

# BIDDING DOCUMENT

## Competitive Bidding

**STUPA HEALTH CARE CENTRE COOPERATIVE**  
**BUILDING**  
**ELECTRICAL WORKS**

At

Chuchhepati, Chabahil, Kathmandu

Issued on: October 18, 2021

Issued to: All responsive national Bidders

Invitation for Bids No.: SHCC/02/078/079

# Invitation for Bids

## Stupa Health Care Centre Co-operative Limited (SHCC)

### Invitation for Bids for the **Electrical Works**

Date of publication: **18 October 2021**

1. **SHCC** invites sealed bids or electronic bids from Nepalese eligible bidders for the construction of Electrical works under National Competitive Bidding procedures.
2. Eligible Bidders may obtain further information and inspect the Bidding Documents at the office of SHCC Gokarneshwor -5, Jorpati Kathmandu
3. A complete set of Bidding Documents may be purchased from the office SHCC and the office Gokarnashwor -5 , Kathmandu by eligible Bidders on the submission of a written application, along with the copy of company/firm registration certificate, and upon payment of a non-refundable fee of 5,000 till **31 October 2021** during office hours.
4. Sealed bids must be submitted to the office SHCC, Jorpati hand on or before **12:00 on 16 November 2021**. Bids received after this deadline will be rejected.
5. The bids will be opened in the presence of Bidders' representatives who choose to attend at **16 November, 2021 14:00 Hours at the office of SHCC Jorpati** . Bids must be valid for a period of **90 days** after bid opening and must be accompanied by a bid security, amounting to a minimum of 2.5 %, which shall be valid for 30 days beyond the validity period of the bid.
6. 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 security shall remain the same as specified for the original last date of bid submission.
7. Non submission of the required documents and non-compliance of mandatory requirements as mentioned above may lead to the disqualification of the proposals.
8. The Employer reserves the right to accept or reject, completely or partially any or all the bids without assigning any reasons, whatsoever.

## Bid Data Sheet

A. General	
ITB 1.1	The number of the Invitation for Bids is <b>SHCC/02/078/079</b>
ITB 1.1	The Employer is: <b>Stupa Health Care Centre Co-operative Limited (SHCC)</b>
ITB 1.1	The number and identification of lots comprising this bidding process is: <i>N/A</i> .....
ITB 2.1	The name of the Project is: <b>Electrical Works for Stupa Health Care Centre Co-operative Limited Building</b> . The implementing agency is: SHCC herself.
ITB 4.1 (a)	Maximum number of partner in a joint venture shall be : <i>N/A</i>
ITB 4.2	Eligible countries: <i>Nepal</i>
B. Bidding Document	
<b>ITB 7.1</b>	For clarification purposes only, the Employer's address is: <b>Attention:</b> <b>Address:</b> Jorpati, Kathmandu <b>Telephone:</b> 01-4917557/ 558 <b>Facsimile number:</b> 9851211751 <b>Electronic mail address:</b> info@stupahealth.org.np
ITB 7.4	A Pre-Bid meeting <b>shall be</b> held. Presence of bidders in Pre-Bid Meeting is desirable. Take place at the following date, time and place: <i>N/A</i> <b>Date:</b> <b>Time:</b> <b>Place:</b> Kathmandu-06, Chuchepati, Chabahil A site visit <b>shall not be</b> organized by the Employer but bidders can visit the site any time providing information.
C. Preparation of Bids	
ITB 10.1	The language of the bid is: English / Nepali
ITB 11.1 (b)	In accordance with ITB 12 and ITB 14, the following schedules shall be submitted with the bid, including the priced <b>Bill of Quantities for Unit Rate Contracts</b>
ITB 11.1 (i)	The Bidder shall submit with its bid the following additional documents: - Firm /Company Registration - Business Registration license - VAT/PAN registration certificate - Tax clearance certificate up to 2076/2077 tax clearance of 2077/78 is desirable. - Power of attorney
ITB 13.6	The prices quoted by the Bidder [ <i>insert "shall be" or "shall not be"</i> ] subject to

	adjustment during the performance of the Contract. Not Applicable
ITB 15.1	The bid validity period shall be: <i>Ninety (90) days</i>
ITB 16.1	The Bidder shall furnish a bid security, from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law with a minimum of 2.5 %, which shall be valid for 30 days beyond the validity period of the bid.
ITB 16.2 (b)	Account Name: Stupa Health Care Center Co-operative Ltd. Bank Name: ICFC Finance Ltd. Bank Address: Boudha Account Number: 00200100061563000001
ITB 17.1	In addition to the original of the bid, the number of copy/ies is/are: Not applicable
ITB 17.2	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;
<b>D. Submission and Opening of Bids</b>	
ITB 18.1	Bidders shall have the option of submitting their bids <b>by hand</b>
ITB 19.1	<b><u>For bid submission purposes only, the Employer's address is:</u></b> Attention: Reception Address: SHCC Office, Gokarnashwor -5 Jorpati . <b><u>The deadline for bid submission is :</u></b> <b>Date : 16 November, 2021, Time : 12:00 Hours</b>
ITB 22.1	The bid opening shall take place at : Address : Gokarnashwor -5 <b>Date : 16 November, 2021</b> <b>Time : 14:00 hours (Time will be allocated in difference of 30 minutes for bidders in different packages)</b>
<b>E. Evaluation and Comparison of Bids</b>	
ITB 29.5	The amount of the performance security be increased by <b>Eight (8) percent</b> of the quoted bid price.

# Evaluation and Eligibility Criteria

This Section contains all the criteria that the Employer shall use to evaluate bids and eligible Bidders.

## 1. Eligibility

Criteria Requirement	Compliance Requirements	Submission Requirements
Firm Registration Certificate	must meet requirement	Document attachment
Business Registration Certificate (License)	must meet requirement	Document attachment
VAT and PAN Registration certificate	must meet requirement	Document attachment
Tax clearances certificate for the F/Y 2076/77 desirable 2077/78 or Tax return submission evidence or evidence of tax time extension for 2077/78	must meet requirement	Document attachment

## 2. Evaluation Criteria

<b>Qualification Requirement for completion of Similar works in last 5 years</b>		
<ul style="list-style-type: none"> <li>• The eligible bidders can be a private entity, government entity or a joint venture of not more than two firms.</li> <li>• The eligible bidder's Minimum Average Annual Construction Turnover of the best 3 years within the last 5 years shall be not less than <b>60 million</b>.</li> <li>• The eligible bidder's Minimum Work experience of minimum two numbers of similar size and nature (one is at least more than 100 beds Hospital Project) shall not be less than <b>40 million</b>, at least one project as prime contractor.</li> <li>• The eligible bidder shall have imported and installed at least one dry transformer not less than 630 kVA within last 3 years. The documents relevant to the import of transformer such as custom clearance document, NEA test certificate etc. in the name of bidder's firm or JV shall be submitted as evidence.</li> <li>• The eligible bidder shall have supplied and installed at least two numbers of oil type transformers not less than 200 kVA each within last 3 years. The document relevant to the specified work such as letter from the client and copy of VAT bill in the name of bidder's firm or JV from authorized vendor or contractor of similar nature shall be submitted as evidence.</li> <li>• The eligible bidder shall have supplied and installed at least three numbers of generators not less than 200 kVA each within last 3 years. The document relevant to the specified work such as letter from the client and copy of VAT bill in the name of bidder's firm or JV</li> </ul>	<p>must meet requirement</p>	<p style="text-align: center;">Document attachment.</p> <p>Must include employers certificate with built up area disclosed.</p> <p>Additionally, as built drawing of the completed building with employer/Consultant approval.</p>

## A. 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	<input type="checkbox"/> Contractor	<input type="checkbox"/> Management Contractor	<input type="checkbox"/> Subcontractor
Total Contract Amount	<input type="checkbox"/> 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			

### Key Personnel

The Bidder must demonstrate that it has the personnel for the key positions that meet the following requirements:

SN.	Position	Required No.	Academic Qualification	Total Work Experience [Years]	Experience in Similar Works [years]
1.	Team Leader Senior Electrical Engineer	1	Masters in relevant subject	10	5
2.	Electrical Engineer	1	B.E (Electrical)	5	3

3.	Site In charge	1	I.E (Electrical or experienced of at least 2 similar nature projects)	3	3
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### Resume of Proposed Personnel

The Bidder shall provide all the information requested below. Fields with asterisk (\*) shall be used for evaluation.

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*



# Letter of Bid

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

Date: .....

Name of the contract: .....

Invitation for Bid No.: .....

To:  
.....  
.....

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) Clause 8;
- (b) We offer to execute in conformity with the Bidding Documents the following Works:
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is: NRs. ....; or when left blank is the Bid Price indicated in the Bill of Quantities;
- (d) The discounts offered and the methodology for their application are:.....
- (e) Our bid shall be valid for a period of .....*[insert validity period as specified in ITB 15.1]* 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) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from eligible countries or any countries [insert the nationality of the Bidder, including that of all parties that comprise the Bidder if the Bidder is a consortium or association, and the nationality of each Subcontractor and Supplier];
- (h) 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;

- (i) 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;
- (j) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council;
- (k) We are not a government owned entity/We are a government owned entity but meet the requirements of ITB 4.5;¹
- (l) 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;
- (m) We declare that, we have not been black listed as per ITB 3.4 and no conflict of interest in the proposed procurement proceedings and we have not been punished for an offense relating to the concerned profession or business.
- (n) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive; and
- (o) If awarded the contract, the person named below shall act as Contractor's Representative:
- (p) 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: .....

In the capacity of .....

Signed .....

Duly authorized to sign the Bid for and on behalf of .....

Date .....

# Bid Security

## Bank Guarantee

Bank's Name, and Address of Issuing Branch or Office  
(On Letter head of the Commercial Bank or Financial Institution eligible to issue Bank  
Guarantee as per prevailing Law)

Beneficiary: ..... name and address of  
Employee.....  
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  
..... name of Contract . ..... under Invitation for Bids 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..... name of Bank. .... hereby  
irrevocably undertake to pay you any sum or sums not exceeding in total an amount of . .  
.....amount in figures ..... (. .... 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 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 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) 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.
- (d) is involved in fraud and corruption in accordance with the ITB

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 later 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, ICC Publication No.  
758.

. . .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).

# Bidder's Information Format

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

# Bidder's Information

Form ELI - 1: Bidder's Information Sheet

<b>Bidder's Information</b>	
<b>Bidder's legal name</b>	
<b>Bidder's country of constitution</b>	
<b>Bidder's year of constitution</b>	
<b>Bidder's legal address in country of constitution</b>	
<b>Bidder's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)</b>	
<b>Attached are copies of the following original documents.</b>	

## **GENERAL NOTES**

1. The items given in this schedule are provisional. The Contractor shall be paid for the actual quantity of work executed as measured at the site at the rates tendered. The Owner reserves the right to increase or decrease any of the quantities, or to omit totally any item of work. Any claim by the Contractor on these accounts will not be entertained.
2. All the items of work given in this schedule of quantities shall be executed strictly in accordance with the latest Indian Standard Specifications and the requirements of the Electricity Supply Authority read in conjunction with the relevant drawings and Specifications.
3. The Contractor shall visit the site and shall satisfy himself as to the conditions under which the work is to be performed. He shall also check and ascertain the location of any existing structure or equipment or any other situation which may affect the work. No extra claim as a consequence of ignorance or on ground of insufficient description will be allowed at a later date.
4. All equipment and material shall be IS approved.
5. All approvals shall be obtained from Owner/ Consultant
6. All equipment and material shall be inspected at manufacturer's works as per relevant IS by the Owner or his representative before despatch to site.
7. All vendor drawings shall be approved by the Owner/ Consultant before fabrication work starts.
8. All Testing and Commissioning shall be as per relevant IS for equipment and IS: 732:1989 for the installation. All these testing records are to be maintained and submitted for Owner/ Owner's representative.

## **A. CIRCUIT CUM POINT WIRING**

The rates for all point wiring items shall also include supplying and fixing of the following:

1. This schedule of Quantities shall be read in conjunction with the technical specification, General & Special conditions as well as all tender drawings.
2. Approved GI saddles and grouting the same for exposed conduit work.
3. 16 gauge thick Outlet boxes and junction box.
4. All fixing accessories such as clips, brass screws etc.
5. Quoted rate for MCB controlled primary point shall include all the materials and works necessary including circuit length from DB upto first Point. Quoted rate for Switch controlled primary point shall include all the materials and works necessary including 1st switch board and first light point.
6. Embedding conduits and accessories in walls and floors etc. during construction and/ or cutting chases (with chase cutting machine) and making good the same as necessary in the case of concealed conduit work.
7. Switch, socket outlet and necessary blank plates wherever required.
8. PVC insulated copper conductor stranded flexible wire of Green colour with yellow bands for earthing of fixtures, outlet boxes and third pin of socket outlet.
9. Repainting of conduits, outlet boxes and junction boxes where ever damaged.
10. All wires shall be PVC insulated copper conductor stranded flexible 1100 volts grade and shall be of approved make.
11. All sockets shall be shuttered type and with earth terminal. All sockets for UPS system shall be provided with distinct RED dot on the socket for easy identification.
12. Suitable rating of plugs top shall be provided for all splash proof industrial socket outlets.
13. Separate neutral and earthing wire shall be provided for each circuit.
14. Lighting and power circuit to be kept separate.
15. Average length consider by us for point wiring are tentative only. Vendor to reverify the same from drawings befor quoting.
16. In case of switch control, primary point shall be considered as from switch board to first light point and secondary point shall be considered as from first light point to next light points(Loop point).In case of MCB control, primary point shall be from MCB (D.B.) to first light point and secondary point shall be considered as from first light point to nex light points (Loop point)

## **B. CABLES, MAINS AND SUB MAINS:**

The rate shall also include the following :

1. Providing and fixing junction boxes with covers including painting where ever required.
2. Providing all fixing accessories such as clamping devices nuts, bolts and screws.
3. Wherever the cables are of aluminium and bus bars of copper bimetallic lugs shall be used.
4. All cable shall be laid with one diameter gap.
5. All cables shall be IS approved.
6. Double compression glands
7. Fire retardant paint one meter on both side of wall penetration and at termination as per specifications.
8. Buried LT cables to be laid atleast 750 mm below ground.

## **C. DISTRIBUTION BOARDS/ RISING MAINS:**

The rates for the distribution boards apart from the Breakers and instruments shall also include the following :

1. Supporting rigid steel framework.
2. Cubicle type, 14 gauge CRCA sheet steel enclosed.
3. Complete with interconnections and distribution bus bars.
4. Proper bonding to earth.
5. Painting/ lettering on Breakers and distribution boards, the location they serve, providing on each panel its circuit diagram.
6. Providing cable clamps/ supports within distribution boards cable alley.
7. TPN ACB's/ MCCB's shall mean 3 pole ACB's/ MCCB's with adequate size of neutral link.
8. All MCB's shall be of minimum 10 KA breaking capacity.
9. The breaking capacity of MCCB's are mentioned panel wise. All MCCB's shall be with thermal magnetic releases up to 250 amps and microprocessor based above 250 amps capacity, unless specified otherwise.
10. All motor feeders MCCBs shall be of motor duty.
11. Distribution panels shall be Powder Coated with Siemens gray paint shade no. RAL-7032 of IS-5.
12. Degree of protection for following type of distribution panel enclosure shall be as per IS:13947-1993.
  - a. IP 52 for indoor panels.
  - b. IP 54 for kitchen and laundry panels.
  - c. IP 55 for outdoor panels.
13. All MCCB's shall be provided with operating mechanism for door interlock.



14. Current density of aluminium shall be 1.25 sq mm for 1.0 amps for rated current of bus bars and current density of copper shall be 1 sq.mm for 1.0 amps for rated current of bus bars.
15. Tinned copper/ GI earth bus as specified in the BOQ shall be provided through out the length of each board.
16. All measuring instruments (Meters) shall be of digital electronic with LED of approved make and compatible with system.
17. All hinged door shall be earthed through 2.5 sq mm tinned braided copper wire.
18. All panels shall have provision of the following:
  - a. Pad locking of Switch board doors.
  - b. Pad locking of MCCB's handles in "OFF" Position.
19. Additional set of C.T.s, potential free contacts, connectors, contactors with wiring etc are to be provided for BAS including space required for various transducers in Main Switch Board sections. Only transducers shall be supplied by BAS contractor.
20. All MCB's used for protection of resistive and lightly inductive load shall be type "B" characteristic and inductive (motor) load shall be of type "C" characteristic and discharge lamps and UPS etc. shall be of type D characteristic.
21. All incoming and outgoing air circuit breakers shall be placed on middle portion of the vertical in single tier formation.
22. All PTs/ control transformer shall be provided with centre tap earth secondary.

**D. CAPACITOR BANKS WITH AUTOMATIC CONTROL PANELS:**

The rates for the capacitor bank panels apart from the switches and instruments shall also include the following :

1. Supporting rigid steel framework.
2. Cubicle type, 14 gauge CRCA sheet steel enclosed.
3. Complete with interconnections and distribution bus bars.
4. Proper bonding to earth.
5. Providing cable clamps/ supports within panels cable alley.
6. The breaking capacity of MCCB's are mentioned panel wise. MCCB's shall be with thermal magnetic releases.
7. Rubber mats shall be provided in front of all panels and the back where they are accessible from the back as per IS 5424-1969.
8. Automatic capacitor control panels shall be powder coated with Siemens Grey RAL 7032 of IS-5.
9. Enclosure of all capacitor control panel shall be as per IS 13947-1993.
10. All MCCB shall be provided with operating mechanism for door interlock.

11. Current density of aluminium shall be 1.25 sq mm for 1.0 amps for rated current of bus bars current density of copper shall be 1 sq.mm for 1.0 amps of rated current of bus bars.
12. TPN MCCB shall means 3 pole MCCB with adequate size of neutral link.
13. All copper bus bars shall be factory tinned.
14. Tinned copper/ GI earth bus shall be provided through out the length of each panel.
15. All automatic control panel shall have provision for the following:
  - a. Padlocking of Switch board doors.
  - b. Padlocking of MCCB's handles in OFF position.
16. All hinged door shall be earthed through 2.5 sq.mm tinned braided copper wire.
17. All PT's/ Control transformer shall be provided with center tap earth secondary.
18. All incoming and outgoing feeders have Pad locking facility.
19. All bus bars section/ backside panels shall have pad locking facility and hinged type doors.

#### **E. EARTHING INSTALLATION**

Rates shall also include the following :

1. All fixing accessories such as saddles, screws rawl plugs etc.
2. Jointing by rivetting and brazing after rivetting in case of copper and welding/ bolting in case of GI earthing.
3. Cutting chases/ holes and making good the same wherever required.
4. Effecting adequate and proper interconnections.
5. Use of copper thimbles.
6. Earthing system shall comply to IS:3043-1987.
7. All earthing pits shall be interconnected.
8. All equipment motors, DB's, panels to be connected on both ends (double earthing) with suitable strip/ wires.
9. Soil resistivity test shall be conducted of the area where earth pits are to be located.

#### **F. LIGHTNING PROTECTION SYSTEM:**

Rates shall also include the following:

1. All fixing accessories such as brass saddles, brass screws rawl-plugs etc.
2. Jointing by rivetting and brazing after rivetting in case of copper and by welding/ bolting in case of GI.
3. Cutting chases, holes and making good the same wherever required.
4. Effecting adequate and proper interconnections.
5. Use of copper thimbles.
6. Lightning protection system shall comply to IS 2309 - 1989.
7. All earthing pits shall be interconnected.

#### **G. SUPPLY OF LIGHTING FIXTURES:**

The rates shall include all components that may be required to make the supply complete in all respects such as:

1. All lamps.
2. Internal wiring between accessories.
3. Earthing terminal.
4. Complete provision for installation.

#### **H. HV INSTALLATION: SUPPLY AND INSTALLATION OF SUB-STATION EQUIPMENT**

The rates under this section shall also include:

1. Supporting rigid frame work.
2. All fixing accessories such as foundation bolts, nuts and bolts etc as required.
3. Touching up all damaged paint with approved paint shade.
4. Rubber mats shall be provided in front and back of the HT switchgear as per IS-5424-1969.
5. All control cabling including termination between transformer and HT switchgear as required.
6. Interlocking shall be provided between transformer door and VCB HT breaker panel. When transformer door open respective SF6 breaker shall be tripped.
7. Degree of protection for transformer enclosure shall be IP-23.(Applicable for Dry Type Transformer Only).
8. All protection relays shall be microprocessor based.
9. Provision shall be made for all HT breakers to be hooked up with BAS for status indication.

**I. HT CABLES & LT CONTROL CABLES:**

The rates under this section shall also include the following:

1. Providing and fixing approved cable supports and grouting the same as required.
2. Effecting proper connections at terminations.
3. Ensuring that provision is left in buildings and trenches as the work proceeds, for incorporating of cable supports at a later date.
4. Providing all, fixing accessories such as clamping devices, nuts and bolts etc.
5. Clamping to supports where laid in trenches.
6. Providing proper supports for cable terminals as called for.
7. Wherever cables cross walls provide proper sleeves at the time of civil work.

**J. EARTHING FOR SUB-STATION EQUIPMENT:**

The rates for earthing items shall also include the following:

1. All fixing accessories such as brass, saddles, brass screws, rawl plugs etc.
2. Jointing by rivetting and brazing after tinning.
3. Cutting chases, holes and making good the same wherever required.
4. Effecting adequate and proper interconnections.
5. Use of copper thimbles.
6. Excavation of earth, refilling, watering and ramming and making good as approved in all kinds of soil.
7. All earthing pits shall be interconnected.
8. Earthing shall be as per IS-3043-1987

### **Brand of Makes/ Manufactures**

The following Brands of the Electrical equipments/Accessories/Materials shall be used under this Project, But the Client/ Consultant reserve the rights to approves for all brands with their equivalentents (brands/products) as per condition without dominating the intend design concept and calculation. However items which did not specified under this Design Documents should be as per Consultant's recommendations only.

LED LIGHTINGS	PHILIPS/ OSRAM/ WIPRO/ TECHNOLIGHT, REIZ
<b>FAN</b> CEILING	BAJAJ, CROMPTON, KHETAN, ALMONARD
EXHAUST	
<b>SWITCH/SOCKET/RECEPTACLES</b> 3 pin 13A/3 pin 16 A/Gang Switches	NORTHWASTE, LEGRAND, NOVA, WIPRO
RG 6/ RJ 11/RJ 45 outlet	SCHNEIDER, LEGRAND, NOVA, WIPRO
Outdoor type weather proof plugs/sockets	SCHNEIDER, LEGRAND
<b>PANEL BOARD/ DISTRIBUTION BOARD</b>	HIMALAYA ENG, WIPRO, SIMENS, INDOASIAN
<b>CIRCUIT BREAKERS</b>	LEGRAND, SIMENS,
<b>CABLE/WIRE</b> U/A, ARM Wire	PIONEER, TRISHAKTI, PRAKASH PIONEER, LITMUS, TRISHAKTI
<b>PVC CONDUIT/ DUCT BOTTOM</b> PVC Rigid Conduit PVC Duct Bottom	LIUTONG/ LEGRAND LEGRAND
<b>FIRE ALARM EQUIPMENTS –</b>	HONEYWELL, C-TECH, SYSTEM SENSOR

## **ABBREVIATIONS:**

A	: Ampere
Arm	: Armored
BS	: British Standard
CFL	: Compact Fluorescent Lamp
CDF	: Communication Distribution Frame
COB	: Chip on Board
Cu	: Copper
DB	: Distribution Board
DP	: Double Pole (Phase)
EW	: Emergency Ward
FATB	: Fire Alarm cable termination block
FDB	: Floor Distribution Boards
FF	: First Floor
FFL	: Finished Floor Level
FTL	: Fluorescent Tube Light
GI	: Galvanized Iron
HDP	: High-Density Polythene
HRCAl	: Hot rolled Cast Alloy
Hz	: Hertz
IEC/IES	: International Electro technical Commission/ Standard
IS	: Indian Standard
JB	: Junction Box/Board
LED	: Light Emitting Diode
MCB	: Miniature Circuit Breaker
MCCB	: Molded Case Circuit Breaker
MDB	: Main Distribution Board/Box
mm	: Millimeter
NBC	: Nepal National Building Code
NEA	: Nepal Electricity Authority
MDF	: Main Distribution frame
MPB	: Main panel Board
NS	: Nepal Standard
PB	: Panel Board/Box
PL	: Power Saving Lamp
PVC	: Poly Vinyl Chloride
RCCB	: Residual Current circuit breaker
SDB	: Sub Distribution Board/Box
SMD	: Surface Mounted Device
SP	: Single Pole (Phase)
Sq. mm	: Square Millimeter
SWG	: Standard Wire Gauge
TP	: Three Pole/Phase
TPN	: Three Pole (Phase) with/and Neutral
TPNE	: Three Pole (Phase) with/and Neutral with/and Earth

Un Arm : UN Armored  
V : Volt  
W : Watt

## **GENERAL SPECIFICATIONS**

### **SCOPE**

The works covered shall include furnishing all labour, materials, equipment and services in connection with the complete work, as indicated.

The Contractor shall consult drawings, bill of quantities, and specifications all together, which gives the total scope of the work.

The contractor shall supply and install all the electrical and allied system works as per BOQ complete with all accessories including materials, fixtures, equipments and appliances etc.

All equipments shall be complete and operative in all respects and shall be left in satisfactory working conditions.

The contractor shall perform the following work in addition to furnish the delivering of the equipment, materials and accessories.

- a. Assembling at the site
- b. Erection and complete Installation
- c. Testing of all equipments
- d. Commissioning of the wiring and equipment.
- e. Trial operation and all necessary adjustments.
- f. Obtaining Owner's/Engineer's approval and written acceptable for satisfactory operation.

### **ACCESSORIES**

Supplementary and complimentary items required in connection with completing a particular item of work are deemed to be accessories and are generally mentioned together with the main items, may be in the bill of quantities, specifications or in the drawings. For example, while fixing Luminaries the followings are termed accessories: extension rods, nail grips, screws, connectors, LED bulb, LED tube, reflector/ chain holder, boxes etc. Some accessories may not be found enumerated anywhere in the text. Nevertheless, these missing accessories are deemed inclusive in the quoted rate. The quality and quantity of these Accessories are subject to confirmation of the Designer.

### **APPENDIX**

Some appendices are inclusive/ exclusive in this package of work. Notwithstanding these shall confirm to all the relevant codes of practices, NBC and others.

#### **Rates**

- i) 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.
- ii) 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.

- iii) 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.
- iv) The rate quoted in the tender shall include all charges for scaffoldings, centring materials, tools and equipment, store sheds (warehouse) 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 s/he may require for the successful completion of the work. The rates shall be inclusive of sales tax, or any other fees or duty levied by any government or public bodies.

#### **ADDITION/ALTERNATON**

No addition, temporary or permanent, shall be made to authorized load of the existing situation until it has been definitely ascertained that the current carrying capacity and the condition of the existing accessories e.g. conductors, breakers, switches etc. affected including those of the supplying authorities are adequate for the increase load.

No alternation in the designed are permitted without due permeation of the designer/Electrical engineer in writing.

#### **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**

- i) 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.
- ii) 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.

- iii) 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 detailed shop drawings of all installations not detailed on the drawings provided. Any change or amendment made during installation 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.
- iv) Submit for approval, manufacturers detailed shop drawings, specifications and data sheets for all equipment.

### **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**

- i) All electrical fixtures shall be cleaned of stamping and markings [except those required by codes], iron cuttings and other foreign materials.
- ii) Electrical switch boards, receptacles, equipment shall be vacuum cleaned of dust and debris.
- iii) 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 OCH Maintenance staffs in the efficient operation of the entire system.

**Guarantee**

The Contractor shall make good the following guarantee requirements within one year following date of final acceptance without additional cost to the Owner: -

- i) 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.
- ii) 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.
- iii) The entire electrical and mechanical apparatus shall operate at full ratings without objectionable noise or vibration.

**WARRANTY**

1. Manufacturer Warranty: 3 years from the date of project hand-over for any manufacturing defect.
2. Contractors Warranty: 1 year from the date of installation completed for any installation defect.

**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.

## **ELECTRICAL WORKS - GENERAL**

### **GENERAL**

1. This General Technical Specification covers the general technical requirements for the complete purchase, supply, delivery, before or after delivery testing or on the site testing, storing, fabricating and assembling on the site, installation, after installation testing, commissioning and put in to normal operation of the electrical system for the project including all necessary supplementary or complementary materials, supervision, labor, tools, equipments and accessories, miscellaneous materials, testing and putting in acceptable operation of the electrical system.
2. The electrical system shall be implied as the works related to indoor and outdoor lighting system, Normal and appliances special power sockets, fans, telephone system, fire alarm system, computer networking system, distribution system, power and control panels etc.

### **SCOPE**

1. The scope of work under this section shall be as mentioned under the **section 1** Electrical Works - General paragraph 1 and 2. And as per bellows:
2. Scope of electrical works shall covered by the following unless otherwise mentioned in the Scope of work or on the Bill of Quantity:

#### **Section 1 – Internal Electrification**

- a. Distribution Board as mentioned on the BOQ
- b. L.T. 400/230-volt cables with termination
- c. Point wiring of all internal lighting/power; exhaust fan, power outlets etc. as indicate on the electrical drawing. including supply and fixing and put into operation with all required accessories in all respect as per mentioned quantities
- d. Installation of light fixtures, gang switches, outlets etc.
- e. Supply of telephone wiring with outlets with main cable.
- f. Supply of fire alarm system wiring with detector/hooter/FATB.
- g. Supply of computer networking system wiring.

## **Section 2 – External Electrification**

- a. Feeder cables for 400 volt 3 phase, 50 Hz supply as mentioned on the BOQ/Drawings
- b. Feeder cables for 230-volt 1 phase, 50 Hz supply as mentioned on the BOQ/Drawings
- c. Grounding of complete system consist grounding of internal power outlets.
- d. Grounding of every external live metal part, DB boards, CDFs etc.
- e. External lighting's wiring.

## **SUBMITTALS**

Product data with supplementary literature should be submitted to the owner/architect's engineer and get approval for each type of materials as indicated before placing/ordering for/to the project site.

## **REGULATION AND STANDARD**

The whole electrical system (materials/labor) shall confirm to the Nepal National Building Code NBC 207, 2003 and relative code of practice of IS & BS.

## **PROTECTION OF WORK**

The Contractor shall effectively protect, at his/her own expense, such of his/her work, materials or equipment as is liable to injury during the construction period. All openings to any part of the conduit system, as well as associated fixtures and equipment, both before and after being set in place, must be securely covered or otherwise protected to prevent obstruction of the conduit or injury due to carelessly or maliciously dropped tools or materials, grit, dirt or any foreign matters. The Contractor will be held responsible for all damages so done until his work is fully and finally accepted. Conduit ends shall be covered with capped bushings.

## **SECTION 2 - ELECTRICAL MEANS AND METHODS**

This Section includes the following:

1. PVC Conduit/ PVC Surface duct bottom.
2. Circuits (Lighting/Power/Outdoor)
3. L.T. Wiring system.
4. Wiring
5. Electrical identification/color coding

## 1. PVC CONDUIT/ PVC SURFACE DUCT BOTTOM

- A. All the PVC rigid conduits shall be High impact conforming to BS-EN-50086, Crush resistance 120 kgf or equivalent for internal electrical works; the PVC Surface conduits shall conform to the BS-EN-50086 standard and minimum wall thickness should be 2 mm, single length of the conduit for light circuit should not be more than 10 meters and 15 meters for power circuits respectively. All the PVC conduits shall be single lengths without joint except in the junction or pull box. Fixing of standard bends and elbows shall be allowed as far as practicable and all curves maintained by bending the conduit pipe itself with the long radius which shall permit easy drawing in of conductors. No cable joint shall be allowed in the conduits. The conduit pipe shall be fixed by means of saddles (with nylon and metal grip and steels crew) not more than 600 mm apart or by any other approved means of fixing. Conduit shall be fixed in the wall/ ceiling after slab casting, plastering and shall be finished neatly after erection of conduit.
- i) All wiring shall be drawn inside PVC conduits and in recess manner, unless otherwise shown. The diameters of the conduits shown in the drawing are all internal diameters. The smallest size of the conduit used shall be 20 mm dia. and 2 mm thick. The size of the conduit to be used in any section depends upon the number and sizes of the cable to be drawn in that particular section. As a general rule the sum total area of the cables shall not exceed 60 % of the internal sectional area of the conduit.
  - ii) Where no size is shown for conduit for the conductors indicated, use the minimum code-permitted size. Provide sizes in excess of code requirements where more bends are encountered.
  - iii) Protect conduits from entry of foreign materials during construction; replace conduits containing any foreign materials that can not be removed, clean out conduit containing water before conductors pulled in.
  - iv) Conduits shall run in a direct line with long sweep bends or by bending the conduit pipe itself with the long radius. Conduits shall be continuous and secured to boxes with glands termination.
  - v) Conduits Crossing Over Expansion Joints: Provide minimum 30 cm length flexible conduit at the point of crossing building expansion joints. Extra conduits and cables shall be provided at the expansion joints for minimum 15 cm deviation.
  - vi) Except in specific locations, use standard conduit fittings. Use suitable sized pull boxes, unless otherwise specifically approved for use on conduit fittings [at locations only where a pull box size inhibited by space limitations].
  - vii) All fastening devices and supports for electrical equipment, fixtures, panels, outlets, conduits and cabinets shall be capable of supporting not less than 4 times the ultimate weight of the object or objects fastened or supported thereby.

- viii) Provide pull boxes as required to limit the number of bends in any conduit racing to not more than three 90 degrees bends; use 18 gauge galvanised sheet steel boxes of required size with removable covers and install with accessibility to cover up after work is completed.
  - ix) Conduits in ceiling bottom, in case of false ceiling, shall be fixed in group or individual with galvanised trapeze or cradle or saddle as the case may be and non-ferrous fixing hardware as approved.
- B. PVC surface duct bottom should be double Z locking type with cover and white in color. In case of joint for the surface duct shall be used the overlap method of duct shall be used. Fixing of the surface bottom shall be done by minimum 25 mm self threaded steel screws with nylon washer by using the nylon grip on each 750 mm intervals. Surface bottom more than 35 mm shall be fixed with cross zigzag screwed with nylon grip in 500 mm intervals. The entire duct bottom shall be single lengths without joint except in the junction or pull box. Do not bend the duct bottom without putting the pull boxes. No cable joint shall be allowed in the conduits.

## **2. CIRCUITS (LIGHTING/FAN/POWER)**

### **2.1 LIGHTING**

A circuit is intended to feed and control light points viz. LED, FTL, CFL, Fans some 2/3 pin convenient outlet etc. A light circuit shall not exceed > 10 such points or < 1 KW loading whichever is less. During execution, independent and separate light circuits for each group of points shall be made; in all light points earth continuity shall be maintained for fixtures with metal body, inbuilt capacitors, ballasts and luminaries class-1. Phasing may be coupled with the electronic ballast in the case of three phase wiring.

### **2.2 POWER**

A power circuit is intended to feed the convenient outlet sockets with earth continuity (Conductor) such as 3/5/6 pin plugs of different capacities.

#### **2.2.1 DEDICATED OUTDOOR POWER/LIGHT CIRCUIT**

Power circuit feeding usually one convenient outlet (single) is indicated by darkening the convenient outlet in the drawing. Light circuit for outdoor pole lights shall be done as per drawings

#### **2.2.2 GENERAL CIRCUIT**

Any circuits not belonging to above mentioned i.e. dedicated power circuit is termed as general circuit and may contain convenient outlets of different types (e.g. 3 pin/5 pin etc.) and numbers depending upon the situation.

### **2.2.3 LENGTH OF THE CIRCUIT**

Circuits may vary from case to case. The length to be considered shall be the distance between the concerned MCB/ cut out usually positioned inside the DB's and the points via switches and PB s for certain circuit, regardless of its nature (light circuit/power circuit).

## **3 LOW TENSION WIRING SYSTEM**

### **3.1 LIGHT POINTS**

Wiring of final circuits for lights, Power points, fans etc., shall be carried out by distributions and looping system as shown in the drawings. Loop-in-system for light points shall be maintained as per followings:

- i) Phase wire must be looped right from the switch bank and in no case be looped directly from the light point.
- ii) Neutral may be looped either as the phase wire or also may be looped directly from the light point as the case may be.
- iii) No joints throughout the wiring run of the given circuit are allowed.

### **3.2 POWER POINTS**

The wiring system of power points shall be anyone (or all the mixed) of general circuit as mentioned in the item No: 2.2 under Power.

## **4. WIRING**

### **4.1 General**

Wiring of final circuits for lights, power outlets, fans, call bell etc., shall be carried out by distributions and looping system as shown in the drawings. The size of phase wires shall not be less than 2.5 sq. mm. copper conductor PVC insulated cables drawn in suitable conduit. The number of points controlled per circuit and the number of wires in a conduit shall be as per NBC:207; 2003.

### **4.2 Ratings of Outlets**

For purpose of determining the size of the sub-mains and controlling switches, the ratings of outlets shall be as follows, unless otherwise specified.

- i) Light, fan points and Power sockets 6 amp. : 100 watts
- ii) Power outlets 11 amp. : 500 watts
- iii) Power outlets 15 / 16 amp. : 2000 watts



### 4.3 Wiring

The size of the conductors used for phase and neutral wiring shall be as detailed in the drawing and BQ. As a general guide-line the conductor sizes of feeder cables shall be as follows:

- i) 5 /6 amp. rating 2.5 sq. mm Cu. PVC cable
- ii) 10 amp. rating 2.5 sq. mm Cu. PVC cable
- iii) 13/ 15 / 16 amp. rating 4.0 sq. mm Cu. PVC cable
- iv) The conductor size of earth wire for main cable shall be not less than 50 % of the respective phase and neutral wires, unless otherwise specified.

### 5. ELECTRICAL IDENTIFICATION/COLOR CODING

Color codes for visual aids shall be applied in the electrical as listed hereunder:

Red, Yellow and Blue	: For phases
Black	: For neutral
Green	: Earth/Ground
White	: For the 3 <sup>rd</sup> middle point connection as in the case of 2 way control system.
Off white	: Enamel paints for the metallic enclosures of say DB/PB/MPB etc.
Black	: Outdoor lighting poles

Along with the wires the elements and other electrical equipments, e.g. bus bar, neutral bar, Earth stud etc. shall also be suitable color coded. The color of the wire nuts shall match the color of the wires to be jointed together (PVC Tape joints are not allowed). It is to be noted that the color coding required here in shall be the original colors specially that of wire insulation.

Identify the following systems with color-coded, self-adhesive vinyl tape applied in conduits or raceways bends.

Fire Alarm System:	Red.
Telecommunication System:	Green and yellow.
Local Area networking system:	Blue and yellow.
General Light, Power System:	Blue

Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at **6 to 8 inches (150 to 200 mm)** below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds **16 inches (400 mm)** overall.

## **6. METHODS AND MATERIALS**

All works shall be done in a first-class, neat and workmanship manner by mechanics skilled in the trade involved. All details of the installation shall be mechanically and electrically correct.

All materials shall be new, of the best of their several kinds, and without imperfections and blemishes. All material shall be standard products of manufacturer's latest design. Where two or more units of the same class of equipment are required, these units shall be of same manufacturer.

All conduits and equipment shall be installed in such a manner as to preserve access to any other equipment installed.

## **7. CLOSEOUT SUBMITTALS**

Electrical Contractor should submit to the consultant/owner as a final project closeout submittal for electrical and ailed works on the following, but not limited to.

### **A. TESTING**

Electrical Contractor should submit to the consultant/owner testing certificate (test result) for the followings, but not limited to, with jointly undersigned by Contractors Project Engineer, Contractor's Project Electrical Engineer and Owners representatives. All the necessary testing and measuring equipments should be arranged by contractor for testing purpose.

- Earthing (Grounding) system as described on the specification section.
- Switches and sockets for polarity, switches means.
- Load test with lighting and power circuit with/without AC (in case of)
- Breakers directories, circuit.
- Power cables insulation, physical
- Telephone system with/without PBX, each outlet, TDF.
- LAN system.
- Fire alarm system with detectors, sounder, and Manual Call Point etc.
- Indoor and outdoor lighting system with LUX result.
- RCCBs that they brake at the supposed earth leakage

### **B. FINAL (AS BUILT, AS INSTALLED, SHOP) DRAWINGS**

Electrical Contractor should submit to the consultant/owner as built, as installed drawings for the followings, but not limited to.

- Earthing (Grounding) locations.
- Power (main, sub, branch) supply route with length of cable.
- Location of distribution boards with Feeder circuits External/internal light wiring details with numbers of wires.

- Power wiring details with numbers of wires.
- Circuit breakers, table of contents and load balancing.
- Telephone system with each outlet wiring details with numbers of wires.
- FDB, PBX, TDF location with wiring details and numbers of cables.
- LAN system with location, wiring details and numbers of cables.
- Fire Alarm system location with detectors, sounder, MCP, FACP, FATB etc.
- Distribution boards.
- Shop drawings provided by third party installer.
- Underground raceways and duct banks.

#### C. O&M MANUALS

Electrical Contractor should submit to the consultant/owner O&M manuals for the following, but not limited to.

- LAN system.
- Fire Alarm system with detectors, sounder, MCP, FACP, FARP etc.
- Telephones PBX, TDF system
- Other as required by owner.
- RCCB, how to maintain them

#### D. COMMISSIONING DOCUMENTS

Electrical Contractor should submit to the consultant/owner separate electrical commissioning documents (finally compiled) with Project close out submittals dually undersigned by all parties, with but not limited to

- Warranty and after sales service letter from vendor/manufacture.
- Related literature (Product data sheets, brochure, catalogue etc.).
- Testing documents, including RCCB results
- Shop, as built, as installed drawings.
- O& M manuals.

## **SECTION 3 - WIRING DEVICES AND ACCESSORIES**

### GENERAL

This Specification section included the followings:

1. Normal power outlets, residual current circuit breaker (RCCB), miniature circuit breaker (MCB), molded case circuit breaker (MCCB).
2. Single or two way light switch.
3. Switches/Outlets metal boxes, wall junction boxes.
4. Wires and cables
5. Mounting heights for electrical wiring devices.

### SUBMITTALS

Product Data: For each type of product used for project.

### MANUFACTURER

Use only one single manufacturer for all types of wall plates, light switches, power socket outlets.

Recommended manufacturer: Schneider, Legrand

#### **Outlet BOXEs**

Outlet boxes shall be of 18 gauge galvanised steel in size as required to accommodate all wires, fittings, and devices. All flush outlet boxes shall be equipped with a grounding screw. All outlets shall be with PVC Glands for Conduits; these shall be as listed herein below for the various outlets.

#### Wall Boxes

All wall boxes shall be not less than 75 mm square and not less than 50 mm deep. Prior to grouting of the wall boxes the proper size shall be confirmed to receive type and number of light switch / MCB/ outlet.

#### Junction Boxes

Junction Boxes for branch circuits shall be not less than 100 mm square and not less than 50 mm deep. The junction box shall be suitable to receive 20 mm dia. (Min.) conduit.

#### Outlet Mounting

Boxes shall be securely fastened in place in wall or ceiling; provide with plaster rings if required.

**Wiring Devices**

The following list of wiring devices identifies the most common items with the grade of device as required. All lighting switches and power sockets shall be, as far as possible, of same manufacturer and have identical physical appearance.

- i) Light switches with ivory finish, shall be of single pole, one way, two way.

## **LOCAL WALL SWITCHES**

Local wall switches for controlling lighting shall be furnished and installed for each areas, rooms, hallways etc. All switches shall be single pole or 2-way as required.

General indoor areas - Local switches mounted indoors shall be single pole and shall be rated 6 amperes at 230 Volts.

Outdoors and wet locations - Local switches installed in outdoor and wet locations shall be weatherproof switches, single pole or as required rated 10 Amperes at 230 Volts.

## **RECEPTACLES**

The Contractor shall furnish and install all receptacles and specified herein.

The receptacles shall be of 230V, 13/16 Ampere, 3-pole, 3 wire, polarized with third pole grounded.

The receptacles shall be provided on the walls of all the rooms at a spacing of maximum of 4 meter and with minimum of 1 per wall per room.

## **Finish Plates**

Plates shall be plain finish Perspex painting to match the skirting or wall as directed.

## **Mounting Heights**

Mounting heights of all devices such as switches receptacles, wall bracket lights, etc. shall be approved before embedding of the boxes in the masonry.

In general, mounting heights to bottom of devices shall be as indicated herein below, unless otherwise specified in the drawings:-

i) General receptacles: Centred in skirting mounted horizontally 400 mm from finished floor level [FFL] or as instructed.

ii) Light switches: 1400 mm from FFL or as instructed.

iii) Wall Light brackets: As instructed or otherwise 2500 mm from FFL.

## **Miniature Circuit Breaker (MCB)**

The MCB shall be equipped with silver layered contacts with adequate arc extinguishing chamber to cater short circuit current up to 10 KA or as specified in the B. Q. The MCB shall be equipped with tamper proof closely calibrated thermal bimetallic strip for overload protection and short circuit magnetic coil with quick tripping mechanism. The MCB must be able to clear the fault within 5 milli seconds. The TP and DP MCBs shall be provided with the mechanical inter-link with the individual poles.

## **RESIDUAL CURRENT Circuit Breaker (RCCB)**

The RCCB should be with short-circuits and ground fault trip facilities. The RCCB shall be equipped with silver layered contacts with adequate arc extinguishing chamber to cater short circuit current up to 10 kA, earth fault current 0.03 A, Overload current as specified for lighting/power circuits with their load respectively or as specified in the B. Q. The RCCB shall be equipped with tamper proof closely calibrated thermal bimetallic strip for overload protection and short circuit magnetic coil with quick tripping mechanism the RCCB shall be with hydraulic –magnetic for over current pickup and electronic for earth-leakage pickup, the RCCB should be with reset to test facilities.

### **Mains and Sub-mains PVC Insulated Armoured Cables**

These shall conform to latest IS/BS specifications and shall be of plain circular/sector shaped stranded only copper conductor with size and colour as mentioned in the Bill of Quantities.

### **Cable Laying**

#### **Laid Underground**

Where cables are laid underground they shall be laid in a trench to a depth of 90cm [minimum] in the case of LT power cables and 90 cm (minimum) in the case of HT cable from the ground level. Care shall be taken to avoid interference with underground structures i.e. water pipes, sewerage lines etc. Any telephone lines or other cables coming on the way shall be properly shielded as directed by the site engineer. After the excavation of the trench to a specified depth and the width of the trench governed by the no of cables to be buried and the convenience of the digging the cable/cables shall be laid at the bottom of the trench. The bricks on edges shall be laid along the cable on either side. The brick canal so formed shall be filled with chemically inert sand and top of the bricks on edges shall be bridged across by the brick. The completed brick structure shall look like sand filled inverted brick canal. The road crossing shall be avoided as far as practicable. The cast iron pipe protection for the cable shall replace the brick protection across the road crossing. After cable pulling through the cast iron conduit they shall be plugged on either end.

#### **Cables Run Over Horizontal or Vertical Surface**

All the cables run horizontally or vertically should be within factory manufactured cable tray/ladder. Wherever cables are to run along wall surface of either the building or electrical duct or on the ceiling, these shall be fixed with cleats. Cleats shall consist of moulded insulated materials divided in two halves and secured to suitable racks made of angle iron or flat steel of suitable approved section. The securing shall be by means of studs and nuts with locknuts and washers. For PVC armoured cables, aluminium or G.I. claw type clamps may be used. The rates quoted shall include supply and installation of all fixing materials specified above.

In the case of single core power cables three single core cables shall be installed in triangular formation to vertical surface of wall or open cable trench or buried under ground, the cables touching each other throughout and the distance between the wall surface and the nearest cable being 25 mm. Alternatively, three single core cables shall be laid in

triangular formation and laid on non-metallic floor, the cable touching each other and floor throughout.

### **Laid in Ready Trench**

This will mean laying of cable in ready prepared trenches directly on trench floor, or the racks provided on the wall of the trench depending upon number of cables to be laid.

Minimum bending radius shall be twelve times the overall cable diameter in case of XLPEISWAS cables and six times for PVC armoured cables if not otherwise recommended by the Consultant.

The lengths of cables given in the schedule of quantities are only approximate. The successful bidder is required to measure out the actual lengths needed before laying. Straight through joints will not generally be permitted.

### **Jointing**

Cable jointing shall be carried out by skilled jointers with expert supervision. The Contractor shall use the best jointing materials and the necessary cable compound and all jointing sweating, basting, wiping and filling in of compound shall be done in an approved manner.

### **Wiring Cable Run Under Defined Conditions:**

#### **Multi-Core Cable**

Cables of all types other than single-core cables are installed singly, fixed to the vertical surface of a wall or open cable trench, the distance between the surface of the cable and the wall being 25mm [1 inch] in every distance.

### **Provision for Maximum Load**

All conductors, switches and accessories shall be of such size as to be capable of carrying, without their respective ratings being exceeded, maximum current which will normally flow through them. Provide copper branch circuits and feeder conductors sized at 150% of full load capacity. Use full-sized neutral conductor and a separate ground conductor for each circuit. Circuits and feeders that supply power for electronic equipment may require an oversized neutral to compensate for high harmonic neutral currents.



## **Selection of Size of Conductor**

The sizes of conductors of circuits shall be so selected that the drop in voltage from consumers' terminals in a public supply to any and every point on the installation does not exceed three percent of voltage at the consumer's terminals when the conductors are carrying the maximum current under the normal conditions of service.

If the cable size is increased to avoid voltage drop in the circuit, the rating of the cable shall be the current which the circuit is designed to carry. In each circuit or sub-circuit every cable shall have a current rating not less than that of the current rating of the respective protection gear.

Overload protection shall not exceed 10A for 2.5 mm<sup>2</sup> conductors, 20A for 4.0 mm<sup>2</sup> conductors or 30A for 6.0 mm<sup>2</sup> conductors

### **Cable Ends**

Stranded conductors having a nominal cross-sectional area exceeding 6 sq. mm shall always be provided with cable lugs and crimping method suitably applied.

When a stranded conductor having a nominal cross-sectional area less than 6 sq. mm is not provided with cable socket, all strands at the exposed end of the cable shall be soldered together. No oxide grease shall be provided on the exposed end conductor after soldering.

In any system of wiring, no bare or twist joints shall be made at intermediate points in the through run of cables unless the length of a final sub-circuit, sub-main or main is more than the length of the standard coil as given by the manufacturer of the cable. If any joint shall be made through proper cut-outs or through proper junction boxes they shall be easily accessible for inspection.

All through cable connections shall terminate in junction boxes with inspection capabilities.

### **Passing Through Walls and Floors**

Where conductors pass through walls, one of the following methods shall be employed. Care shall be taken to see that wire pass freely through protective pipe or box and that wire pass through in a straight line without any twist or cross in wires on either ends of such holes.

- a) A metal box extending through the whole thickness of the wall and casings or conductor shall be carried so as to allow 1.3 cm air space on three sides of the casing or conductor.
- b) The conductor shall be carried either in a rigid steel conduit conforming to accepted standards or a rigid or semi-rigid non-metallic conduit conforming to accepted standards.

Where conduits pass through walls or floors the standard fire protection method shall be carried by using fire proof sealing materials as per standard.

## **Feeder Wires and Cables Standards**

All wires and cable for feeder circuits shall be as per latest IS/BS specifications.

### **Wire And Cable Protection**

Suitably protect wires and cables from weather and damage during storage and handling; item shall be in first class condition when installed.

### **Wire and Cable Installation**

- i) Conductors shall be of soft drawn annealed copper with PVC insulation and outer coverings as required.
- ii) Conductors sizes shall be standard metric. Conductors shall be stranded and shall have colour coded phase wires. Neutral used for 230V circuits shall have a distinguished colour tracer. Cables installed in conduits shall be multistrend, single core un-armoured and colour coded as per IEE wire size, insulation, and manufacturer's name shall be permanently marked on conductor jacket.
- iii) Conductors installed in wiring channels of continuous row fixtures, and raceway between junction box and recessed fixtures shall be asbestos covered and have 90 degrees insulation. No reduction in branch circuit conductor size below the respective circuit protection rating in wiring channels will be allowed.
- iv) Circuit conductors shall extend to the outlets shown. Circuiting basically shall be as shown in the drawings provided. An arrow indicating to distribution board is a complete circuit i.e. consisting of - one phase conductor, one neutral conductor and one earthing conductor wires with colour codes, in a suitable conduit and wire sizes of all should be same as per the outlets loading. Request for deviations in methods of circuiting and conduit branch circuit distribution shall be submitted in shop drawings form for approval.

### **FIELD CONTROL**

Perform the following field tests and inspections and prepare test reports:

- After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
- Test RCCB operation with fault simulations according to manufacturer's instructions.
- Remove malfunctioning units, replace with new units, and retest as specified above.

## **SECTION 4 – EARTHING (GROUNDING) AND BONDING**

### **GENERAL**

This Section includes Earthing (grounding) of electrical systems and equipment in general unless otherwise noted by manufacturer for their special equipments.

### **APPLICATION**

The grounded neutral of the secondary distribution system shall be supplemented by an equipment grounding system to safeguard equipment and personnel properly. Equipment grounding system shall be incorporated to all metallic enclosures, cabinets and other conductive items in close proximity with electrical circuits and shall operate continuously at ground potential and shall provide a low impedance path for possible ground fault currents. The system shall comply with IS & BS specifications.

### **Copper Plate Earthing Set**

The Earthing set as per IS & BS should consist of the following or as detailed in the bill of quantities.

- a) 1 no. 60 cm x 60 cm x 0.3 cm - copper plate
- b) 1 no. 25 mm dia. PVC pipe of appropriate length and accessories for watering as detailed in the BOQ/Drawing.
- c) Test links for schedule testing.
- d) Earthing enhancing chemical compound filling as detailed in BQ.
- e) Copper flat strip or bare copper wire of appropriate cross section, as the case may be, as stated in the BOQ/Drawing.

### **EARTHING (GROUNDING) CONDUCTORS**

Insulated conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable NBC/IS Code.

### **EQUIPMENT GROUNDING CONDUCTORS**

Install equipment grounding conductors in all feeders and circuits. Each shall be installed such that it is not shared with any other feeder or branch circuit over its entire length from circuit breaker panel board to load.

Install insulated equipment grounding conductor with circuit conductors for the following items

1. Feeders and branch circuits.
2. Receptacle circuits.
3. Armored and metal-clad cable runs.

Earthing (grounding) for outlet Circuits: Install an insulated copper grounding conductor connected to the receptacle grounding terminal.

Metal boxes for light switches, receptacles, pull or junction boxes: Provide insulated ground conductor for each type of metal box.

## **FIELD REPORT**

Perform the following test and inspections and prepare test reports:

Test completed grounding system at each location where a maximum ground-resistance level is specified, Make test at ground rods/plates before conductors are connected to the grid bus.

Report measured ground resistances that exceed the following values:

Distribution units or panel boards serving equipment: 3 ohms.

## **INSTALLATION**

Minimum clearance between two earth stations shall be 5 meters and earthing station shall make minimum 1 meter apart from any building structure. Earthing plate (electrode) shall be overlapped by earthed lead (wire, strip) on both sides in full lengths. Loop lead for earth stations shall be minimum half in size of main earth conductor. For copper cladding earth electrodes earth lead shall brazing in full length of rod.

In case of maintenance free grounding station all required enhancing system shall followed as per manufacture's recommendations.

## **SECTION 5 – DISTRIBUTION BOARDS**

### **GENERAL**

This Section includes Load centers, main, sub-mains, section, floors distribution boards (Complete with switchgears metal enclosures) for low voltage (below 1 kV) application.

### **DEFINITIONS**

A. DB: Distribution Boards.

RCCB: Residual current circuit breakers.

DP/TP: Double Pole (phase)/ Three Pole (Phase).

SP/ SPN: Single Pole (Phase)/Single Pole ( Phase) with/and neutral

TPN: Three Phase (Pole) with /and neutral.

MCB: Miniature Circuit Breakers (Less than 10 kA Ics).

MCCB: Molded Case circuit Breakers ( More than 10 kA Ics)

### **SUBMITTALS**

Contractor should submit the owner, for each type of distribution boards, circuit breakers for Overload, Over current and Short Circuit Currents, RCCB, details dimensioned ACAD drawings with internal components arrangements, types for indoor or outdoor application, recessed or surface mounting, overall dimensioned, size and types of Sheet metal, Copper bus bars, hardware, indicating or measuring instrument etc.

### **MANUFACTURER**

Use only one single manufacturer for all types of MCBs, MCCBs, RCCBs.

Recommended manufacturer for MCBs, MCCBs, RCCBs: Legrand, Schneider, ABB

Recommended manufacturer for measuring and indicating accessories: Selec, AE, Koino, Essma

Recommended fabricator for DBs: Himalaya Electrical, Hyonjan Engineering, Corona Engineering

## STANDARD

All above mentioned circuit breakers and measuring/indicating accessories should be with NFPA-NEC 70, NBC -2007, 2003 and BS standard.

## FABRICATION

The main switch board shall be in door type, totally enclosed, metal clad front standing and shall be dust and vermin proof. The design shall be fixed on a modular construction, the fused switch/MCCB/MCB feeder units being arranged in multi-tier formation in horizontal/vertical panels, fed from horizontal/vertical bus bars. The ratings of each feeder and their order including other ancillary gears to be equipped with will be as detailed in the bill of quantity.

- i) All cabling and maintenance shall be carried out from front and the unit shall be extensible feeder control units arranged in individual compartments with hinged doors. All feeder control units shall be front operated and shall be interlocked with the hinged door. Adjoining surface of doors and covers shall be gasketed.
- ii) Bus bars shall be of high conductivity copper bar of sufficient cross sectional area so that a current density of 2 amp. Per sq. mm is not exceeded at normal current rating and supported on non-hygroscopic insulator. The neutral busbar cross section shall be equal of the phase bus bars and ground busbars cross section shall not less than 50% of the phase bus bars. Electrolyte tinned 'Cu' shall be used unless otherwise mentioned.

These bars shall be covered with insulating sheet e.g. busbar sleeve to avoid live contact. They shall be colored coded as phase oriented. Shapes shall be rectangular in size as their capacity rating +20% in excess.

- iii) Clamp type terminals for copper cables may be provided for feeders up to 30 amps. For feeder of higher rating suitable cable lugs shall be used.
- iv) The feeder control units ratings shall be as specified in the drawing or bill of quantity, switches shall be of quick make and break design with double break per pole. Switch contacts shall be silver plated and housed in suitable insulator. The feeder control operating handle shall be mounted on the front cover.
- v) All the bars shall have bushings/supports made of non-inflammable and non-hygroscopic materials such as hylam, permali, Formica, bakelite etc. Suitable insulating phase barriers should be provided to prevent accidental short circuits during operation
- vi) Hinged front cover: Entire front trim hinged to box and with standard door within hinged trim cover with locking arrangements.
- vii) Finish: Powder coated with manufacture's standard colour.

- viii) Directory card: With transparent protective cover, mounted inside metal frame, inside switchboards door.
- ix) Provide 20 percent spare spaces, 10 percent spare circuit breakers, and 20 percent overall spare current carrying capacity for future expansion as described per Bill of Quantity.
- x) Wiring diagrams: Power, signal, and control wiring
- xi) The construction shall be compartmentalized.
- xii) All distribution boards shall be dead front type. All switches, circuit breakers, etc. shall be operable from the front.
- xiii) All bolts and nuts exposed to external atmosphere shall be cadmium plated or zinc passivated.
- xiv) The working height shall be limited to a maximum of 2,000mm. The design shall be such as to permit easy extension of distribution boards at site on either end.
- xv) The distribution boards shall consist of vertical sections, fabricated from a minimum of 1.6 mm thick sheet steel, shaped and reinforced to form a rigid freestanding structure.
- xvi) The minimum clearance of the power terminal lug from the bottom plate shall be maintained as 200mm.
- xvii) The AC distribution board designed for 4-wire system shall have a fully insulated neutral bus of cross-section same as the main phase buses.
- xviii) Anchor bolts and nuts for each distribution board shall be supplied along with the distribution board.
- xix) All distribution boards mounted indoor shall be provided with enclosure protection of IP 50 as per IEC.
- xx) All distribution boards shall have with required numbers of Brass (for Power cables) cable glands and PVC cable glands for incoming and outgoing cables/feeders as per conduit/ cables schedule and as described on the bill of materials.

Distribution board shall consist of fused switch/MCCB/MCB of ratings as detailed in the drawing or bill of quantities. It should be factory assembled, flush mounted type, of mild steel cabinets, having dead front with hinged door, flush locks, and a typewritten card directory on the door identifying each circuit. The DB box shall be finished with powder coated paint on all sides. Branch circuit breakers used for various circuits shall be mounted in a group at the suitable location of the board. The outgoing circuit breakers shall be

quick make and break type equipped with overload thermal and short circuit magnetic tripping protection.

**Mounting:** The board shall be mounted with the top of the cabinet 2 000 millimetre above the finished floor unless otherwise noted in the drawings. The cabinet shall be plumb and square with the wall of the structure.

## **SECTION 6 - INDOOR LIGHTING**

### **GENERAL**

This Section includes the Indoor lighting fixtures with their illumination requirements, construction features and mounting in details with followings.

1. Indoor lighting fixtures with lamps and ballasts.
2. COB & SMD Indoor LED panel
3. Lighting fixtures mounted on skin surface of building.

This specification covers the design, complete supply and installation of the lighting system for the project including all necessary supervision, labor, tools, equipment and accessories, miscellaneous materials, testing, and putting in acceptable operation of the lighting system.

The originality in manufacture of all lighting fixtures shall be certified by the manufacturer, or the authorized dealers of the manufacturer. The specification shall cover the lighting fixtures and the lamps including all necessary accessories. The contractor shall furnish and install all the fixtures with lamps and accessories as per specification and drawings. The location of the fixtures shall be as per layout plan of electrical lighting drawing and as per instruction by the Owners/Engineers.

Light fixtures shall be provided on ceilings, wall, walkway floor and outdoor carefully aligned and leveled. Adequacy of support system and alignment shall be approved. Approved method of seismic requirements should be applied when installing the all types of fixtures. When installing the indoor recessed type light fixtures minimum two numbers of ceiling support with metal rope should be provided in each fixture.

Fixture shall be left clean at the time of final completion of work, every item shall be in proper working condition, Fixtures shall be protected from dust, paint, dirt, debris etc.

Manufacturer product catalogue number and/or description in the fixture schedule shall establish quality, style, finish etc. similar fixture, which shall meet the exact specially, or quality features and similar appearance shall be submitted for prior approval.



## **DEFINITIONS**

1. HPF: High Power Factor.
2. BF: Ballast factor.
3. LED: Light Emitting Diode
4. COB: Chip on Board
5. SMD: Surface mounted Diode

## **SUBMITTALS**

Contractor should submit the owner, for each type of light fixtures as described in the BOQ (Unless mentioned as client supply), drawings (Manufacturers product data sheet, catalogues etc) with internal components (ballast, starter, holder etc.) arrangements, types for indoor or outdoor application, recessed or surface mounting, overall dimensioned, size and types of fixtures, related hardware etc.

## **MANUFACTURER**

Use only one single manufacturer for all types of indoor lighting with ballast, lamps, starter etc.

Recommended manufacturer for indoor CFL fixtures, LED panels: Philips, Osram,

Wipro

Recommended manufacturer for outdoor CFL decorative sets: Philips, Decon

## **CODES AND STANDARDS**

The lighting fixtures and installation shall meet the requirements of the latest edition of the National Electrical Code (NEC-2005) of the National Fire Protection Association. In addition any rules or regulations applicable to the work shall be followed. In case of any discrepancy, the more restrictive rule shall be binding.

## **SCOPE OF WORKS**

All equipment shall be complete and operative in all details and shall be left in a satisfactory working condition. The Contractor shall furnish and install all materials and equipment, which are obviously a part of the complete illumination installation and without any additional charge to the Employer.

The miscellaneous materials include, but are not limited to, all conduit, wires, controls, lighting panel boards, junction boxes, fittings, supports and other accessories required for the complete installation and satisfactory operation of the indoor lighting system.

The Contractor shall perform the following work in addition to furnishing and delivering of the equipment, materials and accessories specified hereinafter in this specification.

- (a) Assembling at the plant site
- (b) Erection and complete installation
- (c) Testing of all equipment
- (d) Commissioning of all equipment prior to trial operation
- (e) Trial operation and all necessary adjustments prior to initial operation.

## **REQUIREMENTS**

### **Lighting Fixtures and Lamps**

- i) Provide fixtures on ceilings carefully aligned and levelled. Adequacy of support system and alignment shall be as approved.
- ii) Take care to properly install recessed fixtures including adequate provisions of light-leak-proof installation.
- iii) Provide all light outlets with a fixture. Where outlet symbols on drawings do not have a type of designation, provide a fixture for such location the same are those used in similar or like locations.
- iv) All LED Panels shall be of minimum IP 20; Indoor ceiling mounted with high efficiency translucence (HET) diffuser 230-250V with colour temperature 3200-5000 K, or as described on BOQ with following standard parameters as described (v):
- v) LED manufacture - CREE, EPISTAR, OSRAM, SAMSUNG, CRI (color rendering index) - more than 80 (in general equal to 80), Driver - Electronic Ballast, Power factor 0.9, Beam Angle - 120 degree for SMD, 60 degree for COB, Light Output (system lumenious) - 80 lm/watt (in average), Voltage - 160V - 260V, Life - 50000 hours, Standard compliance - IEC 60598-1; Environment - RoHS

- vi) Provide lamps for all fixtures, of first quality, and appropriate and as approved for the use intended. Incandescent lamps shall be rated 230 - 250 volt, except where otherwise indicated.
- vii) Fixture diameters and sizes shall be as specified in Bill of Quantities or as approved.
- viii) Leave fixtures clean at the time of final completion of work; every item shall be in proper working order. Protect fixtures as required from dirt, dust, paint, debris, etc.
- ix) Verify, ceiling construction, recessing depth, and other constructional details prior to installation. Provide plaster frame for all fixtures recessed in plaster ceilings.
- x) All fixtures shall be supplied with complete accessories like lamps, ballasts, power factor improvement capacitors, starters wherever applicable etc, outdoor type fixtures shall be provided with weather/water proof only, and with required accessories for outdoor application.
- xi) All fixtures shall be supplied complete with lamps suitable for operation on a supply voltage and with variation in supply voltage to +/- 10%. Normal supply voltage shall be 1 Phase, 2 Wires, 400/230 volts, 50 Hz Neutral solidly grounded.

## **COORDINATION**

Coordinate layout and installation of Ceiling or Wall lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them.

## **WARRANTY**

1. Manufacturer Warranty: 3 years from the date of project hand-over for any manufacturing defect.
2. Contractors Warranty: 1 year from the date of installation completed for any installation defect.

## **FIELD CONTROL**

Inspect each installed fixture for damage. Replace damaged fixtures and components.

Verify normal operation of each fixture after installation.

## **SECTION 7 – MANUAL FIRE ALARM SYSTEM**

### **GENERAL**

The under mentioned technical specifications, code of practices, standard, etc. shall strictly be followed by the engineers, supervisors, bidder, supplier, contractor, for the supply, installation and testing of the Fire Alarm System in the proposed building project.

This Specification section included the followings:

- Smoke and Heat Detectors
- Response Indicators
- Manual Call Points
- Sounder/Strobe
- Fire Alarm Cable Terminal Block

### **SUBMITTALS**

Product Data: For each type of product used for project.

### **MANUFACTURER**

Use only one single manufacturer for Entire Fire alarming system components.

Smoke detector	-System Sensor, Honeywell, C-Tec
MCP	-System Sensor, Honeywell, C-Tec
Sounder	-System Sensor, Honeywell, C-Tec
Response Indicator	-System Sensor, Honeywell, C-Tec

### **SMOKE DETECTOR:**

The ionization detector model shall be equipped with a dual- chamber, uni- poplar sensing chamber. The nominal sensitivity of the detector shall be 3.5 % / meter as measured in a UL smoke box and shall not alarm when it is exposed to wind gust up to 150 meter per minute. The detector shall be equipped with a light – emitting diode (LED) that is visible from the floor. This LED shall blink every ten seconds to indicate that the detector is operational, in standby, and latch on as visual indication of alarm. The detector shall be capable of applying an output voltage to an optional remote LED enunciator as an indication of its status. It shall be possible to perform a calibrated sensitivity and performance test on the detector without the need for generating smoke. The test method shall test all detector circuits. The detector screen and cover assembly shall be easily removable for cleaning or replacement. It shall maintain stable operation when it is exposed to wind gusts of up to 900 meter per minute. The detector shall use a plug- in, low profile design that is both unobtrusive and aesthetically pleasing. A line plug- in base for a variety of applications shall be available for use with the detectors. Wire connections shall

be made by means of a clamping plate and screw. These bases shall allow for mounting directly to a surface or to 75mm octagon box.

### **RESPONSE INDICATORS:**

Response indicators shall be installed outside of the closed room and LED of response indicator shall help to detect fire inside the room.

### **MANUAL CALL POINTS (MCP)**

Manual call points shall be read switch operation ABS plastic case, PVC quoted glass, test key attach.

### **SOUNDER/STROBE**

This shall be capable of operating at 24 V DC. Sounder/Strobe shall have an operating temperature between 0 Deg Celsius and 50 Deg. Celsius Sounder shall have 8 tone options, selected by means of clips. Strobe shall be powered independently of the sounder and shall operate at 24 V DC.

### **FIELD CONTROL**

As per manufacturer recommendations

Remove malfunctioning units, replace with new units, and retest as specified above.

# Bill of Quantities

## **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.*

## **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. The method of measurement of completed work for payment shall be in accordance with the Specifications.

STUPA COMMUNITY HOSPITAL							
<i>Bill of Quantities for Electrical Works</i>							
S.N.	Description	Qty	Unit	Unit rate NRs		Total Amount NRs	Remarks
				In Figure	In words		
<b>Outdoor Substation Equipments</b>							
<b>1</b>	<b>Two Pole Structure</b>	1	L/S				
	Supply, Installation, Testing & Commissioning of 2 pole structure for terminating 11 KV O.H. supply from NEA as per specifications and drawing. The two pole structure shall comprise of:-						
	steel tubular two pole structure 11 mtrs high in cement concrete foundation 1:3:6 (1 cement : 3 coarse sand : 6 graded aggregate 40mm nominal size) including excavation and refilling etc. as required. The rate shall be inclusive of painting with 2 coats of aluminum paint (on red oxide). The portion of pole under the ground shall be provided with 2 coats of bituminous paint - 2 Nos.						
	Steel sections, channels angles, flats, clamps, GI nuts, bolts and required hardware etc of different sizes for cross arms, bracings, supports etc. for pole GOD etc. including anti limbing barbed wires (conforming to IS:278) having 4 points barbs spaced 75 ±12mm apart. All steel structure shall be given 2 coats of red oxide primer and 2 finishing coats of aluminum paint as required. - Lot						
	Supply, Installation, Testing & Commissioning of 11 KV Glass disc/pin/support insulators complete with clamps and fixing hard wares etc. complete as required						
	Supply, Installation, Testing & Commissioning of 11 KV station class thyrite type lightning arrestors complete with mounting arrangement (on all phases) - 3 Nos.						
	Supply, Installation, Testing & Commissioning of drop out - lock out (DOLO) fuse, gang operating device (Air Break Switch) with pad locking arrangement (operating rod to be supported properly), complete with operating handle and locking arrangement - 1 Set						



	Supply, Installation, Testing & Commissioning of GI stay set complete with 20mm dia 1.8 M long stay rod with 450 x 450 x 7.5 mm anchor plate with thimbles, stay clamps, 7/4.00 mm dia GI stay wire, turn buckle (20mm x 600mm) strain insulator bow tightner in cement concrete 1:3:6 foundation as excavation and refilling - 2 Set						
	Note: The excavation and other civil works related to erect the two pole structure correctly as per norms and as per site incharge are to be included in cost.						
2	Supply, Installation, Testing and Commissioning of 11 KV line using <b>50 sq. mm ACSR Rabbit</b> conductor including jumper & binding works of the conductors as per NEA rules, design, specification, instructions all complete. Above road crossing conductors shall be raised with 1.5 mtrs. long cross arms with all required accessories.	600	RM				
3	Supply, installation, testing and commissioning of <b>GOAB Switch</b> as per NEA specifications fixed in MS channel and Operating Handle to be fixed properly at an operating height.	2	Nos				
4	<b>H.T. CABLING: Make: NS/IS standard.</b>						
	Supplying, laying, testing and commissioning of following sizes of 11 KV grade (earthed), Aluminum conduc-tor, cross linked polyethylene, insulated, individual core screened, flat steel strip armored, PVC sheathed cable complete as required. Laying of cable is underground/trench. (The rate shall also include the laying of cable, excavation, sand filling, bricks and refilling the trench). ( Make Pioneer or any NS standard)						
a	3 C x 50 Sq.mm XLPE HT 11 KV cable from power intake structure to HT Panel, and from HT Panel to Transformers	60	Rm				
5	Supply, installation & testing of HT stay set comprising of - <b>600 x 600 x 6mm earth plate,</b> - 19mm Stay Rod, - turnbuckle, - Stay insulator, - 16 x 305mm eye bolt, - 7/4mm stay wire average length 9mtrs including pit excavation and refilling same after stay fixing as per NEA rules, design, specification, instructions all complete.	2	Set				

<b>6</b>	<b>End Termination</b>	6	Set				
	Heat shrinkable cable jointing of 3 core x 35 sq.mm 11 KV volts grade XLPE insulated armoured cables with suitable cable termination using Raychem/ MECP kits including all accessories.						
<b>7</b>	<b>HT Metering Unit</b>						
a.	Supply, installation, testing and commissioning of <b>30/5 HT Metering Unit</b>	1	Set				
b.	Supply, installation, testing & commissioning of <b>TOD metering unit</b> & taping arrangement with all required accessories including Control Cable connection and earthing as per NEA rules, design, specification, instructions all complete.	1	Nos				
<b>8</b>	<b>Earthing System</b>	2	Set				
	Supply and making of earth pits to construct a LORESS Maintenance free Earth with following specification complete with excavation, back filling, effecting connections testing and commissioning including providing and fixing masoanry chamber and hinged cover.The following material shall used.						
	Copper Bonded Electrodes of required length to achieve required level.						
	LORESS Earth enhancing compound						
	Rod to Cable Clamp						
	Copper Bus Bar(300 x 25 x3 ) mm						
	Insulator						
	70 Sq mm copper cable to connect the earthpit to earth busbar in equipment room of approx. length-20 m.						

Indoor Substation Equipments							
<b>1</b>	<b>H.T. Switchgear</b>						
a	<b>11 KV VCB</b>	1	set				
	Supply, installation, testing and commissioning of 11 KV, Breaker Vacuum Circuit Breaker Panel Board comprising of 1 No. incoming & 1 No. outgoing breakers. Each incoming, outgoing breaker panel shall be totally enclosed, 2 mm thick CRCA sheet steel, floor mounting, free standby, dust and vermin proof indoor type complete as per specification and as described.						
	<b>Incoming Panel:</b>						
	1 no. 50 amps, 11 KV vacuum circuit breaker with breaking capacity of 350 MVA, motorised spring charged and manual closing mechanism rated at 230 volt single phase AC supply while closing and tripping coil shall operate in 24 volts DC supply.						
	3 nos. double core current transformer 50/ 5 amps epoxy cast resin insulated class of insulation E.						
	Core 1-15VA burden class 1.0 for metering.						
	Core 2-15VA burden class 5P10 for protection						
	3 nos. line PT 11 KV/ $\sqrt{3}$ , 110V/ $\sqrt{3}$ , 100VA class 1.0 epoxy cast resin type.						
	IDMT relay with 3 O/C and 1 E/F element.						
	1 no. digital voltmeter (0-12 KV) with selector switch (96mm x 96mm).						
	1 no. digital ammeter (0-150 Amp) with selector switch (96mm x 96mm).						
	1 no. digital power factor meter.						
	1 no. electronic digital type energy analyzer having 30 days memory and parameters of KW, KWH, KVAH, KVARH power factor, frequency etc.						
	1 no. breaker control switch						
	1 set of following indicating lamps						
	Red, Yellow and Blue for phase indication						
	Amber for trip indication						
	Red `ON` Green `OFF`						
	Spring charge indication						

	Auto trip indication				
	1 no. hooter				
	1 set of fuses, ferrules, wiring etc. as required.				
	Suitable arrangement for termination of 3 core 50 sqmm 11KV XLPE cable				
	<b>Outgoing Panel</b>				
	Each Panel With:				
	1 no. 35 Amp, 11 KV vacuum circuit breaker with breaking capacity of 350 MVA and motorised spring charged and manual closing mechanism rated at 230 volt single phase AC supply while closing and tripping coil shall operate in 24 volts DC supply.				
	3 nos. double core current transformer / 5 amps epoxy cast resin insulated class of insulation E.				
	Core 1-15VA burden class 1.0 for metering.				
	Core 2-15VA burden class 5P10 for protection				
	Instantaneous over current protection relay with 3 O/C and 1 E/F element.				
	Restricted earth fault relay.				
	1 no. Anti Pumping device				
	2 nos. VAA33 or equivalent auxiliary relay for transformer fault, alarm and trip suitable for 230V AC supply.				
	1 no. circuit breaker control switch for electrical (T/N/C)				
	1 no. limit switch for test and service position				
	1 no. digital ammeter (0-80 Amp) with selector switch (96mm x 96mm)				
	1 no. digital KWH meter				
	1 set of following indicating lamps				
	Red, Yellow and Blue for phase indication				
	Amber for trip indication				
	Red `ON` Green `OFF`				
	Spring charge indication				
	Auto trip indication				
	1 set of fuses, ferrules, wiring etc. as required.				

	1 No. hooter						
	1 No. master trip relay						
	Suitable arrangement for termination of 1 No. 3 core 240 Sqmm 11 KV XLPE cable.						
	<b>11KV breaker panel, described as above</b>						
<b>2</b>	<b>LT PANEL BOARDS (LT Panels)</b>	<b>1</b>	<b>Set</b>				
	Supply of following MV Panels fabricated out of 2mm thick for structural members (Load bearing members) and 1.6mm thick for door and covers (Non load bearing members) CRCA sheet in cubicle compartmentalize free standing floor mounted, dust and vermin proof with reinforcement of suitable size angle iron, channel 'T' irons and / or flats wherever necessary, 16 gauge CRCA sheet steel shall be used for panels. Cable gland plates shall be provided on top of the panels. Panels shall be treated with all anticorrosive process before painting as per specifications with 2 coats of zinc chromate primer and final approved shade of enamelled paint. 2 Nos. earthing terminals shall be provided for all distribution panels. Panels shall be suitable for 415V, 3-phase, 4-wire, 50Hz supply system lifting hooks shall also be provided in case of large panels. Mv panel should be as per SLD attached herewith.						
	<b>Incomer :</b>						
	1000 A EDO ACB, 50kA -2 Nos. with electro mechanical arrangement						
	1000 A EDO ACB, 50kA Bus Coupler with electro mechanical arrangement- 1 no.						
	1000/5 CT-6 Nos.						
	O/C , E/F, IDMT Relay -2 sets						
	Multifunction meter-2 nos.						
	RYB Indicator-2 sets						
	1000 A Copper Busbar- 2 sets						
	3 Nos. of 1600 A HRC fuse, 80 KA						
	1000 A 4P MCCB, 80kA						
	<b>Outgoings :</b>						
	2 nos of 80 A TP MCCB,36kA						

	9 nos of 25 to 100 A TP MCCB,36kA						
	1 nos of 160 A TP MCCB,36kA						
	2 nos of 200 A TP MCCB,36kA						
	3 nos of 250 A TP MCCB,36kA						
	1 set of RYB indicator lamp with control fuse						
	0-2000 A Ammeter with selector switch						
	0-500 V Voltmeter with selector switch						
	1 no. electronic digital type energy analyzer having 30 days memory and parameters of KW, KWH, KVAH, KVARH power factor, frequency etc.						
	1 set of RYB indicator lamp with control fuse						
	1 set 500/5 CT coil						
	1 set of SPD device.						
	200 KVAr Capacitor Panel attached						
	TP+N+E 1200A Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
3	<b>ON-LINE UPS POWER SUPPLY SYSTEM</b>						
	Design, supply, delivery, storage, installation, testing and commissioning of battery bank, inverter, inter-connection wires and cables, module mounting structure, DC isolators, circuit breakers,etc, all complete) as per technical specifications and including packing and forwarding, loading and unloading charging and cost of insurance and transportation. (A)	1	Set				
	<b>UPS MDB</b>						
	30 kVA+ 30kVA three phase on- line UPS with 900 Ah battery bank system with following panel						
	UPMDB-Free standing type AC Panel comprising of following						
	<b>Incomer</b>						
	2 nos of 80A 4P MCCB, 36kA						
	<b>Outgoings</b>						
	10 nos of 40A TP MCCB, 25KA						
	2 set of Multifunction digital meter						
	2 set of RYB indicator lamp with control fuse						

	Digital Multifunction Meter, CT, PT and other necessary accessories						
	100 ampere TPNE Copper Bus with Insulation support						
4	<b>SUB-STATION SAFETY EQUIPMENTS</b>	1	Lot				
	Supplying and fixing of 11 KV grade size 1000 mm x 900 mm wide checkered rubber matting confirming to IS 5424-1969 complete-8 nos.						
	Supplying & fixing standard shock treatment charts in English & Nepali duly framed 2 nos.						
	Supply and fixing in position the best quality Danger Boards of approved shape and size as specified by Local Electricity Authorities written in English & Local Languages. 2 nos						
	Supply of fire buckets 5 nos. in each set duly filled with fine sand and fixed on an angle iron frame as per requirement of local authorities. Fire buckets shall be painted red from outside and white from inside with additional handle at the bottom.						
	Providing 11 KV tested hand gloves & tool kit - 2 set						
	Supply, installation, testing and commissioning of Fire Extinguishers (4.5 kg CO <sub>2</sub> with first filling) -2 nos.						
	Supply and making of wooden board for Key Hooks- 1 no.						
5	<b>CABLE TRENCH WORKS</b>	1	L/S				
	Making of 600 and 450 mm cable trench for HT and LT cable laying with sand filling and providing signage with danger indication						
6	<b>Earthing System</b>	10	Set				
	Supply and making of earth pits to construct a LORESS Maintenance free Earth with following specification complete with excavation, back filling, effecting connections testing and commissioning including providing and fixing masonry chamber and hinged cover. The following material shall used.						
	Copper Bonded Electrodes of required length to achieve required level.						
	LORESS Earth enhancing compound						
	Rod to Cable Clamp						
	Copper Bus Bar(300 x 25 x3 ) mm						
	Insulator						

	70 Sq mm copper cable to connect the earthpit to earth busbar in equipment room of approx. length-20 m.						
7	<b>30 KVA UPS 3 phase</b>	2	Set				
	30 KVA UPS 3 phase (400 V + 15%, -20%) Volts input & 3 phase output (400 V ± 1%), 50 Hz, Input harmonic Current THD 3% typical at 100% load, 6% maximum at 50% load at complete nonlinear load. All UPS in parallel redundant configuration with overall battery monitoring system.						
8	630 kVA TRANSFORMER 11/0.400 kV , 3phase, 50Hz						
	Supply, installation, testing and commissioning of 630 KVA capacity 11/0.400 KV, 3 phase, 50 Hz copper wound, step down oil type transformer with OLTC, with RTCC Panel,vector group Dyn-11 having cable end box suitable for 3 core 35 Sqmm XLPE al. conductor 11 KV on HT side and provision for terminating bus duct/ cables LT side with all fitting and accessories, WTI alarm and trip wiring complete with limit switches for enclosure door with wiring for interlocking with the HT breakers as per NEA specifications Certified and Tested from NEA. (NEEK or equivalent Make)	1	Nos.				
9	Supply, installation, testing & commissioning of Prime Rated <b>320 KVA (With AMF )</b> , 415 KV, 3-Φ, 50 Hz. Radiator cooled, 4 - stroke silent type diesel generator including soundproof canopy, Battery, control panel with inhouse MCCB, mounted to common base frame, with Fuel Tank, AVM Pad, silencer with all required accessories complete set and load tested for continuous 24 hours as per method stipulated in the specification, installed in PCC Foundation as per the drawing. (Cummins- Jackson, Kirloskar, Greaves or equivalent )	1	Set				
10	<b>Diesel Generator IS Standard or equivalent</b>						
	<b>DG SETS:</b>						



	Supply, installation, testing & commissioning of Prime Rated 620KVA (With AMF ), 415 KV, 3-Φ, 50 Hz. Radiator cooled, 4 - stroke silent type diesel generator including soundproof canopy, Battery, control panel with inhouse MCCB, mounted to common base frame, with Fuel Tank, AVM Pad, silencer with all required accessories complete set and load tested for continuous 24 hours as per method stipulated in the specification, installed in PCC Foundation as per the drawing. (Cummins- Jackson, Kirloskar, Greaves or equivalent )						
a	620 KVA Generator complete set	1	Set				
<b>11</b>	<b>ATS PANEL Make ABB/SIEMENS or Equivalent.</b>						
a	Supply of following ATS Panels fabricated out of 2mm thick CRCA sheet in cubicle compartmentalize free standing floor mounted, dust and vermin proof with reinforcement of suitable size angle iron, channel 'T' irons and / or flats wherever necessary, 16 gauge CRCA sheet steel shall be used for panels. Cable gland plates shall be provided on top of the panels. Panels shall be treated with all anticorrosive process before painting as per specifications with 2 coats of zinc chromate primer and final approved shade of enamelled paint. 2 Nos. earthing terminals shall be provided for all distribution panels. Panels shall be suitable for 415V, 3-phase, 4-wire, 50Hz supply system lifting hooks shall also be provided in case of large panels. Mv panel should be as per SLD attached herewith.	1	Set				
	<b>1000 ampere ATS panel comprising of following</b>						
	<b>Incomers</b>						
	1000 A, 400 V, 40 kA EDO ACB with O/L, S/C and E/F Microcontroller based relay- 2 Nos. with interlocking arrangement						
	<b>Outgoings</b>						
	1000 A, 400 V, 40 kA MDO ACB with O/L, S/C and E/F Microcontroller based relay- 1 Nos.						
	1200 Ampere TPNE Copper Bus						
	Digital Multifunction Meter 2 sets						
	CT, PT, Phase Indicator and other necessary accessories						
<b>12</b>	<b>CAPACITOR PANEL</b>	1	lot				

	200 KVAR Capacitor panel consisting of capacitor units in tier formation; housed in an integrated cubicle type, indoor type automatic switching 'ON' and 'OFF' control panel with dust and vermin proof hinged and lockable doors complete with interconnections, bonding to earth and painting (suitable for 400 Volts, 3 phase 50 Hz supply system).						
	<b>Incomer :-</b>						
	One (1) Nos.200A, TP + N MCCB (50KA) with OL/EF/shortcircuit releases.						
	<b>Outgoing :</b>						
	<b>All outgoing to be provided with the following:</b>						
	Capacitor duty contactor suitable for the capacitor banks rated as given with specified capacitors.						
	Provide capacitors as follows ABB /SIEMENS make						
	Eight (8) Nos.25KVA Capacitor Bank with 60 A TP MCCB (36kA) & Capacitor duty contactor.						
<b>Internal Electrification Main Block</b>							
<b>1</b>	<b>Light , Fan and 5 Ampere Power Point wiring , with required materials and labour all complete</b>						
a	Wiring installation for Lights and fan points on Mains / Essential supplies with mains and submains running on walls and ceiling with 3 nos. 2 sq.mm stranded flexible PVC insulated copper wire in neatly and symmetrically well placed <b>20 mm PVC conduit pipes</b> , with all required fixing accessories including minor chasing / chasing of wall and making good of the same including removing existing circuits , if necessary , to allow for light points laid out and controlled as per new space allocations. <b>Shop Drawings for routes to be followed must be submitted for Approval during execution stage.</b>	1158	pts				
<b>2</b>	Wiring for 6/16 amps Power Outlets with 2*4 sq.mm + 1*2.5 sq.mm Copper Stranded wires in flexible <b>25mm PVC conduit pipe</b> laid in ceiling , with one circuit covering upto 3 outlet Points with required fixing materials from DB's . <b>Shop Drawing for route to be followed to be submitted for approval.</b>	679	pts				

<b>3</b>	<b>Supply and installation of Convenience Outlets with required surface / concealed mounting boxes , including chasing / chiselling of wall and making good of the same , incase of flush mounting of the Outlet. Power Sockets shall be modular type</b>						
a	1x6/16 amp Universal Pin single Power Socket flush mounted with GI Box	388	nos.				
b	2x6/16 amp Universal Pin single Power Socket flush mounted with GI Box	291	nos.				
<b>4</b>	<b>Supply and installation of following light fixtures. All LED fixtures shall be approved by consultant before installation(Wipro/Siemes/Havells or equivalent)and approval by engineer (Sample to be submitted to client &amp; consultant before installation.)</b>						
a	36 watt LED Panel light fixture 2'x2' surface/recess type with inbuilt LED Driver with lumen efficiency 3600 lumen. CRCO23RO36HP65 (immaculate)WIPRO/GE/REIZ/TEKNOLITE or equivalent	353	sets				
b	Decorative Mirror light with 450/600 mm long with 8/10 watt LED light and inbuilt LED driver WIPRO/GE/REIZ/TEKNOLITE or equivalent	76	sets				
c	12 W LED down lighter recess mounted SMD 4" dia with inbuilt LED Driver & lumen output not less than 1140 lumen.	153	sets				
d	18 W LED down lighter surface mounted SMD 200mm x 200 mm or round type with inbuilt LED Driver & lumen output not less than 1710 lumen.	22	sets				
e	9 W LED down lighter recess mounted round type with inbuilt LED Driver & lumen output not less than 855 lumen.	415	sets				
f	Recess Mounted Linear lineos Led Fixture consuming a system wattage of 20W & the luminaire shall be with system efficacy $\geq 110\text{lm/W}$ .	8	sets				
g	20 watt LED tube Light surface type with inbuilt LED driver 1200mm dimension with lumen efficiency $>95\text{ lumen/watt}$	43	sets				
h	LED Cove strip light 24 watt (5 mtr. in roll) with LED driver.	156	sets				
i	16" wall fan heavy duty (Almonard/indoasian/orient or equivalent)	88	sets				
<b>5</b>	<b>Supply and fixing of , including making necessary connections , following light control switches , 5 amp outlet , with facia plate/s , modular units and Flush mounting GI Boxes including fixing and making good of wall surface. modular series</b>						

a	1 gang 1 way switch	328	nos.				
b	2 gang 1 way switch	76	nos.				
c	3 gang 1 way switch	43	nos.				
d	4 gang 1 way switch	47	nos.				
e	6 gang 1 way switch	38	nos.				
f	8 gang 1 way switch	19	nos.				
6	Supply and fixing GI ladder type cable trays, with radial bends, supports of the following sizes as per specification.						
a	1200 mm wide	50	RM				
	Runners 25 x 100 x 25 x 3 mm						
	Rungs 20 x 40 x 20 x 3 mm 250 mm C/C						
	Suspenders 2 Nos. 40 x 405 x 5 mm GI angle 1500 mm C/C						
b	900 mm wide	75	RM				
	Runners 25 x 100 x 25 x 3 mm						
	Rungs 20 x 40 x 20 x 3 mm 250 mm C/C						
	Suspenders 2 Nos. 40 x 40 x 5 mm GI angle 1500 mm C/C						
c	750 mm wide	65	RM				
	Runners 20 x 75 x 20 x 2.5 mm						
	Rungs 20 x 30 x 20 x 2.5 mm 250 mm C/C						
	Suspenders 2 Nos. 32 x 32 x 5 mm GI angle 1800 mm C/C						
7	Supply and fixing of perforated type pregalvanized GI cable trays of the following sizes including providing 2 Nos. 25 x 25 x 4 mm GI angle suspenders at 1800 mm C/C as per specifications.						
a	600 mm x 40 x 40 x 1.6 mm thick	95	RM				
b	450 mm x 40 x 40 x 1.6 mm thick	100	RM				
c	300 mm x 40 x 40 x 1.6 mm thick	250	RM				
d	150 mm x 25 x 25 x 1.6 mm thick	200	RM				
8	<b>Supply, laying and connection of following copper/aluminium cable with / without PVC Pipe / sleeves with fixing materials. XLPE Insulated Power cables shall be of Pioneer/Prakash/Trishakti</b>						
a	3x3.5 Core 300 mm <sup>2</sup> AL. Armoured XLPE CABLE from ATS Panel to Main LT Panel/Main Block	80	Rm				
b	3.5 Ccre 150 sq.mm Al. to Capacitor Bank	10	Rm				

c	3.5 Ccre 120 sq.mm Al. Armoured XLPE CABLE	95	Rm				
d	3.5 Ccre 95 sq.mm Al. Armoured XLPE CABLE	35	Rm				
e	3.5 Ccre 70 sq.mm Al. Armoured XLPE CABLE	60	Rm				
f	3.5 Ccre 35 sq.mm Al. Armoured XLPE CABLE	270	Rm				
g	3.5 Ccre 25 sq.mm Al. Armoured XLPE CABLE	25	Rm				
9	<b>Unarmoured Cu.Cable From LT Panel</b>						
a	3.5 Core 35 sq.mm	35	Rm				
b	3.5 Core 25 sq.mm	55	Rm				
c	4 Core 16 sq.mm	230	Rm				
d	4 Core 10 sq.mm	695	Rm				
e	4 Core 6 sq.mm	35	Rm				
f	4 Core 4 sq.mm	35	Rm				
9	<b>Supply , installation , testing and commissioning of Flush mounting type Sub Distribution Panel Boards fabricated out of 16 SWG CRC Sheet steel duly treated under 7 tank process and finally painted with Epoxy Paint having lockable hinged top cover over inner metallic cover , with following. MCB/MCCB/CB/CONTACTORS/RELAYS shall be of Siemens/ABB or eqvt.</b>						
	<b>FLOOR MAIN DISTRIBUTION BOARD (MDB) Refer SLD</b>						
a	<b>BASEMENT MAIN DISTRIBUTION BOARD (BMDB) Refer SLD</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 nos of 80A TP MCCB, 25kA						
	1 set of RYB indicator lamp with control fuse						
	1set of Multifunction digital meter						
	<b><u>OUTGOING</u></b>						
	1 no of 63A TP MCCB, 25KA						
	1 no of 40A TP MCCB, 25KA						
	3 nos of 20 A TP MCCB, 15KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
b	<b>GROUND FLOOR MAIN DISTRIBUTION BOARD (GMDB) Refer SLD</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no. of 160A TP MCCB, 25kA						

	1 no. of 32 A TP MCCB, 15kA 1 set of RYB indicator lamp with control fuse 1set of Multifunction digital meter <b>OUTGOING</b> 1 no. of 63A TP MCCB, 25kA 2 nos of 40A TP MCCB, 25kA 3 nos of 32 A TP MCCB, 15kA 3 nos of 25 A TP MCCB, 15kA 1 nos of 20 A TP MCCB, 15kA TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
c	<b>FIRST FLOOR MAIN DISTRIBUTION BOARD (FMDB) Refer SLD</b> <b>INCOMING</b> 1 no. of 160A TP MCCB, 25kA 1 no. of 32 A TP MCCB, 15kA 1 set of RYB indicator lamp with control fuse 1set of Multifunction digital meter <b>OUTGOING</b> 2 nos. of 63A TP MCCB, 25kA 1 no of 40A TP MCCB, 25kA 3 nos of 25 A TP MCCB, 15kA 4 nos of 20 A TP MCCB, 15kA TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)	1	set				
d	<b>SECOND FLOOR MAIN DISTRIBUTION BOARD (SMDB) Refer SLD</b> <b>INCOMING</b> 1 no. of 200A TP MCCB, 25kA 1 no. of 32 A TP MCCB, 15kA 1 set of RYB indicator lamp with control fuse 1set of Multifunction digital meter <b>OUTGOING</b> 2 nos. of 63A TP MCCB, 25kA 1 no of 80A TP MCCB, 25kA	1	set				

	3 nos of 25 A TP MCCB, 15kA						
	4 nos of 20 A TP MCCB, 15kA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
e	<b>THIRD FLOOR MAIN DISTRIBUTION BOARD (TMDB) Refer SLD</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no. of 80A TP MCCB, 25kA						
	1 no. of 32 A TP MCCB, 15kA						
	1 set of RYB indicator lamp with control fuse						
	1set of Multifunction digital meter						
	<b><u>OUTGOING</u></b>						
	1 no. of 63A TP MCCB, 25kA						
	1 no of 40A TP MCCB, 25kA						
	3 nos of 25 A TP MCCB, 15kA						
	3 nos of 20 A TP MCCB, 15kA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
f	<b>FOURTH FLOOR MAIN DISTRIBUTION BOARD (FrMDB) Refer SLD</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no. of 80A TP MCCB, 25kA						
	1 no. of 32 A TP MCCB, 15kA						
	1 set of RYB indicator lamp with control fuse						
	1set of Multifunction digital meter						
	<b><u>OUTGOING</u></b>						
	1 no. of 63A TP MCCB, 25kA						
	1 no of 40A TP MCCB, 25kA						
	3 nos of 25 A TP MCCB, 15kA						
	3 nos of 20 A TP MCCB, 15kA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
g	<b>FIFTH FLOOR MAIN DISTRIBUTION BOARD (FthMDB) Refer SLD</b>	1	set				

	<b>INCOMING</b> 1 no. of 200A TP MCCB, 25kA 1 no. of 32 A TP MCCB, 15kA 1 set of RYB indicator lamp with control fuse 1set of Multifunction digital meter <b>OUTGOING</b> 1 no. of 100A TP MCCB, 25kA 2 no of 80A TP MCCB, 25kA 3 nos of 25 A TP MCCB, 15kA 3 nos of 20 A TP MCCB, 15kA TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
h	<b>SIXTH FLOOR MAIN DISTRIBUTION BOARD (SixMDB) Refer SLD</b> <b>INCOMING</b> 1 no. of 125A TP MCCB, 25kA 1 no. of 32 A TP MCCB, 15kA 1 set of RYB indicator lamp with control fuse 1set of Multifunction digital meter <b>OUTGOING</b> 2 nos. of 32A TP MCCB, 15kA 2 no of 80A TP MCCB, 25kA 3 nos of 25 A TP MCCB, 15kA 3 nos of 20 A TP MCCB, 15kA TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)	1	set				
1 0	<b>FLOOR DISTRIBUTION BOARD FOR ACDB- (GACDB, FACDB, SACDB, TACDB, FrACDB, FthACDB, SixACDB) Refer SLD</b> <b>INCOMING</b> 1 nos of 16A TP MCCB, 16kA <b>OUTGOING</b> 3 nos. of 16A RCCB of 30mA 9 nos of 10A SP MCB, 10KA	7	set				



	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
1 1	<b>FLOOR DISTRIBUTION BOARD FROM UPS- (GUPSDB-1&amp;2, FUPSDB-1&amp;2, SUPSDB-1,2,&amp;3, TUPSDB-1&amp;2, FrUPSDB-1&amp;2, FthUPSDB-1&amp;2, SixUPSDB-1) Refer SLD</b>	14	set				
	<b><u>INCOMING</u></b>						
	1 nos of 40A TP MCB, 10kA						
	<b><u>OUTGOING</u></b>						
	3 nos. of 20A RCCB of 30mA						
	6 nos of 6A SP MCB, 10KA						
	15 nos of 10A SP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
1 2	<b>AHU DISTRIBUTION BOARD (AHUDB)</b>						
a	<b>AHUDB-1</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 63A TP MCCB, 15kA						
	1 no of 63A TP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	2 nos of 6A TP MCB, 10KA						
	5 nos of 32A TP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
b	<b>AHUDB-2</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 16A TP MCCB, 15kA						
	1 no of 16A TP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	4 nos of 6A TP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
1 3	<b>FLOOR DISTRIBUTION BOARD</b>						

a	<b>BASEMENT FLOOR DISTRIBUTION BOARD-1 (BDB-1)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 32A TP MCCB, 15kA						
	3 nos of 32A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	12 nos of 16A SP MCB, 10KA						
TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)							
b	<b>GROUND FLOOR DISTRIBUTION BOARD-1 (GDB-1)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 40A TP MCCB, 15kA						
	3 nos of 40A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	21 nos of 16A SP MCB, 10KA						
TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)							
c	<b>GROUND FLOOR DISTRIBUTION BOARD-2 (GDB-2)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 32A TP MCCB, 15kA						
	3 nos of 32A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	12 nos of 16A SP MCB, 10KA						
TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)							
d	<b>FIRST FLOOR DISTRIBUTION BOARD-1 (FDB-1)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 32A TP MCCB, 15kA						
	3 nos of 32A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
6 nos of 6A SP MCB, 10KA							

	15 nos of 16A SP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
e	<b>FIRST FLOOR DISTRIBUTION BOARD-2 (FDB-2)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 40A TP MCCB, 15kA						
	3 nos of 40A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	21 nos of 16A SP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
f	<b>SECOND FLOOR DISTRIBUTION BOARD-1 (SDB-1)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 63A TP MCCB, 15kA						
	3 nos of 63A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	24 nos of 16A SP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
g	<b>SECOND FLOOR DISTRIBUTION BOARD-2 (SDB-2)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 40A TP MCCB, 15kA						
	3 nos of 40A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	18 nos of 16A SP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
h	<b>THIRD FLOOR DISTRIBUTION BOARD-1 (TDB-1)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 32A TP MCCB, 15kA						
	3 nos of 32A DP RCCB, 30mA						

	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	15 nos of 16A SP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
i	<b>THIRD FLOOR DISTRIBUTION BOARD-2 (TDB-2)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 40A TP MCCB, 15kA						
	3 nos of 40A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	18 nos of 16A SP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
j	<b>FOURTH FLOOR DISTRIBUTION BOARD-1 (FrDB-1)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 32A TP MCCB, 15kA						
	3 nos of 32A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	15 nos of 16A SP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
k	<b>FOURTH FLOOR DISTRIBUTION BOARD-2 (FrDB-2)</b>	1	set				
	<b><u>INCOMING</u></b>						
	1 no of 40A TP MCCB, 15kA						
	3 nos of 40A DP RCCB, 30mA						
	<b><u>OUTGOING</u></b>						
	6 nos of 6A SP MCB, 10KA						
	18 nos of 16A SP MCB, 10KA						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
l	<b>FIFTH FLOOR DISTRIBUTION BOARD-1&amp;2 (FthDB-1&amp;2)</b>	2	set				

	<b><u>INCOMING</u></b> 1 no of 63A TP MCCB, 15kA 3 nos of 63A DP RCCB, 30mA  <b><u>OUTGOING</u></b> 6 nos of 6A SP MCB, 10KA 24 nos of 16A SP MCB, 10KA TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
m	<b>SIXTH FLOOR DISTRIBUTION BOARD-1 (SixDB-1)</b> <b><u>INCOMING</u></b> 1 no of 63A TP MCCB, 15kA 3 nos of 63A DP RCCB, 30mA <b><u>OUTGOING</u></b> 6 nos of 6A SP MCB, 10KA 24 nos of 16A SP MCB, 10KA TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)	1	set				
n	<b>CSSDDB DISTRIBUTION BOARD (CSSDDB)</b> <b><u>INCOMING</u></b> 1 no of 63A TP MCCB, 15kA 1 no of 63A TP RCCB, 30mA <b><u>OUTGOING</u></b> 2 nos of 40A TP MCB, 10KA 2 nos of 16A TP MCB, 10KA 1 set of RYB indicator lamp with control fuse TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)	1	set				
o	<b>VRF DISTRIBUTION BOARD (VRFDB)</b> <b><u>INCOMING</u></b> 1 no of 80A TP MCCB, 15kA 1 no of 80A TP RCCB, 30mA <b><u>OUTGOING</u></b>	1	set				

	1 nos of 63A TP MCCB, 15KA						
	1 no of 32A TP MCCB, 15KA						
	2nos of 16A TP MCCB, 15KA						
	1 set of RYB indicator lamp with control fuse						
	TP+N+E Copper Bus Bar with insulation sleeve. (Earth & Neutral Busbar must be suitable for tapping individual circuit by using cable shoes.)						
1 4	<b>FIRE ALARM SYSTEM</b>	1	set				
	Fire point wiring with 2 x 1.5 copper cable in suitable <b>FR PVC CONDUIT</b> without any joint in the middle of the span all complete as per drawing, specifications and instructions. (Wire/cable : Pioneer / Prime or equivalent)	388	point				
	Smoke/Heat Detector	184	Set				
	Manual Call Point	18	Set				
	Hotter	10	Set				
	Response Indicator	245	Set				
	24 Zone fire control panel	1	Nos				
	Installation, Configuration and testing of FCAP all complete	1	Lot				
1 5	<b>Earthing System (Lightening + Distribution Board)</b>	6	Set				
	Supply and making of earth pits to construct a LORESS Maintenance free Earth with following specification complete with excavation, back filling, effecting connections testing and commissioning including providing and fixing masonry chamber and hinged cover. The following material shall used.						
	Copper Bonded Electrodes of required length to achieve required level.						
	LORESS Earth enhancing compound						
	Rod to Cable Clamp						
	Copper Bus Bar(300 x 25 x3 ) mm						
	Insulator						
	70 Sq mm copper cable to connect the earthpit to earth busbar in equipment room of approx. length-20 m.						
1 6	<b>Lightening Protection System</b>						

a	Supply and installation of class A "ESE Lightning protection Device "for building protection as per standard NFC-17-102.It should made of stainless steel with a delta T of 60 microseconds.The device shall be installed at a height of 4 mtr.from the roof of the building using a GI mast. The device shall be connected to the Earth pit using the copper tape of 25 x 3 mm. This copper tape shall run firmly along the side of the mast with the help of spacers.It shall be ensure that this down conductor shall not touch the building throughout.The down conductor shall be connected to the earth electrodes using clamps. (Make :Schirtek, ALLTEC.)	2	set				
b	lightning pad set with stay wire ,GI pole,metal greep ,shaddle,connecor greep and soldering.etc	2	L/S				
c	Lightning Strike Counter	2	set				
d	Copper strip fiber clamp,screw,greep with 2 vult type.(c-curv)	2	L/S				
e	25 mm Cu strip 3 MM thickness with Cu clamp accessories all complte	72	Rm				
f	Supply, installation, testing and commissioning of 2" dia 12 ft Pure GI Pipe with Compound chemical,salt limit,water dumping and three point earth strip welding for underground all complete as per site condation.(1 nos for lightning arrester set)	2	L/S				
g	Design,fabrication,assembling,supply,installation,installation,testing and commissioning of Earth box size L 450mm x W 300mm x D 150 mm made out of pre-galvanized sheets 1.2mm sheet steel and glazed steel door with acrylic, enclosure with 25x6 tinned cu strip with 10 holes & brassnut bolt & washer .	2	L/S				
	<b>Total</b>						
	<b>VAT @ 13 %</b>						
	<b>Grand Total</b>						

## Special Conditions of Contract

A. General	
GCC 1.1 (q)	The Employer is SHCC , Gokarnashwor -5 Jorpati
GCC 1.1 (v)	The Intended Completion Date for the whole of the Works shall be <b>31 March 2022 (4 Months)</b>
GCC 1.1(bb) & 10.1	The Project Manager is Chief Executive Officer , SHCC or assigned The Project Manager and Engineer are synonyms.
GCC 1.1 (ee)	The Site is located at KMC ward 6 Chabail, Kathmandu
GCC 1.1 (hh)	The Start Date shall be <b>December 1, 2021</b>
GCC 1.1 (ll)	The Works consist of MEP works Communication works in individual packages.
GCC 2.2	Sectional Completions are: <b>not applicable</b>
GCC 3.1	The language of the contract is <b>ENGLISH/NEPALI</b> 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 14.1	Schedule of other contractors: <i>The civil works are ongoing at site. The contractor need to coordinate with Site in charge assigned from SHCC and with civil works contractors.</i>
GCC 19.1	The minimum insurance amounts and deductibles shall be: <b>as per packages</b> <ol style="list-style-type: none"> <li>1. The minimum cover for loss of or damage to the Works, Plant and Materials is: <i>[insert percent]</i> of the Contract Amount.</li> <li>2. The maximum deductible for insurance of the Works and of Plant and Materials is: <i>[insert amount]</i></li> <li>3. The minimum cover for loss or damage to Equipment is : <i>[insert amount]</i></li> <li>4. The maximum deductible for insurance of Equipment is: <i>[insert amount]</i></li> <li>5. The minimum for insurance of other property is: <i>[insert amount]</i> with unlimited number of occurrences</li> <li>6. The maximum deductible for insurance of other property is: <i>[insert amount]</i></li> <li>7. The minimum cover for personal injury or death insurance               <ol style="list-style-type: none"> <li>i. for the Contractor's employees is that specified in the Labor act of Nepal and</li> <li>ii. for other people is <i>:[insert amount]</i> with an unlimited number of occurrences</li> </ol> </li> </ol>
GCC 20.1	Site Investigation Reports are: <i>N/A</i>



GCC 23.1	The following shall be designed by the Contractor: <i>N/A</i>
GCC 26.1	The Site Possession Date(s) shall be: <b>1 December 2021</b>
GCC 30.1	The place of arbitration shall be: Kathmandu
<b>C. Time Control</b>	
GCC 34.1	The Contractor shall submit for approval a Program for the Works within 7 Days from the date of the Letter of Acceptance.
GCC 34.3	The period between Program updates is 7 days. The amount to be withheld for late submission of an updated Program is <b>NPR 100,000</b>
<b>D. Quality Control</b>	
GCC 42.1	The Defects Liability Period is: <b>12months</b> for works and <b>24 months</b> for materials supplied.
<b>E. Cost Control</b>	
GCC 49.1	<b>10 %per Annum</b>
GCC 53.1	The Contract <i>is not</i> subject to price adjustment, and the following information regarding coefficients <i>does not</i> apply. The coefficients and indices for adjustment of prices in Nepalese Rupees shall be as specified in the Table of Adjustment Data submitted by bidder together with the Letter of Price Bid which is approved by the Project manager.
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. <i>N/A</i>
GCC 53.7	The Price Adjustment amount shall be limited to a maximum of: 25 % Percentage of the initial Contract Amount.
GCC 54.1	The proportion of payments retained is: <b>5 (five) percent</b>
GCC 55.1	The liquidated damages for the whole of the Works are 0.05 Percent of the final Contract Price per day. The maximum amount of liquidated damages for the whole of the Works is 10 Percent of the final Contract Price.
GCC 56.1	The Bonus for the whole of the Works is <b>0.05 Percent per day</b> . The maximum amount of Bonus for the whole of the Works is <b>NPR 1, 00,000 of the final Contract Price</b> .
GCC 57.1	The Advance Payments shall be: <b>15% and shall be paid in two equal installments</b>

	<p>and to the Contractor.</p> <p><b>First 5% shall be paid within 7 days of contract agreement</b> date after submitting responsive work schedule.</p> <p><b>Another 10% after approval of materials by engineer of major construction material</b> and contractor materials procurement process is started; and submission of insurance policies and certificates as per GCC 19.1 of SCC.</p>
GCC 57.3	<p>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 40 % 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 period.</p>
GCC 58.1	<p>The Performance Security <b>amount is: 5 %</b></p>
<b>G. Finishing the Contract</b>	
GCC 71.1	<p>The date by which operating and maintenance manuals are required is; <b>Before submission of final Running Bill</b></p>
GCC 71.2	<p>The date by which “as built” drawings are required is: <b>Together with final Running Bill</b></p> <p>The amount to be withheld for failing to produce “as built” drawings and/or Operating and maintenance manuals is: <b>NPR 1,00,000</b></p>
GCC 72.3 (i)	<p>The maximum number of days is: <b>90 Days</b>  <b>(The bidders need to submit the realistic time line required for the proposed works in the section below; Bidder’s Information Format. The methods, timeline and work process need to be included.</b></p>
GCC 80	<p>The Project Manager has to obtain the specific approval of the Employer for taking any of the following actions :</p> <ol style="list-style-type: none"> <li>a. Approving subcontracting of any part of the works under General Conditions of Contract Clause 13;</li> <li>b. Certifying additional costs determined under General Conditions of Contract Clause 50;</li> <li>c. Determining start date under General Conditions of Contract Clause 1;</li> <li>d. Determining the extension of the intended Completion Date under General Conditions of Contract Clause 35;</li> <li>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.</li> <li>f. Adjustment of rates under General Conditions of Contract Clause 45;</li> </ol>

# Letter of Intent

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 ..... *[insert amount in figures and words in Nepalese Rupees]* as corrected and modified in accordance with the Instructions to Bidders is hereby selected as substantially responsive lowest evaluated bid.

Authorized Signature: .....

Name: ... ..

Title: .....

CC:

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

## Letter of Acceptance

Date: .....

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

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

This is to notify that your Bid dated .....*date* .....for execution of the.....*name of the contract and identification number, as given in the Contract Data/SCC* ..... for the Contract price of Nepalese Rupees [*insert amount in figures and words in Nepalese Rupees*], 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 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
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

## Performance Security

(On letterhead paper of the Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law)

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

Beneficiary: ..... Name and Address of Employer .....

Date: .....

Performance Guarantee No.:.....

We have been informed that ... .. *[insert name of the Contractor]* (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 .....*[insert name of the currency and amount in figures\*]* (... .. *insert 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.....Day of .....  
\*\*, and any demand for payment under it must be received by us at this office on or before that date.

.....

*Seal of Bank and Signature(s)*

## **Advance Payment Security**

**(On letterhead paper of the Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law)**

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

Beneficiary: .....*Name and address of employer*

Date : .....

Advance Payment Guarantee No.....

We have been informed that .....has entered into Contract No. .... *Name and Address of Employer*.....*name of the Contractor*.....(hereinafter called "the Contractor")..reference number of the Contract.....dated ..... with you, for the execution of ...contract and brief description of Works ..... (Herein after called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum..... name of the currency and amount in figures\*... (*... amount in words* .....) is to be made against an advance payment guarantee.

At the request of the Contractor, we..... *Name of the Bank* ..... hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of.....name of the currency and amount in figures\*..... (*..... 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 used the advance payment for purposes other than the costs of mobilization in respect of the Works.

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 ..... day of .....\*\*, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

.....  
Seal of Bank and Signature(s)