## INDEX

### ADDITIONAL CONDITIONS OF CONTRACT

*(Construction of Flood Lighting along Indo-Bangladesh Border in the state of Mizoram)*

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ADDITIONAL CONDITIONS OF CONTRACT (ACC)
FOR
CONSTRUCTION OF FLOOD LIGHTING
ALONG INDO-BANGLADESH BORDER
IN THE STATE OF MIZORAM

GENERAL

The following Additional Conditions of Contract shall form an integral part of the contract and be read in conjunction with General Conditions of Contract. If there are any provisions in these Additional Conditions of Contract, which are at variance with the provision of General Conditions of Contract, then provisions in this Additional Conditions of Contract shall take precedence over General Conditions of Contract.

(I) The work in general shall be carried out as per CPWD specification 1996 Vol. I to VI (Civil work)/2006/2007 New Delhi for electrical works updated with correction slips issued up to last date of submission of tender.

(II) For items not covered under CPWD specification, 1996 Vol. I to VI (Civil works)/CPWD specification 1994 (Electrical works) as above, the work shall be done as per latest relevant IS code of practice.

1.0 INTRODUCTION

Details of locations of construction sites are as under:-

(i) From BP 2338 (Silkar) to BP 2335 (Tablabagh), length = 15 KM
(ii) From BP 2338 (Silkar) to BP 2351 (Silsuri), length = 45 KM

The above location is accessible from Demagir. The place Demagiri is also called Tlabung and is about 352 KMs from Aizwal via Lunglei. Demagiri is connected by all weather motorable road from Silchar (Assam) – Aizwal – Lunglei – Demagiri road.

2.0 APPROACHES TO SITE

The proposed site for flood lighting falls on Indo-Bangladesh Border area in the State of Mizoram.

The Karnaphulli River and Harina Nala flowing from South to North are forming the Indo-Bangladesh Border in part of proposed stretch and is also coming across while approaching to site. The terrain of this stretch is hilly with rugged dense forest and falls under heavy rain fall area. The Karnaphulli is a perennial river and there is no bridge over this river. There is no bridge over Harina Nala also.
The contractor is to visit the site prior to submission of this offer expected of visiting the site as per Clause No. 6 of General Conditions of Contract. The Contractor shall be deemed to have full knowledge of site, whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise on any account whatsoever shall be allowed.

Since there is no bridge over Karnaphulli & Hairna Nala, the Contractor shall provide and maintain Ferry and/or suitable mode of arrangements required to transport the construction materials, equipments and other items etc. across the Karnaphulli / Harina Nala to the construction site. The Ferry or any other mode of transportation to be adopted across the river / Nala shall be of sufficient capacity and required numbers to cope up with the requirements of manpower, material and equipment etc. consistence with the requirement of work schedule and ensuring completeness of the total scope of work in all respect and aspect within the schedule time of completion. Such Ferrying or any other arrangement resorted to must meet all requirement of safety codes as applicable in the given situations and prevailing condition and shall be approved by Engineer-in-charge of EPI. The cost of such transportation arrangements made by the contractor including its running and maintenance cost etc. are deemed to be included in the price quoted by Contractor.

3.0 SCOPE OF WORK

The scope of work are generally covered but not limited to in this tender are as follows:-

Construction of flood lighting using Flood light poles, luminaries, lamps, cables, panel boards and sub-stations etc. as per Bill of Quantities, specifications, drawings, instructions/orders issued to the contractor from time to time during the entire pendency of work till completion of all obligations as per ambit of the contract.

3.1 The contractor, after installation, testing and successful commissioning of the complete flood lighting installations as per the scope of work of the contract, shall be required to run, operate and maintain the same for a period of 15 days from the date of commissioning and handing over of the entire flood lighting installations in totality. On satisfactory completion of the work in all respect and aspect as per the provisions of the contract specially in all aspect with respect to specifications and technical conditions stipulated there in the contract and thereafter satisfactory performance as per the contract during and after the trial run period of 15 days of the entire flood lighting installations, then the Engineer-In-Charge at his discretion may declare the installation to be put into continuous beneficial use from such date as decided by the Engineer-in-charge after the trial run is over. However, if the trial run in the opinion of Engineer-In-Charge is not found satisfactory for any reason whatsoever, then the period of trial run will be automatically get extended till satisfactory trial run performance of the entire
Flood Lighting System for the specified duration on continuous basis is established and accepted by Engineer-In-Charge.

3.2 The contractor shall provide all kinds of assistance as and when required to EPI during handing over the Flood Lighting & allied works after satisfactory completion as mentioned at Sl.no. 3.1 to the designated agency nominated by Ministry of Home Affairs. In case the quality at any point of time is found not as per specification or deficiencies are found, the contractor will get it rectified at its own cost without any extra cost whatsoever to EPI.

4.0 PRIORITY OF WORKS

If during the course of execution of work, EPI / MHA / BSF fixes priority of execution of work / fixes priority of execution of flood lighting, the contractor has to deploy resources and plan the work accordingly & nothing extra shall be payable to the contractor on this account.

5.0 SALES TAX ON WORKS & TURNOVER TAX

The liability of payment of sales tax on works contract, Turnover Tax, Service tax, Building & Construction Labour cess or similar any other tax including VAT shall be to the contractor’s account and tax deductions at source shall be made as per laws prevalent in the state.

It will be incumbent upon the contractor to obtain a registration certificate as a dealer under the Local Sales Tax Act and the Central Sales Tax Act and the Contractor shall furnish to EPI necessary evidence in original to this effect. Sales Tax on the transactions between the Contractor and his Sub-contractor / Vendors etc. shall not be reimbursed by EPI.

6.0 HANDING OVER OF SITE

The site of the work is located in border area part of which may not be accessible at all the times. The bidder is to visit the site and to ascertain by themselves the working, security logistics and other constraints at site. Although as indicated by Border Security Force, the user of Flood Lighting, the land is available. However, the handing over the sites for total stretch may not be possible in one go.

The contractor to note that area for construction work may be handed over in phases as per availability the work is required to be carried out in constrained situations and nothing extra shall be payable to the contractor. It should be clearly understood that the owner / EPI shall not considered any other compensation whatsoever towards idleness of contractors labour, equipment etc.
The efforts will be made by the EPI to handover the site to the contractor expeditiously on availability. However in case of any delay in handing over the site to the contractor due to any force majeure, security, inaccessibility problem, it should be clearly understood that the EPI shall not consider any revision in contract price or any other compensation whatsoever viz. Towards idleness of contractors labour equipment etc. due any reason whatsoever and decision of EPI engineer in charge shall be final and binding on the contractor.

The contractor have to make his own arrangement for all kinds of approach to work site including borrow / disposal area and for movement of men, materials, machineries, other equipment etc. as may be required to execute and complete the total work in all respect and aspect for carrying out the work under this contract.

The access roads/ path or any other mode required to reach to the work site may or may not be available. The contractor shall accordingly plan his works as per the availability of access roads/ path to site and shall not construed non execution of work or non compliance with the required progress of work or any other aspect or respect with work for any reason at any point of time for non availability of access road/path to site. All drainage of works area and all weather truck able/ haulage roads as required shall be constructed and maintained by the contractor at his own cost for the entire duration of the period till all obligations and responsibilities are fulfilled/discharged in all respect and aspect as per the ambit of the contract without any extra claim to EPI on any account whatsoever.

**7.0 NO EXTRA OR ADDITIONAL AMOUNT ADMISSIBLE**

The price quoted by the contractor shall remain firm and fixed for entire tenure of the contract period as well as extended period till completion/discharge of all obligations in all respect and aspect as stipulated and covered as per the ambit of the contract of completion of works. No additional or extra claim on any account and ground whatsoever for any price variation / escalation shall be entertained at any stage till discharge of all obligations and responsibilities as per the scope of work and ambit of contractual stipulations in totality and in all respect and aspect.

The prices to be tendered are for completed and finished items of works and complete in all respects and aspect for completion of work of the entire contract in totality duly accepted by EPI and its client. All constructional plant, labour, supervision, materials, transport, all temporary works, erection, maintenance, contractor's profit and establishment / overheads, together with preparation of designs drawings pertaining to casting yard (as required) are included in the price quoted by the tenderer. Staging, form work, stacking yard, etc. all general risk, taxes, royalty, duties, cess, octroi and other levies, insurance liabilities and obligations set out or implied in the tender documents and contract or required to complete the entire work in all respect and aspect within the stipulated completion time frame will be considered to be included in
the price quoted by the tenderer and no extra payment whatsoever on this account for any reasons will be entertained at any point of time by EPI.

No extra or additional amount over and above the total quoted price will be admissible on any account whatsoever in any respect or aspect or for any reason. Total price quoted will remain firm and fixed and free from any kind of escalation and variation without any kind of extra or additional amount on any account whatsoever in any respect or aspect or else otherwise during the entire tenure of the contract and till completion and discharge of all the obligations and responsibilities as per the scope of work and ambit of the contract in totality and in all respect, aspect and means.

Any kind of addition and / or deviation and / or changes and / or modifications whatsoever in nature and in any respect and aspect which may be required to complete the entire work in all respect and in totality at any point of time till all responsibilities are discharged as per the contract in full to the satisfaction of EPI and / or its client, the same will carried out and executed by the contractor at no extra cost to EPI on any account and / or manner and / or whatsoever within the stipulated completion time frame of the contract.

8.0 BILL OF QUANTITY:

Quantities mentioned in the Bill of quantity are minimum and tentative and indicative. Bidders are required to thoroughly visit the site and assess the required quantities of each items necessary to complete the work in all respect & aspect in totality as required.

It will be considered & constituted that bidder have thoroughly inspected and assessed all the requirements of all items necessary to complete the job in all respect and aspect and only after this, they have submitted this offer.

The prices to be quoted are for completed & finished items of works & complete in all respect aspect for completion of work of the entire contract in totality.

9.0 MOBILIZATION OF MEN, MATERIAL & MACHINERY

Further to Clause No. 11.0 for “Mobilization of Men, Material & Machinery” of General Conditions of Contract, it shall be contractor’s responsibility to arrange, operate & maintain the total station instrument and its accessories at his own cost to carry out levels (including initial & final levels of earth work), dimensions and alignment of all parts of the works.

Contractor shall provide Bench Marks and other reference points for the proper execution work and these shall be preserved till the end of work.
10.0 COMPLETION TIME

The entire scope of work covered under this contract shall be completed within 12 (twelve) calendar months and the date of start of the contract shall be reckoned 10 (ten) days from the date of issue of Letter of Intent (LOI) / award letter. The completion time of 12 (twelve) months includes monsoon/ rainy season coming during the currency of the contract. The work shall be performed in time. The contractor shall have to plan and mobilise all the required resources and inputs in advance to ensure achievement of the required targets. The bidder is to submit a detailed plan of execution of each individual site activity showing completion of the each activity in a coordinated manner establishing completion of the entire work in all respect and aspect within the stipulated time frame in a bar chart and also submit the plan of augmentation and mobilisation of each and all the input resources including manpower, machineries, supply of items and all other items required to complete the work in totality commensurating with the execution work plan (bar chart) along with the offer. Please note that offer without submission or incomplete submission of the above documents will be liable for rejection.

Within 10(ten) days of date of letter of Intent, the contractor shall submit a Time and Progress Chart (CPM/PERT/Quantified Bar Chart) along with a detailed plan and programme of all the input resources commensurating with the various activities to be executed and get it approved by the Engineer-in-charge. The chart shall be prepared in direct relation to the time stated in the contract documents for completion of items / scope of the work. It shall clearly stipulate the forecast of milestones for the dates of commencement and completion of various items, sections of the work and may be amended as necessary by agreement between the Engineer-in-charge and the contractor within the limitations of time imposed in the contract documents, to ensure required progress during the execution of the work. The physical report including photographs shall be submitted by the contractor on the prescribed format & at regular intervals (both weekly as well as monthly) as decided by the Engineer-in-charge. The contractor shall also furnish along with Bar Chart, the methodology of construction, details of all equipment, manpower, machineries etc. required along with the date by which the equipment will be available at the site of work in working condition. All the activities shall be performed and completed strictly in accordance with approved work schedule.

The Engineer-in-charge, shall however, have the right to review the progress and modify the work schedule suit the site conditions and the contractor shall be required to complete the work in accordance thereof without any extra cost whatsoever to the Owner / EPI.

11.0 SITE LABORATORY

11.1 As part of the contract the contractor shall establish and maintain a site laboratory for the testing of construction material under the direction and
general supervision of Engineer-in-charge. The laboratory room shall be constructed and installed with the required and appropriate facilities. Temperature and humidity controls shall be made available wherever necessary during the testing of samples.

All equipments as required shall be provided by the contractor so as to be compatible with the testing requirements specified. The contractor shall maintain the equipment in good working conditions for the duration of the contract.

The Contractor shall provide approved qualified personnel to run the laboratory for the duration of the contract. The number of staff and equipment available must at all times be sufficient to keep pace with the sampling and testing programme as required by Engineer-in-charge.

The contractor shall fully service the site laboratory and shall supply every thing necessary for its proper functioning including all transport needed to move equipment and samples to and from sampling points on the site etc.

The contractor shall re–calibrate all measuring devices whenever so required by the Engineer-in-charge and shall submit the results of such measurements without delay.

12.0 TEMPORARY WORKS

12.1 Further to Clause no. 82.00 for “Approval of temporary / Enabling works” of General Condition of contract, as far as possible the labour hutments, bulk storage facilities and vehicle parking shall preferably be located near the existing Border Out Post of Border Security Force. The area near BOP’s locations shall be levelled and developed, supply of water and electricity, construction of approach road to these camps shall be arranged by the contractor at his own cost. In case the land in the vicinity of BOP is not of Govt., the contractor may have to hire the land from the owner of the land. The rent / lease amount shall be borne by contractor.

13.0 PLANT & MACHINERY

The contractor at his own cost shall arrange all Plant & machinery required for execution of work. The contractor has to deploy the following minimum Plant & machinery at site immediately after award of work: -

<table>
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<tr>
<th>S.N.</th>
<th>Description</th>
<th>Minimum Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Excavator</td>
<td>One</td>
</tr>
<tr>
<td>2</td>
<td>Tipper/Dumper/Truck</td>
<td>Three</td>
</tr>
</tbody>
</table>
3. Water Tanker  
4. Earth Tester/Magger  
5. DG set (63KVA)  
6. Insulation Testing Magger (1000 volts)  
7. Crimping Tools  
8. Aluminium Ladder (10 Mtr. Height)  
10. Drill Machines (Light & Heavy Duty)  
11. Mixer Machines

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFFICE WITH FACILITIES - The contractor shall provide office with following facilities till defect liability period.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A ACCOMMODATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Furnished office accommodation with one conference room at one or more locations (maximum two locations) as per direction of Engineer-in-charge with basis amenities like two toilets with water borne flushing system and septic tank and soak pit arrangement, Drinking water arrangement, lights, other facilities for all seasons for EPI Engineer &amp; staff &amp; maintenance of it till Defect Liability Period.</td>
<td>Sq.ft.</td>
<td>1000</td>
</tr>
</tbody>
</table>

**Note:**

a) Any other equipment for site test as outlined in CPWD/BIS specification and as directed by the Engineer-in-charge.

b) The quantities of equipments indicated are tentative and can be increased as per the requirement of work or as per the direction of Engineer-in-charge. The above equipment list is indicative and not complete. The contractor has to deploy all the required equipment to complete all the works within stipulated specifications & time period as per contract documents.

c) The contractor will not be allowed to take out equipments from the site without the written permission of Engineer-in-charge.

### 14.0 FACILITIES

The sub-clause 28.3 of the clause no. 28 of General Conditions of Contract (GCC) for Furnished Office Accommodation & Mobility and Communication to be provided by Contractor to EPI shall be replaced and read as under:

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFFICE WITH FACILITIES - The contractor shall provide office with following facilities till defect liability period.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A ACCOMMODATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Furnished office accommodation with one conference room at one or more locations (maximum two locations) as per direction of Engineer-in-charge with basis amenities like two toilets with water borne flushing system and septic tank and soak pit arrangement, Drinking water arrangement, lights, other facilities for all seasons for EPI Engineer &amp; staff &amp; maintenance of it till Defect Liability Period.</td>
<td>Sq.ft.</td>
<td>1000</td>
</tr>
</tbody>
</table>
(ii) Two bed room reasonably furnished transit accommodation at one location near site during contract period. Location shall be decided by Engineer-in-charge.

**In case of non-compliance of above clause no. A recovery will be made from the bills as per actual.**

### B  FURNITURE

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office tables &amp; Chairs (Sr. Executive) at each location</td>
<td>1</td>
</tr>
<tr>
<td>Office tables at each location</td>
<td>2</td>
</tr>
<tr>
<td>Office chairs at each location</td>
<td>12</td>
</tr>
<tr>
<td>Steel almirah at each location</td>
<td>1</td>
</tr>
<tr>
<td>File cabinet at each location</td>
<td>1</td>
</tr>
</tbody>
</table>

**In case of non-compliance of above clause no. B recovery will be made from the bills as per actual.**

### C  OFFICE EQUIPMENT

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Fax Machine at one location as decided by Engineer-in-charge.</td>
<td>1</td>
</tr>
<tr>
<td>ii) <strong>Computer</strong> (Pentium-IV, office edition) with minimum 160GB HDD, 1GB memory, latest version of softwares like MS-Project, Windows, MS-Office etc along with one small portable generator set of sufficient capacity to run the computer and lighting arrangement and one computer operator shall be provided by the Contractor at his own cost at any one location decided by Engineer-in-charge.</td>
<td>1</td>
</tr>
<tr>
<td>iii) DELL/SONY/HP Make Laptop 2GM RAM, 320 GB HDD, latest version of software like MS Project, Windows, MS Projects with internet facility &amp; running cost of internet.</td>
<td>1</td>
</tr>
<tr>
<td>iv) Laser printer or any other printer of equivalent amount A3 size at one location as decided by Engineer-in-charge.</td>
<td>1</td>
</tr>
<tr>
<td>v) <strong>Refrigerator</strong> (165L) at one location as decided by Engineer-in-charge.</td>
<td>1</td>
</tr>
<tr>
<td>vi) <strong>RO</strong> (Drinking water) or any other gadget of equivalent cost at each location.</td>
<td>1</td>
</tr>
<tr>
<td>vii) <strong>Photocopy machine</strong> (CANON NP 3050 OR equivalent model) or any other gadget of equivalent cost as decided by Engineering-in-charge.</td>
<td>1</td>
</tr>
<tr>
<td>viii) <strong>Digital Camera</strong>: Sony make Digital still camera 10.0 Mega Pixel W-series 3 X optical zoom cyber shot (Black)</td>
<td>2</td>
</tr>
</tbody>
</table>
or any other gadget of equivalent cost as decided by Engineer-in-charge.

ix) **Consumables**: All consumables like stationary, ink etc. shall be provided by Tenderer till end of defect liability period. (Stationery items are inclusive of visiting cards, rubber stamps, letter pads, photocopies papers & other items of daily office use). Amount shall be restricted to Rs. 10,000/- per month.

**In case of non-compliance of above clause no. C recovery will be made from the bills as per actual.**

### D CONVEYANCE

Conveyance: Vehicle (Brand New) four wheel drive Scorpio DX / Xylo vehicle or equivalent with Driver and accessories valuing Rs. 30,000/- each vehicle. In case of break-down, contractor shall make alternate arrangements immediately failing which Engineer-in-charge will hire similar type vehicle and debit cost to contractor’s account.

**In case of non-compliance of above clause no. D recovery @ Rs. 55,000/- / per month will be made from the bills.**

### E OTHER FACILITIES

i) Telephone with STD facilities and instruments
   a) Office telephone (fixed line) No. 1
   b) Mobile phone Nos. 3

The cost of each Mobile phone instrument shall be restricted to Rs. 6,000/-

ii) Full time one Office boy / Tea boy at each BOP location decided by Engineer-in-charge. Nos. 1

**In case of non-compliance of above clause no. E recovery will be made from the bills as per actual.**

All the above, facilities are temporary in nature and shall be the property of the contractor. Contractor till defect liability period at his own cost will maintain the above facilities including its running costs / maintenance cost. Engineer-In-Charge shall return to contractor when he (Engineer In Charge) does not require these facilities further. The contractor shall be responsible for watch & ward of the vehicles and other facilities
etc. In case of theft / damage, the contractor shall replace the same within a maximum period of one week.

15.0 PAYMENT ON ACCOUNT

Further to Clause No. 37.00 General Conditions of Contract, the payments shall be released, out of the funds received from Govt. of India on deposit works basis for the project.

Measurements of work carried out by contractors shall be recorded in the measurement books by Site Engineer. The measurement books shall be the basis of all accounts of quantities of work done.

16.0 ANTI MALARIA MEASURES

16.1 The contractor shall at his own expenses make necessary arrangement for undertaking anti-malaria measures as prescribed by Local Health Authorities or as directed by Engineer-in-charge.

17.0 SECURITY & SAFETY

17.1 The site is located near Indo-Bangladesh Border (IBB) wherein the movement of personnel is limited and regulated by Security agencies. The contractor has to work as per the permission given by these Security agencies from time to time and contractor must check before quoting for this job, the working hours, restriction in working and safety of their manpower, plant & equipment. The contractor shall mobilize and organize his resources accordingly to complete the work within stipulated time. The contractor shall have no claim on MHA/EPI or any other agency/ department for any loss of man hours/ machinery due to these restrictions/ regulations.

17.2 A general Security cover shall be provided by BSF/ State Police and payment of Security charges, if any demanded by BSF/ State Police authorities shall be borne by MHA / EPI. However, the contractor shall make his own arrangements for Security and safety of his manpower, plant & equipment, materials etc. Nothing extra shall be admissible on account of this and no compensation shall be paid by MHA/ EPI in case the contractor’s personnel suffer body injury, loss of life or any damages caused to the plant and machinery of the contractor.

18.0 LAND AQUISITION

18.1 The contractor should note that the alignment of Flood Lighting falls in agriculture land area / forest area. The contractor shall be responsible for obtaining necessary approvals for acquisition of land and all required clearance
from Department of Forest / State Government departments / Local Authority for carrying out construction of Flood Lighting & related work.

19.0 DEFECTS LIABILITY PERIOD:

19.1 Further to clause no. 74.0 of General Conditions of contract, the contractor shall be responsible for rectification of all kinds of defects brought to his notice by Engineer-In-Charge, EPI till 12 months after successful completion / discharge of all responsibilities as per the contract, handing over of the total work after successful trial run and put into continuous operation and upon submission of PCR whichever is later.

In case Ministry of Home Affairs appoints an independent and impartial inspection Agency to be called as Third Party Inspection Agency, the contractor shall provide all assistance help / provide all the required input as to the Third Party Inspection Agency to carry out the functions assigned to them, if any defects is pointed out in respect of the executed work or found that the quality of work at any point of time is unsatisfactory as per specification, standards etc. & quality at any point is not found as per specification, the contractor will immediately rectify the same at its own cost without any extra cost to EPI.

20.0 COMPENSATION FOR DELAY

20.1 The contractor shall ensure adequate progress during the execution of work according to the bar-chart/ work schedule. The contractor shall also maintain monthly progress strictly in accordance with bar chart/ detailed work schedule that will be worked out and mutually agreed upon. The contractor shall be liable to the liquidated damages in case the work is delayed by the Contractor beyond the agreed time schedule due to the reasons solely attributable to Contractor. The liquidated damages shall be 2% (two percent only) of the balance value of work for each month of delay beyond stipulated time of completion as envisaged in Contract / Agreement / LOI subject to a maximum of 10% (ten percent) of the balance value of work.

In addition to above, the Contractor shall also compensate EPI to the tune of Rs. 50,000/- (Rupees Fifty Thousand only) per month towards extra expenditure on establishment of EPI for extended period of the job, if the delay is due to reasons solely attributable to the Contractor.

After evaluation of the price analysis, EPI may require amount of performance guarantee be increased at the expense of the contractor to the level sufficient to protect Owner/ EPI against financial loss in the event of default by the contractor, the same has to be complied with by contractor at his own cost without any extra cost whatsoever to EPI.
21.0 Final Bill

The final bill will be submitted by the contractor within 90 days from the date of acceptance of completion of work accompanied by the following documents:

a) Completion of work issued by the Engineer-in-charge specifying the handing over of the work including list of inventories (fittings & fixtures).
b) Computerized stage wise payment schedule.
c) No claim certificate by the contractor.
d) No claim certificate from the sub-agencies / vendors, if any, engaged by the contractor.
e) ‘As built’ drawing
f) Measurement books.
g) Drawings for layout of underground cables and details showing location of sluice valves, electric cable joints etc.
h) All operation and maintenance manuals.
i) All statutory approvals from various State / Central Govt./ Local bodies/ BSF, if required for completion & handing over of the work as included in scope of contractor.
j) Manufacture’s guarantee of various machines / equipments installed as part of works.

22.0 Modifications of Clause No. 76.0 of General Conditions of Contract (GCC)

22.1 Clause No. 76.1 of GCC : Deleted

22.2 Clause No. 76.2: Arbitration between Central Public Sector Enterprises inter se/Government of India Departments/Ministries

I) In the event of any dispute or difference relating to the interpretation and application of the provisions of the contract, such dispute or difference shall be referred by either party to the arbitration as per the instructions (Office Memorandum / Circulars) issued by Govt. of India from time to time with regard to arbitration between one Government Department and another, one Government Department and a Public Sector Enterprise and Public Sector Enterprise inter se.

II) Subject to any amendment that may be carried out by the Government of India from time to time, the procedure to be followed in the arbitration shall be as is contained in D.O. No. DPE/4/(10/2001-PMA-GL-1 dated 22.01.2004 of Department of Public Enterprises, Ministry of Heavy Industries and Public Enterprises, Government of India or any modification issued in this regard.
23. **CLAUSE NO. 76.3 JURISDICTION**

The Courts in Delhi / New Delhi alone will have jurisdiction to deal with matters arising from the Contract, to the exclusion of all other courts.

24. **ALTERATION IN SPECIFICATION, DESIGN AND DRAWING**

The Engineer-In-Charge shall have power to make any alterations in, omissions from, additions to or substitutions for, the original Specifications, Drawings, Designs and Instructions that may appear to him to be necessary during the progress of the work, and the contractor shall carry out the work in accordance with any such instructions which may be given to him in writing signed by the Engineer-In-Charge and such alterations, omissions, additions or substitutions shall not invalidate the contract any means or ways and any altered, additional or substituted work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same terms and conditions and within the same price of the contract without any extra cost to EPI on any account and in any respect / aspect whatsoever in all respects on which he agreed to do the main work.

25.0 **MATERIAL / EQUIPMENTS / ITEM TO BE USED FOR FLOOD LIGHTING WORK**

The materials are to be used on the works from the list of the preferred makes / brands given in the tender documents. In case the contractor intends, the contractor shall submit samples / specifications out of approved makes of materials / products to the engineer in charge for prior approval. In exceptional circumstances engineer in charge may allow alternate equivalent makes / brands of products / materials at his sole discretion. The final choice of brand / make shall remain with the engineer in charge, whose decision in the matter shall be final and binding and nothing extra on this account shall be payable to the contractor.

In case single brand / make are mentioned other equivalent makes brands may be considered by the engineer in charge with prior approval. In case of variance in CPWD / IS specification from approved products makes specification, the specification of approved products make shall prevail for which nothing shall be paid extra to the contractor.
26.0 OTHER CONDITIONS

It is mandatory on part of the contractor to provide safety equipment and gadgets to its all workers, supervisors and technical staffs engaged for the execution of the work. The above equipment and gadgets shall also be provided to EPI by the contractor at his own cost for use of EPI officials and / or workforce.

While working / supervision at site, no staff / worker shall be allowed to enter the site without these equipments / gadgets.

The cost of the above equipments / gadgets shall be included in the price quoted by the contractor for the items & works as per bill of Quantities and contractor shall not be entitled for any extra cost whatsoever in these regard. The above norm is to be strictly complied with at site. In case the contractor is found to be deficient in providing safety equipment / gadgets in the opinion of engineer-in-charge, the engineer in charge at his discretion can procure the same at the risk & cost of contractor and provide the same for use at work site and expenditure incurred towards such procurement shall be recovered from the 1st available bills of the contractor for the same. The decision of the engineer-in-charge shall be final and binding on contractor in this regard.

The contractor has to do all kinds of site clearance, enabling work, barricading, shifting / realignment of existing utility services etc. as required at his own cost and the contractor shall not be entitled for any extra payment whatsoever in this regard.

The contractor should note that this project falls in the forest area, which is governed by Forest Conservation Act 1980. The contractor shall be responsible for obtaining all the approvals from the respective forest authorities to meet the requirements of Forest Conservation Act 1980 or any other applicable Act.

The Ministry of Home Affairs (Govt. of India) has got one-time permission from Ministry of Environment & Forest (Govt. of India) for construction of fencing and patrolling road work for which purpose a strip of 8 to 10 feet width for fencing and 10 to 12 feet width for patrolling road is allowed subject to following conditions.

i) That the project has been specifically approved by the High Level Empowered Committee set up for sanctioning such project in the MHA and intimation of the same has already been sent to the Ministry of Environment and Forest.

ii) That the Forest Department will establishment forest check posts along the roads wherever required in order to prevent illegal movements of forest produce along with international border.
iii) The forest staff shall be included in the joint patrolling program by the BSF and other such agencies manning the border in order to protect the forest beyond the fencing point up to international border. For this purpose a Committee should be constituted at the level of Territorial Divisional Forest Officer to plan and monitor the forest protection activities.

The contractor should restrict its working movement of vehicles, manpower execution of works etc. within the allowed strip and should not damage forestry / trees beyond this allowable strip.

The contractor’s price should include for above provisions and nothing extra beyond the contract price shall be payable in this regard.
SPECIFICATIONS

1. The excavation of trenches for cable laying is to be done below the embankment only, where other agencies shall also be carrying out other activities of fencing work and road construction. In view of this, contractor has to carry out excavation of trenches in a fixed time frame and close coordination with other contractors executing the road and fencing work in the same area. It will be the responsibility of the contractor to carry out the excavation of trenches within targeted period utilizing all required resources.

2. Contractor shall make his own arrangement for watch & ward safety of his men and materials and nothing extra shall be paid by the EPI of this account. Contractor shall also be responsible for the safe custody of materials issued to him by the EPI till such time the work is completed and unused balance materials are handed over back to the department. Nothing extra shall be paid to the contractor on this account.

3. The contractor and his men shall have to abide by the security instructions of BSF authorities. No claim of idle labour or any other claim on this account shall be entertained by the department. The normal working time shall be dawn to dusk, but the department shall not entertain any claim from contractor for extra payment on account of any change in working hours or for extended hours of working.

4. The contractor himself at his own cost will arrange water and electricity required for execution of work and labour etc. including temporary accommodation for them and nothing extra shall be paid on this account.

5. Contractor are advised to unroll / jack the cable drums properly at the time of laying of cable so that the cables are not damaged. UG Cable of size specified in the schedule of material shall be procured in standard drum lengths of 250/500/555 meters approximately.

6. Empty cable drum (wooden) and assorted wooden packing boxes of fitting etc. shall be the property of the contractor after completion of work and such property shall be removed by the contractor within two weeks of the physical completion of works.

7. The contractor will be required to clear shrub / trees etc. falling on the route for which no extra payment will be made and necessary permission from concerned department shall also be arranged by the agency, for which no extra payment shall be made.
8. The contractor will have to maintain proper alignment of poles, focus and flood light luminaries as per illumination level requirements and for this nothing extra shall be paid.

9. All the associated works considered necessary for completion of whole work including any preliminary works are deemed to be included within the scope of the tender.

10. The installation shall be varied out in conformity with the local fire regulations & rules there under wherever they are in force and the provisions in local bylaws, if any.

11. The contractor shall have to maintain the installation in good working condition at his own cost, for a period of one year from the date, from which installations are put into continuous beneficial use, Nothing extra shall be paid on this account to the contractor. Replacement of all consumables such as MCBs, genitor, condenser, ballast, HRC fuses, fuse bases, and all switchgears of LT panel, Essential panel, MTF, SFP required for replacement shall be done by the agency free of cost for which nothing extra shall be paid. For this purpose, the contractor is advised to depute licensed wireman for carrying out the repairs / preventive maintenance and also stock sufficient consumables. All faults in the UG cables shall be attended promptly by the contractors and restored in service by replacing the faulty cable / jointing of the cable of the UG cable. (In this regard the decision of Engineer-in-charge shall be final and binding) for a period of one year from the date from which the complete installation are put into continues beneficial use. Noting extra shall be paid to the contractor for this. The flood lighting installations / fittings should not remain out of service for not more than 48 hours for want of consumables / spares. Failure to restore the individual fitting / installations within 48 hours shall attract penalty @ Rs. 50/- per fitting per day with effect from the date; it became defective / went out of service.

12. Operation of DG sets and maintenance of flood lighting :- For a period of one year from the date of actual commissioning.

a) The contractor would be required to operate and carryout routine maintenance of the DG sets located at specified Sub-Stations along Indo Bangladesh Border during night hours.

b) The firm has to depute technically qualified / licensed operational staff.

c) The operator / staff provided should be well conversant with the systems installed and should be knowledgeable to attend the minor defects. The operator must have a pair of uniforms to be supplied by the contractor and colour will be as per the decision of the Engineer-in-charge.

d) DG set rooms as well as all kind of installations should be kept neat & clean.
e) Before start of engine all the parameters like diesel oil, lubricating oil, Battery water, coolant etc. should checked and any abnormality must be recorded in the Log Book.

f) Daily routine test run of each DG set for 10 minutes, on load shall be conducted to ensure proper and smooth function of DG sets.

g) Operation shall be carried out throughout the month including Sundays & Holidays.

h) Two Nos. DG sets are installed in each Sub-Station and both the DG sets must be run alternately.

i) After the work is awarded the firm would be required to furnish the name, father name, Local address and qualifications of the staff and other antecedent of the staff proposed to be employed by him for the job.

j) Agency will supply all spares and consumables of the DG set, for two hours of running of DG set per day.

k) The firm should submit monthly fuel consumption statement bas per the Logbook.

l) Any type of defects / minor /major faults/break down/malfunctioning of the system shall be brought to the notice of Engineer-in-charge, Incharge of the work immediately.

m) The department shall be doing any type of repairing / servicing work. However in case it is established that the fault has occurred due to negligence or inefficiency of the agency, the cost of such spares shall be recovered from the contractor’s bill. In this regard the decision of Engineer-in-charge will be final and binding on the contract.

n) Any defects / faults shall have to be identified and repaired to the satisfaction of Engineer-in-charge by the contractors for which nothing extra shall be paid on this account.

o) The contractor shall make his own arrangement during one year of operation for tools & plants.

p) The sundry materials like cotton waste, grease, distilled water for batteries and fuse wire required for the maintenance during one year of operation shall be arranged by the contractor within the amount quoted by him and no extra payment shall be made on this account.

q) The contractor shall take all safety precautions to avoid any accident during operation and maintenance. The contractor shall be solely responsible for damage of life / property in case of any accident. The department shall not entertain any claim on this account.

r) If the operator does not report for duty, then recovery shall be made from the bill @ Rs. 500/- per one duty cycle i.e. from 6.00PM to 6.00AM.

s) Firm has to dispute authorized representative for receiving the materials issued / supplied by the department for bonafide use of the work. The name of the authorized person shall be intimated to the Engineer-in-charge.

t) Firm has to attend and undertake all kinds of need-based repairs resulting from breakdowns or otherwise, through its own or authorized resources, at
site or at works; as the case may be. No additional cost of transformation will be allowed.

u) Firm has to provide technical and engineer support for trouble free operation and maintenance of floodlights.

v) This scope of work is an integral part of the item and has to be strictly adhered to.

w) This is an indivisible works contract. The successful tenderer for the work, shall have to attend all equipments covered under the work on their own, irrespective of make of equipment.

x) All work sites are located in restricted zones along the Indo-Bangladesh border. Only persons with reliable integrity should be deployed. Any of the staff involved in any kind of unlawful activity shall be firm’s liability.

y) All the service personnel deployed at site shall be employees of the firm for all practical purposes. EPI shall not be responsible for any of their service matters.

13. The work shall be carried out as per CPWD general specifications for Electrical Works (Part-I) – Internal 2007, (Part-II) – External 1995, Sub-Stations-2007 (Part-IV) and CPWD specifications amended up to date, with any modification indication hereunder and in the schedule of quantities.

14. All T&P required for the execution of work including mounting of fittings on poles, painting of poles, digging trenches, handling of materials and testing of installations shall be arranged by the contractor at his own cost and after quoting the rate nothing extra shall be paid on this account.

15. The design ambient temperature for all electrical equipments shall be takes as 50°C.

16. All materials brought by the contractors for use on work shall be of good quality. The same has to be got approved from the Engineer-in-charge before use at work. After approval of the same, required quantities of poles, brackets and other materials will be brought at site for excavation of work. Any claim for excess / defective materials brought by the contractor and not approved by the Engineer-in-charge shall not be entertained.

17. The GI earth wire of 6 SWG shall be conforming to relevant I.S. specifications.

18. The item of supply, installation, Testing and commissioning of luminaries of the schedule of work includes of providing 2.5 sq.mm P.V.C. insulated copper conductor wire by the contractor. The wires / cables shall be purchased directly from the manufacturer or their authorized dealer and the documentary proof for the same shall be submitted at the time of approval.
19. Wherever more than one cable laid in the same trench, cable with LOWER size will be taken as main cable and other cables will be taken as additional cables in the same trench and will be measured accordingly.

20. The contractor shall have to get the Main LT Panel / Essential Panel fabricated from the approved manufacturers. (As per list of makes of Material)

21. The design and layout as well as strengthening members of the panel to be fabricated and supplied shall be as per the approved drawing / layout.

22. Depth of cable trenches for cable laying direct in ground is to be kept as specified in the specifications. Excavation soil is to be used as cushioning after that protective covering is to be approved. If required the extra earth (surplus earth) after back filling of the excavated trench / pole foundation is to be disposed beyond lead of road. Nothing extra shall be paid on this account.

23. The coarse sand shall be brought from local market. Mixture of concrete shall be new and such as to produce sound, compact, water proof concrete. It should be free from grit and dirt.

24. The locally available quality of bricks shall be acceptable. However, the same shall have to be got approved before use at work.

25. No deviation in specification mentioned shall be allowed.

26. On completion of the work, detailed drawings showing the details of equipment and wiring / cabling as installed shall be submitted in triplicate. Maintenance instructions and procedures shall also be submitted with the same.

27. Out of these, three sets, one shall be of the type which is suitably framed (size 60cm x 40cm) and the same shall be displayed on the well of the DG room at a prominent place for the use of the staff.


28.1 Drawings of the main control panel / main feeder pillars / sub- feeder pillar / essential panel / loop box poles/DG sets/ C.G. Box etc. shall be submitted within 15 days from stipulated date of commencement of work, through a technically competent and authorized person.

28.2 The EPI shall examine drawing and communication of approval of drawings shall be sent (by fax etc.) and will be handed over to the site representative.
28.3 The fabrication of the MLTP/EP/FP/S.F.P. shall be done as per the approved drawing.

28.4 The Engineer-in-charge or EPI authorized Quality Assurance Division’s / QA Representative, RO, New Delhi shall do inspection of the items of supply before they are dispatched to site of work. Copies of inspection certificates issued by EPI officers shall be attached with dispatched documents to consignee. The tenderer shall make all arrangements for inspection of the materials at factory.

28.5 Contractor shall arrange, before dispatch of the LT panels / feeder pillars, an inspection and certification from the authorized Engineer of the manufacturer of the SDFUs about the genuineness and the same shall be submitted to the engineer-in-charge along with inspection / test report prepared by the inspection officer authorized by Quality Assurance Division’s / QA Representative, RO, New Delhi of EPI.

28.6 Inspection of POLES – The firm shall get the poles & brackets inspected by the EPI after manufacturing of the same before painting and dispatch. The date, time and location for inspection should be intimated 10 days in advance for each lot. Clearance shall be issued by the Engineer-in-charge / Project Management Division, New Delhi on the basis of the report of the inspecting officer. The total quantity poles shall have to be completed in 4 months time in 3 to 4 lots, but not more than four as decided by Engineer-in-charge / Project Management Division, New Delhi on the basis of bar chart submitted by successful tenderer.

29. All the drawings specified and issued with the tender specifications are for the purpose of tendering only.

30. The work shall be done as per CPWD general specifications for Electrical Works-Part-IV (Sub stations as amended up to date) and Part-I Internal-2005 except that the general arrangement of the switchgears shall be as per the approved Drawing. Degree of protection shall be not less than IP 42. Cubical type switchboard shall be fabricated out of sheet steel or CRCA sheet not less than 2.00mm thick; wherever necessary such sheet steel members shall be stiffened by angle iron.

31. **Framework:** General constructions shall employ the principle of compartmentalization & segregation for each circuit. Multitier mounting or feeders is permissible. The general arrangement for multitier construction shall be such that the horizontal tiers should give a pleasing and aesthetic look. The general arrangement shall be got approved before fabrication. Cable entries for various feeders shall be either from the bottom through the cable alleys located in the panel. All cable entry shall be through gland plates. There shall be removable gland plate and provision for each cable entry should be so kept, that
there should not be any dislocation of already wired circuit when new feeders are added. The construction shall include necessary cable support for clamping the cable in the cable alley.

32. **Incomer Termination:-** Incomer termination shall be suitable for receiving underground cable.

33. **Instruments:-** All voltmeters and ammeters shall be flush mounted type size of 96 Sq.mm conforming to class 1.5 of IS 1248 for accuracy. All voltmeters shall be protected with HRC fuses.

34. **Indications Lamps:-** On all incomers of MV – Panels On/Off indicator (Pilot) lamps shall be provided suitable for operation on AC 230 volt supply. All lamps shall be protected by proper HRC fuses.

35. **Control Wiring:-** All small wiring controls, indication etc. shall be with suitable copper Conductor cables PVC insulated conforming to IS 1554 part-I wiring shall be suitably supported & clamped. Where wires are drawn through steel conduits, the work shall conform to CPWD General Specification from Electrical works (Part-I internal) 2005 &IS 732 as the case may be. Identification ferrules shall be at both ends of the wires. All control wiring meant for external connection are to be brought out on a terminal board.

36. All the main and distribution panel will be free standing, floor mounting, front operated, compartmentalized and segregated for each cubical in construction having multitier arrangement of the incomers and feeders as per detail given in the schedule of quantities. The panel shall have bottom cable entry (Gland plate) and a suitable size of bus chamber middle of the panel vertically or as approved by the Engineer-In-Charge as per requirement at site.

37. All the electrical components selected for constructing various modules of Main Panel / Essential Panel /MFP /SFP must have different ratings to perform the duty for which they required to do consistently, without any deterioration in their normal life and safety of the other equipments. However these ratings will not be lesser than ones specified in the items.

38. **General arrangement and layout:-** The height of the panel should be limited to handle etc. of the highest unit shall not be at a height more than 1700 mm. All the cables incoming to main L.T Panels will be entering from the bottom. For this purpose a removable gland plate will be provided at the bottom. A minimum distance of 250mm. will be provided between the gland plate and the nearest terminal for proper dressing and termination of the cable. All the components of module will be mounted on a component plate using the machine screws and
taped holes. (Except, the components mounted on the door). These components plate should be fixed with bolts for easy replacements.

39. **Fabrication:** The main L.T Panel will be metal clad, cubical in construction, freestanding, floor mounted, indoor type sheet metal enclosure. All the cubicles will be equipped with front located, outward opening; lockable doors having hidden wings and a bolted back cover both using non deteriorating neoprene rubber gaskets. The panel board will have structural frame made out of shapes Sheet steel or CRCA sheet 2.00 mm thick sheet to cover all the sides, top and bottom of the cubicles. The panel should be fabricated in a single length section. All the nuts and bolts, handles, meters, knobs, etc. appearing from outside of the rigidity the panel will be provided with a base frame made out of M.S. channel. All the hardwares used in the assembly will be electroplated. The compartmentalization of the cubicles shall be got down by MS sheet / 6mm thick FRP sheet as per requirement / approved drawing.

40. **Bus Bar:** The main busbar of the panel will be shaped out of high conductivity, electrically conductor grade, aluminium and with sufficient cross section to have a current density of 160Amp/ sq.cm (900Amp/sq.inch). The bus bar will be covered with **RED, YELLOW, BLUE AND BLACK** heat shrinking PVC sleeve throughout. The bus bar will run in a separate busbar chamber using bus insulators made of non-deteriorating, vermin proof, non hygroscopic materials such as epoxy fiber, reinforced polyester and the glazed porcelain.

Each vertical section of modules will be given power supply by using a set of complete enclosed vertical bus bars taping off from the main bus bars. These vertical bus bars will be of adequate size and rating to carry the full load current of all the modules. A minimum of 1.6 times the width of bus bars will be the lapping length of each joint.

Base frame of the cubical plane shall be made out of 100mm X 45mm X 4.8mm MS channel.

41. All iron works of control panels shall be powder painted at the works before dispatch to the site with two coats of anti corrosive primer paint / finishing of approved colures. However, further finishing if required after installation shall be done at site by the tenderer without any extra cost.

42. The powder painting for LT panel and essential panel shall have to be done after seven tank cleaning process.

43. Suitable numbers of removal gland plates of 2mm thick M.S sheet for incoming and outgoing cables in the base plate of panel to be provided.
44. **MAIN FEEDER PILLAR AND SUB FEEDER PILLAR**

44.1 Routine tests are recommended in the IS 8623/93 shall be conducted. Type tests however are not required.

44.2 **CONSTRUCTION:**- It shall be provided with two leaf door with suitable numbers of heavy duty outside hinges. The pillar shall be fabricated out of 2.00 mm thick MS sheet and doors on front and rear side shall be fitted with two numbers mechanical locking and one no. pad locking arrangement. The roof of the feeder pillar shall be front and back drip proof top fabricated from 3mm thick MS sheet. Arrangement for pad locking of doors shall be made in the centre of the door. All doors shall be provided with suitable door handles i.e feeder pillars should be openable from both fronts as well as from rear side. The general lay out has been shown for feeder pillars as per Drawing attached. Degree of protection shall be not less than IP 42.

44.3 The feeder pillars shall have a slopping canopy projecting out on all sides with suitable slopping channel on front for drainage of water.

44.4 Angle iron legs shall be suitably shaped at the bottom for anchoring in concrete base.

44.5 The feeder pillars shall be provided with Ventilation Window covered with wire net in double fold from inside. The window shall be provided on the both side of feeder pillars.

44.6 The feeder pillars shall be provided with a danger notice plate (As per CPWD specification for electrical works ,Part-I and Interal-1994.

44.7 Two sets of , 4nos. Aluminum bars to be provided as per drawing with sufficient drilling holes with nuts and bolts of galvanized or tinned shall be provided for incoming and out going connection with necessary thimbles/ lugs upto the size of 3.5 x 185 sq.mm U.G. cable.

44.8 All outgoings from MFP will go from 63 Amps. TPN SDF Unit. All necessary connections , inter-connections etc. shall be done by the contractor.

44.9 At the bottom phase of feeder pillars there should be suitable provision for cable entry/ provision for fixing cable gland and providing detachable gland plates etc. as required.

44.10 Two coats of anti-corrosive primer of approved brand and one quote of superior quality Aluminum paint of approved brand shall be provided after seven tank cleaning process.

44.11 For outgoing connections minimum 100 Amps. 4way terminal blocks shall be provided.

44.12 All the metal clad DIN type switch disconnector fuse (SDF) Units will be fixed on suitable size angle iron frame inside the feeder pillar.

44.13 Suitable size of bus bar chamber along with suitable Capacity aluminum bus bar as per schedule of work shall be provided.
44.14 Suitable size of neoprene rubber gasket shall be provided to make the complete MFP waterproofing.

45. **CONTROL GEAR BOX**

45.1 The work shall be done as per CPWD general specifications for Electrical Works-Part-IV-(Substations)-2007 as amended up to date and Part-I Internal (2005).

45.2 Control gear box shall be fabricated out of 1.6 mm thick M.S sheet. The front cover shall be single door type and suitably hinged with industrial hinges at the sides and provided with a handle to facilitate easy opening and closing of the cover and suitable locking arrangement with two nos. mechanical locks and one No. pad locking arrangement shall also be made. Suitable size of neoprene rubber gasket shall be provided to make the complete CG Box waterproofing. The whole box shall be pre treated, primer coated and two coats of finishing coat of aluminum paint.

45.3 The control gear box shall have suitable mounting arrangement for ease of installation at site and suitable for mounting on pole.

45.4 The control gear box shall be suitable to operate 4nos HPSV 250W lamps. The accessories like the ballast, Igniter, PF improvement capacitors, links etc. shall be mounted on and easily removable cassette type tray (4nos per CG Box) made out from 1.6 mm thick (minimum) M.S. hooks at the top and necessary clamps at the bottom. Suitable stiffening for strengthening shall be provided to the control gearbox and its cover.

45.5 The control gear box shall also house the followings : 4nos single pole ISI mark “C” class MCBs (Outgoing) of 6 amps rating and having rupturing capacity of 10KA conforming to IS 8828 to make it possible to isolate any individual lamp circuit during maintenance.

45.6 The internal-connections of all the accessories in CG Box are pre-wired with not less than 2.5 sq.mm PVC insulated copper conductor and tagged properly. In case of flexible copper the terminal wire should be round soldered finish or with proper thimbles.

45.7 One no. earthing terminal shall be provided of adequate size for earthing the box.

45.8 A 40 mm diameter hole shall be provided at the centre of the backside of CG Box to facilitate and fixing of the same and drawing of wires.

45.9 The circuit diagram shall be duly screen painted on the inside of the cover of the CG Box.

45.10 The ballasts, ignitors, and capacitors shall be fixed on the cassette plate and wired with adequate working space for easy removal of these components by the contractor.

45.11 The inter connection between CG Box & Loop Box will be done by 2 X 4sq.mmPVC insulated copper conductor wire.

45.12 4 nos. 30 Amps capacity multi way stud type terminal to be provided for connections.
45.13 Two nos. aluminum bus bars with suitable No. of holes shall be provided for receiving connections from Loop Box.
45.14 The fixing clamps of the CG Box to be fabricated from 40mm X 5mm M.S flat iron.
45.15 The contractor shall arrange the nuts and bolts required for fixing of CG Box.
45.16 Two nos. adequate sizes of earth terminals shall be provided.

46.0 LOOP BOX

46.1 The work shall be done as per CPWD general specification for Electrical Works Sub station (Part-IV)-2007 as amended up to date and Internal (Part-I) 2005.
46.2 The loop box shall be fabricated out of 1.6 mm thick M.S sheet. The front cover shall be suitably hinged at the side and provided with a handle at the side and provided with a handle to facilitate easy opening and closing of the cover and suitable locking arrangement and one No. pad locking shall also be provided. Suitable neoprene rubber gasket shall be provided to make the complete loop box waterproofing. The whole box shall be pre-treated, primer coated and two finished coat of Aluminum paint as approved by the Engineer-In-Charge.
46.3 The loop box shall have suitable mounting arrangement for ease of installation at site and suitable for mounting on pole of diameter 193.7 mm.
46.4 One number SPN ISI marked “C” class MCB outgoing of 16 Amps rating having a rupturing capacity not less than 10 KA confirming to ISI-8828 to make it possible to isolate the all lamps circuit during maintenance.
46.5 Suitable no. of holes for incoming and out going shall be provided at the bottom of the loop box suitable for cable glanding of
46.6 The loop box shall have four pieces of 100 Amps capacity Aluminum bus bars having necessary holes for incoming and out going connections of suitable numbers of cables.
46.7 Two numbers earthing terminals shall be provided of adequate size for earthing of the loop box.
46.8 The fixing clamp of the loop box to be fabricated from 40mm X 5mm M.S flat iron.
46.9 The contractor shall arrange the nuts and bolts required for fixing of loop box.
46.10 Painting the LT Panel shall be powder painted. Main feeder pillars, sub feeder pillars, CG Box and loop boxes shall be brush painted with approved shade of paint after two coats of anti corrosive paints and after standard seven tank cleaning process.

47.0 POLES

47.1 The steel tubular poles to be supplied shall be swaged type and shall confirm to IS specification No.2713-1980 Part I,II amended up to date. The designation of the poles required is 410 –SP -57of the said IS specification.
47.2 One number flange 8mm thick of 300 mm outer diameter (symmetrically located) shall be circumferentially welded to the upper section of the pole, at a distance of 300mm from the top for mounting flood lighting bracket. The upper face of the flange shall be machine finished.

47.3 Two numbers full threaded GI nipples, out of which 1 No. of 40mm diameter 25mm long made of GI pipe shall be provided to the pole for entry of wires. The 40 mm diameter nipple shall be at a distance of 3750mm from bottom and the other one at the distance of 4500mm from the bottom end of the pole. These nipples shall be screwed to the GI nuts, which in turn are to be poles after drilling necessary boles in the pole. The nipples should be full threaded with necessary nuts and washers.

47.4 Two number holes of size 12mm diameter shall be provided in each pole at a height of 3450 mm from the bottom end of the earthing purpose and one number 12mm nut shall be welded on the above pole.

47.5 Two number slots of size 25mm X 25 mm to be cut out at the top of the pole as per drawing for wiring purpose.

47.6 The earthing hole and holes for nipples shall be at right angles to each other. But the plane of top slots of pole will be on the same of the earthing holes.

47.7 The poles and accessories shall be given 2 coats of primer paint before dispatch.

47.8 The octagonal type of poles also acceptable subject to EPI approval.

48.0 BRACKETS

48.1 Brackets shall be made of minimum 4mm thick M.S sheet of channel shaped of size 175mm X 75mm X 4mm thick and 2 nos. of MS flat stiffeners will be provided and the stiffeners shall be made out of 50mm X 5mm M.S. Flat.

48.2 Three Nos. M.S. clamps of required length with suitable nos. of 18mm diameter hole will be provided for mounting of 3nos. flood lighting luminaries. The M.S champ shall be made out of 40 mm X 5 mm M.S Flat.

48.3 One No. M.S flange of 8mm thick and 300mm outer diameter with 4Nos. holes of 18mm diameter (symmetrically located) shall be circumferentially welded of on M.S pipe of 300mm long and 165.10mm outer diameter, and 4.85mm wall thickness which in turn to be welded to the channel shaped bracket.

48.4 Necessary shots on top of the M.S Bracket shall be provided to enable proper swivelling of M.S clamp.

48.5 Necessary holes of suitable diameter (not less than 18mm) should be drilled on M.S Bracket for taking out and wires for wirings.

48.6 Two Nos. slots of size 25mm X 25mm are to be cut out at the top of the flange pipe to match the same with slots on the pole. Sharp edges of the slots are to be rounded off.

48.7 Four Nos. slots of required size are to be curt out at the top of the bracket for fixing of single fittings.

48.8 The brackets are to be painted with two coats of printer.
48.9 For installation of fitting necessary holes as per requirement shall have to be done by the firm.

49.0 EXECUTION OF WORKS:

49.1 Cable Laying:

49.1.1 The cable laying from BOP sub-station to IBB road (Link Road), village area and other public places will be done with sand cushioning and protective covering.
49.1.2 The cabling work along IBB road shall be under ground as per CPWD specifications.
49.1.3 The cable route marker shall be provided in the middle of space and at bending and turning points.
49.1.4 During the digging and cutting of road berm has to be made good by proper filling of earth and consolidation.
49.1.5 Separate trenches shall be used for laying of sub main cables.

49.2 ERECTION OF POLES:

49.2.1 The base plate shall be fixed with pole before placing of pole in the pole pit and two coats of black painting will be done up to the height of 4500mm from the bottom of the pole.
49.2.2 Erection of pole will be done as per the site condition and as per the direction of Engineer-In-Charge.
49.2.3 The pole base foundation will be of size 900mm X 900mmX200mm in C.C 1:3:6 (1-Cement :3 coarse sand:6-grade stone of normal size 40mm)
49.2.4 The pole is to be rested on the above CC foundation and will be erected in CC foundation of size 600mm X 600mm covering the MS base plate up to the height of 1830mm. above 600mm X 600mm CC foundation / collar will be of size 400mm X 400mm.
49.2.5 All the poles shall be at the equal distance from the centre of bituminous road as far as possible.
49.2.6 Also after erection height of the pole in one stretch as far as possible shall remain same from the road top level.
49.2.7 All poles shall be independently earthed with two separate strip earth electrode of size 25mm X 5mm X 6000mm long each.
49.2.8 The earth terminal / stud shall remain unpainted in order to provide electrical / mechanical contact.

49.3 EARTH FILLING:
49.3.1 The earth filling around the pole shall be done as per direction of Engineer-in-charge.
49.3.2 The earth filling at the location where feeder pillars will be installed along with poles shall be of larger size, as per the direction of Engineer-in-charge.
49.3.3 The earth filling shall be done in layers of 200mm height and to be rammed/rolled/consolidated well.
49.3.4 Necessary slopes shall be provided after earth and planting of grasses to be rendered on slope surface in order to reduce soil erosion.

49.4 ERECTION OF MFP / SFP

49.4.1 The angle iron legs of MFP/SFP are to be grouted in cement concrete 1:3:6 (1 Cement :3 Coarse sand : 6 Graded stone aggregate 40mm normal size) foundation of size 500 mm X 500mm X 500mm below the original ground level and 200mm X 200mm X 1300mm height above the original ground level.
49.4.2 The CC foundation height will be 1800 mm out of which 500mm will below level and 1300mm will above the original ground level.
49.4.3 Three sides of MFP /SFP above IBB road will be covered at a height of 750mm with 155mm thick brick masonry wall.
49.4.4 The drawing should be got approved from the Engineer-In-Charge before execution of the work.

49.5 EARTHING:-

49.5.1 The work shall be done as per CPWD general specifications for Electrical Works-Part-I (Internal 2005 as amended up to date and Part-II External-2007).
49.5.2 Each pole will be independently earthed with 2 Nos. G.I strips of size 25mm X 5mm and the minimum length of each strip will be 6000mm. Due to site condition the length may vary.
49.5.3 The loop box and C.G Box will be loop earthed with the pole with 6 S.W.G.G.I wire and the thimbles at two points in loop box and point in C.G Box respectively.
49.5.4 All the main feeder pillars and sub feeder pillars will each have two independent earth electrodes. From each earth electrode to main feeder pillars / sub feeder pillars the loop earthing will be with 6SWGG.I wire in 15mm dia G.I pipe.
49.5.5 The G.I pipe provided for cable protection along the bridge / Culvert shall be earthed both side with 25mm X 5mm G.I Strip.
49.5.6 The copper earthing mentioned in the schedule of work will be used for DG Set neutral earthing and these items will be executed as per the direction of the Engineer-In-Charge.
50.0 SPECIFICATION FOR LUMINARIES

50.1 A sample of each item of supply (1 X 250 watt & 2 X 250 watt) shall be handed over to the office of undersigned with 10 days of the award of work. These samples shall be returned back afterwards. The makes of luminaries shall be strictly as per tender conditions. The offer must be attached with technical literature & photometric data along with write up of the luminaries offered.

50.2 Copy of type test certificate for luminaries as per ISI, including type test certificate from a Central / State government or public sector laboratory or laboratory recognized / accredited by the Central / State Government for such tests for such tests for the light fitting.

50.3 Contractors should obtain an undertaking from the manufacture that they have a system of quality control to ensure consistent good quality of finished product and as such has a scheme of inspection of the floodlight fitting for the following individual design parameters.

A: FITTING

Dimension accuracy (Consistency)
1) Reflecting / surface quality
2) GLASS QUALITY – LIGHT TRANSMISSION HEAT
3) Fixing arrangement for lamp holder assembly
4) Holder
5) Protection class of the fitting
6) Photometric characteristics.

B: CONDENSER

1) Capacity
2) Breakdown Voltage
3) Dielectric loss
4) Dimensional accuracy (consistency)
5) Temperature rise

C: CHOKE

1) Inductance
2) Tap voltage
3) Winding wire and insulation
4) Core assembly, air gap
5) Encapsulation
6) Power loss and rated voltage
7) Temperature rise with 260 volts applied.
D: IGNITOR
1) Ignitor pulse measurement including
   a) Pulse Height
   b) Pulse Width
   c) Pulse Position
   d) No of Pulses / cycle

50.5 The bidders are required to indicate in technical bid a prescribed range of the defined parameters. The should also indicate whether they are conducting 100% inspection for the stated parameters (specific details should be given if it is 100% inspection). The system of inspection should cover the extent and scope of inspection carried out at the time of receipt the assembly of the finished light fitting. The bidder should intimate the arrangements provided by them for conducting various test during inspection.

50.6 The contractor has to submit following undertaking on his letter-pad while Submitting the tender.

"The technical specification in respect of luminaries shall in all respect conform to specifications as laid down in tender and in keeping with offer now submitted by us. We shall be fully liable in case at any stage, the specification and quality of the goods as supplied us is found to deviate from the specification and quality as laid down in the tender and as offered by us ("In tender offer")

50.7 INSPECTION / TESTING

50.7.1 The Inspecting officer should do inspection of the items of supply, before they are to place delivery. On completion of inspection, dispatch instruction accompanied with copies of inspection report, shall be issued by the Inspecting Officer. Only those material as passed in inspection by the inspecting officer shall be dispatched. Copy of inspection certificate as issued by Inspecting Officer shall be dispatched to site of work.

50.7.2 PLACE OF INSPECTION / TEST:- Contractor should state the place / factory where the equipment will be put for inspection. They should also clearly indicate the facilities available for different tests.

50.7.3 INSPECTION OFFICER: The inspecting officer will be nominated by quality assurance division/QA Representative, RO, New Delhi or the Engineer-in -charge.

50.7.4 ARRANGEMENT FOR INSPECTION / TEST:- All arrangements required for inspection of materials at factory are to be made by the supplier and nothing
extra shall be paid for the same. Contractor shall also arrange duly calibrated measuring instrument for conducting various tests.

The test certificate of manufacturer for the routine test conducted as per IS shall also be furnished to the inspecting officer at the time of inspection. The following Acceptance Test shall be carried out by the Inspecting Officer as per relevant IS specification. The lot size for the purpose of inspection shall be as per relevant IS specification.

(A) FOR FITTINGS

I) VISUAL EXAMINATION
II) INSULATION RESISTANCE AND ELECTRIC STRENGTH
III) RESISTANCE TO DUST AND MOISTURE
IV) PHOTOMETRIC TEST

50.7.5 MARKING OF INSPECTED MATERIAL: The inspecting officer will get the stickers (marked “INSPECTED”) pasted on all items inspected and an additional sticker marked “TESTED” only on the items tested or stamp their identification mark issued by QAD Division.

50.7.6 INSPECTION SCHEDULE: The inspection call should be sent by FAX/TELEGRAM within 30 days from the stipulated date of commencement of work and inspection shall be carried out within 10 days of receipt of such inspection call. Inspection call should be given at least 14 days prior to date of inspection proposed.

50.8 PACKING: The Luminaries with accessories shall be enclosed in polythene sheet cover before packing. The packing cases shall be of wooden and will be provided with small punched opening at required place so that the sticker pasted by inspecting officer may be seen without opening the packing case.

51.0 TECHNICAL SPECIFICATIONS FOR LUMINAIRES

51.1 FLOOD LIGHTING LUMINAIRES SUITABLE FOR 2X250 WATTS SON-T LAMPS

51.1.1 The flood light luminaries shall be non-integral for use with 2nos. 250w high pressure sodium vapour lamps (Tubular type) The luminaries shall be heavy duty type suitable for outdoor installation for narrow area lighting.

51.1.2 The housing shall be made of cast aluminium alloy of LM-6 necessary cooling fins for heat dissipation. It shall house the optical system with necessary reflector, heat resistant toughened glass in front with weather proof gasket made from ethylene propylene rubber (EPR)/Neoprene/EPDM material) and
aluminium back plate cover in the rear. This may contain lamp holders, porcelain connectors and reflectors. The housing shall be equipped with suitable lamp supports (one for each lamp).

51.1.3 The reflector shall be made of Aluminium of high purity electro/chemically brightened and anodized. The reflector shall be at least 0.7mm thick. This shall not be deformed while relamping, cleaning etc.

51.1.4 The arrangement shall be such that the lamp replacement ids conveniently done without affecting either the aiming, or the protection qualities of the enclosure.

51.1.5 Suitable mounting bracket (for the luminaries) shall be made of Galvanized steel with coating of epoxy based anti corrosive paint. The bracket shall be suitable for fixing on the pole whose design is indicated in the drawing enclosed. The contractor shall furnish dimensional sketch showing details of holes in the brackets for the luminaries. In the case the holes in the luminaries-mounting bracket any auxiliary fixing arrangement required for mounting on the pole bracket should be included in the offer.

51.1.6 A graduated disc of anodized aluminium shall also be providing as part of the fitting to indicate the aiming position.

51.1.7 All hardware shall be heat resistant. All fixing arrangement like screws, clamps etc. Shall be made of stainless steel.

51.1.8 The flood light luminaries when fitted with 250W SON-T (TUBULAR TYPE) lamps shall give a light output of at least 600cd /1000 1m (peak value) along its principal axis and have a photometric distribution to give 50% of the peak value or more at an angle of 30deg. And 10% of the peak value or more at an angle of about 52 deg (both values in the horizontal plane). The 50% and 10% outputs or more in vertical plane should be at about 9.2 deg. And 45.4 deg respectively.

51.1.9 The contractor shall provide Photometric distribution curves (both horizontal and vertical) in the form of a Type Test Certificate. They should also furnish the beam factors of the luminaries (both for 50% and 10% of peak beams). The type test certificate should be from a laboratory recognized / accredited to Central /State Government Organization. These data including certificates shall be enclosed along with tender document.

51.2 FLOOD LIGHTING LUMINARIES SUITABLE FOR 1X 250 W SON-T LAMPS.
51.2.1 Flood lighting luminaries shall be non-integral type suitable for use with 1no. 250 W high-pressure sodium vapour lamp (Tubular type). The luminaries shall be heavy-duty type suitable for outdoor installation for Narrow area lighting.

51.2.2 The reflector shall be made of high purity anodized spun aluminium designed for symmetrical light distribution. The reflector shall be suitable brightened.

51.2.3 The reflector may also serve the purpose of hosting, and shall be sufficiently thick (at least 1.2mm) for the purpose. Luminaries with independent housing are also acceptable and in this case also, reflector shall be sufficiently thick so as not to be deformed while re-lamping, cleaning etc.

51.2.4 Rear housing shall be made of east aluminium alloy of LM-6 grade with necessary cooling fins for heat dissipation. It shall house the lamp holder, porcelain connector and cable gland. The housing shall be detachable for convenient relamping without disturbing the aiming angle.

51.2.5 Luminaries shall be provided with heat resistant toughened glass in front fixed to the housing with the help of water proof gasket made from ethylene propylene rubber (EPR)/Neoprene rubber/EPDM rubber. Test certificates to the effect that the gasket is made of EPR/Neoprene rubber/EPDM rubber material has to be provided.

51.2.6 Suitable mounting brackets (for the luminaries) shall be made of galvanized steel with coating of epoxy base paint corrosive paint. This bracket shall be suitable for fixing on the pole bracket whose design is indicated in the drawing enclosed. The bidder shall furnish dimensional sketch showing details of holes in the brackets for the luminaries. In case the holes in the luminary mounting bracket do not correspond to the holes in the existing pole bracket, any auxiliary fixing arrangement required for mounting on the pole bracket should be included in the offer.

51.2.7 A graduated disc of anodised aluminium shall also be provided as part of the fitting to indicate the aiming position.

51.2.8 All hardware shall be heat resistant. All fixing arrangement like screws clamps etc. shall be made of stainless steel.

51.2.9 The luminaries when fitted with 1X 250 W SON-T (Tubular Type) lamp shall give a symmetrical light output of at least 10500 cd / Kilo lumen along its principal axis, and provide 50% of the PEAK VALUE OR MORE AT AN ANGLE of 8.2deg.
51.2.10 The bidder shall provide the photometric distribution curve in the form of Type Test Certificates and also furnish the beam factors of the luminaries (both of 50% and 10% peak of beams). The type test certificate should be from a laboratory recognized / accredited to Central / State Government Organization.

51.3 **ILLUMINATION LEVEL:**

The vertical luminance required at various distance from the line of poles are given as below:-

51.3.2 **ILLUMINATION REQUIRED:** Distance in from the line of poles / minimum level of vertical illumination in lux at height of 1.5mts. above ground level along the parallel line shown in the sketch

- 2 Lux at a height of 1.5 mtr. Distance 140 mtr.
- 2.5 Lux at a height of 1.5 mtr. Distance 100 mtr.
- 4.5 Lux at a height of 1.5 mtr. Distance 60 mtr.
- 6.0 Lux at a height of 1.5 mtr. Distance 30 mtr.

51.3.3 The contractor should give the calculation for the illumination levels at spacing of not more than 10 mts. For the area of consideration (shaded in the sketch). They should furnish detailed calculation from the photometric data for the point of minimum level of illumination along each of the four lines referred above (i.e. at 140, 100, 60 and 30 mts) the mounting height of luminaries shall be 9.2 mts. Above ground level and the spacing between the poles will be 100 mts.

51.4 **THE FITTINGS AND ACCESSORIES SHALL CONFORM TO THE FOLLOWING STANDARDS.**

I) FLOOD LIGHT LUMINARIES IS 10322 (PART-V / sec-5: 1987)

II) XLPE UG Cables IS-7089 (Part-I)-1988

III) Capacitors: IS-1569(1976), so as to achieve power factor as 0.9

IV) Ignitor: IS 12449 (Part-II): 1988

V) BALLAST: Conforming to IS: 6616-1982 Ballast should be made of copper enameled coils with polyester filling. It should be low loss copper centigrade. It should be ortho cyclic for low voltage consumption. The ballast shall have one number earthing terminal. The tapping should be recognized / accredited toe Central / State Government Organization shall be provided by the tenderer.

VI) All other components shall conform to relevant IS specifications.
VII) The Ignitor should be suitable for integral type of fittings (for 30 mtrs. Distance)

52.0 SPECIFICATION FOR XLPE, UG CABLES

52.1 The contractor is required to indicate maximum, 3 makes of the UG cables from among the specified makes mentioned in the list of makes which they intend to use for this work. A certified copy of the valid BIS license for all sizes of UG Cables covered in this work, shall also be furnished along with tender offer, in favour of all three manufacturer of the makes offer by the contractor, conforming that these are of ISI marked cables.

52.2 Inspection & Testing – contractor must intimate to the Engineer – in – Charge / QA Representative, RO, New Delhi at least 14 days in advance, about the probable dates when the entire lot of UG Cables of all sizes to be used in this work shall be ready at the manufacturer’s premises. Engineer – in – Charge or QA authorised Representative, RO, New Delhi shall inspect the UG Cables at the manufacturer’s premises and carry out the Acceptance and Routine tests on the ISI marked cables of sizes, (separate for each size) as prescribed in IS-7098 (Part-I) – 1988 as amended up to date and in accordance with the sampling plan prescribed therein.

In addition to above, contractor shall arrange to furnished certified copies of all the Type Test Certificates, as prescribed in the relevant IS-7098 (Part-I) to the Engineer – in – Charge, along with the call of inspection of the UG Cables. The Engineer – in – Charge for his authorized representative shall be given access to the original Type Test for verification in respect of each size of the Cables, under inspection, by the manufacturers.

The inspecting officer shall do inspection of the items of supply, before they are dispatched to place of delivery. On completion of inspection, the Inspecting Officer / Engineer – in – Charge shall issue dispatch instructions accompanied with copies of inspection report. Only those materials as passed in inspection by the inspecting Officer shall be dispatched. Copy of inspection certificate as issued by inspecting Officer shall be dispatched to site of work.

52.3 Place of Inspection / Testing: - Contractor should state the place / factory where the equipment will be put up for inspection. They should also clearly indicate the facilities available for different tests.

52.4 Inspecting Officer: - The inspecting officer will be the Engineer – in Charge or any officer authorized by Quality Assurance Div. / Q.A. Representative RO for the purpose of inspection / test.
52.5 Arrangement for Inspection / Testing: - All arrangements including duly calibrated measuring instrument required for inspection of materials at factory are to be made by the supplier and nothing extra shall be paid for the same. The contractor shall arrange all facilities for testing and inspection of material at manufacturer's site with the written consent of the manufacturer.

52.6 Packing: - Strictly in accordance with the provisions as per clause 18.1, 18.2 and 18.2.1 in IS-7098 (Part-I) – 1988 as amended up to date.

52.7 Delivery Period: - Shortest possible time schedule in delivery is required to be framed / observed, but not later than specified. The date of actual receipt of materials at site will be considered as the relevant date for this purpose. The whole quantities of XLPE UG cables are to be supplied within 60 days from the stipulated date of commencement of work.

52.8 Placing Order on UG Cables: - Before placing orders on the manufacturer for supply of the cables, the contractor is required to carefully get assessed the exact requirement of each size of the cable at the site of work.

53 QUALITY ASSURANCE AND INSPECTION:

53.1 Sole responsibility for quality of works rests with the contractor through routine inspection and testing by the technical staff employed by the contractor. The quality of the work shall be assured through routine and random testing of materials and items of work in the field laboratory and outside laboratory. The record of such quality inspection shall be kept at site and shown to Engineer-in-Charge during his inspection.

53.2 Quality Assurance and Inspection: The Engineer – in – Charge and/or Quality Assurance Division / Q.A. Representative, New Delhi including the Third Party Inspecting Agency (TPIA) duly deputed by the Government may also assure proper quality being achieved by the contractor over the materials and items of work.

53.3 Outside Laboratory: The tests required to be conducted in outside laboratory shall be conducted in the laboratory as may be approved by the Engineer – in – Charge / Quality Assurance Division / Q.A. Representative, New Delhi such as National Test House, Regional Research Laboratory, Regional Engineering College, laboratory of Engineering Colleges, NSIC or any other laboratory.

53.4 Testing: -
   A. Non-association during Sampling and/or Testing: In case the contractor or his authorized representative is not present or does not associate himself in
collection of test samples, the test results/reports of such tests and consequences thereon shall be binding on the contractor.

B. Costs:

a. Samples of materials/items of work required for testing in field or outside laboratory shall be provided free of cost by the contractor. The contractor shall also assist inspection and collection of samples for testing by Engineer – in – Charge or his authorized representative including TPIA.

b. Sampling: All costs incurred in collection of samples, packing and transportation to the approved outside lab/field laboratory shall be borne by the contractor.

c. Testing: The cost of testing conducted in outside approved laboratory shall be borne by the contractor.

53.5 Contractor shall facilitate all necessary help at no extra cost for carrying out:

(i) Inspection of works
(ii) Inspection of quarries and collection of test samples there from
(iii) Collection of samples of all materials brought at site
(iv) Testing of all materials at field laboratory/out side laboratory approved by Engineer – in - Charge

53.6 Owner of this project is Ministry of Home Affairs. MHA at its discretion may appoint an independent & impartial inspection to be called as Third Party Inspection. The contractor shall provide all assistance to the TPI to carry out the functions assigned to them.

53.7 The contractor shall submit fortnightly work program to the Engineer – in – Charge in order to enable him/TPIA to supervise inspection of work and testing of materials.

53.8 The reports of inspection, test results, whether relating to field tests or outside laboratory tests and/or suggestions, decision given by Engineering in-charge / TPIA shall be final and upon the contractor.

54. **SAFETY CODES AND LABOUR REGULATIONS:-**

54.1 In respect of all labour employed directly or indirectly on the work and successful tenderer (herein after called the contractor) at his own expenses will arrange for the safety provisions to comply with the statutory regulations. S.I.S recommendation and CPWD codes. In case of default, EPI shall be at liberty to make arrangements and provide facilities as aforesaid and recover the cost from the contractor.
54.2 The contractor shall provide necessary barriers, warning signals and other safety measures to avoid any accident. He shall be liable for such accident as may be done due to any cause in accordance with the Indian Law and Regulation and EPI / Govt. Agency shall not be responsible for any accident, damage incurred or claims arising there from during the period of erection under his responsibility and putting into operation of the equipments under his supervision. Where necessary he shall also provide all insurance including third party insurance as may be necessary to cover the risk.

54.3 Nothing in this specifications shall be construed to relieve the contractor of his responsibility for the design, manufacture and installation of the equipment with accessories in accordance with applicable standards and statutory Regulations and safety codes in force from the safety angle.

55. The fuel for operational requirement for two hours are within the scope of the contract and shall be born by the contractor. Stock for sufficient amount of fuel to run the generator for minimum 48 hours shall be maintained by the contractor.

55.1 Recording for critical operational parameter indicated in the meters and gauges mounted on the engine or electric panels (logbook) shall be done by the contractor.

56. ROUTINE MAINTENANCE

A) Daily Checks
1. Keeping the DG sets room clean. Wipe out dirt from external surface of engines, generator & control panels.
2. Check the levels of diesel in daily service tank, lubricant oil engine, crank case and (in case of water cooled engines) water in radiator. Fill / top up as necessary.
3. Inspect the engines for any leakage of diesel oil, engine oil and coolant in the respective system.
4. Check the position of change over switch when the engine will start.
5. Record the readings of voltage of supply and engine battery voltage.
6. Check the terminals of battery set and cleaning with jute, Grease etc. as required.

B) Weekly Checks
1. Run the set on load for 30 minutes. Observe for any abnormality of noise, vibration, bearing surface heating (whether warm), engine pick up, voltage level and frequency.
2. Check the levels of electrolyte in the battery of the engine. Top up with distilled water as necessary, if the battery needs charging early and also examine
whether trickle charger (if provided) is defective. Dusting of bowling inside of all electric panels with compressed air or electric blowers.
3. Check whether all panel lamps, fuses and instruments are healthy in the control panel.

C) **Monthly Checks**
1. Check engine radiator for air restriction if any, clean up. Check the condition of drive belts, hose and radiator cap.
2. Clean the battery terminals and apply grease to prevent corrosion. Check specific gravity of the electrolyte.
3. Check the exhaust system for leakage, corrosion and vibration. See whether the exhaust smoke is not very dark.
4. Check that there are no restrictions to air flow in air cleaner.
5. Check coupling with alternator for any sign of fatigue

D) **Six Monthly Check**
1. Inspect the electrical control panel and starters to see that all power/control contracts are clean, all terminals are sound and all fuses are intact. Blow out dirt from machine windings at panels by a blower, check brushes (where provided) of alternators.
2. Inspect all cable end terminations i/c control cables. Tighten as required.
3. Check all safety controls and alarms in the set supply system.
4. Check filters of diesel oil, coolant and air cleaner element of the engine after checking total hours of operation as per manufacturer’s recommendations.
5. Check the belt tension. Tighten if required.

Note: New belts will stretch within one hour operation, these are to be readjusted.

**Specifications for construction on Power plant room / plant room/ DG room**

Power Plant room / DG room shall be single storeyed RCC framed structure with filler brick work, sloped roof with metal colour coated poly Di-flouro coated Gal volume steel sheet & gypsum board for false ceiling, boundary wall around power plant room & bore well as per design & drawing approved by EPI.
## LIST OF PREFERED MAKES FOR CIVIL WORKS

<p>| 1. Cement (ORDINARY Portland/Portland Pozzolana) | ACC/GRASIM/AMBUJA/ULTRA TECH./LAFARGE/STAR/STOP CEM |
| 2. TMT / Tor Steel | SAIL/TISCO/RINL/SHYAM STEEL |
| 3. Structural steel | SAIL/TISCO/RINL/SHYAM STEEL |
| 4. Precast CC Tiles | HINDUSTAN TILES / NIMCO PREFAB/NITCO KONKRETE |
| 5. Ceramic Tiles | NITCO/ORIENT/SOMANY/KAJARIA/ANGLER/JOHNSON/GLORY |
| 6. RCC Pipes | AKSHAY/KK/HINDUSTAN/PRAGATI |
| 7. Manhole Covers (SFRC) | KK/HINDUSTAN |
| 8. Kerb Stone (Precast CC) | NIMCO PREFAB / SUBHASH FERRO CONCRETE / HINDUSTAN TILES |
| 9. Chainlink Wiremesh | MITTAL/SHAKTI – WELD MESH |
| 10. PVC Pipes / Fittings | SUPREME / PRAKASH / ORI PLAST / FINOLEX |
| 11. Float Glass and Mirror | MODIGUARD / ASAHI/SAIN GOBAIN/GUARDIAN |
| 12. Water-proofing Compound | CICO / CHEMISTIK / FOSROC/MBT/DEGUSSA |
| 13. Cement / Concrete Additives | CICO / CHEMISTIK / FOSROC/MBT/DEGUSSA/FOSROC/SIKA |</p>
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<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Brand(s)</th>
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<tr>
<td>14.</td>
<td>Distemper-Dry/Oil Board</td>
<td>ICI / ASIAN, BERGER</td>
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<tr>
<td>15.</td>
<td>Aluminium Sections for Doors / Windows</td>
<td>HINDALCO / JINDAL / NEROLAC</td>
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<td>16.</td>
<td>Floor Hardner</td>
<td>SNOWCEM / CHEMISTIK/ FOSROC / Sika</td>
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<tr>
<td></td>
<td>Description</td>
<td>Brands</td>
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<tr>
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</tr>
<tr>
<td>17.</td>
<td>Cement Paint</td>
<td>SNOWCEM / ICI / NEROLAC / BERGER / ASIAN</td>
</tr>
<tr>
<td>18.</td>
<td>Primer for steel</td>
<td>ICI / ASIAN / BERGER / NEROLAC</td>
</tr>
<tr>
<td>19.</td>
<td>Synthetic Enamel Paint</td>
<td>ICI / ASIAN / BERGER / NEROLAC</td>
</tr>
<tr>
<td>20.</td>
<td>Plastic Emulsion</td>
<td>ICI / ASIAN / BERGER / NEROLAC</td>
</tr>
<tr>
<td>21.</td>
<td>Waterproof ply &amp; Board</td>
<td>DURO / GREENPLY / CENTURY / KITPLY</td>
</tr>
<tr>
<td>22.</td>
<td>Flush Door Shutter</td>
<td>KITPLY / SWASTIK / DURO</td>
</tr>
<tr>
<td>23.</td>
<td>Rolling Shutter</td>
<td>DIANA / RAYMUS / RAMA</td>
</tr>
<tr>
<td>24.</td>
<td>Bitumenous Sealent</td>
<td>STP / LLOYD</td>
</tr>
<tr>
<td>25.</td>
<td>PVC Door Shutter</td>
<td>RAJSHRI / SINTEX</td>
</tr>
<tr>
<td>26.</td>
<td>PVC Tank</td>
<td>SINTEX / ELECTROPLAST / STAR / LOTUS</td>
</tr>
<tr>
<td>27.</td>
<td>WC / Wash Basin</td>
<td>CERA / PARRYWARE / HINDUSTAN</td>
</tr>
<tr>
<td>28.</td>
<td>C.P. Fittings</td>
<td>PARKO / HINDUSTAN / SEIKO / ORIENT</td>
</tr>
<tr>
<td>29.</td>
<td>S.C.I. Pipes</td>
<td>RIF / NITCO / BENGAL IRON / IISCO</td>
</tr>
<tr>
<td>30.</td>
<td>White Cement</td>
<td>BIRLA WHITE / JK WHITE</td>
</tr>
<tr>
<td>31.</td>
<td>Oxidized Aluminium Fittings</td>
<td>EBCO / DOOR LINE</td>
</tr>
<tr>
<td>32.</td>
<td>Gypsum False Ceiling</td>
<td>INDIA GYPSUM / BORAL</td>
</tr>
</tbody>
</table>
## LIST OF PREFERED MAKES FOR ELECTRICAL ITEMS

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>ITEMS</th>
<th>PREFERRED MAKES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>FLOOD-LIGHT POLES AS PER IS2713(PART I TO III)-1980</td>
<td>JINDAL POLES/UTKARSH TUBES &amp; POLES, CALCUTTA POLES/HIMALAYAN DRAGON, SAI STRUCTURALS</td>
</tr>
<tr>
<td>2.</td>
<td>OCTAGONAL POLES</td>
<td>BAJAJ OR EQUIVALENT (APPROVED BY EPI)</td>
</tr>
<tr>
<td>3.</td>
<td>LT PANELS</td>
<td>MANUFACTURER HAVING CPRI TEST CERTIFICATES</td>
</tr>
<tr>
<td>4.</td>
<td>SDF/ HRC FUSE</td>
<td>L&amp;T/SIEMENS/HAVELLS/SCHNEIDER/ABB/HPL/BCH</td>
</tr>
<tr>
<td></td>
<td>A) 1.1KV LT POWER CABLES</td>
<td>CCI/GLOSTER/NICCO/UNIVERSAL/NATIONAL RALLISON/RPG(ASIAN) /HAVELLS/INDUSTRIAL CABLES / TORRENT / POLYcab / SKYTONE</td>
</tr>
<tr>
<td></td>
<td>B) 1.1 KV CONTROL CABLES</td>
<td>ASIAN CABLE / FINOLEX / UNIVERSAL / GLOSTAR / CCI / HAVELLS / NICCO / POLYcab / TORRENT / SKYTONE/ NATIONAL/ RALLISON</td>
</tr>
<tr>
<td>5.</td>
<td>A) CABLES GLANDS</td>
<td>COMET / DOWELL / JAINSON</td>
</tr>
<tr>
<td></td>
<td>B) LUNGS &amp; THIMBLES</td>
<td>DOWELLS/JAINSON</td>
</tr>
<tr>
<td>6.</td>
<td>PRE FABRICATED CABLE TRAY</td>
<td>SLOTCO/PILCO/STEELWAYS/INDIANA/PATNY</td>
</tr>
<tr>
<td>7.</td>
<td>MCB, MCB DB, AND ISOLATORS</td>
<td>L&amp;T (HAGAR)/SIEMENS/MDS (LEGRAND)/INDO ASIAN / SCHNEIDER STANDARD / HAVELLS/ GE POWER</td>
</tr>
<tr>
<td>8.</td>
<td>RCCB</td>
<td>L&amp;T (HAGAR)/SIEMENS/MDS (LEGRAND) / INDO ASIAN / SCHNEIDER / HAVELLS / GE POWER</td>
</tr>
<tr>
<td>9.</td>
<td>CONDUIT</td>
<td>ISI MARKED</td>
</tr>
<tr>
<td>10.</td>
<td>PVC INSULATED COPPER WIRE (ISI MARKED)</td>
<td>SKYLINE / GRANDLAY / FINOLEX / HAVELLS / POLYcab/NICCO/UNIVERSAL</td>
</tr>
<tr>
<td>S.NO.</td>
<td>ITEMS</td>
<td>PREFERRED MAKES</td>
</tr>
<tr>
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</tr>
<tr>
<td>11</td>
<td>CHANGE OVER SWITCH</td>
<td>L&amp;T/SIEMENS/C&amp;S/ HAVELLS</td>
</tr>
<tr>
<td>12</td>
<td>AMMETER, VOLTMETER</td>
<td>AE/MINILEC/RISHAB/MECO/IMC</td>
</tr>
<tr>
<td>13</td>
<td>SELECTOR SWITCH</td>
<td>KAYEE/BCH/UNIQUE</td>
</tr>
<tr>
<td>14</td>
<td>INDICATING LAMP</td>
<td>VAISHNO/BCH/L&amp;T/ESSEN/BINAY</td>
</tr>
<tr>
<td>15</td>
<td>CTS</td>
<td>AE/MECO/HPL/KAPPA</td>
</tr>
<tr>
<td>16</td>
<td>PVC PIPE</td>
<td>ISI MARKED / PECISION</td>
</tr>
<tr>
<td>17</td>
<td>LIGHT FITTINGS</td>
<td>PHILIPS/GE/VEERA/BAJAJ/CGL/HAVELLS</td>
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<tr>
<td>18</td>
<td>250WATT HPSV SON T LAMP</td>
<td>PHILIPS/GE/OSRAM/CGL/HAVELLS</td>
</tr>
<tr>
<td>19</td>
<td>D.G. SET</td>
<td>KIRLOSKER/JACKSON/CATTERPILLER / MTU / PERKINS/ CUMMINS/</td>
</tr>
</tbody>
</table>

Note:- Items not covered above shall be approved by EPI before procurement.
A. LIST OF DOCUMENTS / CERTIFICATES TO BE SUBMITTED WITH TENDER DOCUMENT

1. Undertaking by the bidder that they will supply only approved / preferred make of luminaries for which they have submitted the technical details.

2. Photometric distribution curves (both horizontal & vertical) in the form of type test certificate including beam factors of the luminaries. The type test certificates should be from a laboratory recognized / accredited to central / state Government organization(Clause 51.1.9).

3. Calculation for illumination level at spacing of not more than 10 mtr grid for the area of consideration (shaded area as per drawing 9.3) detailed calculation from the photometric data for the point of minimum level of illumination along each of the four lines referred above (i.e. at 140,100,60 and 30mts) the mounting height of luminaries shall be 9.2mts. Above ground level and the spacing between the poles will be 100mts (Clause 51.3.2 & 51.2.3).

4. Schedule of progress of works.
B. LIST OF DOCUMENTS TO BE SUBMITTED BY THE CONTRACTOR AFTER AWARD OF WORK / DURING THE INSPECTION / TESTING OF MATERIALS AT THE MANUFACTURER’S WORKS

1. Certificate from the authorized manufacturer of SDFUs about the genuineness of the switchgears used in the panels / feeder pillars.

2. Test certificate of manufacturer of luminaries for routine tests conducted as per IS to the inspecting officer at the time of inspection (Clause 50.7.4).

3. Test certificate for Ethylene propylene rubber(EPR)/Neoprene Rubber / EPDM gaskets for luminaries (Clause 51.1.2).

4. Documentary proof of purchase of PVC wires / cables from the manufacturer / authorized dealer(Clause 18).

5. On completion of work, three sets of complete contour layout drawing of each BOP i/c poles with pole number, SFPS, MFP, main LT panel, Essential panel with cable route, cable joints mentioning different colour for various size of UG cables. The drawing must be as per the real contour with references such as rivers, bridges, villages, border road & BP/MP etc. The layout drawing should be minimum of 60 cm x 40 cm and to be fixed inside the DG room of respective BOPs(Clause 26 & 27).

6. Copies of the type test certificate for each size of the ISI marketed aluminium conductor XLPE UG armoured cables of the make (out of the acceptable makes mentioned in the tender document).

7. Contractor shall submit following drawings in requisite for approval before manufacturing:

   i) GA drawings of panels, poles with foundation details, DG set with foundation plan luminaries and any other drawings necessary for execution / completion of work in all respect.

   ii) Control schematic.

   iii) Flood lighting layout, cable layout, earthing layout & illumination layout.

   iv) Overall plan showing sub-station / flood lighting etc. prior to manufacturing.

8. An undertaking has to be submitted by the tenderer so as to abide by the specific makes of luminaries for which the technical details have been submitted along with tender paper. In no case change of makes shall be allowed after opening of tender. Hence an undertaking from the manufacturers of the
luminaries about their consent for supply of required quantity of the luminaries in the stipulated period must be obtained and submitted to the department along with tender documents by the contractor. This certificate is to be submitted along with the inspection call.

9. Copy of type test certificates for luminaries as per IS (Clause 8.3).

10. Undertaking of manufacturer of luminaries for system of quality control (Clause 8.6).

11. Undertaking by the contractor (Clause 8.6).