



Jaipur Development Authority, Jaipur

Engineering Procurement and Construction (EPC)

Agreement

For

**Ramniwas Bagh Underground Parking Project
Phase-II, Jaipur**



Jaipur Development Authority, Jaipur



Engineering Procurement and Construction (EPC) Agreement For Ramniwas Bagh Underground Parking Project Phase-II, Jaipur

Bid Reference No.

Bidding Document

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DISCLAIMER

The participating bidders are informed through sale of Bidding Documents and under disclaimer of bid documents, Volume-I as under:-

- (a) The interested bidder should make its own independent assessment and seek its own professional, technical, financial and legal advice.
- (b) The information provided in the bid documents has been prepared in good faith; it is not and does not purport to be comprehensive or to have been independently verified. Neither JDA, nor any of its officers or employees, nor any of their advisers nor consultants accept any liability or responsibility for the accuracy, reasonableness or completeness of, or for any errors, omissions or misstatements, negligent or otherwise, relating to the proposed parking project, or makes any representation or warranty, express or implied, with respect to any written or oral information made or to be made available to any of the recipients or their professional advisers and, so far as permitted by law and except in the case of fraudulent misrepresentation by the party concerned, and liability therefore is hereby expressly disclaimed.
- (c) The information contained in the bid documents is selective and is subject to updating, expansion, revision and amendment that a recipient may require. Neither JDA nor any of its officers, employees, nor any of its advisors nor consultant undertakes to provide any recipient with access to any additional information or to update the information in bid documents or to correct any inaccuracies therein which may become apparent. Each recipient must conduct its own analysis of the information contained in bid documents or to correct any inaccuracies therein which may become apparent. Each recipient must conduct its own analysis of the information contained in bid documents or to correct any inaccuracies therein that may contain in bid documents and is advised to carry its own investigation into the proposed parking project, the legislative and regulatory regime which applies thereto and by and all matters pertinent to the proposed Project and to seek its own professional advice on the legal, financial, regulatory and taxation, consequences of entering into any agreement or arrangement relating to the proposed Project.
- (d) The bid documents includes certain statements, estimates, targets and forecast with respect to the parking project. Such statements, estimates, projections, targets and forecasts reflect various assumptions made by the management, officers and employees of JDA, which assumptions (and the base formation on which they are made) may or may not prove to be correct. No representation or warranty is given as the reasonableness of forecasts or the assumptions on which they may be based and nothing in bid documents is, or should be relief on as, a promise, representation or warranty. The estimate provided with the bid document is only for reference purpose. Actual assessment of cost for the work shall be carried out by participating bidder before online submission of bid.

जयपुर विकास प्राधिकरण, जयपुर

कमरा नं. जेबी-एफएफ-102, रामकिशोर व्यास भवन, इन्दिरा सर्किल जवाहर लाल नेहरू मार्ग, जयपुर-302004

दूरभाष : + 91-141-2569696, ई-मेल : vmjohari.jda@rajasthan.gov.in

क्रमांक:जविप्रा/अधि.अभि.(आर.ओ.बी/आर.यू.बी.-IV)/2020-21/डी-198 दिनांक: 26.11.2020

निविदा सूचना

निविदा सूचना: जविप्रा/अधि. अभि. (आर.ओ.बी/आर.यू.बी.-IV)/04/2020-21

जयपुर विकास प्राधिकरण द्वारा Engineering, Procurement & Construction (EPC) के आधार पर "Ram Niwas Bagh Under Ground Parking Project Phase-II, Jaipur " जिसकी अनुमानित लागत रु 95.00 करोड़ के लिए ऑनलाईन बिड्स दिनांक 29.12.2020 को सायं 6:00 बजे तक आमन्त्रित की जाती है। निविदा बोली का ऑनलाईन आवेदन व भुगतान जविप्रा पोर्टल पर करने की अन्तिम तिथि 29.12.2020 को सायं 6:00 बजे तक है। निविदा बोली के दस्तावेजों का विस्तृत विवरण www.sppp.rajasthan.gov.in, www.eproc.rajasthan.gov.in and www.jda.urban.rajasthan.gov.in पर देखा जा सकता है।

(UBN No.

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निविदा में भाग लेने वालों को निम्न शर्तों की पूर्ति करनी होगी।

1. निविदादाता जयपुर विकास प्राधिकरण की वेबसाइट www.jda.urban.rajasthan.gov.in पर पंजीकृत हो एवं निविदा में भाग लेने के लिए बोलीदाता को आवेदन करने के लिए दस्तावेज शुल्क, अमानत राशि, आर.आई.एस.एल. प्रोसेसिंग शुल्क ऑनलाईन जमा करनी होगी।
2. ऑनलाईन निविदा प्रस्तुत करने के लिए निविदादाताओं का राजस्थान सरकार के ई-प्रोक्यूरमेंट पोर्टल www.eproc.rajasthan.gov.in पर पंजीकृत हो।

अधिशायी अभियन्ता (आर.ओ.बी/आर.यू.बी.-IV)

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

Room No. JB-FF-102, Ram Kishore Vyas Bhavan, Indira Circle, Jawaharlal Nehru Marg, Jaipur – 302 004

Telephone: +91-141-2569696 Email:- vmjohari.jda@rajasthan.gov.in

No: - JDA/EE(ROB-RUB IV)/2020-21/D- 198

Dated: 26.11.2020

NOTICE INVITING BID

NIB No. : JDA/EE (ROB/RUB -IV)04/2020-21

Online Bids are invited up-to 6.00 PM of 29.12.2020 for **“Ram Niwas Bagh Uunder Ground Parking Project Phase-II, Jaipur”** on Engineering, Procurement & Construction (EPC) basis. Estimated cost is Rs 95.00 Crore. The last date for Applying Bid and making online payment on JDA portal is up-to time 6.00 PM of 29.12.2020. Details may be seen in the Bidding Document at our office or the State Public Procurement Portal website www.sppp.rajasthan.gov.in, www.eproc.rajasthan.gov.in and www.jda.urban.rajasthan.gov.in.

(UBN No.)

To participate in the bid, bidder has to be:

1. Registered on JDA website www.jda.urban.rajasthan.gov.in, for participating in the Bid, the Bidder has to apply for the Bid and pay the Bidding Document Fee, RISL Processing Fee and Bid Security Deposit, online only.
2. Registered on e-Procurement Portal of Government of Rajasthan www.eproc.rajasthan.gov.in for online e-Bid submission.

Executive Engineer (ROB/RUB -IV)

Copy to :-

1. PRO Cell, JDA, Jaipur through TA to DE (I) for publication in News paper.

Job No. JDA/EE RRP-2/A&F/2019-2020/Mar/188 dated 17.03.2020 for Rs 3,79,85,326

Executive Engineer (ROB/RUB IV)

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

Room No. JB-FF-102,, Ram Kishore Vyas Bhavan, Indira Circle, Jawaharlal Nehru Marg, Jaipur – 302 004

Telephone: +91-141-2569696 Email: vmjohari.jda@gmail.com

No: - JDA/EE(ROB /RUB -IV)/2020-21/D-198

Date:26.11.2020

NIB No. : JDA/EE(ROB/RUB IV)/04/2020-21

Name & Address of the Procuring Entity	➤ Name : Executive Engineer (ROB/RUB -IV), Jaipur Development Authority ➤ Address : Room No. 313-B , Nagrik Seva kendra, JDA Campus, Indira Circle, JawaharLal Nehru Marg, Jaipur- 302004 (Rajasthan) ➤ Email :
Subject Matter of Procurement	Ramniwas Bagh Underground Parking Project Phase-II, Jaipur on Engineering, Procurement & Construction (EPC) basis Job No. 2457/2019-20 dated 04.03.2020 of Jaipur Smart City Limited, Jaipur.
Bid Procedure	➤ Post qualification open competitive bidding as per e-Bid procedure at http://eproc.rajastha.gov.in
Bid evaluation Criteria (Selection Method)	➤ L1 (eg. Least Cost based Selection (LCBS)-L1)
Websites for downloading Bidding Document, Corrigendum's, Addendums, etc.	➤ Websites: www.sppp.rajasthan.gov.in , www.eproc.rajasthan.gov.in , www.jda.urban.rajasthan.gov.in
Website for online Bid application participation and payment *	➤ Website: www.jda.urban.rajasthan.gov.in ➤ For participating in the Bid, the Bidder has to apply for this Bid and pay the Bidding Document Fee, RISL Processing Fee and Bid Security Deposit, online only. ○ Bidding document fee: Rs. 10000/- Rupees (Ten Thousand Only) ○ RISL Processing Fee: Rs. 1000/- (Rupees One Thousand Only) ➤ Requisite Bid Security Deposit
Estimated Procurement Cost	INR 95.00Cr (Ninety Five Crores only)
Bid Security Deposit	➤ Amount (INR) : 1% of Estimated Procurement Cost of Rs 95.00 Cr i.e. Rs. 95.00 Lacs for contractor registered in equivalent in other department/private entity in JV with registered contractors. 0.5% of Estimated Procurement Cost of Rs 95.00 Cr i.e. Rs. 47.50 Lac for Contractor registered in AA Class in JDA. ➤ Bid security deposit may be submitted on line or by way of bank Guarantee (BG). In case bidder opt to submit bid security through BG, The BG should valid up to six months from the date of opening of the bid in prescribed format enclosed with bid documents. ➤ The bidder will provide details of BG No. ,issuing date , expiry date etc. on line tendering system of JDA ➤ The originally BG will be physically handed over in JDA to Executive Engineer of on line tendering system of JDA as detailed below .A copy of this BG to be attached with bid document during uploading .

Date/Time/Place of Pre-Bid	➤ 09.12.2020 at 11.00 AM in " Manthan", Third Floor, Main Building, Ram Kishore Vyas Bhavan, Indira Circle, Jawahar Lal Nehru Marg, JDA Campus, Jaipur or through video conferencing (VC) for which the interested bidders may intimate to Executive Engineer (RRP-II) Seven days (07) in advance.
Applying Bid and making Online Payment on JDA portal (www.jda.urban.rajasthan.gov.in)	➤ Start Date: 28.11.2020 at 10.00 AM ➤ End Date: 29.12.2020 at 06.00 PM ➤ In case EMD in from BG Original Bank Guarantee is to be submitted in Room No NB-III, 215B of DD (E&B) of Bank Building, Jaipur Development Authority by 30.12.2020 10.00 AM to 01.01.2021 up to 4.00 PM
Bid Submission on e-Procurement Portal of GOR (www.eproc.rajasthan.gov.in)	➤ Start Date: 28.11.2020 at 10.00 AM ➤ End Date: 29.12.2020 at 06.00 PM
Date/Time/Place of Technical Bid Opening	➤ 04.01.2021 at 11.00 AM in , Room No 313-B , Nagrik Seva Kendra, Ram Kishore Vyas Bhavan, Indira Circle, Jawahar Lal Nehru Marg, Jaipur- 302004 (Rajasthan)
Date/ Time/ Place of Financial Bid Opening	➤ Will be intimated later to the Technically qualified bidders
Bid Validity	➤ 120 days from the bid submission deadline
Completion period of work	➤ 30 Months

* Jaipur Development Authority has decided to receive Earnest Money Deposit (EMD) (Bid Security), Tender Fee and RISL processing fee online through JDA Portal. The bid security options available in tender for participants are as mentioned below:

A. Payment Options:

Option-1: Bank Guarantee (BG) against EMD / Bid Security

Bidder may opt Bank Guarantee (BG) against EMD (Bid Security), for which bidder requires to prepare BG before applying in the tender. The details of BG requires to be fed on JDA portal before paying balance amount (Tender Fee + RISL Processing Fee). This amount will be paid through Payment Gateway only, option to make balance payment through EFT (RTGS/NEFT) will not be available.

If bidder does not opt for BG against EMD, options of making complete payment through Payment Gateway or through EFT (NEFT / RTGS) will be available.

Option-2: Electronic Fund Transfer (EFT: NEFT/RTGS)

If the bidder selects payment mode as EFT (NEFT/RTGS), "Paying Slip for EFT (NEFT/RTGS)" will be generated by the system for the complete amount. The payment can be made from any Bank any Branch using this Paying Slip through NEFT/RTGS (Claim against payment made through EFT in any other JDA bank account will not be acceptable and bidder stands disqualified from participation in the bid applied for). After successful transaction through NEFT/RTGS, as per the standard procedures it may take 4 to 24 hours in process of confirmation of EFT through Auto-Process depending on the time of EFT done. Therefore, option to make payment through EFT (NEFT/RTGS) will be available till 48 hours prior to closing date of bid participation.

Option-3: Payment Gateway (Aggregator)

The facility to make payment through Debit Card, Credit Card, Net banking etc., will be available. User can use this facility from anywhere any time till the closing date & time of bid participation.

B. Bid Participation Receipt

After confirming payment, the bidder will get Bid Participation Receipt on the basis of which user will get the payment details along with other details for bidding on e-Procurement portal of GOR.

- In case of BG as the remaining payment will be done through Payment Gateway, on successful transaction the “Bid Participation Receipt” will be generated on real time basis.
- In case complete payment is done through Payment Gateway, on successful transaction the “Bid Participation Receipt” will be generated on real time basis.
- In case complete payment is done through EFT (NEFT/RTGS), on confirmation of payment from ICICI Bank (Auto Process) “Bid Participation Receipt” will be available on Login of Bidder on JDA portal.

Note:

1. Bidder (Authorised signatory) shall submit their offer on-line in Electronic formats both for technical and financial proposal.
2. In case, any of the bidders fails to pay the Tender Fee, BSD, and RISL Processing Fee, online (subject to confirmation), its Bid shall not be accepted.
3. To participate in online bidding process, Bidders must procure a Digital Signature Certificate (Type III) as per Information Technology Act-2000 using which they can digitally sign their electronic bids. Bidders can procure the same from any CCA approved certifying agency, i.e. TCS, Safecrypt, Ncode etc. Bidders who already have a valid Digital Signature Certificate (DSC) need not procure a new DSC. Also, bidders must register on <http://eproc.rajasthan.gov.in> (bidders already registered on <http://eproc.rajasthan.gov.in> before 30-09-2011 must register again).
4. JDA will not be responsible for delay in online submission due to any reason. For this, bidders are requested to upload the complete bid well advance in time so as to avoid 11th hour issues like slow speed; choking of web site due to heavy load or any other unforeseen problems.
5. Bidders are also advised to refer "Bidders Manual Kit" available at eProc website for further details about the e-Tendering process.
6. Training for the bidders on the usage of e-Tendering System (eProcurement) is also being arranged by DoIT&C, GoR on a regular basis. Bidders interested for training may contact e-Procurement Cell, DoIT&C for booking the training slot.
Contact No: 0141-4022688 (Help desk 10 am to 6 pm on all working days) e-mail: eproc@rajasthan.gov.in
Address : e-Procurement Cell, JDA, YojanaBhawan, Tilak Marg, C-Scheme, Jaipur
7. The procuring entity reserves the complete right to cancel the bid process and reject any or all of the Bids.
8. No contractual obligation whatsoever shall arise from the bidding document/ bidding process unless and until a formal contract is signed and executed between the procuring entity and the successful bidder.
9. Procurement entity disclaims any factual/ or other errors in the bidding document (the onus is purely 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.
10. The provisions of RTPPA Act 2012 and Rules 2013 thereto shall be applicable for this procurement. Furthermore, in case of any inconsistency in any of the provisions of this bidding document with the RTPPA Act 2012 and Rules thereto, the later shall prevail.

Executive Engineer (ROB/RUB -IV)

Process for Participation & Depositing Payment Online

JAIPUR DEVELOPMENT AUTHORITY, has decided to receive Bidding document fee, RISL Processing Fee and Bid Security Deposit (BSD) through online mode only for which the bidder has to get registered himself on JDA portal www.jaipurjda.org.

To participate in the bid, bidder has to be:

1. Registered on JDA website www.jaipurjda.org (by depositing Rs. 500.00 online, the validity of which remains 3 (three) years).
For participating in the Bid, the Bidder has to apply for this Bid and pay the Bid Document Fee, RISL Processing Fee and Bid Security Deposit, online only.
2. Registered on e-Procurement Portal of Government of Rajasthan www.eproc.rajasthan.gov.in for online e-Bid submission.

Methods for depositing on line amount

Option-1: Bank Guarantee (BG) against EMD / Bid Security

Bidder may opt Bank Guarantee (BG) against EMD (Bid Security), for which bidder requires to prepare BG before applying in the tender. The details of BG require to be fed on JDA portal before paying balance amount (Tender Fee + RISL Processing Fee). This amount will be paid through Payment Gateway only, option to make balance payment through EFT (RTGS/NEFT) will not be available.

If bidder does not opt for BG against EMD, options of making complete payment through Payment Gateway or through EFT (NEFT / RTGS) will be available.

Option-2: Electronic Fund Transfer (EFT: NEFT/RTGS)

If the bidder selects payment mode as EFT (NEFT/RTGS), "Paying Slip for EFT (NEFT/RTGS)" will be generated by the system for the complete amount. The payment can be made from any Bank any Branch using this Paying Slip through NEFT/RTGS (Claim against payment made through EFT in any other JDA bank account will not be acceptable and bidder stands disqualified from participation in the bid applied for). After successful transaction through NEFT/RTGS, as per the standard procedures it may take 4 to 24 hours in process of confirmation of EFT through Auto-Process depending on the time of EFT done. Therefore, option to make payment through EFT (NEFT/RTGS) will be available till 48 hours prior to closing date of bid participation.

Option-3: Payment Gateway (Aggregator)

The facility to make payment through Debit Card, Credit Card, Net banking etc., will be available. User can use this facility from anywhere any time till the closing date & time of bid participation.

C. Bid Participation Receipt

After confirming payment, the bidder will get Bid Participation Receipt on the basis of which user will get the payment details along with other details for bidding on e-Procurement portal of GOR.

- In case of BG as the remaining payment will be done through Payment Gateway, on successful transaction the “Bid Participation Receipt” will be generated on real time basis.
- In case complete payment is done through Payment Gateway, on successful transaction the “Bid Participation Receipt” will be generated on real time basis.

In case complete payment is done through EFT (NEFT/RTGS), on confirmation of payment from ICICI Bank (Auto Process) “Bid Participation Receipt” will be available on Login of Bidder on JDA portal.

While participation in the bid, a receipt will be generated through the system showing the submission details as per Bid Participation Receipt (Sample Enclosed). The bidder is required to fill the instrument numbers for various heads on e-Procurement portal www.eproc.rajasthan.gov.in as mentioned in the receipt.

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

SCHEDULE AND SPECIFICATIONS

Name of Work: - Ramniwas Bagh Underground Parking Project Phase-II, Jaipur

1.	NIB No.	:	EE (ROB/RUB-IV)/04/2020-21
2.	Approximate cost	:	₹ 95.00 Crore
3.	Cost of the Bid document	:	₹ 10000.00, Through On Line Payment only.
4.	Bid Processing Fees	:	₹ 1000.00 , Through On Line Payment only.
5.	Bid Security (In favors of Secretary, JDA, Jaipur.)	:	➤ Amount (INR): 1% of Estimated Procurement Cost of Rs 95.00 Cr i.e. Rs. 95.00 Lacs for contractor registered in equivalent in other department/private entity in JV with registered contractors. 0.5% of Estimated Procurement Cost of Rs 95.00 Cr i.e. Rs. 47.50 Lacs for Contractor registered in AA Class in JDA. ➤ Bid security deposit may be submitted on line or by way of bank Guarantee (BG). In case bidder opt to submit bid security through BG, The BG should valid up to six months from the date of opening of the bid in prescribed format enclosed with bid documents. ➤ The bidder will provide details of BG No. ,issuing date , expiry date etc. on line tendering system of JDA The originally BG will be physically handed over in JDA to Executive Engineer of on line tendering system of JDA as detailed below .A copy of this BG to be attached with bid document during uploading .
6.	Download of Bid document	:	From 28.11.2020, 10.00 AM to 29.12.2020 upto 6:00 PM
7.	Upload the Bid Document	:	From 28.11.2020, 10.00 AM to 29.12.2020 upto 6:00 PM
8.	Date of Pre Bid Meeting	:	09.12.2020 at 4.00 PM
9.	Date/Time/Place of Technical Bid Opening	:	04.01.2021 at 11.00 AM in , Room No 313-B, Nagrik Seva Kendra , Ram Kishore Vyas Bhavan, Indira Circle, Jawahar Lal Nehru Marg, Jaipur- 302004 (Rajasthan)
10.	Date/ Time/ Place of Financial Bid Opening	:	Will be intimated later to the Technically qualified bidders

11.	Physically BG submission start date	:	30.12.2020 at 10:00 AM
12.	Physically BG submission end date	:	01.01.2021 at 4:00 PM
13.	Last Date of submission of Bid cost, Bid Process cost & Bid Security.	:	29.12.2020 up to 6.00 PM through online only.
14.	Date of opening of Technical Bid	:	04.01.2021 at 11.00 AM (Room 313-B , Nagrik Seva Kendra, JDA Campus, Jaipur)
15.	Completion period of work	:	30 Months

SCHEDULE – A: INFORMATION USEFUL FOR THE BIDDERS:

The Bidder should see the site and fully understand the conditions of the site before bidding and include all lead, lift etc. for the material in his item rate/percentage to be quoted on the rates give in the Schedule ‘G’. The work shall be carried out in accordance with the Indian standard specification/ BIS specification and to the entire satisfaction of the Engineer–In–Charge of the work.

SCHEDULE – B: LIST OF THE DRAWING:

1. General Arrangement Drawing (GAD)

The other drawings may be seen in office of the undersigned.

SCHEDULE – C: LIST OF THE DRAWING TO BE SUPPLIED BY THE BIDDER:

List of the drawing to be supplied by the bidder -As per requirement of contract

SCHEDULE - D: TEST OF THE MATERIALS:

The testing of the materials and workmanship shall be conducted by the JDA staff as necessary. The result of such tests should confirm to the standard laid down in the Indian standard/BIS detailed specification. Qualified personnel as required duly approved by JDA shall have to be engaged at site by the contractor at his cost. The JDA reserves the right to engage such staff and recover the expenses from the contractor on such account in case of his failure to do so.

SCHEDULE – E: SAMPLES OF THE MATERIALS:

The sample of the materials to be used by the bidder shall be deposited 15 days in advance with the Engineer In charge and be got approval by him before use.

SCHEDULE - F: TIME OF COMPLETION:

The work should start within 10 days of issue of work order and complete within 30 months

SCHEDULE – G: ATTACHED SEPARATELY BASED APPROVED NON BSR ITEMS, JDA BSR ITEMS ETC.

SCHEDULE – H: SPECIAL CONDITION:

Attached Separately.

SCHEDULE – I: LIST OF MATERIAL TO BE SUPPLIED BY THE DEPARTMENT

NIL

SCHEDULE – J: COST OF BID DOCUMENTS, PROCESSING FEES & BID SECURITY.

The Bid processing fees payable to Managing Director R.I.S.L. & Cost of Bid documents & Bid Security is payable to Secretary, JDA, Jaipur will be accepted on line only Kindly refer "Instructions to Bidders" of the bid documents for process of online payment.

**Signature of the Bidder
With full Address**

**Executive Engineer (ROB/RUB -IV),
JDA, Jaipur**

SECTION I

INSTRUCTION TO BIDDERS (ITB)

Section-I : Instruction to Bidders (ITB)

Important Instruction: - The Law relating to procurement “The Rajasthan Transparency in Public Procurement Act, 2012” [hereinafter called the Act] and the “Rajasthan Public Procurement Rules, 2013” and modified thereof from time to time [hereinafter called the Rules] under the said Act have come into force which are available on the website of State Public Procurement Portal <http://sppp.raj.nic.in>. Therefore, the Bidders are advised to acquaint themselves with the provisions of the Act and the Rules before participating in the Bidding process. If there is any discrepancy between the provisions of the Act and the Rules and this Bidding Document, the provisions of the Act and the Rules shall prevail.

1.	General		
	1.1 Scope of Bid		In support of the Invitation to Bid indicated in the Bid Data Sheet (BDS), the Procuring Entity issues this Bidding Document for the procurement of works as named in the BDS and as Specified in Section V, Procuring Entity's Requirements.
	1.2 Interpretation		Throughout this Bidding Document: (a) The term “in writing” means communicated in written Form through letter, fax, e-mail etc. with proof of receipt. (b) If the context so requires, singular means plural and Vice versa; and “Day” means calendar day.
	1.3 Code of Integrity	1.3.1	Any person participating in the procurement process shall: - i. Not offer any bribe, reward or gift or any material benefit either directly or indirectly in exchange for an unfair advantage in procurement process or to otherwise influence the procurement process; ii. Not misrepresent or omit that misleads or attempts to mislead so as to obtain a financial or other benefit or avoid an obligation; iii. Not indulge in any collusion, bid rigging or anti- competitive behaviour to impair the transparency, fairness and progress of the procurement process; iv. Not misuse any information shared between the Procuring Entity and the Bidders with an intent to gain unfair advantage in the procurement process; v. Not indulge in any coercion including impairing or harming or threatening to do the same, directly or indirectly, to any party or to its property to influence the procurement process; vi. Not obstruct any investigation or audit of a procurement process; vii. Disclose conflict of interest, if any; and viii. Disclose any previous transgressions with any Entity in India or any other country during the last three years or any debarment by any other Procuring Entity.
		1.3.2	Conflict of Interest: A conflict of interest is considered to be a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations. A Bidder may be considered to be in conflict of interest with one or more parties in this bidding

			process if, including but not limited to: have controlling partners/ shareholders in common; or receive or have received any direct or in direct subsidy from any of them; or have the same legal representative for purposes of this Bid; or have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Procuring Entity regarding this bidding process; or The Bidder participates in more than one Bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which the Bidder is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a Bidder, in more than one Bid; or the Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the Works that are the subject of the Bid; or The Bidder or any of its affiliates has been hired (or is proposed to be hired) by the Procuring Entity as Engineer-in-charge/ consultant for the Contract.
		1.3.3	The Bidder shall have to give a declaration regarding compliance of the Code of Integrity prescribed in the Act, the Rules and stated above in this Clause along with its Bid.
		1.3.4	Breach of Code of Integrity by the Bidder: - Without prejudice to the provisions of Chapter IV of the Rajasthan Transparency in Public Procurement Act, in case of any breach of the Code of Integrity by a Bidder or prospective Bidder, as the case may be, the Procuring Entity may take appropriate action in accordance with the provisions of sub-section (3) of section 11 and section 46 of the Act.
	1.4 Eligible Bidders	1.4.1	A Bidder may be registered in JDA in AA category or registered in appropriate equivalent class in other department/ Private Entity or PSU or, any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture [JV]
		1.4.2	JOINT VENTURE: In case the bidder comprises a joint venture or consortium, following requirements shall also be complied with: The JV will have to be formed before submission of the bid and total number of JV partners shall not exceed 2 (Two). They must designate lead partner duly authorized by all the members who will represent the J.V. Any of the two partners can be a lead partner. The lead partner shall be nominated as being partner-in-charge and this authorization shall be evidenced by submitting power of attorney signed by the legally authorized signatories of all the partners. The partner-in- charge (or, the lead partner) shall be authorized to incur liabilities and to receive instructions on the behalf of the partners of the Joint Venture, whether jointly or severally, and entire execution of the contract (including payment) shall

		be carried out exclusively through the partner-in-charge. The share of one of the two partners shall not be less than 26% and rest of the share shall be held by other partner (For example if share of one partner is 26% then for other partner it will be 74%.) The JDA will only send communication to the lead partner, which will be deemed to have been sent to all the J.V. partners. Similarly, any negotiation and / or agreement with the lead partner shall be deemed to have been concluded with all the J.V. partners. All the members of J.V. shall be bound by the said communication and all acts/ deeds of the lead member. Any one of the two partners, alone, should fulfill the Technical Criteria laid down in section –III: Evaluation and qualification, clause 2(a) & 2(b) of Special Conditions. Similarly, any one of the two partners, alone, should fulfill the Financial Criteria laid down in clause 2(c), 2(d) & 2(e) of Special Conditions. For rest of the eligibility criteria, qualifications of the two partners may be clubbed together. The individual partner of J.V. alone or with other partners cannot participate in the same bid. For calculation of bid capacity, turn over and work liability of all the firms of joint venture shall be considered together. Attested copy of the MoU / Agreement/ Power of attorney entered into by the joint venture / consortium members duly notarized shall be submitted along with the Technical Bid with intended percentage participation nomination of lead member and division of responsibility to clearly define the work of each member etc. All the members of the joint venture/ consortium shall be jointly and severally liable for the execution of the Contract. In the event of default by any member of the joint venture/ consortium in the execution of his part of the contract, the partner-in-charge will have the authority to assign the work to any other party acceptable to the employer to ensure the execution of the part of contract. If initially the bid has purchased and submitted by the any partner or by the JV firm, in case JV bid accepted, the work order will be issued in favour of name of JV and the bidder will submit details of JV bank account to which payment is to be deposited by JDA. The experience certificate will be issued as per percentage of the shareholders defined in JV agreement of the two partners.
	1.4.3	A Bidder/JV constituting the bidder, shall have the nationality of India. In case of International Competitive Bidding or Joint Venture, Consortium or Association [where permitted], the nationality of the Bidder and all parties constituting the Bidder shall be of India or an eligible country declared as such by Government of India. A Bidder shall be deemed to have nationality of a country if the Bidder

			is a citizen or constituted or incorporated, and operates in conformity with the provisions of the Laws of that country. This criterion shall also apply to the determination of the nationality of proposed Sub-Contractors or suppliers for any part of the Contract including related services
		1.4.4	A Bidder should not have a conflict of interest in the procurement in question as stated in the RTPP Rule 81 and this Bidding document.
		1.4.5	A Bidder debarred under section 46 of the RTPP Act shall not be eligible to participate in any procurement process undertaken by any Procuring Entity, if debarred by the State Government; and a Procuring Entity, if debarred by such Procuring Entity.
		1.4.6	The Bidder must be a registered Contractor in appropriate class with the Department/ Organization or any other Department/ Organization. He shall furnish necessary proof for the same. PSU can participate in tender. Private Entity in joint venture with any contractors registered in class "AA" in JDA or registered in appropriate equivalent class in other department (jointly and severally defined as bidder) can also participate in tender
		1.4.7	(i) Any change in the constitution of the firm, etc., shall be notified forth with by the Bidder in writing to the Procuring Entity and such change shall not relieve any former partner/ member of the firm, etc. from any liability under the Contract. (ii) No new partner/partners shall be accepted in the firm by the Bidder in respect of the contract unless he/they agree to abide by all its terms, conditions and deposit with the Procuring Entity a written agreement to this effect. The Bidder's receipt for acknowledgement or that of any partners subsequently accepted as above shall bind all of them and will be sufficient discharge for any of the purpose of the Contract. (iii) The status of the lead partner/ representative of the Joint Venture, Consortium or Association as a major stake holder shall not change without the consent of the Procuring Entity. New major stake holder must agree to abide by all terms and conditions of the Contract.
		1.4.8	Each Bidder/ JV shall submit only one Bid
		1.4.9	Bidder/JV should be registered under the GST Act and submit the proof of registration before signing the Contract agreement. He is also required to provide proof of Permanent Account Number (PAN) given by Income Tax Department.
2	BID DOCUMENT		
	2.1 Sections of the Bidding Document	2.1.1	The Bidding Document consists of two volumes (volume I & II). Volume I comprises three parts (part I, II, & III) which includes Sections as indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB Clause 2.3 [Amendment of Bidding Document]. (A) Volume-I

		Part I: Bidding Procedures Section I. Instructions to Bidders (ITB) Section II. Bid Data Sheet (BDS) Section III. Evaluation and Qualification Criteria Part II: Requirements Section IV. Procuring Entity's Requirements. Part III: Contract Section V(A) - General Conditions of Contract [GCC] Section V(B). Special Conditions of Contract [SCC] Section V (C). Contract Forms (B) Volume-II : Financial bid and bill of quantities. BOQ for reference purpose only being EPC contract.
	2.1.2	The Invitation for Bids (NIB) issued by the Procuring Entity is also part of the Bidding Document.
	2.1.3	The Bidding Document shall be uploaded on the e-procurement portal, eproc.raj.nic.in along with the Notice Inviting Bids. The complete Bidding Document shall also be placed on the State Public Procurement Portal, sppp.raj.nic.in. The prospective Bidders may download the bidding document from these portals. The price of the Bidding Document and processing fee of e-bid shall have to be paid to the Procuring Entity in the amount and manner as specified in NIB and e-procurement portal.
	2.1.4	The Procuring Entity is not responsible for the completeness of the Bidding Document and its addenda, if they were not downloaded correctly from the e-procurement portal or the State Public Procurement Portal
	2.1.5	The Bidder is expected to examine all instructions, forms, terms and specifications in the Bidding Document. Failure to furnish all information or authentic documentation required by the Bidding Document may result in the rejection of the Bid.
	2.2 Clarification of Bidding Document and Pre-Bid Meeting	
	2.2.1	The Bidder shall be deemed to have carefully examined the conditions, specifications, size, make and drawings, etc. of the Works and Related Services to be provided. If any Bidder has any doubts as to the meaning of any portion of the conditions or of the specifications, drawings etc., it shall, before submitting the Bid, refer the same to the Procuring Entity and get clarifications. A Bidder requiring any clarification of the Bidding Document shall contact the Procuring Entity in writing or e-mail at the Procuring Entity's address indicated in the BDS. The Procuring Entity will respond to all raised queries in pre bid meeting. Minutes of pre bid meeting shall be uploaded on the e-procurement portal, state public procurement portal and shall be sent to all bidders who will participating in pre bid meeting prior to the dead line of submission of bids as specified in ITB Sub-Clause 4.2.1[Deadline for Submission of Bids]. The pre bid minutes issued by procurement entity shall then become part of the bid document and shall read as addendum to bid document.
	2.2.2	The Bidder or his authorized representative may attend the pre bid meeting on the specified date and

			time as mentioned in NIB. The purpose of pre bid meeting will be to clarify issues and to answer question on any matter related to this procurement that may be raised. If required, site visit may be arranged by the procuring entity.
		2.2.3	The Bidder is requested, to submit questions in writing, to reach the Procuring Entity not later than one week before the date of Pre-Bid Meeting.
		2.2.4	At any time prior to the deadline for submission of the Bids, the Procuring Entity, suo motto, may also amend the Bidding Document, if required, by issuing an addendum which will form part of the Bidding Document
		2.2.5	Non-attendance at the Pre-Bid Conference will not be a cause for disqualification of a Bidder.
	2.3 Amendment of Bidding Document	2.3.1	Any addendum issued shall be part of the Bidding Document and shall be uploaded on the State Public Procurement Portal and the e-procurement portal.
		2.3.2	To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Procuring Entity may, at its discretion, extend the deadline for the submission of the Bids, pursuant to ITB Sub-Clause 4.2 [Deadline for Submission of Bids], under due publication on the State Public Procurement Portal and the e-procurement portal and newspapers.
3	Preparation of Bids		
	3.1 Cost of Bidding	3.1.1	The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Procuring Entity shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
		3.1.2	The Bidder shall furnish the scanned attested copies of following documents with its Bid: - i. Partnership Deed and valid registration certificate with the Registrar of Firms in case of Partnership Firms. Power of Attorney in favour of the partner signing/submitting the Bid, authorizing him to represent all partners of the firm. ii. GST registration certificate and Permanent Account Number (PAN) given by the Income Tax Department. iii. Address of residence and office, telephone numbers, e-mail address iv. Certificate of Registration and Memorandum of Association issued by Registrar of Companies in case of a registered company and in case of any other statutory or registered body, certificate of incorporation or registration issued by concerned authorities. Power of attorney in favour of the person signing the Bid. v. Where permitted to bid as Joint Venture, Consortium or Association, letter of formal intent to enter in to an agreement or an existing agreement in the form of a Joint Venture, Consortium or Association.
	3.2 Language of Bid	3.2.1	The Bid, as well as all correspondence and documents relating to the Bid between Bidder and the Procuring Entity, shall be written in English/

			Hindi. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages duly accepted by the Bidder in English/ Hindi in which case, for purposes of interpretation of the Bid, such translation shall govern
	3.3 Documents Comprising the Bid	3.3.1	The bidders shall submit the bid online with all pages numbered serially and by giving index of submissions. Bid should be submitted as follows : (a) Two-envelope system would be adopted, for POST QUALIFICATION. Envelope-1 being for Technical Bid and Envelope - 2 being for Financial Bid. Each envelope would be sealed separately and super scribed as "Envelope-1 Technical Bid" and "Envelope-2 Financial Bid". Both envelopes would be placed in Third envelope duly sealed, bearing the name of work and the name of the bidding contractor. In this third envelope, envelop of earnest money, GST certificate and copy of registration of contractor in required category should also be kept. (E-Bid procedure at http://eproc.rajastha.gov.in) (b) The technical bid will be opened only of those bidders whose proper Bid Security (Earnest money), GST certificate, Copy of PAN Card and copy of registration of contractor in required category are found to be in order.
		3.3.2	The Technical Bid shall contain the following: - Technical Bid Submission Sheet and Technical Bid containing the filled-up Bidding Forms and Declarations related to Technical Bid . - proof of payment of price of Bidding Document, processing fee, Bid Security, in accordance with ITB Clause 3.10; - written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB Clause 3.11; - documentary evidence in accordance with ITB Clause 3.7 establishing the Bidder's eligibility to bid; - documentary evidence in accordance with ITB Clause 3.8 establishing the Bidder's qualifications to perform the contract if its Bid is accepted; - the Notice Inviting Bids; - any other document required in the BDS; and - Others considered necessary to strengthen the Bid submitted.
		3.3.3	The Financial Bid/ Price Proposal shall contain the following: Financial Bid/ Price Proposal Submission Sheet and the applicable Price Schedules, in accordance with ITB Clauses 3.4, 3.5; Any other document required in the Bid documents.
	3.4 Bid Submission Sheets and Price Schedules	3.4.1	The Bidder shall submit the Technical Bid and Financial Bid using the Bid Submission Sheets provided. These forms must be completed without

			any alterations to their format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.
		3.4.2	The Bidder shall submit as part of the Financial Bid, the Price Schedules for Works, using the forms
	3.5 Bid Prices	3.5.1	Total Price which the Bidder wants to charge for the entire Works with all its contingencies in accordance with drawings and specifications shall be quoted (in figures and words) by the Bidder. The quoted amount shall be specified in the financial bid in order to regulate the amount to be added to or deducted from the fixed sum on account of additions and alterations not covered by the Contract. Payments shall be linked to various stages of completion of the Works specified in Activity Schedule given in Section V C Special Condition of Contract.
		3.5.2	Prices quoted by the Bidder shall be fixed during the Execution of the work and not subject to variation on any account, unless otherwise specified in the BDS. A Bid submitted with an adjustable price quotation shall be treated as non-responsive and shall be rejected, pursuant to ITB Clause 5.7 [Responsiveness of Bids]. However, if in accordance with the BDS, prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract, a Bid submitted with a fixed price quotation shall not be rejected, but the price adjustment shall be treated as zero.
		3.5.3	All duties, taxes and other levies payable by the Bidder under the contract, or for any other cause, shall be included in the rates and prices, and the total Bid Price submitted by the Bidder.
	3.6 Currencies of Bid	3.6.1	The rates quoted by the Bidder shall be in Indian Rupees. All payments shall be made in Indian Rupees only.
	3.7 Documents Establishing the Eligibility of the Bidder	3.7.1	To establish their eligibility in accordance with ITB Clause 1.4 [Eligible Bidders], Bidders shall: complete the eligibility declarations in the Bid Submission Sheet and Declaration Form. If the Bidder is an existing or intended Joint Venture [JV], Consortium or Association in accordance with ITB Sub-Clause 1.4.1, shall submit a copy of the Agreement, or a letter of intent to enter into such Agreement. The respective document shall be signed by all legally authorized signatories of all the parties to the existing or intended JV, Consortium or Association as appropriate; and the existing or intended JV shall authorize an individual/ partner in one of the firms as lead partner of the JV to act and commit all the partners of JV for the Bid.
	3.8 Documents Establishing the Qualifications of the Bidder	3.8.1	To establish its qualifications to perform the Contract, the Bidder shall submit as part of its Technical Proposal the documentary evidence indicated for each qualification criteria specified in Section III, [Evaluation and Qualification Criteria].
	3.9 Period of Validity of Bids	3.9.1	Bids shall remain valid for 120 days after the Bid submission deadline date as specified by the Procuring Entity. A Bid valid for a shorter period shall be rejected by the Procuring Entity as non-responsive

		3.9.2	In exceptional circumstances, prior to the expiration of the Bid validity period, the Procuring Entity may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. The Bid Security or a Bid Securing Declaration in accordance with ITB Clause 3.10 [Bid Security] shall also be got extended for thirty days beyond the dead line of the extended validity period. A Bidder may refuse the request without forfeiting its Bid Security or a Bid Securing Declaration. A Bidder granting the request shall not be permitted to modify its Bid.
	3.10 Bid Security	3.10.1	The Bidder shall furnish as part of its Bid, a Bid Security for the amount specified in the BDS.
		3.10.2	Bid Security shall be 1% of the value of the Works indicated in the NIB. For bidders registered with the JDA, the bid security shall be 0.5% of the value of works indicated in the NIB. The bid security shall be in Indian Rupees.
		3.10.3	The Bid Security may be given in the form of a banker's Cheque or demand draft or bank guarantee of a Scheduled Bank in India, in specified format, or deposited through eGRAS/ net banking, if permitted.
		3.10.4	In lieu of Bid Security, a Bid Securing Declaration shall be taken from Government Departments and State Government Public Sector Enterprises, Autonomous bodies, Registered Societies, Cooperative Societies which are owned or controlled or managed by the State Government, Public Sector Enterprises of Central Government. For the Bid Securing Declaration.
		3.10.5	Scanned copy of Bid Security instrument or a Bid Securing Declaration shall necessarily accompany the sealed Bid. Any Bid not accompanied by Bid Security or Bid Securing Declaration shall be liable to be rejected.
		3.10.6	Bid Security of a Bidder lying with the Procuring Entity in respect of other Bids awaiting decision shall not be adjusted towards Bid Security for this Bid. The Bid Security originally deposited may, however be taken into consideration in case Bids are re-invited.
		3.10.7	The issuer of the Bid Security and the confirmer, if any, of the Bid Security, as well as the form and terms of the Bid Security, must be acceptable to the Procuring Entity.
		3.10.8	Prior to submitting its Bid, a Bidder may request the Procuring Entity to confirm the acceptability of a proposed issuer of a Bid Security or of a proposed confirmer, if different than as specified in ITB Clause 3.10.3. The Procuring Entity shall respond promptly to such a request.
		3.10.9	The bank guarantee presented as Bid Security shall be got confirmed from the concerned issuing bank. However, the confirmation of the acceptability of a proposed issuer or of any proposed confirmer does not preclude the Procuring Entity from rejecting the Bid Security on the ground that the issuer or the confirmer, as the case may be, has become

			insolvent or is under liquidation or has otherwise ceased to be creditworthy.
		3.10.10	The Bid Security of unsuccessful Bidders shall be refunded soon after final acceptance of successful Bid and signing of Contract Agreement and submitting Performance Security by successful Bidder pursuant to ITB Clause 6.4 [Performance Security].
		3.10.11	The Bid Security taken from a Bidder shall be forfeited in the following cases namely :- (a) When the Bidder withdraws, or modifies his Bid after opening of Bids; or (b) when the Bidder does not execute the agreement in accordance with ITB Clause 6.3 [Signing of Contract] after issue of letter of acceptance/ placement of Work order within the specified time period; or (c) when the Bidder fails to commence the Works as per Work Order within the time specified; or (d) when the Bidder does not deposit the Performance Security in accordance with ITB Clause 6.4 [Performance Security]; in the prescribed time limit after the work order is placed; or (e) if the Bidder breaches any provision of the Code of Integrity prescribed for Bidders in the Act and Chapter VI of the Rules or as specified in ITB Clause 1.3 [Code of Integrity]; or (f) if the Bidder does not accept the correction of its Bid Price pursuant to ITB Sub-Clause 5.5 [Correction of Arithmetical Errors].
		3.10.12	In case of the successful bidder, the amount of Bid Security may be adjusted in arriving at the amount of the Performance Security, or refunded if the successful bidder furnishes the full amount of Performance Security. No interest will be paid by the Procuring Entity on the amount of Bid Security.
		3.10.13	The Procuring Entity shall promptly refund the Bid Security of the Bidders at the earliest of any of the following events, namely: - (a) The expiry of validity of Bid Security; (b) The execution of agreement for procurement and Performance Security is furnished by the successful bidder; (c) The cancellation of the procurement process; Or The withdrawal of Bid prior to the deadline for presenting Bids, unless the Bidding Document stipulates that no such withdrawal is permitted.
		3.10.14	The Bid Security of a Joint Venture, Consortium or Association must be in the name of the Joint Venture, Consortium or Association that submits the Bid. If the Joint Venture, Consortium or Association has not been legally constituted at the time of Bidding, the members of the proposed consortium or JV shall enter in to an Agreement to form a legally constituted JV after the issue of Letter of Acceptance / Letter of Intent to them and also declare a partner as the lead partner in whose name the Bid Security may be submitted.
	3.11 Format and Signing of Bid	3.11.1	All pages of the Technical and Financial Bid shall be digitally signed by the Bidder or authorized signatory

			on behalf of the Bidder. This authorization shall consist of a written confirmation and shall be attached to the Bid. In case of a Joint Venture, Consortium or Association, if the Joint Venture, Consortium or Association has not been legally constituted at the time of Bidding, all the members of the proposed Joint Venture, Consortium or Association shall digitally sign the Bid.
4	Submission and Opening of Bids		
	4.1 Sealing and Marking of Bids	4.1.1	Bidders shall submit their Bids to the Procuring Entity electronically only on the e-procurement portal, www.eproc.rajasthan.gov.in . In submission of their Bids, the Bidders should follow the step by step instructions given on the e-procurement portal
		4.1.2	The Bidder shall enclose the Technical Bid and the Financial Bid in separate covers. The proof of payment of price of Bidding Document, processing fee and Bid Security shall be enclosed in third cover. The price of Bidding Document and Bid Security shall be paid in the name of the Procuring Entity and the processing fee shall be paid in the name of RISL.
	4.2 Deadline for Submission of Bids	4.2.1	Bids shall be submitted electronically only up to the time and date specified in the Notice Inviting Bids and BDS or an extension issued thereof.
	4.3 Withdrawal, Substitution and Modification of Bids	4.3.1	A Bidder may withdraw, substitute or modify its Bid after it has been submitted by submitting electronically on the e-procurement portal. A written Withdrawal/ Substitutions/ Modifications etc. Notice on the e-procurement portal, duly digitally signed by the Bidder or his authorized representative, and shall include a copy of the authorization in accordance with ITB Sub- Clause 3.11.1 [Format and Signing of Bid]. The corresponding Withdrawal, Substitution or Modification of the Bid must accompany the respective written Notice. All Notices must be received by the Procuring Entity on the e-procurement portal prior to the deadline specified for submission of Bids in accordance with ITB Sub-Clause 4.2. [Deadline for Submission of Bids].
		4.3.2	No Bid shall be withdrawn, substituted or modified in the interval between the deadline for submission of the Bid and the expiration of the period of Bid validity specified in ITB Clause 3.9. [Period of Validity of Bids] or any extension thereof.
	4.4 Bid Opening	4.4.1	The electronic Technical Bids shall be opened by the Bid opening committee constituted by the Procuring Entity at the time, date and place specified in the Bid Data Sheet in the presence of the Bidders or their authorized representatives, who choose to be present.
		4.4.2	The Bidders may choose to witness the electronic Bid opening procedure online.
		4.4.3	The Financial Bids shall be kept unopened until the time of opening of the Financial Bids. The date, time and location of electronic opening of the Financial Bids shall be intimated to the bidders who are found qualified by the Procuring Entity in evaluation of their Technical Bids.
		4.4.4	The Bid opening committee shall prepare a list of

			the Bidders or their representatives attending the opening of Bids and obtain their signatures on the same. The list shall also contain the representative's name and telephone number and corresponding Bidders' names and addresses. The authority letters brought by the representatives shall be attached to the list. The list shall be signed by all the members of Bids opening committee with date and time of opening of the Bids.
		4.4.5	First, covers marked as "WITHDRAWAL" shall be opened, read out, and recorded and the covers containing the corresponding Technical Bids and Financial Bids shall not be opened. No Bid shall be permitted to be withdrawn unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is readout and recorded at Bid opening. If the withdrawal notice is not accompanied by the valid authorization, the withdrawal shall not be permitted and the corresponding Technical Bid shall be opened. Next, covers containing Scanned copy of online payments and registration certificate shall be opened, read out, and recorded. Next, covers marked as "SUBSTITUTION Technical Bid" shall be opened, read out, recorded. The covers containing the Substitution Technical Bids and/ or Substitution Financial Bids shall be exchanged for the corresponding covers being substituted. Only the Substitution Technical Bids shall be opened, read out, and recorded. Substitution Financial Bids will remain unopened in accordance with ITB Sub-Clause 4.4.4. No Bid shall be substituted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out and recorded at Bid opening. Covers marked as "MODIFICATION Technical Bid" shall be opened thereafter, read out and recorded with the corresponding Technical Bids. No Technical Bid and/ or Financial Bid shall be modified unless the corresponding modification notice contains a valid authorization to request the modification and is read out and recorded at opening of Technical Bids. Only the Technical Bids, both Original as well as Modification is to be opened, read out, and recorded at the opening. Financial Bids, both Original as well as Modification, will remain unopened in accordance with ITB Sub-Clause 4.4.4.
		4.4.6	All other covers containing the Technical Bids shall be opened one at a time and the following read out the name of the Bidder, whether there is a modification or substitution; whether proof of payment of Bid Security or Bid Securing Declaration, if required, payment of price of the Bidding Document and processing fee have been enclosed Any other details as the Bids opening committee may consider appropriate
		4.4.7	After all the Bids have been opened, their hard copies shall be printed and shall be initialled and dated on the first page and other important papers

			of each Bid by the members of the Bids opening committee. Only Technical Bids shall be read out and recorded at the bid opening and shall be considered for evaluation. No Bid shall be rejected at the time of opening of Technical Bids except Alternative Bids (if not permitted) and Bids not accompanied with the proof of payment of the required price of Bidding Document, processing fee and Bid Security.
		4.4.8	The Bids opening committee shall prepare a record of opening of Technical Bids that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, modification, or alternative offer (if they were permitted), any conditions put by Bidder and the presence or absence of the price of Bidding Document, processing fee and Bid Security. The Bidders or their representatives, who are present, shall sign the record. The members of the Bids opening committee shall also sign the record with date.
		4.4.9	After completion of the evaluation of the Technical Bids, the Procuring Entity shall invite Bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified to attend the electronic opening of the Financial Bids. The date, time, and location of the opening of Financial Bids will be intimated in writing by the Procuring Entity. Bidders shall be given reasonable notice of the opening of Financial Bids.
		4.4.10	The Procuring Entity shall notify Bidders in writing whose Technical Bids have been rejected on the grounds of being substantially non-responsive and not qualified in accordance with the requirements of the Bidding Document
		4.4.11	The Bids opening committee shall conduct the electronic opening of Financial Bids of all Bidders who submitted substantially responsive Technical Bids and have qualified in evaluation of Technical Bids, in the presence of Bidders or their representatives who choose to be present at the address, date and time specified by the Procuring Entity.
		4.4.12	All covers containing the Financial Bids shall be opened at the time & date and the following read out and recorded- the name of the Bidder; whether there is a modification or substitution; the Bid Prices; any other details as the Bids opening committee may consider appropriate After all the Bids have been opened, their hard copies shall be printed and shall be initialled and dated on the first page of each Bid by the members of the Bids opening committee. All the pages of the Price Schedule and letters, Bill of Quantities attached shall be initialled and dated by the members of the committee. Key information shall be encircled and unfilled spaces in the Bids shall be marked and signed with date by the members of the Bids opening committee.
		4.1.13	The Bids opening committee shall prepare a record of opening of Financial Bids that shall include as a

			minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification, the Bid Price, any conditions, any discounts and alternative offers (if they were permitted). The Bidders or their representatives, who are present, shall sign the record. The members of the Bids opening committee shall also sign the record with date.
5.	Evaluation and Comparison of Bids		
	5.1 Confidentiality	5.1.1	Information relating to the examination, evaluation, comparison, and post-qualification of Bids, and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.
		5.1.2	Any attempt by a Bidder to influence the Procuring Entity in its examination of qualification, evaluation, comparison of the Bids or Contract award decisions may be resulting in the rejection of its Bid, in addition to the legal action which may be taken by the Procuring Entity under the Act and the Rules.
	5.2 Clarification of Technical or Financial Bids	5.2.1	To assist in the examination, evaluation, comparison and qualification of the Technical or Financial Bids, the Bid evaluation committee may, at its discretion, ask any Bidder for a clarification regarding his Bid. The committee's request for clarification and the response of the Bidder shall be in writing.
		5.2.2	Any clarification submitted by a Bidder with regard to His Bid that is not in response to a request by the Bid evaluation committee shall not be considered.
		5.2.3	No change in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetical errors discovered by the Bid evaluation committee in the evaluation of the financial Bids.
		5.2.4	No substantive change to qualification information or to a submission, including changes aimed at making an unqualified Bidder, qualified or an unresponsive submission, responsive shall be sought, offered or permitted.
	5.3 Deviations, Reservations and Omissions in Technical or Financial Bids	5.3.1	During the evaluation of Technical or Financial Bids, the following definitions apply: i.) "Deviation" is a departure from the requirements specified in the Bidding Document; ii.) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and iii.) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
	5.4 Nonmaterial Non-conformities in Technical or Financial Bids	5.4.1	Provided that a Technical or Financial Bid is substantially responsive, the Procuring Entity may waive any non-conformities (with recorded reasons) in the Bid that do not constitute a material deviation, reservation or omission.
		5.4.2	Provided that a Technical or Financial Bid is substantially responsive, the Procuring Entity may request the Bidder to submit the necessary

			information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Bid related to documentation requirements. Request for information or documentation on such nonconformities shall not be related to any aspect of the Financial Proposal of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
	5.5 Correction of Arithmetical Errors in Financial Bid	5.5.1	Provided that a Financial Bid is substantially responsive, the Bid evaluation committee shall correct arithmetical errors during evaluation of Financial Bid on the following basis: i. if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Procuring Entity there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected; ii. if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and iii. if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (i) and (ii) above.
		5.5.2	If the Bidder that submitted the lowest evaluated Bid does not accept the correction of errors, its Bid shall be disqualified and its Bid Security shall be forfeited or its Bid Securing Declaration shall be executed.
	5.6 Preliminary Examination of Technical or Financial Bids	5.6.1	The Procuring Entity shall examine the Technical or Financial Bids to confirm that all documents and technical documentation requested in ITB Sub-Clause 3.3 [Documents Comprising the Bid] have been provided, and to determine the completeness of each document submitted.
		5.6.2	The Procuring Entity shall confirm, following the opening of the Technical or Financial Bids, that the following documents and information have been provided: i. Bid is signed, as per the requirements listed in the Bidding documents; ii. Bid has been sealed as per instructions provided in the Bidding documents; iii. Bid is valid for the period, specified in the Bidding documents; iv. Bid is accompanied by Bid Security or Bid securing declaration; v. Bid is unconditional and the Bidder has agreed to give the required performance Security; vi. Price Schedules in the Financial Bids are in accordance with ITB Clause 3.4 [Bid Submission Sheets and Price Schedules]; vii. written confirmation of authorization to commit

		the Bidder; viii. Declaration by the Bidder in compliance of Section 7 and 11 of the Act; and ix. Other conditions, as specified in the Bidding Document are fulfilled.
5.7 Responsiveness of Technical or Financial Bids	5.7.1	The Procuring Entity's determination of the Responsiveness of a Technical or Financial Bid is to be based on the contents of the Bid itself, as defined in ITB Sub-Clause 3.3 [Documents Comprising the Bid].
	5.7.2	A substantially responsive Technical or Financial Bid is one that meets without material deviation, reservation, or omission to all the terms, conditions, and specifications of the Bidding Document. A material deviation, reservation, or omission is one that: if accepted, would- i. affect in any substantial way the scope, quality, or performance of the Goods and Related Services specified in Section V, Schedule of Supply; or limits in any substantial way, inconsistent with the Bidding Document, the Procuring Entity's rights or the Bidder's obligations under the proposed Contract; or (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.
	5.7.3	The Procuring Entity shall examine the technical aspects of the Bid in particular, to confirm that requirements of Section IV, Procuring Entity's Requirements have been met without any material Deviation, reservation, or omission.
	5.7.4	If a Technical or Financial Bid is not substantially responsive to the Bidding Document, it shall be rejected by the Procuring Entity and may not subsequently be made responsive by the Bidder by Correction of the material deviation, reservation, or omissions.
5.8 Examination of Terms and Conditions of the Technical or Financial Bids	5.8.1	The Procuring Entity shall examine the Bids to confirm that all terms and conditions specified in the GCC and the SCC have been accepted by the Bidder without any material deviation or reservation.
	5.8.3	The Procuring Entity shall evaluate the technical aspects of the Bid submitted in accordance with ITB Clauses 3.3 [Documents Comprising the Bid] and to confirm that all requirements specified in Section IV [Procuring Entity's Requirements] of the Bidding Document and all amendments or changes requested by the Procuring Entity in accordance with ITB clause 2.3 [Amendment of Bidding Document] have been met without any material deviation or reservation.
5.9 Evaluation of Qualification of Bidders in Technical Bids	5.9.1	The determination of qualification of a Bidder in evaluation of Technical Bids shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB Clause 3.8 [Documents Establishing the Qualifications of the Bidder] and in accordance with the qualification criteria indicated in Section III [Evaluation and Qualification Criteria]. Factors not included in Section III, shall not be used in the Evaluation of the Bidder's qualification.

	5.10 Evaluation of Financial Bids	5.10.1	The Procuring Entity shall evaluate each Financial Bid, the corresponding Technical Bid of which has been determined to be substantially responsive
		5.10.2	To evaluate a Financial Bid, the Procuring Entity shall only use all the criteria and methodologies defined in this Clause and in Section III, Evaluation and Qualification Criteria. No other criteria or methodology shall be permitted.
		5.10.3	To evaluate a Financial Bid, the Procuring Entity shall consider the following: i). the Bid Price quoted in the Financial Bid; ii) price adjustment for correction of arithmetical errors in accordance with ITB Clause 5.5[Correction of Arithmetical Errors]; iii) Adjustment of bid prices due to rectification of nonmaterial nonconformities or omissions in accordance with ITB Sub Clause 5.4.3 [Nonmaterial Nonconformities in Bids], if applicable.
		5.10.14	If the Bid, which results in the lowest evaluated Bid Price, is considered to be seriously unbalanced, or front loaded, in the opinion of the Procuring Entity, the Procuring Entity may require the Bidder to produce detailed rate analysis for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those rates with the construction methods and schedule proposed. If the rate justification is not satisfactory submitted by the bidder, the bid of such bidder may be rejected.
	5.12 Negotiations		
		5.12.1	To the extent possible, no clarifications shall be Conducted after the pre-Bid stage. All clarifications needed to be sought shall be sought in the pre-Bid stage itself.
		5.12.2	Negotiations may be undertaken only with the lowest Bidder when the rates quoted are considered much higher than the prevailing market rates.
		5.12.3	The Competent committee shall have full powers to undertake negotiations. Detailed reasons and results of negotiations shall be recorded in the proceedings.
		5.12.4	The lowest Bidder shall be informed about negotiations in writing either through messenger or by registered letter and e-mail (if available). A minimum time of seven days shall be given for calling negotiations. In case of urgency, the competent committee, after recording reasons, may reduce the time, provided the lowest Bidder has received the intimation and consented to holding of negotiations.
		5.12.5	Negotiations shall not make the original offer made by the Bidder inoperative. The competent committee shall have option to consider the original offer in case the Bidder decides to increase rates originally quoted or imposes any new terms or conditions.
		5.12.6	In case of non-satisfactory achievement of rates from lowest Bidder, the Bid evaluation committee may choose to make a written counter offer to the lowest Bidder and if this is not accepted by him, the committee may decide to reject and re-invite Bids or to make the same counter-offer first to

			the second lowest Bidder, then to the third lowest Bidder and so on in the order of their initial standing in the bid evaluation and work order be awarded to the Bidder who accepts the counter-offer.
		5.12.7	In case the rates even after the negotiations are considered very high, fresh Bids shall be invited.
	5.13 Procuring Entity's Right to Accept Any Bid, and to Reject Any or All Bids	5.13.1	The Procuring Entity reserves the right to accept or reject any Bid, and to annul the Bidding process and reject all Bids at any time prior to Contract award without assigning any reasons thereof and without there by incurring any liability to the Bidders.
6.	Award of Contract		
	6.1 Procuring Entity's Right to Vary Quantities	6.1.1	If the Procuring Entity does not procure any subject matter of procurement or procures less than the quantity specified in the Bidding Document due to change in circumstances, the Bidder shall not be entitled for any claim or compensation except Otherwise provided in the Bidding Document.
	6.2 Acceptance of the successful Bid and award of contract	6.2.1	The Procuring Entity after considering the recommendations of the Bid Evaluation Committee and the conditions of Bid, if any, financial implications, samples, test reports, etc., shall accept or reject the successful Bid.
		6.2.2	Before award of the Contract, the Procuring Entity shall ensure that the price of successful Bid is reasonable and consistent with the required specifications.
		6.2.3	A Bid shall be treated as successful only after the competent authority has approved the procurement in terms of that Bid.
		6.2.4	The Procuring Entity shall award the contract to the Bidder whose offer is the lowest in accordance with the evaluation criteria.
		6.2.5	Prior to the expiration of the period of validity of Bid, the Procuring Entity shall inform the successful Bidder in writing, by registered post or email, that its Bid has been accepted.
	6.3 Signing of Contract	6.3.1	In the written intimation of acceptance of its Bid sent to the successful Bidder, it shall also be requested to execute an agreement in the format given in the Bidding Document on a non-judicial stamp of requisite value at his cost and deposit the Performance Security or a Performance Security Declaration, if applicable, within a period specified in the BDS. In case the successful bidder is a JV still to be legally constituted, all parties to the JV shall sign the Agreement.
		6.3.2	If the Bidder, whose Bid has been accepted, fails to sign a written procurement contract or fails to furnish the required Performance Security or Performance Security Declaration within the specified time period, the Procuring Entity shall forfeit the Bid Security of the successful bidder / execute the Bid Securing Declaration and take required action against it as per the provisions of the Act and the Rules.
		6.3.3	The Bid Security, if any, 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. Until a formal contract is executed, LOA shall constitute a

			binding contract.
	6.4 Performance Security	6.4.1	Performance Security shall be solicited from the successful Bidder except State Govt. Departments and undertakings, corporations, autonomous bodies, registered societies, co-operative societies which are owned or controlled or managed by the State Government and undertakings of Central Government. However, a Performance Security Declaration shall be taken from them.
		6.4.2	(i) The amount of Performance Security shall be ten percent (5%) of the amount of the Work Order. The currency of Performance Security shall be Indian Rupees.
		6.4.3	Performance Security shall be furnished in one of the following forms as applicable- a). Deposit through eGRAS; or b). Bank Draft or Banker's Cheque of a Scheduled Bank in India in favour of Secretary, JDA, Jaipur; or c). National Savings Certificates and any other script/ instrument under National Savings Schemes for promotion of small savings issued by a Post Office in Rajasthan, if the same can be pledged under the relevant rules. They shall be accepted at their surrender value at the time of Bid and formally transferred in the name of the Procuring Entity with the approval of Head Post Master; or d). Bank guarantee in favour of Secretary JDA, Jaipur payable at Jaipur. It shall be got verified from the issuing bank. Other conditions regarding bank guarantee shall be same as specified in ITB Sub-Clause 3.10 [Bid Security]; or e). Fixed Deposit Receipt (FDR) of a Scheduled Bank. It shall be in the name of the Procuring Entity on account of Bidder and discharged by the Bidder in advance. The Procuring Entity shall ensure before accepting the Fixed Deposit Receipt that the Bidder furnishes an undertaking from the bank to make payment/ premature payment of the Fixed Deposit Receipt on demand to the Procuring Entity without requirement of consent of the Bidder concerned. In the event of forfeiture of the Performance Security, the Fixed Deposit shall be forfeited along with interest earned on such Fixed Deposit. f). The successful Bidder at the time of signing of the Contract agreement, may submit option for deduction of Performance Security from each running and final bill @ 5% of the amount of the bill.
		6.4.4	Performance Security furnished in the form of a document mentioned at options (a) to (e) of Sub-Clause 6.4.3 above, shall remain valid for a period of sixty days beyond defect liability period.
		6.4.5	Failure of the successful Bidder to submit the Performance Security in accordance to 6.4.3 above and sign the Contract accordingly shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event, the Procuring Entity may either cancel the procurement process or if deemed appropriate, award the Contract at the rates of the lowest Bidder, to the next lowest evaluated Bidder whose offer is

			substantially responsive and is determined by the Procuring Entity to be qualified to perform the Contract satisfactorily.
		6.4.6	Forfeiture of Performance Security: Amount of Performance Security in full or part may be forfeited in the following cases: - when the Bidder does not execute the agreement in accordance with ITB Clause 6.3 [Signing of Contract] within the specified time; after issue of letter of acceptance; or when the Bidder fails to commence the Works as per Work order within the time specified; or when the Bidder fails to complete Contracted Works satisfactorily within the time specified; or when any terms and conditions of the contract is breached; or to adjust any established dues against the Bidder from any other contract with the Procuring Entity; or if the Bidder breaches any provision of the Code of Integrity prescribed for the Bidders specified in the Act, Chapter VI of the Rules and this Bidding Document. Notice of reasonable time will be given in case of forfeiture of Performance Security. The decision of the Procuring Entity in this regard shall be final.

SECTION II

BIDDING DATA SHEET

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

Contents

- A. Introduction
- B. Bidding Documents
- C. Preparation of Bids
- D. Submission and Opening of Bids
- E. Award of Contract

A. Introduction

ITB. 1.1.1	The Number of the Invitation for Bids (NIB) is: 04/2020-21 The Member of the Invitation for Bids is: Jaipur Development Authority. Name of Work: Ramniwas Bagh Underground Parking Project Phase-II, Jaipur (Detailed Scope of work has been defined in Section IV: Procuring Entity's Requirement)
1.1.2	Period of Completion: Construction work in all respect shall be completed in 30 months from the Start Date, which shall be the stipulated date of commencement mentioned in work order.
1.1.3	Estimated Cost of work is: Rs. 95.00 Crore.
ITB 1.4.1	Joint Ventures / Consortium are permitted comprising not more than 2 (two) firms/companies. The minimum equity under JV / Consortium of lead firm should be min 74% and another firm 26%
ITB 1.4.2	"Bidders of Indian Nationality" are only permissible.
ITB 1.4.5	Bidder may be Registered with Government Department/Organisation class AA or appropriate equivalent class/PSU/Private Entity.
ITB 1.4.8	The bidding process is open to bidders who fulfil the prescribed eligibility criteria.
ITB 1.4.9	Each bidder shall upload on-line / submit only one bid for one work. A bidder who submits or participates in more than one bid for the particular Works will be disqualified.

B. Bidding Documents

ITB 2.1.3	This is an "on-line tender". Therefore, tender documents in physical form shall not be available for sale but can be downloaded from the website and pay cost (Rs 10,000/-) while submitting the filled-up Bidding document to the Procuring Entity along with the processing fee of Rs 1,000/- separately in favor of MD RISL, Jaipur. The bidder should submit, by date & time specified in NIB, in original, hard copies of (i) cost of bid document as Rs. 10,000/-Online (ii) Bid processing fee of Rs. 1,000/- online to Managing Director, RISL, Jaipur payable; (iii) Bid Security as per RTPP; (iv) Letter of Technical Bid; (v) Power of Attorney; and (vi) Joint Venture Agreement, if applicable. The bidder should upload scanned copies of these documents on e-procurement website along with their technical bids.
ITB 2.2.1	For Clarification purposes only, the Procuring Entity's address is: OFFICE OF THE EXECUTIVE ENGINEER ROB-RUB-IV Jaipur Development Authority ROOM NO 313-B , Nagrik Seva Kendra Ram Kishor Vyas Bhawan, Indira Circle, Jawahar Lal Nehru Marg, Jaipur-302004 EPABX +91 -141-2569696 Ext.- 7466 : Fax +91-141- 2574555 email : vmjohari.jda@rajasthan.gov.in

ITB 2.2.2	Pre bid Meeting to be held as below: Date: 09.12.2020 Time: 11:00 AM Venue: Manthan Hall Jaipur Development Authority. No site visit shall be organized by the procuring entity. However, bidder are advised to visit the sites at their own expenses and if any support is required, shall be provided by the JDA.
ITB 2.2.3	The Bidders are requested, to submit questions in writing, to reach the Procuring Entity.
ITB 2.3.1	Any addendum issued shall be part of the Bidding Document and shall be uploaded on the State Public Procurement Portals http://sppp.rajasthan.gov.in/ and http://eproc.rajasthan.gov.in or www.jda.urban.rajasthan.gov.in
ITB 2.3.2	To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Procuring Entity may, at its discretion, extend the deadline for the submission of the Bids, pursuant to ITB Sub-Clause 4.2 [Deadline for Submission of Bids], under due intimation to the Bidders by uploading it on the State Public Procurement Portal and its e-procurement portal.

C. Preparation of Bids

ITB 3.2.1	The language of the bid shall be English
ITB 3.3.1	The online Bid shall comprise of two parts submitted simultaneously, one containing the Technical Bid/ Proposal and the other the Financial or Price Bid/ Proposal.
ITB 3.3.2	The Bidder shall submit the forms, declarations and documents, as specified in Section IV of Bid Document, with the Technical Bid:
ITB 3.3.3	The Bidder shall submit the following additional documents with its Technical Bid: - Technical Bid/Proposal Submission Sheet and Technical Bid containing the filled-up Bidding Forms and Declarations related to Technical Bid, possession of required qualifications and Code of Integrity given in Section IV [Bidding Forms]; - Proof of payment of price of Bidding Document, processing fee and Bid Security in accordance with ITB Clause 3.10; - Written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB Clause 3.11; - Documentary evidence in accordance with ITB Clause 3.7 establishing the Bidder's eligibility to bid; - Documentary evidence in accordance with ITB Clause 3.8 establishing the Bidder's qualifications to perform the contract if its Bid is accepted; - The Notice Inviting Bids; - The PAN No. (Permanent Account Number) of Income tax with the Xerox copy of the PAN card. - Alternative bids shall not be permitted.

	ix. Alternative times for completion shall not be permitted. (However, this does not prohibit the successful bidder from completing the work as per specifications before schedule) x. Any other document required in the BDS; and xi. Others considered necessary to strengthen the Bid submitted.
ITB 3.5.1	Add following: The form of contract for the work “Ramniwas Bagh Underground Parking Project Phase-II” will be a Lump Sum contract on EPC basis.
ITB 3.5.2	The Prices quoted by the Bidder shall be fixed.
ITB 3.5.3	All variations in taxes and duties shall be borne as per relevant clause of the Section VI B: SCC
ITB 3.9.1	The Bid validity period shall be 120 (One Twenty days) days from deadline for submission of bids.
ITB 3.10.2	Add following: Bid security shall be of the value: a). 1 % (Rs 95.00 Lakhs) (For registered contractor in appropriate class in other department/ Private Entity), b). 0.5 % (Rs 47.50 Lakhs) for AA Class contractor registered as contractor in JDA as indicated in NIB c). PSU can submit a bid security declaration certificate.
ITB 3.10.3	A Bid Security shall be provided as a part of the bid in the form of a Banker's Cheque or Demand Draft or Bank Guarantee of a Scheduled Bank in India, in specified format which shall remain valid for a period of 45(forty-five) days beyond the validity of the bid.
ITB 3.11.1	Only Digital signed copy shall be submitted through e-procurement website.
ITB 3.11.2	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: Power of Attorney.

D. Submission and Opening of Bids

ITB 4.1.1	For bid submission purposes only, the Procuring Entity's address is: OFFICE OF THE EXECUTIVE ENGINEER ROB/ RUB -IV Jaipur Development Authority, Room no 313 B , Nagrik seva kendra Ram Kishor Vyas Bhawan, Indira Circle, Jawahar Lal Nehru Marg, Jaipur-302004 Bidders shall submit their Bids electronically only. The Bidders shall submit the Bid online with all pages numbered serially and by giving an index of submissions. Each page of the submission shall be initialled by the Authorised Representative of the Bidder as per the terms of the tender. The Bidder shall be responsible for documents accuracy and correctness as per the version uploaded by the Procuring Entity and shall ensure that there are no changes caused in the content of the downloaded document. The bidder shall follow the following instructions for online submission: • Bidder who wants to participate in bidding will have to procure digital certificate as per IT Act to sign their electronic bids. Offers which are not digitally signed will not be accepted. Bidder shall submit their offer in electronic format on above mentioned website after digitally signing the same. • Cost of bid document is Rs. 10,000/- should be deposited by online, whereas the Processing fee Rs. 1,000/- should be deposited online to MD,

	RISL, Jaipur payable at Jaipur. Scanned copy of proof of payments shall be submitted with the technical bid. - The Procuring Entity will not be responsible for any mistake occurred at the time of uploading of bid or thereafter. - If holiday is declared on submission & opening date of tender the scheduled activity will take place on next working day.
ITB 4.1.2	Bids are required to be submitted in Electronic Format, it shall be submitted on the e-procurement portal: http://eproc.rajasthan.gov.in
ITB 4.2.1	The Deadline for electronic Bid submission is Date: 29.12.2020 Time: 06.00 PM
ITB 4.4.1,4.4.5	The online Bid opening shall take place at: OFFICE OF THE EXECUTIVE ENGINEER RRP-II Jaipur Development Authority, Room no 313 B , Nagrik seva kendra Ram Kishor Vyas Bhawan, Indira Circle, Jawahar Lal Nehru Marg, Jaipur-302004 The tendering process shall be conducted online only; DD/BG of Bid Security shall be submitted physically up to deadline described in tender document.
ITB 4.4.13,4.4.15	The Procuring Entity will open the Financial proposal as per e-tendering procedure.

E. Award of Contract

ITB 6.3.1	The period within which the Performance Security is to be submitted by the successful Bidder and the Contract Agreement is to be signed by him from the date of issue of Letter of Acceptance is 15 Days.
ITB 6.3.3	The procuring entity shall promptly return the bid security after the earliest of the following events, namely: 1. The expiry of validity of bid security 2. The execution of agreement for procurement and performance security is furnished by the successful bidder; 3. The cancellation of the procurement process; or 4. The withdrawal of bid prior to the deadline for presenting bids, unless the bidding documents stipulate that no such withdrawal is permitted.
ITB 6.4.1	Performance Security shall be solicited from the successful Bidder in accordance to 6.4 of ITB.
ITB 6.4.3	(i) Performance Security amounting to total @5% of contract value (Ref Clause 6.4.2 of ITB) shall be submitted in advance at the time of signing of agreement as per latest rules under RTPP act. Bank Guarantee encashable at Jaipur submitted against the performance guarantee, shall be unconditional and en-cashable/ invokable at Town for which tenders are invited or submitted i.e. at Jaipur. (ii) The successful Bidder at the time of signing of the Contract agreement, may submit option for deduction of Performance Security from each running and final bill @ 5% of the amount of the bill.
7.1	First Appellate Authority shall be: Executive Committee JDA, Jaipur Second Appellate Authority shall be: A.C.S./P.S. UDH Jaipur

Name of Project: - Ram Niwas Bagh Under Ground Parking Project Phase - II, Jaipur

Section –III Evaluation and Qualification



JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**SCHEDULE AND SPECIFICATIONS****SCHEDULE – A: INFORMATION USEFUL FOR THE CONTRACTORS:**

The Tenderer should see the site and fully understand the conditions of the site before tendering and include all leads, lift etc. The work shall be carried out in accordance with the MORTH/I.R.C. specification and relevant Manual and to the entire satisfaction of the Engineer – In – Charge of the work.

Qualified personnel as required under the contractor enlistment rules duly approved by the Deptt. shall have to be engaged at site by the Contractor. The deptt. Reserves the right to engage such staff and recover the expenses from the contractor on such account in case of his failure to do so.

SCHEDULE – B: LIST OF THE DRAWING TO BE SUPPLIED TO THE CONTRACTOR:

1. JDA shall provide conceptual drawing of each floor for tendering purpose only.

SCHEDULE – C: LIST OF THE DRAWING TO BE SUPPLIED BY THE BIDDER:

Successful Contractor shall supply all the architectural / structural drawing / drawing of various services like electrical, firefighting, force ventilation, CCTV system, smart parking solution etc for all components of proposed underground parking and various shuttering plans/as built drawing of whole project.

SCHEDULE - D: TEST OF THE MATERIALS:

The test of the materials and workmanship shall be conducted by the JDA staff as necessary. The result of such tests should confirm to the standard laid down in the Indian standard MORTH/ I.R.C. specification and relevant Manual.

SCHEDULE – E: SAMPLES OF THE MATERIALS:

The sample of the materials to be used by the contractor shall be deposited 15days In advance with the Engineer In charge and be got approval by him before use.

SCHEDULE - F: TIME OF COMPLETION:

The work should start within 15 days of issue of work order and complete within time limits.

Signature of the Contractor

With full Address, Mob No, Landline No & E-mail address

JAIPUR DEVELOPMENT AUTHORITY JAIPUR**SPECIAL CONDITION OF THE CONTRACT FOR CONTRACTORS**

Name of work: - Ramniwas Bagh Underground Parking Project Phase -II.

Special conditions of contract for the project as detailed here under, shall be applicable in addition to all other terms and condition already prescribed under standard agreement forms/rules and regulations to contract.

1. Procedure:

Procedure for qualification would be as follow:

- (a) Two-envelope system would be adopted. Envelope-1 being for Technical Bid and Envelope - 2 being for Financial Bid. Each envelope would be sealed separately and super scribed as "Envelope-1 Technical Bid" and "Envelope-2 Financial Bid". Both envelopes would be placed in Third envelope duly sealed, bearing the name of work and the name of the bidding contractor. In this third envelope, envelop of earnest money, GST certificate and copy of registration of contractor in required category should also be kept. (E-Bid procedure at <http://eproc.rajastha.gov.in>)
- (b) The technical bid will be opened only of those bidders whose proper Earnest money, GST certificate and copy of registration of contractor in required category are found to be in order.
- (c) The Technical Bid envelope would be opened on the date as specified in the NIB.
- (d) The Financial Bid envelope would be opened only of those bidders who fulfill all the technical bid criteria.

2. Criteria:

Criteria would be as follows:-

- (a) The bidder should have executed following quantities of work in any one financial year of the last five financial years. However the bidder may opt current year in the said financial assessment period.

S. No.	Item	Quantity
1	Controlled RCC/ Design Mix concrete of Minimum M-25 grade & above.	20600.0 CUM.
2	Steel Reinforcement/Structural Steel	3345.0 MT
3	Bored Cast in situ Pile of Minimum 600 mm Dia and above (Bidder should enclose the certificate of requisite Qty of bored cast in situ pile in running meters only no certificate will be entertained of having Qty in cubical content)	6545.0 Rmt

Note:-

- (i) The Bidder should enclose the certificate having quantities financial year wise otherwise the certificate will not be considered.
 - (ii) Quantities of all the items mentioned in criteria 2 (a) should be executed in one financial year.
 - (iii) Certificate issued by Govt. of India, State Govts., Union Territory, Govt. Undertakings, Autonomous Bodies shall only be considered.
 - (iv) Bidder should enclose the certificate of requisite qty of bored cast in situ pile in running meters only no certificate will be entertained of having qty in cubical content.
- (b) The bidder should have completed/executed at least one similar nature of work (i.e. Multistory Parking, Multistory RCC Frame Structure Building, Hospital Project, Modern Bus Stop, Airport Project, Shopping Mall etc.) in last Five financial year (including current year, if opted by the bidder) of value not less than 60 % of the Estimated Cost of the work (bid cost) i.e. 57.00 Crore updated to present price level.

Note:-

- (i) The starting & completion date of the work is to be in between above said financial year. If no then maximum work (70%) is to be completed in above said financial year.
 - (ii) If bidder is submitted certificate having different components / nature of work then proper completion certificate of required similar nature (Multistory Parking, Multistory RCC Frame Structure Building, Hospital Project, Modern Bus Stop, Airport Project, Shopping Mall etc.) Component is to be enclosed.
 - (iii) Certificate issued by Govt. of India, State Govts., Union Territory, Govt. Undertakings, Autonomous Bodies shall only be considered.
- (c) The bidder should have achieved an annual financial turnover of at least 60% of the Estimated Cost of the work (bid cost) i.e. 57.00 Crore in any one of last Five Financial years (including current year, if opted by the bidder)

Note:-

- (i) The bidder should enclose certificate of Turn over from Chartered Accountant for last five financial years & audited balance sheet of the year which is considered by the bidder in criteria 2 (c).
- (ii) If current year or last year has been opted by bidder whose balance sheet is not submitted till the submission of bid then certificate from Chartered Accountant should be enclosed.
- (d) The bidder should have at least 25% of estimated cost as a working capital based on current assets and current liabilities (including the short term loan re-payment due in current years)
- (e) The bidder should submit certificate of Net Worth for the Financial Year 2019-20 (from latest audited balance sheet) and should be positive. (Certificate of Chartered Accountant showing calculation of Net Worth must be enclosed).

Note:-

- (i) **The bidder should enclose certificate of Chartered Accountant *clearly* mentioning that the working capital is as per formula given in tender document and clearly stating the individual components CA must also clearly mention that he has gone through the Revolving line of credit which is issued by scheduled Bank and Bank's commitment is project specific, assured and without any ambiguity and shall be available till final completion of project, otherwise bid shall not be considered For revolving line of credit bank's letter should be attached. The bank issuing revolving line of credit has to be scheduled Bank as per format, otherwise it shall not be considered.**
- (f) The bidder should give Affidavit to deploy the machinery and equipment as specified in Schedule – III, for the execution of this work.
- (g) Bid Capacity: Bidders who meet the minimum qualification criteria will be qualified only if available bid capacity is equal to or more than the total Bid value.
The available bid capacity will be calculated as under:

$$\text{Bid Capacity} = (A \times N \times 3 - B)$$

- Where
- A = Maximum value of similar nature of work (Underground Parking, Multistory Building, Hospital Project, Modern Bus Stop, Airport Project etc.) executed in one year during the last 5 financial years (updated to present Price level) taking in to account the completed as well as works in progress. However, the bidder may opt current year in the five year assessment period
 - N = Number of year prescribed for completion of the work for which bids are invited. In present case value of N shall be 2.5
 - B = Value, at present price level of existing commitments and ongoing works to be executed during 'N' period (period prescribed for completion of the works for which the bids are invited)

Note:-

- (a) **Certificate from Chartered Accountant should be enclosed by bidder clearly indicating maximum value of Civil Engineering Work in one Financial Year.**
- (h) Litigation History: - Bidder should provide accurate information on any litigation or arbitration resulting from contracts completed or under execution by him over the last five years. The maximum value (updated at the present price level) of disputed amount claimed in the litigation / arbitration resulting from contracts executed in last five years shall be deducted from the calculated Bid Capacity of the bidder. The details shall be furnished in Schedule VI.

Note :-

- (i) **The present price level for turnover, cost of completed work & disputed amount of similar nature (Underground Parking, Multistory Building, Hospital Project, Modern Bus Stop, Airport Project etc.), the previous year's value shall be given weight age of 10% per year as follows :-**

(a)	2020-2021 (Current Year)	1.00
(b)	2019-2020	1.00
(c)	2018-2019	1.10
(d)	2017-2018	1.21
(e)	2016-2017	1.33
(f)	2015-2016	1.46

3. **Documentation** :

The bidder should furnish the following documents along with the technical bid:

- (a) Information regarding financial resources and capability in Schedule –I.
- (b) Information regarding works executed in the last five years in Schedule–II
- (c) Certificates from the concerned Engineer–In–Charge in support and verification of the information furnished in Schedule–II
- (d) Affidavit regarding machinery and equipment required for deployment, as detailed in scheduled – III.
- (e) Information regarding details of maximum value of civil engineering works executed in any one year during the last five years taking into account the completed as well as works in progress in schedule – IV.
- (f) Information regarding existing commitments and ongoing works to be completed in schedule – V.
- (g) Information regarding details of litigation or arbitration contracts to be furnished in schedule – VI.
- (h) Calculation of Bid capacity in schedule – VII.
- (i) Certificate required for net worth & working capital from chartered accountant in describe format in bid.
- (j) Affidavit as per Annexure I.

4. **Important:**

- (A) The bidder must ensure that all the information required in the Documents is furnished by him complete in all respects. He would not be allowed to withdraw any document, or to rectify any information furnished therein, after submitting the bid.
- (B) The bidder should give an affidavit that the information furnished in schedule I, to VII is correct. If any information is found incorrect, the offer of the bidder shall be rejected and action be taken as per rules.
- (C) Bidders must do paging of all enclosure of bid documents.

5. **REJECTION OF BIDS:**

THE DEPARTMENT RESERVES THE RIGHTS TO REJECT ANY BID OR TO DISQUALIFY ANY OR ALL THE BIDDERS, WITHOUT ASSIGNING ANY REASONS AT ANY STAGE.

- i. If Bid is not accompanied with the requisite documents mentioned in Clauses 3 (a) to 3 (j) or is not in accordance with procedure specified in Para 1, or is not accompanied with earnest money & GST Certificate and registration of contractor (If applicable) in required category it would be liable for rejection.
- ii. Furnishing of incorrect or incomplete or concealment of any information required in the bid documents would render the bid liable for rejection.
- iii. If all the copies enclosed in support and affidavit are not duly attested by Bidder himself then bid of the bidder is to be rejected.

6. IN CASE OF JOINT VENTURE:

In case the bidder comprises a joint venture or consortium, following requirements shall also be complied with:

- a. The JV will have to be formed before submission of the bid and total number of JV partners shall not exceed 2 (Two). They must designate lead partner duly authorized by all the members who will represent the J.V. Any of the two partners can be a lead partner. The lead partner shall be nominated as being partner-in-charge and this authorization shall be evidenced by submitting power of attorney signed by the legally authorized signatories of all the partners.
- b. The partner-in- charge (or, the lead partner) shall be authorized to incur liabilities and to receive instructions on the behalf of the partners of the Joint Venture, whether jointly or severally, and entire execution of the contract (including payment) shall be carried out exclusively through the partner- in- charge.
- c. The share of one of the two partners shall not be less than 26% and rest of the share shall be held by other partner (For example if share of one partner is 26% then for other partner it will be 74%.) The JDA will only send communication to the lead partner, which will be deemed to have been sent to all the J.V. partners. Similarly, any negotiation and / or agreement with the lead partner shall be deemed to have been concluded with all the J.V. partners. All the members of J.V. shall be bound by the said communication and all acts/ deeds of the lead member.
- d. Any one of the two partners, alone, should fulfill the Technical Criteria laid down in clause 2a, 2b & 2c of Special Conditions. Similarly, any one of the two partners, alone, should fulfill the Financial Criteria laid down in clause 2d.2e & 2f of Special Conditions. For rest of the eligibility criteria, qualifications of the two partners may be clubbed together.
- e. The individual partner of J.V. alone or with other partners cannot participate in the same bid.
- f. Bid capacity is to be calculated by clubbing turn over and work in hand of all the firms of joint venture.
- g. Attested copy of the MoU / Agreement/ Power of attorney entered into by the joint venture / consortium members duly notarized shall be submitted along with the Technical Bid with intended percentage participation nomination of lead member and division of responsibility to clearly define the work of each member etc.
- h. All the members of the joint venture/ consortium shall be jointly and severally liable for the execution of the Contract.
- i. In the event of default by any member of the joint venture/ consortium in the execution of his part of the contract, the partner-in-charge will have the authority to assign the work to any other party acceptable to the employer to ensure the execution of the part of contract.
- j. If initially the bid has purchased and submitted by the any partner or by the JV firm, in case JV bid accepted, the work order will be issued in favour of name of JV and the bidder will submit details of JV bank account to which payment is to be deposited by JDA.
- k. The experience certificate will be issued as per percentage of the shareholders defined in JV agreement of the two partners.

EXECUTIVE ENGINEER (ROB/RUB- IV)
JDA, JAIPUR

Annexure: 5**Bid Evaluation Sheet****Name of Work:** - Ramniwas Bagh Underground Parking Project Phase -II.

S. No.	Criteria	Required Qualification	Bidders qualification	Bidders uploaded document Page No. in support of qualification.	Remark
1	2	3	4	5	6
1	Registration Certificate - As per Clause 1e of Special Conditions of Contract.	The bidder should have a valid Registration Certificate in AA Category or appropriate equivalent class (If applicable) as specified.			
2	GST Certificate - As per Special Conditions of document	-			
3	Fee Payment Details (Please enclose copy of electronic receipt)	-			
(i)	Cost of Bid	Rs. 10,000/-			
(ii)	Bid Processing Fee	Rs. 1,000/-			
(iii)	Bid Security	(i) 1% of Estimated Cost Rs. 95 Lac (Rupees Ninety Five Lacs only) by the firms not registered in JDA/ Private Entity (ii) 0.5% of Estimated Cost Rs. 47.50 Lacs			

		(Forty Seven Lacs Fifty Thousand only) registered in JDA (iii) PSU can submit bid security declaration certificate.			
4	The bidder should have executed following quantities of work in one financial year of the last five financial years. However the bidder may opt current year in the said financial assessment period.				
i	Controlled RCC/ Design Mix concrete of Min. M-25 grade & above.	20600.00 Cum			
A	Year of execution	-			
B	Quantity executed	-			
ii	Reinforcement Steel/Structural steel	3345.00MT			
A	Year of execution	-			
B	Quantity executed	-			
iii	Bored Cast in situ Pile of Min. 600 mm Dia & above (Bidder should enclose the certificate of requisite qty of bored cast in situ pile in running meters only no certificate will be entertained of having qty in cubical content)	6545.00 Rmt			
A	Year of execution	-			
B	Quantity executed	-			
5	The bidder should have completed/executed at	Rs 5700.00(Lac)			

	least one similar nature of work (i.e. Multistory Parking, Multistory RCC Frame Structure Building, Hospital Project, Modern Bus Stop, Airport Project, Shopping Mall etc.) in last Five financial year (including current year, if opted by the bidder) of value not less than 60 % of the Estimated Cost of the work (bid cost) updated to present price level).				
A	Value of work executed	-			
B	Financial year	-			
7	The bidder should achieved an annual financial turnover of at least 60% of the Estimated Cost of the work (bid cost) i.e 57.00 crore in any one of last Five years (including current year, if opted by the bidder).	5700.00 Lacs			
A	Annual Turn over	-			
B	Financial Year	-			
8	The bidder should have at least 25% of estimated cost as a working capital based on current assets and current liabilities (including the short term loan repayment due in current years)				
9	The bidder should have submit certificate of Net Worth for the Financial Year 2019-20 (from latest audited balance sheet) and should be positive. (Certificate of Chartered Accountant showing				

	calculation of Net Worth must be enclosed).				
10	Affidavit to deploy machinery and equipment as specified in Schedule - III, As per Clause 2d of Special Conditions.	-			
11	Bid Capacity = $(A \times N \times 3 - B)$ As per Clause 2e of Special Conditions.	-			
(i)	A= Maximum value (at present price level) of Civil Engineering work.	-			
(ii)	N = Year of Construction	N=2.5			
(iii)	B = Value at present price level of existing commitments and ongoing works to be executed during "N" period.	-			
(iv)	Litigation History- As per Clause 2f of Special Conditions.	-			
12	Affidavit for Correctness of documents Clause 3(i)	-			
13	Declaration by bidder under RTTP Act. (Annexure A, B, C, D)	-			
14	Undertaking for not Blacklisted				

Signature of Bidder with Seal

Schedule – I
FINANCIAL RESOURCES AND CAPABILITY
 [Reference clause 3 (a)]

1. Name of Bidder: - M/s.....

2. Total financial turnover achieved by the bidder in the last five financial years:

S.N.	Year	Turnover
(a)	2020-2021 (Current Year)	
(b)	2019-2020	
(c)	2018-2019	
(d)	2017-2018	
(e)	2016-2017	
(f)	2015-2016	

Note: Balance Sheets and Profit & Loss Accounts is to be enclosed by the bidder which is considered by him as per criteria 2 (a).

3. Total financial Turnover projected in the current financial year
4. Has the bidder ever been debarred from bidding for Central Government / State Government / any Government undertaking?
Yes / No, if yes give details.
5. Has bidder ever been declared insolvent?
Yes/No, if yes give details.
6. Name(s) and Address of Branch/(s) for bidder's Bankers.

I/We hereby certify that the above information is correct to the best of my/our knowledge and belief.

Date :

Signature of Bidder
(With Seal wherever applicable)

SCHEDULE – II**[Reference clause 3(b)]****Details of Quantities of work executed during last five financial years**

S. No	Name of Works (With agreement No. & Date)	Client	Place (district)	Financial Year	Controlled RCC/Design Mix concrete of Min. M-25 grades and above	Steel Reinf.	Bored Cast in Situ Pile of Min. 600 mm dia and above	Page No.

Signature of Bidder

Note : Certificate from concerned Engineer-in-Charge should be enclosed in support and verification of the above statement.

Schedule – III
[Reference Clause 3(d)]
SELF DECLARATION REGARDING DEPLOYMENT
OF MACHINERY

Signed
 Photograph
 of Applicant

**I/WE..... PROPRIETOR/ PARTNER/ AUTHORIZED
 SIGNATORY OF M/S UNDER TAKE THE OATH THAT I/WE WILL
 DEPLOY THE MACHINERY AND EQUIPMENT LISTED BELOW AS AND WHEN REQUIRED IN THE
 EXECUTION OF THIS WORK.**

S. No.	Name of Machinery	Minimum Requirement (In Nos.)	Availability		
			Owned	Leased	Hire
1	Hydraulic Excavator / JCB (Owned/Lease/Hire)	2	1	1	-
2	Vibrators Plate /Needle/Screed	10	5	5	-
3	Total Station Instrument (Owned/Lease/ Hire)	1	1	-	-
4	Computerized Batch Mix Concrete plant minimum 30 Cum/Hr capacity (Owned/Lease/ Hire)	1	-	1	-
5	Transit Mixers (TM) (Owned/Lease/ Hire)	5	2	3	2
6	Water Tanker (Owned/Lease/ Hire)	3	1	-	1
7	Dumper (Owned/Lease/ Hire)	4	2	-	2
8	Hydra 20 T (Owned/Lease/ Hire)	1	-	1	-
9	Concrete Pump (Owned/Lease/ Hire)	4	1	2	1
10	Hydraulic Pile Rig machine (Owned/Lease/ Hire)	2	-	1	1
11	Shuttering Plates in Sqmt	10000 SqMt.	10000 Sqmt		

I/We hereby certify that the above information is correct to the best of my/our knowledge and belief.

Date:

Signature of Bidder

(With seal)

Note:- The applicant has to enclosed a self attested photo identity card with above affidavit.

SCHEDULE – IV

Reference Clause 3 (e)

DETAILS OF MAXIMUM VALUE CIVIL ENGINEERING WORKS EXECUTED IN ANY ONE YEAR DURING THE LAST FIVE YEARS TAKING INTO ACCOUNT THE COMPLETED AS WELL AS WORKS IN PROGRESS

S. No.	Name of Works (with agreement No. & Date)	Client	Place (district / state)	Financial Year	Cost of Work as per Work Order	Stipulated date of commencement	Stipulated date of completion	Value of work done during the year	Page No.

Date:

Signature of Bidder
(With seal)

SCHEDULE - V**[Reference Clause 3(f)]****DETAILS OF EXISTING COMMITMENTS & ON GOING WORKS TO BE COMPLETED**

S. N o	Name of Works (with agreement t No. & Date)	Client	Cost of Work as per Work Order	Stipulated date of commenceme nt	Stipulated date of completion	Value of balanc e work on date of bid	Likely date of completion of balance work	Pag e No.

Date:

Signature of Bidder
(With seal)

SCHEDULE - VI

[Reference Clause 3(g)]
DETAILS OF LITIGATION OR ARBITRATION CONTRACTS

S. No.	Name of Works (with agreement No. & Date)	Client	Work Order Amount	Disputed Amount Claimed in Litigation / Arbitration	Date of Raising Disputed Amount	Actual Award Amount, if the case is Decided	Cause of Litigation & matter in Dispute

Date:

Signature of Bidder
(With seal)

SCHEDULE – VII
[Reference clause 3(h)]

BID CAPACITY

Name of Bidder : -----

1	A = Maximum value of Civil engineering works executed in any one year during the last Five year (updated to present price level)	Lacs.	Certified details enclosed at Page No.
2	N = Number of years prescribed for completion of the work for which bids area invited	2.5	
3	B = Value at present price level of existing commitments and ongoing works to be completed during next N period	Lacs.	Certified details enclosed at Page No.

$$\begin{aligned} \text{BID CAPACITY} &= A \times N \times 3-B \\ &= \text{.....Lacs.} \end{aligned}$$

Signature of Bidder

ANNEXURE- I**(Reference Clause 3 (i))**

To be given on Non-Judicial stamp Paper of Rs. 50/- only, duly Self Attested

SELF DECLARATION

Signed
Photograph
of Applicant

I/We..... Proprietor/ Partner/ Authorized signatory of
M/s under take the oath that the information furnished by
me/us in schedule I to VI of the Technical Bid for : **“Ram Niwas Bagh Under Ground Parking
Project Phase - II, Jaipur.”** is correct to the best of my/our knowledge. If any information is found
to be incorrect JDA has right to reject the Bid and to take action against me/us as per rules.

Date:

Proprietor/ Partner/ Authorized signatory

M/s

(With seal)

Note:- The applicant has to enclosed a self-attested photo identity card with above affidavit.

ANNEXURE 2**UNDERTAKING FOR NOT BLACKLISTED****(On a Non Judicial Stamp of Rs 50/-)**

I/We S/O Shri.....Age.....Year..... Resident
 of.....
 District.....State.....Proprietor/ Partner/ Authorized signatory of M/s
 hereby declare and undertake as under.

1. I/We declare that _____ in capacity as _____ of _____ has not been charged with any prohibitory and /or penal action such as banning(for specific time or permanent)/de-registration or any other action under the law by any Government and/or Semi Government and/or Government undertaking.
2. I/We declare that I/We have perused and examined the tender document including addendum, condition of contract, specifications, drawings, bill of quantity etc. forming part of tender and accordingly, I/We submit my/our offer to execute the work as per tender documents at the rates quoted by me in capacity as _____ of _____
3. I/We declare that my/our firm have not been Black listed/debarred by any institution of Govt./Semi Govt. /Municipalities etc. for failure to pay any dues or for unsatisfactory performance.
4. I/We declare that my/our Firm has not been adjudged by any Court as insolvent, not Convicted under any law for any offence involving moral turpitude or any criminal activity.
5. I/We declare that the information provided by me/us is true and if any given time it is observed that any of the statement made above is in violation of said declaration, I/We are fully aware that contract will be terminated with immediate effect and Security Deposit / EMD shall be forfeited my/our firm shall be Black Listed or debarred from future tender of Jaipur Development Authority.
6. I/We declare that the information furnished by me/us in Technical Bid for “Ram Niwas Bagh Under Ground Parking Project Phase - II, Jaipur” is correct to the best of my/our knowledge and belief and nothing has been concealed therein. I/We are well aware of the fact that if the information given by me is proved false/not true, I/We shall have to face the punishment as per the law. Also all the benefits availed by me shall be summarily withdrawn and JDA has right to reject the Bid and to take action against me/us as per rules.

Enclose I.D. Proof with self-declaration/undertaking.

.....
 Proprietor/ Partner/ Authorized signatory
 M/s
 Stamp and Signature of Authorized Signatory

Note:

1. The undertaking shall be signed by authorized signatory of the bidder.

GENERAL INFORMATION OF TENDERER**ANNEXURE 3**

A. BIDDER INFORMATION SHEET		
BIDDER s Legal Name	Sole Proprietorship Firm/Partnership Firm /Private Limited Company/Public Limited Company/ Joint Venture/Consortium	
In case of single entity, ownership & control of the Tenderer		
In case of JV/Consortium, Legal name of each partner with percentage participation (also Provide information of each member in separate sheet (page 2 of 2)	Legal Name of JV/Consortium member	% participation
Lead member of JV/Consortium,		
Bidder's actual or intended country of constitution		
Bidder's legal address, telephone numbers, fax numbers, e-mail address.		
Bidder's authorized representative or person-in-charge in case of JV/Consortium, (name, designation address)		

SIGNATURE OF
AUTHORIZED SIGNATORY
ON BEHALF OF BIDDER

ANNEXURE 3

B. JV/CONSORTIUM MEMBER INFORMATION	
JV/Consortium Member of Legal Name	
Legal status of the JV/Consortium Member	Sole Proprietorship Firm/Partnership Firm /Private Limited Company/Public Limited Company
Ownership & control of the JV/Consortium Member	
JV/Consortium Member country of constitution	
JV/Consortium Member of legal address, telephone numbers, fax numbers, e-mail address)	
JV/Consortium Member's authorized representative (name, designation address)	

ATTACH ATTESTED COPIES OF FOLLOWING ORIGINAL DOCUMENTS

- Document in support of legal status and ownership & control of the bidder or each member in case of JV/Consortium (undertaking for sole proprietorship/ partnership deed/ Memorandum & Articles of Association)
- In case JV/Consortium, submit MoU/Agreement (duly notarized) entered into by the joint venture/consortium members, containing intended percentage participation, nomination of Lead Member and division of responsibility to clearly define the work of each member etc.
- Authorization/POA in favour of authorized representative of tenderer to represent the bidder and also in favour of authorized representative of each member in case of JV/Consortium

SIGNATURE OF AUTHORIZED
SIGNATORY

ON BEHALF OF BIDDER

SECTION-IV

PROCURING ENTITY'S REQUIREMENTS

5.1 General

5.1.1 Name of Project – Ramniwas Bagh Underground Parking Project

Phase-II Jaipur

Type of Project – Development of Core Infrastructure:

The objective of this project is to improve the city level parking infrastructure for the rapidly increasing urban population and fast-growing city.

5.1.2 Project Background

Jaipur is known as one of the first planned cities of India. Jaipur City was not only planned but its execution was also coordinated in such a manner that a substantial part of the city developed up within seven years of its foundation. The municipality was reorganized in 1926 and a new Municipal Act was prepared in 1929. Post-independence, planned development of the city was taken up after the city became the capital of Rajasthan.

Jaipur is located at a strategic point on the National Highway (NH-8) that connects Delhi and Mumbai. NH-8 is one of the vertices of the Golden Quadrilateral Corridor of the National Highways Development Project. Jaipur with its exotic culture and tradition attracts domestic as well as foreign tourists. The city is currently the 11th largest city in the country and has one of the highest population growth rates. It is clearly one of the most thriving cities of North India. The city is therefore, bound to have increased spatial expansion in the coming decades in order to accommodate both economic as well as population growth. In this context, it is essential to introduce systematic planning measures for the future development of the city.

The Jaipur Region comprises two distinct constituents; the Jaipur Municipal Corporation Greater & Heritage (JMC) area and the rest of Jaipur Region. Jaipur Development Authority (JDA) is responsible for planning of the Jaipur region. Jaipur Region would henceforth be referred as the JDA area. The entire JDA area comprises Jaipur city and the neighboring satellite towns namely, Chomu, Bagru, Bassi, Sheodaspura, Achrol and Jamwaramgarh. It covers a total area of 1464 sq. kms, out of which, the municipal area of Jaipur covers 288 sq. kms. The JMC area is further divided into the walled city and the rest of JMC area.

The population of Jaipur region is 3.073 million as per 2011 census and has shown a consistent increase in the past 50 years. In a recent international survey, Jaipur was ranked the 7th best place to visit in Asia and in another poll, it was ranked third among twelve major Indian cities.

Modern infrastructural facilities are developing fast. The city is expanding very quickly and has become a hot spot for development in Rajasthan.

Since 2000 Jaipur has become a center for education. Jaipur has more than 40 engineering colleges, 40 business management institutes, 15 pharmacy institutes, 4 hotel management institutes, 3 medical colleges and 6 dental colleges. It also has 8 universities including Rajasthan University.

Jaipur has a well-maintained road network with multi-story flyovers and traffic lights with closed circuit cameras. Police control room (PCR) vans are being equipped with GPS to monitor locations and help maintain law and order. There are so many shopping malls and multiplexes which offer an urban lifestyle to Jaipurites.

The growing population and economic activity are already straining the existing infrastructure. The pressure is being felt by water supply, sewage, power and parking spaces. Since there are several areas within the walled city as well as

outside where congestion is significant on account of roadside parking of vehicles leading to the reduction in effective carriage way for movement of vehicles. Parking is a major issue in the walled city area and an emergent issue in the rest of the city. Roadside parking reduces the effective carriage way.

5.1.3 Introduction to Site

Due to increase in the population of vehicles and commercial activities in the walled city of Jaipur, the traffic has increased tremendously. There are more four wheelers and two wheelers in the city than what it used to be till few years ago. In order to solve the parking problem of the walled city, earlier a two level underground parking was constructed in Ramniwas Bagh for 915 Equivalent Car Units (ECU's). In spite of this the parking, problem is still very acute and immediate solution is required as major population of the city now lives South of M.I.Road but the whole sale and retail markets are still located in the walled city. Construction of additional underground parking in Ram Niwas Bagh underground parking will not only provide more parking space for light motor vehicles but also reduce the traffic congestion and pollution in walled city. This will provide relief to the customers who need parking space for parking their vehicles while coming to the walled city area.

The proposal and benefits are:

1. Ensuring sufficient parking spaces for four wheelers as well as the two wheelers in the defined area.
2. Developing Basement parking will not disturb the land usage in the targeted area, which means underground parking levels accompanied with well managed ground floor activities.
3. Enhanced mechanism taking account of the number of vehicles entering and leaving the area.
4. Smart parking solutions make it easy to track the current availability of parking spaces.
5. Improvement of parking practices makes it more convenient to the user.

In order to augment the supply, it is decided to develop parking facility at Ramniwas Garden Jaipur. JDA has proposed to take up development of multi-level parking space at Ramniwas Garden, Jaipur, on Engineering Procurement and Construction basis.

5.2 Area Details:

Area of the Ramniwas Garden which is considered to be converted into a parking lot Area adjoining to South of existing parking toward Ravindra Manch and below Union Football ground is 49680 sqm (average of both basement levels and ground floor open parking). The layout drawing is enclosed for reference purpose only. It is proposed to develop two basement levels of parking with 3.0 m clear height.

The minimum number of ECS to be developed by the EPC contractor is given below:

S. No.	Type	Number	Equivalent ECS
1	Four-Wheeler	1530	1530
Total			1530

The successful bidder will maintain the grandeur of the Ramniwas Garden by landscaping and traditional Jaipur Architectural design on the terrace of the basement parking. No extra payment shall be made.

Note: The ECS should be required as National Building Code and as per Indian Standard Code.

5.3 Scope of work

The successful bidder has to carry out the developments on the site as underground parking including two basement.

For scope of work, bidder is expected to refer bidding document and also advised to visit the project site. Hence following are some of the important work required to be taken up by the bidder:

Brief scope of work includes:

1. Detailed structural design of the proposed structure. The structure shall be of RCC and shall be designed as per the relevant IS codes.
2. Protection of adjoining property/ structure especially Janana Hospital, Ravindra Manch, Garden Area etc are in bidders' scope. Any loss to property or human being will be sole responsibility of the bidder.
3. Protection by piling around the excavated area is to be done.
4. Development of smart parking system with entry and exit gates, each bay sensors, parking guidance system, smart ticketing system which can accept common mobility card as and when implemented,
5. Design and implementation of the complete lighting as per the relevant IS codes.
6. Design and implementation of MEP.
7. Design and implementation of Signage.
8. Design and implementation of Ventilation system.
9. Design and implementation of each parking bay along with installation of sensors.
10. Design and implementation of Electric substation system including transformer.
11. Design and implementation of DG system with 60% backup of total consumption.
12. Design and implementation of firefighting with Fire Annunciation System, lifts, staircase.
13. All the statutory clearances are in bidders' scope. Authority will provide assistance only.
14. All necessary NOC (fire, Pollution, electrical etc.) required to make the MLCP operational are in bidders' scope. No extra charges will be paid by employer for the same.
15. All the structural drawings and designs shall be prepared by the bidder. The bidder shall submit the same to JDA. JDA shall get it proof checked by IIT/MNIT or equivalent institution. All cost of proof checking shall be borne by the bidder.
16. Carriage of all excavated/ dismantled material up-to the site designated by engineer in-charge is in bidders' scope.
17. Cleaning of area including cutting of trees is in bidders' scope. Re-Plantation of trees, if required in accordance to prevailing law is in bidders' scope.
18. The bidder shall subject to applicable laws and with assistance of the authority is liable to shifting of utilities including electric lines, water supply lines and telephone cables to an appropriate location or alignment within or outside the site if and only if such utility comes or shall cause a material adverse effect on the construction, operation and maintenance of the project. The cost of such shifting is within the bidder's scope.
19. The Contractor shall ensure that senior planning and erection personnel from his organization are assigned exclusively for this project. The Contractor shall appoint one Engineer In-charge holding senior management position in the organization. He shall be assisted on full time basis by a minimum of two electrical engineer & three senior supervisors. The entire staff shall be posted at site on full time basis. Separate ID card to be given by the Contractor to each worker working on site.

20. The project management shall be through modern technique. The Contractor's office at site shall be fully equipped with fax, computers & plotter and shall prepare proper bar chart and completion schedules to be submitted & ensure timely completion. Erection engineer and supervisors shall be provided with mobile communication system so that they can always be reached.
21. The bidder shall procure clean earth excavated at site and refill the clean earth on top of the upper basement slab up to minimum 1.0 m height. Refilling of clean earth is within the scope of work and no extra payment shall be made.
22. Deleted.
23. The contractor will provide office at site fully equipped with fax, Internet, computers, printers and operators for engineer in Charge.
24. Minimum 6 no. automatic lifts of minimum 13 passenger's capacity are to be provided connecting all the floors.

Note: Above scope is indicative only. All the activities including NOC or any other permission/ approval from departments, for work execution or to make the system operational in all respect are in bidders' scope. No extra charges will be paid for the same.

Detailed Scope of work includes but no limited to:

Civil Work-

- i) Complete soil investigation of the whole project as per latest IS code.
- ii) P.T. survey and levelling of whole project site and submission of drawings in 3 sets.
- iii) Getting Consent to Establish & Consent to Operate from pollution control board for underground parking as well as for construction plants & machinery which is used during construction.
- iv) Design - Detailed structural designing of proposed parking structures and get it vetted from MNIT/IIT's through JDA. For designing following consideration are considered-
 - a) The proposed parking structure is designed as a RCC framed structure in which footing can be isolated or combined as per design consideration and conventional slab resting on beam or flat slab may be designed.
 - b) The foundation of proposed RCC framed structures is designed for 2 level underground parking.
 - c) The Proposed parking structure will be designed for earthquake effects.
 - d) Upper basement slab for part-D (Ground in front of Ravindra Manch) will be designed for minimum one meter earth filling over Upper basement slab for maintaining surface garden.
 - e) Upper basement slab for part-E (Union Football Ground) will be designed for minimum one meter earth filling over Upper basement slab for restoring football activities over the ground.
 - f) All floors of proposed parking would be matched to existing parking levels and interlinked with existing one.
 - g) Parking shall be designed with min two exit ramps and two entrances.
- v) Demolition – All the temporary / permanent structures falling in the alignment of proposed parking shall be demolished and disposed-off from the site immediately no additional payment shall be made for demolition work.
- vi) Site protection work

- a) 2.0 Mtr height hard barricading (barricading of minimum 2.0 mtr height at stipulated active site of the same project site, made with angle iron frame of 50x50x5mm and GI sheet of 0.63mm thick including primer painted initially, painting, lettering & border with reflective paint at the time of every shifting, traffic diversion arrangement, safety guard, suitable lightning arrangement during night, complete in all respect till completion of the project as per technical specification and direction of Engineer-In-charge and same shall be possessed by the contractor after completion of the Project.) shall be provided before starting the piling work (all-around the site).
- vii) Protection work before excavation
 - a) The proposed parking site is surrounded by busiest major roads - on south side by M.I. road & east side by Albert hall road.
 - b) For protection work appropriate size of anchored pile and tie beam would be provided as per the design.
- viii) Earth work
 - a) Earth work in excavation shall be started after protection work with the help of hydraulic excavator of capacity 0.9 cum and disposal of surplus excavated earth (excluding qty required for backfilling) with in all lead & lift as per the direction of Engineer-in-charge from immediate effect.
 - b) Compaction of loose earth which was disturbed during excavation shall be carried out at OMC as per relevant code.
- ix) Plain cement concrete – levelling course of 150 mm thick under footing and flooring of M-10 (1:3:6) with 20 mm size aggregate shall be used for PCC by mechanical means.
- x) Reinforced cement concrete – Minimum M-35 grade concrete (RMC) shall be used for all RCC members i.e. Pile, tie beam for piles, footings, beams, columns, lintels, all slabs, lower basement floor, walls etc.
- xi) Reinforcement steel – Primary steel i.e. TATA, SAIL, VIZAG etc of Fe - 500D shall be used for all RCC as per relevant IS codes as per the direction of Engineer-in-charge.
- xii) Shuttering Material – Steel shutting shall be used for all RCC members with steel props (cup lock shuttering) duly designed for carrying construction period loads. The contractor shall submit the drawing & design of steel shuttering dully vetted from MNIT/IIT's before execution of work as per the direction of Engineer-in-charge.
- xiii) Brick work – Class - 75 designated bricks shall be used for brick masonry in 1:4 CM where ever required as per the direction of Engineer-in-charge.
- xiv) Plastering – 20 mm thick 1:4 CM plaster shall be used on outer face of brick work & outer peripheral wall and 12 mm on internal faces as per the direction of Engineer-in-charge.
- xv) Flooring –
 - a) Drive way & parking spaces – 100 mm thick M-30 grade vacuum dense concrete with 4 to 6 mm thick construction joint filled with filler material as per relevant code and as per the direction of Engineer-in-charge.

- b) Electric Room – 25 mm thick kota stone flooring over 25 mm thick 1:3 CM with skirting shall be used as per the direction of Engineer-in-charge.
 - c) Driver waiting – 600 mm x 600 mm vitrified tile with skirting shall be used in driver waiting area as per the direction of Engineer-in-charge.
 - d) Stairs & stair case – 20 mm thick green marble (keshriya ji / amba ji) shall be used for riser and treads with nosing whenever required, 1.2 mtr height dado / skirting shall be used in staircase as per the direction of Engineer-in-charge.
 - e) Lift / Elevator Lobby – 20 mm thick granite (south black / red) shall be used for lobby area of lift / elevator and dado on lift walls as per the direction of Engineer-in-charge.
- xvi) Finishing – Contractor shall apply two & more coat branded putty over plastered surface and shall apply two & more coat branded exterior acrylic emulsion paint on primed surface as per the direction of Engineer-in-charge.
- xvii) Door/Window –
 - a) Door frame - Pressed steel door frames of profile 'C' confirming to IS: 4351 manufactured from commercial mild steel sheet of 1.25 mm thickness including hinges jamb, lock jamb, bead and if required angle threshold of mild steel angle of section 50x25mm, or base ties of 1.25mm pressed mild steel welded or rigidly fixed together by mechanical means, adjustable lugs with split end tail to each jamb including steel butt hinges 2.5mm thick with mortar guards, lock strike-plate and shock absorbers as specified and applying a coat of approved steel primer after pre-treatment of the surface as directed by Engineer-in-charge
 - b) Door Shutter – Commercial veneer 35 mm thick flush door shutter of ISI 2202-67 marked shall be used as per the direction of Engineer-in-charge.
 - c) Rolling Shutter – Automatically operated steel rolling shutter on all entry / exit ramps shall be provided.
 - d) Window / Ventilator - Factory made ISI marked steel glazed doors, windows and ventilators side /top /centre hung with beading and all members such as F7D, F4B, K11 B and K12 B etc. complete of standard rolled steel sections, joints mitred and flash butt welded and sash bars tenoned and rivetted with 15x3mm lugs, 10cm long, embedded in cement concrete blocks 15x10x10cm of 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size) or with wooden plugs and screws or rawl plugs and screws or with fixing clips or with bolts and nuts as required, including providing and fixing of hinges, pivots, float glass panes with glazing clips and special metal sash putty of approved make and a priming coat of approved steel primer excluding the cost of metal beading and other fittings except necessary hinges or pivots complete as per approved design.
- xviii) Water proofing –
 - a) Water proofing over roof - shall provide APP (Atactic Polypropylene Polymer) modified prefabricated five layer, 3mm thick water proofing

membrane, black finished reinforced with glass fiber matt consisting of a coat of bitumen primer for bitumen membrane @ 0.40 ltr/sqm. by the same membrane manufactured of density at 25°C, 0.87 - 0.89 kg/ltr and viscosity 70 - 160 cps. over the primer coat the layer of membrane shall be laid using Butane torch and sealing all joints etc., and preparing the surface complete. The vital physical and chemical parameters of the membrane shall be : Joint strength in longitudinal and transverse direction at 23°C as 350/300 N/5cm. Tear strength in longitudinal and transverse direction as 60/80N. Softening point of membrane not less than 150°C. Cold flexibility shall be upto -2°C when tested in accordance with ASTM, D - 5147. The laying of membrane shall be got done through the authorized applicator of the manufacturer of membrane : 3 mm thick

- b) Gola – shall be provide 150x150 mm in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 10mm and down gauge) including finishing with cement mortar 1:3 (1 cement : 3 fine sand) as per standard design and adequate doges of water proofing compound as per the direction of Engineer-in-charge.

xix) Exit / Entrance ramps –

- a) Structure – Structure for exit / entrance ramps shall be of steel structure with columns and trusses as per approved drawing & design including erection and painting as per the direction of Engineer-in-charge.
- b) Roofing – Shall be used of colour coated trapezoidal profile sheet of 1015mm supply cover width and 1072mm effective supply nominal 28.5mm deep ribs with subtle square fluting in the five pan at nominal 200mm centre-to-centre. The end rib shall be designed for anti-capillary action, to avoid any seepage of water through the lateral overlap. The feed material is manufactured out of nominal 0.50 mm Total Coated Thickness (TCT), Hi-Tensile steel with min. 550 MPa yield strength, metallic hot dip coated with Aluminium- Zinc alloy (55% Aluminium, 45% Zinc) as per AS 1397 - Zinalume AZ150 (Min. 150 gms/sq.mt. total on both sides) with Colorbond steel quality paint coat. The paint shall have a total coating thickness of nominal 35 pm, comprising of nominal 20 pm exterior coat on top surface and nominal 5 pm reverse coat on back surface over nominal 5 pm primer coat on both surfaces of approved colour shade by the department. The steel sheet shall be fastened with nominal 40 pm zinc coated or nominal 25 pm zinc-tin alloy coated, Hex head, self-drilling screw as per AS 3566-2002 class 3 fasteners of approved make (Buildex orequivalent) with EPDM washer as per the requirement considering the profile shape and design load. the fastener size shall be calculated as per the design or manufacturers recommendations. The profile sheet, fastner size etc. shall be approved by teh department. The miniumum overlap of the sheet should not be less than 75mm. All the accessories like gutter/flashing/capping shall be made iron the same material (or manufactures recommendation) which is used for main cladding application. The measurement shall be based on finished/covered surface area (Lysaght TRIMDEK Tata Blue Scope or equivalent make or equivalent) as per the direction of Engineer-in-charge.

- xx) Curing – Membrane curing (hassan cloth), & water ponding methods shall be for adopted for RCC/Cementitious member as per the direction of Engineer-in-charge.
- xxi) Metal work – Proper designed steel hand railing for stair case and exit and entrance ramps shall be used as per the direction of Engineer-in-charge.
- xxii) Parking signage/markings – Adequate traffic / parking signage / marking shall be provided for smooth traffic movement and retro- reflectorized cautionary, mandatory and informatory signage as per IRC :67 for parking area and surrounding areas as per the direction of Engineer-in-charge.
- xxiii) Tube well – 3 nos 250 mm dia tube shall be provided for water requirement for firefighting. Getting permission from concern department shall be on the contractor's part. Proper connection from the tube well to water tank shall be provided.
- xxiv) Rain water harvesting – Adequate number of Rain Water Harvesting structures shall be provided as per the direction of Engineer-in-charge.
- xxv) Restoration of site – Site shall be restored at its original position like restoration of kerb stone, footpaths, B.T. roads, C.C. Roads, boundary walls, grills / gratings etc as per the direction of Engineer-in-charge.
- xxvi) Site office & Laboratory – Well-furnished site office space with computers / printers shall be provided also shall establish the testing laboratory with desired number of testing equipment's for carrying out various test on site as per relevant codes. Also provide a seven seater vehicle model not less than 2018 for site visit for JDA.
- xxvii) Safety measures – shall adhere all safety measures and safety codes to achieve zero fatal injury. If contractor fail to adhere safety norms, Engineer-in-charge shall impose a penalty of maximum 10% amount of contract value which shall never be refunded in any case.
- xxviii) Earth filling with available surplus soil excavated from foundations and taken from only from outside of building plinth in layers not exceeding 20cm in depth, consolidating each deposited layer including ramming and watering and consolidation

Electric Work –

- a) Complete design and implementation of lightening system in whole parking space.
- b) Compete design and installation of sub-station.
- c) Complete design and installation of fire-fighting system.
- d) Complete design and installation of Smart Parking Solution.
- e) Complete design and installation of CCTV System.
- f) Complete design and installation of 10 Kw Solar PV System.
- g) Complete design and installation of forced ventilation
- h) Complete design and installation of lift & elevators.

A. Electrical Works-

- 750 kVA 2 Nos. DG sets with PLC based DG synchronization control panel.
- Panel work for all services with LT Cables
- Other required accessories.

- B. Dewatering System**
- 2 HP Submersible pump complete in all respect.
- C. Parking Management System**
- 4 No boom barrier.
 - Ticket Dispenser unit.
 - Automatic number plate reader System.
 - Outdoor/Indoor LED Guidance Display.
 - Parking Sensor.
 - Server as required for the system
 - Other required accessories.
- D. CCTV Security System**
- 5 Mega pixel CCTV Cameras
 - Network Video Server
 - Switches, Racks, Display, Optical fiber cable, CAT-6 Cable
 - Other required accessories
- E. Solar PV System**
- 10 K.W. Grid connected solar power plant with mounting stricture, Net metring, Invertor
 - Other required accessories.
- F. Elevators**
- 16 Passenger 3 Stope, Machine room less elevator with ARD
 - Other required accessories.
- G. Fire Detection & Fighting works**
- Addressable fire alarm panel.
 - Heat detectors, Hooters, Control relay modules etc.
 - 6 Zone call station with mixer amplifier and Speakers.
 - LED signages.
 - 2850 LPM electric driven fire pump.
 - 2850 LPM diesel engine fire pump.
 - 180 LPM Jockey pump
 - Fire extinguishers
 - Other required accessories.
- H. Force ventilation**
- 315 mm dia jet vent fans
 - Axial fans for normal exhaust, smoke exhaust and fresh air exhaust.
 - CO detectors

- Other required accessories.

I. 33/0.4 KV Sub-Station work

- 33/0.4 KV Dry type 2 Nos Transformers having capacity 1000 KVA each.
- 33 KV Main cubical panel consisting of one incoming and two outgoing panels with copper bus bar.
- Bus trunking system, HT Cable.
- Other required accessories.

The scope of work also includes the following:

The contractor shall responsible for 5 year operation and maintenance of all the services commissioned by contractor under the contract. No extra payment shall be made for the following:

- The contractor should deploy staff for working hours between 6:00 AM to 10:00 PM (in two shift) as per below-
 1. At-least one electrician per shift of max. 8 hrs. with one supervisor. Electrician shall have electrical wireman license with min. 2 years experience and supervisor shall have electrical supervisor license with min. 3 years experience.
 2. At-least one lift operator for each lift having experience two years (first shift 6:00 AM to 2:00 PM and second shift 2:00 PM to 10:00 PM). One supervisor with min. 3 years lift work experience alongwith ITI certificate (Experience certificate is required).
 3. One experienced operator of force ventilation for each shift with 2 year experience. One supervisor with min. 3 years for ventilation work experience along with ITI certificate (Experience certificate is required).
 4. One experienced operator for fire detection and firefighting system for each shift shall have 2 years experience with one supervisor having min. 3 year experience of fire system work along with ITI certificate (Experience certificate is required).
 5. One operator for parking Management and CCTV security system for each shift The operator shall have CCNA certificate with at-least 2 years experience. One supervisor having IT Diploma with Min. 3 years experience.
- For complete supervision of all services one engineer should be deployed by the contractor. The engineer shall have Degree or Diploma with Min. 5 year experience in electrical field.
- The operation and maintenance of the installation shall be carried out between 8:00 AM to 10:00 PM including Saturday, Sunday and other holidays. Necessary staff required for the work shall be deployed on shift duty with necessary reliever for weekly off purpose. All necessary tools required for the maintenance shall be provided by contractor.
- The staff deployed in the parking should be in proper uniform with safety apparels, photo identity cards.
- The contractor shall be responsible to maintain all record that are required for the purpose of operation and maintenance including logbook, complaint register, inventory register, attendance register and all other records as is considered necessary.
- The contractor shall be responsible for any act of negligence on his part or on the part of employee due to mishap or accident occurred in the system and injuries thereon.

- The contractor or sub-contractor engaged in the work shall possess valid electrical contractor licenses.
- If any fault and damage occurs in the system/installations, same shall be repaired/restored in two hours during DLP. If fault not removed in scheduled time, penalty will imposed as below and shall be recovered from his performance security /security deposit-

○ For minor fault –	- 0 to 2 Hours.	- NIL
After 2 hours -	- Rs. 100 per hour.	
○ For minor equipment damage	- 0 to 6 Hrs.	-NIL
After 6 Hrs.	- Rs. 500 per day.	
○ Major equipment fault/damage	- 0 to 7 days	-NIL
After 7 days	- Rs. 5000 per Week	
- The contractor shall submit original equipment manufacturer's certificate for all major items with five years warranty.
- All the equipment should have factory inspection by JDA's engineer in charge as per prevailing IS code, prior to dispatch the material. All the expenses occurred during the inspection will be borne by the contractor.
- The successful bidder maintenance shall submit the report to Executive Engineer, Electrical JDA every fortnightly. Drawing out of water accumulation from basement will be in bidder's scope of work.
- In case of failure of successful bidder to perform his obligation as specified in the scope of work, JDA shall be free to carry out the work and shall recover two times of actual expenditure occurred on the work from his performance security/security deposit.

5.4 Contractor Obligation

- A. On the site the facilities to be provided for round the clock parking.
- B. The space for minimum 1530 ECS are required to be provided.
- C. While undertaking development of the Project, the Successful Bidder shall adhere to the latest amended National Building Code of India, other relevant IS Codes and practices, Development Control Rules, FSI Limits, statutory requirements, laws of land, the principles of good industry practices and any other norms as applicable from time to time.
- D. The concrete grade as well as flooring will be as per the relevant Bureau of Indian Standard and IRC standards. All the drawings will be submitted to the Authority and after their approval only the construction activity will start.
- E. On completion of the work, the place will be handed over to JDA However, the contractor will be responsible for maintaining the asset for 5 years of Defect Liability Period, during which period, the contractor will be liable to rectify/amend any defect, including those for civil works, mechanical/electrical and instrumentation works, sensors and will change all the equipment or parts there of promptly and without any additional cost.
- F. Water and Electricity charges from start date to final handing-over of site are in bidder's scope.

5.5 DETAILED TECHNICAL SPECIFICATIONS:

5.5.1 INTRODUCTION

5.5.1.1 PREAMBLE

The technical specifications for the execution of works are detailed out in this particular document. These are to be read in conjunction with the Drawings.

Specifications given are in amplification OR in addition to the specifications/requirements indicated in the relevant codes & standards and shall comply with the local rules and regulations.

The Technical Specifications shall be generally as brought out in the “Standard Specifications published by RUIDP” in force as latest publication with all amendments. Tenderer shall procure the copy of the same at his own cost from RUIDP.

The Technical Specifications, in accordance with which the entire work described hereinafter, shall be constructed and completed by the Contractor, comprises of the following:

5.5.2 EXCAVATION AND BACKFILL: -

5.5.2.1 Scope: -

This specification describes the general requirements of excavation and earthwork in different materials, site grading, filling, including filling back around foundations and plinths, disposal of surplus soil, stacking as directed by the Engineer and all other related operations and activities for the intent and purpose of work covered under this Specification.

5.5.2.2 Applicable Codes and Specifications

The latest revision of the following Indian Standards and Codes, unless otherwise specified, shall be applicable to all Excavation and Earthwork.

IS:783	Code of practice for laying of pipe.
IS:1200	Method of measurements of Building and civil Engineering works
IS:3764	Safety Code for Excavation Work
IS:2720 Part– II	Determination of Moisture Content
Part–VII	Determination of Moisture Content - Dry Density Relation using Light Compaction.
Part – VIII	Determination of Moisture Content - Dry Density Relation using Heavy Compaction.
Part – XXVIII	Determination of Dry Density of Soils, In place, by the Sand Replacement Method.
Part – XXIX	Determination of Dry Density of Soils, In place, by the Core Cutter Method.

5.5.2.3 General: -

The Engineer will furnish drawings wherever, in his opinion, such drawings are required to show areas to be excavated and/or filled and the sequence of priorities of such work. The Contractor shall visit the site and make himself knowledgeable about the site conditions and the surroundings. The Contractor shall ascertain the nature of the ground to be excavated and the work to be done and shall accept all responsibility for the cost of the work involved.

Before starting the excavation, the site shall be cleared of all structure's debris, bushes, shrubs, tree roots, vegetation, grass, trees, and other undesirable rubbish. Unsuitable material obtained from the excavation shall be disposed off the building area as directed. Material suitable for backfilling or otherwise shall be stacked within Site Premises or as directed for reuse. Surplus materials shall be used for levelling the ground around the structure within the site premises as directed. Rate of excavation will include sorting out of useful material and stacking the same separately including multiple handling if required. Any obstacle encountered during the excavation shall be reported to the Engineer and shall be dealt with as instructed.

5.5.2.4 Support to excavations: -

Excavation shall be left open for a short period as practicable and necessary also well protected with Piling protection. Immediately before laying of foundations or other such construction work therein, the sides of excavation shall be trimmed temporary ropes erected, if necessary, to contain loose earth, and the bottom shall be cleaned free of loose or disturbed ground, well rammed and approved by the Engineer.

5.5.2.5 Setting Out: -

The Contractor shall set out the centreline layout of the building or other involved works after clearing the site and get the same approved by the Engineer. It shall be the responsibility of the Contractor to install substantial reference marks, bench marks etc. and maintain the same as long as required by the Engineer. The Contractor shall assume full responsibility for proper setting out, alignment, elevation and dimension of each and all parts of the work as per drawings and instructions.

5.5.2.6 Ground Level and Site Level: -

Before starting the excavation, the requisite block levels of the entire plot shall be taken by the Contractor in consultation with the Engineer and a proper record of these levels shall be jointly signed by the Contractor and the Engineer. A block level plan showing all ground levels of the plot shall be prepared and shall jointly be signed by the Contractor and the Engineer. The levels shall be taken at intervals of 5.0 M or less as required and directed.

5.5.2.7 Classification: -

All materials to be excavated shall be classified by Engineer into one of the following classes and be paid for at the rate tendered for that particular class of material. No distinction shall be made whether the material is dry, moist or wet. The decision of Engineer regarding the classification of the material shall be final and binding on Contractor and not be a subject matter of any appeal or arbitration.

All earthwork shall be classified under any of the following Categories:

5.5.2.8 Dense & hard soils: -

These shall include all kinds of soils containing kankar, sand, silt, Murom, shingle, gravel, clay, loam, peat, ash, shale etc. which can generally be excavated by spade, pick axes and shovel and which is not classified under soft and decomposed rock and hard rock defined below. This shall also include embedded rock boulders not longer than 1 meter in any direction & not more than 200 mm in any one of other two directions.

5.5.2.9 Soft and Decomposed Rock

These shall include rock, boulders, slag, chalk, slate, hard mica schist, laterite and all other material which in the opinion of Engineer is rock but does not need blasting and could be removed with picks, hammer, crow bars, wedges or pneumatic breaking equipment. The mere fact that Contractor resorts to blasting for reasons of his own shall not qualify for classification under hard rock. This shall also include excavation in macadam and tarred roads and pavements. This shall also include rock boulders not longer than 1 meter in any direction and not more than 500 mm in any one of the other two directions. Masonry to be dismantled lying underground will also be measured under this item.

5.5.2.10 Hard Rock: -

These shall include all rock occurring in large continuous masses, which cannot be removed except by chiselling or blasting for loosening it. Harder varieties of rock with or without weans and secondary minerals, which in the opinion of Engineer require blasting, shall be considered as hard rock. Boulders of rock occurring in such sizes and not classified under (a) and (b) above shall also be classified as hard rock. Concrete work both reinforced and unreinforced to be dismantled will be measured under this item, unless a separate provision is made in the Schedule of Quantities.

5.5.2.11 Shoring: -

The sides of the excavation should be timbered and shored in such a way as is necessary to secure that from falling in and the shoring shall be maintained in position as long as necessary in the opinion of the engineer. The Contractor shall be responsible for the proper design of the shoring to hold the sides of the excavation in position and ensure safety to persons. The shoring shall be removed as directed after the items for which it is required are completed.

5.5.2.12 Earth Work for leveling of the area: -

Before earth work is started, the area coming under cutting and filling shall be cleared of shrubs, vegetation, grass, trees, saplings of girth and rubbish removed outside the periphery of the area by the Contractor at his cost under clearance and as directed by the Engineer. The roots of trees shall be removed to a minimum depth of 600 mm below ground level or 300 mm below foundation level whichever is deeper and the hollows filled up with approved earth/ P.C.C. as directed by the Engineer, levelled and rammed to the satisfaction of the Engineer at no extra cost. Under no circumstances shall undermining or undercutting be allowed. The final surface shall be neatly dressed and compacted to the required levels. Any extra cutting done, shall be filled back on the approved earth / PCC as directed by the Engineer duly consolidated at the Contractor's cost.

During the execution of the work, the natural drainage of the area shall be maintained by the Contractor. The approved earth from cutting shall be directly used for filling as directed. The filling of the approved material, as directed by the Engineer, shall be done in layers, each layer of not more than 300 mm depth, watered and consolidated with roller not less than 10 MT.

A proctor density of 95% needs to be achieved for this compaction. The earth used for filling shall be free from all roots, rubbish, grass and all lumps and clods shall be broken before filling. The top surface of finally finished area shall be neatly dressed and compacted.

5.5.2.13 Protection: -

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

5.5.2.14 Stacking of Excavated Materials: -

All materials excavated will remain the property of the Employer and rate for excavation shall include sorting out of useful materials and stacking them on site as directed. Materials suitable and useful for backfilling, plinth filling or levelling of the plot or other use shall be stacked in convenient places but not in such a way as to obstruct free movement of men, material and vehicles or encroach on the area required for constructional purposes or beyond the site boundary.

5.5.2.15 Dewatering: -

The contractor shall be responsible, at his own cost for controlling and diverting properly all the surface, monsoon and sub-soil water during the excavation work. The contractor shall furnish, install and operate all necessary equipment's to keep the excavation area free from water during construction. He shall dispose off such water as per the directions of the Engineer.

Rate for excavation shall include bailing or pumping out water which may accumulate in the excavation during the progress of work either from seepage, springs, rain or any other cause and diverting surface flow, if any, by bunds or other means. Pumping out water shall be done in such a approved manner as to preclude the possibility of any damage to the foundation trench, concrete or masonry or any adjacent structure. When water is met in foundation trenches or in tank excavations, pumping out water shall be from auxiliary pit of adequate size dug slightly outside the building excavations by the Contractor at his own cost. The depth of auxiliary pit shall be refilled with approved excavation materials after the dewatering is over by the Contractor at his own cost. The excavation shall be kept free from water:

- A. During inspection and measurement.
- B. When concrete and/or masonry work is in progress and till it comes above the natural water level and Till the Engineer considers that the concrete / mortar is sufficiently set.

Unless separately provided for in the Schedule of Quantities, the cost of dewatering is deemed to have been included in the unit rates quoted for excavation.

5.5.2.16 Use of rock from site: -

If the Contractor utilizes rock excavated from site for rubble soling / masonry due credit shall be given to client in the rate quoted by him for that item.

5.5.2.17 Disposal of surplus Material: -

The contractor shall dispose off all the surplus excavated materials including deleterious and organic materials at disposal area designated by the Engineer within the lead specified in the relevant Bill of Quantity item. All necessary permissions will be his own responsibility. The necessary royalty if payable as per the Govt./ Statutory Bodies shall be deemed to be included in quoted rates.

This material shall be spread evenly in layers as per the Engineer's instructions. The excavated material intended for subsequent backfill or other filling purpose shall be stored temporarily at locations designated by the Engineer.

5.5.3 Backfilling: -

All fill material shall be subject to Engineer's approval. If any material is rejected by Engineer, Contractor shall remove the same forthwith from the site at no extra cost to the Owner. Surplus fill material shall be deposited/disposed off as directed by Engineer after the fill work is completed.

5.5.3.1 Materials: -

To the extent possible available selected surplus soil from excavated materials shall be used as backfill. Fill material shall be free from clods, salts, sulphates, organic or other foreign material. All clods of earth shall be broken or removed. Where excavated material is mostly rock, the boulders shall be broken into piece not larger than 150 mm size, mixed with properly graded fine material consisting of Murom or earth to fill up the voids and the mixture used for filling.

5.5.3.2 Borrowed material: -

If any selected fill material is required to be borrowed. Contractor shall make arrangements for bringing such material from borrow pits outside the owner's premises. The material and source shall be subject to prior approval of Engineer. The approved borrow area shall be cleared of all bushes, roots of trees, plants, rubbish etc. Soil containing salts/sulphate and other foreign material shall be removed. The materials so removed shall be burnt or disposed off as directed by Engineer. Contractor shall make necessary access roads to borrow areas and maintain the same at his cost if such access road does not exist.

5.5.3.3 Filling in pits, trenches and around foundations of structures, walls etc.

As soon as the work in foundations has been accepted and measured, the spaces around the foundations, structures, pits, trenches etc. shall be cleared of all debris, and filled with earth in layers not exceeding 200 mm, each layer being watered, rammed and properly compacted before the succeeding one is laid. Each layer shall be compacted to the satisfaction of the Engineer. Earth shall be rammed with approved mechanical compaction rammers. Usually no manual compaction shall be allowed, unless Engineer is satisfied that in some cases manual compaction by tampers cannot be avoided. The final backfill surface shall be trimmed and levelled to proper profile as directed by Engineer or as indicated on the drawings.

5.5.3.4 Plinth filling: -

Plinth filling shall be carried out with approved material, as described herein before, in layers not exceeding 150 mm, watered and compacted with mechanical compaction machines. Engineer may however permit manual compaction by hand tampers in case he is satisfied that mechanical compaction is not possible. The filling will be done at optimum moisture content to achieve maximum density of fill.

5.5.3.5 Sand filling in plinth and other places: -

At places where so specified in the BoQ item, backfilling shall be carried out with local sand if directed by Engineer. The sand used shall be clean, medium grained and free from impurities. The filled-in-sand shall be kept flooded with water for 24 hours to ensure maximum consolidation. Any temporary work required to contain sand under flooded condition shall be to Contractor's account. The surface of the consolidated sand shall be dressed to required level or slope. Construction of floors or other structures on sand fill shall not be started until Engineer has inspected & approved the fill.

5.5.3.6 Filling in trenches for pipes and drains: -

Filling in trenches for pipes and drains shall be commenced as soon as the joints of pipe and drains have been tested and passed. The backfilling material shall be properly consolidated by watering and ramming, taking due care that no damage is caused to the pipes.

Where the trenches are excavated in soil the filling from the bottom of the trench to the level of the centreline of the pipe shall be done by hand compaction with selected approved earth in layers not exceeding 80 mm; backfilling above the level of the centreline of the pipe shall be done with selected earth by hand compaction or other approved means in layers not exceeding 150 mm.

In case of excavation of trenches in rock the filling up to a level of 300 mm. above the top of the pipe shall be done with fine materials such as, earth, Murom etc. The filling up of the level of the centreline of the pipe shall be done by hand compaction in layers not exceeding 80 mm, whereas the filling above the centreline of the pipe shall be done by hand compaction or approved means in layers not exceeding 150 mm. The filling from a level 300 mm above the top of the pipe to the top of the trench shall be done by hand or other approved mechanical method (with broken rock filling of size not exceeding 150 mm mixed with fine material as available to fill up the voids.) Filling of the trenches shall be carried simultaneously on both sides of the pipe to avoid unequal pressure on the pipe.

No excavation of foundations shall be filled in or covered up until all measurements of excavation; masonry, concrete and works below ground level are jointly recorded. In case back filling is done without recording measurements of foundation work, the Contractor will have to remove back filling at his cost for taking measurements otherwise the foundation work will not be measured and will not be paid for.

5.5.3.7 Rates to include for excavation items: -

Apart from other factors mentioned elsewhere in this contract, rates for the item of excavation shall also include for the following:

- a) Clearing the site of all bushes, grass, roots of trees etc.
- b) Setting out works, profiles etc. as required.
- c) Bailing and pumping out water as required and directed.
- d) Excavation at all depth (unless otherwise specified in the Schedule of Quantities) and removal of all materials of whatever nature wet or dry and necessary for the construction of foundation, underground reservoir etc., preparing bed for laying concrete, for roads etc.
- e) Sorting out useful excavated material and conveying beyond the structure and stacking them neatly on the site for backfilling or reuse as directed and disposing off surplus / unusable material.
- f) Necessary protection including labor, materials and equipment's to ensure safety and protection against risk or accident.
- g) Backfilling in layers and with adequate compacting as per relevant IS code.
- h) The excavation remaining after constructing the footings, columns, plinth beams etc.

5.5.3.8 Mode of Measurement: -

Excavation for foundation of columns, beams, walls and the like shall be measured and paid net as per plan dimensions of bed concrete at the lowest level. As shown in the drawing (the length and breadth) and depth shall be computed from the concerned drawings / Excavation levels and ground levels taken before excavation.

Any additional excavation required for working space, work, planking, dewatering and strutting etc. shall not be measured and not to be paid separately but rates quoted for excavation shall include for all these factors. No increase in bulk after excavation shall be made. The excavation in the rock shall be measured by stack measurements after deducting 50% quantity towards voids. The stacks of broken rock shall be made on a levelled ground of not more than 1.2 m height, & the cost of the same shall be included in the rate of the excavation. If the excavated earth is mixture of rock & soil, the quantities for excavation in the soil shall be obtain after deducting rock quantity (Measured by stack measurements) from total excavation quantity in the area.

Excavation beyond dimensions of base concrete for foundation as per drawing or below required level shall be filled back by the Contractor at his cost as directed by the Engineer.

5.5.4 ANTI-TERMITE TREATMENT

5.5.4.1 Chemicals

The treatment of the areas shall be carried out by applying one of the following chemicals at not less than the designated concentration:

Chemicals	Concentration
Biflex	TC 0.05% concentration
Dieldrin	0.5% applied in oil solution or water
Trichlorobenzene	1 part to 3-part oil

The Contractor shall clearly indicate along with his quotation the chemical he proposes to use. A daily record shall be maintained by the Contractor indicating the amount of work done and the quantity of chemical consumed for the work.

5.5.4.2 Treatment for Masonry Foundation and Basements

The bottom surface and sides (up to a height of 300 mm from the bottom) of the excavations made for masonry foundations and basements shall be treated with the chemical emulsion mentioned above at 5 litres/m² of surface area.

5.5.4.3 Treatment of Backfill Earth

After the masonry foundations and retaining walls of the basement come up, the backfill in immediate contact with the foundation structure shall be treated with the chemical emulsion at the rate of 7.5 litres/m² of the vertical surface of the sub structure for each side. The earth is usually returned in layers and the treatment shall be carried out in similar stages. The chemical emulsion shall be directed towards the concrete or masonry surfaces of the columns and walls so that the earth in contact with these surfaces is well treated with the chemical.

5.5.4.4 Treatment for R.C.C. Foundations and Basements

The treatment shall start at a depth of 500 mm below the ground level except when ground level is raised or lowered by filling or cutting after the foundations have been cast. In such cases the depth of 500 mm shall be determined from the new soil level resulting from filling or cutting mentioned above and soil in immediate contact with the vertical surface of RCC foundations. From this depth, the backfill around the columns, beams and RCC basement walls shall be treated at the rate of 7.5 litres/m². The other details of the treatment shall be as laid down in 5.4.4.2, 5.4.4.3 above.

5.5.4.5 Treatment of Top Surface of Plinth Filling

The top surface of the consolidated earth within the walls shall be treated with the chemical emulsion at the rate of 5 liters/m² of the surface before the sand bed or subgrade is laid. If the filled earth has been well rammed and the surface does not allow the emulsion to seep through, holes shall be made up to 50 to 75 mm deep at 150 mm centres both ways and may be made with 12 mm diameter mild steel rod on the surface to facilitate absorption of the emulsion.

5.5.4.6 Treatment at Junction of Walls and Floor

Special care shall be taken to establish continuity of the vertical chemical barrier on inner wall surfaces from the ground level (where it has stopped with the treatment described in 3.4 above) up to the level of the filled earth surface. To achieve this, a small channel 30 mm x 30 mm shall be made at all the junctions of wall and columns with the floor (before laying the sub grade) and rod holes made in the channel up to the ground level 150 mm apart and the rod moved backward and forward to break up the earth and chemical emulsion poured along with channel at the rate of 7.5 liters/m² of the vertical wall or column surface of the sub structure so as to soak the soil right to the bottom. The soil should be tamped back into place after this operation.

5.5.4.7 Treatment of Soil along external perimeter of building

After the building is complete, the earth along the external perimeter of the building should be rodded at intervals of 150 mm and to a depth of 300 mm. The rods should be moved backward and forward parallel to the wall to break up the earth and chemical emulsion poured along the wall at the rate of 7.5 litres/m² of vertical surfaces. After the treatment, the earth should be tamped back into place. Should the earth outside the building be graded on completion of building, this treatment should be carried out on the completion of such grading. In the event of filling being more than 300 mm, the external perimeter treatment shall extend to the full depth of filling up to the ground level so as to ensure continuity of the chemical barrier.

5.5.4.8 Treatment of Soil under apron along external perimeter of building

Top surface of the consolidated earth over which the apron is to be laid shall be treated with chemical emulsion at the rate of 5 litres/m² of the vertical surface before the apron is laid. If consolidated earth does not allow emulsion to seep through, holes up to 50 to 75 mm deep at 150 mm centre both ways may be made with 12 mm diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion.

5.5.4.9 Treatment for Walls retaining soil above floor level

Retaining walls like the basement walls or outer walls above the floor level retaining soil need to be protected by providing chemical barrier by treatment of retained soil in the immediate vicinity of the wall, so as to prevent entry of termites through the voids in masonry, cracks and crevices etc., above the floor level. The soil retained by the walls shall be treated at the rate of 7.5 liters/m² of the vertical surface so as to affect a continuous outer chemical barrier in continuation of the one formed under column centre.

5.5.4.10 Treatment of Soil surrounding pipes, wastes and conduits

When pipes, wastes and conduits enter the soil inside the area of the foundation, the soil surrounding the point of entry must be loosened around each such pipe, waste or conduits for a distance of 150 mm and up to a depth of 75 mm before the treatment is commenced.

When they enter the soil, they shall be similarly treated unless they stand clear of the walls of the building by about 75 mm for a distance of over 300 mm.

5.5.4.11 Treatment to Expansion Joints

Expansion joints at ground floor level are one of the biggest hazards for termite infestation. The soil beneath these joints should receive special attention when the treatment under 3.5 is carried out. This treatment should be supplemented by treating through the expansion joint after the sub grade has been laid at the rate of 2 liters/m.

5.5.4.12 Spraying Equipment

A pressure pump shall be used to carry out spraying operations to facilitate proper penetration of chemicals into the earth.

5.5.4.13 Safety Precautions

These chemicals shall be brought to site in the form of emulsifiable concentrates. The containers should be clearly labeled and should be stored carefully so that children and pets cannot get at them. They should be kept securely closed. Workers should wear clean clothing and should wash thoroughly with soap water, especially before eating and smoking. If chemicals splash into the eyes, they shall be flushed with plenty of soap, water and immediate medical attention should be sought. The concentrates are oil solutions and present a fire hazard owing to the use of petroleum solvents. Flames, sparks, etc. should not be allowed while mixing. Care should be taken in the application of chemicals to see that they are not allowed to contaminate wells or springs, which serve as sources of drinking water.

5.5.4.14 Guarantee - 10 years

In the unlikely event of any treatment becoming necessary subsequently during the guarantee period, necessary inspection and treatment as required shall be carried out free of cost.

5.5.5 RUBBLE SOLING

5.5.5.1 General

The Contractor shall get the sources and quality of rubble approved by the Engineer. The Contractor shall be fully responsible for any or all compensations to be paid as royalty, rents or damages to properties and injuries to persons etc., caused in obtaining the rubble. No claim on account of any obstruction caused in collection of materials or difficulties or action arising out of quarrying in Government or private land shall be entertained and the client shall remain indemnified with regard to such action and payment. Quarrying shall be done only from sound portions of approved quarries; the disintegrated and weathered portions being rejected. The rubble of approx. 220 to 250 mm in size shall be hard, tough, sound durable, dense clean of coarse texture, free from unsound material, cracks, decay and weathering. There, water absorption shall be as low as possible, but not more than 5%.

The Contractor shall get a sample of rubble stone approved by the Engineer before ordering his supply. All leads and lifts for transporting the rubble to the site and place of work are included in the rate for the item. The stones to be used shall be broken rubble with fairly regular shape and free of weathered, soft and decayed portion. The rubble shall be of sound stones. The stones shall be of full depth of the soling, and the length and width shall not generally exceed two times the height. The stones to be used for wedging in the joints between larger stones shall be chips of the largest size

possible to fit the interstices. The bed on which rubble filling is to be laid shall be cleared of all loose material, leveled, compacted and approved by the Engineer before laying rubble soling.

Rubble soling shall be laid to the specified thickness closely packed by hand and firmly set, the interstices between adjacent stones shall be wedged in with smaller stones of proper size and shape and well driven in with wooden mallets to ensure a tightly packed layer. Such wedging shall closely follow the placing of the larger stones. The residual interstices shall be filled and packed with sand. After hand packing and wedging, compaction of the soling shall be done thoroughly with rammers. Adequate care shall be taken by the Contractor while laying and compacting the rubble soling to see that the masonry or any part of the structure is not damaged.

5.5.5.2 Brick Soling

The ground shall be dressed, consolidated by ramming or by light rolling and a 12-mm thick cushion of sand laid. The bricks shall be laid on the sand cushion with fine joints and placed firmly in position by hammering with wooden mallet. The surface shall be free from undulations. The 'frog' side shall be on the underside. The joints shall be broken in all direction and bricks cut as required. The pattern of laying and number of layers shall be as per Schedule of Item. Orientation shall be as desired by the Engineer. After laying of each layer of bricks, sand shall be spread over and worked into the joints to pack the bricks tight.

5.5.5.3 Rubble Soling

The rubble stones shall be sound, hard and durable. They shall have at least one dimension equal to the thickness of rubble packing and shall in any case, not be less than 150 mm in any direction. The stones shall be carefully hand packed with longest side of each stone (which in no case shall be less than thickness of rubble packing) placed vertical with the smaller face of the two ends at the top. All interstices between stones shall be filled in solid with well driven stone chips and the surface shall be made uniform with sand. The surface shall be formed to such slopes as directed by the Engineer. The rubble packing shall be thoroughly consolidated and sprinkled with water. The rubble soling surface shall be finished with murum or sand as per the instructions of the Engineer. The depth of rubble packing shall be taken as consolidated depth. The concrete for flooring shall be laid over rubble packing only after the Engineer issues order to that effect.

5.5.5.4 Mode of Measurement

The item shall be measured in cubic meters according to the volume specified.

5.5.6 CONCRETE WORK: -

5.5.6.1 Scope: -

This specification describes the general requirements for concrete to be used on projects using in-situ production facilities including the requirements in regard to the quality, handling, storage of ingredients, proportioning, batching, mixing and testing of concrete, the requirements in regard to the quality, storage, bending and fixing of reinforcement and the transportation of concrete from the mixer to the place of final deposit, placing, curing, protecting, repairing and finishing.

5.5.6.2 Applicable codes and Specifications: -**5.5.6.2.1 Materials: -**

IS:269	Specification for Ordinary, rapid-hardening and low heat Portland Cement
IS:455	Specification for Portland Blast Furnace Slag Cement
IS:1489	Specification for Portland- Pozzolana Cement
IS:8112	High strength 43 grade cement
IS:12269	High strength 53 grade cement
IS:12330	Sulphate resistant cement
IS:8042	White cement
IS:4031	Method of physical tests for Hydraulic Cement
IS:650	Specification for Standard Sand for Testing of Cement
IS:383	Specification for coarse and fine aggregates from natural sources for concrete.
IS:2386	Method of tests for aggregates for concrete (Part I to VIII)
IS:516	Method of tests for strength of concrete.
IS:1199	Method of sampling and analysis of concrete.
IS:3025	Method of sampling and test (physical and chemical) water used in industry.
IS:3550	Method of test for routine control for water used in Industry.
IS:4990	Specification for Plywood for concrete shuttering work.

5.5.6.2.2 Equipment: -

IS:1791	Specification for batch type concrete mixers.
IS:2438	Specification for Roller Pan Mixer.
IS:2505	Specification for Concrete Vibrators.
IS:2506	Specification for Screed Board Concrete Vibrators.
IS:2514	Specification for Concrete Vibrating Tables.
IS:3366	Specification for Pan Vibrators
IS:4656	Specification for Form Vibrators for Concrete.
IS:2722	Specification for portable swing weigh Batchers for Concrete. (single & double bucket type).
IS:2750	Specification for Steel Scaffoldings.

5.5.6.2.3 Codes of Practices: -

IS:456	Code of Practice for plain and reinforced concrete
IS:457	Code of Practice for general construction of plain and reinforced concrete for dams and other massive structures.
IS:1343	Code of Practice for pre-stressed concrete.
IS:3370 (Part I to IV)	Code of Practice for concrete structures for storage of liquids.
IS:3935	Code of Practice for composite construction.

IS:3201	Criteria for design and construction of precast concrete trusses.
IS:2204	Code of Practice for construction of reinforced concrete shell roof
IS:2210	Criteria for the design of R.C. shell structures and folded plates.
IS:2751	Code of Practice for welding of mild steel bars used for reinforced Concrete construction.
IS:2502.	Code of Practice for bending and fixing of bars for concrete reinforcement.
IS:3558	Code of practice for use of immersion vibrators for consolidating concrete.
IS:3414	Code of Practice for design and installation of joints in buildings.
IS:4014	Code of Practice for steel tubular, scaffolding (Part I & II)
IS:2571	Code of Practice for laying in situ cement concrete flooring.
IS:13920	Code of Practice for ductile detailing of reinforced concrete structures Subjected to seismic forces.
IS:3696 (Part I & II)	Safety Code for scaffolds and ladders

5.5.6.3**Construction Safety: -**

In the event that any state, city or other governmental bodies enforce requirements more stringent than those set forth in this Specification by reference thereto and shall supersede this Specification where applicable and any additional cost of complying therewith shall be deemed to be included in the quoted rates for concrete work.

5.5.6.4**General: -**

The quality of materials and methods and control of manufacture and transportation of all concrete work irrespective of mix, whether reinforced or otherwise, shall conform to the relevant portions of this Specification.

The Engineer shall have the right to inspect the source of materials, the layout and operation of procurement and quality control systems. Such inspection shall be arranged and the approval of the Engineer obtained prior to the commencement of concrete work.

5.5.6.5**Material for Standard Concrete: -**

Ingredients used in the manufacture of standard concrete shall consist solely of a standard type Portland cement, clean sand, natural coarse aggregate, clean water and admixtures, if specified.

5.5.6.5.1**Cement: -**

Cement used on the works shall comply with the requirements of IS:269-1976 for ordinary or low heat Portland cement, IS:8112-1976 for high strength ordinary Portland cement and

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IS:1489-1976 for Portland Pozzolana, IS:455-1989 for Slag Cement and obtained from approved sources.

If ordered by the Engineer-in-Charge certificate of tests from an approved laboratory shall be obtained at the Contractor's cost. Samples for test shall be extracted as in Clause 5.6 IS:3535-1966 within one week of delivery and the test shall be made within four weeks of delivery and the test shall be made within four weeks of delivery. All cement shall be stored in weatherproof structures and prevented from damage by moisture. These buildings shall be provided by the Contractor at his own cost and placed in locations approved by the Engineer. Provision for storage shall be ample and shipments of cement as received shall be separately stored so as to provide easy access for identification and inspection of each shipment. Storage buildings shall have a capacity for the storage of sufficient cement to allow sampling & testing at least 15 days before use. The cement should be stacked on wooden platform leaving a gap of at least 150 mm between ground & the cement bag. The bags should not be touching to the walls & should be placed at least 300 mm away from sidewalls. Maximum 10 bags or max by 5'5" in height for safe handling should be allowed in each stack. While shifting the bags from one place to other no hooks shall be allowed.

Stored cement shall meet the test requirements at any time after storage when re-test is ordered by Engineer.

The Contractor shall keep an accurate record of the delivery of cement along with its batch no & week of manufacture if the cement is 4-week-old at the time of purchase should not be purchased and its use in the work. Copies of the record shall be supplied to the Engineer-in-Charge as required.

Cement shall be used in the sequence in which it is received & within 8 weeks from the date of manufacture. No cement shall be unnecessarily stored for a long period. If the cement becomes lumpy it shall be removed from the site immediately. Any cement which has deteriorated or which has been damaged or contaminated, whether during transit to the site or at the site or otherwise, shall not be used and shall be immediately removed from the site and replaced at the expense of the Contractor.

5.5.6.5.2 Admixtures: -

The admixture shall be conformed to IS:9103. The use of admixtures to improve workability is allowed only if there is a proven evidence that neither the strength nor the other requisite qualities of concrete and/or steel, accessories, grout etc. are impaired by their use. The use of admixtures containing Calcium Chloride, Fluorides, Nitrates and Sulphates is prohibited.

The Engineer's decision on all matters relating to the use of admixtures shall be final.

Admixtures shall be stored in a suitable weatherproof building. Any material which has deteriorated or which has been contaminated or damaged whether during transit or at site shall not be used and shall be immediately removed from the site and replaced at the Contractor's own expense.

5.5.6.5.3**Dosage: -**

Optimal dosage of a superplasticizer is important. Dosage beyond the optimal dosage may be detrimental and can cause segregation or excessive retardation, which can be harmful to concrete. The dosage optimization can be done by using Marsh Cone apparatus or using mini slump test or by the flow table methods described in ASTM C109.

5.5.6.5.4**Aggregates: -**

All aggregates shall generally conform to the requirements of IS:383. Materials shall be used only from sources of supply approved by the Engineer. Any material which has deteriorated or been contaminated shall not be used for concrete. All aspects of aggregates handling and storage are subject to the approval of the Engineer and shall be such as to minimize segregation and breakage and prevent contamination by grass, soil, wood, sawdust, oil, aggregates of other sizes or other foreign materials and so that adequate supplies are available at site in advance of the requirements. Each size of aggregate shall be stored on a separate platform or stockpile at locations to be approved by the Engineer and such platform or stockpiles shall be sufficiently removed from each other to prevent the material at edges of the edges of the piles from becoming intermixed by constructing bund walls at constructional cost. If the aggregates are stockpiled on the ground, the bottom portion of the stockpiles within one foot of the ground shall not be used.

For both fine and coarse aggregates, tests shall be carried out, for physical characteristics, limits of deleterious substances and soundness prior to use and also whenever the source of supply is changed. All tests will be conducted by the Contractor's expense at a laboratory or in facilities approved by the Engineer. Sand shall be of approved quality, clean, sharp and free from injurious amount of silt dust, mica, shells, soft and flaky particles, shale, alkali, organic matter, loam or other deleterious substances. The sand shall be from a source approved by the Engineer, and if required by him it shall be thoroughly washed, screened and graded by the Contractor at his own expense to the satisfaction of the Engineer, and he shall include in his rate the cost of washing. It shall be within the range of grading zone I and grading zone II of table III of IS:383. The sand shall have a fineness modulus of not less than 2.2 or more than 3.2. Stone dust or grit shall not be permitted.

Coarse aggregates shall be rounded / angular crushed stone of uniform sizes and gravel or shingle shall not be permitted. The whole of the ingredients of the coarse aggregates shall consist of hard stone free from deleterious substances and contain soft or elongated pieces or white spots. If it is considered necessary, the Engineer may instruct that it be washed, screened and graded at the Contractor's expense. The Contractor shall include in his price for concrete the cost of washing and screening the aggregate. Coarse aggregates of size 4.75 mm to 10 mm called as M1 & of size 10mm to 20mm called as M2 shall be stacked separately & should not be allowed to get intermixed at site prior to putting in concrete mixer by constructing bund walls at stock pits at contractor's cost. The coarse aggregates shall have a fineness modulus of not less than 5.5 or more than 8.0.

5.5.6.5.5 **Mixing Water: -**

The water for mixing concrete shall be potable & shall be first tested at the Contractor's expense for its suitability by a laboratory approved by the Engineer. It is usually required to be fit for drinking, or to be taken from an approved source. This is to ensure that the water is reasonably free from such impurities as suspended solid, organic matter, dissolved salts which may adversely affect the proper ties of the concrete, especially the setting and hardening. If required IS:3025 and IS:3550 may be followed for testing. If the quality of water to be used for mixing concrete is in doubt, it should be assessed by comparing the setting times of cement paste and the compressive strength of concrete made with it and with tap water under similar conditions. Seawater shall not be used for concrete work.

5.5.7 **Expansion and Isolation joints**

Expansion and isolation joints in concrete structures shall be provided at specified places, as detailed indicated on the drawings. The materials and types of joints shall be as specified hereinafter. In case of liquid retaining structures, additional precautions shall be taken to prevent leakage of liquids as may be specified on the drawings or as directed by the Engineer. All materials shall be procured from reliable/specified manufacturers and must have the approval of the Engineer.

5.4.7.1 **Bitumen Board**

Bitumen impregnated fiber board of approved manufacture as per IS:1838 may be used as fillers for expansion joints.

5.4.7.2 **Expanded Polystyrene Boards**

If required, commercial quality expanded polystyrene products commonly used for thermal insulations shall also be used as filler material in expansion joints. The thickness may vary from 12 mm to 50 mm. A coat of Bitumen paint shall be applied on the board against which concrete shall be placed.

5.4.7.3 Joint Sealing Strips

Joint sealing strips may be provided at the construction, expansion and isolation joints as a continuous diaphragm to contain the filler material and/or to exclude passage of water or any other material into or out of the structure. The sealing strips shall be either metallic like G.I., Aluminum or Copper, or non-metallic like rubber or PVC.

5.4.7.4 Polysulphide Sealant

Joints shall be sealed using a two-component, non-sag, polysulphide joint sealant. The sealant must be capable of reaching initial cure in less than 3 hours at 25°C and full cure in less than one week at 25°C.

The sealant must be capable of accommodating repeated cyclic movement of up to +30% and –30%. The sealant must provide an excellent bond to common masonry, metal glass and ceramic surfaces when used with the appropriate primer.

The sealant manufacturer must be accredited to ISO 9001.

5.4.7.5 Mode of Measurement

Concrete in ground floor paving and concrete mat below footings and plinth beams and lift shafts shall be measured in cubic meter.

Footings shall be measured in cubic meter up to bottom of pedestals. Columns including pedestals shall be measured in cubic meter, height being measured from top of footings or of lower slab up to soffit of upper slab. Where adjacent slab thickness differ, average soffit shall be considered. Plinth beams and floor beams shall be measured in cubic meter length being considered between faces of supporting columns or beams and depth being considered as projecting either above or below slabs or chajjas. Slabs & chajjas shall be measured in cubic meter being the product of their projected superficial areas including bearing by the depth.

Staircase steps with waist shall be measured in cubic meter, landing being measured along with slabs and chajjas.

Lintels, mullions, bed-blocks, sills and copings shall be measured in cubic meter. In general, IS:1200 (Part II) shall be followed.

A Check List shall be prepared by the Contractor as directed by the Engineer and no concreting work shall be done till all the points in the Check-List are checked.

5.5.8 Formwork & Staging: -**5.5.8.1 Scope: -**

This Specification deals with supply of approved drawings, materials, cleaning, treatments & removal of formwork both below ground level and above ground level for all types of concrete works.

Where ever indicated by the Engineer-in-charge or shown on the drawings, the contractor would prepare detailed drawings for the staging and enabling works, designed for all the construction loads mentioned below and the scheme approved and signed by a registered Structural Engineer.

5.5.8.2 General: -

The formwork surface in contact with concrete shall be either steel plates not less than 12 G thick or plywood not less than 12mm thick, or timber planks not less than 25 mm thick all with stiff steel and/ or timber backing frame work. The framework shall be properly designed to take the load of wet concrete; the reinforcement & all type of live load & impact load such as man, machinery & equipment's for placing, compacting, finishing & supervising the

entire activity of concreting. The framework shall also be strong enough to take impact or other type of load while placing compacting. The contractor shall use adequate nos of supports/toe rods with prior permission from engineer to ensure exact finished dimensions of concrete members. The form contact surface shall be oiled before positioning the reinforcement and avoiding contact with the reinforcement. Formwork shall be such that all joints are mortar tight and their removal is possible without jarring the concrete. The staging shall be of steel / timber props with steel / timber headers, kickers, stiffeners, ledgers, joints, shoring and bracing. Bamboos shall not be used anywhere in the staging or bracing. No nails shall be driven anywhere in the staging or bracing. No nails shall be driven anywhere in the already poured concrete to fix or support the staging or formwork. The size number and disposition of props and other staging shall be such as to safely carry the full-imposed operational loads including the effects of vibration.

For exposed interior and exterior concrete surfaces of beams, columns and walls plywood or other approved forms, thoroughly cleaned and tied together with approved corrosion-resistant devices shall be used. Utmost care shall be exercised in ensuring that all columns forms are plumb and true and thoroughly cross-braced to keep them so till the required time. All floor and beam centering shall be crowned not less than 8 mm in all directions for every 5 meters span. Unless described on the Drawing or elsewhere to the contrary beveled strips 25 mm x 25 mm shall be provided, without any extra charge, to form angles and in the corner of column and beam boxes for chamfering of corners. Temporary openings for cleaning, inspection and for pouring concrete shall be provided at the base of vertical forms and at other places where they are necessary and as may be directed by the Engineer-in-Charge. The temporary openings shall be so formed that they can be conveniently closed when required and must not leave any mark on the concrete.

Forms may be reused but before each reuse they shall be thoroughly scraped and cleaned, joints gone over and repaired, and insides re-treated to prevent adhesion. The shape, strength, rigidity, mortar tightness and surface smoothness of formwork and staging shall be maintained at all times to the satisfaction of the Engineer. It shall be Contractor's sole and ultimate responsibility to design, erect, maintain and remove the formwork staging efficiently. The Engineer may however approve the system or instruct the Contractor to make modifications therein. Such modifications shall be incorporated by the Contractor without claiming any extras. Contractor has to take prior approval for Shuttering scheme.

5.5.8.3 Removal of Forms: -

The Contractor shall record on the drawings or in other approved manner, the date on which the concrete is placed in each part of the work and the date on which the formwork is removed there from and have this record checked and counter signed by the Engineer-in-Charge. The Contractor shall be responsible for the safe removal of the formwork but the Engineer-in-Charge may delay the timing if he considers it necessary. Any work showing signs of damage through premature removal of formwork or loading

shall be entirely reconstructed by the Contractor without any extra cost to the Owner.

Forms for various types of structural components may be removed before the maximum periods specified below (Table V) which shall also be subject to the approval of the Engineer-in-Charge. Engineer at his discretion may extend this maximum period for removal of formwork and Contractor shall retain the formwork for a longer period as desired by the Engineer-in-Charge at no extra cost to the Owner.

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

Table: Removal of formwork

Removal of formwork	Minimum Period (as required by Engineer)
Vertical faces of footing, beams and columns, walls	24 hours
Under sides of slabs	7 days
Under sides of beams (Up to 6.0 m span)	14 days
Under sides of beams (More than 6.0 m span)	21 days
Under sides of beams (With props left under)	7 days

Note:

- If Portland puzzolana cement is used (if specifically allowed), time required is to be increased as per instructions of Engineer.
- If concreting is done inclement weather i.e. temperature below 10°C or above 40°C, the above periods shall be suitably increased as per instructions of Engineer.
- Above details given in the table is not applicable for PT slab.

5.5.8.4 Tolerance in Finished Concrete: -

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

For

Sectional dimensions	± 5 mm
Plumb	1 in 1000 of height
Levels	+ 3 mm before any deflection has taken place.

The tolerances given above are specified for local aberration in the finished concrete surface and should not be taken as tolerance for the entire structure taken as a whole for the setting and alignment of formwork which should be as accurate as possible and true to shape required to the satisfaction of the Engineer-in-Charge. Any error, within the above tolerance limits, or any other

as may be specially set up by the Engineer-in- Charge, if noticed in any of the structure after part or portion stripping of forms, shall be corrected in the subsequent work to bring back the structure to its true line, level and alignment.

5.5.9 Cement Concrete (plain/reinforced): -

5.5.9.1 Scope: -

This specification deals with cement concrete, plain or reinforced, for general use, and covers the requirements for concrete materials, their storage, handling grading, mix design, strength and quality requirements, pouring at all levels, protection, curing, finishing and other related works.

The Contractor shall furnish all labor, materials and equipment form, plan and finish all structural concrete and miscellaneous items complete as indicated in the drawings/or directed by Engineer.

The Contractor shall be given the option to make arrangements and procure his own coarse aggregates from a source, approved by the Engineer. In case however, it is found by the Engineer-in-charge that the coarse aggregates are not suitable or fail to pass the tests, the contractor shall be required to get the rocks from the quarries and install his own crusher within the work site to be decided and approved by the Engineer-in-Charge, to crush the rocks and produce the coarse aggregates. The contractor shall make his own arrangements to quarry out rocks suitable for manufacture of coarse aggregates from the quarries and shall at his own cost, arrange to transport the rocks/boulders from these quarries to the location of the crusher. The installation of the crusher and screen of adequate size and capacity shall be done such that the desired quantum of coarse aggregates in accordance with the specifications are available. Power supply for running this crusher shall be given to the contractor at a charge equal to the prevailing tariff rate of State Electricity Board as prevalent for that area at the time of Award of Work. The Contractor shall not be eligible for any extra claim for performing all the above operations for supplying required quality and quantity of coarse aggregates for concreting purposes.

The provision of IS:456 latest revision shall be complied with unless permitted otherwise and any other Indian Standard Code (latest revision) shall form a part of this Specification to the extent it has been referred to or applicable within this Specification.

5.5.9.2 General: -

Concrete shall be either ordinary or controlled, in grades designated as M15, M20, M25, M30, etc. as specified in IS:456. In case of liquid retaining structures, IS:3370 will be followed. Plain/Lean concrete shall be 1:4:8, 1:3:6 nominal mix with aggregate of nominal size 40 mm maximum; and of 1:2:4 mix with 20 mm and down aggregates or as indicated on Drawings and Schedule of items.

Ordinary concrete is recommended only when accurate control is impracticable and not necessary, as directed by the Engineer-in-Charge, ordinary concrete may not require preparation of trial mix.

Concrete mix proportions for ordinary concrete shall be as per IS:456.

In proportioning concrete, the quantity of cement shall be determined by actual weight. The quantities of fine and coarse aggregates may be determined by volume, but preferably by weight. If the aggregates are moist, allowance shall be made for bulking and weight in accordance with IS:2386 (Part III). Allowance shall also be made for surface water present in the aggregates when computing the water content. The amount of surface water shall be determined by one of the field methods described in IS:2386 (Part III). All the above data shall be ascertained and maintained properly to the satisfaction of the Engineer-in-Charge.

The water cement ratio shall not be more than those specified in IS:456. The cement content of any nominal mix proportion shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction, so that the water cement ratio specified above for a particular mix is not exceeded. No extra payment shall be made to the contractor for use of the extra cement.

Preliminary tests, as specified, in the IS Code and required by the Engineer-in-Charge, shall be carried out sufficiently in advance of the actual commencement of the work with different grades of concrete made from representative samples of aggregates and cement expected to be used on the job to ascertain the ratios by weight of cement of total quantity of fine and coarse aggregates and the water-cement ratio required to produce a concrete of specified strength and desired workability.

Table: Minimum Cement Content for design mix (Controlled concrete)

Grade of concrete as per IS:456	Content of 43 grade in kg/m ³ of finished concrete
M15	240
M20	300
M25	300
M30	320
M35	340
M40	360
M45	440
M50	460

The minimum cement content for each grade of concrete shall be as per Table 5.6.2 above. If the requirement of cement is found to be more than that specified below, then such excess quantities of cement shall be used and for which no extra payment shall be made.

At least 4 trial batches are to be made and 7 test cubes taken for each batch noting the slump on each mix. These cubes shall then be properly cured and two cubes for each mix shall be tested in a testing laboratory approved by Engineer-in-Charge at 7 days and others at 28 days for obtaining the ultimate compressive strength. The test reports shall be submitted to the Engineer-in-Charge. The cost of mix design and testing shall be borne by the Contractor. On the basis of the preliminary test reports for trial mix, a proportion of mix by weight and water- cement ratio shall be approved by the Engineering- Charge, which shall be expected to give the required strength,

consistency and workability and the proportions so decided for different grades of concrete shall be adhered to during all concreting operations. If, materials, being used get changed from those used for ascertaining mix design, the contractor shall have to run similar trial mixes to redesign the mix proportions and consistency. It shall be within the competency of the Engineer-in-Charge to reduce the number of trial batches and then number of test specimens mentioned above. Further, the Engineer-in-Charge may also allow adoption of the mixes already tried and found satisfactory, with similar materials, for other jobs at the same site, without any fresh design of mix.

The mix once approved must not be varied without prior approval of the Engineer-in-Charge. However, should the contractor anticipate any change in the quality of future supply of materials than the ones used for preliminary mix design, he shall inform the same to the Engineer-in-Charge and bring fresh samples well in advance to carry out fresh trial mixes. The Engineer-in-Charge shall have access to all places and laboratory where design mix is prepared. Design mix shall indicate by means of graphs and curves, etc. the extent of variation in the grading of aggregates, which can be allowed. In designing the mix proportions of concrete, the quantity of both cement and aggregate shall be determined by weight. The Engineer-in-Charge may allow the quantity of aggregates to be determined by equivalent volume basis, after the relationship between the weight and volume is well established by trial, and the same shall be in calibrated ranks or weighed. All measuring equipment shall be maintained in clean and serviceable condition, and their accuracy periodically checked.

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

5.5.9.3 Strength Requirements: -

Where ordinary Portland cement conforming to IS:269 or Portland blast furnace slag cement conforming to IS:455 is used the compressive strength requirements for various grades of concrete shall be as shown in Table III. Where rapid Hardening Portland cement is used, the 28 days compressive strength requirements specified in Table III shall be met in 7 days. The strength requirements specified in Table III shall apply to both controlled concrete and ordinary concrete.

Table: Strength requirements of concrete

Grades of concrete as per IS 456	Min compressive strength conducted in accordance with IS:516 (N/mm ²)			
	For 150 mm cube specimens at 7 days Work Test	For 150 mm cube specimen at 28 days	For 150 mm cube specimen at 28 days	
			Preliminary Test	Work Test
M15	10		20	15

M20	13.5	26	20
M25	17	32	25
M30	20	38	30
M35	23.5	45.5	35
M40	26.7	52	40
M45	30	58.5	45
M50	33.33	65	50

Other requirements of concrete strength as may be desired by the Engineer-in-Charge shall be in accordance with Indian Standard IS:456. The acceptance of strength of concrete shall be as per Clause 16 "Sample size and Acceptance Criteria" of IS:456 subject to stipulations and/or modifications stated elsewhere in this specification.

Concrete work found unsuitable for acceptance shall have to be dismantled & replaced to the satisfaction of the Engineer-in-Charge by the Contractor free of cost to the Owner. No payment for the dismantled concrete, the relevant formwork and reinforcement, embedded fixtures, etc. wasted in the dismantled portion shall be made. In the course of dismantling, if any damage is done to the embedded items or adjacent structures, the same shall also be made good free of charge by the Contractor to the satisfaction of the Engineer-in-Charge.

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

With permission of the Engineer-in-Charge, for any of the above-mentioned grades of concrete, if the water quantity has to be increased in special cases, cement shall also be increased proportionately to keep the ratio of water to cement same as adopted in trial mix design for each grade of concrete. No extra payment for the additional cement provided on this account shall be made to the Contractor.

5.5.9.4 Workability: -

5.5.9.4.1 Mixing: -

The workability of concrete shall be checked at frequent intervals by slump Test. Where facilities exist, and if required by the Engineer-in-Charge, alternatively, the Compacting Factor test in accordance with IS:1199 shall be carried out.

The degree of workability necessary to allow the concrete to be well consolidated and to be worked into the corners of formwork and around the reinforcement to give the required surface finish shall depend on the type and nature of the structure and shall be based on past experience and tests. The limits of consistency for structures are as specified in Table IV below:

Table: Workability

Placing conditions	Workability with vibration	
	Degree	Slump
Concreting of shallow section footing/raft	Low	25 - 75
Beams/columns etc. lightly reinforced sections	Medium	50 -100
Heavy reinforced sections	High	100 -150

Thorough mixing of the concrete is essential and all concrete shall be mixed on weigh batching machine.

A mixing time of not less than two minutes after all materials including water, have entered the mixing drum shall be considered as a satisfactory period for mixers up to 1 cum capacity.

A slightly longer mixing time may be required for mixers exceeding 1 cum capacity and for dry concrete mixes. Mixing time, however, vary according to the type of mixer and the above periods may be modified by the Engineer according to the observed mixing efficiency.

When the concrete is mixed, the complete contents of the drum shall be discharged in one operation into a hopper or container. Mixing time is lost and risk of segregation occurs if the batch is discharged into a number of separate barrows or containers.

At the start of the day the first batch or two of the concrete will be harsh and stony because some mortar will stick to the inside of the drum around the blades. The proportion of coarse aggregate shall therefore be reduced for the first mix or two.

The mixer shall be thoroughly washed from inside and the blades cleaned after use. The inside of the drum shall be inspected regularly and any blades, which are worn or broken, shall be replaced.

When hand mixing is permitted by the Engineer-in-Charge for concrete to be used in relatively unimportant structures, it shall be carried out on a watertight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in color and consistency. In case of hand mixing, extra cement @ 10% of design mix shall be added to each batch at no extra cost to the Owner.

5.5.9.4.2 Conveying Concrete:

Concrete shall be handled and conveyed from the place of mixing to the place of final laying by approved means, before the initial setting of the cement starts. Concrete should be conveyed in such a way so that no segregation or loss of any of the ingredients takes place. If segregation does occur during transport, the concrete shall be re-mixed. During very hot or cold weather, if directed by the Engineer-in-Charge, concrete shall be transported in deep containers, which will reduce the rate of water loss, by evaporation and loss of heat. No extra water shall be poured on to the concrete while placing it.

Conveying equipment's for concrete shall be well maintained and thoroughly cleaned before commencement of concrete mixing. Such equipment shall be kept free from set concrete.

5.5.9.4.3 Placing: -

No concrete shall be started until the surface on which it is to be laid has been checked and approved by the Engineer.

Concrete shall be transported from the mixer to the place of final laying and rapidly as practicable and by methods, which shall prevent segregation or loss of ingredients. Equipment's for cutting, pumping and pneumatically conveying concrete shall be of such size and design as to ensure a practically continuous flow of concrete at the delivery and without any segregation of ingredients. The interval between adding the water to the dry materials in the mixer and the completion of the final placing inclusive of compaction of the concrete shall be well within the initial setting time for the particular mix. As far as possible concrete shall be placed in formwork by the means approved by Engineer and not be dropped from a height or handled in a manner which may cause segregation.

Care must be taken to ensure that the inserts, fixtures, reinforcement and formwork are not displaced or distorted during placing of concrete. No concrete shall be placed in open, while it rains, if there has been any sign of washing of cement and sand, the concrete shall be entirely removed immediately. Suitable precautions shall be taken in advance to guard against rains before leaving the fresh concrete unattended. No

accumulation of water shall be permitted on or around freshly laid concrete. Slabs beams and similar members shall be poured in one operation normally. In special circumstances, with the approval of the Engineer, these can be poured in horizontal layers not exceeding 500 mm in depth. When poured in layers it must be ensured that the under layer is not already hardened. Bleeding of under layer, if any shall be effectively removed. Molding, throating, drip course, etc. shall be poured as shown on the Drawing or as desired by the Engineer. Holes shall be provided and bolts, sleeves, anchors, fastenings or other fixtures shall be embedded in concrete as shown on the approved Drawings or as directed by the Engineer. Any deviation there from shall be set right by the Contractor at his own cost, as instructed by the Engineer.

5.5.9.4.4 Compacting: -

The object of compacting concrete is to achieve maximum density. The concrete shall therefore, be placed a little in excess of its specified, so that after proper compaction its final desired depth is obtained. Manually rodding and tapping the concrete and tapping the formwork on its external face shall be continuously carried out at the actual pouring head, while compacting the concrete with mechanical vibrations shall be done sufficient distance away from the pouring

head, so that the vibrator is utilized only to compact the concrete and not to spread it.

Slabs shall be vibrated with plate vibrators.

Beams and Columns shall be vibrated using immersion vibrators as per IS:2505 and IS:3558; thin sections like water tank walls shall be vibrated using surface vibrators. The Contractor shall at all times have in reserve sufficient vibrators of each variety to guard against shut down of the work occasioned by the failure of the equipment in operation and to permit the equipment to be serviced and overhauled in rotation. No concreting will be permitted in the event of power failure or vibrator failure. The Engineer, may, at his absolute discretion, permit concreting by increasing the slump and correspondingly increasing the cement contents at the Contractor's cost; but in that case the concrete compacted without mechanical vibration shall be paid for at a rate 10% less than Contract rates. Except for shallow or inaccessible concrete, the vibrator shall be penetrated vertically at regular distance and intervals, not at an angle or at haphazard intervals. It is better to vibrate at smaller intervals for shorter periods of time, rather than at wider intervals for longer period of times.

At corners, obstructions, embedded fixtures and congested reinforcement areas, the vibrators shall be manipulated with the utmost care and handled only by the most experienced workmen. All vibrating operations for the entire duration of the job shall be carried out by the same set of workmen.

5.5.9.4.5 Curing: -

All freshly placed concrete surfaces shall be protected from the elements and from defacement during building operations. The Contractor shall provide and use, enough tarpaulins or other suitable materials to cover completely or enclose, all freshly finished concrete. As soon as the concrete has hardened sufficiently to prevent damage, it shall be cured maintaining the concrete in a damp condition by application of wet sacking or other approved moisture retaining covering for a period of 28 days after placing the concrete.

Extreme care shall be taken to ensure that all surfaces are kept in a moist condition and no local area shall be allowed to dry out intermittently.

If the concrete surface; at the time of removing the form, is observed rough, honeycombed or with the loose aggregates, the necessary rectifications like pressure (injection) grouting will be carried out by the Contractor at his own cost as per the instructions from the Engineer.

The Engineer may order testing of concrete, if the concrete is observed doubtful from the strength and durability point of view and all the cost of testing, and other cost such as delay in further work etc. will be borne by the Contractor.

5.5.9.4.6 Finish to Concrete Surface: -

Finish to concrete surfaces at various situations shall be as per direction of the Engineer. Where form finish is specified, the final

surface shall be smooth and even and no undulations, ridges, spots etc. shall be permitted. They shall also be laid to pattern as directed. In case surfaces intended and directed for form finish, exhibit any of the defects above mentioned, the surfaces shall be rubbed with carborundum or plastered and the finished as directed at the risk and cost of the Contractor. The decision as to the acceptability or otherwise of a surface will be notified by the Engineer and the Contractor will implement the instructions accordingly.

5.5.9.4.7 Concrete Cover for Reinforcement: -

Where not specially indicated in the drawings, concrete cover for reinforcement shall be as per the latest Indian Standards and as per direction at site from time to time. Properly cured concrete cover blocks to suit various covers as required shall be provided in adequate numbers sufficiently ahead of the work.

For works buried below ground level, only annular cover blocks shall be used.

5.5.9.4.8 Construction Joints: -

When the work is to be interrupted, the concrete shall be rebated at the joint to such shape and size as may be required by the Engineer-in-Charge or as shown on the drawings. All vertical construction joints shall be made with stop boards, which are rigidly fixed and slotted to allow for the passage of the reinforcing steel. If desired by the Engineer-in-Charge, keys and/or dowel bars shall be provided at the construction joints. In the case of water retaining structures, water-stop of approved material shall be provided if so, specified on the Drawing or desired by the Engineer-in-Charge, construction joints shall be provided in position as shown or described on the Drawings. Where it is not described, the joints shall be in accordance with the following:

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

Concrete in a beam shall be placed throughout without a joint, but if the provision of a joint is unavoidable, the joint shall be vertical and at the middle of the span.

A joint, in a suspended floor slab shall be vertical at the middle of the span and at right angle to the main reinforcement.

In forming a joint, concrete shall not be allowed to slope away to a thin edge. The locations of construction joints shall be planned by the contractor well in advance of pouring and have to be approved by the Engineer-in-Charge.

Construction joints in foundations of equipment shall not be provided without specific concurrence of the Engineer-in-Charge.

Before fresh concrete is placed, the cement skin of the partially hardened concrete shall be thoroughly removed and surface made rough by hacking, sand blasting, water jetting, air jetting or any other methods as directed by the Engineer-in-Charge. The rough surface shall be thoroughly wetted for about two hours and shall be dried and cooled with 1:1 freshly mixed cement sand slurry immediately before

placing the new concrete. Approved variety of bonding agent such as Bond Crete, Nit bond (Fosroc) or equivalent shall be applied to the existing concrete. The new concrete shall be worked against the prepared surface before the slurry sets. Special care shall be taken to see that the first layer of concrete placed after a construction joint is thoroughly rammed against the existing layer. Old joints during pour shall be treated with 1:1 freshly made cement sand slurry only after removing all loose materials.

5.5.9.4.9 Openings and Inserts: -

All openings and inserts which are designated in due time or as required for services, will be exactly provided by the Contractor including supply of materials. The Contractor should also fix the anchors or such items in exact position and in perfect lines and levels. Inserts apply to such items as timber, dowel bolts, loops, brackets, suspension irons, hooks screws, plates, pipes of various types and diameter etc. Openings in concrete or masonry must be provided in slightly bigger, if directed so, as shown in drawings or as instructed by the Engineer. It must be clearly understood that the provisions of inserts and openings as contemplated in this contract are to be carried out with 'utmost precision' and any deviation of the same from that as shown in drawing or instructed, have to be rectified by the Contractor at his own cost and risk.

5.5.9.4.10 Proportioning the Mix (For nominal mix concrete): -

In ordinary concrete (not controlled concrete), proportion of cement to fine aggregate and coarse aggregate shall be as set out in Table "A" below. Those proportions are based on assumption that the aggregates are dry.

In proportioning ordinary concrete, quantity in cubic meters of cement shall be determined by weight taking the value of 1440 kg of ordinary cement and 1280 kg of rapid hardening cement for one cubic meter. Allowance shall be made for surface water present in the aggregate when computing the water content. Surface water present in the aggregate shall be determined by one of the field methods described in IS:2386 (Part III). In the absence of exact data and for ordinary concrete, the amount of surface water may be estimated from values given in Table "B".

Table A

How Nominal Mix	Total quantity of dry aggregates	Maximum quantity of water required per bag of cement
	(kg)	(litre)
M10	480	34
M15	350	32
M20	280	30

NOTE:

- i. Quantity of water to be reduced by approximately 20% for mechanically vibrated concrete.
- ii. Approximate quantity of water container in wet sand is as given below. Quantity of water to be added to be reduced accordingly.

Table B

Aggregate	Liters/m3
Very wet sand	120 to 160
Wet sand	80
Moist sand	40

5.5.9.4.11 **Grades of Concrete, Strength etc.:-**

The Bill of Quantities specifies various Grades of concrete. The strength corresponding to these Grades is as per table below.

Grade of Concrete	Compression Strength at 28 days (N/mm ²)
M15	15
M20	20
M25	25
M30	30
M45	45
M50	50

Even though the Bill of Quantities specifies various grades of concrete, it is possible that the grade may be altered to suit the site conditions.

The strength of preliminary test cubes shall be as per IS:456.

The type of concrete for any particular situation shall be as per instructions given to the Contractor by the Engineer notwithstanding anything contained in the foregoing clauses.

5.5.9.4.12 **Volume Batching with weight control:-**

Where batching by volume with weight control is specified by the Engineer, all measurements of sand, coarse aggregates and water shall be by volume and of cement by the bag controlled by regular periodical weighing. In order to ensure correct proportioning, the following precautions shall be taken.

The contractor shall maintain at site a suitable number of platform balance similar to the one used for weighing luggage on railway platforms, capable of weighing up to 200 kg to the nearest 100 gm. The balance shall be used for weighing cement bags and occasionally boxes of sand and coarse aggregate as specified below.

The contractor shall provide the mixer operator with two standard measures. One of 5 liter and one of 1-liter capacity for measuring the water to be added to the mix. The quantity of water to be added to the mix shall be approved by the Engineer or his representative and may be adjusted by them as frequently as necessary in order to allow for the moisture content of the sand or coarse aggregate and workability desired. On no account shall the contractor be allowed more water to

be added to the mix than that specified. A mix containing such excess water may be rejected by the Engineer or his representative and not allowed for use in the works.

Sand and coarse aggregates shall be measured by volume. The sizes of measuring boxes or the depth to which they are filled or both shall be adjusted to obtain the correct weight of each material specified by the Engineer for that mix.

Every fifth or tenth measuring box of sand or of coarse aggregate shall be weighed on the balance to ensure that filling of boxes is being uniformly done. Adjustments shall be made from time to time in the amount of each box filled to take into account variations in moisture content and bulking of sand. More frequent weighing of boxes, particularly of sand, if found to vary considerably, in moisture content, and bulking, may be required by the Engineer and shall be done by the contractor without additional cost to the Owner.

5.5.9.4.13 Placing Temperatures: -

Fine and coarse aggregates for concreting shall be kept shaded and the concrete aggregates sprinkled with water for a sufficient time before concreting in order to ensure that the temperature of these ingredients is as low as possible prior to batching. The mixer and batching equipment shall also be shaded.

5.5.9.4.14 Mixing: -

Materials for concrete shall be compiled out in rotation into the mixer as directed by the Engineer or his representative. After all other ingredients as required are in the drum, water shall be added in measured quantities in the manner specified by the Engineer at site.

The mixer shall be run to a working speed to be decided in consultation with the Engineer or his representative. The mixer shall be run for at least two minutes and at least 40 revolutions after the full quantity of water has been placed in the drum.

The mixing and tempering of cement mortar of concrete, which has partially set, will not be allowed.

5.5.9.4.15 Foundation Bedding: -

All earth surfaces upon which or against which concrete is to be placed, shall be well compacted and free from standing water, mud or debris. Soft or spongy area shall be cleaned out and back filled with either soil-cement mixture, lean concrete or clean sand compacted as directed by Engineer. The surfaces of absorptive soils shall be moistened.

Concrete shall not be deposited on large sloping rock surfaces. The rock shall be cut to form rough steps or benches by picking, barring or wedging. The rock surface shall be kept wet for 2 to 4 hours before concreting.

5.5.9.4.16 Grouting: -

Grout shall be provided as specified on the drawings. The proportion of standard grout shall be such as to produce a flowable mixture consistent with minimum water content and shrinkage. Surfaces to be

grouted shall be thoroughly roughened and cleaned. All structural steel elements to be grouted, shall be cleaned of oil, grease, dirt etc. The use of hot, strong caustic solution for this purpose may be permitted. Prior to grouting, the hardened concrete shall be saturated with water and just before grouting water in all pockets shall be removed. Grouting once started shall be done quickly and continuously.

Variation in grout mixes and procedures shall be permitted if approved by Engineer.

5.5.9.4.17 Hot Weather Requirements: -

Adequate provisions shall be made to lower concrete temperatures, which shall not exceed 38°C in case of freshly placed concrete under all weather conditions.

5.5.9.4.18 Tests of determination of strength of concrete: -

As will be apparent from the Bill of Quantities, the strength of concrete specified is the criterion and the Contractor shall make every effort to obtain the specified strength by good quality control. In case of concrete, which does not obtain the specified strength at 28 days, such work shall be demolished and reconstructed to obtain the requisite strength as directed by the Engineer. To determine whether concrete in any particular part of the work is of the requisite strength or not, test cubes (works test cubes) shall be made from samples collected from the concrete being poured for the particular part and determined as per accepted criteria detailed hereinafter. The salient feature for the collection of samples is as indicated below:

Testing of Concrete Cubes for determining Compression Strength

1) Quality

As specified

2) Compression Strength

Shall be as specified for the particular type of concrete.

3) Criteria for acceptance of work

As per relevant IS Code.

4) Quantum of cubes and testing

A set of 9 cubes shall be cast per every 50 m³ of concrete.

OR

A set of 9 cubes on every day of concrete.

OR

A set of 9 cubes on every important element as decided by the Engineer.

The decision of the Engineer in this regard shall be final and binding.

5) Cubes

The size of cubes shall be 150 x 150 x 150 mm.

The number of cubes to be collected from each sample as detailed below shall be nine. Three cubes each are intended for testing at 7 and 28 days respectively for determining the strength. Cubes tested at 7 days should give strength of not less than 70% of the corresponding strength at 28 days. It shall

however be expressly understood that the test results at 28 days only shall govern and 7 days tests are intended to obtain a fair idea at an early stage. Balance 3 cubes shall be kept as stand-by.

6) Number of Tests

The number of cube tests in a work shall be entirely at the discretion and as directed by the Engineer. Cubes shall generally be collected for various structural members and also for works at various levels. It shall also be collected whenever the usual quality for a particular strength is suspect.

7) Preparation and Testing of Cubes

Casting of cubes, preparation of molds for the same, processing and curing the cubes and pressure testing the same shall be as per detailed instructions which will be issued to the Contractor from the Engineer from time to time or as per relevant Indian Standards as amended up to date and as directed.

8) Equipment molds, testing etc.

It is the entire responsibility of the Contractor to prepare and get the cubes tested and provide for all material, labor, molds, equipment, facility and charges for testing etc. The Contractor's rate for concrete work shall be deemed to include for these and no extra whatsoever is admissible on this account.

9) Slump

If in the opinion of the Engineer, slump cone tests are required to be performed to establish workability the same shall be carried out free of cost. Slump tests are however, to serve as guide only.

5.5.9.4.19 Ready Mix Concrete: -

All other specification indicating under item of Plain and Reinforced concrete work shall be applied for this item of work also.

The work includes providing, laying, curing etc., complete for concrete work in strict accordance with the approved manufactures specification and relevant IS code. Ready mix concrete shall be from automatic computerized batching plant with mix capacity 25 m³/ Hr. The rate should include cost of concrete of specified grade, transporting to the site, placing at desired position with concrete, pump, vibrating and mixing admixture, retarding agent and finishing the concrete.

5.5.9.4.20 Mode of Measurement: -

Concrete in ground floor paving and concrete mat below footings and plinth beams and lift shafts shall be measured in cubic meter.

Footings shall be measured in cubic meter up to bottom of pedestals. Columns including pedestals shall be measured in cubic meter, height being measured from top of footings or of lower slab up to soffit of upper slab. Where adjacent slab thickness differ, average soffit shall be considered. Plinth beams and floor beams shall be measured in cubic meter length being considered between faces of supporting columns or beams and depth being considered as projecting either

above or below slabs or chajjas. Slabs & chajjas shall be measured in cubic meter being the product of their projected superficial areas including bearing by the depth.

Staircase steps with waist shall be measured in cubic meter, landing being measured along with slabs and chajjas.

Lintels, mullions, bed-blocks, sills and copings shall be measured in cubic meter. In general, IS:1200 (Part II) shall be followed.

A Check List shall be prepared by the Contractor as directed by the Engineer and no concreting work shall be done till all the points in the Check-List are checked.

5.5.10 REINFORCEMENT STEEL WORKS: -

5.5.10.1

General

The steel to be used for reinforcement concrete work shall comply with the requirements of Indian Standard Specification No. 2062, 432, 1139 and 1786. Steel bars made for rerolling old rails, bars etc. will not be allowed to be used on any account and the Contractor must produce proof that such bars are not being used. Should the results of tests conducted through an approved laboratory at the Contractor's expense made in accordance with the provisions of relevant Indian Standard Specification show that the steel does not comply with these specification, the Engineer may, at his discretion, reject the lot or lots from which the sample or samples were taken and the same shall not be used in the works but shall be removed there from and the work already executed with such bars may be ordered to be demolished at the Contractor's cost. The Contractor will not be paid for the demolished work nor will the completion time limit be extended, in that case.

All steel used for reinforcement shall be free from loose scales or rust which must be removed with a stiff wire brush and coated with neat cement as directed. Bars must also be free from oil or paint.

All bending shall be done cold, gradually, evenly and without jerks. All protruding bars to which other bars are to be spliced later, must be protected from rusting by a coat of thin neat cement grout and contractor's rates shall be inclusive of this item. The steel shall be properly braced, supported and otherwise held in position by plastic or concrete spacer blocks and steel chairs so as to prevent displacement while concrete is put in. Tiles or stone chips will not be permitted to be used as spacer blocks. The correct number and size of reinforcing bars, stirrups and binders shall be provided and placed in position strictly according to the contract drawings and instructions. This must be looked after with proper care and checked over by a competent foreman of the Contractor personally and finally before pouring the concrete. A steel fitter should be in full time attendance while pouring concrete to adjust and fix the reinforcement.

5.5.10.2

Steel for Reinforcement

The steel used for reinforcement shall be any of the following types:-

- I. Mild steel and medium tensile bars conforming to IS 432 (Part I)
- II. High strength deformed steel bars conforming to IS 1786
- III. Hard drawn steel wire fabric conforming to IS 1566

- IV. Structural steel conforming to Grade A of IS 2062
- V. Thermo-mechanically treated (TMT) Bars.
- VI. It may be noted that only Primary steel i.e. TATA, SAIL, VIZAG etc of Fe - 500D shall be used for all RCC as per relevant IS codes as per the direction of Engineer-in-charge.

Elongation percent on gauge length is $5.65 \sqrt{A}$ (Square root of A) where A is the cross-sectional areas of the test piece.

Mild steel is not recommended for the use in structures located in earthquake zone subjected to severe damage and for structures subjected to dynamic loading (other than wind loading) such as railway and highway bridges.

Welding of reinforcement bars covered in this specification shall be done in accordance with the requirements of IS 2751.

Nominal mass/weight: The tolerance on mass/ weight for round and square bars shall be the percentage given in Table 5.1 of the mass/ weight calculated on the basis that the masses of the bar/wire of nominal diameter and of density 7.85 kg/ cm³ or 0.00785 kg/mm³.

Table Tolerance on Nominal Mass

Nominal size (in mm)	Tolerance on the Nominal Mass per cent		
	Batch	Individual sample +	Individual sample for coil (x)
Upto and including 10	+7	-8	+8
Over 10, upto and including 16	+5	-6	+6
Over 16	+3	-4	+4

+ for individual sample plus tolerance is not specified

(x) for coil batch tolerance is not applicable

Tolerance shall be determined in accordance with method given in IS 1786.

High strength deformed bars & wires shall conform to IS 1786. The physical properties for all sizes of steel bars are mentioned below in Table 5.5.15.

Table 5.5.15

Sr.No.	Property	Fe 415	Fe 425 D	Fe 500 D	Fe 550 D
1	0.2 Per cent Proof stress/ yield stress, Min, N/mm ²	415	415	500	550

2	Elongation, per cent, Min. on gauge length $5.65 \sqrt{A}$ (Square root of A), where A is the cross-sectional	14.5	18.0	16.0	14.5
3	Tensile strength, Min	10 Per cent more than the actual 0.2 per cent proof stress/yield stress but not less than 485.0 N/mm ²	12 Per cent more than the actual 0.2 per cent proof stress/yield stress but not less than 500.0 N/mm ²	10 Per cent more than the actual 0.2 per cent Proof stress/yield stress but not less than 565.0 N/mm ²	8 Per cent more than the actual 0.2 per cent Proof stress/yield stress but not less than 600.0 N/mm ²
4	Total elongation at maximum force, percent, Min on gauge length $5.65 \sqrt{A}$ (Square Root of A), where a is the cross-sectional area	-	5	5	5

Tests: Selection and preparation of Test sample. All the tests pieces shall be selected by the Engineer in-Charge or his authorized representative either-

a) From cutting of bars

Or

b) If he so desires, from any bar after it has been cut to the required or specified size and the test piece taken from and any part of it.

In neither case, the test pieces shall be detached from the bar or coil except in the presence of the Engineer-in-Charge or his authorized representative.

The test pieces obtained in accordance with as above shall be full sections of the bars as rolled and subsequently cold worked and shall be subjected to physical tests without any further modifications. No deduction in size by machining or otherwise shall be permissible. No test piece shall be enacted

or otherwise subject to heat treatment. Any straightening which a test piece may require shall be done cold.

Tensile Test: 0.2% proof stress and percentage elongation –

This shall be done as per IS 1608, read in conjunction with IS 226.

RE- test: This shall be done as per IS 1786.

Rebind test: This shall be done as per IS 1786.

Chemical composition of reinforcement bars shall be as per Table 5.5.15 as follows: -

Table

Constituent	Maximum Per cent			
	Fe 415	Fe 415 D	Fe 500 D	Fe 550 D
Carbon	0.3	0.25	0.25	0.25
Sulphur	0.06	0.045	0.04	0.04
Phosphorus	0.06	0.045	0.04	0.04
Sulphur and Phosphorus	0.06	0.045	0.04	0.04

Thermo-mechanically treated reinforcement bars

- There is no BIS code for TMT bars. The available code BIS 1786 pertains to HSD Bars. Therefore, there should be no stipulation that TMT bars should conform to relevant BIS code.
- The TMT bars are being produced under valid license from either of the firms namely Temporal, Thermax Encon Turbo & Turbo Quench. These firms have acquired patents and are giving licenses to various producers to produce TMT Bars.
- The TMT bars shall conform to IS 1786 pertaining to Fe 500 D or Fe grade of steel as specified of make TATA, SAIL, VIZAG or equivalent.
- In design and construction of reinforced concrete building in seismic zone III and above, steel reinforcement of Grade Fe 500 D shall be used.

5.5.10.3

Applicable Codes & Specifications: -

IS:1786 – 2008 & IS 432 (Part I & II) Specification for Thermo Mechanically Treated (TMT) and HYSD steel Bars and hard drawn steel wire for concrete reinforcement.

5.5.10.4

Supply: -

Reinforcement bars, shall be either plain round mild steel bars Grade 1 as per IS:432 (Part 1) or medium tensile steel deformed bars as per IS:1139 or cold twisted steel bars as per IS:1786, as shown and specified on the drawings or in the Bill of Quantities.

High Yield Strength Deformed bars (HYSD) of grade Fe500, IS:1786 grade will be used as specified on the drawings and as directed by the Engineer.

Wire mesh or fabric shall be in accordance with IS:1566. Substitution of reinforcement will not be permitted except upon written approval from Engineer.

5.5.10.5

Storage: -

The reinforcement shall not be kept in direct contact with the ground but stacked on top of an arrangement of timber sleepers or the like.

If the reinforcing rods have to be stored for a long duration, they shall be coated with cement wash before stacking and/or be kept under cover or stored as directed by Engineer.

Fabricated reinforcement shall be carefully stored to prevent damage, distortion, corrosion and deterioration.

5.5.10.6 Quality: -

All steel shall be of Grade 1 quality unless specifically permitted by Engineer. No rerolled material will be accepted. If demanded by Engineer, Contractor shall submit the manufacturer's certificate for steel. Random tests on steel supplied by Contractor may be performed by Owner as per relevant Indian Standards. All costs incidental to such tests shall be at Contractor's expense. Steel not conforming to specifications shall be rejected and shall be carried away from site by Contractor at his cost.

All reinforcement shall be clean, free from grease, oil, paint, dirt, loose mill scale, loose rust, dust, bituminous material or any other substances that might destroy or reduce the bond. All rods shall be thoroughly cleaned before being fabricated. Pitted and defective rods shall not be used. All bars shall be rigidly held in position before concreting. No welding of rods to obtain continuity shall be allowed unless approved by Engineer.

If welding is approved, the work shall be carried out as per IS:2751 according to best modern practices and as directed by Engineer.

In all cases of important connections, tests shall be made to prove that the joints are of the full strength of bars welded, special precautions, as specified by Engineer, shall be taken in the welding of cold worked reinforcing bars and bars other than mild steel.

5.5.10.7 Laps: -

Laps and splices for reinforcement shall be as shown on the drawings. Splices in adjacent bars shall be staggered and the locations of all splices, except those specified on the drawings or approved by Engineer. The bars shall not be lapped unless the length required exceeds the maximum available lengths of standard bars.

5.5.10.8 Bending: -

Reinforcing bars supplied bent or in coils, shall be straightened before they are cut to size. Straightening of bars shall be done in cold and without damaging the bars. This is considered as a part of reinforcement bending fabrication work.

All bars shall be accurately bent according to the sizes and shapes shown on the detailed working drawings/bar bending schedules. They shall be bent gradually by machine or other approved means. Reinforcing bars shall not be straightened and regent in a manner that will injure the material; bars containing cracks or splits shall be rejected. Bars shall be bent cold, except for diameter of over 25 mm, which may be bent hot, if specifically approved by Engineer. Bars, which depend for their strength for cold working, shall not be bent hot. Bars bent hot shall not be heated beyond cherry red color (not

exceeding 845oC) and after bending shall be allowed to cool slowly without quenching. Bars incorrectly bent shall be used only if the means used for straightening and re-bending be such as shall not, in the opinion of Engineer, injure the material. No reinforcement shall be bent when in position in the work without approval, whether or not it is partially embedded in hardened concrete. Bars having kinks or bends other than those required by design shall not be used. Contractor shall prepare his own bar bending schedule as per RCC drawings as per requirement and as directed and instructed, keeping wastage of bar length to minimum possible in general & bigger diameter of bars in particular. Contractor shall keep a competent person for supervising bar cutting & bending so that already cut length of bar is utilized before a new length of bar is taken.

5.5.10.9**Fixing: -**

Reinforcement shall be accurately fixed by any approved means and maintained in the correct position shown in the drawings by the use of blocks, spacers and chairs as per IS:2502 to prevent displacement during placing and compaction of concrete. Bars intended to be in contact at crossing points shall be securely bound together at all such points. The vertical distances required between successive layers of bars in beams or similar members shall be maintained by the provision of mild steel spacer bars at such intervals that the main bars do not perceptibly sag between adjacent spacer bars. Binding wire shall be 16 gauge annealed soft iron wire for tying bars.

5.5.10.10**Cover: -**

Unless indicated otherwise on the drawings, clear concrete cover for reinforcement (exclusive of plaster or other decorative finish) shall be as follows:

At each end of reinforcing bar, not less than 25 mm nor less than twice the diameter of the bar.

For a longitudinal reinforcing bar in a column, not less than 40 mm, nor less than the diameter of the bar. In case of columns of minimum dimension of 200 mm or under, with reinforcing bars of 12 mm and less in diameter, a cover of 25 mm to be used & provided.

For longitudinal reinforcing bars in a beam, not less than 25 mm or less than the diameter of the bar.

For tensile, compressive, shear, or other reinforcement in a slab or wall not less than 13 mm, nor less than the diameter of such reinforcement.

For any other reinforcement, not less than 13 mm, nor less than the diameter of such reinforcement.

For footings and other principal structural members in which the concrete is deposited directly against the ground, cover to the bottom reinforcement shall be 75 mm. If concrete is poured on a layer of lean concrete the bottom cover may be reduced to 50 mm.

For concrete surfaces exposed to the weather or the ground after removal of forms, such as retaining walls, grade beams, footing sides and top, etc. not less than 50 mm.

Increased cover thickness shall be provided, as indicated on the drawings, for surfaces exposed to the action of harmful chemicals (or exposed to earth

contaminated by such chemicals) acid, alkali, saline atmosphere, Sulphur us smoke etc.

For reinforced concrete members, totally or periodically immersed in sea water or subject to sea water spray, the cover of concrete shall be 50 mm more than those specified above.

For liquid retaining structures, the minimum cover to all steel shall be 40 mm or the diameter of the main bar, whichever is greater. In the presence of sea water and soils and waters of a corrosive character the cover shall be increased by 10 mm.

Protection to reinforcement in case of concrete exposed to harmful surroundings may also be given by providing a dense impermeable concrete with approved protective coatings, as specified on the drawings. In such a case, the extra cover mentioned above, may be reduced by Engineer to those shown on the drawings.

The correct cover shall be maintained by cement mortar (1:2) cubes, PVC cover blocks or other approved means. Reinforcement for footings, grade beams and slabs on subgrade shall be supported on precast concrete blocks as approved by Engineer. The use of pebbles or stones shall not be permitted.

The minimum clear distance between reinforcing bars shall be in accordance with IS:456 or as shown in drawings.

For bars in corrosive environment these covers will be increased by 20 mm in every case.

5.5.10.11 Inspection: -

Erected and secured reinforcement shall be inspected and approved by Engineer prior to placement of concrete.

5.5.11 MASONRY: -

5.5.11.1 Scope

This specification covers furnishing, installation, repairing, finishing, curing protection, maintenance and handling of masonry and allied works for use in structures and locations covered under the scope of the Contract.

5.5.11.2 Applicable Codes

The latest revision of the Indian Standards and Codes, unless otherwise specified, shall be applicable to all brickwork and block work.

IS:1077	Specification for Common Burnt Clay Building Bricks
IS:2180	Specification for Burnt Clay Building Bricks, heavy duty
IS:2116	Specification for Sand Masonry Mortar
IS:2212	Code of Practice for Brickwork
IS:3495	Method of sampling and testing Clay Building Bricks

IS:2250	Code of Practice for Preparation and Use of Masonry Mortar
SP:27	Handbook of Method of Measurement of Building works
IS:432	Specifications for Mild Steel and Medium Tensile Bars
IS:2185	Specification for Cement Concrete Block
IS:2572	Code of Practice for construction of Concrete Walls
IS:9103	Specification for Admixture of Concrete

5.5.11.3 Rubble Masonry:

IS:1129 (1972)	Stone, Dressing
IS:8348 (1977)	Stone, slabs, stacking and packing for transportation
IS:1805 (1973)	Glossary of terms: quarrying and dressing
IS:1121 (1957)	Compressive, transverse and sheer strength determination.
IS:8759 (1977)	Maintenance and preservation of stone
IS:4348 (1973)	Permeability determination
IS:1122 (1957)	Specific gravity and porosity determination.
IS:4121 (1967)	Water transmission rate through natural building stone
IS:1706 (1972)	Wear resistance, determination by abrasion method.

5.5.11.4 General

All the connected masonry in structure shall be carried up neatly at one uniform level throughout but where breaks are unavoidable, the joint shall be made in good long step so as to prevent cracks developing between new and old work. All joints shall be full of mortar. The work shall be kept constantly moist on all the faces for a period of at least ten days and wetted twice a day thereafter for a month. Green work shall be protected from rain by suitable covering. The work shall also be suitably protected from damage during construction.

5.5.11.5 Scaffolding

Simple scaffolding shall be allowed for the masonry work. In this case, the inner end of the horizontal scaffolding pole shall rest in a hole provided in the header course only. Only one header for each pole shall be left out. The holes left in masonry work for supporting the scaffolding shall be filled and made good before plastering.

The Contractor shall be responsible for providing & maintaining sufficiently strong scaffolding, so as to withstand all loads likely to come on it.

5.5.11.6 Mortar

Mix for mortar shall be specified in the schedule of items. For cement and sand mortar, cement and sand in required proportions shall be mixed

dry in a mechanical mixer and then water added and mixed further. Minimum quantity of water shall be added to achieve working consistency. Surplus mortar dropping from masonry, if received on surface free from dirt may be mixed with fresh mortar if permitted by the Engineer who may direct additional cement to be added without any extra payment. No mortar that has stood for more than half an hour shall be used.

5.5.11.7 Random Rubble Masonry: -

Stones shall be roughly chisel dressed. They shall be so arranged to break joints as much as possible, avoiding lines of joints horizontal and vertical. Quoins shall be same as for coursed rubble first sort.

All stones shall be carefully fitted with thickness of joints not exceeding 6 mm. Joints may be chisel dressed for fitting in position properly. The inside face shall conform to uncoursed rubble masonry.

50% of the face stones shall be more than 0.01 cu.mt. for wall thickness up to 500 mm and 0.015 cu.mt. in thicker walls. They shall be as far as possible of equal size on the face.

30% of backing stones and hearting shall not be less than 0.01 cu.mt. up to 500 mm thickness of walls and 0.015 cu.mt. for thicker walls.

5.5.11.8 Brick Masonry

Bricks shall be table molded, sound, hard, homogeneous in texture of uniform size, shape and color, must be well burnt so as to give a clear ringing sound when struck. They shall be clean, free from flaws, cracks, chips, stones or lumps of any kind, especially lime. These shall not show appreciable signs of efflorescence either dry or subsequent to soaking in water. They shall have sharp edges and angles and even surfaces and shall be sound & hard. They shall be from a source approved by the Engineer-in-Charge and quality of bricks should be such that they shall not absorb more than 20% of water by weight after immersion in water for 24 hours and shall have a crushing strength of 40 kg/cm² minimums. All bricks shall be thoroughly soaked in water before use. They should be soaked for about twelve hours for this purpose. No broken bricks shall be used except as closures. The courses shall be laid flush in mortar and every course shall be thoroughly grouted. Joints shall be broken vertically and they shall not exceed 10 mm in thickness. The work shall not be raised more than 12 courses per day. It shall be kept constantly wetted for at least 10 days and wetted twice a day thereafter for a month. All joints shall be thoroughly flushed with mortar of mix as specified in the schedule of quantities, at every course. Care shall be taken to see that the bricks are bedded effectively and all joints completely filled to the full depth.

The joints of brickwork to be plastered shall be raked out to a depth not less than 10 mm as the work proceeds. The surface of brickwork shall be cleaned down and watered properly before the mortar sets.

Before starting the brick masonry, the concrete surface e.g. beams, columns, slabs, chajjas etc. shall be thoroughly hacked and washed to remove all mud, dirt, loose particles etc. When fresh brick work is to be

started on the old brick masonry, the surface should be thoroughly cleaned and washed to remove all loose mortar, mud, dirt etc.

The size of a brick shall be 230 x 115 x 75 mm. 230 mm & 115 mm thick walls will be built with fair face on one side only. All walls of greater thickness shall be built without exception with fair face to both sides.

The Contractor shall provide all necessary openings for doors and windows or other services and shall embed electrical fittings, fixtures and sleeves supplied by another agency, if required, at no extra cost.

The rates for brickwork shall also include the cost of the following:

- 1) Making good all holes, chases etc. to any depth due to conduit pipes, hold fasts, switches, plug boxes, exhaust fans openings and other openings.
- 2) Single Brick Masonry: Brickwork 115 mm they shall be provided with transoms & mullions when length or height of the wall exceeds 2 m. Materials and workmanship for a half brick on edges partition wall shall be specified above. The wall shall be stiffened at interval of 1 m vertically & 3 m horizontally by RCC M20. Stiffeners of size 115 mm x 115 mm thickness to the full length of wall and shall be provided with two numbers 8 mm MS Bars as center reinforcement (only the reinforcement will be paid separately under relevant items.) Measurement of brickwork shall be in square meter. The rate shall also include the cost of making good holes, chases etc. at any depth due to the conduit pipes, hold fasts, switches, plug boxes, exhaust fan openings and other openings.
- 3) Bad workmanship if observed will lead to the rejection of the work and the bad work will be demolished and redone to the satisfaction of the Engineer by the Contractor at his own cost.

5.5.12 PLASTERING: -

5.5.12.1

Scope

This specification covers applying the plaster to old and new contracted concrete and masonry in the structure as per specified proportions, in line and level including making good surface, curing and as per the instruction by Engineer.

5.5.12.2

Applicable Codes

IS:383	Specification for Coarse and Fine Aggregates
IS:412	Specification for Expanded Metal Sheets for General Purpose.
IS:1542	Specification for Sand for Plaster
IS:1635	Code of Practice for field Slaking of Building lime and Preparation of Putty.
IS:1661	Code of Practice for the Application of Cement and Cement Lime Plaster Finishes
IS:2394	Code of Practice for the Application of Lime Plaster Finish

IS:2402	Code of Practice for External Rendered Finishes
IS:2645	Specification for Integral Cement Waterproofing Compound.

5.5.12.3**General**

The item refers to plastering concrete or masonry surface in cement mortar of specified proportion and specified thickness including scaffoldings, curing etc. complete as specified and directed.

5.5.12.4**Cement Plaster:****5.5.12.4.1 Cement**

It shall conform to IS:269-1958 when the type of cement is not specified, ordinary Portland cement shall be used.

The weight of ordinary Portland cement shall be taken as 1140 kg/m³ (90 lbs per cubic foot). The measurement of proportion of cement should normally be on the basis of weight and whole bags, each undisturbed and sealed 50 kg. A bag being considered equivalent to 35 liters (0.034 cu.m.) in volume. When part bag is required, cement shall be taken by weight, assuming 35 liters to be equal to 50 kg. (1 cu.ft. = 90 lbs). Care should be taken to see that each bag contains full quantity of cement.

5.5.12.4.2 Tests

When the tests are considered necessary, they shall be carried out as indicated in IS:269-1958. The Contractor should ensure that the cement is of sound and required quality.

5.5.12.4.3 Storage

Cement required for the use shall be as fresh as possible and stored on planks raised 150 mm (6") to 200 mm (8") above the floor and stacked about 300 mm (12") away from the walls in suitable closed weatherproof buildings at the work site or at the selected approved site, in such a manner as to prevent deterioration by dampness or moist atmosphere or intrusion of foreign matter. Cement shall be stored in such a way as to allow the removal and use of cement in chronological order of receipt i.e. first received first used. Not more than 10 bags or max by 5'5" in height for safe handling shall be stacked vertically in one pile and maximum width of the piles should not be more than 3 m (10' – 0"). Any cement, which has deteriorated, caked or which has been damaged shall not be used. Cement concerning which there is doubt shall not be used pending testing & satisfactory results. Cement that is condemned shall be immediately removed from the work site. When temporarily stored in the open for use within 48 hours, it shall be kept on platform of planks about 150 mm (6") to 200 mm (8") above ground and covered with a tarpaulin. Ordinary cement stored for more than one month from the date of receipt from the factory shall be subject to test and used only if found

satisfactory. The cost of test shall be borne by the agency responsible for the storage after two months from receipt.

Different kinds of brands of cement of the same brand from different mills should be stored in different groups and should not be mixed during use except when directed in writing by the Engineer. The cement shall not be stored for unduly long periods. It should not be handled in such a way as to impair its strength or useful characteristics.

5.5.12.4.4 Measurements

When required to be measured, measurement shall be by weight with tons as the unit.

5.5.12.4.5 Sand

Sand shall conform to IS:383-1952 and equivalent portion of IS:515-1959 as directed by the Consultant.

Sand shall be crushed stone screenings or natural sand. Sand shall be clean, well graded, hard, strong, durable and gritty particles free from injurious amounts of dust, clay, kankar nodules, soft or flaky particles, shale, alkali, salts, organic matters, loam, mica or other deleterious substances and shall be approved by the Consultant.

The maximum size of particles shall be limited to 5 mm (3/16"). Where best trap sand available in the region contains murum or laterite particles, such particles may be allowed up to 5%. If the fine aggregate contains more than 4% of clay, dust or silt it shall be washed. If the quality of fine aggregate is doubtful, it shall be tested for clay, organic impurities and other deleterious substances as laid down in IS:383-1952. It shall not contain deleterious materials in such quantity as to reduce the strength or durability of the mortar. Sea sand shall not be used.

The sand shall not contain more than 8% of silt as determined by field test with measuring cylinder.

The fine aggregate for cement mortar for first coat of plaster should generally satisfy the following grading:

I.S. Sieve	Percentage by Weight Passing Sieve
4.8 mm	100
2.4 mm	80 - 95
1.2 mm	70 - 90
0.6 mm	40 - 85
0.3 mm	5 - 50
0.15 mm	0 - 10

The fineness modulus shall not exceed 3.0.

I.S. Sieve	Percentage by Weight Passing Sieve
4.8 mm	100
2.4 mm	100
1.2 mm	75 - 100
0.6 mm	40 - 85

0.3 mm	5 - 50
0.15 mm	0 - 10

The fine aggregate for cement mortar for second coat of plaster may have the following grading:

The fineness modulus shall not exceed 1.6

IS:1543-1960 shall generally apply for sand for plaster.

5.5.12.4.6 Gradation

The gradation of materials from any one source shall not vary in composition beyond the range of values that governs it, in selecting source of supply. For determining the degree of uniformity, determination of fineness modulus shall be made upon representative samples furnished by the Contractor from such source as he proposes to use. Fine aggregate from any one source having a variation in fineness modulus of the representative samples submitted by the Contractor shall be rejected or may be accepted subject to such change in the proportion of aggregate as the Engineer may direct.

5.5.12.4.7 Storage

The fine aggregate should be stacked carefully on a clean hard surface so that it will not get mixed up with deleterious foreign material. Sand shall not be stacked in high conical heaps so that segregation of heavier particles by sliding down may be prevented. It shall be placed in layers not thicker than those resulting from lorry loads dumped on the same plane.

5.5.12.4.8 Tests

The aggregates shall satisfy the tests referred to in IS:383-1952. Samples of sand to be used for a particular item shall be got approved by the Engineer, who shall keep it in his office for reference.

5.5.12.4.9 Measurement

When required to be measured, measurement shall be by volume with cu.m. as the unit. No deduction shall be made for the voids.

5.5.12.4.10 Water

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

If required by the Consultant, it shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement tests for soundness, time of settling and mortar strength as specified in IS:269-1958. Any indication of unsoundness, change in time of setting by 30 minutes or more, or decrease of more than 10%

in strength of mortar prepared with the water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water tested. Seawater shall not be used.

Water fit for drinking will generally be found suitable for mixing cement mortar.

Water for curing cement mortar should not be too acidic or too alkaline. It should have a PH value ranging between 4.5 to 8.5. It should be free of elements, which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar surfaces. Hard and bitter water containing more than 100 p.p.m. of sulphates shall not be used for curing purpose.

Portable water will generally be found suitable for curing cement mortar.

5.5.12.4.11 Proportions

Cement and sand shall be mixed in specified proportions, sand being measured in measuring boxes. The proportions will be by volume on the basis of 50 kg. Bag of cement being equal to 35 liters (about 0.034 cu.m.) The mortar may be hand mixed or machine mixed as directed by the Engineer.

5.5.12.4.12 Preparation

In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform color is obtained. Fresh and clean water as specified above shall be added gradually & thoroughly mixed to form a stiff plastic mass of uniform color so that each particle of sand shall be completely covered with a film of wet cement.

The water cement ratio may be as under or as directed by the Engineer.

Cement	Sand	Water-Cement Ratio	Quantity of water per 50 kg of cement
1	1	0.25	12.5
1	1.5	0.28	14.0
1	2	0.30	15.0
1	2.5	0.35	17.5
1	3	0.40	20.0
1	4	0.53	26.5
1	5	0.60	30.0
1	6	0.70	35.0
1	8	0.90	45.0

Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar nor the mixing water of the mortar shall flow out. Machine mixed mortar shall be prepared in an approved mixer. About 5% to 10% of mixing water shall be put into the mixer and sand & cement in the required proportions shall be then added.

The remainder of water, quantity of which shall be predetermined by consideration of strength and consistency shall be added uniformly. Mixing will be continued until all particles of sand are uniformly coated with cement paste. Mixing for 1½ to 2 minutes will normally be sufficient. Water cement ratio shall be as per hand mixed mortar. The mortar so prepared shall be used within 30 minutes of adding water; only such quantity of mortar shall be prepared as can be used within 30 minutes. The mortar remaining unused after that period or mortar which has partially hardened or is otherwise damaged shall not be tempered or remixed. It shall be thrown away.

5.5.12.4.13 Scaffolding

Scaffolding required for facility of construction shall be provided by the Contractor at his own expense.

Scaffolding shall be double or single as is warranted. Scaffolding shall be erected with steel sections or pipes, so as to be safe for all construction operations. The Contractor shall take all measures to ensure the safety of the work and working people. Any instructions by the Engineer in this respect shall also be complied with. The Contractor shall be entirely responsible for any damage to property or injury to persons resulting from ill-erected scaffolding, defective ladders and materials or otherwise arising out of his default in this respect. Proper scaffolding shall be provided to allow easy approach to every part of the work. Overhead work shall not be allowed. No log holes shall be made in the wall when scaffolding is being erected. For internal / External plaster double scaffolding with steel pipes / H frames to be used.

5.5.12.4.14 Tools and Accessories

Tools & accessories used in plasterwork may advantageously conform to IS:1630-1960. All tools shall be cleaned by scraping and washing at the end of each day's work or after use. Metal tools shall be cleaned after each operation. All tools shall be examined to see that they are thoroughly cleaned before plastering is begun.

5.5.12.4.15 Program of work in relation to plastering

All general precautions as specified in IS:1661-1960, Clause 9, shall be done in IS:1661- 1960, Clause 13. Care shall be taken to see that other parts of the work or adjacent works are not damaged while plastering.

5.5.12.4.16 Preparatory Work

All joints in the face work that is to be plastered shall be raked out to a depth equal to not less than the width of the joints or as directed by the Engineer. The raking shall be done taking care not to allow any chipping of masonry. In new work the raking out shall be done when the mortar in the joints is green. Smooth surfaces of concrete must be suitably roughened to provide necessary bond for the plaster. All dirt, soot, oil, paint or any other material that might interfere with satisfactory bond shall be removed. The surface to be plastered shall

be cleaned and scrubbed with fresh water and kept wet for 6 hours prior to plastering. Level pads, rough grounds for windows to be fixed before plastering. It shall not be commenced unless the preparatory work is passed in writing by the Engineer.

5.5.12.4.17 Gauges

Patches of plaster 150 mm x 150 mm (6" x 6") shall be put on about 3 m (10' –0") apart as gauges to ensure even plastering in one plane.

5.5.12.4.18 Plastering

In all plaster work, the mortar shall be firmly applied with somewhat more than the required thickness and well pressed into the joints and on the surface and rubbed and leveled with a flat wooden rule to give required thickness. Long straight edges shall be freely used to ensure a perfectly plane even surface. All corners must be finished to their true angles or rounded as directed by the Engineer. The surface shall be finished to plane or curved surfaces as shown on the drawings or as directed by the Engineer and shall present a neat appearance. The mortar shall adhere to the masonry surface intimately when set and there should be no hollow sound when struck. Plaster shall be done from top downwards.

At all the joints of concrete and brickwork or at the junction of different construction materials, 150 mm wide chicken wire mesh of 26 G thickness & 15 mm mesh size shall be used fixed after the first coat of plaster. The wire mesh will then be covered by the final coat of plaster.

5.5.12.4.19 Finishing

In any continuous face of a wall, finishing treatment of any type should be carried out continuously and day to day breaks made to coincide with architectural breaks in order to avoid unsightly junctions.

5.5.12.4.20 Moldings, Grooves, Bands etc.

These shall be worked true to template and drawn neat, clean and level. All exposed angles and junctions with doorframes etc. shall be carefully finished.

5.5.12.4.21 Watering and Curing

All plasterwork shall be kept damp continuously for a period of 14 days. To prevent excessive evaporation on the sunny or windward side of the buildings in hot, dry weather, matting or gunny bags may be hung over on the outside of the plaster in the beginning and kept moist. The fog curing of internal / external shall start within 90 minutes of completion of plastering to avoid hair cracks on plastered surface. Should the Contractor fail to water the work to the satisfaction of the Engineer, the latter engage requisite labor, materials and equipment to water the work properly at the Cost of the Contractor.

5.5.12.4.22 Bad Work

Should the mortar of the plaster perish through neglect of watering or for any other default and if the work is not done as specified, the plaster shall be removed and redone at the Contractor's expense. It is most essential that the Contractor shall properly plan out his overall construction and finishing program in such a way as to ensure that all such plastered and form finished surfaces are completed and handed over by him free from any defects – especially from any of the following aesthetic defects: -

Smudges and stains as result of spilling of cement mortar, plaster or any other material on to the finished surfaces.

Rectification patches, which may be the result of plastered or form finished surfaces having been accidentally damaged or broken, or because of such surfaces having had to be chased or opened out after final finishing.

Even minor chipping, scratching or other forms of accidental damage to the finished surfaces, as a result of negligence or carelessness on the part of the site organization during construction.

Item to include

- Erecting, dismantling and removing the scaffolding.
- Preparing the surface to receive plaster.
- Providing cement plaster of the specified average thickness with specified number of coats.
- Any moldings, grooves, bands etc. if shown on the drawings or as specified unless separately provided in the tender.
- All labor, materials, use of tools and equipment to complete the plastering as per specifications.
- Curing

5.5.12.4.23 Mode of Measurement

The contract rate shall be per sq. mt. of plastering of specified thickness. All work shall be measured net in sq. mt. Dimensions shall be measured and quantity worked out correct upto two places of decimals in meter and sq. mt. respectively. If the average thickness of plaster provided by the Contractor is more than what is specified, on any account no extra payment will be made. For jambs, soffit, sills etc. for openings not exceeding 0.46 sq. mt. (5.0 sq. Ft.) each in area ends of joists, beams, posts, girders and opening not exceeding 0.046 sq. mt. (0.5 sq. Ft.) each and opening not exceeding 2.8 sq. mt. (30.0 sq. Ft.) each, deductions and additions shall be made in the following manner:

No deductions shall be made for ends of joists, beams, posts etc. not exceeding 0.46 sq. mt. (5 sq. Ft.) and for openings not exceeding 0.46 sq. mt. (5 sq. Ft.) each and no addition shall be made for reveals, jambs, soffit, sills etc. of these openings nor for finishing the plaster around ends of joists, beams, posts etc.

Deductions of openings exceeding 0.46 sq. mt. (5.0 sq. Ft.) but not exceeding 3 sq. mt. (32.0 sq. Ft.) each shall be made as follows and

no addition shall be made for reveals jambs, soffits, sills etc. of these openings.

- When only one face is plastered no deductions shall be made.
- When both faces of the wall are plastered with the same plaster deduction shall be made for one face only.
- When two faces of a wall are plastered with deft plaster deductions shall be made from the plaster on the side of frames for doors, windows etc. on which the width of reveal is less than that of the other side.

In case of opening of area above 3 sq. mt. (32.0 sq. Ft.) deductions shall be made for the actual openings but jambs, soffits and sills shall be measured and paid. Ceiling with projections beams, shall be measured over beams i.e. the plastered faces of beams shall be measured and added to the plastering of ceilings.

5.5.13 Oil Emulsion (Oil Bound) Washable Distempering

5.5.13.1 Materials

Oil emulsion (Oil Bound) washable distemper (IS 428) of approved brand and manufacture shall be used. The primer where used as on new work shall be cement primer or distemper primer as described in the item. These shall be of the same manufacture as distemper. The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer. Only sufficient quantity of distemper required for day's work shall be prepared.

The distemper and primer shall be brought by the contractor in sealed tins in sufficient quantities at a time to suffice for a fortnight's work, and the same shall be kept in the joint custody of the contractor and CPWP SPECIFICATIONS 2009 554 the Engineer-in- Charge. The empty tins shall not be removed from the site of work, till this item of work has been completed and passed by the Engineer-in-Charge.

Providing and applying two or more coats of plastic emulsion paint of matt finish: 50-60 micron each coat of approved brand, manufacturer and shade to give a smooth finish on new concrete surfaces over a coat of approved primer including the cost of preparing the surfaces with approved filling materials, along with sand papering wherever required, scaffolding etc. complete.

5.5.13.2 Preparation of the Surface

For new work the surface shall be thoroughly cleaned of dust, old white or color wash by washing and scrubbing. The surface shall then be allowed to dry for at least 48 hours. It shall then be sand papered to give a smooth and even surface. Any unevenness shall be made good by applying putty, made of plaster of paris mixed with water on the entire surface including filling up the undulations and then sand papering the same after it is dry.

In the case of old work, all loose pieces and scales shall be removed by sand papering. The surface shall be cleaned of all grease, dirt etc. Pitting in plaster shall be made good with plaster of paris mixed with the color

to be used. The surface shall then be rubbed down again with a fine grade sand paper and made smooth. A coat of the distemper shall be applied over the patches. The patched surface shall be allowed to dry thoroughly before the regular coat of distemper is applied.

5.5.13.3 Application

5.5.13.4 Priming Coat:

The priming coat shall be with distemper primer or cement primer, as required in the description of the item. The application of the distemper primer shall be as described in 13.18.4.

Note: If the wall surface plaster has not dried completely, cement primer shall be applied before distempering the walls. But if distempering is done after the wall surface is dried completely, distemper primer shall be applied.

Oil bound distemper is not recommended to be applied, within six months of the completion of wall plaster. However, newly plastered surfaces if required to be distempered before a period of six months shall be given a coat of alkali resistant priming Paint conforming to IS 109 and allowed to dry for at least 48 hours before distempering is commenced.

For old work no primer coat is necessary.

5.5.13.5 Distemper Coat:

For new work, after the primer coat has dried for at least 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the distemper, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. One coat of distemper properly diluted with thinner (water or other liquid as stipulated by the manufacturer) shall be applied with brushes in horizontal strokes followed immediately by vertical ones which together constitutes one coat.

The subsequent coats shall be applied in the same way. Two or more coats of distemper as are found necessary shall be applied over the primer coat to obtain an even shade.

A time interval of at least 24 hours shall be allowed between successive coats to permit proper drying of the preceding coat. For old work the distemper shall be applied over the prepared surface in the same manner as in new work. One or more coats of distemper as are found necessary shall be applied to obtain an even and uniform shade.

15 cm double bristled distemper brushes shall be used. After each day's work, brushes shall be thoroughly washed in hot water with soap solution and hung down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

5.5.14 Exterior Painting on Wall

5.5.14.1 Material

The paint shall be (Textured exterior paint/Acrylic smooth exterior paint/premium acrylic smooth exterior paint) of approved brand and manufacture.

This paint shall be brought to the site of work by the contractor in its original containers in sealed condition. The material shall be brought in at a time in

adequate quantities to suffice for the whole work or at least a for night's work. The materials shall be kept in the joint custody of the contractor and the Engineer-in-Charge. The empty containers shall not be removed from the site of work till the relevant item of work has been completed and permission obtained from the Engineer-in-Charge.

5.5.14.2 Preparation of Surface

For new work, the surface shall be thoroughly cleaned off all mortar dropping, dirt dust, algae, fungus or moth, grease and other foreign matter of brushing and washing, pitting in plaster shall make good, surface imperfections such as cracks, holes etc. should be repaired using white cement. The prepared surface shall have received the approval of the Engineer in charge after inspection before painting is commenced.

5.5.14.3 Application

Base coat of water proofing cement paint.

1. All specifications in respect of base coat of water proofing cement paint shall be as described under above similar clauses.
2. Before pouring into smaller containers for use, the paint shall be stirred thoroughly in its container, when applying also the paint shall be continuously stirred in the smaller containers so that its consistency is kept uniform. Dilution ratio of paint with potable water can be altered taking into consideration the nature of surface climate and as per recommended dilution given by manufacturer. In all cases, the manufacturer's instructions & directions of the Engineer-in-charge shall be followed meticulously.

The lids of paint drums shall be kept tightly closed when not in use as by exposure to atmosphere the paint may thicken and also be kept safe from dust.

1. Paint shall be applied with a brush on the cleaned and smooth surface. Horizontal strokes shall be given, First and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks.
 2. All specifications in respect of base coat of water proofing cement paint shall be as described under above similar clauses.
- Painting

5.5.15 CARPENTRY, JOINERY, DOORS:

5.5.15.1 Scope

The work in general shall consist of supplying and/or erecting and installing of all doors, windows, ventilators, louvers, rolling shutters, glazed partitions, etc. as shown on drawings with all materials complete including supply and fixing of glass and glazing.

The scope shall also include the assembly and erection of all doors, windows, louvers, glazed partitions, etc. Supplying and/or fixing of all door and window accessories and hardware are also included in the scope.

5.5.15.2 Applicable Codes and Specifications

The following codes, standards and specifications are made a part of this specification. All standards, specifications, codes of practices referred to herein shall be the latest edition including all applicable official amendments and revisions.

In case of discrepancy between this specification and those referred to herein, this specification shall govern.

IS: 4021	Timber door, window and ventilator frames.
IS: 2202	Wooden flush door shutters (Solid core Type) Part – I.
IS: 1003	Timber paneled and glazed shutters. (Parts I & II)
IS: 4020	Methods of tests for wooden flush doors: Type tests.
IS: 1761	Transparent sheet glass for glazing and framing purposes.
IS: 4351	Steel door frames.
IS: 1038	Steel doors, windows and ventilators.
IS: 1361	Steel windows for industrial buildings.
IS: 1081	Code of practice for fixing and glazing of metal (Steel and Aluminum) doors, windows and ventilators.
IS: 5807	Method of test for clear finishes for wooden furniture (Part I to III)
IS: 1477	Code of practice for painting of ferrous metals in buildings and allied Finishes (Part I & II)
IS: 2338	Code of practice for finishing of wood and wood-based materials (Part I).
IS: 1948	Aluminum doors windows and ventilators
IS: 1949	Aluminum windows for industrial buildings.
IS: 3548	Code of practice for glazing in building.

5.5.15.3 Wood works:

Timber used for joinery shall be of good approved quality or Teak wood unless otherwise specified (Ref.IS:4021) and shall be well seasoned (IS:1141) cut square, of natural growth, uniform in texture, straight grained, free from excess wane, from sapwood dead knot or other defects and blemishes (Ref.IS:3364).

All timber for carpentry, joinery, rough frame work, backings, grounds, fixing strips and the like shall be treated with an approved wood preservative (Ref.IS:401) and the Contractor shall strictly observe the manufacturer's instructions for using this material. The maximum permissible moisture content in timber shall be in accordance with IS: 287-latest.

All workmanship shall be of the best quality (IS: 6534) Scantlings and boarding's shall be accurately sawn and shall be of uniform width and thickness throughout. All carpenter's work shall be left with a sawn surface except where otherwise specified. Work shall be framed together and securely fixed in the best possible manner and with properly made joints.

All brads, nails, screws, plugs, pin, etc. to be provided as necessary and as directed and approved.

Timber of approved quality is to be purchased at the commencement of the contract for further seasoning on the site. The preparation of timber is to commence simultaneously with the beginning of the work generally and to proceed continuously until all the wood work is prepared and stacked on or near the site. All the timber of large scantlings is to be sawn immediately on arrival at site to allow for any shrinkage that may take place. All timber brought to site shall be given anti-termite treatment.

Joints in various members forming any timber frame shall be provided only as shown in the drawings or as directed by the Engineer. Two millimeters will be allowed for each wrought face of the sizes specified except when described as finished in which case they shall hold to the full dimensions specified.

All work is to be properly tenoned, shouldered, wedged, pinned, braded, etc. to the satisfaction of the Engineer and all properly glued with best quality glue. All joinery shall be finished off in a proper manner, planed and sand papered as required (IS: 2338).

Any joiner's work which shall be split, fracture, shrink, or show flaws or other defects due to unsoundness, inadequate seasoning or bad workmanship, shall be removed and replaced with sound material at the Contractor's expense.

Use of nails shall not be permitted. Fixing of members shall be done by using screws or round brads, heads of which shall be properly punched in ends of timbers built into walls shall have air space left between themselves and the walls.

All exposed faces of woodwork shall be sand papered once before erection for approval of the Engineer. No color or other preservatives shall be applied without prior approval of the Engineer.

Doors, windows and ventilator frames, transoms and mullions shall be rebated. All dimensions shall be as per drawings. The top framing member of doors and top and bottom framing of windows and ventilators shall project about 150 mm in brick work. The verticals of door frames shall project about 50 mm below finished floor.

Frames for doors and windows will be provided with Mild Steel holdfasts made of 40 mm x 3mm thick flats 200 mm long and fixed into jambs M-15/10 P.C.C. 1200 mm high frames with 6 Nos and frames above 2000 mm with 8 Nos holdfasts. Each holdfast will be fixed to the frame with 3 Nos 50 mm GI screws.

The doors shall be paneled or solid flush doors as described in the item of work. All flush doors shall be supplied with approved fittings such as hinges, mortice lock of approved make with handles on sides, oxidized brass tower bolts and latch arrangements, door stops etc. and as shown in drawings but exclusive of door closer. Door closers, where separately specified shall be of heavy-duty hydraulic type to be approved by Engineer/Architect.

Doors shall generally have no sills but if a few have to be provided; the CONTRACTOR shall do so at no extra cost to the OWNER.

For fixing timber frames to concrete, raw plugs and screws of 16 gauges shall be used wherever specified. Rawle plugs and screws of gauge 16 shall also be used for fixing raw rough grounds, framing, hangers, hat hooks, curtain rails etc. Unless otherwise specified, screws used for the work shall be galvanized.

All timber surfaces coming into contact with masonry or concrete shall be given two coats of wood preservative or so lignum approved by the Engineer.

Paneled and glazed shutters, styles and rails shall be as shown in the drawing, molded and mortised together (Ref IS: 1003). The shutters shall be square and free from twist. All glazing is to be of sheet glass of selected quality and approved by the Engineer/Architect.

It shall be clear and free from defects. It shall be cut to the required size and fixed to frame either with spring clips, with approved quality, or with teakwood beading as per details.

The Engineer may order any timber frame to be put together on the ground and submitted to suitable tests to his satisfaction before being placed in position. The cost of any such test shall be borne by the Contractor.

All surfaces of timber resting on or bedded in masonry or concrete shall be well coated with coal tar.

All fixing holes shall be pelleted and concealed from view. 35 mm thick flush type block board (IS:2202) shall be manufactured from selected timber well-seasoned and shall be of solid particle board core construction with 25 mm thick teak wood lipping all around the edge. The stiles and rails shall be of one piece or alternatively, two or more pieces glued together. The thickness of the cross band shall not be less than 3mm and the thickness of the facing shall be of best quality commercial ply thickness not less than 1.5mm. Where veneer finish, or Formica finishes or any other type is specified they shall be glued separately. All the plywood shall be glued under pressure. Glue used shall be phenol formaldehyde resins.

5.5.15.4 Flush door shutter with paint finish

Providing and fixing ISI marked flush door shutters conforming to IS:2202 (Part I) nondecorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters. Flush door panel shall be 35 mm thick, with 25 mm thick teak wood lipping on all edges, including fixing with stainless steel butt hinges, screws and painting in approved color. Size and design of doors to be as per detailed door drawings. Painting shall include applying approved wood primer and 2 or more coats of paint of approved make and color.

5.5.15.4.1 Fixtures:

All doors and windows shall be provided with best quality fixtures as specified in the drawing. Samples of all fittings shall be submitted for approval by the Engineer. Unless otherwise specified, hinges, tower bolts, AL drops, handles, baby latches, etc. shall be of best quality of specified size. Mortise lock, hydraulic closer and other fixtures shall be of approved make.

5.5.15.4.2 Painting:

Painting shall be carried out only after the joinery has been inspected and approved by the Engineer. The surface preparation and applying of primer coats of paint and final coats of paint shall be carried out as per specifications for painting. Unless otherwise specified a minimum of 2 coats of primer paint and 3 coats of final paint to be applied. Where polishing or varnishing is specified, the surface to be varnished or polished shall be protected from contamination such as inadvertent painting and surface damage. The polishing or varnishing shall be according to the specifications for varnishing or polishing under the section Painting.

The contractor shall submit samples of each type of hardware to the Engineer. The approved samples shall be retained by the Engineer for comparison of bulk supply. The samples shall be returned to the Contractor towards the end for incorporation in the job. The frames shall be erected in accordance with manufacturer's instructions. The frame shall be aligned and kept plumb by suitable supporting arrangement. As the masonry is being constructed the holdfasts are embedded in concrete mix 15/10. Where required for fixing with concrete member, raw plug and GI screws shall be used. The joints between the steel frame and masonry work, after being finished with plaster shall be finished with approved bitumen mastic. Glass panes, unless otherwise specified shall be of 6mm thickness and shall be free from flaws, specks and bubbles. It shall have properly squared corners and straight edges, and shall be fixed to frame with glazing pins and approved putty.

5.5.15.5 PVC DOOR & uPVC WINDOW MOLDED PVC DOOR (WOOD FREE)

Description: This item shall govern the provision of fabrication, supply and installation of 30 mm thick factory-made molded PVC door (Wood free) as per drawing approved by Engineer-in-charge

General Requirement: The 30 mm thick factory-made molded PVC door (Wood free) shall be fabricated in accordance with design requirement and detailed as per drawing, in conformity with the requirements of this specification.

Feature: Feature of molded PVC door are as follows:

1. 100% Water Proof
2. Dimensionally stable
3. Acid/Alkali Resistant
4. 100% Termite Proof
5. Maintenance Free
6. Flame Retardant

Fabrication description:

30 mm thick factory-made molded PVC door (Wood free) consisting of frame made out of M.S. tubes of 19-gauge thickness and size of 20 mm x 40 mm for stiles as well as top, bottom & lock rail. M.S. frame shall have a coat of metal primer of approved make & manufacturer. The inside panel shall consist of 20 mm thick multi-chamber hollow PVC section of 1mm wall thickness, bonded using solvent cement / cyanoacrylate adhesive with 5 mm (+0.25) thick molded PVC sheet of density 600 kg/cbm with 2, 4, 6 raised panel

design in plain / prelim colors after routing the molded design on one side of the inside panel. 5 mm (+0.25) plain / prelim PVC sheet to be pasted using solvent cement / cyanoacrylate adhesive on other side of the hollow PVC section.

All the four edge of the panel to be sealed with lipping of 10 mm thick & 20 mm wide PVC sheet baton made by sticking 2 nos. foam PVC sheets of 5 mm (+0.25) thickness using PVC solvent cement adhesive. Door edge lipping to be painted with PVC ink of matching color of Plain/Prelim molded PVC sheet of door 20 mm thick (5 mm x 4 nos.) thick PVC sheet to be given for lock provision at lock height. Door to be fixed with frame with 3 nos. stainless steel butt hinges of size 100 mm x 25 mm x 2mm and 50 mm long steel screws drilled suitable to pass through both the walls of the M.S. tube other hardware should be fixed with 25 mm x 8 mm size steel screws etc., complete as per manufacturer's specification and drawing or direction of Engineer-in-charge. Finish: All the surface of molded PVC door (Wood free) should be uniform smooth finish and free from crack and seam. Passing joints shall be finished ensuring that no gaps are visible.

Tolerance: All Dimensions (except thickness of profile sections) shall be as per drawing $\pm 0.25\text{mm}$.

Test: Molded PVC door shall be subjected to the following test: -

Edge Loading Test as per IS 4020 Part 7

Slamming test as per IS 4020 Part 10

Shocking resistant test for soft body and heavy body as per IS 4020 Part 8

Measurement: The unit of measurement shall be in square meter.

5.5.15.6 General Steel Door:

Fixing 50 mm thick steel door shutter with double skinned with 0.8 mm (22 gauge) galvanized steel sheets (bending radius 1.2) mm spangle free of size to fit the above frame, stressed-skin design, (no visible joint on faces), lock seam joint (without any visible weld joints on the vertical edges also) and flush top with inverted channel; and with paper honey-comb infill bonded to the skin with PU/Co-polymer resins, pre-punched /pre-drilled to receive ironmongery as per the manufacturer specification. Suitable reinforcement is to be provided in the door shutter to receive the hardware and hardware to be fixed on the door including vision panel fasteners. The doors with double shutters are to be provided with astragals on both sides & astragals to be fitted to the door without any fasteners. The shutter to be fixed with SS hinges 304 grades (size 100x75x3mm). The door frame (section size 143x57) will be made from 1.6mm thick GI steel /GP steel pressed to double rebate profile for better structural strength. Frames are to be fixed with fasteners.

1. GI – Sheet

GI-Sheets 1.6mm /120 gsm of Zinc Coating plus 40 micron of Primer / 40 micron of finish paints or powder coating upto 80 Micron, having 3 mm thick base plate and duly reinforced; pre-machined for receiving latch/lock; with recessed pre-drilled 3 mm hinge plates, Ready- to-receive specified hardware/ironmongery, to be supplied in CKD condition & to be jointed at site Butt & bolted as per kitty design.

2. Handling and Storage of Fabricated Materials

All doors, windows, etc. shall be packed and crated properly before dispatch, to ensure that there shall be no damage to the fabricated materials. Loading into wagons and trucks shall be done with all care to ensure safe delivery of materials at site in undamaged condition. While taking delivery of items supplied by Owner, the Contractor shall satisfy himself that the items supplied are upto the specified standard. Any defect detected shall promptly be brought to the notice of the Engineer.

All doors, windows etc. shall be stored under cover in a way to prevent damage or distortion. Special care shall be taken to prevent staining of aluminum products by rust, mortar etc.

3. Assembly & Erection at Site

In general, the fixing of steel doors, windows, ventilators, louvers, etc. shall conform to IS: 1081 and as shown on drawings. The contractor shall assemble and install all steel doors. Sashes, fixed metal louvers etc. including transoms and mullions for composite units in respective places as shown on drawings, keeping proper lines and levels, and in approved workmanship manner, to give trouble free and leak-proof installations. The installation shall be done according to the instructions of the manufacturer, and/or as approved by the Engineer. If required by the Engineer, the installation shall be carried out under the supervision of the manufacturer's representative. The contractor shall take every precaution against damage of the components during installation. Necessary holes, chases, etc. required for fixing shall be made by the Contractor and made good again as per original, after installation, without any extra charge. After installation of steel doors all abrasions to shop-coat of paint shall be retouched and made good with the same quality of paint used in shop coat.

All coupling mullions, transoms, frame, etc. in contact with adjacent steel and other members, shall be well bedded in mastic. The Contractor shall bring to the site the mastic cement in original sealed containers of manufacturer and shall apply it as per the instructions. For all frames supplied by either the Owner or the contractor, mastic shall be supplied by the Contractor and caulking done properly as per drawings, Specifications and as per instructions of the Engineer. Door shutters partition hardware fixtures etc. shall be fixed only after major equipment has been installed in rooms. Wherever required, nylon cords of approved quality shall be supplied along with pivoted sashes and shall be of adequate length to terminate one meter from the floor. Loose ends of cards shall end in metal or plastic pull as approved by the Engineer.

4. Acceptance Criteria**• For Fabricated Items**

Overall dimensions shall be within +/-1.5mm of the size shown on drawings.

Mullions, transoms etc. shall be in one length and permissible deviations from straightness shall be limited to + / - 1.5 mm from the axis of the member.

Door and window shutters shall open without jamming. The clearance at head and jamb for door shutters shall not exceed 1.5 mm. For double leaf doors, the gap at the meeting stiles shall not be more than 1.5 mm.

Door leaves shall be undercut where shown on drawings.

Doors, windows, frames etc. shall be on a true plane, free from warp or buckle.

All welds shall be dressed flush on exposed and contact surfaces.

Correctness of location and smoothness of operation of all shop installed hardware and fixtures.

Provision for hardware and fixtures to be installed at site.

Glazing beads shall be cut with mitered corners.

Glazing clips, fixing devices etc. shall be supplied in adequate numbers.

Shop coats shall be properly applied.

Exposed aluminum surface shall be free from scratches, stains and discoloration;

Anodized surfaces shall present a uniform and pleasing look.

- **For Installed Items**

Installations shall be at correct location, elevation and in general on a true vertical plane.

Fixing details shall be strictly as shown on drawings.

Assembly of composite units shall be strictly as per drawings, with mastic caulking at transoms and mullions, gaskets, weather strips etc. complete.

All frames on external walls shall be sealed with polycopid or mastic caulked to prevent leakage through joint between frames and masonry.

All openable sections shall operate smoothly without jamming.

Locks, fasteners etc. shall be unique (one to one) positively. Keys shall be noninterchangeable.

Cutting to concrete or masonry shall be made good and all abrasions to shop paint shall be touched up with paint of same quality as shop paint.

Aluminum doors, windows etc. shall be free from scratches, stain or discoloration.

Hinges, Tower bolts, locks.

Hardware shall include handle pull / push indicator plates etc., as specified.

- **Information to Be Submitted with Tender**

Names of manufacturers for doors, windows etc.

Manufacturer's catalogue for all hardware and fixture proposed to be used.

- a) **After Award**

Before starting fabrication of all metal doors, windows etc. the Contractor shall submit detailed fabrication drawings to the Engineer for approval. The fabrication shall be started only after approval of drawings.

Before bulk supply, he shall submit for the approval of the Engineer, samples of all bought out items and samples of each type of fabricated item. The samples shall be retained by the Engineer for comparison of bulk supply and returned to the Contractor towards the end for the final incorporation in the job.

5. **Rates**

Shall be unit rates for items described in schedule.

6. **Mode of Payment and Measurement:**

The rate quoted shall include the cost of supplying, fabricating and fixing in position frames, putty, glass panes, all necessary fixtures, applying paints as specified, embedding hold fasts in concrete or fixing to concrete members raw plugs and GI screws etc. complete and shall be paid on square meter basis.

For doors, the width shall be the overall width prior to plastering and the height shall be from finished floor to the top of top frame measured prior to plastering.

The work includes preparation of shop drawings as per manufacturer's specifications and architectural drawings complete etc. which shall be approved by Engineer-in-charge.

Appendix-A

Mechanical Properties and Chemical Composition of Steel

Table

Chemical Composition

Grade Designation	Quality				Ladle analysis, Percent, Max	Carbon Equivalent (CE), Max		Method of Deoxidation
1	2	3	4	5	6	7	8	9
E 165 (Fe 290)		0.25	1.25		0.045	0.045		Semi-killed or killed
E 250 (Fe 410 W)	A	0.23	1.50	0.045	0.045	0.045	0.42	Semi-killed or killed
E 250 (Fe 410 W)	B	0.22	1.50	0.045	0.045	0.045	0.41	Killed
E 250 (Fe 410 W)	C	0.20	1.50	0.045	0.045	0.045	0.39	Killed
E 300 (Fe 440)		0.20	1.30	0.045	0.045	0.045	0.40	Semi-killed or killed
E 350 (Fe 490)		0.20	1.50	0.045	0.045	0.045	0.42	Semi-killed or killed
E 410(Fe 540)		0.20	1.60	0.045	0.045	0.045	0.44	Semi-killed or killed
E 450 (Fe 570)	D	0.22	1.60	0.045	0.045	0.045	0.46	Semi-killed or killed

E 450 (Fe 590)	E	0.22	1.80	0.045	0.045	0.045	0.48	Semi-killed or killed

Notes:

- Carbon equivalent (CE) based on ladle analysis = $Mn + (Cr+Mo+V) + (Ni + Cu) (C+6) 5 15$
- When the steel is killed by aluminium alone, the total aluminium content shall not be less than 0.02 per cent. When the steel is killed by silicon alone, the silicon content shall not be less than 0.10 per cent. When the steel is silicon-aluminium killed, the silicon content shall not be less than 0.30 per cent and total aluminium content shall not be less than 0.01 per cent.
- Microalloying element like Nb, V, Ti and B shall be added singly or in combination. Total microalloying element shall not be more than 0.25.
- New grades designation system based on yield stress has been adopted, simultaneously old designations have also been given in parentheses.
- Steel of qualities A, B and C are generally suitable for welding processes. The weldability increases from quality A to C.
- Copper may be present between 0.20 to 0.35 per cent as mutually agreed to between the purchaser and the manufacturer. The copper bearing quality shall be designated with a suffix Cu, for example, E 250 Cu. In case of product analysis, the copper content shall be between 0.17 and 0.38 per cent. 1 “To be supplied subject to the agreement between the purchaser and the manufacturer”.
- Nitrogen content of steel shall not exceed 0.012 per cent which shall be ensured by the manufacturer by occasional check analysis. For micro alloyed steel this is to be reduced to 0.009 per cent.
- The steel, if required may be treated with rare earth element for better formability.
- Lower limits for carbon equivalent and closer limits for other elements may be mutually agreed to between the purchaser and the manufacturer.
- Incidental element-Elements not quoted in Table 1 shall not be intentionally added to steel without the agreement of the purchaser, other than for the purpose of finishing the heat. All reasonable precautions shall be taken to prevent the addition from scrap or other materials used in manufacture of such elements which affect the hardenability, mechanical properties and applicability.

Table**Mechanical Properties**

Grade Designation	Quantity	Tensile strength Min. Mpa	Yield stress, ReH Min. Mpa			Percentage Elongation at Gauge length Lo 5.65 $\sqrt{SO}$ Min.	Internal Bend Diameter Min.)		Charpy V notch Impact Energy Min. J	
			<20	20-40	>40		<25	>25	At Room Temp.	At 20 deg. C
1	2	3	4	5	6	7	8	9	10	11
E 165 (Fe 290)	-	290	165	-	-	23	2t	-	-	-
E 165 (Fe 290)	A	410	250	240	230	23	3t	2t	-	-
E 165 (Fe 290)	B	410	250	240	230	23	2t	3t	27 (See Note 3)	
E 165 (Fe 290)	C	410	250	240	230	23	2t	3t	27 (See Note 3)	
E 165 (Fe 290)	-	440	300	290	280	22	2t	3t	50	30
E 165 (Fe 290)	-	490	350	330	320	22	2t	3t	50	25
E 165 (Fe 290)	250	540	410	390	380	20	2t	3t	50	25
E 165 (Fe 290)	D	570	450	430	420	20	2t	3t	45	20
E 165 (Fe 290)	E	590	450	430	420	20	2t	3t	45	20

- A. 1 MPa= 1MN/m²= 0.102 kgf/mm²=144.4 psi
- B. Temperature of Charpy impact values will be subject to mutual agreement.
- C. The more stringent requirements than those given above may be as agreed to between the purchaser and the manufacturer.

5.5.16 Hollow Metal GI Fire Rated Door:

A. Materials

GI Fire rated door shall be as per IS 3614 part-1 & part-2 for stability and integrity vide test report no. FR/0490 Dt: 03-10-2011. Pressed Galvanized steel conforming to IS 277 are of the following specification.

B. Construction

Recommended fire door shall have doors tested at CBRI for maximum rating of 2hrs tested with vision panel of minimum 0.1 Sqmtr per shutter as requirement & application. Individual Test certificates should also be

available for glass used in vision lies confirming the required fire ratings /panels being a part of the fire door assembly. Doors should be finished in Thermosetting Powder Coating desired RAL Shades. Manufacturer test certificate shall cover doors both single & double leaf doors and Hardware should pass European certificate "CE" of conformity / UL with required fire ratings. Any deviation in specification and sheet thickness other than what is mentioned in the test certificates are not allowed. Proper label confirming the type of door and the hourly rating is mandatory. Approved manufacturer Navair International Ltd or equivalent subject to architect's approval. And should be ISO Certified Company.

Door frame shall be double rebate profile of minimum size 155mm X 80mm made out of 1.60mm (16gauge) minimum thick galvanized steel sheet. NDRF 155x80 Frames shall be Butt jointed and field assembled with self-bolted. The frames should be finished with Thermosetting Powder Coating in desired RAL Shade. All provision should be mortised, drilled and tapped for receiving appropriate hardware. Frames should be provided with back plate bracket and anchor fasteners for installation on a finished plastered masonry wall opening.

Detailing shall be as per architectural drawing & as per the direction of Engineer In charge including preparation of shop drawing & getting it approved from architect. Door leaf shall be minimum 50mm thick fully flush double skin door with or without vision lite. Door leaf shall be manufactured from 1.25mm (18gauge) minimum thick galvanized steel sheet. The internal construction of the door should be rigid reinforcement pads for receiving appropriate hardware. The infill material shall be Rockwool treated with Viper FRS 881 LH. All doors NSD 12049 shall be factory prepped for receiving appropriate hardware and provided with necessary reinforcement for hinges, locks, and door closers. The edges should be interlocked with a bending radius of 1.4mm. For pair of doors astragals has to be provided on the meeting stile for both active and inactive leaf. Vision lite wherever applicable should be provided as per manufacturers recommendation with a bedding and screws from inside. However, the glass should be 5mm thick clear glass of 120 min fire rated.

C. Finishing

The surface of door frame shall be thoroughly cleaned, free of rust, mill-scale dirt oil etc. either by mechanical means, for example sand or shot blasting or by chemical means such as pickling.

D. Fixing

Frames shall be fixed up right in plumb and plane. To avoid sag or bow in width during fixing or during construction phase, temporary struts across the width preventing sides bulging inwards may be provided. Wall shall be built solid on each side and grouted at each course to ensure solid contact with frame leaving no voids behind the frame.

E. Rate

The rate shall include the cost of labour and material involved in all the operation described above including one coat of approved steel primer but excluding two coats of paint.

5.5.17 WATERPROOFING

5.5.17.1 Terrace Waterproofing Insulation Using EPS Boards

A. Scope

This specification covers the insulation and waterproofing system for terrace slab.

B. General

- Quality assurance: All products in the system shall meet the key performance properties listed in Section A against each and shall be sourced from a manufacturer with a certified QA system such as, ISO 9001 or an established and proven QA system that has ensured consistent products.
- Approved sources: All products in the specified system shall be sourced from a single manufacturer, from amongst the list of approved products and sources foreach in Section B.
- Installation: All the products/systems specified in this document shall be installed by a Specialist Applicator approved by the manufacturer strictly in accordance to the written application guide by the manufacturer.
- Multiple sources and compatibility: Should the Specialist Applicator or the Contractor want products from different sources, they shall submit proof of compatibility between the products of different sources.
- Alternate equivalents: Should the Specialist Applicator or Contractor prefer to use alternative equivalent product(s) to the approved list in Section B, it can only be after obtaining a written approval by the Specifier for use of the preferred alternative; such approvals can only be issued by the Specifier after establishing conformity to the specified key performance properties.
- Substrate preparation: Before starting to install the specified waterproofing system, the substrate shall jointly be inspected by the Contractor and the Specialist Applicator for soundness; any defects shall first be repaired utilizing products and systems compatible with the specified waterproofing system.

C. The Waterproofing System

The specified waterproofing system is meant for the water tightness of terrace slab covering the horizontal & the vertical surface and different parts; each generic product specified shall meet the key performance properties in Section A. Schematic diagram of the waterproofing system is attached as appendix.

Waterproofing system for Terrace slab with built-up over it: Providing and applying a Liquid, cold-applied elastomeric waterproofing membrane system strictly to the written application guidelines of the manufacturer. The elastomeric, seamless waterproof membrane shall exhibit the key

performance properties as specified below. Applied in 2 coats to a DFT of 1.5mm thick.

D. The Insulation System

The specified insulation system is meant for over deck insulation of the roof would be done using expanded polystyrene boards. The boards shall have Tongue & Groove Locking arrangement for thermal bridging. Insulation shall be done by a built-up which would consist of 2 boards of 50 mm average thickness.

Screed Laid to slope shall be of 75mm average thickness, shall be of M20 grade with wire mesh @ 75mm x 75mm.

5.5.17.2 Integral Cement Based Treatment for Water Proofing on Horizontal

E. Preparation of Surface

The Water Proofing Treatment over the lean concrete/levelling course surface should adhere to the surface firmly, the surface of levelling course should be roughened properly when the concrete is still green. In case the surface is not made rough before the concrete is set, the work of water proofing should not be executed till proper key is provided for the base layer of Cement Mortar 1:3.

F. Blending Cement/Water with Water Proofing Compound

The required quantity of cement bags to be used for a particular portion of work should be emptied on a dry platform. Water proofing compound bearing ISI mark and conforming to IS 2645 should then be mixed properly with the cement. The quantity of water proofing compound to be mixed should be as prescribed by the manufacturer but not exceeding 3% by weight of cement. The quantity of cement and water proofing compound thus mixed should be thoroughly blended and the blended cement should again be packed in bags.

For the water proofing compound in liquid form, the blending is to be done with water. This can be done by taking the just required quantity of water to be mixed in the particular batch of dry cement mortar.

The required quantity of water thus collected per batch of dry cement mortar to be prepared should be mixed with liquid water proofing compound from sealed tins with ISI mark. The water thus mixed with water proofing compound shall be thoroughly stirred so that the water is blended with water proofing compound properly.

G. Laying Water Proofing Course

Before laying the base course of cement mortar 1:3, the lean concrete surface shall be cleaned neatly with water. Cement slurry. (ii), shall be applied only on the area of the concrete surface, that can be covered with the cement mortar (1:3) base course within half an hour. The cement slurry should cover every spot of the surface and no place shall remain uncovered. Just after the application of cement slurry on the surface, the cement mortar prepared as per clause 5.6.11.2.1 (v) should be used for laying the base course. Base Course should be laid to a perfect level with wooden/aluminum straight edge of at least 2 mtrs. long. The top surface of cement mortar should be finished neatly and later scratched when green with a suitable instrument before the base course dries and gets hard that is just before the base course takes up initial set.

When the 25-mm thick base course is just getting set the cement slurry prepared as per clause 5.6.11.2.1 (iv) should be spread over the base course up to the area that shall be covered with just two to three stone slabs. The cement slurry shall be spread in such a way that the area of base course to be covered immediately shall be covered with slurry without any gap or dry spots. Immediately on applying cement slurry on the base course the Rough Kota Stone slab shall be laid over the base course and pressed gently so that the air gap can be removed.

The slurry applied on the surface which gets spread when the stone slab is pressed shall get accumulated in the joints of adjacent stone slabs and if any gap still remains between the stone slabs the same should also be filled with additional quantity of cement slurry. For laying the stone slabs in perfect level, two stone slabs at adjacent concerns/ends shall be fixed firmly to the required level and a string stretched over the two slabs, the intermediate slabs shall then be set to the level of the string.

H. Curing

Immediately after completing the fourth layer, arrangements shall be made for the top RCC slab as quickly as possible and in the meantime till the top slab is casted the water proofing treatment shall be kept wet continuously. In case the concreting of slab gets delayed for more than 2 weeks the curing can be stopped after 14 days.

I. Measurement

Length and breadth shall be measured along the finished surface correct to a cm and the area shall be worked out to nearest 0.01 sqm.

J. Rate

The rate shall include the cost of all labour & materials involved in all the operations described above. The cost of grading with cement concrete / cement mortar shall be paid for separately.

5.5.17.3 Water Proofing Treatment to Vertical and Horizontal Surface of Depressed Portion of WC, Kitchen and The Like

1) Before the Water Proofing Treatment

Before the water proofing treatment, the internal plaster of ceiling and walls of WC block leaving the portion for dado/skirting should be completed. Grooving / chasing for doing the concealed work of GI/CI pipes/Electrical conduits should be completed. Cleaning the depressed/sunken portion of WC of all debris, extra mortar sticking to the vertical and horizontal surface etc. Necessary holes for 'P' trap /Nhani trap/Water escape pipe etc. should be completed.

2) Preparing Surface and Fixing Pipes and Fittings

Before the water proofing treatment work, proper key in the concrete surface should be provided. The depressed/sunken portion should be hacked by a hacking tool, after the concrete slab is cast and when this concrete is still green. The vertical surfaces of the depressed /sunken portion should be hacked with a hacking tool just after the shuttering is removed. In case of old work, the water proofing treatment on such surfaces shall be permitted after making proper spatter dash key. Fixing the 'P' trap in position and all other pipes work including the water

escape pipe shall be fixed properly and the holes should be plugged carefully before taking up the water proofing work.

- **1st Course**

Cement duly blended with water proofing compound as explained shall be used for preparing the cement slurry.

The consistency of the slurry should be such that 4.4 kg. of blended cement with water proofing compound is used per sq. meter area of surface to be treated. The slurry should be started from the vertical faces towards the bottom of the floor. Particular care should be taken to see that the slurry is applied to corners without leaving any gap.

- **2nd Course**

Immediately on applying the blended cement slurry on the surface to be treated cement plaster 20 mm thick in CM 1:3 (1 blended cement: 3 coarse sand) shall be applied both on vertical and horizontal surfaces taking particular care to complete the entire depressed/ sunken portion of WC within a day so that the plaster can be done without any joint. Junctions shall be properly rounded. The surfaces of the plaster shall be left rough but finished in one plain and cured for a week.

On completion of the curing period both horizontal and vertical surfaces shall be cleaned properly and gently and allowed to dry.

- **3rd Course**

Only after the surface is completely dried the blown or residual bitumen shall be applied @ 1.7 kg. of bitumen per sqm area.

- **4th Course**

PVC sheet 400 micron thick shall be spread evenly without any kink immediately, so that the PVC sheet sticks to the surface firmly. PVC sheet shall be continued to be laid over the main slab up to 100 mm.

Overlapping of PVC sheet should be done with a minimum overlap of 100 mm, duly pasting the overlapped sheet with an application of bitumen @ 1.7 kg. / sqm.

The projections of pipes and 'P' trap outlet etc. inside the depressed/sunken portion of WC shall also be cladded with water proofing treatment layer up to a height of 150 mm, using a coat of bitumen with PVC sheet complete.

The surfaces of depressed/sunken portion of WC shall not be left without covering with specified filling material and base concrete, otherwise the PVC sheet layer may be tampered by the labour working in the vicinity.

Fixing up of WC pan, filling specified material and the top base concrete should be done as early as possible and the top horizontal layer of water proofing may be taken up later i.e. just before laying the floor tiles.

- 3) **Measurement**

Length and breadth shall be measured along the finished surface correct to a cm. and area shall be worked out to nearest 0.01 sqm. No payment however shall be made for the 100 mm overlap of PVC Sheet over the roof slab.

- 4) **Rate**

The rate shall include the cost of labour and materials involved in all the operations described above.

5.5.18 FLOORING / ALLIED WORK

5.5.18.1 Scope

This specification covers furnishing, installation, finishing, curing, testing, protection, maintenance till handing over various types of floor finishes and allied items of work as listed below:

5.5.18.2 Applicable Codes

IS:269 Specification for ordinary and Low Heat Portland Cement
 IS:383 Specification for Coarse and Fine Aggregates
 IS: 777 Specification for Glazed Earthenware Tiles
 IS:1237 Specification for Cement Concrete Flooring Tiles
 IS:1443 Code of Practice for Laying and Finishing of Cement Concrete Flooring Tiles
 IS: 2571 Code of Practice for Laying In-situ Cement Concrete Flooring Tiles
 IS: 457 Specification for Ceramic Unglazed Vitreous Acid Resisting Tiles
 IS: 2114 Code of Practice for laying in situ Terrazzo Floor Finish
 IS: 4860 Specification for Acid Resistant Bricks
 IS: 5491 Code of Practice for laying in situ Granolithic Floor Topping

5.5.18.3 Vitrified Tiles in Flooring / Skirting

The base shall be cleaned and the bedding mortar 20 mm to 25 mm shall be laid. A neat cement grout shall be spread before laying tiles. The tiles shall be cured for 5 days. The joints shall be filled with cement slurry tinted to match the colour of tiles. For fixing the tiles in skirting the bedding mortar shall be 12 mm. The tiles shall conform to relevant I.S. code. The contractor shall produce test certificate for the tiles.

5.5.18.4 Polished Kotah, Cudappah, Shahabad & Tandur Stone Flooring, Skirting and Facing:

5.5.18.4.1 Materials

Stones shall be of the best variety to be approved by the Engineer and shall be of specified thickness and size.

The stone slabs shall be sound, durable and uniform in size, thickness and color. They shall be free from soft veins, cracks or flaws and their edges shall be true and square and shall be machine cut and the surface double machine polished, if require as per item description. Sorting of stones of one-color shade shall be done prior to fixing to avoid color variation in the work.

5.5.18.4.2 Workmanship

The surface on which the stone slabs to be laid shall be cleaned of all dust and saturated with water.

The stone slabs shall be set in cement slurry over 20 mm thick lime mortar 1:2/cement mortar 1:4 bedding and tamped with wooden mallet.

The joints shall be flushed with cement and cured for 7 days.

The final cutting / polishing shall be done as directed after the completion of curing period.

5.5.18.5 Marble / Granite Flooring, Skirting & Facing**5.5.18.5.1 Materials**

Marble slabs shall be of the type mentioned in the item and of the color and quality approved by the Engineer. Slabs shall be hard, dense, uniform and homogenous in texture. They shall have even crystallizing grain and be free from defects and cracks.

The surface shall be machine polished to an even and perfectly plain surface and edges machine cut, true and square.

No slab shall be thinner than the specified thickness at its thinnest part. The dimensions of the slab shall be as specified in item. A few specimens of the finished slabs shall be deposited by the Contractor in the Engineer's office for reference.

5.5.18.5.2 Workmanship

They shall be laid to the pattern shown in the drawings or as directed by the Engineer.

The surface on which the marble / Granite slab is to be laid shall be cleaned of all dust and saturated with water.

The marble slabs shall be set in cement slurry over 20mm thick lime / cement mortar 1:1:2 bedding and tamped with wooden mallet. The joints shall not exceed 1 mm in thickness and shall be flushed with white cement and cured for 10 days.

Finishing shall be done as per IS:2114-1962. Normally polishing shall be done for flooring by machine. Hand polishing shall be allowed only for skirting and facing. A smooth polish shall be obtained in either case to the entire satisfaction of the Engineer.

5.5.18.6 Trimix Concrete Flooring

Trimix concrete is a method of producing high wear resistant & high compressive strength concrete minimizing water permeability & dusting.

The specification of work should conform to those specified by the manufacturer, as to achieve the desired results but in no case, shall be lesser than as mentioned hereunder

5.5.18.6.1 Concrete in floor

The surface where the trimix concrete method of laying the floor is to be adopted, shall be thoroughly cleaned of all dust, loose particles etc. It shall then be wetted to have just a moist surface & sprinkled with cement slurry. Then two side track rails on which leveling beam & a surface vibrator be mounted, shall be erected to proper/desired levels & gradient as to have the specified thickness of concrete. A stop ends then be placed at the starting end. Both track rails & stop ends should be preferably of mild steel. The concreting then be started with desired/specified grade of concrete. However, it is advisable to use M20 grade concrete minimum for better final results. The placing of machine mixed concrete begins from starting end & is continued to horizontal manner. Poker vibrators will be used to vibrate the laid concrete thoroughly with minimum 50 mm dia. needles. On completion of laying of approximate 5/6 m² area the surface vibrator then be run over the concrete surface to achieve better overall

compaction of concrete. This process is continued & the surface vibrator be run the second time along with leveling beam on the finished concrete surface.

Then the vacuum mat be placed on this leveled concrete & the excess water from the concrete is sucked off. A time of approximate 1.5 to 2.0 minutes per centimeter thickness of concrete slab is normally adopted for vacuum treatment. However, care to be taken at this stage is curling at ends due to excess use of vacuum mats. Immediately thereafter normal floating operation should begin or if special topping is specified then the same is worked into the concrete surface with the float disc. The floater suggested here are power operated skin floaters. The floating is continued till desired finish is obtained. The curing of the surface shall be done by ponding method for at least 15 clear days prior to putting the surface to use. M.S. reinforcement 8 dia. at 250 mm c/c both ways shall be placed in concrete approx. 50 mm below the top surface of concrete. This mesh shall be for individual panels formed by side construction joint & expansion joint.

5.5.18.6.2 Joints in floor and sealing

- i. The Construction joints in concrete shall be spaced at approx. 40 m² area and /or as per item & will be made by sawing the already laid & finally cured concrete to obtain 3 mm to 4 mm by 30 mm to 40 mm deep joints. These joints shall be cleaned of all dust & be filled in with clear sand 3 mm by 26 mm to 36 mm deep & then the top be sealed properly by polysulphide joint sealant approx. 3 mm to 4 mm by 4 mm deep.
- ii. The Expansion joints shall be spaced at approx. 120 m² area and/or as per item & shall constitute formation of 20 mm to 25 mm clear joint between the two concrete. This joint be formed by placing the Shalitek board in position against the old concrete leaving 20 mm x 10 mm joint at top, which shall be filled in by polysulphide joint sealant.

5.5.19 Sanitary Fixtures & Fittings: -

5.5.19.1 Scope

The scope of this section consists of but is not necessarily limited to supply, installation, testing and commissioning of following items:

- Sanitary appliances and fixtures for toilets.
- Chromium plated brass fittings
- Accessories e.g. towel rods, soap dish, Grab bar, etc.

Whether specifically mentioned or not the Contractor shall provide for all appliances and fixtures all fixing devices, nuts, bolts, screws, hangers as required.

All exposed pipes within toilets and near appliances/fixtures shall be of chromium plated brass or copper unless otherwise specified.

5.5.19.2 General Requirement

Sanitary appliances and fixtures for toilets, chromium plated brass fittings, stainless steel sinks, bathroom accessories like towel rods, toilet paper

holders, soap dish, towel rails, coat hooks, mirrors etc. as listed in the relevant items in the Schedule of Quantities shall be supplied by the contractor. Contractor to take prior approval from the engineer / client for the make, model, type and color etc.

All appliances, fixtures and fittings shall be provided with all such accessories as are required to complete the item in working condition whether specifically mentioned or not in the Schedule of Quantities, specifications, and drawings. Accessories shall include proper fixing arrangements, brackets, nuts, bolts, washers, screws and required connection pieces.

The sanitary fixtures and fittings shall be installed at the correct assigned position as shown on the drawings and as directed by the Architect / Owner's Site Representative and shall fully meet with the aesthetic and symmetrical requirements as demanded by the Architect / Interior Designer.

All fixtures and accessories shall be fixed in accordance with a set pattern matching the tiles or interior finish as per Architect requirements. Wherever necessary, the fittings shall be centered to dimensions and pattern as called for.

Fixing screws shall be half round head chromium plated (CP) brass screws, with CP brass washers unless otherwise specified.

Fixtures shall be installed by skilled workman with appropriate tools according to the best trade practice.

All appliances, fittings and fixtures shall be fixed in a neat workman like manner true to level and to heights shown on the drawings and in accordance with the manufacturer's recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions.

Faulty locations shall be made good and any damage to the finished floor, tiling, plaster, paint, insulation or terrace shall be made good by the Contractor at his own cost. Fixtures shall be mounted rigid, plumb and true to alignment.

All materials shall be rust proofed; materials in direct or indirect contact shall be compatible to prevent electrolytic or chemical (bimetallic) corrosion.

Wall flanges shall be provided on all walls, floors, columns etc. wherever supply and disposal pipes pierce through them. These wall caps shall be chromium plated brass fittings and the receiving pipes shall be large enough to cover the punctures properly.

Sanitary appliances, subject to the type of appliance and specific requirements, shall be fixed in accordance with the relevant standards and the following:

During the entire period of installation and afterwards contractor shall protect the appliances by providing suitable cover or any other protection so as to absolutely prevent any damage to the appliances until handing over (The original protective wrapping shall be left in position for as long as possible)

The appliances shall be placed in correct position or marked out in order that pipe work can be fixed or partially fixed first.

The appliance shall be fixed in a manner such that it will facilitate subsequent removal if necessary.

The appliance shall be securely fixed. Manufacturer's brackets and fixing methods shall be used wherever possible. Compatible rust-proofed fixings shall be used. Fixing shall be done in a manner that minimizes noise transmission.

Appliances shall not be bedded (e.g. WC pans, pedestal units) in thick strong mortar that could crack the unit (e.g. ceramic unit)

Pipe connections shall be made with demountable unions. Pipe work shall not be fixed in a manner that it supports or partially supports an appliance. Appliances shall be fixed true to level firmly fixed to anchor or supports provided by the manufacturer and additional anchors or supports where necessary.

Sizes of sanitary fixtures given in the Specifications or in the Schedule of Quantities are for identification with reference to the catalogues of make considered. Dimensions of similar models of other makes may vary within + 10% and the same shall be provided and no claim for extra payment shall be entertained NOR shall any payment be deducted on this account.

The contractor shall fix all plumbing fittings such as water faucets, shower fittings, mixing valves etc. in accordance with manufacturer's instructions and connect to piping system. The contractor shall supply all fixing materials such as screws, raw plugs, unions, collars, compression fittings etc., as required.

Joints / gaps between all sanitary appliances / fixtures and the floor / walls shall be caulked with an approved mildew resistant sealant, having antifungal properties, of color and shade to match that of the appliances / fixture and the floor / wall to the extent possible.

5.5.19.3 European Water Closet

Water Closet shall be wash down or symphonic wash down type wall mounted set only, as shown in the drawings, designed for low volume flushing from 5-7 liters of water, flushed by means of a porcelain flushing cistern or an exposed or concealed type (as detailed in the drawings or as directed by the Owner's Site Representative) 32 mm size CP brass flush valve with regulator valve. Flush pipe / bend shall be connected to the WC by means of a suitable rubber adaptor. Wall hung WC shall be supported by CI floor mounted chair which shall be fixed in a manner as approved by the Owners Site Representative.

Each WC set shall be provided with approved quality of seat, rubber buffers and chromium plated hinges. Seat shall be so fixed that it remains absolutely stationary in vertical position without falling down on the WC. Each WC shall be provided with 110 mm dia (OD) PVC Pan Connector connecting the ceramic outlet of WC to CI pipe. For common toilets or otherwise mentioned Indian style WC is proposed.

Final WC selection will be as per drawings & architects comment or as per Owners site representative.

Low level flushing cistern (exposed or concealed) shall be provided for WC in specified toilets. Contractor shall install cistern in accordance to the manufacturer's specification to the satisfaction of the Owner Site Representative. Provision of flush valve shall be made for Public / Staff toilets.

Final selection will be as per drawings & architects comment or as per Owners site representative.

5.5.19.4 Urinals

Urinals shall be lipped type half stall with glazed vitreous China of size as called for in the Bill of Quantities or other mentioned in the BOQ.

Half stall urinals shall be provided with 15 mm dia CP spreader, 32 mm dia CP domical waste and CP cast brass bottle trap with pipe and wall flange and shall be fixed to wall by CI brackets, CI wall clips and CP brass screws as recommended by manufacturer complete as directed by the Owner's Site Representative.

Flushing for urinals shall be by means of no hand operation, infrared electric flush valve with complete kit of plumbing, electrical and electronic items, infrared photo cells, solenoid valve transformer and electrical connection. The automatic flush sensor plate shall be flush and press fitted and is of high-quality mirror polish finish. Each urinal shall be provided with one flush valve unit.

Flush pipes shall be GI pipes concealed in wall chase but with chromium plated bends at inlet and outlet.

Final Urinal selection will be as per drawings & architects comment or as per Owners site representative.

5.5.19.5 Urinal Partitions

Urinal partitions shall be white glazed vitreous china of size specified in the Schedule of Quantities.

Porcelain partitions shall be fixed at proper heights with CP brass bolts, anchor fasteners and MS clips as recommended by the manufacturer and directed by the Owner's Site Representative.

Final Urinal partition selection will be as per drawings & architects comment or as per Owners site representative.

5.5.19.6 Cisterns / Flush Valve

Low level flushing cistern (exposed or concealed) shall be provided for WC in specified toilets. Contractor shall install cistern in accordance to the manufacturer's specification to the satisfaction of the Owner Site Representative. Provision of flush valve shall be made for Public / Staff toilets. Final selection will be as per drawings & architects comment or as per Owners site representative.

5.5.19.7 Wash Basin

Wash basins shall be white glazed vitreous china of size, shape and type specified in the Schedule of Quantities. All Wash basins should be Wall mounted type or as per architecture comments if specified.

Each basin shall be provided with painted GI or CI brackets and clips and the basin securely fixed to wall. Placing of basins over the brackets without secure fixing shall not be accepted.

The CI brackets shall be provided with two coats of red oxide primer and two coats of synthetic enamel paint of make, brand and color as approved by the Owner's Site Representative. The cost of fixing the basin shall be inclusive of supply and installation of brackets as described above. Each basin shall

be provided with 32 mm dia CP waste with overflow, pop-up waste or rubber plug and CP brass chain as specified in the Schedule of Quantities. Final selection will be as per drawings & architects comment or as per Owners site representative.

5.5.19.8 Chromium Plated Fittings

5.5.19.8.1 Stop Cock

A stop cock is a valve with suitable means of connection for insertion in a pipe line for controlling or stopping the flow. They shall be push button type & of brass chromium plated & of diameter as specified in the description of the item. They shall conform to IS 781-1977 & shall be polished bright.

5.5.19.8.2 Angle Valve

Angle Valve / Angular Stop Cock shall be chromium plated brass or powder coated brass of size, shape and type specified in the Schedule of Quantities. Angle Valve / Angular Stop Cock shall be fixed all with CP wall flanges of approved quality all as specified in the Schedule of Quantities. and shall include cutting and making good as required or directed by the Site Representative.

5.5.19.8.3 Pillar Cock

Pillar Cock shall be chromium plated brass of size, shape and type specified in the Schedule of Quantities.

5.5.19.8.4 Bib Tap

A bib cock is a draw off tap with horizontal inlet & free outlet. They shall be push button type & of brass, chromium plated & of diameter as specified in the description of the item. They shall conform to IS 781-1977 & shall be polished bright.

5.5.19.8.5 Gun Metal Gate Valve

The gun metal gate valve shall be approved quality & shall be gun metal fitted with wheel & shall be of gate valve opening full way & of the size as specified. These shall conform to IS 778 with latest updates & amendments.

5.5.19.8.6 Double Coat Hook

Twin coat hook shall be chromium plated brass or of stainless steel or powder coated brass of size, shape and type specified in the Schedule of Quantities. Twin coat hook shall be fixed with screws/capping having finish similar to the towel ring in wall with raw plugs or nylon sleeves and shall include cutting and making good as required or directed by the Site Representative.

5.5.19.8.7 Towel Ring

Towel ring shall be chromium plated brass or of stainless steel or powder coated brass of size, shape and type specified in the Schedule of Quantities. Towel ring shall be fixed with screws/capping having finish similar to the towel rail in wall with raw plugs or nylon sleeves and shall

include cutting and making good as required or directed by the Site Representative.

5.5.19.8.8 Toilet Paper Holder

Toilet paper holder shall be of chromium plated as specified in the schedule of quantity.

5.5.19.8.9 Soap Dish

S.S Soap dish shall chromium plated brass or of stainless steel or powder coated brass of size, shape and type specified in the Schedule of Quantities. S.S Soap dish shall be fixed to wall with CP brass screws, etc. S.S Soap dish shall be fixed with screws/capping having finish similar to the towel ring in wall with rawl plugs or nylon sleeves and shall include cutting and making good as required or directed by the Site Representative.

5.5.19.8.10 Toilets for the Disabled

Where specified, in washroom facilities designed to accommodate physically disabled, accessories shall be provided as directed by the Owners Site Representative. Stainless steel garb brass of required size suitable for concealed or exposed mounting and opened non-slip gripping surface shall be provided in all washroom. The flushing cistern/ valve shall be provided with chromium plated long handles. Final selection will be as per drawings & architects comment or as per Owners site representative.

5.5.19.8.11 Mockup and Trial Assembly

The installation of the sanitary fixtures and fittings shall be as per the shop drawings approved by the Architect/Consultant. The contractor shall have to assemble at least one set of each type of sanitary fixtures and fittings in order to determine precisely the required supply and disposal connections. Relevant instructions from manufacturers shall be followed as applicable. This trial assembly shall be developed to determine the location of puncture holes, holding devices etc. which will be required for final installation of all sanitary fixtures and fittings. The above assembly shall be subject to final approval by the Architect / Interior Designer. The fixtures in the trial assembly can be re-used for final installation without any additional payments for fixing or dismantling of the fixtures.

5.5.19.8.12 Supporting and Fixing Devices

The contractor shall provide all the necessary supporting and fixing devices to install the sanitary fixtures and fittings securely in position. The fixing devices shall be rigidly anchored into the building structure. The devices shall be rust resistant and shall be so fixed that they do not present an unsightly appearance in the final assembly. Where the location demands, the Architect may instruct the contractor to provide chromium plated or other similarly finished fixing devices. In such circumstances, the contractor shall arrange to supply the fixing devices

and shall be installed complete with appropriate vibration isolating pads, washers and gaskets.

5.5.19.8.13 Final Installation

The contractor shall install all sanitary fixtures and fittings in their final position in accordance with approved trial assemblies and as shown on drawings. The installation shall be completed with all supply and waste connections. The connection between building and piping system and the sanitary fixtures shall be through proper unions and flanges to facilitate removal/replacement of sanitary fixtures without disturbing the built-in piping system. All unions and flanges shall match in appearance with other exposed fittings.

Fixtures shall be mounted rigid, plumb and to alignment. The outlets of water closet pans and similar appliances shall be examined to ensure that outlet ends are butting on the receiving pipes before making the joints. It shall be ensured that the receiving pipes are clear of obstruction. When fixtures are being mounted, attention shall be paid to the possibility of movement and settlement by other causes. Overflows shall be made to ensure that necessary anchoring devices have been provided for supporting water closets, wash basins, sinks and other appliances.

5.5.19.8.14 Protection against Damage

The contractor shall take every precaution to protect all sanitary fixtures against damage, misuse, cracking, staining, breakage and pilferage by providing proper wrapping and locking arrangement till the completion of the installation. At the time of handing over, the contractor shall clean, disinfect and polish all the fixtures and fittings. Any fixtures and fittings found damaged, cracked chipped stained or scratched shall be removed and new fixtures and fittings free from defects shall be installed at his own cost to complete the work.

5.5.19.8.15 Measurement

Rate for fixing only of sanitary fixtures accessories, CP fittings shall etc. include all items, and operations stated in the respective specifications and bill of quantities and nothing extra is payable.

Rates for all items under specifications Para above shall be inclusive of cutting holes and chases and making good the same, CP screws, nuts, bolts and any fixing arrangements required and recommended by manufacturers, testing and commissioning and making good to the satisfaction of the Owner's Site Representative.

5.5.19.8.16 Testing

All appliances, fixtures and fittings shall be tested before and after installation. Water seals of all appliances shall be tested. The contractor shall block the ends of waste and ventilation pipes and shall conduct an air test.

5.5.20 QUALITY ASSURANCE & QUALITY CONTROL

Testing of all materials and works as mentioned in the RUIDP publications or stipulated in the codes or as directed by the Engineer shall be carried out by

the Contractor and test reports shall be submitted regularly to the Engineer for his perusal. The Contractor is to notify the Engineer the program of such tests well in advance, so that such tests, either conducted in his own laboratory, laboratory established at the site or any accredited laboratory or at Manufacturer's place can be witnessed by him / his representative or Third Party, if appointed by the Procuring Entity. Also establish an office for uses of client at site.

The Contractor is to abide by the stipulations/ clauses appearing in the QA & QC Manual published by the RUIDP.

5.5.21 ELECTRICAL

5.5.21.1 Electrical Wiring

5.5.21.2 Scope

The Scope of work covers electrical Works for complete electrification in the proposed underground car parking including supply, installation, testing and commissioning of the complete electrical installation.

- a) Electrical substations
- b) Main LT panel, Emergency LT panel, Distribution Boards, Sub distribution boards including LT cables and terminations.
- c) Lighting system equipment's including Light control switches, lighting and power receptacle units, all wiring and submains, conduiting, point wiring, circuit wiring submain wiring and earthing and all other items necessary for lighting system.
- d) Light fitting & fixtures complete with all accessories, lamps, suspension/mounting arrangements brackets for all service areas & land scape court.
- e) Earthing and lightening protection system complete with all accessories, earthing chamber etc.
- f) PA system, CCTV including conduiting and wiring.

5.5.21.3 Makes

The electrical material shall be supplied/installed/commissioned as per Group 1/Class A of RUIDP (SOR 2013) and other items / material (electrical/civil) shall be as per Group 1 / Class A of the prevailing of PWD BSR, Jaipur Circle.

5.5.21.4 TECHNICAL SCOPE

The scope of contract is explained below. (Bidder should visit the site before bidding)

Quantities as estimated or approximated are as mentioned in schedule of quantities. They are only for broad estimation purpose. Contractor shall however ascertain the exact quantity required at site and supply and install the materials as per SLD& technical specifications and scope as per site visit. No extra amount shall be admissible, unless change in the scope or location. Therefore, contractor to visit and check the site conditions before bidding. Supply of the Materials shall be to the Specification of this Tender document and installation shall be as described, as per drawings approved, instructions issued by consultant and/or the purchaser from time to time.

The Contractor shall take into account prevailing ambient temperature / weather conditions at site while designing the equipment as mentioned

in technical specifications. Any de-rating factors related to ambient temperature shall be considered as per relevant IS specs. This scope shall be generally as per Contract Agreement and shall include additional jobs or additional quantities as may be required to be carried out for the completion of the electrical installation work in the opinion of the JDA Engineer. Any other jobs/ items required to be carried out shall be evaluated on the basis of similar item rates under the Contract. Where such similar items do not exist, the Contractor shall submit cost analysis to arrive at the item rates for the approval of JDA Engineer. (Actual invoice / price list & discount, tax details shall be submitted along with rate analysis for each extra item.)

5.5.21.5 LIAISONNING

1. Contractor shall submit installation detail working drawings for JDA approval within 7 Days of the award of contract.
2. Bidder to visit the site before bidding to understand the scope completely.

5.5.21.6 DOCUMENTATION

The following detailed documents and drawings shall be submitted for JDA approval within 05 days of award of work.

1. Earth bus, Equipment / Panel earthing, etc.,
2. SLDs/Control Schematic/BOQs/ QAPs for all other electrical components to be used in this package
3. Any other drawings as may be required by JDA Engineer for completing the project on time without cost over-run.

5.5.21.7 GENERAL

This section of specifications defines the general requirements of Electrical System to be installed. For selection of all Electrical Equipment's or anything related to Electrical System requirements, the Contractor shall follow the specifications contained herein.

The specification shall be applicable for the scope of work, which include design, equipment selection, manufacture, inspection at the Manufacturer's, Contractor's or his Subcontractor's works, supply, installation (including storing, unloading and transferring the material / equipment to the Contractor's storage area, maintaining equipment and material in safe custody and assembling the elements of the equipment and installing at the Project Site, testing, conducting Trial Runs and Pre-commissioning of the plant, equipment and electrical system to the satisfaction of the Employer's representative. After successful Commissioning of the plant, it shall be handed over to the Employer. The Contractor shall also be responsible for operation and maintenance (O&M) of the plant, if applicable and specified elsewhere, after it is formally commissioned.

The Contractor shall submit his design calculations and drawings based on 'Design Criteria for Electrical Equipment and Systems' for the review and approval of the Employer's Representative. The

Incoming Main Feeders Voltage shall be as per the availability from the respective Rajasthan Power Distribution Company. It shall be the Contractor's risk and responsibility to modify the incoming voltage at the construction stage depending on the availability of and supply of State Company. The Contractor has to verify the available Feeder Voltage.

The scope of the Contractor's design and installation shall include, but not be limited to: ds and other associated equipment. The work shall also include the specifications for workmanship, laying cables, earthing systems, lightning protection etc. It shall be the responsibility of the Contractor to design the Electrical System based on the selection of the mechanical equipment being supplied on this Project. It shall be the responsibility of the Contractor to design the electrical system based on the selection of the mechanical equipment being supplied in the Project.

All of the electrical and instrumentation equipment to be supplied under this Contract shall be of reputed manufacturers which are approved in Group A of RUIDP BSR. The equipment of only those manufacturers, who have sufficient proven experience in manufacturing the respective equipment of similar capacities, shall be considered. The respective equipment shall have been manufactured, supplied, installed, and be running satisfactorily for at least last 10 years. The Contractor shall submit major products, capacity of production and supply records (past 5 years) of the intended manufacturers for the major electrical equipment and materials supplied by them in his Bid for proven of their capability.

For uniformity of appearance all switchgear and control panels shall have a common appearance and color.

In order to reduce the number and variety of spares to be inventoried to minimum, electrical components of a similar type and purpose used throughout the Works shall be of the same manufacturer and type / series, unless it can be shown by the Contractor to be impractical to do so.

All ventilation grills provided on electrical Plant shall be provided with fly screens to prevent the entry of insects.

All equipment offered shall comply with the requirements specified in the latest editions of applicable Indian/ International Standards and shall also comply with the good engineering practices.

Drawings provided in the Documents are indicative and to be read as general guidance to the Bidder for bidding purpose only. The Contractor shall design the Electrical System to suite site conditions, standard engineering practice and on the basis of 'Design Criteria', based on which the shop drawings shall be submitted to the Employer's Representative for his approval. The shop drawings shall include but not be limited to literatures and catalogs of manufacturer, detailed calculation and analysis, working drawings and any other supporting materials required for the evaluation of the Employer's Representative. The Contractor shall resubmit shop drawings where

requested in accordance with the instructions and recommendations made by the Employer's Representative for his approval.

The Contractor or his Subcontractor shall possess a valid Electrical Contractor's license of appropriate class from the concerned statutory bodies governing the area of work. The Contractor shall fully comply with the relevant statutory rules and regulations.

All type (as applicable) of routine and acceptance tests on all the equipment shall be conducted in accordance with the latest applicable IS and IEC Standards at the presence of Employer's Representative as required or a designated Third-Party Inspector as appropriate. All costs for the tests shall be borne by the Contractor. Test reports required in the Contract and requested by the Employer's Representative shall be submitted by the Contractor to the Employer's Representative.

All Pre-commissioning tests shall be carried out at the presence of Employer's Representative and approval for the same shall be obtained before Commissioning. All approved test reports shall be properly maintained by the Contractor and shall be handed over to the Employer after completion of the Project. All instruments and accessories required for testing and inspection of the equipment specified herein shall be provided by the Contractor at no extra cost to the Employer.

Liaison with the JVVNL, the Electrical Inspector and other government agency / statutory bodies for obtaining power supply and other clearances shall be included in the Contractor's Scope. After completion of installation work, the Contractor shall arrange for inspections and shall obtain approval from the applicable statutory bodies. Any modifications or revisions in the equipment or installation of the equipment as required by the statutory bodies shall be carried out by the Contractor. All costs and fees for testing, inspection, calibration, modification or revision of the works required for approval by such statutory bodies shall be borne by the Contractor.

Irrespective of the specifications of the respective items in other Subsections of this document, the Contractor shall be required to provide all required equipment, accessories, cabling, earthing, necessary transducers, sensors, system hardware, software, programming logic, etc. to achieve the functional requirements described in the Contract. The installation of the electrical equipment shall be carried out with close coordination of the associated civil and electromechanical works.

5.5.21.8 POWER SUPPLY INFORMATION

All equipment shall have rated withstand capacity based on the following criteria. The proposed power supply voltages shall be as follows:

System / Voltage	Allowable Variations	Specification / Rating
240v AC System	Voltage variation +10% to -15%	Single phase and neutral, 50 hz,

System / Voltage	Allowable Variations	Specification / Rating
	Frequency Variation +3% to -5%	effectively earthed system

5.5.21.9 **DESIGN CRITERIA FOR ELECTRICAL EQUIPMENT/ SYSTEM**

The following shall be the Design Criteria for the electrical equipment / system for this Project.

5.5.21.10 **Site Conditions**

The bidder shall note the following local conditions while preparing his design as per respective project:

Description	Value
Altitude	Approximately 50 m above mean sea level or as per project
Ambient Air Temperatures (Indoor Values)	5° C Minimum 50° C Maximum
Climate	Hot and humid/Dry throughout the year
Design Flood Level	As applicable as per Project

5.5.21.11 **Estimation of Loads**

The following assumptions have been made to arrive at the estimated load of the different sites.

a)	Load Factor		
i)	Main motor	:	0.95
ii)	Auxiliary motor	:	0.9
iii)	Auxiliary load, valve motors, etc.	:	0.9
iv)	Lighting load	:	1.0
b)	Diversity Factor		
i)	Main and auxiliary motor	:	1.0
ii)	Auxiliary load, valve motors, etc.	:	1.5
iii)	Lighting load	:	1.2

5.5.21.12 **EARTHING SYSTEM**

All Electrical Equipment must be efficiently double earthed in accordance with the requirement of IS-3043/IEEE 80 and relevant regulations of Electric Supply Authority. The earth pits shall be as per IS with proper arrangement for testing. All earthing conductors shall be hot dip galvanized / electrolytic grade base copper conductor. The main earthing rings shall be done as per practice laid in Indian Standard. The earthing of individual electrical equipment by two distinct strips/conductors shall be done as per practice laid in Indian Standard.

The sizes and material of conductors for earthing various equipment shall be as per relevant Earthing Drawing / General Notes for Earthing and Earthing Schedule. All electrical equipment shall be connected to the earth bus at two points except the lighting fittings and junction boxes. Following earthing resistances shall be measured and recorded in the presence of Institute during the dry season.

Resistance of each earth electrode with electrode isolated from the system. Combined earth resistance of the installation measured at the substation, switch room and any other point as directed by the Institute. Earthing resistance at each electrode shall be measured. No earth electrode shall have greater resistance than 3 Ohms as measured by an approved earth testing apparatus. In rock soil the resistance may be up to 5 ohms.

5.5.21.13 Scope

The scope includes supply of earthing conductors and their installation including associated civil work as per the specifications, to the satisfaction of the Engineer's representative and the Electrical Inspector. Proper earthing shall be provided to ensure adequate system neutral earthing and for equipment and personnel safety.

All work such as cutting, bending, supporting, painting/coating, drilling, welding, clamping, bolting and connection to structures, equipment frames, terminals, etc. shall be in the Contractor's scope of work. All incidental hardware and consumables such as fixing cleats/clamps, anchor fasteners, lugs, bolts, nuts, washers, bituminous compound, welding rods, anti-corrosive paint as required for the complete work shall be deemed to be included by the Contractor as part of the installation work.

5.5.21.14 Earthing System Installation

Earthing system shall conform to the latest edition including all official amendments and revisions of IS: 3043 and Indian Electricity Rules, 1956. All materials and fittings used in the earthing installation shall conform to the relevant Indian Standards or shall be as approved by the Engineer's Representative. Installation work shall be in accordance with approved earthing layout drawings and any change in routing, size of conductors etc. shall be subject to the prior approval of the Engineer's Representative.

Metallic frames of all electrical equipment shall be earthed by two separate and distinct leads and then connected with earthing system

An earthing pad shall be provided under each operating handle of the disconnector. Operating handle of the disconnector and the supporting structure shall be bonded together by a flexible connection and connected to earth grid.

Cable sheaths and armor shall be bonded to the earthing system. Metal pipes and cable conduits shall be effectively bonded and earthed.

Neutral connection shall never be used for equipment earthing.

The scope of installation of earthing leads to the equipment and risers on steel structures/walls shall include laying the conductors, welding/cleating at specified intervals, welding to the main earth grids, risers, bolting at equipment terminals and coating welded joints by bituminous paint. Galvanized conductors shall be touched up with zinc-rich paint when holes have to be drilled in them at site for bolting to equipment/structure.

Wherever earthing conductor crosses underground service duct and pipes, it shall be laid 300 mm below them. If the distance is less than 300 mm, the earthing conductor shall be bonded to such service ducts/pipes. Wherever earthing conductor passes through walls, GS sleeves shall be provided for the passage of earthing conductor. The pipe ends shall be sealed by suitable water-proof compound. Water stops shall be provided where earthing conductor enters the building from outside, below grade level.

5.5.21.15 Connections

All connections in the main earth conductors buried in earth/concrete shall be welded type. Connection between earthing conductor and earth leads shall also be of welded type. Connection between buried MS conductor and GS conductor above ground shall be done above ground. Connection between earth leads and equipment's shall be of bolted type.

5.5.21.16 GENERAL CONSTRUCTIONAL FEATURES

Sheet steel used for fabrication of switchboards, control cabinets, marshalling boxes, etc. shall be cold rolled.

All panels, boards etc. shall comprise rigid welded structural frames made of structural steel sections or of pressed and formed cold rolled sheet steel of thickness not less than 2 mm. The frames shall be enclosed by sheet steel of at least 2 mm thickness. Stiffeners shall be provided wherever necessary.

All doors, removable covers, gland plates, etc. shall be of at least 1.6 mm thickness and shall be gasketed all-round the perimeter.

All doors shall be supported by strong hinges of the disappearing or internal type and braced in such a manner as to ensure freedom from sagging, bending and general distortion of panel or hinged parts.

All floor mounted panels/boards shall be provided with a channel base frame. Total height of all floor mounted cubicles/panels shall not be greater than 2300 mm. Where steel pedestals for mounting of boards/panels are specified, the total height including that of the pedestal shall not exceed 2500 mm.

Switchboard/control cabinet/panel shall be dust and vermin proof. Degree of protection of the enclosure shall be IP 54 for indoor installations and IP 55 for outdoor installations. Minimum ten percent of the spare feeders shall be provided for each type/rating.

5.5.21.17 MAKE OF MATERIAL

All material of specific makes accepted during bidding stage or from approved list of makes.

In case of any problem / difficulties in procurement of such items, alternative makes will be approved by Engineer & owner based on samples and specifications submitted by contractor. Alternative material shall be procured only after written approval for makes.

Procurement and use of material of makes not in approved list shall be sole responsibility of the contractor. Contractor shall replace all such

material at no additional cost within a stipulated period. Bidder to bid based on the RUIDP/RUDSICO approved /supplied makes.

5.5.21.18 EQUIPMENT / WORKMANSHIP

The equipment to be supplied under this Contract shall be strictly as per specifications of the Contract and relevant IS specifications. In the event of any ambiguity/ dispute the JDA Engineer verdict shall be final and binding on the Contractor.

5.5.21.19 QUANTITIES

Quantities mentioned in the Tender documents are approximate. Before placing order, Bidder is advised to check the quantity with his working drawings and arrive at actual required quantities as per site conditions. In any case, the payment will be made on the basis of finally supplied and erected quantities on completion of work as per scope. JDA Engineer may not keep option to pay for any additional quantities left balance and not erected.

Bidder to note that no claims for loss / compensation/ escalation on the grounds of increase / decrease in the quantities indicated in the tender schedule of quantities, shall be entertained under any circumstances, nor will the Contractor shall be entitled to prefer any claims whatsoever on these grounds.

5.5.21.20 INDICATIVE PROGRAM

No indicative program is attached herewith. The contractor is to submit his own program/schedule to be completed for completion of works as per Conditions of Contract.

5.5.21.21 SAFETY AND SECURITY MEASURES

The Contractor shall be solely responsible for the safety of installing Electrical Materials at site and should take adequate precaution to prevent any accident or harm to material & people during installation. The Contractor shall bear the cost of the damages done at site and surroundings.

5.5.21.22 ALTERATION

The Contractor will be allowed to carry out minor alterations, if required, due to site specific conditions only after prior written approval from the Engineer. If necessary, Engineer reserves the right to review and suggest changes before providing consent for the alterations.

5.5.21.23 COMMISSIONING, QUALITY ASSURANCE & QUALITY CONTROL

Testing and commissioning of all materials and works as mentioned in the RUIDP publications or stipulated in the codes or as directed by the Engineer shall be carried out by the Contractor and test reports shall be submitted regularly to the Engineer for his perusal. The Contractor is to notify the Engineer the program of such tests well in advance, so that such tests, either conducted in his own laboratory, laboratory established at the site or any accredited laboratory or at Manufacturer's place can be

witnessed by him / his representative or Third Party, if appointed by the Procuring Entity.

The Contractor is to abide by the stipulations/ clauses appearing in the QA & QC Manual published by the RUIDP.

5.5.22 Parking Structure

5.5.22.1 Design Specifications

This section details the structural design specifications for a various types of parking systems. This shall form integral part of the development obligations of the contractor shall have to comply with these specifications as bare minimum. **Only Ramp based parking is considered in the proposal.** Two levels of basement parking area are proposed to be developed.

Table 5.5.22.1 – Design of Parking Structure

Fixed Design Parameter	Permissible
Minimum dimension and weight of a car (SUV category) to be considered	Length – 5.00m Width – 2.50m Height – 2.60m Weight -2500 Kg
Required arrangement for convenient parking by physically challenged drivers (2% of total ECS capacity) will have to be provided.	

Table 5.5.22.2 – Covenants

S.No.	Type of Parking	Item Description	Covenant
1	Manual parking	Construction below ground	Should not exceed two basement levels
2	Manual parking	Height of parking without elevators	Should not exceed two Floors
3	Manual parking	Height of each basement floor	Clear Floor Height Should not less than 2.6 m
4	Manual (required Human intervention in vehicle handling below ground)	Depth of construction below ground	Should not exceed two basement levels or 12.0 m below ground whichever is less.
5	Manual parking	Space for calculation One ECS including circulation within parking structure.	Not less than 32m ² per ECS for underground
6	Manual parking	Parking bay/slot dimension per car space	Not less than 5.0 m long and 2.5 m wide.

7	Manual parking	Mechanical ventilation	Mechanical ventilation must permit a minimum of 15 air changes per hour for normal ventilation and as per environmental requirement and 30 air changes per hour in case of fire of distress call
8	Manual with ramp provisions	Gradient of ramp	Not steeper than 1:6 ratio with minimum transition space of 5 m at termination of the ramp
9	Manual	Width of ramp	Minimum of 6.5 m width for two-way traffic and only 4.5 m for one way traffic.
10	Manual	Carriageway of pavement for circulation within parking facilities	Not less than 4.5 m, if one way, and not less than 6.5 m if it is two ways flow.

Concrete and floor specifications shall be as per the latest Bureau of Indian Standard and IRC specifications.

Minimum delay is caused to users of the parking facility and the maximum queue length at any of the entry area the facility shall not ideally exceed three cars, at any point of time, except under exceptional circumstances.

5.5.22.2 Column Centers

In a modern car park, there should be no columns to impede access to parking spaces. In basement car parks this is difficult but not impossible to achieve. While using the standard grid within the construction there will be an advantage by using adequate free space between columns which will allow for three car spaces. Designers should allow for adequate clear space between column edges so that full width spaces are available to patrons.

5.5.22.3 Head Clearance

Flat ceilings are preferable in all car parks. Structural beams should not be located in the vicinity of parking spaces, and if this cannot be avoided then allowance must be made not only for the height of car roofs but also for the height of hatchback doors which swing up.

5.5.22.4 Entry and Exit Area Specifications

5.5.22.4.1 Location

Location of the Entry and Exit Areas and of the driveways along with their connection to the road system should be made properly and at

least two exits are required to be provided for access to and from the basements at each site. Besides the ramps for vehicles the developer is obligated to provide at least 2 elevators and 2 staircases for movement of users from basements to ground level at convenient locations.

5.5.22.4.2 Size

The Entry and Exit Areas must be sized to allow drivers to safely and comfortably drive in and out the vehicle. Turning radius and width of drive aisles and minimum clear width of Entry and Exit Area shall be designed according to the respective needs and leaving adequate space to the left and right of the car for passengers to leave / enter the car and in accordance with Applicable Codes.

5.5.22.4.3 Components

- A. Motion detectors and CCTV cameras or similar devices shall be installed inside the Entry and Exit Areas to ensure that no person or animals are inside the Entry and Exit Areas or vehicle when the machine starts moving. Cameras shall be installed to record digital photos of the physical condition of the car entering and exiting the premises. The images are also helpful to locate cars for drivers with a lost ticket and to validate damage claims as well as to detect any suspicious activity in the parking area.
- B. The Entry and Exit Areas entrance doors shall be mounted, secured and operated safely, isolating the passengers from the Entry and Exit Areas during movement of the machinery and vehicles. Safety locks / emergency switches shall be installed to stop any machinery if a person or animal is detected in this area.
- C. Recesses in the floor area shall be minimized to the need of guiding the drivers in the “drive-in” process. All other areas shall be flat for pedestrian traffic. Gaps between moving parts and platforms need to be limited as per Applicable codes.
- D. All Entry and Exit Areas must comply with disability requirements.
- E. The driveways for inbound and outbound traffic shall be designed to provide sufficient queuing spaces; simple visual signage and guidance shall clearly direct approaching traffic off the street and into the Entry and Exit Areas. Respective commands via a visual message center shall be applied inside the Terminals for the drivers in such manner that an easy use of the system is possible.
- F. Inbound / outbound traffic crossing shall be prevented.
- G. Inside and outside Entry and Exit doors shall be provided to prevent drivers and animals from coming into contact with any moving elements of the system.
- H. As Entry and Exit Areas are the exchange station of the Parking Structure, special attention shall be directed to ease the “drive-in” and positioning of the car by the drivers (preferably by means of physical aids)
- I. Means of catching of debris and drippings from the incoming cars shall be applied to avoid such drippings to cars and machinery inside the terminals, during transportation and storage inside the system.
- J. The Ticketing Station or access system shall be located outside the Entry and Exit Areas on the right side of the inbound traffic.

5.5.23 Throughput Capability

The throughput of a system is the minimum number of cars a system can store or retrieve (measures in by any random one-way traffic), in the time frame of one hour. Dwell time is defined as the total time a driver takes to drive into the system, leave the car, exit the system and buy a parking ticket. In case of exiting the system, Dwell Time is the time taken by the driver to return the

parking ticket, identify his car, and drive it out of the system. A reasonable average dwell time (entering/exiting) of 30 seconds per car driving into the Entry and Exit Areas can be assumed if physical drive-in guidance is provided. In the absence of such physical guidance system, an average dwell time of 60 seconds shall be considered.

5.5.24 Fire Safety

1. Fire safety measures as recommended in applicable codes shall be implemented.
2. Provisions shall be made in the Parking Facility that leakage of fuel tanks or other flammable fluids are collected during transportation and storage of the vehicle.
3. Construct the 'Parking Facilities' structure and the equipment with non-combustible construction. In addition, those portions of the facility used for the transport and / or storage shall have a finish of non-absorbent, non-combustible material.
4. Contractor shall make all provisions in the construction as per the Relevant Fire Safety Act as well as take all measures as per the rules and regulations including guidelines from Central Government, State Government and drafted by the ULB and any agency appointed by the government on the subject.
5. Functional requirements:
 - I. **Fire Hydrant System:**
 1. SITC of Hydrant landing valve with complete accessories as per IS:5290-1983 (Type 'A').
 2. First-Aid Fire Hose Reel wall mounting swinging type conform to IS: 884-1985.
 3. Non-percolating flexible hose (RRL type-'A') ISI marked (IS:636).
 4. Standard fireman's axe with heavy insulated rubber handle.
 5. M.S. hose door fabricated from 16g M.S. sheet with full glass door and locking arrangement.
 6. Gun Metal Fire Brigade connection as per IS:904-1983.
 7. Weather proof hose cabinets fabricated from 16 g M.S. Sheet with full glass door and locking arrangement for Open ground floor.
 8. Air cushion tank as per design.
 9. Mild Steel pipe (IS:1239 Part-I) heavy class including painting with one coat of primer and two or more coats of synthetic enamel paint.
 10. Mild Steel black pipe (IS:1239 Part-1) heavy class as per IS: 10221 complete of appropriate dia as per design.
 - II. **Automatic Sprinkler System:**
 - Mild Steel black pipe (IS:1239 Part-1) heavy class as per IS: 10221 complete of appropriate dia as per design.
 - Corrugated stainless steel (AISI 304) un braided flexible sprinkler pipe size according to design.
 - Slim seal Butterfly valves (PN 1.6) complete with matching flanges rubber insertion, nuts, bolts and washer etc. of sizes as per design.
 - Ball valve should be with hard chrome plated ball inside PTFE (Teflon) seat & ring with chrome plated center handle with female BSP threads and size as per design.

- Flow indicating switches should be electrically operated with threaded connection for a minimum flow of 90 lpm for indicating water flow in sprinkler branch line on each floor with necessary fittings.
- Mild Steel Pipe (IS: 1239 Part-1) heavy class, Flanges, Bends, Tees, Elbow, Reducers, Clamps. Hangers etc. including painting with one coat of primer and two or more coats of enamel paint of approved make and size as per design.

III. FIRE PUMPS, VALVES & ACCESSORIES:

- Electrical Motor Driven Fire Pumping set suitable for automatic operation consisting of the following as per design.
- Diesel Engine Driven Fire Pumping set suitable for automatic operation consisting of the following as per design.
- Fire Pump Control Panel should be cubical type floor mounted fabricated of 14 g M.S. CRCA Sheet duly powder coated finish and accessories as per design.
- Slim seal dual plate type non-return valves (PN 1.6) complete with matching flanges, rubber insertion, nuts, bolts and washer etc. of sizes as per design.
- Slim seal Butterfly valves B 190 Class (PN1.6) complete with matching flanges rubber insertion, nuts, bolts and washer etc. of sizes as per design.
- Providing of Y - STRAINER in Pump Suction Water line complete with flanges etc as per specifications & drawings.
- Providing and fixing resilient rubber neoprene lined single arch vibration eliminators suitable for raw water up to 450C temperature working pressure 7kg and test pressure 14 kg/ cm² of sizes as per design.

IV. PORTABLE CHEMICAL FIRE EXTINGUISHERS:

- Supply and fixing of ISI marked (IS: 15683) ABC (Dry Powder) fire extinguishers of capacity as per design.
- Supply and fixing of ISI marked (IS:2878) Portable fire Extinguisher, Carbon-dioxide type flat base including valve, discharge hose of not less than 10 mm dia. 1m long & complete in all respects including initial fill with CO₂ gas conforming to IS:307-1966 filled to a filling ratio of not more than 0.667 and wall suspension bracket of capacity as per design.

V. FIRE ANNUNCIATION SYSTEM:

- SITC Smoke Detector (Dual Chamber) Ionization type with mounting base, LED, etc complete as required. Analogue Addressable type.
- SITC of microprocessor based 2 - wire loop (each loop accessing 90 addressable units) Fire Alarm Control Panel. The Panel shall be able to give pin point location of addressable units via the address code for each unit. The Panel shall also be able to automatically switch off all control switches whenever any Alarm is triggered. The Panel shall also be able to give voice announcement to individualized speakers. The Panel shall have built in sounder, Maintenance Free Batteries of minimum 15 Ah of 24 volts capable of minimum of 12 hours with battery charger, rectifier. Loop cards, LCD unit to indicate Fire / Fault Signal of individual unit, built in-built / external printer, to log all incoming data etc. complete in all respect.

- Supply, Installation, Testing and Commissioning of Addressable Manual Break Glass/ flap Unit (Double action) with two inbuilt isolator or isolator module with flexible network structures & necessary fixing arrangements with key complete as required shall be UL/VDS/LPCB (following EN54 Standard Approval). (Makes: Notifier, Bosch, Fike, Edward)
- Supply, Installation, Testing and Commissioning of Standalone Loop Powered Addressable sounder with 5 different programmable tone the sound pressure not less than 90 DB, it should be programmed from the panel shall be UL/VDS/LPCB.
- Control modules for floor wise activation of hooters & as well as Fire Sprinkler Flow switch according to design.
- Wiring should be of FRLS copper conductor ISI marked (IS:694) of 1.1 kV grade as per design.

5.5.25 Ventilation

1. Areas accessible to the public / drivers shall be equipped with sufficient ventilation. (as per applicable code)
2. Depending on the design of the Entry and Exit Areas, a ventilation of emissions may be required in that area.
3. Functional requirements:
 - SITC of Ductless Ventilation / Jet fans as per attached specifications for normal ventilation and Smoke Extraction along with silencers on both sides (minimum length of 2D). The fan shall be suitable for 300 Deg C for 2 Hrs operations. Each fan shall be complete with dual speed motor and adjustable pitch die cast aluminum impeller. Casing shall be made of Hot dipped Galvanized steel with min. 220 GSM Coating. The Motor shall be run on the electrical power suitable for 415V/3Ph/ 50Hz. Fan shall be AMCA Certified for Air and Sound Performance. The fan shall be CE/UL Certified for smoke control and exhaust applications as per EN 12101-3. The motor make of smoke/exhaust fan shall be same as mentioned on the fire certificate of the fan provided by international independent laboratory under certifying authority of appropriate size as per design requirements.
 - SITC of AMCA Certified (For Air and Sound Performance) Axial fans complete with casing made of Hot dipped Galvanized Iron with min. 220 gsm coating, motor, with adjustable pitch die cast aluminum impeller (Hub and blades) Casing position shall be as per the job requirement and shall be marked on the fan assembly The Fan assembly along with motors (FOR EXHAUST) should be tested for Temperature range: 300Deg. C temperature for a minimum duration of 2 hours for Smoke Evacuation. Motor shall be high efficiency class IE2 (as per IS 12615), Class H insulation suitable for operation on 415±10% volts, 50Hz, 3 phase AC power. Motor should be VFD compatible. The Axial Fan rates shall be inclusive of Fire-retardant Flexible connection, Sound attenuators with Mounting arrangement and Vibration isolators for installation. Fan total efficiency should not be less than 70%. For normal exhaust, noise level should not be more than 75 db @ 3 m distance, while smoke exhaust, noise level should not be more than 85 @ 3

m, when measured in hemispherical reverberant room conditions. Fan shall be EN 12101-3 Certified & CE/UL Listed for high temperature of appropriate size as per design requirements.

- SITC of AMCA Certified (For Air and Sound Performance) Axial fans complete with casing made of Hot dipped Galvanized Iron with min. 220 gsm coating, motor, with adjustable pitch die cast aluminum impeller (Hub and blades) Casing position shall be as per the job requirement and shall be marked on the fan assembly. Motor shall be high efficiency class IE2 (as per IS 12615), Class F insulation suitable for operation on $415 \pm 10\%$ volts, 50Hz, 3 phase AC power. Motor should be VFD compatible. The Axial Fan rates shall be inclusive of Fire retardant Flexible connection, Sound attenuators with Mounting arrangement and Vibration isolators for installation. Fan total efficiency should not be less than 70%. For normal exhaust, noise level should not be more than 80 db @ 3 m distance, while smoke exhaust, noise level should not be more than 90 @ 3 m, when measured in hemispherical reverberant room of appropriate size as per design requirements.
- SITC of online, continuous monitoring of CO and radicals concentration in ambient air, measuring range: 0-300 ppm CO with electro-chemical galvanic (Gel electrolyte) technology, sensor should be UL2075 certified, response time $t_{90} < 30$ sec, with anti-sleep feature, capable of providing multiple threshold to identify normal mode, invisible smoke mode and fire mode. It should provide both analog output and digital communication via RS485 serial interface with Modbus RTU. It should be uniquely addressable and suitable for connection in digital communication bus. Enclosure should have minimum fire retardant UL94: V0 rated with IP65 protection. Sensor cell should be plug-in, field replaceable, sensor life expectancy > 7 years, replaceable sensor cell, CE certified. It Should confirm to EMC- Directive 2014/30/EU. Panels should be equipped for auto / manual operation, fire command input, emergency control etc.
- SITC of ducting made from GSS of class VIII & fabricated as per IS:655 and as per drawings & designs.
- Supply and installation of ladder type / perforated type cable trays of the following sizes fabricated out of perforated hot dip galvanized MS Sheet of minimum 2 mm thick with 75mm flange to be installed horizontally or vertically. The cable tray shall be complete including cost of bends, elbows, cross, tees, reducers etc. as per drawings / site conditions and rate shall include cost of hor fasteners, screw, nuts, bolts and misc. other fixing hardware painting of support structure etc. i) Structural steel such ISMC, ISA, Flats, rods etc. to be used for support shall be included in this item. ii) The cable try shall be factory built. Bidder shall include number of tees, crosses, bends, elbows etc.

5.5.26 Lighting/Accessibility for Maintenance

- a. Lighting in areas accessible to the drivers / public shall be properly illuminated.
- b. Old recommendations on internal lighting standards e.g. of 50 lux, have long ago been discarded by the industry and replaced by minimum standards of 100 lux and 250 to 350 lux at entrance/exits. Suitable energy efficient luminaries can be used without sacrificing the luminance. Lighting in stairwells and lobbies need to be to a very high specification to minimize perceptions of personal isolation.
- c. The parking structure shall be designed such, that maintenance personnel has access to all storage spaces, machinery and electronic components in a safe manner. The usage of harnesses is acceptable as long as OSHA criteria are followed.
- d. Graphical User Interface/ON – Line Support:
- e. The parking facility shall have an installed and all-time workable capability to the manufacturer / technical operator with a short response time to handle any alarms generated by the system.

5.5.27 Lines of Sight

Personal security is greatly enhanced in car parks where lighting levels are high and clear lines of sight are designed into a facility e.g. at access points to lift lobbies, stair lobbies, at corners on pedestrian routes. In addition, all doors, including lift doors, should have large glass panels, all walls should have large glass windows so patrons can check whether it is safe to pass through or not. Structural walls can have 'openings' cut into them, to increase natural light penetration and improve sight lines.

5.5.28 Lifts

Supply, Installation, Testing and Commissioning (SITC) of minimum 13 passengers and minimum speed 0.63 m/s serving different floors (2B+G), 3 stops and 3 openings on same side. V3F drive operation with SS cabin car, automatic door operation, digital display direction indication at all level, etc. complete in all respect.

Lift must be of reputed manufacturer like Kone, Jhonson, Schindler, S. Lift or equivalent must be approved from engineer in-charge before supplying the same.

5.5.29 Stairs

In all car parks, there are significant numbers of patrons who refuse to use lifts, and so all stairs should be designed to a high standard to accommodate this and should be alarmed for easy access in the event of a fire.

5.5.30 Scale

The size or capacity of a car park needs to be directly related to the likely peak demands for parking in the immediate vicinity of the site. Patrons will not normal walk more than 180 meters (2.5 min) from their car to their destination.

5.5.31 Display Board

Display board shall be installed at the entrance of the parking space giving details of number of parking spaces and availability of parking spaces.

5.5.32 Smart Parking

5.5.32.1 Functional Requirement: Smart Parking

JDA has envisioned the intelligent parking services that address city's parking issues through intelligent parking management. This will enable citizens with real-time information about available parking and allows them to book spaces in advance using mobile applications. The results are low traffic congestions and a more effective partnership of city with citizens, local businesses, and parking enforcing agencies. The solution should improve parking guidance, parking enforcement, and parking administration as well as provide parking occupancy, utilization revenue, and enforcement reports through analytics. "Off Street Parking" shall mean closed area with single entry and exit access controlled through boom barrier. The main objectives of the Intelligent Parking Management (IPM) planned is to address the following:

1. The smart parking solution should be able to obtain real time situational awareness about the occupancy of parking lot.
2. The smart parking solution should be able to obtain real time situational awareness about the occupancy of parking lot.
3. The smart parking solution should provide real time location-based view to citizens about proximity of parking lots and availability of parking lots.
4. The smart parking solution should enable the above functions with minimum manual intervention.
5. The smart parking solution should enable the above functions with minimum manual intervention.
6. The smart parking solution must geo-reference all the parking lots.
7. The smart parking solution must geo-reference all the parking lots.
8. The smart parking solution may use video camera-based analytics or other sensor-based solutions to determine number of vehicles entering and exiting parking lots. The smart parking solution should do so at each floor, in case of multilevel parking and communicate the data.
9. The smart parking solution should report occupancy of parking lots to a central software application deployed at the Command/Operations center using the network laid out as a part of this tender document.
10. The parking system should have features for various reporting requirements like:
 - a. Real Time and Historical occupancy reports
 - b. Violations and Overstay reports
11. The complete smart parking system should be able to handle pass system creating all types of passes – daily pass, weekly pass and monthly pass with auto-renewal facility.
12. The system should be able to create and enforce dynamic pricing such as peak hour pricing, peak day pricing, peak season pricing etc.,
13. The system should be able to work in offline mode as well along with online mode.

14. The total number of slots and free slots for parking must be displayed on a digital signboard near the entrance of the parking lots. The smart parking solution's integration with other elements within the tender scope must facilitate display of parking information at variable messaging displays deployed at key points of interest in the city. This feature to be developed as part of the system, however this will be deployed as and when all the parking spaces in the city are developed and integrated.
15. The smart parking solution needs to have parking ticket vending machine at the entrance where the ticket can be issued by the machine on pressing the button by the user/ operator. Further, the solution will have provision for a handheld device through which parking receipts can be generated on payment of fees through card or cash.
16. The payment collection can be done via card as well as cash (manually) at the kiosk where parking ticket can be shown/ given to the staff at the exit. Parking staff should be able to scan the ticket and provide the printed receipt.
17. The smart parking solution should facilitate real time revision of parking fees and should enable real time communication of rules to handheld terminal and parking kiosks.
18. The smart parking solution should retain videos of car entering /exiting the parking zone as per the security guidelines.
19. The smart parking solution should have a mobile and a web delivery channel for citizens to get real time parking availability and pre-book parking lots using online payment of parking charges facilitated through a payment gateway.
20. The parking operations platform should make the data and policy management of parking available to other third-party applications using well-documented APIs.
21. The Parking System should be able to integrate with a Payment Gateway, facilitating payment by Cash and all kind of cashless mode of payment.
22. A mobile application and web-based user interface should be provided with the following features:
 - a. The application should have citizen module and officer module.
 - b. Through the citizen module, the user should be able to locate nearest parking lot and also pre-book based on his geographical coordinates. The same information must be made available on map with routing information.
 - c. The citizen should be able to see all the parking lots with exact available space in a real-time mode.
 - d. While locating nearest parking lot, the latest parking slot availability should be given to the user.
 - e. The application should have a compliance officer module where JSCL designated inspector / operator will be able to check compliance of slot occupancy against the fees paid by the citizen.
 - f. The citizens should be able to generate MIS report to view occupancy of parking lots over a defined time period.

- g. The administrators should be able to generate MIS report to view occupancy, collection and other usage statistics over a defined time period.
23. The entire solution should be an integrated one with consumer app and parking management system integrated with each other.
24. The entire solution should be an integrated one with consumer app and parking management system integrated with each other.
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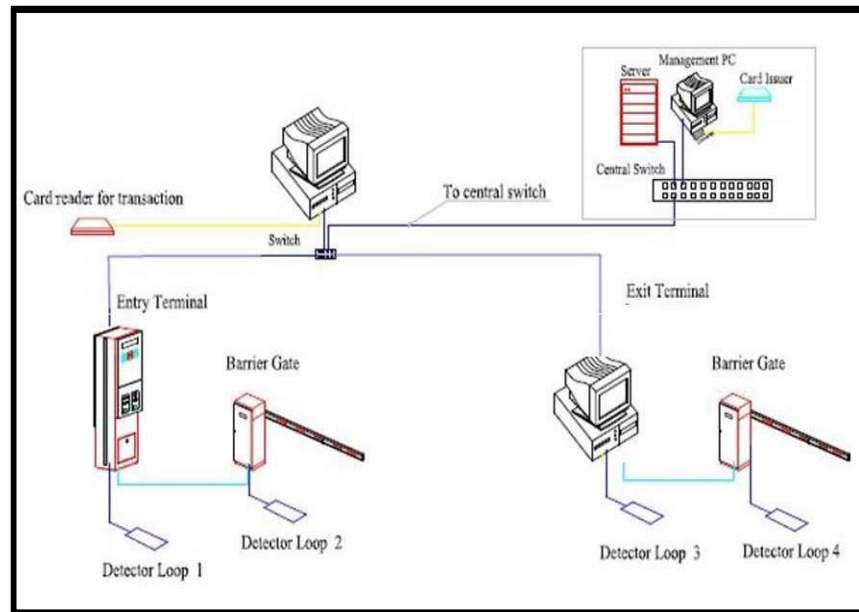


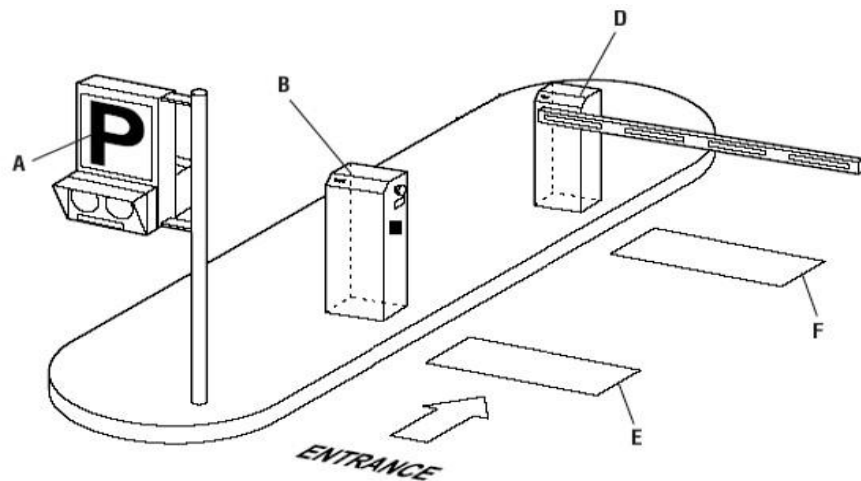
Figure 5.2: Solution Architecture

Entry Algorithm

- As shown in figure: At entry vehicle stops by barrier to get parking ticket.
- Vehicle stops over the presence loop that activates the Entry Terminal.
- Ticket Dispenser with lighted display information to “Press Button for Ticket or show card”
- **Occasional user** has to press ticket request button to get barcode printed ticket that comes out from ticket slot.
- **Permanent User** has to show his registered Subscriber or set-value card on the entry terminal.
- Driver Image camera will capture the image of driver/Vehicle at the time of process ticket or card.
- On verification of valid card or acceptance of parking ticket, barrier will get open automatically.
- As and when vehicle crosses the transit loop, command will be forwarded to barrier to close down.

Entry Algorithm

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- On verification of valid card or acceptance of parking ticket, barrier will get open automatically.
- As and when vehicle crosses the transit loop, command will be forwarded to barrier to close down.



- A. Parking Full / Available Indication Light
- B. Ticket Dispenser with built-in card reader
- C. Traffic Control Barrier
- D. Ticket Dispenser Activation loop/Presence Loop
- E. Barrier Closing loop/Transit Loop

Parking Entry Terminal



Traffic Control Barrier

- Modern, energy-saving barrier with extensive functions, specially designed for demanding tasks in parking management systems.

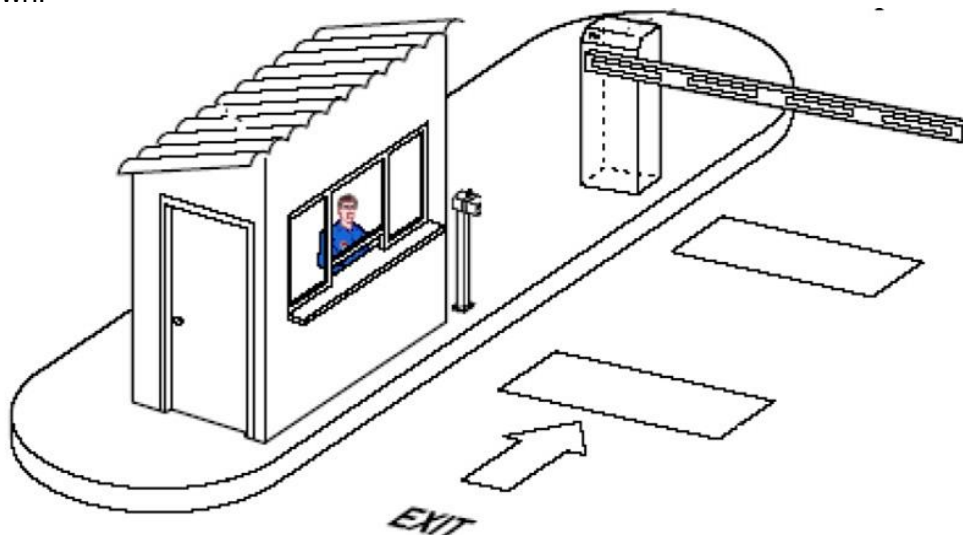
Exit Algorithm**For Occasional Users:**

As shown in figure: At entry vehicle stops by barrier for payment of parking charges. Vehicle will be detected by presence loop that activates Cashier Exit System. Operator will receive the ticket for scanning the ticket by hand held scanner. On scanning Driver Image will pop up on the screen to verify the Entry Image. After image verification parking stay charges will appear on the screen. On confirmation of amount collection from the system barrier will open automatically. Payment receipt for user will come out from the printer automatically.

Permanent User:

User will show his issued card on the reader Image of the vehicle/ Diver will be captured.

Card data verify from database and barrier opens automatically As and when vehicle crosses the transit loop, command will be forwarded to barrier to close down.



- A. Cashier Booth
 - B. Camera
 - C. Traffic Control Barrier
 - D. Ticket Dispenser Activation loop/Presence Loop
 - E. Barrier Closing loop/Transit Loop
- Processing Barcode Ticket tickets.
 - Issuance of subscriber and set-value card.
 - Renewal and additional payment of season parker cards
 - Issuing of lost tickets
 - Issuing of replacement tickets
 - Shift report after shift change
 - External display and keyboard
 - Barcode Scanner
 - Cash Drawer
 - Control Processing Unit
 - Vehicle Loop Detection

- External receipt printer for issuing receipts
- Ethernet connection
- Automatic cash drawer
- Value/time cheque processing
- Discount processing

Bay Sensor

Each parking bay sensor will be installed to know whether the parking bay is occupied or vacant.

CENTRALIZE CONTROL SYSTEM

- Centralize Control system for gate management
- Real Time Field Device Monitoring
- Revenue Generation Report
- Revenue Survey Report
- Reports and statics
- Daily, Weekly and Monthly Reports.
- Daily Vehicle Count.

CENTRALIZE CONTROL SYSTEM

- Daily Vehicle Flow rate
- Vehicle wise daily movement details
- Parking Survey
- Event and Log Management
- Alarm Management
- Card/TAG Registration
- Password Protected Login

Management Console

- Graphical, clear presentation of the parking system
- Checking and controlling of the devices
- Functional alarm message reporting with direct access to detailed information
- Administering customer and card data and issuing various types of tickets
- Tariff module for the convenient design of car park tariffs
- Car park-specific tariff configuration



- Temporal tariff validity
- Linear, progressive and digressive tariff structure

- Tariffs for various payment types
- Definition of maximum amounts (limits)
- Definition of flat rates (fixed amounts)
- More favorable tariffs for specific periods
- Weekday-dependent tariffs
- Individual tariffs for public holidays and special days

5.5.33 **Smart Parking Solution Requirements**

S. No.	Description	Compliance (Y/N)
1	Parking management desktop and mobile application should be able to create and update parking location, block, slot and rate information	
2	Parking management desktop application should be able to update all assets and hardware information for a parking place	
3	Parking management desktop application should support error reporting and diagnostics for all assets and hardware for a parking place	
4	Parking management desktop and mobile application should provide parking availability and occupancy	
5	Parking management desktop application should provide parking fee collection reports	
6	The available parking slots can be viewed through parking mobile application	
	variable message sign boards	
7	Wirelessly connected variable sign boards should be available at the point of interest (specified by Jaipur Smart City Limited) in the approaching road displaying the available slots	
8	Bidder should have hand held point of sale system for parking ticketing	
9	The entire system should provide real time reports to the concerned parties (Jaipur Development Authority and the contractor) of the parking scenario	
10	All the data collected to be provided to the concerned parties in a readable format on demand	
Off – Street Parking Requirements		
11	Nearest available parking lots are shown using maps and if public decides to reserve it, reservation is done with payment done from e-wallet or after physically going there in which case the parking lot might or might not be available.	
12	If parking slots are not available, the minimum waiting time for getting an available parking slot should be displayed in parking mobile application	
13	If parking slots are not available for parking place, the user is allowed to enter the parking place and leave immediately through exit. The time within which the user has to exit without getting charged for his stay	

	should be configurable. If the user takes more time to exit than the allowed time, user should be charged.	
14	The entry to off street parking place should be managed by automatic boom barrier and parking ticket dispensing machine	
15	The vehicle number and image of the number plate should be captured at the time of entry and exit of parking should be stored	
16	The parking management application should calculate the final settlement amount based on the user privileges, dynamic pricing and issue a receipt	
17	The smart card management system (card and reader) should be integrated with the parking management application	
18	The parking management application at any location should be able to function for a day even if it is not connected to the data center	
19	The entire solution should function 2 hours with uninterrupted power supply backup	

5.5.34 System Components

Camera

Cameras mounted at the entry and exit of the parking lot to capture Vehicle Number Plate and check against the parking database for vehicle authentication and grant user access based on privileges. 4 ANPR cameras at entry and exit for number plate detection, IP Outdoor bullet IR cameras for the general surveillance:

ANPR cameras (Makes should be UL, CE, FCC, BIS certified or approved by engineer incharge):

S. No.	Minimum Specifications	
1	IP 2 Mega pixel ANPR camera	IP 2 Mega pixel ANPR camera
	Image sensor	
2	Total pixels	1920x1080P or better
	Power	
3	Power Supply	12 DC -24 DC $\pm$ 20%
4	Power Consumption	Maximum 12 W
	Video performance	
1	Sensitivity	Colour: 0.001 Lux @ (F1.2, AGC ON), 0.0001 Lux with IR
2	Dynamic range	120 dB or better
	Video streaming	

1	Video compression	H.265, H.264
2	Streaming	Multiple configurable streams in H.264 and MJPEG, Configurable frame rate and bandwidth.
3	Overall IP Delay	Minimum 120 ms, Maximum 340 ms
4	Encoding interval	50/60 fps
	Video functions	
1	Day/Night	Color, Monochrome, Auto
2	Adjustable picture settings	Contrast, Saturation, Brightness
3	White Balance	Support
4	Contrast enhancement	On/off
5	Privacy Masking	Four independent areas, fully programmable
6	Shutter	Automatic Electronic Shutter
7	Noise reduction	Support 3D DNR
8	Sharpness	Sharpness enhancement level selectable
	Input/output	
1	Alarm input	2 input
2	Alarm output	2 output
	Optical	
1	Lens mount	On Board mounted
2	Lens type	6-12 mm
3	Horizontal field of view	103.3°to 38.6° or better
	Network	
1	Encryption	TLS 1.0 or SSL
2	Ethernet	Minimum 10/100 Base-T, auto-sensing, half/full duplex
3	Interoperability	ONVIF S
	Software	
1	Unit Configuration	Viewing Via web browser or Configuration Manager
2	Firmware update	Remotely programmable
3	Software viewer	Web browser or third-party software
	Environmental	
1	Operating Temperature	Minimum -30 °C to +60 °C maximum
2	Storage Temperature	Minimum -30 °C to +70 °C maximum
3	Humidity	Minimum 20% to 90% relative humidity (non-condensing)

	Certifications and approvals	
1	Standards	UL, CE, FCC, BIS
2	ONVIF conformance	ONVIF S & G Profile

Camera: Ample no of Cameras (**Makes should be** UL, CE, FCC, BIS certified or approved by engineer in charge)
mounted at crucial locations for video surveillance or as per site required:

S. No.	Minimum Specifications	
1	IP 5 Mega pixel outdoor IR camera	
2	Image sensor	
3	Total pixels	Minimum 3072 × 1728 or equivalent
4	Power	
5	Power Supply	12 VDC
6	Power-over-Ethernet	Support
7	Power Consumption	Maximum 20 W
8	PoE	IEEE 802.3af / IEEE 802.3at
Video performance		
1	Sensitivity	Minimum Color 0.01 lx, 0 lux with IR
2	Dynamic range	120 dB Wide Dynamic Range (WDR)
Video streaming		
1	Video compression	At least H.265 and M- JPEG or better
2	Streaming	Multiple configurable streams in H.264 and MJPEG, Configurable frame rate and bandwidth.
3	Overall IP Delay	Minimum 120 ms, Maximum 340 ms
4	Encoding interval	20 fps or better at 3072 × 1728(or equivalent)
Video functions		
1	Day/Night	Color, Monochrome, Auto
2	Adjustable picture settings	Contrast, Saturation, Brightness
3	White Balance	4 automatic modes, manual mode and measure
4	Contrast enhancement	On/off
5	Privacy Masking	Four independent areas, fully programmable
6	Video Analysis	Line crossing detection, intrusion detection, unattended baggage

		detection, object removal detection, Scene change detection, Audio exception detection ,Face Detection
7	Shutter	Automatic Electronic Shutter
8	Backlight compensation	On/off
9	Noise reduction	Support 3D DNR
10	Sharpness	Sharpness enhancement level selectable
11	Other functions	Image mirror, Image flip, Video watermarking, Display stamping
Input/output		
1	Alarm input	Support
2	Alarm output	Support
Optical		
1	Lens mount	On Board mounted
2	Lens type	Varifocal 2.8-12mm with Auto iris
3	Horizontal field of view	Minimum 90°to 25°
Network		
1	Protocols	TCP/IP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, PPPoE, NTP, UPnP, SMTP, SNMP, IGMP, 802.1X, QoS, IPv6, Bonjour
2	Encryption	TLS 1.0 or SSL
3	Ethernet	Minimum 10/100 Base-T, auto-sensing, half/full duplex
4	Interoperability	ONVIF Profile S
Software		
1	Unit Configuration	Viewing Via web browser or Configuration Manager
2	Firmware update	Remotely programmable
3	Software viewer	Web browser or third-party software
Environmental		
1	Operating Temperature	Minimum -30 °C to +60 °C maximum
2	Storage Temperature	Minimum -30 °C to +70 °C maximum
3	Humidity	Minimum 20% to 90% relative humidity (non-condensing)

Certifications and approvals		
1	Standards	UL, CE, FCC, BIS
2	ONVIF conformance	ONVIF S & G Profile

Storage: 128ch Network Video Recorder(Makes should be UL, CE, FCC, BIS certified or approved by engineer in charge) with 1 month recording

S. No	Minimum Specifications	
1.	IP video input	128 ch upto 12MP resolution supported
2.	Incoming bandwidth	Min. 500 Mbps
3.	Outgoing bandwidth	Min. 500 Mbps
4.	Recording resolution	Upto 12MP
5.	Video o/p interfaces	2 HDMI port; atleast 1 supporting 4K resolution, 1 VGA port; supporting 2MP resolution
6.	Audio o/p	1 ch
7.	Compression technique	H.265,H.264
8.	Live view/Playback resolution	Upto 12MP resolution
9.	Synchronous playback	Up to 16 channels
10.	Smart Playback function	Should support Smart search for the selected area in the video and smart playback to improve the playback efficiency
11.	VCA storage	Should support saving the captured VCA Pictures for smart IPC's VCA detection
12.	SATA interfaces	Hot swappable 16 sata interfaces with each supporting 8TB, should support ANR technology
13.	Power supply	Should Supports redundant power supply to improve the system stability
14.	HDD Management	Should Support HDD quota and group modes; different capacity can be assigned to different channels
15.	RAID arrays	RAID0, RAID1, RAID5, RAID 6, RAID10
16.	Hot spare function	Should support N+1 hotspare function
17.	Network interfaces	4, RJ-45 10/100/1000 Mbps self-adaptive Ethernet interface, supporting fault tolerance, multi addressing.
18.	Serial interfaces	RS-485; Keyboard
19.	USB interface	3 × USB connectors, with at least 1 USB 3.0

20.	Alarm i/o	16 i/p and 8 o/p
21.	Power supply	100 to 240 VAC, 50 to 60 Hz., Dual Power, Redundant
22.	Consumption (without hard disk)	≤140W
23.	Working temperature	0 to +50°C (32 to 122°F)
24.	Working humidity	10 to 90 %
25.	Certification	UL,CE,FCC, BIS

Parking Display

System should integrate LED displays to communicate the parking slots availability at the parking lot entrance. These displays should be able to display parking offers and advertisements too.

S. No.	Parameter	Min. Requirement
1	Estimated LED Life Span	Minimum 100,000 hours
2	Pixel	Each pixel makes up by 3 in one
	SMD	
1	Pixel Pitch	6 mm
2	Regulatory Certifications	CE, FCC, UL
3	Consumption W/m2	750 Max and 250 Typically
4	Ambient Temperature	-200 C ~ 500 C
5	Ambient humidity	10% ~ 99%
6	Display Resolution	160 pixels x 200 pixels
7	Display size	W 960mm * H 1200 mm
8	Ingress protection	IP65 Front and IP54 rear
9	Power supply	100~240 V AC 50/60 Hz
10	Colours	281 Trillion
11	Brightness	5000 Nits or higher

Parking Ticket Dispensing Machine

Parking Ticket Dispensing Machine should print the Parking Ticket with the parking slot number allotted, entry time, duration of stay, rate, unique transaction ID/booking ID and the Vehicle Number Plate on entry.

Parameter	Min. Requirement
Printer	Integrated thermal with graphics capabilities, 18 lines per second, 22, 32, or 42 columns;
	40mm paper roll
Paper	40mm roll: Length: 163mm; Max Width: of 78mm;
Ingress protection	IP65
Power supply	110 ~ 240 Voltage
Push Button	Contact closure/open on press
Environmental	0°to 50°C (32°to 122°F) operating temperature: 5% to 90% relative humidity,

	non-condensing Storage temperature: -20° to 60° C / 5% to 90% RH; non-condensing

Boom Barrier

Automatic Boom Barriers with inbuilt magnetic loop detector to stop and validate the entry of the vehicle to the parking and exit of the vehicle from the parking.

Parameter	Min. Requirement
Length of the beam with both straight and articulated options	3.5 meter
Max opening time	2 sec
Max closing time	2 sec with programmable option
Duty cycle or % Use frequency	Greater than 70 %
Power Unit	Electro-mechanical
Power Consumption Max.	30 W
Controller board interface	NO/NC / TCP/IP
Sensing	Photocell based optical sensing and magnetic loop detector
MCBF (Mean cycle between failure)	8000000 with 3rd party certification
Input power supply	230 V AC $\pm$ 10%, 50/60 Hz
Ingress protection class	IP 54
Operating temp	-20 to + 55 Deg C
Beam type	round or rectangular or octagonal
Security	Door with security lock
Manual override	Automatic barrier unlocking device in case of power failure. Opening should be possible by hand as well.
Safety feature while car under the barrier closing	Reverse on contact or non-contact sensing mechanism, Auto sway away feature

Parking Payment Machine

Payments at parking lots exit are through Parking Ticket Machine. Need to take bank notes, credit cards including Rupay, NFC/EMV, smart cards and debit cards.

Parameter	Min. Requirement
Processor	400 MHz 32-bit/500 MIPS processor
Memory	192 MB (128 MB of Flash, 64 MB of SDRAM) standard, designed to support up to 500 MB
Display	2.8", 320x240 pixel color TFT (QVGA)
Mag-stripe Reader	Triple track (tracks 1, 2, 3), high coercivity, bi-directional
Primary Smart Card	ISO 7816, 1.8V, 3V, 5V; synchronous and asynchronous cards; EMV Approved
SAM Card Reader	2 Security Access Modules (SAMs)
Battery	Li-Ion 3.6V / 2200mAh (8Wh)
Keypad	3 x 4 numeric keypad, plus 4, screen-addressable keys and a navigation key
Peripheral Ports	Single USB connector and Integrated Charging

Printer	Integrated thermal with graphics capabilities, 18 lines per second, 22, 32, or 42 columns; 40mm paper roll
Wireless Modem	3G /4G
Protocols	Application selects between asynchronous protocols (Visa 1, Visa 2 and others) and synchronous protocols (including ISO 8583/SDLC)
Security	3DES encryption, Master/Session and DUKPT key management; PCI PTS 3.0 approved
Printer Paper	40mm roll: Length: 163mm; Max Width: of 78mm;
Environmental	0° to 50° C (32° to 122° F) operating temperature; 5% to 90% relative humidity, non-condensing Storage temperature: -20° to 60° C / 5% to 90% RH; non-condensing
Voltage	AC input 100-240 VAC, 50/60 Hz; DC output 5 VDC, 1 Amp
Contactless Applications	MasterCard Pay Pass M/Chip MasterCard Pay Pass Magstripe Visa payWave MSD Visa payWave qVSDC Discover Zip American Express Express Pay Pass-through access to ISO 14443-4 and MI Fare card, for direct host terminal-based application access

Network Switch

A network switch is required to connect the devices at entry and exit.

S. No.	Parameters/ Features	Minimum Required Specification	Compliance (Yes/No)
1	General Feature	The switch should be Industrial Grade ruggedized in nature that provides minimum 4 x 10/100 BASETX PoE (15.4W) access ports, additional 2 x 1000 Base-X SFP & 2x 1GE Uplink ports. One (1) ruggedized single mode SFP should be supplied with the switch.	
		Switch should have non-blocking wire-speed architecture with support for both IPv4 & IPv6 from day one with wire rate switching fabric of minimum 2 Gbps or more.	
		The switch should support backup storage drives, which will store the last known configuration of the switch, in case of hardware failure and replacement, reinserting the storage drive should restore the switch to original working condition without any manual intervention.	

2	Layer 2 Features	802. 1Q VLAN on all ports with minimum 2k MAC address	
		Spanning Tree Protocol as per IEEE 802.1d, ring protection protocol like REP or equivalent	
		Should support Jumbo frames up to 9000 bytes & Link Aggregation Control Protocol (LACP) as per IEEE 802.3ad.	
3	Layer 3 Features	Static, Inter-VLAN routing must be enabled from day one	
4	Quality of Service (QoS) Features	Switch should support classification and scheduling as per IEEE 802.1P on all ports with minimum four egress queues per port	
5	Security Features	Switch should support ACLs, Extended IP ACLs, support RADIUS and TACACS+ for access restriction and authentication.	
		Should support a mechanism to shut down Spanning Tree Protocol Fast-enabled interfaces when BPDUs are received to avoid accidental topology loops.	
		Switch should support static ARP, Proxy ARP, UDP forwarding and IP source guard, DHCP Snooping, DHCP Option 82, Dynamic ARP Inspection (DAI), IP Source Guard, Network Address Translation, BPDU Guard, Port-Security, DHCP Snooping, 802.1x, 802.1AE, MAC Authentication Bypass, 802.1x Multi-Domain Authentication, Storm Control	
6	Management Features	Switch should be SNMP manageable with support for SNMP Version 1, 2 and 3.	
		Support for Automatic Quality of Service or equivalent for easy configuration of QoS features for critical applications.	
		Switch should support PTP, FTP/TFTP	
7		-5 to +70°C continuous operating temperature range	
		Operating relative humidity: 5% to 95% no condensing	
		Protection Class -minimum IP 30, NEMA TS- 2	

	Mechanical Conditions	Switch should support CIP Ethernet/IP, IEEE 1588 PTP	
		EMC interface immunity:	
		Switch should be EN55024, EN 61000-4-2 Electro Static Discharge, EN 61000-4-5 Surge, EN 61000-4-8 Power Frequency Magnetic Field, EN 61000-4-11 AC Power Voltage	

Parking lot Gateway

Minimum Specifications	
Working temperature	-35 °C to 70 °C
Emission current	400 mA
Receiving current	130 mA
Antenna	External SMA antenna
Receiver sensitivity	-102 dBm
Output power	≥+ 18dBm
Communication range	≥ 1.5km (Visual)
Transmission rate	39 kbps (adjustable)
Working Frequency	868 Mhz
Voltage input	AC 110 ~ 250ACV
Special design	Waterproof & Lightning protection
Operating voltage for load control	AC220V
IP Grade	IP65

Software

All software used for IPM has to be compatible with the platforms specified in the below table:

Software	Specification
Web Application	Should run on browsers IE 11+, Chrome 45+, Firefox 45+
Database	Open Source or Enterprise
Mobile Application	Should run on iOS 9+, Android 5+

Note: -

1. For all works RUIDP/PWD/A&M technical specifications shall be applicable.
2. The civil and electrical materials shall be supplied/installed/commissioned as per group 1/class A of RUIDP (SOR 2017) and all other items shall be as per Group 1/ class A of the prevailing in PWD BSR 2019 Jaipur circle.
3. The quality assurance, quality control plans to be submitted for approval before commencement of works.

Section VA

General Conditions of Contract (GCC)

("Copy of appendix XI of PWF&AR, Govt. of Rajasthan effective from 01.07.99 and subsequent addendum dated 19.03.2001 & 29.03.2001 and other amendments up to date. In case of any typographical error or omission or alteration the original version of the same shall be valid.")

DEFINITIONS

The "Contract" means the documents forming the bid and acceptance thereof and the formal agreement executed between the Jaipur Development Authority and the Contractor, together with the documents referred to therein, including these conditions, Notice inviting Bids, Instructions to Bidders, Special Conditions of Contract, Specifications, Drawings and Designs, Tender and other information submitted by the Contractor and instructions issued from time to time by the Engineer-in-charge and all these documents taken together shall be deemed to form one contract and shall be complementary to another.

In the contract the following expressions shall, unless the context otherwise requires, have the meanings herein respectively assigned to them:-

The "WORKS OR WORK" shall, unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by, or by virtue of the contract contracted to be executed, whether temporary or permanent and whether original, altered, substituted or additional.

The "SITE" shall mean the land an/or the other places on, into or through which work is to be executed under the contract, or any adjacent land, path or street, through which work is to be executed under the contract, or any adjacent land, path or street, which may be allotted or used for the purpose of carrying out the contract.

The "CONTRACTOR" shall mean the individual or firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representatives of such individual or the persons composing such firm or company, the successor of such firm or company and the permitted assign of such individual or firm or company.

The "ENGINEER-IN-CHARGE" shall mean the Executive Engineer In charge of Jaipur Development Authority who shall supervise and be in-charge of the work.

The "GOVERNMENT DEPARTMENT" shall mean the Jaipur Development Authority.

The "Accepting Authority" shall mean Executive Committee of Jaipur Development Authority.

The "Director" or "Chief Engineer" shall mean The Director (Engineering-I) of Jaipur Development Authority.

The 'Superintending Engineer' shall mean the Superintending Engineer (RRP) of Jaipur Development Authority.

"ESTIMATED COST" shall mean the cost of the work or works as estimated on the basis of the TENDERED rate or rates agreed to between the parties to the contract.

Where the context so requires, words importing the singular only also include the plural and vice-versa. Any reference to masculine gender shall wherever required include feminine gender and vice versa.

Headings and marginal notes to these General Conditions of Contract shall not be deemed to form a part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.

The clause 23 of condition of contract under section 2 of GCC i.e. standing committee for settlement of disputes is read as:

If any question, difference or objection, whatsoever shall arise in any way, in connection with or arising out of this instrument, or the meaning of operation of any part thereof, of the rights, duties or liabilities of either party men, save in so far, as the decision of any such matter, as herein before provided for, and been so decided, every such matter/ constituting a total claim of Rs. 50,000/- or above, whether its decision has been otherwise provided for an whether it has been finally decided accordingly, or whether the rights or obligations of the parities, as the result of such termination, shall be referred for decision to the empowered standing committee, which would consist of the followings:

Jaipur Development Commissioner, JDA, Jaipur -Chairman

Director (Engineering-I), JDA, Jaipur

Director (Finance), JDA, Jaipur

Director (Law), JDA, Jaipur

Additional Chief Engineer, JDA, Jaipur

Superintending Engineer, JDA, Jaipur - Member Secretary

The Engineer-in-Charge, on receipt of application along with nonrefundable prescribed fee, (the fee would be two percent of the amount in dispute, not exceeding Rs. One lac) from the contractor, shall refer the disputes to the committee within a period of three months from the date of receipt of application.

The contractor shall be furnished, free of cost one certified copy of the contract documents except standard specifications. Schedule of Rates and such other printed and published documents, together with all drawings as may be forming part of the Bid Documents. None of these documents shall be used for any purpose other than that of this contract.

Procedure and application form referring cases for settlement by the Standing Committee shall be, as given in form RPWA 90.

AGREEMENT No.
 Year..... 20
 Circle.
 Division.....
 Sub- Division.....

Name of Work: RamniwasBagh Underground Parking Project (Phase-II)

Contractor:.....

Sanction No. Dt..... Rs.....

Technical Sanction No.

Job No.

- (a) Stipulated Date of Start of work.....
- (b) Stipulated Date of Completion of work.....
- (c) Actual Date of Completion.....
- Extension applied on & sanctioned.....

Vide: C.E./S.E./E.E. No..... Dt. 20

Details of Documents

Page :

- (a) Percentage Rate Tender R.P. W.A. 100
(See rule 322 & note 1 below rule 331)
- (b) Schedule A to F
- (c) Schedule H
- (d) Schedule G
- (e) Schedule
- (f) General Specification and Conditions of Contract
- (g) Contractor's Labour Regulations
- (h).....

No.

Date:

Copy forwarded to:

Director Eng (I) / (Finance), JDA, Jaipur

Additional Chief Engineer, JDA, Jaipur

Additional Director (Revenue)/CAO, JDA, Jaipur

Superintending Engineer (RRP) , JDA, Jaipur

The Assistant Engineer / JEN

Auditor

Shri..... Contractor

M/s.....

Amended up to _____ Effective from _____

GENERAL RULES AND DIRECTIONS FOR THE GUIDANCE OF CONTRACTOR

All works, proposed for execution by contract, will be notified in a form of Invitation to tender pasted on public places and on a board hung up in the office and signed by the Chief Engineer or other duly Authorized Engineer.

The form of invitation to tender will state the work to be carried out, as well as the date for submitting and opening of tenders, and the time allowed for carrying out the work; also the amount of Earnest Money to be deposited with the tender, and the amount of the Security Deposit to be deposited by the successful Bidder and the percentage, if any, to be deducted from bills. Copies of the specifications, Designs and drawings and Estimated rates/Scheduled rates and any other documents required in connection with the work signed for the purpose of identification by the Executive Engineer, shall also be open for inspection by the contractor at the office of the Chief Engineer or other duly authorized Engineer during office hours.

In the event of the tender being submitted by a firm, it must be signed separately by each partner, thereof, or in the event of the absence of any partner, it must be signed on his behalf, by a person holding a power of attorney, authorizing him to do so. Such power of Attorney will be submitted with the tender and it must disclose that the firm is duly registered under Indian Partnership Act, by submitting the copy of registration certificate.

Receipts for payments, made on account of a work when executed, by a firm must also be signed by the several partners, except where the contractors are described in their tender as a firm, in which case the receipts must be signed in the name of the firm by one of the partners or by some other person having authority to give effectual receipts for the firm.

Any person, who submits percentage rate tender, shall fill up the usual printed form stating at how much percent, above or below the rates specified in scheduled G, he is willing to undertake the work. Only one rate of percentage more or less on all the Estimated rates/ Scheduled rates shall be mentioned. Tenders, which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort, will be liable to rejection. No single tender shall include more than one work, but contractors who wish to tender for two or more works shall submit a separate tender for each work. Tenders shall have the name and number of the work, to which they refer, written outside the envelope.

The Chief Engineer or other duly authorized Engineer will open the tenders in the presence of any tendering contractor(s) or their authorized representatives who may be present at the time, and will announce and enter the rates/amounts of all tenders in the register of Opening of tenders, (Form RPWA 20A). In the event of the tender being accepted, a receipt for the Earnest Money deposited shall be given to the contractor, who shall sign copies of the specifications and other documents mentioned in Rule 1. In the event of a tender being rejected, the earnest money forwarded with such unaccepted tenders shall, be returned to the Contractor making the same.

The Chief Engineer or other duly authorized Engineer shall have the right of rejecting all or any of the tender without assigning any reason.

The receipt of an Accountant, Cashier or any other official, not authorized to receive such amount, will not be considered as an acknowledgement of payment to the Chief Engineer or other duly authorized Engineer.

The memorandum of work tendered for, the memorandum of materials and of Tools and Plants to be supplied by the Department and their rates, shall be filled in and completed in the office of the Chief Engineer or duly authorized Engineer before the tender form is issued.

If it is found that the tender is not submitted in proper manner, or contains too many corrections and or unreasonable rates or amounts, it would be open for the Engineer-in-charge not to consider the tender, forfeit the amount of earnest money and/or delist the contractor.

The Bidder shall sign a declaration under the Official Secrets Act for maintaining secrecy of the tender document, drawings or other records connected with the work given to him in form given below. The unsuccessful Bidder shall returned all the drawings given to them.

Declarations

“I/We hereby declare that I/We shall treat the tender documents, drawings and other records, connected with the work, as secret confidential documents, and shall not communicate information derived there from to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the same.”

Any percentage rate tender containing item-wise rates, and any item rate tender containing percentage rate below or above estimated/scheduled rates, will be summarily rejected. However, if a Bidder voluntarily offers a rebate for payment within a stipulated period, this may be considered.

On acceptance of the tender, the name of the accredited representative(s) of the Contractor (with a photograph and signature attested), who would be responsible for taking instructions from the Engineer in charge, shall be communicated to the Engineer-in-charge.

Sales tax or any other tax on materials, or Income Tax in respect of the contract shall be governed by Clause 36 A, B and C and D of the Conditions of Contract. Deduction of Income Tax at source will be made as per provisions of the Income Tax Act, in force from time to time.

The tender to work shall not be witnessed by a Contractor or Contractors who himself/themselves has/have tendered or who may and has/have tendered for the same work. Failure to observe the secrecy of the tenders will render tenders of the contractors, tendering as well as witnessing the tender, liable to summary rejection.

If on check, there are discrepancies, the following procedure shall be followed:-

Where there is a difference between the rates in figures and words, lower of the two rates shall be taken as valid and correct rate.

When the rate quoted by the contractor in figures and in words tallies, but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount worked out.

While quoting rates, if rate/rates against any item or items are found to be omitted, the rate given in the Schedule ‘G’ by the department for such items will be taken into account while preparing comparative statement and contractor shall be bound to execute such item on ‘G’ Schedule rates.

In case where percentage is given but the ‘above’ or ‘below’ not scored, the tender will be non-responsive.

The Contractor shall comply with the provisions of the Apprenticeship Act, 1961, and the rules and orders issued, there under, from time to time. If he fails to do so, his failure will be breach of the contract and the original sanctioning authority in his discretion may cancel the contract. The Contractor shall also be liable for any pecuniary liability arising on account of violations by him of the provisions of the Act.

The Contractor shall read the specifications and study the working drawings carefully before submitting the tender.

The site for execution of the work will be made available as soon as the work is awarded. In case, it is not possible for the Department to make the entire site available on the award of the work, the Contractor shall arrange his working programme accordingly. No claim, whatsoever, for not giving the site in full on award of the work or for giving the site gradually in parts will be tenable. The contractor may satisfy himself regarding site, acquisition of land, approach roads etc.

The tender documents show already the specific terms and conditions on which tenders are required by the Government. Hence, all tenders should be in strict conformity with the tender documents and should be fulfilled in, wherever necessary, and initialed. Incomplete tenders are liable to be rejected. The terms and conditions of the tender documents are firm, as such conditional tenders are liable to be rejected.

The Bidder, while submitting tender, must provide adequate information regarding his financial, technical and organizational capacity and working experience to execute the work of the nature and magnitude.

The Chief Engineer or other duly authorized Engineer reserves the right to ask for submission of samples as in respect of materials for which the Bidder has quoted his rates before the tender can be considered for acceptance. If the Bidder, who is called upon to do so, does not submit within seven days of written order to do so, the Engineer-in-charge shall be at liberty to forfeit the said earnest money absolutely.

The Contractor shall submit the list of the works, which are in hand (progress), in the following form:-

Name of work	Name and particular of the Sub-Division / Division, where work is being executed	Amount of work	Position of works in progress	Remarks
1	2	3	4	5

The Contractor should quote his rates only in one language i.e. either in Hindi or English. Rates should be quoted in figures as well as in words. In case a Contractor has quoted rates in both the languages, and the rates so quoted differ, then the lower of the two shall be treated as the rate quoted by the Contractor.

All additions, deletions, corrections and overwriting, must be serially numbered and attested by the Contractor at every page, so also by the officer opening the tenders, so as to make further disputes impossible on this score.

After acceptance of the tender, the Contractor or all partners (in the case of partnership firm), will append photographs and signatures duly attested, at the time of execution of Agreement.

If any contractor, who having submitted a tender does not execute the agreement or start the work or does not complete the work and the work has to be put to retendering, he shall stand debarred from participating in such retendering in addition to forfeiture of Earnest Money/Security Deposit and other action under agreement.

The tender documents shall be issued to those contractors only having valid enlistment as on the date of issue of documents.

(a) If a Bidder reduces the rates voluntarily after opening of the tenders/negotiations, his offer shall stand cancelled automatically, his earnest money shall be forfeited and action for debarring him from business shall be taken as per enlistment rules.

(b) If a non-Bidder offers lower rates after opening of tenders, action for debarring him from business shall be taken as per enlistment rules.

Contractors shall submit only unconditional tenders. Conditional tenders are liable to be rejected summarily.

GENERAL CONDITIONS OF CONTRACT

("Copy of appendix XI of PWF&AR, Govt. of Rajasthan effective from 01.07.99 and subsequent addendum up to date. In case of any typographical error or omission or alteration the original version of the same shall be valid.")

Clause 1: Security Deposit

"The security deposit @ 5% of the gross amount of the running bill shall be deducted from each running bill and shall be refunded as per rules on completion of the contract as per terms and conditions. The earnest money deposited shall however be adjusted while deducting security deposit from the first running bill of the contractor. There will be no maximum limit of security deposit.

A contractor may, however, elect to furnish bank guarantee or any acceptable form of security for an amount equal to the full amount of security deposit @ 5% of the work order before or at the time of executing the agreement. In that case earnest money may be refunded only after furnishing of the bank guarantee as above. During the execution of the work or after completion of the work also a contractor may replace the security deposit by furnishing bank guarantee for an equal amount. However, during execution of the work if cost of work exceeds as shown at the time of furnishing bank guarantee, balance security deposit shall be deducted from the Running Account Bills."

All compensation or other sums of money payable by the Contractor to Government under the terms of his contract may be deducted from or paid by the sale of a sufficient part of his Security Deposit, or from interest arising therefrom, or from any sums, which may be due or may become due to the Contractor by the Government on any account whatsoever, and in the event of his Security Deposit being reduced by reason of any such deduction or sale as aforesaid, the Contractor shall within ten days thereafter, make good in cash or Bank Guarantee of Nationalized/Scheduled bank, as aforesaid, any sum or sums which may have been deducted from or raised by sale of his Security Deposit or any part thereof.

In case of Bank Guarantee of any Nationalized/Scheduled Bank is furnished by the Contractor to the Government, as part of the Security Deposit and the bank goes into liquidation or, for any reason is unable to make payment against the said Bank Guarantee, the loss caused thereby shall fall on the Contractor and the Contractor shall forthwith, on demand, furnish additional security to the Government to make good the deficit.

The liability or obligation of the bank under the Guarantee Bond shall not be affected or suspended by any dispute between the Engineer-in-Charge and the Contractor, and the payment, under the Guarantee Bond by the bank to the Government shall not wait till disputes are decided. The bank shall pay the amount under the Guarantee, without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the Contractor. The demand, so made, shall be conclusive as regards to amount due and payable by the bank, under the guarantee limited to the amount specified in the Guarantee Bond. The guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

The Bank Guarantee shall remain valid up to the specified date unless extended on demand by the Engineer-in-Charge which shall include the period of completion of the contract and the defect removal period as per terms of the Agreement. Bank's liability shall stand automatically

discharged unless a claim in writing is lodged with the Bank within the period stated in the Bank Guarantee including the extended period. After satisfactory completion of the contract and clearance of all dues by the Contractor, the Chief Engineer or duly authorized Engineer will discharge the Bank Guarantee after expiry of the original or the extended period, as the case may be. In case the date of expiry of the Bank Guarantee is a holiday, it will be deemed to expire on the close of the next working day.

Government is not concerned with any interest accruing to the Contractor on any form of Security (primary or collateral) lodged by him with the bank or any sums payable to sureties obtained by the Bank as counter guarantee to secure its own position. These will be the matters between the Bank and the Contractor.

Clause 2: Compensation for delay

The time allowed for carrying out the work as entered in the tender, shall be strictly observed by the Contractor and shall be reckoned from the 10th day after the date of written order to commence the work is given to the Contractor. If the Contractor does not commence the work within the period specified in the work order, he shall stand liable for the forfeiture of the amount of Earnest Money and Security Deposit. Besides, appropriate action may be taken by the Engineer-in-Charge/competent authority to debar him from taking part in future tenders for a specified period or black list him. The work shall, throughout the stipulated period of completion of the contract, be proceeded with all due diligence, time being essence of the contract, on the part of the Contractor. To ensure good progress during the execution of work, the contractor shall be bound, in all cases in which the time allowed for any work exceeds one month (save for special jobs), to complete 1/8th of the whole of the work before 1/4th of the whole time allowed under the contract has elapsed, 3/8th of the work before 1/2 of such time has elapsed and 3/4th of work before 3/4th of such time has elapsed. If the contractor fails to complete the work in accordance with this time schedule in terms of cost in money, and the delay in execution of work is attributable to the contractor, the contractor shall be liable to pay compensation to the Government at every time span as below: -

A.	Time Span of full stipulated period	1/4th	1/2th	3/4th	Full
B.	Work to be completed in terms of money	1/8th	3/8th	3/4th	Full
		(Rs.)	(Rs.)	(Rs.)	(Rs.)
C.	Compensation payable by the contractor for delay attributable to contractor at the stage of:	Delay up to one fourth period of the prescribed time span – 2.5% of the work remained unexecuted			
		Delay exceeding one fourth period but not exceeding half of the prescribed time span – 5% of the work remained unexecuted.			
		Delay exceeding half of the prescribed but not exceeding three fourth of the time span – 7.5% of the work remained unexecuted			
		Delay exceeding three fourth of the prescribed time span – 10% of the work remained unexecuted			

Note: In case delayed period over a particular span is split up and is jointly attributable to Government and contractor, the competent authority may reduce the compensation in proportion of delay attributable to Government over entire delayed period over that span after clubbing up the split delays attributable to Government and this reduced compensation would be applicable over the entire delayed period without paying any escalation.

Following illustrations is given: -

First time span is 6 months, delay is of 30 days which is split over as under: -

5 days (attributable to Government) + 5 days (attributable to contractor) + 5 days (attributable to Government) + 5 days (attributable to contractor) + 5 days (attributable to Government) + 5 days (attributable to contractor)

Total delay is thus clubbed to 15 days (attributable to Government) and 15 days (attributable to contractor).

The normal compensation of 30 days as per clause 2 of agreement is 2.5% which can be reduced as $2.5 \times 15 / 30 = 1.25\%$ over 30 days without any escalation by competent authority.

Note: The compensation, levied as above, shall be recoverable from the Running Account Bill to be paid immediately after the concerned time span. Total compensation for delays shall not exceed 10 percent of the total value of the work.

The contractor shall, further, be bound to carry out the work in accordance with the date and quantity entered in the progress statement attached to the tender.

In case the delay in execution of work is attributable to the contractor, the spanwise compensation, as laid down in this clause shall be mandatory. However, in case the slow progress in one-time span is covered up within original stipulated period, then the amount of such compensation levied earlier shall be refunded. The Price escalation, if any, admissible under clause 45 of Conditions of Contract would be admissible only on such rates and cost of work, as would be admissible if work would have been carried out in that particular time span. The Engineer-in-Charge shall review the progress achieved in every time span, and grant stagewise extension in case of slow progress with compensation, if the delay is attributable to contractor, otherwise without compensation.

However, if for any special job, a time schedule has been submitted by the Contractor before execution of the agreement, and it is entered in agreement as well as same has been accepted by the Engineer-in-charge, the Contractor shall complete the work within the said time schedule. In the event of the Contractor failing to comply with this condition, he shall be liable to pay compensation as prescribed in forgoing paragraph of this clause provided that the entire amount of compensation to be levied under the provisions of this Clause shall not exceed 10% of the value of the contract. While granting extension in time attributable to the Government, reasons shall be recorded for each delay.

Clause 2A: Incentive for Early Completion:

(Added by Order No. F.2.(4) FD/Exp.III/99-II dated: 16.01.2018 Circular No 66/2018) with immediate effect)

In the event that the project (Cost more than Rs. 50 Crore) Completion date occurs prior to the scheduled Completion Date (after taking into account any time extension approved by the competent Authority for delays not attributable to the contractor), the contractor shall be entitled to receive a payment of incentive equivalent to 0.03% (zero point zero three percent) of the Contract Price for each day by which the Project Completion Date precedes the Scheduled Completion Date, but subject to a maximum of 3% (Three percent of the Contract

Price). Provided, however, that the payment of incentive, is any, shall be made only after the issue of the completion certificate.

Note: Contract Price for calculation of above incentive means Original Cost of Work, plus Cost of Additional and Extra Items, if any, but excluding price variations/ Escalations granted, if any.

Clause 3: Risk & Cost Clause

The Engineer-in-charge or the Competent Authority defined under rules may, without prejudice to his rights against the Contractor, in respect of any delay or inferior workmanship or otherwise, or any claims for damages in respect of any breaches of the contract and without prejudice to any rights or remedies under any of the provisions of this Contract or otherwise, and whether the date for completion has or has not elapsed, by notice in writing, absolutely determine the Contract in any of the following cases:

If the Contractor having been given by the Engineer-in-charge, a notice in writing to rectify, reconstruct or replace any defective work or that the work is being performed in any inefficient or otherwise improper or un-workman like manner shall omit to comply with the requirements of such notice for a period of seven days, thereafter, or if the Contractor shall delay or suspend the execution of the work so that either in the judgement of the Engineer-in-charge (which shall be final and binding) he will be unable to secure completion of the work by the date for completion or he has already failed to complete the work by that date,

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

If the contractor commits breach of any of the terms and conditions of this Contract,

If the contractor commits any acts mentioned in, clause 19 thereof.

When the Contractor has made himself liable for action under any of the cases aforesaid, the Engineer-in charge on behalf of the Governor of Rajasthan shall have powers: -

To determine or rescind the contract, as aforesaid (of which determination or rescission notice in writing to the Contractor under the hand of the Engineer-in charge shall be conclusive evidence), upon such determination or rescission, the earnest money, full security deposit of the contract shall be liable to be forfeited and shall be absolutely at the disposal of Government.

To employ labour paid by the Department and to supply materials to carry out the work or any part of the work, debiting the Contractor with the cost of the labour and the price of the materials (of the amount of which cost and price certified by the Engineer-in-charge shall be final and conclusive against the contractor) and crediting him with the value of the work done in all respects in the same manner and at the same rates, as if it had been carried out by the Contractor under the terms of this Contract. The certificate of the Divisional Officer, as to the value of the work done, shall be final and conclusive evidence against the Contractor provided always that action under the sub-clause shall only be taken after giving notice in writing to the Contractor. Provided also that; if the expenses incurred by the Department are less than the amount payable to the Contractor at his agreement rates, the difference shall not be paid to the Contractor.

After giving notice to the contractor to measure up the work of the contractor and to take such part thereof, as shall be unexecuted out of his hands, and to give it to another contractor to complete, in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (of the amount of which excess, the certificate in writing of the Engineer-in-charge shall be final and

conclusive) shall be borne and paid by the original Contractor and may be deducted from any money due to him by Government under this contract or on any other account whatsoever, or from his Earnest Money, Security Deposit, Enlistment Security or the proceeds of sales thereof, or a sufficient part thereof, as the case may be. In the event of any one or more of the above courses being adopted by the Engineer-in-charge, the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of contract. And, in case action is taken under any of provisions aforesaid, the Contractor shall not be entitled to recover or be paid, any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-charge has certified, in writing, the performance of such work and the value payable in respect thereof, and he shall only be entitled to be paid the value so certified.

Clause 4: Contractor remains liable to pay compensation, if action not taken under clause 3

In any case in which any of the powers conferred by clause 3 hereof, shall have become exercisable and the same shall have not been exercised, the non-exercise, thereof, shall not constitute waiver of any of the conditions hereof, and such power shall, notwithstanding, be exercisable in the event of any future case of default by the Contractor for which, by any clause or clauses hereof, he is declared liable to pay compensation amounting to the whole of his Security Deposit /Earnest Money/Enlistment security and the liability of the Contractor for past and future compensation shall remain unaffected.

Powers to take possession of, or require removal, sale of Contractor's plant

In the event of the Engineer-in-Charge putting in force, powers vested in him under the preceding Clause 3 he may, if he so desires, take possession of all or any tools, plants, materials and stores, in or upon the works or the site, thereof or belonging to the contractor or procured by him and intended to be used for the execution of the work or any part thereof, paying or allowing for the same in account, at the contract rates or, in case of these not being applicable, at current market rates, to be certified by the Chief Engineer or duly authorized Engineer (whose certificate thereof, shall be final and conclusive), otherwise the Engineer-in-Charge may, by notice in writing to the contractor or his clerk of the works, foreman or other authorized agent, require him to remove such tools, plant, materials or stores from the premises (within a time to be specified in such notice), and in the event of the contractor failing to comply with any requisition, the Chief Engineer or other duly authorized Engineer may remove them at the contractor's expenses, sell them by auction or private sale on account of the Contractor and at his risk in all respects, and the certificate of the Chief Engineer or other duly authorized Engineer, as to the expense of any such removal, and the amount of the proceeds and expense of any such sale shall be final and conclusive against the Contractor.

Clause 5: Extension of time

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 on any other grounds, he shall apply, in writing, to the Engineer-in-Charge within 30 days of the date of the hindrance, on account of which he desires such extension as aforesaid, and the Authority Competent to grant extension under the rules/delegations of power or other duly authorized Engineer shall, if in his opinion, (which shall be final) reasonable grounds be shown therefore, authorize such extension of time, if any, as may, in his opinion, be necessary or proper, if the period of completion of contract expires before the expiry of the period of one month provided in this clause, the application for extension shall be made before the expiry of the period stipulated for completion of the contract. The competent authority shall grant such extension at each such occasion within a period of 30 days of receipt of application from contractor and shall not wait

for finality of work. Such extensions shall be granted in accordance with provisions under clause (2) of this agreement.

Clause 5 A: Monthly Return of Extra Claims

Contractor has to submit a return every month for any work claimed as extra. The Contractor shall deliver the return in the office of the Executive Engineer and obtain Receipt Number of the Receipt Register of the day on or before 10th day of every month during the continuance of the work covered by this contract, a return showing details of any work claimed as extra by the contractor which value shall be based upon the rates and prices mentioned in the contract or in the Schedule of Rates in force in the District for the time being. The contractor shall be deemed to have waived all claims, not included in such return, and will have no right to enforce any such claims not included, whatsoever be the circumstances.

Clause 6: Final Certificate

On completion of the work, the contractor shall send a registered notice to the Engineer-in-charge, giving the date of completion and sending a copy of it to the officer accepting the contract, on behalf of the Governor and shall request the Engineer-in-charge to give him a certificate of completion, but no such certificate shall be given nor shall the work be considered to be complete until the contractor shall have removed from the site on which the work shall be executed, all scaffolding, surplus materials and rubbish and cleared off the dirt from all wood work, doors, walls, floors, or other parts of any building in, upon or about which the work is to be executed or of which he may have possession for the execution thereof, he had filled up the pits. If the contractor shall fail to comply with the requirements of this Clause as to removal of scaffolding, surplus materials and rubbish and cleaning off dirt and filling of pits on or before the date fixed for completion of the work, the Engineer-in-charge may, at the expense of the contractor, remove such scaffolding, surplus materials, and the rubbish and dispose of the same, as he thinks fit, and clean off such dirt and fill the pits, as aforesaid, and the contractor shall forthwith pay the amount of all expenses, so incurred, and shall have no claim in respect of any such scaffolding or surplus materials, as aforesaid, except for any sum actually realized by the sale thereof. On completion, the work shall be measured by the Engineer-in-charge himself or through his subordinates, whose measurements shall be binding and conclusive against the contractor. Provided that, if subsequent to the taking of measurements by the subordinate, as aforesaid, the Engineer-in-charge had reason to believe that the measurements taken by his subordinates are not correct, the Engineer-in-charge shall have the power to cancel the measurements already taken by his subordinates and acknowledged by the Contractor and to take measurements again, after giving reasonable notice to the Contractor, and such re-measurements shall be binding on the Contractor.

Within thirty days of the receipt of the notice, Engineer-in-charge shall inspect the work and if there is no visible defects on the face of the work, shall give the Contractor, a certificate of completion. If the Engineer-in-charge finds that the work has been fully completed, it shall be mentioned in the certificate so granted. If, on the other hand, it is found that there are certain visible defects to be removed, the certificate to be granted by Engineer-in-charge shall specifically mention the details of the visible defects along with the estimate of the cost for removing these defects. The final certificate of work shall be given after the visible defects pointed out as above have been removed.

Clause 7: Payment on Intermediate Certificate to be regarded as advance

No payments shall be made for works estimated to cost less than rupees twenty-five thousand, till after the whole of the works shall have been completed and a certificate of completion given. But in the case of works estimated to cost more than rupees twenty five thousand, the Contractor shall on submitting the bill therefore, be entitled to receive a monthly payment proportionate to the part, thereof, then approved and passed by the Engineer-in-charge, whose

certificate of such approval and passing of sum, so payable, shall be final and conclusive. Running Account Bill shall be paid within 15 days from presentation. But all such 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 and imperfect or unskillful work to be removed and taken away and re-constructed or re-erected, or considered as an admission of the due performance of the contract, or any part thereof, in any respect, or the accruing of any claim, nor shall it conclude, determine, or effect in any way the powers of the Engineer-in-charge under these conditions or any of them to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be made/submitted by the Contractor within one month of the date fixed for completion of the work, otherwise the Engineer-in-charge's certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on all parties.

Clause 7A: Time Limit for Payments of Final Bills

The final bill shall be paid within 3 months on presentation by the contractor after issuance of final completion certificate in accordance with clause 6 of the conditions of contract. If, there shall be any dispute about any item(s) of the work, then the undisputed item(s) only, shall be paid within the said period of 3 months. If a final bill (which contains no disputed item or disputed amount of any item) is not paid within the period of three months from presentation of final bill or 6 months from the date of receipt of registered notice regarding completion of work in accordance with clause 6 of the conditions of the contract, the defects, if any, shall be brought to the notice of the higher authority. The period of 3 months shall commence from the date of rectification of the defects. The higher authority shall ensure that in no case final bill should be left unpaid after 9 months from the receipt of registered notice regarding completion of work. The contractor shall submit a memorandum of the disputed items along with justification in support within 30 days from the disallowance thereof, and if he fails to do so, his claims shall be deemed to have been fully waived and absolutely extinguished.

Clause 8: Bills to be submitted on completion of specified stage of work

In case of Lump Sum contract, bills will be submitted by the contractor on completion of various stages of work as specified in the contract document. The claim as far as admissible, authorized or paid, if possible, before expiry of 10 days from the presentation of the bill. The claims for additions & alterations, if any, may also be included in the bills if their measurements have been recorded and checked.

Clause 8A: Bills to be submitted on completion of specified stage of work

In case of Lump Sum contract, bills will be submitted by the contractor on completion of various stages of work as specified in the contract document. The claim as far as admissible, authorized or paid, if possible, before expiry of 10 days from the presentation of the bill. The claims for additions & alterations, if any, may also be included in the bills if their measurements have been recorded and checked.

Clause 8B: Recovery of Cost of Preparation of the Bill

In case of contractor of class A and AA do not submit the bill within time fixed, the Engineer in Charge may prepare the bill as per the provision of clause 8 of the general conditions of the contract but @ 0.5 % of amount of such a bill shall be made and credited to the general revenue on account of preparation of bill.

Clause 9: Bills to be on printed forms

The Contractor shall submit all bills on the printed forms, to be had on application, at the office of the Engineer-in-charge and the charges in the Bills shall always be entered at the rates

specified in the tender or in the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender, at the rates hereinafter provided for such work.

Clause 9A: Payments of Contractor's Bills to Banks

Payments due to the Contractor may if so desired by him, be made to this Bank instead of direct to him, provided that the contractor has furnished to the Engineer-in- Charge(I)an authorization in the form of a legally valid document, such as a Power of Attorney conferring authority on the Bank to receive payments, and (ii) his own acceptance of the correctness of the account made out, as being due to him, by Government, or his signature on the bill or other claim preferred against

Government before settlement by the Engineer-in-Charge of the account or claim, by payment to the Bank. While the receipt given by such bank shall constitute a full and sufficient discharge for the payment, the Contractor should, whenever possible, present his bill duly receipted and discharged through his Banker. Nothing, herein contained, shall operate to create in favor of the Bank any rights vis-a-vis the Governor.

Clause 10: Stores supplied by Government

If the specification or estimate of the work provides for the use of any special description of material, to be supplied from Engineer-in-charge's stores, or if, it is required that contractor shall use certain stores to be provided by the Engineer-in- charge, specified in the schedule or memorandum hereto annexed, the contractor shall be bound to procure and shall be supplied such materials and stores as are, from time to time, required to be used by him for the purpose of the Contract only, and the value of the full quantity of materials and stores, so supplied, at the rates specified in the said schedule or memorandum, may be set off or which may be deducted from any sum, then due or thereafter become due, to the Contractor under the Contract or otherwise or against or from the Security Deposit or the proceeds of sale, if the same is held in Government securities, the same or sufficient portion thereof being in this case, sold for this purpose. All materials supplied to the contractor, either from Departmental stores or with the assistance of Government, shall remain the absolute property of Government. The Contractor shall be trustee of the Stores/ Materials, so supplied/ procured, and these shall not, on any account, be removed from the site of work and shall be, all times, open to inspection by the Engineer-in Charge. Any such material, unused and in perfectly good condition at the time of completion or determination or rescinding of the contract, shall be returned to the Divisional officer's Stores, if, by a notice in writing under his hand, he shall so require, and if on service of such notice, the contractor fails to return the materials, so required, he shall be liable to pay the price of such materials in accordance with provision of clause 10 B *ibid*. But the contractor shall not be entitled to return any such materials, unless with such consent, and shall have no claim for compensation on account of any such materials, so supplied to him as aforesaid being unused by him, or for any wastage in or damage to any such materials. For the stores returned by the contractor, he shall be paid for, at the price originally charged excluding storage charges, in case of materials supplied from departmental stores and actual cost including freight, cartage, GST, taxes etc., paid by the Contractor, in case of supplies received with the assistance of Government, which, however, should in no case exceed market rate prevailing at the time the materials are taken back. The decision of the Engineer-in-charge, as to the price of the stores returned, keeping in view its condition etc., shall be final and conclusive. In the event of breach of the aforesaid condition, the Contractor shall, in addition to throwing himself open to account for contravention of the terms of the license or permit and/or for criminal breach of trust, pay to the Government, all advantages or profits resulting, or which in the usual course, would result to him by reason of such breach. Provided that the Contractor shall, in no case be entitled to any compensation or damage on account of any delay in supply, or non-supply thereof, all or any such materials and stores.

Clause 10A: Rejection of materials procured by the Contractor

The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion, are not in accordance with the specifications and, in case of default, the Engineer-in-Charge shall be at liberty to employ other person(s) to remove the same without being answerable or accountable for any loss of damage, that may happen or arise to such materials to be substituted thereof, and in case of default, Engineer-in-Charge may cause the same to be supplied and all costs, which may attend such removal and substitution, are to be borne by the Contractor.

Clause 10B: Penal rate in case of excess consumption

The Contractor shall also be charged for the materials consumed in excess of the requirements calculated on the basis of standard consumption approved by the department, at double of the issue rate including storage and supervision charges or market rate, whichever is higher. A Material Supply and Consumption Statement, in prescribed Form RPWA 35A shall be submitted with every Running Account Bill, distinguishing material supplied by the Government and material procured by the Contractor himself. The recovery for such material shall be made from Running Account Bill next after the consumption and shall not be deferred. Certificate of such nature shall be given in each Running Account Bill.

Clause 10 C: Hire of Plant and Machinery

Special Plant and Machinery, required for execution of the work, may be issued to the Contractor, if available, on the rates of hire charges and other terms and conditions as per departmental Rules, as per Schedule annexed to these conditions. Rates of such Plant & Machinery shall be got revised periodically so as to bring them at par with market rate.

Clause 11: Works to be executed in accordance with specifications, Drawings, Orders etc.

The Contractor shall execute the whole and every part of the work in the most substantial and satisfactory manner and both as regards materials and otherwise in every respect, in strict accordance with the Specifications. The Contractor shall also conform exactly fully and faithfully to the designs, drawings (either designed by department or designed by contractor and approved by Engineer-in-charge during additional execution) and instructions in writing relating to the work signed by the Engineer-in-charge and lodged in his office and to which the Contractor shall be entitled to have access at such office or on the site of the work for the purpose of inspection during office hours and the Contractor shall, if he so require, be entitled, at his own expense, to make or cause to be made copies of specifications and of all such designs, drawings and instructions, as aforesaid. A certificate of executing works as per approved design, specifications etc. shall be given on each Running Account Bill.

The specifications of work, material, methodology of execution, drawings and designs shall be signed by the Contractor and Engineer-in-charge while executing agreement and shall form part of agreement.

Clause 12:

The Engineer-in-charge shall have power to make any alterations, omissions or additions to or substitutions for the original specifications, drawings, designs and instructions, that may appear to him to be necessary during the progress of the work and the contractor shall carry out the work in accordance with any instructions which may be given to him in writing signed by the Engineer-in-charge and such alterations, omission, additions or substitutions shall not invalidate the contract and any altered, additional or substituted work, which the contractor may be directed to do in the manner above specified as part of the work, shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work. The time for the completion of the work shall be extended in the proportion that the altered,

additional or substituted work bears to the original contract work, and the certificate of the Engineer-in-charge shall be conclusive as to such proportion. The rates for such additional, altered or substituted work under this clause shall be worked out in accordance with the following provisions in their respective order:

If the rates for the additional, altered or substituted work are specified in the contract for the work, the contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the contract for the work.

If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the such rates will be derived from the rates for a similar class of work as are specified in the contract for the work.

If the rates for the altered, additional or substituted work cannot be determined in the manner specified in the sub-clauses (i) to (ii) above, then the rates for such composite work item shall be worked out on the basis of the concerned Schedule of Rates of the District/area specified above minus/plus the percentage which the total tendered amount bears to the estimated cost of the entire work put to tender. Provided always that if the rate for a particular part or parts of the item is not in the Schedule of Rates, the rate for such part or parts will be determined by the Engineer-in-Charge on the basis of the prevailing market rates when the work was done.

If the rates for the altered, additional or substituted work item cannot be determined in the manner specified in sub-clauses (i) to (iii) above, then the contractor shall within 7 days of the date of receipt of order to carry out the work, inform the Engineer- in – Charge of the rate which it is his intention to charge for such class of work supported by analysis of the rate or rates claimed and the Engineer-in-Charge shall determine the rate or rates on the basis of prevailing market rates, and pay the contractor accordingly. However, the Engineer-in-Charge, by notice in writing, will be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner, as he may consider advisable. But under no circumstances, the contractor shall suspend the work on the plea of non-settlement of rates on items falling under the clause.

Except in case of items relating to foundations, provisions contained in sub- clauses(i) to (iv) above shall not apply to contract or substituted items as individually exceed the percentage set out in the tender documents under clause 12.A.

For the purpose of operation of clause 12 (v) the following works shall be treated as work relating to foundations: -

For buildings, compound wall plinth level or 1.2 meters (4 ft.) above ground level whichever is lower, excluding items above flooring and D.P.C. but including base concrete below the floors.

For abutments, piers, retaining wall of culverts and bridges, walls of water reservoir and the bed of floor level.

For retaining walls, where floor levels is not determinate 1.2 meters above the average ground level or bed level.

For roads, all items of excavation and filling including treatment of sub base and soling work.

For water supply lines, sewer lines underground storm water drains and similar work, all items of work below ground level except items of pipe work for proper masonry work.

For open storm water drains, all items of work except lining of drains.

Any other items of similar nature which Engineer-in-Charge may decide relating to foundation.

The rate of any such work, except the items relating to foundations, which is in excess of the deviation limit shall be determined in accordance with the provisions contained in Clause 12.A.

Clause 12A:

The quantum of additional work for each item shall not exceed 50% of the original quantity given in the agreement and the total value of additional work shall not exceed 20% of the total contract value, unless otherwise mutually agreed by the Engineer-in-charge and the Contractor. This limit shall not be applicable on items relating to foundation work which shall be executed as per original rates or provision of clause 12 (i) to (iv).

In case of contract substituted items or additional items, which results in exceeding the deviation limit laid down in this clause except items relating to foundation work, which the contractor is required to do under clause 12 above, the contractor shall within 7 days from the receipt of order, claim revision of the rate supported by proper analysis in respect of such items for quantities in excess of the deviation limit notwithstanding the fact that the rates for such items exist in the tender for the main work or can be derived in accordance with the provision of sub clause (ii) of clause 12 and the Engineer-in-Charge, may revise their rates having regard to the prevailing market rates and the contractor shall be paid in accordance with the rates so fixed. The Engineer- in-Charge shall, however, be at liberty to cancel his order to carry out such increased quantities of work by giving notice in writing to the contractor and arrange to carry it out in such manner as he may consider advisable. But under no circumstances, the contractor shall suspend the work on the plea of non-settlement of rates of items failing under this Clause.

All the provisions of the preceding paragraph shall equally apply to the decrease in rates of items for quantities in excess of the deviation limit notwithstanding the fact that the rates for such items exist in the tender for the main work or can be derived in accordance with the provisions of sub-clause(ii) of the preceding clause 12 and the Engineer-in-Charge may revise such rates having regard to the prevailing market rates unless otherwise mutually agreed by the Engineer-in-Charge and the Contractor.

Clause 13: No compensation for alteration in or restriction of work to be carried out.

If, at any time after the commencement of the work the Government shall, for any reason, whatsoever, not require the whole work, thereof, as specified in the tender, to be carried out, the Engineer-in-charge shall give notice, in writing, of the fact to the Contractor, who shall have no claim to any payments 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 the work not having been carried out. Neither, shall he have any claim for compensation by reason of alterations having been made in the original specifications, drawings, and design, and instructions, which shall involve any curtailment of the work, as originally contemplated. Provided, that the Contractor shall be paid the charges for the cartage only, of materials actually brought to the site of the work by him for Bonafede use and rendered surplus as a result of the abandonment or curtailment of the work or any portion thereof, and taken them back by the Contractor, provided however, that the Engineer-in-charge shall have, in all such cases, the option of taking over all or any such materials at their purchase price or at local market rates whichever may be less. In the case of such stores, having been issued from Government Stores, charges recovered, including storage charges, shall be refunded after taking into consideration any deduction for claim on account of any deterioration or damage while in the custody of the contractor, and in this respect the decision of the Engineer-in-charge shall be final.

Clause 14: Action and compensation payable in case of bad work

If, it shall appear to the Chief Engineer or any authorized authority or the Engineer-in- charge or his subordinates in-charge of the work, or to the committee of the retired officers/officers appointed by the State Government for the purpose that any work has been executed with unsound, imperfect or unskillful workmanship, or with material of any inferior description, or

that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted, or otherwise not in accordance with contract, the Contractor shall on demand in writing from the Engineer-in-charge, specifying the work/materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, will rectify or remove and reconstruct the work, so specified, in whole or in part, as the case may be, remove the materials or articles, so specified, and provide other proper and suitable materials or articles at his own cost, and in the event of his failing to do so, within a period to be specified by the Engineer-in- Charge in his demand as aforesaid, then the Contractor shall be liable to pay compensation at the rate of one percent, on the tendered amount of work for every week not exceeding ten percent, while his failure to do so shall continue, and in the case of any such failure, the Engineer-in-Charge 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 the risk and expense, in all respects of the contractor.

Clause 15: Work to be open to inspection: Contractor or his responsible Agent to be present

All work, under or in course of execution or executed in pursuance of the contract shall, at all times, be opened to inspection and supervision of the Engineer-in-charge and his superior officers e.g. Superintending Engineer, Additional Chief Engineer, Chief Technical Engineer, Chief Engineer, and his subordinates and any other authorized agency of the Government and the contractor shall, at all times during the usual working hours, and at all other times at which reasonable notice of the intention of the Engineer-in-charge or his subordinate and any other authorized agency of Government or committee of retired officers/officers appointed by the State Government for the purpose to visit the works shall have been given to the Contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for the purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the Contractor himself.

Clause 16: Notice to be given before any work is covered up

The Contractor shall give not less than 7 days' notice, in writing, to the Engineer-in- charge or his subordinate-in-Charge of the work, before covering up or otherwise placing beyond the reach of measurement, any work in order that the same may be measured, and correct dimensions thereof, be taken before the same is so covered up or placed beyond the reach of measurement and shall not cover up or place beyond the reach of measurement any work without the consent in writing of the Engineer-in- Charge of the work, and if, any work shall be covered up or placed beyond the reach of measurement without such notice having been given or consent obtained, the same shall be uncovered at the Contractor's expense or in default, thereof, no payment or allowance shall be made for such work, or for the materials with which the same was executed.

Clause 17: Contractor liable for damage done and for imperfections

If the Contractor or his work people or servants shall break, deface, injure or destroy any part of a building, in which they may be working or any building, road, fence, enclosure, or cultivated ground contiguous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work, while in progress, from any cause, whatsoever, or any imperfections become apparent in it, within a period specified in clause 37, after a certificate, final or otherwise of its completion, shall have been given by the Engineer-in-charge, may cause the same to be made good by other workmen and deduct the expense (of which the certificate of the Engineer-in-charge shall be final) from any sums that may be then, or at any time thereafter, may become due to the Contractor, or from his security deposit, or the proceeds of sale thereof, or of a sufficient portion thereof.

Clause 18: Contractor to supply plant, ladders, scaffolding etc.

The Contractor shall arrange and supply, at his own cost, all material (except such special materials, if any, as may, in accordance with the contract, be supplied from the Engineer-in-charge's stores), plants, tools, appliances, implements, ladders, cordage, tackle, scaffolding and temporary works requisite or proper for the proper 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 in these conditions, or not, or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer in- Charge, as to any matter as to which, under these conditions, he is entitled to be satisfied or which he is entitled to require, together with carriage thereof, to and from the work. The Contractor shall also arrange and supply, without charge, the requisite number of persons with the means and materials, necessary for the purpose of setting out work and counting, weighting and assisting in the measurement or examination at any time and from time to time of the work, or materials. Failing his so doing, the same may be provided by the Engineer- in-charge, at the expense of the Contractor, and the expenses may be deducted from any money due to the Contractor under the Contract, or from his Security Deposit or the proceeds of sale thereof, or a sufficient portion thereof. The Contractor shall also provide all necessary fencing and lights required to protect the public from accident and shall be bound to bear the expenses of defense of every suit, action or other proceeding at law, that may be brought by any person for injury sustained owing to neglect of the above precautions, and to pay any damages and costs which may be awarded in any such suit, action proceeding to any such person or which may, with the consent of the Contractor, be paid to compromise any claim by any such person.

Clause 19: Work not to be sub-let, Contract may be rescinded and Security

Deposit and Performance Forfeited for sub-letting, bribing or if Contractor becomes insolvent.

The Contractor shall not be assigned or sublet without the written approval of the Chief Engineer, and if the contractor shall assign or sublet his contract or attempt so to do, or become insolvent, or commence any insolvency proceedings or make any composition with his creditors, or attempt so to do, or if any bribe, gratuity, gift, loan, requisite reward or advantage, pecuniary or otherwise, shall either directly or indirectly, be given, promised or offered by the Contractor or any of his servants or agents to any public officer or person, in the employ of Government, in any way, relating to his office or employment, or if, any such officer or person shall become, in any way, directly or indirectly, interested in the contract, the Chief Engineer may, thereupon, by notice, in writing, rescind the contract and Security Deposit of the Contractor shall, thereupon, stand forfeited and be absolutely at the disposal of Government and the same consequences shall ensure as, if the contract had been rescinded under Clause 3 hereof, and in addition the Contractor shall not be entitled to recover or be paid for any work therefore, actually performed under the Contract.

Clause 20: Sums payable by way of compensation to be considered as reasonable compensation without reference to actual loss

All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

Clause 21: Changes in constitution of firm

Where the Contractor is a partnership firm, the previous approval, in writing, of the Engineer-in-charge shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or a Hindu undivided family business concern, such approval, as aforesaid, shall likewise be obtained before the Contractor enters into any partnership agreement thereunder the partnership firm would have the right to carry out the work thereby undertaken by the Contractor. If, previous approval, as aforesaid, is not obtained, the Contract shall be deemed to have been assigned in contravention of Clause 19 hereof, and the same

action may be taken, and the same consequences shall ensure, as provided in the said clause 19.

Clause 22: Work to be under direction of Engineer-in-charge

All the works, to be executed under the contract, shall be executed under the direction and subject to the approval, in all respect, of the Engineer-in-charge of the Government of Rajasthan for the time being, who shall be entitled to direct, at what point or points, and in what manner, they are to be commenced, and from time to time, carried on.

Clause 23: Standing Committee for Settlement of Disputes

If any question, difference or objection, whatsoever shall arise in any way, in connection with or arising out of this instrument, or the meaning of operation of any part thereof, or the rights, duties or liabilities of either party then, save in so far, as the decision of any such matter, as herein before provided for, and been so decided, every such matter constituting a total claim of Rs. 50,000/- or above, whether its decision has been otherwise provided for and whether it has been finally decided accordingly, or whether the Contract should be terminated or has been rightly terminated, and as regards the rights or obligations of the parties, as the result of such termination, shall be referred for decision to the empowered Standing Committee, which would consist of the followings:-

Secretary, LSG, GoR.

Finance Secretary or his nominee, not below the rank of Deputy Secretary.

Law Secretary or his nominee, not below the rank of Joint Legal Remembrancer.

Commissioner Nagar Nigam Jaipur.

Chief Engineer Nagar Nigam Jaipur.

The Engineer-in-charge, on receipt of application along with non-refundable prescribed fee, (the fee would be two percent of the amount in dispute, not exceeding Rs. one Lac) from the Contractor, shall refer the disputes to the committee, within a period of three month from the date of receipt of application. Procedure and Application for referring cases for settlement by the Standing Committee shall be, as given in Form RPWA 90.

Clause 23A: Contractor to indemnify for infringement of Patent or design

Contractor shall fully indemnify the Governor of Rajasthan against any action, claim or proceeding, relating to infringement or use of any patent or design, or any alleged patent or design, rights, and shall pay any royalties, which may be payable in respect of any article or part thereof, included in the contract, in the event of any claims made under or action brought against Government. In respect of any such matters, as aforesaid, the Contractor shall be, immediately, noticed thereof, and the Contractor shall be at liberty, at his own expense, to settle any dispute or to conduct any litigation, that may arise there from provided that the Contractor shall not be liable to indemnify the Governor of Rajasthan, if the infringement of the patent or design or any alleged patent or design, right is the direct result of an order passed by the Engineer-in-Charge in this behalf.

Clause 24: Imported Store articles to be obtained from Government

The contractor shall obtain from the stores of the Engineer-in-charge, all imported store articles which may be required for the work or any part thereof, or in making up articles required thereof, or in connection therewith, unless he has obtained permission, in writing, from the Engineer-in-charge, to obtain such stores and articles from else-where. The value of such stores and articles, as may be supplied to the Contractor by the Engineer-in-charge, will be debited to the Contractor, in his account, at the rates shown in the schedule attached to the contract, and if they are not entered in the schedule, they will be debited at cost price, which for the purposes

of this contract, shall include the cost of carriage and all other expenses, whatsoever, which shall have been incurred in obtaining delivery of the same at the stores aforesaid plus storage charges.

Clause 25: Lump-sums in estimates

When the estimate, on which a tender is made includes lump sums, in respect of parts of the work, the Contractor shall be entitled to payment in respect of the item of work involved, or the part of the work in question at the same rates, as are payable under the contract for such items or if the part of the work in question is not, in the opinion of the Engineer-in-charge, capable of measurement, the Engineer-in-charge may at his discretion pay the lump sum amount entered in the estimate and the certificate in writing of the Engineer-in-charge shall be final and conclusive with regard to any sum or sums payable to him under the provisions of this clause.

Clause 26: Action where no Specification

In case of any Class of work for which there is no such specification as is mentioned in the contract document referred in ITB Clause 4.1, such work shall be carried out in accordance with the detailed specification of the department and also in accordance with the instructions and requirement of the Engineer-in-charge.

Clause 27: Definition of work

The expression “works” or “work” where used in these conditions, shall, unless there be something either in subject or context, repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed, whether temporary or permanent, and whether original, altered, substituted or additional.

Clause 27A: Definition of Engineer-in-charge

The term “Engineer-in-charge” means the Divisional officer who shall supervise and be in-charge of the work and who shall sign the contract on behalf of the Governor.

Clause 28:

It cannot be guaranteed that the work will be started immediately after the tenders have been received. No claims for increase of rate will be entertained, if the orders for starting work are delayed.

Clause 29: Payments at reduced rates on account of items of work not accepted and not completed to be at the discretion of the Engineer-in-charge

The rates for several items of works, estimated to cost more than Rs. 1,000/-, agreed within, will be valid only when the item concerned is accepted as having been completed fully in accordance with the sanctioned specifications. In cases, where the items of work are not accepted, as so completed, the Engineer-in-charge may make payment on account of such items, at such reduced rates, as he may considers reasonable, in the preparation of final or on account bills, and his decision in the matter shall be final and binding.

Clause 29A: Payments at part rates

The rates for several items of works may be paid at part rates provisionally in running bills in proportion to the quantum of items executed at the discretion of Engineer-in-charge. In case of item rates, if the rate quoted for certain items are very high in comparison to the average/overall tendered premium, then the payment at running stages shall not be made more than the average sanctioned premium. The deferred payment, will however be released after successful completion of the work.

Clause 30: Contractors Percentage:

The percentage referred to in the “Tender for works” will be deducted/ added from/ to the gross amount of the bill before deducting the value of any stock issued.

Clause 31: Contractor to adhere to labour laws/regulation

The Contractor shall adhere to the requirements of the Workmen's Compensation Act and Labour Legislation in force from time to time and be responsible for and shall pay any compensation to his workmen which would be payable for injuries under the Workmen's Compensation Act, here-in-after called the said Act. If such compensation is paid by the State as Principal employer under Sub Section (1) of section 12 of the said Act, on behalf of the Contractor, it shall be recoverable by the State from the Contractor under Sub Section (2) of the said section. Such compensation shall be recovered in the manner laid down in clause 1 of the Conditions of Contract.

Note: All contracts with Government shall require registration of workers under the building & other Construction Workers (Regulation of Employment & Conditions of Services) Act, 1996 and extension of benefit to such workers under the Act. Deduction of cess at source will be made as per provisions of the said Act, in force from time to time.

Clause 32: Withdrawal of work from the Contractor

If the Engineer-in-charge shall at any time and for any reasons, whatever, including inability to maintain prorate progress, think any portion of the work should not be executed or should be withdrawn from the Contractor, he may, by notice in writing to that effect, require the Contractor not to execute the portion of the work specified in the notice, or may withdraw from the Contractor the portion of work, so specified, and the Contractor shall not be entitled to any compensation, by reason of such portion of work having been withdrawn from him. The Engineer-in-charge may supplement the work by engaging another agency to execute such portion of the work at the cost of the original contractor, without prejudice to his rights under clause 2. He shall also be competent to levy compensation for delay in progress. The recovery of excess cost shall be made from next available running bill or any other claim and shall not be deferred.

Clause 33:

The Contract includes clearance, leveling and dressing of the site within a distance of 15 meters of the building on all sides except where the building adjoins another building.

Clause 34: Protect works

The Contractor shall arrange to protect, at his own cost, in an adequate manner, all cut stone work and other work, requiring protection and to maintain such protection, as long as work is in progress. He shall remove and replace this protection, as required by the Engineer-in-Charge, from time to time. Any damage to the work, so protected, no matter how it may be caused, shall be made good by the Contractor free of cost. All templates, forms, moulds, centering, false works and models, which in the opinion of the Engineer-in-Charge, are necessary for the proper and workman like execution of the work, shall be provided by the Contractor free of cost.

Clause 35: Contractor liable for settlement of claims caused by his delays

If the progress of the work has fallen so much in arrears as to prevent other contractors on the work, from carrying out their part of the work within the stipulated time, he will be liable for the settlement of any claim, put in by any of these contractors for the expenses of keeping their labour unemployed, to the extent considered reasonable by the Engineer-in-Charge.

Clause 36A:

The liability, if any, on account of quarry fees, royalties, Octroi and any other taxes, cess and duties in respect of materials actually consumed on public work, shall be borne by the Contractor.

Clause 36B:

The cost of all water connections, necessary for the execution of work, and the cost of water consumed and hire charges of meters and the cost of electricity consumed in connection with the execution of work, shall be paid by the Contractor, except where otherwise specifically indicated.

Clause 36C: Payment of Sales Tax, and any other Taxes

Royalty or other tax on materials, issued in the process of fulfilling contract, payable to the Government under rules in force, will be paid by the Contractor himself.

Clause 36D:

In respect of goods and materials procured by the Contractor, for use in works under the contract, sales tax will be paid by the Contractor himself. But in respect of all such goods manufactured and supplied by the Contractor and works executed under the contract, the responsibility of payment of sales tax would be that of the Engineer-in-charge.

Clause 37: Refund of Security Deposit

The Security Deposit will be refunded after the expiry of the period, as prescribed below: -

In case of contracts relating to hiring of trucks and other T&P, transportation including loading, unloading of materials, the amount of Security Deposit is refundable along with the final bill.

Supplies of material: As per provisions of G.F.& A.R.

Ordinary repairs: 3 months after completion of the work provided the final bill has been paid.

Original works/special repair works: Security Deposit will be refunded six months after completion, or expiry of one full rainy season, or after expiry of defect liability period as defined in the special condition of agreement, whichever is later provided the final bill has been paid.

In case of PWD original works/special repairs works costing more than Rs. 10.00 Lacs, partial amount of Security Deposit will be refunded during the defect liability period @ 10% of SD amount after lapse of one year of completion and thereafter 10% of original amount of SD at the end of each subsequent year. The remaining amount of SD be refunded after the expiry of Defect Liability period.

Clause 38: Fair Wage Clause

The Contractor shall pay not less than fair wages/minimum wages to labourers engaged by him on the work as revised from time to time by the Government, but the Government shall not be liable to pay anything extra for it except as stipulated in price escalation clause (clause 45) of the agreement.

Explanation: "Fair Wage" means minimum wages for time or piece work, fixed or revised, by the State Government under Minimum Wages Act, 1948.

The Contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wages to labourers indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work as if the labourers have been immediately or directly employed by him.

In respect of all labourers immediately or directly employed on the work, for the purpose of the Contractor's part of this agreement, the Contractor shall comply with or cause to be complied with the Public Works Department Contract's Labour Regulations made, or that may be made by the Government, from time to time, in regard to payment of wages, wages period, deductions from wages, recovery of wages not paid, and unauthorized deductions, maintenance of wages register, wage card, publication or scale of wages and other terms of employment, inspection and submission of periodical returns and other matters of a like nature.

The Engineer-in-charge shall have right to deduct from the money due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers, by reasons of non-fulfillment of the conditions of the contract, for the benefit of the worker or workers, non- payment of wages or of deductions made therefrom, which are not justified by the terms of the contract, or as a result of non-observance of the aforesaid regulations.

Vis-a-Vis the Government of Rajasthan, the Contractor shall be primarily liable for all payments to be made and for the observance of the regulations aforesaid, without prejudice to his right to claim indemnity from his sub- contractors.

The regulations, aforesaid, shall be deemed to be part of this contract and any breach, thereof, shall be deemed to be breach of the Contract.

Clause 39: Contractor to engage technical staff

The Contractor shall engage the technical staff, as follows, on the contract works:

For works costing Rs. 100 Lac and above – One Graduate Engineer

For works costing between Rs. 50 Lac to Rs. 100 Lac - One qualified diploma holder having experience of not less than 3 years.

For works costing between Rs. 15 Lac and Rs. 50 Lac - One qualified diploma holder

The technical staff should be available at site, whenever required by Engineer-in- charge to take instructions.

Clause 39 A:

The Contractor shall comply with the provisions of the Apprenticeship Act, 1961, and the Rules and Orders issued, thereunder, from time to time. If he fails to do so, his failure will be a breach of contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions of the said Act.

Clause 40: Safety code

The Contractor shall follow the safety code (s) of the department and as specified in special conditions of contract.

Clause 41: Near Relatives barred from tendering

The Contractor shall not be permitted to tender for works in Circle, in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of the Superintending Engineer and Assistant Engineer (both inclusive). He shall also intimate the names of persons, who are working with him in any capacity, or are subsequently employed by him and who are near relatives to any gazetted officer in the Organization/Department. Any breach of this condition by the Contractor would render him liable to be removed from the approved list of contractors of the Department. If such facts is noticed (a) before sanction of tender, his offer shall be declared invalid and earnest money shall be forfeited, (b) after sanction of the tender then the tender sanctioning authority may at his discretion forfeit his earnest

money, security deposit and enlistment deposit and work/remaining work may allot to any registered contractor on the same rates as per rules.

Note: By the term "near relative" is meant wife, husband, parents, and grand-parents, children and grandchildren, brothers and sisters, uncles and cousins and their corresponding in-laws.

Clause 42: Retired Gazetted Officers barred for 2 years

No Engineer of Gazetted rank or other Gazetted officer, employed in Engineering or Administrative duties in an Engineering Department of the Government of Rajasthan, is allowed to work as a Contractor for a period of 2 years of his retirement from Government service without the previous permission of Government of Rajasthan. This contract is liable to be cancelled, if either the Contractor or any of his employee is found, at any time, to be such a person, who had not obtained the permission of Government, as aforesaid, before submission of the tender or engagement in the contractor's service, as the case may be.

Clause 43: Quality Control

The Government shall have right to exercise proper Quality Control measures. The Contractor shall provide all assistance to conduct such tests.

Clause 43 A:

The work (whether fully constructed or not) and all materials, machines, tools and plant, scaffolding, temporary buildings and other things connected therewith, shall be at the risk of the contractor until the work has been delivered to the Engineer-in-charge, and a certificate from him, to the effect, obtained.

Clause 44: Death of Contractor

Without prejudice to any of the rights or remedies under the contract, if the Contractor dies, the legal heirs of the Contractor or the Chief Engineer or duly authorized Engineer shall have the option of terminating the contract without any compensation.

Clause 45: Price Variation Clause: Deleted

No Price variation will be paid in this EPC contract.

Clause 46: Force-Majeure

Neither party shall be liable to each other, for any loss or damage, occasioned by or arising out of acts of God such as unprecedented floods, volcanic eruptions, earthquake, epidemic or other invasion of nature and other acts.

Clause 47: General Discrepancies and Errors

In case of percentage rate tenders, if there is any typographical or clerical error in the rates shown by Department in the "G" Schedule, the rates as given in the Basic Schedule of Rates of the Department for the area shall be taken as correct.

Clause 48: Post payment Audit & Technical Examination

The Government shall have right to cause an audit and technical examination of the works, and the final bills of the contractor, including all supporting vouchers, abstracts, etc., to be made within 2 years after payment of the final bill, and if, as a result of such audit and technical examination, any sum is found to have been over paid in respect of any work done by the Contractor under the contract, or any work claimed by him to have been done by him under the Contract and found not to have been executed or executed below specifications, the Contractor shall be liable to refund the amount of over payment, and it shall be lawful for Department to recover the same from him in the manner prescribed in Clause 50 or in any other manner legally permissible, and if it is found that the Contractor was paid less than what was due to him under

the contract in respect of any work executed by him under it, the amount of such under-payment shall be duly paid by the Government to the Contractor.

Clause 48A: Pre-Check or Post Check of Bills

The Government shall have right to provide a system of pre-check of Contractor's bill by a specified Organization, and payment by an Engineer or an Accounts Officer/sr. Accounts Officer/ chief Accounts Officer/ financial Advisor, as the Government may in its absolute discretion prescribe. Any over-payments excess payments detected, as a result of such pre-check or post-check of Contractor's bills, can be recovered from the Contractor's bills, in the manner, herein before provided, and the Contractor will refund such over/excess payments.

Clause 48B: Check Measurements

The department reserves to itself, the right to prescribe a scale of check measurement of work, in general, or specific scale for specific works, or by other special orders (about which the decision of the department shall be final). Checking of measurement by superior officer shall supersede measurements by the subordinate officer, and the former will become the basis of the payment. Any over/excess payments detected, as a result of such check measurement or otherwise at any stage up to the date of completion and the defect removal period specified elsewhere in this contract, shall be recoverable from the Contractor, as any other dues payable to the Government.

Clause 49: Dismantled materials

The Contractor, in course of the work, should understand that all materials e.g. stone, bricks, steel and other materials obtainable in the work by dismantling etc. will be considered as the property of the Government and will be disposed off to the best advantage of the Government, as per directions, of the Engineer-in-charge.

Clause 50: Recovery from Contractors

Whenever any claim against the Contractor for the payment of a sum of money arises out of or under the contract, the Department shall be entitled to recover such sum by appropriating, in part or whole of the Security Deposit, Security Deposit at the time of enlistment of the Contractor. In the event of the security being insufficient, or if no security has been taken, then the balance or the total sum recoverable, as the case may be, shall be deducted from any sum, then due or which at any time, thereafter, may become due to the Contractor, under this or any other contract with the Governor of Rajasthan. Should this sum be not sufficient to cover the full amount recoverable, the Contractor shall pay to the Department on demand the balance remaining dues.

The department shall, further, have the right to effect such recoveries under Public Demand Recovery Act.

Clause 51: Jurisdiction of Court

In the event of any dispute arising between the parties hereto, in respect of any of the matters comprised in this agreement, the same shall be settled by a competent Court having jurisdiction over the place, where agreement is executed and by no other court, after completion of proceedings under Clause 23 of this Contract.

Schedule of Materials to be supplied by the Department, if available (Referred to in clause 10)

S.No.	Particulars	Quantity, meters	Rates		Place of Delivery
			Unit	Rupees	
1.	NIL	NIL	NIL	NIL	NIL

2.					
3.					

Schedule of Machinery/T&P to be supplied by the Department

The following Machinery/T&P shall be supplied by the Department, if available, to the Contractor, on hire as per “Rules of the Department for supply for machinery and T&P to the Contractor on hire”

(Referred in Clause 10 C)

S.No.	Item	Rate	Place of Delivery and Return
	NIL	NIL	NIL

Progress Statement referred to in Clause 2 of Conditions of Contract

Name of Work	Date from which the work should be commenced	Date by which the work should be completed	Monthly rate of Progress
1	2	3	4

The contractor has been informed that his tender has been accepted

Dated Signature of Engineer- in -charge

Dated signature of Contractor

Notes: - For Filling in the Progress Statement Form

Columns 2,3, and 4 must be initialed and dated by the Contractor

Column 4 must be initialed and dated by the Chief Engineer or other duly authorised Engineer also.

The date in column 2 should correspond to the date on which the order to commence work is given to the contractor read with Clause 2 of the conditions of contract.

The date in column 3 must correspond to the period stated in Sub clause(e) of the Memorandum below “Tender for works”.

Column 4. This will ordinarily be worked out proportionately; thus if Rs. 24,000/- is the cost of the whole or portion of work tendered for, and six months period of completion, then the monthly rate of progress should be Rs. 4,000. If necessary, quantities may also be specified in this column at the discretion of the Chief Engineer.

The Certificate as to intimation of acceptance of tender printed at the foot of the form, must be signed and dated both by the Chief Engineer or other duly authorised Engineer and the Contractor. Annexure to Appendix XI

RAJASTHAN PUBLIC WORKS DEPARTMENT CONTRACTORS LABOUR REGULATIONS

Short Title: These regulations may be called "The Rajasthan public Works Department Contractors-

Labour Regulations"

Definition : In these regulations unless otherwise expressed or indicated, the following words and expressions shall have the meaning hereby assigned to them respectively, that is to say :-

"Labour" means workers employed by a Rajasthan P.W. Department contractors directly or indirectly through a sub contractor or other person by an agent on his behalf

"Fair Wage" means minimum wages for time or piece work fixed or revised by the state Government under the minimum wages Act 1948

"Contractor" shall include every person whether sub-Contractor or headman or Agent employing labour on the work taken on Contract.

"Wages" shall have the same meaning as defined in the payment of Wages Act and includes time and price rate wages.

Display of Notice regarding wages etc. : The contractor shall (a) before he commences his work on contract, display and inconspicuous places on the work notices in English and the correctly maintain in Hindi by the majority of the workers giving the rate of wages which have been certified by the Executive Engineer, Superintending Engineer, the Chief Engineer or Labour Commissioner, as fair wages and the hours of works for which such wages are earned, and (b) send a copy of such notices to the Certifying Officers.

Payment of Wages :

Wages due to every worker shall be paid to him direct.

All wages shall be paid in current coin or currency or in both

Fixation of wage periods :

The contractor shall fix the wage periods in respect of which the wages shall be payable

No wage period shall exceed one month

Wages of every workman employed on the contract shall be paid before the expiry of ten days the last day of the wage period in respect of which the wages are payable.

When the employment of any worker is terminated by or on behalf of the contractor, the wages earned by him shall be paid before the expiry of the day succeeding the one on which his employment is terminated.

All payments of the wages shall be made on a working day except when the work is completed before the expiry of the wage period, in which case, final payments shall be made within 48 hours of the last working day

Note: The term "working day" means a day on which the labour is employed in progress.

Wage Book and Wage Slips etc.

The Contractor shall maintain a Wage Book of each worker in such form as may be convenient but the same shall include the following particulars :-

Rate of daily or monthly wages.

Nature of work on which employed

Total number of days during wage period

Total amount payable for the work during each wage period

All deductions made from the wages with an indication in each case of the ground for which the deduction is made

Wages actually paid for each wage period

The contractor shall also main in a wage slip for each worker employed on the work

The Executive Engineer may grant an exemption from the maintenance of the wage books and wages slips to a contractor who, in his opinion, may not directly or indirectly employ more than 50 persons on the work.

Fines and deductions which may be made from wages:

(i) The wages of a worker shall be paid to him without any deductions of any kind except those authorized, namely the following

Fines.

Deductions for absence from duty i.e. from the place or places where, by the terms of his employment, he is required to work. The amount of deduction shall be in proportion to the period for which he was absent

(c) Deductions for damages to or loss of goods expressly entrusted to the employed person for custody or for loss or any other deductions of money, which he is required to account where such damages or losses are directly attributable to his neglect or default.

(i-a) The Rajasthan Government may, from time to time, allow deductions other than those specified in clause I above.

No fines shall be imposed on a worker and no deductions for damage or loss shall be made until worker has been given an opportunity of showing cause against each fine or deductions.

The total amount of fines, which may be imposed in any one wage period on a worker, shall not exceed an amount equal to three paise in rupee of the wage payable to him in respect of that wage period.

No fine imposed on any worker shall be recovered from him by installments or after the expiry of 60 days from the date on which it was imposed.

Register of fines etc.: The contractor shall maintain a register of fines and of all deductions for damage or loss. Such register shall mention the reasons for which fine was imposed or deduction for damage or loss was made.

The contractor shall maintain both in English and local Indian Language, a list approved by the» Labour, Commissioner clearly stating the acts and omission for which penalty of fine may be imposed on a workman and display it in a good condition in conspicuous place on the work.

Preservation of Register: The wage registers the wage card and the register fines deduction; required to be maintained under these regulations, shall be preserved for 6 months after the date of the first entry made in them.

Powers of Labour Welfare Officer to make investigation of enquiry: The Labour Welfare Officer or any other person, authorized by the State Government on their behalf, shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clauses and provisions of the regulations. He shall investigate into any complaint regarding default made by the Contractor or Sub-Contractor in regard to such provisions

Report of Labour Welfare Officer: The Labour Welfare Officer or other person, authorized as aforesaid, shall submit report of the result of his investigation or enquiry to the Executive Engineer concerned indicating the extent, if any. to which the default has been committed with a note that necessary deductions from the contractors bill be made and the wage and other dues be- paid to the labour concerned in case an appeal is made by contractor under clause 12 of

these regulations, actual payment to Labors will be made by the Executive Engineer after the Labour Commissioner had given decision on such appeal.

Appeal against the decision of Labour Welfare Officers : Any person aggrieved by the decision and recommendation of the Labour Welfare Officer or other persons, so authorized, may appeal against Such decision to the Labour Commissioner within 30 days from the date of decision forwarding simultaneously a copy of his appeal to Executive Engineer concerned but subject to such appeal the decision of the Officer shall be final and binding upon the contractor

12-A.No party shall be allowed to be represented by a lawyer during any investigation, enquiry, appeal or any other proceedings

Inspection of Wage Books and Slips : The contractor shall allow inspection of the wage books and wage slips and register of fines and deductions to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Welfare Officer or any other person authorized by the State Government on his behalf

Submission of Returns : The Contractor shall submit periodical returns, as may be specified from time to time

Amendments. The State Government may, from time to time, add to or amend these regulations and on any questions as to the application, interpretation effect of these regulations, the decision of the Labour Commissioner to the Government of Rajasthan or any other person authorized by the State Government in that behalf, shall be final.

Schedule of Fair Wages to be Given by Executive Engineer

LIST OF ACTS AND COMMISSION FOR WHICH FINE CAN BE IMPOSED

(1) Wilful insubordination or disobedience whether alone or in combination with another. (2) The fraud or dishonesty in connection with the contractors business of property of the Rajasthan P.W.D. (3) Taking or giving bribes or any illegal gratification. (4) Habitual late attendance. (5) Drunkenness, fighting riot or disorderly or indecent behavior. (6) Habitual negligence. (7) Smoking near or around the area where combustible or other materials are stocked. (8) Habitual indiscipline. (9) Causing damage work in progress or to property of the Rajasthan P.W.D. or the contractor. (10) Sleeping on duty. (11) Malingering or sowing down work. (12) Giving of false information regarding name, age, father's name. (13) Habitual loss of wage cards supplied by the employers. (14) Unauthorized use of employer's property or manufacturing or making of unauthorized articles at the work places. (15) Bad workmanship in construction and maintenance by skilled workers which is not approved by the department and for which contractors are compelled to undertake rectification. (16) Making false complaints and/or misleading statement. (17) Engaging, in trade within the premises of the establishment. (18) Any delinquency of business affairs of the employers. (19) Collection or canvassing for the collection of an money within the premises of an establishment unless authorized by the employer. (20) Holding meeting inside the premises without previous sanction of the employer. (21) Threatening or intimidating any workman or employee during the working hours within the premises

Schedule showing (approximately) materials to be supplied from the Public Works Store for work contracted to be executed and the rates of which they are to be charged for

Particulars	Rates which the materials will be charged to the contractor			Place of delivery
	Unit	Rs.	NP.	

Note : The person or firm submitting the tender should see that the rates in the above schedule are filled up by the Engineer-in-charge on the issue of the form prior to the submission to the tender.

(Signature of Contractor)

(Signature of Engineer)

Progress Statement referred to in Clause 3 of Conditions of Contract

Name of Works	Date from which work should be commenced	Date by Which the work should be completed	Monthly Rate of progress
1	2	3	4

The contractor has been informed that his tender has been accepted.

Date:

Date

Engineer-in-charge

Contractor

NOTES FOR FILLING IN THE PROGRESS STATEMENT FORM ON THE LAST PAGE

Columns 2,3 and 4 must be initialed and dated by the contractor.

Column 4 must be initialed and dated by the Chief Engineer or other duly authorized Engineer also

The date in column 2 should correspond to the date on which the order to commence work is given to the contractor, specified in line 3, clause 2, page 3 of the "condition of contract".

The date in column 3 must correspond to the period stated in clause (f) page 2 of the tender

Column 4. This will ordinarily be worked out proportionately; thus, if Rs. 24,000/- is the cost of the whole or portion of work tendered for, and six months period of completion, then the monthly rate of progress should be Rs. 4,000/-. If necessary, quantities may also be specified in this column at the discretion of the Chief Engineer

The certificate as to intimation acceptance of tender printed at the foot of the form, must be signed and dated both by the Chief Engineer or other duly authorized engineer and the contractor.

Statement of Payment & Recoveries to be attached with the agreement of works

S.No. of Bill	Gross Amount of Bill	Progressive Total Amount of Bill	Recoveries									Net Amount of Payment	C.B. Vr. No. & Date	Dated Initial Of	
			Material & T&P	Quantity Hours	Amount	SD	Income Tax Deduction	Sales Tax	Royalty	Other Recoveries	Total Recoveries			D.A.O.	EE
1	2	3	4(a)	4(b)	4(c)	4(d)	4(e)	4(f)	4(g)	4(h)	4(i)	5	6	7	8

SECTION VB SPECIAL CONDITION OF CONTRACT

SPECIAL CONDITIONS**SCHEDULE 'H'**

1. Use of Bitumen mixture Tar mechanical lime grinder, cement concrete mixer & vibrator is essential for the work. Which shall have to be arranged by the contractor at his own level/cost?
2. The contractor shall follow the contractor labour regulation and abolition Act 1970 & Rule 1971.
3. The JDA shall have right to cause on audit and technical examination of the work and the final bills of the contractor including all supporting vouchers, abstract etc. to be made within two years after payment of the final bills and if as a result such audit any amount is found to have been over paid/excess in respect of any work done by the contractor under the contract or any work claimed by him to have been done under this contract and found not to have been executed the contractor shall be liable to refund such amount and it shall be lawful ;for the JDA to recover such sum from him in ;the manner prescribed in special condition no. 8 or any other manner legally permissible and if it is found that the contractor was paid less then that was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be paid by the JDA to the contractor.
4. The contractor shall not work after the sunset and before sunrise without specific permission of the EIC.
5. Whenever any claim against the contractor for the payment of a sum of money arises out or under the contracts, the JDA shall be entered to recover the sum by appropriating in part or whole of the security deposit of the contractor. In the event of the security being insufficient or if no security has been taken from the contractor then the balance of the total sum recoverable as the case may shall be deducted from any sum then due or which a any time there contract with the JDA should this sum be sufficient to recover the full amount recoverable, the contractor shall pay to JDA on demand the balance remaining due. The JDA shall further have the right to effect such recoveries under P.D.R. Act.
6. The rate quoted by the contractor shall remain valid for a period of 4(four) months from the date of opening of the tenders.
7. By submission of this tender the contractor agree to abide with all printed conditions provided in the PWD manual from 64 (Chapter 3-para 36) and subsequent modification.
8. No conditions are to be added by the contractor and conditional tender is liable to be rejected.
9. All transaction in the execution of this work and this tender will be liable to sale-tax vide section 2(B) read with sub clause (4) Sale-tax Rule, 1954.
10. If any tenderer withdraws his tender prior to expiry of said validity period given at S.No. 6 or mutually extended prior or makes modifications in the rates, terms and conditions of the tender within the said period which are not acceptable to the department or fails to commence the work in the specified period, fails to execute the agreement the department shall without prejudice to any, other right or remedy, be at liberty to forfeit the amount of Bid Security (EMD) given in any form absolutely. If any contractor, who having submitted a tender does not execute the agreement or start the work or dose not complete the work and the work has to be put to retendering, he shall stand debarred for six months from

- participating of tendering in JDA in addition to forfeiture of Bid Security (EMD) / Security Deposit and other action under agreement.
11. The contractor shall arrange his own machinery required for the work such as Bitumen Mixer, Hot Mix plants and paver road roller, Tar boiler, sprayer etc.
 12. The contractor shall arrange his own storage tanks upto 10 Tones capacity for storing bulk bitumen wherever supplied by the department.
 13. Rules regarding enlistment of contractors provide that work upto five times limit for which they are qualified for tendering can be allotted to them Therefore, before tender the contractors will keep this in mind, and submit the details of work. Tenders with incomplete or incorrect information are liable to be rejected.
 14. Any material not conforming to the specifications collected at site shall have to be removed by the contractor within a period of 3 days of the instructions, issued by the Engineer-In-charge in writing. Failing which, such material shall be removed by the Engineer-In-charge at risk and the contractor after expiry of 3 days period.
 15. The material collected at site and paid provisionally shall remain under the watch and ward of the contractor till it is consumed, fully on the work.
 16. The rates provided in tender documents are inclusive of all Taxes royalty.
 17. For paver work at least 3 road rollers shall be simultaneously deployed.
 18. Bitumen for tack coat or any other purposes, shall be applied only by a bitumen sprayer of a mechanical pressure.
 19. No extra lead of earth/material shall be paid over and above as specified in 'G' schedule. Source/borrow pit area for earth shall have to be arranged by the Contractor at his own cost.
 20. Undersigned has full right to reject any or all tenders without given any reasons.
 21. Mortar of Masonry work and lean concrete will be permitted mixer with hopper.
 22. As per Supreme Court decision "All contracts with Governments shall require registration of workers under the building and other construction workers (Regulation of Employment and Conditions of Service) Act, 1996 and extension of benefits to such workers under the act."
 23. Special Conditions of Contract regarding Defect Liability Period (DLP) for Roads works costing Rs. 25.00 lacs and more shall be applicable.
 24. The tender are required to submit copy of their enlistment as contractor.
 25. Conditions of RPWA-100 will be mandatory & acceptable to the contractor.
 26. Any tender received with unattested cutting/overwriting in rates shall be rejected and such bidder will be debarred from tendering for three months in JDA.
 27. All the provisions of THE RAJASTHAN TRANSPARENCY IN PUBLIC PROCUREMENT ACT, 2012 and Rules, 2013 will be applicable. If there is any contradictions in existing special conditions and provisions of THE RAJASTHAN TRANSPARENCY IN PUBLIC PROCUREMENT ACT, 2012 and RULES, 2013, provisions of THE RAJASTHAN TRANSPARENCY IN PUBLIC PROCUREMENT ACT, 2012 and RULES 2013 shall be applicable.
 28. The Contractor will have to install display boards at site of work as directed by Engineer in charge. Failing which penalty of Rs. 5000.00 per day will be imposed.
 29. As per order no D-352, dated 29.08.2018, the last date of bid submission is considered a key date for deciding the base indexes.
 30. For mix delayed period decision on price variation shall be applicable as per order no D-352, dated 29.08.2018 (Enclosed at page no 166-167)

**Signature of Contractor
with full address & Mobile No.**

**Executive Engineer (ROB/RUB-IV)
JDA, Jaipur.**

RTTP Annexure A: Compliance with the Code of Integrity and No Conflict of Interest

- (a) Any person participating in a procurement process shall-
- (b) Not offer any bribe, reward or gift or any material benefit either directly or indirectly in exchange for an unfair advantage in procurement process or to otherwise influence the procurement process;
- (c) Not misrepresent or omit that misleads or attempts to mislead so as to obtain a financial or other benefit or avoid an obligation;
- (d) Not indulge in any collusion, Bid rigging or anticompetitive behavior to impair the transparency, fairness and progress of the procurement process;
- (e) Not misuse any information shared between the procuring entity and the bidders with an intent to gain unfair advantage in the procurement process;
- (f) Not indulge in any coercion including impairing or harming or threatening to do the same, directly or indirectly, to any party or to its property to influence the procurement process;
- (g) Not obstruct any investigation or audit of a procurement process;
- (h) Disclose conflict of interest, if any; and
- (i) Disclose any previous transgressions with any entity in India or any other country during the last three years or any debarment by any other procuring entity.

Conflict of interest:-

The Bidder participating in a bidding process must not have a Conflict of Interest.

A Conflict of interest is considered to be a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations.

(i) A bidder may be considered to be in conflict of interest with one or more parties in the bidding process if, including but not limited to:

- (a) Have controlling partners/shareholders in common; or
- (b) Receive or have received any direct or indirect subsidy from any of them; or
- (c) Have the same legal representative for purposes of the bid; or
- (d) have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another bidder, or influence the decisions of the procuring Entity regarding the bidding process; or
- (e) The bidder participates in more than one bid in a bidding process. Participation by a bidder in more than one bid will result in the disqualification of all bids in which the bidder is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a bidder, in more than one bid; or
- (f) the bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the goods, works or services that are the subject of the Bid; or
- (g) Bidder or any of its affiliates has been hired (or proposed to be hired) by the procuring entity as engineer-in-charge/consultant for the contract.

Signature of Bidder
with full address & Mobile No.

RTTP Annexure B: Declaration by the Bidder regarding Qualifications**Declaration by the Bidder**

In relation to my/our Bid submitted to for procurement of in response to their Notice inviting Bids No.....Dated.....I/we hereby declare under Section 7 of Rajasthan Transparency in Public Procurement Act, 2012 that :

1. I/we possess the necessary professional, technical, financial and managerial resources and competence required by the Bidding Document issued by the Procuring Entry;
2. I/we have fulfilled my/our obligation to pay such of the taxes payable to the union and the state government or any local authority as specified in the Bidding Document.
3. I/we are not insolvent, in receivership, bankrupt or being wound up, not have my/our affairs administered by a court or a judicial officer, not have my/our business activities suspended and not the subject of legal proceedings for any of the foregoing reasons;
4. I/we do not have, and our directors and officers not have, been convicted of any criminal offence related to my/our professional conduct or the making of false statements or misrepresentations as to my/our qualifications to enter into a procurement contract within a period of three years preceding the commencement of this procurement process, or not have been otherwise disqualified pursuant to debarment proceedings;
5. I/we do not have a conflict of interest as specified in the Act, Rules and the Bidding Document, which materially affects fair competition;

Date :

Signature of bidder

Place :

Name :

Designation :

Address :

RTTP Annexure C: Grievance Redressal during Procurement Process

The designation and address of the First Appellate Authority is Executive Committee (EC), JDA, The designation and address of the Second Appellate Authority is **A.C.S./P.S., UDH, Govt. of Rajasthan.**

(1) Filing an appeal:-

- a) if any bidder or prospective bidder is aggrieved that any decision, action or omission of the procuring entity is in contravention to the provisions of the Act or the rules or the guidelines issued there under, he may file an appeal to First Appellate authority, as specified in the Bidding document within a period of ten days from the date of such decision or action, omission, as the case may be, clearly giving the specific ground or grounds on which he feels aggrieved:
- b) Provided that after the declaration of a bidder as successful the appeal may be filed only by a bidder who has participated in procurement proceedings:
- c) Provided further that in case a procuring entity evaluates the technical bids before the opening of the financial bids, an appeal related to the matter of financial bids may be filed only by a bidder whose technical bid is found to be acceptable.
- (2)** The officer to whom an appeal is filed under Para (1) shall deal with the appeal as expeditiously as possible and shall endeavor to dispose it of within thirty days from the date of the appeal.
- (3)** If the officer designated under Para (1) fails to dispose of the appeal filed within the period specified in Para (2), or if the bidder or prospective bidder or the procuring entity is aggrieved by the order passed by the first appellate authority, the bidder or prospective bidder or the procuring entity, as the case may be, may file a second appeal to second appellate authority specified in the bidding document in this behalf within fifteen days from the expiry of the period specified in Para (2) or of the date of receipt of the order passed by the first appellate authority, as the case may be.

(2) Appeals not to lie in certain cases:-

No appeal shall lie against any decision of the procuring entity relating to the following matters, namely:-

- (a) Determination of need of procurement
- (b) Provisions limiting participation of bidders in the bid process
- (c) The decision of whether or not to enter into negotiations
- (d) Cancellation of a procurement process
- (e) Applicability of the provisions of confidentiality

(3) From of Appeals:-

- a) An appeal under Para (1) or (3) above shall be in the annexed form along with as many copies as there are respondents in the appeal.
- b) Every appeal shall be accompanied by an order appealed against, if any, affidavit verifying the facts stated in the appeal and proof of payment of fee,
- c) Every appeal may be presented to first appellate authority or second appellate authority, as the case may be, in person or through registered post or authorized representative.

(4) Fee for filing Appeal:-

- (a) Fee for first appeal shall be rupees two thousand five hundred and for second appeal shall be rupees ten thousand, which shall be non-refundable.
- (b) The fee shall be paid in the form of bank demand draft or banker's cheque of a scheduled bank in India payable in the name of appellate authority concerned.
- (5) Procedure for disposal of Appeal:-**
 - (a) The first appellate authority or second appellate authority as the case may be, upon filing of appeal, shall issue notice accompanied by copy of appeal, affidavit and documents, if any, to the respondents and fix date of hearing
 - (b) On the date fixed for hearing, the first appellate authority or second appellate authority, as the case may be shall-
 - (i) Hear all the parties to appeal present before him; and
 - (ii) Peruse or inspect documents, relevant records or copies thereof relating to the matter.
 - (c) After hearing the parties, perusal or inspection of documents and relevant records or copies thereof relating to the matter, the appellate authority concerned shall pass an order in writing and provide the copy of order to the parties to appeal free of cost.
 - (d) The order passed under sub-clause (c) above shall also be placed on the state public procurement portal.

Date :

Signature of bidder

Place :

Name :

Designation :

Address :

FORM No. 1
[see rule 83]
Memorandum of Appeal under the Rajasthan
Transparency in Public procurement Act, 2012

Appeal No.....of Before
the.....(First/Second Appellate authority)

- 1- Particulars of appellant :
 - (i) Name of the appellant :
 - (ii) Official address, if any:
 - (iii) Residential address :
- 2- Name and address of the respondent(s):
 - (i)
 - (ii)
 - (iii)
- 3- Number and date of the order appealed against and name and designation of the office/authority who passed the order (enclose copy), or a statement of a decision, action or omission of the procuring Entity in contravention to the provisions of the Act by which the appellant is aggrieved:
- 4- If the Appellant propose to be represented by a representative the name and postal address of the representative:
- 5- Number of affidavits and documents enclosed with the appeal:
- 6- Grounds of appeal :
 (Supported by an affidavit)
- 7- Prayer :

Place :

Date :

Appellant's Signature

RTPP Annexure D: Additional Conditions of Contract**1. Correction of arithmetical errors**

Provided that a financial bid is substantially responsive, the procuring entity will correct arithmetical errors during evaluation of financial Bids on the following basis:

- (i) if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the procuring entity there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;
- (ii) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- (iii) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (i) and (ii) above.

If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its bid shall be disqualified and its bid security shall be forfeited or its bid securing declaration shall be executed.

2. Procuring Entity's Right to Vary quantities.

- (i) At the time of award of contract, the quantity of goods, works or services originally specified in the bidding documents may be increased or decreased, by a specified percentage, but such increase or decrease shall not exceed twenty percent, of the quantity specified in the bidding documents. It shall be without any change in the unit prices or other terms and conditions of the bid and the conditions of contract.
- (ii) If the Procuring entity does not procure any subject matter of procurement or procures less than the quantity specified in the bidding document due to change circumstances, the bidder shall not be entitled to any claim or compensation except otherwise provide in the conditions of contract.
- (iii) In case of procurement of goods or services, additional quantity may be procured by placing a repeat order on the rates and conditions of the original order. However, the additional quantity shall not be more than 25% of the value of goods of the original contract and shall be within one month from the date of expiry of last supply. If the supplier fails to do so, the procuring entity shall be free to arrange for the balance supply by limited bidding or otherwise and the extra cost incurred shall be recovered from the supplier.

3. Dividing quantities among more than one bidder at the time of award (In case of procurement of Goods):-

As a general rule all the quantities of the subject matter of procurement shall be procured from the Bidder, whose Bid accepted. However, when it is considered that the quantity of the subject matter of procurement to be procured is very large and it may not be in the capacity of the Bidder, whose Bid is accepted, to deliver the entire quantity or when it is considered that the subject matter of procurement to be procured is of critical and vital nature, then in such cases, the quantity may be divided between the Bidder, whose Bid is accepted and the second lowest Bidder or even more Bidder in that order, in a fair, transparent and equitable manner at the rates of the Bidder, whose Bid is accepted.

Special Conditions of Contract regarding Defect Liability Period (DLP) for Various works costing Rs. 25.00 Lacs and more

(a) The routine maintenance activities and their periodicity as per JDA Office order no: JDA/Ex.En.(TA to Dir Engg.-I)/2016/D-29 dated 11.03.2016

Table-I

S.No.	Type of work	DLP Period
1	Bridge work / Underpass	5 Years
2	CD work	5 Years
3	CC road, PQC work	5 Years
4	CC tiles/Kerb/ Medians	5 Years
5	Drains	3 Years
6	Roads	
	(i) Two Layer WBM/GSB	6 Months or one full rainy season whichever is later
	(ii) For Renewal/Strengthening	
	(a) BT upto 30 mm thickness	1 Year
	(b) BT above 30 mm to upto 40 mm	2 Years
	(c) BT above 40 mm to upto 90 mm	3 Years
	(d) BT above 90 mm	5 Years
	(iii) New roads	
	(a) BT upto 90 mm	3 Years
	(b) BT more than 90 mm	5 Years
7	Compound wall	3 Years
8	Building work	
	(i) Work pertaining to sanitary works electrical works, Joinery works and painting works.	5 Years
	(ii) Work pertaining to building structure and other civil works.	5 Years
9	Electric work except maintenance	5 Years
10	Sewer/water supply all including STP and water supply related work except maintenance works	3 Years

Note: DLP for all the components of the work under this project shall be 5 years.

1. DRAINAGE WORKS

1.1 The Defect Liability Period (DLP) for all Drainage works including all related work shall be five years. Drainage works executed by the Contracting agency shall be maintained by them at their own cost for five years (DLP) from the actual date of completion of work as per the clause in the Contract Agreement and Special Condition of Contract.

1.2 No extra payment shall be made to the contracting agency on account of maintenance of Drain works and removal of defect during Defect Liability Period.

1.3 The word “Drainage Works” means all new Drain Works construction, its covering work, cleaning inside and other works.”

1.4 The word “Maintenance of Drain Works during Defect Liability Period” means

- (i) Routine maintenance of Drain Works including cleaning the drains, spouts etc and carriage of malba etc from the site.
- (ii) To remove the defect as & when appear in part and entire structure of Drain Works, in specified time and keeping the Drain clean & good condition. and
- (iii) Damages due to improper drainage / drains, local flooding, depressions on roads etc.

1.5 The contracting agency shall do the routine maintenance of Drain works, including pavement, road side and cross drains including surface drains to the required standards and keep the entire Drain surface and structure in Defect free conditions during the entire period of routine maintenance, which begins at completion of the construction work and ends after three years.

1.6 The routine maintenance shall consist of the routine maintenance operation defined in manual for maintenance of roads of MoRTH and shall be carried out accordingly.

1.7 The Drain maintenance activities and their periodicity

S.No.	Name of Item/Activity	Frequency of operations in one year
1	Restoration and cleaning of rain water spouts & repair of any type of damages.	Once in a year, generally before rains.
2	Cleaning of inner portion of the drains by removing the covers at regular interval and carriage and disposal of malba etc.	As and when required.
3	Insurance of proper functioning of drains including civil maintenance and desilting of drains.	As and when required.

2. General

2.1 Inspection of works during Defect Liability Period

2.1.1 The contracting agency shall undertake joint detailed inspection along with Engineer-in-charge/A.En., at once in three months in case of all Drain works. The Engineer-in-charge can reduce this frequency in case of emergency. The Contracting agency shall forward to the Engineer-in-charge the record of inspection and rectification immediately after the joint inspection. The Contracting agency shall pay particulars attention on those Drain sections, which are likely to be damaged during rainy season.

2.1.2 One register has to be maintained by every A.E.n for recording the inspection details of works in his jurisdiction under defect liability period.

2.2 Conditions regarding Security Deposit

2.2.1 Security for DLP-

The contracting agency shall have to furnish security deposit (SD)/Performance Security in the form of Bank Guarantee in favor of Secretary JDA, Jaipur valid from the actual date of completion, which shall be assigned by the Engineer-in-charge.

2.2.2 Refund of SD (Performance Guaranty)-

The release of SD amount shall be as following table:-

S.No.	Released SD DLP period	5th year
1	At the end of 1 year	10 %
2	At the end of 2 Years	10 %
3	At the end of 3 Years	10 %
4	At the end of 4 Years	20 %
5	At the end of DLP (5 Years)	50 %

Various conditions for managing DLP are as under:-

- (i) During DLP period if contractor fails to repair any work even after issue of 7 days written notice, same work shall be got executed by respective Executive Engineer at the contractor's risk and cost and the double of actual expenditure shall be recovered from his performance security/security deposit. This process shall be applicable throughout the DLP period. In case of failure of any obligation under part of contractor during DLP should be debarred and blacklisted from JDA for three years as per RTPP Rule 2012 and 2013 where he defaults twice in a single agreement or in two different works.
- (ii) Quarterly inspection as per rules shall be carried out and DLP registers shall be maintained by respective Executive Engineers to monitor the DLP repairs.
- (iii) Special and regular inspection shall also be carried out as per order no. JDA/Ex.En & TA to DE-I/ 2014-15/D-223 dated 12.03.2015 and order no. SE (PMGSY) CIRCULAR 2006/D-115 dated 04.05.2006 point no. 3
- (iv) In case JDA feels to take up work on any existing DLP road due to any reason, following procedure should be adopted.
 - (a) At the time of withdrawal total liability of repairs as per DLP conditions to be carried out and contractor shall be asked to complete the same. After completion of assessed repairs DLP period shall be released after deduction amt. as per table below.

% recovery on withdrawal of DLP on work order amt. DLP period	1 Year	2 Year	3 Year	4 Year	5 Year
5 Years	9.00	7.88	6.45	4.62	2.47

Note :- Calculation is to be done on quarterly basis.

- (b) In case Contractor fails to carry out these repairs, same shall be carried out at his risk and cost. If the total amt. of such repairs works out to be more than total retained amt. of SD, same shall be recovered from other works and as per PDR rules. The amount as per Table-III is also to be deducted in addition to this amount.

- (ix). Based upon type of work, DLP conditions for works to be carried out during DLP period with their frequency of respective type of work shall be prepared by respective SE's after approval of these periods.

2.2.3 Force Majeure

The defect arises due to earthquake, cyclone, and natural calamities shall not be the responsibly of contracting agency.

Signature of Contractor

With Full Address

Executive Engineer (**ROB/RUB-IV**)

JDA, Jaipur.

The following Particular Conditions of Contract shall complement, amend, and supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC

Definitions

1. The Intended Completion Date will be 30 Months from Issuance of work order followed by 5 Years (60 months) of DLP.

The **Start Date** is the date as specified in the work order. This is the date when the Contractor can commence work on the Contract, but does not necessarily coincide with Possession Date of all the locations of Site.

2. Interpretation

Sectional Completion will be not allowed.

3. Language and Law

The law which shall govern the conduct of the Contract and according to which the Contract shall be construed is that in force in the State of Rajasthan, India. The language of the contract shall be in English.

4. Communications

Any notification under this Contract shall be served on the party concerned when received by telex, hand delivery, courier delivery, or registered letter at the addresses listed in the Contract Data Any notification under this Contract shall be served at the addresses provided below:

Address of the Contractor:

Name: _____

Address: _____

Address:

Executive Engineer (ROB/RUB-IV)

Jaipur Development Authority

Room No 313 B, First Floor, Nagrik Seva Kendra Building

Ram Kishor Vyas Bhawan, Indira Circle,

Jawahar Lal Nehru Marg, Jaipur-302004

5. Personnel and Equipment

List of minimum personnel required during execution period:

Position	Nos.	Minimum Experience required
Project Manager	1	Total 15 years with 5 years in similar work
Project Engineer	2	At least 10 years' experience with 3 years in similar work
Quality Assurance cum Site Engineer	1	At least 5 years' experience
Supervisor	3	At least 5 years' experience
Surveyour	1	At least 5 years' experience

In case the contractor does not engage the staff as specified in this section, the EIC shall deduct amounts as indicated below and shall engage staff on his own:

Position	Nos.	Salary to be deducted for each person if not engaged by contractor
Project Manager	1	Rs. 1,00,000/- per month
Project Engineer	2	Rs. 75,000/- per month
Quality Assurance cum Site Engineer	1	Rs. 50,000/- per month
Supervisor	3	Rs. 25,000/- per month
Surveyour	1	Rs. 25,000/- per month

6. Insurance

The minimum amount of Third-Party Liability insurance cover shall be *Rs 10,00,000 (Rupees ten Lakhs only)* per occurrence or event, with the number of occurrences not less than four. The Contractor shall promptly notify the Engineer of each claim made under the Third-Party Liability coverage, and shall renew the Third-Party Insurance after each such occurrence in order to maintain the number of covered occurrences at not less than four.

The minimum coverage against damage to the Works and materials during construction shall be *Rs. 5,00,000 (Rupees Five Lakhs only)*.

7. Possession of Site

The employer will give possession of the sites as elaborated in the Notice to Proceed on the Date of Start as mentioned in NTP. The contractor will not be entitled to any delay or compensation event unless his work as per the agreed "Schedule of Work" is actually held up because of delay in the Employer's hand over of the site to the contractor. Refer Section V, Work Requirements for further details.

- The work program shall be given in Inception Report submitted by the Selected Bidder and the same shall be final and binding, once approved by the Engineer. The Contractor shall submit the detailed method statement defining Contractor's methodology for implementation backed with his proposal for equipment planning & deployment duly supported with broad output calculation. The Drawings for any particular activity shall be issued to the contractor at least 30 days in advance of the schedule date of the start of the activity as per the approved program.

9. The Contractor shall provide an updated Work Program by the last day of each Month, which shall clearly demonstrate the actual progress achieved on each activity, the effect of the progress achieved on the timing of the remaining work, and the proposed changes in activities that will enable the Contractor to complete the Works within the Intended Completion Date. In case the Contractor fails to submit an updated Work Program within this time limit, the Engineer will be entitled to withhold an amount of Rs. 1,00,000/- (Rupees One lakh only) or 1% of the Contract Value (Whichever is more) from the next payment certificate, and continue to withhold this amount until the next payment after the date on which the overdue program has been submitted.

10.1 If in the opinion of the Engineer, the work on site is not progressing satisfactorily in accordance with the mutually agreed "Work Program" and the delay is likely to affect the overall completion of the work within the intended date of completion, he may by a written notice to the Contractor ask him to expedite the works within 15 days suitably to make for deficiencies.

10.2 If the contractor fails to take appropriate action in time in pursuance of 10.1, the Engineer may by another notice inform him the components of work that will be carried out by him through another agency in parallel to the other activities being carried out by the contractor at his cost with a view of expediting the works and reducing delays. The value of the work so carried out will be credited to the contractor's account, but he will not be responsible for the quality of the said work. The Engineer will recover the cost spent plus 5% for supervision charges from the next bill or

If the contractor fails to take appropriate action in time in pursuance of 10.1, the Engineer may withhold 25% amount of the delayed part of the work from the next running bills, till the contractor achieves the progress as per the agreed Work Plan.

If authority still feels the slow progress of the project then authority is free to make payments to the eligible vendors of materials and labours and get the work executed without consent of the contractor. However the contractor will be responsible for the whole project.

10.3 In addition to the Updated Program, Monthly updated progress reports shall be prepared by the Contractor and submitted to the Engineer in six copies in the first week of every calendar month. Reporting shall continue until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works. Each report shall include:

- (a) Photographs and detailed descriptions of progress.
- (b) charts showing the status of Construction Documents, purchase orders, manufacture and construction;
- (c) records of personnel and Contractor's Equipment on Site;
- (d) copies of quality assurance documents, test results and certificates of Materials;
- (e) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and

Comparisons of actual and planned progress, with details of any aspects which may jeopardize the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome such aspects.

11. Identifying Defects:

Unless otherwise indicated elsewhere in the contract, the Quality Assurance and Quality Control (QA/QC) document, as issued by the RUIDP, shall be followed. The Contractor, prior to commencement of permanent works at site shall set up his own laboratory with prior notification to the Employer's Representative as defined in Section V.

12. Correction of Defects:

(i) The Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins from the physical completion date specified in the completion certificate/ taking over certificate. The Defects Liability Period may be extended for as long as Defects remain to be corrected. The **Defect Liability Period** is 5 year from the date of completion mentioned in the certificate of Completion pursuant to the provisions of Clause 48.

(ii) The Engineer shall certify that all Defects have been corrected. If the Employer considers that

Correction of a Defect is not essential; he can request the Contractor to submit a quotation for the corresponding reduction in the Works Contract Price. If the Employer accepts the quotation, the corresponding change in the Contract Price is a Variation. The Defects Correction Period is 14 (fourteen) Days from the date of receipt by the Contractor of the Employer's notice to correct any Defects in the Works.

(iii) If the Contractor has not corrected a Defect within the time specified in the Engineer's notice, the Engineer may have the defect corrected by other contractor(s) and recover the cost paid for the same plus 5% for supervision charges from any amount due to the contractor.

13. Contract Price

This is a Lump Sum contract on EPC basis.

The Contract Price includes all duties, taxes, royalty, and fees that may be levied in the accordance with the laws and regulations in force as on the Base Date on the Contactor's equipment, Plant, Materials and supplies to be acquired for the purpose of this Agreement and on the services to be performed under this Agreement. Nothing in this Agreement shall relieve the Contractor from its responsibility to pay any tax including any tax that may be levied in India on profits made by it in respect of this Agreement.

14. Payments

14.1 The Contract Price shall not be adjusted, except as stated in Price adjustment as per Clause 44.

14.2 The Contract Price shall not be adjusted to take account of any unforeseen difficulties or costs, unless otherwise provided for in this Agreement.

14.3 Unless otherwise stated in this Agreement, the Contract Price covers all the Contractor's obligations for the Works under this Agreement and all things necessary for the Construction, and the remedying of any Defects in the Project.

14.4 All payments under this Agreement shall be made in Indian Rupees.

14.5 Clause 45 (Price variation clause) of GCC shall not be applicable on this Lump Sum contract.

14.6 The Authority shall make payments to the Contractor as certified by the Engineer on completion of a stage, as specified, and valued in accordance with the proportion of the Contract Price assigned to each item and its stage. Contractor will be paid as per the Payment Schedule prescribed below:

15. The Bidder shall quote a Consolidated Price.**1 Payment for Material:**

With respect to materials and Plant brought by the Contractor to the site for incorporation in the permanent works, no claim shall be made by the Contractor unless the following conditions have been met to the Engineers satisfaction.

- i. The materials and plant are in accordance with the relevant BIS specifications for the works.
- ii. The materials and the plant have been delivered to the site and are properly stored and protected against loss, damage or deterioration.
- iii. The Contractors records of the requirements, orders, receipts and use of materials and plant are kept in a form approved by the Engineer, and such records are available for inspection by the Engineer.
- iv. The Contractor has submitted a statement of his cost of acquiring and delivering the materials and plant to the site, together with such documents as may be required for the purpose of evidencing such cost.
- v. The materials are to be used within a reasonable time as decided by the Engineer and the Contractor shall not unnecessarily procure any material or equipment too much in advance.

2 Payment Schedule:

Payment shall be made in stages for each component as envisaged as under:

Serial	Stages of Payment	Percentage of Contract Price to be paid
1	Advance payment	Nil
2	Completion of piling work	14% of contract value. breakup is as under
	i) Completion of 20% of piling (Cumulative)	2.75%
	ii) Completion of 40% of piling (Cumulative)	5.50% (Cumulative)
	iii) Completion of 60% of piling (Cumulative)	8.25% (Cumulative)
	iv) Completion of 80% of piling (Cumulative)	11.00% (Cumulative)
	v) Completion of 100% of piling (Cumulative)	14.00% (Cumulative)
3	Upon completion of excavation up to the designed level	9.0 % of contract value. breakup is as under
	i) Upon 50% Excavated Qty. of Part-D	2.0%
	ii) Upon 100% Excavated Qty. of Part-D (Cumulative)	4.0%(Cumulative)
	iii) Upon 50% Excavated Qty. of Part-E	6.50%(Cumulative)

	iv) Upon 100% Excavated Qty. of Part-E (Cumulative)	9.00%(Cumulative)
4	Upon Completion of foundation (Footings & Columns)	20.00 % of contract value. breakup is as under
	i) Upon 20% Completion of Part-D	1.80%
	ii) Upon 40% Completion of Part-D (Cumulative)	3.60%(Cumulative)
	iii) Upon 60% Completion of Part-D (Cumulative)	5.40%(Cumulative)
	iv) Upon 80% Completion of Part-D (Cumulative)	7.20%(Cumulative)
	v) Upon 100% Completion of Part-D (Cumulative)	9.0%(Cumulative)
	vi) Upon 20% Completion of Part-E	11.0%(Cumulative)
	vii) Upon 40% Completion of Part-E (Cumulative)	13.0%(Cumulative)
	viii) Upon 60% Completion of Part-E (Cumulative)	15.0%(Cumulative)
	ix) Upon 80% Completion of Part-E (Cumulative)	17.0%(Cumulative)
	x) Upon 100% Completion of Part-E (Cumulative)	20.0%(Cumulative)
5	Upon Completion of lower basement slab	15.00 % of contract value. breakup is as under
	i) Upon 25% Completion of Part-D	1.75%
	ii) Upon 50% Completion of Part-D (Cumulative)	3.50% (Cumulative)
	iii) Upon 75% Completion of Part-D (Cumulative)	5.25% (Cumulative)
	iv) Upon 100% Completion of Part-D (Cumulative)	7.00% (Cumulative)
	v) Upon 25% Completion of Part-E (Cumulative)	9.00%(Cumulative)
	vi) Upon 50% Completion of Part-E (Cumulative)	11.00%(Cumulative)
	vii) Upon 75% Completion of Part-E (Cumulative)	13.00%(Cumulative)
	viii) Upon 100% Completion of Part-E (Cumulative)	15.00%(Cumulative)
6	Upon Completion of upper basement slab	15.00 % of contract value. breakup is as under
	i) Upon 25% Completion of Part-D	1.75%
	ii) Upon 50% Completion of Part-D (Cumulative)	3.50% (Cumulative)
	iii) Upon 75% Completion of Part-D (Cumulative)	5.25% (Cumulative)
	iv) Upon 100% Completion of Part-D (Cumulative)	7.00% (Cumulative)

	v) Upon 25% Completion of Part-E (Cumulative)	9.00%(Cumulative)
	vi) Upon 50% Completion of Part-E (Cumulative)	11.00%(Cumulative)
	vii) Upon 75% Completion of Part-E (Cumulative)	13.00%(Cumulative)
	viii) Upon 100% Completion of Part-E (Cumulative)	15.00%(Cumulative)
7	Electrification, Sub Station, Force Ventilation & Lifts	9.00 % of contract value. breakup is as under
	i) On installation	6.00%
	ii) On testing and commissioning	9.00%(Cumulative)
8	Smart Parking Solution, Solar PV System & CCTV Security	4.00 % of contract value. breakup is as under
	i) On installation	2.50%
	ii) On testing and commissioning	4.00% (Cumulative)
9	Fire Detection and Fighting Works & Dewatering System	3.00 % of contract value. breakup is as under
	i) On installation	2.00%
	ii) On testing and commissioning	3.00% (Cumulative)
10	All finishing works (including brick masonry, plastering, painting, flooring, door/windows, staircase railing, exit and entry ramp shed, marking etc.	6.00 % of contract value.
11	Restoration of parking area, construction of roads, cleaning of site & handing over	5.00 % of contract value.
TOTAL		100%

16. Advance Payment

Advances to contractors are as a rule prohibited, and every endeavor should be made to maintain a system under which no payments are made except for work actually done.

Exceptions are, however, permitted in the following cases:

- (a) Cases in which a contractor, whose contract is for finished work, requires an advance on the security of the materials brought to site. Divisional officers may, in such cases, make advances upto an amount not exceeding 75 percent of the current value of the materials (as assessed by themselves according to their character), provided that they are of an imperishable nature and that a formal indenture is drawn up in Form 31 with the contractor under which the Government secure a lien on the materials and are safeguarded against losses due to the contractor postponing the execution of the work or the shortage or misuse of the materials and against the expense entailed for their proper watch and safe custody. Payment of such advances should be made only on the certificate of an officer, not below the rank of Sub-Divisional officer, that the quantities of materials, upon which the advances are made have actually been brought to site, that the contractor has not previously received any advance on that security and that the materials are all required by the contractor for use on items of work for which rates for finished work have been agreed upon. The officer granting such a certificate

will be held personally responsible for any overpayment which may occur in consequence. Recoveries of advances, so made, should not be postponed until the whole of the work entrusted to the contractor is complete. They should be made from this bills for work done as the materials are used, the necessary deductions being made, whenever the items of work, in which they are used are billed for.

Note-1 Divisional Officers are responsible that:-

- i. When secured advances have been made for materials, recoveries are made regularly from the very first payment made for those items of actual work in which such materials have been used.
- ii. No secured advances are made for any materials, unless they are to be used within three months at the most.
- iii. Materials are actually measured in details before making secured advances on them and their value is based on the actual rates for the purpose of determining the percentage at which secured advances on materials should be made.

Note-2 Imperishable materials include Bricks, Rolled Steel Joists, etc. while articles such as Lime, Sand, kankar, etc. are perishable. Coal is, however, excluded from both the categories and no advance is permissible on his article.

- (b) Cases in which, in the interest of works, it is absolutely necessary to make petty advances, in such cases advances upto Rs. 250 may be allowed by subordinates.
- (c) In all other cases, only with the sanction of the Government who may, in exceptional circumstances authorize such advances as may be deemed indispensable, taking the necessary precautions for securing the Government against loss and for preventing the system from becoming general or continuing longer than is absolutely essential. A register in Form RPWA 68 shall be maintained in respect of Advance Payments made in exceptional circumstances with the sanction of the Government.

Note: The Divisional officer has full powers to make advance payments to Electric Supply under taking under the Indian Electricity Act, 1910 for execution of works.

17. Securities

- 17.1** A performance security shall be provided to the Employer in accordance with the Instructions to Bidders and shall be issued in a form acceptable to the Employer, and denominated in the types and proportions of the currencies in which the Contract Price is payable.
- 17.2** The performance security/security deposit (SD) shall be returned to the Contractor as per clause 2.2.2 Refund of performance security/security deposit SD.
- 17.3** The Employer shall notify the Contractor of any claim made against the institution issuing the performance security.
- 17.4** The Employer may claim against the Amount of Performance Security in full or part may be forfeited in the following cases:
 - i. When the bidder does not execute the agreement in accordance with ITB Clause 6.3(signing of Contract) within the specified time, after issue of LOA; or
 - ii. When the bidder fails to commence the works as per Work Order within the time specified; or

- iii. When the bidder fails to complete contracted work satisfactorily within the time specified; or
- iv. When any term and condition of the contract is breached; or
- v. To adjust any established dues against the bidder from any other contract with the procuring entity; or
- vi. If the bidder breaches any provision of the Code of Integrity prescribed for the bidders specified in the Act, Chapter 6 of the rules and this Bidding Document.
- vii. If any of the following occurs for 14 days or more-
 - a. If the Contractor is in breach of the Contract and the Employer has notified him that he is; and
 - b. The Contractor has not paid an amount due to the Employer.
- viii. Notice of reasonable time will be given in case of forfeiture of Performance Security. The decision of the procuring entity in this regard shall be final.

18. Completion

- (i) "When whole of the work has been substantially completed and have satisfactory passed any Tests on Completion prescribed by the contractor, the Contractor may give a notice to that effect to the Engineer, with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work. The Engineer shall issue a certificate complying completion of the works to the contractor."
- (ii) "If any part of the permanent work has been substantially completed and has satisfactorily passed any Tests on Completion prescribed by the Contract, the Engineer may issue a Completion Certificate in respect of the part of the Permanent Work before completion of the whole of the Works and, upon the issue of such Certificate, the Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in the part of the Permanent Work during the Defects Notice Period." Hence the defect liability period starts on the date on which part/ substantial completion certificate is issued, for that particular part of the permanent work has been substantially completed.

19 Taking Over

"The Employer shall take over the whole works or section of works within Seven (7) days of issuance of Completion Certificate, as per Clause no 52.1 and 52.2."

20. Site Environmental Plan (SEP)

The Contractor should prepare a detailed Site Environmental Plan (SEP) as per the Environmental and Social Management Framework and EMP format attached for location/s identified to be potentially impacted such as but not limited to the work site, base camp. The SEP should include arrangement for disposal of sites for excavated materials, sanitary and other waste, and storage location for fuel, oil and lubricants, facilities for equipment, labour and housing, among others. The SEP should be reviewed and approved prior to construction activities by the Engineer.

21. Safety, Security and Protection of the Environment

(A) General

- i. This section of the Specification sets out limitations on the Contractor's activities specifically intended to protect the environment.
- ii. The Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the works and all associated operations on site or off-site are carried

- out in conformity with statutory and regulatory environmental requirements including those prescribed elsewhere in this document.
- iii. The Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of the Works. This shall wherever possible be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated.
 - iv. In the event of any spoil, debris, waste or any deleterious substance from the Site being deposited on any adjacent land, the Contractor shall immediately remove all such material and restore the affected area to its original state to the satisfaction of the Engineer. This should be monitored regularly in accordance with the Environmental Management Plan.
 - v. During construction, the area should be to avoid trespassing of animals and people. Unauthorized persons should not be allowed within the construction area.
 - vi. During construction, there should be signs to inform public of on-going work, warning on dangers due to trenches along roads, excavations on different sites.
 - vii. Contact town authorities to arrange for the use of excavated material where possible, such as in construction projects, to raise the level of land prior to construction of roads or buildings, or to fill previously excavated areas.
 - viii. Especially for cleaning, desilting, and dredging of drainages: Contact town authorities to arrange for testing and analysis of sludge/excavated materials for hazardous components. If material are hazardous, coordinate with authorities for approve disposal sites;
 - ix. Prevent generation of dust by removing excavated materials as soon as it is excavated, by loading directly onto trucks and covering with tarpaulins to prevent dust during transportation.
 - x. All excavation should be done in the dry seasons to avoid any impacts on surface water drainage if water collects in any quantity, it will need to be pumped out, and it should be then be donated to neighboring farmers to provide a beneficial use to the communities most affected by this aspect of the work.
 - xi. Plant five (5) trees for every tree to be cut.
 - xii. Consult town authorities to identify any buildings at risk from vibration damage and avoiding use of pneumatic drills or heavy vehicles in the vicinity.
 - xiii. Providing wooden bridges for pedestrians and metal sheets for vehicles to allow access across open trenches where required (including access to houses).
 - xiv. Carefully planning of transportation routes with the municipal authorities to avoid sensitive areas as far as possible, including narrow streets, congested roads, important or fragile buildings and key sites of religious, cultural or tourism importance.
 - xv. Consulting historical and archaeological authorities at both national and state level to obtain an expert assessment of the archaeological potential of the site. Alternate location should be considered if the area is medium or high risk.
 - xvi. Developing a protocol in conducting any excavation work to ensure that any chance finds are recognized and measured are taken to ensure they are protected and conserved this should involve having excavation observed by a person with archaeological field training, stopping work immediately to allow further investigation if any finds are suspected; and calling the state archaeological authority if a find is expected and taking any action they acquire ensuring its removal or protection in situ.
 - xvii. Living spaces for access between mounds of excavated soil and providing footbridges so that pedestrians can cross open trenches;
 - xviii. Increasing the workforce in these areas to ensure that work is completed quickly;

(B) . Water Quality

- i. The Contractor shall prevent any interference with the supply to or abstraction from, and prevent any pollution of, water resources (including underground percolating water) as a result of the execution of the Works.
- ii. Areas where water is regularly or repetitively used for dust suppression purposes shall be

- laid to fall to specially constructed settlement tanks to permit sedimentation of particulate matter. After settlement, the water may be re-used for dust suppression and rinsing.
- iii. All water and other liquid waste products arising on the Site shall be collected and disposed of at a location on or off the Site and in a manner that shall not cause either nuisance or pollution.
 - iv. The Contractor shall not discharge or deposit any matter arising from the execution of the Works into any waters except with the permission of the Engineer and the regulatory authorities concerned.
 - v. The Contractor shall at all times ensure that all existing stream courses and drains within, and adjacent to, the Site are kept safe and free from any debris and any materials arising from the Works.
 - vi. The Contractor shall protect all watercourses, waterways, ditches, canals, drains, lakes and the like from pollution as a result of the execution of the Works.

22. Air Quality

- i. The Contractor shall devise and arrange methods of working to minimize dust, gaseous or other air-borne emissions and carry out the Works in such a manner as to minimize adverse impacts on air quality.
- ii. The Contractor shall utilize effective water sprays during delivery manufacture, processing and handling of materials when dust is likely to be created, and to dampen stored materials during dry and windy weather. Stockpiles of friable materials shall be covered with clean tarpaulins, with application of sprayed water during dry and windy weather. Stockpiles of material or debris shall be dampened prior to their movement, except where this is contrary to the Specification.
- iii. Any vehicle with an open load-carrying area used for transporting potentially dust producing material shall have properly fitting side and tail boards. Materials having the potential to produce dust shall not be loaded to a level higher than the side and tail boards, and shall be covered with a clean tarpaulin in good condition. The tarpaulin shall be properly secured and extend at least 300 mm over the edges of the side and tail boards.
- iv. In the event that the Contractor is permitted to use gravel or earth roads for haulage, he shall provide suitable measures for dust palliation, if these are, in the opinion of the Engineer, necessary. Such measures may include spraying the road surface with water at regular intervals.

23. Noise

- i. The Contractor shall consider noise as an environmental constraint in his planning and execution of the Works.
- ii. The Contractor shall take all necessary measures so that the operation of all mechanical equipment and construction processes on and off the Site shall not cause any unnecessary or excessive noise, taking into account applicable environmental requirements. The Contractor shall use all necessary measures and shall maintain all plant and silencing equipment in good condition so as to minimize the noise emission during construction works.
- iii. Using modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions and ensuring they are maintained to manufacturers' specifications.

24. Control of Wastes

- i. The Contractor shall control the disposal of all forms of waste generated by the construction operations and in all associated activities. No uncontrolled deposition or dumping shall be permitted. Wastes to be controlled shall include, but shall not be limited to, all forms of fuel and engine oils, all types of bitumen, cement, surplus aggregates, gravels, bituminous mixtures, etc. The Contractor shall make specific provision for the proper disposal of these and any other waste products, conforming to local regulations and acceptable to the Engineer.

25. Emergency Response

- i. The Contractor shall plan and provide for remedial measures to be implemented in the event of occurrence of emergencies such as spillages of oil or bitumen or chemicals.
- ii. The Contractor shall provide the Engineer with a statement of the measures he intends to implement in the event of such an emergency which shall include a statement of how he intends to provide personnel adequately trained to implement such measures.
- iii. Should any pollution arise from the Contractor's activities he shall clean up the affected area immediately at his own cost and to the satisfaction of the Engineer, and shall pay full compensation to any affected party.

26 Protection of Trees and Vegetation

The Contractor shall ensure that no trees or shrubs or waterside vegetation are felled or harmed except for those required to be cleared for execution of the Works. The Contractor shall protect trees and vegetation from damage to the satisfaction of the Engineer. No tree shall be removed without the prior approval of the Engineer and any competent authorities. Should the Contractor become aware during the period of the Contract that any tree or trees designated for clearance have cultural or religious significance he shall immediately inform the Engineer and await his instructions before proceeding with clearance. In the event that trees or other vegetation not designated for clearance are damaged or destroyed, they shall be repaired or replaced to the satisfaction of the Engineer, who shall also impose a penalty to twice the commercial value of any timber affected, as assessed by the Engineer.

27. Water Supply and Electric Power

The Contractor shall make his own arrangements at his own expense for water supply and electric power supply for construction, testing and other purposes. Only clean water free from deleterious

28. Fire Prevention

68.1 The Contractor shall take all precautions necessary to ensure that no vegetation along the line of the road outside the area of the permanent works is affected by fires arising from the execution of the Works. The Contractor shall obtain and follow any instructions of the competent authorities with respect to fire hazard when working in the vicinity of gas installations. Should a fire occur in the natural vegetation or plantations adjacent to the road for any reason the Contractor shall immediately suppress it. In the event of any other fire emergency in the vicinity of the Works the Contractor shall render assistance to the civil authorities to the best of his ability. Areas of forest, scrub or plantation damaged by fire considered by the Engineer to have been initiated by the Contractor's staff or labour shall be replanted and otherwise restored to the satisfaction of the Engineer at the Contractor's expense.

29. Fossils

The Contractor shall make his staff available for briefing on archaeological matters as directed by the Engineer.

30. Clearance of Contractor's Facilities

On or before expiry of the Defects Notice Period the Contractor shall clear away all his temporary facilities including but not limited to offices, camps, storage and holding yards, workshops, crushing and mixing plant, diversion and haul roads so that the land is returned to at least its previous condition and, in the case of agricultural land, potential productivity. Clearance shall include but not be limited to tasks such as the removal of unwanted structures, removal of metallic and concrete debris, removal and disposal of any soil contaminated by diesel, bitumen or other polluting material, ripping to relieve compaction,

grading, replacement of topsoil, and turfing and grassing, as appropriate. Where improvements have been made such as land filling or installation of boreholes or construction of boat landings these may be retained subject to the agreement of the landowner. The Employer reserves the right to inspect the site of any facilities established or used by the Contractor in connection with the Works and to undertake any corrective measures necessary to restore the land, and to recover the cost from monies due or to become due to the Contractor.

31. Fair Wages

31.1 The Contractor shall pay not less than fair wage/minimum wages to laborer's engaged by him on the work as revised from time to time by the Government of Rajasthan, but the Government shall not be liable to pay anything extra for it except as stipulated in price adjustment clause (Clause 41) of the Contract.

(Explanation: "Fair wage" means minimum wages for time or piece work, fixed or revised, as established by the State Government under the Minimum Wages Act, 1948.)

31.2 The Contractor shall, notwithstanding the provisions of any Contract to the contrary, cause to be paid fair wages to laborers indirectly engaged on the work, including any labour engaged by his sub-Contractors in connection with the said work, as if the laborers have been immediately or directly employed by him.

31.3 In respect of all laborers, immediately or directly employed on the work, for the purpose of the Contractor's part of this agreement, the Contractor shall comply with or cause to be complied with, the Public Works Department Contract Labour Regulations' made, or that may be made, by the Government, from time to time, in regard to payment of wages, wage period, deductions from wages, recovery of wages not paid, and unauthorized deductions, maintenance of wages register, wage card, publication of scale of wages and other terms of employment, inspection and submission of periodical returns, and all other matters of a like nature.

31.4 The Engineer shall have the right to deduct, from the money due to the Contractor, any sum required or estimated to be required for making good the loss suffered by a worker or workers by reasons of non-fulfillment of the conditions of the Contract for the benefit of the worker or workers, non-payment of wages or of deductions made there from, which are not justified by the terms of the Contract or as a result of non-observance of the aforesaid regulations.

31.5 Vs-à-Vs the Government of Rajasthan the Contractor shall be primarily liable for all payments to be made and for the observance of the regulations aforesaid, without prejudice to his right to claim indemnity from his sub-Contractors.

31.6 The regulations, aforesaid, shall be deemed to be part of this Contract and any breach thereof, shall be deemed to be breach of the Contract.

32. Safety and Accident Prevention Officer

Due precautions shall be taken by the Contractor, at his own cost, to ensure the safety and protection against accidents of all staff and labour engaged on the Works, local residents in the vicinity of the Works, and the public travelling through the Works. The Contractor shall have on his staff on Site a designated officer qualified to promote and maintain safe working practices. This officer shall have authority to issue instructions and shall take protective measures to prevent accidents, including but not limited to the establishment of safe working practices and the training of staff and labour in their implementation.

33. Protective Clothing and Footwear

- 33.1 The Contractor shall, at his own expense, provide protective clothing and equipment to all staff and labour engaged on the Works to the satisfaction of the Engineer, and on his failure to do so the Employer shall be entitled to provide the same and recover the cost from the Contractor. Such clothing and equipment shall include, at a minimum, protective footwear for workmen undertaking concrete mixing work, protective footwear and gloves for any workmen performing bituminous paving works, protective footwear, clothing, cream, gauntlet-type gloves, hats, safety glasses or goggles and filter masks for workmen undertaking lime stabilisation works, hard hats for workmen engaged on bridge construction, and otherwise as appropriate to the job in hand and to the Engineer's satisfaction.
- 33.2 Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (PPE), Health and safety training should be conducted for all site personnel; availability of documented procedures to be followed for all site activities; and documentation of work-related accidents;

34. First-Aid Services

The Contractor shall, at his own expense, provide first aid equipment at all camps and work sites to the satisfaction of the Engineer, and shall ensure that at all work sites where 40 or more persons are engaged on the Works there shall at all times be a person qualified in first-aid with access to appropriate first-aid equipment. A first-aid post shall be established at each base camp comprising a suitable room with two beds, washing and examination facilities, appropriate medical supplies, and staffed on a full-time basis by a qualified paramedical attendant.

35. Health and Pests

The Contractor shall at his own expense and throughout the period of the Contract ensure that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements for his staff and labour, and shall comply with all the regulations and requirements of the local health authorities with respect to disease prevention and control. He shall warn his staff and labour of the dangers of communicable diseases including those transmitted by insects, water, faecal/oral contact and sexual activity. The Contractor shall take the precautions necessary to protect all staff and labour employed on the Site from insect nuisance, rats and other pests and minimise the dangers to health and the general nuisance caused by the same. Should malaria or other insect-borne diseases be prevalent in the area, he shall provide his staff and labour with suitable prophylactics, equip living accommodation with screens and bed-nets, and carry out spraying with approved insecticides, as appropriate and to the Engineer's satisfaction.

36. Disorderly Conduct

The Contractor shall at all times take reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his employees and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same. "Disorderly conduct" shall include but not be limited to harvesting of natural resources such as firewood or fish by the Contractor's labour when this is done to the detriment of pre-existing local interests.

37. Records of Labour and Accidents

The Contractor shall maintain full records of numbers, working hours and wages of labour, safety, health and welfare of persons, accidents, and damage to property and make such reports on these matters to the Engineer as he may from time to time prescribe.

38. General

Unless otherwise indicated elsewhere in the Contract, The General Specification for civil works and the Quality Assurance and Quality Control (QAQC) document, as issued by the PMU of RUIDP, shall be followed. The QAQC document of JDA is an integral part of the document and it will be provided with the bid document. A copy of the same shall be made available at the site by the contractor.

39. Site Office for Engineer and Other Supervisory Staff

The Contractor shall arrange to provide office of minimum 100 sq. ft. size as per specification with two tables, four chairs, one steel almirah, sufficient number of display board, telephone etc. fully furnished office accommodation within 15 days from the date of commencement of same and shall become property of the Contractor at the completion of the work. The electrical charges / water charges and all other charges shall be arranged within the area of the work. Approval shall be taken from Engineer prior to making arrangement of the office. The construction of site office and its or maintenance are incidental to the work. The office shall be functional until work is completed. If Engineer found that office arranged by the contractor is not being maintained properly then Engineer has right to deduct a reasonable amount from that payment. In case adequate space is not available for setting up of such office, the Engineer may waive such requirement on being requested by the Contractor, in writing.

40. Field Laboratory

40.1 Within 15 (Fifteen) days from the date of commencement of the work, the Contractor shall arrange to provide a 250 sqft. fully furnished and adequately equipped field laboratory as per Specifications and directions of the Engineer, 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 found that Laboratory arranged by the Contractor is not being maintained properly then Engineer has right to deduct a reasonable amount from payment. The construction of Field Laboratory & its maintenance are incidental to the work. Notwithstanding the above, the Engineer may agree to the Contractor's proposal to use facilities of accredited/ Government laboratories, upon scrutinising the details of such laboratories, submitted by the Contractor. Even in that case also, the Contractor will keep and maintain certain basic equipment at site as mentioned under Section V: Procuring Entity's Requirement.

40.2 The calibration of the laboratory equipments and instruments shall at the initial stage to be certified by agencies approved by the Engineer. 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 sufficient advance prior to conducting any tests for the materials and work. The Engineer will also inspect the laboratory and the contractor shall provide adequate facilities to the Engineers for his independent verification of the accuracy and adequacy of the facilities.

41. Pre-Construction Inspection, Testing & Review of Data for Materials, Plant & Equipment

41.1 The contractor shall place order for the material and the equipment only after the approval of the Engineer. The Contractor shall submit the detailed drawings for the approved manufacturer and the procedure of submission, review and revision shall be specified herein below.

41.2 The Contractor shall inform the Engineer about the likely dates of manufacturing, testing and dispatching. The Contractor shall notify the Engineer for Inspection and Testing, at least twenty-eight days prior to packing and shipping and shall supply the manufacturer's test

results and quality control certificates. The Engineer will decide whether he or his representative will inspect and test the material/ equipment or whether he will approve it on the basis of manufacturer's certificate.

41.3 The inspection and test categories shall be applied prior to delivery of the equipment, of various categories as indicated in the technical specifications for each type of the equipment.

Category A: - The Drawing has to be approved by the Engineer before manufacturing and Testing. The material has to be inspected by the Engineer or by an Inspecting agency approved by the Engineer at the manufacturer's premise before packing and dispatching. The Inspection charges of the agency will be borne by the Employer but the contractor has to pay the inspection charges. The Contractor shall include in their next bill the inspection charges and the same will be reimbursed by the Employer from the provisional Sum. The Contractor shall provide the necessary equipment and facilities for tests and the cost, thereof, shall be borne by the Contractor. In case of failure of any item during third party inspection no charges shall be reimbursed to the contractor for the same.

Category B:- The drawings of the Equipment have to be submitted and to be approved by the Engineer prior to manufacture. The material has to be tested by the manufacturer and the manufacturer's test certificates are to be submitted and approved by the Engineer before dispatching of the Equipment. Notwithstanding the above, the Engineer, after examination of the test certificates, reserves the right to instruct the Contractor for retesting, if required, in the presence of Contractor's representative.

Category C: The material may be manufactured as per standard and delivered to the site.

For material / Equipment under category "A" and "B", the Engineer will provide an authorization for packing and shipping after inspection.

The testing, approval for dispatching shall not absolve of the Contractor's obligation for satisfactory performance of the plant."

Indicative list of Inspection Items with Category

S. No.	Item	Category of inspection
1	Cement, Steel, Bricks	Category A
2	Electric Cable, Conductors	Category A
3	Electric poles	Category A
4	Bitumen	Category A
5	Others as directed by Engineer & as mentioned in QA/QC manual	

42. Supply of Colored Record Photographs

The Contractor shall, at his own cost, arrange to take colour photographs at various stages / facets of the work including interesting and novel features of the work as directed by the Engineer and supply two copies of colour record photographs mounted in the albums including negatives with specification and these shall be kept by Employer.

43. Public Awareness / Information Display

The Contractor shall, at his own cost, arrange to provide, erect and maintain necessary display boards/ banners etc. at selection points of project site giving such information as considered necessary for public awareness/ information/ safety as directed by the Engineer.

44. Contractor's Responsibilities

The contractor shall promptly inform the Employer and the Engineer of any error, omission, fault, or any other defect in the design or drawings or specification for the works, which he discovers when reviewing the contract documents, or in the process of execution of the works. The Engineer will resolve the ambiguity or correct the error and will notify the contractor of the interpretation to be adopted.

45. Services

45.1 Underground and overhead services are likely to be met with during construction. These are to be protected against damage by the Contractor at his own cost.

45.2 The contractor shall be required to carry out removal / shifting of existing utilities at his own cost. The contractor work program shall include this activity. The work shall be carried out under supervision of concerned department. The supervision charges of the line agencies shall be paid by the contractor and shall be reimbursed on actual on submission of receipt.

45.3 In cases of utilities to be shifted by Govt. departments, no amount shall be paid extra for shifting/ co-ordination. The employer would provide full support to contractor in coordinating with line agencies; however, no claim on account of delay in shifting of utilities by line department will be admissible.

46. Setting Out

46.1 The Contractor(s) shall set out the whole of the work in conjunction with an officer to be deputed by the Engineer and during the progress of the work to amend on the requisition of the Engineer any errors which may arise therein and provide all the necessary labour materials and equipments for so doing. The contractor(s) is/are to provide all tools, plant, machinery, labour and materials (with the exceptions noted in the relevant clauses for issue of departmental materials as per schedule attached) which may be necessary and required for the work. All materials and workmanship shall conform to the relevant specifications mentioned in the tender documents.

46.2 During execution of pile foundation, if there is any variation in soil strata which was not anticipated earlier, the matter shall be referred to Engineer – in – charge for review and modification of design by the competent authority, if considered necessary. Time taken in this process is consider in the original completion period, however no claim on account of delay in getting the sanction from competent authority will be admissible.

46.3 The contractor shall carryout the detailed topographic survey at site and prepare the pre-commencement survey map for approval of the Engineer's representatives. Based on the approved Pre-commencement survey map, the contractor will prepare the necessary working drawings for the purpose of execution.

46.4 Contractor shall be responsible for taking all traffic block and shutdowns etc. from west central railway authority for execution in railway land / spans. Contractor will get all designs and drawings approved from west central railway authority for all temporary and permanent works of railway land / spans. This will be all incidental to the work. No separate claim on this account shall be payable.

46.5 Defect liability period shall be 5 year. Contractor shall furnish an affidavit from the manufacture / supplier firms before actual date of completion.

47. Labor

47.1 Engagement of Staff and Labor

- a) Except as otherwise stated in the Specification, the Contractor shall make arrangements for the engagement of all staff and labor, local or otherwise, and for their payment, housing, feeding and transport.
- b) The contractor shall pay equal wages for men and women for work of equal value or type.
- c) The Contractor shall provide and employ on the Site in the installation of the Facilities such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged to use local labor that has the necessary skills.
- d) The Contractor shall be responsible for obtaining all necessary permit(s) and/or Visa(s) from the appropriate authorities for the entry of all labor and personnel to be employed on the Site into the country where the Site is located. The Employer will, if requested by the Contractor, use his best endeavors in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national or government permission required for bringing in the Contractor's personnel.
- e) The Contractor shall at its own expense provide the means of repatriation to all of its and its Subcontractor's personnel employed on the Contract at the Site to the place where they were recruited or to their domicile. It shall also provide suitable temporary maintenance of all such persons from the cessation of their employment on the Contract to the date programmed for their departure. In the event that the Contractor defaults in providing such means of transportation and temporary maintenance, the Employer may provide the same to such personnel and recover the cost of doing so from the Contractor.
- f) Be required to employ atleast 50% of the labour force from communities within a radius of 2kms from the site, if sufficient people are available.

47.2 Persons in the Service of Employer

The Contractor shall not recruit, or attempt to recruit, staff and labor from amongst the Employer's Personnel.

47.3 Labor Laws

- (a) The Contractor shall comply with all the relevant labor Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.
- (b) The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst its employees and the labor of its Subcontractors.
- (c) The Contractor shall, in all dealings with its labor and the labor of its Subcontractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor.

47.4 Rates of Wages and Conditions of Labour

- (a) The Contractor shall pay rates of wages, and observe conditions of labor, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.

- (b) The Contractor shall inform the Contractor's Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages and allowances as are chargeable under the Laws for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

47.5 Working Hours

- (a) No work shall be carried out on the Site on locally recognized days of rest, or outside the Normal working hours, which shall be 9.00 AM to 5.00 PM on all days of the week., unless:
 - (i) otherwise stated in the Contract,
 - (ii) the Engineer gives consent, or
 - (iii) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer.
- (b) If and when the Contractor considers it necessary to carry out work at night or on public holidays so as to meet the Time for Completion and requests the Engineer's consent thereto, the Engineer shall not unreasonably withhold such consent.
- (c) This Sub-Clause shall not apply to any work, which is customarily carried out by rotary or double-shifts.

47.6 Facilities for Staff and Labor

- (a) Except as otherwise stated in the Specification, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Specification.
- (b) The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.

47.7 Health and Safety

- (a) The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.
- (b) The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the performance of the Contract, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.
- (c) The Contractor shall send, to the Engineer, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Engineer may reasonably require.

(d) The Contractor shall throughout the contract (including the Defect Liability Period):

- (i) conduct Information, Education and Consultation Communication (IEC) campaigns, at least every other month, addressed to all the Site staff and labor (including all the Contractor's employees, all Sub-Contractors and Employer's and Engineer's employees, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to of Sexually Transmitted Diseases (STD)—or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular;
- (ii) provide male or female condoms for all Site staff and labor as appropriate; and
- (iii) provide for STI and HIV/AIDS screening, diagnosis, counseling and referral to a dedicated national STI and HIV/AIDS program, (unless otherwise agreed) of all Site staff and labor.

The Contractor shall include in the program to be submitted for the execution of the Facilities under Sub-Clause 18.2 an alleviation program for Site staff and labor and their families in respect of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS. The STI, STD and HIV/AIDS alleviation program shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation of this program shall not exceed the Provisional Sum dedicated for this purpose

47.8 Funeral Arrangements

In the event of the death of any of the Contractor's personnel or accompanying members of their families, the Contractor shall be responsible for making the appropriate arrangements for their return or burial, unless otherwise specified in the SCC.

47.9 Records of Contractor's Personnel

The Contractor shall keep accurate records of the Contractor's personnel, including the number of each class of Contractor's Personnel on the Site and the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis in a form approved by the Engineer and shall be available for inspection by the Engineer. Until the Contractor has completed all work.

47.10 Supply of Foodstuffs

The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.

47.11 Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

47.12 Measures against Insect and Pest Nuisance

The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce their danger

to health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

47.13 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift barter or disposal by Contractor's Personnel.

47.14 Arms and Ammunition

The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

47.15 Prohibition of All Forms of Forced or Compulsory Labour

The contractor shall not employ "forced or compulsory labor" in any form. "Forced or compulsory labor" consists of all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.

47.16 Prohibition of Harmful Child Labor

The Contractor shall not employ any child to perform any work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. "Child" means a child below the statutory minimum age of 14 years.

48. MONITORING

Provision for regular monitoring will be mcommissade as per the Environmental Management Plan and actions will be taken in case of non-compliance.

49. Special conditions:

The contractor shall responsible for 5 year operation and maintenance of all the services commissioned by contractor under the contract. No extra payment shall be made for the following:

- The contractor should deploy staff for working hours between 8:00 AM to 10:00 PM as per below-
 1. At-least one electrician per shift of max. 8 hrs. with one supervisor. Electrician shall have electrical wireman license with min. 2 year experience and supervisor shall have electrical supervisor license with min. 3 year experience.
 2. At-least one lift operator for each lift each shift of max. 8 hours. One supervisor with min. 3 year lift work experience.
 3. One experienced operator of force ventilation for each shift of max. 8 hours with 2 year experience. One supervisor with min. 3 year for ventilation work experience.
 4. One experienced operator for fire detection and firefighting system for each shift of max. 8 hrs. Shall have 2 year experience with one supervisor having min. 3 year experience of fire system work.
 5. One operator for parking Management and CCTV security system for each shift of max. 8 hrs. The operator shall have CCNA certificate with at-least 2 year experience. One supervisor having IT Diploma with Min. 3 year experience.
- For complete supervision of all services one engineer should be deployed by the contractor. The engineer shall have Degree or Diploma with Min. 5 year experience in electrical field.

- The operation and maintenance of the installation shall be carried out between 8:00 AM to 10:00 PM including Saturday, Sunday and other holidays. Necessary staff required for the work shall be deployed on shift duty with necessary reliever for weekly off purpose. All necessary tools required for the maintenance shall be provided by contractor.
- The staff deployed in the parking should be in proper uniform with safety apparels, photo identity cards.
- The contractor shall be responsible to maintain all record that are required for the purpose of operation and maintenance including logbook, complaint register, inventory register, attendance register and all other records as is considered necessary.
- The contractor shall be responsible for any act of negligence on his part or on the part of employee due to mishap or accident occurred in the system and injuries thereon.
- The contractor or sub-contractor engaged in the work shall possess valid electrical contractor licenses.
- If any fault and damage occurs in the system/installations, same shall be repaired/restored in two hours. If fault not removed in scheduled time, penalty will imposed as below-

○ For minor fault –	- 0 to 2 Hours.	- NIL
After 2 hours -	- Rs. 100 per hour.	
○ For minor equipment damage	- 0 to 6 Hrs.	-NIL
After 6 Hrs.	- Rs. 500 per day.	
○ Major equipment fault/damage	- 0 to 7 days	-NIL
After 7 days	- Rs. 5000 per Week	
- The contractor shall submit original equipment manufacturer's certificate for all major items with five years warranty.
- All the equipment should have factory inspection by JDA's engineer in charge as per prevailing IS code, prior to dispatch the material. All the expenses occurred during the inspection will be borne by the contractor.

50. Change of Scope

50.1 Authority may, notwithstanding anything to the contrary in this Agreement, require provision of such addition/deletion to the works and services on or about the Project which are beyond the scope of the Project as contemplated by this Agreement (Change of Scope), Provided such change do not require expenditure exceeding/ reducing by 10% of project cost and do shall be made by Authority by an order (the "change of Scope order") issued in accordance with the procedure set forth in sub clause 50.2

50.2 Procedure for Change of Scope

- a. Authority shall whenever it desires provision of addition/deletion of works and services referred to in sub clause 50.1 above, issue to bidder a notice of Change of Scope (the "Change of Scope Notice") through Engineer In-charge.
- b. Upon receipt of Change of Scope Notice, the bidder shall, within a period of 15 (fifteen) days, provide to the Engineer In-charge such information as is necessary and reasonable together with preliminary documentation in support of the following:
 - I. The impact which the Change of Scope is likely to have on the Project Completion Schedule if the work is required to be carried out before construction period and
 - II. The cost to the bidder of complying with such Change of Scope Notice on account of increases in quantities of items of work mentioned in the Bill of Quantities at the rate mentioned therein. In case the Bill of quantities does not

carry certain items of work required under the Change of Scope, the bidder shall provide the analysis of rates-for carrying out such items of work.

- c. Engineer In-charge shall review the information provided by the bidder, assess the change in quantities of items of work, verify the analysis of rates if required, determine the additional cost to the bidder as a result of such Change of Scope and determine the extension/ reduction, if any, to the construction period provided that there will be no change in construction period if the change in the project cost is upto 2%, Provided that where the change in project cost is beyond 2%, then the proposed extension/ reduction to the construction period would taken into account the total change in the project cost (including 2% above).
- d. Authority shall issue the Change of Scope Order within a period of 15 (fifteen) days from the date of recommendation made by the Engineer In-charge in accordance with preceding sub clause (c) above.
- e. The Change of Scope Order shall be effective and binding upon receipt thereof by the bidder, Notwithstanding a Dispute regarding cost and time for implementation of such order, the bidder shall proceed with the performance of such order promptly following; receipt thereof. Any Dispute regarding the extension in the construction period recommended by the Engineer In-charge shall be resolved in accordance with the Dispute Resolution Procedure.

SECTION V C

CONTRACT FORMS

Table of Contents

1. Letter of Acceptance
2. Contract Agreement
3. Performance Security
4. Performance Security Declaration

1. Letter of Acceptance**Letter of Acceptance*****[on letter head paper of the Procuring Entity]***

No.

Dated

To: ***[name and address of the Contractor]*** Subject: ***[Notification of Award for the Works]***

This is to notify you that your Bid dated ***[date]*** for execution of the
 ... ***[name of the contract and identification number, as given in the Contract Data]***
 for the Accepted Contract Amount of the equivalent of ***[amount in numbers and words and name of currency]***, as corrected and modified
 in negotiations and in accordance with the Instructions to Bidders has been accepted
 by ***[designation of the Procuring Entity]*** The date of commencement
 and completion of the Works shall be:

You are requested to furnish the Performance Security/ Performance Security Declaration within Days in the form given in the Contract Forms for the same for an amount equivalent to Rupees within days of notification of the award valid up to 60 days after the date of expiry of Defects Liability Period and maintenance period, if applicable, and sign the Contract, failing which action as stated in sub-section 2 of section 42 of the Rajasthan Transparency in Public Procurement Act, 2012 and Instructions to Bidders shall be taken.

Authorized Signature:

Name and Title of Signatory: THE EXECUTIVE ENGINEER (ROB/RUB-IV) Jaipur
 Development Authority

Designation:

2. Contract Agreement.

Contract Agreement Works

THIS AGREEMENT made this day of 2021, between Government of Rajasthan, represented by the Executive Engineer, JDA (Jaipur development Authority) Ram Kishor Vyas Bhawan, Indira Circle, Jawahar Lal Nehru Marg, Jaipur-302004 (hereinafter "the Employer") which expression shall, where the context so admits, be deemed to include his successors in office and assigns, of the one part and M/S _____(Contractor name)_____ (Contractor address) (hereinafter "the Contractor"), which expression shall, where the context so admits, be deemed to include his heirs, successors, executors and administrators, of the other part:

WHEREAS the Employer desires that the Works known as [name of the Contract] should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects therein, and for which the Contractor has submitted Performance Security for Rupees ----- in the form of -----(For Jaipur Development Authority)

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
 - a) the Letter of Acceptance;
 - b) RFP as uploaded in eproc.rajasthan.gov.in; sppp.rajasthan.gov.in
 - c) Any addendum, corrigendum issued.
 - d) the Bid of the Contractor as accepted along with the correspondence done on it, if any;
3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor Rupees _____/- Rupees (word only) + GST as consideration for execution and completion of the Works and the remedying of defects therein, in the manner prescribed by the Contract.
5. All the terms and conditions of NIT _____, Jaipur will be part of this agreement.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of India on the day, month and year indicated above.

Signed by
Executive Engineer
Jaipur Development Authority

Signed by
Contractor
for and on behalf the Contractor

Witness, Name, Signature, Address
Signature, Address
Signed by

Witness, Name,
Signed by

3. Performance Security

(Format of the Bank Guarantee Bond Against Earnest Money Deposit,

En cashable at branch of the bank in Jaipur City).

The Secretary,

Jaipur Development Authority

Jaipur.

Whereas Jaipur Development Authority through Executive Engineer ROB/RUB-IV, (hereinafter called 'The Jaipur Development Authority') has called for tenders for execution of work " Ramniwas Bagh Underground Parking Phase-II"Jaipur" estimated to cost Rs.(Rupees.....only) on (Date) or any extended date as per normal rules.

1. In consideration of Jaipur Development Authority having made such a stipulation in Rules and M/s(name of contractors) are desirous of depositing Earnest Money Rs. (Rupees only) in the form of Bank Guarantee as Earnest Money in order to participate in the tender for work abovementioned as per Rules and will be so permitted on production of a Bank Guarantee for Rs. (Rupees.....only) We.....(name and address fo Bank) having Registered office hereinafter referred to as the Bank at the request of M/s Contractor (s), do hereby undertake to pay to Secretary, Jaipur Development Authority an amount not exceeding Rs./- (Rupees only) on demand.
2. We(name and address of bank)....., do hereby undertake to pay Rs./- (Rupees Only) The amount due and payable under this guarantee without any demur or delay, merely on a demand from Secretary, Jaipur Development Authority any such demand made on the bank by the Jaipur Development Authority shall be conclusive and payable by the Bank under the guarantee. The Bank Guarantee shall be completely at the disposal of Secretary, Jaipur Development Authority and We(name and address of bank)....., bound ourselves with all directions given by Jaipur Development Authority regarding this Bank Guarantee However our Liability under this guarantee shall be restricted to an amount not exceeding Rs./- (Rupees Only).
3. We the(Name and address of Bank), undertake to pay Jaipur Development Authority any money so demanded notwithstanding any dispute or disputes raised by the contractor (s) any suit or proceeding pending before any Court or Tribunal or Arbitrator etc. Relating thereto our liability under these presents being absolute, unequivocal and unconditional.
4. We(Name and address of Bank), further agree with Jaipur Development Authority that the Jaipur Development Authority shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Jaipur Development Authority against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor (s) or for any forbearance, act or omission on the part of the Jaipur Development Authority or any indulgence by

the Jaipur Development Authority or the said Contractor (s) or by any such matter or thing whatsoever which would but for this provision have effect of so relieving us.

5. The liability of us (Name and address of Bank), under this guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s).
6. We(Name and address of Bank), lastly undertake not to revoke this guarantee except with the consent of Jaipur Development Authority in writing.
7. This Bank Guarantee shall remain valid and in full effect, until it is decided to be discharged by the Jaipur Development Authority. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs.....
8. It shall not be necessary for Jaipur Development Authority to proceed against the contractor before proceeding against the guarantee herein contained shall be enforceable against the Bank notwithstanding any security which Jaipur Development Authority may have obtained or obtain from the Contractor.
9. That on demand of JDA, this Bank Guarantee is encashable at following branch in Jaipur City.

1. Name of Bank:

2. Name of the branch with branch code:

3. Address:

4. E-Mail Id:

5. Telephone No.

6. Fax No.:

If the last date of expiry of the Bank Guarantee happens to be a holiday of the Bank, the Bank Guarantee shall expire on the close of the next working day.

10. We(Name and address of Bank), undertake that the amount covered under the above Bank Guarantee shall be automatically be credited in the accounts of JDA in ICICI Bank, JDA Campus, Jaipur through IFSC Code No ICIC0006754, Bank Account No. 675401700518 on the date of expiry or its validity, unless the agencies get it re-validated well before its expiry date or produce NOC from JDA in written for its release.

11. All claims under the guarantee will be **payable at Jaipur**.

This guarantee will be returned to us as soon as the purpose for which it is issued is fulfilled' The BG Confirmation letter No is an integral part of the BG No.

Date _____ Signature of the Bank _____

Witness _____ Seal _____

[Signature, Name and Address]

[Note: To be furnished on appropriate non-judicial stamps.]

4. Performance Security Declaration (Applicable for Public Undertaking departments)**Form of Performance Security Declaration**Date: _____ ***[insert date (as day, month and year)]***Contract Name and No.: _____ ***[insert name and number of Contract]***To: _____ ***[insert Designation and complete address of Procuring Entity]***

We, the undersigned, declare that:

We understand that, according to your conditions, the Contract must be supported by a Performance Security Declaration as a guarantee to ensure fulfillment of our all performance obligations under the Contract for _____ ***[insert name of subject matter of procurement]***.

We accept that we will automatically be suspended from being eligible for bidding in any contract with you for the period of time of _____ ***[Procuring Entity to indicate here the period of time for which the Procuring Entity will declare a Bidder ineligible to be awarded a Contract if the performance Security Declaration is to be executed]*** starting on the date that we receive a notification from you, the _____ ***[Designation of the Procuring Entity]*** that our Performance Security Declaration is executed, if we are in breach of any of our performance obligation under the conditions of the Contract,

We understand this Performance Security Declaration shall expire after 60 days of completion of our all obligations under the Contract including Defect Liability, warranty/ Guarantee, etc. in accordance with the conditions of the Contract.

Signed: _____

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

In the capacity of: _____

[insert legal capacity of person signing the Performance Security Declaration]

Name: _____

[insert complete name of person signing the Declaration]

Duly authorized to sign the Contract for and on behalf of: _____

[insert complete name and address of the Bidder]Dated on _____ day of _____, _____ ***[insert date of signing]***

Corporate Seal _____

SECTION VI SHE MANAGEMENT

PART – I : SHE MANAGEMENT

1.0 General

1.1 Scope

1.1.1 This document defines the principal requirements of the Employer on Safety, Health and Environment (SHE) associated with the contractor / sub-contractor and any other agency to be practiced at construction worksites at all time.

1.2 Definition / languages

1.2.1 In this document

- i) The use of 'shall' indicates a mandatory requirement.
- ii) The use of 'should' indicates a guideline that is strongly recommended.
- iii) The use of 'may' indicates a guideline that is to be considered.
- iv) 'SHE' means Safety, Health and Environment.
- v) Employer means Jaipur Development Authority., (JDA).
- vi) Chief Safety Officer means an officer nominated by JDA who is overall responsible for monitoring all SHE functions prescribed in this document.
- vii) BOCWA means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996
- viii) BOCWR means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998
- ix) RBOCWR means Rajasthan Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2002
- x) DG means Director General of Ministry of Labour, Govt. of India.
- xi) CIIBC means Chief Inspector of Inspection of Building and Other Construction of Govt. of Rajasthan.

1.3 Application of this document

1.3.1 This document applies to all aspects of the contractor's scope of work, including all aspects conducted by sub-contractors and all other agencies. There shall be no activity associated to the contract, which is exempted from the purview of this document.

1.4 Purpose of this document

1.4.1 The objective of these guidelines is to ensure that adequate precautions are taken to avoid accidents, occupational illness and harmful effects on the environment during construction.

1.4.2 This document:

- i) Describes the SHE interfaces between Employer and the Contractor.
- ii) Details the processes by which the contractor shall manage SHE issues while carrying out the work under the contract.
- iii) Describes by reference, the practices and procedures as given in the JDA Project Safety, Health & Environment manual for best SHE performance.

1.4.3 **These requirements shall be read together with JDA Project SHE Manual, OHSAS 18001-1999, Occupational Health and Safety Management System and ISO 14001: 2004 Environmental Management Systems. Definition of**

key terms used in these requirements related to OHSAS 18001 and ISO 14001 standard are found in JDA's Project SHE Manual.

2.0 'SHE' Targets and Goals

2.1 The SHE targets, goals and aim for the Works are to achieve:

- i) Zero total recordable injuries.
- ii) Zero reportable environmental incidents
- iii) All personnel inducted in accordance with the approved contractor SHE plan
- iv) Total compliance of conducting inspections and audits as per approved SHE plan
- v) 100% incident recording and reporting
- vi) 100% adherence of usage of appropriate PPEs at work.
- vii) Executing construction work with least disturbance to the environment, adjoining road users and traffic.

3.0 Compliance

3.1 Memorandum of Understanding (MOU)

3.1.1 A Memorandum of Understanding placed at **Appendix No.: 1** shall be executed before the award of contract by the contractor with regard to various provisions on Safety, Health and Environment to be practiced during the construction work.

3.2 JDA's SHE Policy and Management Systems

3.2.1 The construction works shall be undertaken in accordance with JDA's SHE Policy and Management Systems as amended from time to time provided in Project SHE Manual.

3.3 Indian statutory requirements

3.3.1 Primary statutory regulations

3.3.1.1 **Contractor shall develop thorough understanding about Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, Central Rules 1998, Building and Other Construction Workers' Welfare Cess Act, 1996 and Central Rules, 1998 and, not only to satisfy the Inspectors' perspective but the use of legislation as the strong tool for effective SHE management at construction worksites. Contractor is strongly advised to practice the principle of voluntary compliance.**

3.3.1.2 In order to facilitate the contractor for better understanding on the various provisions of the above Act and Rajasthan Govt. Rules, a tabulated information highlighting the Sections/Rules referring to the corresponding registration of contractors, maintenance of registers and records, hours of work and wages, welfare, medical facilities and safety requirements are given in **Appendix No.: 2**. It is an indicative one and not a limiting list.

3.3.2 In addition, the construction works shall be undertaken in accordance with all applicable legislation and Indian statutory requirements listed below but not limiting to:

- i) Indian Electricity Act 2003 and Rules 1956
- ii) National Building Code, 2005
- iii) Factories Act, 1948, Central Govt, Rajasthan Govt Factories Rules.

- iv) Motor Vehicles Act as amended in 1994 and The Central Motor Vehicles Rules, 1989.
- v) Indian Road Congress Code IRC: SP: 55-2001 'Guidelines on Safety In Road Construction Zones.
- vi) The Petroleum Act, 1934 and Rules 1976
- vii) Gas Cylinder Rules, 2003
- viii) Indian Explosives Act. 1884, along with the Explosives substance Act 1908 and the Explosives Rules 1983
- ix) The (Indian) Boilers Act, 1923
- x) The Public Liability Insurance Act 1991 and Rules 1991
- xi) Minimum Wages Act, 1948 and Rules 1950
- xii) Contract Labour Act, 1970 and Rules 1971
- xiii) Child Labour (Prohibitions & Regulations) Act, 1986 and Rules 1950
- xiv) Environment Protection Act, 1986 and Rules 1986
- xv) Air (Prevention and control of Pollution) Act, 1981
- xvi) Water (Prevention and Control of Pollution) Act, 1974
- xvii) The Noise Pollution (Regulation & Control) Rules, 2000
- xviii) Notification on Control of Noise from Diesel Generator (DG) sets, 2002
- xix) Recycled Plastic Usage Rules, 1998
- xx) Notification, Central Ground Water Board, Act January 1997
- xxi) Manufacture, Storage & Import of Hazardous Chemicals Rules, 1989
- xxii) The Hazardous Waste (Management & Handling) Rules, 1989
- xxiii) Hazardous Waste Management Rules 1989 (as amended in 1999)
- xxiv) Delhi Tree Preservation Act (1994)
- xxv) Batteries (Management and Handling) Rules
- xxvi) Fly ash utilization notification, Sept 1999 as amended in August 2003
- xxvii) Guidelines of Delhi Urban Arts Commission and Central Vista Committee

3.3.3 Workman Compensation Act, 1923 along with allied Rules

3.3.3.1 **The contractor shall ensure that all his employees / workmen are covered under 'Workmen Compensation Act' and shall pay compensation to his workmen as and when the eventuality for the same arises.**

3.3.4 Notwithstanding the above Act/Rules, there is nothing in those to exempt the contractor from the purview of any other Act or Rule in Republic of India for the safety of men and materials.

3.3.5 If the requirements stated in this document are less stringent than or in conflict with the country's applicable legislation, the latter shall apply.

3.4 International Standards, Guidelines & ISO Certifications

3.4.1 The works should be undertaken in accordance with the applicable international guidelines, standards and specifications on SHE and every contract shall aim to achieve ISO certifications listed below during the currency of the contract:

OHSAS 18001-1999 : Occupational Health and Safety Management System.

ISO 14001-2004 : Environmental Management Systems.

3.4.2 The process of certification shall start immediately after the award of the work and complete within reasonable time. Towards this, the contractor shall undertake the required steps including appointment of ISO consultant for

obtaining the certification on Occupational Health and Safety Management System and Environment Management System.

- 3.4.3 **In case of failure on the part of the contractor, the Employer at the cost of the contractor shall do the same.**

4.0 CONTRACTOR SHE POLICY AND PLAN

- 4.1 The contractor as per Section 39 of the BOCW Act shall formulate a SHE policy and get it approved by JDA respectively and display it at conspicuous places at work sites in Hindi and a local language understood by the majority of construction workers.

- 4.2 **WITHIN 4 WEEKS OF THE NOTIFICATION OF ACCEPTANCE OF THE TENDER, THE CONTRACTOR SHALL SUBMIT A DETAILED AND COMPREHENSIVE CONTRACT SPECIFIC SHE PLAN. THE SHE PLAN SHALL INCLUDE DETAILED POLICIES, PROCEDURES AND REGULATIONS WHICH, WHEN IMPLEMENTED, WILL ENSURE COMPLIANCE OF THE CONTRACT PROVISIONS. THE SHE PLAN SHALL INCLUDE THE FOLLOWING BUT NOT BE RESTRICTED TO:**

- i) A statement of the Contractor's policy, organisation and arrangements for SHE*
- ii) The name(s) and experience of person(s) within the Contractor's proposed management who shall be responsible for co-ordinating and monitoring the Contractor's SHE performance;*
- iii) The number of SHE staff who shall be employed on the Works, their responsibilities, authority and line of communication with the proposed Contractor's agent;*
- iv) A statement of the Contractor's policy and procedures for identifying and estimating hazards, and the measures for addressing the same;*
- v) A list of SHE hazards anticipated for this Contract and sufficient information to demonstrate the Contractor's proposals for achieving effective and efficient health and safety procedures;*
- vi) A description of the SHE training courses and emergency drills which shall be provided by the Contractor, with an outline of the syllabus to be followed;*
- vii) Details of the safety equipment which shall be provided by the Contractor, including personal protective equipment;*
- viii) A statement of the Contractor's policy and procedures for ensuring that Contractor's Equipment used on the Project Site are maintained in a safe condition and are operated in a safe manner;*
- ix) A statement of the Contractor's policy and procedures for ensuring that sub-contractors comply with the Contractor's safety plan;*
- x) A statement of the Contractor's disciplinary procedures with respect to SHE related matters, and*
- xi) A statement of the Contractor's procedure for reporting and investigating accidents, dangerous occurrences or occupational illnesses*

- 4.3 The Contractor shall, from time to time and as necessary are required by the Employer to produce supplements to the SHE Plan such that it is at all times a detailed, comprehensive and contemporaneous statement by the Contractor of his site safety, industrial health and environment obligations, responsibilities,

policies and procedures relating to work on Site. Any and all submissions of supplements to the SHE Plan shall be made to the Employer in accordance with the agreed procedures.

- 4.4 If at any time the SHE plan is, in the Employer's opinion, insufficient or requires revision or modification to ensure the security of the Works and the safety of all workmen upon and visitors to the Site, the Employer may instruct the Contractor to revise the SHE plan and the Contractor shall within 7 days submit the revised plan to the Employer for review.
- 4.5 Any omissions, inconsistencies and errors in the SHE Plan or the Employer's acceptance or rejection of the SHE Plan and/or supplements thereto shall be without prejudice to the Contractor's obligations with respect to site safety, industrial health and environment and shall not excuse any failure by the contractor to adopt proper and recognized safety practices throughout the execution of the Work.
- 4.6 The Contractor shall adhere to the SHE Plan and shall ensure, as far as practically possible, that all sub-contractors of all tiers require that contracting parties each have a copy of the Site SHE Plan and comply with its provisions.
- 4.7 The details of contents to be covered in the site SHE plan are given in **Appendix No.: 3.**

5.0 Designer's role

5.0 Designer's role in Safety, Health and Environment

- 5.1 Designer's primary role includes to minimise the risk to health and safety of those who are going to construct, maintain, clean, repair, dismantle or demolish the structures and any one else like adjoining road users/general public, who might be affected by the work.

5.2 General philosophy

- 5.2.1 When considering health and safety in designer's work, they shall be expected to do what is reasonable at the time the design is prepared. It may be possible for hazards, which cannot be addressed at the feasibility stage to be looked at during detailed design. In deciding what is reasonably practicable, the risk to health and safety produced by a feature of the design has to be weighed against the cost of excluding the feature. The overall design process does not need to be dominated by a concern to avoid all risks during the construction phase and maintenance. However, a judgement has to be made by weighing up one consideration against another so the cost is counted not just in financial terms, but also those of fitness for purpose, aesthetics, buildability or environmental impact. By applying these principles, it may be possible to make decisions at the design stage, which will avoid or reduce risks during construction work. In many cases, the large number of design considerations will allow a number of equally valid design solutions. What is important is the approach to the solutions of design problems. This should involve a proper exercise of judgement, which takes account of health and safety issues.**

5.3 Hierarchy of Risk Control

5.3.1 Designers shall need, so far as reasonably practicable, to avoid or reduce risks by applying a series of steps known as the hierarchy of risk control or principles of prevention and protection. The steps to be adopted shall include the following:

- i) consider if the hazard can be prevented from arising so that the risk can be avoided (eg, alter the design to avoid the risk);
- ii) if this cannot be achieved, the risk should be combated at source (eg, ensure the design details of items to be lifted include attachment points for lifting);
- iii) failing this, priority should be given to measures to control the risk that will protect all people;
- iv) only as a last resort should measures to control risk by means of personal protection be assumed (eg, use of safety harnesses).

5.4 Duty to provide health and safety risks in the drawing itself

5.4.1 In case of situations where the designers have carried out the design work and concluded that there are risks, which was not reasonably practicable to avoid, detailed information shall be given about the health and safety risks, which remain. This information needs to be included with the design to alert others to the risks, which they cannot reasonably be expected to know. This is essential for the parties who have to use the design information.

5.4.2 If the designers' basic design assumptions affect health or safety, or health and safety risks are not obvious from the standard design document, the designer shall provide additional information. The information shall include a broad indication of the assumptions about the precautions for dealing with the risks. The information will need to be conveyed in a clear manner; it shall be included on drawings, in written specifications or outline method statements. The level of detail to be recorded will be determined by the nature of the hazards involved and the associated level of risk.

5.5 Employer's approval

5.5.1 Every structure like scaffold, false work, launching girder, earth retaining structures etc. shall have its design calculations included in the method statements in addition to health and safety risks. Employers' designer or his approved proof check consultants as applicable as per the contract conditions shall approve all these designs.

5.6 Any non-standard structures like trestles made up of re-bars or structures which are very old, corroded, repaired for many times etc. for which no design calculations can be made accurately from any national standards, shall not be allowed to be used at sites even for short duration.

5.7 If any of the above mentioned clauses are not adhered penalty shall be imposed depending upon the gravity of the unsafe act and or condition

6.0 Contractor SHE Organization

6.1 Education and Experience

- 6.1.1 The contractor shall appoint the required SHE personnel as prescribed in General Instruction **JDA/SHE/GI/001/MPR/281105** (enclosed at the end) based upon the statutory requirement and establish the safety organisation based upon the contract value. The minimum educational qualification and the work experience are given in General Instruction **JDA/SHE/GI/002/QE/281105**.
- 6.1.2 **In order to effectively interact on labour welfare matters with the Employer and the statutory authorities enforcing the labour welfare legislations every contractor shall employ a full time Labour Welfare Officer duly qualified and experienced as per clause 6.1.1.**
- 6.2 Conduct and competency
- 6.2.1 The conduct and functioning of the contractor SHE personnel shall be monitored by the Employer. Any default or deficiency shall attract penalty as per details given under penalty clause **56.0** of this document.
- 6.2.2 The Contractor shall ensure that all personnel are competent to perform the job assigned to them. In the event that the Contractor is unable to demonstrate the competency of any person whose activities can directly impact on the Works' SHE performance, the Employer shall remove that person from the site without any procedural formalities.
- 6.3 Approval from Employer
- 6.3.1 The name, address, educational qualification, work experience and health condition of each personnel deployed for SHE jobs shall be submitted to the Employer in the format prescribed for the purpose for comments and approval well before the start of the work. Only on approval by the Employer these personnel are authorised to work. In case any of the SHE personnel leaves the contractor the same shall be intimated to the Employer. The contractor shall recruit new personnel and fill up the vacancy.
- 6.4 **Responsibility of SHE personnel**
- 6.4.1 **For all works carried out by the contractor and his sub-contractors, the responsibility of ensuring the required SHE manpower lies with the main contractor only. The minimum required manpower indicated by the Employer includes the sub-contractors' work also. It shall be the responsibility of the main contractor to provide required SHE manpower for all the works executed by all contractors. Necessary conditions shall be included in all sub-contract documents executed by the main contractor.**
- 6.5 Employment status of SHE personnel
- 6.5.1 **No contractor shall engage SHE manpower from any outsourcing agencies in which case the effectiveness would be lost. All SHE manpower shall be on the payroll of the main contractor only and not on the payroll of any subcontractor or outsourcing manpower agencies etc. This condition does not apply to positions like traffic marshals who are engaged almost on a daily requirement basis.**
- 6.6 Reporting of SHE personnel

6.6.1 All SHE personnel are to report to the Chief SHE Manager who shall report directly to the Chief Project Manager. The Employer shall monitor adherence to this procedure at all times. In case of non-adherence penalty shall be levied as indicated in the penalty clause.

6.7 Inadequate SHE personnel

6.7.1 In case if the contractor fail to provide the minimum required manpower as illustrated in General Instruction **JDA/SHE/GI/001/MPR/281105**, or fail to fill up vacancies created within 14 days, the same shall be provided by the Employer at contractor's cost. Any administrative expenses involved to provide the same like paper advertisement or manpower consultant charges, etc shall also be at the cost of contractor.

6.8 Prohibition of performance of other duties

6.8.1 As per Schedule VIII of DBOCWR no SHE personnel shall be required or permitted to do any work which is unconnected to, inconsistent with or detrimental to the performance of the SHE duties for respective category mentioned in General Information **JDA/SHE/GI/001/MPR/281105**

6.9 Facilities to be provided to SHE personnel

6.9.1 **AS PER SCHEDULE VIII OF BOCWR, THE CONTRACTOR SHALL PROVIDE ALL SHE PERSONNEL WITH SUCH FACILITIES, EQUIPMENT AND INFORMATION THAT ARE NECESSARY TO ENABLE HIM TO DISPATCH HIS DUTIES EFFECTIVELY.**

6.9.2 **THE MINIMUM EMPLOYER'S REQUIREMENTS OF SUCH FACILITIES / EQUIPMENTS TO BE PROVIDED FOR SHE PERSONNEL ARE GIVEN IN THE GENERAL INSTRUCTION JDA/SHE/GI/003/AVE/28112005.**

7.0 Contractor SHE Committee

7.1 All employees should be able to participate in the making and monitoring of arrangements for safety, industrial health and environment at their place of work. The establishment of site SHE committees in which employees and Contractor and sub-contractor management are represented can increase the involvement and commitment of employees. The contractor shall ensure the formation and monitor the functioning of contractor SHE committees.

7.2 Terms of Reference

7.2.1 The Terms of Reference for the committee shall be as follows;

- i) To establish company safety policies and practices
- ii) To monitor the adequacy of the contractor's site SHE plan and ensure its implementation
- iii) To review SHE training
- iv) To review the contractor's monthly SHE report.
- v) To identify probable causes of accident and unsafe practices in building or other construction work and to suggest remedial measures.

- vi) To stimulate interest of Employer and building workers in safety by organizing safety week, safety competition, talks and film-shows on safety, preparing posters or taking similar other measures as and when required or as necessary.
- vii) To go round the construction site with a view to check unsafe practices and detect unsafe conditions and to recommend remedial measures for their rectifications including first-aid medical and welfare facilities.
- viii) Committee team members should perform a site inspection before every committee meetings and to monitor SHE inspection reports.
- ix) To bring to the notice of the Employer the hazards associated with use, handling and maintenance of the equipment used during the course of building and other construction work
- x) To suggest measures for improving welfare amenities in the construction site and other miscellaneous aspect of safety, health and welfare in building or other construction work.
- xi) To look into the health hazards associated with handling different types of explosives, chemicals and other construction materials and to suggest remedial measures including personal protective equipment.
- xii) To review the last safety committee meeting minutes and to take action against persons/sub-contractors for non-compliance if any.

7.3 Within 14 days of award of contract, the SHE committee shall be constituted and notification regarding the same shall be communicated to the members and employees as per the format provided in **Form No.: SF 001**

7.4 Site SHE Committee meeting shall be conducted at least once in a **month** with the minimum members listed below:

Chairman	Project Manager
Secretary	SHE Manager (In-charge)
Members	i) Labour Welfare Officer ii) In charge of plant and machinery iii) In charge of site electrics iv) In charge of stores. v) Senior Managers/ Engineers heading different sub functions. vi) Sub – contractor's representative vii) Labour Contractor's representative viii) Workers' representative ix) Co-contractor representative. x) SHE staffs
Employer's Representatives	JDA SHE in charge and other representatives

7.5 Construction SHE Committee meeting shall be conducted at least once in a **week** with the minimum members listed below:

Chairman	Project Manager
Secretary	SHE Manager (In-charge)
Members	i) Labour Welfare Officer ii) In charge of plant and machinery

	iii) In-charge of site electrics iv) Senior Managers / Engineers heading different sub functions v) Sub- Contractor's representative vi) Labour contractor's representative vii) Workers' representatives viii) All SHE Staffs

7.6 Co-contractors' participation

7.6.1 In case of depot, station and other contiguous areas where more than one main contractors are working together, the Employer shall instruct the other contractors to join for the monthly SHE committee meeting of the main civil contractor, so as to discuss and decide about the common provision of security, lighting, toilet, drinking water etc. and sharing the maintenance cost of the same etc.

7.6.2 **The general principle for sharing the cost shall be either based on the contract value of works executed at the contiguous area or the daily average number of workmen employed by each contractor in the contiguous area.**

7.7 Minimum time between two monthly SHE Committee meetings

7.7.1 A minimum period of **21 days** shall be maintained between any two SHE monthly committee meetings.

7.8 Agenda

7.8.1 The Secretary shall circulate the agenda of the meeting at least seven working days in advance of the scheduled date of the meeting to all members.

7.8.2 The agenda should broadly cover the following:

- i) Confirmation of minutes
- ii) Chairman's review/overview of site SHE performance / condition
- iii) Previous month SHE statistics
- iv) Incident and Accident Investigation / dangerous occurrence / near miss report
- v) Site SHE inspection
- vi) Sub-contractors' SHE issues
- vii) Safety presentation by Members
- viii) Report from Employer
- ix) Matters arising
- x) Any other business

7.9 Minutes of the meeting

7.9.1 The Minutes of the meeting shall be prepared as per the format provided at **Form No.: SF- 002** and sent to all members within 2 working days preferably by

mail/fax followed by hardcopy. Safety Committee meeting minutes shall also be displayed in the notice board for wider publicity to all concerned.

7.10 Disciplinary Action

- 7.10.1 The chairman shall inform the members of any outstanding issues in the meeting and in case of repeated offence/ non-compliance by some members or other co/sub contractors and propose suitable disciplinary action including provisions of monetary penalty as per the relevant contract clauses, the Employer shall ensure that the same is implemented.

8.0 ID Card and First day at work, SHE orientation training

- 8.1 The Contractor shall ensure that all personnel working at the site receive an induction SHE training explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation. The training shall cover the contents as given in the General Instruction **JDA/SHE/GI/004/OT/281105.**

- 8.2 **All personnel shall be issued a photo identity card of size 85mm x 55mm duly signed by the authorized representative of the contractor before they are engaged for any work as per the format given in the General Instruction **JDA/SHE/GI/005/IDC/281105****

- 8.3 Contractor shall also issue a personnel SHE handbook in a language known to the workers, which provides information on SHE and emergency procedures that all personnel working on contract are required to know and the need to follow. Contractor shall ensure that this is distributed and its content introduced to all personnel working at the site.

9.0 SHE Training

- 9.1 The behaviour of people at all levels of the contractor is critical for SHE performance.

- 9.2 The contractor shall organise quality SHE training to engage Managers, supervisors and other personnel in behavioural change and improve safety performance.

- 9.3 The Contractor shall analyse the training requirements for all the employees and initiate a training program to demonstrate that all persons employed, including subcontractors, are suitably qualified, competent and fit. This will include:

- i) Detailed Job descriptions for all personnel, to include their specific SHE responsibilities
- ii) Specification of qualifications, competency and training requirements for all personnel
- iii) Assessment and recording of training needs for all personnel, including subcontractors' employees in the workforce, vendor representatives and site visitors
- iv) A system for assessing new hirers e.g. previous training
- v) A means of confirming that the system is effective

- vi) A matrix and schedule of training requirements, covering general, task-specific and SHE-related training, showing the training frequency and interval between refresher courses
 - vii) Timely, competent delivery of training courses
- 9.4 The contractor shall arrange behavioural-based training programmes for all the executives to identify, recognise and eliminate unsafe act and unsafe conditions.
- 9.5 The minimum Employer's requirement of training needs for various categories of employees are given in general instruction **JDA/SHE/GI/006/TM/281105**
- 9.6 The contents of SHE training to Managers/Supervisors as given in general instruction **JDA/SHE/GI/007/TMS/281105** shall be conducted.
- 9.7 **The refresher-training programme to all employees shall be conducted once in six months.**
- 9.8 **Toolbox talk as given in the Employer's Project SHE manual shall be conducted to all high-risk workmen everyday.**
- 9.9 **On-the spot practical skill development training on height safety including scaffold safety, crane safety, welding safety, electrical safety, traffic safety for marshals shall also be conducted to all foremen/ workmen who were associated to the concerned jobs.**
- 9.10 **Daily Safety Oath as given in Project SHE manual shall be taken by every employee including workman without fail.**
- 9.11 **All vehicle drivers including Hydra operators shall be trained on defensive driving at Delhi Govt. and Maruti Institute for Driver Training and Research at Wazirabad Road, Adjoining Loni Road Flyover, Delhi-110094. All vehicle drivers shall also undergo refresher training on defensive driving provided by the same institute once in 6 months.**
- 9.12 All the above listed training programmes except at clause **9.11** shall be organised by the contractor only after taking approval from the Employer for the training faculty / organization, content and durations.
- 9.13 **In case of failure on the part of the contractor to provide all the above-mentioned training programs to all employees in time, the same shall be provided by the Employer through accredited agencies if required by formulating a common scheme to all contractors. Any administrative expenses and training fee towards the same shall be at the cost of the contractor.**
- 10.0 SHE Inspection**
- 10.1 The contractor shall evolve and administer a system of conducting SHE inspections and other risk management analysis on a periodical basis.
- 10.2 The purpose of SHE inspection is to identify any variation in construction activities and operations, machineries, plant and equipment and processes against the SHE Plan and its supplementary procedures and programs.

10.3 Following SHE inspections program shall be adopted.

- i) Planned General Inspection
- ii) Routine Inspection
- iii) Specific Inspection
- iv) Other Inspection

10.3.1 Planned General Inspection

10.3.1.1 Planned general inspections are performed at predetermined intervals and it usually involves the representation from both Contractor and the Employer.

10.3.1.2 Inspections that will be classified under this inspection program are:

- i) Monthly contractor and subcontractors site safety committee Inspection.
- ii) Weekly safety inspection by construction supervisors (Contractors and Sub-contractors).
- iii) Daily safety inspection by contractor site SHE team.

10.3.2 Routine Inspection

10.3.2.1 Routine inspections are often referring to the inspection of work site, equipment and temporary structures performed by site and equipment operators and temporary structure erectors.

Inspections that will be classified under this inspection program are:

- i) Daily Inspection of plant and equipment by operator
- ii) Weekly Inspection of scaffold by scaffolding supervisor
- iii) Monthly Inspection of electrical hand tools by competent electrical supervisor
- iv) Quarterly Inspection of temporary electrical systems by competent electrical supervisor
- v) Half-yearly inspection of lifting machinery, lifting appliances, equipment and gears by Govt. approved competent person.

10.3.2.2 The list mentioned above is not exhaustive. Contractor may add additional categories. Contractors' Site SHE Manager will ensure that a system of routine inspections are carried out periodically to all plants, equipment, powered tools and any other temporary structures that will pose a hazard to operators and workmen.

10.3.3 Specific Inspection

10.3.3.1 Specific inspections are performed on activities without a predetermined date. Competent supervisors usually perform inspections for ensuring an activity whether it is executed in accordance to a general set of rules; method statement submitted or developed procedures.

The following are examples that will be commonly performed as required on the construction site:

- i) Inspection performed before a heavy lifting operation.
- ii) Inspection performed before and after the entry of person into a confined space.

- iii) Inspection performed before and after a welding and gas cutting operation.
 - iv) Inspection of formwork before concreting by formwork erector.
- The list mentioned above is not exhaustive. The contractor shall ensure that a competent supervisor inspects all high-risk processes and activities.

10.3.4 Other Inspection

Other inspections includes the following:

- i) Mandatory Inspections by Labour Department of Government.
- ii) JDA site SHE management team

10.3.5 The contractor shall prepare all required safety inspection checklist for all activity operations and equipment. Checklists will be prepared based on the Indian standards, rules and regulations and Employer's requirements. The formats provided in the Project SHE manual may be referred.

10.3.6 All inspection records and reports will be properly kept and filed for audit purpose. Inspection reports of Planned General Inspection and Routine Inspection will be used for discussion during Safety Committee Meetings.

11.0 SHE Audit

11.1 General

11.1.1 The purpose and scope of SHE audit is to assess potential risk, liabilities and the degree of compliance of construction Safety, Health & Environmental plan and its supplementary procedures and programs against applicable and current SHE legislation regulations and requirements of the employer.

11.1.2 Project Manager holds the ultimate responsibility in ensuring implementation of SHE audit program during the construction work.

11.2 Monthly Audit Rating Score (M A R S)

11.2.1 Monthly Audit Rating Score (MARS) will be performed once in a month. A team consisting of Project manager and Employer representative based on the pre-designed score-rating format will conduct it. The details of the pre-designed monthly audit score rating formats are given in the Project SHE manual.

11.2.2 This Monthly SHE Audit Rating Score (MARS) report will enable the Employer to evaluate the general compliance by the Contractor with the Conditions of Contract, the Employer's Project SHE Manual and the Contractor's site specific SHE Plan.

11.2.3 Monthly Audits will be conducted in accordance with JDA Guidelines. The Project Manager accompanied by the Employer's representatives shall carry out the Audit. The Contractor's senior manager and SHE in-charge should also be invited to attend.

11.2.4 Timing

The Monthly Audit Rating Score (MARS) should be conducted at least 7 days prior to the scheduled date of Monthly SHE Committee meeting.

11.2.5 Evaluation

11.2.5.1 The numerical scoring has been weighed on a 1-10 scale. The audit team will use their observations noted in evaluating the points to be awarded against each of the elements of the audited section. Wherever some topics and sub-topics are not applicable the score rating need not be given. The overall audit ratings shall be achieved by:

$$\text{Overall Audit rating} = \frac{\text{Actual Score Achieved}}{\text{Maximum Possible Score}} \times 100$$

11.2.5.2 The criticality of the required actions for the respective sections of the Audit will be classified as:

Sl. No.	Score	Description	Action
1	< 60%	Immediate	Require Contractor to rectify within 24 hours
2	< 75%	Improvement Necessary	Contractor rectification within 7 days and confirmed in writing to Employer
3	< 90%	Improvement Desirable	Contractor rectification within one month and confirmed in writing to Employer

11.2.6 Report

A copy of each Audit Report will be sent to Employer and to all subcontractors, with whom it will then be discussed in detail at the Monthly SHE Committee Meeting in order to ensure that any corrective actions are agreed upon.

11.3 Monthly Electrical Safety Audit

11.3.1 A team comprising of contractor's senior SHE (Electrical) engineer and Employer's representative shall conduct monthly electrical safety audit covering the following and submit the report to Employer.

- i) Electrical accidents investigation findings and remedy
- ii) Adequacy of power generation and power requirements
- iii) Power distribution and transmission system in place
- iv) Updated electrical single line diagram showing the current condition of power source and distribution including the IP44 DBs arrangement.
- v) Electrical protection devices – selection, installation and maintenance.
- vi) Earth or ground connection and earth pit maintenance details
- vii) Education and training of electrical personnel undertaken
- viii) Routine electrical inspection details
- ix) Electrical maintenance system and register.
- x) Name plate details of major electrical equipment

- xi) Classified zones in the site, if any.

11.4 External SHE Audit

11.4.1 External SHE audits are to be conducted by external agencies that are competent with ISO qualified auditors with the prior approval of the Employer.

11.4.2 Areas of competence of Audit team

11.4.2.1 Practical understanding of BOCW Act and Rules, statutory requirements on health/medical and welfare of workmen, construction hazards and its prevention and control, traffic management, electrical safety, rigging, safety of construction equipment and environment management.

11.4.2.2 Audit shall be conducted as per the guidelines of ISO, ILO, and national standards. Audit report shall also be presented as per the above formats.

11.4.3 External SHE audit shall be conducted on a quarterly basis throughout the currency of the contract.

11.4.4 Targets of SHE Audit:

The contents and coverage of the external audit shall include the following items

11.4.4.1 SHE management:

- i) Organization
- ii) Communication and Motivation
- iii) Time office
- iv) Inspection
- v) Emergency preparedness
- vi) Budget allocation
- vii) Education and Training
- viii) Work permit system

11.4.4.2 Technical:

- i) Building and Structure
- ii) Construction operational safety
- iii) Material safety
- iv) Hand tools and Power tools
- v) Electrical system
- vi) Safety Appliances
- vii) Fire prevention and control
- viii) Housekeeping
- ix) Maintenance and Machinery safety
- x) First-aid and Medical Facilities

- xi) Welfare measures
- xii) Environmental Management

11.4.5 Audit Documents:

11.4.5.1 Contractor shall make the below listed documents available for the review by the Audit team.

- i) SHE policy
- ii) SHE manual
- iii) SHE Rules and Regulation
- iv) SHE organization chart
- v) Annual SHE objectives / programs
- vi) Accident / near miss statistics and analysis
- vii) SHE Training program / records for all personnel
- viii) Operating manuals and maintenance manual of all equipments
- ix) Safe worthiness certificates of all lifting appliances and gears
- x) Medical fitness record for all personnel
- xi) Risk identification, assessment and control details
- xii) Environmental management reports
- xiii) Emergency management records including mock drill

11.4.6 Audit Preparation:

- i) Audit team members are required to gather information by observations through interviews and by checks of hardware and documentation.
- ii) Audit team shall prepare checklist to cover all parts based on SHE legislations rules and regulations and JDA requirements.
- iii) Audit team members shall verify the facts and findings leading to the identified gaps and weakness.
- iv) Audit leader has overall responsibility for reaching a conclusion.

11.4.7 Reporting:

11.4.7.1 Audit report shall be prepared and directly sent to the Employer within 7 days of conducting the audit with a copy to the contractor.

11.4.8 Report contents:

- i) Executing summary - based on the finalized checklists as written the findings to the Employer by the audit team members, the audit leader will compile a concise and accurate summary of observations and findings.
- ii) Introduction - this will contain basic information regarding the facilities or organization audited, the specific audit dates (inclusion of those for preparation and post-audit activities).
- iii) Principal positive findings - This will contain the summary of positive aspects as observed by the auditors. It will also contain highlights of those issue, which may warrant dissemination as best practice regarding methodology used or achievement.

- iv) **Audit Findings** - All audit findings as detailed in the audit checklists shall be grouped together as priority 1 and 2 as detailed below in a separate listing.
 - a) **Priority 1:** Actions to rectify gaps or weakness should generally be implemented within two-weeks time, if risk potential is high or unacceptable.
 - b) **Priority 2:** Actions should be generally implemented or rectified with a maximum of 3 – 4 weeks, if not rectified would create a likelihood of minor injury or business loss.

11.4.9 Conformity Report & Action by Employer

11.4.9.1 The auditor shall inspect the site after 14 days of conducting initial audit for checking the adequacy of implementation of items maintained under priority 1 by the contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.

11.4.9.2 The auditor shall again inspect after 28 days of conducting initial audit for checking the adequacy of implementation of items mentioned under priority 2 by the contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.

11.4.9.3 In case of non-conformity of items mentioned by auditor, the Employer shall take necessary steps including stoppage of work and or imposing any penalty for getting the item implemented.

11.4.10 Failure of contractor to conduct External SHE Audit

11.4.10.1 If the contractor fails to conduct the external SHE audit in time, the Employer at the cost of contractor shall get it done.

12.0 SHE Communication

12.1 The contractor shall take every effort to communicate the Safety, Occupational health and Environment management measures through posters campaigns / billboards / banners / glow signs being displayed around the work site as part of the effort to rise safety awareness amongst the work force. Posters should be in Hindi, English and other suitable language deemed appropriate. Posters / billboards / banners/ glow signs should be changed at least once in a month to maintain the impact.

12.2 The contractor shall also observe important days as listed in General Instruction [JDA/SHE/GI/008/DAY/281105](#) and printing and displaying safety signage and posters as listed in General Instruction [JDA/SHE/GI/009/PS/281105](#).

12.3 The list indicated are the minimum requirements of the Employer and the contractor is encouraged to further the SHE communication activities by formulating suitable reward schemes for safety performers and any other activities, which deem fit for the purpose.

13.0 SHE Submittals to the Employer

13.1 The contractor's SHE management should send the following reports to the Employer periodically:

- i) Daily Reporting of total no of workmen (as given in Clause **13.2**)
- ii) Monthly SHE Report (as given in Clause **13.3**)
- iii) SHE Committee Meeting Minutes (as given in Clause **7.9.1**)
- iv) SHE Inspection Reports
- v) SHE Audit Reports
 - a) Monthly Audit Rating Score (MARS) report
 - b) External SHE Audit
 - c) Electrical Safety Audit
- vi) Air and Noise Quality monitoring report

13.2 Daily Reporting of total no of workmen

13.2.1 The contractor shall report to the Employer the total no of workmen engaged by all including any subcontractor within 2 hours of starting of any shift in any day. This reporting shall be the primary duty of the Chief SHE Manager of the contractor and reporting shall be through tele-fax / email. The onus of checking the receipt of the same by the Employer lies with the contractor. If the information is not received or received more than 2 hrs after starting of the shift, penalty shall be levied as per relevant clause.

13.3 Monthly SHE Report

13.3.1 The contractor shall prepare a monthly SHE report consisting of the following and submit 3 copies within 7th of next month to the Employer as specified in the Project SHE manual.

- i) Monthly man-hour details as specified in the Project SHE manual
- ii) Monthly accident / incident details as specified in the Project SHE manual
- iii) SHE committee details
- iv) Details of SHE training conducted in the month
- v) SHE Inspection
- vi) SHE internal audit details like electrical audit etc.
- vii) SHE Communication activities under taken in the month indicating the number of posters displayed and balance availability in stock.
- viii) Air quality / Noise monitoring details
- ix) Toolbox talks details
- x) PPE details: Quantity purchased, issued to the workmen and stock available.
- xi) Details on IP 44 panel boards, lighting poles, welding and cutting equipments, Ladders, Hoists, tools & tackles.
- xii) Monthly Lux meter study results
- xiii) Housekeeping
- xiv) Barricade maintenance details
- xv) No of critical excavations
- xvi) Health & Welfare activities

- xvii) Safety walk conducted by Contractors' Project Manager in the month
- xviii) SHE Activities Planned for next month

14.0 Accident reporting and investigation

14.1 Reporting to Employer

14.1.1 All accidents and dangerous occurrences shall immediately be informed verbally to the Employer. This will enable the Employer to reach to the scene of accident / dangerous occurrences to monitor/assist any rescue work and/or start conducting the investigation process so that the evidences are not lost.

14.1.2 Reports of all accidents (fatal / injury) and dangerous occurrences shall also be sent within 24 hours as per format provided in the Employer's Project SHE manual.

14.1.3 No accident / dangerous occurrences is exempted from reporting to the Employer.

14.1.4 Any wilful delay in verbal and written reporting to the Employer shall be penalised as per relevant clause.

14.2 Reporting to Govt. organisations

14.2.1 In addition to the above verbal and written reporting to the Employer, as per Rule 210 of BOCWR, notice of any accident to a worker at the building or construction site that:

- a) causes loss of life; or
- b) disables a worker from working for a period of 48 hours or more immediately following the accident;
- c) shall forthwith be sent by telegram, telephone, fax, or similar other means including special messenger within four hours in case of fatal accidents and 72 hours in case of other accidents, to:
 - i) the Regional Labour Commissioner (central), wherein the contractor has registered the firm/work
 - ii) the board with which the worker involved was registered as a beneficiary;
 - iii) Director General and
 - iv) the next of kin or other relative of the worker involved in the accident;

14.2.2 Further, notice of accident shall be sent in respect of an accident which

- (a) causes loss of life; or
- (b) disables the injured worker from work for more than 10 days to
 - i) the officer-in-charge of the nearest police station;
 - ii) the District Magistrate or, if the District Magistrate by order so desires, to
 - iii) the Sub-Divisional Magistrate

14.2.3 In case of an accident causing minor injury, first-aid shall be administered and the injured worker shall be immediately transferred to a hospital or other place for medical treatment.

14.2.4 Where any accident causing disablement that subsequently results in death, notice in writing of such death, shall be sent to the authorities mentioned in clause 14.2.1 and 14.2.2 above within 72 hours of such death.

14.2.5 Reporting of dangerous occurrences:

14.2.5.1 The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:

- (a) collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work;
- (b) falling of objects from height;
- (c) collapse or subsidence of soil, tunnel, pipe lines, any wall, floor, gallery, roof or any other part of any structure, launching girder, platform, staging, scaffolding or means of access including formwork;
- (d) explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure, of any gas or gases or any liquid or solid used as building material;
- (e) fire and explosion causing damage to any place on construction site where building workers are employed;
- (f) spillage or leakage of any hazardous substance and damage to their container;
- (g) collapse, capsizing, toppling or collision of transport equipment;
- (h) leakage or release of harmful toxic gases at the construction site;

14.2.6 In case of failure of launching girder, lifting appliance, loose gear, hoist or building and other construction work, machinery and transport equipment at a construction site, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the Authorities;

14.2.7 Every notice given for fatal accidents or dangerous occurrences shall be followed by a written report to the concerned Authorities under Section 39 of BOCWA and the in the specified Form XIV of BOCWR.

14.3 Accident investigation

14.3.1 General

14.3.1.1 Investigations should be conducted in an open and positive atmosphere that encourages the witnesses to talk freely. The primary objective is to ascertain the facts with a view to prevent future and possibly more serious occurrences

14.3.1.2 Accidents and Dangerous Occurrences which result in death, serious injury or serious damage must be investigated by the Contractor immediately to find out the cause of the accident/occurrence so that measures can be formulated to prevent any recurrence.

14.3.1.3 Near misses and minor accidents should also be investigated by the Contractor as soon as possible as they are signals that there are inadequacies in the safety management system.

14.3.2 Procedure of incident investigation

14.3.2.1 It is important after any accident or dangerous occurrence that information relating to the incident is gathered in an organised way. The following steps shall be followed;

- a) **take photographs and make sketches**
- b) **examine involved equipment, workpiece or material and the environmental conditions**
- c) **interview the injured, eye-witnesses and other involved parties**
- d) **consult expert opinion where necessary**
- e) **identify the specific contractor or sub-contractor involved.**

14.3.2.2 Having gathered information, it is then necessary to make an analysis of incident

- a) **establish the chain of events leading to the accident or incident**
- b) **find out at what stage the accident took place**
- c) **consider all possible causes and the interaction of different factors that led up to the accident, and identify the most probable cause. The cause of an accident should never be classified as carelessness. The specific act or omission that caused the accident must be identified.**

14.3.2.3 The next stage is to proceed with the follow-up action

- a) **report on the findings and conclusions**
- b) **formulate preventive measures to avoid recurrence**
- c) **publicise the findings and the remedial actions taken**

14.4 Employers' independent incident investigation

14.4.1 In case of fatal / dangerous occurrence the Employer shall also conduct independent investigation. Contractor and his staff shall extend necessary co-operation and testify about the accident.

14.4.2 The contractor shall take every effort to preserve the scene of accident till the Employer completes the investigation.

14.4.3 All persons summoned by the Employer in connection to witness recording shall obey the instructions without delay. Any wilful suppression of information by any person shall be removed from the site immediately and / or punishable as per relevant penalty clause.

15.0 Emergency preparedness plan

- 15.1 The Contractor shall prepare an Emergency Response Plan for all work sites as a part of the Contractor SHE Plan. The plan shall integrate the emergency response plans of the Contractor and all other subcontractors. The Emergency Response Plan shall detail the Contractor's procedures, including detailed communications arrangements, for dealing with all emergencies that could affect the Site. This include where applicable, injury, sickness, evacuation, fire, chemical spillage, severe weather and rescue.
- 15.2 The contractor shall ensure that an Emergency Response Plan is prepared to deal with emergencies arising out of:
- i) Fire and explosion
 - ii) Collapse of lifting appliances and transport equipment
 - iii) Collapse of building, sheds or structure etc.
 - iv) Gas leakage or spillage of dangerous goods or chemicals
 - v) Bomb threatening, Criminal or Terrorist attack
 - vi) Drowning of workers
 - vii) Landslides getting workers buried floods, Earthquake, storms and other natural calamities.
- 15.3 Arrangements shall be made for emergency medical treatment and evacuation of the victim in the event of an accident or dangerous incident occurring, the chain of command and the responsible persons of the contractor with their telephone numbers and addresses for quick communication shall be adequately publicized and conspicuously displayed in the workplace.
- 15.4 Contractors shall require to tie-up with the hospitals and fire stations located in the neighbourhood for attending to the casualties promptly and emergency vehicle kept on standby duty during the working hours for the purpose.
- 15.5 Contractor shall conduct an onsite emergency mock drill once in every month for all his workers and his subcontractor's workers.
- 15.6 It shall be the responsibility of the contractor to keep the Local Law & Order Authorities informed and seek urgent help, as the case may be, so as to mitigate the consequences of an emergency. Prompt communication to JDA, telephonically initially and followed by a written report, shall be made by the contractor.
- 16.0 Experts / Agencies for SHE services**
- 16.1 Contractors may utilise the services of experts/agencies empanelled under Rule 250 of BOCWR and Rule 297 of DBOCWR for the purpose of training, internal audit and any other SHE services with prior approval of the Employer.
- 16.2 As an aide to contractors, a list of experts/agencies and the offered service are given in General Instruction **JDA/SHE/GI/010/AE/281105** for ready reference. In addition to it if the contractor would like to use any expert/agencies' services for any SHE activities the same can also be allowed provided that they are competent and meet to the general requirements of Employer. In every case prior approval of the Employer is mandatory.

PART – II : SAFETY

17.0 Housekeeping

- 17.1 Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defence against accidents and injuries.
- 17.2 Contractor shall understand and accept that improper housekeeping is the primary hazard in any construction site and ensure that a high degree of house keeping is always maintained. Indeed “Cleanliness is indeed next to Godliness”
- 17.3 Housekeeping is the responsibility of all site personnel, and line management commitment shall be demonstrated by the continued efforts of supervising staff towards this activity.
- 17.4 General House keeping shall be carried out by the contractor and ensured at all times at Work Site, Construction Depot, Batching Plant, Labour Camp, Stores, Offices and toilets/urinals. Towards this the Contractor shall constitute a special group of house keeping personnel as per General Instruction **JDA/SHE/GI/001/MPR/281105**. This group shall ensure daily cleaning at work sites and surrounding areas and maintain a register as per the approved format by the Employer.
- 17.5 Adequate time shall be assigned to ensure that good housekeeping is maintained. This shall be carried out by team of housekeeping squad.
- 17.6 The contractor shall be responsible to provide segregated containers for disposal of debris at required places and regular cleaning of the same.
- 17.7 Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the surrounding area from excavated soil, rubbish etc, which may cause inconvenience to and endanger the public. The barricade especially those exposed to public shall be aesthetically maintained by regular cleaning and painting as directed by the Employer. These shall be maintained in one line and level.
- 17.8 The structure dimension of the barricade, material and composition, its colour scheme, JDA logo and other details shall be in accordance with specifications laid down in tender document.
- 17.9 All stairways, passageways and gangways shall be maintained without any blockages or obstructions. All emergency exits passageways, exits fire doors, break-glass alarm points, fire fighting equipment, first aid stations, and other emergency stations shall be kept clean, unobstructed and in good working order.
- 17.10 Lumber with protruding nails shall be either bent / removed and properly stacked.
- 17.11 All surplus earth and debris are removed/disposed off from the working areas to officially designated dumpsites. Trucks carrying sand, earth and any pulverized materials etc. in order to avoid dust or odour impact shall be covered while moving. **The tyres of the trucks leaving the site shall be cleaned with water,**

wherever the possibility of spillage on carriageways meant for regular road traffic exists.

- 17.12 No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.
- 17.13 Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and brick etc. shall not be allowed on the roads to obstruct free movement of road traffic.
- 17.14 Water logging or bentonite spillage on roads shall not be allowed. If bentonite spillage is observed on road endangering the safety of road users, the contractor shall be penalised as per relevant clause.
- 17.15 Proper and safe stacking of material are of paramount importance at yards, stores and such locations where material would be unloaded for future use. The storage area shall be well laid out with easy access and material stored / stacked in an orderly and safe manner.
- 17.16 Flammable chemicals / compressed gas cylinders shall be safely stored.
- 17.17 Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to identified locations(s).
- 17.18 All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).
- 17.19 Empty cement bags and other packaging material shall be properly stacked and removed.
- 17.20 The Contractor shall ensure that all his sub-contractors maintain the site reasonably clean through provisions related to house keeping

18.0 Working at Height

18.1 Definitions

- 18.1.1 "access" and "egress" include ascent and descent.
- 18.1.2 "fragile surface" means a surface, which would be able to fail if any reasonably foreseeable loading were to be applied to it.
- 18.1.3 "Line" includes rope, chain or webbing
- 18.1.4 "Personal fall protection" means -
 - (a) a fall prevention, work restraint, work positioning, fall arrest or rescue system, other than a system in which the only safeguards are collective safeguards; or
 - (b) rope access and positioning techniques;
- 18.1.5 "Work at height" means -

- (a) work in any place, including a place at or below ground level;
 - (b) obtaining access to or egress from such place while at work, except by a staircase in a permanent workplace,
- Where, if protective measures were not taken, a person could fall a distance liable to cause personal injury;

18.1.6 "Work equipment" means any machinery, appliance, apparatus, tool or installation for use at work (whether exclusively or not) and includes

- (a) a guard-rail, toe-board, barrier or similar collective means of protection
- (b) a working platform
- (c) a net, airbag or other collective safe guard for arresting falls.
- (d) personal fall protection system
- (e) ladders

18.1.7 "working platform"

- (a) means any platform used as a place of work or as a means of access to or egress from a place of work;
- (b) includes any scaffold, suspended scaffold, cradle, mobile platforms, trestle, gangway, gantry and stairway which is so used.

18.2 Organisation and planning

The contractor shall ensure that work at height is

- i) properly planned for any emergencies and rescue**
- ii) appropriately supervised; and**
- iii) carried out in a manner, which is reasonably practicable safe.**

18.3 The contractor shall ensure that work at height is carried out only when the weather conditions do not jeopardise the health or safety of persons involved in the work.

18.4 Competence

The contractor shall ensure that no person engages in any activity, including organization, planning and supervision, in relation to work at height or work equipment for use in such work unless he is competent to do so or, if being trained, is being supervised by a competent person.

18.5 Avoidance of risks from work at height

The contractor shall ensure that work is not carried out at height where it is reasonably practicable to carry out the work safely otherwise than at height.

18.6 Where work is carried out at height, the contractor shall take suitable and sufficient measures as given below to prevent, so far as is reasonably practicable, any person **falling a distance liable to cause personal injury.**

- (a) his ensuring that the work is carried out
 - (i) from an existing place of work; or
 - (ii) (in the case of obtaining access or egress) using an existing means, complying to the requirements as given in **18.15** where it is reasonably practicable to carry it out safely and under appropriate ergonomic conditions; and

- (b) where it is not reasonably practicable for the work to be carried out in accordance with sub-paragraph (a), his providing sufficient work equipment for preventing, so far as is reasonably practicable, a fall occurring.

18.7 Where the measures taken under clause **18.6** do not eliminate the risk of a fall occurring, every contractor shall

- (a) so far as is reasonably practicable, provide sufficient work equipment to minimise -
 - (i) the distance and consequences; or
 - (ii) where it is not reasonably practicable to minimise the distance, the consequences, of a fall; and
- (b) Without prejudice to the generality of clause **18.4**, provide such additional training and instruction or take other additional suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

18.8 Selection of 'work equipment' for work at height

- 1) the contractor, in selecting work equipment for use in work at height, shall
 - a) give collective protection measures priority over personal protection measures; and
 - b) take account of
 - i) the working conditions and the risks to the safety of persons at the place where the work equipment is to be used;
 - ii) in the case of work equipment for access and egress, the distance to be negotiated;
 - iii) the distance and consequences of a potential fall;
 - iv) the duration and frequency of use;
 - v) the need for easy and timely evacuation and rescue in an emergency; and
 - vi) any additional risk posed by the use, installation or removal of that work equipment or by evacuation and rescue from it;
- (2) The contractor shall select work equipment for work at height which:
 - a) has characteristics including dimensions which:
 - (i) are appropriate to the nature of the work to be performed and the foreseeable loadings; and
 - (ii) allow passage without risk; and
 - b) is in other respects the most suitable work equipment, having regard in particular to the purposes specified in **18.5** and **18.6**.

18.9 Fragile surfaces

18.9.1 The contractor shall ensure that no person at work passes across or near, or working on, from or near, a fragile surface where it is reasonably practicable to carry out work safely and under appropriate ergonomic conditions without his doing so.

18.9.2 Where it is not reasonably practicable to carry out work safely and under appropriate ergonomic conditions without passing across or near, or working on, from or near, a fragile surface, every contractor shall,

- (a) ensure, so far as is reasonably practicable, that suitable and sufficient platforms, coverings, guard rails or similar means of support or protection are provided and used so that any foreseeable loading is supported by such supports or borne by such protection;
- (b) where a risk of a person at work falling remains despite the measures taken under the preceding provisions of this regulation, take suitable and sufficient measures to minimise the distances and consequences of his fall.

18.9.3 Where any person at work may pass across or near, or work on, from or near, a fragile surface, every contractor shall ensure that

- (a) prominent warning notices are so far as is reasonably practicable affixed at the approach to the place where the fragile surface is situated; or
- (b) where that is not reasonably practicable, such persons are made aware of it by other means.

18.10 Falling objects

18.10.1 The contractor shall, where necessary to prevent injury to any person, take suitable and sufficient steps to prevent, so far as is reasonably practicable, the fall of any material or object.

18.10.2 Where it is not reasonably practicable to comply with the requirements of **18.9**, every contractor shall take suitable and sufficient steps to prevent any person being struck by any falling material or object which is liable to cause personal injury.

18.10.3 The contractor shall ensure that no material or object is thrown or tipped from height in circumstances where it is liable to cause injury to any person.

18.10.4 Every employer shall ensure that materials and objects are stored in such a way as to prevent risk to any person arising from the collapse, overturning or unintended movement of such materials or objects.

18.11 Danger areas

18.11.1 Without prejudice to the preceding requirements of these Regulations, every contractor shall ensure that

- (a) where a workplace contains an area in which, owing to the nature of the work, there is a risk of any person at work
 - i) falling a distance; or
 - ii) being struck by a falling object,which is liable to cause personal injury, the workplace is so far as is reasonably practicable equipped with devices preventing unauthorised persons from entering such area; and
- (b) such area is clearly indicated.

18.12 Inspection of work equipment

- 18.12.1 The contractor shall ensure that, where the safety of work equipment depends on how it is installed or assembled, it is not used after installation or assembly in any position unless it has been inspected in that position.
- 18.12.2 The contractor shall ensure that work equipment exposed to conditions causing deterioration which is liable to result in dangerous situations is inspected
- (a) at suitable intervals; and
 - (b) each time that exceptional circumstances which are liable to jeopardise the safety of the work equipment have occurred,
- to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.
- 18.12.3 Without prejudice to paragraph **18.12.1**, the contractor shall ensure that a working platform
- (a) used for construction work; and
 - (b) from which a person could fall 2 metres or more,
- is not used in any position unless it has been inspected in that position or, in the case of a mobile working platform, inspected on the site, within the previous 7 days.
- 18.12.4 The contractor shall ensure that the reports of all inspections are properly maintained and shown to the Employer as and when required.
- 18.12.5 In this clause "inspection",
- (a) means such visual or more rigorous inspection by a competent person as is appropriate for safety purposes;
 - (b) includes any testing appropriate for those purposes,
- 18.13 Inspection of places of work at height
- 18.13.1 The contractor shall so far as is reasonably practicable ensure that the surface and every parapet, permanent rail or other such fall protection measure of every place of work at height are checked on each occasion before the place is used.
- 18.14 Duties of persons at work
- 18.14.1 Any workmen employed by the contractor shall report to the supervisor about any defect relating to work at height which he knows is likely to endanger the safety of himself or another person.
- 18.14.2 Every workmen shall use any work equipment or safety device provided to him for work at height by the contractor, in accordance with
- (a) any training in the use of the work equipment or device concerned which have been received by him; and
 - (b) the instructions respecting that use which have been provided to him by the contractor as per the requirements of the Employer
- 18.15 Requirements for existing places of work and means of access or egress at height

Every existing place of work or means of access or egress at height shall

- (a) be stable and of sufficient strength and rigidity for the purpose for which it is intended to be or is being used;
- (b) where applicable, rest on a stable, sufficiently strong surface;
- (c) be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work to be carried out there;
- (d) possess suitable and sufficient means for preventing a fall;
- (e) possess a surface which has no gap
 - (i) through which a person could fall;
 - (ii) through which any material or object could fall and injure a person; or
 - (iii) giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk;
- (f) be so constructed and used, and maintained in such condition, as to prevent, so far as is reasonably practicable -
 - (i) the risk of slipping or tripping; or
 - (ii) any person being caught between it and any adjacent structure;
- (g) where it has moving parts, be prevented by appropriate devices from moving inadvertently during work at height.

18.16 Requirements for guardrails, toe-boards, barriers and similar collective means of protection

- i) Unless the context otherwise requires, any reference in this section to means of protection is to a guardrail, toe-board, barrier or similar collective means of protection.
- ii) Means of protection shall
 - (a) be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable;
 - (b) be so placed, secured and used as to ensure, so far as is reasonably practicable, that they do not become accidentally displaced; and
 - (c) be so placed as to prevent, so far as is practicable, the fall of any person, or of any material or object, from any place of work.
- iii) In relation to work at height involved in construction work
 - (a) the top guard-rail or other similar means of protection shall be at least 950 millimetres above the edge from which any person is liable to fall;
 - (b) toe-boards shall be suitable and sufficient to prevent the fall of any person, or any material or object, from any place of work; and
 - (c) any intermediate guardrail or similar means of protection shall be positioned so that any gap between it and other means of protection does not exceed 470 millimetres.
- iv) Any structure or part of a structure which supports means of protection or to which means of protection are attached shall be of sufficient strength and suitable for the purpose of such support or attachment.

18.17 Requirements for all Working Platforms

- i) Every working platforms requires a supporting structure for holding it
- ii) Any surface upon which any supporting structure rests shall be stable, of sufficient strength and of suitable composition safely to support the

supporting structure, the working platform and any loading intended to be placed on the working platform.

iii). Stability of supporting structure

Any supporting structure shall

- (a) be suitable and of sufficient strength and rigidity for the purpose for which it is being used;
- (b) in the case of a wheeled structure, be prevented by appropriate devices from moving inadvertently during work at height;
- (c) in other cases, be prevented from slipping by secure attachment to the bearing surface or to another structure, provision of an effective anti-slip device or by other means of equivalent effectiveness;
- (d) be stable while being erected, used and dismantled; and
- (e) when altered or modified, be so altered or modified as to ensure that it remains stable.
- (f) Have suitable base plates and properly footed thereby.

iv). Stability of working platforms

A working platform shall

- (a) be suitable and of sufficient strength and rigidity for the purpose or purposes for which it is intended to be used or is being used;
- (b) be so erected and used as to ensure that its components do not become accidentally displaced so as to endanger any person;
- (c) when altered or modified, be so altered or modified as to ensure that it remains stable; and
- (d) be dismantled in such a way as to prevent accidental displacement.

v) Safety on working platforms

A working platform shall

- (a) be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work being carried out there;
- (b) possess a suitable surface and, in particular, be so constructed that the surface of the working platform has no gap
 - i) through which a person could fall;
 - ii) through which any material or object could fall and injure a person; or
 - iii) giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk; and
- (c) be so erected and used, and maintained in such condition, as to prevent, so far as is reasonably practicable
 - i) the risk of slipping or tripping; or
 - ii) any person being caught between the working platform and any adjacent structure.

vi) Loading

A working platform and any supporting structure shall not be loaded so as to give rise to a risk of collapse or to any deformation, which could affect its safe use.

vii) Additional requirements for scaffolding

Strength and stability calculations for scaffolding shall be carried out unless

- (a) a note of the calculations, covering the structural arrangements contemplated, is available; or
 - (b) it is assembled in conformity with a generally recognised standard configuration.
- viii) Depending on the complexity of the scaffolding selected, a competent person shall draw up an assembly, use and dismantling plan. This may be in the form of a standard plan, supplemented by items relating to specific details of the scaffolding in question.
- ix) A copy of the plan, including any instructions it may contain, shall be kept available for the use of persons concerned in the assembly, use, dismantling or alteration of scaffolding until it has been dismantled.
- x) The dimensions, form and layout of scaffolding decks shall be appropriate to the nature of the work to be performed and suitable for the loads to be carried and permit work and passage in safety.
- xi) While a scaffold is not available for use, including during its assembly, dismantling or alteration, it shall be marked with general warning signs in accordance with and be suitably delineated by physical means preventing access to the danger zone.
- xii) Scaffolding may be assembled, dismantled or significantly altered only under the supervision of a competent person and by persons who have received appropriate and specific training in the operations envisaged which addresses specific risks which the operations may entail and precautions to be taken, and more particularly in
 - (a) understanding of the plan for the assembly, dismantling or alteration of the scaffolding concerned;
 - (b) safety during the assembly, dismantling or alteration of the scaffolding concerned;
 - (c) measures to prevent the risk of persons, materials or objects falling;
 - (d) safety measures in the event of changing weather conditions which could adversely affect the safety of the scaffolding concerned;
 - (e) permissible loadings;
 - (f) any other risks which the assembly, dismantling or alteration of the scaffolding may entail.

18.18 Requirements for collective safeguards for arresting falls

- i) Collective safeguard are a safety net, airbag or other collective safeguard for arresting falls
- ii) A safeguard shall be used only if
 - (a) a risk assessment has demonstrated that the work activity can so far as is reasonably practicable be performed safely while using it and without affecting its effectiveness;
 - (b) the use of other, safer work equipment is not reasonably practicable; and
 - (c) a sufficient number of available persons have received adequate training specific to the safeguard, including rescue procedures.

- iii) A safeguard shall be suitable and of sufficient strength to arrest safely the fall of any person who is liable to fall.
- iv) A safeguard shall
 - (a) in the case of a safeguard which is designed to be attached, be securely attached to all the required anchors, and the anchors and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of safely supporting the foreseeable loading in arresting any fall and during any subsequent rescue;
 - (b) in the case of an airbag, landing mat or similar safeguard, be stable; and
 - (c) in the case of a safeguard, which distorts in arresting a fall, afford sufficient clearance.
- v) Suitable and sufficient steps shall be taken to ensure, so far as practicable, that in the event of a fall by any person the safeguard does not itself cause injury to that person.

18.19 Requirements for personal fall protection systems

- i) A personal fall protection system shall be used only if
 - (a) a risk assessment has demonstrated that
 - (i) the work can so far as is reasonably practicable be performed safely while using that system; and
 - (ii) the use of other safer work equipment is not reasonably practicable; and
 - (b) the user and a sufficient number of available persons have received adequate training specific to the operations envisaged, including rescue procedures.
- ii) A personal fall protection system shall
 - (a) be suitable and of sufficient strength for the purposes for which it is being used having regard to the work being carried out and any foreseeable loading;
 - (b) where necessary, fit the user;
 - (c) be correctly fitted;
 - (d) be designed to minimise injury to the user and, where necessary, be adjusted to prevent the user falling or slipping from it, should a fall occur; and
 - (e) be so designed, installed and used as to prevent unplanned or uncontrolled movement of the user.
- iii) A personal fall protection system designed for use with an anchor shall be securely attached to at least one anchor, and each anchor and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of supporting any foreseeable loading.
- iv) Suitable and sufficient steps shall be taken to prevent any person falling or slipping from a personal fall protection system.

18.20 Requirements for Ladders

- 1) Every contractor shall ensure that a ladder is used for work at height only if a risk assessment has demonstrated that the use of more suitable work equipment is not justified because of the low risk and
 - i) The short duration of use; or
 - ii) Existing features on site, which he cannot alter.
- 2) Only metal ladders shall be allowed. Bamboo ladders are prohibited.
- 3) Any surface upon which a ladder rests shall be stable, firm, of sufficient strength and of suitable composition safely to support the ladder so that its rungs or steps remain horizontal, and any loading intended to be placed on it.
- 4) A ladder shall be so positioned as to ensure its stability during use
- 5) A suspended ladder shall be attached in a secure manner and so that, with the exception of a flexible ladder, it cannot be displaced and swinging is prevented.
- 6) A portable ladder shall be prevented from slipping during use by -
 - i) securing the stiles at or near their upper or lower ends;
 - ii) an effective anti-slip or other effective stability device; or
 - iii) any other arrangement of equivalent effectiveness.
- 7) A ladder used for access shall be long enough to protrude sufficiently above the place of landing to which it provides access, unless other measures have been taken to ensure a firm handhold.
- 8) No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.
- 9) A mobile ladder shall be prevented from moving before it is stepped on.
- 10) Where a ladder or run of ladders raises a vertical distance of 9 metres or more above its base, there shall, where reasonably practicable, be provided at suitable intervals sufficient safe landing areas or rest platforms.
- 11) Every ladder shall be used in such a way that
 - (a) a secure handhold and secure support are always available to the user; and
 - (b) the user can maintain a safe handhold when carrying a load unless, in the case of a step ladder, the maintenance of a handhold is not practicable when a load is carried, and a risk assessment has demonstrated that the use of a stepladder is justified because of
 - (i) the low risk; and
 - (ii) the short duration of use.

19.0 Overhead protection

All contractors shall provide overhead protections as per Rule 41 of BOCWR

- i) Overhead protection should be erected along the periphery of every building which is under construction and the building height shall be 15m or above after construction.
- ii) Overhead protection shall be minimum 2m wide and the outer edge shall be 150mm higher than the inner edge and an angle not more than 20° to its horizontal sloping into the building.
- iii) Overhead protection shall not be erected more than a height of 5m from the base of the building.

- iv) Areas of inadvertent hazard of falling of material shall be guarded or barricaded or roped-off thereby by the contractor.

20.0 Slipping, Tripping, Cutting, Drowning and Falling Hazards

As per Rule 42 of BOCWR,

- i) All places should be free from dust, debris or similar materials.
- ii) Sharp projections or any protruding nails or similar objects shall be suitably guarded or shall even be avoided to make the place safe to work.
- iii) Contractor shall not allow workmen to work or use platforms, scaffolds/passageways or any walkways, which has water, or oil or similar substances spilt and has a slipping hazard, unless it is cleaned off or covered or sanded or saw dusted or make it safe with any suitable material.
- iv) When workers are exposed to areas where fall into water is possible, the contractor shall provide suitable and adequate equipment for saving the workers from drowning and rescuing from such hazard. If the Employer considers, the contractor shall provide well-equipped boat or launch, manned with trained personnel at the work place.
- v) Open side or opening where worker, equipment, vehicle or lifting appliance may fall at a building or outside shall be guarded suitably except in places of free access by reasons of nature of work.
- vi) Suitable safety net shall be provided at places of material / man falling is possible in accordance with national standards.

21.0 Lifting Appliances and Gear

21.1 Lifting appliances means a crane, hoist machinery, derrick, winch, gin pole, sheer legs, jack, hoist drum, slewing machinery, slewing bearing fasteners, luffing machinery sheaves, pulley blocks, hooks or other equipment used for lifting materials, objects or building workers and lifting gears means ropes, chain slings, shackles, hooks, lifting lugs, wire ropes, lifting eyebolts and eyenuts and other accessories of a lifting appliance..

21.2 No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against:

- i) the weights, dimensions and lift radii of the heaviest and largest loads
- ii) the maximum lift height, the maximum lift radius and the weight of the loads that must be handled at each
- iii) the number and frequency of lifts to be made
- iv) how long the crane will be required on site
- v) the type of lifting to be done (for example, is precision placement of loads important?)
- vi) the type of carrier required (this depends on ground conditions and machine capacity In its operating quadrants: capacity is normally greatest over the rear, less over the side, and non-existent over the front
- vii) whether loads will have to be walked or carried
- viii) whether loads will have to be suspended for lengthy periods
- ix) the site conditions, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impede access or operation

- 21.3 The contractor shall ensure that a valid certificate of fitness issued as per clause **21.5** is available for all lifting appliances including synchronised mobile jacks, pre-stressing hydraulic jacks, jacks fitted with launching girders etc. and Employers approval before inducting to the site. **Only after obtaining the approval from the Employer any lifting appliances and gear shall be used.**
- 21.4 The laminated photocopies of fitness certificate issued by competent person, the Employers' approval letter, the operators' photo, manufacturer's load chart and competency certificate shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances.
- 21.5 All lifting appliances and loose gears shall be clearly marked for its safe working load and identification by stamping or other suitable means.
- 21.6 The contractor shall also maintain a register containing a system of identification of all tools and tackles, its date of purchase, safe working load, competent person date of examination etc.
- 21.7 Test and periodical examination of lifting appliances and gears
- 21.7.1 All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent person once at least in every six months or after it has undergone any alterations or repairs liable to affect its strength or stability. Within the validity, if the lifting appliances are shifted to a new site, re-examination by the same competent person for ensuring its safety shall also be done.
- 21.7.2 Contractors can utilise the services of any competent person as defined in Factories Act, 1948 and approved by Chief Inspector of Factories with the permission of the Employer.
- 21.7.3 All alarms and signals like automatic safe load indicators (SLI), boom angle indicators, boom extension indicators, over lift boom alarm, swing alarm, hydraulic safety valves, mechanical radius indicators, load moment indicators etc. shall be periodically examined and maintained always in working condition
- 21.8 Automatic safe load indicators**
- 21.8.1 As stipulated in Rule 57 of DBOCW Rules, every lifting appliances and gears like cranes, hydras etc, if so constructed that the safe working load may be varied by raising or lowering of the jib or otherwise shall be attached with an automatic indicator of safe working loads approved by Bureau of Indian standards/ International certifying bodies which gives a warning to the operator and arrests further movements of the lifting parts.
- 21.9 Qualification of operator of lifting appliances and of signaller etc
- 21.9.1 The contractor shall not employ any person to drive or operate a lifting machine like crane, hydra etc whether driven by mechanical power or otherwise or to give signals to work as a operator of a rigger or derricks unless he
- i) is above twenty-one years of age and possesses a valid heavy transport vehicle driving licence as per Motor Vehicle Act and Rules.

- ii) is absolutely competent and reliable
- iii) possesses the knowledge of the inherent risks involved in the operation of lifting appliances by undergoing a formal training at any institution of national importance acceptable to Employer
- iv) is medically examined periodically as specified in schedule VII of BOCW Rules.

21.10 General requirements of appliances

21.10.1 Out-of level

21.10.1.1 One of the most severe effects of being out-of fit level is that side loads develop in the boom. Because of side loads all mobile cranes lose capacity rapidly as the degree of out-of-level increases and therefore

21.10.2 Boom

- i) The boom is one of the more critical elements of the crane and must be in perfect condition at all time. No boom section with a bent lattice member shall be allowed
- ii) All welds shall be crack and corrosion free
- iii) No member of the boom shall be bent
- iv) All telescopic boom shall be free from cracks, rust, flaking or cracked paint, bulges, greases or varnishes

21.10.3 The sweep area (work area) of the construction machinery shall be always free from obstructions.

21.10.4 All hydraulic piping and fittings shall be maintained leak proof.

21.10.5 The operator cab shall posses good and safe:

- i) structure, windows and windshield wipers
- ii) Drivers chair and foot rest
- iii) Control handles
- iv) Cab instrumentation
- v) Telecommunication
- vi) Cab out fitting
- vii) wind indicator with an adjustable set point shall be in a position representative for the wind on the crane. The indicator shall give continuous information regarding constant speeds and gusts.

21.11 Mandatory rigging requirements

21.11.1 **Rigging shall be done under experienced and qualified rigger only.**

21.11.2 **The primary requirement in rigging shall be to assess the weight of load before attempting any lift.**

- 21.11.3 **All hooks shall be fitted with Master Rings having certificate of fitness from the competent person, so that the hooks are subjected to balanced vertical loading only.**
- 21.11.4 **Only four legged slings shall be allowed which includes master link (ring), intermediate master link (ring) if necessary, chain / wire rope sling, sling hook or other terminal fitting.**
- 21.11.5 **Hand spliced slings up to 32mm diameter shall not be used at site for any lifting purpose.**
- 21.11.6 **No load shall be slewed over public areas without stopping the pedestrians and road traffic first.**
- 21.11.7 **Requirements of outriggers**
- i) **All outriggers shall be fully extended and at all tyres are clear of the ground**
 - ii) **Heavy duty blocking having large bearing area shall be necessary to prevent sinking of floats**
- 21.11.8 **All loads shall have tag-lines attached in order to ensure that the load can be controlled at all times.**
- 21.11.9 **No close working to any live overhead power line is permitted without the operation of a strict Permit to Work.**
- 21.11.10 **Minimum lighting is to be ensured at all lifting operations.**
- 21.12 **Failure to do any of the above shall attract penalty from the Employer as per relevant clause**

22.0 Launching Operation

- 22.1 As launching operation is one of the riskiest job, the contractor shall take utmost precaution at all stages like; planning, establishing casing yard, casting segments, transporting segments, fabrication and erection of launching girders, launching of segments, pre-stressing, auto launching of girders and dismantling of launching girders.
- 22.2 The contractor shall prepare a comprehensive Method Statement for the launching operation, adhering to the SHE conditions laid down in conditions of contract on SHE and project SHE manual. Particular reference shall be made to the provisions on working at height. As the entire process of launching has to be undertaken at an elevated level the safety of workers and the girder is paramount important. The following general guidelines shall be adhered throughout the launching operation.
- i) **Necessary 'working platforms' and fall protection anchorage arrangement shall be provided in the launching girder itself.**
 - ii) **Provisions for mounting light fittings shall also be made available in the launching girder.**

- iii) The casting yard shall be established ensuring the provision given in clause **38.0**
- iv) The workmen engaged in fabrication of reinforcement, concreting the segment shall be provided with necessary PPEs including compulsory hand protection gloves.
- v) Casting and curing of segment shall be undertaken under the direct supervision of the responsible engineer of the contractor.
- vi) Trucks with valid registration, license, safe worthiness certificate, Employer's approval certificate, and pollution under check certificate shall only be used for transport of segments
- vii) Drivers engaged for driving these trucks, shall be trained once in 6 months at Delhi Government and Maruti Institute of Driver Training and Research, Wazirabad Road, Adjoining Loni Road Flyover, Delhi – 110 094 on defensive driving.
- viii) Drivers shall also have undergone proper medical examination as per relevant clause mentioned under 'Medical Facilities'.
- ix) The segments shall rigidly secured to the truck with necessary wooden wedges and necessary red indicators/safety tapes provided so that the vehicle is clearly seen by other road users both in day / night time.
- x) Every launching girder shall have a responsible engineer on duty all the time.
- xi) All the time from erection to dismantling the area between the two piers wherein launching is in progress shall always be barricaded.
- xii) Unloading of segments from trucks, lifting of segments, shifting of segments, gluing shall be done under the direct supervision of the approved engineer of the contractor.
- xiii) Auto launching shall be done only after approval from the Employer. After every auto launching the stability of launching girder shall be ensured.
- xiv) The vertical deflection of launching girder shall be monitored at all critical stages like with/without loads and after every auto launching.
- xv) A register containing all important operational details from erection to dismantling of launching girders shall be maintained and made available to Employer whenever called for.
- xvi) Test certificate for all lifting gears including Macalloy bars shall be maintained at a location closer to the launching girder itself so that it can be referred during all inspections.
- xvii) Adequate lighting at all time shall be ensured in the entire area of operation.
- xviii) Access to drinking water & toilet shall be ensured to all workmen engaged for launching process.
- xix) Proper access ladders/stairways shall be maintained for safe ascending / descending of workmen / engineers.

22.3 Non-adherence to any of the clauses mentioned above shall be viewed seriously by the Employer and penalty levied as per relevant clause.

23.0 Construction machinery

23.1 Construction machineries may include dumpers and dump trucks, lift trucks and telescopic handlers piling rigs, vibro hammers, rail welding equipments, mobile elevating work platforms, cranes, tipper lorries, lorry loaders, skip wagons, 360° excavators, 180° backhoe loaders, crawler tractors, scrapers, graders, loading shovels, trenchers, side booms,

pavers, planers, chippers, road rollers, locomotives, tankers and bowsters, trailers, hydraulic and mechanical breakers etc.

23.2 Safe worthiness certificate

23.2.1 Every construction equipment shall be in sound mechanical working condition and certified by either competent person under Factories Act or manufacturers' warranty in case of brand new equipments or authorized persons / firms approved by Employer before induction to any site.

23.2.2 Every such certificate shall have the date of purchase, main overhauling undertaken in the past, any accident to the equipment, visual examination details, critical components safety check, list of safety devices and its working condition, manufacturer's maintenance checklist, past projects wherein the equipments were used etc as its minimum content.

23.3 Reverse Horns

23.3.1 All Vehicles shall be fitted with audible reverse alarms and maintained in good working condition. Reversing shall be done only when there is adequate rear view visibility or under the directions of a banksman

23.4 General operating procedures

- i) Drivers entering site shall be instructed to follow the safe system of work adopted on site. These shall be verbal instructions or, preferably, written instructions showing the relevant site rules, the site layout, delivery areas, speed limits, etc.
- ii) No passengers shall be carried, unless specific seating has been provided in accordance with the manufacturers recommendations.
- iii) Working on gradients beyond any equipments capability shall not be allowed.
- iv) Prevention of dumper and dump truck accidents should be managed by providing wheel stops at a sufficient distance from the edges of excavations, spoil heaps, pits, etc.
- v) The manufacturer's recommended bucket size must not be exceeded in excavators.
- vi) If excavators operating on a gradient which cannot be avoided, it must be ensured that the working cycle is slowed down, that the bucket is not extended too far in the downhill direction, and that travel is undertaken with extreme caution. A large excavator must never be permitted to travel in a confined area, or around people, without a banksman to guide the driver, who should have the excavator attachment close in to the machine, with the bucket just clear of the ground. On wheeled excavators, it is essential that the tyres are in good condition and correctly inflated. If stabilizing devices are fitted, they should be employed when the machine is excavating.
- vii) When the front shovel of the 180° backhoe loaders is being employed, the backhoe attachment shall be in its "travel" position, with the safety locking device in place.
- viii) When operating the backhoe in poor ground conditions, the stabilisers tend to sink into the surface of the ground, reducing stability. Therefore frequent checks shall be made for the stability of the machine. The loading shovel

should always be lowered to the ground to stabilise the machine when the backhoe is employed.

- ix) The netting operation of the skip wagons should be carried out prior to lifting the skip to reduce the risks of working on the rear platform
- x) If a tractor dozer is employed on clearing scrub or felling trees, it shall be provided with adequate driver protection.
- xi) When two or more scrapers are working on the same job, a minimum distance of at least 25m shall be kept between them.
- xii) In case of hydraulic breakers, hydraulic rams and hoses shall be in good working condition

23.5 All wood working machines shall be fitted with suitable guards and devices such as top guard, riving knife, push stick, guards for drive belts and chains, and emergency stop switch easily accessible by the operator.

23.6 **Penalty**

23.6.1 **If any of the above clauses are not adhered, penalty shall be imposed as per relevant clause depending upon the gravity of the unsafe act and or condition.**

24.0 **Machine and general area guarding**

24.1 The contractor shall ensure at the construction site all motors, cogwheels, chains and friction gearing, flywheels, shafting, dangerous and moving parts of machinery are securely fenced or legged. The fencing of dangerous part of machinery is not removed while such machinery is in motion or in use.

25.0 **Manual lifting and carrying of excessive weight**

25.1 The contractor shall ensure at his construction site of a building or other construction work that no building worker lifts by hand or carries overhead or over his back or shoulders any material, article, tool or appliances exceeding in weight as said below as per Rule 38 of BOCWR, Unless aided by another building worker or device.

Person	Maximum weight in kg.
Adult man	55
Adult woman	30

25.2 No building worker aided by other building worker shall lift or carry weight higher than or exceeding the sum of total of maximum limits set out for each building worker separately as mentioned in the table above.

26.0 **Site Electricity**

26.1 Competency of Electrical personnel:

26.1.1 **The contractor shall employ qualified and competent electrical personnel as specified in general instruction JDA/SHE/GI/001/MPR/281105.**

26.2 Assessment of power

- 26.2.1 The contractor shall assess the size and location of the electrical loads and the manner in which they vary with time during the currency of the contract.
- 26.2.2 The contractor shall elaborate as to how the total supply is to be obtained / generated. The details of the source of electricity, earthing requirement, substation / panel boards, distribution system shall be prepared and necessary approval from Employer obtained before proceeding of the execution of the job.
- 26.2.3 **The main contractor shall take consideration, the requirements of the sub / petty contractors' electric power supply and arrive at the capacity of main source of power supply from diesel generators.**
- 26.2.4 **As the sub / petty contractors' small capacity generators create more noise and safety hazard, no small capacity diesel generators shall be allowed for whatsoever the type of job to be executed under this contract.**
- 26.2.5 **If any unsafe noise making small capacity diesel generators are found used by sub / petty contractors the main contractor shall only be penalised.**

26.3 Work on site

- 26.3.1** The contractor shall also submit electrical single line diagram, schematic diagram and the details of the equipment for all temporary electrical installation and these diagrams together with the temporary electrical equipment shall be submitted to the Employer's for necessary approval. Failure to do so shall invite penalty as per relevant clause.

26.4 Strength and capability of electrical equipment

- 26.4.1 No electrical equipment shall be put into use where its strength and capability may be exceeded in such a way as may give rise to danger.

26.5 Adverse or hazardous environments

- 26.5.1 Electrical equipment which may reasonably foreseeably be exposed to-
- (a) mechanical damage;
 - (b) the effects of the weather, natural hazards, temperature or pressure;
 - (c) the effects of wet, dirty, dusty or corrosive conditions; or
 - (d) any flammable or explosive substance, including dusts, vapours or gases, shall be of such construction or as necessary protected as to prevent, so far as is reasonably practicable, danger arising from such exposure.

26.6 Distribution system:

- 26.6.1 The contractor shall provide distribution system for control and distribution of electricity from a main AC supply of 50Hz for typical appliances,
- i) Fixed plant – 400V 3 phase
 - ii) Movable plant fed via trailing cable over 3.75 kW – 400 3 phase

- iii) Installation in site buildings – 230V single phase
- iv) Fixed flood lighting – 230V single phase
- v) Portable and hand tools – 115V single phase
- vi) Site lighting - 115V single phase
- vii) Portable hand lamps – 115V single phase

26.7 Electrical protection circuits

26.7.1 Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeable become charged as a result of either the use of a system, or a fault in a system, becomes so charged. A conductor shall be regarded as earthed when conductors of sufficient strength and current-carrying capability to discharge electrical energy to earth connect it to the general mass of earth.

If a circuit conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to danger by breaking the electrical continuity or introducing high impedance shall be placed in that conductor unless suitable precautions are taken to prevent that danger.

26.7.2 Appropriate electrical protection shall be provided for all circuits, against over load, short circuit and earth fault current.

26.7.3 The contractor shall provide sufficient ELCBs (maintain sensitivity 30 mA) / RCCBs for all the equipments (including Potable equipments), electrical switchboards, distribution panels etc. to prevent electrical shocks to the workers.

26.7.4 All protection devices shall be capable of interrupting the circuit without damage to any equipments and circuits in case of any fault may occur.

26.7.5 Rating of fuses and circuit breakers used for the protection of circuits should be coordinate with equipment power ratings.

26.7.6 Protection against lightning shall be ensured to all equipment kept in open at sites.

26.8 Cables:

26.8.1 Cables shall be selected after full consideration of the condition to which they shall be exposed and the duties for which they are required. Supply cable up to 3.3 kV shall be in accordance with BS 6346.

26.8.2 For supplies to mobile or transportable equipment where operating of the equipment subjects the cable to flexing, the cable shall conform to any of these codes BS 6007 / BS 6500 / BS 7375.

26.8.3 Flexible cords with a conductor cross sectional area smaller than 1.5 mm² shall not be used and insulated flexible cable shall conform to BS 6500 and BS 7375.

- 26.8.4 Where low voltage cables are to be used, reference shall be made to BS 7375. The following standards shall also be referred to particularly for under ground cables BS 6346 and BS 6708
- 26.8.5 Cables buried directly in the ground shall be of a type incorporating armour or metal sheath or both. Such cables shall be marked by cable covers or a suitable marking tape and be buried at a sufficient depth to avoid their being damaged by any disturbance of the ground. Cable routes shall be marked on the plans kept in the site electrical register.
- 26.8.6 Cabling passing under the walk way and across way for transport and mobile equipment shall be laid in ducts at a minimum depth of 0.6 meters.
- 26.8.7 Cables that need to cross open areas, or where span of 3m or more are involved, a catenary wire on poles or other supports shall be provided for convenient means of suspension. Minimum height shall be 6 m above ground.
- 26.8.8 Cables carrying a voltage to earth in excess of 65V other than supply for welding process shall have metal armour or sheath, which has been effectively earthed and monitored by the contractor. In case of flexible and trailing cables such earthed metal sheath and/or armour should be in addition to the earth core in the cable and shall not be used as the protective conductor.
- 26.8.9 Armoured cables having an over-sheath of polyvinyl chloride (PVC) or an oil resisting and flame retardant compound shall be used whenever there is a risk of mechanical damage occurring
- 26.9 **Plugs, socket-outlets and couplers:**
- 26.9.1 **The contractor shall ensure plugs, socket-outlets, and couplers available in the construction site as “splash proof” type. The minimum degree of Ingress Protection should be of IP44 in accordance with BS EN 60529.**
- 26.9.2 Only plugs and fittings of the weatherproof type shall be used and they should be colour coded in accordance with the Internationally recognised standards for example as detailed as follows:
- (a) **110 volts : Yellow.**
- (b) **240 volts : Blue.**
- (c) **415 volts : Red.**
- 26.10 **Connections**
- 26.10.1 **Every joint and connection in a system shall be mechanically and electrically suitable for use to prevent danger. Proper cable connectors as per national/international standards shall only be used to connect cables.**
- 26.10.2 **No loose connections or tapped joints shall be allowed any where in the work site, office area, stores and other areas. Penalty as per relevant clause shall be put in case of observation of any tapped joints.**
- 26.11 Portable and hand-held equipments:

26.11.1 The contractor shall ensure the use of double insulated or all-insulated portable electrical hand equipment may be used without earthing (i.e. two core cables), but they shall still be used only on 110V because of the risk of damage to trailing leads.

26.12 Other equipments:

26.12.1 All equipment shall have the provision for major switch/cut-off switch in the equipment itself.

26.12.2 All non-current carrying metal parts of electrical equipment shall be earthed through insulated cable

26.12.3 Isolate exposed high-voltage (over 415 Volts) equipment, such as transformer banks, open switches, and similar equipment with exposed energized parts and prevent unauthorised access.

26.12.4 Approved perimeter markings shall be used to isolate restricted areas from designated work areas and entryways and shall be erected before work begins and maintained for entire duration of work. Approved perimeter marking shall be installed with either red barrier tape printed with the words "DANGER—HIGH VOLTAGE" or a barrier of yellow or orange synthetic rope, approximately 1 to 1.5 meter above the floor or work surface.

26.13 Work on or near live conductors

26.13.1 No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless-

- a) it is unreasonable in all the circumstances for it to be dead; and
- b) it is reasonable in all the circumstances for him to be at work on or near it while it is live; and
- c) suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

26.14 Inspection and Maintenance

26.14.1 All electrical equipment should be permanently numbered and a record kept of the date of issue, date of last inspection and recommended inspection period.

26.14.2 Fixed installations shall be inspected at least at three monthly intervals; routine maintenance being carried out in accordance with equipment manufactures recommendations.

27.0 Lighting:

27.1 The contractor shall provide sufficient site lighting, of the right type and at the right place for it to be properly effective. Lighting ought not to introduce the risk of electric shock. Therefore, 230V supplies should be used for those fittings, which are robustly installed, and well out of reach e.g. flood lighting or high-pressure discharge lamps.

27.2 Selection of Luminaries:

The contractor shall select the luminaries as per the area requirement indicated below:

Type of Lighting	Area of Requirement	Luminaries
Area Lighting	Workmen and vehicles to move about in safely.	i) Shovel type: non-symmetrical ii) Symmetrical or non-symmetrical tungsten halogen
Beam flood lighting	Concentrated light over an area from a relatively great distance.	i) Portable flood light (Conical beam) ii) Wide angle flood (fan shaped beam) iii) Medium or narrow angle flood (Conical beam)
Dispersive lighting	Lighting for indoor	i) Dispersive (Mercury florescent) ii) Cargo cluster iii) Florescent trough
Walkway lighting	Lighting for stairways, ladder ways, corridors, scaffold access routs, etc.	i) Well glass unit ii) Bulkhead unit (tungsten filament) iii) Bulk head unit (Florescent)
Local lighting	Lighting on sites and fittings are generally accessible to operatives	i) PAR (Parabolic Aluminised Reflector) lamp cluster ii) Festoons (with or without shades) iii) Adjustable florescent work lamp iv) Portable flood lamp (mounted on own cable drum)

27.3 The contractor shall ensure that luminaries should always be placed so that no person is required to work in their own shadow and so that the local light for one person is not a source of glare for the others. Strongly made clamps should be available for attaching luminaries to poles and other convenient supports.

27.4 Luminaries should be robust, resistant to corrosion and rain proof especially at the point of the cable entry.

27.5 The correct type of lamp for each luminaries should always be used and when lamps need to be replaced if shall be in accordance with the supply voltage.

27.6 Lamp holders not fitted with a lamp should be capped off.

- 27.7 The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction **JDA/SHE/GI/0011/ILL/281105.**

28.0 Hand Tools and Power Tools

28.1 General

- 28.1.1 The contractor is wholly responsible for the safe condition of tools and equipment used by his employees and that of his sub-contractors.
- 28.1.2 Use of short / damaged hand tools shall be avoided and the contractor shall ensure all his hand tools used at his worksite are safe to work with or stored and shall also train his employees (including his sub-contractors) for proper use thereby.
- 28.1.3 All hand tools and power tools shall be duly inspected before use for safe operation.
- 28.1.4 All hand tools and power tools shall have sufficient grip and the design specification on par with national/international standards on anthropometrics.

28.2 Hand tools

- 28.2.1 Hand tools shall include saws, chisels, axes and hatches, hammers, hand planes, screw drivers, crow bars, nail pullers.
- 28.2.2 The contractor shall ensure that,
- i) For crosscutting of hardwood, saws with larger teeth points (no. of points per inch) shall be preferred to avoid the saw jumping out of the job.
 - ii) Mushroom headed chisels shall not be used in the worksite where the fragments of the head may cause injury.
 - iii) Unless hatchet has a striking face, it shall be used as a hammer.
 - iv) Only knives of retractable blades shall be used in the worksite.
 - v) No screwdrivers shall be used for scraping, chiselling or punching holes.
 - vi) A pilot hole shall always be driven before driving a screw.
 - vii) Wherever necessary, usage of proper PPEs shall be used by his employees.

28.3 Power tools

- 28.3.1 Power tools include drills, planes, routers, saws, jackhammers, grinders, sprayers, chipping hammers, air nozzles and drills.
- 28.3.2 The contractor shall ensure that
- i) Electric tools are properly grounded or / and double insulated.
 - ii) GFCIs/ RCCBs shall be used with all portable electric tool operated especially outdoors or in wet condition.

- iii) Before making any adjustments or changing attachments, his workers shall disconnect the tool from the power source.
- iv) When operating in confined spaces or for prolonged periods, hearing protection shall be required. The same shall also apply to working with equipments, which gives out more noise as mentioned in clause **43.0** of this contract document.
- v) Tool is held firmly and the material is properly secured before turning on the tool.
- vi) All drills shall have suitable attachments respective of the operations and powerful for ease of operation.
- vii) When any work / operation need to be performed repeatedly or continuously, tools specifically designed for that work shall be used. The same is applicable to detachable tool bit also.
- viii) Size of the drill shall be determined by the maximum opening of the chuck in case of drill bit.
- ix) Attachments such as speed reducing screwdrivers and buffers shall be provided to prevent fatigue and undue muscle strain to his workers.
- x) Stock should be clamped or otherwise secured firmly to prevent it from moving.
- xi) Workers shall never stand on the top of the ladder to drill holes in walls / ceilings, which can be hazardous, instead standing on the fourth or fifth rung shall be recommended.
- xii) Electric plane shall not be operated with loose clothing or long scarf or open jacket.
- xiii) Safety guards used on right angle head or vertical portable grinders must cover a minimum of 180° of the wheel and the spindle / wheel specifications shall be checked.
- xiv) All power tools / hand tools shall have guards at their nip points.
- xv) Low profile safety chain shall be used in case of wood working machines and the saw shall run at high rpm when cutting and also correct chain tension shall be ensured to avoid "kickback".
- xvi) Leather aprons and gloves shall be used as an additional personal protection auxiliary to withstand kickback.
- xvii) Push sticks shall be provided and properly used to hold the job down on the table while the heels moves the stock forward and thus preventing kickbacks.
- xviii) Air pressure is set at a suitable level for air actuated tool or equipment being used. Before changing or adjusting pneumatic tools, air pressure shall be turned off.
- xix) Only trained employees shall use explosive actuated tools and the tool shall also be unloaded when not in use.
- xx) Usage of such explosive actuated tools shall be avoided in case of places where explosive/flammable vapours or gases may be present.
- xxi) Explosive actuated tools and their explosives shall be stored separately and be taken out and loaded only before the time of immediate use.
- xxii) Misfired cartridges of explosive actuated tools must be placed in a container of water and be removed safely from the project.
- xxiii) No worker shall point any power operated / hand tool to any other person especially during loading / unloading.

29.0 Welding, Gouging and Cutting

- 29.1 Gas cylinders in use shall be kept upright on a custom-built stand or trolley fitted with a bracket to accommodate the hoses and equipment or otherwise secured. The metal cap shall be kept in place to protect the valve when the cylinder is not connected for use.
- 29.2 Hose clamp or clip shall be used to connect hoses firmly in both sides of cylinders and torches.
- 29.3 All gas cylinders shall be fixed with pressure regulator and dial gauges
- 29.4 Non-return valve and Flashback arrester shall be fixed at both end of cylinder and torch.
- 29.5 Domestic LPG cylinders shall not be used for Gas welding and Cutting purpose.
- 29.6 DCP or CO₂ type Fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location. Fire Extinguisher should confirm to IS 2190: 1992.
- 29.7 Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g. on the other side of bulkheads).
- 29.8 Oxygen cylinders and flammable gas cylinders shall be stored separately, at least 6.6 meters (20 feet) apart or separated by a fire proof, 1.6 meters (5 feet) high partition. Flammable substances shall not be stored within 50 feet of cylinder storage areas.
- 29.9 Transformer used for electrical arc welding shall be fixed with Ammeter and Voltmeter and also fixed with separate main power switch.
- 29.10 Welding grounds and returns should be securely attached to the work by cable lugs, by clamps in the case of stranded conductors, or by bolts for strip conductors. The ground cable will not be attached to equipment or existing installations or apparatus.
- 29.11 Use a low voltage open circuit relay device if welding with alternating current in constricted or damp places.
- 29.12 Take precautions against the risk of increased fume hazards when welding with chrome containing fluxed consumables or high current metal inert gas (MIG) or tungsten inert gas (TIG) processes.
- 29.13 Avoid being in contact with water or wet floors when welding. Use duckboards or rubber protection.
- 29.14 All electrical installations shall meet the IS: 5571: 1997 and NFPA 70 for gas cylinder storage area and other hazardous areas.
- 29.15 The current for Electric arc welding shall not exceed 300 A on a hand welding operation.

30.0 Dangerous and harmful environment

As per BOCWR Rule 40,

- i) When internal combustion engines are to be used into a confined space or excavation or tunnel or any other workplace where neither natural or artificial ventilation system is inadequate to keep carbon monoxide below 50ppm, exposure of building workers shall be avoided unless suitable measures are taken and provided by the contractor.
- ii) No worker shall be allowed into any confined space or tank or trench or excavation wherein there is given off any dust, fumes / vapours or other impurities which is likely to be injurious or offensive, explosive or poisonous or noxious or gaseous material or other harmful articles unless steps are carried out by the contractor and certified by the responsible person to be safe.

31.0 Fire prevention, protection and fighting system

31.1 The contractor shall ensure that construction site is provided with fire extinguishing equipment sufficient to extinguish any probable fire at construction site. An adequate water supply is provided at ample pressure as per national standard.

31.2 Recharging of fire extinguishers and their proper maintenance should be ensured and as a minimum should meet Indian National Standards

31.3 All drivers of vehicles, foreman, supervisors and managers shall be trained on operating the fire extinguishers and fire fighting equipment.

31.4 The contractor shall also give consideration to the provision of adequate fire fighting arrangements within the underground and tunnelling operations including the provision of Fire Service compatible hose connections and emergency lighting

31.5 As per the RBOCW Rules 2002, Rule 63(a)(vii), all lifting appliances' driver cabin should be provided with a suitable portable fire extinguisher.

31.6 Combustible scrap and other construction debris should be disposed off site on a regular basis. If scrap is to be burnt on site, the burning site should be specified and located at a distance no less than 12 metres from any construction work or any other combustible material.

31.7 Every fire, including those extinguished by contractor personnel, shall be reported to the Employer representatives.

31.8 Emergency plans and Fire Evacuation plans shall be prepared and issued . Mock drills should be held on a regular basis to ensure the effectiveness of the arrangements and as a part of the programme, the Telephone Number of the local fire brigade should be prominently displayed near each telephone on site.

32.0 Corrosive substances

32.1 As per BOCWR Rule 44, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a building / construction site in a manner that it does not endanger the building worker and

suitable PPE shall be provided by the contractor to the worker during such handling and work. In case of spillage of such substances on building worker, the contractor shall take immediate remedial measures.

33.0 Demolition

33.1 The Contractor shall ensure that

- i) all demolition works be carried out in a controlled manner under the management of experienced and competent supervision.
- ii) the concerned department of the Government or local authority be informed and permission obtained wherever required. Media shall also be informed regarding this concern.
- iii) all glass or similar materials or articles in exterior openings are removed before commencing any demolition work and all water, steam, electric, gas and other similar supply lines are put-off and such lines so located or capped with substantial coverings so as to protect it from damage and to afford safety to the building workers and public..
- iv) examine the walls of all structures adjacent to the structure to be demolished to determine thickness, method of support to such adjacent structures
- v) no demolishing work be performed if the adjacent structure seems to be unsafe unless and until remedial measures like sheet piling, shoring, bracing or similar means be ensured for safety and stability for adjacent structure from collapsing.
- vi) debris / bricks and other materials or articles shall be removed by means of
 - a) chutes
 - b) buckets or hoists
 - c) through openings through floors or
 - d) any other safe means
- vii) no person other than building workers or other persons essential to the operation of demolition work shall be permitted to enter a zone of demolition and the area be provided with substantial barricades.

34.0 Excavation and Tunnelling:

34.1 Excavation

34.1.1 The contractor shall ensure

- i) where any construction building worker engaged in excavation is exposed to hazard of falling or sliding material or article from any bank or side of such excavation which is more than one 1.5 m above his footing, such worker is protected by adequate piling and bracing against such bank or side.
- ii) where banks of an excavation are undercut, adequate shoring is provided to support the material or article overhanging such bank.

- iii) excavated material is not stored at least 0.65 m from the edge of an open excavation or trench and banks of such excavation or trench are stripped of loose rocks and the banks of such excavation or trench are stripped of loose rocks and other materials which may slide, roll or fall upon a construction building worker working below such bank
- iv) metal ladders and staircases or ramps are provided, as the case may be, for safe access to and egress from excavation where, the depth of such excavation exceeds 1.5 m and such ladders, staircases or ramps comply with the IS 3696 Part 1&2 and other relevant national standards.
- v) trench and excavation is protected against falling of a person by suitable measures if the depth of such trench or excavation exceeds 1.5 m and such protection is an improved protection in accordance with the design and drawing of a professional engineer, where such depth exceeds 4m.

34.2 Tunnelling

34.2.1 The contractor shall inform in writing to the Director General within 30 days, prior to the commencement of any tunnelling work.

34.2.2 The contractor shall appoint a responsible person for safe operation for tunnelling work as per Rule 121 & 125 of BOCWR.

34.2.3 The contractor shall ensure

- i) every compressed air system in a tunnel is provided with emergency power supply for maintained continued supply of compressed air as per Rule 155 of BOCWR
- ii) watertight bulkhead doors are installed at the entrance of a tunnel to prevent flooding.
- iii) reliable and effective means of communication such as telephone or walkie-talkie are provided and maintained for arranging better effective communication at an excavation or tunnelling work as per Rule 136 of BOCWR.
- iv) all portable electrical hand tools and inspection lamp used in under ground and confined space at an excavation or tunnelling work is operated at a voltage not exceeding 24V.
- v) only flame proof equipment of appropriate type as per IS:5571:2000 and or other relevant national standard is used inside the tunnel
- vi) petrol or LPG or any other flammable substances are not used, stored inside the tunnel except with prior approval from Employer, and also no oxy-acetylene gas is used in a compressed air environment in excavation or tunnelling
- vii) adequate number of water outlets provided for fire fighting purpose, an audible fire alarm and adequate number and types of fire extinguishers are provided and maintained.
- viii) temperature in any working chamber in an excavation or tunnelling work where workers employed does not exceed 29°C as per Rule 165 of BOCWR.
- ix) all working areas in a free air tunnel are provided with ventilation system as approved by the Director General and the fresh air supplied in such tunnel is not less than 6 m³/ min for each worker employed in tunnel as per Rule 153 of BOCWR.

34.3 Warning signs and notices:

34.3.1 The contractor shall ensure that

- i) suitable warning signs or notices, required for the safety of building workers carrying out the work of an excavation or tunnelling, shall be displayed or erected at conspicuous places in Hindi and in a language understood by majority of such building workers at such building such excavation or tunnelling work
- ii) such warning signs and notices with regard to compressed air working shall include
 - a) the danger involved in such compressed air work
 - b) fire and explosion hazard
 - c) the emergency procedures for rescue from such danger or hazards.

35.0 Work Permit system

35.1 The Contractor shall develop a Work Permit system, which is a formal written system used to control certain types of work that are potentially hazardous. A work permit is a document, which specifies the work to be done, and the precautions to be taken. Work Permits form an essential part of safe systems of work for many construction activities. They allow work to start only after safe procedures have been defined and they provide a clear record that all foreseeable hazards have been considered. Permits to Work are usually required in high-risk areas as identified by the Risk Assessments.

35.2 A permit is needed when construction work can only be carried out if normal safeguards are dropped or when new hazards are introduced by the work. Examples of high-risk activities include but are not limited to:

- i) **Entry into confined spaces**
- ii) **Work in close proximity to overhead power lines and telecommunication cables.**
- iii) **Hot work.**
- iv) **To dig—where underground services may be located.**
- v) **Work with heavy moving machinery.**
- vi) **Working on electrical equipment**
- vii) **Work with radioactive isotopes.**
- viii) **Heavy lifting operations and lifting operations closer to live power line**

35.3 The permit-to-work system should be fully documented, laying down:

- i) **How the system works;**
- ii) **The jobs it is to be used for;**
- iii) **The responsibilities and training of those involved; and**
- iv) **How to check its operation;**

35.4 A Work Permit authorisation form shall be completed with the maximum duration period not exceeding 12 hours.

- 35.5 A copy of each Permit To Work shall be displayed, during its validity, in a conspicuous location in close proximity to the actual works location to which it applies.

36.0 Traffic Management

- 36.1 The basic objective of the following guidelines is to lay down procedures to be adopted by contractor to ensure the safe and efficient movement of traffic and also to ensure the safety of workmen at construction sites.

- 36.2 All construction workers should be provided with high visibility jackets with reflective tapes as most of viaduct /tunnelling and station works are either above or under right-of-way. The conspicuity of workmen at all times shall be increased so as to protect from speeding vehicular traffic.

- 36.3 The guiding principles to be adopted for safety in construction zone are to

- i) Warn the road user clearly and sufficiently in advance.
- ii) Provide safe and clearly marked lanes for guiding road users.
- iii) Provide safe and clearly marked buffer and work zones
- iv) Provide adequate measures that control driver behaviour through construction zones.

36.4 Legal permission

- 36.4.1 In all cases, the contractor shall employ proper precautions. Wherever operations undertaken are likely to interfere with public traffic, specific traffic management plans shall be drawn up and implemented by the contractor in consultation with the approval of local police authorities and/or the concerned metropolitan/civil authorities as the case may be.

- 36.4.2 Such traffic management plans shall include provision for traffic diversion and selection of alternative routes for transport of equipment. If necessary, the contractor shall carry out road widening before commencement of works to accommodate the extra load

- 36.5 The primary traffic control devices used in work zones shall include signs, delineators, barricades, cones, pylons, pavement markings and flashing lights.

- 36.6 The road construction and maintenance signs which fall into the same three major categories as do other traffic signs, that are Regulatory Signs, Warning Signs and Direction (or guidelines) Signs shall only be used. The IRC: 67 (Code of Practice for Road Signs) provide a list of traffic signs. The size, colours and placement of sign shall conform to IRC: 67.

36.7 Regulatory signs

- 36.7.1 Regulatory signs impose legal restriction on all traffic. It is essential, therefore, that they are used only after consulting the local police and traffic authorities.

36.8 Warning signs

- 36.8.1 Warning signs in the traffic control zone shall be utilised to warn the drivers of specific hazards that may be encountered.
- 36.8.2 The contractor shall place detour signage at strategic locations and install appropriate warning signs. In order to minimize disruption of access to residences and business, the contractor shall maintain at least one entrance to a property where multiple entrances exist.
- 36.8.3 A warning sign as given in general instruction **JDA/SHE/GI/012/WS/281105** shall be installed at all secondary road which merges with the primary road where the construction work is in progress at sufficient distance before it merges with the primary road so as to alert the road users regarding the 'Metro Work in Progress'.
- 36.8.4 Materials hanging over / protruded from the chassis / body of any vehicle especially during material handling shall be indicated by red indicator (red light/flag) to indicate the caution to the road users.
- 36.9 Delineators
The delineators are the elements of a total system of traffic control and have two distinct purposes:
- i) To delineate and guide the driver to and along a safe path
 - ii) As a taper to move traffic from one lane to another.
- 36.9.1 These channelising devices such as cones, traffic cylinders, tapes and drums shall be placed in or adjacent to the roadway to control the flow of traffic. These should normally be retro-reflectors complying to IRC: 79 - Recommended Practice for Road Delineators.
- 36.9.2 Traffic cones and cylinders
- 36.9.2.1 Traffic cones of 500mm, 750mm and 1000mm high and 300mm to 500mm in diameter or in square shape at base and are often made of plastic or rubber and normally have retro-reflectorised red and white band shall be used wherever required.
- 36.9.3 Drums
- 36.9.3.1 Drums about 800mm to 1000mm high and 300mm in diameter can be used either as channelising or warning devices. These are highly visible, give the appearance of being formidable objects and therefore command the respect of drivers.
- 36.9.4 Barricades
- 36.9.4.1 Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the working area from the risk of accidents due to speedy vehicular movement. Same the way barricades protect the road users from the danger due to construction equipment and other temporary structures.
- 36.9.4.2 The structure dimension of the barricade, material and composition, its colour scheme, JDA logo and other details shall be in accordance with specifications laid down in tender document.

- 36.9.4.3 All barricades shall be erected as per the design requirements of the Employer, numbered, painted and maintained in good condition and also Barricade in-charge maintains a barricade register in site.
- 36.9.4.4 **All barricades shall be conspicuously seen in the dark/night time by the road users so that no vehicle hits the barricade. Conspicuity shall be ensured by affixing retro reflective stripes of required size and shape at appropriate angle at the bottom and middle portion of the barricade at a minimum gap of 1000mm. In addition minimum one red light or red light blinker should be placed at the top of each barricade.**
- 36.9.5 The contractor shall ensure that all his construction vehicles plying on public roads (like dump trucks, trailers, etc.) have proper license to ply on public roads from the State Transport Authority. Drivers holding proper valid license as per the requirements of Motor Vehicles Act shall drive these vehicles
- 36.9.6 The contractor shall not undertake loading and unloading at carriageways obstructing the free flow of vehicular traffic and encroachment of existing roads by the contractor applying the excuse of work execution.
- 36.9.7 **Tow away vehicle**
- 36.9.7.1 **The contractor shall make arrangements keeping tow away van / manpower to tow away any breakdown vehicle in the traffic flow without loosing any time at his cost.**
- 36.9.8 **Cleaning of roads**
- 36.9.8.1 **The contractor shall ensure the cleanliness of roads and footpaths by deploying proper manpower for the same. The contractor shall have to ensure proper brooming, cleaning washing of roads and footpaths on all the time throughout the entire stretch till the currency of the contract including disposal of sweepage.**

37.0 Work to adjacent railways

- 37.1 Whenever work is to be conducted in close proximity to the live railways then the following measures shall need to be addressed:
- (a) **The rules provided for in the Railway's manual shall be followed.**
 - (b) No persons are allowed to encroach onto the railway unless specific authority has been given by the owner.
 - (c) Adequate protection in accordance with the railway owner's requirements shall be followed. (Provision of Block Inspectors, Flagmen and Lookouts)
 - (d) All persons shall wear high visibility clothing at all times.
 - (e) Any induction training requirements of the railways shall be strictly observed

38.0 Batching Plant / Casting Yard

- i) The batching plant / casting yard shall be effectively planned for smooth flow of unloading and stacking the aggregates reinforcements and cement,

batching plant, transport of concrete, casting the segment, stacking the segment and loading the segments / precast units to the trucks. As far as possible the conflicts should be avoided.

- ii) The batching plant / casting yard shall be barricaded and made as a compulsory PPE zone
- iii) If in case of material unloading area is not maintainable as PPE zone, the same shall be segregated properly and made as a non-PPE zone with appropriate barrications.
- iv) Electrical system shall also be suitably planned so that location of diesel generator, if any, location of DBs, routing of cables and positioning of area lighting poles/masts does not infringe on any other utility and pose danger.
- v) Drainage shall be effectively provided and waste water shall be disposed after proper treatment
- vi) Time office, canteen, drinking water, toilet and rest place shall be suitably located for the easy access to workers. All the facilities shall be properly cleaned and maintained during the entire period of operation.
- vii) Manual handling of cement shall be avoided to a larger extent. Whenever it is absolutely necessary the workmen shall be given full body protection, hand protection and respiratory protection as a basic measure of ensuring better health.
- viii) The PPEs provided to cement handling workmen shall conform to international standards.
- ix) Access roads and internal circulation roads shall be well laid and maintained properly at all time.
- x) Non-adherence to any of the above provision shall be penalised as per relevant penalty clause.

39.0 Personal Protective Equipments (PPEs)

39.1 The contractor shall provide required PPEs to workmen to protect against safety and / or health hazards. Primarily PPEs are required for the following protection

- i) **Head Protection (Safety helmets)**
- ii) **Foot Protection (Safety footwear, Gumboot, etc)**
- iii) **Body Protection (High visibility clothing (waistcoat/jacket), Apron, etc)**
- iv) **Personal fall protection (Full body harness, Rope-grap fall arrester, etc)**
- v) **Eye Protection (Goggles, Welders glasses, etc)**
- vi) **Hand Protection (Gloves, Finger coats, etc)**
- vii) **Respiratory Protection. (Nose mask, SCBAs, etc)**
- viii) **Hearing Protection (Ear plugs, Ear muffs, etc)**

39.2 The PPEs and safety appliances provided by the contractor shall be of the standard as prescribed by Bureau of Indian Standards (BIS). If materials conforming to BIS standards are not available, the contractor as approved by the Employer shall procure PPE and safety appliances.

39.3 All construction workers should be provided with high visibility jackets with reflective tapes conforming to the requirement specified under BS EN 471: 1994 as most of viaduct /tunnelling and station works are executed either above or under right-of-way. The conspicuity of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.

- 39.4 The contractor shall provide **safety helmet, safety shoe and high visibility clothing** for all employees including workmen, traffic marshal and other employees who are engaged for any work under this contract as per the following requirement.

All employees of the Contractor including workmen	Traffic marshals
i) Hard hat with company Logo ii) Safety boots iii) Hi-visibility waistcoat covering upper body and meeting the following requirements as per BS EN 471:1994: a) Background in fluorescent orange-red in colour b) Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm² c) Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm² d) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. e) The bottom strip shall be at a distance of 5cm from the bottom of the vest. f) Strips must be retro reflective and fluorescent g) Waistcoat shall have a side adjustable fit and a side and front tear-away feature on vests made of nylon.	i) Hard hat with reflective tape ii) Safety boots iii) Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994 : a) Background in fluorescent orange-red in colour b) Jackets with full-length sleeves with two bands of retro reflective material, which shall be placed at the same height on the garment as those of the torso. The upper band shall encircle the upper part of the sleeves between the elbow and the shoulder; the bottom of the lower band shall not be less than 5cm from the bottom of the sleeve. c) Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm² d) Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm² e) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. f) The bottom strip shall be at a distance of 5cm from the bottom of the vest. g) Strips must be retro reflective and fluorescent.

39.4.1 Colour coding for helmets

Safety Helmet <u>Colour</u> Code (Every Helmet should have the LOGO* affixed /painted)	Person to use
White	JDA staffs
<u>Grey</u>	All Designers, Architect, Consultants, etc.

Violet	Main Contractors (Engineers / Supervisors)
Blue	All Sub-contractors (Engineers / Supervisors)
Red	Electricians (Both Contractor and Sub-contractor)
Green	Safety Professionals (Both Contractor and Sub-contractor)
Orange	Security Guards / Traffic marshals
Yellow	All workmen
White (with “VISITOR” sticker)	Visitors

Note: LOGO*

1. Logo shall have its outer dimension 2”X 2” and shall be conspicuous
2. Logo shall be either painted or affixed
3. No words shall come either on Top / Bottom of Logo

Logo of the corresponding main contracting company for their employees and sub-contracting company for their employees shall only be used.

39.5 In addition to the above any other PPE required for any specific jobs like, welding and cutting, working at height, tunnelling etc shall also be provided to all workmen and also ensure that all workmen use the PPEs properly while on the job.

39.6 **The contractor shall not pay any cash amount in lieu of PPE to the workers/sub-contractors and expect them to buy and use during work.**

39.7 **The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Employer during the inspections. Failing to do so shall invite appropriate penalty as per the provisions of the contract.**

39.8 It is always the duty of the contractor to provide required PPEs for all visitors. Towards this required quantity of PPEs shall be kept always at the security post.

40.0 Visitors to site

40.1 **No visitor is allowed to enter the site without the permission of the Employer. All authorised visitors should report at the site office. Contractor shall provide visitor’s helmet (White helmet with visitor sticker) and other PPEs like Safety Shoe, reflective jacket, respiratory protection etc. as per requirement of the site.**

40.2 All Visitors shall be accompanied at all times by a responsible member of the site personnel.

40.3 The contractor shall be fully responsible for all visitors’ safety and health within the site..

PART – III: OCCUPATIONAL HEALTH AND WELFARE

41.0 Physical fitness of workmen

- 41.1 The contractor shall ensure that his employees/workmen subject themselves to such medical examination as required under the law or under the contract provision and keep a record of the same.
- 41.2 The contractor shall not permit any employee/workmen to enter the work area under the influence of alcohol or any drugs.

42.0 Medical Facilities

42.1 Medical Examination

- 42.1.1 The contractor shall arrange a medical examination of all his employees including his sub-contractor employees employed as drivers, operators of lifting appliances and transport equipment before employing, after illness or injury, if it appears that the illness or injury might have affected his fitness and, thereafter, once in every two years up to the age of 40 and once in a year, thereafter.
- i) **The Contractor** shall maintain the confidential records of medical examination or the physician authorized by the Employer.
 - ii) No building or other construction worker is charged for the medical examination and the cost of such examination is borne by contractor employing such building worker.
 - iii) The medical examination shall include: -
 - a) Full medical and occupational history.
 - b) Clinical examination with particular reference to
 - i) General Physique;
 - ii) Vision: - Total visual performance using standard orthorator like Titmus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.
 - iii) Hearing: - Persons with normal must be able to hear a forced whisper at twenty-four feet. Persons using hearing aids must be able to hear a warning shout under noisy working conditions.
 - iv) Breathing: - Peak flow rate using standard peak flow meter and the average peak flow rate determined out of these readings of the test performed. The results recorded at pre-placement medical examination could be used as a standard for the same individual at the same altitude for reference during subsequent examination.
 - v) Upper Limbs: - Adequate arm function and grip
 - vi) Spine: - Adequately flexible for the job concerned.
 - vii) Lower Limbs: - Adequate leg and foot concerned.
 - viii) General: - Mental alertness and stability with good eye, hand and foot coordination.

c) Any other tests which the examining doctor considers necessary

- 42.1.2. If the contractor fails to get the medical examination conducted as mentioned above, the employer will have the right to get the same conducted by through an agency with intimation to the contractor and deduct the cost and overhead charges.
- 42.2 **Occupational Health Centre**
- 42.2.1 **The contractor shall ensure at a construction site an occupational health centre, mobile or static is provided and maintained in good order. Services and facilities as per the scale laid down in Schedule X of BOCWR. A construction medical officer appointed in an occupational health centre possess the qualification as laid down in Schedule XI of BOCWR.**
- 42.3 **Ambulance van and room**
- 42.3.1 **The contractor shall ensure at a construction site of a building or other construction work that an ambulance van and room are provided at such construction site or an arrangement is made with a nearby hospital for providing such ambulance van for transportation of serious cases of accident or sickness of workers to hospital promptly and such ambulance van and room are maintained in good repair and is equipped with standard facilities specified in Schedule IV and Schedule V of BOCWR.**
- 42.4 **First-aid boxes**
- 42.4.1 The contractor shall ensure at a construction site one First-aid box for 100 workers provided and maintained for providing First-aid to the building workers. Every First-aid box is distinctly marked "First-aid" and is equipped with the articles specified in Schedule III of BOCWR.
- 42.5 **HIV/ AIDS prevention and control**
- 42.5.1 The contractor shall adopt the Employer's Policy on "HIV / AIDS Prevention and Control for Workmen Engaged by Contractors" and the copy of the policy is given in **Appendix No.: 4.**
- 42.5.2 The Employer will engage a professional agency for implementing the guidelines laid down in the policy and communicate to the contractor.
- 42.5.3 The Contractor shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes.
- 42.5.4 The contractor shall also extend necessary organizational support to the appointed agency for the effective implementation of the Employers' workplace policy on HIV/AIDS for workmen of the Contractors.
- 42.5.5 As laid down in the policy the contractor shall identify peer educators (1 for every 100 workers) and refer them for professional training to the Employers' appointed agency for the purpose.

- 42.5.6 **The peer educators on completion of the training shall serve as the focal point for any information, education and awareness campaign among the workmen throughout the contract period.**
- 42.5.7 The peer educators will be paid a monthly honorarium as fixed by the Employer for rendering his services in addition to his regular duty.
- 42.5.8 The total number of peer educators (1 for 100 workers) shall always be maintained by the contractor.
- 42.5.9 **In case if these peer educators leave the contractor by creating vacancy, then the contractor at his own expense train the new replacement peer educator from the Employers' appointed agency for the purpose.**
- 42.5.10 It is suggested to the contractor that due care should be taken to select the peer educators from among the group of workmen so that they remain with the contractor throughout the contract period.
- 42.6 Prevention of mosquito breeding
- 42.6.1 Measures shall be taken to prevent breeding at site. The measures to be taken shall include:
- i) Empty cans, oil drums, packing and other receptacles, which may retain water shall be deposited at a central collection point and shall be removed from the site regularly.
 - ii) Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding.
 - iii) Contractor's equipment and other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained.
 - iv) Water storage tanks shall be provided.
- 42.6.2 Posters in both Hindi and English, which draw attention to the dangers of permitting mosquito breeding, shall be displayed prominently on the site.
- 42.6.3 **The contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation / spraying of insecticides. Most effective insecticides shall include SOLFAC WP 10 or Baytex, The Ideal Larvicide etc.**
- 42.7 Alcohol and drugs
- 42.7.1 The contractor shall ensure at all times that no employee is working under the influence of alcohol / drugs which are punishable under Govt. regulations.
- 42.7.2 Smoking at public worksites by any employee is also prohibited as per Govt. regulations.
- 43.0 Noise**
- 43.1 The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works and provide demonstrable evidence of the same on Employer's request. The Contractor shall, at his own expense, take all appropriate measures to ensure that work carried out by the Contractor and by

his sub-Contractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise.

43.1.1 Without prejudice to the generality of the foregoing, noise level reduction measures shall include the following:

- i) The Contractor shall ensure that all powered mechanical equipment used in the Works shall be effectively sound reduced using the most modern techniques available including but not limited to silencers and mufflers.
- ii) The Contractor shall construct acoustic screens or enclosures around any parts of the Works from which excessive noise may be generated.

43.1.2 The Contractor shall ensure that noise generated by work carried out by the Contractor and his sub-Contractors during daytime and night time shall not exceed the maximum permissible noise limits, whether continuously or intermittently, as given in the project SHE Manual. The same may be varied from time to time by and at the sole discretion of the Employer, In the event of a breach of this requirement, the Contractor shall immediately re-deploy or adjust the relevant equipment or take other appropriate measures to reduce the noise levels and thereafter maintain them at levels which do not exceed the said limits. Such measures may include without limitation the temporary or permanent cessation of use of certain items of equipment.

43.1.3 The noise monitoring requirements including monitoring locations are given in the project SHE Manual.

43.2 Control Requirements

43.2.1 Construction material should be operated and transported in such a manner as not to create unnecessary noise as outlined below:

- i) Perform Work within the procedures outlined herein and comply with applicable codes, regulations, and standards established by the Central and State Government and their agencies.
- ii) Keep noise to the lowest reasonably practicable level. Appropriate measures will be taken to ensure that construction works will not cause any unnecessary or excessive noise, which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise. Use equipment with effective noise-suppression devices and employ other noise control measures as to protect the public.
- iii) Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.
- iv) The Contractor shall submit to the Employer a Noise Monitoring and Control Plan (NMCP) under contract specific Site Environmental Plan. It shall include full and comprehensive details of all powered mechanical equipment, which he proposes to use during daytime and night time, and of his proposed working methods and noise level reduction measures. The NMCP shall include detailed noise calculations and vibration levels to demonstrate the anticipated noise generation and vibrations by the Contractor.
- v) The NMCP prepared by the Contractor shall guide the implementation of construction activity. The NMCP will be reviewed on a regular basis and

updated as necessary to assure that current construction activities are addressed. It may appear as a regular agenda item in project coordination meetings, if noise is an issue at any location in the contract.

43.3 Occupational Noise

- i) Protection against the effects of occupational noise exposure should be provided when the sound levels exceeds the threshold values as provided in Project SHE Manual.
- ii) When employees are subjected to sound levels exceeding those listed in the Table, feasible administrative or engineering controls should be utilized as given in this document and JDA's Project SHE Manual.
- iii) If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.
- iv) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. Exposure to different levels for various periods of time shall be computed according to the formula and sample computation as given in project SHE Manual.

43.4 Vibration Level

- 43.4.1 In locations where the alignment is close to historical / heritage structures, the contractor shall prepare a monitoring scheme prior to construction at such locations. This scheme for monitoring vibration level at such historical / heritage sites shall be submitted to Employer for his approval. This scheme shall include:
- i) Monitoring requirements for vibrations at regular intervals throughout the construction period.
 - ii) Pre-construction structural integrity inspections of historic and sensitive structures in project activity.
 - iii) Information dissemination about the construction method, probable effects, quality control measures and precautions to be used.
 - iv) The vibration level limits at work sites adjacent to the alignment shall conform to the permitted values of peak p velocity as given in article project SHE Manual.

44.0 Ventilation and illumination

44.1 Ventilation

- 44.1.1 The contractor shall ensure at a construction site of a building or other construction work that all working areas in a free tunnel are provided with ventilation system as approved by the DG/CIIBC and the fresh air supply in such tunnel is not less than 6m³/min for each building worker employed underground in such tunnel and the free air flow movement inside such tunnel is not less than 9m/min.

- 44.1.2 The oxygen level shall not be less than 19.5% in the working environment.

44.2 Illumination

44.2.1 The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction **JDA/SHE/GI/0011/ILL/281105**.

44.2.2 **The contractor shall conduct a monthly illumination monitoring by lux meter for all the locations and the report shall be sent to the Employer within 7th of the next month and the same shall be reviewed during the monthly SHE committee meeting.**

45.0 Radiation

45.1 The use of radioactive substances and radiating apparatus shall comply with the Govt. regulatory requirements and all subsidiary legislation

45.2 Operations involving ionising radiation shall only be carried out after having been reviewed without objection by the Employer's representative and shall be carried out in accordance with a method statement.

45.3 each area containing irradiated apparatus shall have warning notices and barriers, as required by the Regulations, conspicuously posted at or near the area.

45.4 Radioactive substances will be stored, used or disposed shall be strictly in accordance with the Govt. Enactments.

45.5 The contractor shall ensure that all site personnel and members of the public are not exposed to radiation.

46.0 Welfare measures for workers

46.1 Latrine and Urinal Accommodation

46.1.1 **The contractor shall provide one latrine seat for every 20 workers up to 100 workers and thereafter one for every additional 50 workers. In addition one urinal accommodation shall be provided for every 100 workers.**

46.1.2 **When women are employed, separate latrine and urinals accommodation shall be provided on the same scale as mentioned above.**

46.1.3 **Latrine and urinals shall be provided as per Section 33 of BOCWA and maintained as per Rule 243 of BOCWR and shall also comply with the requirements of public health authorities**

46.1.4 Moving sites

46.1.4.1 In case of works like track laying, the zone of work is constantly moving at elevated level or at underground level. In such cases mobile toilets with proper facility to drain the sullage shall be provided at reasonably accessible distance.

46.1.5 **In case if the contractor fail to provide required number of urinals and latrines or fail to maintain it as per the requirements of Public Health laws,**

the Employer shall have the right to provide/maintain through renowned external agencies like “Sulabh” at the cost of the contractor.

46.2 Canteen:

46.2.1 In every workplace wherein not less than 250 workers are ordinarily employed the contractor shall provide an adequate canteen conforming to Section 37 of BOCWA, Rule 244 of BOCWR and as stipulated in Rule 247 of BOCWR the changes for food stuff shall be based on ‘no profit no loss’ basis. The price list of all items shall be conspicuously displayed in such canteen.

46.3 Serving of tea and snacks at the workplace:

46.3.1 As per Rule 246 of BOCWR, at a building or other construction work where a workplace is situated at a distance of more than 200 m from the canteen provided under Rule 244(1) of BOCWR, the contractor employing building works shall make suitable arrangement for serving tea and light refreshment to such building works at such place.

46.4 Drinking water

46.4.1 As per Section 32 of BOCWA the contractor shall make in every worksite, effective arrangements to provide sufficient supply of wholesome drinking water with minimum quantity of 5 litres per workman per day. Quality of the drinking water shall conform to the requirements of national standards on Public Health.

46.4.2 While locating these drinking water facility due care shall be taken so that these are easily accessible within a distance of 200m from the place of work for all workers at all location of work sites.

46.4.3 All such points shall be legible marked “Drinking Water” in a language understood by a majority of the workmen employed in such place and such point shall be situated within six metres of any washing places, urinals or latrines.

46.5 Labour Accommodation

46.5.1 The contractor shall provide free of charges as near as possible, temporary living accommodation to all workers conforming to provisions of Section 34 of BOCWA. These accommodations shall have cooking place, bathing, washing and lavatory facilities

46.6 Creches

46.6.1 In every workplace where in more than 50 female workers are ordinarily employed, there shall be provided and maintained a suitable room for use of children under age of 6 yrs, conforming to the provisions of Section 35 of BOCWA.

PART - IV: ENVIRONMENTAL MANAGEMENT**47.0 Air Quality**

- 47.1 The Contractor shall take all necessary precautions to minimise fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. He shall not allow emissions of fugitive dust from any transport, handling, construction or storage activity to remain visible in atmosphere beyond the property line of emission source for any prolonged period of time without notification to the Employer.
- 47.2 The Contractor shall use construction equipment designed and equipped to minimise or control air pollution. He shall maintain evidence of such design and equipment and make these available for inspection by Employer.
- 47.3 If after commencement of construction activity, Employer believes that the Contractor's equipment or methods of working are causing unacceptable air pollution impacts then these shall be inspected and remedial proposals shall be drawn up by the Contractor, submitted for review to the Employer and implemented.
- 47.4 In developing these remedial measures, the Contractor shall inspect and review all dust sources that may be contributing to air pollution. Remedial measures include use of additional/ alternative equipment by the Contractor or maintenance/modification of existing equipment of the Contractor.
In the event that approved remedial measures are not being implemented and serious impacts persist, the Employer may direct the Contractor to suspend work until the measures are implemented, as required under the Contract.
- 47.5 Contractor's transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time. The Contractor shall carry out periodical checks and undertake remedial measures including replacement, if required, so as to operate within permissible norms.
- 47.6 The Contractor shall establish and maintain records of routine maintenance program for internal combustion engine powered vehicles and equipment used on this project. He shall keep records available for inspection by Employer.
- 47.7 The Contractor shall cover loads of dust generating materials like debris and soil being transported from construction sites. All trucks carrying loose material should be covered and loaded with sufficient free- board to avoid spills through the tail board or side boards.
- 47.8 The Contractor shall promptly transport all excavation disposal materials of whatever kind so as not to delay work on the project. Stockpiling of materials will only be allowed at sites designated by the Employer. The Contractor shall place excavation materials in the dumping/disposal areas designated in the plans as given in the specifications.
- 47.9 The temporary dumping areas shall be maintained by the Contractor at all times until the excavate is re-utilised for backfilling or as directed by Employer. Dust control activities shall continue even during any work stoppage.

- 47.10 The Contractor shall place material in a manner that will minimize dust production. Material shall be minimized each day and wetted, to minimize dust production. During dry weather, dust control methods must be used daily especially on windy, dry days to prevent any dust from blowing across the site perimeter.
- 47.11 The Contractor shall water down construction sites as required to suppress dust, during handling of excavation soil or debris or during demolition. The Contractor will make water sprinklers, water supply and water delivering equipment available at any time that it is required for dust control use. Dust screens will be used, as feasible when additional dust control measures are needed specially where the work is near sensitive receptors.
- 47.12 The Contractor shall provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from work sites such as construction depots and batching plants. At such facility, high-pressure water jets will be directed at the wheels of vehicles to remove all spoil and dirt.
- 47.13 The Contractor shall design and implement his blasting techniques so as to minimise dust, noise, vibration generation and prevention fly rock.
- 47.14 Blasting technique should be consistent not only with nature and quantity of rock to be blasted but also the location of blasting.
- 47.15 The contractor shall give preference to explosives with better environmental characteristics.
- 47.16 The Contractor shall protect structures, utilities, pavements roads and other facilities from disfiguration and damage as a result of his activities. Where this is not possible, the contractor shall restore the structures, utilities, pavements, roads and other facilities to their original or better, failing which the rectification/restoration work shall be carried out at the risk and cost of the contractor.
- 47.17 The Contractor shall submit to the Employer an Air Monitoring and Control Plan (AMCP) under contract specific Site Environmental Plan to guide construction activity insofar as it relates to monitoring, controlling and mitigating air pollution.

48.0 Water Quality

- 48.1 The Contractor shall comply with the Indian Government legislation and other State regulations in existence in Rajasthan State insofar as they relate to water pollution control and monitoring. A drainage system should be constructed at the commencement of the Works, to drain off all surface water from the work site into suitable drain outlet.
- 48.2 The Contractor shall provide adequate precautions to ensure that no spoil or debris of any kind is pushed, washed, falls or deposited on land adjacent to the site perimeter including public roads or existing stream courses and drains within or adjacent to the site. In the event of any spoil or debris from construction works being deposited or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas

restored to their natural state by the Contractor to the satisfaction of the Employer.

- 48.3 Due to lowering of potable water supplies in Rajasthan and subsequent contamination of ground water, the Contractor is not allowed to discharge water from the site without the approval of the Employer. The Contractor must comply with the requirements of the Central Ground Water Board for discharge of water arising from dewatering. Any water obtained from dewatering systems installed in the works must be either re-used for construction purposes and this water may subsequently be discharged to the drainage system or, if not re-used, recharged to the ground water at suitable aquifer levels. The Contractor must submit his proposals for approval of Employer, on his proposed locations of dewatering of excavation and collection of water for either construction re-use or recharge directly to aquifers. The Contractor's recharge proposals must be sufficient for recharging of the quantity of water remaining after deduction of water re-used for construction. During dewatering, the contractor shall monitor ground water levels from wells to ensure that draw down levels do not exceed allowable limits. The Contractor will not be permitted to directly discharge, to the drainage system, unused ground water obtaining from the excavation without obtaining approval of Employer or the Agency controlling the system.
- 48.4 The Contractor shall ensure that earth, bentonite, chemicals and concrete agitator washings etc. are not deposited in the watercourses but are suitably collected and residue disposed off in a manner approved by local authorities.
- 48.5 All water and waste products (surface runoff and wastewater) arising on the site shall be collected and removed from the site via a suitable and properly designed temporary drainage system and disposed off at a location and in a manner that will cause neither pollution nor nuisance.
- 48.6 Any mud slurry from drilling, tunnelling, diaphragm wall construction or grouting etc. shall not be discharged into the drainage system unless treatment is carried out that will remove silt, mud particles, bentonite etc. The Contractor shall provide treatment facilities as necessary to prevent the discharge of contaminated ground water.
- 48.7 The Contractor shall discharge wastewater arising out of site office, canteen or toilet facilities constructed by him into sewers after obtaining prior approval of agency controlling the system. A wastewater drainage system shall be provided to drain wastewater into the sewerage system.
- 48.8 The bentonite mixing, treatment and handling system shall be established by the contractor giving due regard to its environmental impacts. The disposal of redundant bentonite shall be carefully considered whether in bulk or liquid form. The disposal location will be advised and agreed with the relevant authorities.
- 48.9 The Contractor shall take measures to prevent discharge of oil and grease during spillage from reaching drainage system or any water body. Oil removal / interceptors shall be provided to treat oil waste from workshop areas etc.
- 48.10 The Contractor shall apply to the appropriate authority for installing bore wells for water supply at site.

49.0 Archaeological and Historical Preservation

- 49.1 The contractor shall seek to accommodate archaeological and historical preservation concerns that may arise due to the construction of the project especially in close vicinity of such areas where such monuments may be located.
- 49.2 The contractor shall consult the Archaeological Survey of India (ASI) and other parties, on the advise of the Employer, to identify and assess construction effects and seek ways to avoid, minimize or mitigate adverse effects on such monuments.
- 49.3 Adverse effects may include reasonably foreseeable effects caused by the construction that may occur later in time, be farther removed in distance or those that alter, howsoever temporarily, the significance of the structure.

50.0 Landscape and Greenery

- 50.1 As far as is reasonably practicable, the Contractor shall maintain ecological balance by preventing deforestation and defacing of natural landscape. In respect of ecological balance, the Contractor shall observe the following instructions.
- 50.2 The Contractor shall, so conduct his construction operations, as to prevent any avoidable destruction, scarring or defacing of natural surrounding in the vicinity of work.
- 50.3 Where destruction, scarring, damage or defacing may occur as a result of operations relating to Permanent or Temporary works, the same shall be repaired, replanted or otherwise corrected at Contractor's expense. All work areas shall be smoothened and graded in a manner to conform to natural appearance of the landscape as directed by the Employer.
- 50.4 A suggested list of trees/shrubs suitable for planting and landscaping is found in Employer's Project SHE Manual.

51.0 Felling of Trees

- 51.1 The contractor shall identify the number and type of trees that are required to be felled as a result of construction of works and facilities related to JDA Project and inform the Employer.
- 51.2 All trees and shrubbery, which are not specifically required to be cleared or removed for construction purposes, shall be preserved and shall be protected from any damage that may be caused by Contractor's construction operations and equipment. The contractor shall not fell, remove or dispose of any tree or forest produce in any land handed over to him for the construction of works and facilities related to JDA except with the previous permission obtained from the Forest Department.
- 51.3 The Employer shall arrange permission from the forest department for trees to be felled or transplanted. The Employer will permit the removal of trees or shrubs only after prior approval.
- 51.4 Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or

other operation and the Contractor shall adequately protect such trees by used of protective barriers or other methods approved by the Employer. Trees shall not be used for anchorage.

52.0 Fly Ash

- 52.1 The Employer may require the contractor to use fly ash as a percentage substitution of cement, in concrete for certain structures and works.
- 52.2 In all such uses of Fly Ash, the contractor shall maintain a detailed record of usage of Fly Ash. The contractor shall also collect related details and provide to the Employer.
- 52.3 The reporting details on consumption of Fly Ash are found in Employer's SHE Manual.

53.0 Waste

- 53.1 The contractor is required to develop, institute and maintain a Waste Management Programme (WMP) during the construction of the project for his works, which may include: -
- i) Identification of disposal sites.
 - ii) Identification of quantities to be excavated and disposed off.
 - iii) Identification of split between waste and inert material
 - iv) Identification of amounts intended to be stored temporarily on site location of such storage.
 - v) Identification of intended transport means and route.
 - vi) Obtaining permission, where required, for disposal.
- 53.2 Such a mechanism is intended to ensure that the designation of areas for the segregation and temporary storage of reusable and recyclable materials are incorporate into the WMP. The WMP should be prepared and submitted to the Engineer for approval.
- 53.3 The Contractor shall handle waste in a manner that ensures they are held securely without loss or leakage thus minimizing potential for pollution. The Contractor shall maintain and clean waste storage areas regularly.
- 53.4 The Contractor shall remove waste in a timely manner and disposed off at landfill sites after obtaining approval of Conservancy and Sanitation Engineering Department of Municipal Corporation of Jaipur for its disposal.
- 53.5 Burning of wastes is prohibited. The Contractor shall not burn debris or vegetation or construction waste on the site but remove it in accordance with **50.1** above.:-
- 53.6 The Contractor shall make arrangement to dispose of metal scrap and other saleable waste to authorized dealer and make available to the Employer on request, records of such sales.

54.0 Hazardous Waste Management

- 54.1 If encountered or generated as a result of Contractor's activity, then waste classified as hazardous under the "Hazardous Wastes (Management & Handling) Rules, 1989, amendments 2000, 2003" shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
- 54.2 Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 of Environment (Protection) Act, 1986 shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
- 54.3 The contractor shall identify the nature and quantity of hazardous waste generated as a result of his activities and shall file a 'Request for Authorisation' with Jaipur Pollution Control Committee along with a map showing the location of storage area.
- 54.4 Outside the storage area, the contractor shall place a 'display board', which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs to be stored in a secure place
- 54.5 It shall be the responsibility of the contractor to ensure that hazardous wastes are stored, based on the composition, in a manner suitable for handling, storage and transport. The labelling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors.
- 54.6 The contractor shall approach only Authorised Recyclers of Hazardous Waste for disposal of Hazardous Waste, under intimation to the Employer.
- 54.7 Submittal of all environment related documents and records pertaining to monitoring and trend analysis on key parameters such as but not limited to consumption/efficient use of resources such as energy, water, material such as cement, fly ash, iron and steel, recycle/reuse of waste etc that shall have demonstrated continual improvement in the implementation of Environmental management System. Failure to do so the employer shall impose appropriate penalty as indicated under penalty clause.

55.0 Energy Management

- 55.1 The contractor shall use and maintain equipment so as to conserve energy and shall be able to produce demonstrable evidence of the same upon Employer's request.
- 55.2 Measures to conserve energy include but not limited to the following:
- i) Use of energy efficient motors and pumps
 - ii) Use of energy efficient lighting, which uses energy efficient luminaries
 - iii) Adequate and uniform illumination level at construction sites suitable for the task
 - iv) Proper size and length of cables and wires to match the rating of equipment
 - v) Use of energy efficient air conditioners

- 55.3 The contractor shall design site offices maximum daylight and minimum heat gain. The rooms shall be well insulated to enhance the efficiency of air conditioners and the use of solar films on windows may be used where feasible.

PART - V: PENALTY AND AWARDS

56.0 Charges to be recovered from contractor for unsafe act or condition

56.1 JDA has built an image of safety conscious organisation meticulously over a period of seven years. Any reportable accident (fatality / injury) results in loss of life and/or property damage. These accidents not only result in loss of life but also damage the reputation of JDA. Most of the accidents are avoidable and caused preliminary due to contractors' negligence. Hence JDA shall recover the cost of damages from the contractors for every reportable incident (fatality / injury).

56.2 In addition every JDA work site is exposed to public scrutiny as the work is executed just on the right-of-way. Any unsafe act / unsafe condition observed by public further damages our reputation. Because of the non-voluntary compliance of contractors to the condition of contract on she and project she manual, JDA has been forced to establish safety-enforcing organisation. The cost of established such organisation is to be recovered from contractors for all observed safety violations at sites.

56.3 The following table indicates the Safety, Health and Environment violation (unsafe act / unsafe condition) and charges to be recovered from contractors subject to a maximum limit @ 0.1% of the contract value in addition to all other penalties / compensation./ liquidated damages.

SL. NO.	TOPIC	<u>UNSAFE ACT/UNSAFE CONDITION</u>	<u>DEDUCTIBLE AMOUNT</u>
1.	SHE Policy & Plan	i) SHE policy a) non-compliance of clause 4.1 b) Inadequate coverage, not signed c) Not displayed at prominent locations	Rs.1,000 per single violation, compounded to a maximum of Rs. 5,000 at any single instance.
		ii) SHE plan: a) Not as per Employers' content and coverage b) Delay in submission c) Not updated as per employer's instruction as per clause 4.4 d) Copies not provided to all required supervisors / engineers	Rs.10,000 per single violation, compounded to a maximum of Rs.20,000 at any single instance.
2.	SHE Organisation	i) Not complying to the minimum manpower requirements as mentioned in General Instruction JDA/SHE/001/MPR/281105 ii) Not filling up the vacancies created due to SHE personnel leaving the contractor within 14 days. iii) SHE organisation not provided with required Audio-visual and other equipments as per General Instruction DMRS/SHE/012/AVE/281105	i) Rs.5,000 per month for first month and Rs.7,500 for subsequent months ii) Rs.2,500 per month for first month and Rs.4,000 for subsequent months For items iii), iv), v) and vi)

		iv) Employing through outsourcing agencies and SHE personal are not in the payroll of the main contractor v) Disobedience / Improper conduct of any SHE personnel. vi) Chief SHE Manager not reporting directly to CPM of contractor.	Rs.2,500 for first violation and Rs.3,500 for subsequent violations
3.	SHE committee	i) Failed to formulate or conduct SHE Committee meeting for any month ii) Contractor and Sub-contractor representatives not attending SHE Committee meetings iii) Failed to conduct Site inspection before conducting SHE Committee meeting iv) Failed to send SHE Committee Meeting minutes or Agenda to Employer in time v) Non-adherence of clause 7.7.1 vi) Non-adherence of clause 7.9	i) Rs.2,500 for the first violation and Rs.3,500 for the subsequent violations ii) Rs.1,000 to the contractor of the member who had not attended the meeting for first violation and Rs.1,000 for subsequent violations. For item iii), iv), v) and vi) Rs.1,500 for first violation and Rs.2,500 for subsequent violations
4.	ID card	i) Non-adherence of clause 8.1, 8.2 and 8.3	Rs.1,000 for first violation and Rs.1,500 for subsequent violations
5.	SHE Training	i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual with regard to: a) Induction training not given b) Supervisor/engineer/manager training not conducted as per clause 9.6 c) Refresher training as per clause 9.7 and 9.11 not conducted d) Tool-box talk not conducted as per clause 9.8 e) Skill development training not conducted as clause 9.9 f) Daily Safety Oath not conducted as per clause 9.10 g) Top management behaviour based SHE training conducted	For item 1 a) to g) Rs.1,000 for first violation on and Rs.1,500 for subsequent violations
6.	SHE Inspection	i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual as per clause 10.0 ii) Non compliance of clause 10.3.6	Rs.1,500 for first violation and Rs.2,500 for subsequent violations

7.	SHE audit	Internal Audit: MARS i) Not conducted as per SHE Plan ii) Report not sent to Employer iii) Action not taken for any month	For item i) to iii) Rs.2,000 for first violation and Rs.2,500 for subsequent violations.
		External Audit iv) Not conducted as per SHE Plan v) Report not sent to employer vi) Action not taken for any quarter	For item iv) to vi) Rs.1,000 for first violation and Rs.1,500 for subsequent violations.
8.	SHE Communication	i) Important days to be observed for SHE awareness as furnished by employer not observed ii) Posters as furnished by Employer not printed and displayed	i) Rs.1,000 for first violation and Rs.1,500 for subsequent violations ii) 1,000 per contract
9.	SHE Submittals	i) Non compliance of clause 13.1 ii) Non compliance of clause 13.2 iii) Non compliance of clause 13.3	For item i) Rs.1,000 for first violation and Rs.1,500 for subsequent violations For item ii) and iii) Rs.1,500 for first violation and Rs.2,000 for subsequent violations
10.	Injury and Incidence reporting	i) Fatal accidents ii) Injury accident iii) Abnormal delay in reporting accidents or will full suppression of information about any accidents / dangerous occurrence as per clause 14.1.4 iv) Delay in informing about any accidents / dangerous incidents. v) Non-compliance of the clause 14.4	i. Rs.10,000 for first fatality and Rs.20,000 for every subsequent fatality. ii. Rs.2,500 for first grievously injured person and Rs.3,500 for every subsequent grievously injured person (Grievous Injury as defined by Workmen Compensation Act) iii. Rs.7,500 for first violation and Rs.10,000 for subsequent violations For items iv) and v) Rs.5,000 for first violation and Rs.10,000 for subsequent violations
11.	Emergency preparedness Plan	Non-compliance of the clause 15.1,15.2, 15.3, 15.4, 15.5 and 15.6	Rs.10,000 for non-compliance of any of the clauses
12.	Housekeeping	i) Housekeeping maintenance register not properly maintained up to date ii) Surrounding areas of drinking water tanks / taps not hygienically cleaned / maintained	Rs.1,000 per single violation Compounded to a maximum of Rs.10,000 at any single instance

		iii) Office, stores, toilet / urinals not properly cleaned and maintained. iv) Required dustbins at appropriate places not provided / not cleaned. v) Stairways, gangways, passageways blocked. vi) Lumber with protruding nails left as such vii) Openings unprotected viii) Excavated earth not removed within a reasonable time. ix) Truck carrying excavated earth not covered / tyres not cleaned. x) Vehicles / equipments parked / placed on roads obstructing free flow of traffic xi) Unused surplus cables / steel scraps lying scattered xii) Wooden scraps, empty wooden cable drums lying scattered xiii) Water stagnation leading to mosquito breeding	
13.	Working at Height / Ladders and Scaffolds	i) Not using or anchoring Safety Belt ii) Not using Safety Net iii) Absence of life line or anchorage point to anchor safety belt iv) Non-compliance of clause 18.17 v) Using Bamboo ladders vi) Painting of ladders vii) Improper usage (less than 1m extension above landing point, not maintaining 1:4 ratio) viii) Aluminium ladders without base rubber bush ix) Usage of broken / weak ladders x) Usage of re-bar welded ladders xi) Improper guardrail, toe board, barriers and other means of collective protection xii) Improper working platform xiii) Working at unprotected fragile surface xiv) Working at unprotected edges	Rs.1,000 per single violation Compounded to a maximum of Rs.1,500 at any single instance
14.	Lifting appliances and gear	i) Non availability of fitness certificate as per clause 21.3 ii) Documents not displayed on the machine or not available with the operator as per clause 21.4 iii) Maximum Safe Working Load not written on the machine as per clause 21.5 iv) Non-compliance of 21.6	Rs.1,000 per single violation Compounded to a maximum of Rs.2,500 at any single instance

		v) Non-compliance of 21.7 vi) Automatic safe load indicator not provided or not in working condition as per clause 21.8 vii) Age of the operator less than 21 years or without any license and non-compliance of other item as per clause 21.9 viii) Non-compliance of 21.10 ix) Non-compliance of any of the items mentioned regarding rigging requirements as per clause 21.11 x) Failure to submit method statement in case of all critical lifting xi) Person riding on crane. xii) Creating more noise and smoke xiii) Absence of portable fire extinguisher in driver cabin xiv) Fail to guard hoist platform xv) No fencing of hoist rope movement area xvi) Hoist platform not in the horizontal position	
15.	Launching operation	Non-adherence of any of the provisions mentioned in clause 22.2	Rs. 5,000 for first violation and Rs.10,000 for subsequent violations .
16.	Site Electrical safety	i) Non-compliance of clause 26.1.1 ii) Non-compliance of clause 26.2.4, 26.2.5 iii) Non-compliance of clause 26.3.1 iv) Non-compliance of clause 26.7, 26.8 and 26.9.1 v) Non-compliance of clause 26.10 and 26.13 vi) Non-compliance of clause 28.3.2 vii) Exposed electric lines (fermentative damage) and circuits in the workplace. viii) Inserting of bare wires into the socket ix) Improper grounding for the electrical appliances x) Electrical cables running on the ground xi) Non-compliance clause 27.0	Rs.1,000 per single violation Compounded to a maximum of Rs.5,000 at any single instance
17.	Hand tools and Power tools	i) Non-compliance of clause 28.0	Rs.1,000 per single violation Compounded to a maximum of Rs.10,000 at any single instance
18.	Gas Cutting	ii) Wrong colour coding of cylinder.	Rs.1,000 per single violation Compounded to a maximum

		iii) Cylinders not stored in upright position. iv) Flash back arrester, non-return valve and regulator not present or not in working condition. v) Fail to put cylinders in a cylinder trolley. vi) Damaged hose. vii) Using domestic LPG cylinders viii) Fail to store cylinder 6.6m away from fire prone materials ix) Fail to use hose clamps x) Fire extinguisher not placed in the vicinity during operation	of Rs.5,000 at any single instance
19.	Welding	i) Voltmeter and Ammeter not working ii) Improper grounding and return path. iii) Damaged welding cable iv) Bare openings in the cable. v) Non-availability of separate switch in the transformer vi) Non-availability of main switch control to switch off power to the welding unit. vii) Usage of reinforcement rod as return conductor viii) Damaged holder ix) Fire extinguisher not placed in the vicinity during operation	Rs.1,000 per single violation Compounded to a maximum of Rs.5,000 at any single instance
20.	Fire precaution	i) Smoking and open flames in fire prone area ii) Using more than 24V portable electrical appliances in the fire prone area iii) Not proper ventilation in cylinder storage area. iv) Absence of fire extinguishers v) Fire extinguishers not refilled once in a year. vi) Fire extinguisher placed in a not easily accessible location	Rs.1,000 per single violation Compounded to a maximum of Rs.2,500 at any single instance.
21.	Excavation, Tunnelling and confined space	i) Non-compliance of clause 34.1.1 ii) Non-compliance of clause 34.2.3 iii) Non-compliance of clause 34.3	For any item from i) and ii) Rs.1,000 per single violation Compounded to a maximum of Rs.5,000 at any single instance. For item iii) Rs.1,000 per first violation and Rs.5,000 for subsequent violations

22.	Work permit system	i) Non-compliance of clause 35.2 ii) Non-compliance of clause 21.11.9	For item I) and ii) Rs.5,000 per first violation and Rs.10,000 for subsequent violations
23.	Traffic Management	i) Non-compliance of clause 36.4.1 ii) Non-compliance of clause 36.8.3 iii) Non-compliance of clause 36.9.2 iv) Non-compliance of clause 36.9.3 v) Non-compliance of clause 36.9.7 vi) Non-compliance of clause 36.9.8	Rs.5,000 per first violation and Rs.10,000 for subsequent violations
		a) Barricades i) Not Cleaned ii) Not in alignment iii) Not numbered iv) Not painted v) Red lights / reflectors not working vi) Damages not repaired vii) Not secured properly viii) Barricade inspector not employed ix) Protruding parts / portions repaired x) Barricades maintaining register not properly maintained up to date	Rs.2,500 per single violation Compounded to a maximum of Rs.5,000 at any single instance
		b) Contractor Vehicles i) Over loading of vehicles ii) Unfit drivers or operators iii) Unlicensed vehicles iv) Absence of traffic marshals v) Absence of reversing alarm vi) Absence of fog light (at winter) vii) Power / hand brakes not in working condition.	Rs.1000 per single violation Compounded to a maximum of Rs.5,000 at any single instance
		c) Splashing of Bentonite on roads / non-cleaning of tyres of dumpers and transit mixers i) Mishandling of bentonite like splashing of bentonite outside specified width of barricading ii) Non-cleaning of tyres of dumpers and transit mixers before leaving the site and thereby creating a traffic safety hazard to road users.	For item i) and ii) a) Rs.1,000 on first observation. b) Rs. 2,000 on second observation c) Rs. 3,000 on third and subsequent observations
24.	Batching plant / Casting yard	Non-adherence of any of the provisions mentioned in clause 38.0.	Rs. 1,000 for single violation compounded to a maximum of Rs.10,000 at any single instant.
25.	PPE	i) Not having ii) Not wearing (or) using and kept it elsewhere	From item i) to vi). Rs.200 per single violation

		iii) Using damaged one iv) Using wrong type v) Using wrong colour helmet or helmet without logo vi) Using for other operation (e.g. Using safety helmet for storing materials or carrying water from one place to other) vii) Not conforming to BIS standard viii) Non-compliance of clause 39.6, 39.7 and 39.8	For item vii) Rs.1,000 for first violation and Rs.5,000 for subsequent violations For item viii) Rs.5,000 for first violation and Rs.10,000 for subsequent violations
26.	Occupational Health	i) Fail to conduct Medical examination to workers ii) Absence of ambulance van & room iii) Workers not having ID card iv) Inadequate number of toilets v) Toilets not cleaned properly vi) Absence of water facilities for toilets and washing places vii) Toilet placed more than 500m from the work site viii) Absence of drinking water ix) Absence of first-aid person in work site. x) Absence or inadequacy of first-aid box. xi) Misuse of first-aid box. xii) First-aid box not satisfy the minimum Indian standard. xiii) Smoking inside the construction site xiv) Drink and drive or work xv) Excessive noise and vibration xvi) Canteen not provided xvii) Food stuff not served on no loss no profit basis xviii) Creche not provided xix) Accommodation not provided as per BOCWA xx) Fumigation / insecticides not sprayed to prevent Mosquito breeding xxi) Non-compliance of clause 44.1 and 44.2	Rs.1,000 per single violation Compounded to a maximum of Rs.2,500 at any single instance
27.	Labour Welfare measures	i) Non adherence of Labour welfare provisions of BOCWA ii) Fail to register establishment and display the registration certificate at workplace	Rs.1,000 per single violation Compounded to a maximum of Rs.2,000 at any single instance

		iii) Absence of workers register and records iv) Absence of muster roll and wages register v) Fail to display an abstract of BOCWA and BOCWR	
28.	Environmental Management	i) Tyre wash facility not provided ii) Spillage from vehicles not arrest iii) Air monitoring not practiced iv) Noise monitoring not practiced v) The values of air monitoring and noise monitoring not with in acceptable limits vi) Dust control measures at sites not practiced vii) Improper disposal of debris / residues	Rs.1,000 per single violation Compounded to a maximum of Rs.2,000 at any single instance

56.4 Without limiting to the unsafe acts and or conditions mentioned above in clause 56.3 the Employer shall have the right to deduct charges for any other unsafe act and or condition depending upon the gravity of the situation on a case-to-case basis. The charges shall be in comparison with that of the similar offence indicated in clause 56.3.

57.0 Stoppage of work

57.1 The Employer shall have the right to stop the work at his sole discretion, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and / or property, and / or equipments. In such cases, the contractor shall be informed in writing about the nature of hazards and possible injury / accident.

57.2 The contractor shall not proceed with the work until he has complied with each direction to the satisfaction of Employer

57.3 The Contractor shall not be entitled for any damages / compensation for stoppage of work, due to safety reasons and the period of such stoppage of work shall not be taken as an extension of time for Completion of the Facilities and will not be the ground for waiver of levy of liquidated damages.

58.0 Awards

The following categories will be considered for awards as per the scheme in practice and discretion of Employer

- i) For every safe million man hour working without any reportable incidents
- ii) Zero fatality contracts
- iii) 100% adherence to voluntary reporting of all accidents throughout the currency of contract
- iv) Safest project team of the year.
- v) Best SHE team of the year.
- vi) Safest Contractor of the year.

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**APPENDIX NO.: 1****Memorandum of Understanding between JAIPUR DEVELOPMENT
AUTHORITY (JDA) and the Contractor for safe execution of
contract work**

This Memorandum of Understanding is made and executed by and between JAIPUR DEVELOPMENT AUTHORITY (JDA), or their authorized representative(s), hereinafter referred to as "EMPLOYER" (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the one party

AND

M/s _____
having _____ its _____ registered _____ office _____ at _____

hereinafter referred to as the "CONTRACTOR" (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the other party

WITNESSETH THAT

WHEREAS the EMPLOYER gives highest importance to the occupational safety, health and environment during execution of work, seeks cooperation from the CONTRACTOR in this endeavor.

Thus, this Memorandum of Understanding is for promoting the safety, health and environment aspects required to be followed at workplace/site and will be applicable to any site job to be done by the CONTRACTOR

AND

WHEREAS the CONTRACTOR has read all the terms and conditions of the EMPLOYER and whereas the CONTRACTOR has studied the following documents:

- (a) Tender Documents, including Notice Inviting Tender, General Conditions, Special Conditions,
- (b) Conditions of Contract on Safety, Health and Environment and Project Safety, Health and Environment Manual.
- (c) Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act 1996, Central Rules 1998 and subsequent Rajasthan Government Rules 2002, Building and Other Construction Workers Welfare Cess Act 1996 and Rules 1998 and Rajasthan Building and Other Construction Workers' Welfare Board Rules and
- (d) Indian Electricity Act 2003 and Rules 1956.

(e) Corresponding International / Bureau of Indian Standard Codes.

The amendments to any of the above rules and any other rules & regulations or procedures, circulars, notices & advices laid down by the EMPLOYER from time to time.

Now it is hereby AGREED AND DECLARED by and between the EMPLOYER and the CONTRACTOR as follows:

Clause - I in	The CONTRACTOR shall abide by the terms and conditions stipulated in Condition of Contract on Safety, Health & Environment and Project Safety, Health & Environment Manual.
Clause - II of	The CONTRACTOR shall undertake full responsibility for safe execution of job at work place/site and safety of his personnel and adjoining road users during work.
Clause - III be	Without giving any prior notice, the EMPLOYER shall from time to time be entitled to add/or amend any or all terms and conditions with a view to improving safety and occupational health of personnel and safety of work, with immediate effect and the same shall be binding on the CONTRACTOR. The contractor agrees to implement all such amendments, which shall be laid down by the EMPLOYER.
Clause - IV codes	Besides following the guidelines, safety rules and regulations, safety codes given in various safety procedures/documents mentioned above, the CONTRACTOR shall also prepare detailed method statement which includes job safety analysis wherever there are complicated and hazardous/high risk working involved and get it approved from Employer before execution of work.
Clause - V the	Any negligence or violation in implementing any of the provision of conditions of contract on Safety, Health & Environment and JDA project Safety, Health & Environment Manual shall be viewed seriously and the contractor is liable to compensate the employer for the loss of reputation. The cost of damage shall be fixed on case-to-case basis.

In witness thereof the Parties hereto by representatives duly authorised have executed this Memorandum of Understanding on _____ day of _____ 20____.

Signed on

Signed on

For and on behalf of JDA

For and on behalf of (Contractor)

Signature:

Signature:

Name:

Name:

Title:

Title:

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR.**APPINDIX No. 2.**

Safety, Welfare and Occupational Health requirements as per
BOCW Act 1996 and Rules 1998 and Rajasthan Building and
Other Construction Workers Rules 2009

(This list has been prepared in chronological order with primary importance to Section of Act and secondary importance to Rules)

S - Refers relevant Sections in BOCWA

R - Refers relevant Rules in BOCWR

C - Refers relevant Chapter No. in BOCWR

Sl. No.	Items	Relevant Sections / Rules in BOCWA and BOCWR and DBOCWR
1.	Registration of establishment	S – 7, R – 23 to 27
2.	Display of registration certification at workplace	R – 26 (5)
3.	Hours of work	S – 28 R – 234 to 237
4.	Register of overtime	S – 28; S – 29 R – 241(1) Form XXII
5.	Weekly rest and payment at rest	R – 235
6.	Night shift	R – 236
7.	Maintenance of workers registers and records	S – 30 R – 238
8.	Notice of commencement and completion	S – 46 R – 239
9.	Register of persons employed as building workers	R – 240
10.	Muster roll and wages register	R – 241(1) (a); Form XVI and XVII
11.	Payment of wages	R – 248

12.	Display of notice of wages regarding	R – 249
13.	Register of damage or loss	R – 241(1)(a); Form XIX, XX, XXI
14.	Issue of wages book	R – 241(2)(a); Form XXIII
15.	Service certificate for each workers	R – 241(2)(b); Form XXIV
16.	Display an abstract of BOCWA and BOCWR	R – 241(5)

17.	Annual return	R – 242; Form XXV
18.	Drinking water	S – 32
19.	Latrines and Urinals	S – 33 R - 243
20.	Accommodation	S – 34
21.	Crèches	S – 35
22.	First-aid boxes	S – 36 R – 231 and Schedule III
23.	Canteens	S – 37 R – 244
24.	Food stuff and other items served in the canteens	R – 245
25.	Supply of tea and snacks in work place	R – 246
26.	Food charges on no loss no profit basis	R - 247
27.	Rajasthan BOCW welfare Board Rules	R – 250 to 296
28.	Safety committee	S – 38 R – 208
29.	Safety officer	S – 38 R – 209 and Schedule VII
30.	Reporting of accidents and dangerous occurrences	S – 39 R – 210
31.	Procedure for inquiry in to the causes of accidents	R – 211
32.	Responsibility of employer	S - 44 R – 5
33.	Responsibility of Architects, Project engineer and Designers	R – 6
34.	Responsibility of workmen	R – 8
35.	Responsibility for payment of wages and compensation	S – 45
36.	Penalties and Procedures	S – 47; S – 55

37.	Excessive noise, vibration etc	R – 34
38.	Fire Protection	R – 35
39.	Emergency action plan	R – 36
40.	Fencing of motors	R – 37
41.	Lifting of carrying of excessive weight	R – 38
42.	Health, Safety and Environmental Policy	R – 39
43.	Dangerous and Harmful Environment	R – 40
44.	Overhead protection	R – 41
45.	Slipping, Tripping, Cutting, Drowning and Falling Hazards	R – 42

46.	Dust, Gases, Fumes, etc	R – 43
47.	Corrosive substance	R – 49
48.	Eye Protection	R – 45
49.	Head Protection and other protection apparel	R – 46; R – 54
50.	Electrical Hazards	R – 47
51.	Vehicular traffic	R – 48
52.	Stability of structure	R – 49
53.	Illumination	R – 50; R – 124
54.	Stacking of materials	R – 51
55.	Disposal of debris	R – 52
56.	Numbering and marking of floors	R – 53
57.	Lifting appliances and gears	C – VII; R – 55 to 81
58.	Runways and Ramps	C – VIII; R – 82 to 85
59.	Working on or adjacent to water	C – IX; R – 86 & 87
60.	Transport and earthmoving equipments	C – X; R – 88 to 95
61.	Concrete work	C – XI; R – 96 to 107

62.	Demolition	C – XII; R – 108 to 118
63.	Excavation and Tunnelling works	C – XIII; R – 119 to 168
64.	Ventilation	R – 153
65.	Construction, repair and maintenance of step roof	C – XIV; R – 169 to 171
66.	Ladders and Step ladders	C – XV; R – 172 to 174
67.	Catch platform and hoardings, chutes, safety belts and nets	C – XVI; R – 175 to 180
68.	Structural frame and formworks	C – XVII; R – 181 to 185
69.	Stacking and unstacking	C – XVIII; R – 186 & 187
70.	Scaffold	C – XIX; R – 188 to 205
71.	Cofferdams and Caissons	C – XX; R – 206 to 211
72.	Explosives	C – XXI; R – 212 & 213
73.	Piling	C – XXII; R – 214 to 222
74.	Medical Examination for building and other construction worker, Crane operator and Transport vehicle drivers	R – 81; R – 223(a)(iii) and Schedule XII
75.	Medical examination for occupational health hazards	R – 223(a)(iv)
76.	Charging of workers for Medical Examination	R – 223(b)
77.	Occupational health centres and Medical officers	R – 225 and Schedule X & XI
78.	Ambulance van & room	R – 226 & 227 and Schedule IV & V

79.	Stretchers	R – 228
80.	Occupational health service for building workers	R – 229
81.	Medical examination for occupational health hazards	R – 223(a)(iv)
82.	Emergency care services and emergency treatment	R – 232

83.	Panel of experts and agencies	Central Rule 250 Delhi Rule 297
84.	Power of inspectors	Central rule 251 Delhi rule 298

JAIPUR DEVELOPMENT AUTHORITY,JAIPUR.

APPENDIX NO.: 3

SITE SHE PLAN

Contract No	
Contractor Name	
Jaipur Development Authority, Jaipur	

Project Name

1.	Project Highlights i) Title of the content ii) Contractor Number iii) Brief scope of work iv) Location map/ key plan v) Period of the project
2.	SHE Policy
3.	Site Organisation Chart Chart indicating reporting of SHE personnel
4.	Roles & Responsibility Individual responsibility of the i) Project Manager ii) Construction Manager iii) Construction Supervisors iv) SHE Committee Members v) SHE In charge vi) Site Engineers vii) First Line Supervisors viii) Sub-contractors
5.	SHE Committee i) Details - Chairman, Members, Secretary and Employer's representative, ii) Procedures for effective conduct of meeting
6.	SHE Training
7.	Subcontractor Evaluation, Selection and Control
8.	SHE Inspection
9.	SHE Audit
10.	Accident Investigation And Reporting Procedures
11.	Occupational Health Measures

12. Labour Welfare Measures	
13.	Risk assessment and mitigation procedures
14.	Safe Work Procedures i) Work at Height ii) Structural Steel Erection iii) Launching of segments iv) Floor, Wall Openings and Stairways v) Welding, Cutting and Bracing vi) Lifting appliances vii) Work Permit Systems viii) Electrical Equipments ix) Mechanical Equipments x) Excavation xi) Fire Prevention xii) Hazardous Chemicals and Solvents xiii) Ionising Radiation xiv) Lighting xv) Abrasive Blasting
15.	Work Permit System
16.	List of standard job specific PPEs to be used in the site
17.	Maintenance of Regime for construction Equipment and Machinery
18.	Traffic management
19.	Housekeeping
20.	Environmental Management
21.	Emergency Management
22.	Visitors and Security arrangement

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

APPENDIX NO.: 4

**WORKPLACE POLICY ON HIV/AIDS PREVENTION & CONTROL FOR WORKMEN
ENGAGED BY CONTRACTORS**

“Being mobile in and of itself is not a risk factor for HIV infection. It is the situations encountered and the behaviours possibly engaged in during mobility or migration that increase vulnerability and risk regarding HIV / AIDS.”

UNAIDS, Technical update on ‘Population, Mobility and AIDS’, February 2001, p.5

JAIPUR DEVELOPMENT AUTHORITY (JDA) recognizes HIV / AIDS as a developmental challenge and realizes the need to respond to it by implementing regular HIV / AIDS prevention programmes and creating a non-discriminatory work environment for HIV infected workmen engaged by contractors. For the purpose of making conscientious, sensitive and compassionate decision in addressing the realities of HIV / AIDS, JDA has established these guidelines based on ILO code of practice on HIV / AIDS.

- Creating awareness through professional agency using IEC (Information, Education and Communication) package specially designed for migrant workers.
- Institutional capacity building by training the project implementation team, Safety, Health & Environment (SHE) Managers, establishing linkages for efficient diagnosis and treatment of the affected workers, effective monitoring of implementation and documentation for further learning.
- Establishing peer educators by selecting them in consultation with contractors and training them through professional agencies so that they become focal point for any information, education and awareness campaigns among the workmen throughout the contract period.

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**General Instruction : JDA/SHE/GI/001/MPR/200106****MINIMUM MANPOWER REQUIREMENTS OF SHE ORGANIZATION BASED ON CONTRACT VALUE**

	1	2	3	4	5	6
Awarded Contract value (in Cr.)	Chief SHE Manager	Senior SHE Manager	Junior SHE Manager	Safety Steward	Senior SHE (Electrical) Engineer	Junior SHE (Electrical) Engineer
Upto 2	-	-	1	Refer Note 1	-	1
Upto 10	-	1	Refer Note 1		1	Refer Note 2
Upto 25	1	Refer Note 1			1	
Upto 100	1				1	
Upto 250	1				1	
More than 250	1				1	

	7	8	9	10	11	12	13
Awarded Contract value (in Cr.)	*Junior SHE (Fire) Manager / **Senior SHE	Occupational Health officer with Necessary Nursing Assistants (Refer	Environmental Manager	Senior SHE (Traffic) Engineer (Refer Note4)	Barricade Maintenance Squad (Refer Note4)	House Keeping Squad	Labour Welfare Officer

	(Fire) Manager	Note3)					
Upto 2	-	-	-	-	Refer Note 5	Refer Note 6	-
Upto 10	-	1 (PT)	1	1			1
Upto 25	1*	1 (PT)	1	1			1
Upto 100	1*	1 (FT)	1	1			1
Upto 250	1**	2(FT)	1	1			1 with support staff
More than 250	2**	2(FT)	1 with support staff	1			1 with support staff

Note 1: Adequate, qualified and trained SHE Professionals with required support staff to be deployed at each worksite at each shift.

Note 2: Adequate, qualified and trained Electrical Engineers / supervisors to be deployed at each worksite at each shift.

Note 3: (PT) means Part-Time and (FT) means Full-time.

Note 4: Senior SHE (Traffic) Engineer Post and Barricade Manager (including the staff) Posts are applicable to contracts where the work has to be executed either below or over the right-of-way like Viaduct, Tunnel Contracts wherein erection and maintenance of barricades are paramount important.

Note 5: One Barricade Manager supported by required supervisors and workmen

Note 6: One Housekeeping Manager supported by required supervisors and workmen

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**General Instruction : JDA/SHE/GI/002/QE/281105**

**MINIMUM QUALIFICATION AND EXPERIENCE FOR (SHE) SAFETY,
ELECTRICAL, ENVIRONMENTAL, TRAFFIC ENGG. AND OCCUPATIONAL
HEALTH PROFESSIONALS**

Sl. No	Designation	Qualification	Experience (in years)
1	Chief SHE Manager	The Chief SHE Manager shall have qualified in any of the following degree/diploma: i) Post Graduate Diploma in Industrial Safety & Environmental Management (PGDISEM) from National Institute of Industrial Engineering, Mumbai ii) M.E. in Industrial Safety from NIT, Trichy, Tamil Nadu iii) M.E. in Industrial Safety from Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu iv) B.E. in Fire and Safety Engg. From Cochin University of Science and Engg. Cochin, Kerala v) B.E. with advanced Safety Management Diploma from CLI / RLI Mumbai / Chennai / Kolkata and Kanpur. vi) B.E / B.Arch., with one year <u>Full Time</u> advanced Safety diploma from NICMAR, Hyderabad. vii) B.E / B.Tech with any other equivalent State and Central Govt. recognized full time Degree / Diploma in Safety. viii) International qualifications like CSP (Certified Safety Professional), NEBOSH, MIOSH, MSISO etc.	2 {for all category except (iv) and 5yrs for category (iv)}
2	Senior SHE Manager	As stated in Sl. No:1 and in addition the following categories: i) B.Sc.(Physics/Chemistry/Maths) with one year Full Time advanced Safety diploma from NICMAR, Hyderabad ii) B.Sc. / Diploma in Engg. with advanced Safety Management Diploma from CLI / RLI / Mumbai /	2 {for category (i), (ii) and (iii) only}

		Chennai / Kolkata and Kanpur. iii) B.Sc. (Physics/Chemistry/Maths) with One year Full Time diploma in Safety Engineering offered by West Bengal State Technical Education Departments and similar courses by other states. iv) Any Graduate or diploma holder with 7 years of work experience in full fledged SHE department of any Public Sector / Leading Private Sector / MNC / with prior approval of employer on a case to case basis	

3	Junior SHE Manager	i) Degree in Science / Diploma in Engineering with Govt. recognized safety diplomas from Correspondence course of recognized University, National and State Productivity Councils, Other State Technical Education Boards etc. ii) Any Graduate or diploma holder with 5 years of work experience in full fledged SHE department of any Public Sector / Leading Private Sector / MNC / with prior approval of employer on a case to case basis	2 (for category (i) only)
4	Safety Steward	Any basic qualification with any SHE related certificate courses.	2
5	Senior SHE (Electrical) Manager	Degree in Electrical Engineering + Govt. recognized Electrical License holder	2
6	Junior SHE (Electrical) Manager	Diploma in Electrical Engineering + Govt. recognized Electrical License holder	1
7	Senior SHE (Fire) Manager	i) B.E. (Fire) from National Fire Service College, Nagpur ii) B.E (Fire & Safety) from Cochin University Graduate with any Govt. recognized diploma in Fire iii) Fire Safety with 5 years of experience	2 (for category (i) and (ii) only)
8	Junior SHE (Fire) Manager	Any Diploma holder with any Govt. recognized diploma in Industrial Fire Safety.	1
9	Occupational Health Officer	MBBS with Govt. recognized degree/diploma in Industrial/ occupational health	1

10	Environment Manager	Govt. recognized PG Degree / PG Diploma / Degree in Environmental Engineering / Science	2
11	Senior SHE (Traffic) Engineer	Govt. recognized PG Degree / Degree / Diploma in Traffic/Transportation Engineering or Planning	1
12.	House Keeping Squad - Manager	Any Diploma in Engineering	1
13	Barricade Manager	Any Diploma in Engineering	1
14	Labour Welfare Officer	Any Degree with Govt. Recognized Degree / Diploma / P G Diploma in Labour Welfare related fields like Law, Personnel / Industrial Relations etc.	2

Note 1: In some extraordinary cases where the candidate had earlier worked in JDA Projects they can be considered for the following posts:

- i) Senior SHE Manager
- ii) Junior SHE Manager
- iii) Safety Steward

depending upon the qualification and no. of years of experience on a case-to-case basis

even if they do not possess the prescribed qualification as listed above.

Note 2: In all other cases other than listed under **Note 1** irrespective their earlier experience

with JDA projects the candidates shall qualify as specified above.

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

MINIMUM REQUIREMENTS OF SHE MONITORING AND AUDIO-VISUAL EQUIPMENTS

- For the purpose of minimum requirements of Audio-visual and Other equipment the contracts are categorized into the following groups:

Contract Value (Initial awarded value of contract)	Group
Upto 25 Cr	A
Upto 100 Cr	B
Upto 250 Cr	C

More than 250 Cr	D

2. Every contractor falling into the above groups shall provide the following minimum required audio visual aids for conducting weekly review, monthly safety committee and other post review meeting of all fatal and major incidences effectively. These audio-visual equipments are a must for conducting periodical in-house safety presentations in the training programmes.
3. In addition to the above portable hand held digital sound level meter (SLM) and portable hand held digital lux meter are also to be provided.

Sl. No	SHE monitoring and Audio-Visual Equipment details	SHE monitoring and Audio-Visual equipment required for			
		Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Portable hand held Digital Sound Level Meter (SLM)	1	1	1	1
2.	Portable hand held Digital Lux Meter	1	1	1	1
3.	Laptop Computer with standard configuration including multi media Facilities	1	1	1	1
4.	Colour Printer	1	1	1	1
5.	Computer projector with screen	-	1	1	1
6.	Overhead projector	1			
7.	35mm Camera (For taking accident investigation photos in which case the images can not be easily altered)	1	1	1	1

8.	Digital camera with flash of minimum 4 mega pixel and video facility	1	1	1	2
9.	Digital still camera with flash of minimum 4 mega pixel	1	2	4	6
10.	Portable loudspeaker (for tool-box talk and emergency purpose)	1	1	2	6
11.	Communication facility like mobile phone, walky-talky etc	For all supervisors and managers/engineers working in Safety, Health & Environment			
12.	Accident investigation Kit containing the following:	1	1	1	2
a)	Chalk piece for marking				
b)	Measuring tape for measuring ☐ Flexible tape – 2m length ☐ Metal Foot long scale and ☐ Metal tape – 30m				
c)	Equipment tags				
d)	Multipurpose Flash light				
e)	Barrier tape of 20m length				
f)	Accident investigation Forms and checklists				
g)	Enough Paper for witness recording and other noting				
h)	Emergency Phone Numbers list				

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**Topics for First day at work SHE orientation training of Workmen****1. Hazard Identification Procedure**

Hazards on site:

- ☐ Falls
- ☐ Earthing work
- ☐ Electricity
- ☐ Machinery
- ☐ Handling materials
- ☐ Transport
- ☐ Site housekeeping
- ☐ Fire

2. Personal Protective Equipment

- ☐ What is available?
- ☐ How to obtain it?
- ☐ Correct use and care

3. Health

- ☐ Site welfare facilities
- ☐ Potential health hazards
- ☐ First Aid/CPR

4. Duties of the contractor

- ☐ Brief outline of the responsibilities of the Contractor by law
- ☐ Details of Contractor's accident prevention policy
- ☐ JDA's SHE manual
- ☐ Building and other Constructions Welfare Law

5. Employee's Duties

- ☐ Brief outline of responsibilities of employee under law
- ☐ Explanation of how new employees fit into the Contractor's plan for accident prevention. (Induction and orientation).

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**ID Card Format**

(85 mm x

55mm)

Front side of ID Card:

JDA's ROB- Bassi Project	
Company Logo	Name & Address of Main / Sub / Labour contractor
Name: Designation: Blood Group: Valid up to:	Photo
Authorised Signatory	

Backside of ID Card:

Employee Address: _____ _____ _____ _____	
1 This card is the property of "XX" (Main / Sub / Labour Contractor) and must be returned on demand and on transfer / cancellation of employment. 2 A charge will be levied for replacement of the card due to loss or theft 3 If found please return it to:	

Main contractors' Address

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**SHE Training details for Managers and Supervisors**

1. The Law and Safety	2. Policy and Administration
Statutory requirement Appropriate regulations Duties of employer and employee	Effect of incentive on accident prevention Human relations Consultation Safety Officer: duties, aims, objectives
3. Safety and the Supervisor	4. Principles of Accident Prevention
Safety and efficient production go together Accidents affect morale and public relations	Attitudes of management, supervision and operations Methods of achieving safe operations Accident and injury causes
5. Site Inspection	6. Human Behavior
The role of management Hazard Identification Procedure Records results Follow-up procedures Feedback	Motivating agencies Individual behavior Environmental effects Techniques of persuasion
7. Site housekeeping	8. Health
Site organization Relationship of site housekeeping to accident Occurrence Site access Equipment storage Material stacking Materials handling	Medical examination Hazard to health on site Sanitation and welfare Protective clothing First Aid/CPR
9. Personal Protective Equipment	10. Electricity
Eye, face, hands, feet and legs Respiratory protective equipment Protection against ionizing radiation	Appreciation of electrical hazards Power tools Arc welding Low voltage system Lighting and power system on sites ELCB, RRCB, Grounding/Ground fault circuit interrupters (GFCIs)
11. Oxygen and Acetylene Equipment	12. Equipment
Cylinder storage and maintenance Condition and maintenance of valves, regulators, and gauges Condition and maintenance of hoses and fittings Pressures	Accidents related to moving parts of machinery Appreciation of principles of guarding Importance of regular maintenance

13. Transportation	14. Excavations
Transport to and from site Hazard connected with site transport Competent drivers Dumpers Tipping trucks Movement near excavations	Method of shoring Precautions while shoring Precautions at edge of excavations Removal of shoring Sheet steel piling
15. Working platforms, Ladders, and Scaffolding	16. Cranes and other Lifting Machines
Hazards connected with the use of ladders Maintenance and inspection Type of scaffold Overloading Work on roofs Fragile material Openings in walls and floors Use of safety belts and nets	Licensing, certification and training required for operation of cranes Slings methods Signaling Access to crane(s) Maintenance and examination Ground conditions Hazards and accident prevention methods connected with the use of different types of cranes/heavy equipment Crane Lift Plan for all lifts
17. Lifting Tackle	18. Fire Prevention and Control
Slings - single and multi-legged Safe working loads (SWLs) Safety hooks and eyebolts Cause of failure Maintenance and examination	Principle causes determining fire Understanding fire chemistry Fire fighting equipment Fire fighting training
19. Communications	20. Manual Handling
Effective methods of communication (particular interest to non-English speaking workers) Method and preparation of reports Safety committees Safety meeting	Body posture and procedure for lifting, pushing, pulling, dragging, sitting and walking Ergonomics Stretching exercises

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

SHE Training Matrix

Types of training	Management																				Supervisor							Specific																					
	SHEOrientation	SHELeadership	SHEPlan	SHEImprovementPlan	ManagementofChange	SHEAudit& Inspection	SHEEmergencyRespons	Incident/AccidentInvestiaa	SHECommunication	SHEPromotion& Incentives	TrafficManagement	HazardIdentification & Risk	Permittowork system	Confinedspace entry	scaffolding	WasteManagement	EnvironmentMonitoring	Labounwelfare measures	BehaviouralBased Safety	Management/Incident	Job/TaskSafety Analysis	Safety Training	Observation Programme	IndustrialFirst Aid & CPR	Incident/Accident	Firefighting	ConfinedSpace Testing	ScaffoldErection & Dismantling	Rigging	WireRopeInspection	CraneInspection	Electrical/MechanicalIsolation	PermittoWork System	ConfinedSpace Working	ExplosiveHandling & Storage	HeavyLifting Operation	Radiography(X-Ray)	HAZMAT Handling & Control	Welding, Cutting & Bracing	PowerActuated Hand Tool	Electrical/MechanicalIsolation	RoofingWork	Steelerectionwork	ScaffoldErection/Dismantling	False-workErection / Dismantling	PaintinginConfined Area			
Project Manager	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Sr. Construction Managers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Quality Manager	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Planning engineer	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Construction Managers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Construction Supervisors	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Construction Foreman	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Machinery Operators	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐											

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JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**DAYS TO BE OBSERVED FOR CREATING SHE AWARENESS**

1 st Monday to Sunday of January	Road Safety Week (Subjected to confirmation from Ministry of Road Transport, Govt. of India every year.)
16 th February	Kyoto Protocol Day
March	Red Cross Month
4 th March	National Safety Day
7 th April	World Health Day
14 th April	Fire Safety Day
April 18 to 22	Earth Week
20 th April	Earth Day
20 th April	Noise Awareness Day
28 th April	ILO World Day for Safety and Health at Work
May 1 to 7	Emergency Preparedness Week
5 th June	World Environmental Day
12 th June	World Day against Child Labours
9 th July	Occupational Health Day
17 th October	World Trauma Day
1 st December	World AIDS Day

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**Minimum Requirements of SHE Communication Posters / Signages / Video**

1. For the purpose of Minimum requirements of SHE Communication Posters / Signages / Video the contracts are categorized into the following groups:

Contract Value (Initial awarded value of contract)	Group
Upto 25 Cr	A
Upto 100 Cr	B
Upto 250 Cr	C
More than 250 Cr	D

2. Every contractor falling into the above groups shall prepare a SHE Communication Plan as a part of site specific SHE Plan and shall include the following minimum requirement of Posters / Signages / Video as applicable. In case readymade posters are available in any of the category from National Safety Council, Loss Prevention Association of India or any other safety related organisations they may procure the same and display it. In case the same is not available then the contractors' shall make necessary arrangements to get the posters designed and printed on their own. All the above are to be detailed in the Site SHE Plan and get an approval from the Employer before displaying the posters.

Table No.: 1 - Minimum No. of Posters

Sl.No	SHE Poster Title	Minimum No. of concepts in each title	No. of Posters / Signage / Video			
			Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Safety Culture	5	Each 10	Each 50	Each 75	Each 100
2.	Daily Safety Oath	1 English &1 Hindi	Each 100	Each 200	Each 500	Each 1000
3.	Mandatory PPE Usage					
a)	Signages to display the messages like PPE ZONE, NO PPE ZONE, HARD HAT AREA etc.	2 types of sizes made up of metal sheet to be mounted at different locations.	Each 25	Each 50	Each 75	Each 200

b)	Helmet	5	Each 25	Each 50	Each 75	Each 200
c)	Shoe	5	Each 25	Each 50	Each 75	Each 200
d)	Goggles & Ear Protection	5	Each 25	Each 50	Each 75	Each 200
e)	Full Body Harness	5	Each 25	Each 50	Each 75	Each 200
f)	Hi-Vi Jacket	5	Each 25	Each 50	Each 75	Each 200
4.	Emergency Management Plan	5	Each 25	Each 50	Each 75	Each 200
5.	Working at Heights	10	Each 25	Each 50	Each 75	Each 200
a)	Ladder, Stairway, Scaffold - Signages to display the messages like SAFE, UNSAFE, FIT FOR USE, AVOID USE etc.	5 types of sizes made up of metal sheet to be mounted at different locations	Each 25	Each 50	Each 75	Each 200
6.	Site Electricity	5	Each 25	Each 50	Each 75	Each 200
7.	Fire and Explosion	5	Each 25	Each 50	Each 75	Each 200
8.	Crane Safety	5	Each 25	Each 50	Each 75	Each 200
9.	Slings	5	Each 25	Each 50	Each 75	Each 200
10.	Rigging Procedures	5	Each 25	Each 50	Each 75	Each 200
11.	Excavation	5	Each 25	Each 50	Each 75	Each 200
12.	Occupational Health (Mosquito Control, HIV/AIDS awareness, Dust Control, Noise Control, No Smoking/Spitting, etc.)	10	Each 25	Each 50	Each 75	Each 200
13.	First – Aid	3	Each 25	Each 50	Each 75	Each 200
14.	Labour Welfare Measures (Payment of Minimum Wages, Avoidance of Child labour, Signing in	5	Each 25	Each 50	Each 75	Each 200

	the Muster Roll, In case of accidents-what to do? etc					
15.	Importance of “Safety Handbook”	1	25	50	75	200
16.	Traffic Safety (Speed limit, safe crossing and working within barricaded area etc.)	5	Each 25	Each 50	Each 75	Each 200
17.	Environmental Monitoring (Spillage of Muck, hazardous material,	5	Each 25	Each 50	Each 75	Each 200

	Improper drainage, water spray for dust containment etc.)					

18.	Video in Hindi on PPE usage – 15 minutes duration	1	-	-	-	1

Note 1: Items mentioned under 17 is **video**. Items under 3 (a) and 5 (a) are **metal signage boards** and all other items are **posters**.

Table No.: 2 – Size of Posters / Signages

Sl.No	Item	Size
1.	Posters – Standard	17"x22" –135 GSM 4 Colour Printing
2.	Posters – Special (Wherever required)	17"x22" card laminated FA Poster
3.	Posters - Mega size (Wherever required)	32"x40" Flex FA Poster
4.	First-Aid Booklet	6"x4"
5.	Safety Handbook	6"x4"
6.	Signages	Small : 12"x6" Big : 24"x12"
7.	Road Traffic Sign Boards	Strictly as per Indian Road Congress (IRC) specifications

Table No.: 3 – Safety Signage Colour (as per IS 9457)

Sl.No	Type of signage	Colour
1	Mandatory	Blue
2	Danger	Yellow
3	Prohibit	Red
4	Safe conditions	Green

General Instruction : JDA/SHE/GI/010/AE/281105**Experts / Agencies for SHE Services**

Sl. No.	Organisation	Services
1.	Bureau Veritas Industrial Services (India) Pvt. Ltd., B-21 & 22, First Floor, Sector-16, NOIDA-201 301 (U.P.) Phone: 0120 - 2515055 Fax: 0120 - 2515248 E-mail: enp.delhi@in.bureauveritas.com	☐ External SHE Audit ☐ SHE Management / Technical Training
2.	Central Labour Institute Post box no: 17851, N.S.Monkikar Marg Sion , Mumbai- 400 022 Tel.: 022- 4092203 Fax: 022 – 4071986 E-mail: cli@dgfasli.nic.in	☐ SHE Management / Technical Training
3.	Construction Industry Development Council 801, 8 th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi – 110 019 E-mail: cidc@vsnl.com	☐ SHE Management / Technical Training
4.	Delhi Productivity Council 1E/10, Swami Ramtirath Nagar New Delhi – 110 055 Tel.: 23522835	☐ SHE Management / Technical Training
5.	Det Norske Veritas AS, 203, Savitri Sadan 1, 11 Preet Vihar Community Centre, New Delhi-110 092 Phone: 011-22531502/2253/1503, 22427688/22531278 Fax: 011-2253 0247 Website: www.dnv.com	☐ External SHE Audit ☐ SHE Management / Technical Training
6.	Dr. A. V. Baliga Memorial trust Link House, Bagadur Shah Zafar Marg Press Area	☐ HIV / AIDS awareness

	New Delhi – 110 002 Phone: 011 – 23311119	
7.	Dr. Cris Research Centre For Occupational Health & Safety 306, Guru Arjuna Dev Bhawan, Ranjit Nagar Complex, New Delhi – 110 008 Phone: 9810040406 Fax: 011 – 25702929 E-mail: team@drcri.com Website: www.drcri.com	☐ Ambulance Room & Van ☐ Communication Materials ☐ First-aid box ☐ First-aid Training ☐ HIV / AIDS awareness ☐ ID Card ☐ Medical Facilities ☐ SHE Orientation Training
8.	DuPont Safety Resources, E.I. DuPont India Private Limited, Arihant Nitco Park 6 th Floor, 90, Dr. Radhakrishnan Salai, Mylapore, Chennai-600 004 Phone: 044-2847 2800, 2847 3752 Fax: 044-2847 3800 Mobile: 9381201040 Website: in.dupont.com	☐ SHE Management Training
9.	EQMS INDIA PVT. LTD. 304 & 305, 3rd Floor, Rishabh Towers, Plot No. 16, Community Centre, Karkardooma, Delhi - 110092. Phone: 011 - 22374729 / 22374775 Fax: 011- 22374662 E-mail: eqms@eqmsindia.org Website: www.eqmsindia.com	☐ ISO Certification ☐ SHE Management / Technical Training
10.	Green Cross Consultants 59, 1 st Cross, 1 st Floor, Jai Bharath Nagar, Bangalore-560 033 Phone: 080-2549 6782 E-mail: etgrangan@yahoo.com	☐ SHE Management / Technical Training
11.	HSRTC, PENTASAFE, 201, 2 nd Floor, Town Centre, Andheri Kurla Road, Marol, Andheri (East), Mumbai-400 059	☐ SHE Practical Field Training for Height Safety

	Phone: 022-2850 2210/20/50 Fax: 022-2850 2260 E-mail: training@penta-safe.com	
12.	Institute of Driving Training & Research, Wazirabad Road, Adjoining Loni Road flyover.	☐ SHE Technical Training for Vehicle Drivers.

13.	Institute for Research, Development & Training of Construction Trades & Management, An Educational Institute, Society and Trust, 1 st Floor, UVCE Alumni Association Building, K.R. Circle, Bangalore-560 001 Phone: 080-22294291/22243257 Fax: 080-22243257 E-mail: ubrco@vsnl.com Website: www.instructindia.org	☐ SHE Technical /Field Training
14.	International Engineering Company K – 10, South Extension, Part – 2, New Delhi – 110 049 Phone: 011 – 26254761, 26258130 Mobile: 9312260130 E-mail: ashok@intenco.net	☐ Crane and Lifting appliances and Gears Certification ☐ SHE Practical Field Training for Crane Safety
15.	L & T Eutectic 32, Sivaji Marg, New Delhi – 110 015 Phone: 011 - 51419538, 51419539 Fax: 011 - 51419600 Website: www.Inteutecticwelding.com	☐ SHE Practical Field Training for Welding Safety
16.	Loss Prevention Association of India Ltd. Warden House, Sir P.M. Road, Mumbai – 400 001 Website: www.lpaindia.org	☐ SHE Management / Technical Training
17.	MFA Crucial Moments Healthcare Pvt. Ltd., 42, Okhla Industrial Estate, Phase – II New Delhi – 110 020 Phone: 011 – 55624000 Fax: 011 – 55624010 E-mail: contact@crucialmoments.net	☐ First-aid Training

18.	Modicare Foundation 4 Community Centre, New Friends Colony, New Delhi – 110 065 Phone: 011 – 5167235059 Fax: 011 – 26915469 E-mail: nivedita@modi.com nivedita@gmavil.com Website: www.modicarefoundation.org	☐ HIV / AIDS awareness

19.	National Safety Council HQ and Institute Building 98A, Sector 15, industrial Area C.B.D Belapur, Navi Mumbai – 400614 Phone: 27579924	☐ SHE Management / Technical Training
20.	NICMAR (National Institute of Construction Management and Research) 910,9 th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi – 110 019 Phone: 011 – 51618415, 51618417, 51618418 Fax: 011 – 51618416	☐ SHE Management / Technical Training
21.	Quality Growth Services Pvt. Ltd. H-13, Kirti Nagar, New Delhi – 110 015 Fax: 011 – 25431737 / 25438598 / 25918332 E-mail: qgs@qgspl.com Website: www.qgspl.com	☐ ISO Certification
22.	Safety Engineers Association / Safety Educational Trust – India 2/257, First Floor, Dr. Ambedkar Nagar, Manapakkam, Chennai – 600 116 Phone: 044 – 22523461 E-mail: safetrustindia@rediffmail.com	☐ SHE Management / Technical Training
23.	SHE Management Consultancy & Support Services, 145 A, Pocket-VI, (DDA Flats), Kondli Gharoli, Mayur Vihar-II, Delhi-110 096 Fax: 011-2262 5015 Mobile: 9811153873 E-mail: r_k_p@vsnl.net	☐ SHE Management / Technical Training
24.	St. Johns' Ambulance Red Cross Road New Delhi – 110 001	☐ First-aid Training
25.	Vexil Business Process Services Pvt. Ltd. 208, A/4, Savitri Nagar, New Delhi – 110 017 Mobile: 9350232714, 98102832201, 9350232716 E-mail: info@vexilbps.com Website: www.vexilbps.com	☐ Emergency Preparedness Mock drill ☐ SHE Management / Technical Training

26.	Welding Research Institute Bharat Heavy Electricals Ltd. (BHEL) Trichirappalli,	☐ SHE Practical Field Training for Welding Safety

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**Minimum Lighting Requirements**

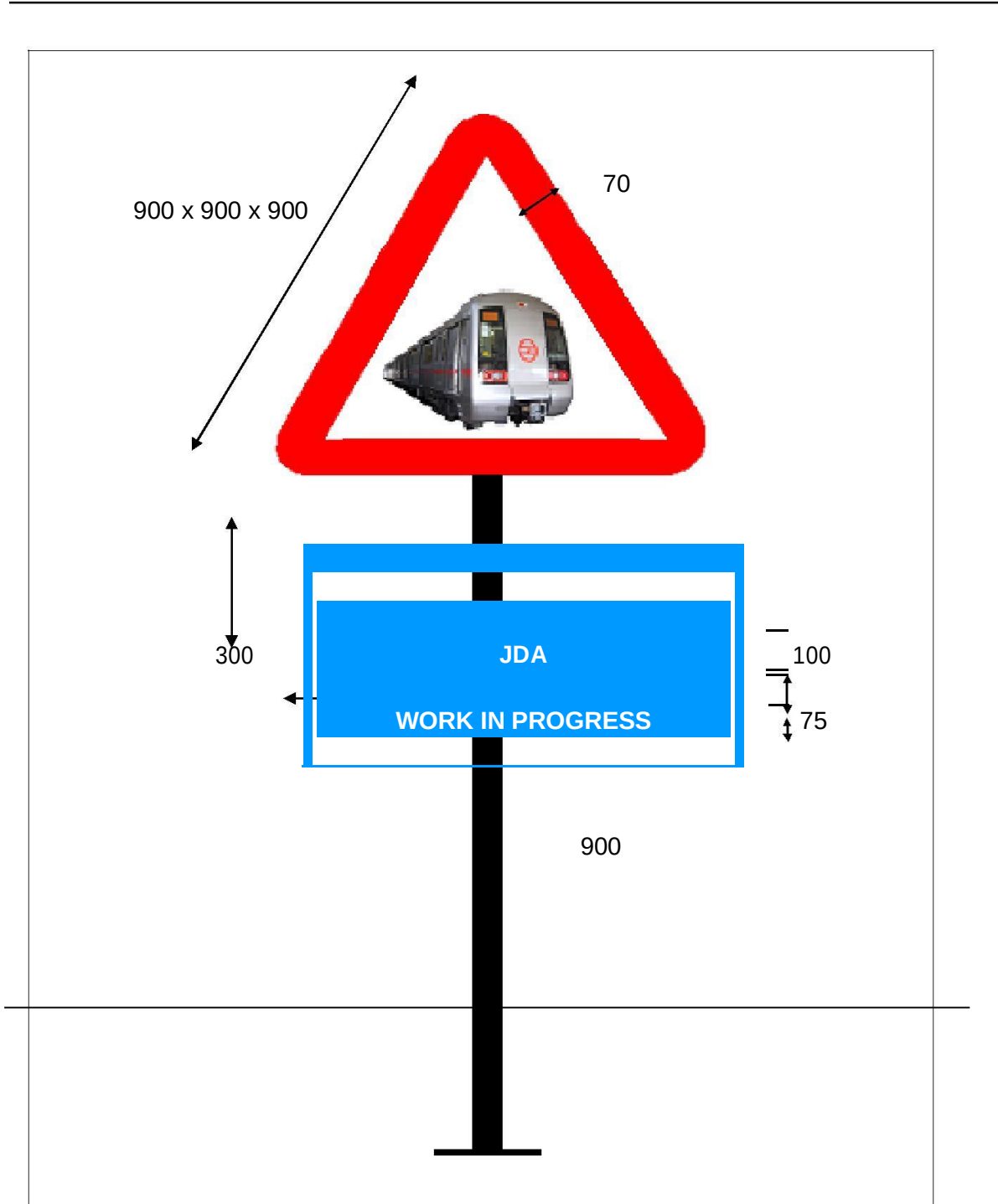
Sl. No.	Facility or Function	Luminance – lx (lm/ft²)
1.	Administrative areas (offices, drafting and meeting rooms, etc.)	540 (50)
2.	Construction areas - general indoor - general outdoor -tunnel and general underground work areas (minimum 110 lux required at tunnel and shaft heading during drilling, mucking and scaling)	55 (5) 33 (3) 55 (5)
3.	Access ways - exit ways, walkways, ladders, stairs	110 (10)
4.	Maintenance / Operating areas / shops - vehicle maintenance shop - carpentry shop -outdoors field maintenance area - refueling area, outdoors -shops, fine details work -shops, medium detail work - welding shop	325 (30) 110 (10) 55 (5) 55 (5) 540 (50) 325 (30) 325 (30)
5.	Mechanical/electrical equipment rooms	110 (10)
6.	Hoists, Elevators, freight and passenger	215 (20)
7.	Warehouses and storage rooms/area -indoor stockroom, active/bulk storage - indoor rack storage - outdoor storage	110 (10) 270 (25) 33 (3)
8.	Health Centers and First aid stations and infirmaries	325 (30)
9.	Toilets, wash and dressing rooms	110 (10)
10.	Work areas – general (not listed above)	325 (30)
11.	Parking areas	33 (3)

12.	Visitor areas	215 (20)
13.	Laboratories	540 (50)

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

General Instruction : JDA/SHE/GI/012/WTS/281105

Warning Traffic Sign



All dimensions are in “mm”

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**FORM No. : SF/001**

FORMATION OF SITE SHE COMMITTEE	
Contract No	
Contractor Name	
Contract Title	

<u>CIRCULAR</u>					
<u>Committee</u> The following SHE Committee is constituted with immediate effect: Chairman: Members: 1) 2) 3) 4) 5) Secretary:					
<u>Periodicity</u> The committee will meet at least once in a month on the day (specify date)					
<u>Agenda</u> Secretary will circulate agenda of the meeting at least two days in advance of the schedule date of the meeting.					
<u>Circulation</u> Gist of the meeting will be minutes in the standard format and circulated to the following under the signature of the secretary. <table style="width: 100%;"> <tr> <td>1. Chairman</td> <td>3. JDA Representatives</td> </tr> <tr> <td>2. Members</td> <td>4. Others concerned</td> </tr> </table>		1. Chairman	3. JDA Representatives	2. Members	4. Others concerned
1. Chairman	3. JDA Representatives				
2. Members	4. Others concerned				
Date:	Signed By: -----				
	CHAIRMAN				

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR**FORM No. : SF/002****MINUTES OF SHE COMMITTEE MEETING**

Contract No.			
Contractor Name			
Contract Title			
Meeting No.		Date of Meeting	
Location of Meeting			

MEMBERS PRESENT	INVITEES	MEMBERS ABSENT

REPORT SENT TO

No. of Copies	Name / Dept.	No. of Copies	Name / Dept.	No. of Copies	Name / Dept.

Prepared by:**Location:****Date:****MINUTES OF SHE MEETING**

Item No.	Description of Discussion	Action By	Target	Remarks

1	Complaints received from Clients and corrective and preventive action			
2	Review of MOM of previous meeting			
3	NCR's / Observation from third party			
4	First - Aid cases / Reportable accident cases			
5	Future jobs and specific requirement			
6	Status of implementation of Safety plan			
7	Sub-contractor performance			
8	Analysis of first-aid cases			
9	Need for any specific system / training / PPE's / resources			
10	Observation of SHE committee during last walk down			

Next SHE Meeting is scheduled on:

Date:	Chief SHE Manager (Signature & Name)
Date:	Project Manager (Signature & Name)

SECTION VII DRAWINGS

M. I. ROAD

TO SANGANERI GATE



S.NO.	BLOCKS	NO. OF CARS		AREA (Sq.Mt.)	
		UPPER BASEMENT	LOWER BASEMENT	UPPER BASEMENT	LOWER BASEMENT
01	PART - D	266	286	1,900.00	7,900.00
		552 CARS		15,800.00	
02	PART - E	488	490	16,940.00	16,940.00
		978 CARS		33,880.00	
TOTAL		1530.00 CARS		49,680.00 Sq.Mt.	

RAMNADAS BAGCHI PARKING
EXTENSION AND STAIRS
LAYOUT

NOTE: 1. ALL DIMENSIONS TO BE GIVEN IN METERS.
2. THE PROPOSED PARKING EXTENSION IS TO BE CONSTRUCTED IN TWO PHASES. THE FIRST PHASE IS TO BE CONSTRUCTED IN THE YEAR 2018 AND THE SECOND PHASE IS TO BE CONSTRUCTED IN THE YEAR 2019.
3. THE PROPOSED PARKING EXTENSION IS TO BE CONSTRUCTED IN THE YEAR 2018 AND THE SECOND PHASE IS TO BE CONSTRUCTED IN THE YEAR 2019.
4. THE PROPOSED PARKING EXTENSION IS TO BE CONSTRUCTED IN THE YEAR 2018 AND THE SECOND PHASE IS TO BE CONSTRUCTED IN THE YEAR 2019.
5. THE PROPOSED PARKING EXTENSION IS TO BE CONSTRUCTED IN THE YEAR 2018 AND THE SECOND PHASE IS TO BE CONSTRUCTED IN THE YEAR 2019.

SCALE: 1:1000

DATE: 10/01/2018

BY: [Signature]

FOR: [Signature]

PROJECT: RAMNADAS BAGCHI PARKING EXTENSION AND STAIRS

CLIENT: RAMNADAS BAGCHI

DESIGNER: RAMNADAS BAGCHI & ASSOCIATES

ARCHITECT: RAMNADAS BAGCHI

ENGINEER: RAMNADAS BAGCHI

CONTRACTOR: RAMNADAS BAGCHI

CONTRACT VALUE: 1000000000

CONTRACT PERIOD: 12 MONTHS

CONTRACT START DATE: 10/01/2018

CONTRACT END DATE: 10/01/2019

CONTRACT STATUS: ON GOING

CONTRACT TYPE: LUMP SUM

CONTRACT CURRENCY: INR

CONTRACT PAYMENT TERMS: 10% ADVANCE, 90% ON COMPLETION

CONTRACT DISPUTE RESOLUTION: ARBITRATION

CONTRACT GOVERNING LAW: INDIAN LAW

CONTRACT JURISDICTION: MUMBAI

CONTRACT FORCE MAJEURE: 30 DAYS

CONTRACT TERMINATION: 30 DAYS

CONTRACT ASSIGNMENT: 30 DAYS

CONTRACT SUBCONTRACTING: 30 DAYS

CONTRACT VARIATION: 30 DAYS

CONTRACT CANCELLATION: 30 DAYS

CONTRACT RESCUE: 30 DAYS

CONTRACT FORCE MAJEURE: 30 DAYS

CONTRACT TERMINATION: 30 DAYS

CONTRACT ASSIGNMENT: 30 DAYS

CONTRACT SUBCONTRACTING: 30 DAYS

CONTRACT VARIATION: 30 DAYS

CONTRACT CANCELLATION: 30 DAYS

CONTRACT RESCUE: 30 DAYS

STUDY

- ALL DONATIONS TO BE COLLECTED ON SITE

- NO ATTEMPT TO BE CALLED OR BEAT THE DRAWING ONLY WRITTEN QUESTIONS TO BE FOLLOWED.
- IN THE EVENT OF ANY DISCREPANCIES AND DIFFERENCES BETWEEN ANY ARCHITECTS, ALL DRAWINGS OR OTHER DRAWINGS DRAWING OR SITE CONDITIONS OR OTHERS WITH EXISTING REFERENCES TO BE MADE TO THE ARCHITECT FOR CLARIFICATION PRIOR TO EXECUTION OF WORK AT SITE.



PART-D

S.NO.	BLOCKS	NO. OF CARS		AREA (sq.Mt.)	
		UPPER BASEMENT	LOWER BASEMENT	UPPER BASEMENT	LOWER BASEMENT
01	PART - D				
		266	286	7,900.00	7,990.00
		552 CARS		15,800.00	
02	PART - E	488	490	16,940.00	16,940.00
		978 CARS		33,880.00	
TOTAL		1530.00 CARS		49,680.00 Sq.Mt.	

UPPER BASEMENT PLAN

PROPOSED KANINIWAS BACH INTEGRATED PARKING LAYOUT

**PRAMOD JAIN & ASSOCIATES
ARCHITECTS, PLANNERS, INTERIOR &
INDUSTRIAL DESIGNERS**

COUNCIL OF ARCHITECTURE

CAUTION: MATERIALS IN THIS SECTION ARE NOT TO BE USED FOR CONSTRUCTION OF A BUILDING OR STRUCTURE.

FILE NO: 0141 - 2719 OCT / 23

PAK 0141 - 401671

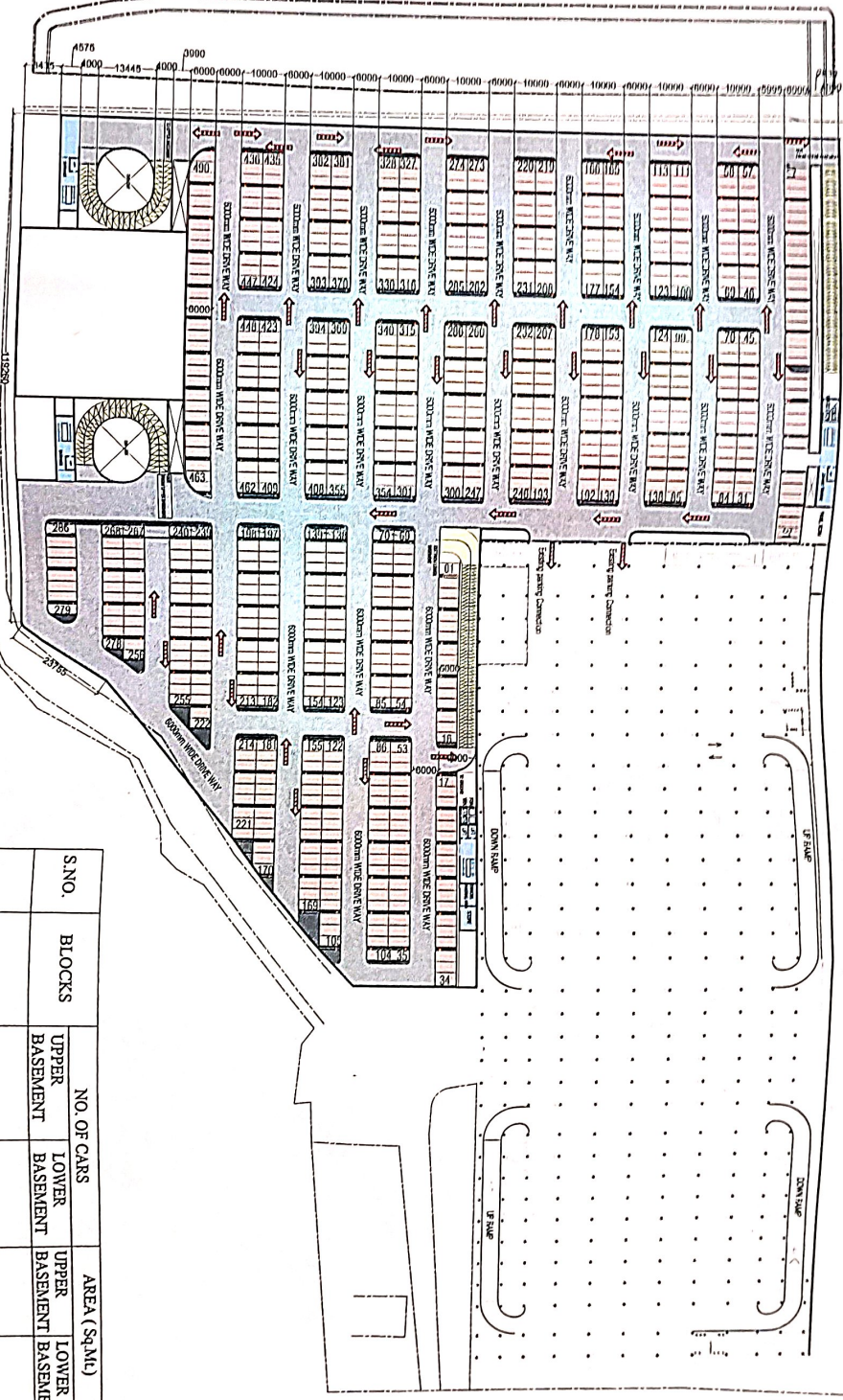
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FLUENT MAN AND SHALL NOT BE TRACED CORRESPONDENT 1 BUT ON PAGE 15. (THEY WERE NOT)

RAJNIVAS BAGH PARKING EXTENSION AND SUBWAYS JAPUR

NOTE:
* ALL DIMENSIONS TO BE CHECKED ON SITE.
* NO DIMENSIONS TO BE GIVEN FROM THE MAIN ROAD.
* ALL VENTILATION DIMENSIONS TO BE FOLLOWED.
* IN THE EVENT OF ANY DISCREPANCIES AND DISAGREEMENTS
BETWEEN THE ARCHITECT AND THE CONTRACTOR OR CONTRACTOR
AND THE CLIENT, THE CONTRACTOR OR CONTRACTOR SHALL BE
RESPONSIBLE FOR THE DIMENSIONS OF WORK AS SET.

S.NO.	BLOCKS	NO. OF CARS		AREA (Sq.Mt)	
		UPPER BASEMENT	LOWER BASEMENT	UPPER BASEMENT	LOWER BASEMENT
01	PART - D	266	286	7,900.00	7,900.00
		552 CARS		15,800.00	
02	PART - E	488	490	16,940.00	16,940.00
		978 CARS		33,880.00	
TOTAL		1530.00 CARS		49,680.00 Sq.Mt.	



PART - E

PART - D

PART - A

RAJNIVAS BAGH PARKING
EXTENSION AND SUBWAYS
JAPUR

PROPOSED RAJNIVAS BAGH
INTEGRATED PARKING LAYOUT
PRAMOD JAIN & ASSOCIATES
ARCHITECTS PLANNERS INTERIORS
INDUSTRIAL DESIGNERS

DATE: 09/09/2023
SCALE: 1:1000
DRAWN BY: RAJNIVAS BAGH
CHECKED BY: RAJNIVAS BAGH
APPROVED BY: RAJNIVAS BAGH

THE DRAWING AND DESIGN IS THE SOLE PROPERTY OF RAJNIVAS BAGH. NO PART OF THIS DRAWING SHALL BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT THE WRITTEN PERMISSION OF RAJNIVAS BAGH.

Abstract of Cost (For reference purpose only)		
S.No.	Description of items	Amount
1	Civil Works	772462161.40
2	Electrical Works	39201261.80
3	Drainage System	2251140.00
4	Parking Management System	28035170.00
5	CCTV Security	4312852.00
6	Elevators	11771286.00
7	Fire Detection and Fighting Works	14543920.00
8	Forced Ventilation	36023860.00
9	33/0.4 kV Substation work	30861505.75
	Total	939463156.95
	Utility Shifting	5411589.00
	Grand Total	944874745.95

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

Name of Work :- Ramniwas Bagh Parking Project (Phase-II), Jaipur.

BOQ (Civil Works)

Based on RUIDP BSR-2017, PWD BSR-2013 & Non BSR

Sl. No.	RUIDP - 2017	ITEM OF WORK	QTY.	UNIT	RATE	AMOUNT
1	DISMANTLING WORKS					
1.1	2.4	Dismantling of existing structures like culverts, bridges, retaining walls, CC road and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and lead of 50 Metres as directed by Engineer				
1.1.1	2.4.1	Lime Concrete, cement concrete grade M-10 (1:5:10) and below	16.00	Cum	264.00	4,224.00
1.1.2	2.4.2	Cement Concrete Grade M-15 and above and PCC blocks	674.00	Cum	427.00	287,798.00
1.2	3.1.1	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 Metres lead as per direction of Engineer-in-charge. In cement mortar	70.00	Cum	284.00	19,880.00
1.3	2.4.5.2	Rubble stone masonry in cement mortar	94.00	Cum	256.00	24,064.00
1.4	14.42	Providing, fixing, maintaining, shifting & refixing, barricading of minimum 2.0 mtr height at stipulated active site of the same project site, made with angle iron frame of 50x50x5mm and GI sheet of 0.63mm thick including primer painted initially, painting, lettering & border with reflective paint at the time of every shifting, traffic diversion arrangement, safety guard, suitable lightning arrangement during night, complete in all respect till completion of the project as per technical specification and direction of Engineer-In-charge and same shall be possessed by the contractor after completion of the Project. Payment under this item will be released (1) 50% At the time of Providing new barricading at the time of start of project at location and plan as approved by the Engineer & certification (2) 50% After completion of project including shifting re-erecting and maintaining the barricading in position, during entire construction tenure with requisite manpower /flagman etc. complete for guiding traffic and safety etc and dismantling after completion of project.	575.00	Metre	2500.00	1,437,500.00
	TOTAL OF DISMANTLING WORKS =					1,773,466.00
2	EARTH WORK					
2.1.1	4.10.1.1	Earth work in excavation in foundation, trenches etc. including dressing of sides and ramming of bottoms, including getting out the excavated material, refilling after laying pipe/ foundation and disposal of surplus excavated material at a lead upto 50m suitable site as per direction of Engineer for following depths, below natural ground / Road top level. In all types soils/ saturated soil such as moorum, sand, sandy silt, clay, black cotton soil, kankar, etc. Depth upto 1.5 m	225306.00	Cum	164.00	36,950,184.00
2.1.2	4.10.1.2	Add extra for over all depth of excavation above 1.5 m and upto 3.0 m over item no 4.10.1.	28164.00	Cum	11.50	323,886.00
2.1.3	4.10.1.3	Add extra for over all depth of excavation above 3.0 m and upto 4.5 m over item no 4.10.1.1	33797.00	Cum	26.00	878,722.00
2.1.4	4.10.1.4	Add extra for over all depth of excavation above 4.5 m and upto 6.0 m over item no 4.10.1.1	39430.00	Cum	46.00	1,813,780.00
2.1.5	4.10.1.5	Add extra for over all depth of excavation above 6.0 m and upto 7.5 m over item no 4.10.1.1	45062.00	Cum	70.50	3,176,871.00
2.1.6	4.10.1.6	Add extra for over all depth of excavation above 7.5 m and upto 9.0 m over item no 4.10.1.1	56324.00	Cum	98.50	5,547,914.00

2.2	4.13	Earth filling with available surplus soil excavated from foundations and taken from only from outside of building plinth in layers not exceeding 20cm in depth, consolidating each deposited layer including ramming and watering and consolidation with lead up to 50 m and lift upto 1.5 m.	37485.00	Cum	98.00	3,673,530.00
2.3	1.1	Carriage of Materials by mechanical transport including loading, unloading and stacking :: Beyond 10 Km. upto 20 Km. per Km.	187821.00	Cum	283.00	53,153,343.00
	TOTAL OF EARTH WORK =					105,518,230.00
3	PLAIN CEMENT CONCRETE WORK					
3.1	21.1.5	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering - All work upto plinth level : 1:3:6 (1 Cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size).	5440.00	Cum	3750.00	20,400,000.00
	TOTAL OF PLAIN CEMENT CONCRETE WORK =					20,400,000.00
4	BORED CAST IN SITU PILE					
4.1	13.21	Bored cast-in-situ R.C.C. pile with design mix concrete using batching plant, transit mixer and concrete pump, excluding reinforcement complete as per drawing and technical specifications and removal of excavated earth with all lifts and lead upto 1000 m. as per clause 1100, 1600 & 1700 of MoRT&H Specification including all material, labour and machinery.	0.00			
4.1.1	13.21.4.4	750 mm dia pile RCC Grade M -35 (Design mix)	0.00			
		Anchor Pile Tie Beam	13090.00	Mtr	4,690.00	61,392,100.00
4.2	14.7.4	Providing and laying structural plain/ reinforced cement concrete (design mix) of specified grade in substructure at all levels using batching plant, transit mixer, concrete pump and vibrator including cost of form work complete as per drawing and clause 1500, 1700 and 2200 of MoRT&H specification including all scaffolding, material, labour, machinery etc. RCC Grade M -35	0.00			
		Anchor Pile Tie Beam (450mm x 750 mm)	254.00	Cum	5,660.00	1,437,640.00
4.3	13.24	Providing and laying TMT bar reinforcement at any level in foundation/ pile/ pile cap complete as per drawing and clause 1600 of MoRT&H Specification including all material, labour and machinery.	924.00	Tonne	51,400.00	47,493,600.00
	TOTAL OF BORED CAST IN SITU PILE WORK =					110,323,340.00
5	REINFORCED CONCRETE WORK					
5.1	14.7.4	Providing and laying structural plain/ reinforced cement concrete (design mix) of specified grade in substructure at all levels using batching plant, transit mixer, concrete pump and vibrator including cost of form work complete as per drawing and clause 1500, 1700 and 2200 of MoRT&H specification including all scaffolding, material, labour, machinery etc. RCC Grade M -35	28805.00	Cum	5660.00	163,036,300.00
5.2	38.4	Providing and Placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before pouring concrete etc. complete :	0.00			
5.2.1	38.4.1	Serrated with central bulb (225mm wide, 8-11mm thick).	2163.00	Mtr	264.00	571,032.00
	TOTAL OF REINFORCED CONCRETE WORK =					163,607,332.00
6	STEEL REINFORCEMENT					
6.1	14.25	Supplying, fitting and placing TMT bar reinforcement in sub structure/ superstructure at all level complete as per drawing and clause 1600 & 2200 of MoRT&H Specification including all material, labour, machinery etc. Reinforcement with TMT bar in super structure	5762.00	Tonne	52800.00	304,233,600.00
	TOTAL OF STEEL REINFORCEMENT =					304,233,600.00
7	BRICK WORK					

7.1	24.5.1	Brick work with FPS bricks of class designation 75 in superstructure above plinth level upto two stories in all shapes and sizes in : Cement mortar 1:4 (1 cement : 4 coarse sand)	2038.00	Cum	4500.00	9,171,000.00
	TOTAL OF BRICK WORK =					9,171,000.00
8	DOORS AND WINDOWS					
8.1	29.15	Providing and fixing pressed steel door frames confirming to IS: 4351 manufactured from commercial mild steel sheet of 1.25 mm thickness including hinges jamb, lock jamb, bead and if required angle threshold of mild steel angle of section 50x25mm, or base ties of 1.25mm pressed mild steel welded or rigidly fixed together by mechanical means, adjustable lugs with split end tail to each jamb including steel butt hinges 2.5mm thick with mortar guards, lock strike-plate and shock absorbers as specified and applying a coat of approved steel primer after pre-treatment of the surface as directed by Engineer-in-charge:				
8.1.1	29.15.2	Profile C	118.00	Mtr	433.00	51,094.00
8.2	29.12	Providing and fixing factory made ISI marked steel glazed doors, windows and ventilators side /top /centre hung with beading and all members such as F7D, F4B, K11 B and K12 B etc. complete of standard rolled steel sections, joints mitred and flash butt welded and sash bars tenoned and rivetted with 15x3mm lugs, 10cm long, embedded in cement concrete blocks 15x10x10cm of 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size) or with wooden plugs and screws or rawl plugs and screws or with fixing clips or with bolts and nuts as required, including providing and fixing of hinges, pivots, float glass panes with glazing clips and special metal sash putty of approved make and a priming coat of approved steel primer excluding the cost of metal beading and other fittings except necessary hinges or pivots complete as per approved design.	216.00	Sqm	3040.00	656,640.00
8.3	28.24	Providing and fixing external grade board solid core single leaf flush door shutters ISI 2202-67 marked using Phenol formal dehyderesin in glue both sides including approved ISI marked Stainless Steel butt hinges fittings with necessary screws complete as per annexure 'A' :	0.00			
8.3.1	28.24.3	35 mm thick	0.00			
8.3.1.1	28.24.3.1	Commercial Veneer both side	56.00	Sqm	1590.00	89,040.00
	TOTAL OF DOORS AND WINDOWS =					796,774.00
9	METAL WORKS					
9.1	39.35	Wrought iron and mild steel welded work) (using angles, square bars, tees and channel grills, grating frames, gates and tree guards of any size and design etc. including cost of screens and welding rods or bolts and nuts complete fixed in position but without the cost of excavation and concrete for fixing which will be paid separately.	1034.32	Quintal	6770.00	7,002,346.40
9.2	29.27.1	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing and staircase railing including applying a priming coat of approved steel primer. M.S. tube.	2772.00	Kg	90.50	250,866.00
9.3	29.6.1	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths interlocked together through their entire length and jointed together at the end by end locks mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete including the cost of providing and fixing necessary 27.5cm long wire springs grade No.2 and M.S. top cover of required thickness for rolling shutters. 80x1.25mm M.S. laths with 1.25 mm thick top cover.	286.00	Sqm	2250.00	643,500.00
9.4	29.8.1	Exceeding 10.00 sqm and upto 16.80 sqm in the area.	130.00	Sqm.	726.00	94,380.00
9.5	29.7	Providing and fixing ball bearing for rolling shutters.	356.00	each	339.00	120,684.00

9.6	29.9	Extra for providing grilled rolling shutters manufactured out of 8 mm dia. M.S. bar instead of laths as per design approved by Engineerin-charge. (Area of grill to be measured).	286.00	Sqm	272.00	77,792.00
	TOTAL OF METAL WORKS =					8,189,568.40
10	FINISHING WORK					
10.1	32.1.2	Cement plastering including T&P, scaffolding, material and complete labpour, including cost of water, curing, racking of joints etc. with 12 mm cement plaster of mix : 1:6 (1 cement : 6 fine/ coarse sand)	21650.00	Sqm	138.00	2,987,700.00
10.3	32.10	Extra for providing and mixing water proofing material in cement plaster work in proportion recommended by the manufacturers.	3000.00	per bag of 50kg. of cement used in the mix	30.50	91,500.00
10.4	32.49.1	Wall painting with plastic emulsion paint of approved brand and manufacture to give an even shade: Two or more coats on new work	21650.00	Sqm	80.50	1,742,825.00
10.5	32.50.1	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade :- Two or more coats on new work.	2000.00	Sqm	69.00	138,000.00
10.7	32.41.1	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete. On steel work	3058.00	Sqm	116.00	354,728.00
10.8	32.35.1	Finishing walls with Acrylic Smooth exterior paint of required shade : New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including base coat of water proofing cement paint applied @ 2.20 kg/ 10 sqm).	1732.00	Sqm	90.50	156,746.00
10.9	38.19.1	Providing and laying APP (Atactic Polypropylene Polymer) modified prefabricated five layer, 3mm thick water proofing membrane, black finished reinforced with glass fibre matt consisting of a coat of bitumen primer for bitumen membrane @ 0.40 ltr/sqm. by the same membrane manufactured of density at 25°C, 0.87 - 0.89 kg/ltr and viscosity 70 - 160 cps. over the primer coat the layer of membrane shall be laid using Butane torch and sealing all joints etc., and preparing the surface complete. The vital physical and chemical parameters of the membrane shall be : Joint strength in longitudinal and transverse direction at 23°C as 350/300 N/5cm. Tear strength in longitudinal and transverse direction as 60/80N. Softening point of membrane not less than 150°C. Cold flexibility shall be upto -2°C when tested in accordance with ASTM, D - 5147. The laying of membrane shall be got done through the authorised applicator of the manufacturer of membrane : 3 mm thick	25412.00	sqm	410.00	10,418,920.00
	TOTAL OF FINISHING WORK =					15,890,419.00
11	FLOORING WORK					
11.1	9.6.3	Providing and laying un-reinforced, plain cement concrete mix with Concrete Mixer & vibrator pavement over a prepared sub base with 43 grade cement , coarse and fine aggregate conforming to IS: 383, maximum size of coarse aggregate not exceeding 25 mm, mixed as per approved mix design, laid, spread, compacted and finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints etc including all material, labour, machinery, lighting, guarding and maintenance of diversion. PCC M-30	1490.00	Cum	4940.00	7,360,600.00
11.2	27.2.1	Providing and fixing Granite stone slab mirror polished and machine edge cut in walls, pillars, steps, Shelves, Sills Counters, Floors etc. laid on 12mm (Av.) thick base of cement mortar 1:3 (1 cement : 3 coarse sand) jointing with white cement mortar 1:2 (1white cement : 2 marble dust) with pigment to match the shade of the marble slab including grinding, rubbing and polishing complete. Jhunjhunu / Jalore (Red / Chocolate Colour)	0.00			
11.2.1	27.2.1.2	Above 3600 Cm2 Tiles	1506.00	sqm	3440.00	5,180,640.00

11.3	27.3.2	Extra for providing edge moulding to 15-18mm thick marble/ Granite stone counters, Vanities etc. including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge.Granite Work	558.00	Metre	200.00	111,600.00
11.4	30.24.2	Kota stone slab flooring 25mm thick over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand) :Area of each slab 2001 to 5000 sqcm	1584.00	Sqm	1090.00	1,726,560.00
11.5	27.1	Providing and fixing Marble stone flooring table rubbed, 15-18 mm thick over 20mm (Av.) thick base of CM 1:4 (1 cement : 4 coarse sand) or slab in wal, steps, pillars, counters, jambs, shelves, sills etc laid over 12mm (Av.) thick base of CM 1:3 (1 cement : 3 coarse sand), jointing with white cement mortar 1:2 (1 white cement : 2 marble dust) with pigment to match the shade of the marble slab including grinding, rubbing and polishing complete	0.00			
11.5.1	27.1.3	Keseriaji/ Abu Ambaji (Green Marble)	0.00			
11.5.1.1	27.1.3.3	Above 3601 Cm2 Slabs	189.00	Sqm	1970.00	372,330.00
11.5	27.18	Providing and fixing 1st quality ceramic glazed vitrified tiles of colour standard white, grey, ivory, fume, red brown, light green, light blue, and other light shades with water absorbtion less than or equal to 0.08% confirming to IS : 13753 & IS : 15622 in floor, steps etc laid on bed on neat cement slury finished with flush pointing in the white cement mixed with pigment to match the shade of the tile complete (excluding the the cost of cement plaster on wall and pillar)	0.00			
11.5.1	27.18.1	Size 600mm x 600mm	960.00	Sqm	1310.00	1,257,600.00
	TOTAL OF FLOORING WORK =					16,009,330.00
12	MISC. WORK					
12.1	31.21	Providing gola 75x75 mm in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 10mm and down gauge) including finishing with cement mortar 1:3 (1 cement : 3 fine sand) as per standard design :	208.00	Mtr	136.00	28,288.00
12.2	19.1	Providing, lowering, laying in trenches, aligning, fixing in position and jointing socketed rubber gasket type ISI marked uPVC pipes of Class III (6 Kg/sqcm) suitable for potable water with rubber ring joints (as per IS 4985-2000) of following outer dia with all accessories (excluding specials) complete including all material, labour, hydraulic testing and commissioning as per Technical Specifications and as per direction of Engineer	0.00			
12.2.1	19.1.2	110 mm dia	304.00	Mtr	273.00	82,992.00
12.3	19.2	Providing, lowering, laying in trenches, aligning, fixing in position and jointing uPVC pipe fittings/ accessories of class III (6 Kg/sqcm) confirming to IS:7834 suitable for potable water with rubber rings joints in uPVC pipe line at all levels/ depth including all material, labour, hydraulic testing and commissioning as per Technical Specifications and as per direction of Engineer	0.00			
12.3.1	19.2.6	Double/Single socketed 90 degree long bend (single piece welded with socket)	0.00			
12.3.1.1	19.2.6.2	110 mm dia	32.00	Each	299.00	9,568.00
12.4	10.10	Providing and fixing precast cement concrete M-20 grade (Using mechanical Concrete Mixer) kerb stone top and bottom width 115 and 165 mm respectively, 250 mm high on 150 mm thick PCC M-10 grade foundation as per design, including fixing at site as per clause 408 of MoRT&H Specification including all material, labour, machinery, lighting, guarding and maintenance of diversion.	703.00	Metre	254.00	178,562.00
12.5	30.20	Chequerred precast cement concrete tiles 22 mm thick in footpath & courtyard jointed with neat cement slurry mixed with pigment to match the shade of tiles including rubbing and cleaning etc. complete on 20 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand).	0.00			
		Dark shade using ordinary cement.	563.00	Sqm	689.00	387,907.00

	TOTAL OF MISC. WORK =					687,317.00
13	RETROREFLECTROISED TRAFFIC SIGNS & ROAD APPURTENANCES					
113.1	10.9	Providing and fixing of retro- reflectorised cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminium sheeting, 1.5 mm thick supported on a mild steel angle iron post 3 Metre long and size 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing including all material, labour.				
13.1.1	10.9.1	90 cm equilateral triangle	4.00	Each	3820.00	15,280.00
13.1.2	10.9.2	60 cm equilateral triangle	20.00	Each	2510.00	50,200.00
13.1.3	10.9.3	60 cm circular	20.00	Each	3370.00	67,400.00
13.1.4	10.9.4	80 mm x 60 mm rectangular	20.00	Each	4700.00	94,000.00
13.1.5	10.9.5	60 cm x 45 cm rectangular	20.00	Each	3280.00	65,600.00
13.1.6	10.9.6	60 cm x 60 cm square	20.00	Each	3890.00	77,800.00
13.1.7	10.9.7	90 cm high octagon	4.00	Each	5990.00	23,960.00
13.2	10.10	Providing and erecting direction and place identification retroreflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick framed to angle iron 40x40x5mm with area not exceeding 0.9 sqm supported on a mild steel single angle iron post 75 x 75 x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 x 45 x 60 cm, 60 cm below ground level as per approved drawing including all material, labour.	120.00	sqm	8470.00	1,016,400.00
13.3	10.80	Providing and laying marking of center line and stop line etc with hot thermoplastic compound 2.5 mm thick on road/ plain surface, including reflectorising glass beads @ 250 gms per sqm area with special applicator machine, as per IRC:35 including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control involved. The finished surface to be level, uniform and free from streaks and holes as per clause 803 of MoRT&H Specification including all material, labour, machinery, lighting, guarding and maintenance of diversion.	1337.00	Sqm	382.00	510,734.00
13.4		Providing and fixing SWISS type hazard marker made out of 2mm thick M.S. sheet size of box is 15x15cm with hold fast at bottom whole body is painted in white stoving enamel paint with white/ high intensity grade prismatic type sheeting on all four side complete in all respect including all material, labour, and diversion.	120.00	Each	650.00	78,000.00
	TOTAL OF RETROREFLECTROISED TRAFFIC SIGNS & ROAD APPURTENANCES =					1,999,374.00
14	TUBE WELL					
14.1	20.20	Construction of tube-well from ground levels and upto 100 Meter depth and above to accommodate housing and assembly pipe of following sizes in all types of alluvium strata by percussion/ rotary drilling method and with gravel as per IS:4097-1967 and packing as per IS:2800 (Part I -& II) 1979 as amended upto date (the work includes the cost of gravel & its primary packing and packing during development, lowering of housing & strainer assembly pipes, with supply and wrapping of coir-rope, wherever necessary for arresting fine sand particles. The work will not include cost of housing pipe and strainer pipe assembly and development work, but work would be completed after obtaining sand free water).				
14.1.1	20.2.3	250 mm dia Nominal bore	500.00	Mtr	1693.00	846,500.00
14.2	20.3	Development of tube well as per IS specification using suitable compressor to give sand free water for required yield of the gravel packed tube well.	20.00	Hour	424.00	8,480.00

14.3	20.4	Supply of ERW M.S. black casing pipe ISI marked (IS: 4270/1992) of grade Fe410 of following nominal bore sizes at site of work.	0.00			
14.3.1	20.4.2	125 mm dia	500.00	Mtr	1116.00	558,000.00
14.4	20.5	Supply of strainer pipes made of ERW M.S. black pipe ISI mark of following sizes at the site of work including required size of slotting as per IS:8110-1985 of following nominal bore sizes at site of work.	0.00			
14.4.1	20.5.3	250 mm dia	200.00	Mtr	1569.00	313,800.00
14.5	20.7	Supply and fixing of tube well cover of M.S. sheet (6mm thick) with nuts and bolts complete for casing size:	0.00			
14.5.1	20.7.5	250mm dia	2.00	Each	321.00	642.00
14.6	20.8	Supply and fixing of M.S. clamp set of 50 ×6mm flat iron with nuts and bolts etc. for holding the riser pipe assembly of submersible pump set.	4.00	Each Set	260.00	1,040.00
14.7	20.9	Installation of submersible motor pump set in tube-well/open well complete (labour charges only) including transportation of tripod, chain pulley block & any other material required for lowering purpose.	2.00	Each	3509.00	7,018.00
14.8	34.12	Providing and fixing G.I. pipes complete with G.I. fittings including trenching and refilling etc.	0.00			
14.8.1	34.12.7	65 mm dia. nominal bore	400.00	Mtr	525.00	210,000.00
14.9	34.17	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :	0.00			
14.9.1	34.17.5	65 mm nominal bore	4.00	Each	3600.00	14,400.00
14.10	34.38	Painting G.I. pipes and fittings with two coats of anti-corrosive bitumastic paint of approved quality :	0.00			
14.10.1	34.38.7	65 mm diameter pipe	400.00	Mtr	16.00	6,400.00
14.11	34.46	Providing and fixing G.I. Union in existing G.I. pipe line, cutting and threading the pipe and making long screws including excavation, refilling the earth or cutting of wall and making good the same complete wherever required :	0.00			
14.11.1	34.46.7	65 mm nominal bore.	24.00	Each	1070.00	25,680.00
	TOTAL OF TUBE WELL =					1,991,960.00
	TOTAL IN RS. (ON RUIDP BSR - 2017)					760,591,710.40
			<u>Based on PWD BSR-2013 (Road & Building)</u>			
15	BASED ON PWD BSR 2013					
15.1	R-10.24	Providing and fixing PVC Bump Speed Breakers size 350 mm x 250 mm x 50 mm fitted with key hooks complete with labour material and traffic diversion arrangements.	280.00	Rmt	2140.00	599,200.00
15.2	B-12.22	Providing and applying white cement based putty over plastered surface to prepare the surface even and smooth complete	21650.00	Sqm	72.00	1,558,800.00
15.3	B-11.32	Vacuum processed concrete including cost of equipments, labour etc. for flooring of lower basement and upper basement complete in all respect as per directions of Engineer incharge.	73904.00	Sqm	71.00	5,247,184.00
15.4	B-11.33.2	Cutting of construction joint/ longitudinal joint 4 to 6 mm. wide using mechanical concrete cutter including cost of diamond bit cutting wheel and filling of bitumen sealing compound in groove including cost of sealing compound.50 mm depth	21875.00	P Mtr.	65.00	1,421,875.00
	TOTAL IN RS. (ON PWD BSR - 2013)					8,827,059.00

16	NON BSR	Providing & fixing of colour coated trapezoidal profile sheet of 1015mm supply cover width and 1072mm effective supply nominal 28.5mm deep ribs with subtle square fluting in the five pan at nominal 200mm centre-to-centre. The end rib shall be designed for anti-capillary action, to avoid any seepage of water through the lateral overlap. The feed material is manufactured out of nominal 0.50 mm Total Coated Thickness (TCT), Hi-Tensile steel with min. 550 MPa yield strength, metallic hot dip coated with Aluminium- Zinc alloy (55% Aluminium, 45% Zinc) as per AS 1397 - Zinalume AZ150 (Min. 150 gms/sq.mt. total on both sides) with Colorbond steel quality paint coat. The paint shall have a total coating thickness of nominal 35 pm, comprising of nominal 20 pm exterior coat on top surface and nominal 5 pm reverse coat on back surface over nominal 5 pm primer coat on both surfaces of approved colour shade by the department.	0.00			
		The steel sheet shall be fastened with nominal 40 pm zinc coated or nominal 25 pm zinc-tin alloy coated, Hex head, self-drilling screw as per AS 3566-2002 class 3 fasteners of approved make (Buildex or equivalent) with EPDM washer as per the requirement considering the profile shape and design load. the fastener size shall be calculated as per the design or manufacturers recommendations. The profile sheet, fastener size etc. shall be approved by the department. The minimum overlap of the sheet should not be less than 75mm. All the accessories like gutter/flashing/capping shall be made from the same material (or manufacturer's recommendation) which is used for main cladding application. The measurement shall be based on finished/covered surface area.(Lysaght TRIMDEK Tata Blue Scope or equivalent make or equivalent)	2904.00	Sqm	1048.00	3,043,392.00
	TOTAL IN RS. (ON NON BSR)					3,043,392.00
TOTAL AMOUNT IN RS (RUIPD-2017, PWD-2013 & NON BSR) =						772,462,161.40

Electrical Estimate

Name of Project :- RAMNIWAS BAGH MULTI LEVAL PARKING

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
		DG SET				
	66.18	SITC of DG Set complete with 1500 RPM Diesel Engine of suitable BHP & AC Brush less SPDP Alternator mounted on a common base Frame & coupled through a flexible coupling or close coupled. Alternator shall be self regulated with standard Alternator Protection(Over voltage, over speed & under voltage). Engine shall have residential silencer, up to 10 M exhaust piping , electronic / Mechanical governor, Manual & electric Start, Batteries, Fuel tank (with Stand) & piping, control panel (16 G) with MCCB (4P; 25 KA), Ammeter, Voltmeter, Frequency Meter, Energy Meter & Hour Meter, Engine instruments panel, AVM and with Weatherproof, powder coated Accoustic enclosure for DG set for sound attenuation fabricated from 1.6 mm CRCA sheet steel (structure) with side wall fabricated from 1.6 mm CRCA sheet and filled with foam as per CPCB norms latest amendments & IS 8183 .The doors are fabricated from 1.6 mm CRCA sheet packed with accoustic material, floor of MS chequered plate 5.0 mmthick, All doors/ opening are sealed with neoprene/ EPDN gaskets. The enclosure has built in fuel tank, residential silencer (isolated from main DG chamber) with protection and tripping of DG set against				
	66.18.2.26	750 KVA at 0.8 pf 415V 50Hz 3-Ø	Each	2	6360881	12721762
6	Non BSR	SITC OF PLC BASED DG SYNCHRONIZATION CONTROL PANEL SUITABLE FOR 2 NOS. 750 KVA DG SYNCHRONIZATION. Detail specifications as per bid document.	Each	1	504450	504450
a						
		LT CABLES				
7	51.20	Providing & Laying XLPE insulated / P.V.C. sheathed cable of 1.1 KV grade with aluminium conductor armoured of IS:7098-I/1554-1 approved make in ground as per IS:1255 including excavation of 30cmx75cm size trench, 25 cm thick under layer of sand, second Class bricks covering, refilling earth, compaction of earth, making necessary connection, testing etc. as required of size.				
a		300.0 Sq.mm				
		3.5 core	Mtr.	2450	1257.0	3079650
b		185.0 Sq.mm				
		3.5 core	Mtr.	750	841.0	630750
c		120.0 Sq.mm				
		3.5 core	Mtr.	1850	602.0	1113700
d		95.0 Sq.mm				
		3.5 core	Mtr.	200	502.0	100400
e		50.0 Sq.mm				
		3.5 core	Mtr.	350	316.0	110600
f		35.0 Sq.mm				
		3.5 core	Mtr.	2200	262.0	576400

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
h		16.0 Sq. mm				
		4.0 core	Mtr.	950	191.0	181450
i		10.0 Sq. mm				
		4.0 core	Mtr.	800	173.0	138400
k		6.0 Sq. mm				
		2.0 core	Mtr.	2800	131.0	366800
8	52.70	Supplying and making one end termination with heavy duty double compression brass gland SIBG type, heavy duty copper lugs duly crimped with crimping tool, PVC tape etc for following size of Armoured PVC insulated & PVC sheathed/ XLPE aluminium conductor cable of 1100 volt grade as required of size.				
a		3.5 x 300.0 sq.mm	Set	28	1917.0	53676
b		3.5 x 120.0 sq.mm	Set	16	1,126	18016
a		3.5 x 95.0 sq.mm	Set	16	862	13792
b		3.5 x 50.0 sq.mm	Set	10	462	4620
a		3.5 x 35.0 sq.mm	Set	16	196	3136
a		4.0 x 16.0 sq.mm	Set	24	111	2664
b		2.0 x 6.0 sq.mm	Set	70	72	5040
9		LT Panel E Block				
9.1	48.10	SITC of wall/free standing floor mounted dust and vermin proof compartmentalised cubical panel made out of CRCA sheet, required hardware, duly painted by two coats of zinc/red oxide primer followed by Powder coated / epoxy / PU painted with phosphatisation in grey or required shade after rinsing. The panel having PU/Neoprene rubber gasket of not less than 3mm thickness, separate detachable, gland plate M.S. base channel, hinged door with locking arrangement for equipment/switchgear. Thickness of sheet shall not be less than 1.6mm up to 600mm length/width of any compartment and be of 2.0mm above 600mm. Load bearing structure shall be of 2.0mm thick sheet supported by base M.S. channel if required. Side walls and cable alley compartments having bolted type doors with detachable extension type structure (only outer area on all sides shall be measured and panel to be fabricated from CPRI approved fabricator).	SQ.Mtr.	52	1800.0	93600
9.2	48.20	Supplying and fixing of Aluminium / Copper bus bar by means of SMC / DMC type insulator, high tensile nuts and bolts spring washers in existing panel including bending , cutting in required shape and size and colour coding with heat shrinkable PVC sleeves.				
A		Electrolytic grade Aluminium bus bar	Kg.	15	394.0	5910
9.3	48.80	SF of 240/220 V, LED (22.5 mm dia) Pilot lamp with integral circuit,terminal block, including connection etc. as required.				
a		Red/yellow/Green colour	Each	5	120	600

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
9.4	48.10	P & F of P & F of energy analyser (multy function energy meter) with LCD/ LED display capable of minimum 20 numbers electrical parameters display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect. with LCD/ LED display capable of measuring electrical parameters like V, I, F, PF, KW, Kva, Kvar, Kwh, Kvah, Kvarh display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect.	Each	1	10,005	10005
9.5	48.50	SF of Current Transformer , with all necessary support in existing panel including connection etc. as required .				
a	48.5.7	from 500 / 5 to 1600/5 Ratio , 15 VA , class 0.5 accuracy	Each	3	1,384	4152
9.6	46.10	P&F 240/415 V MCB of breaking capacity not less than 10 KA (B/ C/ D tripping characteristic) ISI marked IS 8828(1996)]/ conforming to IEC 60898 in existing board/sheets including making connections with lugs, testing etc. as required 0.5 A to 4 A rating (Protection MCB)	Each	10	225	2250
		INCOMING				
9.11	49.20	SITC of fixed / Draw out type 4 pole Air Circuit Breaker conforming to IS 13947/IEC 60947 P-2 in existing LT panel suitable for LT installation 440 V, 50 Hz and having adjustable short-circuit, earth fault and over load MICRO-PROCESSOR release with LCD display, bargraph and separate LED indication for each type of fault, at least 4NO & 4NC auxiliary contacts safety shutter and fault position acknowledgement mechanism type, ACB shall have separate indication for service, test, isolation, maintenance position including making connections etc. as required.				
9.11.1	49.2.2.4	1600 A Rating ,50 / 65kA	Each	1	193716.0	193716
		Bus Coupler				
	49.2.2.4	1600 A Rating ,50 / 65kA	Each	1	193716.0	193716
		Outgoings				

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
9.12	49.70	SITC of quick make and quick break 4 POLE current limiting MCCB having following current rating, short circuit breaking capacity at 440/415 V, 50 Hz; O/L & S/C settings and conforming to IS 13947-2 / IEC 60947-2 with front face and centralised adjustable, line load interchangeability, having positive isolation capability, provision for UVR , shunt trip ,earth fault trip, push (test) to trip , including making connections with lugs / spreaders etc. as required				
		With Thermal Magnetic release				
9.12.1		630 Amp , 35/50 kA, adjustable O/L & adjustable S/C setting, Ics = 100 % Icu	Each	2	40891.0	81782
9.12.2		400 Amp ,35 kA, adjustable O/L & adjustable S/C setting, Ics = 100 % Icu	Each	1	22426.0	22426
		160 Amp, 16/25 kA, adjustable O/L & fixed S/C setting Ics = 100 % Icu	Each	1	12623.0	12623
9.12.3		400 Amp ,35 kA, adjustable O/L & adjustable S/C setting, Ics = 100 % Icu	Each	1	22426.0	22426
9.12.4		400 Amp ,35 kA, adjustable O/L & adjustable S/C setting, Ics = 100 % Icu	Each	1	22426.0	22426
		160 Amp, 16/25 kA, adjustable O/L & fixed S/C setting Ics = 100 % Icu	Each	1	12623.0	12623
		400 Amp ,35 kA, adjustable O/L & adjustable S/C setting, Ics = 100 % Icu	Each	1	22426.0	22426
		APFC				
		Incoming				
	49.20	SITC of fixed / Draw out type 4 pole Air Circuit Breaker conforming to IS 13947/IEC 60947 P-2 in existing LT panel suitable for LT installation 440 V, 50 Hz and having adjustable short-circuit, earth fault and over load MICRO-PROCESSOR release with LCD display, bargraph and separate LED indication for each type of fault, at least 4NO & 4NC auxiliary contacts safety shutter and fault position acknowledgement mechanism type, ACB shall have separate indication for service, test, isolation, maintenance position including making connections etc. as required.				
	49.2.2.3	Draw out type (Manual spring charged) 1000 A Rating , 50kA	Each	1	160168.0	160168
		Bus Coupler				
	49.2.2.3	1000 A Rating , 50kA	Each	1	160168.0	160168
	48.50	SF of Current Transformer , with all necessary support in existing panel including connection etc. as required .				

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
	48.5.7	from 500 / 5 to 1600/5 Ratio , 15 VA , class 0.5 accuracy	Each	3	1,384	4152
	48.13	SITC of microprocessor based intelligent power factor correction relay having sensitivity up to 50 milli Amp secondary current and following way, self analysing auto c/k setting according to targeted power factor setting, the relay shall have minimum three digit display unit for display of real power factor, targeted power factor, lag/lead capacitor switching status, alarm output for under current, over current, insufficient compensation, indication of switching on units, auto/manual status, and shall have over load protection, no volt release etc. as required.				
		6 to 14 stage				
		sensitivity up to 50 milli Amp	Each	1	18220.0	18220
	46.10	P&F 240/415 V MCB of breaking capacity not less than 10 KA (B/ C/ D tripping characteristic) ISI marked IS 8828(1996)]/ conforming to IEC 60898 in existing board/sheets including making connections with lugs, testing etc. as required 6 A to 32 A rating (Protection MCB)	Each	6	161	966
		Outgoings				
	49.60	SITC of quick make and quick break 3 POLE current limiting MCCB having following current rating, short circuit breaking capacity at 440/415 V, 50 Hz; O/L & S/C settings and conforming to IS 13947-2 / IEC 60947- 2 with front face and centralised adjustable, line load interchangeability, having positive isolation capability, provision for UVR , shunt trip , earth fault trip, push (test) to trip, including making connections with lugs / spreaders etc. as required				
		250 Amp , 35/50kA, adjustable O/L & adjustable S/C Setting	Each	2	19013.0	38026
9.13	49.6.1.1	160 Amp , 16/25 kA, adjustable O/L & fixed S/C setting	Each	2	10571.0	21142
	46.1.4.1	Triple pole MCB 6 A to 32 A rating	Each	1	670.0	670
9.16	46.1.4.2	MCB 3P 40 A 63 A rating mcb	Each	7	1033.0	7231
9.17	48.16	P & F of 440 Volt 3 pole capacitor (AC 6 B) duty contactor with 3 no. early make and post break auxiliary contacts in series with quick discharge damping resistors/ reactors to limit the inrush current , conforming to IS:13947-4-1/IEC:947-4-1, Din rail mounting type including making connections, testing etc. as required. suitable for following capacity capacitor bank				
b		11 to 20 KVAR	Each	4	3,108	12432

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
C		30 KVAR	Each	4	3601.0	14404
D		50 KVAR	Each	2	10935.0	21870
E		100 KVAR	Each	2	12000.0	24000
	48.15	P & F of ac operated heavy duty 230 /440 Volt power contactor conforming to IS:13947-4-1/IEC:947-4-1having provision of mechanical interlocking, Din rail mounting type including making connections, testing etc. as required.				
	48.15.1	3 pole AC3 Rating contactors .				
	48.15.1.3	21to 25 Amp	Each	1	1374.0	1374
	48.15.1.6	41 to 50 Amp	Each	7	3760.0	26320
		160 to 250 Amp	Each	4	10000.0	40000
	48.80	SF of 240/220 V, LED (22.5 mm dia) Indicating lamp with integral circuit, terminal block, including connection etc. as required.				
		Red/yellow/Green colour	Each	14	120	1680
	48.70	SF of CT linked selector switch	Each	14	377	5278
		SITC of wall/free standing floor mounted dust and vermin proof compartmentalised cubical panel made out of CRCA sheet, required hardware, duly painted by two coats of zinc/red oxide primer followed by Powder coated / epoxy / PU painted with phosphatisation in grey or required shade after rinsing. The panel having PU/Neoprene rubber gasket of not less than 3mm thickness, separate detachable, gland plate M.S. base channel, hinged door with locking arrangement for equipment/switchgear. Thickness of sheet shall not be less than 1.6mm up to 600mm length/width of any compartment and be of 2.0mm above 600mm. Load bearing structure shall be of 2.0mm thick sheet supported by base M.S. channel if required. Side walls and cable alley compartments having bolted type doors with detachable extension type structure (only outer area on all sides shall be measured and panel to be fabricated from CPRI approved fabricator).	SQ.Mtr.	52	1800.0	93600
		Supplying and fixing of Aluminium / Copper bus bar by means of SMC / DMC type insulator, high tensile nuts and bolts spring washers in existing panel including bending , cutting in required shape and size and colour coding with heat shrinkable PVC sleeves.				
		Electrolytic grade Aluminium bus bar	Kg.	15	394.0	5910
		LT Panel D Block				

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
10.1		SITC of wall/ free standing floor mounted dust and vermin proof compartmentalised cubical panel made out of CRCA sheet , required hardware ,duly treated for derusting in 7 tank process with dephosphating and with powder coating on both side of panel in desired shade The panel having PU/ Neoprene rubber gasket of not less than 3mm thickness , separate detachable gland plate M.S. base channel ,hinged door with locking arrangement for equipment/switchgear . Thickness of sheet shall not be less than 1.6 mm up to 600 mm length / width of any compartment and be of 2.0 mm above 600 mm. Load bearing structure shall be of 2.0 mm thick sheet supported by base M.S. channel if required . Side walls and cable alley compartments having bolted type doors with / without detachable extension type structure. (only outer area on all sides shall be measured & panel to be fabricated from CPRI approved	SQ.Mtr.	52	1800.0	93600
10.2	48.10	Supplying and fixing of Aluminium / Copper bus bar by means of SMC / DMC type insulator, high tensile nuts and bolts spring washers in existing panel including bending , cutting in required shape and size and colour coding with heat shrinkable PVC sleeves.				
A	48.20	Electrolytic grade Aluminium bus bar	Kg.	14	394.0	5516
10.3		SF of 240/220 V, LED (22.5 mm dia) Indicating lamp with integral circuit, terminal block, including connection etc. as required.				
a	48.80	Red/yellow/Green colour	Each	9	120	1080
10.4		SF of Current Transformer , with all necessary support in existing panel including connection etc. as required .				
a	48.50	from 500 / 5 to 1600/5 Ratio , 15 VA , class 0.5 accuracy	Each	3	1,384	4152
10.5	48.5.7	P&F 240/415 V MCB of breaking capacity not less than 10 KA (B/ C/ D tripping characteristic) ISI marked IS 8828(1996)]/ conforming to IEC 60898 in existing board/sheets including making connections with lugs, testing etc. as required 0.5 A to 4 A rating (Protection MCB)	Each	5	206	1030
	46.10	P & F of P & F of energy analyser (multy function energy meter) with LCD/ LED display capable of minimum 20 numbers electrical parameters display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect. with LCD/ LED display capable of measuring electrical parameters like V, I, F, PF, KW, Kva, Kvar, Kwh, Kvah, Kvarh display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc.	Each	1	10,005	10005
	48.10					
		INCOMING				

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
		SITC of fixed / Draw out type 4 pole Air Circuit Breaker conforming to IS 13947/IEC 60947 P-2 in existing LT panel suitable for LT installation 440 V, 50 Hz and having adjustable short-circuit, earth fault and over load MICRO-PROCESSOR release with LCD display, bargraph and separate LED indication for each type of fault, at least 4NO & 4NC auxiliary contacts safety shutter and fault position acknowledgement mechanism type, ACB shall have separate indication for service, test, isolation, maintenance position including making connections etc. as required.				
	49.20	Draw out type (Manual spring charged) 800 A Rating , 50kA	Each	1	153482.0	153482
	49.2.2.1	Spare				
		Draw out type (Manual spring charged) 800 A Rating , 50kA	Each	1	153482.0	153482
	49.2.2.1	Outgoings				
		SITC of quick make and quick break 4 POLE current limiting MCCB having following current rating, short circuit breaking capacity at 440/415 V, 50 Hz; O/L & S/C settings and conforming to IS 13947-2 / IEC 60947-2 with front face and centralised adjustable, line load interchangeability, having positive isolation capability, provision for UVR , shunt trip ,earth fault trip, push (test) to trip , including making connections with lugs/spreaders etc. as required				
	49.70	With Thermal Magnetic release				
10.1		630 Amp , 35/50 kA, adjustable O/L & adjustable S/C setting, Ics = 100 % Icu	Each	2	40891.0	81782
		630 Amp , 35/50 kA, adjustable O/L & adjustable S/C setting, Ics = 100 % Icu	Each	1	40891.0	40891
		160 Amp, 16/25 kA, adjustable O/L & fixed S/C setting Ics = 100 % Icu	Each	1	12623.0	12623
10.1		400 Amp ,35 kA, adjustable O/L & adjustable S/C setting, Ics = 100 % Icu	Each	1	22426.0	22426
		250 Amp , 35/50kA, adjustable O/L & adjustable S/C Setting	Each	1	24851.0	24851
		160 Amp, 16/25 kA, adjustable O/L & fixed S/C setting Ics = 100 % Icu	Each	1	12623.0	12623
		160 Amp, 16/25 kA, adjustable O/L & fixed S/C setting Ics = 100 % Icu	Each	1	12623.0	12623
12		Lift Panel				

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
12.1		SITC of wall/ free standing floor mounted dust and vermin proof compartmentalised cubical panel made out of CRCA sheet , required hardware ,duly treated for derusting in 7 tank process with dephosphating and with powder coating on both side of panel in desired shade The panel having PU/ Neoprene rubber gasket of not less than 3mm thickness , separate detachable gland plate M.S. base channel ,hinged door with locking arrangement for equipment/switchgear . Thickness of sheet shall not be less than 1.6 mm up to 600 mm length / width of any compartment and be of 2.0 mm above 600 mm. Load bearing structure shall be of 2.0 mm thick sheet supported by base M.S. channel if required . Side walls and cable alley compartments having bolted type doors with / without detachable extension type structure. (only outer area on all sides shall be measured & panel to be fabricated from CPRI approved fabricator)	SQ.Mtr.	38	1800.0	68400
12.2	48.10	Supplying and fixing of Aluminium / Copper bus bar by means of SMC / DMC type insulator, high tensile nuts and bolts spring washers in existing panel including bending , cutting in required shape and size and colour coding with heat shrinkable PVC sleeves.				
A	48.20	Electrolytic grade Aluminium bus bar	Kg.	10	394.0	3940
12.2		SF of 240/220 V, LED (22.5 mm dia) Indicating lamp with integral circuit, terminal block, including connection etc. as required.				
a	48.80	Red/yellow/Green colour	Each	3	120	360
12.3		SF of Current Transformer , with all necessary support in existing panel including connection etc. as required .				
a		from 200 / 5 to 400/5 Ratio , 10 VA , class 1 accuracy	Each	3	719	2157
12.4						
		P&F 240/415 V MCB of breaking capacity not less than 10 KA (B/ C/ D tripping characteristic) ISI marked IS 8828(1996)]/ conforming to IEC 60898 in existing board/sheets including making connections with lugs, testing etc. as required 0.5 A to 4 A rating (Protection MCB)	Each	5	206	1030

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
	46.10	P & F of P & F of energy analyser (multy function energy meter) with LCD/ LED display capable of minimum 20 numbers electrical parameters display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect. with LCD/ LED display capable of measuring electrical parameters like V, I, F, PF, KW, Kva, Kvar, Kwh, Kvah, Kvarh display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect.	Each	1	10,005	10005
	48.10	INCOMING				
12.8		SITC of quick make and quick break 4 POLE current limiting MCCB having following current rating, short circuit breaking capacity at 440/415 V, 50 Hz; O/L & S/C settings and conforming to IS 13947-2 / IEC 60947- 2 with front face and centralised adjustable, line load interchangeability, having positive isolation capability, provision for UVR , shunt trip ,earth fault trip, push (test) to trip , including making connections with lugs / spreaders etc. as required				
	49.70	With Thermal Magnetic release				
		160 Amp, 16/25 kA, adjustable O/L & fixed S/C setting Ics = 100 % Icu	Each	1	12623.0	12623
		Outgoings				
		Four pole MCB				
		40 Amp to 63 Amp Rating	Each	7	1,311	9177
	46.1.6.2					
15.2		Force Ventilation panel 4 panels upper basement				
A		SITC of wall/ free standing floor mounted dust and vermin proof compartmentalised cubical panel made out of CRCA sheet , required hardware ,duly treated for derusting in 7 tank process with dephosphating and with powder coating on both side of panel in desired shade The panel having PU/ Neoprene rubber gasket of not less than 3mm thickness , separate detachable gland plate M.S. base channel ,hinged door with locking arrangement for equipment/switchgear . Thickness of sheet shall not be less than 1.6 mm up to 600 mm length / width of any compartment and be of 2.0 mm above 600 mm. Load bearing structure shall be of 2.0 mm thick sheet supported by base M.S. channel if required . Side walls and cable alley compartments having bolted type doors with / without detachable extension type structure. (only outer area on all sides shall be measured & panel to be fabricated from CPRI approved fabricator)	Kg.	60	350.0	21000

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
15.3		Supplying and fixing of Aluminium / Copper bus bar by means of SMC / DMC type insulator, high tensile nuts and bolts spring washers in existing panel including bending , cutting in required shape and size and colour coding with heat shrinkable PVC sleeves.				
a		Electrolytic grade Aluminium bus bar	Each	12	150	1800
15.4		SF of 110/220 V, LED (22.5 mm dia) Indicating lamp with integral circuit, terminal block, including connection etc. as required.				
a		Red/yellow/Green colour	Each	12	2,978	35736
15.6		SF of Current Transformer , with all necessary support in existing panel including connection etc. as required .				
15.7		from 200 / 5 to 400/5 Ratio , 10 VA , class 1 accuracy	Each	12	206	2472
		Single pole MCB 0.5 A to 4 A rating (Protection MCB)	Each	20	225	4500
	46.1.1	P & F of P & F of energy analyser (multy function energy meter) with LCD/ LED display capable of minimum 20 numbers electrical parameters display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect. with LCD/ LED display capable of measuring electrical parameters like V, I, F, PF, KW, Kva, Kvar, Kwh, Kvah, Kvarh display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect.	Each	4	10,005	40020
	48.10					
		INCOMING				
15.1		630 Amp , 35/50 kA, adjustable O/L & adjustable S/C setting, Ics = 100 % Icu	Each	8	40891.0	327128
a		Outgoings				
		up to 100 Amp , 16/25 kA, adjustable O/L & fixed S/C	Each	20	7,716	154320
	49.7.1.12					
16		Fresh Air Panel Lower Basement				

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
16.1		SITC of wall/ free standing floor mounted dust and vermin proof compartmentalised cubical panel made out of CRCA sheet , required hardware ,duly treated for derusting in 7 tank process with dephosphating and with powder coating on both side of panel in desired shade The panel having PU/ Neoprene rubber gasket of not less than 3mm thickness , separate detachable gland plate M.S. base channel ,hinged door with locking arrangement for equipment/switchgear . Thickness of sheet shall not be less than 1.6 mm up to 600 mm length / width of any compartment and be of 2.0 mm above 600 mm. Load bearing structure shall be of 2.0 mm thick sheet supported by base M.S. channel if required . Side walls and cable alley compartments having bolted type doors with / without detachable extension type structure. (only outer area on all sides shall be measured & panel to be fabricated from CPRI approved fabricator)	Kg.	16	350.0	5600
16.2		Supplying and fixing of Aluminium / Copper bus bar by means of SMC / DMC type insulator, high tensile nuts and bolts spring washers in existing panel including bending , cutting in required shape and size and colour coding with heat shrinkable PVC sleeves.				
A		Electrolytic grade Aluminium bus bar	Each	4	150	600
16.3		SF of 110/220 V, LED (22.5 mm dia) Indicating lamp with integral circuit, terminal block, including connection etc. as required.				
a		Red/yellow/Green colour	Each	6	2,978	17868
16.4		SF of Current Transformer , with all necessary support in existing panel including connection etc. as required .				
a		from 200 / 5 to 400/5 Ratio , 10 VA , class 1 accuracy	Each	6	206	1236
16.5		Single pole MCB 0.5 A to 4 A rating (Protection MCB)	Each	10	225	2250
a	46.1.1	P & F of P & F of energy analyser (multy function energy meter) with LCD/ LED display capable of minimum 20 numbers electrical parameters display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect. with LCD/ LED display capable of measuring electrical parameters like V, I, F, PF, KW, Kva, Kvar, Kwh, Kvah, Kvarh display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect.	Each	2	10,005	20010
	48.10	INCOMING				

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
a		160 Amp, 16/25 kA, adjustable O/L & fixed S/C setting Ics = 100 % Icu	Each	4	12623.0	50492
16.7		Outgoings				
		Four Pole MCB 40 to 63 Amp	Each	12	1311.0	15732
		Dewatering Panel				
16.1		SITC of wall/ free standing floor mounted dust and vermin proof compartmentalised cubical panel made out of CRCA sheet , required hardware ,duly treated for derusting in 7 tank process with dephosphating and with powder coating on both side of panel in desired shade The panel having PU/ Neoprene rubber gasket of not less than 3mm thickness , separate detachable gland plate M.S. base channel ,hinged door with locking arrangement for equipment/switchgear . Thickness of sheet shall not be less than 1.6 mm up to 600 mm length / width of any compartment and be of 2.0 mm above 600 mm. Load bearing structure shall be of 2.0 mm thick sheet supported by base M.S. channel if required . Side walls and cable alley compartments having bolted type doors with / without detachable extension type structure. (only outer area on all sides shall be measured & panel to be fabricated from CPRI approved fabricator)	Kg.	32	350.0	11200
16.2		Supplying and fixing of Aluminium / Copper bus bar by means of SMC / DMC type insulator, high tensile nuts and bolts spring washers in existing panel including bending , cutting in required shape and size and colour coding with heat shrinkable PVC sleeves.				
A		Electrolytic grade Aluminium bus bar	Each	8	150	1200
16.3		SF of 110/220 V, LED (22.5 mm dia) Indicating lamp with integral circuit, terminal block, including connection etc. as required.				
a		Red/yellow/Green colour	Each	12	2,978	35736
16.4		SF of Current Transformer , with all necessary support in existing panel including connection etc. as required .				
a		from 200 / 5 to 400/5 Ratio , 10 VA , class 1 accuracy	Each	12	206	2472
16.5		Single pole MCB 0.5 A to 4 A rating (Protection MCB)	Each	20	225	4500

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
a	46.1.1	P & F of P & F of energy analyser (multy function energy meter) with LCD/ LED display capable of minimum 20 numbers electrical parameters display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect. with LCD/ LED display capable of measuring electrical parameters like V, I, F, PF, KW, Kva, Kvar, Kwh, Kvah, Kvarh display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect.	Each	4	10,005	40020
	48.10	INCOMING				
a		160 Amp, 16/25 kA, adjustable O/L & fixed S/C setting Ics = 100 % Icu	Each	2	12623.0	25246
16.7		Outgoings				
		Four Pole MCB 40 to 63 Amp	Each	11	1311.0	14421
		SF of selector switch for voltmeter (4 position) including making connection etc. as required .	Each	10	341	3410
		SF of CT linked selector switch of 10 A for Ampere meter (4 position) including making connection etc. as required	Each	10	377	3770
		SF of CT operated direct reading type Ampere meter on existing panel , making connection by PVC insulated copper conductor with PVC sleeves / channel etc. as required. Digital Type Above 500 A	Each	10	1,053	10530
		SF of (0-500) V range Volt meter on existing panel , making connection by PVC insulated copper conductor with PVC sleeves / channel etc. as required. Digital Type.	Each	10	1,053	10530
		Earthing				
		Plate Earthing as per IS:3043 with copper Earth plate of size 600mm x 600mm x 3.0mm by embodying 3 to 4 mtr. below the ground level with 20 mm dia. G.I. 'B' class watering Pipe including all accessories like nut, bolts, reducer, nipple ,wire meshed funnel, and C.C. C.C. finished chamber covered with hinged type with locking arrangement C.I. Cover, C.I. Frame of size300mm x 300mm complete with alternate layers of salt and coke/charcoal, testing of earth resistance as required.	Each	50	5,500	275000
20		S & Laying following size earth wire/strip in horizontal or vertical run in ground/surface/recess including riveting, soldering, saddles, making connection etc. as required.				
a	54.4.7	25mm x 3mm copper strip	Mtr.	200	527.0	105400
		Wiring				

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
b		Wiring of twin control light point with 1.5 sq. mm FR PVC insulated unsheathed flexible copper conductor 1.1 kV grade and 1.5 sq.mm FR PVC insulated unsheathed flexible copper earth conductor 1.1 kV grade (IS:694) of approved make in surface / recessed ISI marked steel conduit & it's accessories, round tiles,18 SWG M.S. box with earth terminal, screwless cage connectors for neutral looping in switch board & false ceiling point, 6 A two way switch, 3.0 mm thick phenolic laminated sheet, zinc plated / brass screws, cup washers, bushes, check nuts, making connections, testing etc. as required. FRLS Wire				
21	43.20	Short point (up to 3 mtr.)	P. point	30	257.5	7725
a	42.2.1	Medium point (up to 6 mtr.)	P. point	30	442.9	13287
	42.2.2	Long point (up to 10 mtr.)	P. point	30	645.8	19374.3
	42.2.2	Wiring of 3 pin 6 amp. Light plug point with 1.5 sq. mm FR PVC insulated unsheathed 1.1 kV grade flexible copper conductor and 1.5 sq.mm FR PVC insulated unsheathed 1.1 kV grade copper earth conductor (IS:694) of approved make double lock/ ISI marked single lock pvc casing capping & it's accessories, 18 SWG M.S. box with earth terminal, screwless cage connectors for neutral looping in switch board & false ceiling point, 6 A switch, 6 A socket, 3.0 mm thick phenolic laminated sheet, zinc plated / brass screws, cup washers, making connections, testing etc. as required. FRLS Wire.				
	46.90	On board	P. point	30	83.0	2488.5
		P & F of Industrial plug and socket conforming to IEC 60309-1/2 made out of self extinguishing engineering polymer / polyamide, nickel plated brass sleeve and pins, socket with shutter including making connection etc as required				
	46.90	Surface mounted socket				
23	46.9.2	32 A 4 pin	Each	20	677.0	13540
a	46.9.2.1	16 A 3 pin	Each	17	59.0	1003
b	46.9.2.2	P & F following modular accessories made out of unbreakable and fire retardant poly carbonate with silver contacts including making connections testing etc. as required				
24	47.27	6 A one way switch	Each	20	59.0	1180
a	47.27.1	6 A 3 pin shuttered socket	Each	10	111.0	1110
b	47.27.5	P & F following size mounting grid plates with cover plates				
25	47.28	4 Module (Single 6A)	Each	20	56.0	1120
a	47.28.1	10/ 12 Module (Triple 6 A)	Each	20	52.0	1040

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
	47.28.5	P & F following size hot dip galvanized M.S. box with earthing terminal in recess/ surface suitable for modular accessories as required				
b	47.29	4 Module (Single 6A)	Each	20	52.0	1040
26	47.29.3	5-6 Module				
	47.29.4	10/ 12 Module (Triple 6 A)	Each	20	194.0	3880
27	47.29.6	P & F following size mounting grid plates with cover plates				
a	47.28	5/6 Module	Each	20	88.0	1760
b	47.28.3	S&F following sizes of ISI marked steel conduit along with heavy duty accessories in surface /recessed using saddles, clamps, fasteners as required including cutting the wall and making good the same as required.				
	43.40	20 mm	R. mtr.	5200	70.0	364000
28	43.4.1.	25 mm	Mtr.	15000	88.0	1320000
b	43.4.2	Supplying and drawing FR PVC insulated & unsheathed flexible copper conductor ISI marked (IS:694) of 1.1 kV grade and pproved make in existing surface or recessed conduit/casing capping including making connections etc. as required. FRLS Wire.				
c	44.10	2 x 2.5 sq. mm. + 1x1.5sqmm	Mtr.	9500	60.5	574750
d	44.1.8	2 x 4.0 sq. mm. + 1 x 2.5 sq. mm.	Mtr.	8000	84.7	677600
e	44.1.17	2 x 6.0 sq. mm. + 1 x 2.5 sq. mm.	Mtr.	7900	119.9	947210
32	44.1.122	4 x 10.0 sq.mm	Mtr.	4200	365.2	1533840
	44.1.25	4 x 16.0 sq.mm	Mtr.	3200	589.6	1886720
a	44.1.28	P&F recessed/ surface mounting heavy duty Vertical type sheet steel Distribution board with provision of incomer, phophatised ,powder painted complete with 100 A insulated copper bus bar , neutral link, earth link and din bar, conforming to IS13032 & IS8623 including making internal DB terminations with copper lugs , testing etc. as required.				
33	46.10	Double door (Three phase)				
a	46.10.2	6 Way	Each	42	4747.0	199374
34	46.10.2.2	P&F 240/415 V AC MCB with positive isolation of breaking capacity not less than 10 KA (B/ C/ D tripping characteristic) ISI marked IS 8828(1996)]/ conforming to IEC 60898 in existing board/sheets including making connections with lugs, testing etc. as required.				
	46.20	Single Phase 6 A to 32 A rating SP	Each	252	161.0	40572
		Four pole MCB 40 A 63 A rating	Each	42	1311.0	55062

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
		Supply, Fabricating & installing following sizes of perforated cable trays including horizontal and vertical bends, reducers tees, cross members and other accessories as required and duly suspended from the ceiling with suspenders and including painting as required.				
35	52.40	225mm x 50mm x 1.6mm	Each	1200	366	439200
	52.4.1.3	450mm x 62.5mm x 2.0mm	Each	2500	814	2035000
	52.4.1.10	P&F 240/415 V isolator conforming to IS:13947-III/ IEC 60947-3 on existing board / sheet including making connections with lugs , testing etc. as required				
37	46.20	Four pole Isolator				
		30 A / 40 A rating	Each	40	621	24840
37		P & F screw Clamp / Spring clamp type Terminal Blocks suitable for Din / Panel mount with Nylon T.B., End Plate, Adjacent insulated Jumpers, End Stop, etc. complete in all respect for following sizes.				
a	45.12	6 sq. mm.				
		One In One Out				
		8 way	Each	20	284	5680
b		10 sq. mm.				
		One In One Out				
		8 way	Each	20	460	9200
c		16 sq. mm.				
		One In One Out				
		8 way	Each	20	626	12520
38		SF of rubber matting with one side corrugated as per IS specifications 15652/2006				
a	48.11	3.3 KV, 2 mm thick	SQ.Mtr.	20	2,831	56620
b		11 KV, 2.5 mm thick	SQ.Mtr.	12	3,618	43416
		S&F of 36 Watt IP 20 LED 2'x2' fixture, Recessed / surface type, having efficacy of not less than 100 lumen / watt , made out from CRCA housing and with high purity / transmissivity diffuser for uniform light distribution high efficiency driver electronics and in compliance to IEC standard (integral with light fixture) , life time of more than 50000 burning hours, CCT 6000K (minimum), CRI>80 driver maintaining PF>0.9	Nos.	975	3950	3851250
	E301300	P & F of IP20 LED batten type light fixture made from CRCA sheet stlle housing suitable for mounting LED tube system (integral driver), Power consumption of 18W/36W, 1500/3000 lumens, system lumen efficiency 80 lm/ watt output, life time of 50000 burning hours with 70% initial lumen maintained. CCT 3000° K, 4000° K and 6000° K.				
	57.26	4' LED Tube shape fixture 18W	Nos.	20	1048	20960

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
36	57.26.3	P & F of IP65 IK10 rated LED bulk head type light fixture made from CRCA sheet steel housing suitable for mounting LED tube system (integral driver), Power consumption of 10-15W , 500-600 lumens system lumen efficiency 70 lm/ watt output suitable for 1x100 W GLS/9W CFL bulk head fixtures, life time of 50000 burning hours with 70% initial lumen maintained. CCT 3000° K, 4000° K and 6000° K. Fixture shall be in compliance with CE & KEMA standards. LED Bulk head luminaire 9/10W	Each	60	1,271	76260
	57.21	P & F energy efficient / energy saving 9 Watt IP 20 LED Bulb cool white, in existing holder / fixture as required, minimum 900 Lumen output, 25000 burning hours, CCT 5700K, ANSI, Lamp efficacy minimum 100 lumen/Watt, CRI>80, Driver efficiency >85%, PF 0.95 at full load/ 230 volt AC.	Each	20	83	1660
	E301000	P & F of IP-66 protected high power LED flood light system with extruded aluminium housing , toughened glass diffuser with suitable lenses on LED to achieve various beam angles, 240 volt, 50Hz, of high power LED lamps supplied with pre wired cable of 1 mtr. Integrated driver shall be high efficiency having efficiency more than 85 % and in compliance to IEC standards. System life of 50000 burning hours with 70 % of initial lumen be maintained. Light output in red , green , blue, cool white or warm white colour as per engineers choice. Fixtures shall be CE compliance				
	58.32	High power LED flood light 60 watt	Nos.	14	5611	78554
	58.32.3					
		External Lighting				
		Supply and installation of 6m ornamental lighting pole - Single Arm The installation includes supply and installation of Pole, hardware 2x2.50 SqMM Cu Wiring from junction box to the fixture base, RCC/PCC foundation etc as required for complete installation. Pole as similar to already installed poles. The Pole and Fixture should be supplied of Kessels Shredder / K-Lite/ ADVENT/ Luster.	Nos.	35.00	30030	1051050
	quotation	50W LED Street Light Fixture [Dimension : Ø 634 x 412mm] as similar to already installed lights of K-Lite/ ADVENT/ Luster.	Nos.	35.00	21193	741755
	quotation	P & F in position frame made out of M.S. angle (riveted or welded) finished with two coats of red oxide and enamel paint of following sizes as required. 50mm x 50mm x 6mm	Meter	180	286.0	51480

S.No.	BSR	Description	Unit	QTY.	Rate	Total Amount
	45.20	SITC of Air Cooled split Air conditioners complete with Indoor unit(IDU), Out door unit (ODU), surface / concealed copper Refrigerant piping with insulation (EP foam pipe section) upto 10 Mtr (IDU to ODU), copper power cable upto 10 Mtr (IDU to ODU), R- 22 Refrigerant suitable for 400/230V +10% of 50 Hz 1 /3 AC supply capable of performing COOLING, DEHUMIDIFICATION, AIR CIRCULATION, FILTRATION & VENTILATION of following capacity with resprocating/ rotary/ scroll compressor as specified.				
	65.40	Wall/Ceiling Mounted				
	65.4.1	1.5 ton	Each	2	34243.0	68486
	65.4.1.2		Total			39201261.8

Dewatering System

S.No.	BSR	Description	Unit	Qty	Rate	Amount
1	E261500	SITC of ISI marked Submersible mud pump set minimum 20 mm solid handling 2900 RPM , three phase, 415 V, 50 Hz, having following capacity.				
1.1	E261502	2 HP, (20 - 12) Mtr. (120 - 360) LPM	Each	10	40000	400000
2	69.3	S & F of Star delta Starter with MCB,Main and Aux Contactor,O/L Relay, L/R Selector Switch,3 Indicating lamps,Start-Stop Push Button ,Control MCB with panel with all accessories with following rating 18.5 KW	Each	10	11417	114170
3	34.1	P & F G.I. pipes (<i>Internal Work</i>) with G.I. Fittings excluding union (IS:1239 Mark) & MS clamps including cutting and making good the walls and floors:				
3.1	34.10.1	40mm dia nominal bore	Mtr.	200	489	97800
Total BSR						514170
4		Construction Surface Drain coverd with ms Greating with 112mm thick brick masonry in CM 1:4,110mm thick base concrete 1:5:10, 37mm thick M-15 grade C.C. flooring ,12mm 1:4 cement plaster on all exposed faces of walls including top surface excavation & disposal of earth complete as per approved design/drawing:				
4.1		300 mm drain,300mm Av. Depth	Mtr.	750	1500	1125000
Total Non BSR						1736970
Grand Total						2251140

Commercial Offer of Parking Management System						
S. No.	Item	DESCRIPTION of item	Qty	Unit	Unit Price	Total Amount
A	Parking Sensor / Detector	SITC of Ultrasonic detection technology, RS485 communication, addressable, connected in loop, with parking status LED indicator (GREEN / RED), CE certified	1467	Unit	9,322	13,675,374
1	Indoor LED Guidance Display	SITC of GREEN / RED color guidance LED display, RS485 communication, addressable, loop based, with arrow direction	24	Unit	57,525	1,380,600
2	Outdoor LED Guidance Display	SITC of Parking Space LED display, RS485 communication, addressable, loop based, with arrow direction	4	Unit	88,500	354,000
3	Zone Control Units	SITC of TCP / IP communication, loop connected, control parking sensor, LED guidance display,	24	Unit	112,100	2,690,400
4	ANPR System	SITC of Automatic number plate reader for cars, with blacklist / whitelist entries, LED display, offline working mode, IP54 protected	4	Unit	398,250	1,593,000
5	Ticket Dispenser	SITC of Automatic ticket dispenser, TCP/IP communication, barcode / Qcode type, built in voice intercom, thermal printing	2	Unit	448,400	896,800
6	Boom barrier	SITC of High speed boom barrier, carbon fibre / aluminum material, IP54 protected, left / right direction, 3 mtr length	4	Unit	188,800	755,200
7	Central Control Unit	SITC Central Control Unit with Parking management system, remote online status and booking application	1	Unit	1,239,000	1,239,000
8	Desktop System	SITC of Desktop system at Entry and Exit booth, with monitor, with windows system	4	Unit	76,700	306,800
9	Ticket Scanner	SITC of Wireless ticket scanner, barcode / Q code scanning, RS232 support	2	Unit	46,728	93,456
10	Printer	SITC of High Speed ticket / receipt printer	2	Unit	42,480	84,960
11	Server Unit	SITC of Server Unit 8GB RAM, Core i5 with latest server OS, including	2	Unit	767,000	1,534,000
12	Network Switch	SITC of Network Switch	10	Unit	21,240	212,400
13	Network Cable	Providing and laying of Network Cable	6000	Mtr	112	672,600
14	Communication Cable	Proving and laying of Communication Cable	3200	mtr	112	358,720
15	Cable Conduit	S&F following sizes of ISI marked steel conduit along with heavy duty accessories in surface /recessed using saddles, clamps, fasteners as required including cutting the wall and making good the same as required. 25mm	6800	mtr	88	598,400
16	Cable Tray	Cable Tray	3000	mtr	307	920,400
17	Power Cable	1.5mm 3 core copper cable	4200	mtr	159	669,060
		Total				28,035,170

Electrical Estimate

Name of Project :- RAMNIWAS BAGH MULTI LEVAL PARKING

S.No	BSR	Description	Unit	QTY.	Rate	Total Amount
		CCTV SYSTEM				
1		Supply,Installation,Testing & Commissioning of 1/2.8" CMOS Image sensor 5 Mega pixel or better, 2592 X 1944 resulation Vandal resistant K10 (20J impact) per IEC 62262 Bullet/Box network Camera IP-67, up to 60 images per second at , autofocus motorized remote zoom lence, integrated adaptive upto 60 mtrs IR illumination, accesssible edge storage with Micro SD card, Motion Detection and camera sabotage Analytics, operating Temperature form - 40° to 60°C , power over ethernet (PoE) and 24 VAC power input, Compatible with Third-party Video systems, ONVIF profile S Conformant, H.265, H.264 & MJPEG for real time monitoring and recording , wide coverage focal Length 2.8 to 12 mm, WDR-120db, external 2TB Micro SD card , UL listed Vista or Window XP, suitable for installation.	Each	45	50000.00	2250000
2		Supply installation Testing and Commissioing of Network Video Server . The storage shall delivers total available throughput of 450 Mbps. 200 Streams for recording of IP video streams as well as playback and export through the client machine .It should have following hardware fetaure as minimum Processor Intel® Xeon E3-1230 v5 or better, Operating System Microsoft® Windows®Server 2012 . It should have 200GB SSD storage for Operating system.It should gave Internal Memory 32 GB DDR3 ECC or better with a Storage upto 84 TB or more. It should have 7 SATA or better slot for the recording system. It should support RAID 6 feature for HDD redundancy and NVR should be UL listed. It should have Internal, RedundantcPower Supply. It should have hot standby failover	Each	1	700000.00	700000
3		Supply, installation of L3 switch for CCTV control room, Proposed Switch should have 20 10/100/1000BASE-T ports 4 Combo 10/100/1000BASE-T/SFP ports and 4 SFP+ ports, RJ45 Console Port, One Mini USB console ports, 1G RJ-45 Ethernet for out-of-band IP management, one USB port for firmware and configuration files, Alarm Port: 1 RJ-45 port and should have 1GB DRAM and 1GB flash. Switch should Support Internal/External Redundant Power Supply.The Switch shall be able to do Physical Stack min 9 units per stack and support long-distance stacking over fiber, All ports should have inbuild 6 kV surge protection. Operating Temperature -5 to 50 °C (23 to 122 °F), Switch should be CE, FCC,BSMI, VCCI, cUL, CB, CCC certified.(Make:- Juniper/Cisco/Extreme)	Each	1	180000.00	180000
		Switch with 24-Port 10/100/1000 POE Mbps + 2 combo 1000 Mbps switch with minimum 130 watts Power Budget and all ports should have inbuild 6 kV surge protection.The Switch should have IGMP Snooping v1,v2 and MLD Snooping, The Switch should have Spanning tree 802.1d, 802.1w, Support Loopback Detection and G.8032 ERPS,Operating Temperature -5 to 50 °C (23 to 122 °F),Switch should be CE,FCC,UL,BSMI, VCCI, cUL, LVD, CB, CCC certified.(Make:- Juniper/Cisco/Extreme)	Each	3	55000.00	165000
		Supply, installation, testing & commissioning of Wall mounted 9U enclosure of dimension 600W X9UX500D with front sheet steel glass door , top and bottom cover with cable entry provision, integrated side walls , 1 pair of 19" angles with wall mounting provision, captive hardware(pack of 20).. (Make: COMRACK/RITTAL/HCL/DYNAMIC)	Each	3	10663.00	31989
4		Supply, installation, testing & commissioning of 42 U Rack suitable DK-PS Frame, 800W x 2000H x 1000D, Top cover with 4 x cutout of Dia 112, 2 x cutout of Dia 112 for cable entry. Bottom cover with 4 x cutout of Dia 112 for cable entry. All cutouts blanked with Plastic caps. 2 pairs, 42 U 19" L type angle, Front & Rear, on Vertical Cable Trough (LH & RH)2 Pair, on 6 punched section. (Make: COMRACK/RITTAL/HCL/DYNAMIC)	Each	1	69307.00	69307
5		Supply Installation Testing & Commissioning of workstation with Intel Xeon, Quad Core, 2.26 Ghz, 16GB RAM, 1 TB HDD, OS or better specs, as recommended by VMS Software. The server shall be suitable for any open platform software, as required as per specification & at site of work in line with the Engineer in Charge instructions.(Dell/HP/IBM)	Each	1	128500.00	128500
6		Supply Installation Testing & Commissioning of 42/43" LED Monitor, Full HD, 24x7 opreanal, HDMI Port, Component Video Inputs, 1 Digital Audio Out, VGA Port.	Each	1	44783.00	44783

7		Supplying, Installation, Testing & Commissioning of 24 port loded LIU Box with all the required pigtaills complete in all respect upto entire satisfaction Engineer in charge of works.(Makes : Cisco, Schinder, Dlink)	Each	4	21325.00	85300
8		Supplying, Installation, Testing & Commissioning of SFP 10/100/1000 of SFP Module complete in all respect upto entire satisfaction Engineer in charge of works.(Makes : Cisco/Juniper/ Extreme)	Each	4	12437.00	49748
		Supplying, Installation, Testing & Commissioning of OFC Patch cord etc complete as reqd. (Amp/Molex/Schinder)	Each	15	2215.00	33225
		Supply Installation Testing & Commissioning of Single mode 6 core OFC cable etc as reqd.(Amp/Molex/Schinder)	Meter	1100	112.00	123200
9		Supplying and drawing following sizes of FRLS PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required. a) 2 x 1.5 sq. mm	Meter	750	60.00	45000
10		Supply Installation Testing & Commissioning of CAT 6 UTP Cable complete in all respect upto entire satisfaction Engineer in charge of works.(Amp/Molex/Schinder)	Meter	1800	45.00	81000
11		Supply installation ,testing and commissioning of 5/6 KVA UPS INVERTOR On Line With 42AHx16 battery for the one hour Backup complete in all respect upto entire satisfaction Engineer in charge of works.(Makes:- APC/Emerson/Numeric.)	Each	1	185000.00	185000
12	43.40	S&F following sizes of ISI marked steel conduit along with heavy duty accessories in surface /recessed using saddles, clamps, fasteners as required including cutting the wall and making good the same as required. 25mm	Meter	1600	88.00	140800
			Total			4312852

<u>LIFT/ESCALATORS</u>						
BSR	S.No	Device Description	Unit	Qty	Rate	Amount
	1	<u>ELEVATOR PWD BSR E-305200</u>				
E305205		Supplying , installation , Testing and commissioning of the passenger/goods/Stretcher or Bed elevator having following main features:				
		(a) MOTOR : Gearless lift drive comprising of high starting torque lift duty , 3 phase 440 Volts A.C. permanent magnetic synchronous motor of proper rating with high efficiency shall be used.				
		(b) Operation / Drive : Microprocessor based /PLC, AC Variable Voltage variable frequency variable speed (V3F) vector control drive with encoder feedback closed loop system shall be used for lift car and door operation which shall be full collective selective operation hall call demand response , UP/Down hall stops , main , Up/Down contactor with overload and phase reversal relay and safety controls .				
		(c) Traction Media : main hoist flat coated steel belt / rope . Thimbles of spring permit adjustment of uniform tension for smooth operation of the elevator Pulse belt monitoring system to avoid the cut in the belt.				
		(d) Car : car should be with M S platform with bracings of adequate size and to sustain the impact load cabin plus passengers with safety factor of fire for steel with Anti skid PVC flooring and side panels should be of Stainless steel with hair line finish of sheet of grade 304 duty with S.S. handrails . Car ceiling shall be steel finish with aesthetic appearances with LED ceiling lights .The size of the car shall be taken as per available lift well size and relevant BIS code of lifts . Car panel will also be of S S 304 grade finished with emergency stop device , emergency alarm,mechanical door safety device ,full length infra-red curtain in car door , facility of auto/attended mode . All car panel buttons and all floor switches must be with brail language as per lift act. Agency shall also provide & install one No. 2 MP , IR , IP based ceiling mounted Dome Camerain the car complete with connecting cables & accessories (To be connected with existing CCTV system in the Building) .The inspection unit shall be provided at the top of the car.				
		(e) Landing Doors : All landing door shall be fully automatic centre opening / telescopic made of hair line finish stainless steel grade 304 with key holes and infrared curtains with unlocking facility from outside.				
		(f) Emergency light : Appropriate rechargeable battery operated LED emergency light in the car and along with alarm switch shall be provided.				
		(g) ARD : Automatic rescue Device (ARD) shall be provided according to passenger capacity with SMF batteries of approved brands as per BSR.				
		(h) Audio-Visual Indication : Audio visual indication in the lift car , showing over loading such that doors kept open till excess load is removed.				

		(i) Scrolling Indicators: Digital scrolling indicator system for up-down arrow with floor position indicator shall be provided inside the car and at all stops/floors.				
		(j) Buffers : Spring buffers/PU Buffers shall be provided.				
		(k) Car Fan : ENERGY EFFICIENT Car fan/blower with automatic sleep timer shall be provided.				
		(l) Voice Annunciator: Voice annunciator with suitable music shall be provided in lift car.				
		(m) Self diagnostics system for operational and safety parameters shall be provided in control panel .				
		(n) Mechanical/Electronic over speed governor , door key holes in the floor doors, fireman switch shall be provided .				
		(o) Lift machine hoisting arrangement in the lift machine room , counter balance to promote smooth and economic operation complete with steel guide rails for the car & counter weight ,Trap Door , Lifting hooks as required and monkey ladders for lift pit should be provided by the agency along with all other steel structure works , foundations for the machine etc as required.				
		(p) Permanent wiring in lift machine room and in lift well with providing and fixing of electrical distribution board complete with SP & TP MCB's , proper numbers of light points, with LED fixtures , exhaust fan , 2 nos copper plate /chemical earthing with 8 SWG copper earth wire and plug points shall be provided by the agency . (Power supply of 3 phase 440 V shall be made available by department in lift machine room .)				
		(q) All civil work related to installation of lift like finishing , cleaning and levelling of lift pit , white wash of lift well and in machine room shall be done by the lift erecting agency without any extra cost.				
		(r) Granite or marble cladding around all landing door openings shall be in the scope of lift installation agency and additional payment shall be made according to the actual measurement / schedule by the department to the lift agency.				
		(s) Agency has to provide all working drawings and documents to comply latest BIS specifications and make proper liaison services for obtaining all necessary permissions.				
		15/16 passengers/1020/1088 Kg , 3 stops , rated speed Adjustable up to 1.0 mtr /sec with 2 years comprehensive maintenance / DLP .	Nos	6	1961881	11771286
	Total					11771286

FIRE FIGHTING ESTIMATE

S.No.	BSR	Device Description	Unit	Qty	Rate	Amount
1	E290100	Supplying, Installation, Testing & Commissioning of Local Fire authority approved Electric Driven Main fire pump for Sprinkler / Hydrant applications suitable for automatic operation and consisting of following details given as A, B, C, D, E, F and G . (A) Horizontal Single / Multi stage Centrifugal End suction, back pull type pump complete for delivery of below mentioned discharge , with necessary Butterfly valve on the suction side (all items to be matching with the suction side dia of the pump) and pressure gauge ,Butterfly valve and non return valve on the delivery side side (all items to be matching with the delivery side dia of the pump) and including bypass arrangement for Testing of pump (B) Material of construction : Pump Casing - Cast Iron, Impellor - Bronze, Shaft - SS 410, Packing - Mechanical Seal (C)Pump shall be capable of furnishing not less than 150 % of rated capacity at a head not less than 65 % of the rated head. The shut off head shall not exceed 120 % of rated head (D) Squirrel cage induction motor suitable for 3 phase, 415 V, 50 HZ, Ac supply 2900 / 1450 RPM T.E.F.C confirming to IP:55 , of required HP suitable for the above pump ,along with flexible coupling , coupling guard complete in all respect . (E) Common bed plate fabricated from mild steel channel for installation of pump and Motor (F) Pump is to be inspected by third party like RITES / PDIL at manufacturer's premises and inspection report is to be submitted. (G) Suitable cement concreat foundation duly plastered with anti vibration pads.				
a	E290106	2850 LPM suitable for 88 Mtr Head, multi stage, 1500 RPM	Each	1	568960.0	568960
		SITC of Local fire authority approved Diesel Engine driven Pump suitable for automatic operation as per discharge defined beolw consisting of the following details given as A, B, C, D, E and F . (A) Horizontal Single / Multi stage Centrifugal End suction, back pull type pump complete for delivery of below mentioned discharge complete with necessary flexible pipe, Butterfly valve on the suction side (all items to be matching with the suction side dia of the pump) and pressure gauge ,Butterfly valve and non return valve on the delivery side side (all items to be matching with the delivery side dia of the pump) and including bypass arrangement for Testing of pump (B) Material of construction : Pump Casing - Cast Iron, Impellor - Bronze, Shaft - SS 410, Packing - Mechanical Seal				

S.No.	BSR	Device Description	Unit	Qty	Rate	Amount
2	E290200	(C) Pump shall be capable of furnishing not less than 150 % of rated capacity at a head not less than 65 % of the rated head. The shut off head shall not exceed 120 % of rated head				
		(D) Radiator cooled Diesel Engine developing suitable BHP for the below mentioned discharge at 1500 / 1800 RPM, flexible coupling and coupling guard with the Pump, common bed plate for mounting of the Engine and Pump, Antivibration damping arrangement by cushy foot, Diesel Engine starting Panel for starting of the engine automatically if the Normal electrical supply fails with a unit of battery bank of 12/24v, 180 Ah, Lead Acid Battery with Boost / Trickle charger as required for operation of Diesel engine, Exhaust Pipe of suitable diameter minimum 10 M length, with muffler, day oil tank of 300 lts capacity with first charge and hand operated oil pumping set,				
		(E) Pump is to be inspected by third party like RITES / PDIL at manufacturer's premises and inspection report is to be submitted.				
		(F) Suitable cement concrete foundation duly plastered with anti vibration pads.				
a	E290206	2850 LPM suitable for 88 Mtr Head, multi stage, 1500 RPM	Each	1	897000	897000
3	E290400	SITC of Local fire authority approved Vertical multistage Jockey pump with SS Body, SS impeller, SS shaft, mechanical seal coupled with Squirrel cage induction motor for automatic operation suitable for three phase, 415 V, 50 Hz AC supply with synchronous speed of 2900 RPM, T.E.F.C type confirming to IP:55 with flexible coupling and coupling guard with the pump, Common bed plate fabricated from mild steel channel, Suitable cement concrete foundation duly plastered with anti vibration pads.				
a	E290401	180 LPM suitable for 88 Mtr	Each	1	125440.0	125440
4	E291600	Supplying and fixing air vessel of continuous welded construction fixed at riser top made of 250 mm dia, 8 mm thick MS sheet, 1200 mm in height with air release valve on top and flanged connection to riser, drain arrangement with 25 mm dia Gun Metal wheel valve, with required accessories, pressure gauge and painting with two coats of Red Oxide and two coat of post office red enamel paint as required.	Each	1.0	8200.0	8200

S.No.	BSR	Device Description	Unit	Qty	Rate	Amount
5	E291100	SITC of floor mounted dust and vermin proof compartmentalised cubical type main fire pump house panel made out of CRCA sheet , required hardware ,duly treated for derusting in 7 tank process with dephosphating and with powder coating on both side of panel in desired shade The panel having PU/ Neoprene rubber gasket of not less than 3mm thickness , separate detachable gland plate M.S. base channel ,hinged door with locking arrangement for equipment/switchgear . Thickness of sheet shall not be less than 1.6 mm up to 600 mm length / width of any compartment and be of 2.0 mm above 600 mm. Load bearing structure shall be	Set	1	185000.0	185000
		Incomer				
		320 Amp. TPN MCCB (adj.O/L) with Extended ROM, 35 kA, with Thermal magnetic release, Digital Ammeter, Voltmeter, Selector switches,CT, Indicating Lamps, 400 Amps Alum. Bus bar with with heat shrinkable sleeves.				
		Out going				
		(a) 200 Amp. TPN MCCB(adj.O/L) with Extended ROM, 35 kA, with Thermal magnetic release, Digital Ammeter, Voltmeter, Selector switches,CT, Indicating Lamps for 'ON', 'OFF', 'TRIP' 1 no. star Delta Starter of 75 HP with thermal over load relay, timer, push buttons, Auto / Manual selector switch, Single phase preventor - 2 Sets				
		(b) 63 Amp. TPN MCCB (adj.O/L) with Extended ROM, 25 kA, with Thermal magnetic release, Digital Ammeter, Voltmeter, Selector switches, CT, Indicating Lamps for 'ON', 'OFF', 'TRIP' 1 no. Star Delta / DOL Starter of 5 - 15 HP with thermal over load relay, timer, push buttons, Auto / Manual selector switch, Single phase preventor - 1 Set				
		© One no. Diesel Engine Auto Starting kit with Auto . Manual selector switch & 3 attempt starting device, timers, relays, Indicating lamp for High / Low Lub. Oil pressure, High water temperature and engine ON indication, Battery charger, suitable for 12 V / 24 V DC with trickle / boost selector switch, DC ammeter & voltmeter				
		(d) System controller to control Operation Main Electric pumps, Diesel pump, jockey pump in sequence as per specs. Consisting of relays, timers, sensors, annuciation window for fault indication.				
6	E291700	Providing, installation, testing and commissioning of stainless steel strainer of dia given below fabricated out of 1.6 mm. thick stainless steel sheet with 3 mm. dia holes with stainless steel flange of following sizes.				
a	E291703	200 mm dia	Each	1	16000	16000
b	E291701	100 mm dia	Each	1	8000	8000
7	E292100	Supplying, fixing, testing commissioning of butterfly valve PN 1.6, with Bronze/ Gunmetal seat duly ISI marked complete with Nuts, Bolts, washers, gaskets, conforming to IS 13095, of following sizes as required.				
a	E292103	80 mm dia	Each	3	2983.0	8949

S.No.	BSR	Device Description	Unit	Qty	Rate	Amount
b	E292104	100 mm dia	Each	5	4169.0	20845
c	E292106	200 mm dia	Each	1	11700.0	11700
d	E292105	150 mm dia	Each	5	5770.0	28850
8	E292000	Providing, installation, testing and commissioning of dual plate non-return valve of following sizes confirming to IS:5312 complete with rubber gasket, G I bolts, nuts, washers etc. as required.				
	E292002	80 mm dia	Each	1	7123.0	7123
	E292003	100 mm dia	Each	2	9028.0	18056
a	E292004	150 mm dia	Each	1.0	13488.0	13488
9	E292200	Providing, installation, testing and commissioning of Brass ball valves of following sizes as required.				
a	E292202	25 mm dia.	Each	5.0	705.0	3525
10	E290700	SITC of pressure switches including necessary wiring upto control panel and Ball valve.	Each	1	2250	2250
11	E292900	Supplying & fixing 63 mm dia stainless steel IS : 3444 Gr. - 1 branch pipe with 20 mm (nominal internal diameter) size Gun metal nozzle conforming to IS 903, suitable for instantaneous connection to interconnect hose pipe coupling as required	Each	15	1976	29640
12	E290800	Providing & fixing 100mm dia bourden type, Stainless steel dial type pressure Gauge (0 - 16 Kg) range, 3 / 8 " BSP bottom entry on Pump Delivery Line complete with Ball valve	Each	3	850	2550
13	E293400	Supplying and fixing of Hose Cabinet of size 750 mm x 600 mm x 250 mm made of 1.6 mm thick MS sheet with 6 mm thick glazed glass doors including necessary locking arrangement suitable to accommodate external hydrant with butterfly valve, 2 Nos 15 Mtr. Long Hose pipe, 1 No. branch pipe, mounted on wall OR raised brick platform & duly painted with post office red externally and white internally with synthetic enamel paint complete in all respect, for external hydrant, as required.	Each	15	4250	63750
14	E292500	Supplying and fixing Gun metal single headed Internal / external yard hydrant valve with 1 No. 63 mm dia instantaneous Gun metal coupling and cast iron wheel, ISI marked, conforming to IS 5290 (type A) with blank Gunmetal cap and chain as required.	Each	15	6150.0	92250
15	E293200	Supplying and fixing Fire Brigade Connection of CI body with Gun Metal male instantaneous inlet couplings complete with cap and chain as required for 150mm dia MS pipe connection, conforming to IS 904 as required of following way :				
a	E293201	2 Way	Each	2.0	7680.0	15360

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S.No.	BSR	Device Description	Unit	Qty	Rate	Amount
Fire Aram						
22	E295100	SITC of microprocessor based loop UL/ EN54 Addressable Fire Alarm Control Panel as per NFPA 72 approval. The Panel shall be able to give pin point location of addressable units via the address code for each unit. The Panel shall also be able to automatically switch off all control switches when-ever any Alarm is triggered. . The Panel shall have built in buzzer, SMF batteries for min. 24 Hrs.back up, battery charger, rectifier. Loop interface cards, communication module, LCD unit to indicate Fire / Fault Signal of individual unit, option for external printer, to log all incoming data etc complete in all respect.				
a	E295104	2 - loop	Each	2.0	225000.0	450000
23	E294100	SITC of Rate of Rise Heat Detectors (Thermal Detectors):GRADE-I Addressable analogue type Heat Detectors with solid state design with sensing element combination of fixed type and rate of rise of temperature indicating LED, mounting base etc. as required.	Each	360.0	3750.0	1350000
24	E295700	SITC of Hooter suitable for addressable type fire alarm system with storb light with minimum 85 db audible etc. as required.	Each	12.0	6350.0	76200
25	E294800	SITC of Addressable type manual fire alarm boxes (MCP/Pull Station) shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. Manual fire alarm boxes shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger. etc. as required.	Each	15.0	3650.0	54750
26	E295301	Monitor module for monitoring of flow switches of hydrent / sprinklers	Each	20.0	5250.0	105000
27	E295302	Control relay modules for tripping of AHU / pressurise fans and ventilators	Each	8.0	4500.0	36000
28	E294700	SITC of Fault isolation module to electrically isolate different sections of detector loops.	Each	20.0	2450.0	49000
29	Quotation	S.I.T.C of 6 Zone call station, unidirectional cond, Microphone, 6 Zone selection keys, all call key and momentary PTT key for calls, LED indication fo Zone selection, selectable priority levels and dirrerent type and post call chimes, voltage range 18-24 Volt, current consumption 30ma nominal sensitivity: 80 DB, SPL, Frequency Response: 100 Hz-16 KZ, Output impedance 200 Ohms.				
a		Make: Bosch/SURE/JBL/EV	Each	1.0	206500.0	206500
30	Quotation	S.I.T.C of Pre-Amplifier, with dual channel operation (call and back ground Music) simultaneously, 2 inputs for call staions, Universal input for Mic/Line with speech optimized tone control, 3 inputs for music selection and music optimized tone control, highest priority emergency/telephone input with signal level detector, Make Bosch/SURE/JBL/EV/PHILIPS	Each	1	56640	56640

S.No.	BSR	Device Description	Unit	Qty	Rate	Amount
31	Quotation	S.I.T.C of Mixer Amplifier, 240 Watts, with 4 Mic input with priority, overload protection FAN COOLED. Make BOSCH/EV/SURE/JBL/PHILIPS	Each	2	31152	62304
32	Quotation	Providing & fixing signages consisting LED shall consist of Signage on half side and arrow on other half. Signage shall be any of the following:Exit / Staircase / Extinguisher location / Manual Call Box / Hydrant etc. Signage shall be as per drawing MAKE : Bajaj	Each	180	8408	1513440
33	51.3	Providing and laying XLPE/PVC insulated & PVC sheathed armoured control cables of 1.1 KV grade with copper conductor as per IS 1255 including excavation of 30 CmX75 Cm size trench 25 Cm thick under layer of sand and second class bricks covering, backfilling & Compaction				
a		2C x 1.5 sq.mm	Each	8500	120	1020000
34	43.4	S&F following sizes of ISI marked steel conduit along with heavy duty accessories in surface /recessed using				
a		25 mm	R.mtr.	9800	70	686000
35	E295500	SITC of 6 W Wall Mounted Speakers suitable for addressable type fire alarm system with line matching transformers & selecteable tap setting as required.	Each	60.0	1950.0	117000
Sub Total						5782834
Grand Total						14543920

Forced Ventilation

S.No.	BSR	Device Description	Unit	Qty	Rate	Amount
1		JET VENT FAN Supply of Ductless Ventilation / Jet fans as per attached specifications for normal ventilation and Smoke Extraction along with silencers on both sides (minimum length of 2D) . The fan shall be suitable for 300 Deg C for 2 Hrs operations. Each fan shall be complete with dual speed motor and adjustable pitch die cast aluminium impeller. Casing shall be made of Hot dipped Galvanized steel. The Motor shall be run on the electrical power suitable for 415V/3Ph/ 50Hz				
1.1		315 dia jet fan with dual speed for Upper Basement	Nos	78	38500	3003000
1.2		315 dia jet fan with dual speed for Lower Basement	Nos	78	38500	3003000
		Make: SEVCON-Lti/HOWDEN/GREENHECK/Rosenberg				
2		FIRE RATED TUBE AXIAL FAN WITH MOTOR				
		Supply Axial fans complete with casing made of Hot dipped Galvanised Iron, motor, with adjustable pitch die cast aluminium impeller (Hub and blades) Casing position shall be as per the job requirement and shall be marked on the fan assembly The Fan assembly along with motors (FOR EXHAUST & SUPPLY) should be tested for Temperature range: 300Deg. C temperature for a minimum duration of 2 hours for Smoke Evacuation. Motor shall be suitable for operation on 415±10% volts, 50Hz, 3 phase AC power. The Axial Fan rates shall be inclusive of Fire retardant Flexible connection, Sound attenuators with Mounting arrangement and Vibration isolators for installation.				
2.1		32000 cfm @ 25 mm for Normal Exhaust Mode-	Nos	6	295000	1770000
2.2		42000 cfm @ 25 mm for normal Exhaust Mode	Nos	12	428000	5136000
		24000 cfm @ 30 mm for Smoke Exhaust Mode	Nos	6	221000	1326000
		32000 cfm @ 30 mm for Smoke Exhaust Mode	Nos	12	295000	3540000
2.5		56000 cfm @ 30 mm for Normal Supply Mode--Lower Basement	Nos	6	606000	3636000
2.6		56000 cfm @ 30 mm for Smoke Supply Mode--Lower Basement	Nos	5	606000	3030000
		Make: SEVCON-Lti/HOWDEN/GREENHECK/Rosenberg/System Air				
3		COMPUTATIONAL FLUID DYNAMICS (CFD) ANALYSIS FOR CO SIMULATION (all Basements)	LOT.	2	150000	300000
4		Supply of CO DETECTORS				
4.1		Upper Basement and Lower Basement	Nos	74	11500	851000
5		Supply of Electrical cum PLC Panel for Upper BASEMENT with MCB feeders with starters, Single speed with suitable incomer MCCB, metering panel, aluminium bus bar , PLC logic controller with necessary internal control wiring etc	Nos	2	750000	1500000
6		Supply of Electrical cum PLC Panel for Lower BASEMENT with MCB feeders with starters Single speed with suitable incomer MCCB, metering panel, aluminium bus bar , PLC logic controller with necessary internal control wiring etc	Nos	2	800000	1600000
7	E270300	SITC of ducting made from GSS of class VIII & fabricated as per IS:655 and as per approved drawings & designs including the cost of hangers, supports , angle , expansion fasteners , closed cell neoprene gasket T&P etc. as required of following gauge:				
7.1	E270303	1.00mm (20 G)	Sqm.	1400	883.0	1236200

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33/0.4 kV Substation at RNG Parking Phase-II

BSR	S.No.	Description	Unit	Qty.	Rate	G.Total (G)
66.10.1.13	1	Supply, Installation, Testing and commissioning of copper wound Transformers 33/0.433 KV, Three phase, 50 Hz, DYN 11, ONAN type , Standard accessories with off load tap changer (+5% to -10% in steps of 2.5%), winding / Top --- temperature rise of 45°C/40°C first fill oil, having permissible total loss values not exceeding 7.5% of the maximum total loss values for 11 KV as per energy efficiency level - 2 at basic Insulation level conforming to ISS 2026 (Part- I to Part - II), latest ammended and IS 1180 Part-I : 2014. Transformers described as above and as per the following continuous rating 1000 kVA	Each	2	2154178	4308356
2		SITC of 33kv main cubical panel, 630amps, 31.5ka indoor panel consiting of 1 incoming and 2 outgoing panel with copper busbar complete in all respect detailed specification as per bid documents.	Each	1	4678982	4678982
	51.8	Providing & Laying XLPE insulated IS:7098/II/85 of approved make H.T.cable for working voltage 33 K.V.Earthed with Stranded Compacted Circular Aluminium Conductor, Conductor Screened with Extruded Semi-conducting compound, XLPE Insulated, Insulation Screened with extruded semi-conducting compound in combination with Copper Tape, cores laid up, inner sheath of Thermoplastic tape, galvanised flat steel strip armoured and overall Extruded PVC Type ST- 2 Outer Sheathed cable direct in ground including excavation of 30cmx150cm size trench, 25cm layer of river sand, second Class bricks covering, refilling earth, compaction of earth, making necessary connection testing etc.as required of size.				
51.8.6		3 core 300.0 Sq.mm	Mtr	4500	2 350.00	10575000.00
52.1	3	Providing & making heat shrinkable type indoor/outdoor/straight through terminations/joint kit of approved make suitable for XLPE insulated 33 KV cable, with required components, prepration of cable ends, testing etc. as required of following sizes.				
52.1.3	3.1	Straight Through				
52.1.3.2	3.2	3 core 240/300 /400 Sq.mm	Set	25	45 078.00	1126950.00
52.1		Providing & making heat shrinkable type indoor/outdoor/straight through				
52.1.1		Indoor				
52.1.1.2		3 core 240/300 /400 Sq.mm	Set	4	12 322.00	49288.00
51.13	4	Laying of 33 KV & 11 KV XLPE cable without Road cutting i.e. Through burrowing machine VERMiER (120 cm deep) executed cast of cable use of this technology must be restricted to the situation like:-(i) When the passage available for laying the proposed cable is totally a metal or cement. (ii) When the road cutting is not permitted by the local administration				
51.13.1	4.1	33/11 KV 3 C x 300 Sq mm cable	meter	4500	493.00	2218500.00
53.8	5	S.I.T.C. of bus trunking arrangement in convenient sections complete with housing of galvanized sheet steel of minimum 1.5 mm thickness, copper bus bar for use on 3 phase, 4 wire, 415 volts, A.C. supply with degree of protection IP-42 for the following current carrying capacity, including jointing of sections, flexible joints. expansion joints, bends, and earthing with 2 runs of alum. strips etc.as required.				
53.8.2		1000 Amps.	per mtr.	15	20 467.35	3 07 010.25
53.8.5		1600 Amps.	per mtr.	15	29 848.50	4 47 727.50
53.8.7		2500 Amps.	per mtr.	15	39 798.00	5 96 970.00
54.30	7	Plate Earthing as per IS:3043 with copper Earth plate of size 600mm x 600mm x 3.0mm by embodying 3 to 4 mtr. below the ground level with 20 mm dia. G.I. 'B' class watering Pipe including all accessories like nut, bolts, reducer, nipple ,wire meshed funnel, and C.C. C.C. finished chamber covered with hinged type with locking arrangement C.I. Cover, C.I. Frame of size300mm x 300mm complete with alternate layers of salt and coke/charcoal, testing of earth resistance as required.	each	5	5,500	27500
54.4.7		S & Laying following size earth wire/strip in horizontal or vertical run in ground/surface/recess including riveting, soldering, saddles, making				
		25mm x 3mm copper strip	Mtr.	20	527.0	10540

BSR	S.No.	Description	Unit	Qty.	Rate	G.Total (G)
	48.10	SITC of walll/free standing floor mounted dust and vermin proof compartmentalised cubical panel made out of CRCA sheet, required hardware, duly painted by two coats of zinc/red oxide primer followed by Powder coated / epoxy / PU painted with phosphatisation in grey or required shade after rinsing. The panel having PU/Neoprene rubber gasket of not less than 3mm thickness, separate detachable, gland plate M.S. base channel, hinged door with locking arrangement for equipment/switchgear. Thickness of sheet shall not be less than 1.6mm up to 600mm length/width of any compartment and be of 2.0mm above 600mm. Load bearing structure shall be of 2.0mm thick sheet supported by base M.S. channel if required. Side walls and cable alley compartments having bolted type doors with detachable extension type structure (only outer area on all sides shall be measured and panel to be fabricated from CPRI approved fabricator).	SQ.Mtr.	52	1800.0	93600
	48.20	Supplying and fixing of Aluminium / Copper bus bar by means of SMC / DMC type insulator, high tensile nuts and bolts spring washers in existing panel including bending , cutting in required shape and size and colour coding with heat shrinkable PVC sleeves.				
		Electrolytic grade Aluminium bus bar	Kg.	15	394.0	5910
	48.80	SF of 240/220 V, LED (22.5 mm dia) Pilot lamp with integral circuit,terminal block, including connection etc. as required.				
		Red/yellow/Green colour	Each	5	120	600
	48.10	P & F of P & F of energy analyser (multy function energy meter) with LCD/ LED display capable of minimum 20 numbers electrical parameters display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect. with LCD/ LED display capable of measuring electrical parameters like V, I, F, PF, KW, Kva, Kvar, Kwh, Kvah, Kvarh display with 1A/5A CT input for LV/ HV network, RS 485 communication port etc. complete in all respect.	Each	1	10,005	10005
	48.50	SF of Current Transformer , with all necessary support in existing panel including connection etc. as required .				
	48.5.4	from 2000 / 5 to 3200 /5 Ratio , 15 VA, class 1 accuracy	Each	3	1,457	4371
	46.10	P&F 240/415 V MCB of breaking capacity not less than 10 KA (B/ C/ D tripping characteristic) ISI marked IS 8828(1996)]/ conforming to IEC 60898 in existing board/sheets including making connections with lugs, testing etc. as required 0.5 A to 4 A rating (Protection MCB)	Each	5	225	1125
		SF of selector switch for voltmeter (4 position) including making connection etc. as required .	Each	1	341	341
		SF of CT linked selector switch of 10 A for Ampere meter (4 position) including making connection etc. as required	Each	1	377	377
		SF of CT operated direct reading type Ampere meter on existing panel , making connection by PVC insulated copper conductor with PVC sleeves / channel etc. as required. Digital Type Above 500 A	Each	1	1,053	1053
		SF of (0-500) V range Volt meter on existing panel , making connection by PVC insulated copper conductor with PVC sleeves / channel etc. as required. Digital Type.	Each	1	1,053	1053
	49.20	SITC of fixed / Draw out type 4 pole Air Circuit Breaker conforming to IS 13947/IEC 60947 P-2 in existing LT panel suitable for LT installation 440 V, 50 Hz and having adjustable short-circuit, earth fault and over load MICRO-PROCESSOR release with LCD display, bargraph and separate LED indication for each type of fault, at least 4NO & 4NC auxiliary contacts safety shutter and fault position acknowledgement mechanism type, ACB shall have separate indication for service, test, isolation, maintenance position including making connections etc. as required.				
	49.2.2	Draw out type (Manual spring charged)				
	49.2.2.1	1600 A Rating ,50 / 65kA	Each	3	193,716	581148
		2000 A Rating ,65 kA	Each	2	239,808	479616
		3200 A Rating ,65 kA	Each	1	335,483	335483
	6	Supervision and Bay Charges to RVPNL/JVVNL	Lump Sum	1	5000000	50 00 000.00
		Grand Total				3 08 61 505.75