**Amritsar Smart City Limited**

**Invitation for Proposals**

**For**

# Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission

Duration: 28 Months

Bid No. 05/ASCL/2019-20

July 2019

**Chief Executive Officer,**
**Amritsar Smart City Limited,**
**Amritsar**

# SECTION-I–INVITATION FOR BID (IFB)

**Notice inviting online Bids for: Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission**

Amritsar Smart City Limited, Amritsar (hereinafter referred to as "ASCL" or "Employer" or "Procuring Entity") invites online unconditional bids through e-procurement portal **https://eproc.punjab.gov.in** from eligible and interested parties (the "**Bidder**" or "**Bidders**").

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| **Name & Address of ASCL** | Chief Executive Officer<br>Amritsar Smart City Limited, SCO – 21, II Floor, District Shopping Complex, B-Block, Ranjit Avenue, Amritsar - 143001, Punjab, INDIA |
| **Subject Matter of Procurement** | Notice inviting Online Bids for Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission |
| **Approx. value of the Project** | Rs. 13603.91 Lakh |
| **Period of Completion** | 28 (twenty-eight) months |
| **Bid Document Fee** | Rs.15,000/- |
| **Period of on-line availability of Bid Documents (Start Date/ End Date)** | Start Date: From: 11.07.2019 03:00 PM<br><br>End Date: - Till: 19.08.2019 & 03:00 PM |
| **Date and time for Pre-bid Meeting** | Date/ Time: 22.07.2019 11:00 AM<br>Place: PMIDC office,<br>Punjab Municipal Bhawan,<br>5th Floor, Plot No. 3,<br>Dakshin Marg,<br>Section 35 A,<br>Chandigarh |
| **Manner, Start Date for submission of Bids** | Manner: Online on e-Procurement website http://eproc.punjab.gov.in<br><br>Start Date: 11.07.2019 03:00 PM |
| **End Date for submission of Bids** | End Date: 19.08.2019 03:00 PM |
| **Amount of Bid Security/ Earnest Money Deposit** | Rs.136.04 Lakhs |
| **Date and Time of opening of Technical Bid:** | 19.08.2019 03:30 PM |
| **Date and Time of opening of Financial Bid** | Will be intimated later to the Technically qualified bidders |

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| **Language** | • This Bid Document has been issued in English language.<br>• Bids shall be submitted in English.<br>• All correspondence exchange shall be in English language. |
| **Bid Validity Period** | 120 (one hundred and twenty) days from the bid submission deadline |
| **Preparation of Bids** | The Bids shall comprise of the following:<br><br>**Technical Bid & Financial Bid as per Clause 6** |

**Note:**

1. The Bid Documents can be downloaded from website: www.eproc.punjab.gov.in. The document downloaded from the aforesaid website should not be tempered, and if any such tempering is detected before or after the opening of bids, the Bidder shall be debarred for a period of 6 (six) months.
2. Bidder (through its Authorized Representative) shall submit their offer (the "**Bid**" or "**Proposal**") online in Electronic formats comprising of both Technical Bid and Financial Bid at **https://eproc.punjab.gov.in**. Bid Document Fees, Tender Processing Fees and bid security (the "**Bid Security**") should be deposited through Amritsar Smart City Limited, "Payment Gateway Service on E-Procurement platform". If Bid Security is submitted in the form of Bank Guarantee then the original Bank Guarantee shall reach office of Amritsar Smart City Limited well before the last date of submission of bid.
3. Bidder for additional details such as estimated cost, important date, detailed information, qualification and eligibility criteria, visit website: https://eproc.punjab.gov.in for downloading Bid Document.
4. Any subsequent addendum/ corrigendum shall be published/ uploaded only on the website http://eproc.punjab.gov.in and will not be published in the newspapers. In case there is a holiday on the day of opening of Bids, activities assigned on that date shall be carried out on the next working day.
5. While electronically submitting the Bids, it should be ensured that the Bid Documents including Conditions of Contract are digitally signed by the Bidder.
6. For participating in the above e-tender, the Bidders shall have to get themselves registered with https://eproc.punjab.gov.in and get User ID, password, Class 3 Digital Signatures Certificate (DSC) is mandatory to participate in the e-tendering process. **For any clarification/ difficulty regarding e-tendering process Bidders shall contact helpdesk on the phone numbers mentioned on the website.**
7. The documents shall be prepared and scanned in different files and uploaded during the online submission of Bid.
8. While submitting the Bid Security, the Bidder shall carefully choose the modes of payment provided on the eprocurement portal because once a mode is selected then it will not change. If the Bidder has any doubts, it shall contact the helpdesk of eprocurement portal. The phone numbers are provided on the eprocurement portal. If the Bidder chooses any wrong option and is, therefore, not able to submit its bid, then the Employer or eprocurement portal shall not be responsible for non-submission of its bid.

9. Amritsar Smart City Limited will not be responsible for delay in online submission due to any reason. For this, Bidders are advised to pay Bid Document Fee, Bid Security and upload their complete Bid well advance in time so as to avoid 11th hour issues like slow speed, pending transaction, choking of website due to heavy load or any other unforeseen problems.
10. Bid documents consisting of qualification information and eligibility criterion of Bidders, plans, specifications, drawings and the set of terms & conditions of the Contract to be complied with by the Contractor can be seen on website https://eproc.punjab.gov.in and scanned copies of the required documents and information as per this Bid Document should be attached in the Technical Bid as prescribed in this RFP.
11. Uploaded documents of valid and successful bidder (hereinafter referred to as the "**Successful Bidder**") will be verified with the original before signing the agreement, to be uploaded prior to the date and time for Bid submission specified herein.
12. The Bid Document is not to be uploaded by the Bidder. The Bidder has to only agree/ disagree with the conditions in the Bid Document. The Bidder who disagrees on the conditions of the Bid Document cannot participate in the Tender.
13. Bid (s) once submitted online cannot be resubmitted or withdrawn.
14. Conditional bids, Bids without payment of Bid Security and the bids not meeting the qualifying criteria on the date of receipt of bid shall be summarily rejected.
15. All the prospective Bidders are encouraged to participate in the pre-bid meeting and it is advised that the work sites are visited and Bid Documents are studied thoroughly.
16. ASCL reserves the sole right to cancel the bid process and reject any or all of the Bids without assigning any reason.
17. Procurement entity disclaims any factual/ or other errors in the Bid Document (the onus is solely on the individual bidders to verify such information) and the information provided therein are intended only to help the Bidders to prepare a logical Bid/Proposal.

Chief Executive Officer
Amritsar Smart City Limited
Amritsar

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# SECTION –I

# INSTRUCTIONS TO BIDDERS
# (ITB)

# (A) GENERAL

## 1. Scope of Bid

1. The Employer, Amritsar Smart City Limited (hereinafter referred to as the "**Employer/ ASCL/ Procuring Entity**") invites bids for "Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 (five) years of Operation and Maintenance Period including Defect Liability under Smart City Mission" for 7.4 km of Outer Circular Road of Walled City passing through major junction such as Hall Gate, Mahan Singh Gate, Chattiwind Gate, Hakima Gate and Lohgarh Gate. Construction/implementation phase will be of 28 (twenty-eight) months duration.

2. The Successful Bidder will be expected to complete the works by the intended Completion Date specified in the Contract Data.

3. Throughout these bidding documents, the terms 'bid' and 'tender' and their derivatives (Bidder/ tenderers, bid/tender, bidding/tendering, etc.) are synonymous.

4. The term "in writing" means communicated in written form (e.g. by mail, e-mail, fax, distributed or received through electronic-procurement system used by the Employer) with proof of receipt.

5. If the context so requires, "singular" means "plural' and vice versa.

6. "**Day**" means calendar day, unless otherwise specified as a "Business Day." A Business Day is any day that is a working day of the Employer. It excludes the Employer's official public holidays.

## 2. Source of Funds

1. Source of Fund is from Smart City Mission funds (Government of India and Government of Punjab).

## 3. Eligible Bidders

1. The Bid is open to established and reputed Bidders who fulfil Minimum Eligibility requirements laid down in Clause 4 of ITB.

2. All Bidders shall provide the information in the forms specified in Section IA-Qualification Information Forms, a statement that the Bidder is neither associated, nor has been associated, directly, or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the Project/ Work(s) or being proposed as Project/Work Manager for the contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the works, and any of its affiliates shall not be eligible to bid.

3. The Bidder may be a natural person, Limited Company/ Corporation, Proprietary firm, Partnership firm or any combination of them in the form of a joint venture (hereinafter referred to as "**Joint Venture**" or "**JV**"), under an existing agreement, or with the intent to enter into such an agreement supported by a letter of intent. In case of a JV, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Bidding process and, in the event the JV is awarded the Contract, during contract execution. Unless specified in the BDS, a JV can have a maximum of 3 (three) members.

## 4. Minimum Eligibility Criteria/ Qualification of the Bidder

All Bidders shall provide in Section IA, Qualification Information Forms, a preliminary description of the proposed work method and schedule, including conceptual drawings/ structural drawings and charts. The proposed methodology should include programme of work duly supported with broad calculations and quality assurance procedures proposed to be adopted justifying their capability of execution and completion of work as per technical specifications, within stipulated period of completion.

All bidders shall include the following information and documents with their bids in Section 1A:

a. Copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the Bid to commit the Bidder;
b. Total monetary value of construction/ civil work performed for each of the last five years;
c. Experience in works of a similar nature and size for each other last five years, and details of works underway or contractually committed; and clients who may be contacted for further information on those contracts;
d. Major items of construction equipment proposed to carry out the Contract;
e. Reports on the financial standing of the Bidder, such as profit and lost statements and auditor's reports for the past five years;
f. Evidence of access to line(s) of credit and availability of other financial resources facilities (10% of Contract Value), certified by the Bankers (not more than 3 months old);
g. Undertaking that the bidder will be able to invest a minimum cash upto 25% of contract value of work, during implementation of work;
h. Authority to seek references from the Bidder's bankers;
i. Information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned, and disputed amount;
j. The proposed methodology and programme of execution, backed with equipment planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specification within the stipulated period of completion as per milestones.

**<u>Qualification Requirements:</u>**

| S. No. | Criterion | Documentary Evidence Required |
|---|---|---|
| 1. | Bidder may be a natural person/ sole proprietorship Firm/ Company/ Partnership firm/ LLP registered in India as on the Bid submission Date or a Joint Venture, existing or intended. | Copies of original documents defining the constitution or legal status, place of registration and principal place of business; written power of attorney to the signatory of the Bid to commit the Bidder. If the Bidder is a JV, then all the members shall give Power of Attorney |
| 2. | The Bidder must have in the past 5 (five) years ending on last day of month previous to the one in which bids are invited, successfully completed:<br>a. 1 (one) Similar Work of a value not less than Rs. **108.83** Cr<br>**Or**<br>b. 2 (two) Similar Works of Value not less than Rs. **68.02** Cr each<br>**Or**<br>c. 3 (three) Similar Works of value not less than Rs **54.42** Cr each.<br>***"Successfully Completed"*** *shall mean the works where the bidder has obtained the Final Completion Certificate from the Client*<br>***"Similar works"*** *for this tender document shall mean Construction of Road or Street or Junction or Corridor Improvement Work in urban areas, completed in last 5 (five) years.* | List of similar works completed during previous 5 (five) years duly supported with Work Order/ Notification of Award and completion/ performance certificate from authority for whom work has been completed and information shall include name of work, estimated cost, date of start and date of completion. |
| 3. | The Bidder must have achieved a minimum annual financial turnover, from civil engineering construction/ roads work, equal to Rs.5441.6 Lakhs or more in any one of the last three (3) financial years immediately preceding the Financial Year in which bids are invited (i.e. FY 2016-17, 2017-18 and 2018-19). | Copies of balance sheets and statement(s) featuring turnover during the mentioned periods should be submitted duly signed by the Bidder and the Chartered Accountant concerned, as applicable.<br><br>Form provided for calculation of Annual Turnover duly signed and sealed by the CA. |
| 4. | The Bidder should not have been debarred/ blacklisted by any State Government / Central Government/ PSU/ ASCL/ Government authority in India for any reason and the same subsists as on Bid Submission Date. | Enclose blacklisting/ debarring declaration |
| 5. | All Bidders/ each member of JV shall | (i) Copies of original documents defining |

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| | attach the information and documents (self-attested) with their online Technical Bid along with the information required as per Section IA. | the constitution or legal status, place of registration and principal place of business; written power of attorney to the signatory of the Bid to commit the Bidder;<br><br>(ii) List of similar works completed during previous 5 (five) years duly supported with performance certificate from authority for whom work has been completed and information shall include name of work, estimated cost, date of start and date of completion;<br><br>(iii) Reports on financial standing of the Bidders, such as profit and loss statements and auditor's reports for the past 5 (five) years;<br><br>(iv) Evidence of access to line(s) of credit and availability of other financial resources facilities (10% of Contract value), certified by the Bankers (Not more than 3 months old) (in case of Joint Venture, this criterion shall be met collectively and lead partner must meet at least 51% of the criteria);<br><br>(v) Undertaking that the Bidder/ JV will be able to invest a minimum cash upto 25% (twenty-five percent) of Contract value of work, during implementation of work;<br><br>(vi) Authority to seek references from the Bidder's banker(s);<br><br>(vii) Copy of Permanent Account Number (PAN) issued by Income Tax department;<br><br>(viii) Affidavit/ undertaking of not having been black-listed by any Govt./ Semi Govt. Organization/ Corporation at any stage and/ or debarred by the department of Punjab PWD (B&R).<br><br>(ix) Affidavit/ undertaking that information being submitted is correct and true, and that any false information shall lead to disqualification at any stage; |

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| | | (x) GST Registration Number issued by concerned department;<br><br>(xi) EPF registration certificate from Provident Commissioner;<br><br>(xii) Details of available bid capacity with an undertaking that the available bid capacity, calculated as per clause 6 in this table below, is more than the estimated value of the Project/ Work(s); **(as specified in Appendix).**<br><br>(xiii) Any other qualification information specified in the Conditions of Particular Application. |
| 6. | Calculation of bid capacity of the prospective Bidders | Assessed Available Bid capacity = (A * N * 2 -B)<br>Where<br><br>A = Maximum value of Works executed in any one financial year during the last 5 (five) years (updated to the price level of the financial year in which Bids are received at a rate per year as indicated in Appendix) taking into account the completed as well as works in progress.<br><br>N = Number of years prescribed for completion of the works for which bids are invited (e.g. 28 months = 28/12 = 2.33).<br><br>B = value (updated to the price level of the year indicated in Appendix) of existing commitments (only allotted works) on the last date of submission of bids as per bidding document and on-going works to be completed during period of completion of the works for which bids are invited.<br><br>**Note: (a)** The statement showing the value of existing commitments and on- |

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| | | going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Engineer in charge, not below the rank of an Executive Engineer or equivalent.<br>**(b**) In case of Joint Venture, the available bid capacity will be applied for each partner to the extent of his proposed participation in the execution of the Works.<br>**(c)** The bidder/ each member of JV shall submit calculation sheet wherein Bid capacity has been calculated as per the formula provided above and the same shall also be certified by the CA. The calculation sheet shall be supported by supporting documents i.e. work orders, completion certificates, CA certificate, etc. |
| 7. | The key activities required to be fulfilled by the bidder/ all the members of the Joint Venture collectively | Experience of the following categories:<br>(a) Construction of Urban roads/ streets of at least 10 kms. or above<br>(b) Construction of Utility ducts of at least 5 kms. or above |
| 8. | Criteria for **disqualification** of Bidders | Even though the Bidders meet the above qualifying criteria, they are subject to be disqualified if they have:<br>a. made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or<br>b. record for poor performance such as abandoning the works, not properly completing the Contract, inordinate delays in completion, or financial failures etc.<br>c. Bidder or any member of the JV shall not be habitual litigant with history of Court/ Arbitral decisions (unless appeal is pending) against him since last five years from last date of submission of bid. |

**Additional Requirements for Joint Venture:**

1. Joint Ventures must also comply with the following minimum qualification requirements:
   i. The lead partner shall meet not less than 51% (fifty one percent) of all the qualifying criteria regarding turnover and experience mentioned in Sr. 2 & 3 in the table above. The Joint Venture must collectively satisfy the qualifying/ eligibility criteria regarding turnover and experience mentioned in Sr. 2 & 3 in the table above. The experience of the other Joint Venture partners shall be considered if it is not less than 26% (twenty-six percent) of the qualifying criteria given above regarding turnover and experience. However, in case one of the Joint Venture partners is proposed to be included primarily to provide financial strength to the Joint Ventures, such Joint Venture shall have to commit to provide liquidity support to the project to the extent of 10% (ten percent) of the value of the Contract.
   ii. The aggregate Technical capacities and financial capacities of only those JV members, who have and shall continue to have an equity shareholding of at least 26% (twenty-six percent) each in the JV till the completion of the Contract Period i.e. Operation and Maintenance Period, shall be considered for the purpose of evaluation.
   iii. The Lead partner nominated at the time of submission of the bid, shall continue to be the lead partner for the entire Contract Period with a minimum shareholding of 51% up till construction period and minimum 26% up till the end of Operation and Maintenance Period.
   iv. The Joint Venture must also satisfy the criteria collectively.
   v. The information of a Joint Venture after prequalification, any change in a pre-qualified Joint Venture, will be subject to the written approval of the Employer prior to the deadline for submission of bids. Such approval shall be denied if (i) partners withdraw from a Joint Venture and the remaining partners do not meet the qualifying requirements; (ii) the new partners to a Joint Venture are not qualified individually or as another Joint Venture. Any material changes in the membership of a Bidder during the Contract period will be rejected.
   vi. The Employer may require such documents/ undertakings/ indemnities as it may deem fit from JV members before or at the time if issuance of Letter of Award or signing of Agreement.
   vii. Bid shall be signed so as to legally bind all partners, jointly and severally, and shall be submitted with the original of Joint Venture agreement providing the 'joint and several' liability with respect to the Contract.
   viii. The representative of the Lead partner shall hold authorization in the form of Power of Attorney from all the JV members. JV must designate one or more person(s) to represent the Bidder in its dealings with the Employer. Unless specifically advised to the contrary, Employer will assume that the person(s) designated is authorized to perform all tasks, including, but not limited to, providing information, responding to inquiries and entering into contractual commitments on behalf of the Bidder. Any and all limitations on the Authority of the designated person(s) should be detailed in

the Bid.

## 5. One Bid per Bidder

1. Each Bidder shall submit only one bid. A Bidder who submits or participates in more than one Bid will cause all the Proposals with the Bidder's participation to be disqualified.

## 6. Cost of Bidding

1. The Bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

2. The Bidder shall be deemed to have satisfied himself before bidding as to the correctness and sufficiency of his bid information for the works and of the rates and prices given in the relevant Schedule or quoted by him, which rates and prices shall, except as otherwise provided, cover all his obligations under the Contract and all matters and things necessary for the proper completion of the works

## 7. Site Visit

1. The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract of construction of the Works. The costs of visiting the site shall be at the Bidder's own expense.

## (B) BIDDING DOCUMENTS

### 8. Contents of Biding Documents

1. The set of Bidding Documents comprise of the documents listed below and addenda issued in accordance with Clause10:

| Section | Particulars |
|---|---|
| 0 | Invitation for Bids (IFB) |
| 1 | Instructions to Bidders (ITB) |
| 2 | Qualification Information Forms |
| 3 | Conditions of Contract |
| 4 | Contract Data |
| 5 | Securities and other forms |
| 6 | Drawings/ Specifications/ Bill of Quantities |
| 8 | Document to be furnished by Bidder |
| 9 | Technical Specification |
| 10 | Form of Technical Bid |
| 11 | Price Bid |

2. Bid Documents can be downloaded from the e-portal. Documents to be furnished by the Bidder in compliance to section IA will be prepared by him and uploaded / furnished as in two parts (refer Clause12).

3. The Bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, technical specifications, Price Bid, forms, Annexures and General Arrangement drawings (if any) in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the Bidder's own risk. Pursuant to clause 26 hereof, bids which are not substantially responsive to the requirements of the Bid Documents shall be rejected.

### 9. Clarification of Bidding Documents

1. A prospective Bidder requiring any clarification of the Bid Documents may notify the Employer in writing at the Employer's Address indicated in Appendix. The Employer will respond to any request for clarification pursuant to Clause 9.3. Copies of the Employer's response will be uploaded on the e procurement website mentioned in the ITB of this Bid Document, including a description of the enquiry but without identifying its source.

2. **Pre-bid Meeting**

   a) The Bidder or his official representative is invited to attend a pre-bid meeting, which will take place at the address, venue, time and date as indicated in APPENDIX.

   b) The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

c) The Bidder is requested to submit any questions in writing to reach the Employer not later than one week before the meeting. The queries received beyond this date will not be entertained.

d) Minutes of the meeting, if applicable, including the text of the questions raised (without identifying the source of inquiry) and the responses given will be uploaded on the e-procurement website. Any modification to the Bid Document that may become necessary as a result of the Pre-Bid Meeting shall be made by the Employer through the issue of addendum and not through the Minutes of Pre-Bid Meeting.

e) Non-attendance at the Pre-Bid Meeting will not be a cause for disqualification of a Bidder.

**10. Amendment of Bid Documents**

1. Before the deadline for submission of Bids, the Employer may modify the Bid Documents by issuing addenda.
2. Any addendum thus issued shall be part of the Bid Documents and shall be uploaded on the website as corrigendum by the Employer.
3. To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at his discretion, extend as necessary the deadline for submission of Bids, in accordance with Sub-clause 20.2 below.

## (C) Preparation of Bids

### 11. Language of the Bid

1. All documents relating to the Bid exchanged by the Bidder and the Employer shall be in the English language. Supporting documents and literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the English language, in which case, for purposes of interpretation of the Bid, such translation shall govern.

### 12. Documents Comprising the Bid

1. The Bid to be submitted online by the Bidder (refer Clause 8.1) shall comprise of scanned copies of the following in 2 (two) separate parts:

**Part I Technical Bid:**
**Envelope I**

(i) Proof of depositing EMD whether through NEFT/ Net Banking/ RTGS/Bank Guarantee;

(ii) Proof of Payment of Cost of Bid Document;

(iii) Qualification information and supporting documents as per forms mentioned in Section IA;

(iv) Certificates, undertakings, declarations as per forms mentioned in Section IA;

(v) Undertaking that the Bid shall remain valid for the period specified in Clause 15.1.

**Part II Financial Bid:** (No hard copy to be submitted)
"Financial Bid" shall comprise

(i) Letter of Bid – Financial Part as specified in Format K

(ii) Financial Bid in the format as provided in the eprocurement portal.

2. Following documents, which are not submitted with the Bid will be deemed to be part of the Bid:

| Section | Particulars |
|---|---|
| 0. | Invitation for Bids (IFB) |
| 1. | Instructions to Bidders |
| Vol. 2 | Scope of Work |
| 3. | Conditions of Contract |
| 4. | Contract Data |
| 5. | Securities & Other Forms |
| 6. | Drawings |

3. The Technical Part shall not include any information related to the Bid price. Where material financial information related to the Bid Price is contained in the Technical Part of the Bid shall be declared non-responsive.

4. Bids submitted by a JV shall include a copy of the Joint Venture Agreement (hereinafter referred to as the "**JVA**") entered into by all the members of the JV. Alternatively, a letter of intent to execute a JVA in the event of a Successful Bid shall be signed by all members and submitted with the Bid, together with a copy of the proposed agreement.

## 13. Bid Price

1. The Contract shall be for the whole Project/Work(s) as described in Section II (Scope of Work), based on the Financial Bid submitted by the Bidder online.

2. The Bidder shall have to quote rates in format referred in Appendix to ITB, in overall percentage, and not item wise. If the bid is in absolute amount, overall percentage would be arrived at in relation to the probable amount of contract given in NIT. The overall percentage rate shall also apply for all items of work.

3. All duties, taxes (including GST) and other levies payable by the Bidder under the contract or for any other clause, shall be included in the rates, prices and total Bid Price by the Bidder.

4. The prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 49 of the Conditions of Contract.

## 14. Currencies of Bid and Payment

1. The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees. All payment shall be made in Indian Rupees.

## 15. Bid Validity

1. Bids shall remain valid for a period not less than 120 (one hundred and twenty) (the "**Bid Validity Period**") days after the deadline date for Bid submission specified in Clause 20. A Bid valid for a shorter period shall be rejected by the Employer as non-responsive. In case of discrepancy in Bid Validity Period between that given in the undertaking pursuant to Clause 12.1 (iv) and the Form of Bid submitted by the Bidder, the latter shall be deemed to stand corrected in accordance with the former and the Bidder has to provide for any additional security that is required.

2. In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the Bidders to extend the period of validity for a specified additional period. The request and the Bidder's responses shall be made in writing. A Bidder may refuse the request without forfeiting his Bid Security. A Bidder agreeing to the request will not be required or permitted to modify his Bid, but will be required to extend the validity of his Bid Security for a period of the extension, and in compliance with Clause 16 in all respects.

## 16. Bid Security (Earnest Money)

1. The Bidder shall furnish, as part of his Bid, a Bid Security in the amount as mentioned in

IFB for the particular work. This Bid Security shall be in favour of **"Chief Executive Officer, Amritsar Smart City Limited",** and shall be payable on the eprocurement portal through net banking payment gateway or by way of Bank Guarantee. Bank Guarantee shall also be uploaded in the eprocurement portal.

2. **While submitting the Bid Security, the Bidder shall carefully choose the modes of payment provided on the eprocurement portal because once a mode is selected then it will not change. If the Bidder has any doubts, it shall contact the helpdesk of eprocurement portal. The phone numbers are provided on the eprocurement portal. If the Bidder chooses any wrong option and is, therefore, not able to submit its bid, then the Employer or eprocurement portal shall not be responsible for non-submission of its bid.**

3. Any Bid not accompanied by an acceptable Bid Security shall be rejected by the Employer as non-responsive.

4. Bid Security submitted online through Net banking/ RTGS/ NEFT will be returned to the unsuccessful bidders as per the procedure and policy of the e-procurement portal and Employer will not be responsible for any delay in refund of such security. Bid Security submitted in the form of Bank Guarantee will be returned after signing of Contract with the successful bidder.

5. The Bid Security of the Successful Bidder will be discharged when the successful Bidder has signed the Agreement and furnished the required Performance Security.
6. The Bid Security may be forfeited:

   (a) If the Bidder withdraws the Bid or seeks to modify, alter, add or subtract or put any rider on any ground whatsoever, after Bid opening during the Bid Validity Period;
   (b) If the Bidder does not accept the correction of the Bid Price, pursuant to clause 27; or
   (c) In the case of a successful Bidder, if the Bidder fails within the specified time limit to:
      (i) Sign the Agreement; or
      (ii) Furnish the required Performance Security.

**17. Alternative Proposals by Bidders**

1. Bidders shall submit offers that fully comply with the requirements of the Bid Documents, including the conditions of contract (including mobilization advance or time for completion), basic technical parameters and requirements as indicated in the drawing and specifications. Conditional offers will not be considered further in the process of tender evaluation. Bidders shall have to furnish the detailed design and working drawings consistent with the basic technical parameters and requirements indicated in the Bid Documents. Further, he shall obtain technical approval of the Engineer for the design and

drawings of each component of the structure in the manner prescribed in the Conditions of Contract and the Technical Conditions.

**18. Format and Signing of Bid**

1. The Bidder shall on-line submit Bid comprising of documents as per prescribed clause 12.

2. Bid shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the Bid.

3. In case the Bidder is a JV, the Bid shall be signed by an authorised representative of the JV on behalf of the JV and so as to be legally binding on all the members as evidenced by a Power of Attorney signed by their legally authorised representatives.

## (D) SUBMISSION OF BIDS

### 19. Sealing, Marking and Submission of Bids

1. Qualification documents (Format A – J) completed in all respects should be submitted on-line as scanned copies in the required format.

2. The Bidder shall place two separate digitally signed files marked "Technical Bid (Cover-I)" and "Financial Bid (Cover-II)".

3. The contents of Technical and Financial Bids will be as specified in clause 12.1 and are to be signed digitally by the Bidders.

4. **No physical Bids shall be accepted by the Employer except the documents mentioned hereunder. Only online Bids shall be considered. The Bidder submitting the Bid shall submit original Power of Attorney/ Board resolution in his/ her favour as specified in the format specified in this document so as to reach the Employer well before the last date stipulated for the submission of Bids. In case of JV, the letter of Intent or JV agreement shall also be submitted. Bid Security, if in the form of Bank Guarantee, shall also reach office of Employer before the last date of submission of bids.**

### 20. Deadline for Submission of the Bids

1. Complete Bids (including Technical) must be uploaded online through the procurement portal before the date and time (as per server clock) indicated in appendix. The Employer does not take any responsibility for the delay caused due to non-availability of internet connection or network traffic jam etc.

2. The Employer may extend the deadline for submission of Bids by issuing an amendment in accordance with Clause 10, in which case all rights and obligations of the Employer and the Bidders previously subject to the original deadline will then be subject to the new deadline.

### 21. Late Bids

1. The electronic bidding system would not allow any late submission of Bids after due date and time as per server time.

### 22. Modification and withdrawal of Bids

1. Bidders may modify or withdraw their Bids before the deadline prescribed in Clause 20.

2. No Bid may be modified after the deadline for submission of Bids.

3. Withdrawal or modification of a Bid between the deadline for submission of bid and the expiration of the original of Bid Validity Period specified in Clause 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid Security pursuant

to Clause 16.

## (E) BID OPENING AND EVALUATION

### 23. Bid Opening

1. The Employer will open all the Bids online in the presence of the Bidders or their representatives who choose to attend at time, date and the place specified in Appendix in the manner specified in Clause 20 and 23. In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day. The Bids shall be evaluated by a Tender Evaluation Committee.

2. The Part-I containing Technical Bid shall be opened first.

3. The Bids accompanied with valid Bid Security will be taken up for evaluation with respect to the Qualification Information and other information furnished in Cover I of the Bid pursuant to Clause 12.1 for pre-qualification of Bidders.
   (i) After receipt of confirmation of the bid security, the pre-qualified Bidder may be asked in writing to clarify or modify his Technical Bid, if necessary, with respect to any rectifiable defects.
   (ii) The Bidders will respond in not more than 4 (four) days of issue of the clarification letter.
   (iii) On receipt of these clarifications the Committee will finalize the list of responsive Bidders whose Financial Bids are eligible for consideration and date of opening of Financial Bids shall be intimated to them.
   (iv) The Employer shall inform, by Post, fax or e-mail, the Bidders, whose Technical Bids are found responsive, date, time and place of online opening of Part-II i.e. Financial Bid as stated in the Appendix. In the event of the specified date being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day. The Bidders or its representative may attend the opening of Financial Bids.

4. Financial Bids of only those bidders will be opened whose technical part were responsive and have been declared qualified in technical evaluation. The remaining Bids shall not be opened. The technically qualified Bidders' names, the Bid Prices, the total amount of each bid, any discounts, such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. Any Bid Price or discount, which is not read out and recorded, will not be taken into account in Bid Evaluation.

### 24. Process to be Confidential

1. Information relating to the examination, clarification, evaluation, pre-qualification of Bidders, comparison of Bids and recommendations for the award of the Contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the Successful Bidder has been announced. Any effort by a Bidder to influence the Employer's processing of Bids, pre-qualification or award decisions may result in the rejection of his Bid.

**25. Clarification of Financial Bids**

1. To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdown of unit rates. The request for clarification and the response shall be in writing, but no change in the price or substance of the Bid shall be sought, offered, or permitted.

2. Subject to sub clause 25.1, no Bidder shall contact the Employer on any matter relating to his Bid from the time of the Bid opening to the time the contract is awarded.

3. Any effort by the Bidder to influence the Employer in the Employer's Bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidder's bid.

**26. Examination of Bids and Determination of Responsiveness**

1. During the detailed evaluation of "Technical Bids" and qualification of Bidders, the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3 and 4; (b) documents has been properly signed; (c) is accompanied by the required securities (d) is substantially and unconditionally responsive to the requirements of the Bid Documents. During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining Bid conditions, i.e. technical specifications, and drawings. Financial Bids shall be opened in respect of Bidders who shall be pre-qualified on the basis of contents/ enclosures/ documents and information included in Technical Part.

2. A substantially responsive "Financial Bid" is one which conforms to all the terms, conditions and specifications of the Bid Documents, without material deviation reservation. A material deviation or reservation is one:

   (a) which affects in any substantial way the scope, quality, or performance of the Works; or

   (b) which limits in any substantial way, inconsistent with the Bid Documents, the Employer's right of the Bidder's obligations under the Contract; or

   (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

3. If a "Financial Bid" is not substantially responsive, it will be rejected by the Employer and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

**27. Correction of Errors**

1. "Financial Bids" determined to be subsequently responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

(a) Where there is a discrepancy between the rates in figures and in words, the rate in words will govern; and
(b) such adjusted bid price shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount the Bid will be rejected, and the Bid security may be forfeited.

**28. Evaluations and Comparison of Financial Bids**

1. The Committee will evaluate and compare only the Bids determined to be substantially responsive in accordance with Sub Clause 26.2.

2. In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid price by adjusting the Bid Price as follows:

   (a) making any correction for errors pursuant to Clause 27, or
   (b) making an appropriate adjustment for any other acceptable variations, deviations, and
   (c) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with clause 22.

3. The Employer reserves the right to accept or reject any variation or deviation. Variations and deviations and other factors, which are in excess of the requirements of the Bid Documents or otherwise result in unsolicited benefits for the Employer, shall not be taken into account in Bid evaluation.

4. The estimated effect of the price adjustment condition under the conditions of contract, during the period of implementation of the Contract, will not be taken into account in Bid evaluation.

5. If the Bid of the Successful Bidder is seriously unbalanced (by more than or less than 25% (twenty five percent)) in relation to the Employer's estimate of the cost of work to be performed under the Contract, the Committee may require the Bidder to produce detailed price analysis for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analysis, the Employer may require that the amount of the Performance Security set forth in Clause 32 be increased at the expense of the Successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the Successful Bidder under the Contract.

## (F) AWARD OF CONTRACT

### 29. Award Criteria

1. Subject to clause 30, the Employer will award the Contract to the Bidder whose Bid has been determined:

   (i) to be substantially responsive to the Bid Documents and who has offered the lowest evaluated Bid Price (L1); and

   (ii) to be within the available bid capacity.

   In no case, the contract shall be awarded to any bidder whose available bid capacity is less than the evaluated bid price, even if the said bid is the lowest evaluated bid. The contract will in such cases be awarded to the next lowest bidder at his evaluated bid price.

### 30. Employer's Right to accept any Bid and Reject any or all Bids

1. The Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

### 31. Notification of Award and Signing of Agreement

1. The Bidder whose bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid Validity Period by cable, telex or facsimile, email, confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay to the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

2. The notification of award of Bid will constitute the formation of the contract, subject only to the furnishing of a Performance Security in accordance with the provisions of Clause 32.

3. The Agreement will incorporate all correspondence between the Employer and the successful Bidder. It will be signed by the Chief Executive Officer, Amritsar Smart City Limited and the successful Bidder within 21 (twenty-one) days of the intimation sent to the Bidder.

4. Upon furnishing by the Successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

5. The Bid Security of the Bidders whose Bids could not be accepted shall be refunded soon after the contract with the Successful Bidder is signed and his Performance Security is obtained.

**32. Performance Security**

1. Within 21 (twenty one) days of receipt of the Letter of Acceptance, the Successful Bidder shall deliver to the Employer a Performance Security (hereinafter referred to as the "**Performance Security**") (to cover the amount of liquidated damages and/ or the compensation for the breach of the Contract) in the form given below for an amount equivalent to 5% (five per cent) of the Contract Price plus additional security for unbalanced Bids in accordance with Clause 28.5 of ITB and Clause 54 of Conditions of Contract valid upto 60 (sixty) days beyond the date of expiry of the Contract Period:

   (i) a bank guarantee in the form given in Section 5 (Securities and other forms); or
   (ii) Fixed Deposit Receipt in favour of the Amritsar Smart City Limited.

2. If the Performance Security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder's option, by a Nationalized/Scheduled Indian Bank or (b) a foreign bank located in India and acceptable to the Employer and the same shall be valid for 60 (sixty) days from the date of expiry of complete contract period including operation and maintenance period. The Bank Guarantee shall be payable at Amritsar.

3. Failure of the successful Bidder to comply with the requirements of Sub-clause 32.1 shall constitute sufficient grounds for cancellation or annulment of the award and forfeiture of the Bid Security.

**33. Forfeiture of Performance Security**

Amount of Performance Security in full or part may be forfeited in the following cases:

1. When the Bidder does not execute the contract within the specified time; or
2. When the Bidder fails to commence the Works within the specified time; or
3. When any terms and conditions of the Contract is breached; or
4. To adjust any established dues against the Bidder.

Notice of reasonable time shall be given in case of forfeiture of Performance Security. The decision of the Employer shall be final in this regard.

**34. Advance Payment and Security**

1. The Employer may provide an Advance Payment on recommendation of Engineer on the Contract Price as stipulated in the Conditions of Contract, subject to maximum amount, as stated in the Contract Data.

**35. Corrupt or Fraudulent Practices**

1. The Employer will reject a Proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question and will declare the firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract with State PWD, CPWD, NHAI, AAI, DRDO or any other Government Agencies or Public sector undertaking, if it at any time

determines that the firm has engaged in corrupt or fraudulent practices in competing for the contract, or in execution.

For the purpose of this Clause:

"**Corrupt Practice**" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in Contract execution.

"**Fraudulent Practice**" means a misrepresentation of facts in order to influence a procurement process or the execution of a Contract to the detriment of the Employer, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish Contract prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition.

## APPENDIX TO I.T.B.

| ITB Clause Reference | Bid Data |
|---|---|
| ITB 1.1 | **The Employer is:**<br>The Chief Executive Officer,<br>Amritsar Smart City Limited,<br>Amritsar |
| ITB 1.1 | Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability under Smart City Mission, for 7.4 km of Outer Circular Road of Walled city passing through major junction such as Hall Gate, Mahan Singh Gate, Chattiwind Gate, Hakima Gate and Lohgarh Gate.<br><br>Construction/implementation phase will be of 28 (twenty-eight) months duration. |
| ITB 4 | The details of available bid capacity are required. |
| ITB 4 | The value of work may be enhanced at simple rate of 8% (eight per cent) per annum to bring it to the present value |
| ITB 4 | The undertaking regarding available bid capacity is required |
| ITB 9.3 | The Pre-Bid Meeting will take place at following date, time and place:<br><br>Date: 22.07.2019 Time: 11:00 AM<br>Place:<br>PMIDC office,<br>Punjab Municipal Bhawan,<br>5th Floor, Plot No. 3,<br>Dakshin Marg,<br>Section 35-A,<br>Chandigarh |
| ITB 15.1 | The Bid Validity Period is 120 (one hundred twenty) days |
| ITB 16.1 | A Bid Security (Earnest Money) amounting to Rs.136.04 Lakhs (Rupees One Hundred Thirty-Six Lakhs Four Thousand Only) is required and the same may be paid online through Net Banking/ NEFT/ RTGS at portal www.eproc.punjab.gov.in. or by way of Bank Guarantee in favour of "Chief Executive Officer, Amritsar Smart City Limited". If the Bidder is a Joint Venture, then the Bid Security shall be submitted by the |

| | |
|---|---|
| | Lead Partner. |
| ITB 19 | The Bids shall be submitted online on **https://eproc.punjab.gov.in** |
| ITB 20.1 | The Bid should be submitted latest by 19.08.2019 03:00 PM |
| ITB 23.1 | The Technical Bid will be opened online in the office of:<br><br>The Chief Executive Officer,<br>Amritsar Smart City Limited,<br>Amritsar. |
| ITB 23.4 | The Financial Bid shall be opened online in the office of:<br><br>Address: The Chief Executive Officer,<br>Amritsar Smart City Limited,<br>Amritsar. |
| ITB 32.1 | The Performance Security shall be in the name of the Chief Executive Officer, Amritsar Smart City Limited, Amritsar |

# Section IA

## Qualification Information Forms

i. Qualification document as detailed below, complete in all respects, should be submitted on-line as scanned copies as per the stipulations of Clause 4.2 of ITB.

Pre-qualification document contains the following forms:

| | |
|---|---|
| FORMAT A | Structure and organisation |
| FORMAT B | Annual turnover |
| FORMAT C | Litigation details - court cases/ arbitration |
| FORMAT D | Details of Contracts of Similar Nature and Complexity |
| FORMAT E | Particulars all Works |
| FORMAT F | Existing Commitments |
| FORMAT G | Availability of Credit Line |
| FORMAT H & I | Affidavit/ Undertaking |
| FORMAT J | Power of Attorney |
| FORMAT K | Financial Bid |
| FORMAT L | JV Information Form |
| FORMAT M | Joint Venture Agreement |

If necessary, additional sheets can be added to the schedules. Such attachments should be clearly marked as follows:

'Attachment1 to Form A, Attachment 2 to Form B' etc.

ii. While submitting the Qualification Information duly filled in, Bidders shall enclose latest copies of brochures of their firm/ company and technical documentation if any giving additional information and proper reference to the brochures.

iii. Each page of Qualification Information shall be duly signed by the Bidder or his authorized representative.

iv. Costs incurred by applicant(s) in making this offer, in providing clarifications or attending discussions, conferences, or site visits shall not be reimbursed by the Employer.

v. Incomplete bids shall be summarily rejected.

vi. The language for submission of application shall be English.

vii. The enclosed Forms should be filled in completely and all questions should be answered. If any particular query is not relevant, it should be replied as 'not applicable'.

viii. Financial data, Project/ Work(s) costs, value of works, etc. should be given in Indian Rupees only except for Works carried out abroad for which figures may be furnished in United States Dollars (USD). Deemed Export Project/ Work(s) procured against International Competitive Bid, though executed within the country and where the currency of bid/ contract is US Dollars or other convertible currency shall be considered as "Works Abroad."

ix. If the bid is made by a firm in partnership, it shall be signed by all the partners of the firm along with their full names and current addresses, or by a partner holding the power of attorney for the firm for signing the application. In such a case a certified copy of the power of attorney should accompany the application. A certified copy of the partnership deed, current address of the firm and the full names and current addresses of all the partners of the firm shall also accompany the application. Such Firm will be required to furnish satisfactory evidence of its existence like copy of Certificate of Registration before the contract is awarded.

x. If the Bid is made by a limited company or a corporation, it shall be signed by a duly authorized person holding the proper/ legal and valid authorization for signing the application, in which case a certified copy of the proper/ legal and valid authorization should accompany the application. Such limited company or corporation will be required to furnish satisfactory evidence of its existence like copy of Certificate of Incorporation before the contract is awarded.

xi. If the Bid is made by a Joint Venture, it shall be signed by the Lead Member of the Joint Venture who shall be authorized by all other JV members through a duly notarized Power of Attorney to participate in the Bid. All the members of the JV shall have authority in the form of Board Resolution/ Power of Attorney from their respective organization, to enter into Joint Ventures, participate in the Bids, etc.

xii. The information furnished must be sufficient for the satisfaction of the Employer to show that the Bidder is capable in all respects to successfully complete the envisaged work.

## Letter of Technical Bid

Date: _____ NIB No.: _____

To

Chief Executive Officer,

Amritsar Smart City Limited,

Amritsar

Subject: Technical Part

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bid Document, including Addenda issued in accordance with the terms and conditions of the tender document.

(b) We offer to execute in conformity with the Bid Document the following Works: *Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission for* 7.4 km of Outer Circular Road of Walled City passing through major junction such as Hall gate, Mahan Singh Gate, Chattiwind Gate, Hakima Gate and Lohgarh Gate.

(c) Our Bid shall be valid for a period of **120** (one hundred twenty) days from the date fixed for the Bid submission deadline in accordance with the Bid Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(d) If our Bid is accepted, we commit to obtain a Performance Security in the amount of 5% (five percent) of the Contract Price for the due performance of the Contract;

(e) Our firm/ JV, including any subcontractors or suppliers for any part of the Contract, have nationalities from the eligible countries;

(f) We are not participating, as Bidder/ member of a JV, in more than one Bid in this bidding process, other than alternative offers, if permitted, in the Bidding Document;

(g) Our firm/ Company/ Director/ Partner has not been debarred by the Central/ any State Government or the Procuring Entity;

(h) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed;

(i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive;

(j) We agree to permit Government of Punjab or the Procuring Entity or their representatives to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by the Procuring Entity;

(k) We declare that we have complied with and shall continue to comply with the

provisions of the Code of Integrity including Conflict of Interest as specified for Bidders in this Bidding Document during this procurement process and execution of the Works as per the Contract;

(l) Other comments, if any:

Name/ address of the Bidder: _____

In the capacity of: _____

Signed _____

Duly authorised to sign the Bid for and on behalf of: _____ _____

Date: _____

Tel: _____Fax: _____

E-mail:_____

**Note**:
*Person signing the Bid shall have the power of attorney given by the Bidder attached with the Bid.*

## DECLARATION FOR ACCEPTING TERMS AND CONDITIONS OF BID DOCUMENT

To, Date:

The Chief Executive Officer,
Amritsar Smart City Limited,
Amritsar.

**Subject: Bid Document dated: [●] for "Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission"**

Sir/ Madam,

I/ We have carefully gone through the Terms & Conditions mentioned in the above referred Bid Document. I/ We declare that all the provisions of this Bid Document are acceptable to my/ our company/ firm who has submitted its Bid as a Bidder for this Project. I further certify that I am an Authorized Representative of my company/ firm i.e. the Bidder and am therefore, competent to make this declaration. I further undertake on behalf of my company/ firm that we shall abide by the Bid including the Financial Bid submitted by my company/ firm.

Yours faithfully,

(Signature of the Bidder)
Name:
Designation:
Seal:
Date:
Business Address:

## Format A

### Information about the Bidder

***(In case of JV: to be filled and signed by each member)***

### STRUCTURE AND ORGANIZATION

| | | | | |
|---|---|---|---|---|
| 1. | The Bidder is | | | |
| | (a) | An individual | | …… |
| | (b) | a Sole Proprietorship | | …… |
| | (c) | a firm in Partnership | | …… |
| | (d) | a Limited Company or Corporation | | …… |
| | (e) | a Joint Venture | | …… |
| 2. | Attach the Organization Chart showing the structure of the organization including the name of the Directors, position of directors, position of officers, JV members, Lead Member. | | | …… …… |
| 3. | No. of years of experience: | | | |
| | (a) | As a Prime Contractor (Contractor shouldering major responsibility) | | …….. |
| | | i) | In own country | …… |
| | | ii) | other countries (specify country) | …… |
| | (b) | In a Joint Venture | | |
| | | i) | in own country | …… |
| | | ii) | other countries (specify country) | ……..…… |
| | (c) | As Sub-Contractor (specify main Contractor) | | |
| | | i) | in own country | …… |
| | | ii) | Other countries (specify country) | …… |
| 4. | For how many years has your organization been in business of similar works under its present name? | | | …….. |
| 5. | Have you ever left the work awarded to you incomplete? (If so, give name of Project/Work(s) and reasons for not completing the work). | | | …… |
| 6. | In which fields of civil engineering construction, do you claim specialization and interest? | | | |

| | | |
|---|---|---|
| | | …… |
| 7. | Give details of your soil and materials testing laboratory, if any (include full range of equipment available; 'make', year, latest calibration date and functional conditions details etc. including present status indicating their availability for the contract (s) being applied for) | …… |
| 8. | Give details of your experience in similar works. | ……<br>…… |

Authorised Signature of Bidder with
date and Office seal

**Format B**

**Annual Turnover**

*(In case of JV, each member to provide the certificate as per the qualification criteria)*

**Bidder's Name: _____** **Date: _____**

| S. No. | Financial Year | Annual Turnover (Rs.) |
|---|---|---|
| **1** | | |
| **2** | | |
| **3** | | |

**Note**: The audited Financial Statements for the corresponding year has to be attached.

Name of the auditor issuing the certificate
Name of the auditor's Firm:
Seal of the auditor's Firm:
Date:

**(Signature, name and designation of the authorised signatory for the Auditor's Firm)**

**Format C**

**Litigation Details - Court Cases/arbitration**

*(In case of JV, to be provided and signed by each member)*

| Name of Bidder | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Name of the Work | Name & Address of the Employer | Title of the Court/ Arbitration case | Name of Court/ Arbitrator | Status (Pending/ Decided) | Disputed Amount (Current Value) | Actual Awarded Amount in decided Court cases/ Arbitration |
| | | | | | | | |
| | | | | | | | |

Authorized Signature of Bidder

with date and Office seal

## Format D

**Works (Similar Works) that show that bidder fulfils Technical Eligibility Criteria as per ITB 4.3 of RFB document**

Bidders should provide information on the Projects that they have completed and which show that they fulfil the eligibility criteria mentioned at Clause 4.3 of the RFB document.

| Sr. No. | Name of Contract | Employer's Contact Address, Tel, Fax | Value of Work | Completion Date | Scope of Work |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| | | | | | |

The projects shall be supported by completion certificates certified by the Client.

Authorized Signature of Bidder

with date and Office seal

**Format E**

**PARTICULARS OF ALL WORKS EXECUTED DURING LAST 7 YEARS**

| Sr. No. | Detail of work | Amount (Rs.) |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Authorized Signature of Bidder
with date and Office seal

**Format F**

**CURRENT CONTRACT COMMITMENTS / WORKS IN PROGRESS**

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

| Current Contract Commitments | | | | | |
|---|---|---|---|---|---|
| **Sr. No.** | **Name of Contract** | **Employer's Contact Address, Tel, Fax** | **Value of Outstanding Work [Current INR Equivalent]** | **Estimated Completion Date** | **Average Monthly Invoicing Over Last Six Months [INR month)]** |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| | | | | | |

Authorized Signature of Bidder/ JV member with date and Office seal

**Format G**

**FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF OVERDRAFT/ CREDIT FACILITIES**

**BANK CERTIFICATE"**

This is to certify that M/s …….……. is a reputed company with a good financial standing.

**If the contract for the Project/ Work(s), namely "……" is awarded to the above firm, we shall be able to provide overdraft/ credit facilities to the extent of INR…… to meet their working capital requirements for executing the above Contract.**

Name of the Bank:……

Senior Bank Manager:…….……..
Address of the Bank:……..

……..

……..
Phone & Fax No.:…….

**Check-List**

| S.No | Criteria | Requirements | Cross Referencing / Page no. at which required information is available (To be mentioned) | Indicate Eligibility Y / N |
|---|---|---|---|---|
| 1 | Solvency Certificate | Solvency certificate from Bidder's bank for 100% (one hundred percent) of the estimated project cost. | | |
| 2 | Undertaking to continue the work for a period of 4 (four) months in case funds are delayed by the Employer | Confirmation certificate to continue the project at the same pace even if department could not make payment upto a period of 4 (four) months. | | |
| 3 | Abandoning | Declaration regarding not abandoned /Black listing for any work of Govt. of Punjab / Union Govt./ other State Govt./ PSU's etc. | | |
| 4 | RFP document fee | | | |
| 5 | Undertaking for Specialized works | | | |

Authorised Signature of Bidder with date and Office seal

**Format H**
**Affidavit**

1. I/ we, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.

2. The undersigned also hereby certifies that neither our firm(s)/ company M/s ____ have abandoned any work under Government of India or Government of Punjab nor any contract awarded to us for such works have been rescinded, during last 5 (five) years prior to the date of this Bid.

3. The undersigned hereby authorize(s) and request(s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding my (our) competence and general reputation.

4. The undersigned understand(s) and agree(s) that further qualifying information may be requested and agrees to furnish any such information at the request of the Departmental / Project implementing agency.

5. The under signed are not debarred for contract work by Government of Punjab or any other Agency of Government of India or any of the State Governments at present. Or the undersigned was debarred for contract work by_____for a period of and have completed my/ our term.

6. The undersigned has never been convicted by any court of law for any of the offences under any Indian/ foreign laws.

_____

(Signed by an Authorized Officer of the Firm/ Company/ Lead Member of the JV)

Title of office:_____

Name of Firm/ JV:_____

Date:

**Format I**

**Affidavit**

I, the undersigned do hereby undertake that our firm/ company i.e. _____ would invest minimum cash up to 25% of the value of the work during implementation of the Contract.

Signed by an Authorised Officer of the Firm

Title of the officer

Name of Firm

Date

**Format J**

**Format for Power of Attorney (POA) for Signing of Bid**

*(Printed on the INR 500/- stamp paper***)**

Know all men by these presents, we….....*[name of the firm and address of the registered office]* do hereby irrevocably constitute, nominate, appoint and authorise Mr/ Ms *[name]*, …… son/daughter/wife of .....and presently residing at ……., who is presently employed with us and holding the position of ....., as our true and lawful attorney (hereinafter referred to as the "**Attorney**") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our application for submission of our Bid for the _____ (Name of the Works) proposed by Amritsar Smart City Limited, Amritsar (the "**Employer**") including but not limited to signing and submission of Bid and other documents and writings, participate in Pre-bid and other conferences and providing information/ responses to the Employer, representing us in all matters before the Employer, signing and execution of all contracts including the Contract Agreement and undertakings consequent to acceptance of our Bid, and generally dealing with the Employer in all matters in connection with or relating to or arising out of our Bid for the said Work and/ or upon award thereof to us and/or till the entering into of the Contract Agreement with the Employer.

AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE, ……., THE ABOVE-NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS …… DAY OF ……. 2019

(Signature, name in block letters,
designation and address of the signatory
delegating the POA)

Witnesses:

Witness 1: Witness 2:

Name: Name:

Address: Address:

Occupation: Occupation:

Accepted

……
…… (Signature)

(Name in block letters,
Title and Address of the Attorney)

**Note:**

1. The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.
2. Wherever required, the Bidder should submit for verification the extract of the charter documents and documents such as a board or shareholders' resolution/ power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.
3. For a Power of Attorney executed and issued overseas, the document will also have to be legalised by the Indian Embassy and notarised in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention 1961 are not required to be legalised by the Indian Embassy if it carries a conforming Apostilled certificate.
4. Power of Attorney shall be submitted in original in the office of Employer at least 3 (three) days before the bid submission date.

**Format K**

**Financial Bid**

To

The Chief Executive Officer
Amritsar Smart City Limited
Amritsar

Subject: Letter of Bid – Financial Part

1. I/ We hereby bid for the execution of the above work within the time specified at the rate (in figures) _____(in words) _____percent below/ above or at par based on the Bill of Quantities and item wise rates given therein in all respects and in accordance with the specifications, designs, drawings and instructions in writing in all respects in accordance with such conditions so far as applicable.

2. I/ We undertake that if our Bid is accepted to commence the works as soon as is reasonably possible after the receipt of the Engineer's notice to commence, and to complete the whole of the works comprised of the works comprised in the contract within the time stated in the document.

3. I/We agree to abide by this Bid for the period of 120 (one hundred twenty) days from the date fixed for receiving the same, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

4. Unless and until a formal agreement is prepared and executed this Bid together with your written acceptance thereof, shall constitute a binding contract between us.

5. I/ We understand that you are not bound to accept the lowest or any tender you may receive.

**Note**:

i. Only 1 (one) rate of percentage above or below or at par based on the Bill of Quantities and item wise rates given therein shall be quoted.
ii. Percentage shall be quoted in figures as well as in words. If any difference in figures and words is found lower of the two shall be taken as valid and correct rate. If the bidder is not ready to accept such valid and correct rate and declines to furnish Performance -Security and sign the agreement his earnest money deposit shall be forfeited.
iii. In case the percentage "above" or "below" is not given by a bidder, his bid shall be treated as non-responsive.
iv. All duties, taxes (including GST), and other levies payable by the bidder shall be

included in the percentage quoted by the bidder.

Dated this __day of 2019

Signature in the capacity of _____

Duly authorized to sign bids for and on behalf of _____
(in block capitals or typed)

Address_____

**Format L**

**Bidder's JV Information Form**

*(to be filled for each member of Bidder's JV)*

Date: _____

RFB No. and title: _____

| |
|---|
| Bidder's JV Name: |
| JV Member's Name: |
| JV Member's Country of Registration: |
| JV Member's Year of Constitution: |
| JV Member's Legal Address in Country of Constitution: |
| JV Member's authorised representative information:<br>Name: _____<br>Address: _____<br>_____<br>Telephone/ Fax numbers: _____<br>E-mail address: _____ |
| Attached are copies of the original documents of:<br>a. Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above<br>b. In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and that they are not under the supervision of the Employer. |

**Format M**

**Joint Venture Agreement (Maximum Three Members)**

*[To be executed on Stamp paper of appropriate value]*

THIS JOINT BIDDING AGREEMENT is entered into on this the …… day of …… 2019

**BETWEEN**

1. ……, a company/ firm/ sole proprietorship having its registered office at …… (hereinafter referred to as the **—First Part** which expression shall, unless repugnant to the context include its successors and permitted assigns)

**AND**

2. ……, a company/ firm/ sole proprietorship having its registered office at …… (hereinafter referred to as the **—Second Part** which expression shall, unless repugnant to the context include its successors and permitted assigns).

**AND**

3. ……, a company/ firm/ sole proprietorship having its registered office at …… (hereinafter referred to as the **—Third Part** which expression shall, unless repugnant to the context include its successors and permitted assigns).

The above-mentioned parties of the FIRST, SECOND and THIRD are collectively referred to as the **—Parties** and each is individually referred to as a **—Party**

**WHEREAS**,

A. **Amritsar Smart City Limited, represented by its Chief Executive Officer and having its office at SCO 21, 2nd Floor, Distt. Shopping Complex, B-Block, Ranjit Avenue, Amritsar (hereinafter referred to as the "Procuring Entity" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) has invited applications (the "Applications") by its Request for Bids No. …… dated …… (the "RFB") for "Selection of Bidders for Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability under Smart City Mission".**

B. The Parties are interested in jointly Bidding for the Works as members of a Joint Venture Agreement (the **"JVA" or the "Agreement"**) and in accordance with the terms and conditions of the RFB document and other Bid documents in respect of the Works, and

C. It is a necessary condition under the RFB document that the members of the JV shall enter

into a Joint Bidding Agreement and furnish a copy thereof with the Application.

**NOW IT IS HEREBY AGREED as follows**:

**1. Definitions and Interpretations**

In this Agreement, the capitalised terms shall, unless the context otherwise requires, have the meaning ascribed thereto under the RFB.

**2. JVA**

(a) The Parties do hereby irrevocably constitute a Consortium/Joint Venture (the "**JV**") for the purposes of jointly participating in the Bidding Process for the Works. The Parties confirm that all JV members shall sign the Contract Agreement.

(b) The Parties hereby undertake to participate in the Bidding Process only through this JV and not individually and/ or through any other consortium constituted for this Works, either directly or indirectly or through any of their associates.

**3. Covenants**

The Parties hereby undertake that in the event the JV is declared the Successful Bidder and awarded the Contract, the JV members shall enter into a Contract Agreement with the Procuring Entity and, through its lead partner, undertake to perform all its obligations in compliance with the Contract Agreement for the Works.

**4. Role of the Parties**

The Parties hereby undertake to perform the roles and responsibilities as described below:

(a) Party of the First Part shall be the Lead Member of the JV and shall have the power of attorney from all Parties for conducting all business for and on behalf of the JV during the Tendering Process, for execution of the Contract Agreement is entered into with the Procuring Entity and until the completion of the Project Work; Party of the First Part shall be the ……. and
(b) Party of the Second Part shall be the [■]
(c) Party of the Third Part shall be the [■]

**5. Joint and Several Liabilities**

The Parties do hereby undertake to be jointly and severally responsible for all obligations and liabilities relating to the Works and in accordance with the terms of the RFB, Bidding Document and the Contract Agreement.

**6. Percentage Participation in the JV**

(a) The Parties agree that the proportion of percentage participation in works among the Parties in the JV shall be as follows:

First Party (Lead Member): [should have at-least 51% (fifty one percent) participation]
Second Party: [should have at least …..% (….. percent) participation]
Third party: [should have at least ……% (….. percent) participation]

(b) The Parties undertake that they shall collectively hold 100% (one hundred percent) of the percentage participation of the JV at all times until the completion the Contract of the Works.

**7. Representation of the Parties**

Each Party represents to the other Parties as of the date of this Agreement that:

(a) such Party is duly organised, validly existing and in good standing under the laws of its incorporation and has all requisite power and authority to enter into this Agreement;

(b) the execution, delivery and performance by such Party of this Agreement has been authorised by all necessary and appropriate corporate or governmental action and a copy of the extract of the charter documents and board resolution/ power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the JV Member is annexed to this Agreement, and will not, to the best of its knowledge:

i. require any consent or approval not already obtained; or
ii. violate any Applicable Law presently in effect and having applicability to it; or
iii. violate the memorandum and articles of association, by-laws or other applicable organisational documents thereof; or
iv. violate any clearance, permit, concession, grant, license or other governmental authorisation, approval, judgement, order or decree or any mortgage agreement, indenture or any other instrument to which such Party is a party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or
v. create or impose any liens, mortgages, pledges, claims, security interests, charges or encumbrances or obligations to create a lien, charge, pledge, security interest, encumbrances or mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Agreement.

(c) this Agreement is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and

(d) there is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its associates is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfilment of its obligations under this Agreement.

**8. Termination**

This Agreement shall be effective from the date hereof and shall continue in full force and effect until the Operation and Maintenance is completed under and in accordance with the Contract Agreement, in case the Contract is awarded to the JV. However, in case the JV is either does not get selected for award of the Contract, the Agreement will stand terminated in case the Applicant is not pre-qualified or upon return of the Bid Security by the Employer to the Bidder, as the case may be.

**9. Miscellaneous**

(a) This Joint Bidding Agreement shall be governed by laws of India.

(b) The Parties acknowledge and accept that this Agreement shall not be amended by the Parties without the prior written consent of the Employer.

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

| | |
|---|---|
| SIGNED, SEALED AND DELIVERED | SIGNED, SEALED AND DELIVERED |
| For and on behalf of | For and on behalf of |
| LEAD MEMBER by: | SECOND/ THIRD |
| (Signature) | (Signature) |
| (Name) | (Name) |
| (Designation) | (Designation) |
| (Address) | (Address) |

In the presence of:

| | |
|---|---|
| (Witness 1) | (Witness 2) |

***Notes**:*

1. *The mode of the execution of the Joint Bidding Agreement should be in*

*accordance with the procedure, if any, laid down by the Applicable Law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.*

2. *Each Joint Bidding Agreement should attach a copy of the extract of the charter documents and documents such as resolution / power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the Consortium Member.*
3. *For a Joint Bidding Agreement executed and issued overseas, the document shall be legalised by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney has been executed. However, the Power of Attorney provided by Applicants from countries that have signed the Hague Legislation Convention 1961 are not required to be legalised by the Indian Embassy if it carries a conforming Apostiled certificate.*

**FINANCIAL BID/ PRICE SCHEDULE**
***(TO BE FILLED ONLINE ONLY; This is only a template)***

| **SL. NO** | **Particulars of work** | **Qty** | **Rate** | **Amount (Rs.)** | **Bidders Quoted percentage** ***(above/ below/ at par)*** |
|---|---|---|---|---|---|
| 1 | Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission | 1 | | 1,36,03,90,649 | |
| | Total (Round off) | | | | |

**Total Amount= Rs……**
**Total Amount = (in words)**

Note:

1. If there is a discrepancy between the unit price and total price, the unit PRICE shall prevail.
2. This format is to be filled online only. Any hard copy submission of the Financial Bid shall lead to rejection of the Bid.

Signature of Authorized Representative _____

Name & Designation _____

Name of Bidder: _____

Business Address _____

Date: _____

Seal of the Bidder_____

# SECTION - II

## SCOPE OF WORK

*(Detailed scope of work shall be referred from Volume II)*

# SCOPE OF WORK

1. **Name of Work:**

   Redevelopment of Outer Circular Road of Walled City at Amritsar as a "Smart Road"

2. **Project Road and Influence Area**

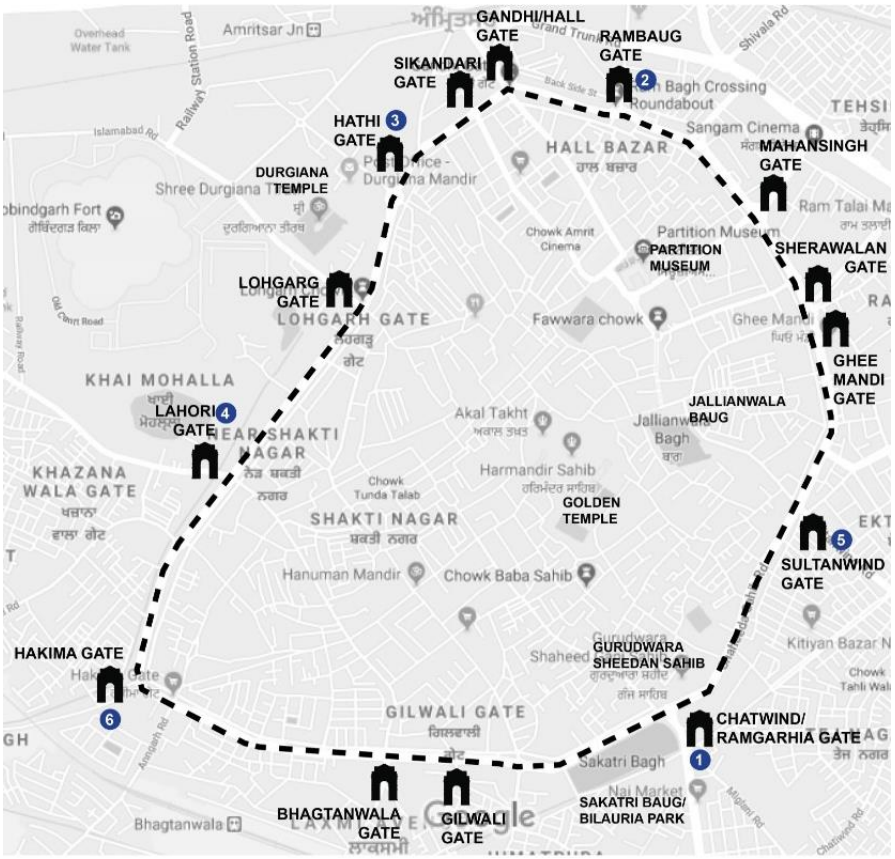
Amritsar's urban expansion has seen an outward growth anchored in the centre by Sri Harmandir Sahib. The Galliara, as the immediate environs of the Holy centre came to be known, formed the first ring of built development.

This urban expansion is pivoted around the Walled City- characterized by high density development housing the city centre for commerce, governance, and religion etc – all within a compact area of barely 2km x 2.5km - with Sri Harimandir Sahib as the nucleus of all activity impacting growth.

The fortifications of the Walled City created the second ring surrounding the holy centre and historic city that established itself around it. While the fabric of the fortifications does not exist in their entirety on this edge, the footprint of this edge exists today as an important ring of movement, activity, commerce and more, called the circular road. This 7.4 km road has 12 (twelve) gates of the historic fortification (Figure:1-1) exist as key nodes and point of entry into the historic city. Activity patterns are distinct between the gates and offer insight into how the character of the edge has developed vis-à-vis activity patterns seen within the Walled City and in the buffer immediately surrounding it.

As of today, circular road is very stressed due to high population density, commercial activities and religious and tourism attraction. Non-uniform geometry, aboveground utilities, lake of pedestrian area, shared carriageways for motorised and non-motorised makes this area unaesthetic and highly vulnerable for pedestrian and NMT.

Thus, there is an urgent need for planning proposals to work within a framework that anticipates mounting pressures on the Walled City and environs of Sri Harimandir sahib therein and formulates designs to de-stress this centre. After series of discussions, circular road has been considered to be developed as "Smart Road" to de-stress the core city and to provide space for all road users.




*12 gates of Historic Fortification*

***Challenges and Issues on Circular Road***

- Major Variations in ROW resulting to bottlenecks.
- Significant movement of NMT vehicles along the entire corridor.
- Pedestrian Facilities are insufficient and poorly maintained.
- Haphazard on-street parking by private vehicles resulting in reduced carriageway width.
- Traffic congestion due to indiscriminate stopping / parking of Autos, E-Rickshaws and cycle rickshaws at junctions.
- Encroachment by commercial establishments is severe and will be difficult to control post development.
- Overhead powerlines.
- Lack of data and mapping of underground utilities.

Project Influence Area (PIA) is main, old and core part of the city known as Walled City and surrounding, consists on major transportation and tourist hubs e.g. ISBT, Railway station and Gobindgarh fort etc.

Besides an important tourist destination (due to the existence of Golden Temple, Durgiana Mandir, Jallianwala Bagh, etc.), the importance of PIA can be assessed as follows:

- It has large whole sale market with major commodities of production and export being woollen blankets, embroidered clothes, printed textiles, shawls, carpets, food items, such as papad, pickles, etc.

- It has also emerged has a great centre of heritage and historical significance. The history of Amritsar (mainly in PIA) is more than 400 (four hundred) years old and is intricately intertwined with the birth of Sikh religion.
- Heritage Corridor attracts lakhs of tourist and resident to walk free and peacefully
- ISBT and railway station is lies within 0.5km of Circular road which impact directly and further create pressure in terms of noise, pollution and congestion.
- Gobindgarh fort on west side is one of the emerging tourist destinations in the City is just 0.5km from Lohgarh Gate.

Walled City constituting 2.5 % or 1/41th (3.47 sq.km) of the total city area (142.37sq.km) houses 15% or 1/6th of the M.C.A population (1,60,000 persons approximately). It has been observed that 93% of the workers in Amritsar city are engaged in tertiary activities, 4% in household industry and 3% in primary activities i.e. cultivators and agricultural labourers.

The Deputy Commissioner, an officer belonging to the Indian Administrative Service is in charge of general administration of the District. He is generally a middle-level IAS officer of Punjab Cadre. As the District Magistrate, he also effectively the head of the police force. A Municipal Corporation is responsible for the management of public works and health systems in the city of Amritsar. The Municipal Corporation is a democratic body of councillors and is presided over by the Mayor, who is elected by the councillors. At present, there are more than 70 (seventy) councillors.

There is a felt need for reviving the storm water disposal system of the city. Currently most of the city has ineffective infrastructure related to storm water drainage. At present, in most of the areas in the Walled City the sullage is discharged directly into the road side open drains which join the sewerage manhole after flowing for some distance. This creates very unhygienic condition in the Walled City and invites various diseases in the city.

Power supply to the Circular smart Road area is fed from 132/66/11 KV Substation at Hakima Gate and Chattiwind, Amritsar through 11 KV Overhead line. One feeder from Ghee Mandi 66/11KV substation also in some areas, 11 KV Cable tied along the 11KV pole of 11 KV overhead line. 415-volt supply (LT Supply) is distributed through overhead lines and the individual consumer is fed through service wire connected from 415 V LT poles.

## 3. Objective and Scope

Main objective of “Smart Road” assignment in Amritsar city is to improve aesthetic, space for all road users, lying of all the utilities line below the ground in manner to sustain for long term while maintaining the old heritage look of the city. It also constitutes the proposal of strategic improvement of the overall traffic movement including non-motorised and pedestrian with an aim to reduce congestion and friction in mobility.

Streets perform certain basic functions in the built environment such as providing routes for people vehicles and public transport, and accommodating utility services and drainage systems. The design of a street affects how successful it is in performing these functions,

and it can also vitally affect the urban character of a neighbourhood and influence how people use the street and interact with each other on it. The quality of a street and its connections can affect whether people choose to walk or cycle, or take the car. It can affect whether people feel safe. Thus, the character of the street needs to be developed in such a way so that along with the functions which it has to perform, such as safety, accessibility and connectivity, other purposes such recreational activities, resting places, interactive neighbourhood, and so on are also encouraged. Under the current project, the main road in the ABD area in Amritsar adding up to a total length of 7.4 km have been taken up to the above aspects of usable and pedestrian friendly streets. It is proposed to undertake the work of redesigning of the street, retrofitting of footpath and road, undergrounding of electrical limes, place making on road, junction redesigning etc. amongst other improvements on the street.

The proposed design considers the visitor convenience, universal access, local coherence and service integration on the iconic major road of the old city.

The project scope comprises the reorganization of the spaces along the road and introducing urban design features onto the road facilitate the pedestrian/visitor movement as well as the other activities taking place on the road. The redesigned section of the road is as per the carrying capacity and the existing traffic circulation of the road. The various components of proposed project are stated further.

## 3.1 Scope of Civil and Landscaping Work

- Development and strengthening of carriage way with uniform lane widths and geometric designs of roads and junctions as per street design standards.
- Provision of design features on the junctions such as table top crossing, kerbs as per turning radius, yellow box junctions etc.
- Construction of pathways along the roads and provide roads as per the lanes and carriage-way as per the proposal, paving the pedestrian pathways as per the design.
- Construction of NMT (non-motorised traffic) tracks along the roads and provide roads as per the lanes and carriage-way as per the proposal, paving the tracks as per the design and technical specifications.
- Construction of RCC utility ducts for water, power and optical fibre cables (OFC) as per the design and specifications.
- Construction bus bays, auto bays and on-street parking along the roads as per the design.
- Provision of medians as per the design.
- Provision of light-poles on the pathways as per the Plan.
- Provision of street furniture such as benches, dust-bins etc.
- Provision of other features such as bollards, ramps for physically challenged, landscaping features, plantations with tree-guards etc.
- Level of roads to be maintained as existing and longitudinal/lateral gradient to be maintained as per IRC standard.

- Recently laid gas pipelines to be assessed as per the norms and guidelines issued by "Petroleum and natural gas regulatory board".
- Desilting, replacement and relining of Sewerage and Storm pipelines along the Circular Road subject to CCTV Survey
- Provision of 614 numbers of Vending cart to Street vendors
- Provision of Special Enforcement Zone and deployment of Traffic Marshals
- The Scope of Work of Bidder is not limited to the major item of civil works as elaborated above but includes all civil works required for the successful completion & commissioning works concerned of the project without any extra cost.
- The Scope of Work also includes sampling & testing of construction material on the specimens taken during execution of the work. The testing shall be performed by a separate agency, approved by the Engineer–in-Charge.
- Site office, cement & other construction material storage go downs and fabrication yard for reinforcement, inserts etc. shall be constructed by the successful Bidders at his own cost.
- All construction equipment required for execution of the work shall be arranged, procured & hired by Successful Bidders at his own cost along with operations, skilled & semiskilled personnel. The Successful Bidders shall also furnish a list of construction equipment to be deployed by him.
- Site for storing the equipment/material within a reasonable distance from the proposed installation shall be provided by the client. However, construction of temporary sheds/ barricades for the temporary store, site office as well as safety and security of equipment shall be in the successful Bidder's scope.
- Any other work as directed by Engineer-in-Charge.
- Please refer **Annexure A** for Plans, Cross-section details and Electric works drawings, **Annexure B** for Traffic Management Proposal and **Annexure C** for Bill of Quantities.

The type and character of the outer circular road needs to be carefully detailed to respond to the functions it performs, i.e. providing mobility or access or both. Safety of road users is a major concern now because the number of traffic accidents and fatalities on urban roads has continued to increase in the past few years. Therefore, application of appropriate geometric design standards on urban roads is essential to ensure the safety to all road users. A design of the entire road cross-section holds considerable importance, as

- It governs the design speed of vehicles
- Reflects prioritization in space allocation
- Introduces concepts of universal design and traffic calming

Listed below is a brief list of standards and guidelines which required to be followed while designing the improvement proposals

- IRC:35-2015- Code of Practice for Road Markings (Second Revision)
- IRC:67-2012- Code of Practice for Road Signs (Third Revision)
- IRC:99-2018- Guidelines for Traffic Calming measures in Urban and Rural Areas (First Revision)
- IRC:70-1977- Guidelines on Regulation and Control of Mixed Traffic in Urban Areas
- IRC:65-2017- Guideline for Planning and Design of Roundabouts

- IRC:11-2015- Recommended Practice for the Design and Layout of Cycle tracks (First Revision)
- IRC:103-2012- Guideline for Pedestrian Facilities
- IRC:119-2015- Guidelines for Traffic Safety Barriers
- IRC:86-1983- Geometric Design for Roads in Urban Area
- IRC: SP:41-1994-Guidelines for the Design of At-Grade Intersection in Rural and Urban Areas
- IRC: SP:84-2014- Manual of Specifications & Standards for Four Laning of Highway
- IRC: SP:90-2010- Manual for Grade Separators and Elevated Structures
- IRC:103-2012- Guidelines for pedestrian facilities (First Revision)
- Design of Urban Roads: Code of Practice Part-1 – Cross sections. (Ministry of Urban Development, Government of India)
- Design of Urban Roads: Code of Practice Part-2 – Intersections. (Ministry of Urban Development, Government of India)

## 3.2 Scope of Work for Electric Works

To implement System Improvement & Augmentation Scheme for existing Electrical Network in Circular Smart Road area, Amritsar in Punjab on "Turnkey basis" with operation and maintenance of the electrical distribution system for five years.

The proposed system envisages the following:

(a) Supply, laying, termination and commissioning of 11 KV 3Cx300 sq.mm XLPE armoured cable in trenches from Hakima Gate, Chattiwind, Hall Gate and Ghee Mandi substation to field RMUs at Circular Road. Proposed 11 kV feeders shall be double of existing feeders. One additional feeder shall run along whole of length.

(b) Installation of 11/0.443 KV 135 nos. 500 kVA customised Compact Substations consisting of Ring Main Unit (RMU), oil type Transformer and LV compartment in one enclosure with Feeder Remote Terminal Unit (FRTU) and SCADA connectivity in place of pole mounted oil filled transformers so as to monitor the distribution system very effectively. The SCADA connectivity is ensured through modem. The customisation is done so that any of the equipments such as RMU, Distribution transformer and LT panel are separate and can be replaced easily.

(c) Proposed kVA capacity is 67500 against existing 30176 kVA.

(d) Design, fabrication of RCC cable trench with MS support for laying 11 KV cables and 415 Volt cables from CSS to feeder pillars.

(e) Design, fabrication and installation of PVC duct for branching HT line to streets.

(f) Design, supply and Installation of DWC duct pipe in buried cable trench for laying service cable from feeder pillar to consumers.

(g) Design, Supply and Laying of XLPE/ PVC cables/ telephone ducts for distribution of power in 11KV and 433 V which replaces the 11KV, 433V and other overhead lines.

(h) Design, Supply and installation of 11KV three / four-way Ring main Units shall be installed in market area to provide 11 KV power to private transformers and for transformers installed for interior roads which are fed from the existing overhead lines.

(i) Installation of 433 Volt feeder pillar for providing service connection to individual consumers though underground cables.

(j) Credit of old transformers have been considered

(k) New chemical earths shall be provided to all equipments.

(l) All feeders shall start from EHT substation main 11 kV panel. Additional 2 no. VCB's shall be provided each at all four EHT substations.

(m) Installation of Lighting poles, LED lights, lighting feeder pillar with automatic lighting control system.

(n) Levelling the Complete Area, earmarked for work.

(o) RCC cable Trenches / RCC duct banks for road crossing, manholes, RCC cover slab etc. as required in the area for incoming and outgoing Cables etc.

(p) Excavation, back filling and levelling for buried cable trenches / earth pits etc.

(q) All materials including cement and steel required for the civil and Electrical work is in the scope of the contractual / executing agency.

(r) The scope of civil works for bidder covers design, engineering, supply of labour & materials, transportation, construction and commissioning of entire civil engineering works required for installation & erection of all the Cables 11KV and 1.1 KV Cables for the project area facilities etc. as designed and / or supplied by him.

(s) Soil excavation and back filling if required for Construction of RCC cable Trench and Cables and other works trenches as and where required.

(t) RCC cable trench connecting the feeding and receiving substation and plot with pre-cast RCC cover slab all along & encased HDPE pipe at all the locations.

(u) Drainage arrangement in cable trenches.

Apart from the urban revitalization of the roads and junctions, the project also includes the setting up of a traffic movement scheme in the subject area. This traffic scheme has been developed in order to improve the traffic movement scenario, drastically reduce congestion on the roads, further reducing the pollution and environment degrade in the area, improve the functionality of the roads and streets. The proposed scheme of the traffic movement has been developed in context with the proposed designs of the roads and junctions which makes it important to establish this movement scheme and concept. The features of the traffic scheme have been described in **"Annexure B"**.

### 3.3 Scope of Work for Sewerage and Drainage Works

a) Cleaning and de-silting of entire Sewerage on the circular Road (for CCTV and ascertaining the condition of sewer for repair works)
b) Replacement of damaged brick sewers on the periphery of walled city with new sewer

line using RCC NP3 with HDPE lining (only the damaged portion of the pipe length shall be replaced). .

After CCTV survey, contractor shall submit the the CCTV footage report with analysis stating the condition of sewer in the various stretches of the sewer network on the circular road. The report shall include stretches where pipeline is damaged and require replacement. On the peripheral road, the existing sewer line shall be replaced by appropriate dia RCC pipeline and the connections to the existing brick sewer shall be re-connected to the new sewer line. Though laying of sewer line at busy peripheral road require traffic management to avoid inconvenience to the people. However, proper planning and implementation, this inconvenience could be minimized.
The layout of these pipes has been presented in drawing no. DI1245-101-100/RFP/SEW/NET/04 and the dia-wise lengths of sewers has been presented in table below.

Table 0-1: Dia-wise length of pipes for CIPP / MWSL lining and replacing brick sewers by new pipes

| S.N. | Existing Brick sewer dia/ size | Proposed Dia of Pipe | Length (m) |
|---|---|---|---|
| Replacing existing brick sewer with new RCC pipelines | | | |
| 1 | 600X900mm | 800 | 2,584 |
| 2 | 750X1150mm | 900 | 245 |
| 3 | 950X1450mm / 1050mm | 1,100 | 2,317 |
| 4 | 1150mm, 1200mm | 1,200 | 1,669 |
| 5 | 1300mm, 1350mm, 1450mm | 1,400 | 1,641 |

The actual length of sewer and requirement of rehabilitation of sewer shall be reviewed after de-silting and evaluating CCTV footage by a “special technical committee” to be constituted by the competent authority through PMIDC / Local Government Department/ASCL. Replacement of sewer shall be done only for the length for which sewer is found damaged. Replacement of sewer shall be undertaken between the manholes.
After construction of new sewer line, the existing brick sewer on the periphery of walled city shall be abandoned.

## 3.4 Traffic Management during Construction

During construction works for road improvement plan of the outer circular road, there are probabilities of disruption or delay to existing traffic, and resultant inconvenience to road users. There is need to ensure the continued effective function of the carriageway during such works for which necessary plan and traffic management measures are to be prepared and implemented during construction activities. This document outlines broad scope of activities to be undertaken by the contractor:

1. To conduct trial run on the identified stretches of road in ABD area.

2. To prepare traffic management plan during construction of road network including special arrangement for special days/festive season.

The contractor is required to submit a structured approach for the development of a traffic management strategy which shall be considered, to minimize delay and inconvenience for road users during construction of road alignment.
The contractor shall be responsible for the control, guidance in direction of traffic movement and protection of all road and pedestrian traffic along the entire road improvement stretch, which may be affected by carrying out of the Works, and would manage all such traffic to minimise any delays and disruptions to vehicular and pedestrian access and the movement of road traffic. These plan/strategies need to be discussed and approved by the Traffic Police, Nagar Nigam and other relevant authorities before implementation on ground.

The contractor shall ensure the effects of works on the control, direction and management of traffic, in view to:

- Promote the continuous, safe and efficient movement of traffic;
- Maintain the traffic carrying capacity of Affected Road; and
- Minimise any delays and disruptions to traffic and the movement of traffic.

The contractor, during the entire contract duration, will have to develop, implement, maintain and update the Traffic Management Plan to include details, as a minimum, of:

- Road user safety;
- Proposed traffic arrangements to manage users, including vehicular, cyclist, pedestrian and rickshaws on Affected Roads;
- Access arrangements for residents, local businesses and their customers and other organisations;
- Arrangements for construction vehicle parking
- Parking requirements – alternate arrangements (if required) to be discussed with authorities control long term on-street parking of vehicles and guide them to the designated parking areas
- Enforce the one-way movements on the selected roads in a stringent manner.
- Cease traffic management activities as and when requested by the client or the Amritsar Traffic Police.
- Update the Traffic Management Plan in accordance of the site requirement.
- Trial run to be conducted for the one-way movement for the identified stretch.

During construction hardware in terms of signages, traffic furniture is required at critical locations. Some of the traffic furniture have been listed below

| |
|---|
| Standard Traffic Cone |
| Barricades |
| Traffic Torch |
| Direction Blinkers |

| |
|---|
| Lighting (bulb on barricade) |
| Signage poles |
| Pedestrian path railing (wherever space permits) otherwise traffic cones and taping for pedestrian path |

Signs that shall be used at the construction site and the carriageways are as provided in the figure given below, and not limited to only the provided signs but also all the relevant signs used during construction activities and blockages along roadways. IRC: SP:55-2015 to be referred to prepare the TMP for construction site. Traffic signages needs to be installed at strategic locations as discussed by Traffic police. Following traffic signages to be installed (but not limited to):

| | |
|---|---|
| 1 | No Parking |
| 2 | Short term Parking Area |
| 3 | Informatory Signage |
| 4 | Temporary diversion signages |
| 5 | No Entry |
| 6 | No Standing & Stopping |
| 7 | Speed Limit |
| 8 | Under construction Zone |
| 9 | Bus and heavy vehicles timings |
| 10 | Cycle & Pedestrian Only |
| 11 | Compulsory Left |
| 12 | Compulsory Right |
| 13 | Stop |
| 14 | Pedestrian crossing |
| 15 | U Turn |
| 16 | Signage at Junction |


*Sample Road Signages*

Trial run to be carried for the identified stretch as shown in the figure below, which includes section from

- Chattiwind Chowk to Gilwali Chowk
- Gilwali Chowk to Bhagtanwala Chowk
- Bhagtanwala Chowk to Hakima Gate
- Hakima Gate to Lohgarh Gate
- Lohgarh Gate to Hathi Gate
- Hathi Gate to Sikandari Gate
- Sikandari Gate to Hall Gate
- Hall Gate to Rambagh Gate
- Rambagh Gate to Gumbad Chowk
- Gumbad Chowk to Mahan Singh Gate
- Mahan Singh Gate to Ghee Mandi
- Ghee Mandi to Chattiwind

Following points to be considered:

- The trial run to be carried out for at least 3 days, time preferably on the normal days (when there are no major religious activities planned).
- Before implementing the trial run, the contractor should prepare a plan of action which needs to be approved from the client and Traffic Police.
- The Traffic management scheme will be published in the newspapers and handouts will be distributed to inform the local public of the area, starting at least 2 days prior to the first test run day.

Contractor has to assist traffic police by deploying sufficiently trained traffic marshals to regulate the traffic.

## 4. WORK PLAN, EQUIPMENTS & STAFFING

Work Plan will be divided into phases:

a) Design and Development
b) Construction

### 4.1 Design and Development

This phase starts from the date of signing of the Agreement to the date of approval of GFC. The total timeline for this phase is 2 months w.e.f. from the date of signing of Agreement. Applying the design principles, objective and expected outcomes illustrated in the document as well as attached drawings/documents provided by the employer, the contractor must develop on the concept provided, to create a good for construction (GFC) drawings package, which on approval, shall be followed by on-site implementation. During this process, the contractor shall review the concepts design and planning for betterments or improvements, which may be incorporated to better achieve the Employer's goals and objectives. These betterments, if any, shall be submitted by the contractor to the Client representative/PMC for review and for the approval before the closure of the Good for construction drawings stage.

*Table 0-2: Key Deliverables by the Contractor during Design and Development Period*

| S.No. | Task | Task Details | Time Frame |
|---|---|---|---|
| 1 | Surveys and Investigation | - Contractor shall conduct all investigations required for design and execution of project like traffic studies and road investigations, Inventory of roads, Geo-tech investigations minimum 3 m below the hard rock or as per the BIS standards and for its structural stability and propose any new pavement, junction improvements, if required. | 2 Months from Award |
| 2 | Revision of Cross-sections | - Based on the revised cross section, traffic and other relevant parameters, contractor will have to design the geometry of road and pavement etc. and get it vetted and approved by 'Engineer in Charge'. | - Within 2.5 Months of Award |
| 3 | Development Stage | - During the development phase, everything that will be needed to implement the project is arranged. Potential suppliers or subcontractors are brought in, a schedule is made, materials and tools order plan to be made, and instructions are given to the personnel and so forth. All matters must be clear for the parties that will carry out the | - Along with the Task 1 &2 |

| | | | |
|---|---|---|---|
| | | implementation. | |

### 4.2 Construction Phases

Outer circular road is one of the major corridors in Amritsar core city area. For smooth operation of the road during construction, construction of the road has been divided into 7 phases. 7 phases are listed hereunder.

*Table 0-3: Construction Phases*

| S. No. | Construction Phases | Section-1 | Section-2 |
|---|---|---|---|
| **1** | Phase-1 | Chattiwind Chowk to Gilwali Chowk | - |
| **2** | Phase-2 | Gilwali Chowk to Bhagtanwala Chowk | - |
| **3** | Phase-3 | Bhagtanwala Chowk to Hakima Gate | Mahan Singh Gate to Ghee Mandi |
| **4** | Phase-4 | Hakima Gate to Lohgarh Gate | Gumbad Chowk to Mahan Singh Gate |
| **5** | Phase-5 | Lohgarh Gate to Hathi Gate | Rambagh Gate to Gumbad Chowk |
| **6** | Phase-6 | Hathi Gate to Sikandari Gate | Hall Gate to Rambagh Gate |
| **7** | Phase-7 | Sikandari Gate to Hall Gate | Ghee Mandi to Chattiwind |

*Table 0-4: Key Tasks/ Deliverables by the Contractor during Construction Period*

| S.No. | Task | Task Details | Time Frame |
|---|---|---|---|
| 1 | Traffic Management | For safe circulation of traffic during construction, traffic management is required which includes barricading of work zone, signage and alternate path for circulation. Approval of the same is required from Engineer in Charge. | It will go Phase wise and need to be implement in 7 (seven) days before Start of Construction. |
| 2 | Implementation | • Sewerage and Drainage Works as per CCTV survey outcome<br>• Excavation and Construction of Trenches (Along and Across), Manholes<br>• Lying of Powerlines and OFC Trenches<br>• Pavement Overlay/Construction for MVs, NMV lane and Walkways | It will go phase wise and 3 (three) months is allocated for each phase. |
| | | • Streetscape, Landscaping, Furniture and Way side amenities<br>• Junction Improvement | It will go phase wise after completion of carriageway |

The key equipments for the project to be arranged by contractor and taken away after completion of work,

- Tar Boiler
- Mixture/Mixol
- Concrete Mixture
- Water Tanker
- Diesel Road Roller (8-10 Ton Capacity)
- Vibratory Roller
- Tractor
- Truck
- Hot mix plant with sensor paver
- Air compressor
- Mechanical Broom
- Bitumen Distributor/ mechanical sprayer
- Tipper
- J.C.B.
- Precast concrete moulds for Jersy Barrier and Kerbs
- Pumpset
- Equipments for cleaning drains i.e Spade, Pickaxe etc.

### 4.3 Project Time lines

One month has been taken into consideration for contract award and mobilisation. The project implementation time since appointment of contractor is 28 (twenty eight) months.

The Work is proposed to be completed in 28 (twenty eight) months span. The month wise detailed bar chart for the project is given below:

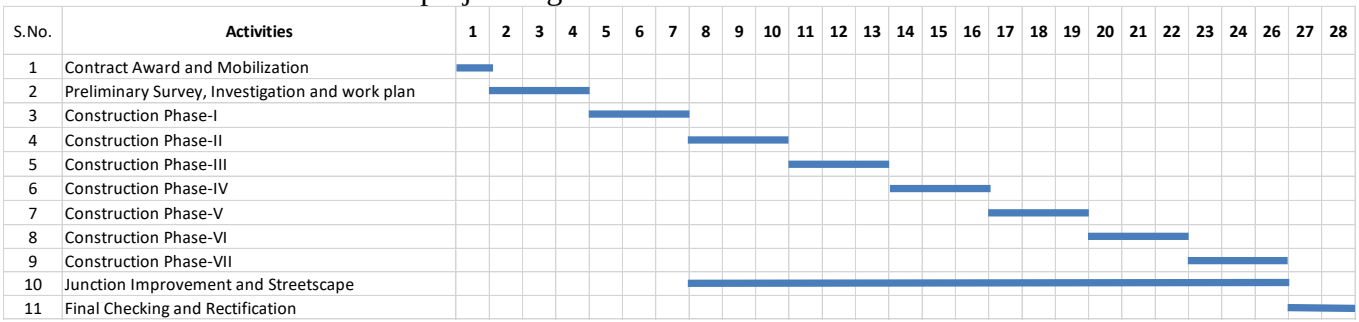



Figure 0-1: Project Time lines

### 4.4 Field Staffing

For Civil Work and Electrical Work

| Sr. No. | Name of the person/ No.s | Qualification | Whether working in field or office | Experience of execution of similar works |
|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** |
| 1 | Project Manager (1 No.s) | B.E. Civil | Field (fulltime) | 15 Years |

| | | | | |
|---|---|---|---|---|
| 2 | Project Engineer (1 No.s) | B.E. Civil | Field (fulltime) | 10 Years |
| 4 | Electrical Engineer | B.E. Electrical | Field (fulltime) | 10 Years |
| 5 | Architect | B. Arch | Field (fulltime) | 5 Years |
| 6 | MEP / Drainage Expert | Diploma Civil | Field (fulltime) | 5 Years |
| 7 | Site Engineer Civil (2 No.s) | Diploma Civil | Field (fulltime) | 5 Years |
| 8 | Site Engineer Electrical (2 No.s) | Diploma Electrical | Field (fulltime) | 5 Years |
| 9 | Site Supervisor (3 No.s) | ITI or Diploma Civil | Field (fulltime) | 5 Years |

### 4.5 Setup of Laboratory

Within 15(Fifteen days) from the date of commencement of work the Contractor shall arrange to provide 250 sqft. Size a fully furnished and adequately equipped field laboratory as per Specifications and directions of the Engineer-In-Charge, including maintenance of the same.
This shall be removed at the completion of the work. All dismantled items of field laboratory and all equipment shall be property of the Contractor at the completion of the work. The Laboratory shall be functional till the work is completed. If Engineer-In-Charge found that Laboratory arranged by the Contractor is not being maintained properly then Engineer-In-Charge has right to deduct a reasonable amount from payment.
The calibration of the laboratory equipment and instruments shall at the initial stage to be certified by agencies approved by the Engineer-In-Charge. Laboratory equipments shall be properly maintained and calibrated throughout the period of the Contract by the Contractor at his own expense. The Contractor shall notify the Engineer-In-Charge in sufficient advance prior to conducting any tests for the materials and work. The Engineer-In-Charge will also inspect the laboratory and the contractor shall provide adequate facilities to the Engineer-In-Charge for his independent verification of the accuracy and adequacy of the facilities.

Indicative List of Laboratory Equipment Required

- Compression Testing machine 100 MT capacity – 1 nos
- Slump cone (2 nos)
- IS Sieve Analysis Set
- Gauge to measure thickness of coating
- Measuring tape (4 nos of steel) , vernier scale, water tank for curing (2 nos), thermometers, vibrating platform, tools and tackles, etc
- Levelling instrument (Auto levels of standard BIS manufacturer),
- Compass
- Balance (2 type) volume measuring apparatus & hand tools etc.

- BIS Sieves, sieve shaker and hydrometer – 1 set each for Coarse and Fine aggregates
- Sand replacement cylinder and core cutter – 1 set
- Cylinder and cube moulds (Minimum 12 nos)
- Measuring instruments
- Instant Moisture meter
- Ultrasonic density meter
- Levelling staves (Aluminium) – 3 nos minimum
- Compression testing machine for testing mortars and bricks etc – 1 no
- Plastic measuring cylinder for Silt content of fine aggregate – 1 no
- Bitumen content test equipment
- Marshal stability equipment
- Bitumen penetration test equipment
- Bitumen pavement density testing equipment
- Impact Value test for aggregates
- Flakiness and elongation test for aggregates

The contractor shall place order for the material and the equipment only after the approval of the Engineer-In-Charge. The Contractor shall submit the detailed drawings for the approved manufacturer and the procedure of submission, review and revision shall be specified herein below. For determining that the Works conform to Specifications and Standards, the Engineer-In-Charge shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MOSRTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

Staff for Field Testing Laboratory

| **Technical Personnel** | **Number** | **Experience in Road Works** |
|---|---|---|
| A. Diploma holder in Civil Engineering | 2 | Minimum 5 years of Experience in Testing and Quality control in Road Work. |
| B. Lab Assistant/Technical (ITI/B.Sc.) | 4 | Minimum 2 years of Experience in Maintenance of Plant & Machinery. |
| C. Surveyor | 2 | Minimum 2 years of Experience in Testing |

## 5. OPERATION & MAINTENANCE

The Defect Liability including Operation and Maintenance for this work is 60 (sixty) months. During this period, it shall be the responsibility of the contractor to clean the area and furniture, tree/shrub cutting, etc at an acceptable serviceability level as directed by the Engineer in charge.

During the Defect Liability period, any damage, breakage, theft or loss in the works executed shall be borne by the contractor only.

During the operation and maintenance period contractor shall provide a supervisor level staff for attending to all the O&M activities during the O&M Period.

Electrical assets are to be handed over to PSPCL after 2 years of completion of construction work, hence defect liability period of electrical works shall be 1.5 Years followed by 6 months of transition period. In transition period training to PSPCL staff shall be given for smooth transition and operations.

For period specified as the “Defect Liability Period” for the work from the date of issuance of the completion certificate in accordance with para "Final Inspection and Acceptance” the Contractor shall remain liable for any of the works or parts thereof or equipment and fittings supplied which in the opinion of the Engineer fail to comply with the requirements of the contract or are in any way unsatisfactory or defective.

To the extent that the works and each part thereof shall at or as soon as practicable after the expiry of the above period be taken over by the Engineer in the condition required by the contract to the satisfaction of the Engineer. The Contractor shall finish the work (if any) outstanding at the date of completion as soon as may be practicable after such date and shall execute all such work of repair, amendment, reconstruction, rectification and making good of defects imperfections, shrinkages or other faults as may during the period of maintenance or after its expiry be required of the Contractor in writing by the Engineer as a result of an inspection made by or on behalf of the Engineer prior to the expiry of the period. All such work shall be carried out by the Contractor at his own expenses if the necessity thereof shall in the opinion of the Engineer be due to the use of materials or to the neglect or failure on the part of the Contractor to comply with any obligation expressed or implied on the Contractor's part under the contract. If the Contractor fails to do any such work as entitled to carry out such work in which the Contractor should have carried out at the Contractor's own cost, the Engineer shall be entitled to recover from the Contractor the cost thereof or may deduct the same from the moneys that become due to the Contractor. Notwithstanding the aforesaid, if the Contractor remains in default, one calendar month after the Engineer has given written instructions in writing, the Security Deposit shall become payable to the ASCL who will deduct the cost plus overhead expenses of such works as have been necessary to rectify the Contractor's default and the balance, if any, shall be disbursed. The Contractor shall submit the operation and maintenance manual for the fruitful operation of the works. The Contractor will have a liberty to visit the operating works during the defect liability period including Operation and Maintenance shall satisfy himself about the on-going operations in case he does not visit & a defect is observed then the Engineer's opinion shall be final & binding as to the application of defect liability.

During the operation and maintenance period contractor shall provide a supervisory level staff as mentioned below;

| | **Technical Personnel** | **Number** | **Experience in Road Works** |
|---|---|---|---|
| 1. | Diploma holder in Civil Engineering (Supervisor) | 1 | At least 5 years |
| 2. | Diploma holder in Civil Engineering (Asst.) | 1 | At least 2 years |

Other support Staff required during O&M

| | | |
|---|---|---|
| 1. | Gardener | 4 |
| 2. | Painter | 4 |
| 3. | Skilled Labour | 4 |
| 4. | Unskilled labour | 8 |
| 5. | Sweeper | 4 |

## 5.1 Roads and Public Realm Operation and Maintenance

O&M activities covered under the project include the following points:

### *5.1.1 Sidewalk/Plaza Maintenance –*

*a) Stone paving installation and replacement*

- To replace an individual unit, or an area of paving, one unit needs to be completely removed from the paving. Other units can then easily be removed if required.
- Brush off any jointing sand adhering to the edges of the blocks or chip off any mortar adhering to the edges of flags.
- The exposed bedding layer can be floated, trowelled or screeded to prepare it for replacing the paving units. If correcting levels, add or remove bedding material as required.
- After breaking up old pavement, remove and recycle as much as possible.
- Regular visual inspection: It is necessary to observe the non-appearance of new damages in the repaired stone pieces, as well as healthy parts.
- Use same quality stone for paving replacement.

*b) Cleaning Stone Paving-*

- Sandstone paving provides a durable, hard wearing surface, but like any other surfacing material, may suffer from staining. Due to the nature of its construction, vegetation may also grow in the joints, or on the paving itself in shaded areas which remain damp. Regular maintenance and good cleaning practices will enhance the overall appearance of the paving in the long term.
- The cleaning speed should be slow to control the effects that occur.
- The selected method should not produce products that alter the stone items.
- The method chosen should not damage the surface of the piece.
- Any building dirt or leftover reclamation staining may be removed quite satisfactorily with a proprietary cleaning solution, if necessary.
- If necessary, stone paving surfaces may be washed with brush and water or using high pressure hoses. If the latter, care should be taken not to blast away

sand in joints. Do not use high pressure jets or suction cleaners for at least 3 (three) months to allow normal detritus build up.

*c) Landscape Maintenance*

- During the establishment period all trees and shrubs shall be watered by thorough specified watering at regular intervals.
- All dead trees shall be replaced by same tree species and with same height trees as a healthy one.
- It is to be ensured that the trees and plants after being planted do not get damaged or deteriorate due to the construction works carried out on the site.
- Prune trees and shrubs during the dormant season to facilitate proper growth and sight lines for vehicles and pedestrians.
- Keep basins and planting areas free of weeds. Remove weeds manually or by torch. Use broadcast herbicides only as a last resort and use approved natural herbicides. Avoid application of fertilizer if rain is expected.
- Do not leave leaves, twigs, chips, or other debris in the gutter or paved shoulder.

### *5.1.2 Street/Road Repair and Maintenance*

*a) Asphalt/concrete removal*

- Schedule asphalt and concrete removal activities for dry weather.
- After breaking up old pavement, sweep up materials thoroughly to avoid contact with rainfall and storm water runoff. Recycle as much material as possible, and properly dispose of non-recyclable materials

*b) Concrete installation and replacement*

- Avoid mixing excess amounts of fresh concrete or cement mortar on-site.
- Store dry and wet materials under cover, protected from rainfall and runoff.
- Wash out concrete transit mixers only in designated wash-out areas where the water will flow into drums or settling ponds or onto dirt or stockpiles of aggregate base or sand.
- Whenever possible, return left-over materials in the mixer barrel to the yard for recycling.
- Dispose of small amounts of excess concrete, grout, and mortar in the trash.

*c) Patching, resurfacing, and surface sealing*

- Stockpile materials away from streets, gutter areas, storm drain inlets or watercourses. During wet weather, cover stockpiles with plastic tarps or berm around them if necessary, to prevent transport of materials in runoff.
- Pre-heat, transfer or load hot bituminous material away from drainage systems or watercourses. Cover and seal nearby storm drain inlets and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and until all water from emulsified oil sealants has drained or evaporated.

Clean any collected materials from these covered manholes and drains for proper disposal.

- After the job is complete, remove stockpiles (asphalt materials, sand, etc.) as soon as possible.

*d) Signing and striping*

- All signage should be checked regularly for any damage.
- The damaged sign boards should be immediately replaced to avoid inconvenience of the users.
- Road markings should be repainted if necessary.

*e) Barrier maintenance*

- The areas around the median/ barrier should be checked for litter, spattering and stains.
- Wet or dry-cleaning method must be adopted as required.
- In case of scrapped paint or discoloration due to weather or external factors, the units may be repainted.

*f) Equipment cleaning, maintenance, and storage;*

- Clean equipment including sprayers, sprayer paint supply lines, and patch and paving equipment, and mud-jacking equipment at the end of each day. Conduct cleaning at a corporation or maintenance yard if possible. Use proper collection methods for the cleaning solution and recycle or dispose of waste materials at an approved hazardous waste facility.

### *5.1.3 Street/Road/Sidewalk Sweeping and Cleaning*

*a) Sweeping timing and frequency*

- Define the street sweeping program, and set priorities for sweeping frequency based on factors such as traffic volume, land use and get it approved by PMC.
- Establish and maintain a consistent sweeping schedule
- Establish and implement a record-keeping system to evaluate the effectiveness of the sweeping program.

*b) Observations of material accumulation*

- Sweeping equipment operation and selection
- Ensure that equipment operators are operating equipment according to manufacturer's recommendations.
- Maintain equipment in good condition and purchase replacement equipment as needed.

*c) Other measures to improve sweeping efficiency*

- Require operators to report trees or other obstructions interfering with street cleaning.

### *5.1.4 Kerb Maintenance*

- Deteriorated kerb blocks should be removed and replaced with same quality curbs.
- For installing the curb-stones it firstly needs to be outlined where the stones are going to be placed and calculate how much higher of the level of the square the stones are going to be.
- Kerb stones should be installed using a water level and following a rope.
- The stones must be secured from the front and behind in joints, which can be done with the help of concrete bedding.
- Preventive maintenance includes regular deck flushing, sealing the joints with waterproofing sealants.
- Painting of kerbs if required has to be done as per Traffic police norms during maintenance period.

### *5.1.5 Medians*

- The medians should be visually inspected on a regular basis for any signs of damage, vandalism, breakdown of surface finish, dirt or atmospheric residue.
- Painting of railing is to be done for all surfaces where the paint has been removed due to weather or vandalism.
- In addition to the visual inspection, a regular cleaning regime is also required.
- The areas around the median/ barrier should be checked for litter, spattering and stains.

### *5.1.6 Lay-byes/parking/stops maintenance*

- The lay-bye markings should be visually inspected for any damage and repainted if necessary
- The changing points at the lay-byes should be inspected regularly and any damage should be quickly attended to.
- It should be ensured that the lay-byes do not get encroached by temporary shops, settlements or obstacles which shall defeat the purpose of the space, in co-ordination with the local traffic police, Nagar Nigam or concerned departments, keeping the supervising team of the PMC informed.

### *5.1.7 Street furniture maintenance*

*a) Benches and Dustbins*

- To maximize life expectancy the seating and dustbins should be visually inspected on a regular basis for any signs of damage, vandalism, breakdown of surface finish, build-up of salt, dirt or atmospheric residue, and loose fixings.
- Damaged items shall be replaced if cannot be repaired.
- All cleaning and maintenance should be recorded, detailing the method of cleaning, what products have been used, and what repair work has been undertaken.

*b) Toilets*

- Ensure use of proper cleaning agents.
- Establish a frequent cleaning schedule for the toilets and keep performance record as approved by PMC.
- Ensure regular inspection of joints and securing arrangements, flushing systems, p/s traps, water tank, etc

*c) Vegetation*

- During the establishment period all trees and shrubs shall be watered by thorough deep watering at regular intervals.
- Prune trees and shrubs during the dormant season to facilitate proper growth and sight lines for vehicles and pedestrians.
- Keep basins and planting areas free of weeds. Remove weeds manually or by torch. Use broadcast herbicides only as a last resort and use approved natural herbicides. Avoid application of fertilizer if rain is expected.
- Do not leave leaves, twigs, chips, or other debris in the gutter or paved shoulder.

*d) Litter Control*

- Post “No Littering” signs where needed and enforce anti-littering laws.
- Provide an adequate number of litter receptacles in commercial areas and other litter- source areas.
- Empty litter receptacles on a frequent enough basis to prevent spillage.
- Encourage public education efforts to include an anti-littering message.

*e) Street art and Graffiti*

- Wall paintings and installations should be consistently checked for damage and vandalization.
- Any damage must be repaired as early as possible.
- Illegal graffiti should be removed using mechanical or chemical removal.
- The surface maybe repainted with contextual designs approved by authorities.

*f) Other Road Furniture*

- All kind of road furniture including signage, advertisement boards, bus shelters, drain gullies, electrical distribution boxes etc. needs to be visually inspected on a regular basis for any signs of damage, vandalism, breakdown of surface finish, build-up of salt, dirt or atmospheric residue, and loose fixings.

## 5.2 Maintenance for Electrical Works

1. Joint Annual maintenance contract (AMC) shall be initiated after completion of installation & commissioning of underground cable, CSS & RMU, DT box, service feeder pillar and other electrical items for two years.

2. O&M shall be initiated after completion of installation and commissioning of street lighting system on all the specified roads and issue of completion certificate by ASCL after due inspection and testing.
3. The contractor shall install a Help Desk minimum 30 days in advance before the initiation of the O&M period.
4. The contractor shall be responsible for maintaining / repair / replacement / comprehensively of all the cable failure, cable joint failure, compact substation equipment failure, failure of electrical items such as ACB, MCCB, MCB & LED indicators, busbar in feeder pillar (DT box, service feeder pillar) and other electrical items executed.
5. The contractor shall be responsible for shortage of any items required for repairing or replacement of failed items. Hence, contractor shall have availability of minimum 15-20% spares of all critical equipment in contractor store at Raipur.
6. Contractor shall maintain team of one supervisor, one skilled and two unskilled working staff per shift at Amritsar Smart City project site.
7. Contractor shall provide vehicle for movement of staff with spare parts to cater any consequence and quick response to maintenance team.
8. Contractor shall provide latest cable fault locator equipment with van and tools to its maintenance team as per BoQ and handover to Punjab State Power Corporation Limited (**"PSPCL"**) after successful completion of O&M period.
9. Contractor shall provide training for O&M of fault finding in cable, CSS & RMU etc.
10. Availability of communication network through the selected mode shall be ensured by the contractor for data and SMSs. The contractor shall bear the cost of connectivity of all such network charges and pay monthly/ annually as the case may to the telecom service provider.
11. The Non -availability of incoming power supply from PSPCL shall be intimated by contractor within 24 hours. The contractor shall coordinate with PSPCL on behalf of ASCL shall facilitate as and when required to expedite the response.
12. Any complaint for failure of luminaire due to lack of earthing, SPD, connector and loose connections shall be to contractor's Account.
13. The contractor shall take adequate insurance to cover themselves for the cost of O&M during the tenure of the contract including the ones due to theft.
14. The contractor shall make provision for adequate number of Ladder mounted vehicles self-sufficient with all the required tools and instruments, duly calibrated, to meet the maintenance requirements as per service benchmark.
15. All the necessary modifications that are required to be carried out for the efficient working of the system including network and Luminaires and minimise the breakdowns and issues shall be carried out by contractor from time to time at its own cost.
16. The maintenance work will be carried out without disturbing the street traffic and with proper work permit.
17. A web-based Complaint Management System shall be installed which should enable users to log complains and monitor its status & closure. The CMS shall be updated regularly with new updates/ patches to improve the performance during the contract period.

18. The help desk will handle user queries and issues relating to implemented solution
19. A Standard Operating Procedures (SOP) for O&M process shall be created by the contractor from logging of request to closure of the request. The SOP shall address call prioritization guidelines, problem security codes and escalation procedures etc. in consultation with ASCL;
20. It shall be also possible to log requests by user through other channels like email and web interface;
21. A Report containing the operational Status of each light pole, complaints received and resolved, preventive maintenance schedule and status, Stock of spares, man power update, etc shall be submitted to the ASCL on a weekly basis;
22. The call statistics will be analysed every quarter after Go-Live and the number of Customer Care Executives may be ramped up or down accordingly on a week's notice;
23. Resources - contractor shall maintain O&M team, tools and calibrated measuring and verification instruments as specified above from the day one of the contract. In case the required resources are not deployed on time, a penalty of Rs.5000/- (Rupees Five Thousand only) per day shall be imposed for the first week and the same shall be doubled in the subsequent weeks till adequate resources are deployed.
24. System Uptime - contractor shall maintain sufficient resources and achieve minimum uptime of 95% (ninety-five percent) on yearly basis (year period to be decided by RSCL for the entire system, excluding the period of non-availability of power supply.
25. Complains Resolution - All the complaints shall be redressed within 24 (twenty four) working hrs. In case the service provider fails to comply with the same a penalty of Rs. 100/- (Rupees Hundred only) per day per complaint shall be imposed for a period of 7 (seven) days after which the amount will be doubled for the next subsequent weeks till the complaint is resolve to the satisfaction of the owner.
26. At any given time, the contractor shall maintain spares equivalent to minimum 1% of the total number of lights installed. Failing to maintain spares and causing delay in resolution of the complaint shall be penalized as indicated above.
27. Cleaning of the luminaire cover shall be taken up once in half year and record shall be maintained and reported to ASCL.

### 5.3 Traffic Enforcement Zone

It is considered that Smart and surrounding area will be enforced as a "Traffic Enforcement Zone". The primary goal of the Traffic Enforcement Zone

- Traffic Enforcement - to ensure the safety of non-motorised vehicles and pedestrians. Discouraging the movement of any motorised vehicles on NMT tracks and Pedestrian pathways
- Organised Parking- Parking, pickup, drop-offs in designated area only
- No-Honking Zone- No vehicular horn allowed except emergency vehicles
- The maintenance of the archaeological cultural heritage refers to the landscape maintenance of a stationary relic or other archaeological entity and its surroundings
- Traffic Management during Construction and Operation period

"Traffic Enforcement zone" need a dedicated enforcement team. The following manpower (both skilled and non-skilled) is proposed within the area of responsibility of one Zone (Unit). Entire road divided into 4 zones. This is proposed based on their duties and responsibilities and the area of responsibilities.

1. Marshal Team – (5 nos. per unit/day)
   - Area of responsibility – 1-2 kms
   - A team of 9 deployed in three shifts (8 hours each)
     - Day Shift 1 – 2 Marshal
     - Day Shift 2 – 2 Marshal
     - Night Shift – 1 Marshals
     - Marshal Outpost – One outpost to every unit

2. Head Marshal – (2 nos for all unit/day)
   - Area of responsibility – 7.5 kms
   - Head Marshal – One Marshal in one shift (no head Marshal in night Shift)

**DUTIES AND RESPONSIBILITIES**

**1. <u>Marshal Team</u>**

Each Marshal Team has an area of operation of approximate 2 kilometres of Circular road. The mandate of supervising the other roads may be added subsequently, within the scope of Enforcement, when they are fully trained, equipped and experienced with all necessary wherewithal to deal with these challenges.

Some of the duties of the Marshal Team are –

- Liaison with Police – Local SHO
- Assist Police in enforcement against overspeeding, overloading, drunken driving, contra-flow movement, for helmet and seat belts etc.
- Informing to MCA against unauthorized access to circular road and all types of encroachments
- Accident site management (traffic diversion and control, etc.) and clearance of accident debris, Reporting and providing first aid to road crash victims
- Traffic Management during Construction and Operation of Project Road.

**2. <u>Head Marshal</u>**

- Liaison with Police – Local SDOP/SHO and Municipal Corporation's Enforcement Wing
- Supervise Marshal Teams

**The recruitment** of the basic functionary, i.e. a Marshal, will be made on contractual basis at a salary structure of the basic minimum wage of skilled labour as per the Government of India norms. The recruitment can be made from Private Security Services, which provide manpower. A certain quota of the number of positions can be reserved for Ex-Servicemen.

**Training:** The Marshals and Head Marshals will undergo a two months' basic course at the designated police training institutions of the Punjab State to prepare them for duties and responsibilities of Marshals

**Uniform** accoutrements & logo suitable to climate may be designed by hiring the services of professional experts. The uniform would include:

- Trousers
- Shirts
- Winter clothing (as per requirement)
- Headgear
- Shoe
- Belt with provisions for equipment such as wireless sets
- Reflective jacket

**Technology and Equipment:** Marshal Team shall be required to be provided with the following facilities to perform their functions flawlessly on round-the-clock basis.

- Motorcycles & Patrol vehicles
- Breathalysers with Camera
- Radar Guns (Speed Measurement Equipment)
- Traffic Cones (Traffic Control Device)
- Electronic Batons (Red/Green)
- Torch Lights
- Head/Body Strap Camera
- Tow-away cranes and other Emergency vehicles on rental basis

Costing for the enforcement team will be done separately in BoQs, this will part of Operation and Maintenance of Road.

### 5.4 Operation and Maintenance during O&M phase

The activities required, but not limited to; to maintain the sewerage and storm water drainage (Rider) system on the Outer circular road for problem free sewerage and drainage system have been mentioned as below:

- Carrying out regular and preventive maintenance of the assets created under this contract.
- Repair of sanitary sewer network peripheral road considered under this project as per instructions of Engineer in charge as and when required. Contractor shall provide all the required material and labour required for the operation and maintenance purpose.
- Repair of rider storm network peripheral road considered under this project as per instructions of Engineer in charge as and when required. Contractor shall provide all the required material and labour required for the operation and maintenance purpose.
- Cleaning of manholes and road gulley's of rider storm sewer network once before every monsoon season and as and when required,
- Contractor shall record any complaint recied from department/ resident and will immediately rectify it.
- Cleaning of sewer pipe line as and when required and removal of blockage in sewer pipe line and avoiding any sewer overflows.

- Contractor shall handover the Operational manual to the Employer and shall train the staff of the Employer. Separate training shall be organised for the different category of the staff.

## Penalties

- No overflows from the Manholes: Penalty for non-compliance will be INR 10,000 per instance
- Submission of "As built" drawings both in soft copies and hard copies (two prints and one polyester film) – Penalty for non-compliance will be INR 5,00,000
- No silt/ dismanteled material / debris is allowed to be kept at road side and shall be put directly into the container / trolley. – Penalty for non- compliance will be INR 20,000 per instance.
- CCTV inspection to be carried out after removal of silt from the system and submitted to the Employer within a week – Penalty for non-compliance will be INR 20,000 per instance
- The Contractor shall carry out mandatory cleaning of road gulleys and storm sewer manhole before the monsoon season irrespective of the regular maintenance work – Bidder will not get payment quoted by bidder against this item and Penalty for non-compliance will be INR 10,00,000 per year.
- Any Stolen / Broken man hole covers / frame shall be replaced immediately within 12 hours – Penalty for non-compliance will be INR 10,000 per instance. Further, if any damage / mishapening occurs due to missing manhole cover/ frame, the contractor shall be solely responsible for loss or damage whatsoever it may be. Any subsequent delay will attract a further penalty of Rs. 10,000 per day.

**6. Stakeholders**

The subject area is a significant part of the physical character and the built fabric of the area which is renowned the world over for its cultural richness and heterogeneous character. Improvement of the mobility and traffic in the scope area is very significant work for the area and therefore it was important to identify the issues and challenges by interacting with the stakeholders in the area.

The project has been developed with consequent interaction with stakeholders which are majorly the board governing the smart city projects, govt. departments and organizations active in the area. Thereby, proposed design and the features related to it has been discussed at the administrative levels of the city.

Furthermore, it is important to maintain the integrity of the project so that the consent and inferences at these interaction levels remain valid. The important stakeholders of the project are mentioned hereby:

- Nagar Nigam, Amritsar
- Amritsar Improvement Trust (AIT)
- Punjab Urban Planning and Development Authority / Amritsar Development Authority Public Works Department, Punjab State
- Punjab Water Supply and Sewerage Board (PWSSB)
- Punjab Heritage and Tourism Promotion Board
- Pollution Control Board

- Police Department (Headquarter & Traffic)
- Punjab State Power Corporation Limited (PSPCL)
- Shiromani Gurdwara Parbandhak Committee (SGPC)
- Shree Durgiana Management Committee

It is the prerogative of the working organization to retain the objectives and duties of these departments and organizations in the course of the project and find a mitigating way in the scenario of any issue or challenge arising during the implementation period.

## 7. Challenges

The challenges which shall be dealt with during the course of the project are mostly related to the eccentricity of the space and the lack organized infrastructure. There have been various interferences in the subject area related to the infrastructure through a long period of time, majority of which had not done with adequate planning and documentation methods. Therefore, mentioned challenges are foreseen in the execution of the project.

- Non- contextual and unplanned services laid in the streets and roads.
- Lack of the space and dense settlements in the internal parts of the subject area.
- Congestion of space due to high density of moving traffic.
- Extreme congestion and high inflow of tourists and visitors in peak season and festival times.
- Water-logging in the rainy-season, lack of appropriate storm water drainage system.
- Vehicular Domination.
- Non Co-ordinated Development
- Development leading to loss of character
- Lack of Infrastructure

## 8. Opportunities

- Right of Way available on majority of the road.
- Improved local participation.
- Resourcefulness in manpower deployment.
- Low share of four-wheeled vehicles in the subject area.
- Boost in the Tourism.

## 9. Special Instructions for Work Execution

The proposed work needs to be done in context with the existing conditions and specially the already running services of the road. The organic development pattern in the subject area has led to a mix of unplanned services which are not very well recorded and documented in the official records. As the proposed work has to be done at the same road section which is a medium for all the other existing services to be laid there are all chances to find these services causing obstacle in the proposed works. Therefore, in this situation the following points should be considered;

- The contractor should execute the work causing minimum interference to the existing services in the road and should adopt a method which keeps the interest of the proposed

works and does not obstruct or affect the existing network related services, in co-ordination with the respective expert of the PMC.

- It is the responsibility of the contractor to execute the work, including excavation of earth and laying new elements or services as per the proposed design, in conjunction with the existing services over and below the ground level. These service lines majorly are, the underground electrical transmission lines and the feeder pillars, the underground water-supply lines running along or crossing the roads, drainage lines or storm-water lines on the roads, optical or data network lines on the roads, gas supply lines or any other related transmission lines. It is the prerogative of the contractor to execute the proposed works with minimum disturbance to these lines, and wherever there tends to be any interference to this existing network, the contractor shall re-align or re-construct the disturbed line so as to keep the network in working condition in the same manner. Consequently, the related works in order to re-align or repair the existing network of services, the related items can be brick-masonry, concrete work, PCC of approved specifications; precast concrete pipes, G.I., cast iron pipes, optical fibre cables, telephone data cables, electrical cables and the required medium to hold them as per the existing approved specifications and other agencies involved; furthermore other required peripherals as required.
- Contractor has to inform the line (concerned) department immediately if any underground services are found hindering the work and further any re-alignment or damage of the services has to be repaired as per instruction from line department.
- Any hindrance in the work due to above mentioned works cannot be the basis of extension of deadline or increase in the cost of the project.
- The contractor needs to be more careful with the existing services in the internal streets of the subject area. No major deviation or interference should be done in the existing services of the internal streets and only localized flaws can be undertaken to be corrected in co-ordination with the line(concerned) department and the supervision team. Any major deviation from the plan shall be reported immediately to the Architect/Engineer in-charge of the SPV/PMC.
- It is integral for the contractor to consider the required quantity and the respective amount incurred related to the existing services interfered or essential services required (only related to existing scenario) so as to execute the project related work.
- There is an ongoing project on Sewerage and Drainage system for entire ABD area. Synchronizing this proposed work and Smart Road ducting work can provide substantial savings in the capital cost in terms of road reinstatement works.
- There are ongoing projects on health kiosks and smart toilets hence integration of these with wayside amenities of Smart road is required.
- As underground ducting for low/high voltage is carried out only for ABD area, non-ABD area service implications may have to be addressed by the utility service providers.
- It is also advisable if the underground ducting project is implemented along with the Sewerage and drainage upscaling project.

**Protection of Environment:**

The contractor shall take all reasonable steps to protect the environment on and off the Site

and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental
protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority. Contractor has to prepare standard EMP plan before execution of any work.

**Monitoring Requirement & Specifications**

| **Environmental Component** | **Project Stage** | **Institutional Responsibility** | | | | | |
|---|---|---|---|---|---|---|---|
| | | **Parameters** | **Special Guidance** | **Standards** | **Location** | **Implementation** | **Supervision** |
| Air | Construction Stage | SPM, PM-10 PM-2.5, $SO_2$, NOx, CO & HC | Respirable Dust Sampler to be located 50m from the site / plant in the downwind direction. Use method specified by CPCB for analysis | Air (P&CP) Act,1981 and its amendment | Hot mix Plant / Batching Plant / Storage Yards and Parallel to roads sited during construction etc. | Contractor through approved monitoring agency | EE-Contractor |
| | | SPM, RSPM, PM-10, PM-2.5 $SO_2$, NOx, CO & HC | Respirable Dust Sampler to be located 40 meters from the earthworks site downwind direction. Use method specified by CPCB for analysis | Air (P&CP) Act, 1981 and its amendment. | Stretch of the road where construction is in progress at the site. (Major sensitive location like school, hospital and residential setup & Market). | | |
| Surface Water Quality | Construction Stage | pH, BOD, COD, TDS, TSS, DO, Oil & Grease and Pb. | Grab sample shall be collected from source and analyse as per Standard Methods for Examination of Water and Wastewater | Water quality standards by CPCB | As in road side water bodies especially from Source of Water Taken for Construction, Perennial stream during Bridge / Culvert Work | Contractor through approved monitoring agency | EE-Contractor |

| Environmental Component | Project Stage | Institutional Responsibility | | | | | |
|---|---|---|---|---|---|---|---|
| | | **Parameters** | **Special Guidance** | **Standards** | **Location** | **Implementation** | **Supervision** |
| | | | | | etc. | | |
| Noise Levels | Construction Stage | Noise levels on dB (A) scale | Free field at 1 meter from the equipment whose noise levels are being determined | Noise standards by SPCB / CPCB | At equipment yards. Like HM Plant, DG set areas, Batching Plant etc. NB: If needed Sensitive location can be done after consultation with Safety & Environmental Expert of Contractor and EE of ASCL. | Contractor through approved monitoring agency | EE-Contractor |
| Soil Pollution & Erosion | Construction Stage | Turbidity of Construction Water Silt load in water courses or back / sea water | ---- | As specified by the Environmental Expert of Client & as per MOEF & CC Soil quality standards | As specified by the Environmental Expert of ASCL. Preferably to Roads adjacent of Agricultural land if any. | Contractor through approved monitoring agency | EE-Contractor |

# SECTION - III

# CONDITIONS OF CONTRACT

## A. GENERAL

### 1. Definitions

a. Terms, which are defined in the Contract Data may not necessarily have been defined in the Conditions of Contract but keep their defined meanings. Capital initials are used to identify defined terms.

b. **"Bill of Quantities"** means the priced and completed Bill of Quantities forming part of the Bid.

c. **"Certificate of Construction Completion"** means the certificate to be issued by the Engineer to the Contractor upon being satisfied that the construction/ development/ improvement works on the Sites have been completed as per the Conditions of Contract including Scope of Project, Specifications, Technical Conditions, Employer's Requirements, Drawings, etc.

d. **"Compensation Events"** are those defined in Clause 46 hereunder.

e. The "**Completed Work"** means the Redevelopment of Outer Circular Road of Wallet City as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability under Smart City Mission, Amritsar for 7.4 km of Outer Circular Road of wallet city passing through major junction such as Hall Gate, Mahan Singh Gate, Chattiwind Gate, Hakima Gate, Hakima Gate and Lohgarh Gate completed in all respects as per laid down specifications, drawings & conditions of the contract to the entire satisfaction of Engineer. Construction/implementation phase will be of 28 (twenty-eight) months duration.

f. The **"Completion Date"**, the date of completion of the works, is certified by the Engineer in accordance with Sub Clause 57.1.

g. **"Communication"** between parties is the written and signed letters, notices, reminders, memorandum and instructions recorded in the instruction book or books kept at site.

h. The **"Contract"** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.2.

i. The **"Contract Data"** defines the documents and other information which comprise the Contract.

j. "**Contract Period**" means works execution Period of 28 (twenty-eight) months followed by 1.5 (one and half) years of Defect Liability Period and Operation followed by Operation and Maintenance Period of 3.5 (three and half) years. This Contract Period will begin from the date of signing of the Contract and will end with successful taking over of the Project Site by Municipal Corporation, Amritsar. It will also include any time extensions given by the Procuring Entity.

k. The **"Contractor"** is the bidder whose Bid to carry out the Works has been accepted by the Employer.

l. The **"Contractor's Bid"** is the completed Bidding documents submitted by the Contractor to the Employer and includes Technical and Financial bids.

m. The **"Contract Price"** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

n. **"Days"** are calendar days; months are calendar months.

o. A **"Defect"** is any part of the works not completed in accordance with the Contract.

p. The **"Defects Liability Period"** is the period named in the Contract Data and calculated from the Completion Date.

q. **"Employer":** Amritsar Smart City Limited is the employer who will employ the Contractor to carry out the works. The Employer may delegate any or all functions to a person or body nominated by him for specified functions.

r. The term **"Engineer/ Engineer-in-Charge"** shall mean the representative of the Employer, and acting under the orders of the Employer responsible for supervising the Works/ Projects, administering the Contract, certifying payments due to the Contractor, issuing and valuing Variations to the Contract, awarding extensions of time, and valuing the Compensation Events and getting the contract executed on behalf of the Employer.

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

t. The **"Government"** or the **"State Government"** shall mean the Government for the State of Punjab.

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

v. The **"Intended Completion Date"** is the date on which it is intended that the Contractor shall complete the works. The Intended Completion Date is specified in the contract Data. The Intended Completion Date may be revised only by the Engineer in Charge by issuing letter of extension of time, after seeking approval from the Employer.

w. **"Materials"** are all supplies, including consumable, used by the Contractor for execution of the Works.

x. **"Operation & Maintenance"** means operation and maintenance (routine or major) of the Project/ Works and includes all matters connected with or incidental to such operation and

maintenance, provision of services and facilities in accordance with the terms hereof.

y. **"Plant"** is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

z. **"Project Completion Date"** means the date when the Operation & Maintenance period ends as evidenced by the issuance of Project Completion Certificate by the Engineer/ Employer.

aa. The **"Site"** is the area defined as such in the Contract Data.

bb. **"Specifications"** means the Specification of the works included in the Contract and any modification or addition made or approved by the Engineer.

cc. The **"Start Date"** is given in the Contract Data. It is the date when the Contractor shall commence execution of the Project/Work(s). It does not necessarily coincide with any of the Site Possession Dates.

dd. A **"Subcontractor"** is a person or corporate body, who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.

ee. **"Temporary Works"** are works designed, constructed, installed and removed by the Contractor which are needed for construction or installation of the Works.

ff. The **"Tender Evaluation Committee" or "TEC"** is the committee constituted by the Employer for receiving, opening, processing and evaluating the bids.

gg. A **"Variation"** is an instruction given by the Engineer in Charge, which varies the works.

hh. The **"Works"** are what the Contract requires the Contractor to construct, install, and turn over to the Employer through the Engineer in Charge, as defined in the Contract Data. This term shall be used synonymously with the term "Projects" herein after or anywhere in the Contract.

## 2. Interpretation

1. In interpreting these Conditions of Contract, singular also means plural, male also means female or neutral, and the other way around. Headings have no significance.

   Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about the Conditions of the Contract.

   If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply

to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole of the Works).

2. The documents forming the Contract shall be interpreted in the following order of priority:

a) Agreement
b) Letter of Acceptance, notice to proceed with the works
c) Contract Data
d) Conditions of Contract including Special Conditions of Contract
e) Contractor's Bid
f) Amendments, Clarifications issued to the Request for Proposal (if any),
g) Request for Proposal,
h) Specifications
i) Drawings
j) Bill of quantities; and
k) Any other document listed in the Contract Data as forming the part of Contract.

3. If there are varying or conflicting provisions in the documents forming part of the contract, the authority competent to approve the tender shall be the final deciding authority with regard to the intention of the document.

**3. Language and Law**

1. The language of the Contract and the law governing the Contract are stated in the Contract Data.

**4. Engineer's Decisions**

1. Except where otherwise specifically stated, the Engineer shall decide contractual matters between the Employer and the Contractor in the role representing the Employer. Any clarifications on the Contract Data shall be given by the Engineer.

**5. Delegation**

1. The Employer may delegate any of his duties and responsibilities to other person after notifying the Contractor and may cancel any delegation after notifying the Contractor.

**6. Communications**

1. Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act, 1872).

**7. Sub-contracting**

1. The Contractor may sub-contract any portion of work, upto a maximum limit of 25% (twenty-five percent) of contract value or as specified in **Contract Data** whichever is less, with the approval of the Engineer but shall not assign the Contract without the approval of the Engineer in writing. Sub-contracting does not alter the Contractor's

obligations.

**8. Other Contractors**

1. The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Engineer on behalf of the Employer between the dates given in the Schedule of other Contractors. The Contractor shall understand that Sewerage part in this project may require co-ordination with Contractor for "Construction of Trunk Storm Water Drainage & Allied Works, Strengthening and Rehabilitation of Sewer Network with House Connections for Sullage" and if required, to modify its work program and/ or work requirements with the approval of the Engineer-in-Charge. The Contractor shall also provide facilities and services for them as described by the Engineer from time to time.

**9. Personnel**

1. The Contractor shall employ the key personnel to carry out the works or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel already employed.

2. If the Engineer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

**10. Materials, Machinery & Equipment**

1. The contractor shall arrange and supply at his own cost all material, machinery, equipment, plant, tools, appliances, implements, ladder, cordage, tackle, scaffoldings, water and power supply and temporary works requisite or proper for effective execution of the work, whether original, altered or substituted and whether included in the specification or other documents forming part of the Contract or referred to these conditions or not, all of which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer as to any matter which under these conditions he is entitled to be satisfied or which he is entitled to require together with the carriage therefore to and from the work

2. The Contractor shall bear all the expenses including taxes, transportation, loading, unloading, stacking, storage, safe custody against the damage due to sun, rain, dampness, fire, theft etc.

3. The Contractor shall procure all material from sources approved by the Engineer in charge in writing. All the material brought to the site shall be duly accounted for by the contractor and got insured against loss due to any reason what so ever. Proof regarding this supported by the copies of the requisite document shall be regularly submitted to the Engineer-in-charge. The department may summon the complete record of the procurement of materials from the contractor at any time if needed. At site, the material

shall be accounted in a manner prescribed by Engineer-in-charge in writing. The material procured by the contractor shall be strictly according to the specification of that material conforming to ISI standard or any other approving authority as applicable. Storage of the material should be as per approved norm. No damaged or inferior material will be kept at site of work for more than seven days from the date of orders of Engineer in charge to remove the material.

**11. Labour**

1. The Contractor shall unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, boarding and transport.

2. The contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the number of the several classes of labour from time to time employed by the Contractor on the site and such other information as the Engineer may require.

**12. Compliance with Labour Regulations**

1. During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by the all existing labour enactments and rules made thereunder, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations, or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/Employer shall have the right to deduct any money due to Contractor including his amount of Performance Security. The Employer/Engineer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

2. The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

**SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE AND ITS SUBSEQUENT AMENDMENTS TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK.**

1. Workmen Compensation Act 1923: - The Act provides for compensation in case of injury by accident arising out of and the course of employment.

2. Payment of Gratuity Act 1972: - Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more, on death, the rate of 15 (fifteen) days wages for every completed year of service. The Act is applicable to establishments employing 10 or more employees.

3. Employees P.F. and Miscellaneous Provision Act 1952: - The Act provides for monthly contributions by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are:

   i. Pension or family pension on retirement or death, as the case maybe.
   ii. Deposit linked insurance on the death in harness of the worker. Payment of P.F. accumulation on retirement/death etc.

4. Maternity Benefit Act 1951: - The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

5. Contract Labour (Regulation & Abolition) Act 1970: - The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the principal employer by Law. The principal employer is required to take Certificate of Registration and the Contractor is required to take licence from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer, if they employ 20 or more contract labour. (In the present Contract, the Contractor alone shall be the employer or the principal employer for all intents and purposes and under no circumstances shall the Employer or the Engineer be reckoned or treated as the principal employer.)

6. Minimum Wages Act 1948: - The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act, if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.

7. Payment of Wages Act 1936: - It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

8. Equal Remuneration Act 1979: - The Act provided for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.

9. Payment of Bonus Act 1965: - The Act is applicable to all establishments employing 20 (twenty) or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% (eight point three three percent) of wages and maximum of 20% (twenty percent) of wages to employees drawing Rs. 3500/- (Rupees Three Thousand and Five Hundred only) per month or less. The bonus to be paid to employees getting Rs.2500/- (Rupees Two Thousand and Five Hundred only) per month or above upto Rs.

3500/- (Rupees Three Thousand and Five Hundred only) per month shall be worked out by taking wages as Rs. 2500/- (Rupees Two Thousand and Five Hundred only)per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 (twenty) to 10 (ten) for the purpose of applicability of this Act.

10. Industrial Dispute Act 1947: - The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

11. Industrial Employment (Standing Orders) Act 1946: - It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the State and Central Government to 50(fifty)). The Act provides for laying down rules governing the conditions of employment by the employer on matters provided in the Act and get the same certified by the designated Authority.

12. Trade Unions Act 1926: - The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.

13. Child Labour (Prohibition & Regulation) Act 1986: - The act prohibits employment of children below 14 (fourteen) years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.

14. Inter State Migrant Workmen's (Regulation of Employment & Conditions of Service) Act 1979: - The Act is applicable to an establishment which employs 5 (five) or more inter- state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upto the establishment and back, etc.

15. The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996: - All the establishments who carry on any building or other construction work and employs 10 (ten) or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% (two percent) of the cost of construction as may be modified by the Government. The employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The employer to whom the Act applies has to obtain a registration

certificate from the Registering Officer appointed by the Government.

16. Factories Act 1948: - The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing10 (ten) persons or more with aid of power or 20 (twenty) or more persons without the aid of power engaged in manufacturing process.

**13. Employer's and Contractor's Risks**

1. The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

**14. Employer's Risks**

1. The Employer is responsible for the excepted risks which are: (a) in so far as they directly affect the execution of the works in India, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive, or (b) a cause due solely to the design of the Works, other than the Contractor's design.

**15. Contractor's Risks**

1. All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

**16. Limitation of Liability**

1. Neither party shall be liable to the other party in respect of any loss on any account whatsoever in relation to the Work, towards any loss of estimated profit, loss of any other thing or for any direct or indirect/ consequential loss or damage, which might be suffered or has been suffered by the other party in connection with any event arising out of the Contract except for those, which have been specifically provided for in the Contract Agreement.

**17. Insurance**

1. The Contractor shall provide, in the joint names of the Engineer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract Data for the following events which are due to the Contractor's risks:

    (a) Loss of or damage to the Works, Plant and Materials;
    (b) Loss of or damage to Equipment;
    (c) Loss of or damage of property (except the Works, Plant, Materials and Equipment) in connection with the Contract; and

(d) Personal injury or death.

2. Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

3. If the Contractor does not provide any of the policies and certificates required, the Engineer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

4. Alterations to the terms of insurance shall not be made without the approval of the Engineer.

5. Both parties shall comply with any conditions of the insurance policies.

**18. The Works to be completed by the intended Completion Date**

1. The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Programme submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.

**19. Ecological Balance**

1. The Contractor shall maintain the ecological balance by preventing water pollution and defacing of natural landscape. The Contractor shall so conduct his construction operation as to prevent destruction, scarring or defacing of natural surroundings in the vicinity of Work.

2. No separate payment shall be made for compliance with provisions of this clause and all costs shall be deemed to have been included in the bid.

3. The Contractor shall make his own arrangement for the disposal of the spoils from the Works to such place where the same shall not cause nuisance and should be acceptable to the authorities concerned.

**20. Defects Liability Period and Operations & Maintenance**

1. 18 months after the successful completion of the construction phase, shall be of Defects Liability and operation followed by 42 months of Operation and Maintenance Period. Defects Liability Period shall commence from the date of issuance of Certificate of Completion. The Contractor shall be solely responsible for undertaking operation and maintenance of the Project for a duration of 60 (sixty) months commencing from the date of issuance of Certificate of Construction Completion in accordance with the requirements set forth in Scope of Project (Sec.

II of the RFP Document). During the Operation and Maintenance Period, the Contractor shall be responsible for repairing of any/ all defects, replacement of goods and undertaking minor/ major repairs that may be required to the satisfaction of the Engineer. If the Contractor fails to repair & restore the defect(s)/ deficiency(ies) after a notice issued by the Engineer-in-Charge, the Employer will be free to get it remedied at the risk and cost of the Implementing Agency besides taking any other action including levy of Liquidated Damages at the rate of 0.05% of the Contract Price for each week of delay, as per the Contract, if the Implementing Agency does not get it remedied within the period specified in such notice.

**21. Approval by the Engineer – in -Charge**

1. The Contractor may submit Specifications and Drawings showing the proposed Temporary Works to the Engineer, who is to approve them if they comply with the Specifications and Drawings.

2. The Contractor shall be responsible for design of Temporary Works.

3. The Engineer's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

4. The Contractor shall obtain approval of third parties to the design of the Temporary Works where required.

5. All drawings prepared by the Contractor for the execution of the temporary or permanent works are subject to prior approval by the Engineer before their use. In case of dispute, if any, decision of the Employer will be final and binding.

**22. Safety**

1. The Contractor shall be responsible for the safety of all activities on the site, including smooth flow of traffic at his own cost following the laid down guidelines.

**23. Discoveries**

1. Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Engineer on behalf of the Employer of such discoveries and carry out the Engineer's instructions for dealing with them.

**24. Possession of the Site**

1. The Engineer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Engineer is deemed to have delayed the start of the relevant activities and this may be a Compensation Event for the purpose of time extension only without any Cost implication.

**25. Access to the Site**

1. The Employer, Engineer or any other person authorized by the Employer shall at all times have access to the Site and to all places where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured/ fabricated/ assembled for the works.
2. The Engineer shall be entitled, during manufacture, fabrication or preparation to inspect and test the materials and Plant to be supplied under the Contract. If materials or Plant are being manufactured, fabricated or prepared in workshops or places other than those of the Contractor, the Contractor shall obtain permission from the Engineer and his authorized representatives to carry out such inspection and testing in those workshops or places. All the expenses for such visits, inspection shall be borne by the Contractor. Such inspection or testing shall not release the Contractor from any obligation under the Contract.

3. The Contractor shall agree with the Engineer on the time and place for the inspection or testing of any materials for Plant as provided in the Contract. The Engineer shall give the Contractor not less than 24 (twenty-four) hours' notice of his intention to carry out the inspection or to attend the tests. If the Engineer, or his duly authorized representative, does not attend on the date agreed, the Contractor may, unless otherwise instructed by the Engineer, proceed with the tests, which shall be deemed to have been made in the presence of the Engineer. The Contractor shall forthwith forward to the Engineer duly certified copies of the test readings, if the Engineer has not attended the tests, he shall accept the said readings as accurate.

**26. Instructions**

1. The Contractor shall carry out all instructions of the Engineer pertaining to works which comply with the applicable laws where the Site is located.

2. The Contractor shall permit the Engineer to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Engineer or the Employer, if so, required by the Engineer or Employer.

**27. Disputes Resolution Mechanism**

1. If any dispute or differences of any kind what-so-ever arise between the Employer, its authorized representatives and the Contractor in connection with or arising out of this Contract or the execution of Work, these shall be resolved as under.

2. Whether before its commencement or during the progress of Project/Work(s) or after the termination, abandonment or breach of the Contract, the dispute shall in the first instance supported with complete documents and further documents, if any, required by him, be referred for settlement to the Engineer of the Work and he shall, within a period of 60 (sixty) days after being requested in writing by the Contractor to do so, convey his decision to the Contractor. Such decision in respect of every matter so referred shall,

subject to arbitration as hereinafter provided, be final and binding upon the Contractor. In case the Work is already in process, the Contractor shall continue with the execution of the Work as aforesaid with all due diligence, whether any of the parties requires arbitration as hereinafter provided or not.

3. If the Engineer has conveyed his decision to the Contractor and no claim for arbitration has been filed by the Contractor within a period of 60 (sixty) days from the receipt of the letter communicating the decision, the said decision shall be final and binding upon the Contractor and will not be a subject matter of arbitration at all.

4. If the Engineer fails to convey his decision within a period of 60 (sixty) days from the date on which the said request was made by the Contractor, he may refer the dispute for arbitration as hereinafter provided.

5. All disputes or differences in respect of which the decision is not final and conclusive shall, at the request of either party made in communication sent through registered A.D. post, be referred for arbitration to the Arbitral Tribunal consisting of three members with each party appointing their nominee arbitrator and such nominee arbitrators appointed the third presiding arbitrator.

6. The reference to the Arbitral Tribunal shall be made by the claimant party within 120 (one hundred twenty) days from the date of dispute of claim arises during the execution of Work. If the claim pertains to rates or recoveries introduced in the final bill, the reference to the Arbitral Tribunal shall be made within 6 (six) calendar months from the date of payment of the final bill to the Contractor or from the date a registered notice is sent to the Contractor to the effect that his final bill is ready by the Engineer (whose decision in this respect shall be final and binding) whichever is earlier.

7. It shall be an essential term of this contract that in order to avoid frivolous claims, the party invoking arbitration shall specify the disputes based upon facts and calculations stating the amount claimed under each claim and shall furnish a “deposit-at-call” for ten percent of the amount claimed, on a scheduled bank in the name of the Arbitrator/chairman of the Arbitral Tribunal, by his official designation who shall keep the amount in deposit till the announcement of the award. In the event of an award in favour of the claimant, the deposit shall be refunded to him in proportion to the amount awarded with respect to the amount claimed and the balance, if any, shall be forfeited and paid to the other party.

8. The provisions of the Arbitration and Reconciliation Act, 1996 or any other statuary law thereunder or modification thereof and for the time being in force shall apply to the arbitration proceedings under this clause.

9. The Arbitrator/Arbitral Tribunal shall give a reasoned award for each claim/ counter claim.

10. The independent claims of the party other than one seeking arbitration as also the counter claims of any party shall be entertained by the arbitrator.

11. The venue of arbitration shall be **Amritsar**, Punjab. The work under the contract shall continue during the arbitration proceedings.

12. The stamp fee upon the award shall be payable by the party as desired by the Arbitral Tribunal and in the event of such party's default, the stamp fee shall be recoverable from another sum due to such party under this or any other contract.

13. Neither party shall be entitled to bring a claim for arbitration, if it is not filed as per the time period already specified or within 6 ( six) months of the following: -

    a) Of the date of completion of the Work as certified by the Engineer; or

    b) Of the date of abandonment of the Work or breach of Contract under any of its clauses; or

    c) Of its non-commencement or non- resumption of Work within 10 (ten) days of written notice for commencement or resumption as applicable; or

    d) Of the cancellation, termination or withdrawal of the work from the Contractor in whole or in part and/ or revision for closure of the Contract; or

    e) Of receiving an intimation from the Engineer that the final payment due or to be recovered from the Contractor had been determined, for the purpose of payment/ adjustment whichever is the latest. If the matter is not referred to arbitration within the period prescribed above, all the rights and claims of either party under the contract shall be deemed to have been forfeited and absolutely barred by the time for arbitration and even for civil litigation.

14. No question relating to this Contract shall be brought before any civil court without first invoking and completing the arbitration proceedings, if the issue is covered by the scope of arbitration under the Contract. The pending arbitration proceedings shall not disentitle the Engineer to terminate the Contract and to make alternate arrangement for completion of the Works.

15. Arbitral Tribunal shall be deemed to have entered into the reference on the day, notice is issued to the parties fixing the first date of hearing. The Arbitrator/Arbitral Tribunal may, from time to time, with the consent of the parties enlarge the initial time for making and publishing the award. However, the Arbitrator/Arbitral Tribunal shall make all out efforts to decide each claim within a period of 6 (six) months from the date of initiation.

16. The expiry to the contractual time limit, whether originally fixed or extended, shall not invalidate the provisions of this clause.

## B. TIME CONTROL

### 28. Programme

1. Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Programme showing the general methods, arrangements, order, and timing for all the activities in the works along with monthly cash flow forecast.

2. An update of the Programme shall be a Programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

3. The Contractor shall submit to the Engineer, for approval, an updated Programme at intervals no longer than the period stated in the Contract Data. If the Contractor does not submit an updated Programme within this period, the Engineer may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted.

4. The Engineer's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Engineer again at any time. A revised Programme is to show the effect of Variations and Compensation Events.

### 29. Extension of the Intended Completion Date

1. If the contractor shall desire an extension of the time for completion of the Work on the ground of his having been unavoidably hindered in its execution or due to any other ground, he shall apply in writing to the Engineer (with corresponding time extension in Performance Security) within thirty (30) days of the date of hindrance (but before the expiry of time limit) on account of which he desires such extent in time as aforesaid" and the Employer if in his opinion (which shall be final) reasonable grounds be shown therefore and also taking into account the recommendations of the Engineer, authorize such extension of time as may in his opinion be necessary or proper. If the contractor fails to apply for extension as aforesaid and the Work is not completed within the time limit, the Contract shall be determined absolutely after action under relevant clauses.

### 30. Delays Ordered by the Engineer

1. The Engineer may instruct the Contractor to delay the start or progress of any activity within the works. However, any delay of totalling beyond 30 (thirty) days shall require prior written approval of the Employer.

### 31. Management Meetings

1. Either the Engineer or the Contractor may require the other to attend a management

meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

2. The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

**32. Early Warning**

1. The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price or delay the execution of works. The Engineer may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate is to be provided by the Contractor as soon as reasonably possible.

2. The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

## C. QUALITY CONTROL

**33. Identifying Defects**

1. The Engineer shall check the Contractor's work and notify the Contractor of any Defects that are found. The notice of the Engineer shall give the description of the defects in sufficient detail, including the obligations as per the Contract. Such checking shall not affect the Contractor's responsibilities. The Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.

**34. Action and Compensation in case of Bad Work**

1. If it appears to the Engineer or his subordinate-in-charge of the work that any work or part of it has been executed with unsound, imperfect, unskilful workmanship or with materials of any inferior description or that any articles or materials provided by the Contractor for the execution of the work are unsound or of inferior quality to that contracted for or otherwise not in accordance with the contract, the Contractor shall, on written instructions by the Engineer specifying unsound the work, materials or articles, forthwith rectify or remove and reconstruct the work so specified in whole or part, as the case may require or as the case may be, remove the materials or articles at his own proper charge and cost, within a period specified by the Engineer. In the event of his falling to do so, the Contractor shall be liable to pay compensation at the rate of 1.00 % of the estimated amount of unsound work per week. In case the Contractor does not

make the necessary compliance at all, the Engineer may rectify or remove and, re-execute the work or remove and replace with others, the materials or articles complained of as the case may be, at risk and expenses of the Contractor.

**35. Tests**

1. If the Engineer-in-charge instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. The Engineer-in-charge may also ask for tests from third parties for testing the quality of the material to be used or already used. All such tests shall be co-ordinated by the Contractor including sample collection and associated expenses. The bidder shall take into consideration the cost of relevant tests while submitting its bid.

**36. Correction of Defects**

1. The Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected. Every time notice of a Defect is given; the Contractor shall correct the notified Defect within the length of time specified by the Engineer's notice.

**37. Uncorrected Defects**

1. If the Contractor has not corrected a Defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

**38. Issuance of Certificate of Construction Completion**

1. Upon being satisfied that the quality work has been executed by the Contractor in accordance with the Conditions of Contract, Scope of Work, Specifications, Technical Conditions, Employer's Requirements, Drawings, etc., and also upon the Tests having been conducted successfully the Engineer shall issue a Certificate of Construction Completion signifying completion of construction of Works and commencement of Operation & Maintenance Period. However, no certificate shall be issued nor shall the work be considered to be complete until the Contractor has cleared all scaffolding, surplus materials, garbage and all huts and sanitary arrangements set up for the labour at the site and cleaned off the dirt from work.

## D. COST CONTROL

**39. Schedule of Payment**

1. Schedule of payment shall be as mentioned in the Contract Data.

2. The Contractor shall be paid for the quantity of work completed by him on a pro-rata basis at the time of submission of monthly statement pursuant to clause 44.

**40. Variations & Change in the Scope of Work**

1. The Engineer shall have power to make any variations, alterations, omission, additions to or substitutions for the original specifications, drawings, designs and instructions that may appear to be necessary or advisable during the progress of the work, and the contractor shall be bound to carry out the work in accordance with any instructions which may be given to him in writing, signed by the Engineer. Such alterations/additions /substitutions shall not invalidate the contract and shall be carried out by the contractor on the same conditions in all respect on which he agreed to do the main work The time of completion of the work shall be extended in the proportion that the altered, additional or substituted works bears to the original contract work and the certificate of the Engineer shall be conclusive as to such proportion.
2. If the final scope of work differs from the original for the particular item by more than 25% provided the change exceeds 1% of initial Contract Price, the Engineer shall adjust the rate to allow for the change, duly considering:
   (a) Justification for rate adjustment as furnished by the Contractor,
   (b) Economies resulting from increase in quantities by way of reduced plant, equipment, and overhead costs.
   (c) Entitlement of the Contractor to compensation events where such events are caused by any additional work.
   (d) The revised rates will be applicable to the quantity that exceeds 25% limit and not on the entire quantity.
3. The Engineer shall not adjust rates from changes in scope of work, if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Engineer.
4. If instructed by the Engineer, the Contractor shall provide the Engineer with a detailed cost breakdown of any rate of the item undergoing variation in the scope of work.

**41. Variation**

1. All variations shall be included in updated Programmes produced by the Contractor.

**42. Payments for Variation**

1. The rates for such additional altered, substituted work or part of any item shall be determined in accordance with the following provisions in their respective order:
   i. If the rate of the additional, altered, substituted work or part of any item are specified in the contract for the work the contractor is bound to carry out the additional, altered substituted work or part of any item at the same rates as are specified in the contractor for work or derived from the similar items;

   ii. If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the rates for a similar class of work as are specified in the contact for the work;

   iii. If the rates cannot be determined as provided in (i) and (ii) above, then such work shall be paid at the rates entered in common schedule of the rates (on date of tender)

minus/plus the applicable ceiling premium;

iv. If the rates cannot be determined as provided in (i), (ii) and (iii) above, then such work shall be paid at the rates entered in Delhi schedule of the rates (on date of tender) minus/plus the applicable index;

v. If the rates for the altered, additional or substituted work cannot be determined in the manner specified in Clause (i) (ii) (iii) and (iv) above, then the Contractor shall provide the Engineer with a quotation (with breakdown of unit rates) for carrying out the Variation when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within 7 (seven) days of the request or within any longer period stated by the Engineer and before the Variation is ordered.

2. If the Contractor's quotation is unreasonable, the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer's own forecast of the effects of the Variation on the Contractor's costs.

3. If the Engineer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

4. The Contractor shall not be entitled to additional payment for costs which could have been avoided by giving early warning.

**43. Cash Flow Forecasts**

1. When the Programme is updated, the Contractor is to provide the Engineer with an updated cash flow forecast.

**44. Payment Certificates**

1. The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously, along with copies of the following documents:

i. Measurements and quantities of items of work done since last bill.

ii. Copies of quality control tests in specified format covering the work done since last bill.

iii. Copies of instructions recorded in the instruction book containing the instructions and compliance made thereof, covering the work done since last bill.

2. The Engineer shall check the Contractor’s monthly statements within 30 (thirty) days and certify the amount to be paid to the Contractor after taking into account any credit or debit for the month in question in respect of materials for the works in the relevant amounts and under conditions set forth in sub clause 48.3 of the Contract Data (Secured

Advance).

3. The value of work executed shall be determined by the Engineer.

4. The value of work executed shall comprise the value of the percentage of the scope of works completed, multiplied by the rates as mentioned in detailed approved BoQ submitted by the Contractor.

5. The value of work executed shall include the valuation of Variations and Compensation Events.

6. The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in light of later information.

**45. Payments**

1. The Employer shall pay the Contractor the amounts certified by the Engineer as promptly as possible. It will be the endeavour of the Employer not to delay the payments to the Contractor. However, no interest shall be payable for delayed payments by the Employer.

2. Items of the Project/Work(s), for which no rate or price or percentage of lump sum rate has been entered in, will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

3. Any excess payment made to the Contractor inadvertently or otherwise under this Contract or on any account whatsoever and any other sum found to be due to the Government by the Contractor in respect of this Contract shall be recoverable from the Performance Security and/ or retention money of the Contractor and/ or from any payments due to the Contractor.

4. The Engineer may refuse or suspend payments on account of a work when executed by a firm or by a Contractor described in his bid as a firm, unless receipts are signed by all the partners, or one of the partners or an authorized representative of the Contractor who produces a valid authority in writing enabling him to give effectual receipts on behalf of the firm.

5. All the intermediate payments shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed; and shall not preclude the requiring of bad, unsound, imperfect or unskilled work to be removed and taken away and reconstructed, re-laid or re-erected, or be considered as an admission of the performance of the contract or any part thereof in any respect of the occurring of any claim, nor shall it conclude, determine or effect in any way the powers of the Engineer under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise

or in any other way, vary or affect the contract.

6. The receipt of the Accountant or Clerk for any money paid by the Contractor to the Employer will not be considered as a receipt of payment to the Engineer and the Contractor shall be responsible for ensuring that he procures a receipt duly signed by the Engineer.

7. Final payment at the end of the Contract Period i.e. at the end of Operation and Maintenance period will be made only when whole of the Site is handed over to the Municipal Corporation, Amritsar.

**46. Compensation Events**

1. The following are Compensation Events unless they are caused by the Contractor:

   (a) The Engineer does not give Possession/ access to a part of the Site as stipulated in Clause 24 by the Site Possession Date stated in the **Contract Data**.

   (b) The Employer modifies the schedule of other Contractors in a way which affects the work of the Contractor under the contract.

   (c) The Engineer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or other reasons.

   (d) The Engineer orders a delay or does not issue/ approve drawings, specifications and/or instructions required for execution of Works on time.

   (e) The effect on the Contractor of any of the Employer's Risks.

   (f) The Engineer unreasonably delays issuing a Certificate of Completion.

   (g) Other Compensation Events listed in the **Contract Data** or mentioned in the Contract.

2. If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/ or the Intended Completion Date is extended. The Engineer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

3. As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Engineer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Engineer shall adjust the Contract Price based on Engineer's own forecast. The Engineer will assume that the Contractor will react competently and promptly to the event.

4. The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Engineer.

**47. Tax**

1. The rates quoted by the Contractor shall be deemed to be inclusive of all the taxes (including GST), levies, etc. including their variations as notified by the concerned authority from time to time, and also of all the new taxes and levies that may be imposed that the Contractor will have to pay for the performance of this Contract. The Engineer on behalf of the Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

   Nothing in the Contract shall relieve the Contractor from its responsibility to pay any tax that may be levied in India on profits made or otherwise by it in respect of the Contract.

2. The Contractor shall comply with the proper bye-laws and legal orders of the local body or public authority under the jurisdiction of which the work is executed and pay all fees and charges for which he may be liable. Nothing extra shall be payable on this account.

**48. Currencies**

1. All payments shall be made in Indian Rupees.

**49. Price Adjustment**

1. Contract Price shall be adjusted for increase or decrease in rates and price of Bitumen, Cement, Steel, Labour and POL & materials only in accordance with the following principles and as per formula given in Contract Data:

   (a) The Price adjustment shall apply for the work done from the start date given in the Contract Data upto end of the initial intended Completion Date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the Contractor. However, for the work done during the period for which extension has been granted by the Engineer, the price adjustment shall be made using either the rates/ prices prevailing at the time of intended date of completion, or the rates/ prices as prevailing for the period under consideration, whichever is less.

   (b) The price adjustment shall be determined during each month from the formula given in the Contract Data. It will exclude value of the works executed under variations for which price adjustment shall be worked separately based on terms mutually agreed.

   (No price adjustment is to be paid for the work done in the period of first six months from the date of award of the contract irrespective of the time period specified.)

2. To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clauses in the contract, the bid price shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

**50. Retention**

1. The Employer shall retain 5% (five percent) of the amount of each payment due to the Contractor until Completion of the whole of the Project/Work(s) to cover the cost that may be involved in removal of defects, imperfections or taking remedial measures in the work executed.

2. 50% (fifty percent) of the total amount retained shall be repaid to the Contractor after 3 (three) months of completion of construction of the whole of the Project/ Work as certified satisfactory by the Engineer with respect to removal of all defects, imperfections, short comings and taking remedial measures, that may be necessary and after recording of final measurements of work done, for which the certificate of the Engineer would be conclusive.

3. The remaining amount of the retained money shall be repaid when the Operation & Maintenance Period has passed, and after the Engineer has issued a Project Completion Certificate certifying that the Employer has taken over the Works and all Defects notified by the Engineer to the Contractor before the end of this Period have been corrected.

**51. Liquidated Damages**

1. The Contractor shall ensure due diligence to achieve progress of work not less than that indicated in the following milestones:

| | | |
|---|---|---|
| i) | On lapse of 25% contractual time | :10% |
| ii) | On lapse of 50% contractual time | :30% |
| iii) | On lapse of 75% contractual time | :65% |
| iv) | On lapse of 100%(full) contractual time | :100% |

The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Engineer on behalf of the Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

2. In case of default, the Contractor shall, notwithstanding issuance of a prior notice in this regard, pay prospectively as liquidated damages an amount upto 1% of the amount of contract or such lesser amount that the Engineer may levy on behalf of the Employer, for every week of the period for which the work remains uncommenced after 10 days of the issue of acceptance letter; or the work remains unfinished after the completion date.

3. In case of continued default or shortfall in progress, the Engineer may go on enhancing the levy of liquidated damages, each time limited to 1% of the amount of contract per

week of further default subject to maximum limit of five (5) percent of the Contract value.

4. If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. However, no interest shall be payable on the said over payment to the Employer.

5. If the contractor fails to comply with the time for completion as stipulated in the tender, then the Contractor shall pay to the Employer (through the Engineer), the relevant sum stated in the Contract Data as Liquidated damages for such default and not as penalty for everyday or part of day which shall elapse between relevant time for completion and the date stated in the taking over certificate of the whole of the works on the relevant section, subject to the limit stated in the Contract Data.

6. The Engineer/ Employer may, without prejudice to any other method of recovery deduct the amount of such damages from any monies due or to become due to the Contractor. The payment of deduction of such damages shall not relieve the Contractor from his obligation to complete the works or from any other of his obligations and liabilities under the Contract.

7. If, before the Time for Completion of the whole of the Works or, if applicable, any Section, a Taking – Over Certificate has been issued for any part of the Works or of a Section, the liquidated damages for delay in completion of the remainder of the Works or of that Section shall, for any period of delay after the date stated in such Taking-Over Certificate, and in the absence of alternative provisions in the Contract, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works or Section, as applicable. The provisions of this Sub-Clause shall only apply to the rate of liquidated damages and shall not affect the limit thereof.

**52. Advance Payment**

1. The Engineer on behalf of the Employer may make advance payment to the Contractor of the amounts upto 5% (five percent) of the Contract amount (excluding maintenance cost, if any) against provision by the Contractor of an Unconditional Bank Guarantee in favour of the Employer, in a form and by a bank acceptable to the Employer in amounts and currencies equal to the 110% (one hundred ten percent) of the advance payment. The guarantee shall remain effective until the advance payment has been repaid. 9% (nine percent) interest shall be charged on the advance payment. The advance payment shall be paid to the Contractor in minimum 3 (three) parts.

2. The Contractor is to use the advance payment only to pay for Equipment, Plant and Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Engineer.

3. The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done.

**53. Secured Advance**

1. The Contractor, on signing an indenture in the form to be specified by the Engineer, shall be entitled to be paid, during the execution of Work, upto 75% (seventy five percent) of the estimated value of any materials, which, in the opinion of the Engineer, are non-perishable and which have been procured and adequately stored against damage, but which have not been incorporated in the works at the time of making advance.

2. This secured advance shall be subject to the following:

   a) The materials are in accordance with the specification for Works;

   b) Such materials have been delivered to site, and are properly stored and protected against damage or deterioration to the satisfaction of the Engineer. The Contractor shall store the bulk material in measurable stacks;

   c) The Contractor's records of the requirements, orders, receipt and use of materials are kept in a form approved by the Engineer and such records shall be available for inspection by the Engineer;

   d) The Contractor has submitted with his monthly statement the estimated value of the materials on site together with such documents as may be required by the Engineer for the purpose of valuation of the materials and providing evidence of ownership and payment thereof;

   e) Ownership of such materials shall be deemed to vest in the Employer for which the Contractor has submitted an Indemnity Bond in an acceptable format; and

   f) The quantities of materials are not excessive and shall be used within a reasonable time as determined by the Engineer.

**54. Securities**

1. The Performance Security (including additional security for unbalance bids) shall be provided to the Engineer on behalf of the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and for and by a bank or surety acceptable to the Engineer on behalf of the Employer and denominated in Indian Rupees. The Performance Security shall be in favour of the Employer and valid until a date 60 (sixty) days beyond the date of expiry of the Operations & Maintenance Period

and the additional security for unbalanced bids shall be valid until a date thirty (30) days from the issue of the Certificate of Construction Completion.

**55. Cost of Repairs**

1. Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Operation and Maintenance period shall be remedied by the Contractor at Contractor's cost if the loss or damage.

## E. FINISHING THE CONTRACT

**56. Completion**

1. The Contractor shall request the Engineer to issue a Project Completion Certificate of the Completed Works and the Engineer, within 30 (thirty) days of the receipt of such request, shall inspect the work and if there is no defect in the work, shall furnish the Contractor with such a certificate of Project completion.

**57. Taking Over**

1. At least 20 (twenty) days prior to completion of the Operation and Maintenance Period, the Contractor shall apply by notice to the Engineer-in-charge for Taking-Over Certificate for taking over the Works by Municipal Corporation Amritsar or the concerned department**.** If the Works are divided into sections, the Contractor may similarly apply for a Taking-Over Certificate for each section of the Project Site**.** The Engineer-in-charge shall, after receiving the Implementing Agency's application**:**
   i. Issue the Taking-Over Certificate to the Contractor, provided there are no defects or deficiencies; or
   ii. Reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued**.** The Contractor shall then complete this work before issuing a further notice under this Sub-Clause**.**

**58. Final Account**

1. The Contractor shall supply to the Engineer a detailed account of the total amount that the Contractor considers payable under the Contract after the end of construction/ improvement works. The Engineer shall issue the Certificate of Construction Completion and certify any final payment that is due to the Contractor within 56 (fifty-six) days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 (fifty-six) days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 (fifty-six) days of receiving the Contractor's revised account.
2. The procedure in sub-clause 2 above shall be followed after the completion of Operations and Maintenance Period also.

**59. Operating and Maintenance Manuals**

1. The Contractor shall supply, as built drawings and the operating manuals, guarantee papers for all the equipments installed as stated in the Contract Data.

2. If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract Data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

**60. Termination**

1. The Engineer on behalf of the Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. For this purpose, 14 (fourteen) days' notice in writing shall be served by either party on the other party clearly mentioning the particular grounds of Breach of Contract.

2. Fundamental breaches of Contract include, but shall not be limited to the following:

   a) the Contractor stops work for 28 (twenty-eight) days when no stoppage of work is shown on the current programme and the stoppage has not been authorized by the Engineer;

   b) the Engineer instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 28 (twenty-eight) days;

   c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

   d) a payment certified by the Engineer is not paid by the Employer to the Contractor within 90 (ninety) days of the date of the Engineer's certificate;

   e) the Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;

   f) the Contractor does not maintain a security which is required;

   g) the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract Data; and

   h) if the Contractor, in the judgment of the Engineer or the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

   i) If the Contractor, having been given a notice in writing by the Engineer, fails to rectify, reconstruct or replace any defective work or continues the execution of work in an inefficient, improper, un-workman–like manner or not in

accordance with sound Engineering practices or without complying with the directions and requirements or the Contractor continues to be in default of its Operation & Maintenance related obligations, within a period of 10 (ten) days of the issue of said notice.

j) If the Contractor being a company shall pass a resolution or a court shall make an order of the effect that the company shall be wound up or if a receiver or a manager on behalf of the credit or shall be appointed or if circumstances shall arise which entitle the court of creditor to appoint a receiver or manager or to make a winding up order.

k) If the Contractor has not completed at least 40% (forty percent) of the value of construction work required to be completed after half of the completion period has elapsed.

l) If the Contractor commits any acts of defaults with respect to conditions of contract.

3. When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 60.2 above, the Engineer shall decide whether the breach is fundamental or not.

4. Notwithstanding the above, the Engineer on behalf of the Employer, may terminate the Contract for convenience.

5. If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

6. After the termination of the Contract under this clause, the Employer shall be at liberty to get the balance work executed through some other contractual agency or through departmental means or to abandon the balance work altogether or to modify the design and scope of the work in any manner. The Contractor shall have no claim against the Employer in this regard.

**61. Payment upon Termination**

1. If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received upto the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less 5% (five percent) of the Contract value towards compensation for the breach of Contract. The total amount of liquidated damages and compensation for breach of Contract shall, however, be limited to 7.5% of the Contract value or the amount available with the Engineer (in the shape of retention money, Performance Security and due amount of work done if any), whichever is higher. The requisite amount for which the Contractor may become liable shall be

realized by encashing the Performance Security furnished by the Contractor and/ or from other amounts due to the Contractor in respect of this work.

2. If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done. This work value shall take into account the cost of balance material brought by the Contractor and available at site, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works. The advance payment received upto to the date of the certificate, other recoveries due in terms of the contract and the taxes due to be deducted at source as per applicable law, shall be deducted from the work value.

3. **No Compensation for Alteration in or Restriction in Works**

If at any time after the commencement of the work the Employer, for any reason whatsoever, does not require the whole Project/ Work(s) or part thereof to be carried out, the Engineer shall give notice in writing of the fact to the Contractor, who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage, which he might have derived from the execution of the work in full, but which he did not derive in consequence of the full amount of work not having been carried out, neither shall he have any claim for compensation by reasons of any alteration having been made in the original specifications, drawings, designs and instructions, which shall involve any curtailment of the work originally contemplated.

**62. Property**

1. All materials on the Site, Plant, Equipment, Temporary works and Works are deemed to be the property of the Employer, if the contract is terminated because of a Contractor's default.

**63. Release from Performance**

1. If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor the Engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

## F. SPECIAL CONDITIONS OF CONTRACT

1. Contractors are advised to inspect the Site of Work before tendering.

2. All the Works shall be carried out as per detailed specification and instructions of Engineer.

3. The conditional tender shall be liable to be rejected.

4. The quantities are liable to vary on either side to any extent as per actual requirement of work for which no claim whatsoever by the contractor shall be entertained.

5. Any recovery imposed by Technical Audit cell or by higher authority will be deducted from Contractors running final bills during execution of works and will be adjusted from Performance Security if final bill is processed during Operation & Maintenance Period.

6. All the Defects appeared during execution of work will have to be rectified as directed by Engineer within shortest possible time. During Operation & Maintenance Period, the Contractor will deploy sufficient staff as mentioned in the Contract document for proper maintenance of work. If Contractor fails to attend the defects within reasonable time period, the same will be got rectified by the Employer and all expense so incurred will be adjusted from Performance Security of the Contractor.

7. The Contractor will adopt PERT to complete the project in time. A detailed program and weekly working program will have to be submitted by Contractor regularly.

# SECTION – IV

# CONTRACT DATA

## CONTRACT DATA

***The Contract Data hereunder pertains to some specific, but in no way exhaustive, information on the Project/ Work(s). The Bidders are required to study and account for this data in conjunction to various other Sections of the Document. GCC stands for 'General Conditions of Contract'.*** **Clause References are with respect to Section 3**

<table>
<tr><th>CONDITIONS</th><th>REF. GCC CLAUSE</th><th>DATA</th></tr>
<tr><td>Defect Liability Period</td><td>1.15</td><td>1.5 (one and half) year from the date of successful completion of execution phase and it will also include operation of the works.</td></tr>
<tr><td>Employer's name and address</td><td>1.16</td><td>Name: Chief Executive Officer,<br>Amritsar Smart City Limited,<br>SCO-21, 2nd Floor, Distt. Shopping Complex,<br>B-Block, Ranjit Avenue,<br>Amritsar, Punjab.</td></tr>
<tr><td>Engineer's name and address</td><td>1.17</td><td>To be nominated later</td></tr>
<tr><td>Intended Date of Completion</td><td>1.22</td><td>The Intended Completion Date for the whole works is 28 (twenty-eight) months after start of work.<br>The Contractor shall ensure due diligence to achieve progress of work in terms of Contract price not less than that indicated for the following milestones:<br>i) On lapse of 25% contractual time :10%<br>ii) On lapse of 50% contractual time :30%<br>iii) On lapse of 75% contractual time :65%<br>iv) On lapse of 100%(full) contractual time :100%</td></tr>
<tr><td>Operation & Maintenance Period</td><td>1.24</td><td>A period of 60 (sixty) months from the date of issuance of Certificate of Construction Completion</td></tr>
<tr><td>Location of Site</td><td>1.27</td><td>The Site is located at Amritsar</td></tr>
<tr><td>Start Date</td><td>1.30</td><td>The start date shall be the date of signing of the Contract.</td></tr>
<tr><td>The law which applies to the Contract</td><td>3.1</td><td>The Law of the Union of India and the language shall be English</td></tr>
<tr><td>Sub-contracting</td><td>7.1</td><td>Limit of sub-contracting: 25% (twenty five percent) of Initial Contract Price subject to approval of Engineer.</td></tr>
<tr><td>Other Contractors</td><td>8</td><td>The Schedule of Other Contractors (will be supplied later on).</td></tr>
<tr><td>Insurance</td><td>17</td><td><table><tr><td>Item</td><td>Amount to be Insured</td><td>Deductibles</td></tr></table></td></tr>
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<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>A.</td><td>Loss of or damage to the works, Plants and materials</td><td>10% (ten percent) of contract value</td><td rowspan="5">Deductibles for insurance shall be as per latest tariff of General Insurance Company of India plus 20% (twenty percent) of premium amount for items A, B, C & D</td></tr>
<tr><td>B.</td><td>Loss of or damage to equipments</td><td>2.5% (two point five percent) of contract value</td></tr>
<tr><td>C.</td><td>Loss of or damage to property (except the works, plant, Materials, and Equipment) in Connection with the contract:</td><td>1% (one percent) of contract value</td></tr>
<tr><td>D.</td><td>Personal injury or death</td><td>Rs. 2 (two) lakhs per occurrences for maximum three occurrences</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Site Possession Date</td><td>24</td><td>The Site Possession Date shall be Date of award of contract</td></tr>
<tr><td>Programme Schedule</td><td>28.1</td><td>The period for submission of the programme for approval of Engineer shall be 21 (twenty-one) days from the issue of Letter of Acceptance.</td></tr>
<tr><td></td><td>28.3</td><td>The period between programme updates shall be 30 (thirty) days.</td></tr>
<tr><td></td><td>28.3</td><td>The amount to be withheld for late submission of an updated programme shall be Rs.20,000/- (Rupees Twenty Thousand)</td></tr>
<tr><td>Variation</td><td>41</td><td>No increase in rates of any items specified in Bill of Quantity is allowed due to variation in quantities</td></tr>
<tr><td>Payments</td><td>45</td><td>CAPEX Amount:<br>85% during implementation period;<br>Remaining 15% payable along with O&M period;<br>Invoices to be raised as per clause 44.</td></tr>
</table>

| | | |
|---|---|---|
| | | **OPEX Amount:**<br>Payable quarterly against invoices.<br><br>The following shall be in addition to the existing clauses:<br><br>In case of JV, invoices shall be raised by the JV through its Project Incharge. Any payment against the invoices shall only be made to JV account. Therefore, the JV shall have a Bank Account in its name and shall also obtain GST number. In absence of Bank Account and GST no payment shall be made to JV. Inter se GST liability of JV partners shall be borne by the JV only. Employer shall not be liable for GST adjustments among JV members.<br><br>No interest shall be payable by the Employer on delayed payments; however, it shall be the endeavour of the Employer to make the payments promptly. |
| Retention | 50 | The proportion of payment retained (retention money) shall be 5% (five percent) from each bill or in case the Contractor wishes, he can submit a Bank Guarantee to the tune of 5% (five percent) of the Contract Price with the Authority and no retention money shall be deducted from each running bill. |
| Amount of liquidated damages for delay in completion of works | 51 | <u>For Whole of work</u><br>0.1% (zero point one percent) of the Initial Contract Price, rounded off to the nearest Thousand, per week. The damages will be proportionally calculated for days. |
| Maximum limit of liquidated damages for delay in completion of work | 51 | 7.5% (seven point five percent) of the Initial Contract Price rounded off to the nearest thousand. |
| Penalties during Operations and Maintenance | 51 | In case of failure by the Contractor to carry out the O&M as per the O&M respective Schedule mentioned in Appendix -1-part A of this contract data, penalties shall be imposed at the rate as mentioned in the Appendix-1 part B of this contract data.<br>In addition to the above, the works would be carried out and the Employer would back charge the bidder along with a mark-up of 20% (twenty percent) on the actual cost incurred to carry out the said work. |
| Mobilization Advance | 52 | On application by the Contractor, mobilization advance to the extent of 5% (five percent) against bank Guarantee of 110% |

| | | |
|---|---|---|
| | | (one hundred and ten percent) of the contract price maybe paid to the Contractor at an interest rate of 9% (nine percent). |
| | 52 | Repayment of advance payment for mobilization.<br>The recovery of mobilization advance and interest thereof shall stand start when 20% (twenty percent) of the work is completed and shall be fully made when 80% (eighty percent) of the work stands completed based on pro rata basis, provided that the loan shall be completely repaid prior to the expiry of the original time for completion pursuant to Clause 17 and 26. |
| Secured Advance for non-perishable materials brought at site | 53 | The contractor on signing an indenture in the form to be specified by the Engineer-in-Charge, shall be entitled to be paid, during the execution of work 75% (seventy five percent) of the estimated value of any materials, which in the opinion of Engineer-in-charge is non-perishable under P.W.D. code or other regulation applicable in Punjab and which have been procured and adequately stored against damage, but which have not been incorporated in work as the time of making advance:<br>a) The materials are in-accordance with the specification for works.<br>b) Such materials have been delivered to side, and are properly stored and protected against damage or deterioration to the satisfaction of the Engineer. The contractor shall store the extra material in measurable Stacks.<br>c) The Contractor's record of the requirements, orders, receipt and use of materials are kept in a form approved by the Engineer and such records shall be available for inspection by the Engineer.<br>d) The Contractor has submitted with his monthly statement the estimated value of the materials on site together with such documents as may be required by the Engineer for the purpose of valuation of the materials and providing evidence of ownership and payment thereof.<br>e) Ownership of such materials shall be deemed to vest in the Employer for which the Contractor has submitted and Indemnity Bond in an acceptable format and<br>f) The quantities of materials are not excessive and shall be used within a reasonable time as determined by the Engineer.<br><br>(The advance payment will be paid to the Contactor no later than 28 (twenty-eight) days after fulfilment of the above conditions.) |

| | | |
|---|---|---|
| | | The advance shall be repaid from each succeeding monthly payments to the extent materials have been incorporated into the Works. |
| Securities | 54 | Performance Security for 5% (five percent) of contract price plus Rs _____ (to be decided after evaluation of the bid) as additional security in terms of for unbalanced bids.<br><br>Prior to 60 (sixty) days of Start of Operation & Maintenance period the contractor should submit another performance security for Operation & Maintenance which will be 5% (five percent) cost of Operation & Maintenance Period. Only after submission of this Performance Security, the previous performance security shall be released.<br><br>The standard form of Performance Security acceptable to the Employer shall be an unconditional and irrevocable Bank Guarantee of the type as presented in Section 8 of the Bidding Documents. |
| Taking Over | 57 | Taking Over after the expiry of Operation & Maintenance Period:<br>1. Two months prior to the expiry of the Contract period, the Employer/ Municipal Corporation Amritsar (MCA) or the concerned department will inspect and notify the Contractor, the maintenance that is required at the Project Sites for taking over in an acceptable physical conditions )physical conditions in reference to the initial physical condition at the start of O&M period, after accounting reasonable wear and tear during operation( and in fully operational condition.<br>2. Notwithstanding to the notification given by Employer/ MCA as above, the Contractor shall repair, maintain and operate the Project as per the terms and conditions of this contract, till 12.00 Noon up to the date of expiry of the Contract Period.<br>3. The Contractor shall be liable to repair all defects occurred or noticed prior to the 12.00 Noon, up to the date of expiry of contract, even if the facilities are taken over by the Employer/ MCA or the concerned department subsequently, due to expiry of contract period, as per Clause 1 above. However, the MCA/ Employer has to notify all such defects/ liabilities of Contractor within 30 days of taking over of facilities.<br>4. On expiry of contract, the Contractor shall hand over all spares, tools and for which he has been paid.<br>5. After expiry of the Contract, the Contractor shall provide two copies of the updated O&M manual. The components of communication system used during O&M period in |

| | | |
|---|---|---|
| | | operating condition.<br>6. If the Contractor does not comply with any of the provisions of Clause 57, or any other requirement in pursuance of good industry practices, the Engineer–In-charge shall estimate the cost of liabilities due to violation of any of the provisions of this Contract. Such estimates made by Engineer-In-Charge shall be final and binding for the Contractor. However, in a reasonable endeavor, such estimates shall be communicated to the Contractor, within 15 days of expiry of the Contract. The Contractor shall be given an opportunity to rectify the damages through his staff/agents, or for supply of required material provided such rectification of defects on maintenance do not require any shut down of the system, within 30 days of such notification of estimates by Employer/ MCA.<br>7. After the date of expiry of contract and recoveries of all dues payable by the Contractor, the Engineer-In-Charge shall issue a "Certificate of Taking over."<br>8. Till the date of expiry of Contract Period, the Contractor shall do all routine and periodic/ break-down maintenance as required in the O&M manual in force at the time of expiry of contract. |
| Manual | 59.1 | The Schedule of Operating and Maintenance Manual: 15 (fifteen) days after completion. |
| "as built" Drawings | 59.1 | The date by which "as-built" drawings (in scale as directed) in 2 (two) sets are required is within 28 (twenty eight) days of issue of certificate of completion of whole or section of the work, as the case may be. |
| The amount to be withheld for failing to supply "as built" drawings, if any, by the date required | 59.2 | Within 2 (two) months of completion of entire work.<br><br>Penalty of INR 50,000/- (Rupees Fifty Thousand only) per day. |
| Payment upon termination | 61 | The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the Works shall be 20% (twenty percent). |

## 39. ADJUSTMENT FOR BITUMEN COMPONENT

Price adjustment for increase or decrease in the cost of bitumen shall be paid in accordance with the following formula:

**Vb = Pb x (3,-B0)**

**Vb** = Increase or decrease in the cost of bitumen work during the month under consideration due to Changes in rates for bitumen.

**Bo** = The official retail price of bitumen at the IOC Depot at nearest centre (Bathinda) considered by the Foundation while approving the invitation of the Bids. This price for the work under consideration is Rs. [Bitumen price as on]

**B**, = The official retail price of bitumen of IOC Depot at nearest centre (Bathinda) for the month under consideration.

**Pb** = quantity of bitumen actually consumed in the work done in the period under consideration.

If the prices of bitumen change during the period under consideration for working out escalation, the period shall be split up to calculate appropriate adjustment.

Contractor's profit shall not be considered on Price Adjustment.

**ADJUSTMENT FOR CEMENT COMPONENT**

Price adjustment for increase or decrease in the cost of cement procured by the contractor shall be paid in accordance with the following formula:

**\To =No x Ro (Ci-00)/Co**

**\To** =Increase or decrease in the cost of work during the month under consideration due to changes in the rates for cement.

**Co** = The initial price of cement per 50 kg bag based on the All India whole sale price index for cement, as published by the Ministry of Industrial Development, Government of India, New Delhi, as on the date on which the rate of cement Re was enforced by the Department

**Ci**=The current price of cement per 50 bag based on the All India average wholesale price index for cement published by the Ministry of Industrial Development, Government of India, New Delhi (current = month under consideration)

**Rc**=Rate of Cement per 50 Kg bag considered by the Department while inviting the bids, i.e. Rs. per bag as on (date of fixing of this rate as a CSR rate).

**Nc**= Number of 50 Kg cement bags actually consumed in work during the period under consideration.

Contractor's profit shall not be considered on Price Adjustment.

**ADJUSTMENT FOR STEEL COMPONENT**

Price adjustment for increase or decrease in the cost of steel procured by the contractor shall be paid in accordance with the following formula:

**Vs =Q, x RS (Si-So)/ So**

**Vs**=Increase or decrease in the cost of work during the month under consideration due to changes in the rates for cement.

**So**=The initial price of steel per metric tonne based on the All India whole sale price index for steel, as published by the Ministry of Industrial Development, Government of India, New Delhi, As on the date on which the rate of steel Rs. was enforced by the Department

**Si**=The current price of steel per metric tonne based on the All India average whole sale price index for steel, as published by the Ministry of Industrial Development,

Government of India, New Delhi (Current = Month under consideration)

**Rs**=Rate of Steel per metric tonne considered by the Department while inviting the bids, i.e. Rs. per metric tonne as on (date of fixing of this rate as a CSR rate).

**Qs**= Quantity of Steel in metric tonne actually consumed in work during the period under consideration.

Contractor's profit shall not be considered on Price Adjustment.

**Note**: For the application of this clause index of Bars & Rods has been chosen to represent steel group.

**ADJUSTMENT FOR LABOUR COMPONENT**

Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:

**VL =0.85 x Pl/100 x R x (Li-Lo)/ Lo**

**VL**=Increase or decrease in the cost of work during the month under consideration due to changes in the rates for local labour.

**Lo**=The consumer price index for industrial workers for the State on 28 days preceding the date of opening of Bids as published by Labour Bureau, Ministry of Labour, Government of India

**Li**= The consumer price index for industrial workers for the State under consideration as published by Labour Bureau, Ministry of Labour, Government of India

**Pl**= Percentage of Labour component of the work

## APPENDIX 1

### A. Repair/rectification/replacement of Defects and Deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Schedule within the time limit set forth in the table below.

| **Nature of Defect or Deficiency** | | **Time limit for repair/rectification** |
|---|---|---|
| **ROADS** | | |
| **(a)** | **Carriageway and paved shoulders** | |
| (i) | Breach or blockade | Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days |
| (ii) | Roughness value exceeding 2,000 mm in a stretch of 1 km (as measured by a calibrated bump integrator) | 120 (one hundred and twenty) days |
| (iii) | Pot holes | 24 hours |
| (iv) | Any cracks in road surface | 15 (fifteen) days |
| (v) | Any depressions, rutting exceeding 10 mm in road surface | 30 (thirty) days |
| (vi) | Bleeding/skidding | 7 (seven) days |
| (vii) | Any other defect/distress on the road | 15 (fifteen) days |
| (viii) | Damage to pavement edges | 15 (fifteen) days |
| **(b)** | **Road side furniture including road sign and pavement marking** | |
| (i) | Damage to shape or position, poor visibility or loss of retro-reflectivity | As and when required/Once every year |
| (ii) | Painting of km stone, railing, parapets, crash barriers | 7 (seven) days |
| (iii) | Damaged/missing road signs, benches, dustbins, art installations requiring replacement | 7 (seven) days |
| (iv) | Damage to road mark ups | 24 hours |
| **(c)** | **Road lighting** | |
| | Any major failure of the system | 24 hours |
| | Faults and minor failures | 8 hours |
| **(d)** | **Trees and plantation** | |
| (i) | Obstruction in a minimum head-room of 5 m above carriageway or obstruction in visibility of road signs | 24 hours |
| (ii) | Removal of fallen trees from carriageway | 4 hours |
| (iii) | Trees and bushes requiring replacement | 30 (thirty) days |
| (iv) | Removal of vegetation affecting sightline and road structures | 15 (fifteen) days |

[**Note**: Where necessary, the Employer may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

**B. Payment Reduction for Non-Compliance**

**1. Payment reduction for non-compliance with the Maintenance Requirements**

1. Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule.
2. Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.
3. The Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.
4. Clause 6.2 of "Scope of Work" may be referred for all the electrical works.

**2. Percentage reductions in lump sum payments**

1. The following percentages shall govern the payment reduction:

| S. No. | Item/Defect/Deficiency | Percentage |
|---|---|---|
| **(a)** | **Carriageway/Pavement** | |
| | Potholes, cracks, other surface defects | 5% |
| | Repairs of Edges, Rutting | 5% |
| **(b)** | **Road, Embankment, Cuttings, Shoulders** | |
| | Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions | 5% |
| | Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees | 5% |
| | **Road Side Multi Utility Corridor** | |
| | Pedestrian pathway, tiling works, kerbs etc. | 10% |
| | Street lights, pedestrian lights, accent lights | 5% |
| | Signages, bollards, tree pits and grates, dustbins | 5% |
| | Benches and other road furniture | 10% |
| **(c)** | **Bridges and Culverts** | |
| | Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations | 5% |
| | Any Defects in superstructures, bearings and sub – structures | 5% |
| | Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers | 5% |
| **(d)** | **Road Furniture** | |
| | Cleaning, painting, replacement of road signs, delineators, road markings | 5% |

| | | |
|---|---|---|
| **(e)** | **Miscellaneous Items** | |
| | Removal of dead animals, broken down/ accident vehicles, fallen trees, road | 5% |
| | blockades or malfunctioning of mobile crane | |
| | Any other Defects in accordance with paragraph1. | 5% |
| **(g)** | **Defects in Other Project Facilities** | 5% |

2. The amount to be deducted from monthly lump-sum payment for non- compliance of particular item shall be calculated asunder:

**R=P/1OO x M**

Where

**P** = Percentage of particular item/Defect/ Deficiency for deduction

**M** = Monthly lump-sum payment in accordance with the Bid

**R** = Reduction (the amount to be deducted for noncompliance for a particular item/Defect/deficiency)

The total amount of reduction shall be arrived at by summation of reductions for such items/Defects/deficiency or noncompliance.

# SECTION - V

# SECURITIES AND OTHER FORMS

**Performance Bank Guarantee**

To,

**Beneficiary**: Chief Executive Officer,
Amritsar Smart City Limited
SCO 21, 2nd Floor,
District Shopping Complex,
B-Block, Ranjit Avenue,
Amritsar
**Performance Guarantee No.:**

**WHEREAS** _____ (name and address of Contractor) (hereinafter called "**The Contractor**") has been selected vide Letter of Acceptance/ Notification of Award dated _____, pursuant to competitive bidding process in accordance with the Bid Reference No. 05/ASCL/2019-20, to execute the work of "Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission" (hereinafter called "**the Contract**").

**ANDWHEREAS** it has been stipulated by you in the said Notification of Award that the Contractor shall furnish you with a Performance Bank Guarantee by a scheduled bank for the sum specified therein as security for compliance with the obligation in accordance with the Contract.

**AND WHEREAS** we have agreed to give the Contractor such a Bank Guarantee.

**NOW THEREFORE** we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, upto a total of Rs……. (amount of guarantee) _____(Rupees in words) such sum being payable in the types and proportions of currencies in which the Contract Price is payable. And we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Rs……. (amounts of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand. We further agree that no change or addition to or other modification of the terms of the Contractor of the works to be performed there under or of any of the contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee and where by waive notice of any such change, addition of modification.

That Guarantee shall be valid until 60 (sixty) days from the date of expiry of the Operation and Maintenance Period.

Signature and seal of the Guarantor

Name of Bank …….

Address ……..

Dated …….

**Advance Payment Security Demand Guarantee**

*[Guarantor letterhead or SWIFT identifier code]*
**Beneficiary:** *Chief Executive Officer,*
*Amritsar Smart City Limited*
*SCO 21, 2nd Floor,*
*District Shopping Complex,*
*B-Block, Ranjit Avenue,*
*Amritsar*
**Date:** *[Insert date of issue]*

**ADVANCE PAYMENT GUARANTEE No.:** *[Insert guarantee reference number]*
**Guarantor:***[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called the "**Applicant**") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, for the execution of "Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission"(hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum *[insert amount in figures] [insert amount in words]* is to be made against an advance payment guarantee.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]*( _____) *[insert amount in words]*[1] upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

(a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or
(b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number *[insert number]* at *[insert name and address of Applicant's bank]*.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that 90% (ninety

percent) of the Accepted Contract Amount, less provisional sums, has been certified for payment, or on the *[insert day]* day of *[insert month]*, 2 *[insert year]*,[2] whichever is earlier.

Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

*[signature(s)]*

***9.1.1 Note: All italicized text is for use in preparing this form and shall be deleted from the final product.***

1. *The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.*
2. *Insert the expected expiration date of the Time for Completion. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."*

## Indenture for Secured Advances

*(For use in cases in which the contract is for finished work and the Contractor has entered into an agreement for the execution of a certain specified quantity of work in a given time)*

This indenture made the d a y of_____,20__ BETWEEN _____(hereinafter called the Contractor which expression shall where the context so admits or implies be deemed to include his executors, administrators and assigns) or the one part and Employer of the other part.

Whereas by an a g r e e m e n t dated_____(hereinafter called the said agreement) the Contractor has agreed.

AND WHEREAS the Contractor has applied to the Employer that he may be allowed advances on the security of materials absolutely belonging to him and brought by him to the site of the works the subject of the said agreement for use in the construction of such of the works as he has undertaken to execute at rates fixed for the finished work (inclusive of the cost of materials and labour and other charges).

AND WHEREAS the Employer has agreed to advance to the Contractor the sum of Rupees on the security of materials the quantities and other particulars of which are detailed in Accounts of Secured Advances attached to the Running Account bill for the said works signed by the Contractor on and the Employer has reserved to himself the option of making any further advance or advances on the security of other materials brought by the Contractor to the site of the said work.

NOW THIS INDENTURE WITNESSETH that in pursuance of the said agreement and in consideration of the sum of Rupees_____on or before the execution of these presents paid to the Contractor by the Employer (the receipt where of the Contractor doth hereby acknowledge) and of such further advances (if any) as may be made to him, therefore, the said Contractor doth hereby covenant and agree and declare as follows:

1. That the said sum of Rupees so advanced by the Employer to the Contractor as aforesaid and all or any further sum of sums advanced as aforesaid shall be employed by the Contractor in or towards expending the execution of the said works and for no other purpose whatsoever.
2. That the materials details in the said Account of Secured Advances which have been offered to and accepted by the Employer as security are absolutely the Contractor's own property and free from encumbrances of any kind and the Contractor will not make any application for or receive a further advance on the security of materials which are not absolutely his own property and free from encumbrances of any kind and the Contractor will indemnify the Employer against all claims to any materials in respect of which an advance has been made to him as aforesaid.
3. That the materials detailed in the said account of Secured Advances and all other materials on the security of which any further advance or advances may hereafter be

made as aforesaid (hereafter called the said materials) shall be used by the Contractor solely in the execution of the said work in accordance with the directions of the project Manager.

4. That the Contractor shall make at his own cost all necessary and adequate arrangements for the proper watch, safe custody and protection against all risks of the said materials and that until used in construction as aforesaid the said materials shall remain at the site of the said works in the Contractor's custody and on his own responsibility and shall at all times be open to inspection by the Project Manager or any officer authorized by him.

   In the event of the said materials or any part thereof being stolen, destroyed or damaged or becoming deteriorated in a greater degree than is due to reasonable use and wear thereof the Contractor will forthwith replace the same with other materials of like quality or repair and make good the same required by the Project Manager.
5. That the said materials shall not be on any account be removed from the site of the said works except with the written permission of the Engineer or an officer authorized by him on that behalf.
6. That the advances shall be repayable in full along with 9% (nine percent) when or before the Contractor receives payment from the Employer of the price payable to him for the said works under the terms and provisions of the said agreement. Provided that if any intermediate payments are made to the Contractor on account of work done than on the occasion of each such payment the Employer will be a liberty to make a recovery from the Contractor's bill for such payment by deducting there from the value of the said materials than actually used in the construction and in respect of which recovery has not been made previously, the value for this purpose being determined in respect of each description of materials at the rates at which the amounts of the advances made under these presents were calculated.
7. That if the Contractor shall at any time make any default in the performance or observance in any respect of any of the terms and provisions of the said agreement or of these presents the total amount of the advance or advances that may still be owing of the Employer shall immediately on the happening of such default be repayable by the Contractor to be the Employer together with interest thereon at nine per cent 9% (nine percent) per annum from the date or respective dates of such advance or advances to the date of repayment and with all costs, charges, damages and expenses incurred by the Employer in or for the recovery thereof or the enforcement of this security or otherwise by reason of the default of the Contractor and the Contractor hereby covenants and agrees with the Employer to reply and pay the same respectively to him accordingly.
8. That the Contractor hereby charges all the said materials with the repayment to the Employer of the said sum of Rupees and any further sum of sums advanced as aforesaid and all costs, charges, damages and expenses payable under these presents PROVIDED ALWAYS and it is hereby agreed and declared that notwithstanding anything in the said agreement and without prejudice to the power contained therein if and whenever the covenant for payment and repayment here-in- before contained shall become enforceable and the money owing shall not be paid in accordance there with

the Employer may at any time thereafter adopt all or any of the following courses as he may deem best:

a. Seize and utilize the said materials or any part thereof in the completion of the said works on behalf of the Contractor in accordance with the provisions in that behalf contained in the said agreement debiting the Contractor with the actual cost of effecting such completion and the amount due to the Contractor with the value of work done as if he had carried it out in accordance with the said agreement and at the rates thereby provided. If the balance is against the Contractor, he is to pay same to the Employer on demand.
b. Remove and sell by public auction the seized materials or any part thereof and out of the moneys arising from the sale retain all the sums aforesaid repayable or payable to the Employer under these presents and pay over the surplus (if any) to the Contractor.
c. Deduct all or any part of the moneys owing out of the security deposit or any sum due to the Contractor under the said agreement.

9. That in the event of any conflict between the provisions of these presents and the said agreement the provisions of these presents shall prevail and in the event of any dispute or difference arising over the construction or effect of these presents the settlement of which has not been here-in-before expressly provided for the same shall be referred to the Employer whose decision shall be final and the provision of the Arbitration and Conciliation Act, 1996 (for the time being in force) shall apply to any such reference.

**Letter of Acceptance/ Notification of Award**

(Date)…….

To,

(name and address of the Contractor)

Dear Sir,

Subject: Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission; Bid Reference No.: 05/ASCL/2019-20

This is to notify that your bid dated……for execution of the "Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission" for the Accepted Contract Amount of Rupees …… *(amount in words and figures)* as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by Amritsar Smart City Limited and you are hereby declared as the Successful Bidder.

You, the Successful Bidder, is requested to return the duly signed and stamped duplicate copy of this Letter of Acceptance/ Notification of Award within 7 (seven) days from the date of receipt of this LoA, as a token of the receipt and acknowledgment of this LoA, and undertaking of absolute, unconditional and unqualified compliance of the conditions mentioned herein.

Further, you are requested to furnish the Performance Security for an amount of Rs…… *(amount in words and figures)* in favour of "Chief Executive Officer, Amritsar Smart City Limited" within 15 (Fifteen) days of the receipt of this Letter of Acceptance/ Notification of Award, in accordance with the Conditions of Contract, using for that purpose the Performance Security Form enclosed herewith. Such Performance Security shall be valid up to 60 days beyond the expiry of the Operation and Maintenance Period.

Upon the Performance Security being furnished by you, the Successful Bidder, for the requisite amount and in the format at prescribed, Amritsar Smart City Limited shall execute the Contract Agreement with you. Accordingly, it is requested that stamp paper of appropriate value (purchased from the State of Punjab) be provided to the Amritsar Smart City Limited for the said purpose.

Yours Faithfully,

Authorized Signature, Name & title of Signatory, Name of agency

**Agreement Form**

Agreement

HIS AGREEMENT made on ___ day of _____ 2019 amongst the following at Amritsar:

**Amritsar Smart City Limited** acting through its Chief Executive Officer, _____ and having its office at SCO, 21, 2nd Floor, Distt. Shopping Complex, B-Block, Ranjit Avenue, Amritsar, Punjab (hereinafter "the Employer" which expression unless repugnant to the context includes its successors, representatives and permitted assigns);

**AND**

_____ acting through _____ and having its office at _____ (hereinafter "the Contractor" which expression unless repugnant to the context includes its successors, legal heirs, representatives and permitted assigns).

The Employer and Contractor are hereinafter referred to individually as a Party and collectively as the Parties.

**WHEREAS**

**(a)** the Employer desires that the Works known as **Redevelopment of Outer Circular Road of Walled City at Amritsar as "Smart Road" with 5 years of Operation and Maintenance Period including Defect Liability Period under Smart City Mission** (the "Project") should be executed by the Contractor, and has officially accepted the Bid dated _____ by the Contractor for the execution and completion of the Works forming part of the Project as per the terms of the RFP and the Conditions of Contract (GCC & PCC);

**(b)** Notification of Award bearing no. _____ dated _____ has been issued by Employer and in pursuance of the same, the Contractor has furnished Performance Security in the form of Bank Guarantee for an amount of Rs._____ (amount in words and figures) in favour of Chief Executive Officer, Amritsar Smart City Limited, Amritsar;

NOW THIS AGREEMENT WITNESSETH as follows:

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

2. The following documents shall be deemed to form and be read and construed as part of this Agreement. The obligations of the parties towards each other mentioned in the following documents shall be construed to be arising under this Agreement. This Agreement shall prevail over all other Contract documents:
   i. Letter of Acceptance
   ii. Notice to proceed with the works, if any
   iii. Bidding Document (Request for Proposal)
   iv. Contractor's Bid (Technical Part & Financial Part)

v. Addendum, Corrigendum & Clarifications, if any

vi. Contract Data

vii. Special Conditions of Contract

viii. General Conditions of contract

ix. Specifications

x. Drawings

xi. Bill of Quantities

xii. Payment Schedule and

xiii. Any other document listed in the Contract Data / PCC as forming part of the contract

3. In consideration of the payments to be made by the Employer to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer shall not be liable to the Contractor under this Agreement for any loss of profit, loss of revenue or any other indirect or consequential damages that may be suffered by the Contractor. Further, the Contractor shall not be entitled for any interest from Employer for any payment delayed for reasons, whatsoever may be.

5. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

6. The Contractor shall execute the work as per the terms, conditions, designs and specifications given/ approved by the Employer. After successful completion of the Project including the Operation and Maintenance Period, the Contractor shall co-ordinate with the concerned department for Taking Over of the Works.

In witnessed whereof, the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of_____ was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____

In the presence of:

Binding Signature of Employer _____

Binding signature of Contractor _____

**Undertaking**

I, the undersigned do hereby undertake that our firm M/s _____ agree to abide by this bid for a period 120 (one hundred and twenty) days for the date fixed for receiving the same it shall be binding on us and may be accepted at any time before the expiration of that period.

(Signed by the Authorised Officer of the Entity/ Lead Member of the JV)

_____

Title of the Officer

_____

Name of Firm

_____

DATE

# SECTION – VI

## DRAWINGS / MAKES / SPECIFICATIONS / BILL OF QUANTITIES

# 1 Design Intervention

*Full set of Drawing of Plans, Cross sections and typical sections is presented in "Annexure A"*

# 2 Detail Design and Specifications

All the works shall be carried out as per specification for Road, Utility and Junctions work Detailed State PWD Specification, DSR 2016 and Tool kit of INTACH

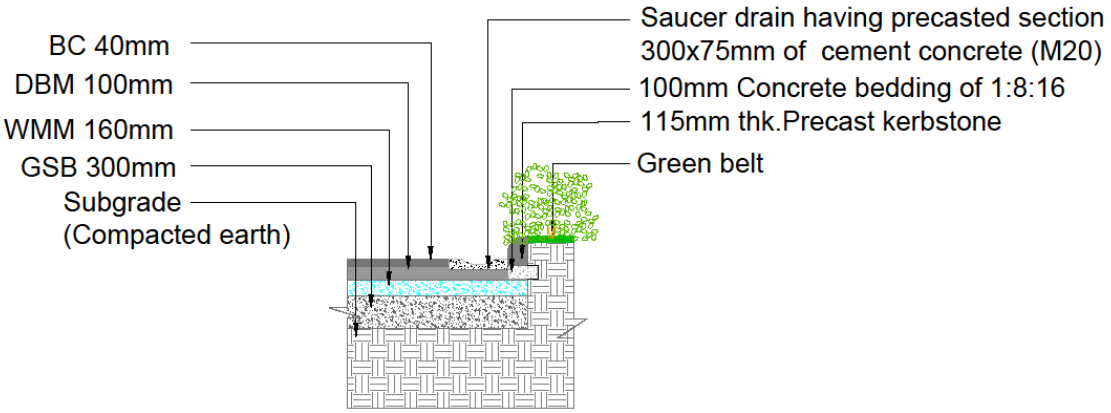
# 3 Civil works

## 3.1 Dismantling work

**Dismantling kerb stone** by manual means and disposal of dismantled material with all lifts and up to a lead of 1000 metre as per MoRT&H specification clause 202.
**Dismantling brick or flagged stone flooring** including concrete base.
**Dismantling of Bituminous courses of flexible pavements** by mechanical means and disposal of dismantled materials up to a lead of 1000 meters, stacking serviceable and unserviceable materials separately as per technical clause 202 of MORT& H specifications.
**Dismantling of Existing Sign Board and Re- Installation** at suitable Place with Painting of Steel Structure complete.

## 1.1 Road work

**Compacting original ground** below embankment- Loosening, levelling and compacting original ground below embankment to facilitate placement of first layer of embankment, scarified to a depth of 150 mm, mixed with water at OMC and then compacted by rolling so as to achieve minimum dry density as given in Table 300-2 for embankment construction as per technical clause 305 of MORT & H specifications.
**Construction of granular sub-base** by providing close graded material grading -I, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per technical clause 401 of MORT&H specifications.




*Typical detail of Road proposed*

Providing, laying, spreading and compacting **stone aggregates of Grading I to water bound macadam** specification including spreading in uniform thickness, hand packing, rolling with smooth wheeled roller 8-10 tonnes in stages to proper grade and camber, applying and brooming requisite type

of screening/ binding Materials to fill up the interstices of coarse aggregate, watering and compacting to the required density complete as per technical clause 404 of MORT&H specifications.

**Water Bound Macadam Grading II** (Without Screening for low volume Roads/ undersigned roads).Providing, laying, spreading and compacting stone aggregates of grading II to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with smooth wheeled roller 8 -10 tonnes in stages to proper grade and camera, applying and brooming requisite type of binding Materials to fill up the interstices of coarse aggregates, watering and compacting to the required density complete as per technical clause 404 of MORT&H specifications.

**Water Bound Macadam Grading III** (Without Screening for low volume Roads/ undersigned roads).Providing, laying, spreading and compacting stone aggregates of grading III to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with smooth wheeled roller 8 -10 tonnes in stages to proper grade and camera, applying and brooming requisite type of binding Materials to fill up the interstices of coarse aggregates, watering and compacting to the required density complete as per technical clause 404 of MORT&H specifications.

**Providing and applying primer coat** with bitumen emulsion SS on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.85kg/sqm complete as per technical clause 502 of MORT&H specifications.

**Providing and applying Tack coat** with penetration grade bitumen VG 10 using bitumen pressure distributor at the rate of 0.40 kg/Sqm on the prepared surface/granular surface treated with primer coat as per technical clause 503 of MORT&H specifications.

**Providing and laying dense graded bituminous macadam** 80mm to 100mm thick with batch type HMP using crushed aggregates of specified grading, premixed with bituminous binder VG-30 @ 4.5%, carriage of mixed material to site of work, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction complete as per technical clause 507 of MORT&H specifications.

**Providing and laying bituminous concrete** 30mm to 45mm thick with batch type hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder VG-30 @ 5.5%, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction complete as per technical clause 509 of MORT&H specifications.

### 1.2 Saucer Drain

**Plain cement concrete M-20 grade precast channel** 300mm wide and 75mm thick fixed in position on earth base including carriage to site of work complete as per technical clause 408 of MORT&H specifications.

Illustrative image showing Precast Kerb channel

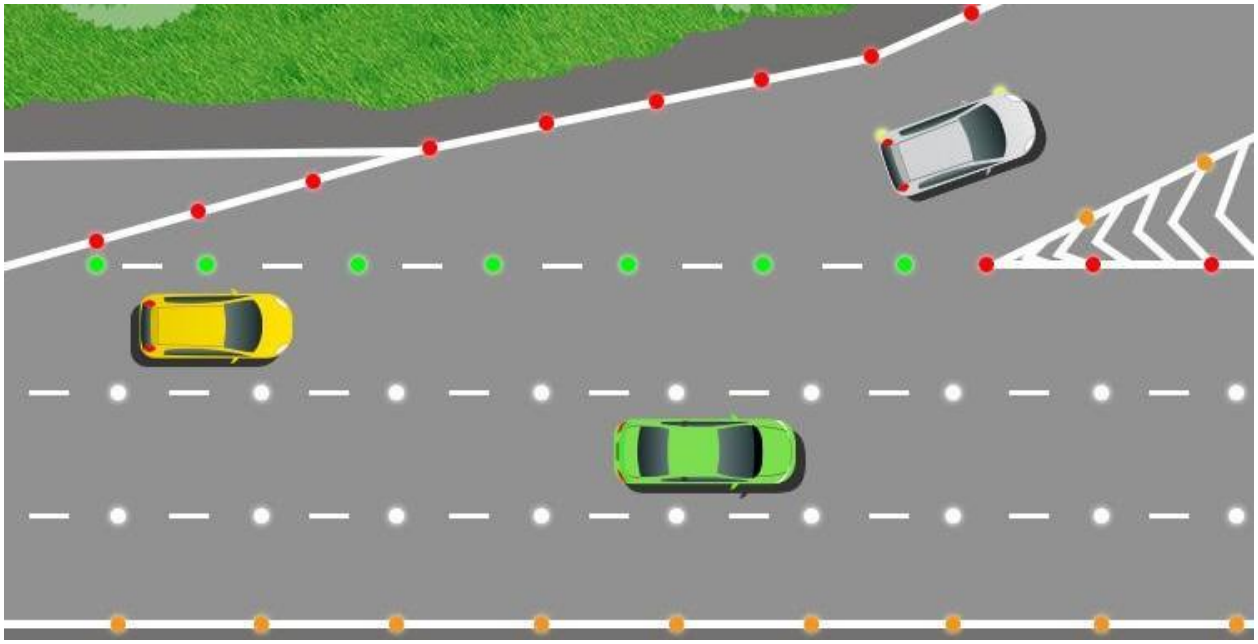
### 1.3 Road marking & Road barriers

**Road marking with hot applied thermoplastic compound** 2.5mm thick including reflectorizing glass beads @ 0.25kg per sqm area as per IRC:35 1997 complete as per technical clause 803 of MORT&H specifications.
**Directional Arrows, lettering** etc. as per Drg. No.61 of MoRT&H Type "Design for Inter-sections on National Highways".

Illustrative image for Road Markings

**Supplying and fixing glow studs** of size 100 X 20 mm made of heavy-duty body shall be moulded ASA (Acrylic styrene Acrylostrite) of ABS having electronically welded micro prismatic lens with abrasion resistant coating as approved by Engineer- in-charge. The glow stud shall support a load of 13635 kg. tested in accordance with ASTM D4280. The slope of retro-reflective surface shall be 35+/ -5 degree to base. The panels on both sides with at least 12 cm of reflective areas up each side. The luminance intensity should be as per the specification and shall be tested as described in ASTM 1: 809 as recommended in BS: 873 part 4: 1973 as per approval sample & manufactures by the Engineer-in-

charge with shank. Based on item no 10.24 RUIDP-2017.



Illustrative image showing layout pattern of Glow studs on road

**Providing 4-wheel road barrier** length of 1150mm, width 500mm and height 750mm LLDP Material, high resistance polymers, non-fading colour with two side reflective tape complete as per engineer-in-charge.

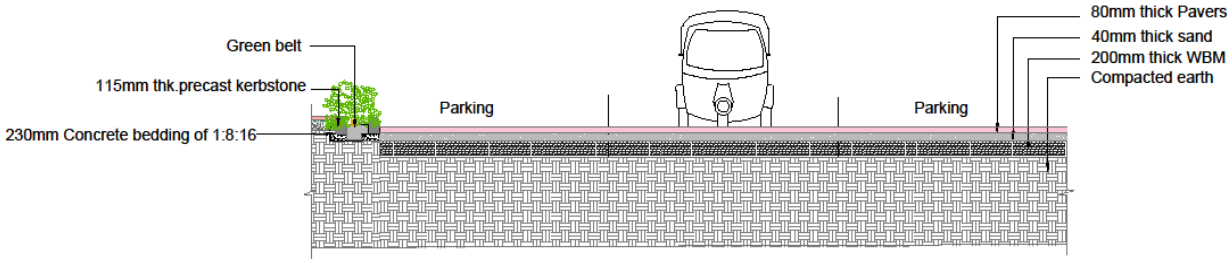
Illustrative image for Road barrier

**Providing and Fixing of PVC Median Marker** with hardener and screw complete as per engineer-in-charge.

Illustrative image showing Median marker

### 1.4 Parking area

**Providing and laying 80 mm thick factory made cement concrete interlocking paver** block of M-40 grade machine made with rubber moulded smooth finish with strong vibratory process or with vibro-hydraulic compaction machine and of approved size and design / shape laid in ordinary **grey colour, dark fast colour** and pattern over and including 40 mm thick compacted bed of coarse sand, filling the joints with fine sand etc, all complete as per directions of Engineer-in-Charge.




*Typical section of Parking area*

### 1.5 Bus Shelters

**Stainless Steel Bus shelter** size 5500mm X 2100mm X 2200mm (Steel grade 304). Back pillar having size 219mm X 3mm and side vertical pillar having size 110mm X 3mm of circular steel hollow section are provided. Inner back panel of size 12' X4' , acrylic sheet of 3mm/4mm thick framed with pipe of size 100 X 50mm. Side advertisement panel of size 5' X 3' , acrylic sheet of 3mm thick framed with 50 X 50 X 3mm angle where angle is connected to the outer solid structure frame of size 100 X 50mm. For roof 12mm thick polycarbonate sheet put on the skeleton of centre member pipe size 75mm dia. and vertical member of 100 X 50mm rectangular hollow section. Roof and structure connected with 8mm thick plate.

Seating – SS Pipe 50 X 25mm (10' length) connect with 140mm dia. pipe. To hold the vertical steel posts 300 X 300 X 10mm base plate connected with 750mm X 16mm anchor bolts.

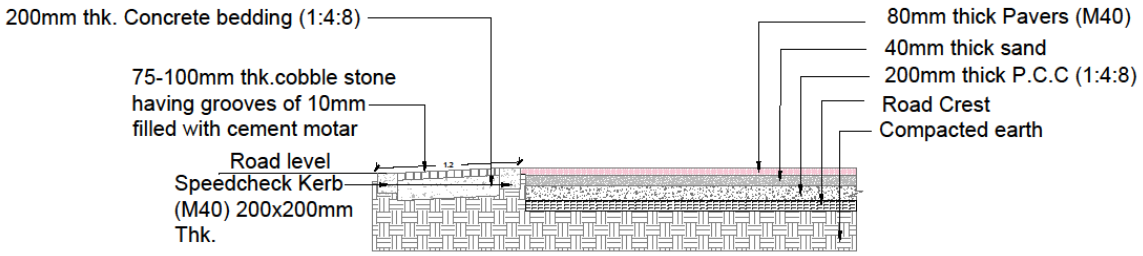
Illustrative image showing Bus Shelter

### 1.6 Table tops

**Cement Concrete** 1:4:8 with stone ballast using concrete mixer volumetric type.

**Supply and Fixing** of Black granite/Jhansi red/Crystal yellow granite/Nasoli granite (beige)/Grey granite/Lakha red granite Cobble Size of 100x100x70mm with 1:3 Cement Mortar and Joint Filled with

1:2 Cement Mortar Including Chisel of Cobble, Labour As per Design/ Drawing.



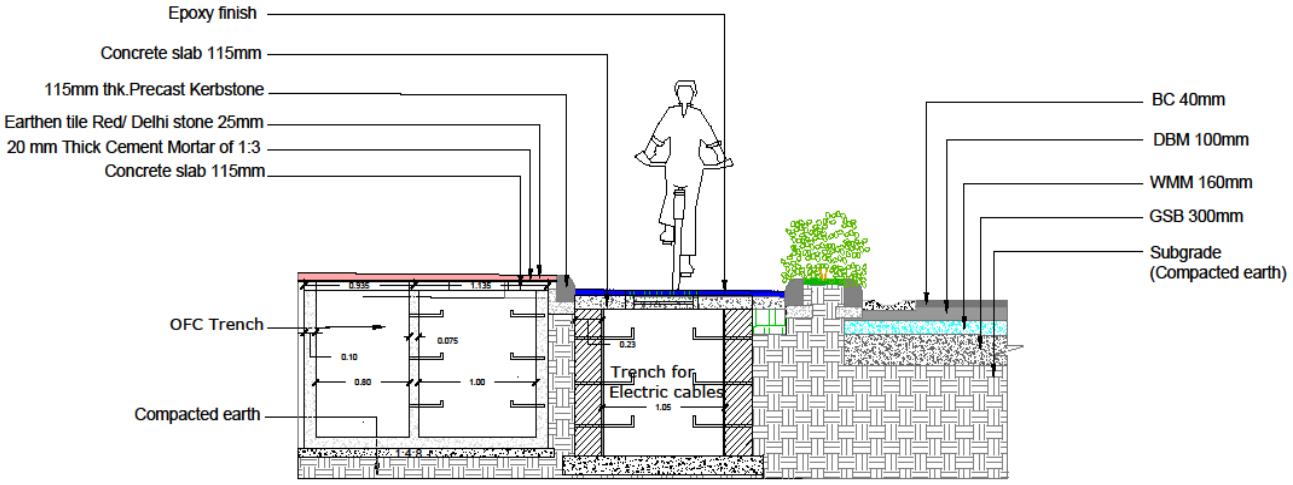

Typical detail of Table top

**Providing and laying 80 mm thick factory made cement concrete interlocking paver** block of M-40 grade machine made with rubber moulded smooth finish with strong vibratory process or with vibro-hydraulic compaction machine and of approved size and design / shape laid in ordinary **grey colour, dark fast colour** and pattern over and including 40 mm thick compacted bed of coarse sand, filling the joints with fine sand etc, all complete as per directions of Engineer-in-Charge.

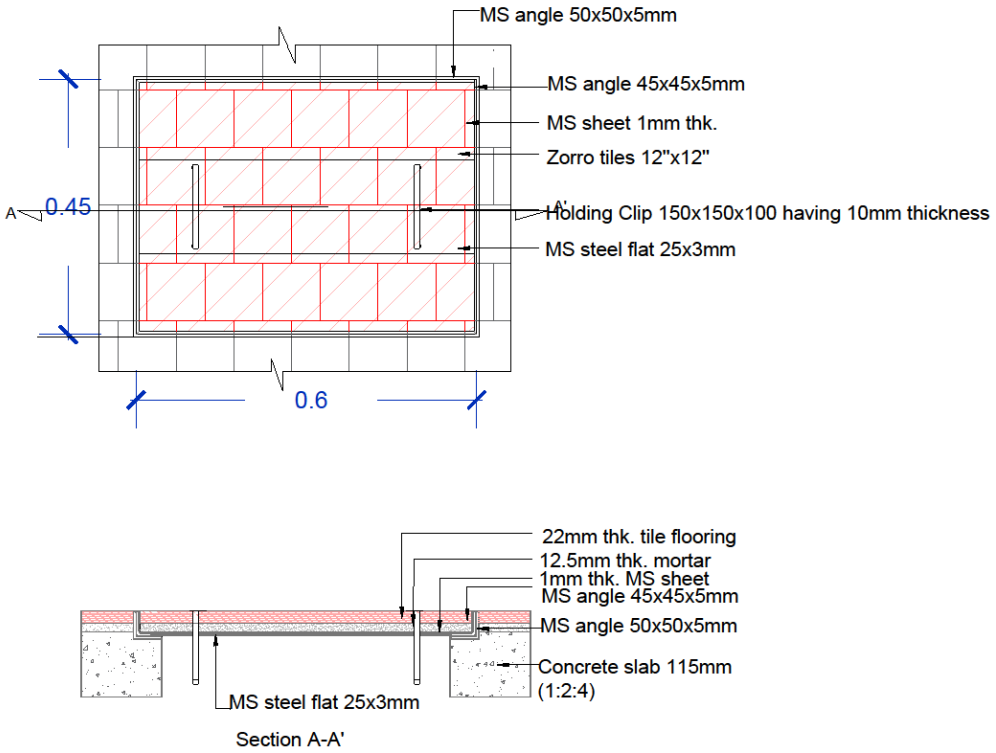
### 1.7 Cycle Track

**Providing and Laying of PLASTITRAK**, Roll-on Surfacing Material :A Solvent Free, High Build, Two pack, Seamless, Tough, skid resistant 1.0-1.5 mm thick red ( or as required ) based on Gloss and colour retaining Acrylic Cross Linking Resin System for Cycle track and similar applications including symbol of CYCLE on White/ yellow/ Blue or Suitable coloured as directed by engineer in charge for cycle track , at junctions or every 100m size 1500 x 900 or size 2500 x 2200 mm.
Plastitrack to be provided at every 50m of internal along the cycle track and full length in the junction, entry/exit of tracks.

*Illustrative image showing Cycle track*




*Typical detail of Cycle Track*




*Typical detail for Manhole cover at cycle track*

## 1.8 Pavements at Pedestrian Area

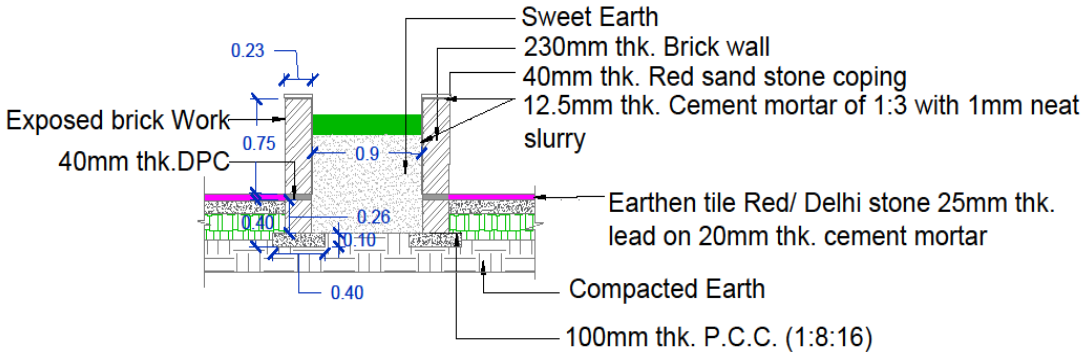
**Providing and Laying 50mm thick cement concrete interlocking paver** block of M-30 grade machine made rubber moulded smooth finish by strong vibratory process or with vibro-hydraulic compaction machine and of approved size and design / shape laid in dark fast colour and pattern over and including 40mm thick compacted bed of coarse sand, filling the joints with fine sand etc, all complete as per direction of engineer-in-charge for non traffic areas such as buildings premises, monuments premises, landscapes, public gardens / parks, domestic drives, paths and patios, embankment slopes, sand stabilization area etc.

Illustrative image showing Interlocking pavers

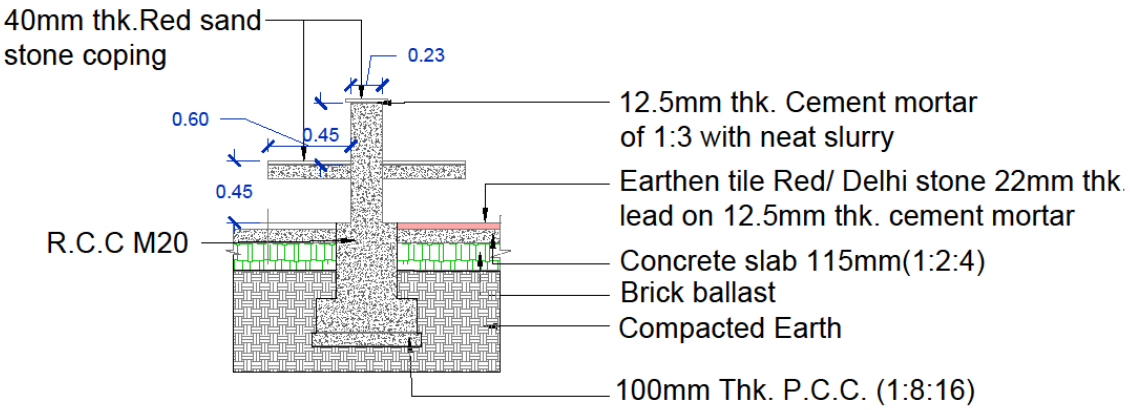
## 1.9 Planters

Planters are created to add visual appeal in the area by raising walls from the ground to a height of 750-900mm and planting small shrubs inside it. These planter walls could also be used as seat wall.
**Earth work** in excavation in foundations, trenches etc. in all kinds of soil where pick jumper work is not involved and not exceeding 2.0 metres depth including dressing of bottom and sides of trenches, stacking the excavated soil clear from the edge of excavation.
**Cement Concrete 1:8:16** with stone ballast using concrete mixer volumetric type.

**First class burnt brick work** laid in cement sand mortar 1:6 in foundation and up to plinth level.




Typical detail of Planter




Typical detail of seating along planters proposed

**Brick work** with machine moulded modular bricks of class designation 125 in exposed brick work

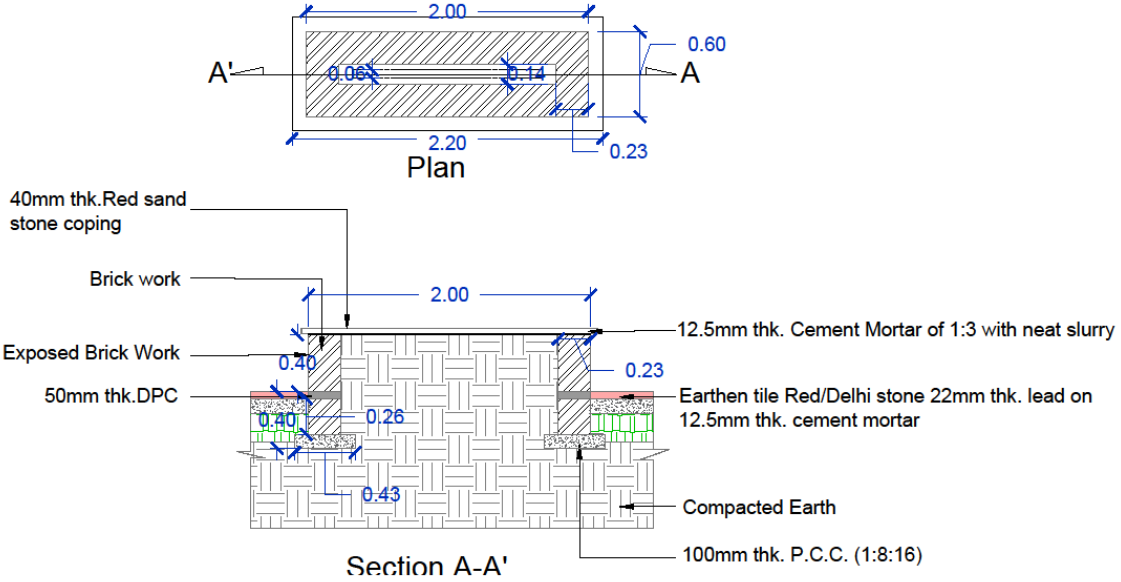
including making horizontal and vertical grooves 10mm wide 12mm deep complete above plinth level in super structure in cement mortar 1:6 (1 cement: 6 fine sand).
**Fine dressed and machine rubbed red sand stone** (from Agra) 25 mm to 50 mm thick lining on wall, pillars, skirting, dado & risers of steps laid in any pattern as specified on 12.5 mm thick cement coarse sand mortar 1:3 with neat cement slurry admixture of pigment to match the shade of stone including labour for fixing cramps, dowels, pins, etc.

## 1.10 Seating

**Earth work** in excavation in foundations, trenches etc. in all kinds of soil where pick jumper work is not involved and not exceeding 2.0 metres depth including dressing of bottom and sides of trenches, stacking the excavated soil clear from the edge of excavation
**Cement Concrete 1:8:16** with stone ballast using concrete mixer volumetric type.

**First class burnt brick work** laid in cement sand mortar 1:6 in foundation and up to plinth level.

**Brick work** with machine moulded modular bricks of class designation 125 in exposed brick work including making horizontal and vertical grooves 10mm wide 12mm deep complete above plinth level in super structure in cement mortar 1:6 (1 cement: 6 fine sand).




Typical detail of Bench/ Seating

**Fine dressed and machine rubbed red sand stone** (from Agra) 25 mm to 50 mm thick lining on wall, pillars, skirting, dado & risers of steps laid in any pattern as specified on 12.5 mm thick cement coarse sand mortar 1:3 with neat cement slurry admixture of pigment to match the shade of stone including labour for fixing cramps, dowels, pins, etc.

## 1.11 Vending zones

**Providing and laying 60 mm thick factory made cement concrete interlocking paver** block of M-35 grade machine made with rubber moulded smooth finish with strong vibratory process or with vibro-hydraulic compaction machine and of approved size and design / shape laid in ordinary grey colour and pattern over and including 40 mm thick compacted bed of coarse sand, filling the joints with fine sand etc, all complete as per directions of Engineer-in-Charge for Non traffic Areas such as Building Premises, monument premises, landscapes, public gardens / parks, domestic drives, paths & patios, embankment slopes, sand stabilization area, etc.

## 1.12 Vending cart

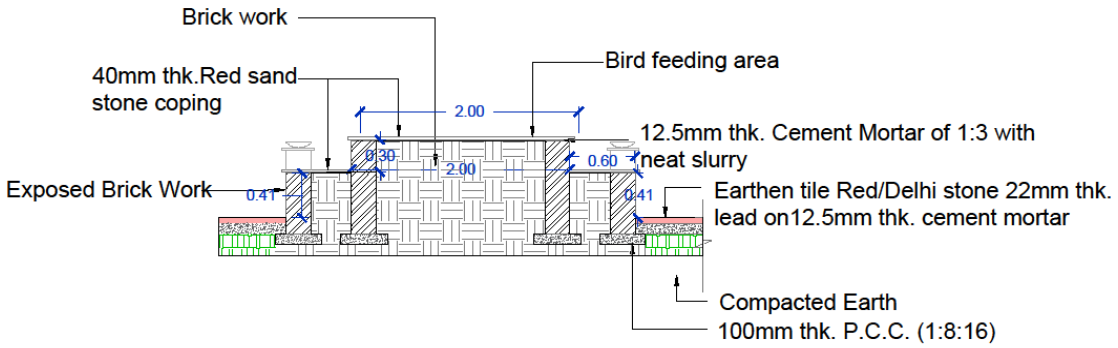
**Supply of vending cart** (Design as per requirement/Engineer In-Charge) Inner size of 1.8 Mtr x 1.2 Mtr x 1.8 Mtr with iron frame structure three side packed, base of cart water proof ply with vinyl flooring,3mm ACP (Aluminium Composite Panel) Cladding 0.5mm profile sheet in roof, SS 202 Front Counter, four wheel size of 600mm dia. Locking arrangement for all sides and with 1 year warranty Complete as per Engineer-In-charge.


Illustrative image showing Vending Carts

### 1.13 Bird feeding area

**Earth work** in excavation in foundations, trenches etc. in all kinds of soil where pick jumper work is not involved and not exceeding 2.0 metres depth including dressing of bottom and sides of trenches, stacking the excavated soil clear from the edge of excavation
**Cement Concrete 1:8:16** with stone ballast using concrete mixer volumetric type.

**First class burnt brick work** laid in cement sand mortar 1:6 in foundation and up to plinth level.




*Typical detail for Bird feeding area*

**Brick work** with machine moulded modular bricks of class designation 125 in exposed brick work including making horizontal and vertical grooves 10mm wide 12mm deep complete above plinth level in super structure in cement mortar 1:6 (1 cement: 6 fine sand).
**Fine dressed and machine rubbed red sand stone** (from Agra) 25 mm to 50 mm thick lining on wall, pillars, skirting, dado & risers of steps laid in any pattern as specified on 12.5 mm thick cement coarse sand mortar 1:3 with neat cement slurry admixture of pigment to match the shade of stone including labour for fixing cramps, dowels, pins, etc.

## 2 Other utilities

### 2.1 Refurbishment of Public toilets

**12.5 mm Thick plaster after scraping** of walls of existing toilets and finishing walls with exterior decorative **cement-based paint** such as snowcem, robbiacem etc. two coats to give an even shade.
**Anti-skid floor tiles** 10mm thick in flooring skirting and dado in 12.5mm thick cement plaster 1:3 in base and jointed with white cement slurry in joints including corners angles and beading.
**Providing and fixing 1st quality ceramic glazed wall tiles** conforming to IS : 15622 (thickness to be specified by the manufacture of approved make in all colours, shades except burgundy, bottle green, black of size 250 x 330 mm, 300 x 300 mm as approved by Engineer-in-Charge in skirting, risers of steps and dados over 12 mm thick bed of cement Mortar 1:4 (1 cement: 4 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm including pointing in white cement mixed with pigment of matching shade complete.
**Providing and fixing in position Chinaware European type water closet** P trap or S trap of approved make (to the approval of the Engineer-in-charge) consisting of 10 Ltr. PVC flushing cistern, PVC short bend 32 mm dia including cost of seat cover complete in all respect and to the entire satisfaction of Engineer-in-charge.
**Providing and fixing PVC flushing cistern** 10 Litres capacity of approved make (to the approval of the Engineer-in-charge) including PVC fittings complete.
**Providing and fixing plastic hygienic seat cover** with lid complete.
**Providing & fixing in position vitreous Chinaware white flat back or angular lipped front urinal** of approved make (to the approval of the Engineer-in-charge) of size 460 x 350 x 260 mm with C.P. brass tube connection 300 mm long complete in all respect.

**Providing and fixing 15 to 20 mm thick Dungri marble partition** of size 375mm x 750mm for different type of urinals.
**Providing and fixing in position vitreous chinaware white lavatory suites** of size 550 mm x 400 mm and of approved make (to the approval of Engineer-in-charge) including brass studs without CP fittings complete in all respect.
**Providing and fixing in position 15mm C.P. Brass Pillar Cock and C.P.brass 15mm stop cock Male and female end / Angle valve** of approved make (to the approval of Engineer-in-charge) complete in all respect.
**Providing and fixing 32 mm dia flexible P.V.C. waste pipe** for sink or wash basin including P.V.C. waste fittings complete. Based on Item No 17.28 DSR-2016.
**Providing and fixing C.P. waste** for 40mm complete. Based on Item No 1951 DSR-2016
**Providing & fixing in position PVC flexible tube connection** of size 15 mm x 300 mm with C.P. Brass nut and size 15 mm x 600 mm with C.P. Brass nut of approved make (to the approval of Engineer-in-charge) complete in all respect.
**Providing & Fixing in position 15 mm i/d bib cock and push cock** of approved make (to the approval of Engineer-in-charge) complete in all respect.
**Providing, laying, jointing, fixing and testing ISI Marked 15 mm i/d G.I. Pipe** (as per IS 1239) B-Class Premium make such as (Jindal Hisar) including cost of specials (such as tees, bends, sockets, elbows etc.), painting with anti-corrosive bitumastic paint, testing, cutting, threading Inside building complete.
**Providing, laying in trenches to correct gradient and alignment** and jointing of 110 mm o/d and 160 mm o/d UPVC pipes having ISI specification IS:15328-2003 class-SN-8 marked make Supreme, Finolex, Kissan, Jain, Prince or equivalent good on them and laying the same in trenches to correct alignment and gradients, cutting and jointing, testing for water tightness and making good the leakages and defects including cost of specials (Specials and Solvent should be of same make as that of pipes) complete in all respects.

## 2.2 Community Bins & Dustbins

**Supply and Fixing of FRP Material Colour Dust Bin** heavy duty as per approved design/drawing.

## 2.3 Bollards

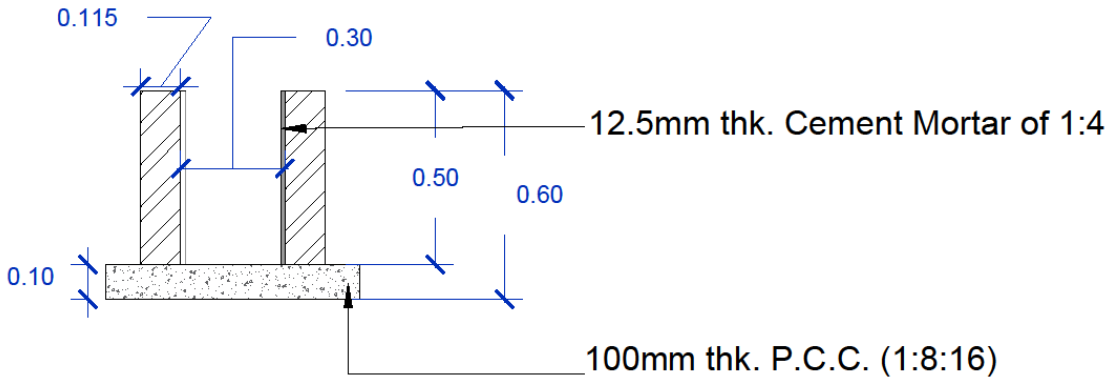
**Precasting and placing in position 125 mm dia Bollards** 600 mm high of required shape including providing M.S. Pipe Sleeve 50 mm dia 300 mm long in the Bollard and M.S. Pipes 40 mm dia and 450mm long with 150x150x6mm M.S. plate welded at bottom and embedded 150mm in cement concrete 1:3:6 (1 Cement : 3 coarse sand (zone-III) : 6 graded stone aggregate 20 mm nominal size), including necessary excavation of size 250x250x450mm deep for the same in bitumen/ concrete pavement at specified spacing. Based on item no 4.9 DSR-2016.

*Illustrative image showing Bollards*

## 2.4 Irrigation system

For irrigation of lawn and planting area, 63mm dia GI ring main line should be installed with Brass QCV (Quick Coupling Valve) at specified locations. This ring line to be connected with existing municipality supply line.

**Cement Concrete 1:8:16** with stone ballast using concrete mixer volumetric type.




*Typical detail for Irrigation Chamber*

## 2.5 Electrical ducts

**Earth work in excavation in foundations, trenches** etc. in all kinds of soil where pick jumper work is not involved and not exceeding 2.0 metres depth including dressing of bottom and sides of trenches, stacking the excavated soil clear from the edge of excavation and subsequent filling around masonry in 15cm layers with compaction including disposal of all surplus soil as directed within a lead of 30 metres.

**Cement Concrete 1:4:8** with stone ballast of size 40mm (Mechanically Mixed).

**First class burnt brick work** laid in cement sand mortar 1:5 in foundation and plinth.

**Reinforced cement concrete M-20** mechanically batch mixed using batch type mechanical mixer as per IS:1791 and vibrated by needle vibrator but excluding steel reinforcement, centring and shuttering in superstructure.

**Shuttering** for faces of concrete foundations and foundation beam & plinth beam (vertical or battering)
**Centring and shuttering** for flat surfaces such as suspended floors, roofs, landings, chajjas, shelves etc.
**Cold twisted deformed (Ribbed/ Tor Steel Bar) Bars** Fe 500 grade as per IS 1786-2008, for R.C.C works, where not including in the complete rate of RCC including bending and placing in position complete.
**Providing and fixing** 500mm internal dia clear inside opening circular **RCC manhole cover** and frame ISI marked as per IS:12592-2002 and top finish to be done as per specifications given for top finish of cycle track, including carriage to site of work loading unloading including stacking and setting the same to correct lines over manhole including cement concrete copping (M:20) around the frame etc. dia of steel for lifting hook is 16mm (for EHD and HD).
**Providing orange colour safety footrest** of minimum 6mm thick plastic encapsulated as per IS:1786 having minimum cross section as 23mm x 25mm and overall minimum length 263mm and width as 165mm with minimum 112mm space between protruded legs having 2mm tread on top surface by rubbing and chequering besides necessary and adequate anchoring projections on tail length on 138mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specification and having manufacturers permanent identification mark to be visible even after fixing including fixing in manholes with 230x150x75cm cement concrete block 1:2:4 complete as per design.
**Providing, laying and fixing 250 mm and 300 mm dia RCC pipe** NP2 class (light duty) in ground complete with RCC collars, jointing with cement mortar 1:2 (1 cement: 2 fine sand) including trenching (75 cm deep) and refilling etc. as required. Based on Item No 14.14 DSR-2016 E&M.

### 2.6 OFC ducts

**Earth work in excavation in foundations, trenches** etc. in all kinds of soil where pick jumper work is not involved and not exceeding 2.0 metres depth including dressing of bottom and sides of trenches, stacking the excavated soil clear from the edge of excavation.
**Cement Concrete 1:4:8** with stone ballast using concrete mixer volumetric type.
**Reinforced cement concrete M-20** mechanically batch mixed using batch type concrete mixer as per IS:1791 and vibrated by needle vibrator but excluding steel reinforcement centring and shuttering in foundation and plinth and also in superstructure.
**Centring and Shuttering** for faces of concrete foundations and foundation beam & plinth beam (vertical or battering), faces of walls, partitions, retaining walls and the like (vertical or bartering including attached pilasters buttresses etc, flat surfaces such as suspended floors, roofs, landings, chajjas, shelves etc.
**Cold twisted deformed (Ribbed/ Tor Steel Bar) Bars** Fe 500 grade as per IS 1786-2008, for R.C.C works, where not including in the complete rate of RCC including bending and placing in position complete.
**Providing & fixing** 560 mm, 500 mm and 450 mm internal diameter circular or 450 mm x 600 mm clear inside opening rectangular **RCC manhole cover and frame** ISI marked as per IS:12592-2002 including carriage from the stores of the Engineer-in-charge to site of work, loading, unloading including stacking and setting the same to correct lines over manholes including cement concrete copping (M:20) around the frame etc. Dia of steel for lifting hook is 16mm. (for EHD and HD).
**Providing, laying and fixing 250mm dia RCC pipe** NP2 class (light duty) in ground complete with RCC collars, jointing with cement mortar 1:2 (1 cement: 2 fine sand) including trenching (75 cm deep) and refilling etc. as required. Based on Item No 14.14 DSR-2016 E&M.
**Providing & fixing** 450 mm x 600 mm clear inside opening **rectangular RCC manhole cover** and frame ISI marked as per IS:12592-2002 including carriage from the stores of the Engineer-in-charge to site of work, loading, unloading including stacking and setting the same to correct lines over manholes including cement concrete copping (M:20) around the frame etc. Dia of steel for lifting hook is 16mm. (for EHD and HD).

### 2.7 Rider storm sewer network

**Excavation manually in trenches** for depths not exceeding 2.0 mtr B.G.L with straight or Open cutting in a built up street / lanes having wall to wall width upto 3 metre for sewers and manholes to full depths as shown in drawings, including Shoring, dressing to correct sections and dewatering of rain water provision for diversion for traffic, protection of existing services i.e. telephone cables, electric lines,

water supply lines and gas lines etc. night signals, profiles, Pegs, Sightrails, boning rods, ,fixing and maintenance of caution boards, fencing refilling trenches, watering , dressing and restoration of surface to original level and removal of surplus spoils from the site of works up to 15 mtrs, for all works other than connections to complete in all respect.

**Providing, lowering in trenches** to correct gradient and alignments, jointing with tytone rubber joint and cutting of 250mm i/d RCC pipes class - NP-2 and NP-3 ISI marked as per ISI code IS:458-2003 into trenches for all depths and laying out the same to correct alignment, gradients, levels etc., cutting of concrete beds and joints holes, supporting the pipes and specials in correct position in a suitable rigid manner while the same are being jointed and until the surrounding benchings, haunches and envelopes are completed. The pipes shall rest on the beds at all joints through their lengths and to ensure this, testing the pipes for leakage and making good the same leakage and all defects to the entire satisfaction of the Engineer in charge including all cartage etc complete in all respects.

**Cement concrete 1:6:12** with 40mm stone aggregate using concrete mixer volumetric type.

**Constructing brick masonry double road gully chambers** of size 610mm x 457mm x 1105mm as per standard drawings (as per sizes given below) including dressing of beds and sides of chambers to exact profiles, 15cm thick lime concrete 16:24:100 (as per specified in item No. 10.3) in foundation, first class brick work laid in cement sand mortar 1:5, 40mm thick cement concrete 1:2:4 topping inside the chamber with a floating coat of 1.5mm thick neat cement laid in one operation to the topping, the entire inner surface of the chamber rendered with neat cement not less than 12.50mm in thickness of 1:2 cement sand plaster and finished with a floating coat of neat cement 1mm thick left absolutely smooth polished and correct to template including cost of SFRC road gully grating and frame complete and to the requirement of the Engineer-In-Charge.

**Extra for Disposal of Surplus Spoils/Earth** if any beyond 15 Mtr as covered for item no 29.4 to 29.5 (1 Km Lead) As per Note-11 Chapter 29, As per Specified Engineer- In -charge Note: 13 Removal of surplus spoils/earth from the site of work if required, will be decided by the Engineer in charge. He must take up tentative quantities in writing with Local Administrations (M.C./ N.A.C./ Panchayat/ Owner of the project) so that surplus spoils/ earth may be filled in public place (the destination/ destinations). Before so fillings, levels of site be recorded with respect to fixed bench mark near site and then again levels be recorded after filling. Record actual measurement of earth filling and lead in measurement book (loading or unloading will not be payable). If local administration does not response to repeated requests, then Engineer in charge will decide the destination in public interest and the record the reasons of his choice and paid accordingly.

### 2.8 Signages

**Advance direction sign board** 900x900mm square as per IRC 67-2012 with high intensity micro prismatic grade retro reflective sheeting Type xi as per ASTM D 4956 09 and as per IRC67 2012 fixed over 4mm thick aluminium composite material (ACM) sheeting having aluminium skin thickness of 0.4 to 0.5mm on both sided and fixing the same with suitable size aluminium alloy rivets @200mm c/c top back support frame of 25x25x3mm angle iron frame supported on a mild steel angle iron post 65x65x6mm without cost of definition plate firmly fixed to ground in foundation concrete M-25 of size 0.60x0.60x0.75m for vertical post complete as per technical clause 801 of MORT&H specifications. A 10 years pre-qualification warranty as per clause 6.9 of IRC 67-2012 for manufacture & a certified copy of test reports from an independent test laboratory confirming to clause 6.7 of IRC 67-2012 including 3 years outdoor weather exposure report for the retro reflective sheeting offered shall be submitted.

**Mandatory Sign Board** 600mm Circular as per IRC 67-2012 with high intensity micro prismatic grade retro reflective sheeting Type xi as per ASTM D 4956 09 and as per IRC67 2012 fixed over 4mm thick aluminium composite material (ACM) sheeting having aluminium skin thickness of 0.4 to 0.5mm on both sided and fixing the same with suitable size aluminium alloy rivets @200mm c/c top back support frame of 25x25x3mm angle iron frame supported on a mild steel angle iron post 65x65x6mm without cost of definition plate firmly fixed to ground in foundation concrete M-25 of size 0.45x0.45x0.60m for vertical post complete as per technical clause 801 of MORT&H specifications. A 10 years pre-qualification warranty as per clause 6.9 of IRC 67-2012 for manufacture & a certified copy of test reports from an independent test laboratory confirming to clause 6.7 of IRC 67-2012 including 3 years outdoor weather exposure report for the retro reflective sheeting offered shall be submitted.

**Informatory Sign Board** 600x450mm Rectangular as per IRC 67-2012 with high intensity micro

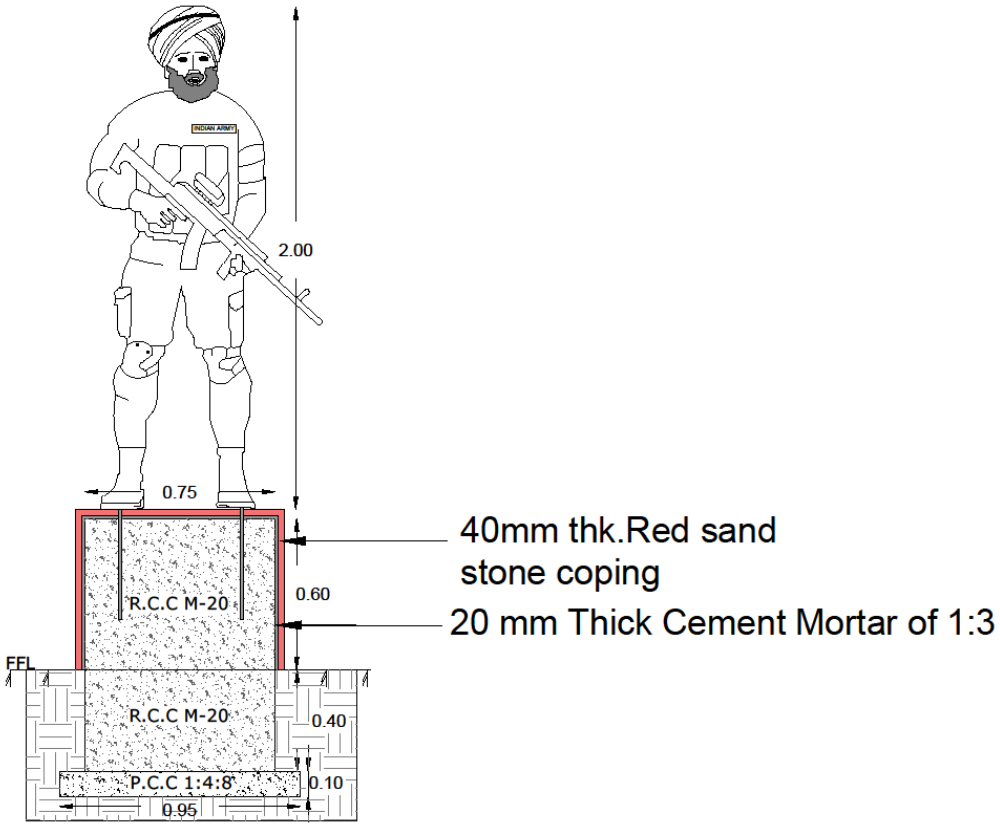
prismatic grade retro reflective sheeting Type xi as per ASTM D 4956 09 and as per IRC67 2012 fixed over 4mm thick aluminium composite material (ACM) sheeting having aluminium skin thickness of 0.4 to 0.5mm on both sided and fixing the same with suitable size aluminium alloy rivets @200mm c/c top back support frame of 25x25x3mm angle iron frame supported on a mild steel angle iron post 65x65x6mm without cost of definition plate firmly fixed to ground in foundation concrete M-25 of size 0.60x0.60x0.75m for vertical post complete as per technical clause 801 of MORT&H specifications. A 10 years pre-qualification warranty as per clause 6.9 of IRC 67-2012 for manufacture & a certified copy of test reports from an independent test laboratory confirming to clause 6.7 of IRC 67-2012 including 3 years outdoor weather exposure report for the retro reflective sheeting offered shall be submitted.

**Overhead sign board** 3000x1500mm cantilever type single sided as per IRC 67-2012 with high intensity micro prismatic grade retro reflective sheeting Type xi as per ASTMD 4956-09 and IRC 67 - 2012 fixed over 2 4 mm thick aluminium composite material (ACM) sheeting having aluminium skin thickness of 0.4 to 0.5 mm on both sided and fixed the same with suitable size of aluminium rivets @ 200mm c/c to back support frame of 40x40x6mm angle iron frame supported on designed single support system of MS pipe and plates in the form of a cantilever type truss made with 350NB pipe @50kg per mtr as vertical support, and 40NB pipe @ 3.61kg per mtr for truss including base plates, gusset plates, designed RCC foundation for fixing in ground complete as per technical clause 802 of MORT&H specifications. A 10 years pre-qualification warranty as per clause 6.9 of IRC 67-2012 for manufacture & a certified copy of test reports from an independent test laboratory confirming to clause 6.7 of IRC 67-2012 including 3 years outdoor weather exposure report for the retro reflective sheeting offered shall be submitted.

# 3 Other Elements

## 3.1 Sculptures

Sculptures are proposed based on PUNJABI CULTURE made in corteen steel 2mm thick. Sheet grade - 1 and approximately 2 m high which will also add visual appeal to the space and also make people crossing through the street aware of Punjabi culture.




*Typical detail for Foundation of sculptures*

**Cement Concrete 1:4:8** with stone ballast using concrete mixer volumetric type for construction of

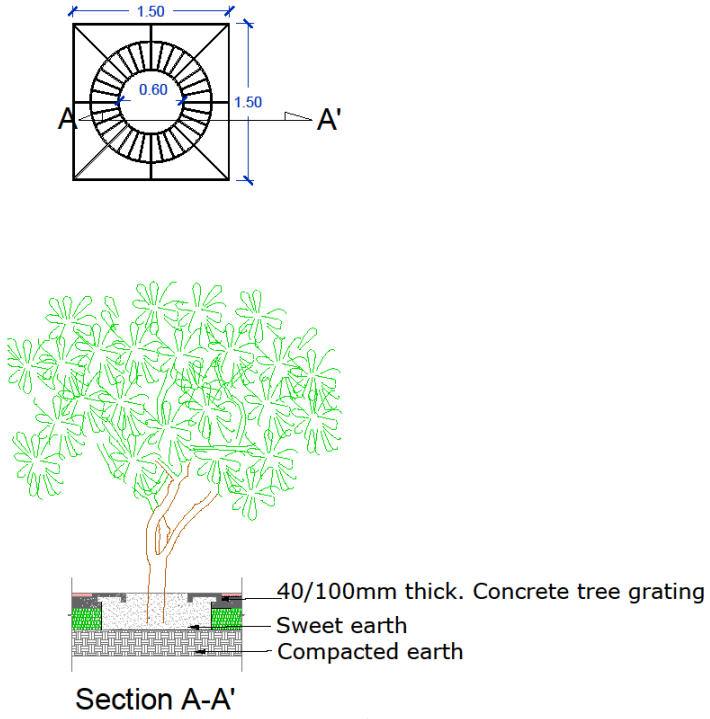
base of Sculptures.

**Fine dressed and machine rubbed red sand stone** (from Agra) 25 mm to 50 mm thick lining on wall, pillars, skirting, dado & risers of steps laid in any pattern as specified on 20 mm thick cement coarse sand mortar 1:3 with neat cement slurry admixture of pigment to match the shade of stone including labour for fixing cramps, dowels, pins, etc.

*Illustrative image showing sculpture based on Punjabi culture*

### 3.2 Tree grating & Tree Guard

Providing & fixing Concrete tree grating 1.5m x 1.5m in size and flushed with ground level fixed to 40mmx100mm M.S flat.




*Typical detail of Tree grating*

Providing & fixing M.S. Flat iron tree guard 60 cm dia and 2 m. High above ground level formed of 4 Nos. 25 mmx6mm and 6 Nos. 25mmx3mm vertical M/S. flat rivetted to 3 no. 40mmx100mm M.S flat iron rings in two halves bolted together with 8mm dia & 30 mm.

### 3.3 Traffic Signals

Providing Control Room connected smart Vehicle Management System at 4 Road Crossing with Pedestrian Management System at Amritsar with following specification

1. "S/E of Intelligent Motherboard Controller with inbuilt GSM connectivity to control room and facility for Vehicle actuation and Area Control Connectivity for Vehicle Management. The detailed specifications of the controller are as below: - HARDWARE Memory : NOVRAM with built in battery battery backup System clock: Calendar clock (RTC) with minimum 5 years

   Battery back-up clock Accuracy of Programming (1 sec per week Programming Facility Through external Engineering Android/IPhone Application)
   GSM Connectivity: All important parameters such as Programs, Timings, Vehicle Actuation parameters etc shall be transferred from Central Control Computer

   **FEATURES**
   Number of signals Minimum 16 signals group should be programmable as either vehicular or pedestrian groups. Additional Programmable dummy groups as desirable.
   Number of stage: 16 stages
   Outputs: The Motherboard should have Connector to connect further to the Sub Control Unit
   Vehicle Actuation: RS232/RS485/DI ports should be provided for communication with sensors and inbuilt software should be provided for Vehicle Actuation Facility so as to run the Traffic Signal in Vehicle Actuation Mode. The control system should have facility for working in Vehicle Actuation Mode. It should sense the inputs from various existing Traffic Sensors and adjust the Traffic Signals according to the intensity of traffic on all four/six roads of the Traffic Junction.
   The controller should be programmable so as to work in Vehicle Actuation at a particular time of the day/whole day/particular date etc. The controller should be integrated with Vehicle Detector cards, Vehicle Sensors cards etc. complete in all respects.
   Area Traffic control compatibility Controller should have live Ethernet/internet port for connecting

to the area traffic control centre. Live port should be provided and testing/ demo should be done/displayed before commissioning of controller. No hardware/software should be required to be provided up to controller at later stage when connection is required for area controller.

**ENVIRONMENTAL FEATURES Operating voltage:24VDC "**
Temperature: 0 C to 70 C, Relative Humidity: Max 95%, the controller shall be installed in the pedestal and also making connections to it with all the incoming and outgoing cables as per site requirement. (Product should be Make Siemens/Keltron/RRE/Bel Make)

2. Design, Manufacture, Supply, Wiring & Commissioning of Traffic Light sub control unit with facility of Output Isolation Through solid state devices with zero cross output solid state switching isolated from control circuit by optical isolation in male female plug type single module. The solid state device should not be used for switching ON/OFF of more than 2 Nos. LED Lamps including shall be installed in the pedestal and also making connections to it with all the incoming and outgoing cables as per site requirement. The Sub Control unit shall be provided with Overload/over voltage protection and modular plug-in type system shall be provided for easy maintenance. The Unit shall also be provided with Indicators for Operator use complete in all respects with continuous input voltage current control & overload (Product should be Make Siemens/Keltron/RRE/Bel Make)

3. "LED SIGNAL HEAD ASSEMBLY:- Supply and erection of IP-65 Approved One Aspect signal Head LED Light Assembly of Keltron/RRE/Bel/Siemens Make Make only of 300mm dia fabricated from polycarbonate materials die moulded Complete in all respects of nominal size 380 X 350mm complete in all respect with LED type traffic signals glasses. The visor shall be fabricated from UV Stabilised HDPE Materials of length min 254 mm depth and tilted 50 alongthe geometrix axis from the back side to front end asper IS7537- 1974 and the assemblies shall have provision for mounting of pole to permit directional adjustments. The lenses of red, amber or green colour shall be fabricated from 5mm dia LED's of light intensity of minimum 5000 mcd and the electronic switching circuit wired on printed circuit board of epoxy material with transparent covering glass of polycarbonate materials. LED Viewing Angle should be 23 degree with max. Forward Current as 20 mA & lamp shall be visible from 400m under normal atmospheric conditions (Conforming to IEC60529)
   a) Glass with a minimum of 190 LED's of Red/Amber colour. (24 number for 4 arm signal)
   b) Glass with a minimum of 66 LED's of Green colour in Arrow/Walking Man shape. (44 for 4 arm signal)
   c) Glass with a minimum of 66 LED's of Red colour in standing man shape. (8 for 4 arm signal)

4. CANTILEVER POLE:-Supply and erection of steel tubular pole 8.70mtr long and in two steps - bottom portion MS Pipe B class ISI mark 3mtr long 150mm dia and top portion MS pipe B class ISI mark gauge 6mtr long of 125mm dia with provision for the erection ofbracket fabricated from 50mmdia M.S. pipe of A class upto 3mtr long, P type arm suitable for fixing of traffic lights and a 200mm dia round M.S. plate of 6mm thickness to be provided at the bottom of the pole. The pole will be erected 1.5mtr below ground level with 1:3:6 cement concrete mixture. The joining of the pole will be done so as to provide maximum supports to the joints including the cost of the all labour and material required for the job. The pole will also be provided with suitable reinforced plastic pole top for the safety of cables etc. The mounting arrangement of the lanterns should be made in such a way that signal heads can be adjusted as per required direction of the site. (4 numbers for 4 arm junction)

5. Supply and erection of double walled corrugated pipe made of high density polyethylene (HDPE) materials to be laid 1mtr below ground level incluidng excavation etc as per CSR Item 33.37
   a) 78/63mm (OD/ID- 80 meter),
   b) 63/51 mm (OD/ID- 50 meter)

6. Laying of HDPE pipe through trenchless boring under road atleast 90cm below ground level or machine cut 100mmX100mmX100mm including digging pits and refilling the same after laying of pipes and bringing the surface to original finish complete in all respects. (80 meter approx.)

7. Supply and erection on PVC under ground copper conductor 1.5mm Sq mm size armoured cable suitable for A.T.C. signals 660/1100 volts conforming to ISS 1554-1998 laid in existing pipe or in trench including cost of labour material required for the job.( Note: Test certificate of original cable manufacturers along with supply details shall be required to be submitted before taking up the installation work at site.)
   a) 14 core (loose in pipe- 270 meter)
   b) 8 core (loose in pipe- 150 meter)

8. Supply and erection of 2 Nos. X 12V 100Amp-Hr Power safe Exide Make Sealed Maintenance free Battery Model EP-100- 12 complete in all respects with connecting terminals etc. The Batteries should be mounted in existing Panels/MS Boxes and duly provided with special arrangement so as to prevent thefts.

9. Supply and erection of Heavy Duty 24V cum 12V DC Rectifier of upto 20Ampere Capacity for extra charging of 24V DC 300AH Batteries complete in all respects.

10. Supply & Erection of MS Pedestal box of approximate size 900 X 600 X 600mm (Nominal) fabricated from 1.6mm thick MS sheet and required supporting members of MS angle iron/ MS Flat duly painted & with separate compartments for batteries & Control System etc. Facility for theft proof installation of Batteries shall also be provided in the pedestal. The pedestal box should have 4 legs 70cm long of 35 x35x 5mm angles iron and grouted 30 cm below ground level in cement concrete mixture complete in all respects with provision for cable entry etc.

11. Supply and erection of Industrial Grade Intelligent 1400W Battery Charger Systems provided with intelligent float charging circuit for 2Nos. 12V150 AH batteries and 1 no. 12 volt 26 AH batteries controller units. The system shall be provided with low/high voltage cut arrangement so as to ensure that in the event of continuous power failure, the batteries do not get deep discharged/ over charged. The charger shall be fabricated from weather resistant heavy duty Power Diodes, Switching FETs/Transistors assembled on Aluminium Heat Sink units, charging ciruicts and metering to show Voltage levels etc. The Charger should also have intgerated 12V Charging System. The system shall be housed in existing box. The cost shall include required wiring of the same. (Battery Charger of PRO/APLAB/ RRE / ELAK/ ABB MAKES ONLY)

12. Supply and erection of MS Pole 100mm dia A Class ISI Mark 6.1m long duly welded for traffic signal head assemblies as requirement at site. The pole should be painted with primer red oxide and two coats of golden yellow synthetic enamel paint. The pole is to be erected 1.00m below ground level in 1:3:6 cement concrete mixture. The provision for cable entry should also be made complete in all respects with all labour and material required for the job including welding of 23 x 23x 5mm M.S. Plate at the bottom and erection of the same in 1:3:6 cement concrete foundation. The pole top canopy fabricated from Reinforced Fiber Plastics in White Colour shall be mounted on the Top of the pole. The pipe shall be of Tata, Jindal or Swastik makes only. (12 numbes)

13. Supply, erection of Microprocessor based Down Counter Timer for ATC Signals to depict the timings of Red, Straight Green or Side Green timings independently. The down counters of approx. size 18”x20” fabricated from Reinforced Plastic with 14” long hood having 2½ digits of 8½” height & 4” width with 30 led’s per segment and approximately 200 LED per digit. LED should be

of 5 mm dia and 5000 mCd total no. of LED should be approx.500. The cost includes wires from lights/ sub controller units to Down Counter Timer. (4 numbers)

14. Supply & laying of PVC Insulated PVC Sheathed Aluminium twin core working voltage 1100V armoured and served cable as per CSR item 33.10(B(ii)- 80 numbers)

15. Coverage of Operation & Maintenance for the period of 5 years

# 4 Sewerage and Storm Water Drainage Works

## 4.1 Sewer Rehabilitation Works

### *4.1.1 De-silting of pipes*

**i. Sewer Flow Control**

Before starting desilting of the sewer shall be blocked in the certain sewer length taken up for desilting and rehabilitation work depending upon the schedule and pump the sewage out of this sewer length to the downstream or drain.

Simultaneously and as long as desilting, inspection and repair, rehabilitation work in the concerned sewer length is going on, over-pump the arriving sewage water in the blocked sewer from upstream to the to the first manhole downstream.

Over-pumping shall be as required on a 24 hours basis. The over-pumping system shall be of sufficient capacity to handle the maximum peak flow.

Sufficient precautions shall be taken to protect the upstream sewer lines from damage that might result from sewer surcharging. Also, sufficient precautions shall be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewer involved.

**ii. Flow Bypassing**

For carrying out the desilting and rehabilitation job, a number of pumps at different locations in the sewer line shall be installed as per site requirement for over-pumping / bypassing the sewage flow. the

necessary pump with suitable capacity, conduit / pipe network and other equipment to divert the flow of sewage around the manhole shall be installed. Suitable sewer line plugs shall be inserted / temporary brick wall shall be constructed into the line upstream & downstream of the section being worked. Plugs shall be designed in such a way that any portion of the sewage can be released or pumped out. After completion of the work in a particular stretch, the plugs / temporary wall shall be removed and the flow restored to the normal conditions. During the operation, we will keep the necessary labour and supervisors to set up and operate the pumping and bypass system.

If required the pumping operation shall be for 24-hour basis so that this will not cause flooding or damage to Public / Private Properties. As far as the pump is concerned, using suitable capacity of deep suction centrifugal pumps / submergible pumps according to the site requirement.

**iii. Desilting of Non Man Entry Sewer**

Engaging the vehicle mounted combined jetting-cum-suction unit for the desilting of non-man-entry sewer, which is capable of creating vacuum for sucking out dense waste / sludge like mud, slurry, grit etc. from the sewer line. High pressure cleaning system can jet water at about 100 to 140 bar, which can

be adjustable as per the requirement by a control valve. By ensuring that no damage occur to the existing sewer

The concept of flushing with more water with less pressure is used for this cleaning operation. A specially designed rotary nozzle is used for the cleaning operation. High pressure water jet equipment will have about

120 meters long hose which will push the debris, sand in the opposite direction to the travel of the hose and the suction hose with suitable suction nozzle is used to remove all the debris, sand, sludge, etc., from the manhole into sludge tank. During the cleaning operation, manhole jack and hose guide system is used wherever it is necessary to prevent damage to the high-pressure hose. The jetting & suction operation can be operated simultaneously for effective cleaning of the pipeline. The suction operation can continue till the sludge tank is filled with slurry, sludge, sand, etc. The safety valve provided inside the sludge tank will stop the operation once the high level is reached. Afterwards for discharge of the debris either this unit can move to the destination for dumping the debris or can transfer this material into another tanker for transportation to the site by blow operation or sludge can be transferred to barrels and the barrels can be transferred to the dump yard / treatment plant. As far as this process is concerned, the silt for drying either at site or any other place shall not be dump or stack. Various special nozzles for sewer cleaning and root cutting application is used. Wherever there is no approach to take the jetting cum suction unit, other conventional method for desilting is followed.

**iv. Desilting of man entry sewer**

The super sucker unit with payload carrier for desilting the man-entry sewer line is engaged. The equipment is provided with dewatering arrangement so that only silt / sludge is sent to the dumping yard. Through the existing manhole chamber necessary suction hose is sent for desilting operation. One end of the suction hose is connected to the specially designed suction nozzle for carrying out desilting operation and another end is connected to the vehicle mounted payload carrier tank to collect all the sludge, solid, debris, sand, silt, etc. The pay load carrier outlet pipe is connected to the vehicle mounted super sucker unit which generate high level of vacuum in the payload carrier tank. Super sucker unit will have diesel engine driven vacuum blower and specially designed cartridge filter and multi-cyclone, pneumatic control system, etc. Once this super sucker is operated it creates high level of vacuum inside the payload carrier through outlet hose. The payload carrier inlet pipe with necessary valve arrangement is connected to the suction hose through quick release coupling which is sent inside the manhole chamber for desilting operation.

Desilting operation personnel with necessary safety gadgets will perform the desilting operation by proper manipulation of suction nozzle and hose inside the sewer pipe. Once the payload carrier is filled with sludge, silt, water and debris, etc., water is filtered back into the storm waterline by the dewatering arrangement and only the sludge and solid collected in the payload carrier is sent to the dumping yard. This operation is continuous till the silt in the entire stretch is cleaned completely. As far as our process is concerned we will not dump or stack the silt for drying either at site or any other place. Once the first payload carrier is filled with silt, it is sent for dumping and the second payload carrier is connected to the super sucker system so that the process can be

continuous without any time loss. After dumping the silt in the dumping yard, the payload carrier is returned back for further collection of silts.

**v. Sewer Cleaning**

During desilting operation if there is any hard deposit of silt high-pressure water jetting system to dislodge the same is used. After desilting to remove any deposits inside the sewer line, a high-pressure water jet system with specially designed manipulator with nozzle for cleaning is used. High pressure cleaning system can jet water at about 100 to 140 bar which can be adjustable as per the requirement by control valve. It is ensured that no damage occur to the existing sewer.

During the cleaning operation, manhole jack and hose guide system is used wherever it is necessary to prevent damage to the high-pressure hose. A trolley / truck mounted high-pressure water jet system for sewer cleaning is used.

HP water jet system is consisting of high pressure pump driven by diesel engine and necessary HP hose of about 120 meter length with suitable nozzles.

### *4.1.2 CCCTV for Pipe Rehabilitation*

**i. Intent and Specifications**

a) The Contractor shall carry out an initial Closed-Circuit Television (CCTV) survey of the complete length of pipelines indicated for rehabilitation to ascertain their material and conditions prior to proceeding with the pipeline rehabilitation works. The contractor shall note that pipe materials may vary along the length of the pipeline.

b) Portions of the pipeline that are found to be beyond repair are to be brought to the notice of the "special technical committee" for a decision to replace / rehabilitate the pipeline.

c) Prior to carrying out the rehabilitation works, the pipeline shall be cleaned and inspected again by members of expert committee, to ensure that the pipeline has been sufficiently prepared and that the pipeline is accessible for rehabilitation.

d) On completion of the rehabilitation or pipe replacement works, a final CCTV survey shall be carried out to ascertain the acceptability of the works. This final survey, method of survey reporting required and some general requirements pertaining to the extent of survey, time of inspection and pipeline preparation, etc shall be elaborated in other Particular Specifications, in the tender document

e) The equipment to be provided for the inspection and CCTV shall be elaborated in other Particular Specifications, in the tender document. The Contractor shall provide sufficient survey/inspection units, including standby units in the event of breakdown, in order to complete the CCTV surveys and/or inspections, within the duration specified by the Engineer-in-Charge. The Contractor shall maintain these equipment/ plant in full working order and shall satisfy the Engineer-in-Chargeat the commencement of each working shift that all items of plant have been provided and are in full working order.

**ii. CCTV Survey after De-Silting**

a) The Contractor shall carry out an initial colour CCTV survey for the purposes of:

- Assessing the internal condition and material of the pipeline and enable the contractor to recommend the rehabilitation system to be

adopted, for the approval of the "special technical committee", so constituted by PMIDC/Local Government Department

- Verifying that the length and diameter of the pipeline are accurately measure and are as indicated on the Contract Drawings -and Specifications.
- Ensuring that all defects, joints, access manhole, air valves, washouts, connection positions, etc have been identified, their position and size measured and noted, and their condition and locations recorded.
- Providing a record of the initial conditions of the pipeline.

b) The initial colour CCTV survey shall be recorded on high definition VHS format video cassette tapes, 35mm colour pictures or equivalent digital picture formats on digital media and typed survey logs all supplied and allowed for in the Contractor's tendered rates. The video record shall show the entire length of the pipeline. A 360° rotational scan indicating general condition shall be implemented at minimum intervals of 10 metres along the pipeline, at connections and at salient defect features.

c) Colour snap shots shall be taken at a minimum of 10 m intervals, at every defect, at joints and at all appurtenances and connections. Each picture shall be systematically annotated with start and finish chamber reference numbers survey direction, chainage, street location and the date and time of the survey

d) Based on the inspection results, the lining condition shall be assessed and inferred structural condition of the pipe line section assessed, where possible.

e) The Contractor shall also assess whether the rehabilitation method proposed is suitable for the pipeline and submit a written report to the Engineer-in-Charge. The assessment shall be carried out by a Professional Engineer or technical committee with relevant experience, engaged by the client. A computer-based software programme approved by the Engineer-in-Charge. shall be used to capture and synthesise the data arising from the pipeline inspection and to grade the data.

**iii. CCTV Inspection Prior to Rehabilitation**

a) The pipeline is to be cleaned immediately prior to rehabilitation. Following cleaning, the pipeline shall be inspected by colour CCTV to confirm that the pipeline is ready for rehabilitation. Although detailed photography is not required at this stage, the Engineer-in-Charge. may instruct the Contractor to provide pictures at locations of defects and other locations of significant interest. The cost of such additional pictures shall be included in the contractor's tendered rates. No additional data logging work is otherwise expected as part of this work.

b) Video records of the CCTV inspection and in-pipeline pictures shall be handed to the Engineer-in-Charge. The video shall be handed over to Engineer-in-Charge for record

c) The Contractor shall be required to re-clean the pipeline if in the opinion of the Engineer-in-Charge, the pipeline is not ready for rehabilitation. A further CCTV inspection will be required to confirm that the pipeline is ready for rehabilitation subsequent to re-cleaning. The costs for such re-cleaning and further CCTV inspection shall be borne by the Contractor. It is therefore critical that the

d) Contractor commences rehabilitation works as soon as possible after the

Initial Colour Survey and once approval for rehabilitation has been granted by a "committee of experts".

**iv. Final CCTV survey of Rehabilitated Pipes**

a) On completion of the pipeline rehabilitation, the Contractor shall re-clean the pipeline and shall carry out a further colour CCTV inspection. In pipeline pictures will only be taken at locations, where a pipeline has been lined, all appurtenances and connections and other distinguishing features (locations where wrinkling is observed, locations where the relined pipeline is not wholly circular, obvious defects in the cured materials, etc.), and at locations where repairs have been carried out.

b) The video and pictures shall be submitted to the Engineer-in-Charge to assist the department in his assessment of the works carried out, following which a decision to accept (or not to accept) the works carried out, shall be made. The Engineer-in Charge's decision on this matter shall be binding and final to the Contractor. Although no data logging work is required as part of this work, all the colour pictures that are submitted to the S.0. shall be properly catalogued.

### *4.1.3 Pipeline Material*

The Material used in Pipeline work for Sewerage is RCC-NP3 HDPE Lining while for Storm Water Drainage pipeline RCC NP3 pipes shall be used. Construction of Manhole Brickwork has size of 1200mm x 7500mm, 1500mmx 900mm, 1200mmx 1800mm and 1500mmx 1800mm.

i. RCC Pipe Class NP-3 as per IS:458-2003 :
ii. Brick work in Manhole : As per CSR Punjab
iii. Manhole Cover (MD, HD & EHD) : As per IS12592-2002
iv. PVC Encapsulated Foot Steps : As per IS:10910
v. Pipe Bedding: Providing and filling local sand as per specification for uPVC & RCC NP3 pipes.

### *4.1.4 RCC (NP 3) pipes*

**i. Quality Assurance steps to be taken at site**

Precast Concrete Pipes (with Reinforcement) Socket and Spigot NP3 as per IS 458:2003

**ii. Check of Documentation**

The Executive at site should obtain the following documents from the Agency and Agency should obtain the same form the Supplier of pipes:

a) Certificate to the effect that the Precast Concrete Pipes (with Reinforcement) Socket and Spigot NP3 pipes have been manufactured strictly as per IS code IS 458: 2003. This Certificate would include Manufacturer's Test Certificate and Test Reports

b) Conduct a check to ensure that each pipe is clearly and indelibly marked in ink/paint or embossed on white base as under. The following markings should be on all procured pipes/collars:

- Identification of the source of Manufacture
- Class and size of S&S pipe
- The words 'SPUN PIPE' or 'VERTICAL CAST (REINFORCED') as may be applicable, for pipes
- Date of manufacture
- BIS Certification Marking
- Any other marking which would be prescribed by the ULB.

c) The above information shall be clearly marked on outside for pipes up to 300 mm internal diameter, and both outside and inside for pipes above 350 mm internal diameter.

d) Obtain from the manufacturer a Certificate indicating the details relating to quality, quantity and dispersion of steel in the pipes as well as the clear cover to the steel provided in the pipes. (Clause 6.2.3 of IS 458:2003).

**iii. Classification**

| Class | Description | Conditions Where Normally Used |
|---|---|---|
| NP3 | Reinforced (in case of pipes manufactured by vibrated casing process) concrete, medium-duty, non-pressure pipes | For drainage and irrigation use, for cross drains/culverts carrying medium traffic |
| NP4 | Reinforced and also Non-reinforced (in case of pipes manufactured by vibrated casting process) concrete, heavy-duty, non- pressure pipes. | For drainage and irrigation use, for cross drains /culvert carrying heavy traffic |

**iv. Sampling for Physical Characteristics**

a) Scale of Sampling (as per IS 458:2003)

| Nos of pipes in the Lot | For requirement under Clause 8 & 9 | | Sample size for Test under Clause 10.2 (Excluding Ultimate load test) |
|---|---|---|---|
| | Sample Size | Permissible Nos of Defects | |
| Up to 50 | 8 | 0 | 2 |
| 51 to 100 | 13 | 1 | 3 |
| 101 to 300 | 20 | 2 | 5 |
| 301 to 500 | 32 | 3 | 7 |
| 501 and above | 50 | 5 | 10 |

b) Dimensions, Workmanship and Finish (Clause 8 & 9 of IS 458:2003)

c) Hydrostatic test, Three-edge bearing test and Permeability test (Clause 10.2 of IS 458:2003)

d) In any consignment, all the pipes of same class, same size and belonging to the same mix of concrete shall be grouped together to constitute a lot.

e) For ascertaining the conformity of the material to the requirements of this specification, samples shall be tested from each lot separately.

f) A pipe failing to satisfy one or more of these requirements shall be considered as defective.

g) The lot shall be declared as conforming to these requirements if the number of defectives found in the sample does not exceed the number of defectives given in Column 3.

h) To ascertain reinforcement, pipes may be broken from different locations.

**v. Dimensions (Clause 8 of IS 458:2003)**

A check of the following physical characteristics will be carried out of samples as listed above:

a) AII the pipes selected shall be inspected for dimensional requirements, finish and deviation from straight.

b) A pipe failing to satisfy one or more of these requirements shall be considered as defective.

**vi. Workmanship and Finish (Clause 9 of IS 458:2003)**

a) Pipes shall be straight and free from crack except that craze cracks may be acceptable.

b) The ends of the pipes shall be square with their longitudinal axis so that when placed in a straight line in the trench, no opening between ends in contact shall exceed 3 mm in pipes up to 600 mm diameter (inclusive), and 6 mm in pipes larger than 600 mm diameter.
c) The outside and inside surfaces of the pipes shall be dense and hard and shall not be coated with cement wash or other preparation.
d) The inside surface of the pipe shall be smooth.
e) For better bond, inner surface of the collar may have rough finish.
f) The pipes shall be free from defects resulting from imperfect grading of the aggregate, mixing or moulding.
g) Pipes shall be free from local dents or bulges greater than 3.0 mm in depth and extending over a length in any direction greater than twice the barrel wall thickness.
h) Pipes may be repaired, if necessary, because of accidental injury during manufacture or handling and shall be accepted if in the opinion of the Engineer-in-Charge, the repairs are sound and appropriately finished and cured, and the repaired pipe conforms to the requirements of this specification.

**vii. Deviation from Straight**

The deviation from straight in any pipe throughout its effective length, tested by means of a rigid straight edge as described in IS 3597 shall not exceed, for all diameters, 3 mm for every metre run.

**viii. Tests to be conducted at two Laboratories**

The following tests are to be got conducted from an authorised and reputed NAB approved labs:

a) The specimens of pipes selected in accordance with 10.1 of IS 458:2003 shall be subjected to the following tests in accordance with IS 3597:1998
    - Permeability Test
    - Hydrostatic Test
    - Three-Edge Bearing Test
    - Split Tensile Tests of concrete cylinder (5.5.2 of IS 458:2003) made from the concrete used for the pipes.
    - Absorption Test
b) Rubber Ring chords used in pipe joints shall conform to Type-2 of IS 5382.:1985

Note:

- The permeability test when conducted in accordance with the method described in IS: 3597:1998 shall meet the requirement of final permeability, which shall not exceed 0.3 cm3.
- Initial absorption should not exceed 2.0 cm3 and the deviation in any two
    - readings during initial absorption should not be more than 8 cm3.
- For Non-pressure pipes, 2% of the pipes shall be tested for hydrostatic test pressure.

## 4.2 HDPE T-Grip for Lining for RCC Pipes

**i. General**

a) T-grip liner is new introduction for lining of concrete pipes with a Polyethylene material. The following guidelines have been made to ensure that the product is of a material of laid down quality parameters.
b) T-grip PE Liner should be made from Polyethylene compound. To maintain the characteristics, Manufacturers can use combination PE materials. However, the liner and allied products used for installation should be made from the propriety grade resin. The T-grip PE liners, the actual resin used in manufacture must constitute not less than 99% of the resin used in formulation. The Manufacturer is permitted to make changes in the formation of the T-grip PE liner, but only after prior approval from the Engineer-in-Charge of Project and technical demonstration no quality parameters are compromised.
c) At any time during the course of Project, whether during Manufacture of the specified T-grip PE liner or in its installation finally in the RCC Pipe, the Engineer-in-Charge should retain samples of the T-grip PE liner or welding strips for testing.

**ii. Properties**

The following are the main properties T-grip PE liner:

| S. No | Test | UOM | Value | Test Method |
|---|---|---|---|---|
| 1. | Material | | HDPE | |
| 2. | Density | g/cc | 0.93-0.94 | ASTM D 1238 |
| 3. | Melt Flow Rate (190 deg. C, 2.16 kg. wt.) | g/10 min. | ≤ 1.00 | ASTM D 638 |
| 4. | Tensile Strength at Yield | MPa | ≥15 | ASTM D 638 |
| | Tensile Strength at break | MPa | ≥24 | ASTM D 638 |
| 5. | Elongation at Yield | % | 12(Min) | ASTM D 638 |
| | Elongation at break | % | 600(Min) | ASTM D 1603 |
| 6. | Carbon Black content | % | 2-3 | ASTM D 2240 |
| 7. | Shore durometer | | 1-sec. ≥50<br>10- sec.240 | ASTM D 570 |
| 8. | Water Absorption | % | ≤0.08 | ASTM D 4801 |
| 9. | Thickness | Mm | 1.65 (Min) | |

HDPE T-grip manufacturer should have in house testing facility for the tests which are mentioned in this circular.

a) All T-grip PE liner including locking extensions, all joints and welding strip shall be free of cracks and other defects that may affect the protective properties of the material.
b) Colour
Colour of T-Rib PE liner shall be of twin colour. In twin colour, Portion of T-rib (Outer layer) which is embeded in RCC Pipe shall be Black-UV resistant and portion (Inner layer) which are come in contact with fluid shall be Grey/Blue.
c) Thickness of inner layer should be 20% of the thickness of total T- rib e.g. If T-rib liner thickness is 2.5mm, then inner layer thickness should be 0.5mm.

**iii. Test**

a) General:

- Sample taken fro T-grip PE liner, Joints or Weld Strips shall be tested to determine material properties.
- Determination of tensile strength and elongation shall be accordance with ASTM D 638 using Die IV. Determination of indentation hardness shall be in accordance with ASTM D2240 using type D Durometer, except that a single thickness of material and indentation hardness shall be made on 1x3 inch (25x75mm) specimens. Thickness of specimen shall be the thickness of the sheet or strip.

b) Measurement of initial Physical Properties:

This measurement determines the initial values for tensile strength, weight, elongation and indentation hardness prior to chemical resistance test.

c) Chemical Resistance Test:

- Determine the physical properties of the specimens after exposure to chemical solutions.
- Test specimen shall be conditioned to constant weight as 72°F (24°C) before and after submersion in the followig solutions for a period of 112 days at 72°+or-5°F (24°+or-3°C).

| **Chemical** | **Test Method** | **Change in Weight Not more than** |
|---|---|---|
| Sodium Hypo-Chloride 1% | As per ASTM D 543 | 0.09% |
| Ferric Chloride 1% | | 0.09% |
| Sodium Chloride 5% | | 0.09% |
| Sulphuric Acid 20% | | 0.09% |
| Nitric Acid 1% | | 0.09% |
| Sodium Hydroxide 5% | | 0.09% |
| Ammonium Hydroxide 5% | | 0.09% |
| Soap & Detergent Solution 2% | | 0.09% |

- At 28 day intervals, specimen shall be removed from each chemical solution and tested. If any specimen fails to meet the 112 days exposure, the material will be subject to rejection.
- Chemical Resistance test to be performed as type test once in year.

d) Water Absorption Rate

- (% change maximum in original weight) as per ASTM D570.
- Results are 0.1% over first 24 hours then the rate drops rapidly. Total absorbed amount is not increased over prolonged period.

e) Water Vapour Transmission Rate:

- This test is to be performed as per ASTM E96 (38◦C and 100% relative humidity).
- The transmission rate should be 0.020 (per 100 square inches per day) for T-grip PE liner thickness of 1.5mm.

f) Co-Efficient of Linear/Thermal Expansion:

- This test is to be performed as per ASTM D696.Test results should be 1.2x10-4 per °C rise in temperature.
- T-grip PE liner should not exhibit significant contraction/expansion differentials to concrete. Hardness-Shore Durometer "D" should be 55 to 25°C as per ASTM D2240 test method.

g) Oxidation Induction Time (OIT)
This test to be performed as per ISO-11357/ Test results should be ≥ 20 minutes minimum at 200◦C.

h) Spark Test:
All liner shall be shop tested for holes with a spark tester set to 20,000 volts to 30,000 volts. Sheets having holes shall be satisfactorily repaired in the shop prior to shipment from the manufacturer's plant.
There should be marking of batch number and manufacturer brand at regular interval on every 50 meters.

**iv. Details and Dimensions:**

a) **Approval of Detail:** T-grip PE liner, strip and other accessory pieces shall conform to the requirements of these specifications and applicable provision of standard plans.

b) **Thickness of Material:** The minimum thickness of sheet and strip shall be as follows:

| Material | Thickness |
|---|---|
| Sheet with Locking | 1.65 mm min (for size up to 300mm RCC Pipe)<br>2.00 mm min (above 300 mm and less than 600 mm) |
| Extensions | 2.50 mm min (above 600m and less than 1200mm) |
| Sheet Plain | 1.65 mm min |
| Joint Strip | 1.65 mm min |
| Weld Strip | 1.65 mm min |

c) **Unit weight w.r.t thickness of material:** The Approximate unit weight with respect to thickness shall be as follows:

| Thickness | Unit weight-kg/$m^2$ |
|---|---|
| 2.00 mm | 3±2% |
| 2.50 mm | 3.4±2% |
| 3.00 mm | 3.95±2% |

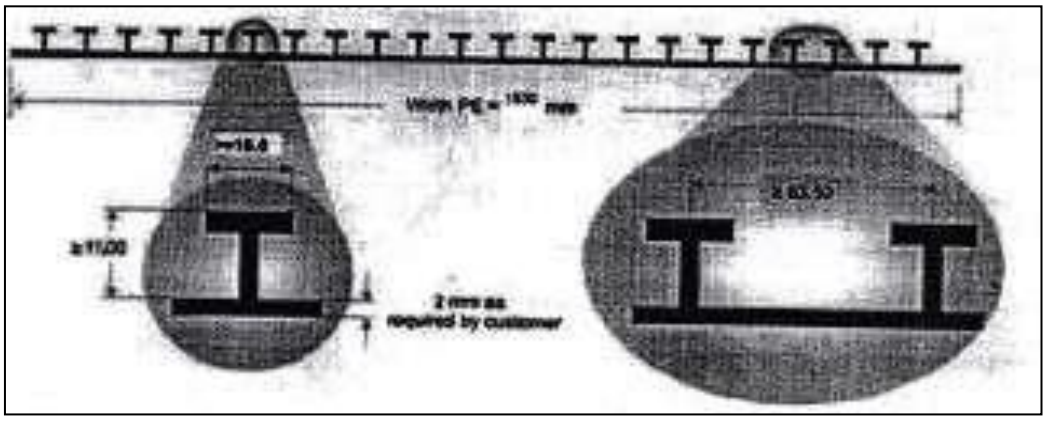
d) **Material Sizes:** T-grip PE liner used for RCC pipe shall be sized to provide the coverage by the plans.

**v. Locking Extensions:**

a) T-grip PE liner to be embedded in concrete shall have internal locking extensions.

b) T-grip PE liner be anchored to concrete surfaces during vertical casting of RCC pipes.

c) Locking extensions shall be of the same material as the T-grip PE liner, shall be integrally extruded with the PE liner, it should have an approved cross section with a minimum web thickness of 3 mm. They shall be ≥ 63.5 mm apart and shall be such that when the extensions are embedded in the concrete, the liner will be held permanently in place. Height of Locking extensions should be ≥ 11 mm from bottom of PE liner. Width of locking extension should be ≥10.00 mm.



d) Locking extensions shall be parallel and continuous except where interrupted for joints flaps, weep channels, strap channels and for other purposes shown on the plans or permitted by the engineer.
e) The T-grip PE liner edge which will be lower terminal edge in the structure shall not extend beyond the base of the final locking extensions more than 3/8 inch (10mm).
f) Flaps: When transverse flaps are specified or required, they shall be fabricated by removing locking extensions so that maximum of
g) 0.32 inch (0.8mm) of the base of the locking extensions remains on the sheet.
h) Pull Test for Locking Extensions: T-grip PE liner locking extensions embedded in concrete shall withstand a test pull of at least 75 pounds per linear inch applied perpendicularly to the concrete surface for a period of 1 minute, without rupture of the locking extensions or withdrawal from embedment. This rest shall be made at a temperature between 86◦F to 95◦F (30◦C to 35◦C) inclusive.

**vi. Shop Welded Joints:**

Shop welded joints, used to fuse individual sections of T-grip PE liner together, shall be at least equal to the minimum requirements of the liner for thickness, and shall be tested for tensile strength. Tensile strength measured across the welded joints as well as Hot-air fabrication welds, shear value shall be 90% of Yield strength of the parent material using a 1x5 straight die.

## 4.3 Manhole Frame and Cover

Steel Fibre Reinforced Concrete (SFRC) frame and cover shall be used for covering the manhole.

The selection of samples per lot for testing, failure percentage, no. of test, Concrete mix curing, etc shall be as per IS 12592 (part-I) for Pre-Cast Concrete Manhole Cover. The load of class AA shall be as per IRC guidelines.

The Manhole cover shall be heavy duty and shall confirm to IS 12592 (Part I & II). The inspection and testing for these shall be done by Third Party agency also in the presence of EIC or his representative. The load test shall be done in accordance with Table 1 of IS 12592 (Part – I). The cover & frame shall be manufactured as per approved drawing. The frame and cover of manhole shall be in SFRC as per approved drawing.

The Road Gulley covers shall have minimum 30% perforation or more with meeting the load test requirements of Heavy Duty as per IS 12592.

## 4.4 LAYING AND JOINTING OF SEWERS

All the sewer lines are to be laid perfectly true both in alignment and to gradient specified. In

case of spigot and socket pipe, the socket end of the pipe shall face upstream.

The sewer lines shall be laid such that the marking on pipes appears at the top of the pipes.

Properly fitted temporary wooden stoppers shall be provided to close the ends of all incomplete sewer line. The stoppers are only to be removed when pipes are being laid and jointed. Opening of sewer at end of day's work shall be capped and sealed.

Sewer pipe laying and jointing shall be started and completed only section wise as per the instruction of the Project Engineer. The sections shall be chosen manhole chamber to manhole chamber. However in unavoidable circumstances the section of sewer line shall be changed as per site condition & as directed by Project Engineer. The work of sewer line laying, manhole chamber construction and house sewer connections shall be done simultaneously so that all the necessary testing can be done efficiently.

After laying of pipe line the trench shall be filled up to top of pipe with moist soil. The trench can be filled up to the top of the pipe level with moist soil to ensure curing of concrete and then after testing of sewer line, trench should be filled. In the duration before filling the trench, soil should be kept moist to ensure adequate curing.

The sewer lines shall be secured in place with approved backfill material tamped under it and proper care shall be taken during tamping at the socket end of the pipe to check that it is not damaged. The watering shall be done on the refilled material in the trench before compaction based on the OMC of the soil to achieve 90 % MDD of the refilled material.

Special arrangements such as cranes, tripods with chain pulley block for lowering the pipes and fittings shall be made by Contractor at his own cost. In no case pipes and fittings shall be dropped.

The posts and rails shall in no case be removed until the trench is excavated, the pipes are laid and Engineer gives permission to proceed with the backfilling.

The pipes fittings and other construction material shall be placed along the alignment in advance with utmost care during transit so that they are not damaged. Any damage due to these reasons shall be Contractor's liability.

### 4.5 Bedding

For RCC pipes bedding shall be designed taking into account the required external loading conditions, geotechnical requirements such as sub soil and bearing capacity of soil encountered in respective sewer line, type, class and material of pipe used for the laying purposes as per CPHEEO manual.

All plastic pipes (uPVC / HDPE) pipes shall be provided with minimum 4 inches of uniform river natural graded sand bedding free from any foreign /sharp etc. The filling surrounding the pipe shall also be of uniform sand for at least 3 inches on each side and until 3 inch above crown of pipe. This shall be done to avoid any possibility of damage to plastic pipes during backfilling.

The bedding below the pipe line and backfilling shall be provided as per the standard / approved drawing / as per direction of the Engineer. After the work of laying and jointing of pipes is completed, the pipes line shall be subjected to hydraulic test at work site. The pipes line should be tested immediately after laying of pipe line. The water required for testing and for any other purpose shall be arranged by the Contractor at his own cost.

## 5 Electric Works

### 5.1 Additional Scope of Work

#### 5.1.1 TECHNICAL SERVICES

The following technical services shall be in the scope of the Bidder:

(a) Liaison with Central/state Government Departments/PSPCL/ CEIG or any other authorities concerned on for matters like work entrustment, vendor approvals,

drawing approvals, PTCC, TA&QC approvals and any other matters connected with the work and gets the approvals within the specified time for successful completion of work for all matters including obtaining approved designs & drawings, and commissioning of the Project including all incidental costs incurred thereon. Amritsar Smart City Limited, however, will provide only all the required administrative supports to the contractor in this regard and also would reimburse to the Contractor all the statutory charges paid to the departments like /CEIG on production of official receipts thereon.

(b) Liaison with Punjab State Power Corporation Limited (PSPCL) for approval of technical specifications, materials, inspection, quality control, testing and commissioning of newly installed equipment, total responsibility for the completeness of the project including erection testing and commissioning.

(c) The successful tenderer shall take the responsibility of obtaining all statutory clearances from all statutory bodies, on behalf of the Owner. (However, fee to be reimbursed by the Owner on production of documentary evidence)

(d) Basic design, drawing and layout engineering of Electrical and Civil & structural work.

(e) Preparation of detailed engineering drawings and documents.

(f) Submission of QAP and Test certificates.

(g) Arranging inspection of the materials by the client/ client representative

(h) Submission of As Built drawing after commissioning of project.

(i) All materials /machinery/items used in the subject package shall be provided according to specification given herein. All electrical items shall be supplied from the "List of Preferred makes". Prior approval from Owner shall be taken for the equipment/ items not available in the list.

### 5.1.2 DRAWING/DOCUMENTS

The scope of work includes submission of all the drawings, data and documents related with the scope of work. A tentative list of drawings, data & documents is indicated below. However, the Bidder shall note that the list is only suggestive. The final list of drawings shall be finalised with the successful Bidder.

Drawings/ Data / Documents to be submitted after Placement of Order:

(a) List of drawings and drawing numbering system.

(b) Design calculation for the selection of major items like Compact substations, Ring Main Unit, Feeder pillars, light poles, light fixtures, cables, Cable trays and Cable Trench.

(c) Quality assurance plan (QAP) of all material and Test certificate of each equipment & components including type test certificates.

(d) Single Line Diagram with ratings and three line diagram of HT and LT distribution.

(e) Cable route drawings and general arrangement (GA) drawings.

(f) Cable schedules, termination schedules and cable routing drawings.

(g) Any other drawings as required shall be finalized during engineering stage

### 5.1.3 NOTE

The Compact Sub Station (CSS) to be supplied against this specification are required for vital installations where continuity of service is very important. The design, materials and manufacture of the equipment shall, therefore, be of the highest order to ensure continuous and trouble-free service over the years. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not. It is not the intent to specify herein complete details of design and construction. The offered equipment shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements. These specifications, the design and constructional aspects, including materials and dimensions, will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulations in that respect in the relevant Indian Standards, IEC standards, I.E. Rules, I.E. Act and other statutory provisions.

The Tenderer/Supplier shall bind himself to abide by these considerations to the entire satisfaction of the purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices. It shall also encompass all necessary project management, data engineering, acceptance testing, training, documentation, warranty services, and installation site surveys including submission of a detailed plan aimed at installing the new RMUs as efficiently as possible with minimum interruptions of power to Employer customers.

Liaison with Central/state Government Departments/PSPCL/ CEIG or any other authorities concerned on for matters like work entrustment, vendor approvals, drawing approvals, PTCC, TA&QC approvals and any other matters connected with the work and gets the approvals within the specified time for successful completion of work for all matters including obtaining approved designs & drawings, and commissioning of the Project including all incidental costs incurred thereon. Amritsar Smart City Limited, however, will provide only all the required administrative supports to the contractor in this regard and also would reimburse to the Contractor all the statutory charges paid to the departments like /CEIG on production of official receipts thereon.

Civil foundations as recommended by the manufacturers of Compact Substation, feeder pillars, lighting pole and mounting arrangement for Control panel and junction box etc. shall be in the scope of the contractor.

All the civil works such as excavation of earth, lying of Hume pipes/ HDPE pipes/ DWC pipes in concreting, back filling of RCC cable trench, providing man holes as required for cable laying and jointing as per standards.

**The quoted price should include all expenses proposed to be incurred by the bidder for dismantling the existing transformers, 11KV/415 volt poles, lines and structures, light fittings and all equipment with care and handing over them to safe custody of concerned authorities.**

Field conditions, the bidder may in its own interest, before submitting the bid, inspect and

examine the area involved and satisfy them regarding the existing system.

**Electrical Power Supply and Water for construction purpose shall be arranged by vendor.**

## 5.2 CODES AND STANDARDS

The distribution system shall be planned considering the latest version of applicable Indian and International Codes and Standards, Climate and Isokeraunic Conditions, and basic electrical data.

The following primary standards and codes (latest editions/ revisions/replacements) shall be used for planning and design of the electrical system:

CODES AND STANDARD

| **Description** | |
|---|---|
| **Guidelines** | |
| Guidelines of Electricity Board and other statutory authorities.<br>BIS: Bureau of Indian Standard<br>IEC: International Electro technical Commission standards<br>IEEE: Institute of Electrical and Electronics Engineers standards<br>Regulations laid down by Indian Electricity Act and Rules<br>National Electrical Code (SP 30, 2011) of India<br>Indian Bureau of Energy Efficiency (BEE) Guidelines<br>Guidelines issued by Central Electricity Authority (CEA)<br>CBIP Publications<br>Any other regulations by the local or state/central government authorities,<br>Regulations issued by tariff advisory committee / fire insurance regulation | |
| **Electrical Codes** | |
| **IS 3043/IEEE-80** | Code of Practice for Earthing |
| **IS/IEC-60947** | LV Switchgear |
| **IEC 62271-202** | HV Prefabricated Sub-Station (CSS) |
| **IS 3427 / IEC-62271-200** | Metal Clad Switchgear |
| **IS 13118/ IEC-62271 -100** | HV Circuit Breakers |
| **IS 1180 Part 1** | Oil Type Distribution Transformers |
| **IS 5578** | Arrangement For Switchgear Bus bars, Main Connection And Auxiliary Wiring |
| **IS 2705** | Current transformer |
| **IS 3156** | Potential transformer |
| **IS 2544** | Bus bar support insulators |
| **IS 3231** | Electrical Relays For Power System Protection |
| **IS 13703** | HRC FUSES |
| **IS 3646** | Code of Practice for interior illumination |
| **IS 1944** | Code of Practice for road lighting |
| **IS 2309** | Protection of buildings and allied structures against Lightning code of practice |
| **IS 7098** | Specification for XLPE insulated PVC sheathed cables |
| **IS 1554** | Specification for PVC insulated cables |
| **IEC: 62259** | Secondary cells and batteries containing alkaline or other non-acid electrolytes-Nickel-cadmium prismatic secondary single cells with partial gas recombination |
| **IEC: 60623 / IS 10918** | Secondary cells and batteries containing alkaline or other non-acid electrolytes-vented Nickel Cadmium prismatic rechargeable single cells |
| **IS 9000** | For Basic climatic and mechanical durability tests for components for electronic and electrical equipment |

| Description | |
|---|---|
| **IS 6619** | For Semiconductor rectifier equipment code |
| **IS 2026** | Power transformers |
| **SP 72 : 2010** | National Lighting Code |
| **1944 (Parts 1 Code of practice for lighting ofand 2)** | Public thoroughfares: Part 1 General principles; Part 2 Lighting of main roads |
| **1944 (Part 5) : 1981** | Code of practice for lighting of public thoroughfares: Part 5 Lighting of grade separated junctions, bridges and elevated road (Group D) |
| **1944 (Part 6): 1981** | Code of practice for lighting of public thoroughfares: Part 6 Lighting of town and city centres and areas of civic importance (Group E) |
| **CEA** | Manual on Transmission planning Criteria |

Other International codes and standards shall be considered if the same are, at least equivalent to, Indian Standards or any other international standard which yields a more desirable outcome.

### 5.2.1 INSULATION COORDINATION

Standardised levels for the highest system voltages Um related to the rated voltages are defined in IEC 60071-1. According to these levels the test voltages for the insulation of high voltage equipment are defined. The following levels have been selected out of IEC 60071-1, IEC 60364 & IS-SP39.

Table 1: Standardised Levels for the Highest System Voltages

| Rated Voltage | Un (kVrms) | 0.4 | 11 | 33 | 110 |
|---|---|---|---|---|---|
| Highest system voltage | Um (kVrms) | 1 | 12 | 36 | 123 |
| Power frequency withstand voltages 50 Hz, 1 min, to earth | Upf (kVrms) | 2 | 28 | 70 | 230 |
| Lightning impulse with stand voltage 1.2/50 µs to earth | Uli (kVpeak) | 8 | 75 | 170 | 550 |

IEC 60815 defines 4 different pollution levels from light to very heavy pollution. To each pollution level the corresponding minimum nominal specific creepage distance is defined. The equipment to be installed in project area will be exposed to salt, fog conditions and to pollution due to exhausts. To consider this situation the pollution level “very heavy” according to IEC will be selected. This pollution level implies a minimum creep age distance of 31.0 mm/kVrms.

### 5.2.2 DISTRIBUTION TRANSFORMERS

All distribution transformers shall be Oil type 11kV/433V with Dyn11 vector group with off-load tap changer with ± 5% variation in steps of 2.5%. LV star winding shall be solidly grounded. Distribution transformer shall be chosen from standard ratings, typically 500 KVA. As a matter of policy only two ratings shall be standardised to reduce the number of stocked spares ease in replacement.

### 5.2.3 POWER FACTOR

For LV distribution loads average power factor of 0.9 shall be considered for designing the electrical system. Power factor improvement system shall be designed to have a power factor of 0.95, by using Automatic Power Factor Control via a switching capacitor bank at LV.

### 5.2.4 HV DISTRIBUTION

HV distribution system shall be designed as an economical and technically viable distribution system. Since the present HV system existing in Smart City project is at 11kV, the same shall be maintained for new design. For each location, HV supply shall be provided with two number 11kV feeders in ring formation, with an open point, so as to operate the system as radial feeders. In case of fault in any one radial feeder, the other shall be able to take the full load of those locations. Thus, under normal conditions each feeder shall be operating at 50% of its full capacity, thereby ensuring 100% redundancy of power. HV supply from 11kV main shall be distributed in the following way:

To a dedicated switching station (SS) for concentrated and high quality loads such as for this project. The design of the switching stations and electrical distribution systems are covered in the scope of works.

As betterment to the DPR concept, customised Compact Sub-Stations (CSS) are proposed to be used in project areas which shall form a part of the open ring system. These CSS shall be equipped with an 11kV SF6 insulated switchboard, oil type transformer with off load tap changer and LV board with switched capacitor bank. Customization shall be made to make CSS in vertical formation, so that any of the equipment that is, RMU, distribution transformer, and LT pane are separate and can be easily replaced. The customised CSS fabricated structure out of GI channels/ I section / angles / GI wire mesh/ MS sheet of 2 mm thick or more. The scope of work include, design, preparation of drawing and submit and get the approval from PSPCL, fabrication of sample and obtain the approval from PSPCL before installation of the CSS in the field.

All these items shall be enclosed in a rust proof enclosure.

All HV/11KV power distribution to secondary substations (CSS) shall be installed in underground concrete duct banks. The size, cross section, location and configuration of the duct banks shall be determined during preliminary and detailed design phases. Electrical cables on the low voltage side, from the 11KV transformer to the final building/facility location, shall be installed in appropriate conduit (as specified in technical specifications) but will not be required to be encased in protective concrete.

11kV HV supply shall be stabilised at the source substation which feeds the main, through on load tap changer (OLTC), with ±10% voltage variation in steps of 1.25%.

Each CSS shall include its own power supply unit (including required auxiliary power transformer, batteries, and battery charger), which shall provide a stable power source for not only the CSS, but also the FRTU and Ethernet switch that the it must be capable of housing.

### 5.2.5 APPLICABLE STANDARD

| STANDARDS | STANDARD DESCRIPTION |
|---|---|
| **IEC 60529** | Classification of degrees of protection provided by enclosures of electrical equipment |
| **IEC 60298 A.C** | metal-enclosed switchgear and control gear for rated voltages above 1KV and up to and including 72KV |
| **IEC 1330** | High voltage/Low voltage prefabricated substations |
| **IEC 60694** | Common specification for HV switchgear standards |
| **IEC 60265** | High-voltage switches-Part 1: Switches for rated voltages above 1kV and less than 52 kV |
| **IEC 6081** | Monitoring and control |
| **IEC 60185** | Current Transformers |
| **IEC 60186** | Voltage transformers |
| **BS 159** | Busbar |
| **IEC 60137** | Bushings |
| **CP 1013(British Code of Practice)** | Earthing |
| **IEC 60255** | Specification for Static Protective Relays |
| **BS 6231** | Wires and wiring |
| **BS 729** | Galvanising |
| **IEC 61000** | Electromagnetic compatibility Standard Description |
| **IEC 60129** | Alternating current Disconnector (isolators) and earthing switches |
| **IEC 62271-100** | Circuit Breakers |
| **IEC 60060-1 BS 923** | High Voltage test technique |
| **IEC 60056** | Vacuum Interrupter |
| **IEC 60034-1** | Motors |
| **IEC 60623** | Open Ni-Cd prismatic rechargeable cell |
| **IEC 60947-4-1** | Control Gears |
| **IEC 376** | Filling of SF6 gas in RS 1.6 Environmental Conditions |
| **IS 1180 Part 1** | Distribution Transformer from 250KVA to 2500KVA |

#### *5.2.5.1 11KV RMU - CONFIGURATION*

- 3-way, 11KV RMU with 2Nos 630A load break switch and 1No. VCB of suitable rating

- 4-way,11KV RMU with 2Nos 630A Load break switches and 2Nos , VCB of suitable rating
- 5-way,11KV RMU with 2Nos 630A Load break switches and 3Nos , VCB of suitable rating
- 7-way,11KV RMU with 2Nos 630A Load break switches and 5Nos , VCB of suitable rating

This Specification provides for design, manufacture, inspection and testing before dispatch, packing and delivery F.O.R.(Destination) of RMUs with necessary take off terminal units for future automations, compatible with SCADA system other accessories and auxiliaries equipment and mandatory spares, described herein and required for their satisfactory operation.

The objective of the RMUs is for extremely small construction width, compact, maintenance free, independent of climate, easy installation, operational reliability, Safe and easy to operate, minimum construction cost, minimum site work and minimum space requirement.

The RMUs shall conform in all respects to high standards of Engineering design, workmanship and latest revisions of relevant standards at the time of offer.

The type of the 11 KV circuit breaker shall be VCB and insulating medium for load break isolators, Earth switch, 11 KV Buses and Necessary current sensors / transformers for protection and metering (wherever required).

- All necessary dry (potential-free) contacts for indications relevant to RMU monitoring
- status and control.
- A PT Panel including auxiliary power transformer for measurement of system voltage and for charging the batteries.
- Battery and battery charger, to provide stable as per motor rating, 24 VDC, power for the RMU's motors.
- Capacitor voltage dividers serving live-line cable indicators.

#### *5.2.5.2 RMU OUTDOOR METAL CLAD ENCLOSURE.*

The RMU enclosure must be a metallic, it shall follows an industrialized process of manufacturing. The RMU and combination shall be tropicalised and outdoor metal enclosed type. The RMU metal parts shall be of high thickness, high tensile steel which must be grit/short blasted, thermally sprayed with Zinc alloy, phosphate or should follow the 7 tank pre-treatment process and be subsequently painted with polyurethane based powder paint. The overall paint layer thickness shall be not less than 80 microns.

The rating of enclosure shall be suitable for operation on three phase, three wire, 11 KV, 50 cycles,

System with short-time current rating of 20KA for 3 seconds for 11 KV with RMU Panels.

The enclosure should have two access doors one for the operation and relay monitoring and other for the cable access. Both the doors should have the locking facility to prevent the access

to operating mechanism to avoid unauthorized operating of RMU and relay.

#### *5.2.5.3 RMU DESIGN FEATURES*

All design features of the proposed RMU, as described in the supplier's bid and in the bid's reference materials, shall be fully supported by the equipment actually delivered. The key design features include those that relate to:

- Maintainability, expandability, and life span
- Ability to operate in severe outdoor environmental conditions.
- Immunity to electrical stress and disturbance.
- Acceptable insulation properties.
- Convenient FRTU interconnection features.

**OUT DOOR RMU**

- Stainless steel enclosure for OUT DOOR RMU application. The manufacturers shall conform the normal current ratings mentioned in GTP at 45 deg. Ambient without derating or as per IEC Standard
- Enclosure with I.P.54 standard protection.
- Offered RMU must be extensible.
- Cable boxes shall be on Front sides.
- RMU ENCLOSURE MUST BE SHIELDED AGAINST SOLAR IRRADIATION AND TESTED FOR AMBIENT OF 45 DEGREE C. The manufacturers shall conform the normal current ratings mentioned in GTP at 45 deg. Ambient without derating, however, design for higher ambient temperature than 45 degree may be admissible.

#### *5.2.5.4 TAKE OFF TERMINAL UNITS FOR AUTOMATION:*

The RMU should be provided with necessary take off terminal units for automations, located in the front recesses / LV cubical of the RMU. The connectivity to the FRTU for SCADA purpose shall be provided. Refer Annexure-1 for general arrangement of the terminals.

#### *5.2.5.5 ISOLATORS (LOAD BREAK TYPE)*

The load break isolators for Incoming and Outgoing supply must be provided. The load break isolators shall consist of 630 Amp fault making/load breaking spring assisted ring switches, each with integral fault making earth switches. The switch shall be naturally interlocked to prevent the main and earth switch being switched "ON at the same time. The selection of the main and earth switch is made by a lever on the facia, which is allowed to move only if the main or earth switch is in the off position. The load break isolators should have the facility for remote operation. Each load break switch shall be of the triple pole, simultaneously operated, automatic type with quick break contacts and with integral earthing arrangement.

The isolating distance between the OFF and the ON position in the isolator should be sufficient to withstand dielectric test as per IS/IEC, so as to have enough isolating distance for ensuring

safety during DC injection for Cable testing.

### *5.2.5.6 VOLTAGE INDICATOR LAMPS AND PHASE COMPARATORS*

The RMU shall be equipped with a voltage indication to indicate whether or not there is voltage on the cable. There should be a facility to check the synchronization of phases with the use of external device. It shall be possible for the each of the function of the RMU to be equipped with a permanent voltage indication as per IEC 601958 to indicate whether or not there is voltage on the cables.

### *5.2.5.7 EXTENSIBLE*

Each combination of RMU shall have the provision for extension by load break isolators / breakers in future, with suitable accessories and necessary Bus Bar. The equipment shall be well designed to provide any kind of extension / trunking chamber for connecting and housing extensible Busbars. Multiple devices inside single gas tank / enclosure will not be acceptable. In case of extensible circuit breakers, the Breaker should be capable of necessary short circuit operations as per IEC at 20 KA, and the Breaker should have a rated current carrying capacity of 200 A to 630 A.

### *5.2.5.8 EARTHING*

The RMU outdoor metal clad, Switch Gear, Load break isolators, Vacuum circuit breakers shall be equipped with an earth bus securely fixed along the base of the RMU.

The size of the earth bus shall be made of IEC/IS standards with tinned copper flat for RMU and M.S.Flat for Distribution Transformer, earth spike and neutral earthing. Necessary terminal clamps and connectors shall be included in the scope of supply.

All metal parts of the switchgear which do not belong to main circuit and which can collect electric charges causing dangerous effect shall be connected to the earthing conductor made of copper having CS area of minimum 75 sq.mm. Each end of conductor shall be terminated by M 10/equivalent quality and type of terminal for connection to earth system installation. Earth conductor location shall not obstruct access to cable terminations.

The following items are to be connected to the main earth conductor by rigid or copper conductors having a minimum cross section of 75 mm (a) earthing switches (b) Cable sheath or screen (c) capacitors used in voltage control devices, if any.

The metallic cases of the relays, instruments and other panel mounted Equipment s shall be connected to the earth bus by independent copper wires of size shall be made of IEC/IS standards. The colour code of earthing wire shall be green. Earthing wires shall be connected on the terminals with suitable clamp connectors and soldering shall not be permitted.

### *5.2.5.9 INSPECTION:*

The inspection may be carried out by the PSPCL at any stage of manufacture. The supplier shall grant free access to PSPCL’s representative at a reasonable time when the work is in progress. Inspection and acceptance of any equipment under this specification by the PSPCL shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be

defective.

The supplier shall keep the PSPCL informed in advance, about the manufacturing programme so that arrangement can be made for inspection. The PSPCL reserves the right to insist for witnessing the acceptance/routine testing of the bought out items. The PSPCL has rights to inspect the supplier's premises for each and every consignment for type & routine test.

No material shall be dispatched from its point of manufacture unless the material has been satisfactorily inspected and tested / unless the same is waived by the PSPCL in writing.

### *5.2.5.10 QUALITY ASSURANCE PLAN:*

The bidder shall invariably furnish following information along with his offer / in case of event of order.

- Statement giving list of important raw materials including but not limited to
- Contact material
- Insulation
- Sealing material
- Contactor, limit switches, etc. in control cabinet.

Name of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested, list of test normally carried out on raw materials in presence of Bidder's representative, copies of test certificates.

- Information and copies of test certificates as in (I) above in respect of bought out accessories & raw materials.
- List of areas in manufacturing process, where stage inspections are to be carried out.
- Normally carried out for quality control and details of such tests and inspections.
- Special features provided in the equipment to make it maintenance free.
- List of testing equipment available with the Bidder for final testing of RMUs and associated combinations vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in the relevant schedule i.e. schedule of deviations from specified test requirements. The supplier shall, within 15days from the date of receipt of Purchase Order submit following information to the PSPCL.

List of raw materials as well bought out accessories and the names of sub-suppliers selected from those furnished along with offer.

- Necessary test certificates of the raw material and bought out accessories.
- Quality Assurance Plan (QAP) withhold points for PSPCL's inspection. The quality assurance plan and hold points shall be discussed between the PSPCL and supplier before the QAP is finalized.
- The supplier shall submit the routine test certificates of bought out items and raw material, at the time of routine testing of the fully assembled breaker.

### *5.2.5.11 11KV FAULT PASSAGE INDICATOR (FPI) WITH DCU*

**SCOPE**:

Supply of overhead Fault Passage Indicators (FPI) for overhead lines to be installed on 11 KV lines. The objective of this remote communicable FPI is to quickly identification of the faulty circuit and automatic update to the SCADA control center over remote communication. Fault Passage Indicators clipped on the overhead lines. One such device shall be clipped on each phase so that to measure current and Voltage presence in this phase and compute fault detection algorithm accordingly. A short-range radio interface shall be embedded in this Fault Passage Indicator so that to allow it communicate with the Data Concentrator interface This specification applies to a system allowing to remotely monitor appearance of faults on an Overhead High Voltage network so that to localise faulty sections and send patrols for reconfiguration of the network accordingly.

The system shall be made of:

- Fault detection systems with wireless communication to be installed on Medium Voltage Overhead Electric networks, as specified in this document.
- An application software is to be installed on a PC in the control centre so that to display the information from these Fault passage indicators. This shall be referred to as Fault Monitoring software. This software with registry address & stored data shall be readable integrating with 104 SCADA.

Alternatively the information through IEC-104 protocol from all FPIs to be integrated with SCADA/DMS under implementation in coordination with SIA.

**PURPOSE:**

To locate the exact passage of faults on overhead lines. The FPI shall indicate both transient as well as permanent faults on the O/H lines .

The Fault Passage Indicators shall be designed to be clipped on the Overhead MV line. 3 Fault Passage Indicators shall be clipped on one line, one on each phase. It shall include the following functions:

- Measurement of current running in the phase it is clipped on
- Detection of Voltage absence/presence on the phase it is clipped on
- From the 2 previous functions, detection of phase-to-phase and phase-to-earth faults
- Short-range radio communication with a Data Concentrator interface at a minimum distance of 100m at least.

It shall be self-supplied from a non-rechargeable battery of a minimum life time 8 years, in the temperature conditions specified in this specification, including at least 1 short range radio communication with the Data Concentrator interface.

The Fault Passage Indicators shall be suitable for outdoor use in the tropical climate condition stipulated in the relevant paragraph. The components used in the Fault Passage Indicators shall be suitably protected from direct sunlight to prevent malfunctioning due to solar radiation. The

maximum operating temperature shall not be less than 70° C. The Fault Passage Indicators shall be suitable for mounting on live line conductors of a diameter ranging between 5 and 25 mm, with clamps designed so that the Fault Passage Indicator can withstand winds of 150km/h without falling from the line. The Fault Passage Indicator shall be fully self-contained type without any external connection, indicator or sensors. The Fault Passage Indicators shall be suitable for use on multiple lines supported by the same pole.

## Wireless communication Fault detection systems

### General information System parameters

The Fault detection systems shall be designed to operate on a Medium Voltage overhead network with the following characteristics:

- Nominal Operation Voltage 7 to 13 kV
- Frequency 50 Hz
- Type of MV neutral earthing: through a resistor or solidly grounded
- Conductor diameter 5 to 25 mm

One single product shall be proposed to cover the whole range of above characteristics: Particularly, the same product should be installed on any network from 7 to 13 kV.

**OPERATION***:*

The Fault Passage Indicator shall operate on either passing over of the absolute threshold current (user settable) or the current variation (di/dt).

Upon the installation of the indicator, the FPI shall adjust itself to the network frequency and voltage of perform required function.

**OPERATIONAL** *SPECIFICATIONS*

Fault detection shall be performed by the Fault Passage Indicator described above. Fault sensing shall be made from current measurement and Voltage presence detection, based on detection of the electromagnetic field and its variations.

The Fault Passage Indicator shall be of the programmable type, suitable for sensing:

Short-circuit faults, Low earth leakage faults (referred to as “unbalance”) phase-to-phase faults Phase-to-earth faults

Event time-stamping

Any change of state of information shall generate a time-stamped event stored in the Data Concentrator memory. The event storage capacity shall be at least 100 events.

**FAULT** *TYPES:*

The FPI shall detect and indicate both earth faults as well as phase to phase faults. In addition to this, the FPI shall also detect and indicate transient and permanent faults.

**INRUSH** *RESTRAINT:*

The FPI shall be equipped to filter out the inrush current due to transformer magnetizing currents thus avoiding the possible false indication of faults.

**RESET***:*

Once the fault is cleared, the FPI shall reset itself upon the power return, it shall also have a facility of resetting with settable time duration and the manual reset.

**TRANSIENT** *FAULT EVOLUTION:*

If FPI is busy in flashing on transient fault and if the permanent fault occurs, the FPI shall automatically change the priority and shall start flashing differently to show the permanent fault; thus helping maintenance crew to review the priorities.

*Salient* **Technical** *Features of FPI*

Offered 11 kV Clip-on / Pole mounting, Remotely monitored ,Outdoor unit Fault Passage Indicator (FPI) should have compatibility with OPEN PROTOCOL SCADA system.

- It should operate on either passing over of the absolute threshold current (user settable) or the current variation(di /dt)
- It should adjust itself to the network frequency and voltage to perform required function.
- It should detect and indicate both earth faults as well as phase to phase faults
- It should also detect and indicate transient and permanent fault
- It should be equipped to filter out the inrush current due to transformer magnetizing currents thus avoiding the possible false indication of faults
- Once the fault is cleared, the FPI shall reset itself upon the power return. It shall also have a facility of resetting with settable time duration and the manual reset
- If FPI is busy in flashing on transient fault and if the permanent fault occurs, the FPI shall automatically change the priority and shall start flashing differently to show the permanent fault; thus helping maintenance crew to review the priorities
- The lithium battery provided inside the FPI should be trouble free of 10 years life and replaceable type, in the case of battery failures and
- The FPI should have some self-test possibility usable when the FI is on the line (powered or not)
- Installation of FPI should be possible on live lines using an isolated hot stick with shot gun type termination
- It should support communication system SNMP, Master station(s) using 60870-5-104protocol, protocol over 3G/GPRS , and forming IPSec VPN based security.
- Short range radio communication with a Data concentrator interface at a minimum distance of 100m at least.
- Monitored information configurable as “alarming” shall include at least the following, consisting both of HV network diagnostic information and monitoring equipment internal faults for self-diagnostic purpose:
- Fault detection appearance with indication of Fault Passage Indicator reporting the fault and tripping criteria tripped.
- Fault detection disappearance with indication of Fault Passage Indicator reporting the fault and tripping criteria tripped clear.

- Voltage absence
- Voltage presence
- Change of state of a digital input
- Fault Passage Indicator absent (failure of the Data concentrator interface to communicate with it through short range radio)
- Fault Passage Indicator battery low

### *5.2.6 GTP*

GTP of distribution feeder pillar box shall be as per Annexure 2.

| **Guaranteed Technical Particulars (GTP)**<br>**Feeder Pillar** | | |
|---|---|---|
| **Sr** | **Description** | **Details** |
| **A** | **General** | |
| 1 | Name of Manufacturer | As per list of manufacturers |
| 2 | Product Designation | Feeder Pillar |
| 3 | Product Details | Multi Way Feeder Pillar – 415 V<br>With Vertical Switch Fuse Unit arrangement |
| 4 | Configuration | Incomer and Outgoing as per given Drawings and SLD |
| 5 | Incoming Circuit | With vertical switch fuse unit with IEC/EN60947-1/-3/ VDE 0660T-107 |
| 6 | Outgoing Circuit | With vertical switch fuse unit with IEC/EN60947-1/-3/ VDE 0660T-107 |
| 7 | Incoming fuse configuration | IEC/EN 60947-1 |
| 8 | Outgoing fuse configuration | IEC/EN 60947-1 |
| 9 | Vertical SFU make | Raychem / Hagger / Schneider / TE connectivity |
| 10 | Outgoing / Incomer cable connection | Suitable for cable connection |
| 11 | Type of termination | In V-clamp without use of crimping socket |
| 12 | Application of product | Outdoor |
| a | Humidity | 90% maximum |
| b | Ambient temperature | Average 35" C, Maximum 48" C |
| **B** | **System Information** | |
| 1 | Rated Voltage | 415V ±10% Between Ph-Ph |
| 2 | No. of phases | 3 No’s |
| 3 | Frequency | 50 to 60 Hz |

| C | **Busbar configuration** | |
|---|---|---|
| 1 | Material for phase & neutral busbar | EC grade Aluminum E91 as per IS 5082 |
| 2 | Current rating of phase busbar | As per BOQ & SLD |
| 3 | Configuration | 3Phase+1Neutral busbar (R-Y-B coded). Horizontallymountedat185mmdistance |
| 4 | Neutral busbar | Full Rated |
| 5 | Dimensions of Phase & Neutral Busbar | 80X 10 mm |
| 6 | Earth Bus | 50 X 6 |
| **D** | **Pillar Construction** | |
| 1 | Material of enclosure | GI/Aluzinc withPUpaintsheet,2.00/1.60mmthick |
| 2 | Material of doors | GI / Aluzinc, with PU paint 2 mm thickness |
| 3 | Material of Gland plate | GI 3.0 thick |
| 4 | Door access | Front, two door, Min 110 degree opening |
| 5 | Door Hinges | Three internal Hinges per door (Hinges shall not be exposed grom out side |
| 6 | Locking arrangement | Locking shall be through key |
| 7 | Cable Entry | From bottom |
| 8 | Surface preparation for painting | 7 tank / 12 tank process |
| 9 | Painting | Powder coated PU paint with min 65-80 micron Thickness |
| 10 | Color | Light grey shade RAL 7035 |
| 11 | Degree of protection | IP55 |

| | | |
|---|---|---|
| 12 | Panel Dimensions (H x W x D) | AS approved |
| **E** | **Test / Operational Requirement** | |
| 1 | Main bus bar short circuit withstand capacity | 50 kA for 1 Sec |
| 2 | Verification of dielectric properties | 2000V /1 minute |
| 3 | Impulse withstand voltage | 20kV |

### *5.2.7 11 KV XLPE INSULATED CABLES*

#### *5.2.7.1 SCOPE:*

The scope of this specification covers the design, manufacture, stage inspection at works, inspection and testing the finished ISI marked 11KV 300 Sq.mm power cables stranded compact circular aluminium conductor, conductor screened with extruded semiconducting compound, Extruded XLPE insulated, insulation screened with extruded semi conducting compound in combination with copper tape, cores laid up inner sheath must be extruded type of PVC ST2, galvanized steel flat strip armoured and overall PVC sheathed cable confirming to IS 7098/P2/2011.

#### *5.2.7.2 RATED VOLTAGE:*

The rated voltage of the cable shall be 11000 Volts AC with the highest system voltage of 28000 Volts between phases of the effectively earthed three-phase transmission system.

The cables shall be capable of operating continuously under the system frequency variation of ± 3 Hz, voltage variation of ± 1 0% and a combined frequency voltage variation of ± 10%.

#### *5.2.7.3 APPLICABLE STANDARDS:*

Unless otherwise stipulated in the specifications, the latest version of the following Standards shall be applicable:

- IS 7098 (Part 2)-Cross-linked Polyethylene insulation for Cables.
- IS 8130-Conductors for insulated electrical cables and flexible cords.
- IS 10810(series)-Methods of tests for cables.
- IS 10418-Drums for electric cables.
- IS 3975-Specification for mild steel wires, strips and tapes for armouring of cables.
- IS 5831-Specification for PVC insulation sheath for electric cables.
- IS 10462-Fictitious calculation method for determination of dimensions of protective coverings of cables Part 1 - Elastomeric and thermoplastic insulated cables.

## *5.2.8 LT XLPE POWER CABLE*

### *5.2.8.1 SCOPE*

The specification covers, manufacture, testing, packing and delivery of 1100 Volts grade, Aluminium/copper conductor, XLPE insulated PVC sheathed multi core power cables and control cables.

Equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under hot and humid tropical climate, conducive to rust and fungus growth.

### *5.2.8.2 STANDARDS*

The specification covers the requirement of XLPE insulated Cables for Working Voltages up to and including 1100 Volts suitable for L.V. Side of Distribution Transformers and for any other L.V. use in 3-Phase (Earthed) System. The Cables shall conform broadly to the latest issue of the following standards including all addition, alternations and modifications thereof. 3.1 IS 7098(Part-I: 1988) Specification for XLPE insulated PVC Sheathed Cables for Working Voltages up to and including 1100 Volts. 3.2 IS : 8130: 1984 Specification for Conductors for Insulated Cable.

All tests carried out at works shall be furnished in six (6) copies for approval of the purchaser. The Cables shall be dispatched from works only after receipt of Purchaser's written approval of shop test reports.

### *5.2.8.3 SHAPE OF CABLES :*

All Cables shall be of circular/sector shaped with neutral conductor as per relevant IS

### *5.2.8.4 CONDUCTORS :*

Aluminium Conductor complying with IS:8130:1984 shall be used. The Conductors shall be stranded.

### *5.2.8.5 MANUFACTURER'S IDENTIFICATION*

The manufacturer's Name or Trade Mark shall be identified throughout the length of the Cable either by embossing on the sheath or by means of a tape bearing the following particulars.

- Manufacturer's Name or Trade Mark.
- Voltage Grade.
- Nominal Section & material of conductor and number of cores.
- Year of Manufacturer.
- Inscription for length of Cables at 1.0 meter interval.
- Name of the Purchaser :
- Marking 'ELECTRIC' shall be embossed/printed throughout the length of the Cable at 10 meter spacing.

### *5.2.8.6 DRAWING DATA & MANUAL :*

The following information shall be furnished:

- Manufacturer's leaflet giving constructions details, dimensions and characteristics of different Cables.

- Current rating of Cables including derating factor due to grouping, ambient temperature and type of various installations.
- Write up, sketch illustrating the manufacturer's recommendation for splitting, jointing and termination of Cables.
- List of Customers to whom the Cable of similar rating has been supplied.
- Type Test Report conducted on similar type of Cable from NABL/ Central Govt approved Accredited Testing Laboratory within 5 years from the due date of opening of Tender is to be submitted.
- Valid Calibration Certificate of instruments used for Testing purpose conducted by NABL accredited Laboratory.

### *5.2.8.7 TESTS AND TESTING FACILITIES*

All the type tests and routine tests shall be carried out in the manufacturer's works as per IS:7098(Part-I):1988 or latest amendment thereof.

The tests mentioned under 'Acceptance Tests' in the relevant IS shall be carried out as 'Acceptance Tests' In addition to above, the following tests for XLPE insulation and PVC sheath shall also be carried out as per IS:10810 during acceptance. a) Physical tests for insulation and sheath. i) Tensile strength and elongation at break. ii) Ageing test. iii) Shrinkage test. iv) Hot-deformation test. b) Fire Resistance test.

All tests shall be performed in presence of Purchaser's representative, if so desired by the purchaser. The Manufacturer shall give at least thirty (30) days advance notice of shop tests.

### *5.2.8.8 TYPE TESTS:*

All the type tests in accordance with IS: 1554 (Part-1)-1988, amended up to date. Type test certificates of similar cabled done not earlier than 5 years from the date of this order shall be submitted.

### *5.2.8.9 ROUTINE TESTS:*

All the Routine tests as per IS: 1554 (Part-1) - 1988 amended up to date shall be carried out on each and every delivery length of cable. The result should be given in test report.

### *5.2.8.10ACCEPTANCE TESTS:*

All Acceptance tests as per IS: 1554 (Part-1) - 1988 and modified up to date including the optional test should have been carried out on similar cables.

### *5.2.8.11PACKING AND MARKING:*

Cables shall be supplied in standard length of 500 meters with plus minus 5% (five percent) tolerance wound on non-returnable wooden drums of good quality.

The following particulars shall be properly legible embossed on the cable sheath at the intervals of not exceeding one meter throughout the length of the cable. The cables with poor and illegible embossing shall be liable for rejection.

- Manufacturer's name.
- Voltage grade.

- Year of manufacture.
- Successive Length.
- Size of cable
- ISI mark

Supplier should provide statistical data regarding cables of all sizes viz.-

- Weight of one meter of finished product of cable of various sizes and ratings.
- Weight of one meter of bare conductor used for cables of various sizes and ratings.

### *5.2.9 CABLING SYSTEM*

All HV and LV power cable shall be XLPE insulated, PVC sheathed, FRLS with anti-rodent coating with stranded aluminium conductor. All 11 KV cables LV cables from CSS to feeder pillar are laid in RCC cable trenches. The service cable from feeder pillar to consumers and street light cables are laid in HDPE / DWC duct pipe.

#### *5.2.9.1 MEASUREMENT OF INSULATION RESISTANCE:*

**Before and after jointing, the insulation resistance of both sections of cables shall be checked.**

#### *5.2.9.2 IDENTIFICATION:*

The identification of each phase shall be clearly and properly noted. The cables shall be jointed as per the design approved by the Employer based on the proposal submitted by the Contractor. Each cable shall have identification for phase and circuit at joint bays.

#### *5.2.9.3 MAKING A JOINT/ END TERMINATION:*

Comprehensive jointing instructions should be obtained from the manufacture of jointing/end kits and meticulously followed. The materials used in the joints/ end kits like ferrules, screen / armour continuity bonds, lugs etc., shall be of good quality and conform to standards. The jointing tools shall be appropriate and as per the requirement of jointing XLPE, PVC cables.

#### *5.2.9.4 CABLE TERMINATIONS:*

The cable terminations used are to be of outdoor type. The preparation of the cable end for installing the terminations and the precautions to be taken before fixing the terminations shall be followed as in the case of the cable jointing procedures. The instructions furnished by the termination manufacturer shall be strictly followed. All terminations shall be done by joint manufacturer's jointers or under their supervision. At cable terminating end, the following provisions for supply and erection are to be included.

A terminating structure should be provided where necessary for supporting the cable to be terminated (except at the ring main unit ends)

A sufficient length of spare cable shall be left in the ground, for future needs.

The rise of the cable immediately from the ground shall be enclosed in suitable size of PVC / GI pipe to

protect against direct exposure to the sun.

The cable shall be properly fastened to the support using non-metallic clamps.

Appropriate labels shall be fixed identifying the phase circuit, voltage and date of commissioning etc., on the cable supporting structure.

#### *5.2.9.5 RCC CABLE TRENCHES*

RCC cable trenches are constructed on both sides of the road for laying 11 KV ad 415 Volt cables. 11 KV cables are laid on the side of the road and 415 volt cables are laid along the property line. The 415 V cables from Compact substation to feeder pillars are laid ducts in RCC cable trench. Cable from feeder pillar to consumers and street light are laid in HDPE duct. 11 KV cables and 415 volt cables laid on GI cable trays. Suitable slope is maintained for easy flow of water in the cable trench. Automatic water pumping system with level sensor is installed for draining water.

#### *5.2.9.6 MOULDED CASE CIRCUIT BREAKERS*

Moulded case circuit breakers shall comply with IEC 60947.2 & 13947 part 2. They shall have the voltage and current ratings of 440 Volt & 200 Amp respectively whereas short circuit breaking capacity and rated short – time withstand current should be as indicated below.
The breaking capacity performance certificates shall be available for category A to the above mentioned standards. The test shall be carried out under the breaking performance during the ultimate breaking capacity (Icu), Ics rating=100% Icu. Certificate for all the sequences (Sequence 1 mandatory) should be available.'
MCCB's shall be of the independent manual closing air-break type, rated for an uninterrupted duty. Auxiliary facilities, including power closing and under voltage releases, shall be provided as indicated. Each MCCB shall have a facility for padlocking in the "OFF" position. Necessary set of CT's together with an ammeter and selector switch as specified. Necessary inter-connections to bus bars. Necessary isolating plugs and sockets for front operated switches to enable withdrawing the entire unit and replacing with another unit disconnecting the cable for maintenance operation. Each MCCB shall provide with a rotary operating mechanism.

#### *5.2.9.7 PAINTING*

All sheet steel shall undergo a process of degreasing, pickling in acid, cold rinsing, phosphating, passivating and then sprayed with a high corrosive resistant primer. The primer shall be baked in an oven. The finishing treatment shall be by application of two coats of epoxy paint of approved colour and stoved.

#### *5.2.9.8 TESTS AT MANUFACTURERS WORK*

All routine tests specified in IS: 8623:1977 shall be carried out and test certificates produced to the Engineer-in-charge. Typical type test certificate shall be furnished.

#### *5.2.9.9 STATUTORY APPROVAL*

Obtaining Approvals & Consents from relevant authorities like Chief Electrical Inspectorate, State Electricity Board, PTCC, all statutory agencies etc like PWD , NHA etc. However, any statutory fees paid by the contractor shall be reimbursed against sub-mission of documentary proof.

#### *5.2.9.10 SAFETY*

Work is to be done on substations in operation; therefore, the following factors are of paramount importance:

(a) Minimization of outage time

(a) Adaptation to operational constraints. All the work shall be conducted in adhere to all instructions and safety rules approved by the PSPCL/Amritsar Smart City Engineer –in-Charge.

#### *5.2.9.11 SPARES*

Recommended spares: The Tenderer shall furnish in his offer a list of recommended spares with unit rates for each set of equipment that may be necessary for satisfactory operation and maintenance of circuit breaker and Isolators for a period of 5 years. The purchaser reserves right of selection of items and quantities of these spares to be ordered. The cost of such spares shall not be considered for tender evaluation.

#### *5.2.9.12 TOOLS*

The Tenderer shall submit a list and unit rates of all the special tools, equipment and instruments required for erection, testing, commissioning and maintenance of all electrical equipments. The purchaser shall decide the quantity of tools to be ordered. Prices of these tools shall not be considered for tender evaluation. However, the list of necessary tools/equipment which will be supplied free of cost with each equipment may be furnished separately.

#### *5.2.9.13 TRAINING*

Provide training on CSS equipments etc. to the operation and maintenance staff of PSPCL/ Client.

#### *5.2.9.14 LIST OF PREFERRED MANUFACTURERS*

The material shall be approved from PSPCL before execution. PSPCL approved vendor list shall be priority to the mentioned below “Preferred Equipment Manufacturers”.

| S.No. | Description | Make |
|---|---|---|
| 1. | 11/0.4kV Distribution Transformer (As part of packaged RMU substation) | Siemens / Crompton / ABB / Schneider / L&T / C&S |
| 2. | SF6 gas insulated 11kV RMU (As part of packaged substation) and Outdoor RMU +_FRTU | Siemens / Crompton / ABB / Schneider / L&T / C&S |
| 3. | Compact Substation (OEM Factory) | Siemens / Crompton / ABB / Schneider / L&T / C&S |
| 3a | Feeder Remote Terminal Unit (FRTU) &<br>Fault Passage Indicator (FPI) | Siemens / Crompton / ABB / Schneider / L&T / C&S |

| S.No. | Description | Make |
|---|---|---|
| | Protection Relay & Meters and multifunction meters<br>integral part of CSS | |
| 4. | LT Switch Board | CPRI approved |
| 5. | CTs and PTs | AE / Kappa / Siemens / Crompton / ABB / Schneider |
| 6. | Insulators | BHEL / Jai Shree / WSI |
| 7. | Numerical Type Protection Relays (for 66kV & 11V Panels at substation level) | ALSTOM / Siemens / ABB / Schneider / L&T |
| 8. | DC batteries / POWER PACK | Exide / Amar-Raja / HBL |
| 9. | Battery Chargers | Amar-Raja / Exide / AE /HBL |
| 10. | L.T. & Control Cables | CCI / Universal / KEI / Finolex /Polycab / Havells |
| 11. | Lighting Cables | CCI / Universal / KEI / Finolex /Polycab / Havells |
| 12. | Lighting Fixtures | Phillips / Bajaj / Crompton / Wipro /Jaquar/Crompton/Havells or as approved |
| 13. | H.T. & L.T. termination kits | Raychem / Denson/ TE |
| 14. | Light Poles | Bajaj / Valmont / Sumip or as approved |
| 15. | Smart Energy Meters | ABB / Schneider / L&T / Secure Meters / HPL |
| 16. | Mild Steel and High Tensile Steel | SAIL / Tata Steel |
| 17. | Bolts, nuts & spring washers | GKW or as approved |
| 18. | HV and LV bushings | BHEL / Jayshree / WSI / CGL / SSB |
| 19. | Cable Glands | HMI / Gripwel / Comet/ raychem |
| 21. | Cable lugs | Dowell's / AMP (Tyco Electronics) |
| 22. | PVC terminals & terminal blocks | ELMEX / ESSEN / Phoenix |
| 23. | Annunciators | Minilec or as approved |
| 24. | Semaphore | ALSTOM / ABB / Siemens / Schneider |
| 25. | Modular type switches | North West / MK / MDS / Schneider / |

| S.No. | Description | Make |
|---|---|---|
| | | Legrand |
| 26. | Indicating meters | Siemens/ Schneider/ABB |
| 27. | Pushing button & indicating light | L&T / BCH / Siemens / C&S |
| 28. | Selector & Control Switches | ALSTOM / Siemens/Schneider |
| 29. | ACB & MCCB | Siemens / ABB / Schneider/L&T |
| 30. | Switch Sockets & Modular type receptacles | BCH / MDS / Crompton / Schneider |
| 31. | MCB | Siemens / ABB / Schneider/L&T |
| 32. | MCB distribution board | Siemens / ALSTOM / Schneider |
| 33. | Lighting panels | MDS / Siemens / L&T / Schneider |
| 34. | Indicating Lamps | Siemens / BCH / / Schneider |
| 35. | Contactors | L&T / Siemens / ALSTOM / Schneider |
| 36. | Portable Fire Extinguishers | Minimax / Mather Platt / Ceasefire |
| 37. | SCADA including Communication equipment & FRTU | ALSTOM / Schneider / ABB / Siemens |
| 38. | DG Set with AMF Panel | Cater Pillar / Kirloskar / Sudhir / Jakson / Sterling & Wilson |
| 39. | Underground HDPE Ducts | Duraline, Bajaj, Reliance |
| 40. | Fibre Optic cables | Usha Martin/ RPG/Finolex/Legrand/AMP |
| 41. | Feeder Pillar | CPRI Approved |
| 42. | APFC Panel | Epcos, Siemens, ABB, Schneider, Legrand, L&T, C&S |
| 43 | 11 KV covered conductor | Raychem/TE connectivity/Tyco/Hagger |
| 44 | Vertical SFU | ABB/ Schneider/Raychem |
| 45 | UPS system | API, Numeric, Amararaja, Aplab/ Microtek, Red Phase |
| 46 | 11kV Cables | CCI / Universal / KEI / Poly cab / Havells |