but only where indicated or with the approval of Engineer-in –charge.

PVC Pipes/Conduit Accessories

a. Unless otherwise indicated, HDP pipes shall be NS marked whereas MS conduits and accessories shall be ISI marked.

b. Unless otherwise indicated, protection against corrosion of conduits and conduit fittings for general use inside buildings shall be Class 2.

c. Adaptable conduit Pull boxes with their covers shall provide a minimum degree of protection of IP42 when used inside building and IP54 when used outside buildings or at other locations as indicated.

d. When conduit/Pipe boxes are installed flush with the building fabric, overlapping covers shall be fitted.

e. Flexible steel conduit for general use inside buildings shall be type A with protection against corrosion equivalent to Class 2. Adaptors shall be of solid type.

Routes and Segregation

a. In case the routes of conduit and ducting are not shown on the drawings, they shall be determined by the Contractor and approved by Engineer-in -charge before work is started. This requirement shall apply where the conduit or duct is concealed within the building fabric as well as where they are on the surface.

b. Conduit and ducting shall be parallel with lines of building construction and properly aligned except where conduit is permitted in floor screeds. Conduit buried in wall finishes shall run vertically only, unless Engineer-in -charge gives approval to deviate from this requirement.

c. Conduit and ducting shall be parallel with lines of building construction and properly aligned except where conduit is permitted in floor screeds. Conduit buried in wall finishes shall run vertically only, unless Engineer-in -charge gives approval to deviate from this requirement.

Accessories

a. Unless otherwise indicated, accessory boxes used with steel conduit shall be made of metal.

b. Accessory boxes shall be suitable for flush or surface mounting, as indicated. Unless otherwise indicated, metal boxes for general use inside buildings shall be of steel of medium category against corrosion.

c. Accessory boxes shall be of adequate depth to accommodate the accessories without causing compression of the cables. Generally boxes shall be 35 mm deep, but for lighting switches installed flush in plaster finish with multi-cored sheathed cables, 16 mm depth boxes may be used.

d. Earthing terminals shall be fixed inside each accessory box and on the grids of grid switches. The earthing terminal of each grid shall be connected by a separate protective conductors to the earthing terminal of the box.

e. Front plates of accessories shall be of material and finish as indicated, but generally finish of various types of accessories in the same area shall match. For flush mounting, plates shall overlap the boxes. For surface mounting, plate shall match the profile of box, without overlap.

f. Where pilot lamps are required, they shall comprise a neon lamp with resistor and a red coloured lens, unless otherwise indicated.

g. Accessories with their boxes and front plates shall provide a minimum degree of protection of IP42 when used inside buildings and IP54 when used outside buildings or at other locations where indicated.

h. Accessory boxes shall be fixed to the fabric of building, independent of connecting cables or conduits. Where the accessories have a minimum degree of protection of IP44, the fixings shall not reduce that protection.

Switches

a. Switches shall be single pole unless otherwise indicated. Their current ratings shall be as indicated, allowance being made for any inductive or capacitive load.

b. Wall mounted switches and socket outlets located inside buildings shall be modular type actuating members unless otherwise indicated. Where mounted adjacent to one another, they shall be grouped in a multi gang box with a common front plate.

c. Pull cord operated switches shall be fixed to white moulded plastic mounting blocks, which in turn shall be fixed to a circular conduit box. Where the conduit boxes are flush with the finish, mounting block shall overlap them. Pull cords shall be white or natural colour and the lower end shall terminate in a moulding of rubber or plastic material.

Socket Outlets

a. Socket outlets shall be of type and rating as indicated. Pilot contacts shall be provided where indicated.

b. Modular formation Socket outlets shall be switched where indicated. On socket outlets rated at 16A and located inside buildings, the switches shall be single pole and have rocker type actuating members unless otherwise indicated.

c. Socket outlets for wet locations shall be provided with covers which shall be screwed on. Any cover required to achieve total enclosure and to ensure the required degree of protection against moisture shall be securely fixed to socket outlet.

Plugs

a. Plugs shall be provided as indicated. Plug bodies shall be of metal, plastic or other material as indicated.

b. Plugs rated at 16A shall be of a non resilient material unless otherwise indicated.

c. Fuse plugs shall be fitted with fuses rated as indicated.

Terminal Blocks

a. Conductors shall be clamped between metal surface and no screws shall make direct contact with conductors.

b. The design shall be such as to maintain sufficient contact pressure to ensure connections on negligible impedance at all times.

c. Metal in contact with conductors shall be 85% copper alloy and any screws shall be of metal that is electrolytically compatible with the copper alloy. The moulded housing shall be an insulating material suitable for the maximum operating temperature of the conductor.

Mounting Heights

a. Mounting heights shall be as follows unless otherwise indicated by the Architects/ Interior Designer, where decision shall be obtained by contractor before start of work.

MOUNTING HEIGHTS (for accessories and equipment)

Accessories or Equipment	Height (mm)
Lighting Switch	1350
Socket outlet	
Location:General	200
above worktops	1100
Telephone outlet	1100

NOTES:

1. Heights are from finished floor level to the center of the accessory or equipment, except in the case of worktops when the measurement shall be from the worktop surface.
2. If the specified height of an accessory coincides with the top of tiling, the accessory shall be mounted above the tiling, leaving a clear gap of 50 mm.
3. Where apparatus is located underneath a worktop, the accessory shall be mounted 100 mm below the underside of the worktop.

b. Where difficulty in locating accessories or equipment occurs the Engineer-in -charge shall be informed.

Supports and Fixing

a. Support shall be positioned with in 300 mm of each bend and conduit box. Conduit boxes shall be fixed to fabric of building independent of the conduit. Where the conduit boxes have a minimum degree of protection of IP44, the fixing shall not reduce that protection.

b. Conduits shall be fixed in accordance with under mentioned Table. No shot firing shall be used and no drilling or welding of structural steel work shall be done without the approval of Engineer-in -charge.

TABLE CONDUIT FIXINGS

1. Fixing of Conduit

Location	Type of fixing
Floor screeds	Saddles
Buried in plasteror render	Crampets or saddles
Above false ceilings	Spacer bar saddles
Surface	Distance Saddles

2. Fixing of Saddles, Conduit Boxes

Building Fabric	Type of fixing
Structural steelwork	Purpose made clamps (type to be approved by SO)
Non-Structural steelwork	Sets screws and nuts.
Concrete, brick or Blocks	Fiber plugs & screws
Hollow blocks & pot Floors	Butterfly spring toggle bolts or gravity bolts.
Timber	Wood screws

c. Screws and nuts shall be cadmium or zinc electroplated or passivated.

Installation

a. If the protective finish of any material has been damaged, those materials shall either not be used or any remedial work shall be approved by the Engineer-in -charge before use. Conduits shall be clean and free from oil.

b. Steel Conduits shall be connected by means of a coupler and an externally screwed bush. Bushes shall be tightened by spanners. Pliers and toothed wrenches shall not be used.

c. Where a terminal block is to be accommodated in a circular conduit box, an extension ring shall be fitted to the box, of sufficient depth to ensure adequate space for the terminal block and cables.

d. The length of thread on the ends of steel conduits shall match that in the conduit fittings or equipment and exposed threads will not be permitted. Running couplings with backnuts may be used with conduit having Class 2 protection, but where the protection is Class 4 only, manufactured running joints will be accepted. Exposed thread on running couplings shall be given a coat of zinc-paint.

e. Conduit shall be cold bent on site with a suitable bending tool and sand filling, without deforming its cross section.

Draw in conduit boxes shall be incorporated at intervals not exceeding the following:

Straight run	l0m;
Run with one or two bends	l0m;
Run with three bends	5m;
Run with four bends	5m;

f. Unless otherwise indicated, conduit buried in concrete shall have at least 30mm depth of cover; it shall be securely fixed to prevent movement during pouring and vibrating of the concrete. Conduit in plaster shall have at least 5 mm depth of cover.

g. Where conduits or ducting cross expansion and settlement joints occur in the building structure, suitable provision shall be made to allow for movement of the structure. The Contractor shall submit his proposals for the approval of Engineer-in –charge.

h. Where conduit passes through an external wall, a conduit box shall be fitted on the inside of the wall and after wiring, filled with an inert permanently plastic compound having a high insulation value.

i. Conduit and ducting shall be installed in screeds only where indicated or after receipt of the Engineer-in -charge approval. Conduit boxes in floors, other than for agreed outlets will not be permitted.

j. Under floor ducting / conduit shall be straight and level and adjusted in height to relate to the finished floor level, as indicated.

k. Open ends of conduit and ducts shall be temporarily plugged immediately after installation to prevent ingress of water and solid materials. The boxes of under floor ducting shall be fitted with temporary lids immediately after they are installed and they shall be maintained as effective protection against ingress of water and solid material until the permanent lids are fitted after screeding is complete.

l. Method to be used for forming fire barriers at fire resistant structural elements such as floors and walls shall be submitted for the Engineer-in -charge approval.

m. Installed conduits and ducts shall be cleaned internally with a swab before cables are drawn-in.

n. If the protective finish of conduit or ducting is damaged after fixing, the damage shall be made good in a manner approved by Engineer-in –charge.

Protective Conductor

a. Protective conductor shall be drawn through ducting and non-screwed metallic conduit.

b. Where live conductors terminate at or loop into terminals adjacent to an appliance or accessory, the protective conductor shall be similarly terminated.

c. A protective conductor shall be installed within each length of flexible steel conduit and connected to an earthing terminal at each end of the flexible conduit.

Wiring

a. No wiring shall be carried out until the appropriate tests required in Section “Inspection and Testing" have been done and the Engineer-in -charge has given his clearance for wiring to commence.

b. A loop in form of wiring shall be used as far as practicable or unless otherwise indicated. Joints in conductors shall not be permitted.

c. At expansion joints, adequate slack shall be left in the cables.

d. Where conduits are installed for wiring by others, a draw wire shall be provided between each draw-in position.

e. Cables forming part of communication circuits shall have identification sleeves at their terminations. Identification shall be consistent with the relevant wiring diagrams.

Cables

a. Cables shall comply with BS 6004; for LV circuits in accordance with Table 5 or ELV circuits in accordance with Table-5. Cables shall have copper conductors, unless otherwise indicated, and the size shall be as indicated.

b. The colour identification of cores shall comply with the IEE wiring regulations for all categories of circuits and for live conductors. The identification shall extend throughout the length of the cable. The additional identification requirements of clause shall also be met.

c. Joint boxes shall comply with BS 4662 or BS 5733 and where they are of insulating material the material shall have the ignitability characteristic 'P' as specified in BS 475. Where terminals are not integral, insulated terminal blocks complying with the requirements of clause 15.15.9 shall be used.

d. Boxes for accessories shall comply with the requirements of clause 15.15.

e. Unless the routes of cables are indicated on the drawings, they shall be determined by the Contractor and approved by the Engineer-in -charge before work is started. Cables shall be concealed within the fabric of the buildings or fixed to the surface of walls and ceilings as indicated.

f. Cables shall be parallel with the lines of the building construction and properly aligned. Cables passing through joints shall be as nearly as practicable at right angles to them and at a distance not greater than 450 mm from a load bearing wall, beam or similar support. Cables buried in wall finishes shall run vertically only, unless the Engineer-in -charge has given approval to deviate from this requirement.

g. A minimum clearance of 150 mm shall be allowed from any equipment, pipe work or ductwork. The distance shall be measured from the external surface of any lagging. In the event of difficulty in achieving these requirements, the Engineer-in -charge shall be informed

h. Cables shall be fixed by saddles of nylon or other suitable plastic material.

i. Cables buried in wall finishes shall be protected throughout the length that is buried by rigid PVC conduit. Normally the conduit shall be non circular but where appropriate, tubular form type A may be used.

j. Cables passing through walls or buried in concrete including floor screeds, shall be protected throughout the length that is buried by rigid PVC conduit tubular form type A.

k. Unless otherwise indicated, conduits buried in concrete all have at least 30 mm depth of·cover. Conduits buried in plaster shall have at least 5 mm depth of cover.

l. Where conduits cross expansion and settlement joints in the building structure, suitable provision shall be made to allow for movement of the structure. The Contractor shall submit his proposals for the approval of the consultant .

m. Conduits entering voids shall terminate not less than 22 mm clear of the building fabric. Open ends of conduit shall be temporarily plugged immediately after they are installed to prevent ingress of water and solid materials.

n. Where cables pass through joints, the number and size of holes shall allow for easy withdrawal and replacement of cables. The diameter of holes shall not exceed 1/6th the depth of the joints. They shall be approximately on the centre line and shall be not less than 75 mm between centres. Joints shall not be notched.

o. The method to be used for forming fire barriers at fire resistant structural elements such as floors and walls shall be submitted for the Engineer-in -charge approval.

p. Where cables enter a metal enclosure, they shall be protected by grommets or secured by cable clamps.

q. Cables shall be looped between outlet points and as far as practicable, intermediate joints shall not be used.

r. Cables fixed to the surface, except in ducts, shall be protected up to a height of 1500 mm by high impact PVC channel.

s. Cables shall have identification sleeves at their terminations.

t. Identification shall be consistent with the relevant wiring diagrams.

Earthing

Scope

a. The scope of this section covers supply installation and testing of earthing system for all non-current carrying metal parts of electrical installation.
b. The type and number of earth electrodes shall be as indicated and shall comply with clauses as appropriate.
c. Dedicated earthing shall be provided for the Server Room equipments, EPABX, UPS System etc.

Earthing System and Equipment Bonding

a. Unless otherwise indicated, earth plates shall be 600 mm x 600 mm minimum, of solid or lattice copper not less than 3 mm thick.
b. Earthing system shall comprise of earth electrode near sub-station. Test link boxes shall be provided at each electrode for periodical resistance measurement. All such earth electrodes shall be interconnected forming a main loop (MEL).
c. Where the earth electrodes are formed with tape, the tape shall be to BS 1432, of the size, length, depth below ground level and layout as indicated.

Conductors

a. Earthing conductors, main earthing bars and main equi-potential bonding conductors shall be of the type, size and conductor material as indicated and shall comply with clauses 19.03.2 to 19.03.5.

b. Tapes shall comply with relevant Indian Standards. Where used to interconnect copper electrodes the tape may be bare, but for interconnecting pipe electrodes and for all other purposes the tap shall have an extruded PVC sheath.

c. Main earthing bars shall comply with relevant Indian Standards.

d. Shall comply with relevant Indian Standards, without sheath, unless otherwise indicated.

Joints and Connections

a. Joints in conductors shall be kept to a minimum.

b. All contact surfaces shall be thoroughly cleaned and coated with an anti-corrosive electrical jointing compound suitable for the conductor materials. For bi-mettallic joints, a separate abrasive shall be used to clean each metal.

c. Connections shall be made as follows:
   - to main earthing bars by phosphor bronze set screws and nuts;
   - to earth rods by bronze, gunmetal or copper clamps with phosphor bronze. Edges of clamps shall be rounded;
   - to earth pipes by phosphor bronze bolts and nuts, direct to the flange of the pipe;
   - to earth plates by bolting, rivetting or welding.

d. Termination of cables shall be by connectors jointed to the cable conductor by the thermit welding process or by compression joints complying with relevant Indian Standards.

e. Joints which are indicated as test points shall be bolted or clamped. Joints in tape, other than at test points shall be made by the reveting and sweating. Overlap of conductors shall be not less than 100 mm.

f. Joints and connections shall be protected by a coating which will form a seal and exclude moisture in all weather conditions. At connections to earth electrodes, the coating shall cover all exposed conductors and in the case of earth pipes, to top surface of the flanges. Protective coatings shall be of a waterproof, inert, tenacious material and of one of the following forms:
   - solvent cutback thixotropic corrosion preventative forming a film of resilient matt petroleum wax;
   - a fast drying durable rubberised sprayed coating;
   - a heat shrink clear sheathing

g. Screws, nuts, washers and rivets for copper conductors shall be of phosphor bronze, naval brass or copper silicon; for aluminium conductors, they shall be of stainless steel. The minimum provision shall be as follows:
   - for flat strip--- two M8 bolts or four 5 mm diameter rivets;
   - for sheet metal--two M8 bolts; where the sheet metal is less than 2 mm thick, it shall be backed for an area of at least 1000 mm2.

Inspection Pits

a. Unless otherwise indicated, connection between an earth conductor and its associated earth electrode system shall be in an enclosure.

b. The enclosure shall have a removable top cover which shall be flush with finished ground level. The enclosure shall be a purpose made concrete inspection pit, a galvanised steel inspection pit embedded in concrete, an earthenware pipe or similar, as indicated. The earth electrode connection shall be just below the lid of the inspection pit with adequate access for testing purposes.

Supports and Fixing

a. Cables shall be supported and fixed in accordance with the standard.

b. Tapes and bars shall be fixed by spacer bar saddles which shall be of non-metallic material or corrosion resistant alloy compatible with the conductors. The maximum spacing off fixings shall not exceed 600 mm unless otherwise indicated.

c. Main earthing bars shall be supported on insulators; they shall be not less then 25 mm clear of the building fabric.

d. For general areas inside buildings, screws and nuts shall be of cadmium electroplated steel or stainless steel; outside buildings, in plant rooms or other locations as indicated, they shall be of stainless steel.

e. No shot firing shall be used and no drilling or welding structural steelwork shall be done without the approval of the consultant.

Installation

a. Electrodes shall be installed in undisturbed ground. The distance between any two electrodes shall be not less than 1.25 times the depth of the longer electrode.

b. Excavations shall be carried out in accordance with relevant Indian Standard and shall comply with the construction IS Regulations, 1961. Excavations shall be kept free of water and protected against damage or collapse. The safety of persons and the protection of structures, buildings, roads, sewers and services from damage shall be ensured; all necessary sheeting, timbering, struting and shoring shall be supplied, erected and subsequently removed.

c. Trenches shall be backfilled in layers and each layer shall be rammed. The first two layers shall be 100 mm deep and rammed by hand the remaining layers shall be not more than 200 mm deep and power ramming may be used. Warning tapes and covers shall be included as specified. Where applicable, top soil and turf shall be replaced and the final level shall be level with or not more than 25 mm above the adjacent ground level.

Lighting Protection System

a. Scope of Works

The work to be done under this section comprises the supply & installation necessary for complete installation of lightning protection system.

The lightning protection system should comply in accordance with IS standards and all installations shall be based on it.

b. Air Terminals

Air termination shall be of tas per given drawings and must have:

- Mechanical Supports
- Down – conductors
- Performance Recording Equipment
- A low impedance Grounding system.

c. Down Conductor

Down conductor shall be as specified in BOQ and shall be copper strip. Main copper conductor shall be connected directly to air termination.

Down conductor must be kept in constant physical contact with structure.

Lightning and Surge Voltage Protection

a. Scope of Works

Work required under this section shall include all material, labour and auxiliaries required to furnish and install complete surge protection devices at main LT Panel incoming feeders (Stage I /Class B) & Distribution Boards (Stage II / Class C) for protection of Building electrical and Electronic system from effect of Lightning discharges. Line induced transient surge voltage or switching surges as per details mentioned in the BOQ.

b. Codes and Standards

Unless and otherwise mentioned somewhere else, the following standards & publications as referred in various parts of these specifications shall apply.

- IEC – 61643-11, IEC – 61643-12
- IEC – 60 364 – 5 - 5. 53
- IEC – 62 305 – 4

c. Surge Protector at Stage I/Class B (LT Panel Protector)

The surge protection Device (SPD) manufacture shall offer a complete line of Surge protection devices to support requirement for main LT panel incoming feeder. Surge protector at this stage shall be provided to protect the down stream electrical and electronics against any lightning discharge surges that may enter into the system through main panel.

Unit status indicator shall be provided to indicate the status of complete protection unit.

Protection shall be manufactured for specific type and voltage of electrical services and shall provide clamping for both normal (L-N) and common (N-G) mode operation.

Protection shall be manufactured to withstand a maximum continuous operating voltage of not less than 115% of normal RMS line voltage of 240 V.

Protection shall be provided with safety MCB's to be connected in series between Line/s to neutral & neutral to earth as per TNS configuration of wiring. It shall be testable on line for routine maintenance, module failure and in order to prevent catastrophic failure modes.

Protection shall be a fail –safe type device that shall have a follow through current quenching capacity upto 25 KA r.m.s, shall have repeated surge capability state, shall be self restoring and be fully automatic in all modes of operation.

Protections shall comply with IEC 61643 and shall be approved for location in which they are listed.

Protection shall have an operating temperature range from -20°C to 60°C.

d. Protection Criteria

- Maximum continuous operating voltage (Rated Voltage) for SPD devices connected to phase – neutral shall not be less than values shown in table.

Nominal voltage rating per phase	Maximum continuous operating voltage
(Vrms)	(Vrms)
240	320

- Surge protective device and associated hardware must comply with IEC 61643 – 11.
- Protection voltage of complete rail ,mount surge protective service shall be type tested to figure as indicated in table below, which must not exceed the values shown.

Service voltage / per phase	Protection voltage @In (Nominal discharge current) / Protection Level
240	<2.5 k V (between line to neutral) 1.5 k V (between Neutral to Earth)

- Surge protective device application at low voltage AC main LT Panel incoming feeder surge impulse current withstanding capacity as shown in table below.

Application Panel Location	Max. Single Withstand surge Current (of 10/350µs Impulse)
Service Entrance (Main LT Panel)	25 k V, 10/350µs (between line to neutral) 100 k V,10/350µs (between Neutral to Earth)

- Compliance to these specifications must be provided in form of a certificate from an independent testing laboratory.

e. Response time of stage – I class – B arrester should not be <100ns

Inspection and Testing

General

a. Inspection and testing shall be done in accordance with the Indian or IEE Wiring Regulations, the requirements of this Section and as indicated.
b. Inspection shall include a physical check that all equipment has been securely fixed and that all electrical connections are mechanically sound.
c. In addition to the test at the completion of each installation, certain tests shall be done during the progress of the Works as required.

Information

For equipment supplied under the contract, the Contractor shall obtain from manufacturers the time/current characteristics of all protective devices for automatic disconnection of supply and provide copies to the Engineer- in -Charge and to the person or persons carrying out the inspection and testing, in addition to meeting the requirements of clause.

Testing Methods

a. The consultant shall be notified of the method to be used for each type of test and the notification shall be given not less than 28 days before the final tests are to be made. The tests shall be carried out in accordance with the methods set out in the IEE Wiring Regulations.
b. For testing, continuity of protective conductors and equi-potential bonding AC source shall be used unless the consultant's agrees otherwise.
c. The method used to verify the effectiveness of the protection afforded by a residual current-operated device shall give the operating time and the current used shall not exceed 100% of the nominal setting of the device. For a fault voltage operated device, the test voltage between the exposed conductive part and earth shall not exceed 50 volts. In addition to the tests simulating an appropriate fault condition, any test facility incorporated in the device shall be operated to test its effectiveness.
d. High Voltage tests on LV cables and factor assemblies shall comply with the requirements for site testing in the appropriate Indian Standards.
e. Alternative methods to those set out in the IEE Wiring Regulations may be proposed for the approval of the Consultant, but they shall be not less effective than those in the Regulations.
f. Where necessary to prevent damage to components of equipment, the equipment shall be disconnected for the duration of the relevant tests.

Power cables

a. Tests shall be made immediately on completion of the installation of power cables to demonstrate that the phase sequence is correct at all end connections.
b. Where indicated, LV cables shall be tested at high voltage in accordance with suitable methods and instruments as soon as their installation is complete.
c. LV cables not required to be high voltage tested, shall be tested for insulation resistance as soon as their installation is complete. The test voltage shall be 500V DC for installations rated up to 500V and 1000V Dc for installations rated up to 1000V. Tests shall cover all permutations between each conductor, screen, metallic sheath, armour and earth.
d. The over sheaths of cables laid under ground shall be given a voltage withstand test after backfilling of the trenches is complete but before termination.

Control and Communication Cables

a. Cables shall be tested as soon as their installation is complete to ensure that the cores are continuous and they have not been crossed and the insulation resistance is satisfactory. Insulation tests shall cover all permutations between each conductor, screen, metallic sheath, armour and earth.
b. For polyethylene and dry paper-insulated communications cables, the insulation resistance for each conductor shall be not less than 1500 L mega ohms, where L is the cable length in Kilometres. The measured resistance of each conductor shall not exceed the calculated resistance by more than 5%; the calculated value will be made available by the Engineer - in - Charge.

Conduits/Pipes and Trunking

a. Where conduit is cast in situ in reinforced concrete, it shall be checked for freedom from blockage and steel conduit shall be tested for electrical continuity as soon as the shuttering has been removed.

b. Steel conduit and bus duct systems shall be inspected and tested before any wiring is installed; under floor ducting shall be inspected and tested before screeding.

Earth Electrodes

The resistance of each earth electrode, whether for earthing of protective conductors, lightning protection or an electrical system, shall be checked immediately after installation of the electrodes and the results submitted to the consultant.

Records and Certificates

a. Inspection and test results shall be recorded on the forms provided by the Authority. Two copies shall be submitted to the Engineer within 7 days of each test.

b. When all inspections and tests results are satisfactory, a Completion Certificate and an Inspection certificate shall be given to the not later than the date of completion of the works. The certificates shall be given in the form laid down in the IS standards/IEE Wiring Regulations for electrical installations and BS 5266 for emergency lightning systems.

c. The values of prospective short-circuit current and earth fault loop impendence at the origin of the installation shall be recorded on the Inspection certificates.

Safety and Miscellaneous Requirements

Scope

This section covers the requirements of items to be provided in the substation for compliance with statutory regulations safety and operational needs.

Requirements

Safety provision shall be generally in conformity with appendices (A) and (C) of Indian CPWD General Specifications for Electrical Works (part 1 Internal) 1972. In particular the following items shall be provided.

Safety Equipment

a. Insulation Mats

Insulation mats confirming to IS: 5424-1969 shall be provided in front of main switch boards and other control equipment as specified.

b. First Aid Charts and First Aid Box

A SHOCK TREATMENT CHART of size 900mm x 600mm high (one in English, one in Hindi, one in Regional language), duly framed on 3mm thick hard board and covered with transparent polythene sheet shall be provided.

The chart displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently provided at appropriate places.

Standard First Aid Boxes containing materials as prescribed by St. John Ambulance brigade or Indian Red Cross should be provided in each sub-station.

c. Danger Plares

Danger plates shall be provided on HV and MV equipment. MV danger notice plate shall be 200 mm x 150 mm made of mild steel at least 2 mm thick vitreous enamelled white on both sides and with inscriptions in signal red colour on front side as required.

Size of the HV Danger Notice plate shall be 250 mm x 200 mm and 2 mm thick.

d. Fire Extinguisher

Portable CO2 conforming to IS :2878-1976 dry chemical (conforming to IS : 2171-1976) extinguishers shall be installed in the sub-station at suitable places as specified.

e. Fire Buckets

Fire buckets conforming to IS : 2546-1974 shall be installed with the suitable stand for storage of water and sand.

f. Tool Box

A standard tool box containing necessary tools required for operation and maintenance shall be provided in sub-station.

g. Caution Board

Four number of 16 gauge M.S sheet caution boards (of size 300 mm x 150 mm) with the language such as "Man on Line", "Don't switch on" etc. shall be available in the sub-station.

The boards shall be printed in RED on white back ground on both sides and provided with wire hook at the top for hanging.

h. Key Board

A key board of required size shall be provided at a proper place containing castle keys, and all other keys of sub-station and allied areas.

Steel Tubular Poles

Poles for Walkway lighting

The pole shall be of galvanised / painted steel of appropriate diameter and length as specified in the drawing or bill of quantities. It should also have holes for cable entry and exit. The poles shall be planted to specified depth in accordance with the height of the pole and the pole bottom shall be concreted by plain cement concrete of ratio 1:2:4 of section 30 cm square, 100 cm height and the upper 30 cm of the concrete remain above ground , or as per the dimensions detailed in the bill of quantity. Alternatively, the pole foundation concrete could be in the form of cylinder with

diameter of 35 cm. And height 100 cm. With upper 30 cm protruding above ground level.

Poles for Area lighting

The poles to be used shall be GI or mild steel tubular poles of appropriate diameter and length as stated in the BQ. The pole shall be planted to specified depth after concreting the bottom by plain cement concrete of ratio 1:2:4 of section 30 cm square, or 35 cm diameter and of specified height as detailed in the bill of quantity. The upper 30 cm of concrete shall protrude above ground level.

Poles for LT Overhead lines

The poles to be used shall be 9 mt. long (complete) consisting of three section of different sized MS pipes welded together with at least 20 cm of overlap at the joints. The dimensions of each section of the pole shall be as follows:

Pole Section	**Outside dia.**	**Length**	**Thickness**
Top section	89 mm	220 cm	3.25 mm
Middle section	114 mm	220 cm	4.50 mm
Bottom section	140 mm	500 cm	4.85 mm

The pole shall be planted to a depth of 1.5 mt. below ground level. The lower portion of the pole shall be cast by plain cement concrete of ratio 1:2:4 forming a cylinder of cross-section of 35 cm in diameter and 100 cm height with 30 cm of lenght above ground level. The remaining 70 cm shall remain buried under ground. The pole including cross arms shall be painted by two coats of red oxide paint.

Poles for HT Overhead lines

The poles to be used shall be 10.6 mt long (complete) consisting of three section of different sized MS pipes welded together with at least 20 cm of overlap at the joints. The dimensions of each section of the pole shall be as follows:

Pole Section	**Outside dia.**	**Length**	**Thickness**
Top section	114 mm	300 cm	3.75 mm
Middle section	139 mm	200 cm	4.50 mm
Bottom section	160 mm	600 cm	6.00 mm

The pole shall be planted to a depth of 1.5 mt. below ground level. The lower portion of the pole shall be cast by plain cement concrete of ratio 1:2:4 forming a cylinder of cross-section of 36 cm in diameter and 100 cm height with 30 cm above ground level. The remaining 70 cm shall remain

buried under ground. The pole including cross arms shall be painted by two coats of red oxide paint.

Pole Stay

The dead end poles and angle poles shall be guyed by means of stay set of appropriate capacity as detailed in the bill of quantities in a manner to counter the un-balanced pull on the pole.

House Service Clamp

The service clamp containing shackle insulators of required numbers, as detailed in the drawing and the bill of quantities shall be grouted on the building wall at a convenient place for house service line. The service cable after tapping the overhead distribution line shall be hooked to the service clamp before entering the house for connecting to main switch board.

Distribution Transformer

Requirement

Copper wound 11,000/400/231 volts distribution transformers suitable for solidly earthed neutral system. The size and number of transformers shall be as detailed in the bill of quantity.

General Specification

The transformer shall comply with IS 1180 [1964] except for the following deviation:

a.	Voltage ratio	:-	11000/400/231 volts
b.	Location	:-	to be used at an average attitude of 2500 mt. above sea level.
c.	Tapping	:-	+2.5% to - 7.5% in steps of 2.5% at no load.
d.	Ambient temperature	:-	Maximum ambient temperature is 40^{o} C and maximum daily average ambient temperature is 30^{o} C.

Connection

Vector group Dy-11 with secondary neutral solidly earthed for which a neutral bushing shall be brought out separately for earthing.

Installation

Indoor or outdoor installation including the details of cable box sizes shall be as detailed in the addenda or the bill of quantities.

Losses and Impedance

These shall be within the tolerance as specified in BS 171 and the bidder shall supply the following information along with the bid.

a. No load and full load losses.
b. Impedance volts
c. Name of the manufacturer
d. Approx. dimension of the tank
e. Approx. total weight

Accessories

The transformer shall be equipped with, but not limited to the following accessories:

a. Off load tap changer with locking arrangement.
b. Silica gel breather
c. Oil conservator with oil level indicator
d. Lifting lugs.
e. Steel rollers
f. Tank grounding terminals
g. Drain valve with plug on the bottom of the tank.

List of approved Manufacturers for Electrical Materials

1.	HT Panel	Alsthom **Crompton** **Schneider** **Siemens**
2.	HT Cable	Gloster Polycab Skytone
3.	Transformers	Volt-amp Kirlosker Crompton Alsthom
4.	Protection Relays	
	a. Numeric Type	Areva

		Siemens Larsen & Toubro
	b. Electromagnetic type	Areva L&T Siemens
5.	static Power Meter & Logger (Trivector Meters)	Conzerv /secure
6.	Electronic Digital Meter (A/V/PF/HZ/KWH) with led display	Conzerv /secure
7.	HRC Fuse and Fuse Fitting	Siemens GE Larsen & Toubro
8.	Bus Ducts and Rising mains	a) Advance Power Control System Adelec Control and Switchgear Ambit Switchgear Tricolite b) Enerlac SPC Electrotech Vidhyut Control and Switch Gear Enerlac Neptune
9.	MV Panel	a) Advance Power Control System Adelec Ambit Switchgear Tricolite b) Enerlac SPC Electrotech Vidhyut Control and Switch Gear Enerlac Neptune
10.	MCB Boards/MCBs/ELCBs	Legrand-MDS Siemens Schneider (Merlin Gerin)
11.	ACBs	L&T Siemens Schneider Electric
12.	MCCBs	L&T Schneider(Merlin Gerin) Siemens
13.	Residual Current Circuit Breakers	Legrand

	Schneider Electric(MG) Siemens
14. Contactors	L&T Merlin Gerin Siemens
15. Meters	L&T Enercon Neptune
16. Indicating Lamps	L&T Siemens
17. CTs and PTs	AE Siemens
18. Selector Switches	L&T(Slazer) Kaycee
19. Capacitors	L&T Siemens Asian Schneider
20. APFC Relay	Epcoss L&T Ducati
21. Bus-bar Support	Nomex Powermex
22. Change Over Switch	HH-Elcon L&T
23. Dimmer Panel	Lutron Schneider iLight (cooper controls)
24. LT Power Cables	Janata Skytone Trishakti Nicco Polycab
25. Cable Glands	Comet Siemens
26. Thimbles	Dowells
27. Cable Joints	Reychem Mahindra

28. Terminal Strip	Connect Well Elmex
29. Wires	Finolex Skyline Rajnigandha Lapp R R Kable
30. MS Conduits	Steel Craft(ISI) BEC(ISI)
31. FRLS PVC Conducts	Polypack BEC Precision
32. Switches/Sockets/outlets	Clipsal(Zencelo –IS) Legrand(Rteor)
33. Telephone Tag Block	Krone
34. Luminaires and Lamps	Wipro, Philips, Decon, Homedec
35. UPS	APD, Power Ware Libert
36. Cable Trays	Pilco Sun Light MEM
37. Industrial Power Socket	
a. Splash Proof	Clipsal MDS Legrand Neptune Balls
b. Metal Clad	Clipsal Legrand
38. Ceiling Fan	Crompton Graves Orient Usha
39. Lighting Fixure: (Service Areas)	
a. Fluorescent	Fiam. Decon Philips Wipro
a) Incandescent/Halogen/PL /Metal Halide	Artlite GE Linolite, Concord, Luminance) Keslec

	Philips Wipro
c) External lighting Fixture	Homedec. Wipro Philips
d) Aviation Obstruction Light (LED Type)	Actos Bajaj Binay
40. Electronic Ballast for Fluorescent	Wipro Philips
41. Lighting Control Equipment/ Dimmers	ABB Dynalite Helvar Lutron Wipro Schneider Electric
42. 50 W Halogen Light Transformer (Encapsulated transformer)	Gemini Global Philips Reiz Opal
43. Shaver Soket	Clipsal(Zencelo –IS) Legrand(Rteor)
44. Timer	Larsen & Toubro MDS lagrand Schneider Electric Siemens
45. Sealed Maintenance Free Batteries	Exide Global Hitachi Shinkobe
46. Battery Charger	Caldyne Chhabi Electricals Joshi Electricals Volstat
47. Lighting pples (HEX / Angular Pole/MS Tubular (Decorative)	Bombay Tubes and Poles Bajaj electricals HOMDEC Lighting Keselec K-Light
48. Fire Sealant & Fire Retardant Paint	BTHM engineering Birla 3 M HILTI Promat

49. Lighting Protection System (early Steamer Emission Type)	Erico LPI Indelec
50. Lighting & Surge Voltage Protection	Hager (marketed By L&T) Obeo betterman Schneider Electric
51. 230/12 V Step Down transformer With BUILTIN Isolation Transformer	Talema Volstat
52 Energy Saving Units	FMS In link Systems Schneider

D. SPECIFICATIONS FOR SANITARY, PLUMBING & WATER SUPPLY WORKS

1.1 SCOPE

This Specification covers the construction of internal and external water supply, soil, waste, vent and rain water system, installation of toilet fixtures, installation of fire fighting system.

1.2 REFERENCE DOCUMENT

The work specified in this section shall be in accordance with the following standards, or approved equal, except as they are modified and supplemented herein:

Code	Subject
IS:1171 - 1963	Basic requirement of water supply, drainage and sanitation.
IS:1239 - 1968	Specification for M. S. or G. I. Pipes and fittings.
IS:1703 - 1962	Specification for cast iron manhole covers and frames intended for use in drainage work.
IS:1742 - 1960	Code of practice for building drainage.
IS:2065 - 1963	Code of practice for water supply in building.
IS:771 - 1958	Specification for vitreous china sanitary ware.
IS:4985	Specification for UPVC pipe
IS:5382	Specification for rubber seal ring.
ASTM : D 2846	Specification for CPVC pipes
NBC 208:2003	Nepal National Building Code
	Sanitation and Plumbing Design Requirements

1.3 RELATED WORK

The Contractor shall become familiar with other Divisions of the specifications affecting work of this trade.

1.4 GENERAL REQUIREMENT

The scope of work covered by this Chapter shall be deemed to comprise the furnishing and installation of all cold and hot water supply pipe work, soil, waste, rain and vent pipe work, vitreous china sanitaryware, CP fixtures etc as shown on plans and as specified. It shall also include the supply of the appertaining materials and parts, scaffolding, off loading on site and all operations in connection with civil works, unless otherwise specified in the Bills of Quantities.

Materials and parts, which the Contractor shall supply and install, shall be new and unused. They shall comply with the regulations regarding quality and dimensions. Materials and parts that are not standardised shall be used only with the approval of the Engineer.

The materials shall be protected from rain and inclement weather all to the satisfaction of the Engineer. The cost of covering materials shall be deemed to be included in the unit prices for the brickwork and masonry.

1.5 SAMPLES/SUBMITTALS

Representative samples to be used shall be submitted to the Engineer and his approval taken before bulk purchase. The samples shall be kept with the Engineer for future reference and comparison. All materials supplied shall conform to these approved samples in all respects.

1.6 BASIC MATERIALS AND METHOD

All materials provided for the contract will be in strict accordance with the latest version of the applicable Indian Standards. All manufacturer's data, specifications and relative information together with samples will be submitted to the Engineer or Site In-charge for approval prior to being purchased, otherwise at the contractor's own risk.

1.7 MATERIALS TRADE NAMES VARIATIONS

Tenders shall be based upon complete installations. Products required which are not shown or mentioned, or not specified herein as to manufacturer; quality, etc. shall be furnished of the highest quality. Materials shall be new and free from all defects. All materials, apparatus or equipment called for on the plans or in the specifications by trade names, or the name of a particular manufacturer, or by catalogue reference are the materials, apparatus, or equipment which should be allowed for in the Tender, or qualification submitted at the time of Tender submission.

1.8 REGULATIONS

The work shall be carried out in accordance with all rules, regulations, by-laws and requirements of all authorities having jurisdiction. All changes and alterations required by an authorized inspector of any authority having jurisdiction should be carried out at no cost to the Owner.

1.9 DRAWINGS AND SPECIFICATIONS

These specifications shall be considered as an integral part of the drawings, which accompany them. Neither the plans nor the specifications shall be used alone. Any item or subject omitted from one, but which is mentioned or reasonably implied in the other shall be considered as properly and sufficiently specified and therefore must be supplied by the contractor. Misinterpretation of any requirements of either the drawings or specifications shall not relieve the contractor of his responsibility for properly completing his work. The contractor shall apply to the Engineer or Site In-charge for any explanation, which he may require in regard to the meaning and intent of any clause in the specification and contract. He shall be held responsible for any errors or losses consequent upon failure to obtain such explanation. The contractor shall consult with the Engineer or Site In-charge to obtain detail drawings or instructions for exact location of equipment as work progresses, before installing fitting or equipment and will be responsible for coordination with all other work trades including finishes. Drawings show general location and routes to be followed by pipes, ducts, etc. where not shown, or shown diagrammatically, the contractor shall install them in accordance with best trade practices.

1.10 SHOP DRAWINGS

The contractor shall submit to the Engineer or Site In-charge all shop and setting out drawings or diagrams necessary in order to make clear the work intended or to show its relation to adjacent work of other trades. The contractor shall make any changes in such drawings or diagrams, which the Engineer or Site In-charge may require, consistent with the contract. Details of shop drawings submitted for approval shall show clearly the relations of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made by the contractor and noted on the drawings before being submitted for approval.

1.11 AS BUILT RECORD

The contractor shall request a complete set of mechanical drawings (white) from the Engineer or Site In-charge and use these for "As Built" records. "As Built" records shall be retained in the site office and kept up to date daily in regard to changes in actual installation from the plans and specifications. Alterations to duct work, piping services, etc. shall be noted and the revised arrangement drawn in accurately, complete with dimensions from column lines. Every precaution shall be taken to protect the drawings from damage and loss. The "As Built" records shall be made available to the Engineer or Site In-charge upon request and made available at each site meeting. After no further alteration can be expected and the contract is nearing completion, the records shall be submitted for final approval. The contractor shall include on "As Built" records the dimensions location of all buried piping and valves, and during construction plainly mark location of exterior services and valves to prevent damage to these until the project is completed.

1.12 CUTTING AND PATCHING

Openings not indicated on the Engineering or Structural drawings, which are required for bringing equipment into the building or for other temporary or permanent service, shall be approved by the Engineer or Site In-charge. The contractor will provide maintain and restore these openings and shall pay for their provision and restoration. Ample notice shall be given of size and location of such openings. The contractor shall ensure that he does not undertake any cutting that may impair the

strength of the building. No holes, except expansion bolts and small screws may be drilled into the structure without obtaining prior approval. Persons, skilled in the trades, shall do all cutting and patching work in a neat and workman like manner.

1.13 PAINTING

All equipment supplied under this specification shall be delivered to the site with a factory applied prime coat of paint unless noted otherwise. All supports and hangers shall receive a prime coat of paint. Painting where required for pipe, duct services, equipment identification, including stenciling shall be carried out by a paint tradesman under this division in accordance with the workmanship and material specification. All factory prime-coated or finish coated equipment shall be touched up or repainted if equipment is marred during shipment or installation.

1.14 EXPANSION AND CONTRACTION

Unless shown otherwise, the contractor shall be responsible for measures to control the thermal movement of piping and apparatus. Piping shall be erected in such manners that strain and weight does not come directly upon connections, joints or apparatus. Where possible, the effect shall be obtained by providing changes in direction and loops in pipe runs, supplemented by the necessary guides, anchors and limit stops.

1.15 PIPE SLEEVES

An adequate number of sleeves (pipe inserts) of mild steel shall be provided where pipes pass through concrete, masonry and similar work. The pipe inserts shall have a flange welded in the center around its circumference, in order to provide water tight and secure fixing into the structure. The sizes of the pipe sleeves (pipe inserts) shall be as per the drawings supplied and / or as given below.

1.15.1 Sleeves through Exterior Walls below Grade

i. Sleeves in exterior foundation walls below grade shall project 25 mm beyond the outside surface of the wall and be flush with the inside surface.

ii. The annular space between the sleeve and the pipe shall be caulked with un-tarred oakum and sealed with approved caulking compound. The sealing shall be 25 mm deep from each side. The pipe and sleeve surfaces shall be cleaned to enable good bonding. Allow 24 hours for setting of the compound. The contractor shall adhere strictly to the manufacturer's recommendation.

1.15.2 Sleeves through Interior Wall, Floor and Ceilings

i. Sleeves through interior masonry walls and partitions shall be set flush with finished wall surfaces.

ii. Sleeves through floors in finished areas shall terminate 25 mm above the finished floor.

iii. Sleeves through floors in service area (e.g., mechanical rooms) shall terminate 50 mm above the finished floor.

iv. The annular space between sleeves and pipes shall be packed with Silicon Rubber. In Machine Room, the packing shall be finished at both ends of the sleeve with 6 mm deep caulking compound. In other areas the finishing may be on the room side only.

v. Pipe insulation shall be carried full thickness through pipe sleeves.

Unless otherwise specified elsewhere, the sleeves size shall be as follows:

Out Side (OD) Diameter of Pipe (If Insulated, OD of Insulation)	Sleeve Size (Nominal Bore of the Pipe for Sleeve)
OD 20 mm to OD 32 mm	NB 2" (50 mm)
OD 33 mm to OD 75 mm	NB 4" (100 mm)
OD 76 mm to OD 125 mm	NB 6" (150 mm)
OD 126 mm to 160 mm	NB 8" (200 mm)
OD 161 mm to OD 200 mm	NB 10" (250 mm)

1.16 CLEAN UP

The contractor shall clean all exposed metal surfaces from grease, dirt or other foreign materials. Chrome plated and polished work shall be left bright and clean. All openings in pipes and fixtures shall be properly capped and plugged during construction. Fixtures and equipment shall be properly protected from damage during the construction period and shall be cleaned in accordance with the manufacturer's instructions.

1.17 SANITARY FIXTURES, RUNS, PIPES

(i) The recommended positions of the sanitary fixtures, runs of all piping etc. as shown in the layout drawing will be adhered to as far as possible or as far as practicable.

(ii) Should there be any discrepancy or incomplete description, ambiguity or omission in the drawings and other documents, whether original or supplementary forming the Agreement, completion or maintenance of the installation, the Contractor shall immediately on discovering the same, draw the attention of the Engineer to this.

(iii) Prior to the installation of all fittings, pumps, traps, etc. The finial position shall be ascertained from the Engineer.

1.18 PROPRIETARY OF MATERIALS

Where proprietary of materials are specified hereafter, the Contractor may propose the use of similar materials of other manufacture but of equal quality for approval by the Engineer. Should the price of alternate materials proposed be lower in price, the Contractor shall a revise schedule of price for the particular item along with his proposal for the use of alternate material in lieu of the one specified.

All materials and goods, where specified to be obtained from a particular manufacturer or supplier, are to be used or fixed strictly in accordance with their instructions.

1.19 PACKAGING

The Contractor is to provide special packaging according to standard practices to project materials or parts of materials from damage, and his rates will be deemed to include for all such protection.

1.20 SPECIFIED MATERIALS

The sources of materials stated in the Specifications are those from which materials are generally

available. However, materials not conforming Specifications shall be rejected even if they come from the stated sources. The Contractor should satisfy himself that sufficient quantity of material of acceptable Specification is available from the stated or other sources.

1.21 STANDARDS

All materials, Workmanship and components shall where applicable and unless otherwise stated in the Agreement or comply with Indian standard or code of practice in use. The Indian Standards referred to here are:

Indian Standards (I.S.), Published by Bureau of Indian Standard, India.

Should there be any discrepancy or incomplete description, ambiguity or omission in the drawings and other documents; whether original or supplementary forming the Agreement, completion or maintenance of the installation, the Contractor shall immediately on discovering the same draw the attention of the Engineer to this. The Works shall be carried out according to this Specification whether specifically mentioned elsewhere or not. No extra in any form will be paid unless it is definitely stated as it is in the Bill of Quantities. Whenever the Specifications are not given or when the Specification is ambiguous, the relevant Indian standards or British Standards and further amendments will be considered as final and binding.

1.22 QUANTITIES

The Works shall be related to the drawings which the Agreement is presumed to have studied. Nothing extra will be paid for any items because of its shape, locations or other difficult circumstances, even if the schedule makes no distinction, as long as the item is shown in the drawings. The quantities given in this schedule are provisional. The Contractor will be paid for the actual quantity of Works executed as measured at Site and priced at the rates in the schedule. The Engineer reserves the right to increase or decrease any of the quantities or to totally omit any item or Works. Any claim by the Contractor on these accounts will not be entertained.

1.23 EXCAVATION FOR PIPE LINES

In excavating trenches for pipe lines, slight rails shall be erected, before excavation is commenced, at every 100 meters and at all change of direction or gradient. The sight rail shall consist of a board, not less than 10 centimeters deep, with the top edge planed true and straight. This shall be supported by a stout wooden post at each end, and its top edge accurately fixed to a definite and, as far as practicable, uniform height above the level of the pipe to be laid. The centre line of the pipe shall be denoted on each rail thereon, and the rail on one side of the centre line painted rail, and on the other side white. The depth of the excavation and the level of the pipe invert shall be checked by means of boning rods of appropriate length. The boning rods used are to be accurately made to the various lengths required, the lower and being provided with a shoe of sufficient projection to rest on the centre of the invert of the last pipe laid.

The excavation shall be carried out to the lines and levels shown on the plans or as ordered by the Engineer, and shall be deep enough to permit a minimum cover as specified hereunder.

	hum Cover in mm
	ıal Ground
anized Iron C / PVC	

The Contractor shall be responsible for and shall at his own cost, make up all subsidence or slips whether arising from its nature of the materials in embankments, from the nature of the ground or from any cause whatsoever. The Contractor shall, his own expense keep the whole of the Working Site dry and from water and construct such temporary water courses and drain as may be surface of the Works. The Contractor shall include in his rates the cost of providing all tools, machinery and all temporary Works such as staging, struts, shoring, planks and poling boards and their removal on the completion of the Works and the cost of pumping and trenches. Whenever pumping is necessary, the whole Works shall be executed as quickly as possible, due care being taken to avoid excessive pumping, which may cause settlement of surrounding land and property.

Any trench or excavation which may have been taken to a great depth than necessary shall be filled into the required level with suitable material approved by the Engineer and rammed solid with watering at the Contractor's expense.

Special care shall be taken provide a solid even bed for the barrel of the pipe, and the floor of the trench shall be properly shaped to received the socket it and the barrels of the pipes. Where lock is met within the trenches, the excavation shall be taken to a depth of 15 cm of selected filling (approved by the Project Engineer) placed on the rock and consolidated to form a firm even bed for the pipe where required, socket holes shall be cut in the rock. In narrow trenches, socket holes shall be cut in the rock. In narrow trenches, the width of the excavation shall be increased. The sides of trenches shall be allowed a slope not exceeding 1 to 12, the width at the bottom being at least 30 cm wider than the socket of the pipe, so as to allow room for ramming the refilled materials under and at the sides of the pipe.

1.24 RE-FILLING

No refilling shall be carried out until the construction Works has been tested and approved. The re-filling on the top and around the sewers shall be done with great care and in such a manner as will obtain the greatest amount of compactness and solidity possible. For that purpose, the earth shall be laid and rammed in regular layers not more than 230mm (9") thick up to the surface and also watered and rammed at each layer. The top soil shall be carefully replaced to match the existing.

1.25 DISPOSAL OF SURPLUS SOIL

The contractor shall, at his own costs and charges, provide places for disposal of all surplus materials not required to be used on the works. As each trench is refilled the surplus soil shall be immediately removed, the surface properly restored and roadways and sides left clear.

1.26 TESTING OF PIPES LINES

CPVC Water Supply Pipes

After each section of the pipeline has been laid and jointed and anchorage's built in for the bends, the pipeline shall be tested in lengths of 2 kilometers or less as directed by the Project Engineer, by and at the expense of the Contractor. Before testing, the trench shall be partially backfield except at the joints. The accessories nodded viz. Test pump, pressure gauge, end pieces including connecting valves and piping etc., for carrying cut the hydraulic tests shall be provided by the Contractor's. The Contractor shall provide the supply of necessary labour and water for testing at his expense, the cost of this shall be included in the unit rate for lying and jointing of pipes. The pipes and joints found to be defective during the test shall be replaced and or reduce by the Contractor and the related labour cost be met by the Contractor.

The two tests that shall be carried out are -

(i) Pressure test: a pressure of at least double the maximum Working pressure, pipes and joints shall be absolutely watertight under the test.

(ii) Leakage test (to be conducted after the satisfactory completion of the pressure test) at a pressure to be specified by the Engineer for a duration of two hours. Unless otherwise specified the leakage test pressure shall be the lower or ½ times the maximum static pressure that will be experienced by the pressure after installation.

Where any section of the main is provided with concrete thrust blocks or anchorages, the pressure test shall not be made until at least five days have elapsed after the concrete was caste.

The procedures to be followed are as follows:

(i) Pressure Test:

- Each valved section of the pipe shall be slowly filled with water and all air shall be expelled from the pipe through hydrants and blow-offs. If these are not available are not available at high places, necessary tapping may be made at points or highest elevation before the test is made and plugs inserted after the tests have been completed.
- If the trench has been partially back-filled the specified pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the poi in a manner satisfactory to the Engineer. The duration of the test shall not be less than 24 cm.
- All exposed pipes, fittings, valves and joints should be carefully examined. Any cracked or defective pipe, fitting and value discovered in consequence of this pressure test shall be removed and replaced by sound material and the test shall to repeat. All joints showing visible leaks shall also be recalled or redone until tight.

(ii) Leakage Test:

- Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section thereof, necessary to maintain the specified leakage test pressure.

The pipe installation will not be accepted until the leakage is less than the number of cm3/h as determined by the formula-

$$q1 = \frac{N\ D\ P}{3.3}$$

Where,

q1 = the allowable leakage in cm^3/h.

N = number of joints in the length of the pipeline.

D = diameter in mm, and

P = the average test pressure during the leakage

1.27 SANITARY AND SEWER PIPES

1.27.1 Sewer Drainage and Site Drainage

The work covered under this section comprises of the supply and installation of the following:

a. Night Soil and Waste Water drainage system complete

Pipes for these works shall be as follows:

a. Pipes up to OD 110 mm size should be of PVC Pipe having working pressure of 4.0 kgf per sq cm and carried out as described herein.

1.27.2 Manholes and Grease Trap Collection Chambers

Manholes and Chambers shall be constructed as shown in Detail Drawings, and where shown on Site Services layout. Materials shall be of not less than 225 mm Brickwork, cast-in-place concrete, or pre cast concrete. Concrete shall be M: 20 strength. All brickwork shall be plastered in cement, sand (1:2). Gratings, lids and castings in general shall be in Cast Iron in accordance with IS 5961 and built in or fixed as detailed.

All manholes designated to be constructed shall be as specified in the Schedule of Quantities.

All manholes shall be supported on a base of cement concrete of such thickness and mix as given in the Schedule of Quantities or shown on the drawings.

Where not specified, manholes shall be constructed as follows:

Maximum Depth in mm	Internal Dimensions of Manhole Chamber
Up to 450 mm	450 mm x 450 mm
Over 450 mm and Up to 600 mm	600 mm x 600 mm
Over 600 mm and Up to 1200 mm	Dia 900 mm or 900 mm x 900 mm

All manholes shall be provided with cement concrete benching in 1:2:4 mix. The benching shall have a slope of 100 mm towards the channel. The depth of the channel shall be the full diameter of the pipe. Benching shall be finished with a floating coat of neat cement.

The manhole chamber covers and frames shall comply with the following ratings:

Manhole Cover	Outside Size of Frame	Inside Size of Frame	Weight in Kg
Light	27" x 27"	24 " x 24" or Ø 500 mm	78.5 kg
Heavy	27" x 27"	24 " x 24" or Ø 600 mm	216 kg

All manholes shall be plastered with 12 mm thick cement mortar 1:3 (1 cement & 3 coarse sand) and finished inside with a floating coat of neat cement. Manholes shall be plastered outside as above cut with rough plaster.

All manholes shall be provided with cast iron covers and frames and embedded in reinforced cement concrete slab weight of cover and frame thickness of slab shall be as specified in the Bill of Quantities or given above.

1.27.3 Making Connections

Contractor shall connect the new sewer line to the existing manhole by cutting the walls, benching and restoring them to the original condition. A new channel shall be cut in the benching of the existing manhole for the new connections; contractor shall remove all sewage and water if encountered in making the connection without additional cost.

1.28 SOIL, WASTE, VENT AND RAIN WATER PIPING

1.28.1 Soil, Waste and Vent Pipes

1.28.1.1 Polyvinyl Chloride (PVC) Pipes and Fittings:

All soil, waste, vent and rain water pipes shall be Un-Plasticized Rigid Polyvinyl Chloride (UPVC) pipes unless specified otherwise. All pipes shall be straight and smooth and inside free from irregular bore and other manufacturing defects.

Fittings shall be of the required degree with or without access door. All access doors shall be made up with rubber gasket, while screw cover to make the fitting air and water tight.

The recommended joints of uPVC pipes shall be solvent cement joints or with rubber ring socket joints.

1.28.1.2 Storage and Handling

UPVC Pipes: The pipes should be given adequate support at all time. Pipes should be stored in a reasonably flat surface free from stones and sharp projections so that the pipe is supported throughout its length. In storage, pipes racks should provide continuous support and sharp corners of metal racks should be avoided. Socket and spigot pipes should be stacked in layers with socket end placed at alternate ends of the stacks to avoid top sided stacks. It is recommended not to store pipe inside another pipe.

On no account pipes shall be stored in a stressed or bent condition or near the source of the heat. Pipes should not be stacked more than 1.5 meters high and pipes of different sizes and classes should be stacked separately.

The ends of pipes should be protected from abrasion and particularly those specially prepared for jointing either by spigot or socket solvent cement joints.

If due to unsatisfactory storage of handling a pipe becomes 'kinked' the damaged portion should be cut out completely. 'Kinking' is likely to occur in very thin walled pipes.

1.28.1.3 Jointing of UPVC Pipes

Methods of Jointing:

i) Solvent Cement Joints

The technique is used with spigot and socket type joint, in which the socket is made specially to form a close fit on the pipe end and with injection molded fittings.

Solvent Cement of the pipe manufacturer (the approved brand used) make shall be used as per the recommendations of the manufactures.

The dust, oil, water grease etc. should be wiped out with dry cloth from the surface to be coated with solvent cement. The coating of solvent cement shall be applied evenly on the inside of the fittings for full length of insertion and then on the outside of the pipe end up to the marked line and the pipe twisted to a quarter of a turn to spread the cement evenly at the same time ensuring the pipe, pushed home fully into the socket. The pipe should be pushed into the rifting socket and held for one to two minutes as otherwise the pipes comes out of the fitting due to slippery quality of cement and the tapering inside bore of the fitting. The surplus cement on the pipe surfaces shall be wiped out. In most of the cases the pipe inserted should be up to the marked line and in no case shall be less than 2/5 of the diameter of the pipe and up to marked line.

When the joint is made, the remaining cement on the pipe surfaces shall be wiped off immediately without fail as the continued action of solvent cement will weaken the wall on the pipe and cause failure under pressure. For warm place in summer month joints shall be made preferably early in the morning or in the evening, when it is cooler and for cold place in winter joints shall be made preferably during the day (sunny) when it is warm.

Since solvent cements are inflammable they should not be used near the naked flames. In certain cases fumes given off from solvent cement may be a source of danger if not carried in a ventilated area.

When not in use, containers of solvent cement should be kept closed tightly to avoid loss of solvent or entry of dirt. Cement, which has gelled or hardened, should be discarded.

ii) Rubber Ring Joints or 'O' Ring Shrink Joints (Shaft Piping)

UPVC pipe and UPVC pipe fittings may be jointed with approved rubber ring to provide the watertight seal. The ring may be housed in groove formed in the socket housing. The rubber is compressed and makes a seal between the pipe and the housing. It is advisable to use uPVC Lubricant for proper sliding of the pipe end to the rubber socket piece.

1.28.1.4 Fixing to Supports

The pipes and specials (fittings) before being laid of fixed shall be examined to see that there are no cracks or defects. The pipes and fittings shall be thoroughly cleaned of all dust and dirt. After laying or fixing the pipes in position they shall be arranged in such a way that centre line of pipes coincide with the centre line of the alignment. Fittings, cleanout and floor drains shall also be laid in their position as stated above uPVC Pipes shall be fixed vertically in shaft by means of uPVC clips anchored to walls using uPVC washers, Galvanized Screws and Plastic dowels. In case of pipes laid horizontally, pipe shall be supported on M.S. Brackets / Hangers of approved design clamped with uPVC Clips.

All pipes laid shall have its open ends securely closed with appropriate plugs during progress of work. Pipes and fittings shall be fixed by using proper approved holder bat clams and special hangers. The pipes shall be fixed perfectly vertical or in a line as directed or as shown in the drawings. The pipes, lay vertically or horizontally shall have the

supporting clamps, hangers, Brackets, etc., as per the specification or as directed by the Engineer. UPVC bat clamps holders shall be used to fix all vertical uPVC pipes in truly vertical position. Branch pipes shall be connected to the stack at the same angle as that of the fittings. Each stack shall be terminated at top for vent. Horizontal pipes running below the ceiling shall be fixed on structural with adjustable clamps. Horizontal pipes shall be laid to uniform slope as mentioned in the drawings and the clamps adjusted to the proper levels so that the pipes fully rest on them. As per the site condition, if required or directed by the Engineer, pre-fabricated semicircular (half the diameter of the said pipe) made out of Plain GI Sheet of proper thickness shall be provided below the horizontal running pips along with above-mentioned adjustable clamps.

1.28.1.5 Testing

All uPVC Soil, Waste, Vent, Rain Water (SWR) pipes and uPVC pipe fittings shall be tested by smoke test and left in working order after completion. The smoke test shall be carried out as stated below:

Smoke shall be pumped into the SWR pipes at the lowest level from a smoke machine, which consists of a blower and a burner.

The materials usually brunt are greasy cotton waste which form clear pungent smoke which is easily detectable by sight as well as by smell if leaking at any point of the drain. During testing if any joint is found leaking the same shall be rectified by the Contractor at no extra cost & to the satisfaction of the Engineer-in-charge.

1.28.2 Nahani or Floor Traps

Nahani or floor traps shall be uPVC, deep seal with an effective seal of 50 mm. As per drawing, Waste pipes may be discharged over the trap. The trap and waste pipes shall be set in cement concrete blocks firmly supported on the structural floor. The blocks shall be in 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate) and extended 35 mm below finished floor level. Contractor shall provide all necessary shuttering and centering for the blocks. Size of the block shall be 300 mm x 300 mm and of the required depth.

1.28.3 Cutting and Making Good

Pipes shall be fixed and tested as building work proceeds. Contractor shall provide all necessary sleeves, holes and chases in structural members as building work proceeds. Wherever holes are cut or left originally they shall be made good with cement concrete 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate) and the surface restored as in original condition. No additional payment shall be made for cutting and making good of holes.

1.29 WASTE PIPES FROM APPLIANCES

1.29.1 Waste Pipes from Appliances

Waste pipe from appliances e.g. wash-basins, shower, bath tub, sinks, drinking fountain, urinals, water closets, etc. shall be of uPVC as given in the Schedule of Quantities or drawings. "Galvanized or Black Wrought Iron Pipes or Pipe Fittings should not be used for Soil Pipes, Waste Pipes, Rain Water Pipes, Anti-Siphon Pipes, Vent Pipes or Drain Pipes from any appliances."

All pipes shall be fixed in gradient towards the out fall drain. Pipes inside a toilet room shall be chased unless otherwise shown on the drawings. Where required pipes may be run at ceiling level in suitable gradient as mentioned in the drawing or directed by the Engineer and supported on structural clamps.

1.29.2 Clean Outs

Clean-outs shall be full pipe size up to 110 mm and a minimum of 110 mm on larger pipe. A clean out shall be installed at, or as close as possible to, the base of every vertical waste, soil and drain stack. A clean out shall be installed at the up-slope of each pipe at which a building drain or branch changes direction by more than 45°.

Clean-outs in horizontal drainage piping shall be at intervals not greater than:

- 15 m where the piping is of dia 100 mm and smaller.
- 30 m where the piping is of large than dia 100 mm.
- 6 m where waste pipes are horizontally connected to sinks.

Nickel Bronze or Stainless Steel Floor Plates with Frames shall be installed on finished floors for access to clean-outs. Clean-outs on horizontal lines in finished areas shall be as per IS specifications.

1.30 WATER SUPPLY

1.30.1 Pipe Line

All Water Supply Pipe Line shall be as mentioned in the drawings and Bill of quantities. The Pipes may be:

1.30.1.1 Chlorinated Polyvinyl Chloride (CPVC) Pipe & Fittings

Chlorinated Polyvinyl Chloride (CPVC) Tubes / Pipes of Class 11 in Copper Tube Size (CTS) dimensions conforming to ASTM: D 2846 of approved brand. Pipe Fittings shall be of Chlorinated Polyvinyl Chloride (CPVC) of Class 11 in Copper Tube Size (CTS) dimensions conforming to ASTM: D 2846 of approved brand. The Pipe Fittings are Couplings, Elbows, Bends, Tees, Transition Coupling, Transition Bushings, etc. Manufacturer's Trademark should be stamped on the CPVC Pipe Fittings. The pipe should have Flowguard labeled and certified.

CPVC Pipe and CPVC Pipe Fittings shall have cold weld joints by CPVC Solvent cement confirming to ASTM: 493. After cutting the pipe, care shall be taken to remove burr from the end of the pipe with appropriate tools. Only with TEFLON tape, threaded Fixtures shall be fitted with CPVC Threaded Adopters.

1.30.2 Laying

All Pipes and fittings shall be of class specified in BOQ manufactured under respective Standards.

All main supply pipes and other pipes to be laid under the ground shall be laid over a minimum of 600 mm sand bedding or selected granular material compacted as described herein this specification.

The water main shall be laid and maintained to the required lines and grades with fittings,

valves, and connections at the required locations and all valves and stems plumb.

Proper implements, tools and facilities shall be provided and used by the Contractor for the safe and convenient performance for the work.

All pipes, valves and fittings shall be carefully lowered into the trench piece by piece by hand ropes or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings and linings.

Under no circumstances shall water main materials be dropped or dumped into the trench.

Valves, valve covers, meters, tapping sleeves and other accessories shall be installed as per the manufacturer's recommendations and in conjunctions and compliance with the requirements of the Local Government or Public Service Authority specifications.

It will be the responsibility of the Contractor to furnish and install all proper size pipe bends for both horizontal and vertical deflections that are required to construct the water main to the line and grade as shown and specified.

1.30.3 Jointing

The jointing shall be made in accordance with the instructions of the pipe and fitting manufactures. The pressure pipe shall be tested to a minimum of 10 kg / sq. cm. pressure. The setting and arrangement of pipes shall be as per the working drawings. Pipes are cut to size and ends are squared.

The pipes and fittings shall be inspected at the site before use. Where the pipes have to be cut, the end shall be carefully plugged so that no obstruction to bore is effected.

The pipe shall be cleaned and cleared of all foreign matters before being laid. For joining, the out side of pipe (thread for GI pipe line) and the inside of the socket shall be cleaned. Care should be taken that all pipes and fittings are properly joined so as to make the joints completely watertight.

After lying, the open ends of the pipe shall be temporarily plugged to prevent access of water, soil or any other foreign materials. Jointing of pipes shall be made according to the different kind of pipes by thread screwing, cold welding, flanges, or flexible joints etc. Joints between dissimilar materials, e.g. copper shall be by means of copper-alloy unions or union ferrules, etc.

Care shall be taken to ensure that all piping and fittings are clean internally and free from particles of sand, soil, metal, plastic, filings and chips, etc.

1.30.4 Clamps

All pipes laid shall have its open ends securely closed with appropriate plugs during progress of work. Pipes and pipe fittings shall be fixed by using proper approved holder bat clams and special hangers. The pipes shall be fixed perfectly vertical or in a line as directed or as shown in the drawings. The pipes laid vertically shall have supporting, the clamps at 1.5 meters centre to centre and the pipes laid horizontally, the clamps at every 1.2 meters centre to centre as shown in the Drawing or as directed by the Engineer. MS bat clamps holders shall be used to fix all vertical pipes in truly vertical position. Horizontal pipes running below the ceiling shall be fixed on structural with adjustable clamps. Horizontal pipes shall be laid to uniform slope as mentioned in the drawings and the clamps

adjusted to the proper levels so that the pipes fully rest on them. As per the site condition, if required or directed by the Engineer, pre-fabricated semi circular (half the diameter of the said pipe) made out of Plain GI Sheet of proper thickness shall be provided below the horizontal running pips along with above-mentioned adjustable clamps. No Iron hooks shall anchor pipes in wall chases.

1.30.5 Testing Water Service Lines

The water service lines shall be hydrostatically tested. Test pressure shall be 10 kg / sq. cm. and the pipes shall be tested for the specified pressure for 24 hours. Defective pipes, pipe fittings and pipe joints shall be replaced or repaired immediately and retested.

1.30.6 Unions

Adequate number of unions shall be provided on all pipelines to enable to dismantle later. Unions shall be provided near each valve, stopcock, and check valve and in case of GI Pipe - at an interval of 6 m (20 ft.) on straight runs.

1.30.7 Shut-Off Valve

Gate Valves shall be heavy gunmetal full way type conforming to IS: 778 (Class: II). Valves shall be tested at manufacturer's works to 21 kg / sq. meter and shall have manufacturer's name stamped on it.

1.30.8 Check (Non Return) Valves

Check Valves / Non Return Valves shall be heavy gunmetal Swing Type conforming to IS: 778 (Class: II). Valves shall be tested at manufacturer's works to 21 kg / sq. meter and shall have manufacturer's name stamped on it.

The Engineer or Site In-charge shall approve all valves before installation work. up to 65 mm and small shall be gunmetal

1.30.9 Isolating Valves

Isolating valves shall be provided on all branch lines to enable isolation of groups of fixtures and sections of building and as shown on drawings.

1.30.10 Drain Points

Drain valves shall be installed in all liquid carrying systems at the low points to facilitate complete drainage of the system.

1.30.11 Hose Bibs

Hose bibs in the building shall be cast brasses with a leather disc, screwed pipe end, 20 mm pipe hose tread. Hose bibs in finished areas shall be chromium plated.

1.31 EXTERNAL WATER SUPPLY

1.31.1 Pipes

All pipes lay outside of the building and generally underground shall be considered as External Water Supply. The types of Pipe and Pipe Fittings shall be as per drawings and / or as mentioned in the Bill of Quantities. The installation of pipe line shall be properly carried out and should be completely watertight. All fixtures and fittings shall be properly

installed and checked against leaks at designated pressure. Necessary Pipe Sleeves in the wall, floor, etc should be provided as per the specification.

1.31.2 Excavation

Generally, external water mains pipe shall be laid a minimum of 600 mm below ground level. Excavation for trenches shall be done as specified elsewhere, but the depth of the trenches shall be as follow

Size of Pipe	Width of Trench	Depth of Trench
For dia 15 mm to 50 mm	300 mm	750 mm
For dia 65 mm to 100 mm	450 mm	1000 mm

1.31.3 Backfilling

Backfilling of trenches shall not commence until the pipes therein have been tested and approved by the Engineer. Under non-paved areas selected excavated materials free from large stones refuse, or organic material as approved by the Engineer or Site In-charge shall do the backfill.

1.32 INTERNAL WATER SUPPLY

1.32.1 Pipes

All pipes inside the building from Over Head Tank to the Toilets and Kitchen and where specified, shall be considered as Internal Water Supply Pipe Line. The types of Pipe and Pipe Fittings shall be as per drawings and / or as mentioned in the Bill of Quantities. The installation of pipe line shall be properly carried out and should be completely watertight. All fixtures and fittings shall be properly installed and checked against leaks at designated pressure. Expansion of hot water pipes shall be compensated for by flexible piping layouts and / or by utilizing bends in pipe line. Necessary Pipe Sleeves in the wall, floor, etc as well as pipe supports, clamps, brackets, etc should be provided as per the specification and instruction of the Engineer.

1.32.2 Pipe Supports and Hangers

The pipes and pipefitting before being laid to fixed shall be examined to see that there are no cracks or defects. The pipes and fittings shall be thoroughly cleaned of all dust and dirt. After laying or fixing the pipes in position they shall be arranged in such a way that centre line of pipes coincide with the centre line of the alignment. Fittings, Valves, etc., shall also be laid in their position as stated above. CPVC or PVC Pipes shall be fixed by push fit before any solvent cement is applied and when cleared by the Engineer then only permanent joints to be made. All the horizontal and vertical run pipes should be supported to walls with the help of PVC Pipe Clamps that should be anchored by Galvanized Screws and Plastic dowels. In case of pipes laid horizontally under ceiling, pipe shall be supported on M.S. Brackets / Hangers of approved design.

SPACING FOR SUPPORTS & HANGERS OF FIXING FOR INTERNAL PIPING

of Pipe	ze of Pipe Line	erval for Pipe Supports for Horizontal Run Pipe Line	nterval for Pipe Supports for Vertical Run Pipe Line

I Pipe Line for water Supply	NB ½"	2.00 m	2.50 m
	NB ¾"	2.50 m	3.00 m
	NB 1"	2.50 m	3.00 m
	NB 1¼"	3.00 m	3.50 m
	NB 1½"	3.00 m	3.50 m
	NB 2"	3.50 m	4.50 m
	NB 2½"	3.50 m	4.50 m
	NB 3"	3.50 m	5.00 m
C / PVC / PP-R Pipe Line for Water Supply	15 mm / ½ "	1.25 m	1.25 m
	20 mm / ¾"	1.50 m	1.50 m
	25 mm / 1"	1.50 m	1.50 m
	32 mm / 1¼"	1.75 m	1.75 m
	40 mm / 1½"	1.75 m	1.75 m
	50 mm / 2"	2.00 m	2.00 m
C Pipe Line for Soil, Waste & Rain Water	0 mm	1.50 m	2.00 m
	OD 75 mm	2.00 m	2.50 m
	OD 110 mm	2.00 m	3.00 m
	OD 160 mm	2.50 m	3.00 m

1.33 METHOD OF MEASUREMENT

GI, CPVC, PVC Pipe Line above ground or under ground shall be measured per running feet and the rate shall be inclusive of all fittings including unions, Hangers, Brackets, Clamps, Pipe Sleeves, cutting chases etc on wall, ceiling, floor and making good the same and testing of pipes and fittings, making good.

GI pipes below ground shall be measured per running feet and the rate shall be inclusive of all fittings and testing of pipes and fittings except the excavation for trenches, refilling and disposal of surplus earth.

Other Fixtures such as Gunmetal valves, non return valves, ball cocks, foot valves, stop cocks, bib cocks, etc., shall be measured by number.

1.34 BATHROOM FIXTURES AND FITTINGS

1.34.1 Bathroom Fixtures

All bathroom fixtures, Ceramic and CP fittings shall be supplied free of cost by the Owners at site Store, Contractor shall make his own arrangement at his cost to check, take delivery, store, install in position including transportation to site of work. No allowances shall be made for theft, breakage and defective materials after taking delivery of the materials.

1.34.2 Installation of Fixtures

The fixtures and fittings shall be provided with all such accessories as are required to complete the item in satisfactory working conditions, whether specifically mentioned or not in the Schedule of Quantities, Specifications and Drawings.

The Bathroom fixtures and fittings shall be installed at the correct assigned position as shown on the drawings and as directed by the Engineer in-charge/Engineer or Site In-charge/Owners, and shall fully meet with the esthetic and symmetrical requirements as demanded by the Engineer In-charge / Engineer or Site In-charge / Owner.

All fixtures and accessories shall be fixed in accordance with a set pattern matching the tiles or interior finish as per Engineer-in-charger's requirements. Wherever necessary, the fittings shall be centered to dimensions and pattern as called for.

Skilled workman shall install fixtures with appropriate tools according to the best trade practice. Manufacturer's instructions shall be followed for the installation of fixtures. Fixtures in all toilets shall be standard height, mounting as called for on the drawings. Fixtures shall be mounted rigid, plumb and true to alignment.

1.34.3 Mock Up and Trail Assembly

The installation of the bathroom fixtures and fittings shall be as per the shop drawings approved by the Engineer-in charge.

The contractor shall assemble on trial basis at least one set of each type of bathroom fixture and fittings in order to determine precisely the required supply and disposal connection. Relevant instructions from manufacturers shall be followed as applicable. This trial assembly shall be developed to facilitate determining the location of punctures, holes, holding devices etc. that will be required for final installation in position of all bathroom fixtures and fittings. The above assembly shall be subject to final approval by the Engineer-in charge / Engineer or Site In-charge / Owner.

The fixtures in the trial assembly can be reused for final installation without any additional payments for fixing or dismantling of the fixtures.

1.34.4 Supporting and Fixing Devices

The contractor at his own cost shall where required, provide all fixtures and fittings securely in position. The fixing devices shall be rigidly anchored into the building structure. The devices shall be rust resistant and shall be so fixed that they do not present an unsightly look in the final assembly. These shall be installed complete with appropriate washers and

gaskets, jointing Materials and Screws etc. as per manufacture manuals.

1.34.5 Final Installation

The contractor at his own cost shall install all bathroom fixtures and fittings in their final position in accordance with approved trail assemblies and as shown on drawings. The installation shall be complete with all supply and waste connections. The connection between built-in piping system and the bathroom fixtures shall be through proper couplings, unions and flanges to facilitate removal / replacement of bathroom fixtures without disturbing the built in piping system. All couplings, unions and flanges shall match in appearance with other exposed fittings.

Fixtures shall be mounted rigid, plumb and true to alignment. The outlets of water closet bowls and similar appliances shall be examined to ensure that outlet ends are butting on the receiving pipes before making the joints. It shall be ensured that the receiving pipes are clear of obstruction. When fixtures are being mounted attention shall be paid to the possibility of movement and settlement by other causes. Overflows shall be arranged as to give visible warning and discharge. A check shall be made to ensure that necessary anchoring devices have been provided for supporting Water Closets, Wash Basins, Sinks and other appliances.

1.34.6 Protection against Damage and Theft

The contractor shall take every precaution to protect all bathroom fixtures and fittings issued to them against damage, misuse, crazing, staining, breakage and pilferage by providing proper wrapping and locking arrangement till the completion and handing over of the installation. At the time of handing over, the contractor shall clean, disinfect and polish all fixtures and fittings. Any fixtures and fittings found damaged, cracked, chipped, stained or scratched shall be removed and new fixtures and fittings free from defects shall be installed at his own cost to complete the work.

1.34.7 Testing

All fixtures and fittings shall be tested for their proper performance by the Contractor thoroughly to satisfy himself that they are in order, before applying for virtual completion.

1.35 MISCELLANEOUS WORK

1.35.1 Disinfecting the Piping System

Before commissioning the water supply system the contractor shall arrange to disinfect the entire system as described in the succeeding paragraph.

The water pipes shall first be filled with water and thoroughly flushed out. The storage tanks shall then be filled with water again and disinfecting chemical containing chlorine added gradually while tanks are being filled to ensure through mixing. Sufficient chemical shall be used to give the water a dose of 50 parts of chlorine to one million parts of water. If ordinary bleaching powder is used, the proportions will be 150 gms of powder to 1000 litres of water. The powder shall be mixed with water in the storage tank. If a proprietary brand of chemical is used the proportions shall be as specified by the makers. When the storage tank is full, the supply shall be stopped and all the taps on the distributing pipes opened successively

working progressively away from storage tank. Each tap shall be closed when the water discharge begins to smell of chlorine. The storage tank shall then be filled up with water from supply pipe and added with more disinfecting chemical in the recommended proportions. The storage tank and pipe shall then remain charged at least for three hours. Finally the tank and pipes shall be thoroughly flushed out before any water is used for domestic purposes.

1.36 SAFETY CODE

- First aid appliance shall be maintained in a readily accessible place including adequate supply of sterilized dressings and cotton wool.
- An injured person shall be taken on a public hospital without loss of time, in cases where the injury necessitates hospitalization.
- Suitable and strong scaffolds should be provided for all works that cannot safely be done from ground.
- No portable single ladder shall be over 8 meters in length. The width between the side rails shall not be less than 30 cm (clear) and the distance between two adjacent runs shall not be more than 30 cms. When a ladder is used an extra labor shall be engaged for holding the ladder.
- The excavated materials shall not be placed within 1.5 meters of the edge of the trench or half of the depth of trenches whichever is more. All trenches and excavations shall be provided with necessary fencing and lighting.
- Every opening in the floor of a building or in working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be one meter.
- No floor, roof or other part of the structure shall be over loaded with debris or materials as to render it unsafe.
- Workers employed on mixing and handling materials such asphalt, cement mortar or concrete and lime mortar shall be provided with protective foot wear and rubber hand gloves.
- Those engaged in welding works shall be provided with welder's protective eye-shields and gloves.
- No paint containing lead or lead products shall be used.
- Suitable facemasks should be provided to the workers when the paint is applied in the form of spray or surface having lead paint dry rubbed and scraped.
- The Contractor to the painter shall supply overalls and adequate facilities shall be provided to enable the working painters to wash during the periods of cessation of work.
- Hoisting machines and tackle used in the works, including their attachments, anchorage and supports shall be in perfect condition.
- The ropes use in hoisting or lowering material or as means of suspension shall be of durable quality and adequate strength and free from defects.

1.37 SANITARY FIXTURES AND ACCESSORIES

All sanitary wares and fittings shall be first class quality white glazed vitreous china ceramic and approved by the Engineer.

1.37.1 Water Closet (W.C.)

(a) European pattern W.C. commode and flushing cistern.

These shall be of white glazed vitreous china first class quality, double or single trap syphonic water closet suite as specified in the Bill of Quantities, P or S Trap flushing cistern as specified conforming to Indian standard Specification. The commode and flushing cistern shall be free from cracks, blisters and shall have smooth surface.

Fixing :- W.C. commode shall be fixed to floor or wall with CP brass screws or by means of 75mm long 6.5mm dia counter sunk bolts and nuts imbedded in floor concrete or as per the instruction of the Project Engineer. The base of pedestal of the commode shall be filled with white cement mixed with pigment to match the shade of floor or as directed by the Engineer. Following measure shall be adopted for fixing the W.C. commode

1. The central axis of the commode shall be perpendicular to the finished face of wall.
2. The outlet of the commode shall be centrally placed in the rubber gasket of the PVC pipe pipe as per drawing or as directed by the Engineer and shall have not leakage.
3. The distance between centre line of outlet of W.C. commode and finished wall face shall be so adjusted as to rest squarely against the finished wall face.
4. Seat and lid shall be of ISI marked solid of heavy duty quality and fitted exactly on the rim of the W.C. Commode with C.P. brass hinges, rubber buffers and C.P. brass nuts.

Method of Measurement

Measurement for the European Water Closet will be made per unit set of complete installation.

1.37.2 Wash Basins

These shall be white glazed vitreous china of first class quality with single tap hole as specified in the Bill of Quantities. These shall be free from cracks, crazes, blister and shall have smooth surface.

Fixing: The basin shall be supported on brackets as per manufacturer's instructions. The basin shall be under-counter or wall hung type. There shall not be any gap between top edge of the basin and finished face of wall.

C.P. Pillar cock: This shall be 15 mm size of C.P. brass central hole Pillar Cock.

Method of Measurement

Measurement for the Hand Wash basin will be made per unit set of complete installation.

1.37.3 Urinals

These shall be white glazed vitreous china of first class quality flat back type with CP push cock. The urinals shall be free from cracks, blisters and shall have smooth surface.

Fixing : Urinals shall be fixed on the wall with the help of C.P. brass screws as per the manufacturer's and/or directed by the Engineer. There shall not be any gap between the back edge of the urinal and finished face of the wall.

Method of Measurement

Measurement for the Urinal will be made per unit set of complete installation.

1.37.4 Water Tanks

Water tank shall be of HDPE as shown on the drawing and specified in the Bill of Quantities. Tank shall be supplied with manhole covers and locking arrangement as per drawing or as directed by the Engineer.

Water tank shall provide inlets, outlets, scour and overflow pipes, sockets for float level switches and inter connections if required. Overflow pipes shall be provided with a mosquito proof brass grating. Scour pipe of size as specified by the Engineer shall be provided with a bend and pipe piece and plug terminating outside the tank wall.

Ball cocks used for tanks shall be high or low pressure ball cocks with brass lever rods and polythene ball floats. The ball floats shall conform to Indian standard which shall be hammer tested.

Water tank shall be fixed in position as shown on drawing or as directed by the Engineer.

Method of Measurement

Measurement for the Water tank will be made per unit set of complete installation.

1.37.5 Toilet paper holder

Toilet paper box shall be of white glazed vitreous china of the same colour and shade as that of the main sanitary fixture. It shall be fixed in wall in a neat Workmanlike manner. Recess in walls, where required, shall be provided. It shall be fix with C.P. brass screws, where required.

Method of Measurement

Measurement for the Toilet Paper Holder will be made per unit set of complete installation.

1.37.6 Soap tray or soap dish

Soap tray or soap dish shall be of white glazed vitreous China of the same colour and shade as that of the main fixtures. Soap tray shall be fixed in wall in a neat Workmanlike manner. Recess in walls, where required, shall be provided. It shall be fixed with C.P. brass screws, where required.

Method of Measurement

Measurement for the Soap Dish will be made per unit set of complete installation.

1.37.7 Towel Rod

Towel rod shall be heavy type of C.P. brass with two brackets. The size of the rod shall be s specified on the drawing or Bill of Quantities. The brackets shall be firmly fastened by means of C.P. brass screws to wooden plugs or fawl plugs firmly embedded in the wall.

Method of Measurement

Measurement for the Towel Rod will be made per unit set of complete installation.

1.37.8 Mirror

Mirrors shall be of approved make 5mm thick. All edged shall be rounded off. Mirrors shall be fixed to wall with brass chromium plated screws and washers. Mirrors shall be of beveled edge of sizes as specified in the Bill of Quantities.

Method of Measurement

Measurement for the Mirror will be made per unit set of complete installation as per size.

1.37.9 C.P. Grating

Floor and urinal traps shall be provided with chromium plated grating, with rim of approved design and shape. Minimum thickness shall be 3mm.

Method of Measurement

Measurement for the CP Grating will be made per unit set of complete installation.

1.37.10 C.P. Fittings

All C.P. fittings, additional bib cocks, shall be of the best quality heavy pattern of approved make. All C.P. fittings shall be fixed in a Works man like manner and shall not carry tool marks and scratches.

Method of Measurement

No Measurement will be made for CP fittings except for the additional items in BOQ. All CP fittings are presumed to be installed with sanitaryware requirement. Measurement will be made for Additional CP fittings as per BOQ item per unit of installation.

1.38MAKE OF EQUIPMENT AND APPROVED MANUFACTURES

1. Sanitary Ware: Hindware or Parryware or equiivalent
2. C. P. Fitting: Jaquar, Nova, Blue Satr or equvalent
3. Glass: Modiguard or equvalent
4. CPVC Pipes: Astral, Ashirbad or equvalent
5. PVC Pipes and fittings: Panchakanya, Nepatop or equivalent
6. Gate Valves: Leader, GG or equivalent
7. C.P. Push Cock: Jaquar, Jal, Viking or equivalent
8. Stainless Steel: Grade 304

Bill of Quantities (BOQ)

Construction of Senior Staff Quarter of Nirmal Lama Polytechnic Institute

IFB No.: CTEVT/NLPI/083/84/NCB/Civil-01

Provisional Sum

SL. No.	Item Description	Unit	Quantity	Unit Rate (NPR)	Amount (NPR)
PS.1	Provide Insurance to permanent works and construction equipments and angainst to work force and engineer's staffs including third party insurance all complete.	PS	1.00	1,00,000.00 One lakh rupees only.	1,00,000.00 One lakh rupees only.
PS.2	Provide Laboratory test for materials and concrete cube tests of required number for the period of contract as per specification and instruction of site incharge.	PS	1.00	35,000.00 Thirty-five thousand rupees only.	35,000.00 Thirty-five thousand rupees only.
PS.3	Provide and maintain all the lights, guards,.fencing netting warning signs project sign board and watching for the protection of the works for the safety and convinces of the public or other as per contract specification and instruction of site engineer.	JOB	1.00	25,000.00 Twenty-five thousand rupees only.	25,000.00 Twenty-five thousand rupees only.
PS.4	Preparation of As Built Drawings after complection of the works all complete.	JOB	1.00	20,000.00 Twenty thousand rupees only.	20,000.00 Twenty thousand rupees only.
	Total provisional sums				1,80,000.00 One lakh eighty thousand rupees only.

Vocational college construction work
CPV: 45214310-6 - Vocational college construction work

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1.1	Site preparation work including cutting of vegetation, surface dressing and site clearance.	Sqm	503.14			
1.2	EARTHWORKS IN EXCAVATION: Earth work in excavation in foundation including lift up to 2.5m timbering, pumping out water from the foundation trench, stacking the soil 1m. minimum from the edge of the foundation trench, back filling the excavated soil with clean and grub of soil up to a lead of 30m. as per drawing, specification and instruction of the engineer, all complete.	Cum	506.83			

Vocational college construction work
CPV: 45214310-6 - Vocational college construction work

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1.3	EARTHFILLING: Earth work in filling in foundation, floor etc. shall be done with good excavated soil in the floor with proper ramming in 20cm layers ,after sprinkling water and consolidating to 15 cm layer, as per drawing, specification and instruction of the engineer, all complete.	Cum	241.05			
1.4	EARTHFILLING IN ROOM AREAS: Earth work in filling in floor etc. shall be done with good imported soil/sand in the floor with proper ramming in 20cm layers ,after sprinkling water and consolidating to 15 cm layer , as per drawing, specification and instruction of the engineer, all complete.	Cum	156.38			
1.6	FLAT BRICK SOLING: Providing and laying, dry brick soling in floor with first class chimney made bricks complete to level including sand filling on joints, as per drawing, specification and instruction of engineer, all complete.	Cum	676.10			
1.7	PCC WORKS: Providing and laying, plain cement concrete (1:3:6) in foundation and floor with cement, sand and stone ballast including mixing, laying in panels providing proper slopes, lines and level and curing, as per drawing, specification and instructions of engineer, all complete.	Cum	36.89			
1.8	RCC WORKS: Providing and laying, plain cement concrete M20 for R.C.C. columns, beams, slabs, lintels, associated cornice columns footings, and all kinds of R.C.C. works with cement,sand and stone ballast including mixing, laying, curing finishing etc. excluding reinforcement, centering and shuttering as per drawings, specification and instruction of the engineer, all complete.	Cum	242.15			
1.29	STEEL REINFORCEMENT: Providing and laying, steel reinforcement bar including straightening, cleaning,cutting, bending, binding with 20 SWG annealed tying wire and fixing in positions as per drawing, specifications and instructions of the engineer, all complete.	MT	35.26			

Vocational college construction work CPV: 45214310-6 - Vocational college construction work						
SL. No.	**Item Description**	**Unit**	**Quantity**	**Bidder's Rate (NPR)**	**Bidder's Rate (in words)**	**Total Amount (NPR)**
1.30	FORMWORKS: Providing and laying, centering and shuttering with approved materials for all kinds RCC works including all necessary mild steel propping, scaffolding, staging, supporting, etc. all complete net as per drawings, specifications and instructions of the engineer, all complete.	Sqm	1,659.23			
1.31	BRICKWORK IN SUBSTRUCTURE: Providing and laying, brickwork in foundation with approved quality first class chimney made brick in perfect line and level, finished including wetting the bricks, packing the joints and curing the work and necessary scaffolding, complete in all types and thickness of walls, columns, etc. as per drawings, specification and instruction of engineer, all complete.	Cum	88.91			
1.32	BRICKWORK IN SUPERSTRUCTURE: Providing and laying, brick work (1: 6) in superstructure with approved quality first class brick in perfect line and level, finished including wetting the bricks, packing the joints and curing the work and necessary scaffolding, complete in all types and thickness of walls, associated cornices, columns, etc. as per drawings, specification and instruction of engineer, all complete.	Cum	137.58			
1.33	Providing & building Brick Masonry 115mm Thk. using bricks of first class chimney made as per NS 1/2035 in Cement mortar (1:4) in superstructure to its true line & level in cement mortar proportion as specified in all shapes, size, at all heights, depths, leads & locations etc. complete including or provision of RCC horizontal stiffeners of 100mm thk in 1:2:4 proportions (Cement : Fine aggregates: Coarse aggregates) at every 10th coarse by using 4 nos. of 8mm dia tor steel reinforcement longitudinal bars and 6mm dia MS reinforcement bars 250mm centre to centre at right angles to longitudinal steel including shuttering, formwork where necessary, as directed by EIC and paid accordingly. The rate shall also include for cleaning of surface, hacking of RCC surface in contact with brickwork, raking of joints, providing, erecting, & dismantling steel scaffolding , curing for 10 days etc. compete as per the drgs., details & specifications and to the satisfaction of Engineer-In-Charge.	Sqm	630.84			

Vocational college construction work
CPV: 45214310-6 - Vocational college construction work

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1.34	Providing and laying, cement sand plastering on floor, wall, ceiling, skirting, dado, cornices, etc. of good finish, including raking the joints, cleaning and wetting the surface and curing the works all complete, as per drawing, specification and instruction of engineer, all complete. - 20mm thick plaster (1:6 c/m)	Sqm	1,499.19			
1.35	12.5mm thick plaster (1:4 c/m)	Sqm	1,853.86			
1.36	Providing and applying, inside and outside painting with approved color and paints with two coats of primer to give uniform color after rendering surface clean with sandpapering as per drawing, specifications and instruction of the engineer, all complete - TWO COAT WEATHER COAT PAINT OVER ONE COAT PRIMER: Providing and applying two coats of weather coat paint over one coat of primer including scraping, surface preparation, scaffolding etc., all complete as per specifications, instructions and as approved by site incharge.	Sqm	854.39			
1.37	TWO COAT DISTEMPER PAINT OVER PRIMER COAT: Providing and applying two coat distemper paint over primer coat including scraping, surface preparation, scaffolding etc., all complete as per specifications, instructions and as approved by site incharge.	Sqm	2,498.66			
1.38	Providing and laying screeding (38mm thick) with 1:2:4 concrete mix on proper slope after scraping, cleaning and watering the old surface as per drawing, specification and instruction of engineer, all complete.	Cum	39.57			
1.39	Providing and laying, 3 mm thick cement sand punning (1:1) on floor, skirting , dado etc. including cleaning and wetting surface, mixing, laying and rubbing with steel trowel to a hard, smooth and shining surface and curing for a quality finish as per drawing, specification instruction of engineer, all complete.	Sqm	1,076.90			
1.40	Supplying and Installation of UPVC Profile Sliding Windows Frame 80*50mm White Colour,Sliding Window sash 55*36mm with galvanized steel Reinforcement of 1.5mm,5mm thick Clear Glass, insect Net,Pattented standard hardware Like:roller,gasket,brush all complete.	Sqm	78.45			

Vocational college construction work
CPV: 45214310-6 - Vocational college construction work

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1.41	Supplying and Installation of UPVC Profile Slidingliding doors Frame 80*50mm White Colour, sash 55*36mm with galvanized steel Reinforcement of 1.5mm, 5mm thick Clear Glass, insect Net, Pattented standard hardware Like:roller,gasket,brush all complete.	Sqm	84.76			
1.42	Supplying and installation of UPVC profile double door with full panel frame 60 x 60 mm, sash 60 x 104 mm, white colour, Pattented standard hardware Like:roller,gasket,brush all complete as per specification of Korean Standard.	Sqm	71.65			
1.43	Providing and laying, 16 mm. thick plain Marblestone in Staircase and kitchen slab, dado, skirting, etc. laid with 20mm thick Cement Sand mortar (1:2) in proper slope for draining wash water, joint not exceeding 3 mm. and pointed with White Cement slurry, grinding, polishing to smooth glazed surface and waxed finish in floor, of the approved colour and quality, as per drawing, specification and instruction of engineer, all complete.	Sqm	57.50			
1.44	Providing & fixing in toilets non slippery ceramic tiles of either 12"x12" or 16"x16" approximately of selected colour pattern and specified makes layed with straight close joints. The area of existing floor slab of toilets shall be cleaned and properly waterproofed before laying the tiles, the tiles shall be laid with required bedding materials of cement and sand mix. The all joints shall be filled in with matching colour ready made fillers of approved brand, the tile floor shall be protected without allowing any damages to finish. Complete with cleaning / washing etc. at final stage.	Sqm	207.06			
1.45	Providing & fixing glazed wall tiles of approved colour pattern and specified make in 12'x18" or 12"x10" in size including cement plaster base treated with required water proofing at atleast up to 18" high wall portion above floor level on all sides and 12mm thk. plain cement paste as bonding material. The tiles shall be laid in straights joints filled with matching colour ready fillers of approved make complete with plumb level and cleaning, washing the total area.	Sqm	226.75			

Vocational college construction work
CPV: 45214310-6 - Vocational college construction work

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1.46	Supplying & fixing railing work of 38 mm Ø stainless steel pipe post @ 2.0 m., 38 mm Ø stainless steel pipe hand rail with two rows of 25 mm Ø stainless steel pipe in between ground & hand rail, having railing height 2.5' -3' as per drawing, specification and instruction of engineer, all complete.	RM	35.48			

Plumbing and sanitary works
CPV: 45330000-9 - Plumbing and sanitary works

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
2.1	Supplying & fixing white glazed porcelain clay one piece commode with 'P" and 'S" trap and slow falling seat cover complete set.	Set	8.00			
2.3	Providing and fixing in position Hand Wash Basin (W.B.) Oval shape of Parryware Standard of size 22" x 16" with 1/2 " dia C.P. single lever hot and cold mixer 11/4 " dia C.P. waste coupling with C.P. chain and rubber plug, 11/4" dia P. V. C. bottle trap heavy quality, 1/2" dia C.P. angle stop-cock 2 nos, with C.P. cap and 1/2" dia C.P. connection to waste line and water lines all complete and ready for operation (all C.P. fittings of Parry, Jaquar or equivalent of apparoed make)	Set	8.00			
2.4	Supplying & fixing in position heavy quality stainless steel sink with single bowl and drain board of 304 grade steel (Parryware Cat. No. 8531 or equivalent) with 1 1/2" dia. Waste couplin and bottle trap, 1/2" dia. C. P. single lever sink mizer with 2 nos. 1/2" dia. C. P. angle stop cock, connecting pipes etc. all complete and ready for use. (All C. P. fittings of American Standard or Jaquar or Parryware)	No.	8.00			
2.5	Supplying and fixing in position shower set compromising of C. P. hot & cold mixer with provision for shower and 115 mm long bend & wall flange and over head shower of Jaquar Cat NO. 491 set and mixer Cat no. 273 or equivalent	Set	8.00			
2.6	CP Soap Dish	No.	8.00			

Plumbing and sanitary works CPV: 45330000-9 - Plumbing and sanitary works						
SL. No.	**Item Description**	**Unit**	**Quantity**	**Bidder's Rate (NPR)**	**Bidder's Rate (in words)**	**Total Amount (NPR)**
2.7	15mm CP Commode Spray	No.	8.00			
2.8	20x600mm CP Towel Rail	No.	8.00			
2.9	Stainless steel towel rod 1.5X45cm	No.	8.00			
2.10	CP Robe Hook	No.	8.00			
2.11	5 mm thick looking mirror of approved make with CP mirror screws and clips. 3'x2' size	No.	8.00			
2.12	PVC floor trap	No.	24.00			
2.13	CP Cocroach trap	No.	24.00			
2.14	110mm Rain Inlet with cover	No.	5.00			
2.15	110mm PVC Cowl Vent	No.	5.00			
2.16	75mm PVC Cowl Vent	No.	4.00			
2.17	B. WATER SUPPLY INSTALLATION - CPVC pipes SDR-11 including MS clamps and brackets, nails and hooks, and all necessary CPVC/Brass specials required for complete installation, cutting, jointing, sealing of joints etc, installation of pipes and specials including making holes and cutting grooves on walls or floor and repairing the same to its original finish. Pipes to be installed on trenches or walls or floor or duct as per drawings, specifications and instructions, cleaning of the system, testing and ready for operation. The rate shall include for all labour and materials required. The measurement shall be done for running feet, fittings etc not payable seperately. - 32 mm	R.ft.	160.00			
2.18	- 25 mm	R.ft.	320.00			
2.19	- 20 mm	R.ft.	720.00			

Plumbing and sanitary works CPV: 45330000-9 - Plumbing and sanitary works						
SL. No.	**Item Description**	**Unit**	**Quantity**	**Bidder's Rate (NPR)**	**Bidder's Rate (in words)**	**Total Amount (NPR)**
2.20	CPVC Ball Valve - 32 mm dia.	No.	2.00			
2.21	- 25 mm dia.	No.	5.00			
2.22	- 20 mm dia.	No.	16.00			
2.23	2000 litres capacity Stainless steel cyllindrical vertical water storage roof tank complete with inlet, outlet, washout, overflow and inter-connection provisions	No.	1.00			
2.24	Pedrollo or equivalent brand electric pump with motor (approx.2 HP) of capacity 40 lpm at 32.5 M head including pipe connections, foundation, electrification, starter, testing and ready for operation (including one set stand-by).	Set	1.00			
2.25	C. SEWER, VENT, RAIN AND WASTE WATER INSTALLATION Panchakanya or approved brand PVC pipes including cutting, jointing, sealing with rubber washer and solvent cement and all necessary Supreme or Prince or Panchakanya brand rubber ringed moulded fittings such as Tees, Y-Tees, Bends (with or without doors), Reducers, Couplers, connector pieces, offsets etc. for complete installation, PVC clamps, nails and hooks. Installation of pipes and specials including making holes on walls or floor and repairing the same to its original finish, excavation and backfill (compaction as per civil works specifications) in any type of soil. Pipes to be installed on trenches or walls or floor or hung to ceilings as per drawings, specifications and instructions, cleaning of the system, testing and ready for operation. The rate shall include for all labour and materials required. The measurement shall be done for running metre, fittings etc not payable seperately. - 110 mm ED 4 kg/cm2	R.ft.	250.00			
2.26	- 75 mm ED 4 kg/cm2	R.ft.	208.00			
2.27	- 50 mm ED 6 kg/cm2	R.ft.	190.00			
2.28	Astral DWV pipes with fittings - 110 mm ED SN-4	R.ft.	300.00			

Plumbing and sanitary works CPV: 45330000-9 - Plumbing and sanitary works						
SL. No.	**Item Description**	**Unit**	**Quantity**	**Bidder's Rate (NPR)**	**Bidder's Rate (in words)**	**Total Amount (NPR)**
2.29	- 75 mm ED SN-4	R.ft.	15.00			

Electrical wiring and fitting work CPV: 45311000-0 - Electrical wiring and fitting work						
SL. No.	**Item Description**	**Unit**	**Quantity**	**Bidder's Rate (NPR)**	**Bidder's Rate (in words)**	**Total Amount (NPR)**
3.1	Main Distribution Board: Main Panel Board-double door type with locking arrangement with 2 coat of red oxide metal prime & 3 stage quality paint before final coat of enamel paint (phases, Neutral link, earth link) TPNE copper busbar including necessary accessories for internal wiring at the board all complete) 250/300AMP 12"×52"×62" size Panel box	Set	1.00			
3.2	Kilo watt hour energy meter 3 phase direct	Set	1.00			
3.3	0-500 volt meter	Set	1.00			
3.4	60/100 Amp meter	Set	1.00			
3.5	Panel Indicator	Set	3.00			
3.6	2 AMP glass fuse with holder 12mm size	Set	1.00			
3.7	Voltmeter selector switch	Set	1.00			
3.8	60/100 AMP C.T. Coil per set 3 pcs	Set	1.00			
3.9	150-200AMP C.T. coil 3 pcs per set	Set	1.00			
3.10	250AMP TP MCCB 36KA	Set	1.00			
3.11	16AMP- 63AMP TP MCCB 16KA	Set	1.00			

Electrical wiring and fitting work
CPV: 45311000-0 - Electrical wiring and fitting work

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
3.12	Floor DB_Ground and first floor with complete set as follows; 40 A, TP MCCB, 18 K, Schneider,ABB, GE,Mitsubishi (SW series) no 1, 16 amp SP MCB (10kA) Schneider/GE/ABB/ no 9, 6 amp SP MCB (10kA) Schneider/GE/ABB/ no 3, busbar of 25mm x 3 mm size no 4, 20 x 3 size earth bus bar no 1	set	2.00			
3.13	Room DB (16 amp DP MCB (10kA) Schneider/GE/ABB/ -1; 16 A, single pole MCB (10kA) Schneider/GE/ABB/-1; 6 A, single pole MCB (10kA) Schneider/GE/ABB/ -1)	set	8.00			
3.14	Main Cable Supply, Delivery, Installation & commission of mains cable from transformer/Generator/to control panel/DB's etc as per drawing and specification including cable shoe at both ends. Note: cost of this item or work shall not include cost of the cable trench & cost of the cable tray. (Prakash cable, Trishakti cables, Pioneer cables, Premiere Cables, Nepal Cable, or any approved manufacturers by Dept of Housing) 3.5C , 70 sq.mm AL Unarm Cable	rm	43.00			
3.15	3.5C , 25 sq.mm CU Unarm Cable	rm	70.00			
3.16	3.5C , 16 sq.mm Cu Unarm Cable	rm	95.00			
3.17	3.5C , 10 sq.mm Cu Unarm Cable	rm	121.00			
3.18	2 x 6 sq.mm Cu+ 1 x 2.5 sq mm	rm	187.00			
3.19	2 x 4 sq.mm Cu+ 1 x 1.5 sq mm	rm	158.00			
3.20	2 x 2.5 sq.mm Cu	rm	79.00			
3.21	Supply and installtion of cable tray/ cable riser made of 3/4" MS angle with strips spacers at 8" distance, down rod all complette with epoxy (doubel quote) paint with following width sizes; 6 " size	rm	21.00			

Electrical wiring and fitting work
CPV: 45311000-0 - Electrical wiring and fitting work

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
3.22	Supply and installtion of cable tray/ cable riser made of 3/4" MS angle with strips spacers at 8" distance, down rod all complette with epoxy (doubel quote) paint with following width sizes; 12 " size	rm	16.00			
3.23	Supply and installation of light point wiring from Room DB/ Junction,Switch Box to various points with 2 x 2.5 sq mm PVC insulated multi stranded copper wire through 20 mm dia MS conduit directly from the SDB's, concealed via switch as per drawing and specification including the cost of junction box and switch .[Note : A light fixture along with its switch and juction shall be counted as a point and the average rm per point is 8 rm from SDB to point]	pts	111.00			
3.24	Supply and installation of light fixtures with required accessories and fiitings, complete set as specification and instruction. 8" dia ceilling dome with GLS	nos	22.00			
3.25	1x 11 W CFL in Wall light	nos	56.00			
3.26	2 x 25 W Candle light in Bathroom Mirror Light	nos	16.00			
3.27	1x 60 W GLS in Bulk Head Light (Wall)	nos	7.00			
3.28	1 x 40 W Normal Box type Fluo Tube with cu ballast	nos	8.00			
3.29	1 x 1/18 W PLT in Globe (street light) Outdoor Light	nos	2.00			
3.30	Supply & Installtion of switch sockets (MAKE : Clipsal/ Orange or eqvt) 1 gang 1 way	nos	8.00			
3.31	2 gang 1 way	nos	8.00			
3.32	3 gang 1 way	nos	32.00			

Electrical wiring and fitting work
CPV: 45311000-0 - Electrical wiring and fitting work

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
3.33	4 gang 1 way	nos	8.00			
3.34	6 gang 1 way	nos	2.00			
3.35	1 gang 2 way	nos	10.00			
3.36	2 gang 2 way	nos	2.00			
3.37	Supply and installation of Two way control light point wiring directly from Room DB to various points with 3 x 2.5 sq mm multistranded insulated copper FR cable through 20 mm internal dia HDPE conduit directly from SDB concealed via switch as per drawing and specification including the cost of junction metal box and 2 nos of switches .[Note : A light point along with its switch and juction shall be counted as a point and the average rm per point is 14 rm from DB to point]	pts.	8.00			
3.38	Supply and installation of 5 A , 2 pin socket point wiring from Room DB with 2 x 2.5 +1 x 1 sq mm pvc insulated multi stranded copper wires through 20 mm internal dia Hard conduit including proper Heavy gause metal box concealed from DB to various points through pool boxes wherever required (no junction boxes shall be used) as per the drawing, as per drawing and specification. [Note : A power point from junction is of average 8 rm per point]	pts.	16.00			
3.39	Supply and installation of 13A/ 16 A single phase 3 pin socket point wiring for City supply and Generator /UPS (computer supply) with 2 x 4 sq mm+1x 1.5 sq mm pvc insulated multi stranded copper wires through 20 mm internal dia Hard cover conduit concealed from DB to various points through pool boxes wherever required no junction boxes shall be used (both City with round pin socket and generator back up points with flat pin sockets) as per drawing and specification. [Note : A power point along with its switch and juction shall be counted as a pointand the average rm per point is 12 rm from DB to point]	pts.	92.00			

Electrical wiring and fitting work
CPV: 45311000-0 - Electrical wiring and fitting work

SL. No.	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
3.40	Supply & Delivery of Sockets (MAKE : Clipsal/ Orange or eqvt) 5 A, 2 pin sockets	nos	16.00			
3.41	15 A, 3/5 pin Round pin power socket with control switch and indicator light .	nos.	92.00			
3.42	Supply and installation of fan point wiring with with 2 x 4 sq mm +1x1.5 sq mm pvc insulated multi stranded copper wires through 20 mm internal dia MS conduit along with MS Box, concealed from SDB to various fan points as per drawing and specification.	pts.	20.00			
3.43	8/10" dia Heavy duty metal body exhaust fan with complete canopy work	set	4.00			
3.44	48" dia ceilling fan with complete installation materials	set	12.00			
3.45	Supply and installation of earth electrode made of 60cm x 60 cm x 3 mm copper plate including 25 x 3 mm cu strip connection up to earth test bench with all required materials for earthing as per drawing and specification.	set	4.00			
3.46	Supply, Installation & commissioning of following - 25 mm x 3 mm cu-strip for Lightening arrester down conductor in exterior bolted in 25 mm size rectangular bush fixed in exterior wall in 700 mm spacing	m	18.00			
3.47	Supply, Installation & commissioning of following - Arrester made of pure Cupper	set	1.00			
3.48	Supply and installation of TV point wiring from Television Block Spliter to individual point with coaxial cable through 20 mm dia PVC conduit concealed including GI 3"x3" (epoxy quoted) metal box concealed as per drawing and specification.[Note : average length considered is 15 rm from the Splitter DP]	pts	24.00			
3.49	Supply and installation of TV socket in concealed metal as per drawing and specification.	nos	24.00			

Electrical wiring and fitting work CPV: 45311000-0 - Electrical wiring and fitting work						
SL. No.	**Item Description**	**Unit**	**Quantity**	**Bidder's Rate (NPR)**	**Bidder's Rate (in words)**	**Total Amount (NPR)**
3.50	Supply and installation of following TV Splitters concealed as per drawing and specification; Floor Splitter box (flush type) 1 :4 splitter with amplifier base and Second floor	nos	3.00			
3.51	Back bone cable (optical fibre or no loss cu coaxial cable) from the main connection to Main splitter and Floor splitter.	m	28.00			

Total Item Price	
VAT (13.00%)	
Grand Total	