



**GOVERNMENT OF ASSAM
PUBLIC WORKS DEPARTMENT
(BUILDING)**

NOTICE INVITING TENDER

NIT No.: CEB/CS/TB-IV(B)/10/2026/03 Dated 26.05.2026

Name of Work: Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.

Estimated cost put to tender	Rs. 30,24,36,569.00 /-
Bid Security	2% i.e. Rs.60,48,731.00/- for General Category OR 1% i.e. Rs.30,24,366.00/- for Reserved Category. (To be deposited through net banking or RTGS/NEFT as per office memorandum no. FEB.269/2017/27 Dtd. 21/08/2019).
Cost of Bid Document	Rs. 30,000.00 (To be deposited through net banking or RTGS/NEFT as per office memorandum no. FEB.269/2017/27 Dtd. 21/08/2019)
Performance Guarantee	5% of tendered amount
Value of Security Deposit	5% of tendered amount
Period of Completion	18 months (3 months for Planning, design and obtaining Approval+ 15 months for execution and completion of work)

**OFFICE OF THE CHIEF ENGINEER, P.W.D. (BUILDING),
ASSAM, CHANDMARI, GUWAHATI-3.**

INDEX**NIT No.: CEB/CS/TB-IV (B)/10/2026/03 Dated 26.05.2026****Name of the Work: Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.**

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Chief Engineer, PWD (Building), Assam
Chandmari, Guwahati-3.

GOVERNMENT OF ASSAM,
FINANCE (ESTABLISHMENT – B) DEPARTMENT,
2ND FLOOR, BLOCK 'F', JANATA BHAWAN,
DISPUR, GUWAHATI-6

ORDERS BY THE GOVERNOR
NOTIFICATION

Dated Dispur the 30-07-2024

No. 530624/1: In order to enhance efficiency and economy in public procurement, the following provisions are hereby made for additional performance security in the case of bids quoting abnormally low price, in exercise of power as per Rule 30 (5) of the Assam Public Procurement Rules, 2020:

1. The Tender Inviting Authority (TIA) will indicate in the bidding documents that quality is dependent on the cost. This has to be supported by clear certification (format at Annexure X) from the Head of the Department (HoD) or Tender Accepting Authority or Officer having relevant Technical Sanction Power that any bid below estimated value put to tender shall have adverse impact on quality of the work. In such cases, the estimated value put to tender shall be mandatorily indicated in the bidding document. In such cases,

1.1. If the Bid of the successful Bidder is at a discount of more than the threshold value i.e. 10% below the estimated value put to tender, then the TIA shall seek written clarifications / justification from the bidder for quoting such price, including detailed price analysis of its bid price in relation to scope, schedule, allocation of risks and responsibilities, and any other requirement of the bid document.

1.2. If the TIA is satisfied that the bidder has substantially demonstrated its capability to deliver the contract at the offered price, the TIA shall accept the bid.

1.3. If after evaluating the justification and price analysis, TIA is not satisfied with the clarifications / justifications offered by the bidder for quoting price lower than the threshold value, the TIA shall seek additional performance security to protect against default.

1.4. The amount of additional performance security will be calculated as per the following matrix:

Sl. No.	Bid quoting financials below estimated value put to tender	Additional Performance Security (PS) to be deposited by successful bidder, over and above normal PS
i.	Between 10.01% to 15%	200% of the difference between threshold value and Bid Amount
ii.	Between 15.01% to 20%	250% of the difference between threshold value and Bid Amount
iii.	20.01% and above	300% of the difference between threshold value and Bid Amount

1.5. This additional performance security in para 1.4 above, shall be treated as part of the Performance Security.

2. In case the Tender Inviting Authority does not give any certificate, linking estimated value put to tender with that of quality of work or certificate is issued by the Authority other than that of Head of the Department (HoD) or Tender Accepting Authority or Officer having relevant Technical Sanction power, provisions of Para 1 above shall not be applicable and principle of L1 for determining Bid shall be adhered to.

3. These instructions will be applicable for procurement of works only.

4. This notification supersedes all other notifications / office orders issued by any Administrative Department with regard to treatment of Bids quoting abnormally low price.

This notification shall come into force with immediate effect.

Signed by

Jayant Narlikar

Date: 30-07-2024
Commissioner & Secretary to the Govt. of
Assam,
Finance Department.

No. 530624/1 – A

Dated Disput the 30-07-2024

Copy for information and necessary action to:-

1. The Principal Secretary to the Hon'ble Chief Minister, Assam.
2. The Accountant General (A & E), Assam, Maidamgaon, Beltola, Guwahati-29.
3. The SO to Chief Secretary for kind information of Chief Secretary, Assam.
4. PS to Hon'ble Ministers (PWD, Finance, PHED, Irrigation, Water Resource and Soil Conservation) Assam for kind information of Hon'ble Ministers
5. PS to all Addl. Chief Secretary/Principal Secretary/Commissioner & Secretary to the Govt. of Assam for kind information of Addl. Chief Secretary/Principal Secretary/ Commissioner & Secretary.
6. Addl. Project Director, AS-CFMS to include suitable provisions to reflect the above changes in the Standard Bidding Documents (SBDs).
7. All Heads of Department.
8. All District Commissioners.
9. All Sr. F.A/F.A.F.A.O./T.O.
10. The Publisher, Assam Govt. Press, Bamunimaidam, Guwahati-21 for publication of the Notification in the Assam Gazette.
11. Content Manager, Finance, (Establishment – B) Department for necessary uploading.

(eSigned)
Commissioner & Secretary to the Govt. of
Assam,
Finance Department.

FD-21030(11)/2/2025-ASPIRe-Finance Department

**GOVERNMENT OF ASSAM
FINANCE DEPARTMENT
F-BLOCK, JANATA BHAWAN,
DISPUR, GUWAHATI-06**

No.604045/1/2025

Dated:13-01-2025

OFFICE ORDER

Sub: Mandatory purchase of items attracting Value Added Tax(VAT), particularly Diesel and Petrol, from the jurisdiction of Assam for works contracts

Whereas it has been observed that certain contractors/vendors, after successfully availing work contracts under various departments of Government of Assam (GoA), are procuring items, attracting VAT, from outside Assam. This results in loss of revenue to the state exchequer. In view of protecting the interests of the State, it is hereby directed that:

1. All contractors and vendors engaged in works contracts with Procuring entity, partially or fully funded from Government of Assam, must mandatorily purchase items attracting VAT, particularly diesel and petrol, exclusively within the jurisdiction of Assam.
2. For all ongoing tenders and future contracts, the following clause shall be included: "*The contractor/vendor shall mandatorily purchase all items attracting VAT, particularly diesel and petrol, required for the execution of the contract exclusively from the jurisdiction of Assam.*"
3. For all ongoing contracts, the above clause must be incorporated through suitable amendment. Administrative Departments are directed to formally notify contractors and vendors of this requirement and ensure compliance with the directive, latest by 25th January, 2025.
4. All administrative departments and subordinate offices must monitor adherence to this directive and report any violation to the Finance Department, Government of Assam, for appropriate action.

This Office Order shall come into force with immediate effect.

Signed by
Ishtiaq Syed Rahman
Secretary to the Government of Assam,
Date: 13/01/2025 13:14:04
Finance Department

Memo No. 604045/1-A

Dated: 13-01-2025

Copy for information and necessary action to:

1. All Administrative Departments/Heads of Departments, Assam, to circulate this Office order to their subordinate offices / procuring entities and ensure

strict compliance.

2. All Addl. Chief Secretaries/ Principal Secretaries/ Commissioner & Secretaries/ Secretaries to the Govt. of Assam, Dispur for information.
3. The PPS to Hon'ble Chief Minister, Assam, Dispur, for kind appraisal of Hon'ble Chief Minister.
4. The PS to Hon'ble Finance Minister, Assam, Dispur, for kind appraisal of Hon'ble Finance Minister.
5. All Project Directors, Heads of PMUs related to EAPs to ensure strict compliance.
6. All District Commissioners, to ensure strict compliance of these directions and ensure its implementation.
7. The SPPP Manager for uploading.

E Signed

Secretary to the Government of Assam,
Finance Department

GOVERNMENT OF ASSAM | অসম চৰকাৰ
OFFICE OF THE CHIEF ENGINEER | মুখ্য অভিযন্তাৰ কাৰ্যালয় ::
PWD BUILDING | লোক নিৰ্মাণ (গৃহ) বিভাগ ::
ASSAM :: GUWAHATI-03 | অসম :: গুৱাহাটী-৩

No. CEB/CS/TB-IV(B)/10/2026/03

Dated 26.05.2026

PRESS NOTICE**নিবিদা আহ্বান কৰা জাননী**

The Chief Engineer, PWD (Building), Assam, Chandmari, Guwahati-03 on behalf of the Governor of Assam, invites fresh bid through Engineering, Procurement and Construction (EPC) Mode- I of contract for the work detailed in the table below, from eligible Firm/Contractor of repute having experience in similar nature of work. Details of bid may be seen at e -procurement portal i.e. www.assamtenders.gov.in

The bidders must be enrolled with e-tendering web portal www.assamtenders.gov.in

মুখ্য অভিযন্তা, লোক নিৰ্মাণ (গৃহ) বিভাগ, অসম, চান্দমাৰি, গুৱাহাটী-০৩ এ অসমৰ ৰাজ্যপালৰ হৈ, তলত উল্লেখ কৰা কামৰ বাবে একে ধৰণৰ কামৰ প্ৰয়োজনীয় অভিজ্ঞতা থকা যোগ্য ঠিকাদাৰ/প্ৰতিষ্ঠানৰ পৰা অভিযান্ত্ৰিক, ক্ৰয় আৰু নিৰ্মাণ (EPC) পদ্ধতি নং - ১ চুক্তিৰ জৰিয়তে নতুন নিবিদা আমন্ত্ৰণ জনাইছে। নিবিদাৰ বিৱৰণ ই-প্ৰকিউৰমেণ্ট পৰ্টেলত চাব পাৰিব অৰ্থাৎ www.assamtenders.gov.in ত।

নিবিদাকাৰী সকল ই-টেণ্ডাৰিং ৱেব পৰ্টেল www.assamtenders.gov.inত পঞ্জীভুক্ত হ'ব লাগিব।

Sl. No ক্র. নং	Name of work কামৰ নাম	Approx. Value of work (in Rs) কামৰ আনুমানিক মূল্য (টকাত)	Bid Security নিবিদা পত্ৰ সুৰক্ষা	Bid Processing Fee নিবিদা প্ৰক্ৰিয়াকৰণ মূল্য (টকাত)	Completion period সম্পূৰ্ণ কৰাৰ সময়সীমা
1. ১.	Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-I শ্ৰীমন্ত শংকৰদেৱ কলাক্ষেত্ৰ, গুৱাহাটী, অসমত ভূপেন হাজৰিকা সংগ্ৰহালয় নিৰ্মাণ। (অভিযান্ত্ৰিক, ক্ৰয় আৰু নিৰ্মাণ (ইপিচি) পদ্ধতি নং - ১ ৰ ভিত্তিত)	Rs. 30,24,36,569.00 ৩০,২৪,৩৬,৫৬৯.০০ টকা	2 % of Bid value for General category, and 1% of Bid value for Reserved category সাধাৰণ শ্ৰেণীৰ বাবে নিবিদা মূল্যৰ ২ %, আৰু সংৰক্ষিত শ্ৰেণীৰ বাবে নিবিদা মূল্যৰ ১%	Rs. 30,000.00 ৩০০০০.০০ টকা	18 (Eighteen) Months ১৮ (ওঠৰ) মাহ

Note টোকা:

- The value of work may change during uploading of DNIT for which no claim will be entertained.
ডিএনআইটি আপলোড কৰাৰ সময়ত কামৰ মূল্য সলনি হ'ব পাৰে যাৰ বাবে কোনো দাবী গ্ৰহণ কৰা নহ'ব।

2. The Press Notice will form a part of the Bidding Document. নিবিদা আহান কৰা জাননীখন নিবিদা নথিপত্ৰৰ এটা অংশ হিচাপে গঠন হ'ব।

Sd/-

Chief Engineer, P.W.D. (Bldg),
Assam, Chandmari, Guwahati-3
মুখ্য অভিযন্তা, লোক নিৰ্মাণ (গৃহ) বিভাগ,
অসম, চান্দমাৰি, গুৱাহাটী-৩।
Dated 26.05.2026

Memo No: CEB/CS/TB-IV(B)/10/2026/03-A

Copy to:-

1. The Spl. Commissioner & Spl. Secretary to the Govt. of Assam, P.W (Building & NH) Department, Dispur, Guwahati-6 for favour of kind information.
2. The Director, NEC, Ministry of DoNER, Jodhpur Officers Hostel, India Gate Circle, Pandora Park, New Delhi-110003 for favour of kind information.
3. The Joint Secretary, (NEC) Ministry of DoNER, Government of India, VigyanBhavan Annexe, Maulana Azad Road, New Delhi-110011 for favour of kind information.
4. The Secretary, NEC Secretariat, Shillong for favour of kind information.
5. The Director (Planning), NEC Secretariat, Shillong for favour of kind information.
6. The Secretary, Transformation and Development Department, Dispur, Guwahati-06 for favour of kind information.
7. The Director of Information and Public Relation, Govt. of Assam, Dispur, Guwahati- 6 with a request to publish the Notice in one issue of a widely circulated National daily Newspaper in English published in the edition of Delhi and also to publish in two local daily news papers, one in English and one in Assamese on or before 29.05.2026 and to furnish the circulated copies of the Newspapers (one copy of the each issue) to the office of the undersigned for further needful action.
8. The Director, Printing & Stationary, Assam, Bamunimaidam, Guwahati-21, for information with a request to publish the notice in Assam Gazette.
9. The Superintending Engineer, P.W.D, Guwahati Building Circle-II, Chandmari, Guwahati-03 for information and wide circulation.
10. The Executive Engineer, P.W.D., Dispur and Dimoria Territorial Building Division, Dispur, Guwahati-06 for information and wide circulation.
11. Notice Board/tender file.
12. Concerned file.

Sd/-

Chief Engineer, P.W.D. (Bldg),
Assam, Chandmari, Guwahati-3
মুখ্য অভিযন্তা, লোক নিৰ্মাণ (গৃহ) বিভাগ,
অসম, চান্দমাৰি, গুৱাহাটী-৩।



GOVERNMENT OF ASSAM
OFFICE OF THE CHIEF ENGINEER, PWD (BUILDING), ASSAM
CHANDMARI, GUWAHATI-03

Email: ceb.apwd@gmail.com

No: CEB/CS/TB-IV(B)/10/2026/06

Dated 08.06.2026

Detailed Notice Inviting Tender (DNIT)

The Chief Engineer, P.W.D. (Building), Assam, Chandmari, Guwahati-3 on behalf of the Governor of Assam invites fresh bids from APWD registered / eligible contractors having experience in similar nature of works.

Details of the bid may be seen at e-procurement portal website i.e. www.assamtenders.gov.in. The bidders must be enrolled in www.assamtenders.gov.in.

Sl. No	Name of Work	Approx. Value of Work (in Rs.)	Completion period (In Months)	Bid Security/EMD	Cost of Bid document (In Rs.)	Defect Liability (In Months)
1	Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.	Rs. 30,24,36,569.00	18 (Eighteen) Months	2 % of Bid value for General category, and 1% of Bid value for Reserved category	Rs. 30,000.00	12 months

The bidders may submit bids for the work as below:-

- The Contractors / Bidders must be registered with the E-tendering system provider for participating in the bidding process. The Bidding document may be downloaded through the P.W.D portal assamtenders.gov.in by using their own user ID.
- Online submission of Technical & Financial Bid is mandatory. Manual submission (without online submission) of bid will be considered as non-responsive. Bidders are to submit the required papers by scanning and uploading the same as per sequence of 'Bid submission' in the activity schedule mentioned below at Sl-3.
- The bidder shall submit the cost of the bid document Bid security / EMD by online method through net banking or RTGS/NEFT as per office memorandum No.FEB.269/2017/27 Dtd.21st August,2019
- The activity schedule for tendering process of the above mentioned packages shall be as per the schedule shown below.

Activity Schedule

Stage No	APWD Stage	Start		End	
		Date	Time	Date	Time
1	Publishing Date	08.06.2026	3:00 PM.	-	-
2	Download of Tender	08.06.2026	3:00 PM.	29.06.2026	2:00 PM.
3	Pre-Bid Meeting Date	15.06.2026	11:00 AM	15.06.2026	2:00 PM

4	Online Bid Submission	15.06.2026	3:00 PM.	29.06.2026	2:00 PM.
5	Technical Bid Opening	29.06.2026	3:00 PM.	-	-
6	Financial Bid Opening	TO BE NOTIFIED LATER			

5. The venue of the Pre bid Meeting will be O/o the Chief Engineer, PWD (Building), Assam, Chandmari, Guwahati-03
6. In the event of any holiday in the sequence of the Activity Schedule, the activities will take place on the next working day.
7. Original Copy of the following documents **along with the hard copy of already uploaded technical bid must be submitted**, within scheduled date and time of online bid submission, at the office chamber of the undersigned.
 - (a) Original Power of Attorney for signing the BID.
 - (b) Scan copy of online payment receipt of Cost of bid & BID Securities.
 - (c) Original copy of Solvency certificate / Net-worth.
8. For any discrepancy between the online bid and the hard copy of the bid, the online bid will govern and will be considered for evaluation.
9. Bidders are advised to scan their Technical Papers at 100dpi (In Black & White mode) in pdf format for multiple pages with maximum file size of 5MB. If numbers of pages exceed, the bidders are advised to create multiple files and upload the same in e-procurement portal assamtenders.gov.in. Document uploaded in any portal other than assamtenders.gov.in will not be accepted. For any assistance for Online Bidding, Bidders may write to assamtenders.gov.in.
10. Successful bidder has to get registered with Assam PWD (Building) after issue of **LOA** for the work.
11. The Detail Notice Inviting bid will be a part of the bidding Documents.

**Chief Engineer PWD (Building),
Assam, Chandmari, Guwahati-3.**

Memo No: CEB/CS/TB-IV(B)/10/2026/06

Dated 08.06.2026

Copy to: -

1. IT cell of this office.

**Chief Engineer PWD (Building),
Assam, Chandmari, Guwahati-3.**

NOTICE INVITING e-tender.

The Chief Engineer on behalf of P.W.D. (Building), Assam, on behalf of the Governor of Assam invites online EPC Mode-1 e-tenders in two bid system (Eligibility and Financial) on **Engineering, Procurement and Construction (EPC) Mode-1** basis from eligible firms/contractors of repute for the following work:

NIT No.	CEB/CS/TB-IV(B)/10/2026/03 Dated 26.05.2026
Name of the Work	Construction Of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.
Estimated cost put to tender	Rs. 30,24,36,569.00/-
Bid Security	2% i.e. Rs.60,48,731.00/- for General Category OR 1% i.e. Rs.30,24,366.00/- for Reserved Category. (To be deposited through net banking or RTGS/NEFT as per office memorandum no. FEB.269/2017/27 Dtd. 21/08/2019).
Cost of Bid Document	Rs.30,000.00 (To be deposited through net banking or RTGS/NEFT as per office memorandum no. FEB.269/2017/27 Dtd. 21/08/2019)
Period of completion	18 months (3 months for Planning, design and obtaining Approval+ 15 months for execution and completion of work)
Pre-bid Meeting	Pre Bid Meeting (Pre-bid Clarification) will be held as per the following time and venue. Start Time at 11.00 hrs Closing Time at 14.00 hrs of 15.06.2026 Venue: - O/o the Chief Engineer, PWD (Building) Assam, Chandmari, Guwahati-3.
Last time & date of online submission of bid, Cost of Bid Document, Bid Security, and other documents as specified in the press notice.	Up to 14:00 Hrs. on 29.06.2026
Period during which hard copies of documents shall be physically submitted	Upto 14:00 Hrs on 29.06.2026
Time & date of online opening of documents.(Mandatory documents) Technical bid	15:00 Hrs. on 29.06.2026

The bid forms and other details can be seen & downloaded from the website P.W.D portal <https://assamtenders.gov.in>.

**Chief Engineer, PWD (Building), Assam
Chandmari, Guwahati-3**

PART-A

SECTION-I

GENERAL INFORMATION

CHECK LIST FOR CONTRACTORS FOR SUBMISSION OF BIDS

1. The tenderers should read all the instructions, terms & Conditions, contract clauses, nomenclature of items, specifications etc. contained in the tender documents very carefully, before quoting the rates. The tenderer should also read the GCC-2020 Pwd (Bldg&NH) with correction slips up to the date of submission of bids which will be part of the agreement.
2. The agency shall quote the rate for complete scope of work in both words and figures in the financial bid.
3. The contractor shall quote his rates keeping in mind the NIT, Scope of Work, DBR, Technical Specifications, Payment Schedule, Terms & Conditions, Additional Conditions and Special Conditions etc. and nothing shall be payable extra whatsoever unless otherwise specified.
4. The contractor shall also furnish a Performance Guarantee of 5% of the tendered amount in addition to the other deposits mentioned elsewhere in the contract for proper performance of the agreement. The Performance Guarantee shall be in the shape of FDR or Bank guarantee as per Performa given in Annexure enclosed. (IFSC Code for Bank Guarantee: SBIN0003030)
5. 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 should be produced with the tender, and it must be disclosed that the firm is duly registered under the Indian partnership act, 1952.
6. The bidder shall quote their rates considering all prevalent taxes/ cess like GST, Workers Cess or any other tax on material /work as applicable and nothing extra shall be paid to the contractor on this account. The department shall deduct Workers Cess, Royalty or any other tax as applicable, from the R/A bills & final bill. However, the contractor shall pay GST to the concerned authorities directly. TDS as applicable shall be deducted from all bills of contractor.
7. The tender which is not duly signed by an authorized signatory or is conditional shall be treated as non-responsive and shall be summarily rejected.
8. Online bid documents submitted by intending bidders shall be opened, only of those bidders, whose Bid Security, Cost of Bid Document and e-tender Processing Fee” and “other documents including eligibility documents as required as per this NIT” are found in order.

INFORMATION AND INSTRUCTIONS FOR CONTRACTORS FOR e-Bidding

- The Chief Engineer on behalf of P.W.D. (Building), Assam, on behalf of the Governor of Assam invites online **EPC Mode-1** e-tenders in two bid system (Eligibility and Financial) on **Engineering, Procurement and Construction (EPC) Mode-1** basis from eligible firms/contractors of repute for the following work:-

NIT No.	CEB/CS/TB-IV(B)/10/2026/03 Dated 26.05.2026
Name of Work	Construction Of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.
Location	Panjabari, Guwahati, Assam
Estimated Cost put to Tender	Rs. 30,24,36,569.00/-
Bid Security	2% i.e. Rs. 60,48,731.00/- for General Category OR 1% i.e. Rs. 30,24,366.00/- for Reserved Category. (To be deposited through net banking or RTGS/NEFT as per office memorandum no. FEB.269/2017/27 Dtd. 21/08/2019)
Cost of Bid Document	Rs.30,000.00 (To be deposited through net banking or RTGS/NEFT as per office memorandum no. FEB.269/2017/27 Dtd. 21/08/2019)
Period of Completion	18 months (3 months for Planning, design and obtaining Approval+ 15 months for execution and completion of work)
Pre-Bid Conference	Pre Bid Meeting (Pre-bid Clarification) will be held as per the following time and venue. Start Time at 11.00 hrs Closing Time at 14.00 hrs of 15.06.2026 Venue: - O/o the Chief Engineer, PWD (Building) Assam, Chandmari, Guwahati-3.
Last date & time of online submission of technical and financial bids	Upto 14:00 Hrs on 29.06.2026
Time and date of opening of Technical Bid	15:00 Hrs on 29.06.2026
Period during which hard copies of documents shall be physically submitted	Upto 14:00 Hrs on 29.06.2026
Opening of financial bids of technically qualified bidders	Shall be intimated through electronically after approval of Technical bids by the competent authority.

- Contractors who fulfill the following requirements shall be eligible to apply. **Joint ventures/Consortium and special purpose vehicles are not accepted.**

A. Work Experience:

The bidder should have satisfactorily completed the works under Central Govt. / State Govt. organization/ Central Public Sector Undertaking within the country as mentioned below during the last 7 years ending previous day of last date of submission of tenders.

For this purpose, cost of work shall mean gross value of the completed work including cost of material supplied by the Government/client but excluding those supplied free of cost:

- i) Experience of having successfully completed similar works during the last 7 years ending previous day of last date of submission of tenders:
 - a. Three similar works each costing not less than **Rs. 12,09,74,628.00/-(40%)** of the estimated cost of the project
 - OR**
 - b. Two similar works each costing not less than **Rs. 18,14,61,941.00/- (60%)** of the estimated cost of the project
 - OR**
 - c. One similar work costing not less than **Rs. 24,19,49,255.00/- (80%)** of the estimated cost of the project.

Similar Work means shall mean “Construction of minimum G+1 building Project including finishing works, water supply, drainage & sanitary installations, electrical works, Firefighting etc. under Central Govt. / State Govt. organization/ Central Public Sector Undertaking within the country executed under one agreement.”

Please note, contractor has to submit completion certificate of the eligible projects issued by not less than executive engineer.

The value of executed works shall be brought to current costing level by enhancing the actual value of work done at simple rate of 7% per annum; calculated from the date of completion to the last date of submission of bids.

Qualified similar works may be physically inspected by PWD Engineers to ascertain the completion, performance and quality of works for finalizing technical bids.

B. The bidder shall satisfy the following financial eligibility criteria.

- (i) The bidder should have had average annual financial turnover (gross) of **Rs. 9,07,30,971/- (30% of Estimate Cost put to Tender)** on construction works during the last three Consecutive years ending **31st March’2025**, balance sheets should be duly audited by **Chartered Accountant**. Year in which no turnover is shown would also be considered for working out the average (**Scanned copy of Audited Balance Sheet to be uploaded for last five financial years 2020-21, 2021-22, 2022-23, 2023-24 and 2024-25**).

The multiplication factor of 7% per annum simple interest is not applicable on the Annual Financial Turnover figure.

- (ii) Should not have incurred any loss (**profit after tax should be positive**) in more than two years during available last five consecutive balance sheets, duly certified and audited by the Chartered Accountant for years ending 31st March’2025. (The balance sheet in case of Pvt./public ltd. Company means its standalone finance statement and consolidated financial statement both).
- (iii) Should have a solvency of minimum **Rs. 12,09,74,628.00/- (40% of Estimate cost put to tender)** (Scanned copy of original solvency certificate issued by scheduled Bank, not older than six months from the last date of submission of bids, to be uploaded) (in the format prescribed in form B).

Or

The bidder should submit Net-worth certificate of minimum **Rs. 3,02,43,657.00 /- (10% of Estimate cost put to tender)** issued by a certified Chartered Accountant

- (iv) The bidding capacity of contractor should be equal to or more than **Rs. 30,24,36,569.00/-**. The bidding capacity shall be worked out by the following formula:

The bidding capacity of the contractor should be equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[AxNx2]-B} Where,

A = Maximum turnover in construction works executed in any one year during the last five years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids has been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

The contractor needs to submit the supporting documents for calculation of A & B as above. Calculation of B information is to be supplied in the following tabular format:

Sl.No	Name of work / Project and location	Owner/ Department	Cost of work (in Cr.)	Date of start as per agreement	Date of completion as per agreement	Work done (in crore upto 31.03.2026)	Balance work (in crore) (4-7)
1	2	3	4	5	6	7	8

3. The intending bidder must read the terms and conditions carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
4. Information and instructions for bidders posted on website shall form part of bid document.
5. The bid document consisting of NIT, DBR, Drawings & Plans, Technical Specifications, Payment Schedule, Finishing Schedule and the set of Terms & Conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website <https://assamtenders.gov.in> free of cost.
6. But the bid can only be submitted after uploading and submission of Bid Security within the period of bid submission and uploading the mandatory scanned documents.
7. Those Bidders not registered on the website mentioned above, are required to get registered themselves beforehand. If needed they can be imparted training on online bidding process as per details available on the website.
8. The intending bidder must have valid class-III digital signature to submit the bid.
9. On opening date, the Bidder can login and see the bid opening process. After opening of bids, he will receive the competitor bid sheets.
10. Bidder can upload documents in the form of JPG format or PDF format.
11. Certificate of Financial Turnover: At the time of submission of bid, bidder may upload affidavit/certificate from CA mentioning Financial Turn Over of last 3 years or for the period as specified in the bid document duly certified by the chartered accountant. There is no need to upload entire voluminous balance sheet.
12. The eligibility (Technical) bid shall be opened first on due date and time as mentioned

above. The time and date of opening of financial bid of bidders qualifying the eligibility (Technical) bid shall be communicated to them at a later date physically/electronically.

13. If a tenderer quotes nil rates against each item in EPC tender in any section / sub head, the tender shall be treated as invalid and will not be considered as lowest tenderer.
14. Pre Bid Meeting (Pre-bid Clarification) will be held as per the following time and venue. Start Time at **11.00 hrs Closing Time at 14.00 hrs of 15.06.2026**. Venue: - O/o the Chief Engineer, PWD (Building) Assam, Chandmari, Guwahati-3. Post pre-bid conference, certain modifications may be issued to all eligible bidders by the Engineer-in-Charge by e-mail, if felt necessary by him. If further pre-bid conferences are required for complete and effective interactions, the date and time of same will be communicated at the end of 1st pre-bid meeting or later. All modifications/addendums/corrigendum issued regarding this bidding process, shall be uploaded on website only and shall not be published in any Newspaper.
15. The department reserves the right to reject any prospective application without assigning any reason thereof and to restrict the list of qualified bidders to any number deemed suitable by it, if too many bids are received satisfying the minimum laid down criteria.
16. After submission of the bid the agency can re-submit revised bid any number of times but before last time and date of submission of bid as notified.
17. While submitting the revised bid, agency can revise the rate of one or more item(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of bid as notified.
18. If any information furnished by the applicant is found incorrect at a later stage, he shall be liable to be debarred from tendering/taking up of works in PWD. The department reserves the right to verify the particulars furnished by the applicant independently
19. The bid submitted shall become invalid and e-bidding processing fee shall not be refunded if:
 - (i) The bidder is found ineligible.
 - (ii) The bidder does not submit the Bid Security.
 - (iii) The bidder does not upload all the documents (including GST registration) as stipulated in the bid document.
 - (iv) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the bidder in the office of bid opening authority.
20. List of Documents to be filled in by the bidders, scanned and uploaded within the period of bid submission.
 - i. Letter of transmittal.
 - ii. Cost of Bid Document
 - iii. List of eligible similar nature of works completed during the last Seven years ending last date of the month previous to the one in which tenders are invited in Form-C. (~~If private works are shown in support of eligibility, certified copy of the tax deducted at source certificate (TDS) shall be submitted along with the experience certificate and the TDS amount shall tally with the actual amount of work done).~~
 - iv. Certificate of Financial Turnover from CA in Form -A.
 - v. Solvency Certificate from a scheduled bank in Form-B / Net-worth Certificate.
 - vi. Certificate of Registration for GST acknowledgement.

If the bidder has not obtained GST registration in the State in which the work is to be taken up, then in such case the bidder shall upload following undertaking with the bid document “If work is awarded to me, I/We shall obtain GST registration certificate within one month from date of receipt of award letter or before payment of 1st RA Bill.

- vii Performance report of works (mentioned in Form-C) in Form-D.
- viii Structure and Organization of the bidder in Form-E.
- ix Bid Security in Form-G.
- x Permanent Account Number (PAN) as issued by the Income tax department.
- x. Signed copy of Integrity Agreement
- xi Declaration about site inspection in Form-H
- xii. Undertaking regarding similar work has not been got executed on back to back basis in Form-I
- xiii Performa of affidavit for non-blacklisting in Form-J.

**Chief Engineer, PWD (Building), Assam
Chandmari, Guwahati-3**

Guidelines/Procedure to be followed in introduction of e'-procurement Solution

1. **Payment of cost of Tender documents:** The collection of cost of Tender documents is dispensed away with, as there is no physical supply of tender documents and to have absolute anonymity of the bidders participating in e- procurement solution. The bidders can view / download the tender documents, from the <https://assamtenders.gov.in>
2. **Submission of Bids:** The bidders who are desirous of participating in 'e' procurement shall submit their price bids in the standard formats prescribed in the Tender documents, displayed at <https://assamtenders.gov.in>. The bidder should upload the scanned copies of all the relevant certificates, documents etc., on the <https://assamtenders.gov.in> in support of their price bids. The bidder shall sign on all the statements, documents, certificates, uploaded by him, owning responsibility for their correctness / authenticity.
3. The bidder has to submit Cost of Bid Document and Bid Security. This Bid Security shall also be uploaded on the e- tendering website by the intending bidder up to the specified bid submission date and time.
4. **Processing of Tenders:** The concerned officer/officers will evaluate and process the tenders as done in the conventional tenders and will communicate the decision to the bidder online.
5. **Price Bid opening:-**The Price bid will be opened online by the concerned officer/Officers at the specified date and time and the result will be displayed on the website <https://assamtenders.gov.in> which can be seen by all the bidders who participated in the tender.
6. **Payment of performance Guarantee:** The bidder shall submit an irrevocable performance guarantee of 5% (Five percent) of the tendered amount in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract. This guarantee shall be in the form of DD / Banker Cheque / pay order / FDR / guarantee bonds of any scheduled bank in favour of **The Executive Engineer, Dispur and Dimoria Territorial Building Division, Dispur, Guwahati-06.**
7. **Participation of Bidders at the time of opening of bids:** Bidders have two options to participate in tendering process at the time of opening of Bids:
 - (i) Bidders can come at the place of opening of bids (electronically) as done in the conventional tender process.
 - (ii) Bidders can visualize processing online.
8. **Signing of agreement:** -After the award of the contract, an agreement will be signed as done in **Conventional Tenders.**

**Chief Engineer, PWD (Building), Assam
Chandmari, Guwahati-3**

e-BIDDING

1. The Chief Engineer on behalf of P.W.D. (Building), Assam, on behalf of the Governor of Assam invitesinvites online **EPC Mode-1 e-** tenders in two bid system (Eligibility and Financial) **on Engineering, Procurement and Construction (EPC) basis** from eligible firms/contractors of repute for the following work:
 - 1.1 Name of the Work: **Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.**
 - 1.2 The enlistment of the contractors should be valid on the last date of submission of bids. In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission of bids.
 - 1.3 The estimate cost put to tender is **Rs. 30,24,36,569.00/-**. This estimate, however, is given merely as a rough guide.
 - 1.4 **The time allowed for carrying out the work will be 18 months (3 months for Planning, design and obtaining Approval+ 15 months for execution and completion of work) from the date of start as defined in Schedule ‘F’ or from the first date of handing over of first part of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.**
2. Contractors who fulfill the following requirements shall be eligible to apply. **Joint ventures / Consortium and special purpose vehicles are not accepted.**

The bidder should have satisfactorily completed the works under Central Govt./ State Govt. organization/ Central Public Sector Undertaking within thecountryas mentioned below during the last 7 years ending previous day of last date of submission of tenders. For this purpose, cost of work shall mean gross value of the completed work including cost of material supplied by the Government/client but excluding those supplied free of cost:

i) Experience of having successfully completed similar works during the last 7 years ending previous day of last date of submission of tenders:

- a. Three similar works each costing not less than **Rs. 12,09,74,628.00/-(40%)** of the estimated cost of the project
- OR**
- b. Two similar works each costing not less than **Rs. 18,14,61,941.00/- (60%)** of the estimated cost of the project
- OR**
- c. One similar work costing not less than **Rs. 24,19,49,255.00/- (80%)** of the estimated cost of the project.

“SimilarWork” shall mean “Construction of minimum G+1 building Project including finishing works, water supply, drainage & sanitary installations, electrical works, Firefighting etc. under Central Govt. / State Govt. organization/ Central Public Sector Undertakingwithin the country executed under one agreement.”

Please note, contractor has to submit completion certificate of the eligible projects issued by not less than executive engineer.

Note:-

The value of executed works shall be brought to current costing level by enhancing the actual value of work done at simple rate of 7% per annum; calculated from the date of completion to the last date of submission of bids.

Qualified similar works may be physically inspected by PWD Engineers to ascertain the completion, performance and quality of works for finalizing technical bids.

a. The bidder shall satisfy the following financial eligibility criteria

- (i) The bidder should have had average annual financial turn over (gross) of **Rs. 9,07,30,971.00/- (30% of Estimate Cost put to Tender)** on construction works during the last three Consecutive years ending 31st March'2025, balance sheets should be duly audited by **Chartered Accountant**. Year in which no turnover is shown would also be considered for working out the average. **(Scanned copy of Audited Balance Sheet to be uploaded for last five financial year 2020-21, 2021-22, 2022-23, 2023-24 and 2024-25).**

The multiplication factor of 7% per annum simple interest is not applicable on the Annual Financial Turnover figure.

- (ii) Should not have incurred any loss (**profit after tax should be positive**) in more than two years during available last five consecutive balance sheets, duly certified and audited by the Chartered Accountant for years ending 31st March'2025. (The balance sheet in case of Pvt./public ltd. Company means its standalone finance statement and consolidated financial statement both)
- (iii) Should have a solvency of minimum **Rs. 12,09,74,628.00/- (40% of Estimate cost put to tender)** (Scanned copy of original solvency certificate issued by scheduled Bank, not older than six months from the last date of submission of bids, to be uploaded) (in the format prescribed in form B).

OR

The bidder should submit Net-worth certificate of minimum **Rs. 3,02,43,657.00/- (10%)** of Estimate cost put to tender) issued by a certified Chartered Accountant.

- (iv) The bidding capacity of contractor should be equal to or more than **Rs. 30,24,36,569.00/-** The bidding capacity shall be worked out by the following formula:

The bidding capacity of the contractor should be equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[AxNx2]-B} Where,

A = Maximum turnover in construction works executed in any one year during the last five years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids has been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

The contractor needs to submit the supporting documents for calculation of A & B as

above. Calculation of B information is to be supplied in the following tabular format:

Sl. No	Name of work / Project and location	Owner/ Department	Cost of work (in Cr.)	Date of start as per agreement	Date of completion as per agreement	Work done (in crore upto 31.03.2026)	Balance work (in crore) (4-7)
1	2	3	4	5	6	7	8

3. Joint ventures are not accepted. Intending bidders are eligible to submit the bid subject to fulfilment of eligibility criteria as stipulated in eligibility document part of this document.
4. The bid document consisting of plans, specifications, schedule of quantities of items to be executed and the set of terms & conditions of the contract to be complied with and other necessary documents except standard general conditions of contract form can be seen free of cost from website <https://assamtenders.gov.in>. The General Conditions of Contract (GCC-2020 Pwd (Bldg&NH) for EPC projects is available. This along with the upto date correction slips may be viewed & downloaded from website <https://assamtenders.gov.in> free of cost.
5. Agreement shall be drawn with the successful bidder on prescribed Form including Standard General Condition of Contract Form as amended up to the last date of submission of bid. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
6. After submission of the bid, the bidder can re-submit revised bid any number of times but before last time and date of submission of bid as notified.
7. While submitting the revised bid, bidder can revise the quoted rates of one or more items any number of times but before last time and date of submission of bid as notified.
8. The bidder has to submit Bid Security through net banking or RTGS/NEFT as per office memorandum no.FEB.269/2017/27 Dtd.21/08/2019. This receipt of online payment of Bid Security shall also be uploaded on the e-tendering website by the intending bidder up to the specified bid submission date and time
9. Agencies willing to participate in this bidding process should get themselves registered through their e- gateway by credit/debit card or internet banking or RTGS/NEFT facility. Only e-bids shall be accepted.
10. Copy of work experience and other documents as specified in the NIT shall be scanned and uploaded to the e-Bidding website within the period of bid submission. However, certified copy of all scanned and uploaded documents as specified in BID document shall have to be submitted physically by all the bidders within 7 days after opening of Technical (eligibility) bid in the office of bid opening authority.
11. Online bid documents submitted by intending bidders shall be opened only of those bidders, Bid Security and other documents scanned and uploaded are found in order.
12. GST, Workers' Cess or any other tax on material /work as applicable shall be paid by the agency himself. The agency shall quote his rates considering all such taxes.
13. The date of opening of Financial Bid shall be informed through email and office order by Chief Engineer, PWD (Building), Assam, Chandmari, Guwahati-3.
14. The bid submitted shall become invalid and e- bid processing fee shall not be refunded if:
 - (i) The bidder is found ineligible.

- (ii) The bidder does not submit the Bid Security.
 - (iii) The bidder does not upload all the documents (including GST registration) as stipulated in the bid document including the Bid Security.
 - (iv) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the bidder in the office of bid opening authority.
 - (vi) If a tenderer quotes nil rates against each item in percentage rate tender or does not quote any percentage above / below on the total amount of the tender or any section head in percentage rate tender, the tender shall be treated as invalid and will not consider as lowest tenderer.
- 15.** The bidder whose bid is finally accepted will be required to furnish a performance guarantee of **5% (Five Percent)** of the bid amount within the period specified in schedule F. This guarantee shall be in the form of cash (in case guarantee amount is less than Rs 10000) or Deposit at Call receipt of any scheduled bank / Banker's cheque of any scheduled bank / Demand Draft of any scheduled bank / Pay order of any Scheduled bank (in case guarantee amount is less than Rs 100000) or Government Securities or Fixed Deposit Receipts of a Scheduled bank or an irrevocable bank Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form. In case the Bidder fails to deposit the said performance guarantee within the period as indicated in schedule 'F' including the extended period if any, the Bid Security by the Bidder shall be forfeited automatically without any notice to the Bidder.
- 16.** The agency whose bid is accepted will also be required to furnish either copy of applicable licenses/registrations or proof of applying for obtaining labour licenses/registrations with GST, EPFO, ESIC, and BOCW Welfare Board including Provident Fund Code No. if applicable and also ensure the compliance of aforesaid provisions by the sub agency, if any, engaged by the contractor for the said work, Program chart (Time & Progress) within the period specified in Schedule-F.
- 17. The description of the work is as follow:**
- Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1 .**
- Intending bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra claims / payments consequent on any misunderstanding or otherwise shall be allowed. The bidders shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of bid implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and local conditions and other factors having a bearing on cost and on the execution of the work.
- 18.** The competent authority on behalf of the Governor of Assam does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without assigning any reason. Bids in which any of the prescribed conditions is not fulfilled or any condition including that of conditional rebate put forth

by the bidders shall be summarily rejected.

19. Canvassing, whether directly or indirectly, in connection with bids is strictly prohibited and the bids submitted by the bidders who resort to canvassing will be liable to rejection.
20. The competent authority on behalf of the Governor of Assam reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted.
21. The bidder shall not be permitted to bid for works in the PWD Assam responsible for award and execution of contracts, in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior 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 Public Works Department. Any breach of this condition by the bidder would render him liable to be removed from the approved list of contractors of this Department, in case of PWD registered Bidders and this breach by other Bidders i.e. non PWD registered shall be treated as concealing of information and appropriate action will be taken for blacklisting such contractors.
22. No Engineer of gazetted rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India/Assam is allowed to work as a Bidder for a period of one year after his retirement from Government service, without the prior permission of the Government of Assam in writing. This contract is liable to be cancelled if either the Bidder or any of his employees is found any time to be such a person who has not obtained the permission of the Government of Assam as aforesaid before submission of the bid or engagement in the Bidder's service.
23. The bid for the works shall remain open for acceptance for a period of **180** days from the date of opening of Technical bid (eligibility bid). Further
 - i) If any tenderer withdraws his tender or makes any modification in the terms and conditions of the tender which is not acceptable to the department within 7 days after last date of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said Bid Security absolutely irrespective of letter of acceptance for the work is issued or not.
 - ii) If any tenderer withdraws his tender or makes any modification in the terms and conditions of the tender which is not acceptable to the department after expiry of 7 days after last date of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 100% of the said Bid Security absolutely irrespective of letter of acceptance for the work is issued or not.
 - iii) In case of forfeiture of Bid Security as prescribed in para (i) and (ii) above, the bidder shall not be allowed to participate in the re-bidding process of the same work.
24. This notice inviting bid shall form a part of the contract document. The successful bidder/bidders, on acceptance of his bid by the Accepting Authority shall within **15 days** from the letter of acceptance, sign the agreement consisting of:
 - i) The Notice Inviting Bid, all the documents including special conditions, additional conditions, particular specifications, and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.

- ii) Standard Form- 7 (GCC 2020 PWD (Bldg& NH) for EPC Works modified up to last date of submission of Bid.

25. For EPC Tenders (As applicable in Present Bid)

- 25.1 The Engineer-in-Charge of the major competent will call bids for the composite work. The cost of bid document and Bid Security will be fixed with respect to the combined estimated cost put to tender for the composite bid.
- 25.2 After acceptance of the bid by competent authority, the Chief Engineer in charge of major component of the work shall issue letter of award on behalf of the Governor of Assam. After the work is awarded, the main contractor will have to enter into one agreement with Chief Engineer/Executive Engineer in charge of major component and has also to sign two or more copies of agreement depending upon number of EE's in charge of minor components. One such signed set of agreement shall be handed over to EE in- charge of minor component.
- 25.3 Entire work under the scope of composite tender including major and all minor components shall be executed under one agreement.
- 25.4 Security Deposit will be deducted separately for each component corresponding to the respective component of works.
- 25.5 The main firm should either himself meet the eligibility conditions for the respective E&M packages/ minor components or otherwise he will have to associate agencies meeting the eligibility requirements as mentioned below after award of the work & within the time prescribed in the NIT document. They will have to submit willingness certificate for each of the component of the Electrical & Mechanical work for Associate agencies by clearly indicating the applicable component of the work.

The firm should have successfully completed similar works during the last 7 years ending upto previous day of last date of submission of tender for each sub heads:

The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum, calculated from the date of completion to the last date of submission of bid:

Sl.No.	Components of Specialized Works	Estimated cost Rs. lakh	Eligibility
E & M Works:			
Sub- Works	Internal Electrical Installation & Fans, Street lighting, Bollard Lighting, Lighting, UPS & Signages	190.11 Lakhs	The main Contractor may execute the work if he is eligible and willing (or) must associate with appropriate Class of registered Composite category contractor in PWD having valid electrical license for execution of this sub head of work.
Sub- Works	Fire Fighting System & Fire Extinguishers including Fire Alarm System	99.24 Lakhs	i. Three Similar completed works each of value not less than 40% of Estimated Cost OR ii. Two Similar completed works each of value not less than 60% of Estimated Cost OR iii. One Similar completed work of value not less than 80% of Estimated Cost Similar work shall mean "SITC of

			Fire fighting system (including wet riser and sprinkler system, portable fire extinguishers)".
Sub- Works	Lifts	32.00 Lakhs	<p>i. Three Similar completed works each of value not less than 40% of the estimated cost.</p> <p>OR</p> <p>ii. Two Similar completed works each of value not less than 50% of the estimated cost.</p> <p>OR</p> <p>iii. One Similar completed work of value not less than 80% of the estimated cost.</p> <p>Similar work shall mean "SITC of Lifts</p>

Note: Other Specialised Work not mentioned above but reflecting in payment schedule, concerned weightage will be considered for the specialised work eligibility as above.

- 25.6 If the main contractor fails to associate agency/agencies for execution of specialized/minor components of work within prescribed time or furnishes incomplete details or furnishes details of negligible agencies even after the tenderer is given due opportunity, the entire scope of such component of works shall be withdrawn from the tender and the same shall be got executed by the Engineer-in-charge at the risk and cost of the main contractor.
- 25.7 In case the main contractor intends to change any of the above agency/ agencies during the operation of the contract, he shall obtain prior approval of respective Engineer-in- charge of the specialized/minor component of the agreement. The new agency/ agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in- charge of respective discipline is not satisfied with the performance of any agency, he can direct the contractor to change the agency executing such items of work and this shall be binding on the contractor.
- 25.8 The main contractor has to enter into agreement with contractor(s) associated by him for execution of specialized/minor component(s). Copy of such agreement shall be submitted to EE in-charge of each specialized/minor component as well as to EE in-charge of major component. In case of change of associate contractor, the main contractor has to enter into agreement with the new contractor associated by him.
- 25.9 Running payment for the major component shall be made by C.E/EE of major discipline to the main contractor. Running payment for specialized/minor components shall be made by the Engineer-in-charge of the discipline of specialized/minor component directly to the main contractor.
- In case main contractor fails to make the payment to the contractor associated by him within 15 days of receipt of each running account payment then on the written complaint of contractor associated for such specialized/minor component, EE in charge of specialized/minor component shall serve the show cause to main contractor and after considering the reply of the same he may make the payment directly to the contractor associated for specialized/minor component as per the terms & conditions of the agreement drawn between main contractor and associate contractor fixed by him, if reply of main contractor either not received or found

- unsatisfactory. Such payment made to the associate contractor shall be recovered by EE of major or specialized/minor component from the next RA/final bill due to main contractor as the case may be.
- 25.10 The composite work shall be treated as complete when all the components of the work are complete. The completion certificate of the composite work shall be recorded by Engineer-in-charge of major component after record of completion certificate of all other components.
- 25.11 Final bill of whole work shall be finalized and paid by the EE of major component. Engineer(s) in charge of minor component(s) will prepare and pass the final bill for their component of work and pass on the same to the EE of major component for including in the final bill for composite contract.
- 25.12 Separate MOU has to be signed with each of the specialized works with either OEMS or with specialized agencies who have the credentials of executing either one work of 80% value or two work of 60% value or three works of 40% value of the corresponding component of the specialized work in last Seven years. MOU should be submitted within one month of the award of work.
- 25.13 It will be obligatory on the part of the tenderer to sign the tender documents for all components before the first payment is released.

**Chief Engineer, PWD (Building), Assam
Chandmari, Guwahati-3**

SECTION-II
TECHNICAL BID
(CIVIL WORK)

BRIEF PARTICULARS OF THE WORK

Brief scope of work:

PWD (Building), Assam proposed to **Construction Of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1 .**

The details of the building and approximate plinth area and particulars are indicated in **table-A**. The minimum plinth area and particulars are also indicated. The work is to be executed on **Engineering Procurement and Construction Basis Mode-1**. The suggestive layout plan and conceptual architectural plans of buildings shall be provided by the department and are annexed with the NIT document. The execution will be done on the basis of drawings and schedule to be prepared by the consultant as appointed by the agency with due approval of the department. The bidder shall engage a consultant, who shall provide complete planning and design, architectural drawings, detailed working drawings, structural drawings & service drawings for all buildings and development works & services sub head in schedule and any other drawings required for completing the project. The drawings and schemes if variance to tender drawings than it shall be pre approved from PWD/PWD PMC appointed consultant and then vetting process should be undertaken else contractor after preparation of working drawings shall be submitting to PWD Authorities//PWD appointed PMC consultant after vetting from IIT Guwahati or any other premier institutions restricted to structure component only. The execution shall be done on the basis on the approved working architectural & structural drawings. CPWD Specifications, relevant IS codes, National Building Code 2016, Harmonised Guidelines & Standards for Universal Accessibility in India 2021 and other standard specifications shall be followed in general except otherwise mentioned in bid document. Samples of the materials of approved make or otherwise shall be got approved from the Engineer-in-charge before use in the work.

The Contractor shall obtain all Pre & all Post construction clearances/approvals from Statutory Authorities. The scope of work includes topographical Survey, soil Investigation, preparation of architectural drawings, detailed working drawings, structural design & drawings of buildings, required services i.e electrical installations including all electrical fittings/fixtures, water supply pumps, sub-mersible pump, de-watering pumps etc. HT and LT include emergency and backup supply, sub-station, DG set with AMF panel, HT Panel, LT panel, feeder pillars. Lightning protection and Earthing system, External Lighting, Fire fighting, fire detection, UPS and any other services required but not specifically indicated, Signages, liaisoning with statutory agencies like Fire Services, BSNL/MTNL, Central Electricity authority, Muncipal Authority, Water supply & sewerage authorities, EIA, CPCB, CGWB / State Water Board etc, forest officer, fire officer, Electrical Service provider for obtaining the pre-construction and post construction clearances. The statutory payments to these agencies will be paid by the EPC Contractor including the charges of HT Electrical Service connection from local supply agency to the HT energy meter in the premises of the building which will be initially paid by the contractor and reimbursed by the department to the contractor on producing the original proof of charges paid to the local concern statutory agency. Liasoning with the local supply agency shall be in the scope of the contractor for which nothing extra shall be paid to the contractor. Thereafter complete construction and commissioning of building(s) along with all mentioned services is in the scope of the work.

The specialised works shall be done by reputed agencies who has carried out similar type of work with high standards and having statutory registrations. Agency will submit the structural steel erection manual, formality and modality as per standard best practice.

The scope of work includes:

- Survey.
- Soil Investigation
- Preparation of Architectural drawings
- Structural Design & Preparation of Drawings
- Detailed working drawings for Architecture, Structure, Fire Fighting & FA-PA Syatem, MEP Services, External Development, Landscaping, Tree / Plantation etc.
- Planning & Design of all E&M equipment.
- UPS
- VRF / VRV AC System
- CCTV System
- Street Lighting With LED
- Emergency Light & Illuminated Signages
- Water Cooler
- Sewage & Drainage Pumps
- Tubewell
- External Site Development (Pathway & Landscape)
- External Sewerage System
- Water Supply System (Filtered Water Supply, Distribution Line Upto 100mm Dia + Peripheral Grid 150mm To 300 Mm Dia Pipes + Unfiltered Water Supply Distribution Lines)
- Horticulture operations i/c 30 cm earth filling, grassing, tree plantation/shrubs and potted plants etc.
- Museum Exhibits
- Façade Lighting Works
- External Façade Elevational Work
- Fire Fighting and Fire Alarm & Public Address System
- External Development (Road, External Sewerage, Filtered Water Supply, Distribution line, Peripheral grid, Unfiltered Water Supply distribution lines, Storm Water Drains, Rainwater Harvesting (R.W.H), Trenches for Services, Horticulture & Landscape, Levelling, Internal Road Paths, Under Ground RCC Water & Firefighting Tanks, RCC Tanks for STP, ETP & WTP, Campus Signages, Boundary Wall, Gate & Guard Room, Earth Filling in Campus etc.)
- Liaisoning with statutory agencies like Municipal, Fire Services, AAI, EIA, BSNL etc. for obtaining the pre construction and post construction clearances. The statutory payments to these agencies will be paid by the contractor which is in the scope of the work except the charges of HT Electrical Service connection from local supply agency to the HT energy meter in the premises of the building which will be initially paid by the contractor and reimbursed by the department to the contractor on producing the proof of charges paid to the local concern agency. Liasoning with the local supply agency shall be in the scope of the contractor for which nothing extra shall be paid to the contractor.
- Plumbing & Water Supply system.
- Thereafter construction and commissioning of building(s) will be completed along with the above-mentioned services.
- Obtaining mandatory approvals (Pre & Post Construction) from all local bodies/ State & Central authorities/ Municipal Corporation, EIA (Environmental Impact Assessment) clearance, fire clearance, forest clearance etc. for the complete works in scope of this contract. Approvals as per latest Assam local building Byelaws / Town & Country Planning (Assam) Bye laws with up-to-date corrections slips, necessary Environmental Clearance from the appropriate authority, NOC from Fire Department, NOC from Airport Authority of India etc. and any other statutory approval/Central

Licensing Approving Authority etc., approval from authorities required for commencing the work, execution of work & services and handing over the assets. The defect liability period after completion of work **shall be 12 months**. The contractor has to withstand the warranty and has to provide repair services to building and all equipments & accessories during the defect liability period. The contractor has to attend the complaints of minor nature within 24 hours and the complaint of major nature within 3 days of receiving the complaints. For this purpose, the contractor has to depute sufficient number of technical manpower within the building complex. In case, **if the complaint is not attended and rectified by the contractor within the specified period as above the work shall be got rectified by the department and the recovery at the double rate of cost of execution of work shall be recovered from the dues of the contractor**. LED fitting/fixtures shall withstand the warranty of five years from the date of handing over the installations to the client department.

- The cost of labour, material, tools and plants and machinery required for execution of the whole project as per Layout plan & detailed design and drawings to be approved, specifications etc. is within the scope of this work. The buildings are to be planned and registered to meet **THREE STAR GRIHA** rating. The contractor is required to execute the work in a befitting manner to suit these standards. The contractor shall take all precautions and abide by all rules, regulations and directions of the regulatory authorities, municipalities, traffic, labour, green tribunal in respect of all kinds of pollution, C&D waste management, labour safety measure etc.
- **The project is funded jointly by the NEC and the State Government. The scope of work to be funded under each component is as follows:**

<u>Scope of Work (NEC Funded)</u>	<u>Scope Of Work (State Govt Funded)</u>
Construction of Museum Block (Civil Works, Plumbing & Fire Fighting Works, Internal Electrical, HVAC Work (VRV/VRF AC Systems))	<ul style="list-style-type: none"> • External Building Façade • External Site Development (Pathway & Landscape), • External Sewerage System, • External Water Supply & Drainage System, (Filtered Water Supply, Distribution Line upto 100mm Dia + Peripheral Grid 150mm to 300mm dia pipes + Unfiltered water supply distribution lines) • Horticulture Operations & Landscaping (30 CM eatyh filling) Grassing, Tree Plantation/Shrubs and potted plants etc • Façade Lighting Works, • Museum Exhibits

A) **Buildings:**

Floor-wise distributions of various facilities are only indicative. The area details included in scope of works are as below:

Built Up Area:**TABLE-A**

AREA SHEETS (IN SQUARE METER)		
Description	MUSEUM BLOCK	
No. Of Floors	G+3	
GROUND FLOOR	916.43	Sqm
FIRST FLOOR	973.18	Sqm
SECOND FLOOR	516.39	Sqm
THIRD FLOOR	491.38	Sqm
GRAND TOTAL	2897.38	Sqm
SITE DEVELOPMENT AREA (PATHWAY & HORTICULTURE)	3400.00	Sqm
EARTH BUMP AREA	1162.00	Sqm
ACTUAL DEVELOPMENT AREA	4562.00	Sqm

- Area and quantum of work as per layout attached with NIT/Tender Document.
- Building can be RCC Framed structure/RCC Composite Structure/PT Slab. Contractors can explore and achieve given design intent. However DBR of Structure is for RCC Framed Structure only.

Note:

1. The payments to Contractor shall be made on the area basis w.r.t each building. The area for purposes of payment shall be the plinth area constructed. Areas for security cabins at entrances, pump room, underground structures including UG Tanks, STP/WTP/Borewells etc. shall not be reckoned towards the plinth areas and their cost shall be deemed to be included in the respective subheads/items of works.
2. For calculation of plinth area, rules for working out the plinth area from plans as given in the annexure II of PAR-2021 shall be followed except following:
3. Porch/Boxing on external wall/Facade will not be counted under built up area.
4. Shafts for sanitary, water supply installations, garbage chute, telecommunication, electrical, fire fighting, etc will not be counted under built up area.
5. Area of Mumty/Machine room, architectural feature if any, above terrace not to be counted in the Plinth area for the calculation of EPC area calculation.
6. The total plinth area of a building shall be the sum total of the plinth area at every floor including the basement, if any.
7. Necessary provision for car parking to be provided while preparing the architectural drawings. Depending upon the adequacy of the land for car parking as per local bye laws, car parking building may be included in the scope of work for which payment will be regulated as per DSR'2021 with relevant Cost index or market rate as applicable on date of execution.
8. All plumbing i.e. water supply and drainage, sewerage and fittings as well as fixtures for points is in the scope of work.
9. Schematic layout plan, Concept drawings of buildings are attached with bidding documents. These are only indicative just to give idea regarding works. The successful bidder shall appoint an architectural consultant who in association with other specialized

consultants shall prepare the architectural drawings afresh considering the requirement of projet following applicable norms with state of art technology. Consultation with PWD / Client shall be done before submitting the same for local body approval. Architectural Consultant shall incorporate all the suggestions and modification as directed. Indicative soil investigation and survey drawing is attached. However, necessary detail survey and soil investigation has to be carried out by the successful bidder for co-relations data and results as indicated in the survey site plan, drawings & soil investigation report as attached with bidding document. No claim about extra payment the change in site condition or soil strata/bearing capacity / water table shall be entertained in future. No claim whatsoever will be entertained in future in this regard.

B] Electrical Works:

Brief description of E&M works: As mentioned in the Part C of the NIT.

C] Site Development Works as per Master Plan and Site Requirement (including survey, investigation, design and construction):

Roads: The road shall be constructed as per MORTH Specification and sufficient for traffic load for such type of campus development. The drawing/Section of Road will be submitted by EPC Contractor and approved by PWD/ Client

A	Main road and peripheral Road	Approach and peripheral roads & pathways as per functional requirements, of the building & as per drawings approved by the Engineer in charge.
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Water supply, Storm water drains and sewer line:

- (a) Survey, investigation, design and execution of dual water supply system of the whole campus including fire fighting system.
- (b) Providing and laying dual water supply lines (one for fresh water and one for treated wastewater) around the building as well as in green areas, inside the building. The wastewater from bathrooms, toilets, canteen and other such area is to be collected and treated in STP and the treated water is to be storage in separate under ground sump, which shall be lifted through pumps and collected in a separate over head tank for supply to the Water Closets only for flushing purpose and for watering in the green area with the uniform sprinkling facility. The surplus wastewater is to be drained out in the main sewer line. Separate over head tank for domestic, flushing and fire requirement are to be provided.
- (c) Any dead / live sewer line / water supply line / electrical line etc if passing through the site shall have to be removed / diverted/relocated to clear the site of any obstruction caused by such lines. Any approval from the local authority for such an action will also be taken by the bidder without any extra payment.
- (d) Survey, investigation, design & construction of storm water drains, sewer line i/c connection to the trunk sewer line /STP/nearest drain. Sewerage treatment plant and the Rainwater harvesting, underground sump overhead tank are included in the scope of work. It should be insured that the wastewater should be collected in the collection tank before the STP plant through gravity.

Landscape and Horticulture:

Survey, investigation, design & execution of Landscape works as mentioned/indicated in Master Plan and vertical plantation for entire plot (both hard & soft) in and around the existing/proposed buildings, roads & services in the scope of this tender and the maintenance of same upto defect **liability period of 12 months**. Landscaping plan including parks, planters and other details etc. as per concept/ landscape layout prepared by consultant, including water bodies, planters, plantation, street formation and other details for the horticulture works and execution of same including providing unfiltered/recycled water supply lines. Development of landscape, construction of its toe wall, providing SS railings, wicket gates, water hydrants, the grassing with Mexican grass, creepers and planting trees etc. shall be completed as per the specification and drawing approved by the Engineer-in-charge Other Items which are not mentioned above but are essential considering functional requirements.

Note:

- 1 All works has to be executed as per specifications provided in the bid document, CPWD Specifications Vol-I & Vol. II-2019 and National Building Codes 2016, (in case of difference if any, stringent / higher specification of the two shall be followed. In absence of CPWD Specification, IS Codes, Harmonised Guidelines & Standards for Universal

Accessibility in India 2021, MoRTH Specifications, National Building Code 2016, CPWD Specifications & sound engineering practices and other standard specifications suitable for modern office building and latest technology shall be adopted as per order of precedence defined in the contract.

- 2 The scope of works & specification are given in general but they are not exhaustive i.e. does not mention all the incidental works required to be carried out for complete execution of the work. The work shall be carried out, all in accordance with true intent and meaning of the specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawings and/ or described in the specifications, provided that the same can be reasonably inferred there from. There may be several incidental works, which are not mentioned in the contract document/specifications but will be necessary to complete the items in all respect. All these incidental works/ costs which are not mentioned but are necessary to complete the work shall be deemed to have been included in the overall amount quoted by the contractor for various components of work. No adjustment of rates shall be made for any variation in quantum of incidental works due to variation/change in actual working drawings. Also, no adjustment of rates shall be made due to any change in incidental works or any other deviation in such element of work (which is incidental to the items of work and are necessary to complete such items in all respects) on account of the directions of Engineer-in-charge. Nothing extra shall be payable on this account.
- 3 In case, some of descriptions are missing in the scope of work or specifications in the bidding documents, items / work shall be executed as given in the CPWD Specifications, MoRTH Specification, NBC-2016, Harmonised Guidelines & Standards for Universal Accessibility in India 2021, IS Codes etc and according to sound engineering practices so as to make the building including related services fully functional. No claim whatsoever shall be entertained at later stage. All cost of providing and making buildings with services, landscape and horticulture works fully complete and making buildings facilities functional in all aspect unless specifically mentioned in the contract document.

Brief Description of Activities:

Planning:

- 1 Survey, investigation (including soil investigation) and other related works & services.
- 2 Architectural planning & Structural designing of buildings & services in the campus and obtaining all statutory / local body approvals (Pre & Post Construction) through the statutory bodies. The agency shall also take permission from Fire Department/Environment/Pollution control Board, other necessary approvals from local bodies etc required to start construction work as per plinth area given above. Signature / authority of department or the client department whenever required shall be provided to the contractor. All liasoning and charges to the concerned authority shall be paid by the contractor for obtaining the clearance. Statutory payments to statutory agencies will be paid by the contractor and will be reimburse by the employer on production of original receipts. This also includes Environmental Impact Assessment & clearance and compliance, Traffic Impact SAI assessment and design of merging/demerging of traffic etc.
- 3 The structural design of earthquake resistant RCC framed structure buildings & design of services in the campus and getting approval from PWD and vetting of drawings by any approved institute such as IIT Guwahati or any other premier institutions restricted to structure component only (The contractor will get all structural design and drawings vetting from any of IIT Guwahati or any other premier institutions approved by Assam PWD (Building) and cost for the same will be borne by Contractor). The IS codes/Standards to be followed for the design & execution of reinforced concrete structure shall be as given in table below in table B:

**TABLE – B (IS CODES TO BE FOLLOWED FOR DESIGN OF BUILDING)
as mentioned in para -6 above.**

Sl. No.	Code	Description
1.	IS-875 (Part 1) - 1987	Code of Practice for Design Loads (other than earthquake) for Buildings and structures – Unit weights of buildings and Stored material.
2.	IS-875 (Part 2) - 1987	Code of Practice for Design Load (other than earthquake) for buildings and structures imposed loads.
3.	IS-875 (Part 3) - 1987	Code of practice for design load (other than earthquake) for Buildings and structures – Wind loads
4.	IS- 875 (Part 4) - 1987	Code of practice for loads (other than earthquake) for buildings and structures - Snow loads
5.	IS-875 (Part 5) - 1987	Code of practice for design loads (other than earthquake) for buildings and structures – Special loads and load combinations.
6.	IS:456 - 2000	Code of practice for plain and Reinforced Concrete.
7.	IS: 1893 - 2016	Criteria for Earthquake resistant design of structures.
8.	IS: 13920-2016	Ductile detailing of reinforced concrete structures subjected to seismic forced – Code of practice.
9.	IS: 1904- 1986	Indian Standard Codes of practice for design & construction foundations in Soil : General Requirements
10.	IS: 800 - 2007	Code of Practice for General Construction in Steel.
11.	IS 2950	Indian Standard Code of practice for design & construction of raft foundation – (Part- 1)
12.	IS 4326	Code of practice for earthquake resistant design and

		Construction of buildings.
13.	IS:3370 (all parts)	Concrete structures for storage of liquids
14.	SP-16	Structural use of concrete. Design charts for singly reinforced beams, doubly reinforced beams and columns.
15.	SP 34	Handbook on Concrete Reinforcement & detailing
16.	SP-7	National Building Code of India
17.	Handbook- by Reynolds & Steedman	Reinforced Concrete Designer's Handbook.
18.	Others	Technical literatures, Manufacturers brochures for usage of structural fixtures, text books, etc.

(Note: Latest updated revisions of the codes and standards would be applied where applicable).

- 4 Design and construction of buildings, services, fittings etc. as per 3 STAR GRIHA rating including dual plumbing system (One from the normal water supply line and the other from the treated water supply of STP for flushing, horticulture purpose), energy saving LED lights etc.
- 5 Building shall be designed for differently-abled persons as per the latest norms of Central Govt.

Execution of Work:

- 1 After approval from PWD/Client and getting approval from local bodies including necessary modifications as per the requirements, execution of work as per the scope of buildings & services defined in the contract document, CPWD Specifications, NBC-2016, Harmonised Guidelines & Standards for Universal Accessibility in India 2021, IS Codes, MoRTH Specifications and Sound Engineering Practices and handing over the assets.
- 2 Submission of completion plan of the building & services including getting approval/clearance from local bodies. Submission of building & services plan & drawings and other related documents both in hard copy 6 nos and the soft copy (in Auto CAD and other software used for the purpose) after completion (i.e. 'as-built').
- 3 Clearance of site before Handing over of the facilities after fulfilling all the obligations under the contract.
- 4 Obtaining necessary clearances/licenses from different local bodies/ statutory authorities required to make office building fully operational during/after completion of work.

Defect Liability period of 12 Months:

- 1 Free defect liability period for buildings, Civil, E&M services, horticulture works for 12 months after completion of complete project (not from the date of actual commissioning of installation).

INFORMATION AND GUIDE-LINES FOR BIDDERS

1.0 GENERAL:

- 1.1 Letter of transmittal and forms for deciding eligibility are given in Section III.
- 1.2 All information called for in the enclosed forms should be furnished against the relevant columns in the forms. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against the relevant column. Even if no information is to be provided in a column, a **“nil” or “no such case”** entry should be made in that column. If any particulars/query is not applicable in case of the bidder, it should be stated as **“not applicable”**. The bidders are cautioned that not giving complete information called for in the application forms or not giving it in clear terms or making any change in the prescribed forms or deliberately suppressing the information may result in the bid being summarily disqualified. Bids made by telegram or telex and those received late will not be entertained.
- 1.3 The bid should be type written. The bidder should sign each page of application, forms and documents before scanning & uploading. Over writing should be avoided. Corrections if any should be made by neatly crossing out, initialing, dating and rewriting. Pages of the eligibility criteria document are numbered. Additional Sheets if any added by the Bidder should also be numbered by him. They should be submitted as a package with signed letter of transmittal.
- 1.4 References, information and certificates from the respective clients certifying suitability, technical knowledge or capability of the bidder should be signed by an officer not below the rank of Executive Engineer or equivalent.
- 1.5 The bidder may furnish any additional information which he thinks is necessary to establish his capabilities to successfully complete the envisaged work. He is, however, advised not to furnish superfluous information. No information shall be entertained after uploading of eligibility criteria document unless it is called for by the Employer.
- 1.6 If private works are shown in support of eligibility, certified copy of the tax deducted at source certificate (TDS) shall be submitted along with the experience certificate and the TDS amount shall tally with the actual amount of work done.

2.0 DEFINITIONS:

- 2.1 In this document the following words and expressions have the meaning hereby assigned to them:
- 2.2 **EMPLOYER:** Means the Governor of Assam, acting through the **Chief Engineer (Building), Assam.**
- 2.3 **BIDDER/Agency/Contractor/Firm:** Means the individual, proprietary firm, firm in partnership, limited company (private or public) or corporation.
- 2.4 **“Year”** means “Financial Year” unless stated otherwise.
- 2.5 **“Competent Authority”** means “Committee constituted of Representatives of PWD and Client

3.0 METHOD OF APPLICATION:

- 3.1 If the bidder is an individual, the application shall be signed by him above his fulltype written name and current address
- 3.2 If the bidder is a proprietary firm, the application shall be signed by the proprietor above his full type written name and the full name of his firm with its current address.

3.3 If the bidder is a firm in partnership, the application shall be signed by all the partners of the firm above their full type written names and current address, or, alternatively, by a partner holding power of attorney for the firm. In the later case a certified copy of the power of attorney should accompany the application. In both cases a certified copy of the partnership deed and current address of all the partners of the firm should accompany the application.

3.4 If the bidder is a limited company or a corporation, the application shall be signed by a duly authorized person holding power of attorney for signing the application accompanied by a copy of the power of attorney. The bidder should also furnish a copy of the Memorandum of Articles of Association duly attested by a Public Notary.

4.0 FINAL DECISION MAKING AUTHORITY

4.1 The employer reserves the right to accept or reject any bid and to annul the process and reject all bids at any time without assigning any reason or incurring any liability to the bidders.

5.0 PARTICULARS PROVISIONAL

5.1 The particulars of the work given in NIT are provisional. They are liable to change and must be considered only as advance information to assist the bidders.

6.0 SITE VISIT

6.1 The bidder is advised to visit the site of work mandatory, at his own cost, and examine it and its surroundings to collect all information that he considers necessary for proper assessment of the prospective assignment. Site visit by the bidder is mandatory as the site is full of number of existing structures

7.0 INTIAL CRITERIA FOR ELIGIBILITY (TECHNICAL BID)

7.1 Contractors who fulfill the following requirements shall be eligible to apply **Joint ventures / Consortium and special purpose vehicles are not accepted.**

7.2 Work Experience:

The bidder should have satisfactorily completed the works under Central Govt./ State Govt. organization/ Central Public Sector Undertaking within the country as mentioned below during the last 7 years ending previous day of last date of submission of tenders. For this purpose, cost of work shall mean gross value of the completed work including cost of material supplied by the Government/client but excluding those supplied free of cost:

i) Experience of having successfully completed similar works during the last 7 years ending previous day of last date of submission of tenders:

a. Three similar works each costing not less than **Rs. 12,09,74,628.00/-(40%)** of the estimated cost of the project

OR

b. Two similar works each costing not less than **Rs. 18,14,61,941.00/-(60%)** of the estimated cost of the project

OR

c. One similar work costing not less than **Rs. 24,19,49,255.00/- (80%)** of the estimated cost of the project.

Similar Work means shall mean “Construction of minimum G+1 building Project including finishing works, water supply, drainage & sanitary installations, electrical

works, Firefighting etc. under Central Govt. / State Govt. organization/ Central Public Sector Undertaking within the country executed under one agreement.”

Please note, contractor has to submit completion certificate of the eligible projects issued by not less than executive engineer.

The value of executed works shall be brought to current costing level by enhancing the actual value of work done at simple rate of 7% per annum; calculated from the date of completion to the last date of submission of bids.

Qualified similar works may be physically inspected by PWD Engineers to ascertain the completion, performance and quality of works for finalizing technical bids.

7.3 The bidder shall satisfy the following financial eligibility criteria.

- i) The bidder should have had average annual financial turnover (gross) of **Rs. 9,07,30,971.00/- (30% of Estimate Cost put to Tender)** on construction works during the last three consecutive years ending 31st March, 2025, balance sheets should be duly audited by Chartered Accountant. Year in which no turnover is shown would also be considered for working out the average. **(Scanned copy of Audited Balance Sheet to be uploaded for last five financial year 2020-21, 2021-22, 2022-23, 2023-24 and 2024-25).**

The multiplication factor of 7% per annum simple interest is not applicable on the Annual Financial Turnover figure.

- ii) Should not have incurred any loss (**profit after tax should be positive**) in more than two years during available last five consecutive balance sheets, duly certified and audited by the Chartered Accountant for years ending 31st March' 2025. (The balance sheet in case of Pvt./public ltd. Company means its standalone finance statement and consolidated financial statement both).
- iii) Should have a solvency of minimum **Rs. 12,09,74,628.00/- (40% of Estimate cost put to tender)** (Scanned copy of original solvency certificate issued by scheduled Bank, not older than six months from the last date of submission of bids, to be uploaded) (in the format prescribed in form B).

OR

The bidder should submit Net-worth certificate of minimum **Rs. 3,02,43,657.00/- (10%)** of Estimate cost put to tender) issued by a certified Chartered Accountant.

- iv) The bidding capacity of contractor should be equal to or more than **Rs. 30,24,36,569.00/-** The bidding capacity shall be worked out by the following formula:

The bidding capacity of the contractor should be equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[AxNx2]-B} where,

A = Maximum turnover in construction works executed in any one year during the last five years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids has been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

8.0 EVALUATION CRITERIA FOR TECHNICAL QUALIFICATION

The details submitted by the bidders will be evaluated in the following manner:

- 8.1.1 The initial criteria prescribed in para above in respect of experience of eligible similar works completed, loss, **Solvency**, financial turnover and **bidding capacity** etc. will first be scrutinized and the bidder's eligibility for the work be determined.
- 8.1.2 The bidders qualifying the initial criteria as set out in para 7.0 above will be evaluated for following criteria by scoring method on the basis of details furnished by them:

(a)	Financial strength (Form "A" & B)	Maximum 20 Marks
(b)	Experience in eligible similar nature of work during last Seven years (Forms C)	Maximum 20 Marks
(c)	Performance on work (Form "D")- Time over run	Maximum 20 Marks
(d)	Performance on work (Form "D")- Quality	Maximum 40 Marks
	Total	100 Marks

To become eligible for short listing the bidder must secure at least **fifty percent** marks in each (section a, b, c and d) and **sixty percent** marks in aggregate.

The department, however, reserves the right to restrict the list of such qualified contractors to any number deemed suitable by it.

NOTE: The average value of performance of works for time overrun and quality shall be taken on the basis of performance report of the eligible similar works.

9.0 FINANCIAL INFORMATION

Bidder should furnish the following financial information:

- Annual Financial Statement for the last five years (in **Form "A"**) **Solvency Certificate in Form-B / Net-Worth Certificate.**

10.0 EXPERIENCES IN WORKS HIGHLIGHTING EXPERIENCE IN SIMILAR WORKS

11.10 Bidder should furnish the following:

- List of all works of similar nature successfully completed during the last Seven years **(in form "C")**.
- Performance reports (corresponding to work mentioned in **(Form-C)** in **Form-D**. If needed, the bidder may attach a separate certificate in this regard from performance report issuing authority.
- If required Departmental Officer(s) may inspect the eligible works as submitted by the agency. The agency shall coordinate such inspections and provide all necessary documents, informations as desired by the visiting officer(s).

11.0 ORGANISATION INFORMATION

11.1 Bidder is required to submit the following information in respect of his organization (in **form 'E'**).

11.2 The bidder should have sufficient number of Technical and Administrative employees for the proper execution of the contract. The bidder should submit a list of these employees stating clearly how these would be involved in this work within 15 days of award of work.

12.0 CONSTRUCTION PLANT & EQUIPMENT

Bidders should furnish the list of construction plant and equipment including steel shuttering, cantering and scaffolding to be used in carrying out the work. Details of any other plant & equipment required for the work not included in NIT and available with

the bidder may also be indicated.

13.0 LETTER OF TRANSMITTAL

The bidder should submit the letter of transmittal attached with the document

14.0 OPENING OF THE FINANCIAL BID

After evaluation of applications, a list of short listed agencies qualified in technical evaluation will be prepared. Thereafter, the financial bids of only the qualified and technically acceptable bidders shall be opened at the notified time, date and place in the presence of the qualified bidders or their representatives. The validity of the tenders shall be 180 days and shall be reckoned from the date of opening of the Technical Bid.

15.0 AWARD CRITERIA

- 15.1** The employer reserves the right, without being liable for any damages or obligation to inform the bidder, to:
- (a) Amend the scope and value of contract to the bidder.
 - (b) Reject any or all of the applications without assigning any reason.
- 15.2** Any effort on the part of the bidder or his agent to exercise influence or to pressurize the employer would result in rejection of his bid. Canvassing of any kind is prohibited.

ANNEXURE-I

ELIGIBILITY AND EVALUATION CRITERIA
CRITERIA FOR EVALUATION OF THE PERFORMANCE OF CONTRACTOR
FOR PRE- ELIGIBILITY

	Attributes		Evaluation	
(a)	<u>Financial Strength</u>	(20 Marks)		
	i) Average annual turnover	16 Marks	(i) 60% marks for minimum eligibility criteria	
	ii) Solvency	4 Marks	(ii) 100% marks for twice the minimum eligibility criteria or more. (iii) In between (i) & (ii)- on pro-rata basis	
(b)	Experience in similar class of work	20 marks	(i)	60% marks for minimum eligibility criteria
			(ii)	100% marks for twice the minimum eligibility criteria or more in between (i) & (ii)- on pro-rata basis.
I	Performance on works [Time Over Run (TOR)]: Maximum 20 marks			
	Parameter	Calculation for points	Score	<u>Maximum Marks</u>
	If TOR =		1.00 2.00 3.00 >3.50	20
	(i) Without levy of compensation		20 15 10 10	
	(ii) With levy of compensation		20 5 0 -5	
	(iii) Levy of compensation not decided		20 10 0 0	
	TOR = AT/ST, where AT =Actual Time; ST= Stipulated Time. Time in the Agreement plus (+) justified period of extension of time. Note: Marks for value in between the stages indicated above is to be determined by straight line variation basis.			
	Performance of works (Quality) as per assessment in form D: 40 Marks (Maximum)			
	(i) Outstanding		40 Marks	
	(ii) Very Good		30 Marks	
	(iii) Good		20 Marks	
	(iv) Poor		0 Marks	
Bidder should furnish the List of eligible similar nature of works successfully completed during the last Seven years in (Form "C").				

INFORMATION REGARDING ELIGIBILITY
LETTER OF TRANSMITTAL

From:

To

Chief Engineer, PWD (Building), Assam
Chandmari, Guwahati-3

Subject: Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1 .

Sir

Having examined the details”, given in **press notice and bid** document for the above work, I/we hereby submit the relevant information.

1. I/We hereby certify that all the statement made and information supplied in the enclosed **forms A** to E and accompanying statement are true and correct.
2. I/We have furnished all information and details necessary for eligibility and have no further pertinent information to supply.
3. I/We submit the requisite certified **Solvency** certificate and authorize the **Chief Engineer** to approach the bank issuing the **Solvency** certificate to confirm the correctness thereof. I/We also authorize **Chief Engineer** to approach individuals, employers, firms and corporation to verify our competence and general reputation.
4. I/We submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following works:

Name of work	Amount	Certificate issued by
-----------------	--------	-----------------------

Certificate

It is certified that the information given in the enclosed eligibility bid are correct. It is also certified that I/We shall be liable to be debarred, disqualified/ cancellation of enlistment in case any information furnished by me/us found to be incorrect.

Enclosures:

Date of submission

Seal of bidder
Signature(s) of bidder(s)

FORM 'A'**FINANCIAL INFORMATION**

- I. Financial Analysis-Details to be furnished duly supported by figures in balance sheet/ profit & loss (standalone finance statement and consolidated financial statement both) account for the last five years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department (Copies to be attached).

Sl. No.	Particulars		Fig in Lakhs Rs			
			Financial Years			
		2020-21	2021-22	2022-2023	2023-24	2024-25
i)	Gross Annual turnover on Construction works					
ii)	Profit / Loss					

- II. Financial arrangements for carrying out the proposed work.
 III. Solvency Certificate from Banker in Form "B" / Net Worth Certificate

Signature of bidder (s)

Signature of Chartered Accountant with Seal

FORM 'B'**FORM OF BANKERS' SOLVENCY CERTIFICATE**
FROM A SCHEDULED BANK

To

Chief Engineer, PWD (Building), Assam
Chandmari, Guwahati-3.

This is to certify that to the best of our knowledge and information that M/s./Shri.....*..... having marginally noted address, a customer of our bank are / is respectable and can be treated as good for any engagement up to a limit of Rs.....*.....).

This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature) For the Bank

NOTE:

- (1) Bankers certificate should be on letter head of the Bank, addressed to **Chief Engineer.**
- (2) In case of partnership firm, certificate should include names of all partners as recorded with.

FORM "C"

**DETAILS OF ELIGIBLE SIMILAR NATURE OF WORKS COMPLETED DURING
THE LAST SEVEN YEARS ENDING PREVIOUS DAY OF LAST DATE OF
SUBMISSION OF TENDER**

Name of the Bidder.....

S.No.	Details	
1.	Name of work / project and location	
2.	Owner or sponsoring organization	
3.	Cost of work in Rs. in Crores	
4.	Date of commencement as per contract	
5.	Stipulated date of completion	
6.	Actual date of completion	
7.	*Litigation/ arbitration cases pending / in progress with details	
8.	Name and Address (Postal & E-mail) / telephone number of officer to whom reference may be made	
9.	Whether the work was done on back to back basis	

*** Indicates gross amount claimed and the amount awarded by the Arbitrator**

Certified that the above list of works is complete and no work has been left out and that the information given is correct to my / our knowledge and belief.

**SIGNATURE OF BIDDER(S)
WITH STAMP**

FORM 'D'

PERFORMANCE REPORT OF WORKS REFERRED TO IN FORMS "C".

1.	Name of work / Project & Location		
2.	Agreement No.		
3.	Estimated Cost		
4.	Tendered Cost		
5.	Date of Start		
6.	Date of completion		
	i)	Stipulated Date of Completion (as mentioned in work order)	
	ii)	Actual Date of Completion	
7.	i)	Whether case of levy of compensation for delay has been decided or not	Yes/ No.
	ii)	If decided, amount of compensation levied for delayed completion, if any.	
8.	Performance Report		
	1) Quality of Work		Outstanding /Very Good/Good/Poor
	2) Financial Soundness		Outstanding /Very Good/Good/Poor
	3) Technical Proficiency		Outstanding /Very Good/Good/Poor
	4) Resourcefulness		Outstanding /Very Good/Good/Poor
	5) General Behaviour		Outstanding /Very Good/Good/Poor
Dated:			Executive Engineer Or Equivalent with stamp

FORM 'E'**STRUCTURE & ORGANIZATION**

1.	Name & Address of the bidder	
2.	Telephone No. / Email id /Telex No./Fax No.	
3.	Legal status of the bidder (attach copies of original document defining the legal status).	
	a) An Individual	
	b) A proprietary firm	
	c) A firm in partnership	
	d) A limited company or Corporation	
4.	Particulars of registration with various Government bodies (attach attested photo- copy).	
	ORGANIZATION/PLACE OF REGISTRATION	REGISTRATION No.
	1.	
	2.	
	3.	
5.	Names and Titles of Directors & Officers with designation to be concerned with this work.	
6.	Designation of individuals authorized to act for the organization.	
7.	Has the bidder or any constituent partner in case of partnership firm, ever abandoned the awarded work before its completion? If so, give name of the project and reasons for abandonment.	
8.	Has the bidder, or any constituent partner in case of partnership firm/ limited company/ joint venture, ever been convicted by the court of law? If so, give details.	
9.	In which field of Civil Engineering Construction, the bidder has specialization and interest?	
10.	Any other information considered necessary but not included above.	

Signature of bidder(s) with stamp

FORM 'F'

To,

The All Bidders

Subject: Construction Of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1 .

Dear Sir,

It is hereby declared that PWD is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of tender/bid documents, failing which the tenderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the PWD.

Yours faithfully

**Chief Engineer,PWD (Building),
Chandmari, Guwahati (Assam)**

FORM-G

BID SECURITY

The bidder has to submit Bid Security through net banking or RTGS/NEFT as per office memorandum no.FEB.269/2017/27 Dtd.21/08/2019. This receipt of online payment of Bid Security shall also be uploaded on the e-tendering website by the intending bidder up to the specified bid submission date and time

FORM 'H'**DECLARATION ABOUT SITE INSPECTION**

To,

**Chief Engineer, PWD (Building), Assam
Chandmari, Guwahati-3.**

Name of Work: Submission of bids for the work of **Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1**

Dear Sir, It is hereby declared that as per PWD-6 FOR e-BIDDING and as per terms and conditions of this tender document, I/ We the bidder inspected and examined the subject site and its surrounding and satisfy myself / ourselves as to the nature of the ground and sub-soil (so far as is practicable), the forms and nature of the site./ ourselves before submitting the bid, the accommodation which may require and all necessary information as to risks, contingencies and other circumstances which may influence or affect our bid have been obtained. I/We the bidder shall have full knowledge of the site and no extra charge consequent upon any misunderstanding or otherwise shall be claimed in later date. I /We bidder shall be responsible for arranging and maintaining at own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by me/us implies that I / We have read this notice and all other contract documents and has made myself /ourselves aware of the scope and specifications of the work to be done and local conditions and other factors having a bearing on the execution of the work.

Yours faithfully (Duly authorized signatory of the bidder)

FORM-I**AFFIDAVIT**

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back-to-back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for bidding in PWD in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Bid Security/Performance Guarantee **(Scanned copy to be uploaded at the time of submission of bid).**

Signature of bidder(s) with stamp

FORM “J”**PROFORMA OF AFFIDAVIT FOR NON - BLACK LISTING**

I/we undertake and confirm that our firm/partnership firm has not been blacklisted by any state/Central Departments/PSUs/Autonomous bodies during the last 7 years of its operations. Further that, if such information comes to the notice of the department, then I/we shall be debarred for bidding in PWD in future forever. Also, if such information comes to the notice of department on any day before date of start of work, the Engineer-in-charge shall be free to cancel the agreement and to forfeit the entire amount of Bid Security /Performance Guarantee (Scanned copy of this notarized affidavit to be uploaded at the time of submission of bid).

NOTE: Affidavit to be furnished on a ‘non-Judicial’ stamp paper worth Rs.100/-

To,

Subject: Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.

Dear Sir,

I/We acknowledge that PWD is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of tender documents, failing which I/We will stand disqualified from the tendering process. I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by PWD. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the tender/bid, PWD shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid in accordance with terms and conditions of the tender/bid.

Yours faithfully

(Duly authorized signatory of the Bidder)

To be signed by the bidder and same signatory competent /authorized to sign the relevant contract on behalf of PWD.

INTEGRITY AGREEMENT

This Integrity Agreement is made at on this day of..... 20.....

BETWEEN

Governor Of Assam represented through **The Chief Engineer, PWD (Building) Assam** (Hereinafter referred as the '**Principal/Owner**', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns).

AND

.....
.....

(Name and Address of the Individual/firms/Company)

through

..... (Hereinafterreferred to as the(Details of duly authorized signatory)"**Bidder/Contractor**" and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

Preamble

WHEREAS the Principal/Owner has floated the Tender (NIT No.) (hereinafter referred to as "**Tender/Bid**") and intends to award, under laid down organizational procedure, contract for the work "**Construction Of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1**" hereinafter referred to as the "Contract".

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as "**Integrity Pact**" or "**Pact**"), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witness as under:

Article 1: Commitment of the Principal/Owner

- 1) The Principal/Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:
 - (a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - (b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidders(s)

- confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.
- (c) The Principal/Owner shall endeavour to exclude from the Tender process any person, whose conduct in the past has been of biased nature.
 - 2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article 2: Commitment of the Bidder(s)/Contractor(s)

- 1) It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government/Department all suspected acts of **fraud or corruption or Coercion or Collusion** of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.
- 2) The Bidder(s)/Contractor(s) commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:
 - a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.
 - b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.
 - c) The Bidder(s)/Contractor(s) will not commit any offence under relevant IPC/PC Act. Further the Bidder(s)/Contractor(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details including information contained or transmitted electronically.
 - d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any. Similarly Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and address of foreign agents/representatives, if any. Either the India agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participate in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.
 - e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose (with each tender as per proforma enclosed) any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.
- 2) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 3) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge

in fraudulent practice **means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to detriment of the Government interests.**

- 4) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/her reputation or property to influence their participation in the tendering process).

Article 3: Consequences of Breach

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/Contractor accepts and undertakes to respect and uphold the Principal/Owner's absolute right:

- 1) If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. **Such exclusion may be forever or for a limited period as decided by the Principal/Owner.**
- 2) Forfeiture of EMD/Performance Guarantee/Security Deposit: If the Principal/Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Bid Security, Performance Guarantee and Security Deposit of the Bidder/Contractor.
- 3) Criminal Liability: If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employees or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of Indian Penal code (IPC)/Prevention of Corruption Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

Article 4: Previous Transgression

- 1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.
- 2) If the Bidder makes in correct statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/holiday listing of the Bidder/Contractor as deemed fit by the Principal/Owner.
- 3) If the Bidder/Contractor can prove that he has resorted/recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Bidders/Contractors/Subcontractors

- 1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Sub- contractors/sub-vendors.
- 2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.
- 3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process.

Article 6: Duration of the Pact

This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor, 24 months after the completion of work under the contract or till the continuation of defect liability period, whichever is more and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, PWD.

Article 7 : Other Provisions

- 1) This Pact is subject to Indian Law, place of performance and jurisdiction is the **Head quarters of the Division** of the Principal/Owner, who has floated the Tender.
- 2) Changes and supplements need to be made in writing. Side agreements have not been made.
- 3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.
- 4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement/Pact, any action taken by the Owner/Principal in accordance with this **Integrity Agreement/Pact or interpretation thereof shall not be subject to arbitration.**

Article 8: LEGAL AND PRIOR RIGHTS

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contract documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

WITNESSES:

1
(signature, name and address)

2
(signature, name and address)

SECTION-III
FINANCIAL BID

NIT FORM PWD-8**PUBLIC WORKS DEPARTMENT**

**STATE: ASSAM
(BUILDING)**

BRANCH: PWD

ENGINEERING, PROCUREMENT AND CONSTRUCTION (EPC) MODE-1 Bid

Tender for the work “

- (i) To be uploaded up to 14:00 Hrs. on 29.06.2026 on website: <https://assamtenders.gov.in>**
- (ii) Technical bid to be opened in the presence of bidders who may be present at 15:00 on 29.06.2026 in the office of the Chief Engineer, PWD (Building), Assam Chandmari, Guwahati-3.**

Sir

I/We have read and examined the notice inviting bid, schedule-A, B, C, D, E & F, Specifications applicable, Drawings & Designs, General Rules and Directions, **General Conditions of Contract 2020 PWD (Bldg& NH) for EPC Project** with amendments up to the last date of submission of bids, clauses of contract, Special conditions, Bill of Quantities & other documents and Rules referred to in the conditions of contract and all other contents in the bid document for the work.

I/We hereby bid for the execution of the work specified for the Governor of Assam within the time specified in Schedule ‘F’ viz, User requirement and approved drawings and in all respects in accordance with the schedule of quantities, specifications, designs, drawing and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the **General Conditions of Contract 2020 PWD (Bldg& NH) for EPC Project** with amendments up to last date of submission of bid and with such materials as are provided for, by, and in respect of accordance with, such conditions so far as applicable

We agree to keep the bid open for One Hundred Eighty **(180) days** from the date of opening of technical bid and not to make any modification in its terms and conditions.

Bid Security within prescribed period, I/We agree that the said Governor Of Assam or his successors, in office shall without prejudice to any other right or remedy, be at liberty to take appropriate action by the department at latest departmental guidelines. Further, if I/We fail to commence work as specified, I/We agree that Governor of Assam or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee absolutely, the said performance guarantee shall be a guarantee to execute all the works referred to in the bid documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in clause 12.1 and 12.2 of **General Conditions of Contract 2020 PWD (Bldg& NH) for EPC Project**

Further, I/We agree that in case of forfeiture of Bid Security or Performance Guarantee as aforesaid, I/We shall be debarred for participation in the re-bidding process of the work.

I/we undertake and confirm that eligible similar work(s) has/have not been got executed through another agency on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for bidding in PWD in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-charge / department shall be free to take appropriate action as per the latest

PWD guideline / forfeit the entire amount of Performance Guarantee.

I/We hereby declare that I/We shall treat the bid 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 State.

Dated: **

Witness: **

Address: **

Occupation: **

Signature of Bidder **

Postal Address **

[** to be filled by Bidder]

ACCEPTANCE**(To be signed by Chief Engineer, PWD (Building), Assam**

The above bid (as modified by you as provided in the letters mentioned hereunder) is accepted by me for an on behalf of the Governor of Assam for a sum of Rs.....*.....(Rupee.....*)

.

The letters referred to below shall form part of this contract agreement: -

(a)

(b)

(c)

For & on behalf of Governor of Assam Signature

Dated: Designation

**Chief Engineer, PWD (Building), Assam
Chandmari, Guwahati-3**

PROFORMA OF SCHEDULES: A TO F

(Civil and Electrical & Mechanical and Horticulture)

SCHEDULE 'A'	:	Schedule of quantity for quoting combined rates for Civil Works, Electrical & Mechanical works and Horticulture works.
SCHEDULE 'B' Schedule of material to be issued to the agency.	:	-NIL-
SCHEDULE 'C' Tools and Plants to be hired to the agency.	:	As provided in the tender document.
SCHEDULE 'D' Extra Schedule For Specific Requirements/ Documents For The Work, if any.	:	Refer Part-A, B, C, D, E, F & G
SCHEDULE 'E' Reference to General Conditions of Contract	:	General Conditions of Contract 2020 PWD (Bldg& NH) for EPC Project for EPC Project as amended/modified up to the last date of submission of Bid and to be read as per Assam PWD delegation of powers.
Name of work	:	Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati Assam on Engineering, Procurement and Construction (EPC) Mode-1 .
Estimated cost of work	:	Rs. 30,24,36,569.00 /-
Bid Security	:	2% i.e. Rs. 60,48,731.00/- for General Category OR 1% i.e. Rs. 30,24,366.00/- for Reserved Category.
Performance Guarantee	:	5% of bid amount
Security Deposit	:	5% of bid amount

SCHEDULE 'A-F' (GENERAL RULES & DIRECTIONS)

Officer inviting bid	:	Chief Engineer, PWD (Building), Assam, Chandmari, Guwahati-3
Definitions:		
		General Conditions of Contract 2020 PWD (Bldg& NH) for EPC Project to be read as per Assam PWD delegation of powers
Engineer-in-Charge for Civil Work/ Horticulture work	:	Executive Engineer, Building Division entrusted with the work.
Engineer-in-Charge for Electrical Work	:	Executive Engineer, Building Division entrusted with the work.
Accepting Authority	:	Chief Engineer, PWD (Building), Assam, Chandmari, Guwahati-3
Percentage on cost of materials and Labour to cover all overheads and profits	:	15% (Provided that no extra overheads and profits shall be payable on the part(s) of work assigned to other agency(s) by the contractor as per terms of contract).
Standard Schedule of Rates		
Civil work	:	CPWD Plinth Area Rates-2021 with modifications and correction slips upto date of submission of bids. + Delhi Schedule of Rates 2021 with amendments up to the date of submission of bid.
Electrical work	:	CPWD Plinth Area Rates 2021 with modifications and correction slips upto date of submission of bids. + Delhi Schedule of Rate 2022 (E&M), DSR (Wet Riser and Sprinkler System)- 2019, DSR 2019 (Items for VRF/VRV Air Conditioning System) with amendments up to the date of submission of bid.
Horticulture work	:	CPWD Plinth Area Rates 2021 with modifications and correction slips upto date of submission of bids. + CPWD Horticulture Delhi Schedule of Rate-2020 with amendments, up to the date of submission of bid.
Department	:	Public Works Department, Government of Assam.
Standard PWD Contract Form	:	PWD Form 7 & GCC-2020 Pwd (Bldg&NH for EPC Projects modified & corrected up-to the last date of submission of Bid.
Clause 1 (i) Time allowed for submission of Performance Guarantee, programme chart (Time and Progress) and applicable labour licenses, registration with GST, EPFO, SIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance.	:	07 (Seven) days

(ii) Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period provided in (i) above.	:	03 (Three) days with late fee @ 0.1% per day (non refundable).
Clause 2	:	
(i) Authority for fixing compensation under clause 2	:	-----
Clause 2A	:	
(i) Whether Clause 2A shall be applicable	:	Not applicable.
Clause 5	:	
(i) Number of days from the date of issue of letter of acceptance for reckoning date of start	:	10 (Ten) days or date of handing over of 1 st part of site whichever is later.
5.1 Schedule of rate of recovery for delay in submission of time and progress chart & progress report	:	Rs. 5000/- Per week of part per week

Table of Milestones:

Sl. No.	Description of Milestone (Physical)	Time allowed in Months (from date of start)	% age amount to be with- held in case of non achievement of milestone
1.	Planning, Design & Engineering Works- Investigation, planning, Designing and obtaining approvals of the same from the local body, client deptt., vetting of structural design, all complete. Preparation of all architectural working drawing, landscape drawings, detailed drawings, structural drawings and MEP / E&M services drawings including obtaining all approval of all local bodies / statutory bodies, all authorities concerned, as may be applicable for the work, all complete as per direction of engineer-in-charge to start the construction activities. Establishment of Site Office.	3 Month	0.25%
(i) For Original work:			
2.	25% of Total work in Financial Terms	7 Months	1.00%
3.	50% of Total work in Financial Terms	10 Months	1.00 %
4.	75% of Total work in Financial Terms	13 Months	1.00%
5.	90% of Total work in Financial Terms	16 Months	1.75%

6.	All civil, electrical & mechanical and horticulture work completed in all aspects in Residential & non- residential buildings with services, clearances from local body/ completion certificates etc. Required to declare buildings and campus authorized for occupation	18 Months	1.00%
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NOTE:

Withheld amount shall be released if subsequent milestone is achieved within respective time specified. However, in case milestones are not achieved by the Bidder for the work, the amount shown against milestone shall be withheld.

Intending bidder may submit phasing of activities/milestones based on their resources and methodology at the time of bidding corresponding to physical milestones/stages indicated in the above table. These shall be formed part of the agreement after approval of the accepting authority, otherwise it would be assumed that the agency agrees with the above-mentioned physical milestones.

Time allowed for execution of work	:	18 months (3 months for Planning, design and obtaining Approval+ 15 months for execution and completion of work)
Authority to decide: -		
(i) Extension of time	:	Executive Engineer, Building Division entrusted with the work.
(ii) Rescheduling of milestones	:	Executive Engineer, Building Division entrusted with the work.
(iii) Shifting of date of start in Case of delay in handing over of site	:	Executive Engineer, Building Division entrusted with the work.

Schedule of handing over of site:

Part	Portion of site	Description	Time Period for handing over reckoned from date of issue of letter of intent.
A			Site is Vacant. Contractor to do own survey and due diligence for the start of work.

Schedule of issue of Designs:

Part	Portion of Design	Description	Time period for issue of design reckoned from date of receipt of tenders
Part A	Portion already included in NIT	LOP, Site survey plan, Indicative Architectural floor plan (conceptual) Soil investigation report (Indicative). However, the consultant to be appointed by the successful bidder will have to prepare the LOP & Architectural Drawings a fresh.	Available in the NIT

Part B-1	Portions of Architectural Designs to be issued	To be finalized by consultant appointed by contractor i/c approvals from engineer in charge and the client	15 days after date of start of work
Part B-2	Portions of Civil Design / structural design & E&M services to be issued	-do	15 days after date of start of work
Clause 5.2 Nature of Hindrance Register (either Physical or Electronic)		:	Physical
Clause 5.4			
Schedule of rate of recovery for day in submission of the modified programme in terms of delay per week		:	
Sl. No.	Contract Value		Recovery (Rupees)
I.	Monthly progress report		Rs. 5000/- per week
II.	Programme chart		Rs. 10000/- per week

Clause 7			
Gross work to be done together with net payment /adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment	:	For civil work: Rs. 1.31 Crore except First 3RA Bills (First 3RA Bill may be of value less than 1.31 Crore) For Elect work: Rs. 0.71 Crore except First 3RA Bills (First 3RA Bills may be of value less than 0.71 Crore) or maximum value of individual specialised work	
Clause 7A Whether clause 7A shall be applicable	:	Yes, Applicable No Running Account Bill shall be paid for the work till the applicable labour licenses, registration with GST, EPFO, ESIC and BOCW Welfare Board, whatever applicable is submitted by the Bidder to the Engineer-in Charge.	
Clause 8A Authority to decide compensation on account if contractor fails to submit completion plans	:	Chief Engineer/Executive Engineer, PWD Assam.	
Clause 10B (ii): Mobilisation advance: Whether Clause 10B(ii) shall be applicable	:	The mobilization advance shall be given @ 10% of the tendered amount as per GCC-2020 Pwd (Bldg&NH) for EPC Projects with up-to-date correction. The Plant & machinery and for shuttering material advance shall be given @ 5% of the tendered amount as per GCC-2020 Pwd (Bldg&NH) for EPC Projects with up to date correction. Note: A separate dedicated Bank Account shall be opened by the agency in any scheduled Bank before release of mobilization/tools & plants advance. Mobilisation advance will not be given for any material for which secured advance is payable, T&P advance will not be given for tools & plants equipments, owned by the agency as intimated in the eligibility documents.	

		Installments of Mobilization advance except the first installment shall be released only after receiving the utilization certificate supported by bank statement of the said account showing the disbursement of mobilization advance by the agency as per clause 10B(ii) of GCC. *[of bid value of Financial Quote].	
Clause 10B (iii) (i) Whether clause 10B (iii) shall be applicable			Yes
Clause 10C Component of labour expressed as percent of value of work		:	Not Applicable
Clause 10 CA:		:	Not Applicable
S.N.	Material covered under this clause	Nearest Materials (other than cement, reinforcement bars and the structural steel) for which All India Wholesale Price Index shall be followed.	Base Price (excluding GST) of all Materials covered under clause 10 CA (issued vide CE letter no. 60 dated 08.01.2021)
1.	Cement : PPC	-	NA
2.	Cement : OPC	-	
3.	Reinforcement Steel TMT Bars- Fe 500D (i) Primary manufacturer	-	

Includes cement component used in RMC brought at site from outside approved RMC plant if any:

Clause 10CC	Applicable
Clause 10CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column. Schedule of component of other Materials, Labour, POL etc. for price escalation	NA
Component of civil (Except materials covered under clause 10 CA) expressed as percent of total value of work.	NA
Component of Electrical construction materials expressed as percent of total value of work.	NA
Component of labour expressed as percent of total value of work.	NA
Component of POL expressed as percent of total value of work.	NA

Clause 11 Specifications to be followed for execution of work	Civil work: CPWD Specifications 2019 Volume- I & II with corrections slips upto last date of submission of bid (bid herein after called CPWD specifications)
	Electrical work: <ol style="list-style-type: none"> 1. CPWD General Specification for Electrical Works Part I Internal–2023. 2. General Specification for Electrical Works (Part III Lifts & Escalators)-2003. 3. CPWD General Specification for Electrical Works Part IV Substation-2013. 4. CPWD General Specification for Electrical Works Part V Wet riser and sprinkler system-2020. 5. CPWD General Specification for Electrical Works Part VI fire detection and alarm system- 2018. 6. CPWD General Specification for Electrical Works Part VII DG Sets– 2013 7. CPWD General Specification for Electrical Works Part VIII Gas Based Fire Extinguishing System–2013. 8. General Specification for Heating Ventilation & Air-Conditioning-2017. 9. CPWD specification of Horticulture & Landscaping – 2020
All above specifications shall be applicable with corrections slips up to the last date of submission/ uploading of bid.	
Clause 12.2 , 12.3 & 12.4 Payment of deviations/variatio beyond 0.25% of the accepted tendered amount , Determination Of Rates & Restrictions on Deviations/Variations	<p>Clause 12.2: In case there is any change in scope as defined in the contract, the contractor shall carry out the changes as per direction of Engineer in Charge and nothing extra shall be payable to the contractor on account of same if the additional cost of such work is up to 0.25% (zero point two five percent) of the accepted tendered amount and worked out as per sub-clause 12'3 below' Variations/deviations upto 0.25% (zero point two five percent) of the accepted tendered amount shall be deducted from overall variations/deviations for making payment.</p> <p>Clause 12.3: In the event, there is any deviations/variatio</p> <p>work as defined in the contract, the contractor shall submit the complete proposal to Engineer-in-charge within 15 days duly supported with :-</p> <ol style="list-style-type: none"> a. Analysis of rates for items involved, along with relevant documents, rates of materials, tools/plants and labour, etc. b. The impact, if any, which the deviations/variatio <p>have on the project completion schedule.</p> <p>On receipt of such proposal, either individually or covering group of items, the Engineer-in-charge shall examine the proposal regarding its admissibility and finalize the proposal/rates within 45 days after receipt of proposal with all requisite details and documents from the contractors, after giving due consideration to the proposal, analysis and rates of materials and labours, etc.</p> <p>12.3.1 The increase/decrease in the rates due to deviations/variatio</p> <p>shall be decided based on the following criteria: -</p>

i. Pricing of deviations

a. If the item of work as stipulated in the schedule of quantity/scope of work deviates on plus side, then the rate for the deviated quantity shall be paid at the agreement rate upto the deviation limit as specified in schedule "F" with the same terms & conditions of the contract. Beyond deviation limit as specified in the schedule "F", rate shall be payable on market rates to be determined based on the relevant documents and prevailing market rates, as per Para (ii) below

b. If the item of work as stipulated in the schedule of quantity/scope of work deviates on minus side, then the amount for such deviated quantity shall be deducted proportionately at the agreement rate.

ii. Pricing of variations

If there are changes in the quantity/specifications/alterations/substitutions/ additions, etc. in the items, other than mentioned in para-(i) above, the rates shall be determined based on detailed analysis of rates with original stipulated scope of items & newly proposed/ provided items. The difference of rates so determined shall be payable to/recoverable from the contractor. The rates for both the components i.e. materials & labour shall be based on prevailing market rates. The rate finalized by the Engineer-in-Charge shall be final and binding.

12.3.2 In case of either non-submission of timely proposal or incomplete proposal by the contractor for deviations/variations, the Engineer-in-Charge shall give final opportunity to the Contractor to submit the complete proposal for change of cost within next 15 days. In case of non-submission or further incomplete submission by the contractor within the stated period, the Engineer-in-Charge shall initiate the proposal and decide the change of cost. In such case the proposal finalized by the Engineer-in-Charge shall be final and binding on the contractor.

Clause 12.4:

- i. Work(s) due to deviations/ variations shall be executed only after getting the instructions of Engineer-in-charge, save except to meet any work of emergent nature.

Notwithstanding anything to the contrary in this clause 12, any change arising from default of the contractor in the performance of his obligations under this agreement shall not be deemed to be deviations/variations and shall not result in any adjustment of the contract price or the project completion schedule

Clause 16 Competent Authority for deciding reduced rates.	:	Chief Engineer/Executive Engineer, PWD Assam
Clause 17	:	Defects liability period shall be 12 months after declaring the original construction work completed by the competent authority i.e. Executive Engineer, PWD Assam or his successor thereof. Security Deposit shall be released as given below: After 6 months of completion of work : 80% of total security deposit After 12 months of completion of work : Balance 20% of total security deposit
Clause 19:		Labour laws to be complied by the contractor:
	Clause	Penalty for each default as mentioned in relevant clause of GCC
	Clause 19 C	Rs. 400/- each default
	Clause 19 D	Rs 2500/- each default
	Clause 19 G	Rs. 500/- each default
	Clause 19 K	Rs. 200/- per trades man per day

Clause 25**Constitution of Dispute Redressal Committee:**

Sl.No	Name of Division	Name of Chairman of DRC	Name of DRC Member Secretary	Name of Member 1 DRC	Case presenter to DRC
1	PWD Assam				

It is clarified that the constituents of DRC given under this clause can be modified by Chief Engineer, Building, PWD Assam or his successor thereof, if required.

Place of arbitration:

Guwahati

Clause 32 (i)

A. The Requirement of Technical / Architectural Personnels required to be deployed by the consultants for planning stage and their recovery rates are as below:

S. No.	Qualification	Discipline	Number	Minimum Experience (Years)	Designation	Rate at which recovery shall be made from the Contractor in the event of not fulfilling provision of clause 36(i)
1.	Graduate Architect	Architect	1	12	Architect	Rs. 70,000/- per Month per person
2.	Graduate Engineer	Civil	1	12	Structural Engineer	Rs. 70,000/- per Month per person
3.	Graduate Engineer	Electrical	1	10	Lead Electrical Engineer with Fire Fighting and Fire Alarm	Rs. 1,00,000/- per month
4.	Graduate Engineer	Civil	1	5	Water Supply and Sanitary Expert	Rs. 50,000/- per month per person

The Requirement of Technical Representative(s) and Recovery Rates: Applicable only for the original construction work

S. No.	Qualification	Discipline	Number	Minimum Experience (Years)	Designation	Rate at which recovery shall be made from the Contractor in the event of not fulfilling provision of clause 36(i)
1.	Graduate Engineer	Civil/ Electrical Engineer	1	12 Years (having experience of one similar nature of work)	Deputy Project Manager	Rs.80,000/- Per Month per Person
2.	Graduate Engineer Or Diploma Engineer	Civil /Electrical/ Mechanical Engineer	2	5 Or 10 Respectively	Project/Site Engineer	Rs.50,000/- Per Month per Person
3.	Graduate Engineer	Civil Engineer	1	8 Years	Quality Engineer	Rs.50,000/- Per Month per Person
4.	Graduate Engineer	Civil Engineer	1	6 Years	Project Planning /Billing Engineer	Rs.40,000/- Per Month per Person

Note:

1. The specialized technical staff for execution of component such as plumbing, water proofing, fire fighting, HVAC, Acoustic, landscaping and other specialised work etc. shall be deployed as per the requirement of work.
2. Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers. Diploma holder with minimum 10-years relevant experience with a reputed construction company can be treated at par with Graduate Engineers for the purpose of such deployment subject to that such diploma holder should not exceed 50% of requirement of degree engineers.
3. Architect should be registered with COA
4. The bidder shall submit a certificate an employment of the technical representative(s) (in the from of copy of form 16 of CPF deduction issued to the engineers employed by him) along with every account bill / final bill and shall produce evidence of regular physical availability of such engineers on the above project whenever required by the engineer-in- charge.

Clause 38 Applicable as given below

i)	Schedule/statement for determining theoretical quantity of cement & bitumen based on Delhi Schedule of Rates	Delhi Schedule of Rates 2021 with amendments up to the date of Submission of bid.
ii)	Variations permissible on theoretical quantities.	
(a)	Cement	
	Cement for works with estimated cost put to tender more than Rs. 5 Lakh.	2% Plus/Minus
	Bitumen for all works.	2.5% Plus only and nil on minus side.
(b)	Steel reinforcement and structural steel	2% Plus/minus side sections for each diameter, section and category.
(c)	All other materials	Nil

RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION

S. No	Description of item	Rates in figure and words at which recovery shall be made from the contractor	
		Excess beyond permissible variation	Less use beyond the permissible variation
1	Cement (PPC)	NIL	Not Permitted
2	Reinforcement bars(TMT) (a) Primary Producer	NIL	Not Permitted
3	Structural steel	NIL	Not Permitted

Appendix-I**ESTABLISHING SITE LABORATORY AND TESTING OF MATERIALS**

Equipments for conducting necessary tests (as per CPWD Specifications 2019 Volume-I) shall be provided and installed at site in the well-furnished site laboratory by the agency at his own cost. The following laboratory equipment should be in general or as and when required be set up at site laboratory: -

Sl. No.	Equipment	Numbers
1.	100MT compression testing machine, electrical -cum- manually operated)	2
2.	Slump cone, steel plate, tamping rod, steel scale, scoop	3
3.	Vicat Apparatus with Desk pot	1
4.	Megger & earth resistance tester	1
5.	Pumps and pressure gauges for hydraulic testing of pressure	1
6.	Weighing scale platform type 100 Kg	1
7.	Graduated glass measuring cylinder of various capacity	As per requirement
8.	Sets of sieves of 450mm internal dia for coarse aggregate [100mm, 80mm, 40mm, 20mm, 12.5mm]	2 sets
9.	Sets of sieves of 200mm internal dia for fine aggregate [4.75mm; 2.36mm; 1.18mm; 600microns; 300 microns & 150 micron, with lid and pan]	2 sets
10.	Sieve Brushes and sieve shaker capable of 200mm and 300mm dia sieves, manually operated with timing switch assembly	1
11.	Cube moulds size 70mmx70mmx70mm	18
12.	Cube moulds size 150mmx150mmx150mm	36
13.	Ultrasonic pulse velocity Test Equipment (For concrete)	1
14.	Hot air oven temp. Range 50°C to 300°C-sensitivity 1 degree	2
15.	Electronic balance 600gx0.1g., 10kg and 50 kg	2
16.	Physical balance weight up to 5 kg	2
17.	Digital thermometer up to 150oc	3
18.	Air Content of concrete testing machine	1
19.	Measuring jars 100ml, 20ml, 500ml	5 Nos each size
20.	Gauging trowels 100mm & 20mm with wooden	5
21.	Spatula 100mm & 20mm with long blade wooden handle	5
22.	Vernier calipers 12" & 6" size	3 each
23.	Digital PH meter least count 0.01mm	3 each
24.	Digital Micrometer least count. 0.01mm	3 each
25.	Digital paint thickness meter for steel 500microns	2
26.	GI tray 600x450x50mm, 450x300x40mm, 300x250x40mm	3 Nos each
27.	Electric Motor mixer 0.25 cum capacity	1
28.	Rebound hammer test digital rebound hammer	2
29.	Screw gauge 0.1mm-10mm, least count 0.05	4
30.	Water testing kit	2

31.	Motorized sieve shaker	2
32.	Pruning Rods 2 Kg weight length 40 cm and ramming face 25 mm ²	2
33.	Extra Bottom plates for 15 cm cube mould	15
34.	Standard Vibration Table for gauging the Cubes	2
35.	Pocket concrete penetrometer 0 to 50kg/sq.cm	3
36.	Concrete temperature measuring thermometer with Brass protection sheath 0- 100 degree centigrade	2
37.	Mortar Cube vibrator	1
38.	Dial type spring balance preferable with zero correction knob capacity 100 kgs. Reading to ½ kg.	2
39.	Counter scale capacity 1 kg and 10 kg	2
40.	Iron Weight of 5 kg, 2 kg, 1 kg, 500 gm, 20 gm, 100 gm	2 each
41.	Brass Weight of 50 gm, 2 gm, 10 gm, 5 gm, 2 gm, 1 gm	2 each
42.	Measuring cylinder TPX or Poly propylene capacity 100 ml, 500 ml, 250 ml, 1000 ml	3 each
43.	Pyrex, corning or Borosil beakers with cover capacity 500 ml, 20 ml, 50 ml	3 each
44.	Wash Bottles capacity 500 ml	5
45.	Thermometers 1-100 degree centigrade /max. and Min/ Dry and wet with table	3
46.	Set of box spanner ratchet	2
47.	Hammer 1lb & 2lb	3 each
48.	Distance metre (of 100 metre)	2
49.	Hacksaw with 6 blades	3
50.	Measuring tape (5 metre)	4
51.	Depth gauge 2 cm	6
52.	Shovels & Spade	6
53.	Steel plates 5 mm thick 75x75 cm	6
54.	Plastic or G.I. Buckets 15 ltr, 10 ltr, 5 ltr	2 each
55.	Wheel Barrow	10
56.	Floor Brushes, hair dusters, scrappers, wirebrush, paint brushes, shutter steel plat oil, kerosene with stove etc.	3 each
57.	Any other equipment for site tests as outlined in BIS codes and as directed by the Engineer-in-charge.	As per requirement
58.	Concrete Core cutter Machine	2

Appendix-II

REQUIREMENTS OF PLANT AND EQUIPMENT AT SITE

Sl. No.	Equipment	Numbers
1.	Builders hoist	3
2.	Centralized concrete batch mix plant of minimum capacity 30 cum per hour (fully automatic with computer control)	1
3.	Excavator cum loader (JCB 3D model or equivalent).	2
4.	Compressor machine minimum 20 CFM with rock Breaker.	2
5.	DG set of minimum capacity 62.5 KVA.	2
6.	Automatic batchmix plant (With printer facility) Min 30cum/hr	1
7.	Mini batching plant (6 cum./hr.).	2
8.	Transit mixers.	As per requirement
9.	Concrete pump	3
10.	Needle Vibrators.	12
11.	Screed leveler.	3
12.	Plate Vibrator	3
13.	Automatic Ring making machine(Reinforcement)	2
14.	Dumper/Tipper	As per requirement
15.	Reinforcement bending machine.	2
16.	Reinforcement cutting machine.	2
17.	Power driven earth rammer (Soil compactor).	1
18.	Total survey station.	1
19.	Water tanker (Minimum capacity of 5000 liters)	2
20.	Welding machine 400 Ampere	3
21.	Screener for coarse sand and fine sand	3
22.	Centrifugal mono block water pump minimum capacity 2 HP	3
23.	Road roller / Vibratory roller 8 to 10 tonnes	1
24.	Drilling machine	3 Nos.
25.	Steel Shuttering with necessary tubular pipe props	12000 sq.mt.
26.	Double steel scaffolding and staging materials.	As per requirement
27.	Air compressor	2 Nos.
28.	Floor grinding/polishing machines	5 Nos.
29.	Granite cutting machine	2 Nos.
30.	Ceramic tile cutting machine	2 Nos.
31.	Granite polishing machine	2 Nos.
32.	Granite hand polishing machine	2 Nos.
33.	Mobile tower crane	1 Nos.
34.	Vacuum dewatering machine for concrete	2
35.	Good quality Camera and handycam for taking photographs and video recording of major activities for record purpose and for quality assurance	1 each
36.	Any other machinery required for completion of the work as per decision of Engineer-in-charge.	As per Actual Requirement

Note:

1. Workshop facilities for fabrication/addition and alterations, and other allied works shall be arranged by the contractor at his own cost.
2. The list of equipment/T&P/machinery as per above is for general guidance. In addition to these, machinery / equipment as required shall be arranged by the contractor in case the requirement at any stage exceeds as per the Programme finalized at his own cost and nothing extra whatsoever on this account shall be paid. This includes equipment for arrangement of concrete from RMC producing plants also.
3. All the equipment, T&P and machinery shall be kept in good working conditions.
4. Equipment like batching plant, concrete pump excavators/Transit mixer etc. shall be allowed to be moved away from the site when, the same are no longer required at site of work in the opinion of Engineer-in-charge.
5. In addition to above list, contractor is bound to brought at site any test equipment for any item of work, at his own cost, which Engineer-in-Charge may direct him. Nothing extra shall be paid to contractor in this regard. Direction of Engineer-in-Charge in this regard shall be final & binding.
6. If contractor fails to comply such directions within time specified by Engineer-in-Charge, the same shall be brought to site by department by any means at cost of contractor itself and nothing shall be paid in this regard.

STANDARD GENERAL CONDITIONS OF CONTRCT

1. DSR 2021/CPWD PAR 2021.
2. General Conditions of Contract (**GCC –EPC 2020 Projects (Bldg& NH)**) Works shall be deemed to be part of the Tender document with upto date correction slip of CPWD.

PART-B
SPECIFICATION

**MINIMUM ACCEPTABLE SPECIFICATIONS
(FOR STRUCTURE, WALLS, ROOFING, PLASTERING, INTERNAL
SANITARY/WATER SUPPLY INSTALLATIONS AND OTHER CIVIL
DEVELOPMENT WORKS OF ALL BUILDINGS)**

Contractor has to design and execute as per CPWD Specifications as covered in CPWD PAR'2021 and approved by client.

ARCHITECTURAL CONSULTANCY

1 GENERAL CONDITIONS FOR PLANNING & DESIGN:

The bidder should engage a Firms / Consultant (whether titled as an Architectural firm or Engineering firm) which shall provide consultancy services in project, detailed architectural drawings, detailed structural analysis, designing and detailing of all services, their drawings & approval, external development works, landscaping, etc. Such Consultant shall prepare and supply all the coordinated Good for construction drawings and get them duly proof checked and approved. The Consultant shall be associated till completion of the project and support PWD in obtaining the completion certificate from the concerned local body.

1.1 The firm / consultant which should be an Indian consultancy firm and should have in-house architectural/Engineering capabilities with minimum experience of 10 years in the field of Consultancy. The Credentials of any such Agency shall be got approved from PWD before engaging them.

1.2 The Firms / Consultants should have completed following Consultancy working the last ten years ending previous day of last date of submission of Bid.

1.2.1 One consultancy work of similar nature involving built up plinth area of minimum 3 works of 1,160 Sqm or 2 works of 1,740 Sqm or 1 work of 2,318 sqm.

1.2.2 The consultant should have in house capabilities in consultancy services of following:-

S. No.	Description	Description	Min. Experience
a)	Lead Architect (registered with Council of Architects)	B.Arch	15 years
b)	Architect	B.Arch	10 years
c)	Structural Engineer	M.Tech	15 years
d)	Electrical Engineer	B.Tech	15 years

1.2.3 The consultancy works completed up to the previous day of last date of submission of bids shall be considered.

1.2.4 In case of non-availability of in-house capabilities in consultancy for any specialised component of Engineering services, the Firms / Consultants will submit intention to engage/associate sub consultant/firms having domain specific specialization to prepare working drawings based on concept drawing, DBR, Technical specification, Client requirement and any other norms required to fulfill functional requirement to operationalize the campus who has got expertise for architecture, structure, MEP Works and other related services and submit the MOU/agreement after due approval from PWD.

1.2.5 The bidder shall within 15 days of award of work, submit details of all Consultancy work of consultancy services of similar nature completed by such firm/ consultant (proposed to be engage) during the last ten years in Form 'C' of

Technical bid, performance report of consultancy services in form 'D' of Technical bid, Structure and Organization details in Form 'E' of Technical bid.

- 1.2.6 In case the proposed consultant does not meet the requirement, the agency shall propose another eligible /capable consultant meeting the requirements immediately upon receipt of such directions from Engineer-in-Charge and no hindrance shall be available to them on this account.

2 ROLE OF THE CONSULTANT

- 2.1 The Role of the Consultant is to provide consultancy services for **Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1** including Internal & External Civil, Electrical & Mechanical Services on Engineering, Procurement and Construction (EPC) Basis. The scope of consultancy work will be for complete project as indicated in the Section-I "Brief Particulars of Work" for HSP, and also Electrical Substation Building, AC Plant Room. The consultancy services shall also include Planning, Designing, Installation, testing and commissioning of E & M services like Internal & external Electrification of Building, Electrical Substation, LT panels DG Set, Fire fighting, wet riser and sprinkler system, Fire Alarm & Public Address System, Drinking water supply system, Dewatering, UPS other E&M services as specified in this NIT. The consultant shall be involved for the entire duration of the project till its final commissioning and handing over to the client department.
- 2.2 The consultant shall provide comprehensive consultancy services in project conceptualization covering space utilization, functional requirements, preparation of LOP, Project cost estimation, Detailed Architectural drawings, structural drawings and various services design, Detailed Project Report including schedule of quantities etc. The project report shall cover all project components in detail. The details of the scope of the work involved mentioned in this Bid Document are broad and suggestive. Notwithstanding the details of the scope of the work and role of agency mentioned elsewhere in this Bid Document, the agency is required to provide drawing and design in all aspects of the work for completing comprehensive planning and designing for proposed construction of buildings.
- 2.3 The consultant shall take all necessary statutory approval from all authorities including local authority, Pollution Control Board, Dept. of Forest & environment, Fire Services of Govt. of Assam, CEA, Air Port Authority etc. Preparation of all submission drawings / materials/ 3D-walk through as per norms and models for these approvals will be the responsibility of the consultant. The statutory approvals shall include obtaining Fire Clearance from CFO and completion certificate for the completed building from the local and statutory bodies.
- 2.4 All Environmental Impact and Social Impact Assessment have to be done by the consultant.
- 2.5 The consultant and his sub consultant shall have constant and regular interaction with the PWD for formulating the design philosophy and parameters, preparation of cost estimate, designs/ drawings and specifications.
- 2.6 The consultant shall have to carry out detailed topographical survey and the survey of all existing services and other constraints existing in and around the site for proper design of all the services.
- 2.7 The Consultant shall have to perform in an efficient, orderly and professional manner and shall deploy necessary qualified and skilled persons according to the requirement of the services. A list of minimum of personnel to be deployed for the work is indicated in schedule A to F.

- 2.8 The Consultant and the Sub-Consultants shall visit the works during execution stage to ensure that the works are being executed as per approved scheme and render appropriate advice and carry out all site related modifications in the designs and drawings.
- 2.9 The consultant shall have to assist engineer-in-charge in preparing presentations and presentation materials during execution of work.
- 2.10 The consultant shall have to prepare design philosophy and the design methodology, listing out relevant codes, related references, sound-engineering practices etc.
- 2.11 The consultant/contractor shall have to get the structural analysis/design and design of services and drawings checked by the **proof consultant to be appointed in consultation with PWD at his own cost and nothing extra shall be paid**. The detailed design notes shall be submitted along with design philosophy to Engineer-in-Charge.
- 2.12 The Consultant shall comply with all applicable laws, bye-laws, and statutory provisions, codes and specifications etc. in the performance of the consultancy assignment and in the execution of the project.
- 2.13 The Consultant shall comply with the applicable norms of local as well as Central Govt.Bodies.
- 2.14 The consultancy services shall be provided through a Team Leader supported by experienced professionals. The Consultant will deploy adequate number of professionals and other staff to deliver the requisite services as per time schedule. The Consultant shall have to submit an Organogram giving details of proposed team detailing the roles/work to be performed by each personnel, their tentative duration, inter-relationships of each personnel etc. Details of key personnel's to be deployed by the contractor/consultant shall be as per serial A of clause 36 of schedule 'F'.
- 2.15 The Consultant shall get the conceptual approval of the Department /client or both through presentations, physical models, computer walk-through etc. Comments and suggestions or alternate proposal of the client and his representatives shall be evaluated and suitably incorporated till the concept design is accepted and frozen.
- 2.16 The Consultant shall develop the concept drawings for each of the building for submission to all the statutory authorities/bodies, incorporate changes, if suggested by the statutory authorities / bodies and obtain approvals from all regulatory authorities.
- 2.17 The Consultant shall ensure that the various building/engineering services are suitable designed without any discrepancies between the structure and finishes, and the requirements of service installation.
- 2.18 The Consultant shall ensure that the nature, position, and appearance of all controls of piped services and electrical installation satisfy user and aesthetic requirements, and ensure that adequate coordination drawings are included. He shall also ensure that the various building/engineering services are designed without any discrepancies between the structure and finishes, and the requirements of service installation.
- 2.19 The Consultant shall have to co-ordinate with the department and attend meetings with the department as and when required including meeting with the contractors.
- 2.20 The consultant shall obtain required clearances from various authorities on completion of the construction work after incorporating the modifications in the drawing and services as suggested by them.
- 2.21 The consultant shall prepare the completion drawing after incorporating the suggestions/modifications and shall obtain completion certificate from local bodies.
- 2.22 The Consultant shall maintain constant, regular and proactive interaction with the department, and structural / services proof consultants for formulating the design philosophy and parameters, preparation of preliminary designs/working drawings/specifications etc.

3 SCOPE OF SERVICES

3.1 The consultant shall provide Comprehensive Consultancy Services in the following areas. The consultant/agency shall appoint specialized consultants for which in-house arrangement is not available. The consultant shall mandatory engage an architect having knowledge of Assam culture and from the infrastructure:

- a) All Architectural Services including building plans/ all hard and soft Landscaping/Signages.
- b) All Quantity Surveying Services
- c) All Civil & Structural Engineering Services including all proof checking work.
- d) All Electrical Engineering Services i/c all proof checking works.
- e) All Mechanical Engineering Services i/c all proof checking works.
- f) All Public Health Engineering Services i/c all proof checking works.
- g) All Waste Water treatment and Management System i/c all proof checking works.
- h) Green Building Concept (TERI-GRIHA Norms to be followed).
- i) The building should be designed for barrier free and accessibility as per hand book on “Barrier free and Accessibility” available and NBC 2016 with available latest guidelines.
- j) Building should be designed based on CPWD guidelines for sustainable habitat with available latest guidelines.
- k) The landscape should be designed based on “a hand book of landscape –with available latest guidelines.
- l) The rain water harvesting shall be designed based on “rain water harvesting and conservation manual” with available latest guidelines.
- m) All fittings for building, Meeting Hall and all E&M.
- n) All interiors and all acoustical treatments.
- o) All water supply & drainage system
- p) All I.T. Service.
- q) Any other services which are required but not specifically indicated.
- r) All other works which are excluded from scope work to be designed and planned.

3.1.1 The consultant shall provide comprehensive consultancy services broadly described hereinafter. However, it should be clearly understood that the description of services is only indicative and the Consultant shall be required to perform any other services which may be required whether or not expressly mentioned hereinafter in this contract document of this work up to the entire project requirement and satisfaction of the client.

3.1.2 The Consultant(s) shall perform all the Architectural, Structural design work, design of services, landscaping, horticultural by utilizing the most economical, effective and widely accepted engineering concepts/practices and shall at all times show a high degree of professionalism in his work.

3.1.3 The Consultant will be fully responsible for the design of all the Civil, Elect. & structural engineering works including landscaping and horticultural services. The services to be provided by the Consultant shall include all building & services for making office fully functional & occupation ready and shall not be limited what shown in the scope of work.

3.2 Preliminary Stage:-

- a) Carry out topographical survey and the survey of all existing services if any and other constraints existing in and around the site.
- b) Carry out soil investigation of the site to establish the soil characteristics and other parameters required for the foundation design of multi-storey buildings. Types of

investigation/test and their qualities shall be get approved from Engineer-in-Charge. Soil investigation agency should be experienced in carrying out the work of similar magnitude, specialized and should be got approved from Engineer-in-charge.

- c) The contractor /consultant shall also get ascertained the liquefaction potential of soil to required depths using modern methodology e.g. Spectral Analysis of Surface Waves (SASW) test or any other method and combination of tests approved by Engineer-in-charge and suggest remedial measures and account for same while suggesting the foundation system and suggesting bearing capacity/load carrying capacity.
- d) The soil report shall be got vetted/proof checked from the Institute of repute as described in the contract document or as approved by Engineer-in-charge.

3.2.1 Master Plan/Lay out plan.

3.2.2 Submission of the revised Master Plan to local bodies and incorporating changes, if any, suggested by them and re- submitting the same.

3.2.3 Obtaining approval of the revised master Plan from local authorities for the work under this project.

3.2.4 Concept Design.

3.2.5 Interact with the user departments of client and finalize the functional plan.

3.2.6 Development of the concept design.

3.2.7 Submission of the draft concept design and make presentation of the scheme.

3.2.8 Modifications of the draft concept plans taking into account the comments, suggestions etc. of the client and the Department.

3.2.9 Submission of the final concept design along with models, photographs, 3D-walk through and as per the requirements & norms etc. The cost of such models, walk through, photographs, etc. shall be borne by the consultant.

3.2.10 Obtaining approval of the Concept design from the PWD, Client

3.2.11 Approval Stage

3.2.12 Development of the Submission Plans.

3.2.13 Submission of the design, drawings and related documents to concerned local authorities

3.2.14 Modifications of the design, drawings etc taking into account the comments, suggestions etc. of the local bodies

3.2.15 Re-submission & obtaining approval of the design, drawings etc from local bodies.

3.2.16 Carrying out Environment Impact Assessment, submission of the same and getting approval from concerned authorities.

3.2.17 Obtaining necessary approval of the project from Local authority.

3.2.18 Detailed design Stage

3.3 Architectural Services

3.3.1 Prepare drawings, schedules and specification of materials and workmanship, in sufficient detail. The drawings & documents shall include detailed site plan, detailed drawings for building including floor plans, elevations, door & window schedules, finishing schedules, wall profiles, Staircases, ramp details, details of important building parts / areas, landscape & horticulture details etc. As far as possible standards of quality performance requirement and descriptive names shall be used rather than specific products or brand names. Prepare and issue “Good for construction” drawings.

Drawings shall be adequately detailed and shall contain enough information to enable construction. The working drawing shall include:

3.3.2 Layout Plan showing:

- Proposed building, green area, location of tank, STP, Sump, RWH, Elect. Sub- Station etc.
- Blow up of road junction / parking area and other such area as required.
- Coordinated External services

3.3.3 Detailed Drawings

- Floor plans, fully coordinated with all services/disciplines, Elevations, Sections, Wall profiles, Doors & Window details, Stairs/Ramps details. Details of building parts, areas, critical special treatments.
- Toilet details.
- Flooring pattern and details
- Dado details
- Roof flow, drainage system including rain water harvesting system underground tank and over head water tank.
- Detailed drawing of art work.
- Any other detail required by the Engineer in Charge.
- Interior design
- Landscape i/c water bodies & Horticulture works of whole campus including surrounding of building.
- Drawings of landscape including blow up of critical areas / landscapes / plant scapes in detailed coordination with all external services
- Horticulture details
- Checking and certifying the Architectural drawings, technical specifications, services and all other drawings to ensure their completeness/correctness
- Finalizing finishing schedule, elevation treatment, fixtures, colour scheme of all building
- Integration of design with the existing landscape including water bodies and suggest modification if any.
- Any other details required for completion of the buildings/services.
- Inspect the works and attend meetings during execution to give clarifications, if any, and to modify the drawings as per the site/construction requirements.

3.4 Civil and Structural Engineering Services

3.4.1 Design Basis

- i. Conduct surveys, tests and other investigations as required to determine the basis to accomplish safe designs as per latest specifications & codes.
- ii. Planning for the structural arrangements with the architectural design.
- iii. The Building shall be analysed as a 'Space Frame'. The building shall be modified using structural engineering software package ETABS/ STRAP/ STAAD or any other standard proven software. SI units should be followed for entire analysis and design. The 135ispatc space frame should be analyzed for Dead Loads (DL), Live Loads (LL), Wind Loads (WL), Earthquake Loads(EQ), and their combinations as per IS: 1893-2002 (part- 1). The Building should also be checked for storey drift. All supports (foundations) of the Building columns and shear walls shall be considered as fixed joints for analysis. Effective length of columns shall be considered as per the standard codes of practice. This structure should be designed and detailed as per

Indian codes of practice.

As the structure is quite tall, the lateral loads will be significant. Transfer of lateral loads is very important & special care must be taken to transfer these loads in super structure and foundation. Sufficient numbers of shear walls should be provided for force transfer in lateral direction & to control the deflection due to lateral loads.

- iv. fCo-ordination & finalization of structural arrangement Foundation system Beam & Column location Beam & Column size finalization Slab profiles All other detailing required for the finalization of design
- v. Finalization of design basis & structural systems.
- vi. **Proof checking of structural design / drawings** and issuing the “Good for construction” drawings. The consultant shall also submit the structural design / details (input / output) by the structural consultant and the proof checking thereof along with comments etc. of proof consultant.

3.4.2 Structural Design Development

3.4.2.1 Design of all the structural and non structural elements

3.4.3 Drawing Stage

- Foundation plans & details
- Column, walls and beam layout plans`
- Floor framing plans, fully coordinated with all disciplines
- Floor slab structural details
- Column & beam structural details
- Staircases, ramps, UG Tank, rain water harvesting chamber etc.
- Requirement of Green Building Concept
- All other details and sketches required for proper execution of the works.

3.5 General Services in the scope of E&M Works

Consultant shall provided Consultancy services for Design, Drawings, Vetting and shop drawings to be provided by Contractor, Schedule of Quantities of various items involved in this work which has been elaborated in detail in **Part C of NIT**

- Design of electrical installations including all electrical fittings/fixtures, water supply pumps, de-watering pumps etc., as necessary.
- Design of Power Supply & Distribution system of HT and LT including emergency and backup supply, sub-station, DG set with AMF panel, HT Panel, LT panel, feeder pillars etc.
- Design of EPABX system, intercom communications facilities, data cable/networking system.
- Design of Lightning protection and earthing system.
- Design of External Lighting
- Design of UPS back up wherever indicated.
- Design of Fire fighting, fire detection and PA system design
- Design of Street light design with control panel
- Design of C.C.TV & equipments.
- Design of Water supply submersible & booster pumps, dewatering pumps etc
- Proper coordination with civil engineering/ mechanical engineering features /services.
- Liaisoning with other statutory agencies like Fire Services, BSNL, local bodies etc.

for obtaining the pre construction and post construction clearances. The statutory payments to these agencies will be paid by the agency.

3.6 Public Health Engineering

- 3.6.1 All the design and drawings should be well coordinated with Architecture, structure and other services drawings
- 3.6.2 All designs shall be as per the latest Indian Standards, Local bye-laws and Statutory norms/regulation.
- 3.6.3 Design of Public Health & Engineering services taking into account various topographical, meteorological, Hydrological etc. reports, identify the source and quality of water, conduct survey of existing water supply system, Sewerage system, Drainage system, Fire-fighting system, other site development works etc. for planning of services. These existing systems are to be augmented if required as per the design.
- 3.6.4 The services shall include following major components:
- 3.6.5 Water Supply System including underground water tanks and pumps & tubewell for fulfilling the requirement of building. Sewerage System including sewerage treatment plant
- 3.6.6 Drainage System i/c rainwater harvesting, absorption trenches etc.
- 3.6.7 Fire Fighting & Fire Suppression System with peripheral grid around building connected with fire main grid.
- 3.6.8 Dual plumbing system i/c untreated water supply system from STP for horticultural operations.
- 3.6.9 Soil waste management

3.7 Services

3.7.1 Water Supply System

- Calculation of water requirements for office building and other services including fire fighting for the buildings and services for the scope of present bidding document.
- Design and prepare working drawings of internal and external dual water supply system including Underground tank, Overhead tank, Water treatment plant, Pumping stations, tubewell, rising mains, distribution system and internal plumbing, recycling of treated waste water etc.
- Untreated water supply system for horticultural works i/c design of sprinkler and drip irrigation system. If necessary the supply to be augmented
- Prepare specifications.
- Internal Sanitary Installation
- Design and prepare working drawings of internal sanitary installations.
- Identify, design and prepare working drawings for differently abled friendly toilets and sanitary installations as per requirement.
- Prepare specifications.

3.7.2 Sewerage System

- Calculation for quantity of waste water generated from different sources and design waste water treatment plant.
- Design and prepare the drawings for pre-treatment of waste water from kitchen / canteen and dining halls before connecting to sewage system i/c. management of solid wastes, oil & grease etc. by suitable treatment and disposal system
- Obtain approval from statutory and local bodies for waste disposal. Prepare specifications.

- Check and approve detailed drawings and data sheets of suppliers/ manufacturers.

3.7.3 **Drainage**

- Design and prepare working drawings for storm water drainage including roof drainage, service area drainage and surface drainage.
- Design and prepare working drawings for rain water harvesting system i/c. rain water harvesting pits, trenches and perforated absorption drains.
- Obtain approval from statutory and local bodies for drainage connections and rainwater harvesting scheme etc.
- Prepare specifications.

3.7.4 **Solid Waste Management**

- Survey, design and prepare the working drawings and system plan for solid waste collection, waste collection, treatment and disposal through appropriate technology.
- Design and drawings for composting of organic waste for production of manure for utilization for horticultural use.
- Design and drawing for utilization for organic waste for other useful products.
- Site development Works
- Design and prepare working drawings (longitudinal & cross section) for roads/ footpaths/ parking areas etc.
- Design and propose working drawing for landscape & horticulture work for the campus i/c garden light, façade lighting etc. The landscape should be both hard and soft types.
- Design and prepare working drawings of irrigation system for horticulture i/c. sprinkler and drip irrigation system.
- Prepare specifications of same.
- Vetting of detailed drawings of suppliers/ manufacturers.
- Other Services
- Project Documentation
- Prepare and submit required number of copies of monthly progress accomplishment reports of the project.
- Ensure the preparation of AS-BUILT drawings and record all approved deviations and changes in drawings.
- Provide any other services not explicitly mentioned but reasonably required for project development.
- Design, calculations and drawings of all services shall be proof checked from IIT Guwahati or any other premier institutions as specified in bid document or as approved by Engineer- in-charge.
- Green Building Design.
- The buildings are to be designed as green building and minimum certification of **3 STAR GRIHA** rating system.
- All the electrical equipments including pumps, motors, transformers etc should comply to minimum ECBC PLUS requirements as per ECBC 2017.
- Differently abled friendly building design:
- The building shall be designed for differently abled persons and shall be as per the latest guidelines of Ministry of Social Welfare, Govt. of India. Necessary pre & post audit of the building shall be got done by certified agencies.

4 Number of Documents and copy rights.

- 4.1 All the documents/drawings, designs, reports and any other details envisaged under this agreement shall be supplied in five copies. All drawings as required for submission to all

the local bodies and other authorities shall be submitted as per the requirement of local body. All the drawings for the comments, discussion and approval of employer shall be submitted in triplicate. Six copies of all the final drawings shall be submitted to the Engineer-in-Charge along with one reproducible in A-1 or large size along with a soft copy in DVD. If there is any revision in any drawing/document for any reason, six copies of drawing/document shall be re- issued along with soft copy in CD without any extra charges. All these drawings will become the property of the Engineer-in-Charge. The Engineer-in-Charge may use these drawings in part or full in any other work without any notice to the consultant and without any financial claim of the consultant.

4.2 The drawings cannot be issued to any other person, firm or authority or used by the Consultant for any other project. No copies of any drawings or documents shall be issued to anyone except the Engineer-in-Charge and / or his authorized representative.

4.3 Architectural Design should cover the following general requirements:

- a) To cater for different functional requirements of user with creative indoor spaces, surroundings, better circulation and flexibility in space planning.
- b) Integrated designs of electrical, mechanical and other services with structural system and construction methodology with low maintenance.
- c) Climate responsive Architecture with integration of daylight and electric light, thermal comfort, ventilation, and highest performance standards for work space efficiency.
- d) Use of low embodied energy materials and local/reused materials and consideration of green building principles.
- e) Water and solid waste management with waste water recycling, water conservation and rain water harvesting.
- f) Development of surroundings with site terrain consideration, traffic circulation, indigenous vegetation and plantation.
- g) The building(s) proposed to be developed should be amenable to latest systems of construction technologies for enabling repeatability and fast track and ease in construction, keeping in mind a lower embodied energy of material and lower energy consumption in the proposed complex.
- h) All the spaces in the building provided shall be adequately ventilated for light and air.
- i) Suitable escapes for fire shall be planned as per the requirement specified in NBC & Assam building byelaws and other applicable standard codes of practice
- j) The setbacks and height of the building shall conform to all regulatory authority rules.
- k) Premium quality materials shall be provided for walls, floors, windows, doors etc in tune with the industry standards of similar buildings.
- l) Proper care shall be taken to plan movement logistics to avoid crisscrossing of traffic
- m) The façade of the building shall be appealing, by judiciously mixing the use of energy efficient glass, cladding materials, wall appropriate to the use of the building. The ratio of glass to wall shall vary depending the direction and as required for **3 STAR TERI-GRIHA certification**.
- n) Space planning for required services shall be given importance.
- o) Service routing and ducts shall be planned for easy access, maintenance and scalability.
- p) Green building materials shall be used for obtaining minimum 3 Star GRIHA rating by the Accredited bodies.
- q) Sufficient space for parking of vehicles as per the norms shall be provided at specified location.
- r) Vertical circulation shall be well planned to provide quick access to upper floors by suitable location of stairs.

5 **Structural design should cover the following general requirements**

- a) The structural design shall be carried out in terms of latest editions and up-to-date

correction/amendment/errata of BIS Codes (Bureau of Indian Standards), other relevant seismic/other codes for making Building Earthquake Resistant, sound engineering practices and as desired by the client/ Employer. The Contractor will also get proof checking of structural drawings with Reputed Engineering Institutes like IIT Guwahati or any other premier institutions approved by the Engineer-in-charge for proof checking of structural drawings/proposals prepared by the structural Engineer. The fee for proof checking shall be borne by the Contractor. The Contractor will liaison and co-ordinate with such Institute approved by Engineer-in- Charge as and when required and as per the direction of Engineer –in-charge. Any changes suggested at later stage in architectural drawings shall be incorporated in the design and required structural drawing shall be proof checked without any extra cost.

- b) Submission of all design calculations in hard and soft copies as per the direction of Engineer –in-charge.
- c) Any other designing and detailing required for comprehensive planning and designing of the proposed building & campus.
- d) The required buildings along with internal and external services have to be planned to achieve minimum cost of operation, minimum maintenance cost and lowest consumption of energy, water & electricity etc.
- e) One combined integrated drawing of all services will be prepared. (For internal & external services separately). For services being laid in false ceiling, an integrated plan of all services will also be prepared to avoid interference from each other.

6 Presentations and Models:

- 6.1.1 Preparation of Model(s) to scale 1:200 or any other suitable scale decided by Engineer-in-charge.
- 6.1.2 Preparation of 3D views and blow ups of typical and critical areas and walk through.

7 Approval From local Authorities:

- 7.1.1 The agency shall take all necessary statutory approval from all local authorities including CFO, DGCA, Pollution Control Board, Environmental, AAI, AERB clearances etc. Preparation of all submission drawings (any numbers) / materials and models as per the required size/scale as required by local bodies.
- 7.1.2 The agency shall take all necessary statutory approval of 'Completion Plan' from all local authorities including CFO, DGCA, Pollution Control Board, AERB, Environmental Clearances, NOC of Fire fighting equipments etc for occupation of the buildings after completion of construction.

8 Submission of Data sheet:

- 8.1 Preparation of Data sheet showing Room wise finishing, flooring and Door window, and other high end Inventory schedule
- 8.2 Preparation of Technical Specification for civil works, electrical works, services, equipments, etc. for all items and submit the data sheet.

GENERAL CONDITIONS

GENERAL SPECIFICATIONS FOR CONSTRUCTION

- 1 Except for the items, for which particular specifications are given or where it is specifically mentioned otherwise in the description of the items, the work shall generally be carried out in accordance with the “CPWD Specifications 2019 (Vol-I & II) with upto date corrections slips for Civil work, CPWD General Specification for Electrical Works Part I Internal – 2013, CPWD General Specification for Electrical Works Part IV Substation – 2013, CPWD General Specification for Electrical Works Part VII DG Sets – 2013, CPWD General Specification for Electrical Works Part V wet riser & sprinkler systems – 2020, General Specification for Heating Ventilation & Air- Conditioning-2017, General Specification for Electrical Works (Part III Lifts & Escalators)-2003, CPWD General Specification for Electrical Works Part II External – 1994, CPWD General Specification for Electrical Works Part VI Fire Detection and Alarm system– 2018. specification for horticulture and landscaping-2018 works with upto date correction slips (hereinafter to be referred to as CPWD specifications). Wherever CPWD Specifications are silent, the latest IS Codes/Specifications, National Building Code 2016, Harmonised Guidelines & Standards for Universal Accessibility in India 2021, Guidelines or AERB, MoRTH specification or any other specification shall be followed
- 2 **The order of preference may be read as the following:-**
 - i. Letter of Intent (LOI)
 - ii. Any Amendment/Corrigendum issued.
 - iii. Special Condition of Contract (SCC)
 - iv. General Condition of Contract (GCC)
 - v. Notice Inviting e-Tender (e-NIT)
 - vi. Schedule of Quantities & Rates (SOQR) and preamble to SOQR
 - vii. Design Basis Report (DBR) with Finishing Schedule & Matrix therein.
 - viii. Approved Construction Drawings by Client
 - ix. CPWD Technical Specification and other Technical Specifications / documents/Relevant BIS Codes.
 - x. National Building codes 2016
 - xi. Harmonised Guidelines & Standards for Universal Accessibility in India 2021
 - xii. Indian Standard Specifications of B.I.S
 - xiii. MORTH specification with upto date correction slip
 - xiv. Architectural/structural drawings.
 - xv. Manufacturers specifications
 - xvi. Sound engineering practice
 - xvii. Between two or more clauses of this contract, the provisions of specific clause relevant to the issue under consideration shall prevail over those in other clauses.
- 3 The tenderer shall acquaint himself with the proposed site of work, its approach roads, working space available etc. before quoting his rates and no claim on this account shall be entertained by the department.
- 4 The contractor(s) shall get himself acquainted with nature and extent of the work and satisfy himself about the availability of materials from kiln or approved quarries for collection and conveyance of materials required for construction.

- 5 The contractor(s) shall study the LOP, Indicative Architectural drawings **and soil investigation report for the site, attached with the bid documents** and satisfy himself about complete characteristics of soil and other parameters at site. However, no claim on the alleged inadequacy or incorrectness of the soil data supplied by the department shall be entertained.
- 6 The tenderer shall see the approaches to the site. In case any approach from main road is required at site or existing approach is to be improved and maintained for cartage of materials by the contractor, the same shall be provided, improved and maintained by the contractor at his own cost. No payment shall be made on this account.
- 7
 - (a) The work will be carried out in the manner complying in all respects with the requirements of relevant by-laws of the local body under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-Charge and nothing extra will be paid on this account.
 - (b) The contractor shall comply with proper and legal orders and directions of the local or public authority or municipality and abide by their rules and regulations and pay all fees and charges which he may be liable.
- 8 The contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupiers of adjacent properties and to the public in general and to prevent any damage to such properties and any pollution of smoke, streams and water-ways. He shall make good at his cost and to the satisfaction of the Engineer-in-Charge, any damage to roads, paths, cross drainage works or public or private property whatsoever caused thereon by the contractor. All waste or superfluous materials shall be carried away by the contractor without any reservation entirely to the satisfaction of the Engineer-in-Charge.
- 9 Utmost care shall be taken to keep the noise level to the barest minimum so that no disturbance as far as possible is caused to the occupants / users of building/adjacent properties.
- 10 Before commencement of any item of work the agency shall correlate all the relevant architectural and structural drawings, and specifications etc. and satisfy himself that the information available is complete and unambiguous. The discrepancy if any shall be brought to the notice of Engineer-in-Charge before execution of work. The agency alone shall be responsible for any loss or damage occurring by the commencement of work based on any erroneous and or incomplete information and no claim whatsoever shall be entertained on this account.
- 11 The Architectural drawings given in the tender other than those indicated in nomenclature of items are only indicative of the nature of the work and materials/fixings involved unless and otherwise specifically mentioned. However, the work shall be executed in accordance with the drawings prepared by the consultant and duly approved by the Engineer-in-Charge.
- 12 Other agencies/sub contractor will also simultaneously execute and install the works of substation/ generating sets, fire fightin etc. of this work and the contractor shall extend necessary facilities for the same. The contractor shall leave such recesses, holes, opening, trenches etc. as may be required for the such related works (for which inserts, sleeves, brackets, base plates clamps etc shall be paid in the relevant item unless otherwise specifically mentioned) and the contractor shall fix the same at the time of casting of concrete, stone work and brick work, if required and nothing extra shall be payable on this account

- 13 The contractor shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in-Charge and shall as far as possible arrange his work and shall place and dispose of the materials being used or removed, so as not to interfere with the operations of other contractor simultaneously working or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of others.
- 14 Some restrictions may be imposed by the district administration/client on the working and on movement of labour, materials etc in the campus/site and may require to issue identity cards to all the persons authorised by the contractor to do the work/visit the work site. The contractor shall be bound to follow all such restrictions / instructions and no claim whatsoever, on this account shall be entertained. The loss of time on this account, if any shall have to be made up by generating additional resources etc at no extra cost.
- 15 The rates quoted by the contractor are deemed to be inclusive of site clearance, setting layout on ground, profile, establishment of reference bench mark, installing various signage, taking spot levels, survey with total station construction of all safety and protection devices, barriers, earth embankments, preparatory works, all testing of materials working during monsoon, working at all depths, height and locations etc. unless specified in the schedule of quantities.
- 16 The contractor is required to deploy resources e.g. manpower, labour, T&P, plant & equipment etc as per availability of site and actual requirement of work. No damage/compensation shall be payable on account of idle manpower (technical/non technical), labour, T&P, plant & equipment and loss of profit etc for whatever reason.
- 17 The rates for all items of work shall, unless clearly specified otherwise, include cost of all labour, material, tools and plants and other inputs involved in the execution of the item.
- 18 The contractor (s) shall quote all-inclusive rates against the items in the schedule of quantities and nothing extra shall be payable for any of the conditions and specifications mentioned. In the tender documents unless specifically specified otherwise.
- 19 Unless otherwise specified in the schedule of quantities, the rates tendered by the contractor shall be inclusive of all cost & taxes and shall apply to all leads, lifts and depth and nothing extra shall be payable on this account.
- 20 Unless otherwise specified in the schedule of quantities, the rates for items shall be considered as inclusive of pumping/bailing out of water, if necessary, for which no extra payment shall be made. Those conditions shall be considered to include water from any source such as inflow of flood, surface and subsoil water etc and shall apply to the execution in any reason.
- 21 The work shall be executed and measured as per metric dimensions given in the Schedule of quantities, drawings etc. (F.P.S. units wherever indicated are for guidance only).
- 22 For completing the work in time the contractor might be required to work in two or more shifts (including night shift). Normally contractors shall not be allowed to execute the RCC, electrical and finishing work at night. Work at night shall, however, be allowed if the site conditions/circumstances so demand. No claim whatsoever shall be entertained on this account., notwithstanding the fact that the contractor may have to pay extra amount for any reason, to the labour and other staff engaged directly or indirectly on work according to the provision labour and other statutory bodies regulation and the agreement entered into by the contractor with them.

- 23 The contractor shall maintain in perfect condition, all portions executed till completion of the entire work allotted to him. Where however phased delivery of work is contemplated these provisions shall apply separately to each phase.
- 24 The foundation trenches shall be kept free from water while works below ground level are in progress.
- 25 No foreign exchange shall be made available by the Department for importing (purchase) of equipment, plants, machinery, materials of any kind or any other items required to be carried out during execution of the work. No delay and no claim of any kind shall be entertained from the Contractor, on account of variation in the foreign exchange rate.
- 26 All ancillary and incidental facilities required for execution of work like labour camp, stores, fabrication yard, offices for Contractor, watch and ward, temporary ramp required to be made for working at the basement level, temporary structure for plants and machineries, temporary barricading or fencing around the working sites, water storage tanks, installation and consumption charges of temporary electricity, telephone, data, water etc. required for execution of the work, protection work, liaison and pursuing for obtaining various No Objection Certificates, completion certificates from local bodies etc, testing facilities, laboratory at site of work facilities for field test and taking samples during execution or any other activities which is necessary (for execution and as directed by the engineer-in-charge) shall be deemed to be included in the rates quoted by the contractor, for various item in the schedule of quantities. Nothing extra shall be payable on these accounts. Before start of the work, the Contractor shall submit to the Engineer-in-Charge, a site / construction yard layout, specifying areas for construction, site office, positioning of machinery, material yard, cement & other storage, fabrication yard, site laboratory, water tank etc.
- 27 All material shall only be brought at site as per program finalized and approved from the Engineer-in-Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.
- 28 The contractor(s) shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, services and compound walls are to be constructed. The stacking shall take place as per stacking plan however, if any change is required, the same shall be done with the approval of Engineer-in-Charge.
- 29 The Contractor shall bear all incidental charges for cartage, storage and safe custody of materials issued by department/arranged by the contractor.
- 30 The terms machine batched, machine mixed and machine vibrated concrete used elsewhere in agreement shall mean the concrete produced in concrete batching and mixing plant and if necessary transported by transit concrete mixers, placed in position by the concrete pumps, tower crane and vibrated by surface vibrator /needle vibrator / plate vibrator, as the case may be to achieve required strength and durability
- 31 The cost of flooring is inclusive of providing sunken flooring in bath-rooms, kitchen, etc. and nothing extra on this account shall be payable
- 32 The site is congested and the surplus excavated earth shall be disposed off after approval from the client department and the earth to be levelled and dressed in the approved dumping ground/place approved by the client, if required. Some earth may be required back for backfilling of site to make up required level. The earth disposed off to dumping grounds to any leads and lifts and the earth carried back for back filling of site from any

leads and lifts shall be inclusive in the rates quoted by the contractor. Nothing extra on this account shall be paid or entertained at any stage. Any legal or financial implications resulting out of disposal of earth or carriage of earth from outside shall be sole responsibility of the contractor. Nothing extra shall be paid on this account.

- 33 No chase cutting of plaster/RCC/CC shall be allowed., so the contractor has to execute the electrical work accordingly. The work should be planned in a systematic manner so that chase cuttings in the walls, ceilings and floors are minimized. Wherever absolutely essential, the chase shall be cut using chase cutting machines. Chases will not be allowed to be cut using hammer/ chisel. The electrical boxes should be fixed in walls simultaneously while raising executing the masonry work. The contractor shall ensure proper coordination of various disciplines viz. sanitary & water supply, electrical, fire-fighting and any other services.
- 34 The work of water supply, internal sanitary installations and drainage etc. shall be carried out as per the bylaws of the Municipal Corporation or any other local body and the contractor shall produce necessary completion certificates from such authority after completion of work
- 35 In case of local Municipal regulations / restrictions by client /non-availability of space at site, if huts for labour are not allowed to be erected at the site of work, the contractor shall be required to provide such accommodation at suitable place at his own cost and nothing extra shall be paid on this account.
- 36 Any cement slurry added over base surface for continuation of concreting for better bond is deemed to have been built in the items and nothing extra shall be payable and no extra cement considered in consumption on this account.
- 37 Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar service encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. In case the same are to be removed and diverted. The same shall be payable to the contractor as per terms and conditions of the contract. The contractor shall not store materials or otherwise occupy any part of the site or work in an manner likely to hinder the operation of such services.
- 38 The contractor shall be responsible for the watch and ward / guard of the buildings safety, fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the department. The PWD will take over the building after rectification of all defects. No extra payment shall be made on this account and no claim shall be admissible on this account.
- 39 The Department shall in no way be responsible for either any delay in getting electric and/or water and/or telephone connections for carrying out the work or not getting connections at all. No claim of delay or any other kind, whatsoever, on this account shall be entertained from the Contractor. Also contingency arrangement of stand-by water & electric supply shall be made by the Contractor for commencement and smooth progress of the work so that work does not suffer on account of power failure or disconnection or not getting connection at all. No claim of any kind whatsoever shall be entertained on this account from the Contractor. Nothing extra shall be payable on this account
- 40 The rate quoted by the contractor / agency shall be inclusive of mobilization to site all necessary machineries and equipment's, furnishing, handling, storing, installation including placing, cutting holes, splicing, driving, re-driving, bailing out water, pulling out and removal of the temporary earth retaining structure / strutting etc. from site and other machineries, equipment's, instrumentations etc. men ,materials etc. , other incidental to

- works, for execution of work, with all safety measures as required for the execution of construction work for safety of surrounding existing buildings, structures, services, parked / moving vehicles, equipment's and machines etc. as per direction of Engineer-in-charge.
- 41 **WARNING/ CAUTION BOARDS:** All temporary warning / caution boards / glow signage display such as “Construction Work in Progress”, “Keep Away”, “No Parking”, Diversions & protective Barricades etc. shall be provided and displayed during day time by the Contractor, wherever required and as directed by the Engineer-in-Charge. These glow signage and red lights shall be suitably illuminated during night also. The Contractor shall be solely responsible for damage and accident caused, if any, due to negligence on his part. Also he shall ensure that no hindrance, as far as possible, is caused to general traffic during execution of the work. This signage shall be dismantled & taken away by the Contractor after the completion of work, only after approval of the Engineer - in - Charge. Nothing extra shall be payable on this account.
 - 42 **SIGN BOARDS:** The Contractor shall provide, erect and maintain till completion of work, a display board of size and shape as per directions of Engineer in charge and paint over it, in a legible and workman like manner, the details about the salient features of the project, as required by the Engineer-in-Charge. The Contractor shall fabricate and put up a sign board in an approved location and to an approved design indicating name of the project, Client/Owner, Engineer-in-charges, Structural Consultants, Department etc. besides providing space for names of other Contractors, Sub-Contractors and specialized agencies within 30 days from issue of award letter. Nothing extra shall be payable on this account. In case of non-compliance/delay in compliance in this, a penalty@ Rs. 500/- per day will be imposed which will be recovered from the immediate next R/A Bill of the Contractor.
 - 43 The contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc., under various labour laws and other regulations applicable to the works, at his site office
 - 44 The contractor shall make all necessary arrangements for protecting works already executed from rains, fog or likewise extreme weather conditions and for carrying out further work, during monsoon including providing and fixing temporary shelters, protections etc. Nothing extra shall be payable on this account and also no claims for hindrance shall be entertained on this account.
 - 45 In case of flooding of site on account of rain or any other cause and any consequent damage, whatsoever, no claim financially or otherwise shall be entertained notwithstanding any other provisions elsewhere in the bid document. Also, the contractor shall make good, at his own cost, the damages caused, if any. Further, no claim for hindrance shall be entertained on this account.
 - 46 Stacking of materials and excavated earth including its disposal shall be done as per the directions of the Engineer-in-Charge. Double handling of materials or excavated earth if required at any stage shall have to be done by the contractor at his own cost.
 - 47 Entry to the campus/site may be restricted from particular entrance gate and agency has to follow security rules of the campus & nothing extra shall be payable on this account.
 - 48 **SETTING OUT**
 - 48.1 Contractor shall provide permanent bench marks and other reference points for the proper execution of work and these shall be preserved till the end of work. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings and directions of Engineer in charge.

- 48.2 The contractor shall carry out survey of the work area, at his own cost, setting out the layout of building in consultation with the Engineer-in-charge & proceed further. Any discrepancy between architectural drawings and actual layout at site shall be immediately brought to the notice of the Engineer-in-charge. It shall be responsibility of the contractor to ensure correct setting out of alignment. Total station survey instruments only shall be used for layout, fixing boundaries, and centre lines, etc., Nothing extra shall be payable on this account.
- 48.3 The contractor shall establish, maintain and assume responsibility for grades, lines, levels and bench marks. He shall report any errors or inconsistencies regarding grades, lines, levels, dimensions to the Engineer-in-Charge before commencing work. If at any time, any error appears due to grades, lines, levels and benchmarks during the progress of the work, the contractor shall, at his own expense rectify such error, if so required, to the satisfaction of the Engineer-in-charge. Nothing extra shall be payable on this account.
- 48.4 Commencement of work shall be regarded as the contractors acceptance of such grades, lines, levels and dimensions and no claim shall be entertained at a later date for any errors found.
- 48.5 Though the site levels may be indicated in the drawings the contractor shall ascertain himself and confirm the site levels with respect to GTS bench mark from the concerned authorities.
- 48.6 The contractor shall ascertain and confirm the site levels with respect to benchmark from the concerned authorities. The contractor shall protect and maintain temporary/permanent benchmarks at the site of work throughout the execution of work. These benchmarks shall be got checked by the Engineer-in-charge or his authorized representatives. The work at different stages shall be checked with reference to bench marks maintained for the said purpose. Nothing extra shall be payable on this account.
- 48.7 The approval by the Engineer-in-Charge of the setting out by the contractor shall not relieve the contractor of any of his responsibilities and obligation to rectify the errors/defects, if any, which may be found at any stage during the progress of the work or after the completion of the work.
- 48.8 The contractor shall be entirely and exclusively responsible for the horizontal, vertical and other alignment, the level and correctness of every part of the work and shall rectify effectively any errors or imperfections therein. Such rectifications shall be carried out by the contractor at his own cost to the instructions and satisfaction of the Engineer-in-Charge.

49 Programme Chart

- 49.1 The Contractor shall prepare an integrated programme chart in MS Project, Primavera software for the execution of work, showing clearly all activities from the start of work to completion, with details of manpower, equipment and machinery required for the fulfillment of the programme within the stipulated period or earlier and submit the same for approval to the Engineer-in-Charge within ten days of award of the contract. Non-submission of such programme or submission of incomplete programme without all required details of manpower T&P etc., shall attract the recoveries as mentioned in the Schedule-F of the tender document. The integrated program chart so submitted should not have any discrepancy with the physical milestones attached in the contract agreement.
- 49.2 The programme chart should include the following:
- i) Descriptive note explaining sequence of the various activities.

- ii) Network (PERT/CPM/BAR CHART) in MS Project/Primavera Software
 - iii) Programme for procurement of materials and manpower by the contractor.
 - iv) Programme of procurement and deployment of machinery / equipment having adequate capacity, manpower activity wise & commensurate with the quantum of work to be done as per the provided drawings or schedule of quantities within the stipulated period, by the contractor.
 - v) Productivity of T&P and manpower of all categories to be employed based on which the activity wise program is being proposed
- 49.3 In addition to above, the contractor shall submit shuttering schedule and cycle time for repetition of floors, adequate to complete structure work within laid down physical milestone etc. and to achieve the progress of work as per programme, he must bring sufficient shuttering material required for cement concrete and R.C.C. works etc.
- 49.4 If at any time, it appears to the Engineer-in-Charge that the actual progress of work does not conform to the approved programme referred above, the contractor shall produce a revised programme showing the modifications to the approved programme to ensure completion of the work. The modified schedule of programme shall be approved by the Engineer-in-Charge. Non-submission of such revised programme shall attract the recoveries as mentioned in the Schedule-F of the tender document.
- 49.5 The submission for approval by the Engineer-in-Charge of such programme or the furnishing of such particulars shall not relieve the contractor of any of the duties or responsibilities under the contract. This is without prejudice to the right of Engineer-in-Charge to take action against the contractor as per terms and conditions of the agreement.
- 49.6 In case of non submission of construction programme by the contractor the program approved by the Engineer-in-Charge shall be deemed to be final.

50 Monthly Progress Report

- 50.1 The contractor shall submit to the Engineer-in-charge by 7th day of each month, 2 hard copies and one on soft copy (CD) of monthly progress report of the work. Such progress report will include the project progress, summary, work progress (planned vs actual), CPM chart, status of financial progress and achievement of milestone, manpower deployment status category wise, inventory of materials and T&P deployed and photographs of important activities. **For delay in submission of the report or submission of incomplete report without all the details mentioned herein, recovery @ Rs.5000/- (Rupees Two Thousand only) per day of delay subject to maximum of Rs.20,000/- for each report will be recovered from the amount payable to the contractor.**

The progress report shall contain the following, apart from whatever else may be required as specified above:

- (i) Project information, giving the broad features of the contract of the work under the contract, and the broad structural or other details.
- (ii) Introduction, giving a brief scope of the work under the contract, and the broad structural or other details.
- (iii) Construction schedule of the various components of the work through a bar chart for the next two fortnights (or as may be specified), showing the milestones, targeted tasks and up to date progress.

- (iv) Progress chart of the various components of the work that are planned and achieved, for the month as well as cumulative upto the month, with reasons for deviations, if any, in a tabular format.
- (v) Plant and machinery statement, indicating those deployed in the work, and their working status.
- (vi) Man-power statement, indicating individually the names of all the staff deployed in the work, along with their designations. No. of skilled workers (trade wise) and total no. of unskilled workers deployed on the work and their location of deployment, activity wise & block wise.
- (vii) Financial statement, indicating the broad details of all the running account payments received upto date, such as gross value of work done, advances taken, recoveries effected, amounts withheld, net payments, details of payments received, etc.
- (viii) A statement showing the extra and substituted items submitted by the contractor, and the payments received against them, items pending for sanction/decision by the Department, broad details of the Bank Guarantees, indicating clearly their validity periods, broad details of the insurance policies taken by the contractor, if any, the advances received and adjusted.
- (ix) Progress photographs, in colour, of the various items/components of the work done upto date, to indicate visually the actual progress of the work.
- (x) Quality assurance and quality control tests conducted during the month, with the results thereof.
- (xi) Videography at various stages of construction right from the day of start of work to date of completion/occupation, covering all major events, inspections, visits by dignitaries etc.
- (xii) Chronological brief of all sort of upto date correspondences made by the contractor and department since the award of work in tabular format.
- (xiii) Details of consumption of electricity, fuel, water, cement, steel, fly ash based products and any other product being used, as directed by the Engineer in charge for the month as well as cumulative since start of work.

Nothing extra, whatsoever, shall be paid on account of the aforesaid submission of monthly report.

51 Safety Precautions

- 51.1 Contractor shall within two weeks of award of work, submit to the Engineer-in-Charge for his approval, list of measures for maintaining safety of manpower deployed for construction and avoidance of accidents. The contractor shall depute **safety Engineer** exclusively for enforcement of safety measures. Such safety Engineer should be a qualified engineer with minimum Eight years of similar experience.
- 51.2 Contractor at his own cost put up the barricading of Corrugated Profile Sheet to a height of 6m or as required as prescribed by NGT, MoEF or building bylaws of the Assam Government or any other appropriate government authority for the area, all around the construction sites through suitable fixing method as per direction of Engineer-in-charge for segregating the construction site and also to control the dust pollution in the campus. Entry to the site shall be controlled for proper security of man and materials and to avoid accidents. All management (including watch and ward) of barricades shall be the full

responsibility of the contractor. The barricades shall be removed only after completion of the work or part of the work. Nothing extra will be payable on this accounts.

- 51.3 Necessary personal protective and safety equipment's such as helmet, safety shoes & harness, gloves etc shall be provided to the all site Engineers, Supervisory staff, labour and technical staff of the contractor by the Contractor at his own cost and to be used at site.
- 51.4 The Contractor(s) shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night, speed limit board, red flags, red lights and providing barriers. He shall be responsible for all damages and accidents caused to existing/new work due to negligence on his part. No hindrances shall be caused to traffic during the execution of the work.
- 51.5 In case of any accident of labours / contractual staff's the entire responsibility will rest on the part of the contractor and any compensation under such circumstances if becomes payable the same shall be entirely borne by the contractor and department shall have no role on this account.
- 51.6 It shall be ensured by the contractor that no electric live wire is left exposed or unattended to avoid any accidents in this regard
- 51.7 Any trenching and digging for laying sewer lines/water lines/cables etc. shall be commenced by the contractor only when all men, machinery's and materials have been arranged and closing of the trench(s) thereafter shall be ensured within the least possible time.
- 51.8 For facia work, outer finishing and other RCC works etc., only double steel scaffolding having two sets of vertical supports with steel staircase for inspection of works by engineer in charge shall be used. The supports shall be sound and strong, tied together with horizontal piece over which scaffolding planks shall be fixed.

52 Quality Assurance

- 52.1 The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material/work beyond set out tolerance limit shall be summarily rejected by the Engineer-in-Charge.
- 52.2 The contractor shall ensure quality control measures on different aspects of construction including materials, workmanship and correct construction methodologies to be adopted. He shall have to submit quality assurance programme within two weeks of the award of work. The quality assurance programme should include method statement for various items of work to be executed along with check lists to enforce quality control.
- 52.3 The contractor shall depute Quality Manager exclusively for enforcement of quality control. Such Quality Manager should be a qualified engineer with minimum Eight years of similar experience. For other staff to be deployed for quality assurance, the contractor may refer to clause 36(i) under schedule "F" attached.
- 52.4 Contractor shall be required to submit detailed method statement for all activities associated with the execution and completion of the work. Such method statement should contain all required details like checklists for pre, post and during execution of the activity/item of work, details of testing methodology, frequency, relevant testing standards as defined in the contract of the items involved in the activity. Engineer in charge reserves the right to direct any amendment/modification in the submitted method statement and contractor shall be bound to submit the amended/modified method statement as directed by Engineer in charge, after which only contractor shall be allowed

- to take up such activity. Contractor shall be required to get inspected any activity to be executed on a day from the Engineer in charge or his authorized representatives and get signed the checklist as per the method statement, after which only the activity on that particular day shall be allowed to start. Contractor shall be fully responsible for all contractual implications, for any delay caused, if any, on account of delay in submission of such method statement or modified method statement or checklists. Nothing extra, whatsoever, shall be paid on this account and his quoted amount shall be deemed to be inclusive of all such activities.
- 52.5 The contractor shall prepare all the needed shop drawings well in advance at his risk and cost deemed to be included in the overall quoted cost and get them approved before placing the order and execution of the item
- 52.6 Contractor shall prepare and submit shop drawings for approval of Engineer in charge, before taking up different activities like aluminium doors, windows, plumbing for water supply and drainage, sewer lines & manholes with IL, ACP cladding, stone cladding, glass curtain walls etc or any other activity as directed by Engineer in charge. Contractor shall be required to make modifications as may be directed by the Engineer in charge in the submitted shop drawings and shall resubmit modified shop drawings. Contractor shall not be allowed to execute the related items without approval of such shop drawings and he shall be fully responsible for all contractual implications, for any delay caused, if any, on account of delay in submission of such shop drawings or modified shop drawings. Nothing extra, whatsoever, shall be paid on this account and his quoted amount shall be deemed to be inclusive of all such activities.
- 52.7 Shop drawings shall be submitted for approval four weeks in advance of planned delivery and installation of any material to allow the Engineer In-Charge ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved program.
- 52.8 Before taking up the work, the contractor shall also provide integrated drawings for various civil and electrical services showing details of lay out plan including sectional elevations. Contractor shall plan and mobilize his resources as per the integrated drawings and as per the site conditions to facilitate convenient execution, installation as well as maintenance of these services. Nothing extra shall be payable on this account.
- 52.9 The contractor shall produce all the materials in advance so that there is sufficient time for testing and approving of the material and clearance of the same before use in work.
- 52.10 Materials used on work without prior inspection and testing (where testing is necessary) and without approval of the Engineer-in-Charge are liable to be considered unauthorized, defective and not acceptable. The Engineer-in-Charge shall have full powers to order the removal of any or all of the materials brought to site by contractor which are not in accordance with the contract specifications or do not confirm, in character or quality to the samples approved by the Engineer-in-Charge. In case of default on the part of the contractor in removing rejected materials, the Engineer-in-Charge shall be at liberty to have them removed at the risk and cost of the contractor
- 52.11 The contractor shall provide at his own cost, suitable weighing, surveying, levelling and measuring arrangements as may be necessary and directed by Engineer in charge at site for checking. All such equipment shall be got calibrated in advance from laboratory, approved by the Engineer-in-Charge. Nothing extra shall be payable on this account.
- 52.12 The contractor shall give performance test of the entire installation(s) as per the

- specifications & codes in the presence of the Engineer-in-charge or his authorized representative before the work is finally accepted and nothing extra what-so-ever shall be payable to the contractor for the test
- 52.13 Wherever work is specified to be done through specialized agencies, their names shall be got approved well in advance from Engineer in charge. Failure to do so shall not justify delay in execution of work. The contractor should negotiate with concerned specialist agencies and send their names with all required requisite documents, for approval to Engineer in charge within 30 days of issue of letter of award of work
- 52.14 All materials obtained from Govt. Stores or otherwise shall be got checked by the Engineer- in-Charge or his any authorized supervisory staff on receipt of the same at site before use.
- 52.15 The contractor shall provide at his own cost suitable weighing and measuring arrangements at site for checking the weight / dimensions as may be necessary for execution of work. The sealed samples are to be handed over to the testing lab by contractor in the presence of Junior Engineer/Assistant Engineer-in-Charge of work
- 52.16 Samples of various materials required for testing shall be provided free of charge by the contractor. Testing charges, if any, shall be borne by the contractor. All other expenditure required to be incurred for taking the samples, conveyance, packing etc. shall be borne by the contractor himself.
- 52.17 The contractor or his authorized representative shall associate in collection, preparation, forwarding and testing of such samples. In case, he or his authorized representative is not present or does not associate him, the results or such tests and consequences thereon shall be binding on the contractor
- 52.18 For certain item, if frequency of tests is not mentioned in the CPWD Specifications, then relevant BIS code shall be followed and tests shall be carried out as per the frequency specified therein
- 52.19 If any load testing or special testing is to be done for any sample whose strength is doubtful, the cost of the same shall also be borne by the contractor.
- 52.20 Samples of all materials and fittings to be used in the work in respect of brand manufacturer and quality shall be got approved from the Engineer-in-Charge, well in advance of actual execution and shall be preserved till the completion of the work. If a particular brand of material is specified in the item of work in Schedule of Quantity, the same shall be used after getting the same approved from Engineer-in-Charge. Wherever brand / quality of material is not specified in the item of work, the contractor shall submit the samples as per approved list of brand names given in the tender document / additional specifications for approval of Engineer-in-charge. For all other items, materials and fittings of ISI Marked shall be used with the approval of Engineer-in-Charge. Wherever ISI Marked material / fittings are not available, the contractor shall submit samples of materials / fittings manufactured by firms of repute conforming to relevant specifications or IS codes and use the same only after getting the approval.
- 52.21 To avoid delay, contractor should submit samples as stated above well in advance so as to give timely orders for procurement. If any material, even though approved by Engineer-in- Charge is found defective or not conforming to specifications shall be replaced / removed by the contractor at his own risk & cost
- 52.22 The contractor shall get the source of all other materials, not specified elsewhere in the document, approved from the Engineer-in-Charge. The contractor shall stick to the

- approved source unless it is absolutely unavoidable. Any change shall be done with the prior approval of the Engineer-in-Charge for which tests etc. shall be done by the contractor at his own cost. Similarly, the contractor shall submit brand/ make of various materials not specified in the agreement, to be used for the approval of the Engineer-in-Charge along with samples and once approved, he shall stick to it
- 52.23 The contractor shall get the source of various raw materials namely aggregate, cement, sand, steel, water etc. to be used on the work, approved from the Engineer-in-Charge and trial mixes for controlled concrete shall be done using the approved materials. The contractor shall stick to the approved source unless it is absolutely unavoidable. Any change shall be done with the prior approval of the Engineer-in-Charge for which tests etc. shall be done by the contractor at his own cost.
- 52.24 Similarly, the contractor shall submit brand/make of various materials to be used for the approval of the Engineer-in-Charge along with samples and once approved, he shall stick to it. Any change will have to be got approved from engineer in charge in advance.
- 52.25 The contractor shall get the water tested with regard to its suitability and conforming to the relevant IS Code. The contractor shall obtain written approval from the Engineer-in-Charge before he proceeds by using the same for execution of work. The water testing charges shall be borne by the contractor. If tube well water is not suitable, the contractor shall arrange Municipal water or from any other source at his own cost and nothing extra shall be paid on this account. The water shall be got tested at frequency specified in latest CPWD Specifications / BIS Code
- 52.26 No concreting shall be done until the mix-design is approved by Engineer-in-charge. In case of change of source or characteristic properties of the ingredients used in the concrete mix- design during the work, a revised concrete mix-design conducted by laboratory established at site shall be submitted by the contractor as per the direction of the Engineer-in-charge. Nothing extra shall be paid on this account. No claim for extra time or delay, whatsoever, on this account shall be entertained
- 52.27 The contractor shall submit shop drawings of staging and shuttering arrangement, stone cladding and other works including mock work as desired by Engineer-in-Charge for his approval before execution. The contractor shall also submit bar bending schedule for approval of Engineer-in-Charge before execution.
- 52.28 Before taking up the finishing work such as Flooring, Plastering, sample unit of toilet, room etc., contractor shall prepare full-scale sample for large-scale repetitive items and get approved from Engineer-in-Charge before taking up for execution on large scale.
- 52.29 Based on the samples approved by the Engineer-in-Charge for various flooring and dado / cladding, materials as specified hereinafter, the contractor shall prepare mockup(s) at site of work as specified under relevant flooring and dado / cladding items, for approval of quality of workmanship and material specified. If the quality of the workmanship and the material is as per the required standards and approved by the Engineer-in- Charge, the mock up shall be allowed as part of the work and measured for payment. Otherwise, it shall be dismantled by the contractor as directed by the Engineer-in-Charge and taken away from the site of the work at his own cost. The mock up(s) so made shall be kept till completion of respective works for reference. Nothing extra shall be payable on this account
- 52.30 The contractor shall prepare & display mock-ups in actual position of each and every item and obtain approval of Engineer-in-charge before execution en masse. The mockup shall be preserved for the purpose of reference till completion of the item represented by

the mockup. Similarly, the contractor shall prepare sample toilet blocks comprising of all finishes and fittings included in the scope of this contract. Approval of Engineer-in-charge shall be obtained before taking up finishing works en masse. The work executed in approved mock ups/sample units in actual position forming part of the main work shall be deemed to be included the scope of work and quoted rates of the contract. However the contractor shall have to dismantle and remove the rejected mock up / sample from the site of work at his cost

- 52.31 The contractor shall invariably prepare the samples of finishing items i.e. flooring of different types, external & internal finishing i/c colour scheme of paint, tiles in dado, flooring in platforms & staircase, water supply & sanitary fittings and any other item as per direction of Engineer-in-charge. The contractor shall proceed with further finishing items only after getting the samples of these items approved in writing from Engineer-in-charge. Toilets and in case of construction of residential quarters, one sample quarter complete in all shape for each category, shall be prepared by the contractor and got approved from Engineer-in-charge in writing. The contractor shall be allowed to proceed with further quarters only after getting the sample quarters approved in writing from Engineer-in-charge. No extra claim whatsoever beyond the payments due at agreement rates will be entertained from the contractor on this account
- 52.32 The construction joints shall be provided in predetermined locations only as decided by Engineer in charge. The cost of shuttering for these construction joints shall be included in item of Concrete work / RCC work and nothing extra shall be payable on this account to the contractor
- 52.33 Water tanks, taps, sanitary, water supply and drainages pipes, fittings and accessories should conform to the specifications provided in bidding documents, if CPWD Specifications are not available, NBC-2016, IS codes shall be followed. The contractor(s) should engage approved, licensed plumbers for the work and get the materials (fixtures/fittings) tested, by the municipal Body/Corporation authorities wherever required at his own cost. The Contractor(s) shall submit for the approval of the Engineer-in-Charge the name of the plumbing Agency proposed to be engaged by him.
- 52.34 All the hidden items such as water supply lines, drainage pipes, conduits, sewers etc. are to be properly tested as per the design conditions submitted before covering.
- 52.35 The contractor shall give a performance test of the entire installation(s) as per standing specifications before the work is finally accepted by making his own arrangements for water supply, electricity etc. and nothing extra whatsoever shall be payable to the contractor for the test
- 52.36 Door/window frames/shutters and other factory-made materials shall be procured from reputed and approved manufacturers or their authorized dealers. Decision of Engineer-in-charge in this regard shall be final and binding.
- 53 **Third Party Quality Assurance:** In order to achieve a high standard of quality, it shall be required to go for Third Party Quality Assurance. For this purpose, a separate agency shall be appointed by the owner/employer who will carry out independent testing of materials and checking and ensuring overall quality procedures. The contractor shall be required to fully cooperate with agency and facilitate them in taking samples, transportation and examination of various activities including documentation at no extra time and cost to the owner/employer. In case of any adverse findings by the Third party agency, the contractor shall do the needful rectifications at no extra time and cost to the owner. The Engineer-in-charge shall be at liberty for getting quality assurance work done through agencies like IIT Guwahati or any other premier institutions approved by

competent authority at its own cost. The successful tenderer shall include the provisions of Quality Assurance while framing the proposed methodology for tests.

54 **Testing of Materials:**

- (i) Laboratory at site: The contractor shall establish and make functional, a testing lab at site within one month from the award of work, without any extra cost to the department with testing equipment's and materials for the field and laboratory tests as mentioned in the list of mandatory tests given in CPWD Specifications 2019 Vol. 1 & 2 and as provided in this bid document. In case of non-compliance / delay in compliance in this, a recovery @ Rs. 1000/- per day will be imposed which will be recovered from the immediate next R/A Bill of the Contractor. Nothing extra shall be payable to him on this account. The representatives of the department shall be at liberty to inspect the testing facilities at site and conduct testing at random in consultation with Engineer in charge. The contractor shall provide all necessary facilities for the purpose. The laboratory shall be equipped, inter alia, with the following equipment:

a) **Balances:**

- i) 7 kg to 10 kg capacity, digital type – Accuracy 10 gm.
- ii) 500 gm capacity, digital type Accuracy 1 gm.
- iii) Digital Pan Balance- 5 kg Capacity- Accuracy 10 gm.
- b) Ovens- Electrically operated, thermostatically controlled up to 1100 C- Sensitivity 10C.
- c) Sieves: as per IS: 460
 - i) IS Sieves – 450 mm internal dia of sizes 100 mm, 80 mm, 63 mm, 50 mm, 40 mm, 25 mm, 20 mm, 12.5 mm, 10 mm, 6.3 mm, 4.75 mm, complete with lid and pan.
 - ii) IS Sieves – 200 mm or 300 mm internal dia (brass frame) of sizes 2.36 mm, 1.18 mm, 500 microns, 425 microns, 300 microns, 212 microns, 150 microns, 90 microns, 75 microns with lid and pan.
- d) Sieve shaker capable to handle of 200 mm, 300 mm and 450 mm dia sieves, electrically operated with timing switch assembly.
- e) Equipment for slump test- slump cone, steel plate, tapping rod, steel scale, scoop.
- f) Minimum number of equipment for concrete testing
- g) Concrete cube moulds 15x15x15cm : 18Nos.
- h) Pruning Rods 2Kg weight length 40cm and ramming face 25mm: 1 No.
- i) Extra Bottom plates for 15cm cube mould : 6 Nos.
- j) Standard Vibration table for cubes : 1 No
- k) Dial gauges 25 mm travel- 0.01 mm/division Least count:- 1 No.
- l) Electrically operated Compression testing machine of 100 tonne capacity. 1 No.
- m) Digital Vernier
- n) Digital micrometer screw gauge.
- o) Elcho meter for measuring all type of paint/powder coating thickness on all materials.
- p) Ultrasonic pulse velocity apparatus for testing of concrete.
- q) Digital distance measuring meter with range of 80 meter.
- r) Digital moisture meter.
- s) Digital infrared temperature meter.
- t) Multi line rotating laser instrument of Hilti or equivalent for plumbing, aligning, levelling and squaring functions for indoor and outdoor.
- u) Pressures pump apparatus for testing of concealed water supply lines for leakage.
- v) Testing apparatus with all required chemicals for testing of water for construction including quick ready to use compact kits.

Not less than 90% tests for material be performed at site lab with above stated equipment's, however at least 10% testing of materials shall be got done from external

laboratories approved by Engineer in charge. However, for the tests to be carried out by the external laboratories, the contractor shall supply free of charge all the materials required for testing, including transportation. If the tests which were to be conducted in the site laboratory are conducted in other laboratories for any the reasons the cost of such tests shall be borne by the contractor.

- (ii) Other Laboratories: The contractor shall arrange carrying out all tests required under the agreement through the laboratory as approved by the Engineer-in-Charge and shall bear all charges in connection therewith including charges for testing for all materials.

54.1 All the test in field lab setup at Construction Site shall be carried out by the Quality control team to be engaged by the Agency which can be witnessed by Engineer-in-charge or his/her designee. A daily report of Tests to be conducted on a day shall be submitted to Engineer-in-charge or his/her designee

54.2 The Agency shall allow access to Third Party Quality Assurance Agency (TPQAA) engaged by Engineer-in-charge to have a control on quality and methodology of execution. At least 20% of Samples of materials including Cement Concrete Cubes shall be taken jointly by Agency and TPQAA / Engineer-in-charge or his authorized representative. All arrangements for transporting and getting the sample to be tested outside shall be made by the Agency.

54.3 Samples for testing, as per approved Quality Assurance Plan, shall be provided by contractor at his cost. The Employer may require additional samples for testing at contractor's cost. Cost of assistance, labour, electricity, fuel, stores, apparatus and instruments, consumables and tests performed at site shall be borne by contractor. Cost of packing and forwarding and testing charges for the tests those cannot be performed at site and to be performed in outside laboratories shall be borne by the Contractor. All costs involved in carrying out the tests and other incidental expense thereto shall be borne by the contractor regardless of the result of the tests

54.4 All tests to be performed outside the field lab shall only be carried out in laboratories approved by NABL unless specifically approved by the Engineer-in-charge. It is also a term of the agreement that out of tests which can be carried out in field laboratory, minimum 20% of important tests e.g. concrete cube tests, test for cement etc., or the tests as directed by Employer, shall be got done through laboratories approved by NABL. For all tests, the contractor shall supply free of charge all the materials required for testing and the testing charges shall be borne by the contractor. No extra claims whatsoever on this account shall be admissible

54.5 Non-destructive test methods such as core test and ultrasonic pulse velocity test shall be carried out by the contractor at his own expense if so desired by the Employer. Such tests shall be carried out by an agency approved by the Employer and shall be done using only recommended testing equipment. The acceptance criteria for these tests shall be as specified by the testing agency or good engineering practice and as approved by the Employer.

55 Maintenance of site Register

55.1 All the registers of tests carried out at construction site or in outside laboratories shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-Charge in the same manner as being issued to PWD field staff. The various registers to be issued to and maintained by the contractor are:

- (a) Materials at site account register
 - (b) Cement register
 - (c) Master test registers
 - (d) Cube test register
 - (e) Paint/chemical register
 - (f) Inspection register
 - (g) Drawing register
- 55.2 All the entries in the registers will be made by the designated engineering staff of the contractor and same should be regularly reviewed by JE/AE/EE.
- 55.3 All the registers of tests carried out at construction site or in outside laboratories shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-Charge in the same manner as being issued to PWD field staff.
- 55.4 All samples of materials including cement concrete cubes shall be taken jointly with contractor by JE and out of this at least 50% samples shall be taken in presence of AE in charge. If there is no JE, all samples of materials including cement concrete cubes shall be taken by AE jointly with contractor. All the necessary assistance shall be provided by the contractor. Cost of sampling & testing are to be borne by the contractor and he shall be responsible for safe custody of samples to be tested at site/ outside laboratory.
- 55.5 All the tests in field lab at construction site shall be carried out by the Engineering staff deployed by the contractor and shall be 100% witnessed by JE/AE and 50% of tests shall be witnessed by AE –in-Charge. At least 10% of the tests are to be witnessed by the Executive Engineer. Minimum 20% of all samples should be tested in outside approved laboratory/ Govt. Engineering sqms.
- 55.6 Submission of copy of all test registers, material at site register along with each alternate running account bill and final bill shall be mandatory. These registers should be duly checked by AE(P) in division office

56 Ultrasonic Pulse Velocity Method of Test for RCC

- 56.1 The under lying principle of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete in terms of density, homogeneity and uniformly is good. The consistency of the concrete as regards its general quality gets established. In case of poorer quality lower velocities are obtained. If there are cracks, voids or flaws inside the concrete which come in the way of transmission of pulse, lower velocities are obtained
- 56.2 **Velocity criterion for Concrete Quality Grading:** The quality of concrete in terms of uniformity, incidence or absence of internal flaws, cracks and segregation etc. indicative of the level of workmanship employed, can thus be assessed using the guidance given in table below, which have been evolved for characterizing the quality concrete in structure in term of the ultrasonic pulse velocity.

S. No	Pulse Velocity by Cross Probing (Km/Sec.)	Concrete Quality Grading
1	Above 4.5	Excellent
2	4.5 to 3.5	Good
3	3.5 to 3.0	Medium

4	below 3.0	Doubtful
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Note: In Case of “doubtful” quality it may be necessary to carry further tests

- 56.3 Pulse velocity method of test of concrete is to be conducted for PWD works as a routine test. The acceptance criteria as per the above table will be applicable which is as per IS: 13311 (part-1): 1992. From the above “Good” and “Excellent” grading are acceptable and below these grading the concrete will not be acceptable. 5% of the total number of RCC members in each category i.e. beam, column, slab and footing may be tested by UPV test method for establishing quality of concrete. It is suggested that test be conducted on RCC beam near joint with column, on RCC column near joint with beam, on RCC footings and rafts. On RCC rafts a suitable grid can be worked out for determining number of tests. In addition, doubtful areas such as honeycombed locations, locations, where continuous seepage is observed, construction joints and visible loose pockets will also be tested.
- 56.4 The test results are to be examined in view of the above acceptance criteria “Good” and “Excellent” and wherever concrete is found with less than required quality as per acceptance criteria, repairs to concrete will be made. Honeycombed areas and loose pockets will be repaired by grouting using Portland Cement Mortar/Polymer Modified Cement Mortar/Epoxy Mortar etc. after chipping loose concrete in appropriate manner. In areas where concrete is found below acceptance criteria and defects are not apparently visible on surface, injecting approved grout in appropriate proportion using epoxy grout /acrylic Polymer modified cements slurry made with shrinkage compensating cement / plain cement slurry etc. will be resorted to for repairs. (refer relevant chapters from CPWD Hand Book on Repairs and Rehabilitation of RCC Buildings). Repair to concrete will be done till satisfactory results are obtained as per the acceptance criteria by retesting of the repaired area. If satisfactory results are not obtained dismantling and relaying of concrete will be done

57 Removal of Rejected / Sub-standard Materials:

The following procedure should be followed in case of removal of rejected/sub-standard materials from the site of work

- Whenever any material brought by the contractor to the site of work is rejected, entry thereof should invariably be made in the site order book under the signature of the AE/AEE giving approximate quantity of such materials.
- As soon as the material is removed, a certificate to that effect may be recorded by the AE/AEE against the original entry, giving the date of removal a mode of removal i.e. whether by truck, carts or by manual labour. If removal is by truck, the registration number of the truck should be recorded.
- When it is not possible for the AE/AEE to be present at the site of work at the time of actual removal of the rejected/sub-standard materials from the site the required certificate should be recorded by the Junior Engineer and the AE/AEE should countersign the certificate recorded by the Junior Engineer.

58 As Built Drawings

On completion of work, the Contractor(s) shall submit at his own cost four prints of “as built” drawings to the Engineer-in-Charge within 30 days of completion of work. These drawings shall have the following information amongst other information that may be directed by Engineer in charge.

- i) Run off all piping and their diameters including soil waste pipes and vertical stacks.
- ii) Ground and invert levels of all drainage pipes together with locations of all manholes and connections, up to outfall.
- iii) Run off all water supply line with diameters, locations of control valves, access panels etc.
- iv) All literatures, manuals, warranty certificates etc. of various installed fittings, fixtures and equipment for the completed projects
- v) The contractor shall make available four (04) sets of computerized Standard Measurement Books (SMBs) as per CPWD works manual having measurement of all the permanent standing in a building.

Final bill will not be paid and Security Deposit shall not be released until submission of as built drawings as above and no claim, whatsoever, shall be admissible for non-payment of final bill or security deposit on account of non-submission of aforesaid as built drawings with required details & SMB.

- 59 The contractor shall render all help and assistance in documenting the total sequence of this project by way of photography, slides, audio-video recording etc. nothing extra shall be payable to the contractor on this account.
- 60 The contractor shall keep himself fully informed of all acts and laws of the Central & State Governments, all orders, decrees of statutory bodies, tribunals having any jurisdiction or authority, which in any manner may affect those engaged or employed and anything related to carrying out the work. All the rules & regulations and bye-laws laid down by Collector / Central/State Govt. and any other statutory bodies shall be adhered to, by the contractor, during the execution of work. The contractor shall also adhere to all traffic restrictions notified by the local authorities. All statutory taxes, levies, charges (including water and sewerage charges, charges for temporary service connections and / or any other charges) payable to such authorities for carrying out the work, shall be borne by the Contractor. The water charges (for municipal water connection as well as tanker water) shall be borne by the contractor. Also, if the contractor obtains water connection for the drinking purposes from the municipal authorities or any other statutory body, the consequent sewerage charges shall be borne by the contractor. The Contractor shall arrange to give all notices as required by any statutory / regulatory authority and shall pay to such authority all the fees that is required to be paid for the execution of work. He shall protect and indemnify the Department and its officials & employees against any claim and /or liability arising out of violations of any such laws, ordinances, orders, decrees, by himself or by his employees or his authorized representatives. Nothing extra shall be payable on these accounts. The fee payable to statutory authorities for obtaining the various permanent service connections and occupancy Certificate for the building shall be borne by the Department
- 61 The contractor shall protect and indemnify the PWD, its officials & employees against any claim and /or liability arising out of violations of any such laws, ordinances, orders, decrees, by himself or by his employees or his authorized representatives or any of his other direct or indirect action taken in relation to the execution of this work. Nothing extra shall be payable on these accounts. In case of failure on part of the contractor in this respect, department shall be free to recover any such amount due to the contractor under this contract or any other contract under the government and the decision of the Engineer in charge in this regard shall be final and binding on the contractor.
- 62 The contractor shall assume all liability, financial or otherwise in connection with this contract and shall protect and indemnify the PWD, its officials & employees from any and all damages and claims that may arise on any account. The Contractor shall indemnify the department PWD against all claims in respect of patent rights, royalties, design,

trademarks- of name or other protected rights, damages to adjacent buildings, roads or members of public, in course of execution of work or any other reasons whatsoever, and shall himself defend all actions arising from such claims and shall indemnify the department in all respect from such actions, costs and expenses. Nothing extra shall be payable on this account. In case of failure on part of the contractor in this respect, department shall be free to recover any such amount due to the contractor under this contract or any other contract under the government and the decision of the Engineer in charge in this regard shall be final and binding on the contractor

62 (a) WATER PROOFING TREATMENT OF ALL TYPES OF WORK: The waterproofing work shall be carried out by specialized water proofing agencies. The Contractor(s) shall submit for the approval of the Engineer-in-Charge, the names of specialized agencies, of repute alongwith their technical capability proposed to be engaged by him, who have executed satisfactorily a minimum of three works of value not less than 40% of corresponding value each or two works of value not less than 50% each or one work of value not less than 80% of corresponding amount in the last five years. For calculation purpose only, cost of waterproofing works will be taken as Rs. 2.00 Cr

(b) ALUMINIUM/GLASS WORK: The aluminium/glass work shall be carried out by specialized agency having adequate workshop with necessary equipments and having the experience in aluminium/glass works. The Contractor(s) shall submit for the approval of the Engineer-in-Charge, the names of specialized agencies, of repute alongwith their technical capability proposed to be engaged by him, who have executed satisfactorily a minimum of three works of value not less than 40% of corresponding value each or two works of value not less than 60 % each or one work of value not less than 80% of corresponding amount in the last five years. For calculation purpose only, cost of aluminium/glass works will be taken as Rs. 2.00 Cr.

(c) STRUCTURAL GLAZING WORK: The structural glazing work shall be carried out by specialized agency having adequate workshop with necessary equipments and having the experience in structural glazing works. The Contractor(s) shall submit for the approval of the Engineer-in-Charge, the names of specialized agencies, of repute alongwith their technical capability proposed to be engaged by him, who have executed satisfactorily a minimum of three works of value not less than 40% of corresponding value each or two works of value not less than 60 % each or one work of value not less than 80% of corresponding amount in the last five years. For calculation purpose only, cost of structural glazing works will be taken as Rs. 1.00 Cr.

63 The work shall be carried out in accordance with the Architectural drawings and structural drawings duly proof checked, to be prepared and submitted by architectural/structural consultants engaged by the contractor, after approval by the Engineer-in-Charge. Before commencement of any item of work the contractor shall correlate all the relevant architectural and structural drawings, nomenclature of items and specifications etc. issued for the work and satisfy himself that the information available there from is complete and unambiguous. The figure and written dimension of the drawings shall be superseding the measurement by scale. The discrepancy, if any, shall be brought to the notice of the Engineer-in-charge before execution of the work. The contractor alone shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and or incomplete information and no claim whatsoever shall be entertained on this account.

64 Sample of Materials

BIS marked materials except otherwise specified shall be subjected to quality test at the discretion of the Engineer-in-Charge besides testing of other materials as per the

specifications described for the item/material. Wherever BIS marked materials are brought to the site of work, the contractor shall, if required, by the Engineer-in-Charge furnish manufacturer's test certificate or test certificate from approved testing laboratory to establish that the material / procured by the contractor for incorporation in the work satisfies the provisions of specifications/BIS codes relevant to the material and / or the work done.

For certain items, if frequency of tests not mentioned in the CPWD Specifications and then relevant IS code shall be followed and tests shall be carried out as per the frequency specified therein.

- 65 The contractor shall be fully responsible for the safe custody of materials brought by him/issued to him even though the materials may be under double lock and key system.
- 66 The contractor shall procure the required materials in advance so that there is sufficient time for testing of the materials and approval of the same before use in the work. The contractor shall provide at his own cost suitable weighing and measuring arrangements at site for checking the weight / dimensions as may be necessary for execution of work. The sealed samples are to be handed over to the testing lab by contractor in the presence of Junior Engineer/Assistant Engineer-in-Charge of work.
- 67 Malba, rubbish & other waste materials shall be reused at site as directed by Engineer-in-Charge or disposed off to recycling agents. No deduction on this account shall be made from the agency as well as no extra payment will be made to agency if it is disposed at pre-defined location within the campus.

68 **Pour card, check-list for Execution of work**

As and when any important item is taken up for execution, the Agency shall submit the specifications and develop a checklist and Pour card. This sample checklist should be got approved from the Engineer-in-charge and should be used at site. This check list should be shown to the Engineer-in-charge or his/her designee during inspection. This procedure is to be followed for all hidden items, CC/RCC work, Steel- reinforcement, shuttering, doors & windows, plumbing, including water supply pipe lines, roof treatment, earth filling etc.

69 **Method Statement**

The agency shall submit a 'Method statement' for each important activity for the approval of the Engineer-in-charge soon after the award of work to him. The 'Methods statement' is a statement by which the construction procedures for any activity of construction are formulated and stated in chronological order. The 'Methods statement', should have a description of the item with elaborate procedures in steps to implement the same, the specifications of the materials involved, their testing and acceptance criteria, equipment to be used, Precautions to be taken, steps of measurement, etc.

ADDITIONAL CONDITIONS

- 1 The amount quoted for **Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1** work out the lowest bidder to be declared as successful bidder as per evaluation criteria. However, the Engineer-in-Charge does not bind himself to accept the lowest bid, and reserves the right to reject any or all of the bids received, without assigning any reasons and there shall be no claims on this account.
- 2 All the pre-construction activities including preparation and requisite approvals of the designs and drawings shall be taken up simultaneously and completed within a period of 03 months.
- 3 Contractor has to take all protective and preventive measures to protect buildings/ structures/other infrastructure/services in the vicinity of the proposed building from any kind of damage at his risk and cost. Sheet piling or other safety measures as directed by engineer in charge shall required to be taken by the contractor to protect the buildings/ structures/services including their foundations from any possible damage. The measures so taken are inclusive in the quoted rates of the contractor. Nothing extra shall be admissible for such measures. Any damage caused on account of any action of the contractor to any adjacent buildings/ structures/other infrastructure/services in the vicinity of the proposed building shall have to be made good by the contractor at his risk and cost, failing which the engineer in charge after giving a notice to this effect in writing shall get it done at the risk and cost of contractor.
- 4 Royalty at the prevailing rates wherever payable shall have to be paid by the contractor on the boulders, metal, shingle, sand and bajri etc. Or any other material collected by him for the work directly to revenue authorities/Govt authorities and nothing extra shall be paid by the department for the same.
- 5 The contractor shall provide at his own cost suitable weighing, surveying and levelling and measuring arrangements as may be necessary at site for checking. All such equipment shall be got calibrated in advance from laboratory, approved by the Engineer-in-Charge. Nothing extra shall be payable on this account.
- 6 Other agencies/sub-contractor will also simultaneously execute and install the works of sub-station / generating sets etc. for the work and the contractor shall afford necessary facilities for the same. The contractor shall leave such recesses, holes, openings trenches etc. as may be required for such related works (for which inserts, sleeves, brackets, conduits, base plates, clamps etc. shall be supplied free of cost by the department unless otherwise specifically mentioned) and the contractor shall fix the same at time of casting of concrete, stone work and brick work, if required, and nothing extra shall be payable on this account.
- 7 All materials obtained from Govt. Stores or otherwise shall be got checked by the Engineer-in-Charge or his any authorized supervisory staff on receipt of the same at site before use.
- 8 All materials and fittings brought by the contractor to the site for use shall conform to the samples approved by the Engineer-in-Charge which shall be preserved till the completion of the work. If a particular brand of material is specified in the item of work in Schedule of Quantity, the same shall be used after getting the same approved from Engineer-in-Charge. Wherever brand / quality of material is not specified in the item of work, the contractor shall submit the samples as per approved list of brand names given in the tender

document / particular specifications for approval of technical sanctioning authority. For all other items, materials and fittings of ISI Marked shall be used with the approval of Engineer-in-Charge. Wherever ISI Marked material / fittings are not available, the contractor shall submit samples of materials / fittings manufactured by firms of repute conforming to relevant specifications or IS codes and use the same only after getting the approval. To avoid delay, contractor should submit samples as stated above well in advance so as to give timely orders for procurement. If any material, even though approved by Engineer-in-Charge is found defective or not conforming to specifications shall be replaced / removed by the contractor at his own risk & cost.

- 9 The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material / work beyond set-out tolerance limit shall be summarily rejected by the Engineer-in-Charge & contractor shall be bound to replace / remove such sub-standard / defective work immediately.
- 10 The day to day receipt and issue accounts of different grade/brand of cement shall be maintained separately in the standard Performa by the Jr. Engineer-in-Charge/AE in-charge of work and which shall be duly signed by the contractor or his authorized representative.
- 11 In the event of any restrictions being imposed by the Security agency, PWD, Traffic or any other authority having jurisdiction in the area on the working or movement of labour
- 12 /material, the contractor shall strictly follow such restrictions and nothing extra shall be payable to the contractor on this account. The loss of time on this account, if any, shall have to be made up by generating additional resources etc.
- 13 **The proposed building work is a prestigious project and quality of work is of paramount importance.** Contractor shall have to engage well experienced skilled labour and deploy modern T&P and other equipments to execute the work. Many items like stone masonry & stone cladding work, stone flooring & other specialized flooring work, wood work, precast RCC coffers, polysulphide/ silicone sealant will specifically require engagement of skilled workers having experience particularly in execution of such items.
- 14 No payment shall be made for any damage caused by rain, snowfall, flood or any other natural calamity, whatsoever during the execution of the work. The contractor shall be fully responsible for any damage to the govt. property and work for which the payment has been advanced to him under the contract and he shall make good the same at his risk and cost. The contractor shall be fully responsible for safety and security of his material, T&P, Machinery brought to the site by him.
- 15 **MODE OF MEASUREMENTS** will be as per payment schedule and weightage thereof;

16 **Site office accommodation and furniture**

A reasonably furnished site office of area about 150 sqmt. having a sample room, A.C. meeting room, A.C. staff rooms with file storage facility along with computers & printers and its consumables, a telephone with STD facility, Fax Machine, internet and toilets & pantry and vehicle(s) 2 numbers (Swift Dzire or equivalent) complete with driver, fuel and consumables and furnished transit accommodation (having minimum 3 BHK) shall be provided for Executing agency/Assam PWD (Building) by the Contractor at his own cost for the duration of the Contract. Electricity & drinking water for the site office will have to be provided by the contractor at his own cost for the site

office.

In case suitable existing building/accommodation is available at site, the same may be furnished as above with the consent of the Executing Agency.

The agency shall provide the following furniture (new) for use of PWD staff at site office.

S.No.	Articles	Quantity
1.	Executive table (wooden) with side racks	1 Nos.
2.	Executive Chair	1 Nos.
3.	Office Tables	1 Nos.
4.	Office Chairs	4 Nos.
5.	Steel Almirah	1 Nos.
6.	Conference table (for 8 seats)	1 Nos.
7.	Conference chairs	08 Nos.

SPECIAL CONDITIONS FOR CEMENT & STEEL

1 SPECIAL CONDITIONS FOR CEMENT

- 1.1 The contractor shall procure 43 grade Ordinary Portland Cement (OPC) conforming to IS:8112/Portland Pozzolana Cement (PPC) [conforming to IS:1489 (Part-I)], as required in the work, from reputed manufacturers of grey cement such as ACC, Ultra tech, Vikram, Shree Cement, Ambuja, Jaypee Cement & J. K. Cement from any other reputed cement Manufacturer having a production capacity not less than one million tonnes per annum. The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacturer(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer, fully or partially. Supply of cement shall be taken in 50 Kg. bags bearing manufacturer's name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-charge and got tested in accordance with provisions of relevant BIS codes. In case test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in-charge to do so.
- 1.2 PPC (Portland Puzzolana Cement) shall be used in RCC structures in accordance with the circular issued by the Directorate General of Works vide No.CDO/SE(RR)/Fly Ash (Main)/102 dt.09.04.2009. The use of PPC shall be regulated as per the following conditions stipulated in the circular dt.09.04.2009:-
 - a) IS:456-2000 Code of Practice for Plain and Reinforced Concrete (as amended upto date) shall be followed in regard to Concrete Mix Portion and its production as under:
 - (i) The concrete mix design shall be done as "Design Mix Concrete" as prescribed in clause-9 of IS: 456 mentioned above.
 - (ii) Concrete shall be manufactured in accordance with clause 10 of above mentioned IS:456 covering quality assurance measures both technical and organizational, which shall also necessarily require a qualified Concrete Technologist to be available during manufacture of concrete for certification of quality of concrete.
 - b) Minimum M30 grade of concrete shall be used in all structural elements made with RCC both in load bearing and framed structure.
 - c) The mechanical properties such as modulus of elasticity, tensile strength, creep and shrinkage of flyash mixed concrete or concrete using flyash blended cements (PPCs) are not likely to be significantly different and their values are to be taken same as those used for concrete made with OPC.
 - d) To control higher rate of carbonation in early ages of concrete both in flyash admixed as well as PPC based concrete, water/binder ratio shall be kept as low as possible, which shall be closely monitored during concrete manufacture.
If necessitated due to low water/binder ratio, required workability shall be achieved by use of chloride free chemical admixtures conforming to IS: 9103. The compatibility of chemical admixtures and super plasticizers with each set OPC, fly ash and /or PPC received from different sources shall be ensured by trials.
 - e) In environment subjected to aggressive chloride or sulphate attack in particular, use of flyash admixed or PPC based concrete is recommended. In case, where structural concrete is exposed to excessive magnesium sulphate, flyash substitution/content shall be limited to 18% by weight. Special type of cement with low C₃A content may also

- be alternatively used. Durability criteria like minimum binder content and maximum water/binder ratio also need to be given due consideration in such environment.
- f) Wet curing period shall be enhanced to a minimum of 10 days or its equivalent. In hot & arid regions, the minimum curing period shall be 14 days or its equivalent.
 - g) Subject to General Guidelines detailed out as above, PPC manufactured conforming to IS: 1489 (Part-I) shall be treated at par with OPC for manufacture of Design Mix Concrete for structural use in RCC.
 - h) Till the time, BIS makes it mandatory to print the % age of flyash on each bag of cement, the certificate from the PPC manufacturer indicating the same shall be insisted upon before allowing use of such cements in works.
 - i) While using PPC for structural concrete work, no further admixing of flyash shall be permitted.
- 1.3 The cement shall be brought at site in bulk supply of approximately **50 tonnes** or as decided by the Engineer-in-charge.
 - 1.4 The cement godown of the capacity to store a minimum of 2000 bags of cement shall be constructed by the contractor at the site of work for which no extra payment shall be made.
 - 1.5 Double lock provision shall be made to the door of the cement godown. The keys of one lock shall remain with the Engineer-in-charge or his authorized representative and the keys of the other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-charge at any time.
 - 1.6 The cement shall be got tested by Engineer-in-charge and shall be used on work only after test results have been received. The contractor shall supply free of charge the cement required for testing including its transportation cost to test laboratories. **The cost of tests shall be borne by the contractor.**
 - 1.7 The actual issue and consumption of cement on work shall be regulated and proper accounts maintained. The theoretical consumption of cement shall be worked out as per procedure prescribed in clause 38 of the contract and shall be governed by conditions laid therein. In case the cement consumption is less than theoretical consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption, no adjustments need to be made.
 - 1.8 Cement brought to site and cement remaining unused after completion of work shall not be removed from site without written permission of the Engineer-in-charge.
 - 1.9 Damaged cement shall be removed from site immediately by the contractor on receipt of notice in writing from the Engineer-in-charge. If he does not do so within three days of receipt of such notice, the Engineer-in-charge shall get it removed at the cost of the contractor.
 - 1.10 Cement bags shall be stored in two separate godowns, one for tested cement and the other for fresh cement (under testing) to be constructed by the contractor at his own cost as per sketches given in C.P.W.D Specifications– 2019 Vol. I to II with upto date correction slips having weatherproof roofs and walls. The size of the cement go down is indicated in the sketch for guidance. The actual size of godown shall be as per site requirements and nothing extra shall be paid for the same. The decisions of the Engineer-in-Charge regarding the capacity needed will be final. Each godown shall be provided with a single door with two locks. The keys of one lock shall remain with Engineer-in-Charge of the work and that of other lock with the authorized agent of the contractor at the site of work so that the cement is issued from godown according to the daily requirement with the

knowledge of both parties. The account of daily receipt and issue of cement shall be maintained in a register in the prescribed performa and signed daily by the contractor or his authorized agent in token its correctness.

- 1.11 Separate cement registers showing the receipt of the OPC and PPC shall be maintained at site. The contractor shall construct separate godowns for storage of OPC & PPC at site and nothing extra on this account shall be payable.
- 1.12 Cement register should be maintained at the site of work..
- 1.13 In order to have an effective control over the issue of cement, the following drill should be observed:
 - a) The cement godown(s) should be properly and effectively double locked, keys of one of the locks remaining with the department and that of the other with the contractor
 - b) The pages of the Cement Register should be as per Appendix-28 of CPWD Works Manual, machine numbered and each page initialed by the Executive Engineer
 - c) Periodical checking of cement godown.: The cement godown and the Cement Register should be checked by the Assistant Engineer/Executive Engineer in- charge of the work as per following schedule
 - d) At least weekly or fortnightly, respectively, in case of works at the headquarters of the Assistant Engineer/Executive Engineer
 - e) Whenever they visit the site of work in case of works that are located outside the Sub-Divisional/Divisional headquarters

2 SPECIAL CONDITIONS FOR STEEL:-

2.1 The PWD/Contractor shall procure IS marked TMT bars of various grades from Primary Steel manufacturers such as SAIL, TATA steel Ltd., RINL, Jindal Steel & Power Ltd., and JSW steel Ltd. Or any other steel manufacturers or their authorized dealers having valid BIS license for IS:1786:2008 (Amendment -1 November 2012)

a) The Steel manufacturers or their authorized dealers (as per following selection criteria) having valid BIS license for IS:1786:2008 (Amendment-1 November 2012) **The procured steel should have following qualities:-**

- i) Excellent ductility, bend ability and elongation of finished product due to possible refining technology.
- ii) Consumption of steel should be accurate as per design.
- iii) Steel should have no brittleness problem in finished product.
- iv) Steel should carry the quality of corrosion and earthquake resistance.
- v) Quality steel with achievement of proper level of sulphur and phosphorus as per IS: 1786:2008.

b) **Selection Criteria of steel manufacturers**

(1) The supply of reinforcement steel for all PWD works should have following selection criteria of steel manufacturers:-

Steel producers of any capacity using iron ore/processed iron ore as the basic raw material adopting advanced refining technologies as given hereunder:-

DRI-EAF = Direct Reduced iron – Electric arc furnace.

Or

ii. BF-BOF = Blast furnace – Basic oxygen furnace

Or

iii. COREX-BOF = COREX – Basic oxygen furnace.

For production of liquid steel to finish product at single/multiple locations with NABL or any other similarly placed accrediting Government body which operates in accordance with ISO/IEC 17011 and accredits labs as per ISO/IEC 17025 conforming to IS: 1786:2008 (Amendment-1 November 2012).

The check list for incorporation of any quality steel producer is enclosed for technical assessment is given in Annexure-1.

Chief Engineer/CPM/PM shall approve the steel manufactures for projects under their jurisdiction

2.2 The contractor shall have to obtain and furnish test certificates to the Engineer-in-charge in respect of all supplies of steel brought by him to the site of work.

2.3 Samples shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to **the specifications**, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week time or written orders from the Engineer-in-Charge to do so.

- 2.4 The steel reinforcement bars shall be brought to the site in bulk supply of **ten tonnes** or more as decided by the Engineer-in-charge.
- 2.5 The steel reinforcement shall be stored by the contractor at site of work in such a way as to prevent distortion and corrosion and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.
- 2.6 For checking nominal mass, tensile strength, bend test, re-bend test etc. specimen of sufficient length shall be cut from each size of the bar at random.
- 2.7 The contractor shall supply free of charge the steel required for testing including transportation to testing laboratories. **The cost of tests shall be borne by the contractor.**
- 2.8 The actual issue and consumption of steel on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of steel shall be worked out as procedure prescribed in clause 38 of the contract and shall be governed by conditions laid therein. In case the consumption is less than theoretical consumption including permissible variations recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment need to be made.
- 2.9 Steel brought to site and steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.
- 2.10 The following procedure should be followed in case of removal of rejected/sub- standard materials from the site of work.
 - i) Whenever any material brought by the contractor to the site of work is rejected, entry thereof should invariably be made in the site order book under the signature of the AE/AEE giving approximate quantity of such materials.
 - ii) As soon as the material is removed, a certificate to that effect may be recorded by the AE/AEE against the original entry, giving the date of removal a mode of removal i.e. whether by truck, carts or by manual labour. If removal is by truck, the registration number of the truck should be recorded
 - iii) When it is not possible for the AE/AEE to be present at the site of work at the time of actual removal of the rejected/sub-standard materials from the site the required certificate should be recorded by the Junior Engineer and the AE/AEE should countersign the certificate recorded by the Junior Engineer.
- 2.11 In case the contractor brings surplus quantity of steel the same after completion of the work will be removed from the site by the contractor at his own cost after approval of the Engineer-in-Charge.
- 2.12 Reinforcement including authorized spacer bars and overlaps shall be measured in length of different diameters, as actually (not more than as specified in the drawing) used in the work, nearest to a centimetre. Wastage and unauthorized overlaps shall not be measured.
- 2.13 The standard sectional weights referred to as in Table 5.4 under para 5.3.4 in CPWD Specifications for works 2009 Vol. 1 will be considered for conversion of length of various sizes of MS bars, Tor steel bars and TMT bars into standard weight. Records of actual sectional weight shall also be kept dia-wise & lot-wise. The average sectional weight for each diameter shall be arrived at from samples from each lot of steel received at site. The decision of the Engineer-in-Charge shall be final for the procedure to be followed for determining the average sectional weight of each lot.

- 2.14 Quantity of each diameter of steel received at site of work each day will constitute on single lot for the purpose. The weight of steel by conversion of length of various sizes of bar based on the actual weighted average sectional weight shall be termed as derived actual weight. If the derived weight as in para 2.14 above is lesser than the standard weight as in para above, the derived actual weight shall be taken for payment. If the derived actual weight is found more than the standard weight then the standard weight as worked out in para 2.13 above shall be taken for payment. In such case nothing extra shall be paid for the difference between the derived actual weight and the standard weight.
- 2.15 Mixing of different type of steel/different grades of steel shall not be allowed in the same structural members as main reinforcement to satisfy clause 26.1 of IS:456.

Tolerances on Nominal Mass (individual sample) shall be as under:

S. No.	Nominal size mm	Tolerances on the Nominal Mass (in % age)
1	Upto and including 10 mm	-8%
2	Over 10 upto& including 16 mm	-6%
3	Over 16 mm	-4%

Annexure-I
Special Conditions for Steel

Sl. No.	Item	Checkpoint	Remarks
1	Steel producer having manufacturing facilities at plant	a. Factory address and Registration no.	
		b. Certificate of manufacturing process	
		c. Refining process of steel Producer	
		c.1 BF-BOF route	
		c.2 Corex-BOF route	
		c.3 DRI-EAF route	
		With documentary evidence either for BOF or EAF	
		d. Steel plant having infrastructure for producing sponge iron, billete and TMT Rebars	
		e. Production and quality flow chart	
		f. Plant evaluation and process verification	
		g. List of plant & machinery	
2	Established	Document verification for:	
		a. Govt./PSU Approvals	
		b. Supply orders of TMT Re-bars in Govt. Projects(Minimum-5 years)	
		c. Verification of direct supply orders to any State/Central Govt. Department	
		d. User Certificate issued by any Govt. Department directly.	
3.	Indigenous	Documentary evidence like;	
		a. Certificate of incorporation.	
		b. Memorandum of articles of association	
		c. Credit rating of the company from CARE/CRISIL/ICRA should not be C/D grade (minimum last 3 year)	
		a. Test results from Govt./NABL accredited laboratories	
		b. In house testing facility for physical/chemical tests(NABL accredited)	
4	Reliable	d. Calibration certificates	
		e. List of lab equipments:	
		e.1 Calibration certificates	
		e.2 Computerized UTM	
5	Use of Iron-Ore/Processes Iron ore as basic raw materials	Verification of Iron-Ore/Process iron ore invoices	

6.	In-house rolling facility	Plant verification to identify in house rolling facilities, production of liquid steel & crude steel	
7.	Licences& certificates	a. ISO 9001:2008 Certification	
		b. ISO 14001:2004 Certification	
		c. OHSAS 18001 : 2007 certificate	
		d. IS 1786:2008(TMT Re-bars)	
		e. IS 2830:1992 (Billets)	
8.	Product Range	TMT Re-bars FE 415/415D/500/500D/550/550D	
		CRS (Corrosion Resistant) & EQR (Earthquake Resistant) TMT Re-bars Size 8 to 36 mm dia	

Note:

DRI-EAF->Direct Reduce Iron-Electric ARC Furnace BF-BOF-> Blast Furnace – Basic Oxygen Furnace COREX-BOF->COREX Furnace- Basic Oxygen Furnace

1 SPECIAL CONDITIONS FOR PREVENTION OF AIR, WATER, LAND POLLUTION, GREEN BUILDING CONSTRUCTION SITE:

The contractor shall strictly adhere to the following conditions as part of his contractual obligations:

- 1.1 The contractor shall not store/dump construction material or debris on metalled road.
- 1.2 The contractor shall ensure that adequate measures are taken for the prevention of erosion of the top soil during the construction phase. The contractor shall implement the Erosion and Sedimentation Control Plan (ESCP) provided to him by the Engineer in Charge as part of the larger Construction Management Plan (CMP). The contractor shall obtain the Erosion and Sedimentation Control Plan (ESCP) Guidelines from the Engineer in Charge and then prepare working plan for the following month activities as a CAD drawing showing the construction management, staging & ESCP. At no time soil should be allowed to erode away from the site and sediments should be trapped where necessary.
- 1.3 The contractor shall ensure that all the top soil excavated during construction works is neatly stacked and is not mixed with other excavated earth. The contractors shall take the clearance of the Engineer in Charge before any excavation. Top soil should be stripped to a depth of 20 cm (centimeters) from the areas to be disturbed, for example proposed area for buildings, roads, paved areas, external services and area required for construction activities etc. It shall be stockpiled to a maximum height of 40 cm in designated areas, covered or stabilized with temporary seeding for erosion prevention and shall be reapplied to site during plantation, landscaping etc. of the proposed vegetation. Top soil shall be separated from subsoil, debris and stones larger than 50 mm (millimeter) diameter. The stored top soil may be used as finished grade for planting areas.
- 1.4 The Contractor should follow the construction plan as proposed by the Architect / Engineer in Charge to minimize the site disturbance such as soil pollution due to spilling. Use staging and spill prevention and control plan to restrict the spilling of the contaminating material on site. Protect top soil from erosion by collection storage and reapplication of top soil, constructing sediment basin, contour trenching, mulching etc.
- 1.5 The surplus excavated earth if any shall be disposed of by the contractor at his own cost from the campus after approval from E-in-C. **The cost of disposal of surplus earth is inclusive in the cost of item of schedule of quantities.**
- 1.6 Required filling of site as per Level indicated in Master Plan and upto extent required has to be done by Contractor with sweet earth/sand.
- 1.7 The contractor shall not change the natural gradient of the ground unless specifically instructed by the Engineer in Charge. This shall cover all natural features like water bodies, drainage gullies, slopes, mounds, depressions, etc. Existing drainage patterns through or into any preservation area shall not be modified unless specifically directed by the Engineer-in-charge.
- 1.8 The contractor shall not carry out any work which results in the blockage of natural drainage.
- 1.9 The contractor shall ensure that existing grades of soil shall be maintained around existing vegetation and lowering or raising the levels around the vegetation is not allowed unless specifically directed by the Engineer-in-charge Contractor shall reduce pollution and land development impacts from automobiles use during construction.
- 1.10 Overloading of trucks is unlawful and creates the erosion and sedimentation problems, especially when loose materials like stone dust, excavated earth, sand etc. are moved.

Proper covering must take place. No overloading shall be permitted.

- 1.11 Surplus dismantle material/building rubbish received from dismantling/demolishing shall be dumped to the dumping ground in properly covered truck with precaution. Agency shall submit the hard copy of photograph showing the properly covered truck disposing the dismantles material/building rubbish. Failure of which shall be sternly dealt and a penalty @Rs.500/- per trip of truck shall be levied and the decision of Engineer-in-Charge shall be final & binding.
- 1.12 Agency/contractor shall not dump the construction material on the metalled road and shall keep the construction material on the physically demarcated space by the Engineer-in-Charge.
- 1.13 All the building material responsible for pollution shall be brought at site from sources covered by tarpaulin and shall take all precautionary measure to ensure that no dust particles are permitted to pollute the air quality, failure of which Agency shall be liable to pay damages as decided by Engineer-in-Charge. The decision of Engineer-in-Charge shall be final & binding.
- 1.14 There shall be no burning of leaves, plastic etc. at construction site.

1.15 CONSTRUCTION PHASE AND WORKER FACILITIES

- 1.15.1 The contractor shall specify and limit construction activity in pre-planned/ designated areas and shall start construction work after securing the approval for the same from the Engineer in Charge. This shall include areas of construction, storage of materials, and material and personnel movement.

1.16 PRESERVE AND PROTECT LANDSCAPE DURING CONSTRUCTION

- 1.16.1 The contractor shall ensure that no trees, existing or otherwise, shall be harmed and damage to roots should be prevented during trenching, placing backfill, driving or parking heavy equipment, dumping of trash, oil, paint, and other materials detrimental to plant health. These activities should be restricted to the areas outside of the canopy of the tree, or, from a safe distance from the tree/plant by means of barricading. Trees will not be used for support; their trunks shall not be damaged by cutting and carving or by nailing posters, advertisements or other material. Lighting of fires or carrying out heat or gas emitting construction activity within the ground, covered by canopy of the tree is not to be permitted.
- 1.16.2 The contractor shall take steps to protect trees or saplings identified for preservation within the construction site using tree guards of approved specification.
- 1.16.3 Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) approved by Engineer in Charge.
- 1.16.4 The contractor shall avoid cut and fill in the root zones, through delineating and fencing the drip line (the spread limit of a canopy projected on the ground) of all the trees or group of trees. Separate the zones of movement of heavy equipment, parking, or excessive foot traffic from the fenced plant protection zones.
- 1.16.5 The contractor shall ensure that maintenance activities during construction period shall be performed as needed to ensure that the vegetation remains healthy.
- 1.16.6 Contractor shall be required to develop and implement a waste management plan, quantifying material diversion goals. He shall establish goals for diversion from disposal in landfills and incinerators and adopt a construction waste management plan to achieve these goals. A project-wide policy of nothing leaves the Site, should be

followed, in such a case when strictly followed, care would automatically be taken in ordering and timing of materials such that excess does not become waste. Consider recycling cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation. Designate a specific area(s) on the construction site for segregated or commingled collection of recyclable material, and track recycling efforts throughout the construction process. Identify construction haulers and recyclers to handle the designated materials. The diversion may include donation of materials to charitable organizations and salvage of materials on-site.

- 1.16.7 Contractor shall collect all construction waste generated on site. Segregate these wastes based on their utility and examine means of sending such waste to manufacturing units which use them as raw material or other site which require it for specific purpose. Typical construction debris could be broken bricks, steel bars, broken tiles, spilled concrete and mortar etc.
- 1.16.8 The contractor shall provide potable water for all workers
- 1.16.9 The contractor shall provide the minimum level of sanitation and safety facilities for the workers at their camp/labour site. The contractor shall ensure cleanliness of workplace with regard to the disposal of waste and effluent; provide clean drinking water and latrines and urinals as per applicable standard. Adequate toilet facilities shall be provided for the workman within easy access of their place of work. The total no. to be provided shall not be less than 1 per 30 employees in any one shift. Toilet facilities shall be provided from the start of building operations, connection to a sewer shall be made as soon as practicable. Every toilet shall be so constructed that the occupant is sheltered from view and protected from the weather and falling objects. Toilet facilities shall be maintained in a sanitary condition. A sufficient quantity of disinfectant shall be provided. Natural or artificial illumination shall be provided.
- 1.17 The contractor shall ensure that air pollution due to dust/generators is kept to a minimum, preventing any adverse effects on the workers and other people in and around the site. The contractor shall ensure proper screening, covering stockpiles, covering brick and loads of dusty materials, wheel-washing facility, gravel pit, and water spraying. Contractor shall ensure the following activities to prevent air pollution during construction:
 - (i) Clear vegetation only from areas where work will start right away
 - (ii) Vegetate / mulch areas where vehicles do not ply.
 - (iii) Apply gravel / landscaping rock to the areas where mulching / paving is impractical
 - (iv) Identify roads on-site that would be used for vehicular traffic. Upgrade vehicular roads (if these are unpaved) by increasing the surface strength by improving particle size, shape and mineral types that make up the surface & base. Add surface gravel to reduce source of dust emission. Limit amount of fine particles (smaller than 0.075mm) to 10 - 20%
 - (v) Water spray, through a simple hose for small projects, to keep dust under control. Fine mists should be used to control fine particulate. However, this should be done with care so as not to waste water. Heavy watering can also create mud, which when tracked onto paved public roadways, must be promptly removed. Also, there must be an adequate supply of clean water nearby to ensure that spray nozzles don't get plugged.
 - (vi) Water spraying shall be done on:

- (a) Any dusty materials before transferring, loading and unloading
 - (b) Area where demolition work is being carried out
 - (c) Any un-paved main haul road
 - (d) Areas where excavation or earth moving activities are to be carried out
- (vii) The contractor shall ensure that the speed of vehicles within the site is limited to 10 km/hr.
- (viii) All material storages should be adequately covered and contained so that they are not exposed to situations where winds on site could lead to dust / particulate emissions.
- (ix) Spills of dirt or dusty materials will be cleaned up promptly so the spilled material does not become a source of fugitive dust and also to prevent of seepage of pollutant laden water into the ground aquifers. When cleaning up the spill, ensure that the clean-up process does not generate additional dust. Similarly, spilled concrete slurries or liquid wastes should be contained / leaned up immediately before they can infiltrate into the soil / ground or runoff in nearby areas
- (x) Provide dust screens or netting to scaffold along the perimeter of the building
- (xi) Cover stockpiles of dusty material with impervious sheeting
- (xii) Cover dusty load on vehicles by impervious sheeting before they leave the site
- (xiii) Contractor shall be required to provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics, and metals. He shall coordinate the size and functionality of the recycling areas with the anticipated collections services for glass, plastic, office paper, newspaper, cardboard, and organic wastes to maximize the effectiveness of the dedicated areas. Consider employing cardboard balers, aluminium can crushers, recycling chutes, and collection bins at individual workstations to further enhance the recycling program.
- 1.18 The contractor shall ensure that no construction leachate (e.g. cement slurry etc.), is allowed to percolate into the ground. Adequate precautions are to be taken to safeguard against this including recycling of wasteful materials, reduction of wasteful curing process, collection, basic filtering and reuse. The contractor shall follow requisite measures for collecting drainage water run-off from construction areas and material storage sites and diverting water flow away from such polluted areas. Temporary drainage channels, perimeter dike/swale, etc. shall be constructed to carry the pollutant-laden water directly to the treatment device or facility (municipal sewer line).
- 1.19 Staging (dividing a construction area into two or more areas to minimize the area of soil that will be exposed at any given time) should be done to separate undisturbed land from land disturbed by construction activity and material storage.
- 1.20 The contractor shall comply with the safety procedures, norms and guidelines (as applicable) as outlined in the document Part 7 Constructional practices and safety, 2005, National Building code of India, Harmonised Guidelines & Standards for Universal Accessibility in India 2021, Bureau of Indian Standards. A copy of all pertinent regulations and notices concerning accidents, injury and first-aid shall be prominently exhibited at the work site. Depending upon the scope & nature of work, a person qualified in first-aid shall be available at work site to render and direct first-aid to casualties. A

telephone may be provided to first-aid assistant with telephone numbers. Complete reports of all accidents and action taken thereon shall be forwarded to the competent authorities.

- 1.21 The contractor shall ensure the following activities for construction workers safety, among other measures:
 - (i) Guarding all parts of dangerous machinery.
 - (ii) Precautionary signs for working on machinery
 - (iii) Maintaining hoists and lifts, lifting machines, chains, ropes, and other lifting tackles in good condition.
 - (iv) Durable and reusable formwork systems to replace timber formwork and ensure that formwork where used is properly maintained.
 - (v) Ensuring that walking surfaces or boards at height are of sound construction and are provided with safety rails or belts.
 - (vi) Provide protective equipment; helmets etc.
 - (vii) Provide measures to prevent fires. Fire extinguishers and buckets of sand to be provided in the fire-prone area and elsewhere.
 - (viii) Provide sufficient and suitable light for working during night time.
- 1.22 The storage of material shall be as per standard good practices as specified in Part 7, Section 2. Storage, stacking and Handling practices, NBC 2016 and shall be to the satisfaction of the Engineer in Charge to ensure minimum wastage and to prevent any misuse, damage, inconvenience or accident. Watch and ward of the Contractors materials shall be his own responsibility. There should be a proper planning of the layout for stacking and storage of different materials, components and equipments with proper access and proper maneuverability of the vehicles carrying the materials. While planning the layout, the requirements of various materials, components and equipments at different stages of construction shall be considered.
- 1.23 The contractor shall provide for adequate number of garbage bins around the construction site and the workers facilities and will be responsible for the proper utilisation of these bins for any solid waste generated during the construction. The contractor shall ensure that the site and the workers facilities are kept litter free. Separate bins should be provided for plastic, glass, metal, biological and paper waste and labelled in both Hindi and English with suitable symbols.
- 1.24 The contractor shall prepare and submit spill prevention and control plans before the start of construction, clearly stating measures to stop the source of the spill, to contain the spill, to dispose the contaminated material and hazardous wastes, and stating designation of personnel trained to prevent and control spills. Hazardous wastes include pesticides, paints, cleaners, and petroleum products.
- 1.25 Contractor shall collect & submit the relevant material certificates for materials with high recycled (both post-industrial and post-consumer) content, including materials like RMC mix with fly-ash, glass with recycled content, calcium silicate boards etc..
- 1.26 Contractor shall collect the relevant material certificates for rapidly renewable materials such as bamboo, wool, cotton insulation, agrofiber, linoleum, wheat board, strawboard and cork etc.
- 1.27 Where possible, the contractor shall select materials/vendors, harvested and

manufactured regionally, within a 800-km radius of the project site.

- 1.28 Contractor shall adopt an IAQ (Indoor Air Quality) management plan to protect the HVAC system during construction, control pollutant sources, and interrupt pathways for contamination. He shall sequence installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile, and gypsum wallboard. He shall also protect stored on-site or installed absorptive materials from moisture damage.
- 1.29 The contractor shall ensure that a flush out of all internal spaces is conducted prior to handover. This shall comprise an opening of all doors and windows for 14 days to vent out any toxic fumes due to paints, varnishes, polishes, etc.
- 1.30 Contractor shall make efforts to reduce the quantity of indoor air contaminants that are odorous or potentially irritating harmful to the comfort and well-being of installer and building occupants. Contractor shall ensure that the VOC (Volatile Organic Compounds) content of paints, coatings and primers used must not exceed the VOC content limits mentioned below:

Paints

Non-flat - 150 g/L Flat (Mat) - 50 g/L

Anti corrosive/ anti rust - 250 g/L

Coatings / Clear wood finishes

Varnish - 350 g/L Lacquer - 550 g/L

Floor coatings - 100 g/L Stains - 250 g/L

Sealers

Waterproofing sealer - 250 g/L Sanding sealer - 275 g/L

Other sealers - 200 g/L

The VOC (Volatile Organic Compounds) content of adhesives and sealants used must be less than VOC content limits mentioned:

Architectural Applications VOC Limit (g/l less water)

Indoor Carpet adhesives - 50 g/L Carpet Pad Adhesives - 50 g/L Wood Flooring

Adhesive - 100 g/L Rubber Floor Adhesives - 60 g/L Sub Floor Adhesives - 50 g/L

Ceramic Tile Adhesives - 65 g/L

VCT and Asphalt Tile adhesives - 50 g/L DryWall and Panel Adhesives - 50 g/L

Structural Glazing Adhesives - 100 g/L Multipurpose Construction Adhesives - 70 g/L

Substrate Specific Application VOC Limit (g/l less water) Metal to Metal - 30 g/L

Plastic Foams - 50 g/L

Porous material (except wood) - 50 g/L Wood - 30 g/L

Fiber Glass - 80 g/L

Wherever required, Contractor shall meet and carry out documentation of all activities on site, supplementation of information, and submittals in accordance with **3 STAR TERI-GRIHA star** program standards and guidelines. Towards meeting the aforementioned building environmental rating standard(s) expert assistance shall be provided to him up on request.

1.31 Water Use during Construction

- 1.32 Contractor should spray curing water on concrete structure and shall not allow free flow of water. Concrete structures should be kept covered with thick cloth/gunny bags and water should be sprayed on them. Contractor shall do water ponding on all sunken slabs using cement and sand mortar.
- 1.33 The Contractor shall remove from site all rubbish and debris generated by the Works and keep Works clean and tidy throughout the Contract Period. All the serviceable and non-serviceable (malba) material shall be segregated and stored separately. The malba obtained during construction shall be collected in well formed heaps at properly selected places, keeping in a view safe condition for workmen in the area. Materials which are likely to cause dust nuisance or undue environmental pollution in any other way, shall be removed from the site at the earliest and till then they shall be suitable covered. Glass & steel should be dumped or buried separately to prevent injury. The work of removal of debris should be carried out during day. In case of poor visibility artificial light may be provided.
- 1.34 The contractor shall provide O & M Manuals wherever applicable.
- 1.35 The contractor shall make himself conversant with the Site Waste Management Program Manual and actively contribute to its compilation by estimating the nature and volume of waste generated by the process/installation in question.

2 MATERIALS & FIXTURES FOR THE PROJECT

- 2.1 Contractor will produce wherever feasible certificate regarding distance of the source of the relevant material.
- (a) Unless otherwise stated cement used at site for reinforced concrete, precast members, mortar, plaster, building blocks, etc shall be PPC (Portland Pozzolana Cement). The PPC must meet the requirements of IS 1489 (Part I) as regards to fly ash content in cement. The contractor shall obtain from the PPC manufacturer the certificate regarding fly ash content in the PPC in each batch of consignment.
 - (b) The contractor has to comply as per MoEF issued notification 8.0.763(E) dated 14th Sept.1999 & latest notification of Jan. 2016 containing directive for greater fly ash utilization.
 - (c) The contractor shall ensure that all paints, polishes, adhesives and sealants used both internally and externally, on any surface, shall be Low VOC products. The contractor shall get prior approval from the Engineer in Charge before the application of any such material.
 - (d) All plumbing and sanitary fixtures installed shall be as per the direction of the Engineer in Charge and shall adhere to the minimum LPM (litres per minute) and LPF (litres per flush) (Wash basin: 6.3 Litre per minute, WC flushing: 4/6 Litre per flushing, Urinal Flushing: 3/6 litre per flush). The contractor shall employ 100% zero ODP (ozone depletion potential) insulation; HCFC (hydro-chlorofluorocarbon)/ and CFC (chlorofluorocarbon) free HVAC and refrigeration equipments and/halon-free fire suppression and fire extinguishing systems.

3 RESOURCES CONSUMED DURING CONSTRUCTION

- (a) The contractor shall ensure that the water and electricity is not wasted during construction. The Engineer in Charge can bring to the attention any such wastage

and the contractor will have to ensure that such bad practices are corrected.

- (b) The contractor shall install necessary meters and measuring devices to record the consumption of water, electricity and diesel on a monthly basis for the entire tenure of the project.
- (c) The contractor shall ensure that all run-off water from the site, during construction is collected and reused to the maximum.
- (d) The contractor shall use treated recycled water of appropriate quality standards for construction, if available.
- (e) No lights shall be turned on during the period between 6:00 AM to 6:00 PM, without the permission of the Engineer in Charge.

4 CONSTRUCTION WASTE

- (a) Contractor shall ensure that wastage of construction material is within 3%.
- (b) All construction debris generated during construction shall be carefully segregated and stored in a demarcated waste yard. Clear, identifiable areas shall be provided for each waste type. Employ measures to segregate the waste on site into inert, chemical, or hazardous wastes.
- (c) All construction debris shall be used for road preparation, back filling, etc, as per the instructions of the Engineer in Charge, with necessary activities of sorting, crushing, etc.
- (d) No construction debris shall be taken away from the site, without the prior approval of the Engineer in Charge.
- (e) The contractor shall recycle the unused chemical/hazardous wastes such as oil, paint, batteries, and asbestos.
- (f) If and when construction debris is taken out of the site, after prior permissions from the Engineer in Charge, then the contractor shall ensure the safe disposal of all wastes and will only dispose of any such construction waste in approved dumping sites.

5 DOCUMENTATION

- a) The contractor shall, during the entire tenure of the construction phase, submit the following records to the Engineer in Charge on a monthly basis:
 - i) Water consumption in litres
 - ii) Electricity consumption in kwh units
 - iii) Diesel consumption in litres
 - iv) Quantum of waste (volumetric/weight basis) generated at site and the aggregated waste types divided into inert, chemical and hazardous wastes.
 - v) Digital photo documentation to demonstrate compliance of safety guidelines as specified here and in the Appendix on Safety Conditions.
- b) The contractor shall, during the entire tenure of the construction phase, submit the following records to the Engineer in Charge on fortnightly basis:
 - i) Quantities of material brought on the site, including the material issued to the

- contractor by the Engineer in charge.
- ii) Inventories of materials used in the work i/c. flyash, flyash bricks etc.
 - iii) Quantities of construction debris (if at all) taken out of the site
 - iv) Digital photographs of the works at site, the workers facilities, the waste and other material storage yards, pre-fabrication and block making works, etc as guided by the Engineer in Charge.
 - v) No. of different categories of labours deployed at site for work (shift wise).
 - c) The contractor shall submit a document after construction of the buildings, a brief description along with photographic records to show that other areas have not been disturbed during construction. The document should also include brief explanation and photographic records to show erosion and sedimentation control measures adopted. (Document CAD drawing showing site plan details of existing vegetation, existing buildings, existing slopes and site drainage pattern, staging and spill prevention measures, erosion and sedimentation control measures and measures adopted for top soil preservation during construction
 - d) The contractor shall submit to the Engineer in Charge after construction of the buildings, a detailed as built quantification of the following:
 - i. Total materials used,
 - ii. Total top soil stacked and total reused
 - iii. Total earth excavated
 - iv. Total waste generated,
 - v. Total waste reused,
 - vi. Total water used,
 - vii. Total electricity, and
 - viii. Total diesel consumed.
 - e) The contractor shall submit to the Engineer in Charge, before the start of construction, a site plan along with a narrative to demarcate areas on site from which top soil has to be gathered, designate area where it will be stored, measures adopted for top soil preservation and indicate areas where it will be reapplied after construction is complete.
 - f) The contractor shall submit to the Engineer in Charge, a detailed narrative (not more than 250 words) on provision for safe drinking water and sanitation facility for construction workers and site personnel.
 - g) Provide supporting document from the manufacturer of the cement specifying the flyash content in PPC used in reinforced concrete.
 - h) The contractor shall submit the following information to the Engineer-in-charge at the end of construction, for all material brought to site for construction purposes, including manufacturer's certifications, verifying information, and test data, where Specifications sections require data relating to environmental issues including but not limited to:
 - (i) Source of products: Supplier details and location of the supplier.
 - (ii) Project Recyclability: Submit information to assist Owner and Contractor in

recycling materials involved in shipping, handling, and delivery, and for temporary materials necessary for installation of products.

- (iii) Recycled Content: Submit information regarding product post industrial recycled and post consumer recycled content, Use the Recycled Content Certification Form, to be provided by the Commissioning Authority appointed for the Project.
- (iv) Product Recyclability: Submit information regarding product and products component's recyclability including potential sources accepting recyclable materials where ever applicable.
- (v) Certifications from manufacturers of Low VOC paints, adhesives, sealant and polishes used at this particular project site
- (vi) Submit environmental and pollution clearance certificates for all diesel generators installed as part of this project. Provide total support to Engineer in Charge and Green Building Consultants appointed by the Engineer in charge in completing all Green Building Rating related formalities, including signing of forms, providing signed letters in the contractor's letterhead whenever required
- i) Provide final certification of well-managed forest of origin to provide final documentation of certified sustainably harvested status: Acceptable wood, certified sustainably harvested, certifications shall include:
 - (i) Clean tech: Provide pollution clearance certificates from all manufacturers of materials
 - (ii) Indoor Air quality and Environmental Issues: Submit emission test data, sourced from the manufacturers, produced by acceptable testing laboratory listed in Quality Assurance Article for materials as required in each specific Specification section.
 - (a) Certifications from manufacturers of Low VOC paints, adhesives, sealant and polishes used at this particular project site.
 - (b) Certification from manufacturers of composite wood products/agrofibre products on the absence of added urea formaldehyde resin in the products supplied to them to this particular site.
 - (c) Submit environmental and pollution clearance certificates for all diesel generators installed as part of this project. Provide total support to Engineer in Charge and Green Building Consultants appointed in completing all Green Building Rating related formalities, including signing of forms, providing signed letters in the contractor's letter head whenever required.

6 EQUIPMENT

- a) To ensure energy efficiency during and post construction all pumps, motors and engines used during construction or installed, shall be subject to approval of the Engineer-in- Charge.
- b) All lighting installed by the contractor around the site and at the labour quarters during construction shall be led fixtures of the appropriate illumination levels. This condition is a must, unless specifically prescribed.

The contractor is expected to go through all other conditions of the **minimum 3 star GRIHA rating system**. Failure to adhere to any of the above mentioned items, without

approval of the Engineer in Charge, shall be deemed as a violation of contract and the contractor shall be held liable for penalty as per terms of the agreement.

In case any penalty is imposed by any Hon'ble Court, NGT or any other authority due to non-compliance of any statutory order, or law or guidelines or pollution control or environmental norms, the same will be borne by the contractor.

7 Submission of Pollution Control Plan

- (a) The contractor shall submit the detailed action plan for control of pollution and for adherence to all the environmental guidelines/Laws/statutes/Court Orders/NGT orders/orders of pollution control authorities through the entire period of construction at site. The detailed action plan shall be submitted to the Engineer-in-Charge within 15 days of the stipulated date of start of work and shall be got approved from the Engineer-in-Charge.
- (b) The contractor shall arrange for control measures of all dust/noise/emission from the construction activities at site of work and shall install screens/curtains/ covers/dust trappers etc. as per guidelines/orders of the NGT/Court of law/ statutory authorities etc. No hindrance shall be allowed, arising out of any stay/stopping of work from any court/statutory authority/NGT/Govt. Authorities as a consequence of the contractor not adhering to any pollution control guideline/law/order of the state bodies during the construction period. Nothing shall be paid to the contractor on account of expenses for any dust/pollution/emission control measures at the site of work or any delay in work due to any orders passed by any court/ statutory authority/Govt. Authorities during the period of construction.

Compensation of Rs. 5,000/- per day will be levied and recovered from the dues of the contractor for each day of delay beyond 15 days for non submission of pollution control plan.

The contractor is strongly advised to study all dust/Noise/emission/ pollution control norms/laws/Court Orders before bidding for the work and quote his rates accordingly for any liability which may arise on this account during the period of construction.

- 8 Nothing extra, whatsoever, shall be paid beyond the quoted rates on the account of compliance of conditions and instructions prescribed under special conditions for prevention of air water land pollution, green building construction and its sub clauses thereof, and the rates already quoted by the contractor shall be deemed to be inclusive of all such provisions except for provided otherwise
- 9 Samples of various materials required for testing as per the frequency prescribed in CPWD specifications/BIS codes/Contract, whichever is higher shall be provided free of charges by the contractor. Testing charges, if any, unless otherwise mentioned, shall be borne by the contractor and testing shall be got conducted in labs approved by SE&PD, Uttarakhand Projects. All other expenditure required to be incurred for taking the samples; conveyance, packing etc. shall also be borne by the contractor himself. No extra payment shall be made on this account.
- 10 For certain item, if frequency of tests is not mentioned in the CPWD Specifications, then relevant IS code shall be followed and tests shall be carried out as per the frequency specified therein.
- 11 Door/window frames/shutters and other factory-made materials shall be procured from reputed and approved manufacturers or their authorized dealers as approved by Engineer

in charge. Decision of Engineer-in-charge in this regard shall be final and binding.

- 12 All CP brass water supply fittings and fixtures mentioned anywhere in the agreement shall be single lever in case of mixers and quarter turn in case of rest and shall be of make and model as per the list of approved makes provided in the agreement.
- 13 All the CP brass/ SS fittings and fixtures for toilets like towel rod, towel rack, robe hook, angle valve and other such wellness products/accessories shall be of make and model as per the list of approved makes provided in the agreement, except otherwise mentioned.
- 14 CP brass nipple/GI hexa nipple of appropriate dia and length, wherever required to be provided, shall be of make as per list of approved makes and nothing extra shall be paid on this account and the overall quoted cost shall be deemed to be inclusive of all such provisions.
- 15 All sanitary wares and fittings shall conform to IS standards and to be procured from approved makes. The contractor shall submit minimum three samples of different makes of approved/ preferred make list for all fittings and fixtures proposed to be used, to the Engineer-in-charge for his approval and decision of engineer-in-charge regarding selection of any sample shall be final and binding. The approved samples shall remain with the Engineer-in-charge till the completion of the work.
- 16 The items of stainless steel railing mentioned in the agreement shall be modular in construction as per the list of approved makes provided in the agreement. Welding of joints shall be resorted to in exceptional cases only with the approval of engineer-in-charge.
- 17 All kind of hardware to be used for fire doors like door closer, hinges, panicbar, trim latch, mortice latch and lock etc. shall be certified having valid certificate of approval from third party reputed International certifying agency like certifire or equivalent.
- 18 Items of aluminium provided for shutter and fixed portion in the agreement shall be of section compatible with euro hinges/ butt hinges/concealed hinges/3d hinges or rollers for use in casement / sliding shutters as directed by the engineer-in-charge, for which nothing extra shall be paid and the decision of engineer-in-charge in this regard shall be final and binding.
- 19 All the aluminium doors and windows shall be factory fabricated through specialized agencies as per the list of approved makes. In case no agency is provided in the list of approved makes, specialized agency shall be got approved from engineer-in-charge after submitting all required document like previous work done, completion certificate, copy of work order, IT TDS certificates for the work done etc. as may have been prescribed in the agreement to the satisfaction of the engineer-in-charge including inspection of work if required. The decision of engineer-in-charge regarding acceptance or rejection of such agency proposed by the contractor shall be final and binding. In no case fabrication of aluminium door and windows shall be allowed at site.
- 20 Contractor shall have to strictly abide and follow all the terms and conditions prescribed by ministry of environment and forest (MoEF), GOI, NGT, CPCB, state PCB, available on their website or any other appropriate government authority for construction works in Hajo or elsewhere, for which nothing extra shall be paid on this account except for provided otherwise in the agreement. The quoted rate shall be deemed to be inclusive of all such provision and conditions and provisions as aforementioned. In case of non-fulfillment of any of the conditions/provisions prescribed by the aforementioned authorities, as the case may be, engineer-in-charge shall get it done at the risk and cost of contractor after giving him a notice in writing and such decision of engineer-in-charge shall be final and binding.

in the contractor.

- 21 Contractor shall be mandatorily be required to provide to the engineer-in charge certified copies of original invoices of all kind of materials, T&P etc. being used or procured for this agreement. Failure to provide any of such information to engineer-in-charge to his satisfaction shall render the contractor ineligible for payment for such items and no claim what so ever on this account shall be admissible and decision of engineer-in-charge in this regard shall be final and binding.
- 22 Contractor shall provide minimum three samples of three different makes for each item of work as per the list of approved makes for the approval of engineer-in-charge. It shall be the discretion of Engineer-in-charge to approve any of the three samples to be submitted bythe contractor and decision of engineer-in-charge in this regard shall be final and binding and nothing extra, whatsoever, shall be admissible on this ground.
- 23 The site for execution of work is very congested and there is no space for labour hutments, batching plant or stacking of construction materials. Therefore, the agency shall have to arrange space outside the campus at its own risk and cost for labour huts, batching plant and stacking of materials required for construction, cost of which may be factored in, while quoting for the work. No claim, whatsoever, shall be admissible on account of hindrance or additional cost being incurred for these activities.
- 24 The land for labour camps & batching Plant and storage/dumping of construction materials shall be arranged by the contractor at his risk and cost. The lease/rent charges shall be borne by the contractor. The Engineer-in-Charge shall extend necessary help and issue necessary recommendations etc. to the concerned clients / department for temporary allotment of land during construction period, if land is available with them. In such cases, the contractor shall vacate the land after completion of work in same condition as was at the time of allotment.
- 25 Rates being quoted by the tenderers shall be deemed to be inclusive of all kind of multiple handling of materials including manual carriage and wastage involved thereto, including all lifts and leads up to the work site. No claim, whatsoever, shall be admissible on account of hindrance or additional cost being incurred for these activities.
- 26 Rates quoted by the tenderers shall be deemed to be inclusive of loading, unloading, carrying away and dumping the malba, rubbish or surplus earth being generated during construction or due to dismantling, outside the campus including all lifts and leads, at any government approved location or any other suitable location in conformity with the laws of land at contractors risk and cost. The entire responsibility and any kind of legal and financial liabilities arising out of such activity including identification of suitable dumping ground (government/private) shall lie completely over the contractor.
- 27 Only river sand/fine aggregates shall be allowed for concrete/mortar/plaster works. Manufactured sand shall not be allowed.
- 28 No hindrance shall be applicable/allowed for bad weather, snowfall, rainfall, hurricane, non-motor able roads, mud, slush etc. and alike conditions and any delay, if any, caused on account of such factors, shall have to be covered up by deploying additional labor, resources and working in shifts. Nothing extra shall be paid on this account over and above the quoted rates.
- 29 The ridges used in metal sheet roofing shall be cut and notched down as per the directions of the Engineer in charge in the trough/valley portions of the metal sheet roofing. In case of pre coated metal profile sheet roofing, self-tapping/drilling screws as per the

specifications shall be provided on each crest/ridge on each purlin. The quoted rates shall be inclusive of all such operations and nothing extra shall be paid on this account.

- 30 All corner joints of tiles in dado shall be made by chamfering the edges of tiles to 45 degree to produce a fine mitred joint and filling same with matching grout. Nothing extra shall be paid on this account.
- 31 All joints of stones in wall claddings shall be made as per the architectural drawings or directions given by Engineer in charge. Making of all kind of such stone joints such as V groove, butt joint, partial butt joint etc., including polishing of the edge of stone in such groove/joint shall be deemed to be included in the quoted cost, unless mentioned otherwise and nothing extra shall be paid on this account.
- 32 Moisture barrier membrane required in the items of modular expansion joint shall be of EPDM membrane of minimum 1.1 mm thickness of make as approved by Engineer in charge. The cost of such membrane and fixing it using epoxy adhesive and putty is deemed included in the quoted rates and nothing extra shall be paid on this account.
- 33 Painting on interior and exterior surfaces of building shall be done using rollers only and nothing extra shall be paid on this account. Painting of corners flat brushes may be used.
- 34 **The defect liability period under Clause-17 of GCC of the agreement shall be Twelve Months from the actual date of completion.**

35 **CCTV FOR SITE MONITORING:**

The contractor shall install and maintain till the completion of work, at least Six Nos IP based 360 degree Rotation PTZ CCTV cameras at such locations so that total site can be monitored at one computer at site and at other at the office of Engineer in charge i/c all other required accessories like data connection, Network Switch, server, PC work station, Cat-6 Wire, and power supply cable, necessary connections complete etc. The CCTV system shall have capacity to save the recordings of at least of Three months. The quoted rates of contractor deemed to have provisions for this arrangement and nothing extra will be payable on this ground.

36 **ROYALTY:**

Contractor shall comply with all statutory rules and regulations w.r.t royalty and other levies and taxes. Royalty at the prevalent rates prescribed by govt., shall be paid by the Contractor or his associate supplier as per Government rules, on all applicable materials such as boulders, metals, all sizes stone aggregates, brick aggregates, coarse and fine aggregates, moorum, river sand, gravels, earth and bajri etc. collected by him for the execution of the work, directly to the revenue authority of the state government concerned. Further, contractor needs to submit proof of submission of full royalty to the state government or local authority. Nothing extra shall be payable on this account.

- 37 The hindrances in execution of work, if any, whether on part of the contractor or department, as required for determining extension of time/rescheduling of milestones etc., with or without levy of compensation, shall be judged/worked out/based on the correspondences and site order book records between the department and the contractor.

PARTICULAR SPECIFICATION
CIVIL & SANITARY INSTALLATION / WATER SUPPLY / DRAINAGE WORK

1 EARTH WORK:-

- 1.1 The work shall be done in accordance with CPWD Specifications - 2019 - Vol. I & Vol. II and National Building Code 2016 with upto date correction slips.
- 1.2 Excavation shall be undertaken to the width of the Basement / Retaining wall footing including necessary margins for construction operation as per drawing or directed otherwise. Where the nature of soil or the depth of the trench and season of the year, do not permit vertical sides, the contractor at his own expense shall put up the necessary shoring, strutting and planking or cut slopes with or without steps, to a safer angle or both with due regard to the safety of personnel and works and to the satisfaction of the Engineer. Nothing extra shall be paid for making steps and slopes etc. as required.
- 1.3 As per approved structural and architectural drawings, foundation of the building shall be excavated with most secured and advance method. Contractor shall use all safety equipment and measures during excavation of the foundation. The contractor shall make at his own cost all necessary arrangements for maintaining water level, in the area where works are under execution low enough so as not to cause any harm to the works or problems in carrying out with the execution and the rates for all items of work shall be considered as inclusive of pumping out or bailing out water, if required, for which no extra payment shall be made. This will include water coming from any source, such as rains, accumulated rain water, floods, leakages from sewer and water mains, subsoil water table being high or due to any other cause whatsoever. During and after excavation, if the sub soil water, rain water, and water from any source percolate in the foundation trench, than contractor shall arrange most suitable method to bail out of this water to the nearest drain. The contractor shall make necessary provision of pumping, dredging, and bailing out water coming from all above sources and excavation and other works shall be kept free of water by providing suitable system approved by the Engineer-in-charge.
- 1.4 The contractor shall at his own cost make all necessary arrangements for stabilization of slope, construction of temporary retaining structure e.g. diaphragm wall, cofferdam, anchor pile, shoring or shuttering, sheet pile required for retaining of earth during excavation as per direction of engineer-in-charge.
- 1.5 All the major excavation shall be carried out by mechanical excavator. No extra payment shall be made for that.
- 1.6 Any trenching and digging for laying sewer lines/water lines/cables etc. shall be commenced by the contractor only when all men, machinery's and materials have been arranged and closing of the trench(s) thereafter shall be ensured within the least possible time
- 1.7 The rates are inclusive for all lead & depths & nothing extra shall be paid for additional lift etc.

2 CONCRETE WORK:-

- 2.1 The work shall be done in accordance with CPWD Specifications - 2019- Vol. I & Vol. II with upto date correction slips.
- 2.2 If the quantity of cement actually used in the work is found to be more than the theoretical quantity of cement including authorized variation, nothing extra shall be payable to the contractor on this account. In the event of it being discovered that after the completion of the work, the quantity of cement used is less than the quantity ascertained as herein before

provided (allowing variation on the minus side) the cost of quantity of cement so less used shall be recovered from the contractor at the rate as specified in schedule 'F'. Decision of the Engineer-in-Charge in regard to the quantity of cement which should have been actually used as per the schedule and recovery at the rate specified shall be final and binding on the contractor.

- 2.3 For non-scheduled items, the decision of the Chief Engineer/Superintending Engineer/Executive Engineer regarding theoretical quantity of the cement which should have been actually used shall be final and binding on the contractor.

3 **R.C.C./C.C WORK (DESIGN MIX CONCRETE):-**

- 3.1 The RCC work shall be done with Design Mix Concrete. Wherever letter M has been indicated, the same shall imply for the Design Mix Concrete. The Design Mix Concrete will be designated based on the principles given in IS: 456, 10262 & SP 23. The condition and specifications stated herein shall have precedence overall conditions and specifications stated in relevant I.S codes/CPWD specifications. The concrete mix shall be designed for specified target mean compressive strength in order to ensure that the work test results do not fall below the acceptance criteria specified for the concrete mix. The Contractor shall design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting requirements specified. The mix shall be designed with quantities of admixture / plasticizer proposed to achieve required workability & strength. The specifications mentioned here in below shall be followed for Design Mix Concrete.
- 3.2 The sources of coarse aggregate, fine aggregate & water to be used in concrete work shall be identified by the contractor & he will satisfy himself regarding their conforming to the relevant specification & their availability before getting the same approved by the Engineer-in-Charge.
- 3.3 Coarse Aggregate: -As per CPWD Specifications - 2019 - Vol. I & Vol. II with upto date correction slips
- 3.4 Fine Aggregate: -As per CPWD Specifications - 2019 - Vol. I & Vol. II with upto date correction slips.
- 3.5 Water:-It shall conform to requirements laid down in IS: 456-2000 / CPWD Specifications - 2019 - Vol. I & Vol. II with upto date correction slips.
- 3.6 Cement:-PPC shall be used for design mix concrete and shall conform to IS-1489 (part-I). However, if higher grade of cement is used by the contractor nothing extra shall be paid on this account.
- 3.7 Admixtures/ Plasticizers:-The admixture shall conform to IS: 9103, wherein required, the admixture of approved quality and approved make only shall be used to attain the required workability. Nothing extra shall be paid for use of admixtures.
- 3.8 Grade of Concrete: The compressive strength of various grades of concrete, characteristic strength, water cement ratio, minimum/maximum cement content, standard deviation etc shall be as per IS:456-2000

NOTE:-

- i) In the designation of a Concrete mix letter M refers to the mix and the number of the specified characteristic compressive strength of 15 cm-Cube at 28 days expressed in N/mm².
- 3.9 The Contractor shall engage one of the following approved laboratories / test house for

designing the concrete mix in accordance with relevant IS Code and to conduct laboratory tests to ensure the target strength & workability criteria for a given grade of concrete: -

- i)
- ii)
- i)
- ii)
- iii)

The various ingredients for mix design / laboratory tests shall be sent to the lab / test houses through the Engineer-in-Charge and the samples of such aggregates sent shall be preserved at site by the department.

- 3.10 In the event if all the five laboratories are unable to carry out the requisite design / testing, the contractor may have it done from any other laboratory with prior approval of the Executive Engineer, PWD Assam Project.
- 3.11 The contractor shall submit the report on design mix from any of above approved laboratories for approval of Engineer-in-Charge within 45 days from the date of submission of structural drawings to the engineer in charge. No concreting shall be done until the design mix is approved. In case of white Portland cement and the likely use of admixtures in concrete with ordinary Portland/white Portland cement, the contractor shall design and test the concrete mix by using trial mixes with white cement and / or admixtures also, for which nothing extra shall be payable.
- 3.12 In case of change of source or characteristic properties of the ingredients used in the concrete mix during the work, a revised laboratory design mix report conducted at laboratory established at site shall be submitted by the contractor as per the direction of the Engineer-in-Charge.
- 3.13 Trial Batches
- 3.14 The designed mix proportion shall be checked for target mean compressive strength by means of trial batches.
- 3.15 The quantities of materials for each trial mix shall be sufficient for atleast six specimens (cubes) and the concrete required for carrying out workability tests.
- 3.16 The workability of trial mix No. 1 shall be measured and mix shall be carefully observed for freedom from segregation, bleeding and its finishing characteristics. The water content, if required, shall be adjusted corresponding to the required changes in the workability.
- 3.17 With the modified water content, the mix proportions shall be recalculated by keeping with water cement ratio unchanged. The mix proportions, as modified, shall form the Trial Mix No. 2 and tested for the specified strength and workability.
- 3.18 In addition, trial mix No. 3 and 4, mix shall be designed by keeping water contents same as that determined for trial mix 2 but varying the water cement ratio +10 percent of the specified value and tested for their design characteristics.
- 3.19 All cost of mix designing and testing connected therewith including charges payable to the laboratory shall be borne by the Contractor including redesigning of the concrete mix wherever required and directed by Engineer-in-Charge.
- 3.20 Approval of Design Mix:-

The design mix for a specified grade of concrete shall be done for a target mean compressive strength

$$T_{ck} = F_{ck} + 1.65s$$

Where F_{ck} = Characteristic compressive strength at 28 days.

S = Standard deviation which depends on degree of quality control.

The degree of quality control for this work is “good” for which the standard deviation (s) obtained for different grades of concrete shall be as follows:-

GRADE OF CONCRETE	STANDARD DEVIATION(S)
M-10	3.5
M-15	3.5
M-20	4.0
M-25	4.0
M-30	5.0
M-35	5.0
M-40	5.0

Minimum three sets of separate preliminary test shall be carried out for each trial batch of concrete mix. Each test shall comprise six specimens and only one test set of six specimens shall be made on any particular day. Out of the six specimen of each set, three shall be tested at seven days and remaining three at 28 days. The preliminary tests at seven days are intended only to indicate the strength to be attained at 28 days. While the design mix shall be approved only on the basis of test strength of 28 days. The design mix shall be considered satisfactory and approval if atleast three preliminary test-sets individually satisfy the following strength and workability criteria.

- The average strength of each test sets is not less than the specified target mean compressive strength (TCK).
- The strength of any specimen cube is not less than 0.85 T_{ck} .
- The concrete mix is required degree of workability and acceptance concrete finish.

3.21 WORK STRENGTH TEST:- TEST SPECIMEN:-

Work strength test shall be conducted in accordance with IS: 516 on random sampling. Each test shall be conducted on six specimens, three of which shall be tested at 7 days and remaining three at 28 days.

3.22 TEST RESULTS OF SAMPLES:-

The test results of the sample shall be the average of the strength of three specimens. The individual variation shall not be more than + 15% percent of the average. If variation is more, the test results shall be treated as invalid. 90% of the total tests shall be done at the laboratory established at site by the contractor and remaining 10% in the laboratory of IIT Guwahati or any other premier institutions as directed by the EE, PWD.

3.23 LOT SIZE:-

The minimum frequency of sampling of concrete of each grade shall be in accordance with the following:-

QUANTITY OF CONCRETE IN THE WORK (CUBIC METRE PER DAY).	NUMBER OF SAMPLES
1-5	1
6-15	2
16-30	3
31-50	4
51 & above	4 Plus one additional sample for each additional 50 cubic metre of part thereof

NOTE: At least one sample shall be taken from each shift.

3.24 STANDARD OF ACCEPTANCE:-

- i) In case the test results of all the samples are above the characteristic compressive strength, the concrete shall be accepted.
 - ii) In case the test result of one or more samples fails to meet the requirement (i) above, it shall be accepted if both the following conditions are met:-
 - a) Any individual test result is not less than $(F_{ck} - 4) \text{ N/mm}^2$.
 - b) The mean of test results from any group of four consecutive samples is more than $(F_{ck} + 4) \text{ N/mm}^2$.
 - iii) Concrete of each grade shall be assessed separately.
 - iv) Concrete is liable to be rejected, if it is porous or honeycombed, its placing has been interrupted without providing a proper construction joint, the reinforcement has been displaced beyond the tolerances specified, or construction tolerances have not been met.
 - v) The contractor has to arrange at site centering and shuttering for as per schedule- F within two months from stipulated date of start of work. Only M.S. centering / shuttering and scaffolding material unless & otherwise specified shall be used for all R.C.C. work to give an even finish of concrete surface. However, marine-ply shuttering in exceptional cases as per site requirement may be used on specific request from contractor as approved by the Engineer-in-Charge.
- 3.25 The rate quoted by the tenderer also include cost of special type of centering and shuttering.g. circular in shape or of any other architectural design.
- 3.26 In order to keep the floor finish as per architectural drawings and to provide required thickness of the flooring as per specifications, the level of top surface of R.C.C. shall be accordingly adjusted at the time of its centering, shuttering and casting for which nothing extra shall be paid to the Contractor.
- 3.27 As per general engineering practice, level of floors in toilet / bath, balconies, shall be kept 25-30 mm lower than general floors. shuttering should be adjusted accordingly and slabs should be laid with towards the drainage point. Nothing extra is payable on this account.

3.28 Production of Concrete

The site for the work is congested. The contractor has to arrange the site / land for installation of batching plant outside the site. All concrete shall be produced through fully computerised weigh-batching plant of suitable capacity (not less than 30 cum/hr.) conforming to IS: 4925 with the arrangements for automatic dispensing of admixture and having facility of giving print out indicating weight / details of all ingredient of concrete in each lot/ batch and variations from the approved design mix if any. **Fully automatic batching and mixing plant having capacity not less than 30 cum/ hour shall be installed at the arranged site by the contractor as the construction site is congested & space for installation for batching plant is not available at construction site. Nothing extra for installation and carriage of concrete from the batching plant shall be entertained.** The batching and mixing plants shall be dedicated plants for this project. Contractor shall make his own arrangements for the necessary infrastructure for installation of batching plant and other machineries. However, if due to any reason, contractor wishes to supplement the concrete from Ready Mix Concrete (RMC) supplier, he is permitted to procure the same from the source approved by the SE&PD, Uttarakhand Project, at his own cost. In such a situation nothing extra shall be paid to the contractor. All technical requirements such as cement type and minimum cement quantity, w/c ratio, slump, admixture etc. shall be conveyed to RMC supplier by the contractor and contractor shall be wholly responsible for ensuring the property of concrete as required at site, nothing extra shall be paid to the contractor.

The contractor may take some time to install his own batching plants at the arranged site and till the batching plants are installed, the contractor is permitted to procure concrete from approved Ready Mix Concrete (RMC) supplier for a period 3 months from date of start of work or the period as agreed by Engineer-in-Charge. Similarly, when the work is nearing completion and daily requirement of concrete is very less, if agreed by the Engineer-in-Charge, the contractor may be permitted to procure the concrete from approved Ready Mix Concrete (RMC) supplier and nothing extra shall be paid to the contractor on this account.

3.29 Land for Temporary Use

The land for labour camps and batching plant and storage /dumping of materials shall be arranged by the contractor. The lease/rent charges shall be borne by the contractor. The Engineer-in-Charge shall extend necessary help and issue necessary recommendations etc. to the concerned department for temporary allotment of land during construction period.

3.30 BATCHING PLANT

The batching and mixing plant shall be fully automatic of suitable capacity not less than 30cum/hour. Automatic batcher shall be charged by devices which when actuated by a single starter switch will automatically start the weighing operation of each material and stop automatically when the designated weight of each material is fed in the mixer. The batching plant shall have automatic arrangement for dispensing the admixture and shall be capable of discharging water in more than one stage. A batching plant essentially shall consist of the following components:

Separate storage bins for different sizes of aggregates, silo for cement and flyash, water storage tank.

Batching equipment, Mixers, Control Panels, Mechanical material feeding and elevating arrangements

The compartments of storage bins for aggregates shall be approximately of equal size. The cement compartment shall be centrally located in the batching plant. It shall be water tight and provided with necessary air vent, aeration fittings for proper flow of cement & emergency cut off gate. The aggregate and sand shall be charged by power operated centrally revolving chute. The entire plant from mixer floor upward shall be enclosed and insulated. The batch bins shall be constructed so as to be self cleansing during draw-down. The batch bins shall in general conform to the requirements of IS: 4925.

The batching equipment shall be capable of determining and controlling the prescribed quantities of various constituent materials for concrete accurately i.e. water, cement, sand, individual size of coarse aggregates etc. The accuracy of measuring devices shall fall within the following limits.

Measurement of Cement: + 2% of the quantity of cement in each batch

Measurement of Water: + 3% of the quantity of water in each batch

Measurement of Aggregate: + 3% of the quantity of admixture in each batch

Measurement of Admixture: + 3% of the quantity of aggregate in each batch

The batching and mixing plant shall have the provision of adjusting the plus / minus quantity of various ingredients in the next batch so that there is no variation in quantity of ingredients from design mix in a lot consisting of 5 to 6 batches.

The mixer in the batching plant shall be so arranged that mixing action in the mixer can be observed from the operator's station. The mixer shall be equipped with a mechanically or electrically operated timing, signalling and metering device which will indicate and assure completion of the required mixing period. The mixer shall have all other components as specified in IS: 4925.

3.31 **Transportation, Placing and Compaction of Concrete**

Mixed concrete from the RMC / Batching plant shall be transported to the point of placement by transit mixers and placed in position through concrete pumps and/or steel closed bottom buckets capable of carrying minimum 0.6 cum concrete. In case the concrete is proposed to be transported by transit mixer, the mixing speed shall not be less than 4 rev/min. of the drum nor greater than a speed resulting in a peripheral velocity of the drum 70 m/minutes at its largest diameter. The agitating speed of the agitator shall be not less than 2 rev/min nor more than 6 rev/min of the drum. The number of revolution of the mixing drum or blades at mixing speed shall be between 70 to 100 revolutions for a uniform mix, after all ingredients, have been charged into the drum. Unless tempering water is added, all rotation after 100 revolutions shall be at agitating speed of 2 to 6 rev/min and the number of such rotations shall not exceed 250. The general construction of transit mixer and other requirement shall conform to IS: 5892.

In case concrete is to be transported by pumping, the conduit shall be primed by pumping a batch of mortar through the line to lubricate it. Once the pumping is started, it shall not be interrupted (if at all possible) as concrete standing idle in the line is liable to cause a plug. The operator shall ensure that some concrete is always there in the pump receiving hopper during operation. The lines shall always be maintained clean and shall be free of dents at all stages. Special precaution shall be taken that surrounding temperature during concreting shall not exceed 30 degree centigrade.

Except where otherwise agreed to by the Engineer-in-Charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 450 mm. Unless agreed to by

the Engineer- in-Charge, concrete shall not be dropped into place from a height exceeding 1.5m. In order to avoid such situations chutes, tremie pipe or closed bottom buckets shall be used. These shall be kept clean and used in such a way as to avoid segregation. Slope of the chute shall be so adjusted that concrete flows without the use of excessive quantity of water. The delivery end of chute shall be as close as possible to the point of deposit. The chute shall be thoroughly flushed with water before and after each working period and the water used for this purpose shall be discharged outside the formwork. The concrete shall be compacted by using immersion type vibrators. When the concrete is being continuously deposited to a uniform depth along a member, vibrator shall not be operated within one meter of free end of the advancing concrete. Every effort shall be made to keep the surface of the previously placed layer of concrete alive so that the succeeding layer can be amalgamated with it by the vibration process. In case the concrete in underlying layer has hardened to such an extent that it cannot be penetrated by the vibrator but is still fresh (that is, just after initial set), un-imposed bond shall be achieved between the top and underlying layer by first scarifying the lower layer before the new concrete is placed by systematically and thoroughly vibrating the new concrete. The points of insertion of vibrator in the concrete shall be so spaced that the range of action overlap to some extent and the freshly filled concrete is sufficiently consolidated at all locations. The spacing between the dipping positions of vibrator shall be maintained uniformly throughout the surface of concrete so that concrete is uniformly vibrated. The vibrating head shall be regularly and uniformly inserted in the concrete so that it penetrates of its own accord and shall be withdrawn slowly whilst running so as to allow redistribution of concrete in its way and allow the concrete to flow back into the hole behind the vibrator. The vibrator head shall be kept in one position till the concrete within its influence is completely consolidated. Vibration shall be continued until the coarse aggregate particle have blended into the surface but have not disappeared. The contractor shall keep at least one additional vibrator in serviceable condition to be used in the event of breakdowns and maintenance problems.

The vibrator head shall not be brought more than 200 mm near to the formwork as this may cause formation of water stagnations. The formwork shall be strong and great care shall be exercised in its assembly. It shall be designed to take up increased pressure of concrete and pressure variations caused in the neighbourhood of vibrating head, which may result in excessive local stress on the formwork. The joints of the formwork shall be made and maintained tight and close enough to prevent the squeezing out slurry or sucking in of air during vibration. The formwork to receive concrete shall be cleaned and made free from standing water, dust, etc. The contractor shall keep provision for screed and shutter vibrators at site.

No concrete shall be placed in any part of the structure until the approval of Engineer-in-Charge has been obtained. If concreting is not started within 24 hours of the approval being given, it shall have to be obtained again from the Engineer-in-Charge. Concreting shall be done continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept, clean, thoroughly wetted and covered with a 13 mm thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. The 13 mm layer of mortar shall be freshly mixed and placed immediately before placing of new concrete.

Where concrete is not fully hardened, all latency shall be removed by scrubbing the wet surface with wire or bristle brushes. Care shall be taken to avoid dislodgement of particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. Particular attention shall be given to corners and

close spots.

In case of rejection of concrete on account of unacceptable compressive strength, governed by para “Standard of Acceptance” as above, the work for which samples have failed shall be redone at the cost of contractor. However, the Engineer-in-Charge may order for additional tests (like cutting cores, ultrasonic pulse velocity test, load test on structure on part of structure, etc) to be carried out at the cost of contractor to ascertain if the portion of structure wherein concrete represented by the sample has been used, can be retained on the basis of results of individual or combination of these tests. The Contractor shall take remedial measures necessary to retain the structure as approved by the Engineer-in-Charge without any extra cost.

- 3.32 Ultrasonic Pulse Velocity Method of Test for RCC members is mandatorily required to be conducted for PWD works as a routine test. The acceptance criteria applicable is as per IS 13311 (Part I) 1992. It may be ensured that this test is carried out in 5% of all RCC structural members, to ensure quality of concrete. “Good” and “Excellent” grading are acceptable and below these grading the concrete will not be acceptable. Wherever concrete is found with less than required quality as per acceptance criteria, repairs to concrete shall be made. Honeycombed areas and loose pockets shall be repaired by grouting using Portland cement Mortar/ Polymer Modified Cement Mortar/ Epoxy Mortar after chipping loose concrete in appropriate manner. In areas where concrete is found below acceptance criteria and defects are not apparently visible on surface, injecting approved grout in appropriate proportion using epoxy grout/acrylic polymer modified cement slurry made with shrinkage compensating cement/ plain cement slurry etc. shall be resorted to for repairs. Repair to concrete shall be done till satisfactory results are obtained as per the acceptance criteria by retesting of the repaired areas. If satisfactory results are not obtained, dismantling and relaying of concrete shall be done. Nothing extra shall be payable over and above the agreement item for executing such rectification works.
- 3.33 The chasing, cutting and making holes in the masonry and / or cement concrete and / or RCC works shall be done carefully without causing any damage to the structure. Only mechanical cutters & core cutting machines shall be used in a workman like manner, for concealing the pipelines and fittings. The chases / holes, so made, shall be made good with the cement mortar of mix 1: 3 (1cement: 3 fine sand) after testing of the pipe lines for leakage. The cost of cutting cores in RCC, cutting holes in masonry & making good the same shall be deemed to be inclusive in the quoted rate of respective item of drainage/water supply lines. Nothing extra, whatsoever, shall be paid on this account.
- 3.34 Any cement slurry added over base surface for bond or for continuation of concreting, for protecting reinforcement bars, its cost shall be deemed to have been included in the respective items, unless specified otherwise and nothing extra shall be payable nor extra cement shall be considered in the cement consumption on this account.

4 SHUTTERING / FORM WORK:-

- 4.1 The work shall be done in accordance with CPWD Specifications - 2019 - Vol. I & Vol. II Specifications with upto date correction slips.
- 4.2 Steel shuttering as approved by the Engineer-in-Charge shall be used by the contractor. Minimum size of shuttering plates shall be 600mm x 900mm except for the case when closing pieces required to complete the shuttering panels. Dented, broken, cracked, twisted or rusted shuttering plates shall not be allowed to be used on the work.
- 4.3 The shuttering plates shall be cleaned properly with electrically driven sanders to remove any cement slurry or cement mortar or rust. Proper shuttering oil or deboning compound shall be applied on the surface of the shutter plates in the requisite quantity before

assembly of steel reinforcement.

- 4.4 The joint filler shall be resilient closed cell expanded polyethene and non- tainting as manufactured by Supreme Industries Ltd.
- 4.5 Providing joint filler of required thickness in position to substrate using either double sided foam adhesive tape or neoprene synthetic rubber adhesive. When forming expansion joint with the Board in in-situ concrete, joint sealing slots can be readily formed in the following matter-
 - a) Before installing, simply cut off a strip of the required depth. Then install the filler flush with the finished surface.
 - b) Prior to sealing, the top strip can then be pulled easily from the joint to provide an uncontaminated sealing slot ready for preparation and sealing.

5 **REINFORCEMENT:-**

- 5.1 The reinforcement shall be done as per CPWD Specifications - 2019 - Vol. I & Vol. II with upto date correction slips.
- 5.2 The item of reinforcement of RCC work includes all operations including straightening, cutting, bending, welding, binding with annealed steel wire or welding and placing in position at all the floors with all leads and lift complete as per CPWD Specification - 2019 - Vol. I & Vol. II with upto date correction slips.
- 5.3 To avoid displacement of bars in any direction and to ensure proper cover, only factory made round type/rectangular cover blocks shall be used by the contractor. Nothing extra shall be payable on this account.

6 **PRE-CAST RCC WORK**

- 6.1 Pre-cast reinforced concrete units shall be of grade or mix as specified. Provision shall be made in the mould to accommodate fixing devices such as hooks, flats etc. And forming of notches and holes. Each unit shall be cast in one operation. A sample of the unit shall be got approved from Engineer-in-Charge before taking up the work.
- 6.2 Pre-cast units shall be clearly marked to indicate the top of member and its locations.
- 6.3 Pre-cast units shall be stored, transported and placed in position in such a manner that these are not damaged.

7 **BRICK WORK:-**

- 7.1 Unless otherwise specified Flyash bricks shall be used in all items of brick work except in toilet and wet areas. In toilet and wet area red burnt clay bricks shall be used. The classification of bricks/blocks brought by the contractor shall strictly conform to CPWD Specifications-2019 Vol-1 & II with upto date correction slips or as specified. The work shall also include for leaving chases / notches for dowels / cramps for all kinds of cladding to come over brick work.

8 **STONE / MARBLE WORK/GRANITE WORK (OTHER THAN MASONARY):-** General:-

- 8.1.1 The execution of stones work shall be in general as per CPWD Specifications- 2019 - Vol. I & Vol. II with upto date correction slips.
- 8.2 The contractor shall compulsory use of wet jet in grinding and stone cutting. Nothing extra shall be paid on this account
- 8.3 Nothing extra shall be payable for using combination of marble, granite and kota in the required pattern at various locations unless otherwise specified

- 8.4 The pattern, spacing and locations of joints shall be as per drawings and direction of the Engineer-in-Charge and nothing extra shall be paid on account of the same.
- 8.5 Whenever tiles and stones flooring is to be done in patterns, the contractor shall get samples of each pattern laid and approved by the Engineer-in-charge before final laying of such flooring. Nothing extra shall be payable on this account
- 8.6 Different stones / tiles used in pattern flooring is included in the quoted rates of the item and nothing extra shall be paid for laying pattern flooring. No additional wastage, if any, shall be accounted for any extra payment
- 8.7 The gaps between the floor and wall tiles/stones shall be filled with silicon sealant and nothing extra shall be paid for filling gaps with silicon sealant.
- 8.8 Proper gradient shall be provided in flooring for toilets, verandah, kitchen, courtyard etc. so that the wash water flows towards the direction of floor trap. Any reverse slope if found, shall be made good by the contractor by ripping open the floor/grading concrete and nothing shall be paid for such rectifications.
- 8.9 No extra cement mortar shall be paid on account of level matching with combination of different types of flooring materials like Kota stone, granite, tiles of different type due to thickness differences in such types flooring material. Contractor shall plan this type variation during casting of slabs itself and shuttering shall be fixed accordingly at staircases, rooms, balconies and in toilets etc. Contractor shall make such changes as may be required to achieve, as aforesaid, in the levels of different floor levels, provided in different architectural and structural drawings issued by the department.
- 8.10 The stone slabs used for providing and fixing in the sills, soffits and jambs of doors, windows, ventilators and similar locations shall be in single piece unless otherwise directed by the Engineer-in-Charge. Wherever stone slab other than in single piece is allowed to be fixed, the joints shall be provided as per the architectural drawings and as per the directions of the Engineer -in-Charge. In the cabin areas, the joints in sills shall preferably be provided in line with the partition wall. Depending on the number of joints, as far as possible, the stone slabs shall be procured and fixed in slabs of equal lengths as per the architectural drawings and as directed by Engineer in-Charge. Half/full moulding shall be shall be provided in stone of sill, soffitt, jambs of door window ventilator, nosing of tread of staircase stone etc.
- 8.11 All the flooring works specified under this sub -head shall be adequately protected by a layer of plaster of paris which shall be laid over a 400 micron PVC film. The protective layer shall be maintained throughout the execution of works and removed just before handing over of the site for which nothing extra shall be payable
- 8.12 Granite stone sill shall be provided at the door door sill wherever the joints of tiles of on either side of door opening does not match. The granite stone of approved color and shade shall also be provided matching with floor of upper level of floor wherever there is level difference in floor level like balconies, toilets, kitchen and corridors.
- 8.13 All holes, rebates, recesses etc. for providing fixing and inserts shall be predrilled and precut and worked using precision machine tools. Nothing extra on this account shall be payable.

9 SAMPLES FOR STONE WORK:-

- 9.1 Samples of each item of stone work either individually or in combination shall be prepared for approval of Engineer-in-Charge before commencement of work.
- 9.2 Sequence of execution for cladding work shall be suggested by the contractor for approval of Engineer-in-Charge.

10 SCAFFOLDING:-

- 10.1 Double steel scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be fixed.

11 WOOD WORK:-

- 11.1 The wood work in general shall be carried out as per CPWD Specifications - 2019 Vol. I & II with upto date correction slips.
- 11.2 The samples of species of timber to be used shall be got approved and deposited by the contractor with the EE before commencement of the work. The contractor shall produce cash vouchers and certificates from kiln seasoning or/and chemical treatment plants about the timber section to be used on the work having been kiln seasoned or/and chemically treated by them
- 11.3 Factory made shutter as specified shall be obtained from factories approved by the Engineer in charge. The contractor shall inform well in advance to the Engineer-in-charge the names and address of the factory from where the contractor intends to get the shutters manufactured. The contractor will place order for manufacture of shutters only after written approval of the Engineer-in-charge in this regard is given. The contractor is bound to abide by the decision of the Engineer-in-charge and recommend a name of another factory from the approved list in case the factory already proposed by the contractor is not found competent to manufacture quality shutters. Shutters will however be accepted only if this meet the specified tests. The contractor will also arrange stage wise inspection of the shutters at factory to the Engineer-in-charge or his authorized representative. Contractor will have no claim if the shutters brought at site are rejected by Engineer-in-charge in part or in full lot due to bad workmanship / quality even after inspection of factory. Such shutters will not be measured and paid and the contractor shall remove the same from the site of work within 7 days after the written instruction in this regard are issued by Engineer in Charge or his authorized representative. Laminates and wooden edge beading on flush doors shall be machine pressed in factory only. The design and pattern of laminates shall be as per the approval of engineer in charge
- 11.4 All fittings and fixtures shall be got approved from the Engineer-in Charge before procurement well in advance and the approved samples shall be kept at site till completion of the work.
- 11.5 Glazing for toilets shall be of translucent type.
- 11.6 The shape and size of beading shall be as per drawings. The joints of beading shall be mitred.

12 STEEL WORK:-

- 12.1 Work shall be carried out as per CPWD Specifications-2019-Vol.I & Vol. II with upto date correction slips.
- 12.2 The rate of T- angle iron frame shall include the following.
- (a) M.S. sill/tie of 10mm dia bar welded to T-iron frames to keep the frames vertical in correct position. The sill / tie shall be embedded in floor concrete. No tie is necessary for window frames.
 - (b) Each T – iron frame for doors shall have 4 Nos. M.S. lugs 15x3mm, 10 cm long welded to each vertical member of the frame.
 - (c) M.S. flat 6 x 25mm, 100mm long having threaded holes (No. of flats shall correspond to the no. of butt hinges to be fixed to door / window shutters) shall be welded at appropriate places at the back of the T-iron frames for fixing the required butt hinges to

the frame with machine screws.

- 12.3 All welded structural steel work shall be tested for quality of weld as laid down in IS:822-1970 before actual erection if required

13 FLOORING

- 13.1 All work in general shall be carried out as per CPWD Specifications-2019-Vol.I & Vol. II with upto date correction slips PWD Specification.
- 13.2 Whenever flooring is to be done in patterns tiles/ stone, the contractor shall get samples of each pattern laid and approved by the Engineer-in-Charge before final laying of such flooring for which nothing extra shall be paid.
- 13.3 Different stones/ tiles used in pattern flooring as per the approved architectural drawings and nothing extra for laying pattern flooring shall be paid. No additional wastage if any shall be accounted for any extra payment.
- 13.4 The proper gradient shall be given to flooring for toilets, court yard, etc. as per the directions of Engineer-in-Charge. For this there may be extra thickness of dry mortar below the tiles/stone slabs. These gradients should be insured in the shuttering itself. Nothing extra shall be paid for this as this is included in awarded cost/tendered cost.
- 13.5 The rate of items of flooring is inclusive of providing sunken flooring in bathrooms, kitchen etc. and nothing extra on this account is admissible. The samples of flooring, dado & skirting as per approved pattern shall be prepared & got approved from the Engineer-in- charge before execution of work

14 Ceramic Tiles/Vitrified Tiles Work/ Granite stone flooring

- 14.1 Work shall be carried out as per CPWD Specifications- 2019 Vol I & II with up to date correction slips and as per manufactures specifications.
- 14.2 Rates shall be inclusive of all operations including labour, material, T&P, scaffolding etc. complete. Nothing extra shall be payable on any account.
- 14.3 Size of ceramic tiles shall not be less than 450 mm x 450 mm. unless or otherwise as per nomenclature of the item and size of vitrified tiles shall not be less than 600 mmX1200 mm. Nothing extra shall be paid on this account.
- 14.4 One piece Granite stone for treads / risers in staircase shall be used and nothing extra shall be paid on this account.

15 Stainless Steel Railing/Handrails:

- 15.1 **GENERAL:** The contractor shall apply all materials, labour, tools, ladders, scaffolding and other equipments necessary for the completion and protection of all stainless steel work.
- 15.2 **MATERIAL:** All stainless steel pipes and plates shall conform to AISI 316 Grade in open areas and corridors and 304 grade in all internal area and the relevant clauses associated with this grade of steel to be followed.
- 15.3 **SURFACE FINISH:** Surface finish of all the stainless steel materials will be in 240 grit satin finish / matt finish.
- 15.4 **ACCESSORIES:** The Stainless Steel railing to be fixed to staircase and all other location shall be modular and of design and make as approval by the Engineer-in-charge and as per list of approved makes. Fixing will be done by stainless steel expansion bolts of approved size and make as per direction of Engineer-in-charge and welding to be done by using organ welding rods and the surface being duly finished and cleaned by K2 passivation, which is nitric acid plus florid acid solution treatment by which the chances

of corrosion will be eliminated and any burn out makes on the metal will also be eliminated.

- 15.5 **COATING MASS:** All stainless steel material will have to be coated by a solution of Inox to avoid finger in prints and avoidance of settlement of environment / atmospheric dust.

16 Waterproofing

- 16.1 Work shall be executed as per CPWD Specifications, 2019 Vol I & II with upto date correction slips.
- 16.2 The contractor shall associate himself with the specialized firm, to be approved by the Engineer-in-charge in writing, for water proofing treatment for basement/lower ground floor, underground tank and on roofs.
- 16.3 Agency shall also submit the names of water proofing specialist along with information about their technical capabilities and list of similar works executed by the specialized agency in the past for the approval of Engineer-in- charge 2 months before the start of waterproofing work, who have executed satisfactorily a minimum of three similar works of area not less than sqm of water proofing to be executed each or two similar works of area not less thansqm of water proofing to be executed each or one similar works of area not less than sqm of water proofing to be executed each to be executed in the last Five years.
- 16.4 Following water proofing system will be used for Raft, retaining wall; basement roof & water stop at construction joint
- 16.5 The waterproofing system shall be from approved makes and specifications only. Product specifications, data sheet, method statement, installation, quality check list & typical sections shall be submitted along with sample for approval of Engineer-in-charge.

Water proofing of Raft: -

Water proofing treatment of raft on positive side shall be done with 1.2 mm thick fully bonded preapplied HDPE membrane system. Pre-applied, fully bonded flexible sheets consisting of HDPE carrier sheet coated with a pressure-sensitive adhesive and a trafficable weather and dirt resistant non-absorbent coating. Membrane should be green label certified. Fully bonded membrane shall comprise of HDPE layer of not less than 0.8 mm, strong adhesive and protective layer. Fully bonded membrane shall have following minimum properties (i) minimum elongation at break 300%; (ii) Peel Strength of concrete > 880 N/m; (iii) Puncture Resistance > 950N;(iv) tensile strength of Membrane Film > 2.1 M.Pa (v) Lap peel adhesion > 1400N/m (vi) shear strength of joints >14 N/mm. In addition to that Crystalline Waterproofing will be used for Basement raft & retaining wall as per given specifications. Other Concrete admixture will not be used in raft and retaining wall to avoid any reaction due to mix of admixtures. The membrane shall have minimum of 75mm side and end laps which shall be sealed with double sided adhesive tape. All vertical surfaces will be fixed using prefixed gaskets/shot gun. The construction joint of raft and retaining wall shall be treated with DSR 2021 item no. 22.25.1 & the treatment of tie rod holes of retaining wall shall be treated with DSR item no. 22.25.2.

The swellable type water stop tape, 19mm x 25mm thick in linear meter (expansive nature) or of approved size shall be provided at the construction joint of RCC structure such as raft slab, retaining walls, and at the junctions of raft slab with the retaining walls etc. After cleaning the surface, one coat of required primer for swellable water stop tape shall be applied throughout the length of the joint @3.78 litre per 240 running meter. Over the primed surface swellable type water stop tape shall be placed along

the center of the concrete section prior to the placement of the adjoining concrete of the raft slab. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge.

Physical properties of Swellable water stops shall be as below :

- I. Specific gravity (ASTM D71) : 1.55 ± 0.05
- II. Volatile matter (ASTM D-6) : 1% maximum
- III. Penetration, 150g cone at 25°C, 5 sec (ASTM D217) : 40 ± 5 mm
- IV. Hydrocarbon content (ASTM D297) : 47% Min.
- V. Rate of Rapid Expansion : (a) Fresh Water Exposure : 24 Hours - 140%, 48 Hours - 175%, 72 Hours - 190%, 120 Hours - 210%
(b) Salt Water Exposure : 24 Hours - 7%, 48 Hours - 12%, 72 Hours - 14%, 120 Hours - 18%

Physical Properties of Swellable Waterstop Primer shall be as below.

- i. % Solid : Min 20%
- ii. Flash Point : 93 deg C
- iii. Dry Time : 25 deg C : 10 min
- iv. Dry Time : 4 deg C : 60 min

Water Proofing of retaining wall: -

Water proofing treatment of retaining wall shall be done with 1.5 mm thick Cold applied, flexible self-adhesive waterproofing Membrane consisting of high density cross laminated polyethylene film with pre-marked selvedge. Membrane must be green label certified. Self-adhesive membrane shall have following properties (i) minimum elongation > 200% to ultimate failure of rubberised asphalt (ii) Puncture resistance > 200N (iii) tear resistance > 200 N.

Protection of Self adhesive Membrane against backfilling: Protection of self-adhesive membrane shall be done with spot bonding 7-8 mm thick dimpled protection board with spun bonded geotextile on top or 25mm-24 kg density expanded polystyrene boards spot stuck over membrane before back filling

Angle fillet (50mm x 50mm) of cement sand mortar mixed with integral waterproofing compound at all intersections between vertical and horizontal surfaces shall be made.

In addition to above, Crystalline waterproofing compound shall be used for retaining wall as per given specification.

**WATERPROOFING TREATMENT TO TOILET/BALCONY, AHU ROOMS,
Water tank & OTHER WET AREAS WITH/WITHOUT SUNKEN**

In bathrooms and balcony, AHU ROOMS water tanks, reservoir, sewage & water treatment plant, etc water proofing shall be done by using integral crystalline slurry of hydrophilic in nature, prepared by mixing in the ratio of 5:2 (5 parts integral crystalline slurry: 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI212-3R- 2010 i.e by reducing permeability of concrete by more than

90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The crystalline materials should have the (i) Permeability reduction >90% (ii) Compressive Strength > 25 Mpa (iii) Chloride content <0.05 %. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage.

Work shall be executed as per CPWD Specifications, 2019 Vol I & II with upto date correction slips.

Water Proofing of terrace.

The Crystalline admixture shall be added in the concrete of roof slab

Brick Bat Terracing/ Water Proofing

The brick bat shall be from over burnt brick. The water proofing compound used in integral water proofing treatment shall satisfy all the performance requirements indicated in IS : 2645 and shall be got tested before its use. The compound shall be used @ 2% by weight of cement used or as recommended by the manufacturer.

Total quantity of the water proofing compound required shall be arranged only after obtaining the prior approved of the Engineer-in-Charge in writing. Materials shall be kept under double lock and key and proper account of the water proofing compound used in the work shall be maintained. It shall be ensured that the consumption of the compound is as per specified requirements.

The finished surface after water proofing treatment for roof slab shall have smooth slope with minimum gradient of 1 in 80.

Before commencement of treatment on roof surface, it shall be ensured that the outlet drain pipes/ spouts have been fixed and the spout opening have been eased and rounded off properly for easy flow of water.

The surface where the water proofing is to be done shall be thoroughly cleaned with wire brushes. All loose scales mortar splashes etc. shall be removed and dusted off. The surface shall be treated with neat cement slurry admixed with proprietary water proof compound to penetrate into crevices and fill up all the pores in the surface. This cement slurry shall be applied at the junction of parapet and terrace slab including the vertical face of the parapet

After the slurry coat is laid, layer of over burnt brick bats shall be laid in cement mortar of mix as specified by specialist firm but not leaner than 1:5 (1 cement : 5 coarse sand) admixed with proprietary water proofing compound to required gradient and joints filled to half the depth. The bricks bat layer shall be rounded at the junction with the parapet and tapered towards top for a height of 300mm. Curing of this layer shall be done for 2 days

After curing, the surfaces shall be applied with a coat of cement slurry admixed with proprietary water proofing compound.

Joints of bricks bat layer shall be filled fully with cement mortar of mix as specified by the specialist firm but not leaner than 1:5 (1 cement : 5 coarse sand) admixed with proprietary water proofing compound and finally top finished with average 20 mm thick layers of cement mortar 1:4 (1 cement : 4 coarse sand) and finished smooth with cement slurry mixed with proprietary water proofing compound. The finished surface shall have marking of 300x300 mm false squares to give the appearance of tiles

Curing of water proofing treatment shall be done for a minimum period of two weeks by flooding the water by making compartments etc

In addition to above the item no. 12.56 of DSR 2021 shall also be operated for roof treatment as per CPWD specification and direction of Engineer – in-charge

Or .

Providing and applying single component, cold-applied, Poly Urethane waterproofing membrane "Roof Guardi (p) or equivalent which cures naturally to form a tough but flexible waterproofing membrane, having tensile strength of 1 MPa as per ASTM D 412, elongation capacity of 500% as per ASTM D 412, with solid content more than 80% . Hardness Shore A 50, having specific Gravity of 1.45 as per IS 101/1964 . This seamless waterproof membrane shall be applied in primer + 2 coats by roller / brush to achieve a total DFT of 1 mm consuming 1.5Kg/Sqm, applied on the prepared concrete substrate, including priming.

Note:- It is recommended to provide Geotextile sheet over the coating as a separation layer with insulation satisfying GRIHA Requirement and provide screed 100 mm avg. thickness with plaster and floating coat of neat cement for protection and slope.

17 Guarantee Bond

Ten years guarantee bond in prescribed proforma attached at annexure herewith shall be submitted by the contractor which shall also be signed by both the specialized agency and the contractor to meet their liability/ liabilities under the guarantee bond. However, the sole responsibility about efficiency of water proofing treatment shall rest with the main contractor.

Ten percent of the cost of water proofing work shall be retained as security deposit and the amount so withheld would be released after ten years from the date of completion of the entire work under the agreement, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor within seven days of receipt of intimation of defects in the work. If the defects pointed out are not attended to within the specified period, the same will be got done from another agency at the risk and cost of contractor.

However, the security deposit deducted may be released in full against bank guarantee of equivalent amount in favour of Engineer-in-Charge, if so decided by the Engineer-in-Charge.

The security deposit against this item of work shall be in addition to the security deposit mentioned elsewhere in contract form.

18 FINISHING

18.1 The work shall be carried out as per CPWD Specifications- 2019 Vol.-I & Vol. II with upto date correction slips.

18.2 All painting material shall brought to the site of work in the original sealed containers. The material brought to the site of work shall be sufficient for at least 30 days of work. The material shall be kept under the joint custody of contractor and representative of the Engineer-in-Charge. The empty contains shall not be removed from the site till the completion of the work without permission of the Engineer-in-Charge

19 SPECIFICATIONS FOR ALUMINIUM DOOR, WINDOW AND VENTILATOR WORKS ETC.

19.1 Extent and intent

Minimum wt/m² of aluminium for fixed & openable windows and doors with frames

shall be 15 kg. Aluminium section of the minimum medium grade shall be used for work.

The work shall be carried out through an approved specialized agency, who shall furnish all materials, labour, accessories, equipment, tool and plant and incidentals required for providing and installing polyester powder coated aluminum doors, windows, claddings, louvers and other items as called for on the drawings. The drawings and specifications cover the major requirement only. The supplying of additional fastenings, accessory features and other items not mentioned specifically herein, but which are necessary to make a complete installation shall be a part of this contract.

20 General

Aluminium doors, windows etc. shall be of sizes, section details as shown in the drawings. The details shown on the drawings indicate generally the sizes of the components parts and general standards. These may be varied slightly to suit the standard adopted by the manufacturer. Before proceeding with any manufacturing, the contractor shall prepare and submit complete manufacturing and installation drawings for approval of the Engineer-in-Charge and no work shall be performed until the approval of these drawings is obtained.

21 Shop Drawings

The contractor shall submit the shop drawings of doors. Windows, louvers, cladding and other aluminum work, based on architectural drawings, to the Engineer-in-Charge for his approval. The drawings shall show full size sections of doors, windows etc. thickness of metal (i.e wall thickness), details of construction, sub frame/ rough ground profile, anchoring details, hardware as well as connection of windows, doors and other metal work to adjacent work. Samples of all joints and methods of fastening and joining shall be submitted to the Engineer-in-Charge for approval well in advance of commencing the work.

22 Samples

Samples of doors, windows, louvers etc. shall be fabricated, assembled and submitted to the Engineer-in-Charge for his approval. They shall be of sizes types etc. as decided by Engineer-in-Charge. All samples shall be provided at the cost of the contractor.

23 Sections

Minimum doors and windows shall be fabricated from extruded section of profile of detailed on drawings. The sections shall be extruded by the manufacturers approved by the Engineer-in-Charge. The aluminium extruded sections shall conform IS designation 63400- WP (HV9WP Old designation) with chemical Composite ion and technical properties as per IS 733 and IS : 1285. The permissible dimensional tolerance of the extruded sections shall be such as not to impair the proper and smooth function/ operation and appearance of doors and windows.

24 Fabrication

Doors, windows, etc. shall be fabricated to sizes as shown, at factory and shall be of section, sizes combinations and details as shown in the Architectural Drawings. All doors, windows etc. shall have mechanical joints. All members shall be accurately machined and fitted to form hairline joints prior to assembly. The joint and accessories such as cleats, brackets, etc. shall be of such materials as not to cause any bimetallic action. The fabrication of doors, windows, etc. shall be done in suitable sections to facilitate easy transportation, handling and installation. Adequate provision shall be made in the door and window members for anchoring to support and fixing of hardware and other fixtures as approved by the Engineer-in-Charge.

25 Powder Coating

All aluminum sections shall be polyester powder coated 60 micron to required color as specified in the item and minimum specification in this documents. Polythene tape protection shall be applied on the powder coated section before they are brought to site. All care shall be taken to ensure surface protection during transportation, storage at site and installation. The tape protection shall be removed on installation. The samples will be tested in the approved laboratory and cost of samples, cost of testing, shall be borne by the contractor.

26 **Protection of Finish**

All aluminium members shall be wrapped with approved self adhesive non- staining PVC tapes.

27 **Handling and stacking**

Fabricated materials shall be stacking in an approved manner to protect the material against any damage during transportation. The loading and unloading shall be carried out with utmost care, on receipt of materials at site, they shall be carefully examined to detect any damaged pieces. Arrangements shall be made for expeditious replacement of damaged piece/ parts. Materials found to be acceptable on inspections shall be repacked in crates and stored safely.

In the case of Composite windows and doors, the different units are to be assembled first. The assembled Composite units should be checked for line, level and plumb before final fixing is done. Units may be serial numbered and identified as how to be assembled in their final location of situation so warrants.

Where aluminum comes into contact with masonry brickwork, concrete, planter or dissimilar metals, it shall be coated with approved insulation lacquer, paint or plastic tape to ensure that electro- chemical corrosion is avoided. Insulation material shall be trimmed off to a clean flush line on completion.

The contractor shall be responsible for assembling Composite, bedding and filling the groove with backup roads polysulphide sealant inside and outside, placing the doors, windows etc. in their respective opening. After the doors/ windows have been fixed in their correct assigned position, the open hollow sections abutting masonry concrete shall be fitted with approved polysulphide sealant densely packed and neatly finished.

The contractor shall be responsible for doors, windows, etc. being set straight plumb, level and for their satisfactory operation after fixing is complete.

28 **Installation**

Just prior to installation the doors, windows etc. shall be uncrated and stacked on edge on level bearers and supported evenly. The frame shall be fixed into position true to line and level using adequate number of expansion machine bolts, anchor fasteners of approved size and manufacturer and in an approved manner. The holes in concrete/ masonry members for housing anchor bolts shall be drilled with an electric drill.

The doors, windows assembled as shown on drawings shall be placed in correct final position in this opening and marks made on concrete members at jambs, sills and heads against the holes provided in frames for anchoring. The frame shall then be removed from the opening and laid aside. Neat hole with parallel sides of appropriate size shall then be drilled in the concrete members with an electric drill at the marking to house the expansion bolts. The expansion bolts shall then be inserted in the holes, struck with a light hammer till the nuts is forced into the anchor shell. The frame shall then be placed in final position in the opening and anchored to the support through cadmium plated machine screws of required size threaded to expansion bolts. The frame shall be set in the opening by using wooden wedges at supported and bar plumbed in position. The wedges shall

invariably be placed at meeting points of glazing bars and frames.

29 Neoprene Gaskets

The contractor shall provide and install Neoprene gaskets of approved size and profile at all locations as shown and as called for to render the doors, windows etc. absolutely air tight and weather tight. The contractors shall produce samples of the gaskets for approval and procure after approval only.

30 Fittings

Hinges, stays, handles, tower bolts, locks and other fittings shall be of excellent quality and manufacturers shall be approved by the Engineer-in-Charge.

31 Manufacturer's Attendance

The manufacturer immediately prior to the commencement of glazing shall adjust and set all windows and doors and accept responsibility for the satisfactory working of the opening frames.

32 Mastic Cement

The gaps between frames and supports and also any gaps in the windows section shall be raked out as directed and filled with mastic cement of approved colour and make to ensure complete water tightness. The mastic cement shall be of such colour and Composition that it would not stain the masonry/ concrete work, shall receive paint without bleeding, will not sag and shall not set hard or dry out under any conditions of weather. The samples of mastic cement to be used for this purpose shall be got approved by the Engineer-in-Charge before its actual use.

33 Sealant

Use modified silicone for joint subject to movement and in glazing.

Surfaces to receive sealant shall be properly prepared, cleaned, primed and excess sealant removed from finished surfaces.

Sealed joints shall be neatly tooled and surfaces smoothed. Follow the instruction of the sealant manufacturers.

Colour of the sealant shall be approved by the Engineer-in-Charge.

34 Glazing

Glazing shall generally be accomplished from the inside of building.

The glazing system shall be designed to this end use a continuous E.P.D.M compression gaskets on both sides (Present Gasket on one side of glazing pocket and roll in gasket on another side). A continuous wet seal shall be provided to ensure a complete water tightness.

Maintain a minimum glazing bite, edge clearance and surface clearance depending on the glass as recommended by the glass manufacturer.

35 Sealant and Gasket Application

Sealant and gasket shall be provided wherever shown in the drawings or required for a permanently weather tight installation. The sealing mechanism is necessary but is not indicated, it shall be of type recommended by the sub-contractor and approved by the Engineer-in-Charge.

All adjoining surfaces shall be protected to receive sealant against staining by masking and/ or other methods.

Joints and joint surfaces shall be clean, dry, and free of any material that may have an adverse effect on the bonding and/ or seal of the sealant and gasket materials.

Apply sealant and gasket under the conditions recommended by the manufacturer(s). Prime all surface to receive sealant and gasket unless recommended otherwise, use no sealant that has started to set in its container or a sealant that has exceeded the self life published by the manufacturer.

Fill all joints continuously and completely with sealant, forming a neat, uniform, concave bead. Finish the material flush with adjoining surfaces unless shown on the drawings. All sealant surfaces shall be tooled smooth.

Tensile or shear stress in structural silicone sealant joint shall not exceed 1.4 kg./ sqm

36 Protection & Cleaning

The contractor shall adequately protect all components and accessories from damage during shipments, storage at job site, erection and after completion of the work. At such time as may be directed, the sub contractor shall remove all protective tapes or coating, thoroughly clean all anodised aluminum and glass surfaces with suitable cleaning agent, make final adjustments to all ventilators, etc. and hardware leaving all in first class working order.

37 Details of Tests

The various tests on aluminum sections shall be conducted in accordance with the relevant IS codes.

The minimum number of tests for powder coating and corrosion resistance shall be as given below:

S.No.	Details	No. of Tests
(i)	Doors, Windows & Ventilators	5% of Nos. manufactured.

The samples of major member of each unit of doors/ windows shall be selected at random by Engineer-in-Charge as such that all the aluminum section be got tested.

The cost of samples, carriage or the samples and testing charges, if any, shall be borne by the contractor.

38 Acceptance Criteria

The aluminum sections shall conform to the provisions of the relevant working drawings. The sectional weight of any aluminum section is higher than the permissible variation same shall be accepted.

Guarantee Bond:- All aluminum work shall carry two years guarantee after completion of the work against water leakage, unsound material and workmanship and defective anodising as per guarantee bond at annexure-III.

Two years guarantee in prescribed proforma attached at Annexure-III must be given by the specialized firm, which shall be counter signed by the contractor, in token of his overall responsibility in addition 10% (Ten percent) of the cost of these items would be retained as guarantee to which the performance of the work done. The cost guarantee against this item of work shall be in addition to the security deposit mentioned elsewhere in the contract form. If any defect is noticed during the guarantee period, it should be rectified by the contractor within seven days, and if not attended to the same will be got done from another agency at the risk and cost of the contractor. However, this security deposit can be released in full, if bank guarantee of equivalent amount for two years is produced and deposited with the department.

Work shall be carried out as per CPWD Specifications- 2019 Vol.-I & Vol.-II with upto

date correction slips.

39 SANITARY INSTALLATIONS/ WATER SUPPLY/ DRAINAGE

- 39.1 The scope of work comprises supply, laying, installation, commissioning and testing of water supply, sewerage and drainage works including sanitary fixtures and fittings. The work in general shall be carried out as per CPWD Specifications- 2019 Volume-I to II with upto date correction slips. Rate include all materials, labour and all the operations mentioned in the respective item unless and otherwise specifically mentioned.
- 39.2 The work of water supply and sanitary installations shall be got executed by the agency as approved by Engineer-in-Charge

40 WATER SUPPLY, SANITARY INSTALLATIONS AND DRAINAGE

- i) The entire plumbing drawing and sanitary installation drawing/ details shall be submitted by the contractor and got approved by the Engineer-in-Charge before the execution
- ii) The contractor shall be responsible for the protection of the sanitary and water supply fittings and other fittings and fixtures against pilferage and breakage during the period of installation and thereafter until the building is handed over.
- iii) The contractor shall furnish all labour, materials and equipment, transportation and incidental necessary for supply, installation, testing and commissioning of the complete Plumbing / Sanitary system as described in the Specifications and as shown on the drawings. This also includes any material, equipment, appliances and incidental work not specifically mentioned herein or noted on the Drawings/Documents as being furnished or installed, but which are necessary and customary to be performed under this contract. The Plumbing / Sanitary System shall comprise of following:
 - a) Sanitary Fixtures and Fittings.
 - b) Internal and External Water Supply.
 - c) Internal and External Drainage.
 - d) Approval from Local Authorities.
 - e) Balancing, testing & commissioning.
 - f) Test reports and completion drawings.
- iv) The contractor shall procure and install all pipes, Sockets /Nipples including shut-off valve etc for mounting sensors/transmitters for the interface to Building Automation System.

Contractor shall use GI pipes and fittings of minimum medium grade. Similarly the sanitary pipes will also be of minimum 100 mm dia of medium grade. The pipes should be designed accordingly to the pressure.

- v) The contractor shall ensure that senior and experienced plumbers are assigned exclusively for this work. Such plumber(s) should have valid license from the local authorities. The project management shall be done through modern technique. For quality control & monitoring of workmanship, contractor shall assign at least one engineer who would be exclusively responsible for ensuring strict quality control, adherence to specifications and ensuring top class workmanship for the installation.
- vi) The work shall be in conformity with the Bye-laws, Regulations and Standards of the local authorities concerned. But if these Specifications and Drawings call for a higher standard of materials and / or workmanship than those required by any of the above regulations and standards, then these Specifications and Drawings shall take precedence

over the said regulations and standards. However, if the Drawings and specifications require something which violates the Bye-laws and Regulations, then the Bye-laws and Regulations shall govern the requirement of this installation.

- vii) The contractor shall obtain all permits/ licenses and pay for any and all fees required for the inspection, approval and commissioning of their installation without additional cost to the department.
- viii) The Plumbing / Sanitary Drawings given by the Engineer In-Charge or issued with tenders are diagrammatic only and indicate arrangement of various systems and the extent of work covered in the contract. These Drawings indicate the points of supply and of termination of services and broadly suggest the routes to be followed. Under no circumstances shall dimensions be scaled from these Drawings. The contractor shall follow these drawings in preparation of his shop drawings, and for subsequent installation work.
- ix) The contractor shall examine all architectural, structural, plumbing, and electrical and other services drawings and check the as-built works before starting the work, report to the Engineer In-Charge any discrepancies and obtain clarification. Any changes found essential to coordinate installation of his work with other services and trades, shall be made with prior approval of the Engineer In-Charge without additional cost to the department.
- x) All the shop drawings shall be prepared on computer through Autocad System based on Architectural Drawings and site measurements. Within two months of the award of the contract, contractor shall furnish, for the approval of Engineer In-Charge, the two sets of detailed shop drawings of complete work and materials including layouts for Plant room, Pump room, Typical toilets drawings showing exact location of supports, flanges, bends, tee connections, reducers, detailed piping drawings showing exact location and type of supports, valves, fittings etc; external insulation details for pipe insulation etc.
- xi) These shop drawings shall contain all information required to complete the work. These Drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors. Each shop drawing shall contain tabulation of all measurable items of equipment/materials/works and progressive cumulative totals from other related drawings to arrive at a variation-in-quantity statement at the completion of all shop drawings. Minimum 4 sets of drawings shall be submitted after final approval along with CD. When he makes any amendments in the above drawings, the contractor shall supply two fresh sets of drawings with the amendments duly incorporated along with check prints, for approval. The contractor shall submit further four sets of shop drawings to the Engineer In-Charge for the exclusive use by the Engineer In-Charge and all other agencies. No material or equipment may be delivered or installed at the job site until the contractor has in his possession, the approved shop drawing for the particular material/equipment / installation.
- xii) Shop drawings shall be submitted for approval four weeks in advance of planned delivery and installation of any material to allow the Engineer In-Charge ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved programme.
- xiii) Samples of all materials like valves, pipes and fittings etc. shall be submitted to the Engineer In-Charge prior to procurement for approval and retention by Engineer In-Charge and shall be kept in their site office for reference and verification till the completion of the Project. Wherever directed a mockup or sample installation shall

- be carried out for approval before proceeding for further installation without any extra cost.
- xiv) Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the contractor of the responsibility or requirement to furnish material and perform work as required by the contract.
 - xv) All materials and equipment shall conform to the relevant Indian Standards and shall be of the approved make and design. Makes shall be in conformity with list of approved manufacturers as per approved list and samples.
 - xvi) Balancing of all water systems and all tests as called for the CPWD Specifications shall be carried out by the contractor through a specialist group, in accordance with the Specifications and Standards. The installation shall be tested and shall be commissioned only after approval by the Engineer In-Charge. All tests shall be carried out in the presence of the representatives of the Engineer In-Charge and without additional cost to the department.
 - xvii) The contractor shall submit completion plans for water supply, internal sanitary installations and building drainage work within 15 days of the date of completion. These drawings shall be submitted in the form of two sets of CD's and four portfolios (300 x 450 mm) each containing complete set of drawings on approved scale indicating the work as installed. These drawings shall clearly indicate complete plant room layouts, piping layouts and sequencing of automatic controls, location of all concealed piping, valves, controls and other services. In case the contractor fails to submit the completion plans as aforesaid, security deposit shall not be released and these shall be got prepared at his risk and cost.
 - xviii) The CCI/CI/PVC pipe and GI pipe etc. wherever necessary shall be fixed to RCC columns, beams etc. with rawl plugs and nothing extra shall be paid for this.
 - xix) "The pig lead/Drip Seal joint or as recommended by hubeless manufacturer to be used in joints of 150mm, 100mm, 75mm, 50mm dia of hubeless iron pipes shall be as per relevant CPWD Specifications." However, in case of 150 mm dia pipes less use of pig lead by more than the required quantity and the permissible variation thereof, a recovery for such quantity shall be made from the contractor at market rate to be determined by Engineer in Charge whose decision in the matter will be final.
 - xx) The contractor shall bear all incidental charges for cartage, storage and safe custody of materials and shall construct suitable godowns, yards at the site of work for storing materials so as to be safe against damage by sun, rain, fire or theft etc., at his own cost and also employ necessary watch and ward establishment for the purpose at his own cost.
 - xxi) All 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, elsewhere in this tender document & drawings. The quoted rates shall be deemed to be all inclusive for a complete item fit for use including all materials, labour T&P, specials, equipment, testing & commissioning etc. Accessories shall include proper fixing arrangement, brackets, nuts, bolts, screws and required connection pieces. Nothing extra whatsoever shall be payable on this account.
 - xxii) Porcelain sanitary ware shall be glazed vitreous china of first quality free from warps; cracks and glazing defects and shall conform to relevant BIS codes. Colour of sanitary ware, shall be specified or as selected by the Engineer-in-Charge.

- xxiii) Nothing extra shall be payable on this account
- xxiv) Horizontal pipes running along ceiling shall be fixed on structural adjustable clamps of approved design. Horizontal pipes shall be laid to uniform slope and the clamps adjusted to the proper levels so that the pipes fully rest on them and are properly secured
- xxv) Contractor shall provide all nuts, bolts, welding material and paint the Clamps with one coat of red oxide and two or more coats of black enamel paint.
- xxvi) Slotted angle/channel supports on walls shall be provided wherever shown on drawings. Angles/channels shall be of sizes shown on drawings or specified in schedule of quantities. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with suitable anchor fasteners. The spacing of support bolts horizontally shall not exceed 1 m.
- xxvii) Wherever M.S. clamps are required to be anchored directly to brick walls, concrete slabs, beams or columns, nothing extra shall be payable for clamping arrangement and making good with cement concrete 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal size) or as directed by the Engineer-in-Charge.
- xxviii) The ground colour shall be applied throughout the entire length of pipe. Colour bands shall be superimposed on the ground colour and shall be applied near valves, junctions, joints, service appliances, bulkheads, valves, etc. for clear identification of fluid being carried and to avoid confusion. The relative proportional widths of the first colour band to the subsequent bands shall be 4:1. The minimum width of the narrowest colour band shall be 25 mm.

GENERAL

- i) a) Rates for all items quoted shall be inclusive of all work and items given in the above mentioned specifications and Schedule of Quantities and applicable for the work under floors, in shafts or at ceiling level at all heights and depths. All rates are inclusive of cutting holes and chases in RCC and masonry work and making good the same.
- b) All rates are inclusive of pre testing and on site testing of the installations, materials and commissioning.
- ii) Cleaning and Disinfection of Pipelines:-

On completion of hydraulic tests and before a pipe is disinfected, it shall be proved to be free from obstruction, debris and sediment by scouring or by any other process which the Engineer-in-charge may prescribe. Upon satisfactory completion of testing and cleaning, the pipelines shall be disinfected as order. Chlorine solution shall be applied at the charging point as the pipeline is being filled and dosing shall be continued until the pipeline is full and at least 50 parts of chlorine per million parts of water have been made available and distributed evenly. If ordinary bleaching power is used, proportions will 150 gms of power to 1000 litre of water. If a proprietary brand is used, the proportion shall be as specified by the manufacturer. The treated water shall be left in pipeline for a period as directed but not exceeding 24 hours chlorine residual tests shall be taken at various points along the pipeline. The disinfection process shall be repeated until the sample of water taken from the pipeline are declared fit for human consumption by a recognized laboratory.

41 Interlocking Paver Blocks

The Interlocking Paver Blocks shall confirm to IS-15658.

Test shall be conducted to satisfy the quality of material for every 25,000 Paver Blocks (of Each grade) or part thereof:-

42 Criteria for Defining Rocky Strata

The contractor shall keep a note of penetration depth versus time from the beginning of the drilling operation. Once the boring reaches the top of the weathered rock, the penetration rate will drop, there will be an increase in the slope of depth versus time plot. If there is no change in the rate of penetration then the contractor will change the bottom tool of piling rig for drilling in rock or provide appropriate machine suitable for drilling in rock. The top of the weathered rock beyond which socketing would start shall be determined from the sample collected from rock drilling. The pile shall be terminated after the specified socketing length is reached. Under the condition that the pile cannot be taken to be prescribed termination level owing to encountering hard rock then the following criteria should be adopted.

- i. Once the hard rock is reached the slope of the penetration depth versus time plot will increase further and tend to be near vertical.
- ii. Continue drilling until the slope is near vertical.

43 SPECIFICATIONS FOR CALCIUM SILICATE TILES

i) GENERAL

This section covers the requirements for all materials, labour, tools, scaffolding and equipment complete in all respect for suspended false ceiling as per nomenclature of the item.

ii) CODES AND STANDARDS:

The codes and standards generally applicable are:

BS -476-PART IV –CALCIUM SILICATE – INCOMBUSTIBILITY I S -277-1982- FOR GALVANIZING OF MS SHEETS

The following clauses are intended to amplify the requirements of the reference documents listed above and the contractor shall comply with these clauses.

iii) MATERIALS

a) Frame work:

A grid of section 600 mm x 600 mm is to be made up of G.I T sections wherein the Main tee is duly suspended from the RCC slab roof. The sizes of the members shall be as under and the entire grid should be able to take a suspended load of minimum 18 kg/sq m.

- i) Perimeter wall angle: 0.40 mm thick gauge having equal flanges of size 22 mm made from pre-coated G.I. coil of length 3.0m.
- ii) Main tees of 3.60m/3.0m length having a web height of 38 mm with a 8mm bulb at the top having an exposed bottom of 24mm capped with a pre-coated G.I. coil wherein the coil thickness is 0.33 mm.
- iii) Cross tees of length 1.20 m and 0.60 m having a web height of 28mm and an exposed bottom of 24mm capped with pre-coated G.I. coil wherein the coil thickness is 0.33 mm.

iv) Ceiling Tile:

Light weight calcium silicate tiles and made from hydrated calcium silicate, reinforcing fibers natural fillers free from formaldehyde and other harmful materials shall not contain any toxic ingredients. The tiles shall be of size 595 mm x 595 mm having reinforced edges of 15 mm thickness all around in a collar of width 24 mm and 10 mm thickness at the center. The tiles shall have an overall density of 350 kg/m³ in the body and 450 kg/m³ at the edges. The tiles shall be primer coated on

both sides and the fair surface shall be having a factory finish in two coats of white dispersion type solvent free paint.

The tiles should be characterized with 100% relative humidity resistance, incombustibility as per BS 476, Part IV, thermal conductivity of 0.043w/moKC, and light reflectance > 85%, and an NRC of 0.50 (sound attenuation: 32 dB). The tiles should weight approx. 5.5 kg/m².

v) Fixing the G.I. Suspension system to the ceiling:

The main runners of size 38 mm x 24 mm x 3.60mm length spaced at 1200 mm centers shall be securely suspended with G.I. suspension wire of 4 mm dia. With necessary level adjusters made from spring steel with adequate tension in one direction. The G.I. wire is to be suspended at 1200 mm centers from the soffit with the aid of soffit cleats made of zinc alloy having dimension 25 mm x 35 mm x 1.6 mm secured to the soffit with metal dash fasteners of size 6 mm x 50 mm.

The last hanger at the end of each main runner should not be greater than 600mm from the adjacent wall. Then flush fitting cross tees of size 28 mm x 24 mm x 1.20 m length are to be inserted in the main tees at 600 mm centers at right angles to the main tees. 600 mm x 600 mm modules are then to be formed by fitting cross tees of size 28mm x 24 mm x 0.6 m length centrally between the longer cross tees.

The system shall rest on periphery walls / partition on the wall angle of section 0.40 mm thick gauge having equal flanges of 22mm made from pre-coated G.I. coil of length 3.0m. The entire grid system shall be designed to bear a distributed load of minimum 15kg /sq.m.

vi) a) Storage and Handling precautions:

- i) Ceiling tiles shall have be supplied in neatly packed cartons.
- ii) Not to store the cartons in flat and wet locations.
- iii) Handle cartons and individual tiles with care.
- iv) Do not drop or stand cartons or tiles or edges or corners.
- v) Open cartons completely and using both hands with protective gloves, remove tiles in pairs with fair faces together

b) Installation Precautions:

The following to be ensured before installation of the ceiling system

- i) The area is dry prior to ceiling installation work.
- ii) All wet trades are completed such as plastering, flooring etc.
- iii) Electrical chasing or drawing lines etc are in place.
- iv) No unauthorized weight is put on ceiling. Lighting fixtures to be suspended independently.
- v) Calcium Silicate Tiles should be installed by experienced contractors in compliance with manufacturers specifications and conditions.
- vi) Installations shall be done in areas free from chemical fumes / freezing temperatures and vibrations.
- vii) Calcium Silicate Tiles shall not be used to support any unauthorized loads.
- viii) Calcium silicate Tiles shall be mechanically suspended properly and shall not be cemented nor glued to the surface of any other material.

vii) Cutouts for light:

Tendered cost shall include the cost of making cut outs required for fixing light fixtures, and fire detectors, etc. No extra payment shall be made for making cut outs.

viii) Fire Resistance:

The ceiling tiles should be as per BS: 476 (Part IV) and to be classified in class 1 for spread of flame as per BS: 476 (Part VII) and class O for propagation as per BS: 476 (Part VI).

- a) Thermal Properties: The tiles should have a low thermal conductivity of 0.43 w/m²KC.
- b) Acoustic properties: The tiles offer an average NRC of .50 and a sound attenuation STA – 32 dB.

vii) Effect of temperature:

The tiles should be suitable for use in high temperature area due to their low heat conductivity. They can also be subjected to freezing temperatures without risk of damages.

44 **SPECIFICATION FOR REINFORCEMENT COUPLER/MECHANICAL SPLICE NOMINAL SIZES**

The nominal sizes of reinforcement couplers based on their internal diameter shall correspond to the nominal sizes of bars covered under IS 1786.

Mechanical Splicing Systems with Parallel Threaded Couplers

A mechanical splice system with parallel threaded couplers is a one in which a parallel thread is cut or formed on the ends of the reinforcing bars, which are then connected by a coupler with matching parallel threads. With parallel threads, the strength of the assembly is directly proportional to the thread engagement length.

Reinforcement couplers shall have adequate strength, length and internal threads as per manufacturer's design to be able to meet the performance requirements as mentioned in this document. All reinforcement couplers shall be finished smooth and shall be free from burrs, cracks and other manufacturing defects. The threads shall be cleanly formed and shall be free from imperfections.

Performance requirements

Static Tensile Test

The tensile strength of the mechanical splice, when tested in accordance with the details given below shall not be less than 125 percent of the characteristic strength of Reinforcement bar used.

Percentage Elongation

The minimum percentage elongation at maximum force, when measured in accordance with the method given below, in the reinforcing bar outside the length of the mechanical splice shall be minimum 3% before the failure of the test piece.

Percentage Elongation at Maximum Force

The percentage elongation at maximum force shall be tested and measured according to IS 1608 outside the length of the mechanical splice on both sides of the connection. Both values shall be recorded and the largest shall be used to assess conformity.

The location of failure shall be deemed to be in the bar if it is outside the length of the mechanical splice. A failure located inside the length of the mechanical splice shall be recorded as a splice failure.

Slip Test

The total slip value measured in accordance with the test procedure described below shall not exceed 0.10 mm.

Cyclic Tensile Test

The mechanical splice shall withstand 100 cycles of the stress variation from 5 percent to 90 percent of f_y (where $f_y = 500 \text{ N/mm}^2$) when tested in accordance with the details given below without loss of static tensile strength capacity when compared with like specimen. The static tensile strength capacity of the test piece shall be determined by testing it statically to failure in accordance with the procedure described above under METHOD OF STATIC TENSILE TEST after subjecting it to stress cycles.

INSTALLATION INSTRUCTIONS

The installation procedure of the reinforcement coupler shall as per manufacturer's recommendations. It will be repeatable and able to achieve its performance under different job site circumstances.

SAMPLING AND CRITERIA FOR CONFORMITY

1. ACCEPTANCE TESTS

- a) Acceptance tests are carried out on samples selected from a lot for the purpose of acceptance of the lot.
- b) Lot : In any consignment, all the reinforcement couplers of the same size, type, class, material traceable to the same cast and manufactured under similar conditions of production shall be grouped together to constitute a lot.
- c) For ascertaining the conformity of the lot to the requirements of the specification, samples shall be tested from each lot separately. The number of couplers to be selected from the lot shall depend on the size of the lot and shall be according to Table 1.

TABLE 1 SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

No. of Couplers in the Lot	Sample Size	Sub-Sample Size	Acceptance Number
(1)	(2)	(3)	(4)
Upto 500	50	13	0
501 to 1200	80	20	1
1201 to 3200	125	32	2
3201 to 10,000	200	32	2
10,001 and above	315	50	3

- d) The couplers shall be selected at random from the lot and in order to ensure the randomness of selection, random number table shall be used. For guidance and use of random number tables IS 4905 may be referred to.

(i) Workmanship and Finish

The number of couplers given in column 2 of Table 1 shall be taken from the lot and examined for workmanship and finish and nominal size. A coupler failing to satisfy any of these requirements shall be considered as defective. If no defective is found in the sample, the lot shall be considered as conforming to these requirements.

(ii) Static Tensile Test

The lot having been found conforming to requirements of workmanship and finish and nominal size as per 1.d (i) shall be tested for static tensile test. For this purpose sub-samples as given in column 3 of Table 1 shall be taken and subjected to this test. The number of couplers required in the sub-sample may be taken from those already tested and found satisfactory according to 1.d(i).

The lot shall be considered to have satisfied the requirement of static tensile test as per 1.d.ii(a) if the number of defective couplers found in the sub-sample is less than or equal to the corresponding acceptance number given in column 4 of Table 1.

45 FIRE CHECK DOORS

FIRE RATED DOORS AND FRAMES SPECIFICATIONS

Providing and fixing of Hollow metal Insulated fire rated doors as per IS 3614 part-1, for stability, integrity & insulation. Pressed galvanized steel conforming to IS 277 with the following specification. Recommended fire door shall be tested to IS 3614 part 2 / ISO 834-1 Part 1 / BS476 Part 20 & 22, CBRI / Certifire, for maximum rating of 120mins with 30minutes of insulation, in latched /unlatched condition (if used with deadbolts and pull handles). Labelled doors with certification shall be with vision glass as a part of complete assembly. Manufacturer test certificate shall cover doors both single and double leaf and all doors supplied shall be within the tested specimen, 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.

Door frame shall be single rebate grooved profile of size 125 x 55mm made out of 1.60mm (16gauge) minimum thick galvanized steel sheet. Frames shall be mitred and field assembled with self-tabs. Frames to have inbuilt grooved sealing system and shall be site fitted with fire rated EPDM gasket as standard. 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. Frames shall be filled with fire rated puff.

Insulated Shutter-Door leaf shall be 46mm thick fully flush double skin door, insulated with or without vision panel. Door leaf shall be manufactured from 1.2mm (18gauge) minimum thick galvanised steel sheet. The internal construction of the door should be rigid reinforcement pads for receiving appropriate hardware. The infill material shall be high density insulation material. Intumescent seals 15x2mm to be provided all around the door in addition to the grooved smoke seal. All doors 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 integrated astragals has to be provided on the meeting stile for both active and inactive leaf. Vision panel wherever applicable should be provided for 6mm clear borosilicate fire rated glass/ 11 mm thick 120 min fire rated intumescent gel filled glass as per manufacturers recommendation with a clipon arrangement.

Providing and fixing of fire rated glass 6mm clear borosilicate of 120min rating / 11 mm thick 120 min fire rated intumescent gel filled glass of the door. The size of the glass shall vary based on the application and usage.

All doors (insulated or Un insulated) and frames shall be finished Pure Polyester Powder coated (minimum 50 microns) and shall have passed minimum 500 hours of salt spray test.

Once frame is installed, it should be filled with PUF as recommended by the manufacturer or engineer in charge.

HOLLOW METAL DOORS AND FRAMES PART 1 - GENERAL

1.0 SECTION INCLUDES

- A. Architectural hollow metal doors and frames as shown on the Drawings and as specified herein.
 - 1. Flush Steel Doors

2. Flush steel fire doors as per Indian standard or British standard
3. Flush steel fire doors with insulation as per Indian standard or British standard
4. Steel frames

1.1 REFERENCES

A. Indian Standard

IS277 standard specifications for steel sheet, Zinc Coated (Galvanized)

IS 3614 Part 1 Specification for fire rated doors, windows, glazed doors & partitions
 IS 3614 Part 2 Metallic and non-metallic fire check doors – Resistance test and performance criteria
 IS 513 Standard Specification for Steel Sheet, carbon, Cold rolled Commercial Quality.

B. British Standard

BS 476 Part 22:1987 Standard methods of test of fire door assemblies.

C. International Standard

ISO 834-1 Fire resistance test - Elements of building construction.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's specifications for fabrication and installation, including data substantiation that products comply with requirements.

B. Certificates:

1. Manufacturers Certification that products comply with referenced standards.
2. Evidence of certificates as listed.

C. Shop Drawings: Submit for fabrication and installation of metal doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and details of joints and connections. Indicate door elevation, internal reinforcement, closure method, and cutouts for glass lights and louvers. Show anchorage and accessory items. Provide schedule of doors and frames using same reference numbers for details and openings as shown on Drawings.

D. Samples

1. Submit 300 mm x 300 mm cut away sample door with provisions for lockset, hinge and corner section of the frame.

1.3 TRANSPORTATION, HANDLING AND STORAGE

A. Deliver, store and handle hollow metal work in a manner to prevent damage and deterioration.

B. Provide packaging such as cardboard or other containers, separators, banding, spreaders and paper wrappings to protect hollow metal items.

C. Store doors and frames upright in a protected dry covered area, at least 100 mm or more above ground or floor and at least 6 mm between individual pieces.

- D. Doors and frames are to have a metal tag with the door number thereon.
- E. Should door wrapper becomes wet, remove immediately.

1.4 QUALITY ASSURANCE

- A. General: Unless otherwise specified, provide doors and frames complying with the Indian standard and the British standard for stability, integrity and insulation
- B. Fire-Rated Door Assemblies: Provide Fire Doors and Frames CBRI / ARAI or Warrington Certifire test certificate
 - 1. Labelled Fire doors and frames in accordance with IS 3614 for stability and integrity Fire tests of Door Assemblies.
 - 2. Where insulation is the criteria supply labelled Fire doors and frames in accordance with IS 3614 for stability, integrity and Insulation Fire tests of Door Assemblies
 - 3. Complying with BS476 part 22: 1987 and which are labelled and listed by Certifire or internationally accredited laboratory.
 - 4. Manufacture doors and frames under the Certifire inspection program and in strict compliance to standards and provide the degree of fire protection, heat transmission.
 - 5. Affix a physical label or approved marking to each fire door or fire door frames at any authorized facility as evidence of compliance and test conducted by approved agency.
 - 6. Conform to applicable codes for fire ratings. It is the intent of the specification that hardware and its application comply or far exceeds the standard for fire doors
- C. Manufacturer: Provide doors, frames and hardware from a single manufacturer approved by the Engineer.
- D. Installers: Minimum three years documented experience installing products of similar nature.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Acceptable Manufacturer: As per approved make list
- B. Substitution: Not permitted
- C. Provide all steel doors, steel fire doors, steel glazed fire doors or steel wood finish doors and hardware from a single door manufacturer.

2.2 MATERIALS

- D. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with IS 513
- E. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with IS 277 zinc-coating, mill phosphatized. Minimum sheet thickness 2.0mm for the frame and 1.6mm for the shutter.
- F. Supports and Anchors: Fabricated of 1.20 mm thick, galvanized sheet steel.
- G. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip

galvanize items to be built into exterior walls

- H. Shop Applied Paint: Rust-inhibitive self-etching primer and polyurethane paint as per manufacturer specification and coating.

2.3 FABRICATION - GENERAL

- I. Fabricate metal door and frame units to be rigid, neat in appearance and free from defects (warp or buckle). Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site.
- J. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only Galvanized steel.
- K. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and mouldings from Galvanized steel.
- L. Fabricate exterior doors, panels, and frames from galvanized sheet steel. Close top edges of all doors as an integral part of the door construction or by addition of inverted steel channel.
- M. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat heads for exposed screws and bolts.
- N. Finish Hardware Preparation
 1. Prepare doors and frames to receive mortised and concealed finish hardware in accordance with Hardware Schedule and templates provided by hardware supplier.
 2. Reinforce doors and frames to receive surface- applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
 3. Locate finish hardware as shown on final shop drawings or, if not shown, in accordance with **Recommended Locations for Builder's Hardware**.
- O. Shop Painting - Primer
 1. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
 2. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
 3. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

2.4 PRESSED METAL FRAMES

- A. General: Provide continuous type pressed metal frames, including glazing stops and reinforcement, of various profiles to suit conditions detailed on the drawings and be constructed of new prime quality, Galvanized sheet steel. All frames shall be fabricated from zinc-coated sheet chemically treated after fabrication for optimum paint adhesion.
- B. Materials: Provide pressed metal frame of the following minimum thickness:
 1. Exterior / interior Frames: 1.6/2.0 mm thick sheet.

2. Wall Anchors: Same thickness and material as frame.
 3. Hinge Reinforcement: Manufacturer's Standard 5mm thick unless recommended otherwise by the door manufacturer.
 4. Strike Reinforcement: Manufacturer's Standard unless recommended otherwise by the manufacturer.
 5. Closer and Holder Reinforcement: 1.6 mm by the required length and width.
- C. Frames:** Provide frames that have joints die-mitred with integral tabs for reinforcement and interlocking of the jambs to head. **All frames should be with grooved seal for air leakages and dust control.** Frames shall be knockdown or equivalent, with self-aligning tabs and slots for securely locked corners.
- D. Construction:** The finished work shall be strong and of rigid construction neat in appearance and free from warp, wave and buckle. Moulded members shall be clean cut, straight and true. Mitres shall be well formed and in true alignment. Fastenings shall be concealed where practicable.
- E. Door Silencers:** Except on weather stripped frames, drill stops to receive 3 rubber silencers on strike jamb of single-swing frames and 4 silencers on heads of double-swing frames.
- F. Anchors**
1. Unless otherwise indicated on drawings, anchor frame in concrete and masonry walls by means of galvanized expansion shields and flat-head machine screws. Screw heads shall be counter-sunk in soffit of jamb. Machine screws shall be approved type, 9 mm diameter by minimum 75 long of zinc plated or dichromated steel with 9 mm diameter by minimum 44 mm long malleable iron or steel expansion shield. Reinforce jamb at each expansion screw location with 5 mm by 38 mm wide steel fitting into inside of stop and welded to backbends. Anchors shall be located not more than 150 mm from top and bottom of each jamb with intermediate anchors spaced at a maximum of 650 mm on center.
 2. Anchors for plaster partitions with truss stud framing shall be Z-clip type, to be secured to studs and welded to back of frames above each hinge reinforcement and just below the top hinge reinforcement. Anchors on the strike side shall occur directly opposite to those on the hinge side.
 3. Provide at least 4 anchors for each jamb for frames up to 2.28 m in jamb height; 5 anchors up to 2.40 m; and one additional anchor for each 0.6 m fraction thereof over 2.4 m jamb height.

2.5 DOOR LEAF

A. General:

Construct exterior or interior doors to the following design and gauges: Full flush 1.2mm or more sheet thickness as approved Full flush/ Rail & Stile -minimum 1.2mm sheet thickness

1. **Interior Doors:** Fabricate interior hollow metal doors of 2 outer sheets, 1.2mm thick galvanized sheet steel, free from rust, scale, pits and surface defects. Unless otherwise indicated on Drawings, hollow metal door thickness shall be 46mm.

2. **Exterior Doors:** Fabricate exterior hollow metal doors of 2 outer sheets, 1.2 mm thick galvanized steel sheet. Unless otherwise indicated on Drawings, hollow metal door thickness shall be 46mm.
3. **Glass Lite doors:** Fabricate glass lite of approved sizes and rating based on the door schedule. The material shall be minimum 1.2mm galvanized steel with face fixing countersunk screws.
4. **Metal Louvered Doors:** Shall be manufacture's standard product fabricated of 20 gauge cold-rolled sheet metal, free from rust, scale, pits and surface defects. Door thickness shall be 46 mm. Stile channels, stiffener channels and other construction members shall be of sizes as recommended by the manufacturer. For fire doors the louvers are not applicable
5. **Service Heavy-Duty Doors:** Fabricate service doors using same sheet facing thickness as that for exterior doors as per door location. Provide additional reinforcing stiffeners for the door construction.

B. Door Construction

I. Full Flush Doors (Non-fire rated)

1. Door leaf to have internal reinforcing channels or z-shaped members of 1.6mm thick steel, on top and bottom. Door stiles to be interlocked on both sides with a bending radius of 1.4mm.
2. Hollow portions of doors shall be filled completely with expanded honeycomb core glued on either inside surface for stability and integrity. If it is mineral wool minimum 100kg density per sq.mt, shall be the infill material
3. Door thickness should be 1-3/4" (46mm)
4. Vertical edge seams: Provide doors with continuous vertical edges and mechanical interlocking joints at lock and hinge edges.
5. Provide single swing doors with not more than 3 mm clearance at jambs and heads and not more than 6 mm clearance at meeting edges of pair of doors (3 mm on fire rated doors).
6. Where required as indicated on door type schedule drawing, provide doors with grills and vision glass panels of thickness indicated on drawings. Manufacturer's standard steel assembly, one side integral with door and the other side equipped with applied steel stops of minimum 20 gage steel, 1-piece lengths, secured within 76 mm of ends and maximum 306 mm centers between with cross-slotted flat-head countersunk screws.
7. Fire Rating: Supply door units bearing Labels for fire ratings indicated in Door Schedule for the locations indicated.
8. All double doors to have integrated astragal both for fire and non-fire rated doors

II. Rail& Stile Doors:

1. Door leaf to have internal reinforcing channels or z-shaped members of 1.6 mm thick steel, on top and bottom. Door stiles to be interlocked on both sides with a bending radius of 1.4mm.
2. Hinge stile and lock stile size of (Maximum 150 x 46mm) plus 16mm

for glass bead and stop.

3. Top Rail size shall be (Maximum 150 x 46mm) plus 16mm for glass bead and stop.
4. Bottom Rail size should be (Maximum 250 x 46mm) plus 16mm for glass bead and stop.
5. Intermediate Rails size should be (Maximum 150 x 46mm) plus 16mm for glass bead and stop
6. Door thickness should be 1-3/4" (46mm)
7. Mechanical fastened hairline flush vertical joints on the inside and interlocking joints at lock and hinge edges.
8. Glazing bead should be 16mm high with countersunk screws.

III. Fire rated Doors: Insulated

1. All fire doors shall be manufactured as per the test certificate and the original product proto type for minimum of 60minutes and maximum of 120minutes as per NBC 2016 requirement
2. It should comply with the specification in terms of sheet thickness and frame design. Door frame and leaf sheet thickness can be on the higher side of the specification but not otherwise and shall be fully compliant in terms of construction design and finish. Minimum recommended sheet thickness for frame shall be 1.6mm (16guage) and shutter shall be 1.2mm (18guage)
3. All fire doors should be tested for stability, integrity and insulation. Doors shall be tested for 120minutes integrity and 30minutes insulation.
4. The infill material shall be high density insulation material tested for minimum 30minutes insulation. The internal construction of the door shall be rigid reinforcement for stability and integrity.
5. Fire doors shall be tested as a complete assembly including Frame, door leaf, vision lite and hardware.
6. Intumescent seal is mandatory for all insulated doors. This is independent of the addition smoke seal if required. Smoke seal cannot be used as an alternative for the intumescent seals.
7. Products tested and certified shall be from approved labs of national (CBRI only) or international repute. Third party certified products under a labelling program shall be acceptable provided the test certificates are valid and in line with the door and hardware.
8. All fire doors supplied by the manufacturer shall also be acceptable to
9. the Local authority or AHJ (Authority Having Jurisdiction)
10. Doors tested without vision panel shall not be used if it is not covered as a assembly in the related test certificate
11. The Maximum size of the glazing shall not exceed the overall glass sq.mt tested.
12. All hardware used shall be in line with minimum and maximum fire rating for which it is tested and approved. The hardware supplier shall provide third part relevant approval certificates from agencies like

CERTIFIRE or equivalent as decided by engineer in charge to the door manufacturer and agree in writing if the material is not tested along with the door.

13. Door manufacturer shall be fully responsible for manufacturing, supplying of material in compliance with the standard and certification. Any deviation there off shall be documented and approved by competent authority before the supplies are affected.
14. Fire Rating: Supply door units bearing Labels for fire ratings indicated in Door Schedule for the locations indicated.

IV. Fire rated Doors: Un-Insulated

1. All fire doors shall be manufactured as per the test certificate and the original product prototype for minimum of 60 minutes and maximum of 120 minutes as per NBC 2016 requirement.
2. It should comply with the specification in terms of sheet thickness and frame design. Door frame and leaf sheet thickness can be on the higher side of the specification but not otherwise and shall be fully compliant in terms of construction design and finish. Minimum recommended sheet thickness for frame shall be 1.6mm (16 gauge) and shutter shall be 1.2mm (18 gauge)
3. All fire doors should be tested for stability, and integrity. Doors shall be tested for 120 minutes stability and integrity.
4. The infill material shall be resin bonded honeycomb craft paper of higher density. The internal construction of the door shall be rigid reinforcement for stability and integrity.
5. Fire doors shall be tested as a complete assembly including Frame, door leaf, vision lite and hardware.
6. Products tested and certified shall be from approved labs of national (CBRI) or International repute. Third party certified products under a labelling program shall be acceptable provided the test certificates are valid and in line with the door and hardware.
7. All fire doors supplied by the manufacturer shall also be acceptable to the Local authority or AHJ (Authority Having Jurisdiction)
8. Doors tested without vision panel shall not be used if it is not covered as a assembly in the related test certificate
9. The Maximum size of the glazing shall not exceed the overall glass sq.mt tested.
10. All hardware used shall be in line with minimum and maximum fire rating for which it is tested and approved. The hardware supplier shall provide relevant certificates to the door manufacturer and agree in writing if the material is not tested along with the door.
11. Door manufacturer shall be fully responsible for manufacturing, supplying of material in compliance with the standard and certification. Any deviation there off shall be documented and approved by competent authority before the supplies are affected.
- 12.

V. Glazed Fire rated Doors: Insulated

1. All glazed fire doors shall be manufactured as per the test certificate and the original product proto type for maximum rating of 120minutes as per NBC 2016 requirement.
2. It should comply with the specification in terms of sheet thickness and frame design. Door frame and leaf sheet thickness can be on the higher side of the specification but not otherwise and shall be fully compliant in terms of construction design and finish. Minimum recommended sheet thickness for frame shall be 1.6mm (16guage) and shutter shall be 1.2mm (18guage)
3. All fire glazed doors should be tested for stability, integrity and insulation. Doors shall be tested for 120minutes integrity and 30minutes insulation.
4. The infill material shall be high density insulation material tested for minimum 30minutes insulation. The internal construction of the door shall be rigid reinforcement for stability and integrity.
5. Fire doors shall be tested as a complete assembly including Frame, door leaf, glazing glass with intumescent seal and hardware.
6. Intumescent seal is mandatory for all insulated doors. This is independent of the addition smoke seal if required. Smoke seal cannot be used as an alternative for the intumescent seals.
7. Products tested and certified shall be from approved labs of national or international repute. Third party certified products under a labelling program shall be acceptable provided the test certificates are valid and in line with the door and hardware.
8. For doors with side and top partitions, the certificate shall satisfy the requirement for maximum size of the partition and sq.mt area.
9. For continuous side partition the design approval shall be based on valid assessment report indicating the maximum and minimum allowable glass in each panel. Manufacturer test certificate for specimen door may not be sufficient, it should be supported by valid assessment report from accredited lab for continuity of the system.
10. Glass manufacturer certificate may not be acceptable as they are just part of the assembly. Door manufacturer test certificate is mandatory.
11. As per NBC all door, hardware and glazing material shall be supplied as a unit by the door manufacturer.
12. All fire doors supplied by the manufacturer shall also be acceptable to the Local authority or AHJ (Authority Having Jurisdiction)
13. Doors tested without vision panel shall not be used if it is not covered as a assembly in the related test certificate
14. The Maximum size of the glazing shall not exceed the overall glass sq.mt tested.
15. All hardware used shall be in line with minimum and maximum fire rating for which it is tested and approved. The hardware supplier shall provide relevant certificates to the door manufacturer and agree in writing if the material is not tested along with the door.
16. Door manufacturer shall be fully responsible for manufacturing,

supplying of material in compliance with the standard and certification. Any deviation there off shall be documented and approved by competent authority before the supplies are affected.

2.6 SHOP FINISH

- A. Carry out shop finishing of metal doors and frames as follows:.
 - 1. Chemically treat non galvanized, non bonderized metal surfaces with a phosphate compound to assure maximum paint adherence.
 - 2. Thoroughly clean all metal surfaces of all rust, scale, grease, rough spots and other foreign matter which may prevent proper paint adhesion.
 - 3. Apply spray coat of rust-inhibitive self-etching Primer on all surfaces of frames and on exposed surfaces of doors and panels. Primer shall be baked on in accordance with manufacturer's recommendations for developing maximum hardness and resistance to abrasion; paint dry film thickness not less than 35 microns.
 - 4. Primed surfaces shall be smooth and suitable to receive the finish coats.

2.7 FINAL FINISH

- A. Painted Doors: All doors and frames can either to painted with suitable aliphatic grade paint polyurethane base. Powder coated frames and shutters are also acceptable. Provide a final painted doors and frames of approved shade. Paint surface shall be tested for 500 hours of salt spray test.
- B. Wood grain finish: Provide wood finish on the grain tech surface of the door and frame. Doors to be hand finished and stained with approved wood finishes.

2.8 HARDWARE PREPARATION

- A. General: Hollow metal doors and pressed metal frames shall be prepared at the manufacturer's plant for all hardware in accordance with templates furnished and shall be drilled and tapped to receive hardware as indicated on the hardware templates.
- B. Mortised and concealed hardware: Mortise, reinforce, drill and tap for mortised and concealed hardware.
- C. Locations: Locate hardware as shown on the drawings and conform to standards established by the door hardware manufacturers.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the substrates and the conditions under which hollow metal doors and frames shall be installed and correct any unsatisfactory conditions.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Engineer.

3.2 INSTALLATION

- A. General: Install metal doors, frames, and accessories in accordance with final shop drawings and manufacturer's data, and as specified in this section.
- B. Placing Frames: Shall comply with provisions Recommended Erection Instructions For Steel Frames, unless otherwise indicated.
- C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified.
- D. Finish Hardware: Conform to recommended hardware installation manual.
- E. Anchors for installation shall be recommended by manufacturer based on kind of construction and fire rating
- F. Grouting of frames shall be done once the doors are fully aligned.

3.2 ADJUST AND CLEAN

- A. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.
- C. Final Adjustments: Check and readjust operating finish hardware items leaving steel doors and frames undamaged and in complete and proper operating condition.

3.3 GUARANTEE BOND:

The work shall be guaranteed for a period of five years from the date of N.O.C. issued by the CFO.

The security deposit @ 5% against this item of work shall be in addition to the security deposit mentioned in schedule-F.

The contractor shall execute the necessary guarantee bond against any structural defect, faulty materials, workmanship and defective finish. In addition 5% (five percent) of the cost of this item of work shall be retained as security deposit and the amount so withheld would be released after five years from the date of completion of the entire work under the agreement, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor along with any incidental repairs to structure, flooring, finishing, fixtures and any other related damaged work within fifteen days of receipt of intimation of such defects in the work. If the defects pointed out are not attended to with the specified period, the same shall be got done from another agency at the risk and cost of the contractor and the cost of attending such repairs shall be deducted from any dues payable to the contractors. However, the security deposit deducted may be released in full against bank guarantee

of equivalent amount in favour of Engineer-in-Charge in the prescribed proforma.

3.4 HERMETICALLY SEALED UNIT

Insulating glass shall be a double glazed unit comprising two sheets of approved glass panes separated by a spacer, hermetically sealed using primary and secondary sealants.

The design of insulating glass system shall consist of:

a) HOLLOW SPACER BAR :

The hollow aluminium spacer bar shall be of required size and shape and shall be colour anodized. The spacer bar shall have two lines of perforations in the inner surface.

b) DESICCANT:

The desiccant filled in the aluminium spacer bar shall be synthesized crystalline compounds of Aluminium Hydroxide, Caustic Soda and Sodium Silicate which absorbs water molecules. The desiccant shall be of 3 A size (A means Angstrom). The quantity of desiccant used shall not be less than 35 gm/m length of spacer bar. Filled spacer bar frame shall not be stored for more than 6 hrs. before assembly and sealing of the unit to ensure proper functioning of the desiccant. The contractor shall submit documentary proof of using the above material in the work.

c) PRIMARY SEALANT :

The primary sealant BUTYL (NAFTOTHERM BU" or equivalent) shall be single component, thermo plastic solvent free sealing compound based on polyisobutylene. The sealant surface shall be free from cavities, depression and other defects. The contractor shall submit documentary proofing of using the above material in this work.

d) SECONDARY SEALANT :

The secondary sealant in double glazed unit shall be silicone sealant. The contractor shall submit documentary proof of using the above material in this work to the entire satisfaction of Engineer-in-Charge. Before application of silicone/polysulphide, the surface shall be cleaned and free from oil, grease, dust and other loose matter. The surface shall be cleaned with alcohol or other suitable solvents. Detergent or soap shall not be used to clean the surfaces. The polysulphide shall be mixed and applied mechanically using automatic mixing machine in the manner approved by Engineer-in-Charge.

18.8 TESTING:- One door assembly shall be selected at random out of the entire lot, one for single leaf and one for double leaf and shall be tested for two hours fire rating. The testing shall be got done from CBRI, Roorkee or any other test laboratory approved by the Engineer-in-charge. The cost of materials, for testing and transportation/packing, testing charges and other incidental charges, shall be borne by the contractor. In case the door fails to meet the requirement, the entire lot shall be rejected.

2.5 SPECIALISED ITEMS

19.1 LIST OF SPECIALISED ITEMS:

Architectural Design and Structural Design of buildings. Procedure for Execution of the Specialized Items:

Such items should be got executed only through associated agencies specialized in these fields. The contractor shall indicate the name(s) of his associated specialized agencies within one month of award of work to Engineer-in-Charge for approval of competent authority.

Specialized Agencies for works shall be approved by the competent authority. The contractors shall quote the rates after careful study of contract conditions, specifications, drawings & schedule of quantities.

It shall be the responsibility of main contractor to sort out any dispute / litigation with the Specialized Agencies without any time & cost overrun to the Department. The main contractor shall be solely responsible for settling any dispute / litigation arising out of his agreement with the Specialized Agencies. The contractor shall ensure that the work shall not suffer on account of litigation/ dispute between him and the specialized agencies / sub- contractor(s). No claim of hindrance in the work shall be entertained from the Contractor on this account. No extension of time shall be granted and no claim what so ever, of any kind, shall be entertained from the Contractor on account of delay attributable to the selection/rejection of the Specialized Agencies.

For specialized items, the main contractor cannot work as a specialized agency unless his name is already included in the list of approved specialized agencies for these items. The contractor shall get these items executed through the specialized agencies as approved by competent authority.

2.6 STRUCTURAL GLAZING General

The Contract Documents define only the design intent and general performance requirements. The Contractor is entrusted with total responsibility for design, structural calculations, shop drawings, fabrications, installation, warranties, certifications and related documentation.

The Contractor shall be entirely responsible for the design, fabrication and erection of the systems, and all work shall be performed entirely by his own forces. Design approved metal framing members to accommodate expansion and contraction of components without buckling, creating stress on glass, structural components and fasteners, joint seals or other damaging effects.

The Contractor shall provide to sealant manufacturer samples of all relevant substrates, including finished aluminium, coated glass, gaskets, setting blocks and brackets.

Sealant manufacturer shall perform tests to verify adhesion, staining and chemical compatibility. The Contractor shall use sealants and substrates only in combinations for which favourable addition and compatibility results have been obtained.

Aluminium surfaces in contact with mortar, concrete, plaster, masonry, wet application of the fire proofing and absorptive materials shall be coated with an anti-galvanic, moisture barrier material.

Within two weeks of signing this agreement the Contractor shall provide a detailed write up on the following:

2.6.1 Conceptual design.

Component and hardware description.

- Design, fabrication & execution methodologies.

- Detailed bar chart & showing all activities from macro to micro details.
- Structural design and engineering fabrication, supply and erection of the Structural/ Structural Glazing wall system including but not limited to the following:
- **Extrusion aluminium framing members.** All interior trim covers and closures.
- All anchor clips, fasteners, and brackets.
- Glazing, including materials, gaskets, sealants, spacers and related work.
- A continuous gutter system at each floor of the unitized Structural Glazing wall. Field water tests.

2.6.2 Samples

Sample of one typical panel shall be fabricated, assembled and installed for approval. It shall be of type as per approved drawings. All samples shall be provided at no cost to the Project In-charge.

2.6.3 Design Considerations:

The Contractor should possess adequate engineering background and facilities inclusive of trained system personnel from their parent company and should be able to prove their design and engineering capabilities to meet structural design parameters. The Contractor should carry adequate Professional Indemnity Insurance supporting a design warranty to the benefit of the Project In-charge. Copies of the same to be forwarded to the Project In-charge within 2 weeks of signing the Agreement.

The Contractor shall submit structural calculations for the system and it shall be stamped and signed by a qualified structural engineer, including mock-up complying with current design rules of the relevant aluminium code include analysis for wind, dead loads, deflections and if appropriate seismic loads on framing members and anchors. All Structural Glazing shall have mechanical joints shall be designed IS 875.

The design shall also ensure that the maximum deflection of any member shall not exceed $1/175$ of the span between supports or 20mm, whichever is less for vertical elements & $1/250$ of the span between supports for horizontal elements. Air leakage through windows should not exceed 0.60 Cu.ft/ Sq.ft. Minimum design pressures both inward, outward and acting perpendicular to glass (including return surfaces) shall be per the requirements the Indian Wind Loading Code IS 875 Part 3 and earthquake regulations.

The framing members should be designed such that deflection perpendicular to the wall plane of any unsupported span shall not exceed $1/175$ or 20mm whichever is the least, under the required design load both positive and negative. Also no failure of structural silicone Joints, damage to joinery, components, or permanent set in the framing members in excess of 0.2 percent of the span shall occur under 1.5 times the design load. Deflection in the wall plane of any glazed horizontal span should not exceed $\frac{1}{2}$ the glass edge clearance dimension below.

The Contractor shall also submit the calculations for the structural silicone joint, size as required.

2.6.4 Water Tightness

A complete drainage system must be incorporated into the Structural Glazing wall

frame. Water leakage and condensation shall be drained or discharged to exterior face of the wall and all internal spaces shall be vented by acceptable means to ensure air-pressure equalization when possible.

Drainage system shall be sealed off per floor height to prevent infiltrated water from leaking to lower floors.

Movement of water behind and on exposed surfaces must be controlled to ensure that water is not retained and that elements will not be damaged or corroded by water and to minimize the potential for algae and fungus growth as a result of standing or trapped water.

2.6.5 Shop Drawings:

The Contractor shall prepare detailed shop drawings incorporating all allowances for construction and fabrication tolerances.

The Contractor shall submit detailed shop drawings for the Structural wall system, aluminium composite panel cladding works to the Project In-charge for review.

The Architect's review will be conformance to the design concept and for the general arrangement only. And such review shall not relieve the Contractor of any responsibilities as stated herein or any other applicable items herein specified.

The Shop drawings shall show joinery techniques, provisions for horizontal and vertical expansion, glass and metal thickness, framing and anchor member profiles, identification all materials including metal alloys, glass types, fasteners and glazing materials, all shop and field sealants by product name. This shall also show relative.

Layout of all adjacent walls, beams, columns and slabs with all dimensions to each other and grid lines/ dimension position of glass edge relative to metal daylight, anchorage details to the building structure and coping details at the parapet are also to be submitted. The drawing shall also indicate all gaskets, weather strips and Aluminium extrusions.

Shop Drawings shall be signed and sealed by a Qualified Structural Engineer with specific experience in Structural Glazing Wall construction and design.

2.6.6 Samples:

Within two weeks of signing the contract the Contractor to submit samples for review three (3) sets of labelled samples of each required type and colour of metal finish, on 300mm long sections of aluminium extrusion shapes. Samples must show extremes of colour texture variation. Samples will be reviewed by Project In-charge for colour and texture only. Compliance with other requirements is the responsibility of the Contractor. Colour and texture range of production material shall match approved samples.

Project In-charge reserves the right to require samples which will show the fabrication techniques and workmanship of the component parts, and the design of accessories and other exposed auxiliary items, before fabrication of this work proceeds

Within two weeks of signing this contract submit for review, 3 sets of samples sealant backers, anchor components, anchor assemblies and epoxies.

2.6.7 Aluminium

Extruded aluminium sections should conform to BIS designation HE9WP/HV9WP, the chemical composition requirements of IS 733, and technical properties as laid down in IS 1285. Standard commercial tolerances shall apply to finished, fabricated and

assembled materials.

2.6.8 Mullions and Transoms

The sections of mullions and transoms shall be designed to withstand deflection and wind pressure as described in specifications and shall be rigid enough to support and retain the glass and other construction variation as indicated.

Reinforcing member, where used, shall be completely enclosed and if fabricated from steel shall be galvanized and protected with two coats of zinc chromate where welded shall be treated in the same way.

The frames shall be formed by integrated PVDF 3 coats (40 – 45 microns) as per AAMA 2605 specification aluminium section with provision to receive fixed glass spandrel and other construction variation as indicated.

Sections of the frame shall be cut and profiled for assembly in the best workmanlike manner and finished in a neat and weatherproof construction with proper tempering of aluminium sections.

All dimensions of the Structural Glazing wall shall conform to the overall sizes shown on the drawings. They shall be fabricated to proven and tested detail designs. All parts shall be supplied ready for fixing and complete with all necessary fittings. Samples of typical sections shall be submitted with the tender. The exact dimensions for frame work shall be physically checked at site before starting fabrication.

All jolts shall be mechanical, jolted with aluminium angles with stainless steel screws.

2.6.9 Silicone Sealant:

The Contractor shall send a sample of PVDF 3 coats (40 – 45 microns) as per AAMA2605 specification aluminium section & selected glass to the silicon sealant manufacturer and get his approval. A copy of that certificate to be submitted to Project In-charge. The cost of samples, carriage of the samples and testing charges, if any shall be borne by the Contractor.

The Contractor shall submit, for record only, glass manufacturer's written statement that any insulated glass, reflective glass and spandrel glass is supported by structural silicone is suitable for such application.

The colour/ shade of sealant shall be decided by the Project In-charge and the Contractor to get approval before procurement.

2.6.10 Glass Specification:

Design should be based on the use of glass as mentioned in the data sheet.

2.6.11 Specification of Glass:

Providing and fixing aluminium semi unitized vertical Structural glazing system with single glass vision panel and spandrel panel of approved make having main frame of verticals and horizontals made out of specially designed extruded aluminium sections to withstand design wind pressure at a height of 30m and fabricated, fixed at all levels, elevation and heights to the Masonry / RC walls with necessary clamps, brackets and anchor fasteners. All clamps and brackets shall be Mild Steel Hot dip galvanized minimum 80 microns thick and shall conform to IS: 4759-1996. The extruded aluminium section shall be anodised in approved colour with a anodic coating of minimum 20 microns. Extruded section shall be of 6063 T5 or T6 alloy conforming to

ASTM B 221. Any other fastening straps, nuts, bolts, rivets, washers, Fire stops at all floor levels etc. shall be in stainless steel SS 304 grade. All tapes shall be of approved make. The system shall be designed to withstand a wind pressure of 200 kg/Sqm and shall be fixed to the masonry/RC walls with necessary clamps, brackets and anchor fasteners, clamps and brackets shall be Hot dip galvanized minimum 80 microns thick, all complete as per manufacturer's manual and specifications. The spandrel panel shall have 50mm thick fibre glass insulation of 48 kg/Cum density of approved make conforming to IS-8183 and 1.0 mm thick Twiga black tissue conforming to BS 476 Part 7. This insulation shall be enclosed in a GI tray fabricated out of 1mm thick. GI sheet and fixed to the glazing framework with stainless steel fasteners. The gap between the GI framework and the concrete framework shall be sealed with Aluminium flashing fixed with stainless steel fasteners. All gaps shall be sealed with Silicone sealant of approved brand. Insulation should be provided in between the Structural glazing aluminium frame work (i.e., behind the spandrel glazed panel) and the structure. Providing 6 mm thick toughened fully tempered hard coated glass of blue/green/blue-green or approved colour having VLT

> 27 %, Solar factor <0.25, U Factor < 1.7 W/sqm K etc. Accessories:

Silicon gaskets, weather stripping, extruded seals and spacers, who do not come into contact with structural silicone sealant shall be of Silicon gasket or approved equivalent. Where in parallel contact with structural silicone sealants, all gaskets, setting blocks and spacers other than foam glazing tapes shall be of heat cur silicone rubber, chemically compatible with the silicone sealant and suitable for the specific purpose intended. All extruded gaskets, weather stripping and spacers other than foam glazing tapes shall have continuous mechanical engagement to framing members adhesive attachment is not acceptable.

The cladding system shall be constructed with (and shall maintain during its design life) a standard of seal which shall not result in any reduction of sound insulation performance.

Gaskets, weather stripping and seals used to achieve the required weather proofness and/or air tightness shall be selected to accommodate fully the range of dimensional tolerances associated with fabrication and installation of the cladding system. Gaskets, weather stripping and seals shall be formed from materials capable of retaining their elastic qualities, dimensions and resistance to physical and chemical attack sufficient to maintain the full water tightness, air tightness and acoustic performance for the design life of the Structural wall.

Extruded gaskets, weather stripping, seals and spacers mechanically engaged by flutes or pockets extruded in framing member shall be installed without residual tension or extension. Dry lubricants may be used to reduce drag during installation of synthetic rubber extrusions and to induce compression so as to prevent gradual elastic shrinkage and retraction from their ends. Wet lubricants containing detergent shall not be used for any purpose which may bring the liquid into contact with the coated surfaces of vision and spandrel glass.

2.6.12 Fabrication & Installation

Installation shall be in true line vertically and horizontally.

Work shall be done by competent workmen who are thoroughly skilled in their trade.

Assemblies shall be neat and free of defects that impair strength, function or appearance. The work shall be accomplished in compliance with the specified criteria without buckling opening or joints. Under stress on fasteners, sealants and gaskets, opening of welds cracking of glass leakage noises and other harmful effects.

As far as practicable fitting and assembly of the work, shall be done in the shop.

All exposed work shall be carefully matched to produce continuity of line and design.

All joints in exposed metal work, unless otherwise shown or specified shall be accurately fitted and rigidly secured with joint sizes conforming to industry standards.

Except where otherwise shown specified or directed the method of assembly and joining shall be as per approved shop drawings. Fabricate and fasten metal work so that the work will not be distorted nor the fasteners over stressed from the expansion and contraction of the metal.

All welding shall be in accordance with the appropriate recommendations of the Indian welding codes and shall be done with electrodes and/ or by methods recommended by the manufacturer of the alloys being welded. All welds behind finished surfaces shall be done as to minimize distortion and/ or dis-coloration on the finished side. All weld spatter and welding oxides on finished surfaces shall be removed by de-scaling and/ or grinding.

Unless otherwise shown or specified, all weld beads or exposed surfaces shall be ground and finished to match and blend with finish on adjacent parent metal. Grinding and polishing of nonferrous metal shall be done only with clean wheels and compounds free from iron and iron compounds. No soldering and/ or brazing shall be allowed.

The Contractor shall conceal all the fasteners where visible in the finished work.

All aluminium components shall fabricate before finishing, Cutting of components will not be acceptable.

As the building is exposed to varying weather actions, all fasteners shall be stainless steel, self tapping screws with Aluminium brackets. Steel anchors shall be pre-holed and galvanized. The bolts shall be steel chromium plated along with nuts and covered with butyl sealing compound.

Where aluminium comes into contact with masonry, brickwork, concrete, plaster or dissimilar metals, it shall be coated with an approved insulation lacquer, paint or plastic tape to ensure that electro-chemical corrosion is avoided.

The Contractors shall be responsible for placing in position the Structural Glazing wall frames for the satisfactory performance and should be totally leak proof for a minimum period of ten years Sealant and Gasket Application

Sealant and gasket shall be provided wherever shown in the drawings or required for a permanently weather tight installation. The sealing mechanism for each location and use shall be as indicated on drawings in those locations where a mechanism is necessary but is not indicated. It shall be of type recommended by the Contractor and approved by the Project In-charge.

All adjoining surfaces shall be protected to receive sealants against staining by masking and/ or other methods.

Joints and joint surfaces shall be clean, dry and free of any material that may have an adverse effect on the bonding and/ or seal of the sealant and gasket materials.

Apply sealants and gasket under the conditions recommended by the manufacturer(s) Prime all surface to receive sealants and gasket unless recommended otherwise use no sealant that has started to set in its container or a sealant that has exceeded the self life published by the manufacturer.

Fill all joints continuously and completely with sealant forming a neat uniform concave bead. Finish the material flush with adjoining surfaces unless otherwise shown on the drawings. All sealant surfaces shall be tooled smooth.

2.6.13 Certification:

The Contractor shall submit a letter of certification from the sealant manufacturer stating that the sealant has been tested for adhesion and compatibility on production samples of metals, glass, and other glazing components, and that all sealant details and application procedures shown on the reviewed shop Drawings are acceptable for use.

Where the Structural Glazing wall and other cladding impinges on, intercepts, covers, is attached to or supported by the work of other trades, for instance at parapet-level junctions with roof membranes and back-up walls, the Contractor's shop drawing and location drawings shall clearly distinguish elements and components of construction by other.

Anchorage System and Building Frame

Each mullion shall be fixed to the structural slab at each floor level. All steel fasteners shall be galvanized to minimum 80-90 microns coated with zinc chromate primer and supplied by the Contractor.

2.6.14 Water Tightness

No gross leakage shall be observed when subject to test for water penetration as described in BS 4315 Part-1.

ANNEXURE-I

GUARANTEE BONDS
GUARANTEE TO BE EXECUTED BY THE CONTRACTOR
FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF STONE
WORK/ TILE WORK.

The agreement made this..... day of Two Thousand between.....S/o(hereinafter called the GUARANTOR on the one part) and the Governor of Assam (hereinafter called the Government on the other part) WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated and made between the GUARANTOR ON THE ONE PART AND the Government on the other part whereby the contractor inter alias undertook to render the work in the said contract structurally stable, workmanship, finishing and use of sound materials.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will remain structurally stable and guaranteed against faulty workmanship, finishing and materials.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain structurally stable after the expiry of maintenance period prescribed in the contract for the minimum life of five years to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

The decision of the Engineer-in-Charge with regard to nature and cause of defect shall be final.

During this period of guarantee, the guarantor shall make good all defects to the satisfaction of the Engineer-in-Charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's cost and risk. The decision of the Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all the defects, commits breach there under, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and or cost incurred by the Government, the decision of the Engineer-in-Charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents have been executed by the obligatorand by for and on behalf of the

Governor of Assam on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of :-

1. 2.
 SIGNED FOR AND BEHALF OF THE Governor
 of Assam BYin the presence of :-
 1.
 2.

ANNEXURE-II**GUARANTEE TO BE EXECUTED BY THE CONTRACTOR
FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF WATER-
PROOFING WORKS.**

The agreement made this..... day of Two Thousand.....
betweenS/o(hereinafter
called the GUARANTOR on the one part) and the
Governor of Assam (hereinafter called the Government on the other part)
WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract)
dated.....and made between the GUARANTOR ON THE ONE
PART AND
the Government on the other part whereby the contractor inter alia undertook to render the
building and structures in the said contract completely water and leak-proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said
work will remain water and leak proof, for Ten years from the date of giving water proofing
treatment.

NOW THE GUARANTOR hereby guarantee that work executed by him will render the
structures completely leak proof and the minimum life of such water proofing treatment shall
be Ten years to be reckoned from the date after the expiry of maintenance period prescribed in
the contract.

The decision of the Engineer-in-Charge with regard to nature and cause of defect shall be
final.

During this period of guarantee, the guarantor shall make good all defects and in case of any
defect being found render the building water proof to the satisfaction of the Engineer-in- Charge
calling upon him to rectify the defects failing which the work shall be got done by the
Department by some other contractor at the Guarantor's cost and risk. The decision of the
Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to execute the water proofing or commits breach there under, then
the guarantor will indemnify the principal and his successor against all loss, damage, cost
expense or otherwise which may be incurred by him by reason of any default on the part of the
GUARANTOR in performance and observance of this supplementary agreement. As to the
amount of loss and/or damage and or cost incurred by the Government, the decision of the
Engineer-in- Charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents have been executed by the obligator
.....and by for and on behalf of
the

Governor of Assam on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of :-

1.
2.

SIGNED FOR AND BEHALF OF THE Governor of Assam BY

.....in the presence of :-

1.
2.

ANNEXURE-III

GUARANTEE TO BE EXECUTED BY THE CONTRACTOR
FOR REMOVAL OF DEFECTS AFTER COMPLETION
IN RESPECT OF SANITARY INSTALLATIONS / WATER SUPPLY / DRAINAGE
WORK AND ALUMINIUM WORK

The agreement made this..... day of Two Thousand..... between
S/o(hereinafter called
 the GUARANTOR on the one part) and the Governor of Assam (hereinafter called the
 Government on the other part)

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract)
 dated..... and made between the GUARANTOR ON THE
 ONE PART

AND the Government on the other part, whereby the contractor inter alia, undertook to render
 the work in the said contract structurally stable, leak proof and sound material, workmanship,
 anodizing, colouring, sealing etc.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said
 work will remain structurally stable, leak proof and guaranteed against faulty material and
 workmanship, defective anodizing / Powder coat colouring and finishing for years
 from the date of completion of work.

NOW THE GUARANTOR hereby guarantee that work executed by him will be free from any
 leakage, seepage, cracks in pipes and guaranteed against faulty material and workmanship,
 defective galvanizing for five years to be reckoned from the date after the expiry of maintenance
 period prescribed in the contract.

The decision of the Engineer-in-Charge with regard to nature and cause of defect shall be final.
 During this period of guarantee, the guarantor shall make good all defects and in case of any
 defect to satisfaction of Engineer-in-Charge at his cost and shall commence the work for such
 rectification within seven days from the date of issue of the notice from the Engineer-in-Charge
 calling upon him to rectify the defects failing which the work shall be got done by the
 Department by some other contractor at the guarantor's cost and risk. The decision of the
 Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all defects or commits breach there under, then the
 guarantor will indemnify the principal and his successor against all loss, damage, cost expense
 or otherwise which may be incurred by him by reason of any default on the part of the
 GUARANTOR in performance and observance of this supplementary agreement. As to the
 amount of loss and/or damage and or cost incurred by the Government, the decision of the
 Engineer-in-Charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents have been executed by the
 obligator..... andby for and on
 behalf of the Governor of Assam on the day, month and year first above written.

IN WITNESS WHEREOF these presents have been executed by the obligator.....
 and by for and on behalf of the
 Governor of Assam on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of :-

1. 2.

SIGNED FOR AND ON BEHALF OF THE Governor of Assam BY.....

in the presence of :-

1. 2.

ANNEXURE-IV

FORM OF PERFORMANCE SECURITY/ BANK GUARANTEE BOND

In consideration of the Governor of Assam (hereinafter called “the Government”) having agreed under the terms and conditions of agreement No._____ dated_____ made between_____ and _____ {hereinafter called “the said contractor(s)”} for the work _____ (hereinafter called “the said agreement”) having agreed to production of an irrevocable Bank Guarantee for Rs._____ (Rupees _____ only) as a security/guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement,

We _____ (indicate the name of the Bank) (hereinafter referred to as “the Bank”) hereby undertake to pay to the Government an amount not exceeding Rs._____/ - (Rupees _____ only) on demand by the Government.

2. We _____ do hereby undertake to (indicate the name of the Bank) pay the amounts due and payable under this Guarantee without any demure, 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 said contractor (s). Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____/ - (Rupees _____ only).

3. We, the said bank further undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s) shall have no claim against us for making such payment.

4. We _____ further agree that the guarantee (indicate the name of the Bank) herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-Charge, on behalf of the Government, certifies that the terms and conditions of the said agreement have been fully and properly carried out by the said contractor(s) accordingly discharges this guarantee.

5. We _____ further agree with the Government that (indicate the name of the Bank) the Government 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 Government against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the 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 of omission on the part of the Government or any indulgence by the Government to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

7. We _____ lastly undertake not to (indicate the name of bank) revoke this guarantee except with the previous consent of the Government in writing.

8. This guarantee shall be valid up to _____ unless extended on demand by Government. Notwithstanding anything mentioned above, our liability against this Guarantee is restricted to

Rs. _____ /- (Rupees _____ only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Dated the _____ day of _____

for _____

(Indicate the name of the Bank)

PART – C
TECHNICAL BID
(Electrical
&MechanicalWorks)

GENERAL INFORMATION AND BRIEF DESCRIPTION OF E&M WORKS

The scope of work includes Planning, Designing, supply, installation testing and commissioning of following E&M services in the **Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1:**

- Wiring for internal electric installation i.e. light & fan point, light & power plug with modular switch, socket and accessories, LED Fittings, Exhaust/Fresh air fan, Ceiling fan, switch board, SDBs, floor panel, main panel, seperate rising main for UPS, Essential & Non-essential supply, Earthing, lightening conductor and lighting arrestor, Area compound lighting with LED fitting & decorative poles, bollard lighting etc. Fire survival cable as per the approved drawing shall be provided for automatic fire alarm system. Dimmable and tunable light fittings with smart control shall be provided in conference halls and Auditorium with lighting control and keypads. All luminaries used shall be energy efficient LEDs.
- Electrical sign board and Exit signages shall be provided for the various services, at various floors of the building as per requirement. Apart from this architectural and brailesinages and all requirement of accessable building should be met.
- All pumps shall be designed to fulfill the requirement of water for office building and fire fighting system. One Submersible pumps shall be provided in borewell. Hydro-pneumatic/booster pumps for supply of drinking water & pumps for HVAC system from UG tank to over head tanks on terrace of building. Suitable size of de-watering pump shall be provided in basement or any other location in AC plant room. One additional pump of each type and of same capacity shall be provided as stand by.
- Substation of minimum capacity comprising of H.T. Panel, Transformers, HT Cable, Bus trunking from Transformer to LT Panel, MV main Panels receiving supplies from transformers and DG sets, Automatic power factor corrector panel, Essential Panel i/c Earthing, inter connecting power cables in sub- station, safety equipments. Planning and design comprising of calculation of electrical load after getting EI & equipment loads of the building, total working capacity of the transformers considering diversity factor of the system, planning & making SLD drawings for the distribution system, sizes of cables as per loads etc. are in the scope of work. The contractor will prepare the drawing of Distribution system, SLD and layout of the equipments. During the approval of design and drawing the consultant will submit the data sheet and catalogue of the various equipment in support of their design. Substation can be of 11/0.433 KV or 33/0.433 KV depending upon the norms of the Distribution Licensee. Preparation of inventory, SLD, BOQ is also in the scope of this work.
- Provision of silent type D.G. Set complete with Automatic load transfer facility using PLC with, Bus Trunking / cables from DG Set to essential panel, control cable, Earthing of DG Set and, exhaust piping as per CPCB norms i/c supporting structure/arrangement is in the scope of this work. The facility of manual bye-pass arrangement from the normal supply shall be in the scope of the work in case of failure of AMF panel and PLC etc. to ensure the availability of trouble free normal supply. Planning and design comprising of making SLD for the distribution system, Calculation of essential load , sizes of cables/bus trunking, layout of the equipments and sizes of the rooms as per site condition, submission of data sheet and catalogue of the various equipment in support of their design, Preparation of SLD and BOQ, is also in the scope of this work.
- Provision of UPS set with 30 min. battery backup is in the scope of this work. Planning and design comprising of preparation of BOQ, distribution system for UPS as per the requirement of NBC 2016, Preparation of SLD, submission of data sheet and catalogue of the various equipment in support of their design etc are also in the scope of this work.
- Fire Fighting system with wet riser & sprinklers for the buildings and equipments as per

the requirement of NBC 2016 with upto date amendments, updated BIS codes, Fire bye-laws of Govt. of Assam and CPWD specifications and as per enclosed specifications and makes. This will also includes peripheral header/ring mains and isolation of ring main at minimum 3 points in the header around the building, the provision of testing valve in the fire pump house with the facility to transfer the water again in the fire sump to avoid the wastage of water, isolation valve in the feeder pipe line to each and every wet riser in the building, electric & diesel fire pump, internal & external fire hydrants, Portable fire extinguishers etc.

- Provision of addressable automatic fire alarm system complete with detectors, addressable fire alarm panel, and all other related accessories to cater the requirements of relevant CPWD specifications., fire services norms of local body and NBC 2016.etc as required This include installation of digital PA and fire evacuation system/plan in the fire control room and minimum 2 nos. at each floor of the building with battery backup or more as per the requirements contained in NBC 2016. The interconnection /wiring for the detectors will be done with copper armoured fire survival cable.
- Power cabling work shall be with XLPE insulated PVC sheathed armoured cable as per IS 7098 only.
- The scope of the work of contract includes Quality Assurance Policy & Check List of E &M Services as per CPWD Hand book as amended up to date and obtaining mandatory approvals from local bodies/ State & Central authorities/ Municipal Corporation, clearance NOC from Fire Department etc. The scope of work also includes three years defect liability period of all E&M services as mentioned above. LED fittings and fixture shall be within the warranty for five years from the date of completion and handing over the site to the client department.

General Services in the scope of E&M Works

The services to be provided by Contractor shall include **(Schedule of Quantities of various items involved in this work, Design, Drawings, Vetting and shop drawings)**

- Design of electrical installations including all electrical fittings/fixtures, watersupply pumps, de-watering pumps etc., as necessary.
- Design of Power Supply & Distribution system of HT and LT including emergency and backup supply, sub-station, DG set with AMF panel, PLC panel, HT Panel, LT panel, APFC panel, feeder pillars etc.
- Design of Lightning protection and Earthing system.
- Design of External Lighting.
- Design of UPS back up as per requirements of NBC 2016 or wherever indicated.
- Design of Fire fighting, fire detection and PA system.
- Design of Street light design with control panel.
- Design of Water supply,submersible& booster pumps, dewatering pumps etc
- Proper coordination with civil engineering/mechanical engineering features /services.
- Liaisoning of other statutory agencies like Fire Services, CEA, etc. for obtaining the pre construction and post construction clearances. The statutory payments to these agencies shall be paid by the contractor except payment for the service connection charges of HT line to the HT meterboard.

<u>Brief Description of Planning activities for E&M Services:</u>	
1	Carry out basic and detailed designs of comprehensive electrical power distribution scheme, indoor and outdoor lighting, lightning protection and earthing systems of all the buildings in accordance with the relevant Indian regulations and Standards. The work shall include, but not limited to the following services:
2	Design and draw up preliminary schemes on the electrical requirements.
3	Design the distribution systems and prepare single line diagrams with details of accessories and equipment.
4	Specify the details and capacities of HT panels, Transformers, LT panels, APFC panels, standby diesel generators and fuel intake, and to specify the type of supply arrangement for incoming power supply, interlocking arrangement between HT panel, transformer, L T panel & DG sets.
5	Design the Sub-station comprising of the HT panel room, transformer room, L T panels room, generator room and to specify the necessary switchgear and control 'Changeover panels, capacitor banks, bus duct, essential and non essential panels as necessary with the appropriate load shedding.
6	Make detailed specifications of all electrical items, essential and non-essential panels, power control centers, capacitor panels and the corresponding bill of quantities for the various items.
7	Design and prepare detailed layout drawings for the individual power plugs, light circuits, power circuits, submains, cable roots from building to the sub station. Indoor and outdoor lighting, lighting protection and earthing system as required.
8	The verification of design and drawing by an institute of repute as defined in bidding document is also in the scope of work.
A. <u>EI Work</u>	
1.	Design and planning of buildings, services, fittings etc. with most energy efficient equipment to get 3 STAR TERI-GRIHA rating of the installation.
2.	Marking of various light, fan, plug points and other electrical EI services on the architecture drawing, preparing of conduit layout plan, preparation of inventory, their circuits, sub-main, DBs, SDBs, Panel etc.
3.	Design and selection of EI fixtures to get the required illumination (lux level calculation at various places), design and selection of ceiling fans, air changes in toilets, air flow for the specific requirement as per CPWD/NBC/IS standards.
4.	Designing of size and capacity of sub-mains, DBs, Panel, rising mains according to the electrical load. The design of the risers for normal supply, emergency supply and UPS supply shall be designed based on maximum connected load and 10% additional capacity in view of the future extension of electrical load.
5.	Marking of various telephone outlets, krones and conduit lay out up to the EPBAX room/Control room.
6.	Preparation of inventory, BOQ etc.

7.	Electrical Sign boards and exit sign boards shall be provided for the various services at required place.
8.	During the approval of design and drawing the contractor will submit the data sheet and catalogue of the various equipment in support of their design.
B.	<u>Fire Fighting & Sprinkler System Work :</u>
1.	Marking of various fire fighting accessories/equipments i.e. location of sprinklers, internal & external hydrants on the architecture drawing, preparation of inventory as per CPWD specification/NBC guidelines/IS codes.
2.	Design of plumbing to get the required pressure at various levels, location of various valves, drain pipes etc as per specifications.
3.	Designing of pump sets, diesel fire pump for fire fighting& sprinkler system and their jockey pumps and layout in the pump house.
4.	Providing fire-fighting portable fire extinguishers as per CPWD/NBC/IS codes specifications.
5.	All the drinking water,submersible,booster and dewatering pumps should be designed.
6.	During the approval of design and drawing the consultant will submit the data sheet and catalogue of the various equipment in support of their design.
7.	Preparation of inventory, BOQ.
C.	<u>Fire Alarm & PA System Work :</u>
1.	Marking of various fire alarm accessories i.e. location of detectors, MCP, fault isolator, hooters/speakers, main panel, repeater panel on the architecture drawings, preparation of inventory as per CPWD Specification./NBC/IS codes.
2.	Design of loop circuits and its route marking on the drawing.
3.	During the approval of design and drawing the consultant will submit the data sheet and catalogue of the various equipment in support of their design.
4.	Preparation of inventory, BOQ.
D.	<u>Sub-station Work :</u>
1.	Preparation of electrical load calculation after getting EI & equipment loads of the building.
2.	Planning & making SLD drawings for the distribution of power supply. The sizes of cables shall be as per electrical loads and other sub-station equipment shall be prepared with justification.
3.	33/11 KV 3 phase supply shall be got available near the building within the campus and accordingly HT cable from the available source to the main incoming of HT panel is in the scope of work.

4.	The minimum capacity of the transformers shall be defined as per scope of work.
5.	LT Panels shall be designed for non-essential, essential and UPS supply.
6.	Suitable size of sandwich/air insulated compact bus trunking between transformer/DG Sets to different essential and non-essential panels.
7.	Earthing for System and safety of equipment as per CPWD/IE rules.
8.	Providing safety equipments.
9.	Layout of various equipments of Sub-station to accommodate in the service building.
10.	The consultant will prepare the drawing of Distribution, SLD and layout of the equipments.
11.	During the approval of design and drawing the consultant will submit the data sheet and catalogue of the various equipment in support of their design.
12.	Preparation of inventory, SLD, BOQ.
E.	<u>DG Set Work :</u>
1.	Planning & making SLD drawings for the distribution and load calculation to evaluate the size of cables/bus trunking.
2.	Essential Panels shall be designed with AMF panel consisting with bypass arrangement auto as well as manual (in case of AMF failure).
3.	Earthing for neutral and safety of equipment as per CPWD /EI rules.
4.	The capacity of the inbuilt diesel tank shall be as per manufacturer standard.
5.	The exhaust piping of the DG Set shall be extended as per the CPWD, CPCB guidelines and suitable MS structure shall be designed and provided to support the exhaust pipe.
6.	The consultant will prepare the drawing of Distribution, SLD and layout of the equipments and sizes of the rooms as per relevant CPWD specifications.
7.	During the approval of design and drawing the consultant will submit the data sheet and catalogue of the various equipment in support of their design.
8.	Preparation of SLD, BOQ.
F.	<u>UPS Work :</u>
1.	Online UPS of working capacity in parallel redundancy mode for office bldg. and IT equipments having 30minute backup with maintenance free batteries .
2.	Suitable size of incomer and outgoing panel for the UPS supply.
3.	For the distribution of UPS supply to all above rooms air insulated compact riser mains shall be provided.
4.	MCB DBs shall be connected with a UPS rising main through UPS Floor distribution panels.
5.	Maintenance free sealed maintenance free batteries shall be provided on a suitable size of rack.
6.	During the approval of design and drawing the consultant will submit the data sheet and catalogue of the various equipment in support of their design.
7.	Preparation of BOQ.

G.	<u>Water Supply, Drainage & Sewage Pump :</u>
1.	Consultant has to design the requirement of water for the building and other services and accordingly design the hydronic pumps to supply to the various services including 1 pump as standby.
2.	Pump shall also be provided for the sewage/dewatering at basement or any other places like AC plant, pump house etc. The calculations based on the catchment area and designing on the base of removal of accumulated water in a period of maximum 30 minutes shall be submitted by the contractor for approval.
3.	During the approval of design and drawing the consultant will submit the data sheet and catalogue of the various equipment in support of their design.
4.	Preparation of BOQ, technical specification.
J.	<u>Signages :</u>
	Consultant has to design all signage for internal and external application, information/location/identification sign of E&M equipments and EDB rooms, statutory signs like fire and exit signs, warning/prohibitory sign like danger plates etc., way finding signs, evacuation plan, any other information required by the Engineer-in charge/client.
	The firm will submit the 3 sets of documents in easily readable sheet for above planning and designing to the department within the stipulated time given in the agreement for the approval of competent authority. The competent authority will examine the documents and if need any correction/amendment, the same shall be made by the firm again free of cost within the quoted rates.
	After the approval of design and drawing, the work will be started accordingly and if during the execution it is found necessary to amend any parameter, shall be made by the firm again free of cost within the quoted rates.
	The firm will prepare the co-ordination working drawing after getting all inputs of various services so that the work of any service should not hamper the progress of work. Before the start of work the firm will submit the RCP drawings showing all the services and equipments to get a proper aesthetic look of the building.
K	Other Items as indicated in scope of work and any other items which are not mentioned but required for functioning of building.

SCOPE OF WORK, USER REQUIREMENTS AND TECHNICAL SPECIFICATIONS:

GENERAL CONDITIONS FOR ALL E&M PACKAGES

1. The agency must study various CPWD specifications; get themselves acquainted with site and site conditions, provision for fire fighting system for the office building in local byelaws and additional conditions carefully. The work shall be executed in close co-ordination with the progress of building work.
2. The work shall be carried out in the following order of preference.
 - (i) Indian electricity rules 2005 & Indian electricity act 2003 amended up to date.
 - (ii) Additional Technical specifications and list of acceptable makes attached.
 - (iii) CPWD general specifications for electrical works Part – I (Internal) – 2013 , Part II (External) -1994 amended up to date, CPWD general specifications for electrical works Part – III (Lifts and Escalators) – 2003, CPWD general specifications for electrical works Part – IV (Sub stations) – 2013, Local Fire Regulations, CPWD general specifications for electrical works Part – V (Wet riser & sprinkler system) – 2006, CPWD general specifications for airconditioning / HVAC works – 2017, National electrical code 2011 amended up to date and Relevant sections of National building code 2016 and CPWD special publications available on CPWD website. (Note: The higher specifications / stringent conditions of CPWD specifications or NBC – 2016 shall be followed).
 - (iv) Relevant BIS standards as modified up to date.
 - (v) Sound Engineering practice as approved by the Engineer – in – charge.
Any additional item of work, if taken up subsequently, shall also confirm to the relevant specifications mentioned above.
3. All the equipments shall be delivered with (i) Manufacturer's test certificate, (ii) Manufacturer's technical catalogues and Installation / Instruction (O&M) manuals.
4. Scaffoldings & any other T & P required for execution, testing and commissioning of work shall be arranged by the contractor and is included in the cost of work tendered by the contractor.
5. The design layout plans / drawings / other documents pertaining to E & M services shall have to be submitted for approval and got proof checked by an institute of repute as defined/mentioned in the bid-document within the time period as specified in the table of mile stone.
6. Inspection before Dispatch: All routine tests shall be conducted before dispatch of equipments. No equipment shall be dispatched out from the manufactures premises before such tests are conducted and test result recorded. These test certificates shall be given along the supply of equipments. The Engineer In-charge shall, if he so desires inspect and witness the pre- delivery tests. For this purpose, the agency shall give 15 day advance notice. Agency shall arrange for inspection of the department. Department shall bear expenses of its officials for inspection as far as traveling, boarding and / lodging is concerned. However, the inspection shall be done at the discretion of the department without any cost implication but ROUTINE TEST & TYPE TEST Certificates shall have to be submitted for equipments. Prior to dispatch, all equipments shall be adequately protected & insured for the whole period of transit, storage and erection against corrosion and incidental damages etc. from the effect of vermin, sunlight, rain, heat and humid climate.

7. PROCEDURE FOR APPROVAL OF MATERIALS, SHOP FLOOR DRAWINGS AND COMMENCEMENT OF WORK:

Within the time specified in table of milestone, the contractor shall submit following documents for approval:

- (i) List of makes & Model numbers of all items of equipments and accessories each sub Head of work.
 - (ii) Catalogues of the equipments to be supplied.
 - (iii) Shop floor drawings of each packages/ Sub work separately for approval.
 - (iv) It is the responsibility of the tenderer to get the makes, models and shop floor drawings approved by the department before placing of order.
8. **Insurance:** The agency shall include storage cum erection insurance including third party insurance right from the storage to commissioning and handing over of various equipments. In insurance , the beneficiary shall be Engineer -In-charge at the cost of the agency.. All insurance which the agency is required to enter into under the contract shall be affected any authorized general insurance company and the agency shall produce the policies of insurance. In case of any delay in ITC & handing over, the insurance cover will be suitably extended by the contractor at his own cost.
 9. **Remedy of failure to insure:** If the agency fails to effect and keep in force the insurance referred to in the preceding sub-clause the department may affect and keep in force any such insurance and pay such premium as may be necessary for that purpose and from time to time deduct the amount, so paid by the department, from any money due or which may become due to bids or recover the same as debit from the agency's bill.
 10. **Quality of material and workmanship:** All parts of the equipment shall be of such design, size and material so as to function satisfactorily under all rated conditions of operation. All components of the equipments shall have adequate factor of safety. The work of fabrication and assembly shall conform to sound engineering practice and on the basis of "Fail Safe Design". The mechanical parts subject to wear and tear shall be easily replaceable type. The construction of the equipments shall be such as to facilitate easy operation, inspection, maintenance and repairs. All connections and contacts shall be designed to minimize risk of accidental short circuits caused by animals, birds and vermin etc. All identical items and their component parts should be completely, interchangeable including spare parts.
 11. **Inspection and testing at site :**
 - (i) The installation shall be subject to necessary inspection during every stage of erection, by the Engineer In-charge or his authorized representative. The successful bidder shall provide all facilities and assistance for the purpose.
 - (ii) The completed installation shall be inspected and tested by the Engineer-in charge in the manner as will be laid down by him, in consultation the agency.
 - (iii) All instruments and facilities necessary for the tests shall be provided by the agency.
 12. **Completeness of work :**
 - (i) The installations shall be completed in all respects and put in to operation even where certain details have not been mentioned / left out in these specifications. Any discrepancy may be brought out in pre-bid meeting.
 - (ii) All E&M services such as Internal Electrical installations, fire fighting system, sprinkler system, street lighting, pumping set etc shall be declared as completed after completion of trial run of 1 month or completion of wholemwork whichever is later. However, the defect liability period shall be of 12 Months from the date of completion of work within the quoted rates. DLP / Warranty period of all works / machine / equipment shall commence from date of completion of complete work (project).
 - (iii) All electrical & mechanical fittings / fixture / appliances, to be provided for the work, where BEE certification is available should have 5-star rating (of BEE) as applicable at the time of supply of the materials. Since, the proposed construction is for 3 TERI-GRIHA.All fittings and fixtures of minimum requirement required for the 3 TERI-GRIHA shall be provided.

The CPWD specifications are available at CPWD website "cpwd.gov.in".The

department shall not be responsible for the lack of knowledge and also the consequences thereof to the Contractor. The information and data mentioned in the tender document have been furnished in good faith and for general information and guidance only. The Engineer-in-Charge in no case shall be held responsible for the accuracy thereof and / or interpretations or conclusions drawn there from by the Contractor and all consequences shall be borne by the Contractor and no claim, whatsoever, shall be entertained from the Contractor, if the data or information furnished in tender document is different from data/drawing after Preparation of architectural drawings, design and approved for construction. It is presumed that the Contractor has satisfied himself for all possible contingencies, situations, bottlenecks and acts of coordination, which may be required between different agencies.

13. **INCIDENTAL CHARGES:** All incidental charges of any kind including cartage, storage, wastage and safe custody of material etc. shall be borne by the Contractor.
14. **QUALITY ASSURANCE:** The Contractor shall make available, on request from the Department, for record, copies of challans, cash memos, receipts and other certificates, if any, vouchers towards the quantity and quality of various materials procured and the same shall be kept in record. They shall also provide information regarding name of the **manufacturer**, manufacturer's product identification, manufacturer's instructions, warning, date of manufacturing and test certificates from manufacturers for the product for each consignment delivered at site, shelf life, if any, for the department to ensure that the material have been procured from the approved source and of the approved quality, as directed by the Engineer-in-Charge. Day to day account of receipt of such material shall be maintained at site of work and shall be regulated by the department. Nothing extra shall be payable on this account.
15. **STORAGE OF MATERIALS:** Storage and safe custody of all materials shall be the sole responsibility of the Contractor. Nothing extra shall be payable on this account. Storage space shall be the responsibility of Agency.
16. **QUALITY CONTROL AND TESTING OF MATERIALS:**
 - (i) All the material to be used on works shall bear ISI certification mark unless otherwise the make is specified in the item or special conditions appended this tender document. In case ISI mark material or the materials mentioned in the tender documents are not available, as per opinion of Engineer-in-charge, which shall be final and binding, the material to be used shall conform to CPWD specifications applicable in this tender or IS Code. In such cases Engineer-in-charge shall satisfy himself about the quality of such material and give his approval in writing. Only articles classified as first quality by the manufacturers shall be used unless otherwise specified. All material not having ISI mark shall be tested as per relevant ISI specification. The Engineer in charge may relax the condition regarding testing if the quantity of the materials required for the work is small. In all cases of use of ISI marked materials proper proof of procurement of materials from authentic manufacturers shall be provided by the contractor to the entire satisfaction of Engineer-in-charge. All materials equivalent to the one specified should be got approved by the Engineer-in-charge before using the said materials in the work.
 - (ii) If the department desires to send any samples of materials for testing in a accredited laboratory, the Contractor at his own expense shall supply all materials, labour for preparing and testing samples as required by the Engineer-in-Charge. The testing shall be carried out in the presence of the representative of the Engineer- in- Charge. The transportation and testing charges shall also be borne by the contractor.
17. No foreign exchange shall be made available by the department for importing (purchase) of equipments, plants, machinery, materials of any kind. No delay and no claim of any kind shall be entertained from the Contractor on account of variation in the foreign exchange rate and/or any Custom duties / charges or any other levies.
18. **NO WAIVING OF LEGAL RIGHTS AND POWERS :** The Engineer-in-Charge shall not be precluded or stopped from taking any measurements, and framing of

estimates or detaining any certificates made either before or after the completion and acceptance of the work and payment, from showing the true amount and character of the works performed and materials Furnished by the Contractor and from showing that any such measurements, estimates or certificates untrue or incorrectly made and that Engineer-in- charge shall not be precluded or stopped from recovering from the Contractor such damages as it may be sustained by reasons of his failure to comply the terms and conditions of the contract.

19. The tenderers shall take into account the element of wastage(s) those are likely to be there in allelements of the work and quote his price, taking that into account. The tenderers shall study all the items from the point of view of wastage(s), which are likely to take place.
20. Power supply required for construction, testing & commissioning shall have to be arranged by the bidder at his own costs. Water required for testing of equipments is also in the scope of agency.
21. The description of E & M service & specification are given in general but they are not exhaustive i.e. does not mention all the incidental works required to be carried out for complete execution of the item of work. The work shall be carried out, all in accordance with true intent and meaning of the specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawings and/ or described in the specifications, provided that the same can be reasonably inferred there from. There may be several incidental works, which are not mentioned in the contract document/specifications but will be necessary to complete the item in all respect. All these incidental works/ costs which are not mentioned, but are necessary to complete the work shall be deemed to have been included in the overall amount quoted by the contractor for various components of work. No adjustment of rates shall be made for any variation in quantum of incidental works due to variation/change in actual working drawings. Also, no adjustment of rates shall be made due to any change in incidental works or any other deviation in such element of work (which is incidental to the items of work and are necessary to complete such items in all respects) on account of the directions of Engineer-in-charge . Nothing extra shall be payable on this account.
22. The scope of work also covers the preparation of layout plans, drawings for E & M schemes and approval of the same from the respective local bodies Fire Officer etc. before the commencement of work and from CEA before energization of Sub-Station etc. During execution, if the local bodies etc. require a modification, the same shall be executed without any extra cost. Finally, after execution, approvals / NOCs / clearances from local bodies etc. shall be the responsibility of successful bidder for which nothing extra is payable. In case any modification / extra work is required by the local bodies which is necessary for approvals / NOCs / clearances, the same shall be got executed within the quoted rates by the Contractor and nothing extra shall be paid on this account. All statutory fees / charges required for obtaining clearances from Fire Officer/CEA / Local Bodies shall be paid by the agency.
23. SUPERVISION OF WORK:
 1. The Contractor shall depute Site Engineers & skilled workers as required for the work as per the documents required in technical bids. He shall submit organization chart along with details of Engineers and supervisory staff. It shall be ensured that all decision making powers shall be available with the representatives of the Contractor to avoid any likely delays on this account. The Contractor shall also furnish list of persons for specialized works to be executed for various items of work. The Contractor shall identify and deploy key persons having qualifications and experience in the similar and other major works, as per the field of their expertise. If during the course of execution of work, the Engineer-in- Charge is of the opinion that the deployed staff is not sufficient or not well experienced; the Contractor shall deploy more staff or better-experienced staff at site to complete the work with quality and in stipulated time limit.
24. No inspection out side the country is permissible. If required so, the same will be

deemed to be waived off and necessary test reports shall be submitted before the dispatch of equipment.

ELIGIBILITY CRITERIA FOR MAIN AGENCY WITH RESPECT TO ASSOCIATED ELECTRICAL AGENCY TO BE ENGAGED BY MAIN CONTRACTOR FOR EXECUTING THE ELECTRICAL SUB-HEADS

1. After award of work and before the first milestone, the main contractor will have to submit Name (s) of the proposed associate contractor (for each of the E&M works), who fulfill set eligibility criteria for the relevant sub-head and got approved from the competent authority of the department. The documents will have to be submitted in detail as required, which will be checked as per NIT for approval of the associate contractors. It will be essential that proposed electrical associate agency qualify the eligibility criteria for sub – head given in NIT.
2. The department reserves the right to allow the main firm to submit additional Documents/additional names of the associates in case of the deficiencies in documents or in case of no associate getting qualified in respect of certain subheads. The same will have to be complied with the main contractor within the time allowed. The decision of the department shall be firm & binding on the intending bidders.
3. The main firm should submit the willingness from eligible electrical contractors to get associated with them for execution of the electrical component of works in wholesome manner and as per the conditions set out in the MOU to be entered into, between the one who is awarded the work and the associated eligible electrical contractor.
4. In support of the eligibility conditions of the proposed associated electrical contractor, copy of their registration documents, Electrical Contractor's License, GST documents, eligibility documents by competent authority shall have to be submitted. Such associate electrical contractor will certify that they are not debarred as on the day of application for sale of tender.
5. In event of the concerned E&M agency not performing satisfactorily or failure of associate/sub-contractor to complete the E&M work, the main contractor on the written direction of the department, shall remove the Associate/sub-contractor deployed on the work and shall submit name of new associate agency who fulfills the conditions mentioned in NIT to execute the leftover work without any loss of time or variation in cost to the department in this regard. Such associates shall also enter into Agreement with the main tenderer and shall meet all the guarantee for the equipments already supplied for which payment has been released by the department in part. If any equipment supplied for the work, during the currency of the earlier Associate/sub-contractor and paid partly by the department, becomes redundant /not in a position to be installed and commissioned and put to beneficial use due to change in agency for execution of E&M work, the main contractor shall be liable for replacement of the equipment(S) at no cost to Department, No change of Electrical Contractor will be allowed without prior approval of Engineer-in-charge.
6. Executive Engineer (E) shall be the Engineer-in-charge as far as Electrical & Mechanical works are concerned.
7. The main contractor shall be responsible and liable for proper and complete execution of the Electrical work and ensure coordination and completion of both civil and electrical work.
8. The main contractor has to enter into agreement with contractor(s) associated by him for execution of E&M subheads. Copy of such agreement shall be submitted to EE(E) in charge of work as well as to EE(C). In case of change of associate contractor, the main contractor has to enter into agreement with the new contractor associated by him.
10. The associate or sub-contractor shall attend the inspection of the work by the Engineer-in- charge of E&M works as and when required. The agencies executing the electrical work should have valid license for LT/HT as applicable and as described in eligibility criteria.

11. Verifiable completion certificates of the work eligibility documents as the case may be, duly attested by the applicant shall be submitted. Valid Electrical Contractor' license, as the case may be, duly countersigned by the applicant as well as signed by the associate contractors shall also be submitted. Self attested GST documents in respect of the associated agencies as well as signed by associate firms shall be submitted along with the tender documents.
12. For components of E&M works, the eligibility criteria for specialized agencies to be associated by the main contractor after award of work will be as detailed below:
 - (a) For the different E&M subheads, the main contractor will have to engage the associate electrical contractor/specialized agency in the field after award of work as per following:-
 - (b) The main firm should either himself meet the eligibility conditions for the respective E&M packages or otherwise he will have to associate an agency meeting the eligibility requirements given below. They will have to submit willingness certificate for each of the component of the Electrical work for Associate agencies by clearly indicating the applicable component of the work.
 - (c) The firm should have successfully completed similar works during the last 5 years ending upto previous day of last date of submission of tender for each sub heads:
 - (d) The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum, calculated from the date of completion to the last date of submission of bid.

NOTE: For the purpose of eligibility criteria only, sub-head wise total cost is taken as below which is rough cost and should not be used or interpreted for any other purpose.

FORM – ‘K’**WILLINGNESS CERTIFICATE FROM CONCERNED COMPETENT
ELECTRICAL CONTRACTOR****(Separate for each sub head of E&M work)**

Name of Work: Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam including internal and external Civil, Electrical & Mechanical Services, Horticulture and External development work on Engineering, Procurement and Construction (EPC) Basis.

Name of sub-work:

I hereby give my willingness to work as electrical contractor for the above mentioned work. I will execute the work as per specifications and conditions for the agreement and as per direction of the Engineer-in-charge. Also I will employ full time technically qualified supervisor for the works.

I will attend inspection of officers of the department as and when required. Dated:

Signature of Main Contractor
Contractor Address:
Telephone:

FAX:

e-mail:

**Signature of Associate Electrical
and Registration detail Address:**
Telephone:

FAX:

e-mail:

**MEMORANDUM OF UNDERSTANDING [M.O.U] BETWEEN
(Separate for each sub head of E&M work)**

- 1] M/S [Name of the firm with full address] [Henceforth called the main contractor]
And
- 2] M/S [Name of the firm with full address] [Henceforth, called Associated Electrical Contractor or Electrical Contractor]

For the execution of Electrical Work: **Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1**

Name of sub-work:

We state that M.O.U between us will be treated as an agreement and has legality as per Indian Contract Act [amended upto date] and the department [PWD] can enforce all the terms and conditions of the agreement for execution of the above work. Both of us shall be responsible for the execution of work as per the agreement to the extent this MOU allows. In case of any dispute, either of us will go for mediation/arbitration by the Executive Engineer, Assam Projects, Any of us may appeal against the mediation/arbitration to the, Guwahati. His decision shall be final and binding on both of us.

We have agreed as under:

1. The electrical contractor will execute all electrical works in the wholesome manner as per terms and conditions of the agreement. The electrical contractor shall be paid as per standard procedure followed by the department and the agreement between parties. Any type of internal transaction between the electrical contractor and the main contractor shall be as per their convenience and mutual understanding without involving the department.
2. The electrical contractor shall be liable for disciplinary action, if he failed to discharge the action[s] and other legal action as per agreement.
3. All the machinery and equipments, tools and tackles required for execution of the electrical works, as per agreement, shall be the responsibility of the electrical contractor.
4. The site staff required for the electrical work shall be arranged by the electrical contractor as per terms and conditions of the agreement.
5. Site order book maintained for the said work shall be signed by the main contractor as well as by the Engineer of the Associated Contractor and by Associated Contractor himself.
6. All the correspondences regarding execution of the electrical work shall be made by the Department with the Associated Contractor with a copy to the main contractor. In case of non-compliance of the provisions of agreement, the main contractor, as well as the associated contractor shall be responsible. The action under clauses 2 and 3 shall be initiated and taken against the main contractor.

• **Name of the Sub Head to be indicated:**

Signature of main contractor
contractor Name :Name :
Address :
Date:

Signature of associated electrical
Address :
Date :

Place:

Place:

COUNTERSIGNED EXECUTIVE ENGINEER

Appendix to Technical Bid Part

Form I Specific Design Experience (Museum Work)

Only for the work “Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.”

(The following table shall be filled in for the Bidder)

Bidder's Name: _____

Date: _____

Specialised Design Consultant / Firm's Name with whom MOU is executed _____

Tender No. and title: _____

All Specialised Design Consultant / Firm (Museum work) for key activities must complete the information in this form as per Evaluation and Qualification Criteria

(A) Work executed as Specialised Design Consultant / Firm (Museum work) (in the same name and style) in the last five years: *[Attach certificate from the concerned Engineer-in-charge.]*

1. Key Activity No One:

Sl. No.	Particulars	Information
1	Name of the Specialised Design Consultant / Firm (Museum work)	
2	Name of the work designed by the Specialised Design Consultant / Firm (Museum work)	
3	Award date of Specialised Design Consultant / Firm (Museum work)	
4	Completion date of Specialised Design Consultant / Firm (Museum work)	
5	Award value of Specialised Design Consultant / Firm (Museum work)	
6	Role in Contract (Mention the Scope of work of Specialised Design Consultant / Firm (Museum work)	
7	Prime Contractor for that work / project	
8	Total Contract Amount (In Rupees)	
9	Quality of the design work by Specialised Design Consultant / Firm (Museum work) (Good / Very Good / Outstanding) certified by concerned Engineer-in-charge	
10	Employer's Name	
11	Employer's Address and Contact No.	

2. Key Activity No two: (Provide similar specialised work in same format as above table)

Appendix to Technical Part

Enclosure-I

Memorandum of Understanding (Museum Work)

Only for the work “Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.”

This memorandum of understanding (MOU) is entered by and between _____(name of the bidder) having office at _____ and _____(Specialized Design Consultant / Firm (Museum work)) having office at _____ on _____(dd/mm/yyyy) to provide specialized job of providing _____(specify the job) vide no. _____ for the work **“Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.”**

In case the bid is successful, the tender inviting authority awards the contract to _____(name of the bidder), then _____(Specialized Design Consultant / Firm) hereby confirms and accepts to provide _____ services as per the NIT No.- _____ for the project **“Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.”**

Further both parties are jointly and severally liable to execute the specialised job as agreed above. Both the parties understood that this memorandum of understanding (MOU) shall be irrevocable and binding for both the parties.

For & On behalf of _____(Name of the bidder)

Signature:

Name :

Designation.

For & On behalf of _____(Name of the Design Consultant / Firm)

Signature:

Name :

Designation.

FORM 'A'
FINANCIAL INFORMATION

(To be submitted separately for each sub-head as required)

- I. Financial Analysis Details to be furnished duly supported by figures in balance sheet / profit & Loss account for the last five years duly certified by the Chartered Accountant or equivalent competent Authority , as submitted by the applicant to the Income Tax Department or equivalent Competent Authority (Copies to be attached)

S. No						
	Particulars	2020-21	2021-22	2022-23	2023-24	2024-25
(i)	Gross Annual turnover					
(ii)	Profit / Loss					

- II. The following certificates shall be enclosed:
 III. Solvency Certificate from Bankers of applicant in the prescribed form 'B'/ Net-Worth Certificate.
 IV. Copy of Annual Turn Over for last 5 years certified by Chartered Accountant or equivalent Competent Authority.

Signature of Chartered Accountant with Seal

Signature of Applicant(S)

- Balance Sheet / Audit report is not required to be submitted.

FORM 'B'**FORM OF BANKERS CERTIFICATE FROM A SCHEDULE BANK****(To be submitted separately for each sub-head as required)**

This is to certify that to best of our knowledge and information that M/shaving noted address, a customer of our bank are / is respectable and treated as good for any engagement up to limit of Rs.....(Rupees.....)

This certificate is issued without any guarantee or responsibility of the bank or any of the officers.

(Signature) For the Bank**NOTE:-**

- (1) Bankers Certificate should be on letter head of the Bank and addressed to tendering authority.
- (2) In case of partnership firm, Certificates should include names of all partners as recorded with the Bank.

FORM 'C'
DETAILS OF ALL WORKS OF SIMILAR CLASS COMPLETED
DURING THE LAST SEVEN YEARS ENDING LAST DAY OF THE
MONTH PREVIOUS TO THE ONE IN WHICH APPLICATIONS ARE
INVITED.

Sl. No	Name of Work / Project & Location	Owner or Sponsoring Organisation	Gross amount	Date of Commencement as per contract	Stipulated date of completion	Actual date of completion	Litigation/arbitration pending/in progress with details*	Name & address/Telephone number of officer to whom reference may be made	Remarks
1	2	3	4	5	6	7	8	9	10

*Indicate gross amount claimed and amount awarded by the Arbitrator.

SIGNATURE OF APPLICANT(S)

Note:-

1. Only those works which satisfies the eligibility criteria needs to be mentioned.

FORM 'D'
PERFORMANCE REPORT OF WORKS REFERED TO IN FORM "C"

- (1) Name of Firm
- (2) (i) Name of Work / Project & Location
(ii) Name of Client / Department
- (3) Agreement Number
- (4) Completion Cost
- (5) Date of Start
- (6) Date of actual completion
- (7) Performance Report - (Quality of work)
- (8) The details of work executed

Dated:

To be signed by competent authority in-charge of work of Executive Engineer level or equivalent.

Note: The Department shall be at liberty to verify the details submitted by the applicant.

Note :- In case make of any equipment or material is not specified in the NIT, the matter shall be referred to the NIT approving authority and obtain the approval. Thereafter the agency can proceed with the supply of material.

PART-C1: (Specification for EI works)

1.0 GENERALSCOPE OF WORK:

The specifications given below pertain to the internal electrical installation work to be carried out in proposed **Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-1.**

All internal electrical works shall be carried out with MS conduit. All switches, sockets, AC Starter, IP Phone socket, Data sockets, stepped type (2 module) fan regulators, bell push and accessories alongwith matching mounting boxes shall be of modular type. Power point for computer shall have 3 sockets and 2 switches in one box.

1. All mounting boxes for plate type accessories shall be of metallic construction and of the same make as that of the plate type switches and accessories.
2. The wires used for the point wiring and power wiring shall be of 650/ 1100 Volts grade Zero Halogen Flame Retardent (ZHFR) PVC insulated multi stranded copper conductor single core cables as per relevant CPWD Specifications.
3. All lighting fixtures should be LED type having efficacy more than 120 Lumen/ Watt except for down lighter, street lights, security lights, bolards, façade light for which efficacy shall be more than 100 lumen/watt and CRI >80, THD <5%, LM 79 & LM 80. The test reports from NABL accredited lab should be submitted by the agency. Colour temperature may be 3000/4000/6000K as per site requirement. The compound light shall be IK 10, IP 66 rating fitting .
4. Lighting Design should be carried out as per National Lighting Code 2010/NBC/ECBC guidelines. Wherever range of illumination for space is mentioned, higher side of Lux level must be taken for design purpose. If as per the design, the quantity of light fixtures comes out that does not make the symmetry, then higher number of light fixtures shall be taken to maintain the symmetry in the room. Similarly number of ceiling fans shall be designed.
5. Arrangement of luminaries in various areas of buildings shall be done on the basis of National Lighting code 2010 and NBC 2016.
6. Ceiling fans will be provided everywhere except stairs/toilets/Bath rooms, basement, terrace and open areas. Only BLDC type ceiling fans of size 1400/ 1200 mm shall be used. Optimum size and number of ceiling fans for rooms of different size shall be as per provision laid down in CPWD specifications for internal E.I. work – 2013 and NBC 2016.
7. The Conduiting work for the telephone wiring shall be carried out in such a way that all the other end of wiring can be terminated in Patch panel including rack of each floor and in the EPBAX room/Control room.
8. Minimum size of copper conductor for power wiring shall be 4 Sq mm and for light and fan points wiring shall be 1.5 sq mm.
9. UPS, Essential & non-essential DBs shall be separate. The size of DBs at one location shall be same irrespective of number of circuits connected from the DBs. The make of MCBDBs, MCBs and RCBOs shall be same everywhere.
10. The wiring and conduit route plan/drawings shall be submitted by the contractor and shall be got approved from the Engineer-in-charge.
11. To facilitate drawing of wires, 18 SWG GI fish wire shall be provided in recessed conduit. Conduits laid for other services, like fire alarm, PA system etc., where wiring is not done along IEI works, fish wire shall be invariably drawn.
12. The connection between incoming switch / isolator and bus bar shall be made with suitable size of thimble and cable.
13. Size of distribution board shall be as per number of light / power circuits. All circuits shall be terminated on individual MCBs. All distribution boards shall be double door type. RCBO of suitable rating shall be provided as main incomer in all DBs.
14. In vertical DBs used for power distribution, main incomer shall be MCCB of 35/36KA rating breaking capacity.
15. LT panel shall be cubicle type with IP 42 protection class and fabricated from approved

- fabricator as per accepted list attached and shall be equipped with digital type measuring instruments like ammeter, voltmeter, frequency meter, watt meter, multi- function meter etc. as per drawing approved by Engineer – in – charge.
16. Each floor Panel shall be fabricated from 2 mm thick M.S. sheet powder coated with 7 tank process and shall be equipped with 4 pole MCCBs, MCBs, Bus bar, digital multifunction meter, LED indicating lamp extended rotary handle and all accessories as required.
 17. MCCBs, if used as incomer then it should have earth fault protection and time delay. Earth leakage modules are not acceptable.
 18. The breaking capacity of MCCB for all types of panel boards except DBs shall be as per fault level of that location. The rated service breaking capacity should be equal to rated ultimate breaking capacities ($I_{cs}=I_{cu}=100\%$). Where I_{cs} is service breaking capacity and I_{cu} is ultimate breaking capacity and they should be of approved make. MCCBs above 200A of 35 /36 KA breaking capacity rating shall be provided with microprocessor relay with suitable fault level with adjustable O/L, S/C, protection and upto 200A with Thermal Magnetic release of suitable fault level having adjustable settings for O/L and S/C.
 19. Floor Panels if required in building shall be provided for essential and nonessential. Incomer of essential panel shall be connected with DG set Supply with changover switching (ATS) and incomer of non-essential panel shall be connected with main/primary supply. Incomer, outgoing, bus bar, indicating instruments etc shall be designed as per maximum load and shall be got approved from Engineer-in-charge.
 20. All types of panel shall be fabricated from approved firms and strictly as per CPWD specifications. The drawing of panel boards must be got approved from Engineer – in – charge before fabrication work. The panel board shall consist of MCCB as incomer and outgoing, aluminium bus bar, digital type ammeter, voltmeter OR multifunction meter, selector switches, LED type indication lamps etc as per standard sound engineering practice.
 21. Rising mains :Upward transmission of power inside the buildings shall be done with the sandwich compact type rising mains with busbar i/c all accessories i.e adapter box, cable end box, tap-off box with MCCB. Rising mains shall be provided separately for essential, non essential & UPS. AHU's shall be fed from essential rising mains. Rating of rising mains shall be decided as per maximum connected load of the building and future expansion of 10% of connected load as approved by Engineer – in – Charge. Rising mains shall be conforming to IEC 61439 as amendment up to date. Design of rising main shall be as per ECBC 2017.
 22. While laying conduits for fire alarm system, sufficient junction outlets are to be provided as per the direction of the Engineer-in-Charge for detectors as required.
 23. After completing the work, necessary test results as envisaged in CPWD General Specifications Part-I (Internal)-2013 & Indian Electricity Rules 1956, shall be recorded and submitted to the department.
 24. Lightning arresters shall be provided for building as per IS; 2309-1989 as amended up to date and CPWD specifications for internal work – 2013 specifications & aviation lights (LED Type) shall also be provided.
 25. RCBO of 300 ma sensitivity of suitable rating shall be provided as Incomer of each Distribution board.
 26. For accommodating various size of cables incoming to the building, Medium class G.I. pipe of suitable size but not less 150 mm shall be provided. Emergency and Normal power supplies shall be taken from independent pipes. Additional provision of one spare pipe for Emergency and one spare pipe for Normal supply cables, each of minimum 150 mm size, shall be kept for future extension within the quoted rates.
 27. Earthing: Earthing system comprising of earth electrode, earth conductor, earth bus, protective conductor etc for building shall be as per provision laid down in CPWD specifications part – I, 2013 specifications. Earthing system should be designed such as to maintain earth resistance as specified in CPWD specifications. Earth resistance shall be checked / tested in harsh climatic conditions.

28. Provision is to be taken in to consideration during designing
 - i. LED mirror light above each wash basin.
29. In other areas which are not covered in above paras following minimum provision shall be provided in the building:-
 - a) In corridor area for each 30 sq mtr area 1 no. 15 amp power plug, 2 nos 5 amps light plugs outlets.
 - b) In other area, for each 10 sq mtrs area 1 no. 15 amp power plug, 2 nos 5 amps light plugs and 2 nos computer outlets comprising of 1 no. 15 amp switch and 3 nos 5 amps sockets alongwith telephone shall be provided.
 - c) Near each computer outlet one number RJ 11 socket shall be provided. The system shall be got approved by the Engineer-in-charge.
 - d) Heavy duty Metallic exhaust fan with louvers as per the requirement of ventilation shall be provided in each toilet.
30. **External lighting:** For compound lighting decorative pole with LED type post top lantern shall be provided. Illumination to be maintained as per NBC 2016 and shall be automatic controlled by timer switch panel. The compound lighting has been designed to cover the external development area of about 92711 Sq meter within the campus Statium which may vary as per the designed approved by the client department. In case the area of development increases upto 5%, the same is included in the scope of the work with in the quoted rates. If the development area where the compound, street & bollard lights decreases, the rate shall be decrease @ 150/- per sqm above or below the percentage quoted by the contractor against respective items.
31. The cabling of the compound lights should be in such a way that every third subsequent/alternate pole shall be connected from each R-Y-B phase of 3-phase supply line for ensuring minimum light at the time of failure of either of the phase.
32. The light luminaries/electrical light fixtures provided under the contract shall be guaranteed for a period of 5 years from the date of completion/ handing over whichever is later. In this regard contractor shall furnish an undertaking for Guarantee/Warrantee of LED luminaries for 5 years from the manufacturer duly endorsed by him.
33. Telephone conduits shall be laid in such a way that all the officials in the office building shall have one dedicated telephone point/connection. The contractor has to lay fish wire in the conduits for ease of laying telephone cables at later stage.

Illuminated Digital Sign Board

The scope of work under this sub head is planning designinig supplying installation testing and commissioning of the Digital Sign Board on various entrances and other important areas like Sub-station Building, Fire and drinking water Pump House, etc. in the building complete with following specifications or better:

Parameter	Specifications
Display Size (W x H)	Size a) 1.92 m x 0.96 m Size b) 1.92 m x 1.92 m
Pixel Pitch	6 mm or better(Lower pitch is regarded as better)
LED Configuration	RGB 3 in 1 SMD
Pixel Density	Minimum 27,000 pixels per sqm or higher
Half Gain Horizontal / Vertical Viewing Angle	H 140 deg / V 90 deg or better
Refresh Rate	>2880 Hz or better
Temp Range	-20 to +50 Degrees C or better
Gray Scale Processing	16 Bit or better
Brightness (Calibrated)	5000 cd/m ² or better
Maximum Power Consumption	850 w/sqm or lower
Dimming Capability	255 levels

Power Input	100 ~ 240 VAC
Individual Tile/Cabinet Dimensions	960 mm (W) x 960 mm (H) x 143 mm (D)
Contrast Ratio	1500:1 or better
Access For Maintenance	Rear
IP Level	Front IP65 / Rear IP54
International Safety Certifications (Mandatory to submit along with the bid)	CE certification for Compliance to CE Under Standards : EN 55022:2010 + AC:2011 Class A, EN 55024:2010+A1:2015, EN 61000-3-2:2014, EN 61000-3-3:2013, AS/NZS CISPR 22:2009+A1:2010
	UL Listed for Compliance to UL Standard For Safety : UL 60950-1 & CAN/CSA C22.2 No. 60950-1-07- Information Technology Equipment-Safety-Part 1: General Requirements
	FCC Certification for Compliance to FCC For Electro Magnetic Emission which may not cause harmful interference, and must not accept any interference received Under Standard : FCC CFR Title 47 Part 15 Subpart B: 2015 Class A, CISPR 22:2008, ANSI C63.4:2014, ICES-003 Issue 6:2016 : Class A
	BIS Registration (Bureau Of Indian Standards) As per Standard : IS 13252(PART 1) :2010
	CB Certification for Compliance to CB Standard for Safety : EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013, IEC 60950-1(ed.2), IEC-1(ed.2);am1, IEC 60950-1(ed.2);am2
Quality/Health & Safety/Environmental Certifications of OEM/OEM subsidiary in India (Copy to be submitted along with the bid	Quality Management System 9001:2015 ,
	Occupation health & Safety Management System - OHSAS 18001:2007 ,
	Environmental Management System 14001: 2015
LED package vendor acceptable makes (certificate from the LED package vendor to be provided during the supply certifying the same)	Cree/Nichia/Nationstar or Equivalent

Red/ Green LED Laser etched emergency exit signages:

The contractor has to Design, plan, provide and install Red/ Green LED Laser etched emergency exit signages double/single sided pendant type made out of powder coated MS housing and etched acrylic sheet indicator with reflective light source > 2W LED, Emergency Backup of minimum 4 hours, 6V

AH SMF/ SLA battery, SMPS Power supply suitable for operation on 230 AV 50 Hz AC supply as per the requirement at all prominent locations to guide the way out of the building to the building users in case of fire. The prominent locations shall be such that the signages can help the people present at any floor/ any location of the building to show them the exit path easily. The size of the letter should be sufficient for visibility of the people as per NBC-2016. These signages shall be installed in all prominent locations of corridors, lobbies, near stairs, etc.

Photoluminescent signages:

The contractor has to Design, plan, provide and install architectural hanging/wall mounted non toxic, non radioactive maintenance free, self glowing photoluminescent signages direct fixed on

wall/ceiling comprising of 2 mm aluminiumpholuminiscent safety signages with high luminous intensity properties with ultraviolet protection layer sheet including printed graphics symbols and written messagesin Hindi & English both. The signage shall be capable of illuminating light for atleast 8 hours, when fully charged. The hight of letter on signages shall not be less than 3 inches.

Sub Station Equipment

Supplying , installation, testing and commissioning of 33 kV/0.433 kV or 11 kV/0.433 kV substation equipment comprising HT panel, dry type/Oil type transformers, HT cable, bus trunking from transformer to LT panel, LT pa automatic power factor correction panel, active harmonic filters, TVSS (tra voltage suppression system), SPD (surge protection system), essential panel, earthing, required inter-connections, substation safety equipments including LT cabling from substation to the buildings fed by the substation.

Generating Sets

Supplying, installation, testing and commissioning of DG sets, AMF ducting / cables from DG sets to essential panel, DG set enclosure room insulation/ventilation/smoke exhaust as required, earthing of DG set system, control cabling, fuel tank/piping, DG set exhaust piping/ exhaust chimney as per CPCB norms, civil works connected with DG sets including foundation as required.

Uniterrupted Power Supply

Supplying, installation, testing and commissioning of online 3 phase UPS System with 30 minutes back up including batteries, interconnecting cables, battery racks etc..

CCTV system

Supplying, installation, testing and commissioning of IP Based CCTV system for building security comprising of PTZ Fixed camera, cabling, recording , display system and hard ware software support

Street Lighting with LED

Supplying, installation, testing and commissioning of LED street/ compound/ highmast/ pathway/ landscape lighting for the entire campus.

Note: The items / equipments / accessories and their ratings mentioned in specifications above are indicative and likely to be changed at the time of execution as per the requirement of the client at later stage. If the increase in over all quantities / rating of the equipement is upto 5% as mentioned in NIT/specifications, the same is included and is in the scope of the work. Nothing extra shall be paid to the contractor on this account. However, if the quantity / rating of the equipement increase beyond 5% as mentioned in the NIT/ specifications, the quantity / rating beyond 5% shall be paid to the contractor on actual basis and deduction if any in rating will be recovered @ weightage of payment schedule.

SECTION- D
HORTICULTURE WORK &
CONDITIONS OF CONTRACT
SPECIFIC TO GREEN BUILDING
PRACTICE

LANDSCAPE AND HORTICULTURE:

- 1 Horticulture activities, tree plantation, Nursery plantation shall be taken up in the campus along with constructional activities, care shall be taken to avoid damages to these including existing trees, recently planted trees and irrigation water supply piping system. Hence, while taking up excavation activities, trees as well as their root zones be protected and the stacking of excavated earth shall be made in such a way that neither plants are buried nor damaged. In case of failure to comply with the above requirements, the damage caused shall be made good at cost of contractor otherwise the cost so incurred and assessed by Engineer in charge shall be recovered from running account bill of contractor.
- 1.1 The scope of this section includes the preparation of planted areas and the supply, planting, protection and maintenance of trees, shrubs, vines groundcover plants and grass of the species and size shown on the drawings approved by Engineer-In-charge. The section covers the provision of qualified labour, equipment, and material necessary to carry out all operations required for landscaping herein specified and shall be read in conjunction with all other relevant sections of the Specification.

SHOP DRAWINGS:-

- 2 The contractor shall submit shop drawings of the planting plans and details to the Architect and Engineer in charge for review and action.
- 2.1 The Contractor shall submit a method statement for the Soft landscape installation including all milestones according to best practices.
- 2.1.1 Samples:-Samples of all materials/plants to be used in this contract shall be submitted for approval of Engineer- In-charge.
- 2.1.2 The Engineer- In- charge shall reserve the right to reject any plant material deemed unacceptable which shall then be replaced with approved specimens.

Programs and Schedules: Provide the following for approval:

- (i) Schedules showing program of implementation for each type of landscape work, indicating anticipated dates and locations for each type of planting.
- (ii) The contractor shall submit a Plant Procurement Schedule, identifying the source of every plant species, including the imported plants.
- (iii) If necessary revised planting schedules with documentation of reasons for there vision.

As-Built Drawings:

- (i) The As-Built drawings shall be submitted to the Architect and Engineer in charge for approval prior to the issue of the Completion Certificate
- (ii) The drawings shall include accurate documentation of the final planting installation, including but not limited to.
 - Plant material substitutions with size, genus and species.
 - Material substitution.
 - Revisions to the scope of work

On approval of the As-Built drawings, the Contractor shall forward the following.

- Three complete sets of As-Built drawings properly folded and provided in the plastic folders as part of the Operations and Maintenance manual.
- Annual maintenance schedule

Weather conditions.

- All work shall be carried out during the appropriate season and in weather conditions suitable for the operation.
- When special conditions affect the planting times and conditions, a planting schedule shall be submitted to the Engineer in charge for review and approval.

Existing Services

- The Contractor shall determine the location of all existing underground services prior to commencing excavation works. Damage to underground utilities shall be repaired at the Contractor's expense.
- When conditions on site are considered detrimental to the plants, such as rubble, ongoing works or obstructions, the Contractor shall notify the Engineer in charge prior to performing the planting works.
- Any excavation in confined spaces, around existing trees or in the vicinity of major utility services shall be executed by hand

Rubbish

- All rubbish and litter as it generate within the landscape boundary, shall be cleared and removed daily. The areas shall be kept in a clean and tidy condition with all driveways, paths, edges, gutters and gullies swept and kept clear of debris at all times. All rubbish and debris shall be removed from site.

Approved Chemicals

- Only chemicals approved and listed by the IIHR India shall be used. All chemicals shall be non-toxic to human beings, birds and animals and subject to the approval of a qualified specialist. The Contractor shall be liable for ensuring that all chemicals are stored separately, handled and supplied strictly in accordance with the manufacturer's printed instructions. Neem cake shall be used as biological pesticide where specified.

MATERIALS

- Soil
- Sweet soil shall be free draining, non-toxic and capable of sustaining healthy plant growth. The soil shall not contain calcium carbonate, subsoil, refuse, roots, heavy clay, noxious weeds, phytotoxic materials, coarse sand, rocks, brush, litter or any other deleterious materials
- The soil shall have PH 6.0 to 7.5 of saturated soil. PH of soil of each lot shall be tested in approved laboratory. Cost of packaging, carriage, testing etc. shall be born by agency.

Fertilizers

- General fertilizer shall be sulfur coated compound N.P.K.16-18-5+trace elements for shrubs, trees and grass areas, and shall be Osmocote or equal and approved by the Engineer incharge.
- Slow release fertilizer tablets shall be equivalent to N.P.K.18-18-5+TSE or N.P.K 17-17-4+TSE and shall be used for trees andshrubs.
- Fertilizer shall be furnished in standard containers with the name, weight and guaranteed analysis of the contents clearlymarked.
- When a mixed fertilizer is specified, the first number shall represent the minimum percentage of soluble nitrogen, the second number shall represent the minimum percentage of available phosphoric acid and the third number shall represent the minimum percentage of water- solublepotash.

Planting Medium

- Planting medium shall consist of a homogeneous mixture of soil, compost and fertilizers as specified.
- One bag of compost shall contain 25kg of compost and shall be applied at the following rates
- Shrub Pit -Half bag per pit Grass/Ground cover bed- Half bag per meter square Shrub bed- One bag per meter square Bedding plants-1 bag per meter square

General fertilizer shall be applied at the following rates.

Shrub Pit -	50 gms per pit
Shrub beds -	100 gms per meter square Grass/Ground cover bed
—	100 gms per meter square Bedding Plants -
	100 gms per meter square

GENERAL:-

- a) All plants shall be of the size specified in the Plant Schedule & Planting Palette at the time of delivery to the site and shall be obtained from an approved source. The Contractor shall allow for all imported and locally sourced plants to be 'grown on' in the holding nursery in order to meet the required specification at time of planting.
- b) All plants shall be supplied as specified in tender documents and the Contractor is expected to import stock if it is not available locally. All imported plant material must be sourced from a reputable Nursery to be approved by the Architect and Engineer in charge prior to purchase. Plants shall be true to and supplied under Latin names. Synonyms must be checked with the Architect and Engineer in charge.
- c) Engineer in charge shall inspect and approve all imported and locally sourced plant material at place of origin. Samples from all plant material shall be made available for approval by the Architect and Engineer in charge.
- d) When inspected, plants shall show no sign of pest infestation, disease, infection, nutrient deficiencies or sunscalds.

Shrubs/Groundcovers

- a) Shrubs and ground covers shall be twin or multi stemmed, full and bushy. The form or shape of the plants shall be typical to its species. Should be nursery grown in 12" grow bags. Height of shrubs minimum 1.5 mt and GC shall be 0.3mt.
- b) The size, colour and appearance of leaves shall be typical for the time of year and stage of growth of the plant species. Leaves shall not be damaged or discoloured.

Grass Turf

- a) Providing and laying Selection no. 1 Grass turf with earth 50mm to 60mm thickness of existing ground prepared with proper level ramming with require tools wooden and then rolling the surface with light roller make the surface smoothen and light watering the same maintenance for 30 days or more till the grass establish properly.

Technical Specifications and Special Conditions for Horticulture Work: TRENCHING IN ORDINARY SOIL:-

1. Trenching is done in order to loosen the soil, turn over the top layer containing weeds etc. and to bring up the lower layer of good earth to form a proper medium for grassing, regressing, hedging and shrubbery. Trenching shall be done to the depth ordered by the Engineer-in-charge. The depth is generally 30cm for grassing and 60 cm for regressing in good soil.
2. The trenched ground shall, after rough dress, be flooded with water by making small kiaries to enable the soil to settle down. Any local depression unevenness etc. shall be made good by dressing and/or filling with good soil.
3. Weeds or other vegetation which appear on the ground are then uprooted and removed and disposed off and paid.

Trenching:-

- Trenching shall consist of the following operations.
- The whole plot shall be divided into narrow rectangular strips of about 1.5 m width or as directed by the Engineer-in-Charge.
- These strips shall be sub-divided lengthwise into about 1 m long sections. Such sections shall be excavated serially and excavated soil deposited in the adjacent section preceding it.
- In excavating and depositing care shall be taken that the top soil with all previous plant growth including roots, get buried in the bottom layer of trenched area, the dead plants so buried incidentally being formed into humus.
- The excavated soil shall be straight away dumped into the adjoining sections so that double handling otherwise involved in dumping the excavated stuff outside and in back filling in the trenches with leads is practically eliminated.

Measurements: Length and breadth of the plot shall be taken correct to 0.1 m and depths correct to cm. Cubical contents shall be calculated in cubic meters, correct to two places of decimal. No deduction shall be made nor extra paid for removing stones, brick bats and other foreign matter met with during excavation upto initial lead of 50 m and stacking from the nothing extra shall and it is disposed by agency.

GOOD EARTH:-

- The earth shall be stacked at site in stacks not less than 50 cm high and of volume not less than 3.0 cum.
- **Measurements:** Length, breadth and height of stacks shall be measured correct to a cm. The volume of the stacks shall be reduced by 20% for voids before payment, unless otherwise described.

FINE DRESSING THE GROUND:-

- Slight unevenness, ups, and downs and shallow depressions resulting from the settlement of the flooded ground, in drying and from the subsequent weeding operations, shall be removed by fine dressing the surface to the formation levels of the adjoining land as directed by the Engineer-in-charge, and by adding suitable quantities of good earth brought from outside, if necessary.
- Measurement: Length, breadth and depth of stacks shall be measured correct to a cm. The area shall be calculated in sqm. correct to two places of decimal.

SPREADING GOOD EARTH:-

- Good earth shall be removed from stacks by head load and spread evenly over the surface to the thickness ordered by the Engineer-in-charge. It shall be spread with a twisting motion to avoid segregation and to ensure that spreading is uniform over the entire area.
- Measurement: The quantity of good earth spread shall be determined by the difference in the volume of good earth in stacks before and after spreading duly reduced for looseness in stacking by 20% of good earth.

DIGGING HOLES FOR PLANTING TREES:-**1. In ordinary soil, including refilling earth after mixing with oil cake, manure and watering.**

- Holes of circular shape in ordinary soil shall be excavated to the dimensions described in the items and excavated soil broken to clods of size not exceeding 75 mm in any direction, shall be stacked outside the hole, stones, brick bats, unsuitable earth and other rubbish, all roots and other undesirable growth met with during excavation shall be separated out and unserviceable material removed from the size as directed. Useful material, if any, shall be stacked properly and separately. Good earth in quantities as required to replace such discarded stuff shall be brought and stacked at site by the contractor which shall be paid for separately. The tree holes shall be manured with powdered Neam/castor oil cake at the specified rate along with farm yard manure over sludge shall be uniformly mixed with the excavated soil after the manure has been broken down to powder, (size of particle not be exceeded 6 mm in any direction) in the specified proportion, the mixture shall be filled in to the hole up to the level of adjoining ground and then profusely watered and enable the

soil to subside the refilled soil shall then be dressed evenly with its surface about 50 to 75 mm below the adjoining ground level or as directed by the Engineer-in-charge.

- **Measurements:** Holes shall be enumerated.

The General Features:

1. The contractor must take all necessary precautions for carrying out the above operations. In the event of any injury/accident on the contractor.
2. If due to any reasons of negligence or improper care of due to any reason whatsoever any plant gets damaged during the contract period the contractor shall replace the same with new plants (same size and same variety) at his own cost and nothing extra shall be paid on this account. If the contractor fails to do so, double recovery at market rates shall be made from running/ final bills and the decisions of the competent authority on the condition of the plants shall be final and binding on the contractor.
The contractor shall hand over the plants, shrubs, trees, lawn area and creeper etc. in good condition on date of completion of his job.
3. The site will have to be left neat and clean after completion of the work to the satisfaction of Engineer-in-Charge.
4. The contractor shall engage/02 nos. (Mali) of men-power per day to maintain the green belt and plantation area in good condition but not less than the required as per the standard norms on day to day basis, which include working supervisor (1Nos). If the contractor does not engage the above said minimum Mali and Supervisor, then double recovery of wages (minimum wages of Labour issued by Govt. of India Ministry of Labour & Employment Office of the Chief Labour Commissioner(C) applicable at the time of execution) shall be made for the same from the bills.
5. The normal working hours shall be 8 hours a day i.e. 9 A.M. to 5 P.M.
6. The contractor shall have to arrange all tools and plants and other items viz. Khurpa Phawara, Hedge cutter, Tokri, Lawn mower etc. required for the proper maintenance of horticulture work in green belt and Plantation area. The running and repair cost of T & P etc. shall be born by the contractor & nothing shall be paid extra on this account
7. Damage/dry plants, grass weeds and rubbish etc. should be disposed off outside the periphery of the area as directed by the Engineer-in-Charge and should not be burn in any case.
8. The contractor shall be required to divert his labour to carry out certain minor changes/ renovation within the existing maintained area wherever considered necessary by the Engineer-in-Charge No extra payment shall be payable on this account.
9. Scope of the work covers maintenance works which includes removal of rank vegetation weeds and bushes in all surroundings within the planted area.
10. The maintenance will be carried out under the General supervision of Engineer-in-Charge or his representative officer in charge at site.
11. The contractor shall maintain site in good condition at all time till the completion of contract.
12. No compensation shall be paid for damage caused by rains, earth quake or other natural calamities during the execution of the work and no claim will be entertained on this account later on.
13. The work shall be carried out in such a manner so as not interfere or effect or disturb other works, being executed by other agencies, if any.
14. Watch and ward of plants and parks area and plantation area will be the contractor responsibility and nothing extra shall.
15. The contractor shall bear all incidental charges for cartage, storage and safe custody of materials procured by him.
16. The Water shall be arranged by the contractor for drinking purpose on his own cost, nothing extra shall be paid on this account.
17. The contractor shall submit the action plan for the maintenance work in the Office of the

Engineer-in-Charge before start of work.

18. The contractor shall submit the T&P list in the Office of the Engineer-in-Charge before start of work.
19. The contractor shall replace the plant of same size, same species within a week if any plant damage during contract period. If the contractor does not replace the dead/damaged plants then double of market rates shall be imposed by the Engineer-in-Charge on this account.
20. The contractor shall submit the fortnightly detail of employee/labour along with invoice/challan of all materials supplied at site in the office of Engineer-in-Charge. If the contractor fails to submit fortnightly labour report, then a recovery of Rs. 500/- shall be made for each fortnight.
21. The work, in general, shall be executed as per the description of item, specifications attached, CPWD specifications 2009 Vol, I, & II with correction slips issued up to 31.07.2019 Specification. If there are varying or conflicting provisions made in any document forming part of the contract, the Engineer-in-Charge shall be the deciding authority with regard to the intention / interpretation of the document and his decision shall be binding without any reservations.
22. The work shall be carried out in the manner complying in all respects with requirement of relevant bye-laws of the local bodies under the jurisdiction of which the entire work is to be executed or as directed by the Engineer-in-Charge and nothing extra will be paid on this account.
23. The Contractor shall make necessary arrangements for medical aid to all his workers including availability of first aid box all the time at the site of work.
24. The department will deal only with the contractor and his authorized representative and none else, with whom contractor may be in liaison or associated in any manner.
25. Any damage done by the contractor to any existing work shall be made good by him at his own cost.
26. The contractor shall maintain in good condition, all works executed till the completion of entire work allotted to the contractor.
27. Contractor should submit videography and photography of horticulture work before start of work and completion of work.

SPECIFICATIONS OF PLANTS:

The plants included under Sub Head 3 to 10 should be as per following specification.

1. The plants should be full of fresh and healthy foliage.
2. The plants should be free from insect, pest and diseases.
3. Plant should be well developed and healthy.
4. The height of the plants will be measured from top of the pots.
5. The height of the plants will be measured from top of the pots.
6. The plants should be true to the variety and Variety name should be tagged.
7. Moss stick used should be made on plastic pipe.
8. Moss stick should be straight and properly fixed in the pot.
9. The rejected plants materials should be removed from the site immediately.
10. Moss stick should be covered with the plants in case of plants supplied with moss stick.
11. The Plant should be well established and should have good foliage.
12. Good earth and manure used for filling the pot/poly bag should be free from any inert material and mixed to proper ratio.
13. Pot/ Poly bag used for filling the plants should be of proper size.
14. There should be proper drainage in pots for plants.
15. The flowering plants should also have proper flowering and should be true to the variety.
16. All plant should have the tendency of growth and should not be stunted or de shaped.
17. There should be no stagnation of water in the pots.
18. Plant should not have any physiological disorder.

19. Tips of the Plants should have intact, there should not be any damages etc.
20. In case of flowering pots flower should be on bud stage/semi bloom stage.
21. In case of potted plant pots should have uniformity/same size and quality.
22. Plants of bigger height should be properly supported/stacked by bamboo stick.
23. Pots/Polybags soil should not be infectious and plant should have free from all kind of diseases.
24. Bulbs, seeds, seedling, suckers should properly treated with fungicides before supply

LANDSCAPING AND HORTICULTURE WORKS

The brief scope of Horticulture works includes avenue tree plantation along with shrubs plantation wherever necessary including digging holes, excavation, removal of excavated malba and refilling the same with proper ratio of manure and good earth as per the scope of site. To create aesthetic ambiance around the building and roads grassing with turf grass Turf (Selection No.1) and dibbling with selection number 1 grass with proper land profile which includes trenching, fine dressing and levelling. In and around the building, pots along with plants is also to be arranged as required to create beauty all around the buildings. For proper growth of trees, shrubs and hedges the landscaping site has to be filled with good earth as required, and to improve the nutritional property of soil and proper growth of plant cow dung manure shall be arranged. After completion of project, the landscaping and horticulture works including lawn, trees, hedge and shrubs etc., will be maintained with proper tools and implements as necessary for a period of 3 year for their proper establishment and growth. For all these development and maintenance work, water has to be arranged by the agency and nothing shall be paid extra for water procurement. The development work includes minimum of following works:

- a) Plantation of Trees : nos.
- b) Plantation of Shrubs : nos.
- c) Display of Foliage plants : nos
- d) Development of Lawn & plantation of ground cover plants.

NOTE: The above list is only indicative and not exhaustive. The contractor has to plan and execute all the missing items required for plantation of trees, shrubs, hedges, grassing, potting with plant and maintenance of all the horticulture features to make the premises to the full use. Nothing extra shall be paid on this account.

1. The work shall be carried out as per “[Schedule of Rates, Analysis of Rates and Specifications\(Horticulture & Landscaping\)-2018](#)”, with up to date correction slips and as per CPWD Yard stick Specification, **NBC 2016**, in absence of detail specification the standard horticulture practices for healthy growth of plants beautification should be followed as approved by engineer in charge.
2. The contractor shall be responsible for arrangement of all necessary tools and plants required at site of work for which nothing extra shall be paid by the department.
3. The Scope of work include preparation of landscaping plan including parks, planters and other details etc. for the horticulture works and execution of same including providing unfiltered/recycled water supply lines from the STP and installation of pumps if required, providing drip irrigation system for trees, shrubs and hedges, sprinkler system for lawns etc. complete will be responsibility of agency. Development of parks, construction of its boundary wall (if required), providing MS railings (including painting), wicket gates, water hydrants, etc. shall be completed as per the specification and drawing approved by the Engineer-in-charge. Contractor has to do horticulture works as per approved landscaping plan including grassing, grass turfs, plantation of shrubs, plants, trees etc. This Landscaping and horticulture work is also part of EPC tender and no extra payment will be made on any account.
4. Grassing will be done with selection No.1 grass including supplying good earth if needed

including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for mowing.

5. Grass turf will be provided with Selection No.1 grass turf with earth 50mm to 60mm thickness of existing ground prepared with proper level and ramming with required tools wooden (Dhurmos) and then rolling the surface with light roller making the surface smooth.
6. Plantation of trees at site will be done with healthy, well developed trees established at the site of following varieties including watering, removal of unserviceable materials etc in quantity as per approved Landscaping drawings.

Sl No	Varieties of Trees with their specifications.	Minimum Qty
	Foxtail palm of ht. 240-270 cm bottom girth 35- 40 cm	
	Magnolia grandiflora of height 150-165 cm.	
	Plumeria alba of height 165-180 cm. with 3-4 branches	
	Mimusops elengi (Maulsri) of height 180-195 cm.	
	Lagerstroemia speciosa	
	Chukrasia tabularis	
	Gmelina arborea	
	Spathodea campanulata	
	Albizia lebbek	
	Alstonia scholaris	
	Artocarpus heterophyllus	
	Heterophragma adenophyllum	
	Mesua ferrea	
	Neolamarckia cadamba	
	Azadirachta indica	
	Terminalia chebula	
	Kigelia pinnata	

7. Plantation of Shrubs at site will be done with healthy, well developed shrubs established at the site of following varieties including watering, removal of unserviceable materials etc in quantity as per approved Landscaping drawings.

Sl No	Varieties of shrubs with their specifications.	Minimum Qty
	Ficus Retusa topiary well developed with fresh & healthy 5 to 6 big	
	Cyprus Golden Conical Shape 150 to 165 cm ht.	
	Cycas circinalis well developed with fresh & healthy 35 to 40	
	Nerium oleander variegated of height 60-75 cm.	
	Tabernaemontana coronaria (Chandni single)	
	Tecoma gaudichaudii of height 45-60 cm.	
	Bougainvillea named variety, Sobhra, Thima, Marry palmar,	
	Hibiscus variegated of height 45-60 cm. with 3-4	
	Hamelia patens (Dwarf) of height 30-45 cm.	

SI No	Varieties of ground cover plants with their specifications.	Qty
	Duranta Golden, having ht.15 to 20 cm	
	Syngonium miniature dwarf, having height 30-45 cm.	
	Ophiopogon jaburan (variegated)	
	Iresineherbstii, of height 25-30 cm.,	
	Clerodendrum inermis of ht. 20 cm to 30 cm	
	Juniperus prostrata with 5 to 6	
	Portulacaria afra (Jade) with 5 to 6 branches in 20 cm	
	Dracaena pennis, well developed, having 6 to 8	
	Dracaena rosea having ht. 30 cm	
	Dracaena Song of India variegated having ht. 30 cm to 45 cm,	
	Display of Foliage Plants	
	Araucaria cookie having ht. 1.20 m to 1.35 m,	
	Areca palm having ht. 1.50 m to 1.80 m	
	Croton Petra Bangalore variety having ht. 60 cm to 75 cm	
	Money Broad Leaves mounted on moss stick 1.20 m ht., 5 to 6 s	
	Raphis palm having ht. 75 cm to 90 cm with 12 to 15	
	Ficus black vivipara pillar topiary (cylinder type)	

8. Plantation of plants at site will be done with healthy, well developed plants established at the site of following varieties including watering, removal of unserviceable materials etc in quantity as per approved Landscaping drawings.
9. Soil testing for texture, nutrient level, water retaining capacity, PH value and other essential test for healthy growth of plants shall be conducted near every building where horticulture/ Land scapings works are to be done, from approved laboratory and at least 25% from ICAR/Krishi Vigyan Kendra/state universities. Necessary recommendation for fertilizer requirement and water consumption requirement shall be made available from the laboratories.
10. In general, the quality of soil in construction area is not very conducive for growth of plants and grasses. Top good soil from the construction site shall be preserved for horticulture purposes. The soil not suitable for grasses and growth of trees shall be removed and good quality soil either from the preserved top soil or brought from outside the campus shall be used for horticulture purpose. No extra payment shall be made for same. The agency will be responsible for healthy growth of plants, trees, shrubs and grasses during construction stage and maintenance upto three year after completion of work.
11. Manure and Fertilizers: Cattle manure/ compost shall be well decayed (should be at least 6 months covered in dump), free from grits and any other unwanted materials. The contractor shall also provide and spread manure (cow dung manure/compost) for healthy growth the plants & trees under his maintenance. Depending upon requirement to maintain the nutrients level of the soil necessary application of chemical fertilizers (NPK) and other micro nutrients should be done.
12. Watering should be done in such any way that optimum level of moisture content for healthy growth of plants and trees is maintained, at no time moisture content should fall below the wilting point. Inadequate or excessive watering is to be avoided. During the dry season watering should be carried out at least daily in summer & twice a week in winter or as per requirement of the tree plant, shrub, water should be sourced from STP (Sewerage Treatment Plants) in case of emergency the source other then STP and be used provided that prior approval of Officer-in-Charge. has been obtained
13. Weeding and Hoeing: The work includes maintaining areas close to the base of the trees and shrubs free from weeds within 300mm radius from the stem of the trees /150mm radius from

- the stem of the plants. Weeding has to be carried out once in a month. All weeds and waste/surplus material are to be disposed off from the site free of cost with all leads and lifts.
14. Pruning and Trimming: All dead or injured twigs, water shoots, unwanted branches are to be removed. Trees, shrubs and ground cover should be pruned to maintain natural shape. The hedges and shrubs shall be given special shapes and sizes to give aesthetic appearance of the greenery at regular intervals.
 15. Pest and Disease control: All trees/plants are to be inspected once in a month to determine any disease or pest infections. Once the infection is identified adequate control measures are to be taken.
 16. The trees and shrubs having height less than 3 meter in the median and planters shall be washed by sprinkler attached with water tankers on monthly basis. The contractor shall take utmost care of the trees and shrubs so that the casualty is brought to a minimum. The dead and fallen tree should be removed immediately from the site of work for smooth traffic movement and it should be brought to the notice of Department so that further survey and auction of the same can be done.
 17. The Department shall not be responsible for any injury partial or permanent or death of any workers at site due to accident or mal functioning of the equipment or by negligence of the staff.
 18. The contractor shall be responsible for removal of garden waste from the site and disposed off at designated dumping area or any other composting yard as approved by Officer-in- Charge..
 19. The contractor shall have to arrange all required tools & plants & other stock items like Bamboo, Sutli, and Hessian cloth. Tokari etc. for the proper development & maintenance of garden feature. Repair cost of tools & plant items shall be borne by the contractor & nothing shall be paid extra on this account.
 20. The Agency should ensure adequate deployed of Mali having experience of Horticulture work, In case of any deficiency the Officer-in-Charge. can issue the necessary direction to increase the staff and Agency should abide by order of Officer-in-Charge.
 21. The rejected & substandard material should be removed from the site of work immediately; the Department shall not be responsible for any damage/ loss of rejected material. If the same will not be removed within five days after issuing notice in writing by Officer-in- Charge, then necessary recovery shall be made @ Rs. 200 per day.

CONDITIONS OF CONTRACT SPECIFIC TO GREEN BUILDING PRACTICE

1.0 The contractor shall strictly adhere to the following conditions as part of his contractual obligations:-

1.1 SITE

- i) The contractor shall ensure that adequate measures are taken for the prevention of erosion of the top soil during the construction phase. The contractor shall implement the Erosion and Sedimentation Control Plan (ESCP) provided to him by the Engineer in Charge/Project Manager as part of the larger Construction Management Plan (CMP). The contractor shall obtain the Erosion and Sedimentation Control Plan (ESCP) Guidelines from the Engineer in Charge/Project Manager and then prepare working plan for the following month activities as a CAD drawing showing the construction management, staging & ESCP. At no time soil should be allowed to erode away from the site and sediments should be trapped where necessary.
- ii) The contractor shall ensure that all the top soil excavated during construction works is neatly stacked and is not mixed with other excavated earth. The contractors shall take the clearance of the Engineer in Charge/Project Manager before any excavation. Top soil should be stripped to a depth of 20 cm (centimeters) from the areas to be disturbed, for example proposed area for buildings, roads, paved areas, external services and area required for construction activities etc. It shall be stockpiled to a maximum height of 40 cm in designated areas, covered or stabilized with temporary seeding for erosion prevention and shall be reapplied to site during plantation, landscaping etc. of the proposed vegetation. Top soil shall be separated from subsoil, debris and stones larger than 50 mm (millimeter) diameter. The stored top soil may be used as finished grade for planting areas.
- iii) The Contractor should follow the construction plan as proposed by the Architect / Engineer in Charge/Project Manager to minimize the site disturbance such as soil pollution due to spilling. Use staging and spill prevention and control plan to restrict the spilling of the contaminating material on site. Protect top soil from erosion by collection storage and reapplication of top soil, constructing sediment basin, contour trenching, mulching etc.
- iv) No excavated earth shall be removed from the campus unless suggested otherwise by Engineer in Charge/Project Manager. All subsoil shall be reused in backfilling/landscape, etc as per the instructions of the Engineer in Charge/Project Manager.
- v) The contractor shall not change the natural gradient of the ground unless specifically instructed by the Engineer in Charge/Project Manager. This shall cover all natural features like water bodies, drainage gullies, slopes, mounds, depressions, etc. Existing drainage patterns through or into any preservation area shall not be modified unless specifically directed by the Engineer-in-charge.

- vi) The contractor shall not carry out any work which results in the blockage of natural drainage.
- vii) The contractor shall ensure that existing grades of soil shall be maintained around existing vegetation and lowering or raising the levels around the vegetation is not allowed unless specifically directed by the Engineer-in-charge.
- viii) Contractor shall reduce pollution and land development impacts from automobiles use during construction.
- ix) Overloading of trucks is unlawful and creates the erosion and sedimentation problems, especially when loose materials like stone dust, excavated earth, sand etc. are moved. Proper covering must take place. No overloading shall be permitted.
- x) The dismantle material/ building rubbish received from dismantling/demolishing shall be dumped to the dumping ground in properly covered truck with precaution. Agency shall submit the hard copy of photograph showing the properly covered truck disposing the dismantles material/building rubbish. Failure of which shall be sternly dealt and a penalty @Rs.500/- per trip of truck shall be levied and the decision of Engineer-in-Charge shall be final & binding.
- xi) Agency/contractor shall not dump the construction material on the metalled road and shall keep the construction material on the physically demarcated space by the Engineer-in-Charge.
- xii) All the building material responsible for pollution shall be brought at site from sources covered by tarpaulin and shall take all precautionary measure to ensure that no dust particles are permitted to pollute the air quality, failure of which Agency shall be liable to pay damages as decided by Engineer-in-Charge. The decision of Engineer-in-Charge shall be final & binding.
- xiii) There shall be no burning of leaves, plastic etc. at construction site.

1.2 Construction Phase and Worker Facilities

The contractor shall specify and limit construction activity in preplanned/ designated areas and shall start construction work after securing the approval for the same from the Engineer in Charge/Project Manager. This shall include areas of construction, storage of materials, and material and personnel movement.

1.3 Preserve and Protect Landscape during Construction

- a. The contractor shall ensure that no trees, existing or otherwise, shall be harmed and damage to roots should be prevented during trenching, placing backfill, driving or parking heavy equipment, dumping of trash, oil, paint, and other materials detrimental to plant health. These activities should be restricted to the areas outside of the canopy of the tree, or, from a safe distance from the tree/plant by means of barricading. Trees will not be used for support; their trunks shall not be damaged by cutting and carving or by nailing posters, advertisements or other material. Lighting of fires or carrying out heat or gas emitting construction activity within the ground, covered by canopy of the tree is not to be permitted.

- b. The contractor shall take steps to protect trees or saplings identified for preservation within the construction site using tree guards of approved specification.
- c. Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) approved by Engineer in Charge/Project Manager.
- d. The contractor shall avoid cut and fill in the root zones, through delineating and fencing the drip line (the spread limit of a canopy projected on the ground) of all the trees or group of trees. Separate the zones of movement of heavy equipment, parking, or excessive foot traffic from the fenced plant protection zones.
- e. The contractor shall ensure that maintenance activities during construction period shall be performed as needed to ensure that the vegetation remains healthy.
- f. Contractor shall be required to develop and implement a waste management plan, quantifying material diversion goals. He shall establish goals for diversion from disposal in landfills and incinerators and adopt a construction waste management plan to achieve these goals. A project-wide policy of nothing leaves the Site, should be followed, in such a case when strictly followed, care would automatically be taken in ordering and timing of materials such that excess does not become waste. The Contractor ingenuity is especially called towards meeting this prerequisite/ credit (Minimum gold rating from IGBC Healthcare facilities rating system). Consider recycling cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation. Designate a specific area(s) on the construction site for segregated or commingled collection of recyclable material, and track recycling efforts throughout the construction process. Identify construction haulers and recyclers to handle the designated materials. The diversion may include donation of materials to charitable organizations and salvage of materials on- site.
- g. Contractor shall collect all construction waste generated on site. Segregate these wastes based on their utility and examine means of sending such waste to manufacturing units which use them as raw material or other site which require it for specific purpose. Typical construction debris could be broken bricks, steel bars, broken tiles, spilled concrete and mortar etc.
- h. The contractor shall provide potable water for all workers
- i. The contractor shall provide the minimum level of sanitation and safety facilities for the workers at their camp/labour site. The contractor shall ensure cleanliness of workplace with regard to the disposal of waste and effluent; provide clean drinking water and latrines and urinals as per applicable standard. Adequate toilet facilities shall be provided for the workman within easy access of their place of work. The total no. to be provided shall not be less than 1 per 30 employees in any one shift. Toilet facilities shall be provided from the start of building operations, connection to a sewer shall be made as soon as practicable. Every toilet shall be so constructed that the occupant is sheltered from view and protected from the weather and falling objects. Toilet facilities shall be maintained in a sanitary condition. A sufficient quantity of disinfectant shall be provided. Natural or artificial illumination shall be provided.

- j. The contractor shall ensure that air pollution due to dust/generators is kept to a minimum, preventing any adverse effects on the workers and other people in and around the site. The contractor shall ensure proper screening, covering stockpiles, covering brick and loads of dusty materials, wheel-washing facility, gravel pit, and water spraying. Contractor shall ensure the following activities to prevent air pollution during construction:
- (i) Clear vegetation only from areas where work will start right away
 - (ii) Vegetate / mulch areas where vehicles do not ply.
 - (iii) Apply gravel / landscaping rock to the areas where mulching / paving is impractical
 - (iv) Identify roads on-site that would be used for vehicular traffic. Upgrade vehicular roads (if these are unpaved) by increasing the surface strength by improving particle size, shape and mineral types that make up the surface & base. Add surface gravel to reduce source of dust emission. Limit amount of fine particles (smaller than 0.075mm) to 10 - 20%
 - (v) Water spray, through a simple hose for small projects, to keep dust under control. Fine mists should be used to control fine particulate. However, this should be done with care so as not to waste water. Heavy watering can also create mud, which when tracked onto paved public roadways, must be promptly removed. Also, there must be an adequate supply of clean water nearby to ensure that spray nozzles don't get plugged.
 - (vi) Water spraying shall be done on:
 - (vii) Any dusty materials before transferring, loading and unloading
 - (viii) Area where demolition work is being carried out
 - (ix) Any un-paved main haul road
 - (x) Areas where excavation or earth moving activities are to be carried out
 - (xi) The contractor shall ensure that the speed of vehicles within the site is limited to 10 km/hr.
 - (xii) All material storages should be adequately covered and contained so that they are not exposed to situations where winds on site could lead to dust / particulate emissions.
 - (xiii) Spills of dirt or dusty materials will be cleaned up promptly so the spilled material does not become a source of fugitive dust and also to prevent of seepage of pollutant laden water into the ground aquifers. When cleaning up the spill, ensure that the clean-up process does not generate additional dust. Similarly, spilled concrete slurries or liquid wastes should be contained / leaned up immediately before they can infiltrate into the soil / ground or runoff in nearby areas
 - (xiv) Provide barricading as per direction of Engineer-in-charge, along the site boundary, next to a road, around batching plant or other public area.
 - (xv) Provide dust screens or netting to scaffold along the perimeter of the building

- (xvi) Cover stockpiles of dusty material with impervious sheeting
- (xvii) Cover dusty load on vehicles by impervious sheeting before they leave the site
- k. Contractor shall be required to provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics, and metals. He shall coordinate the size and functionality of the recycling areas with the anticipated collections services for glass, plastic, office paper, newspaper, cardboard, and organic wastes to maximize the effectiveness of the dedicated areas. Consider employing cardboard balers, aluminium can crushers, recycling chutes, and collection bins at individual workstations to further enhance the recycling program
- l. The contractor shall ensure that no construction leachate (e.g. cement slurry etc.), is allowed to percolate into the ground. Adequate precautions are to be taken to safeguard against this including, reduction of wasteful curing processes, collection, basic filtering and reuse. The contractor shall follow requisite measures for collecting drainage water run-off from construction areas and material storage sites and diverting water flow away from such polluted areas. Temporary drainage channels, perimeter dike/swale, etc. shall be constructed to carry the pollutant-laden water directly to the treatment device or facility (municipal sewer line).
- m. Staging (dividing a construction area into two or more areas to minimize the area of soil that will be exposed at any given time) should be done to separate undisturbed land from land disturbed by construction activity and material storage.
- n. The contractor shall comply with the safety procedures, norms and guidelines (as applicable) and safety, 2005, National Building code of India, Bureau of Indian Standards. A copy of all pertinent regulations and notices concerning accidents, injury and first-aid shall be prominently exhibited at the work site. Depending upon the scope & nature of work, a person qualified in first-aid shall be available at work site to render and direct first-aid to casualties. A telephone may be provided to first-aid assistant with telephone numbers. Complete reports of all accidents and action taken thereon shall be forwarded to the competent authorities.
- o. The contractor shall ensure the following activities for construction workers safety, among other measures:
 - (i) Guarding all parts of dangerous machinery.
 - (ii) Precautionary signs for working on machinery
 - (iii) Maintaining hoists and lifts, lifting machines, chains, ropes, and other lifting tackles in good condition.
 - (iv) Durable and reusable formwork systems to replace timber formwork and ensure that formwork where used is properly maintained.
 - (v) Ensuring that walking surfaces or boards at height are of sound construction and are provided with safety rails or belts.
 - (vi) Provide protective equipment; helmets etc.

- (vii) Provide measures to prevent fires. Fire extinguishers and buckets of sand to be provided in the fire-prone area and elsewhere.
 - (viii) Provide sufficient and suitable light for working during night time.
- p. The storage of material shall be as per standard good practices as specified in Part 7, Section 2. Storage, stacking and Handling practices, NBC 2016 and shall be to the satisfaction of the Engineer in Charge/Project Manager to ensure minimum wastage and to prevent any misuse, damage, inconvenience or accident. Watch and ward of the Contractors materials shall be his own responsibility. There should be a proper planning of the layout for stacking and storage of different materials, components and equipments with proper access and proper maneuverability of the vehicles carrying the materials. While planning the layout, the requirements of various materials, components and equipments at different stages of construction shall be considered.
- q. The contractor shall provide for adequate number of garbage bins around the construction site and the workers facilities and will be responsible for the proper utilization of these bins for any solid waste generated during the construction. The contractor shall ensure that the site and the workers facilities are kept litter free. Separate bins should be provided for plastic, glass, metal, biological and paper waste and labelled in both Hindi and English with suitable symbols.
- r. The contractor shall prepare and submit spill prevention and control plans before the start of construction, clearly stating measures to stop the source of the spill, to contain the spill, to dispose the contaminated material and hazardous wastes, and stating designation of personnel trained to prevent and control spills. Hazardous wastes include pesticides, paints, cleaners, and petroleum products.
- s. Contractor shall collect & submit the relevant material certificates for materials with high recycled (both post-industrial and post-consumer) content, including materials like RMC mix with fly-ash, glass with recycled content, calcium silicate boards etc..
- t. Contractor shall collect the relevant material certificates for rapidly renewable materials such as bamboo, wool, cotton insulation, agrifiber, linoleum, wheat board, strawboard and cork etc.
- u. Where possible, the contractor shall select materials/vendors, harvested and manufactured regionally, within a 800-km radius of the project site.
- v. Contractor shall adopt an IAQ (Indoor Air Quality) management plan to protect the HVAC system during construction, control pollutant sources, and interrupt pathways for contamination. He shall sequence installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile, and gypsum wallboard. He shall also protect stored on-site or installed absorptive materials from moisture damage.
- w. The contractor shall ensure that a flush out of all internal spaces is conducted prior to handover. This shall comprise an opening of all doors and windows for 14 days to vent out any toxic fumes due to paints, varnishes, polishes, etc.

- x. Contractor shall make efforts to reduce the quantity of indoor air contaminants that are odorous or potentially irritating harmful to the comfort and well-being of installer and building occupants. Contractor shall ensure that the VOC (Volatile Organic Compounds) content of paints, coatings and primers used must not exceed the VOC content limits mentioned below:
- Paints
 - Non-flat - 150 g/L Flat (Mat) - 50 g/L
 - Anti corrosive/ anti rust - 250 g/L Coatings / Clear wood finishes Varnish - 350 g/L
 - Lacquer - 550 g/L
 - Floor coatings - 100 g/L Stains - 250 g/L
 - Sealers
 - Waterproofing sealer - 250 g/L Sanding sealer - 275 g/L
 - Other sealers - 200 g/L
 - The VOC (Volatile Organic Compounds) content of adhesives and sealants used must be less than VOC content limits mentioned:
 - Architectural Applications VOC Limit (g/l less water) Indoor Carpet adhesives - 50 g/L
 - Carpet Pad Adhesives - 50 g/L Wood Flooring Adhesive - 100 g/L Rubber Floor Adhesives - 60 g/L Sub Floor Adhesives . 50 g/L Ceramic Tile Adhesives - 65 g/L
 - VCT and Asphalt Tile adhesives - 50 g/L DryWall and Panel Adhesives - 50 g/L Structural Glazing Adhesives - 100 g/L Multipurpose Construction Adhesives . 70 g/L
 - Substrate Specific Application VOC Limit (g/l less water) Metal to Metal - 30 g/L
 - Plastic Foams - 50 g/L
 - Porous material (except wood) - 50 g/L Wood - 30 g/L
 - Fiber Glass . 80 g/L
- y. Wherever required, Contractor shall meet and carry out documentation of all activities on site, supplementation of information, and submittals in accordance with 3 STAR TERI-GRIHA or LEED-Silver star or IGBC -Gold star program standards and guidelines. Towards meeting the aforementioned building environmental rating standard(s) expert assistance shall be provided to him up on request.

1.4 Water use during Construction

- i. Contractor should spray curing water on concrete structure and shall not allow free flow of water. Concrete structures should be kept covered with thick cloth/gunny bags and water should be sprayed on them. Contractor shall do water ponding on all sunken slabs using cement and sand mortar.
- ii. The Contractor shall remove from site all rubbish and debris generated by the Works and keep Works clean and tidy throughout the Contract Period. All the serviceable and non-serviceable (malba) material shall be segregated and stored separately. The malba obtained during construction shall be collected in well formed heaps at properly selected places,

keeping in a view safe condition for workmen in the area. Materials which are likely to cause dust nuisance or undue environmental pollution in any other way, shall be removed from the site at the earliest and till then they shall be suitable covered. Glass & steel should be dumped or buried separately to prevent injury. The work of removal of debris should be carried out during day. In case of poor visibility artificial light may be provided.

- iii. The contractor shall provide O & M Manuals wherever applicable.
- iv. The contractor shall make himself conversant with the Site Waste Management Program Manual and actively contribute to its compilation by estimating the nature and volume of waste generated by the process/installation in question.

1.5 Materials & Fixtures for the Project

Contractor will produce wherever feasible certificate regarding distance of the source of the relevant material.

- (a) Unless otherwise stated cement used at site for reinforced concrete, precast members, mortar, plaster, building blocks, etc shall be PPC (Portland Pozzolana Cement). The PPC must meet the requirements of IS 1489 (Part I) as regards to fly ash content in cement The contractor shall obtain from the PPC manufacturer the certificate regarding fly ash content in the PPC in each batch of consignment.
- (b) The contractor has to comply as per MoEF issued notification 8.0.763(E) dated 14th Sept.1999 & latest notification of Jan. 2016 containing directive for greater fly ash utilization.
- (c) The contractor shall ensure that all paints, polishes, adhesives and sealants used both internally and externally, on any surface, shall be Low VOC products. The contractor shall get prior approval from the Engineer in Charge/Project Manager before the application of any such material.
- (d) All plumbing and sanitary fixtures installed shall be as per the direction of the Engineer in Charge/Project Manager and shall adhere to the minimum LPM (litres per minute) and LPF (litres per flush) mentioned. The contractor shall employ 100% zero ODP (ozone depletion potential) insulation; HCFC (hydro-chlorofluorocarbon)/ and CFC (chlorofluorocarbon) free HVAC and refrigeration equipments and/halon- free fire suppression and fire extinguishing systems.

1.6 Resources Consumed During Construction

- (a) The contractor shall ensure that the water and electricity is not wasted during construction. The Engineer in Charge/Project Manager can bring to the attention any such wastage and the contractor will have to ensure that such bad practices are corrected.
- (b) The contractor shall install necessary meters and measuring devices to record the consumption of water, electricity and diesel on a monthly basis for the entire tenure of the project.
- (c) The contractor shall ensure that all run-off water from the site, during construction is collected and reused to the maximum.

- (d) The contractor shall use treated recycled water of appropriate quality standards for construction, if available.
- (e) No lights shall be turned on during the period between 6:00 AM to 6:00 PM, without the permission of the Engineer in Charge/Project Manager.

1.7 Construction Waste

- (a) Contractor shall ensure that wastage of construction material is within 3%.
- (b) All construction debris generated during construction shall be carefully segregated and stored in a demarcated waste yard. Clear, identifiable areas shall be provided for each waste type. Employ measures to segregate the waste on site into inert, chemical, or hazardous wastes.
- (c) All construction debris shall be used for road preparation, back filling, etc, as per the instructions of the Engineer in Charge/Project Manager, with necessary activities of sorting, crushing, etc.
- (d) No construction debris shall be taken away from the site, without the prior approval of the Engineer in Charge/Project Manager.
- (e) The contractor shall recycle the unused chemical/hazardous wastes such as oil, paint, batteries, and asbestos.
- (f) If and when construction debris is taken out of the site, after prior permissions from the Engineer in Charge/Project Manager, then the contractor shall ensure the safe disposal of all wastes.

1.8 Documentation

- a) The contractor shall, during the entire tenure of the construction phase, submit the following records to the Engineer in Charge/Project Manager on a monthly basis:
 - i) Water consumption in litres
 - ii) Electricity consumption in kwh units
 - iii) Diesel consumption in litres
 - iv) Quantum of waste (volumetric/weight basis) generated at site and the aggregated waste types divided into inert, chemical and hazardous wastes.
 - v) Digital photo documentation to demonstrate compliance of safety guidelines as specified here and in the Appendix on Safety Conditions.
- b) The contractor shall, during the entire tenure of the construction phase, submit the following records to the Engineer in Charge/Project Manager on daily basis:
 - i) Quantities of material brought into the site, including the material issued to the contractor by the Engineer in Charge/Project Manager.
 - ii) Inventories of materials used in the work i/c. flyash, flyash bricks etc.
 - iii) Quantities of construction debris (if at all) taken out of the site

- iv) Digital photographs of the works at site, the workers facilities, the waste and other material storage yards, pre-fabrication and block making works, etc as guided by the Engineer in Charge/Project Manager.
No. of different categories of labours deployed at site for work (shift wise).
- c) The contractor shall submit a document after construction of the buildings, a brief description along with photographic records to show that other areas have not been disturbed during construction. The document should also include brief explanation and photographic records to show erosion and sedimentation control measures adopted. (Document CAD drawing showing site plan details of existing vegetation, existing buildings, existing slopes and site drainage pattern, staging and spill prevention measures, erosion and sedimentation control measures and measures adopted for top soil preservation during construction)
- d) The contractor shall submit to the Engineer in Charge/Project Manager after construction of the buildings, a detailed as built quantification of the following:
 - i. Total materials used,
 - ii. Total top soil stacked and total reused
 - iii. Total earth excavated
 - iv. Total waste generated,
 - v. Total waste reused,
 - vi. Total water used,
 - vii. Total electricity, and
 - viii. Total diesel consumed.
- e) The contractor shall submit to the Engineer in Charge/Project Manager, before the start of construction, a site plan along with a narrative to demarcate areas on site from which top soil has to be gathered, designate area where it will be stored, measures adopted for top soil preservation and indicate areas where it will be reapplied after construction is complete.
- f) The contractor shall submit to the Engineer in Charge/Project Manager, a detailed narrative (not more than 250 words) on provision for safe drinking water and sanitation facility for construction workers and site personnel.
- g) Provide supporting document from the manufacturer of the cement specifying the flyash content in PPC used in reinforced concrete.
- h) The contractor shall submit the following information to the Engineer-in-charge at the end of construction, for all material brought to site for construction purposes, including manufacturer's certifications, verifying information, and test data, where Specifications sections require data relating to environmental issues including but not limited to:
 - i) Source of products: Supplier details and location of the supplier.
 - j) Project Recyclability: Submit information to assist Owner and Contractor in recycling materials involved in shipping, handling, and delivery, and for temporary materials necessary for installation of products.

- (i) Recycled Content: Submit information regarding product post industrial recycled and post consumer recycled content, Use the Recycled Content Certification Form, to be provided by the Commissioning Authority appointed for the Project.
- (ii) Product Recyclability: Submit information regarding product and products component's recyclability including potential sources accepting recyclable materials where ever applicable.
- (iii) Provide final certification of well-managed forest of origin to provide final documentation of certified sustainably harvested status: Acceptable wood, certified sustainably harvested, certifications shall include:
- (iv) Clean tech: Provide pollution clearance certificates from all manufacturers of materials
- (v) Indoor Air quality and Environmental Issues: Submit emission test data, sourced from the manufacturers, produced by acceptable testing laboratory listed in Quality Assurance Article for materials as required in each specific Specification section.
- (vi) Certifications from manufacturers of Low VOC paints, adhesives, sealant and polishes used at this particular project site
- (vii) Certification from manufacturers of composite wood products/agrofibre products on the absence of added urea formaldehyde resin in the products supplied to them to this particular site.
- (viii) Submit environmental and pollution clearance certificates for all diesel generators installed as part of this project. Provide total support to Engineer in Charge/Project Manager and Green Building Consultants appointed by the Engineer in Charge/Project Manager in completing all Green Building Rating related formalities, including signing of forms, providing signed letters in the contractor's letterhead whenever required.

1.9 Equipment

- a) To ensure energy efficiency during and post construction all pumps, motors and engines used during construction or installed, shall be subject to approval of the Engineer-in-Charge.
- b) All lighting installed by the contractor around the site and at the labour quarters during construction shall be led fixtures of the appropriate illumination levels. This condition is a must, unless specifically prescribed.
- c) The contractor is expected to go through all other conditions of the minimum Gold rating of LEED/IGBC health care facilities rating system. Failure to adhere to any of the above mentioned items, without approval of the Engineer in Charge/Project Manager, shall be deemed as a violation of contract and the contractor shall be held liable for penalty as per terms of the agreement.

- d) In case any penalty is imposed by any Hon'ble Court, NGT or any other authority due to non-compliance of any statutory order, or law or guidelines or pollution control or environmental norms, the same will be borne by the contractor.

1.10 Submission of Pollution Control Plan

- a) The contractor shall submit the detailed action plan for control of pollution and for adherence to all the environmental guidelines/Laws/statutes/Court Orders/NGT orders/orders of pollution control authorities through the entire period of construction at site. The detailed action plan shall be submitted to the Engineer-in-Charge within 15 days of the stipulated date of start of work and shall be got approved from the Engineer-in-Charge.
- b) The contractor shall arrange for control measures of all dust/noise/emission from the construction activities at site of work and shall install screens/curtains/ covers/dust trappers etc. as per guidelines/orders of the NGT/Court of law/ statutory authorities etc. No hindrance shall be allowed, arising out of any stay/stopping of work from any court/statutory authority/NGT/Govt. Authorities as a consequence of the contractor not adhering to any pollution control guideline/law/order of the state bodies during the construction period. Nothing shall be paid to the contractor on account of expenses for any dust/pollution/emission control measures at the site of work or any delay in work due to any orders passed by any court/ statutory authority/Govt. Authorities during the period of construction.
- c) A compensation of Rs. 5,000/- per day will be levied and recovered from the dues of the contractor for each day of delay beyond 15 days for non submission of pollution control plan.
- d) The contractor is strongly advised to study all dust/Noise/emission/ pollution control norms/laws/Court Orders before bidding for the work and quote his rates accordingly for any liability which may arise on this account during the period of construction.

1.11 Mode of Measurements

- a. The measurements shall be recorded and entered in computerized format in the first instance by the contractor, and a hard copy shall be submitted to the Department. All entries shall be made exactly as per the existing procedure.
- b. These measurements shall then be 100% checked by the Assistant Engineer. The contractor shall incorporate all such changes or corrections, as may be done during these checks, to his draft computerized measurement, and submit to the department the corrected computerized measurement Books now in use, and with its pages machine numbered.
- c. The Assistant Engineer and the Executive Engineer shall test check these computerized measurement as per the existing instructions. This book shall be treated as a Computerized Measurement Book.
- d. The Assistant Engineer and the Executive Engineer shall record the necessary certificates for their checks and test checks as per the existing procedure in this Computerized Measurement Book

- e. The Computerized Measurement Book shall be allotted a serial number as per the Register of Computerized Measurement Books.
- 1.12** Electrical work (Steel conduit & G.I. wires) shall be carried out as per CPWD specifications for Electrical work Internal 2005 and External 1995 with upto date correction slips. This work shall be supervised by Engineer-in-charge/Project Manager of the work or his authorized representative. Material shall be got approved by Project Manager/ARE/JE before its use at site.

SCOPE OF WORK & PROJECT SPECIFIC DETAIL-GRIHA RATING SYSTEM

1. This Project is to be designed & executed for achieving min. GRIHA 3 Star standards rating Certifications as per latest version stipulated by GRIHA (Green Rating for Integrated Habitat Assessment) Council in respect of the buildings & blocks listed in the Design Basis Report.
2. Accordingly, the contractor is required to adhere to the various environment friendly and GRIHA compliance aspects of construction as well as documentation with respect to use of Materials, Manpower, Machinery and other relevant mandatory requirements. Nothing extra shall be payable over and above the quoted rates as per the financial bid to comply with such requirements.
3. Certification of Facilities as per GRIHA Standards:
All required services from concept planning to completion, documentation including obtaining certification from GRIHA Secretariat/Council are included in the scope of work. This shall also include Energy Simulation and Modeling, Documentation & Co- ordination with GRIHA Council and obtaining Provisional & Final Certification. The Contractor shall ensure that the Project shall be registered with GRIHA Council after award of work. The Contractor shall be required to incorporate all the necessary provisions required for minimum Three Star GRIHA Rating in the drawings, specifications etc. & to undertake the necessary documentation and submissions with GRIHA Council accordingly. They will also be required to provide the various services as referred below:
 - a. Feasibility:
The Contractor will evaluate the certification levels that may be achieved by the project. The feasibility report will comprise of a report, which will divide the overall points in three categories:
 - i) Points that are already planned, if any,
 - ii) Points which are possible to be planned
 - iii) Points those are not feasible (not applicable) for the project.
 - b. All the design and documents prepared for Civil, Structural, MEP, HVAC, and Firefighting Systems etc. shall be in conformity to GRIHA requirements.
 - c. The Contractor, upon award of work, shall ensure registration of the Project with GRIHA Council.

- d. The Contractor shall ensure that the materials are in conformity with the requirements to achieve Minimum Three Star Rating under GRIHA Green Building Rating Systems.
- e. To periodically monitor the parameters set out in the planned score card & suggest remedial measures in case of any shortcomings.
- f. To carry out Building Envelope Analysis, Orientation and Shading Analysis, Day lighting Studies, Energy Modeling, Water Balance Charts etc. using relevant simulation tools.
- g. Preparation, submission and documentation from initiation till completion and receipt of required Green Building Rating for the Project which amongst other requirements as per GRIHA shall include collection, compilation & preparation of filled-in templates/documents, under intimation & in co-ordination with Architectural Consultant & Assam PWD (B), submission of complete compliance documents as required by GRIHA Council in order to get the minimum GRIHA-3 Star standards Rating for the Project. This shall also include all required coordination with GRIHA Council etc. and other relevant statutory bodies inclusive of responding to queries from these offices.
- h. Contractor shall ensure & follow necessary Guidelines, Procedures and formats for records to be maintained (at various stages of the Project) as per requirements of GRIHA Council.
- i. Contractor should apprise Architectural Consultant & Assam PWD (B) of the status with regard to implementation of provisions of GRIHA periodically as per the requirements.
- j. The Contractor shall arrange to get the Energy Audit completed & report prepared through BEE Certified Energy Auditor as per GRIHA norms for obtaining Final GRIHA Certification from GRIHA Council & nothing extra is payable on this account.
- k. The Contractor shall co-ordinate with GRIHA Council & all other relevant statutory authorities as per requirements and nothing extra is payable on this account. However, the required statutory fee payable to the GRIHA Council /statutory authorities, if any, will be borne by Architectural Consultant & Assam PWD (B). The Contractor shall incur such expenditure after prior approval of Architectural Consultant & Assam PWD (B) who shall pay/ reimburse the same to Contractor on submission of payment receipts and documents towards this expenditure. However, Contractor shall be responsible for all the required coordination and liaisoning work.
- l. The contractor shall be responsible for carrying out Orientation Workshop, Due Diligence Site Visits etc. & all expenditures on this account shall be borne by the Contractor.

- m. Any suggestion/remedy indicated by GRIHA Council shall be the responsibility of the contractor, without any extra cost.
4. The Contractor shall also adhere to the following during construction:
 - 4.1 Soil excavation, soil erosion and sedimentation control etc.:- Proper site management strategies shall be followed on the site to ensure proper material staging, soil spill prevention, soil erosion and sedimentation control. The following strategies are listed below:
 - a) Temporary sedimentation basins shall be made on the lowest possible elevation on site during construction to manage all the storm water generated during rains at the site. Photographs of the sedimentation tank shall be submitted to the Engineer-in-charge.
 - b) Spill prevention and control: Spill prevention and control plans to ensure so as to stop the source of the spill and dispose the contaminated material and hazardous wastes. Hazardous wastes include pesticides, paints, cleaners, and petroleum products.
 - c) Proper construction material staging shall be executed on the site.
 - d) Trenches shall be laid along the periphery of the site to carry the storm water from the various locations on the site to the sedimentation basins.
 - e) During the earth excavation, top soil of 0.20m shall be stacked separately on or near by the site at a maximum height of 0.40m.
 - f) Vegetation / mulching of the areas shall be done where the excavated top soil is stacked.
 - g) The soil excavation, particularly during rainy season, shall be done in such a way to minimize site disturbance such as soil pollution due to spillage of construction material and mixing with rainwater.
 - h) The existing vegetation shall be protected by preventing disturbance or damage to specified areas during construction. This will minimize the amount of bare soil exposed to erosive forces. All existing vegetation shall be barricaded on site and marked on a site survey plan.
 - i) Stacked top soil shall be mulched and protected by barricading as stated above and re-laid over pre-designated landscape areas post construction.
 - j) The contractor shall not store /dump construction material or debris on metaled road.
 - k) The contractor shall get prior approval from Engineer-in- Charge for the area where the construction material or debris can be stored beyond the metaled road. This area shall not cause any obstruction to the free flow of traffic/inconvenience to the pedestrians. It should be ensured by the contractor that no accidents occur on account of such permissible.

4.2 Proper site management strategies shall be followed on the site to ensure labor safety and sanitation. Some of these are listed below:

- a) Display warning and safety signs all across the site. Also ensure that safety nets and harnesses are provided for construction workers working on higher floors. The walking boards and formwork shall also be stable. Workers shall be provided with safety equipment like safety helmets, jackets, boots and gloves.
- b) Provide fire extinguishers and barrels of water with bucket tans on the site and sufficient light for workers to work safely at night.
- c) The Contractor shall provide adequate level of sanitation and safety facilities for construction workers.
- d) Provide accommodation and amenities for all staff and labors, employed for the purpose of, or in connection with the contract including fencing, water (both for drinking and other uses), electricity, furniture and other such requirements. Such accommodation and amenities shall be provided by the contractor at a location specifically demarcated by the Client/ Architectural Consultant & Assam PWD, in case such space is made available by the Client/ Architectural Consultant & Assam PWD (B). In case the contractor makes his own arrangement, all such facilities shall be provided in such accommodation. On completion of the contract, such accommodation shall be removed and the site shall be cleared.
- e) The contractor shall employ an officer on the site concerned solely with the safety and protection of all staff and labor against accidents. The officer shall be qualified and shall have authority to issue instructions and take protective measures to prevent accidents or the contractor may setup a working arrangement with a local practitioner to handle injury in an emergency situation.
- f) Contractor shall provide PPE (Personal Protective Equipment) like safety shoes, safety belt/harness, Helmets to all workers at site.
- g) The contractor shall provide mask to every worker working on the construction site and involved loading, unloading and carriage of construction material and construction debris to prevent inhalation of dust particles. The contractor shall provide all medical help, investigation and treatment to the workers involved in the construction of building and carry of construction material and debris relatable to dust emission.
- h) The contractor shall establish a fully equipped first aid center on site to deal with accidental injuries and workers health. The first aid box shall be marked with a red cross on a white background.

- i) The contractor shall not allow an individual to work on site while his ability or alertness is impaired by fatigue, illness or some other cause which might expose him to injury.

4.3 Proper site management strategies shall be adopted on the site such as:

- a) Preparation of site :
 - i. Clear vegetation only from the areas where work will start right away.
 - ii. Vegetate/mulch areas where vehicles don't ply.
 - iii. Apply gravel to the area where mulching/paving is impractical.
 - iv. Identify roads on site that would be used for vehicular traffic. Add surface gravel to reduce source of dust emission.
 - v. Limit vehicular speed on site to 10 km/hour.
- b) During Construction and Demolition(C&D):-
 - i. Water shall be sprayed to prevent dust pollution on the following:
 - a. Any dusty materials before transferring, loading and unloading.
 - b. Areas where demolition work is being carried out.
 - c. Areas where excavation or earth-moving activities are to be carried out.
 - d. Arrangements for wheel washing should be made near the entry/exit gates to prevent air pollution.
 - ii. The contractor shall ensure that C&D waste is transported to the C&D dedicated place within the site earmarked for storing and sorting construction waste side only and due record shall be maintained by the contractor.
 - iii. The contractor shall compulsory use of wet jet in grinding and stone cutting.
- c) The following activities shall be carried out:
 - i. The contractor shall take appropriate protection measures like raising wind breakers of appropriate height on all sides of the plot/area using CGI sheets or plastic and / or other similar material to ensure that no construction material dust fly outside the plot area.
 - ii. The contractor shall ensure that all the trucks or vehicles of any kind which are used for construction purposes / or are carrying construction material like cement, sand and other allied material are fully covered. The contractor shall take every necessary precautions that the vehicles are properly cleaned and dust free to ensure that en- route their destination, the dust, sand or any other particles are not released in air/contaminate air.
 - iii. Covering full stockpile of dusty material with impervious sheeting.
 - iv. Transferring, handling/storing dry loose materials like bulk cement, dry pulverized fly ash inside a totally enclosed system.
- d) Concrete Curing: -Use of gunny bags, ponding for curing purposes. Adding admixtures to concrete which cause a reduction in the water required for curing as per directions of the Engineer- in-charge. Also construct curing tanks on the site for efficient usage of water.

- e) Efficient use of available water.
- f) Plan utilities efficiently and optimize on-site circulation efficiency.
- g) Reduce air and noise pollution due to storage / use of materials and machinery.
- h) Preservation and protection of landscape during construction.
- i) Reduction in waste of construction materials.
- j) Implement recycling programme as far as possible to recycle construction waste materials during construction.
- k) Suitable arrangement for preventing dust and debris entering duct work and working areas.
- l) Create physical barriers between work and non-work areas.
- m) Protection of materials and equipment against moisture dust etc.
- n) Keeping work area clean and dry as possible.
- o) To take safety measures to avoid damage to existing plants and trees.
- p) The contractor shall comply with all the preventive and protective environmental steps as stated in the MoEF guidelines, 2010.
- q) The contractor shall carry out on road- Inspection for black smoke generating machinery. The contractor shall use cleaner fuel.
- r) The contractor shall ensure that all DG sets shall comply with emission norms notified by MoEF.
- s) The contractor shall use vehicle having pollution under control certificate.

The emissions can be reduced by a large extent by reducing the speed of a vehicle to 20 kmph. Speed bumps shall be used to ensure speed reduction. In cases where speed reduction cannot effectively reduce fugitive dust, the contractor shall divert traffic to nearby paved areas.

4.4 Materials:-

- i. Use of materials which conform to the GRIHA Rating System criteria.
 - ii. Use of low emitting materials, adhesives and sealants to -
 - a) reduce/avoid use of materials, which are irritating and naturally cause health problems to the construction workmen and occupants.
 - b) achieve specified Volatile Organic Compounds (VOC) limits as per the GRIHA requirements.
5. The Contractor shall maintain proper record of all the materials/ equipment procured with respect to their source & specifications with details of their manufacturing and recycled content etc. and submit along with all supporting documents to the Engineer-In-charge.
6. Construction Waste Management Plan :
- As already detailed, the broad intent is to avoid materials going to landfills, during construction. It is required to develop a plan to recycle all possible waste generated during construction. Typical items would include land clearing debris, concrete, steel, ductwork, clean dimensional wood, paperboard and plastic used in packing, etc.

7. Indoor Air Quality (IAQ) Management plan.

The HVAC works, in general, shall conform to ECBC 2017. The contractor shall be required to take the specific measures during construction with respect to following main areas of concern:

a. HVAC System Protection :

- i When performing construction activities that produce dust, such as drywall sanding, concrete cutting, masonry work, wood sawing or adding insulation, seal off the supply diffusers and return air system openings completely for the duration of the task.
- ii Shut down and seal off the supply diffusers and return air ducts during any demolition operations
- iii Till the HVAC system is put into use, seal-off the supply diffusers and return air system openings to prevent the accumulation of dust and debris in the duct system during construction.
- iv Do not use the mechanical rooms to store construction or waste materials. Keep rooms clean and neat.
- v Provide periodic duct inspections during construction; if the ducts become contaminated due to inadequate protection, clean the ducts as per requirements and directions of Engineer-In-Charge
- vi Contaminant Source Control:
- vii Use low VOC products as indicated by the specifications to reduce potential problems
- viii Restrict traffic volume and avoid idling of motor vehicles as their emissions could be drawn into the building.
- ix Utilize electric or natural gas alternatives for gasoline and diesel run equipment where possible and practical. Use low- sulphur diesel in lieu of regular diesel.
- x Cycle equipment off when not being used or needed
- xi Exhaust pollution sources to the outside with portable fan systems
- xii Prevent exhaust from re-circulating back into the building
- xiii Keep containers of wet products closed as much as possible. Cover or seal containers of waste materials that can release odour or dust.
- xiv Protect stored on-site or installed absorptive building materials, for instance, Cement, Gypsum / POP etc. from weather and moisture; wrap with plastic and seal tight to prevent moisture absorption.
- xv Electronic air cleaner filter (UL Listed) section equivalent to MERV-13/14 filtration level to be provided in all air handling units. EAC improves the indoor air quality through reducing harmful pollutants like particulate matter (PM_x), PM 2.5, allergens, pollen, smoke, based on trap & kill technology.

xvi UVGI lamp (ultra violet germicide irradiator system) to be provided in all air handling units of critical areas which are capable of reducing microbial bacteria, virus (99.99% kill rate of air borne mold, spores, bacteria, viruses & odour) and VoC' etc.

b. Pathway Interruption:

- i. Provide dust curtains or temporary enclosures to prevent dust from migrating to other areas including existing Complex, as applicable.
- ii. Locate pollutant sources as far away as possible from supply ducts and areas occupied by workers when feasible. Supply and exhaust systems may have to be shut down or isolated during such activity.
- iii. During construction, isolate areas of work to prevent contamination of clean or occupied areas. Pressure differentials may be utilized to prevent contaminated air from entering clean areas.
- iv. Depending on weather, ventilation using 100% outside air will be used to exhaust contaminated air directly to the outside during use of VOC emitting materials.

c. Housekeeping:

- i. Provide regular cleaning concentrating on HVAC equipment and building space to remove contaminants from the building prior to occupancy.
- ii. All coils, air filters, fans & ducts shall remain clean during installation and, if required, will be cleaned prior to performing the testing, adjusting and balancing of the systems.
- iii. Suppress and minimize dust with wetting agents or sweeping compounds.
- iv. Utilize efficient and effective dust collecting methods such as a damp cloth, wet mop, or vacuum with particulate filters, or wet scrubber.
- v. Remove accumulations of water inside the building. Protect porous materials such as insulation and ceiling tile from exposure to moisture.
- vi. Thoroughly clean all interior surfaces prior to replacing filters and running HVAC system for system balancing, commissioning and building flush-out.

d. Scheduling and Construction Activity Sequence:

Schedule high pollution activities that utilize high VOC level products (including paints, sealers, insulation, adhesives, caulking and cleaners) to take place prior to installing highly absorbent materials (such as ceiling tiles, gypsum wall board, fabric furnishings, carpet and insulation, for example)

8. Green Building (GRIHA) provisions for Electrical works and Materials

The Electrical works, in general, shall conform to latest ECBC Norms. Moreover, the contractor shall be required to take the specific measures during construction with respect to following:

- i. All items shall be as per the Green Building provisions and shall adhere to GRIHA Green Building rating system and other Green building standards. This is irrespective of whether the same have been mentioned in the technical specifications or the requirement.
- ii. The vendor to conform during negotiation meetings and before quoting that the MAKE of MATERIAL specified in the e-Tender conforms to Green Building norms and requirements and in case of any queries would clarify during the negotiation meeting. Since we are aiming for the GRIHA 4 Star rating, it is mandated that all products have to be accordingly compliant and if the contractor has not accounted for it in his cost, he WILL NOT be entitled for any further compensation and will have to provide in the same cost.
- iii. Minimum allowable luminous efficacy of all the lamps shall be as per latest ECBC/ NBC 2016.

9. Photographs :

During various stages of construction, the photographs shall be taken by contractor and submitted to the Engineer-In-charge, showing details of specific requirements / measures being taken by the contractor towards above for documentary compliance and records.

10. Contractor shall coordinate with suppliers of various materials and equipment to be procured by him for use in works and provide all required details with respect to their manufacturing facilities; raw materials etc. as per requirements of GRIHA Certification guidelines. Preference should be given to GRIHA compliant products/ materials.

SECTION- F **SCHEDULE OF STAGE** **PAYMENTS**

PREAMBLE TO SCHEDULE OF QUANTITIES & RATES

1. The Schedule of Rates/Price shall be read with all other sections of this Bidding Document.

2. The Contractor is deemed to have studied the drawings, specifications and details of works to be done within the Time Schedule and should have acquainted himself of the conditions prevailing at site.
3. No claim shall be entertained during currency of this Contract towards any items due to the above including where the Contractor has quoted low/ high rates.
4. Owner/Consultant/Client reserves the right to interpolate or extrapolate the rates for any new item of work not covered in Schedule of Quantities & Rates from the similar items already available in Schedule of Quantities & Rates. All the works shall be measured upon completion and paid for at the rate quoted and accepted in the "Schedule of Quantities & Rates ". In case any activity though specifically not covered in Schedule of Quantities & Rates descriptions but the same is covered under scope of work/ scope of supply/ specification/ drawings etc. no extra claim on this account shall be entertained, since Schedule of Quantities & Rates is to be read in conjunction with all other documents forming part of the Contract.
5. All items of work mentioned in the Schedule of Quantities & Rates shall be carried out as per the specifications, drawings and instructions of Owner/Consultant/Client and the rates are deemed to be inclusive of material, consumable, labour, supervision, tools & tackles and detailing of construction drawings, isometric wherever required as called for in the detail specification and conditions of the Contract.
6. Owner/Consultant/Client reserves the right to cancel/ delete/ curtail any item or group of work if necessary. Such a step shall not be construed as reason for changing the rates.
7. The Schedule of Quantities & Rates (SOQR) rates are deemed to be inclusive of all taxes & duties i.e. **Purchase Tax, Turn Over Tax, Excise Duty, Work Contract Tax, Labour Cess & Swachh Bharat Cess or any other Tax, Royalty, all incidental expenditure including Environmental & Pollution Clearance Charges, ESI/PF, Goods & Services Tax (GST).**
8. Bidder shall indicate **"Item Wise rate for each item and subhead"** rounded upto two decimal places in the "Prices" sheet.
9. Payment schedule as provided in NIT is at macro level worked out based on budget head. Successfully bidders has to submit with documentary proof any micro schedule without disturbing main weightage given in payment schedule before submission of running bill. PMC to approve and recommend in consultation with Engineer in charge/ PMC.
10. It is prerogative that the Client may get executed the excluded items by contractor through specialized agency under extra item clause after due sanction and approval from Government/ competent authority or by inviting separate call of tender.
11. Contract Price and Payments
 - A. The bidder shall quote their rates in the prescribed format as per "FINANCIAL BID" of the tender documents. The quoted rates shall be inclusive of all costs towards site visits, planning, designing, site surveys, soil investigations all material, labour, plant and machinery, tools and tackles, batching plant etc. including water & electricity, overhead charges, all taxes (including GST), duties, levies statutory charges / levies applicable from time to time and others as specified etc., incidental works and all other charges for items contingent to the work, such as inspection, packing, forwarding, insurance, freight and delivery at Site, watch and ward of all materials & successful installation, testing & commissioning at site etc, including handing over of the works to the Client, Operation &

Maintenance during Defect Liability Period etc. complete as per Scope of Work. The quoted rates shall also include cost of all other inputs required in the execution of the item, all taxes and duties including Goods & Services Tax. The fee paid by the contractor for obtaining various statutory approvals shall be reimbursed to him after submission of payment receipts and other relevant documents by the contractor.

(i) The quantities given in the Schedule of Quantities are liable to variations. Such variations in quantities shall not, however, vitiate the contract in any way whatsoever. Contractor shall be paid for the actual measured quantities of work executed by the bidder.

(ii) Unless otherwise specified the rates tendered by the contractor shall be all inclusive and shall apply to all shapes, heights, lifts, leads and depth of the building and nothing extra shall be payable to him on any account.

(iii) Royalty, whenever payable, shall be borne by the contractor on the boulders, metal, shingle, sand and bajri etc., or any other materials collected by him for the work direct to the revenue authority of the District / State Government concerned and nothing extra shall be payable on this account.

(iv) The words “as specified”, “as described”, “as shown”, “as directed”, or “as approved”, shall mean as described in the specifications, Schedule of Quantities and other Contract documents as shown on the drawings or as directed by Engineer-in-Charge.

C. The payments to Contractor shall be made on the area basis w.r.t each building. The area for purposes of payment shall be the plinth area actually constructed. Areas for security cabins at entrances, pump room, underground structures including UG Tanks, STP/WTP/Borewells etc. shall not be reckoned towards the plinth areas and their cost shall be deemed to be included in the respective subheads/items of works. Please Note, Porch/Boxing on external wall/Facade will not be counted under built up area.

(i) Shafts for sanitary, water supply installations, garbage chute, telecommunication, electrical, fire fighting, etc will not be counted under built up area.

(ii) For calculation of plinth area, rules for working out the plinth area from plans as given in the annexure II of PAR-2021 shall be followed.

(iii) Area of Mumty/Machine room, architectural feature if any, above terrace not to be counted in the Plinth area for the calculation of EPC area calculation.

(iv) The total plinth area of a building shall be the sum total of the plinth area at every floor including the basement, if any.

Payments for External Development and MEP High Side will be paid as per Job work as provided in Quoting Sheet and regulated as per payment schedule.

12. Note: The items / equipments / accessories and their ratings mentioned in specifications above are indicative and likely to be changed at the time of execution as per the requirement of the client at later stage. If the increase in over all quantities / rating of the equipment is upto 5% as mentioned in NIT/specifications, the same is included and is in the scope of the work. Nothing extra shall be paid to the contractor on this account. However, if the quantity / rating of the equipment increase beyond 5% as mentioned in the NIT/ specifications, the quantity / rating beyond 5% shall be paid to the contractor on actual basis and deduction if any in rating will be recovered @ weightage of payment schedule.

13. Client may ask the contractor to execute additional infrastructure/Building beyond the mandate :

- (i) Increase in built up area due to addition of building will be paid based on quoted price per sqm basis as per typology of building.
- (ii) Infrastructure increase due to addition of buildings will be paid as per actual executed work based on DSR rates with latest cost index applicable/NSR rates on date of such variation.

14. Above mentioned additional work can only be executed after due approval and sanction from Govt. Of Assam.

15. Submission of bill Statement for Works

- a. The Client shall make interim payments to the Contractor as certified by the Client's 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 stages
- b. The interim payment shall be made on "Pro rata basis" and shall be worked out on the percentage of work done out of total scope of work under their activity/item.
- c. The Contractor shall base its claim for interim payment for completed till the end of the month for which the payment is claimed, valued in accordance with the sub-Clause, supported with necessary particulars and documents in accordance with this Agreement.
- d. The proportion assigned to an item will apply only to the Contract Price stated in this Agreement. It shall not apply to any additions or reductions to the Contract Price arising from the issue of any Order for Change of Scope.
- e. The Contractor shall submit interim RA bill, within the time stipulated as per General Conditions of Contract to the Engineer-In-Charge in the form as directed, showing the amount calculated to which the Contractor considers himself entitled for completed Works. The interim RA bill shall be accompanied with the required supporting documents.
- f. The Contractor should submit a compliance certificate, in every bill as per provisions of the EPF and ESI Act as amended from time to time.

16. Production of Records

- a. The Contractor shall, whenever required by the Engineer, produce or cause to be produced for examination by the Engineer, any quotation, invoice, cost or other account books, vouchers, receipts, letters, memoranda or any copy of or extract from any such documents and also furnish information and returns, as may be required, relating to the execution of this Contract or relevant for verifying or ascertaining the cost of execution of this Contract or ascertaining the Materials supplied by the Contractor are in accordance with the Specifications laid down in the Contract. The Engineer's decision on the question of relevancy of any documents, information or returns shall be final and binding on the parties.
- b. If any part or item of the work is allowed to be carried out by a subcontractor, assignee or any subsidiary or allied firm, the Engineer shall have power to secure the books of such sub-Contractor, assignee or any subsidiary or allied firm through the Contractor, and shall have power to examine and inspect the same. The above obligations are without prejudice to the obligations of the Contractor under any statute, rules or order.

All running / intermediate & final payments shall be made to the contractor in accordance with the following schedule and on pro-rata basis:

Payment Schedule

SCHEDULE OF STAGE PAYMENTS		
S No.	Stages of Payment against item No. 1	% of Item Contract Value
A	Planning, Designing, and Construction on EPC Basis Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam, with support services & allied facilities by incorporating stipulated specifications including handing over complete as per scope of work and directions of Engineer-in-charge by incorporating stipulated specification and adopting NBC-2016 norms, NMC norms & IS Codes and guidelines complete in all respect.	
	SCOPE UNDER NEC FUNDS	
1	Planning, Designing, and Construction on EPC Basis RCC framed structure building Museum Building (G+3) with support services & allied facilities by incorporating stipulated specifications including handing over complete as per scope of work and directions of Engineer-in-charge by incorporating stipulated specification and adopting NBC-2016 norms & IS Codes and guidelines complete in all respect. Note :- Plinth Area shall be measured for the actual constructed.	42.50%
	SCOPE UNDER STATE GOVERNMENT FUNDS	
2	Planning, Designing and construction of Civil External development works i.e Pathway & Landscape, External Sewerage System, Water Supply System and Horticulture operations with support services & allied facilities by incorporating stipulated specifications, all services including handing over complete as per scope of work and directions of Engineer In charge.	5.15%
3	Planning, Designing, and Construction on EPC Basis of MUSEUM EXTERNAL FACADE WORK with support services & allied facilities by incorporating stipulated specifications, all services including handing over complete as per scope of work and directions of Engineer In charge.	17.45%
4	Planning, Designing, and Construction on EPC Basis of FAÇADE LIGHTING WORKS with support services & allied facilities by incorporating stipulated specifications, all services including handing over complete as per scope of work and directions of Engineer In charge.	8.25%
5	Planning, Designing, and Construction on EPC Basis of MUSEUM EXHIBITS with support services & allied facilities by incorporating stipulated specifications, all services including handing over complete as per scope of work and directions of Engineer In charge.	26.65%
	Total	100.00%

S No.	Stages of Payment against item No.		Breakup of % of Item Contract Value	% of Item Contract Value
1	Planning, Designing, and Construction on EPC Basis RCC framed structure building Museum Building (G+3) _(42.50% of the project Cost) with support services & allied facilities by incorporating stipulated specifications including handing over complete as per scope of work and directions of Engineer-in-charge by incoporating stipulated specification and adopting NBC-2016 norms & IS Codes and guidelines complete in all respect. Note :- Plinth Area shall be measured for the actual constructed.			
A)	Planning, Design & Engineering Works- Investigation, Planning, Designing and obtaining approvals for works.			
a.	On approval of Engineer-in-charge, the inception report & detailed survey and architectural drawings ready for submission for approval of local bodies and statutory authorities		0.25%	2.50%
b.	On approval of structure design by the proof consultant and Engineer-in-charge		0.35%	
c.	On obtaining all required approvals from statutory authorities and local bodies for commencement of construction as per requirements and directions of Engineer-in-charge.		0.35%	
d.	On submission of all Good for Construction (GFC) drawings as per requirements and directions of Engineer-in-charge:			
	i. Architectural drawings	0.25%	0.55%	
	ii. Structural design & Drawings	0.15%		
	iii. Design & Drawings for Services	0.15%		
e.	On completion of construction		1.00%	
	i. On Completion of Foundation work	0.10%		
	ii. On Completion of 100% Super structure	0.15%		
	iii. On Completion of work	0.25%		
	iv. On obtaining required statutory approvals after completion of works	0.25%		
	v. On handing over to Client	0.25%		
B)	CONSTRUCTION			
a	Civil Works			
(i)	Foundation Work upto plinth level (Completion of PCC, Pile foundation ,Lift pit, water proofing works below foundation and lift pit and sand filling under plinth.	10.26%	68.38%	92.50%
(ii)	Structure Work RCC frame of the entire building from plinth level to terrace level, stair roof, overhead tank, Lift machine room etc.	22.57%		
(iii)	Brick work & Partitioning work upto terrace.	6.84%		
(iv)	Flooring, skirting, dado, wall lining work	6.84%		
(v)	Doors & Windows with hardware	5.47%		
(vi)	External Glazing, ACP, External Cladding etc	3.42%		
(vii)	False Ceiling Work	4.78%		
(viii)	Finishing Work i/c painting (inside & outside)	4.78%		
(ix)	All balance misc. civil Works, viz. Steel work, railing, panelling etc to make functional building	2.05%		
(x)	Structural/Window Glass glazing	1.37%		
	Services			
b	Water Supply & Sewerage System			
(i)	Water Supply System	0.74%	3.38%	

(ii)	Sanitary & Sewerage System	0.75%		
(iii)	Storm water drainage	0.02%		
(iv)	Fittings & Fixtures	0.74%		
(v)	Water Cooler	0.23%		
(vi)	Tubewell	0.65%		
(vii)	Sewage & Drainage Pumps	0.25%		
c	Fire Protection System			
(i)	With wet riser and sprinkler system	2.50%	3.74%	
(ii)	Automatic Fire Alarm System	1.24%		
d	Electrical Works			
(i)	Light Fixtures, Fans	2.25%		
(ii)	Lightening conductors	0.14%		
(iii)	Telephone conduits with wire and switch connection up to exchange EPBX	0.14%		
(iv)	Internal Electrical Works, rising mains and DB & other related works	7.04%		
(v)	IP based CCTV system for building security comprising of PTZ / fixed camera, cabling, digital recording, HD display system with minimum display of 5" x 8" per camera and hard ware software support for internal & External surveillance	0.90%	11.56%	
(vi)	Supplying, installation, testing and commissioning of online 3 phase UPS System with 30 minutes back up including batteries, interconnecting cables, battery racks etc.	0.72%		
(vii)	Supplying, installation, testing and commissioning of LED Street/ Compound/ High mast/ Pathway/ Landscape Lighting for the entire Campus	0.37%		
e	Lift & Escalator			
(i)	Lifts	2.08%	2.08%	
f	HVAC WORK			
(i)	Completion of VRV/VRF AC System, Precision Airconditioning Sysem, Pressurization, Smoke Extraction System with Double Ducting etc., AHU's including all accessories and Indoor Air Quality	3.36%	3.36%	
C)	COMPLETION AND HANDING OVER			
(i)	Testing & Commissioning	2.50%	2.5%	5.0%
(ii)	Handing over	2.50%	2.5%	
	Total (1)		100.00%	100.00%
2	Planning, Designing and construction of Civil External development works _(5.15% of the project Cost) i.e Pathway & Landscape, External Sewerage System, Water Supply System and Horticulture operations with support services & allied facilities by incorporating stipulated specifications, all services including handing over complete as per scope of work and directions of Engineer In charge.			
A)	Planning, Design & Engineering Works- Investigation, Planning, Designing and obtaining approvals for works.			
a.	On approval of Engineer-in-charge, the inception report & detailed survey and architectural drawings ready for submission for approval of local bodies and statutory authorities		0.25%	2.50%
b.	On approval of structure design by the proof consultant and Engineer-in-charge		0.35%	

c.	On obtaining all required approvals from statutory authorities and local bodies for commencement of construction as per requirements and directions of Engineer-in-charge.		0.35%	
d.	On submission of all Good for Construction (GFC) drawings as per requirements and directions of Engineer-in-charge:			
	i. Architectural drawings	0.25%		
	ii. Structural design & Drawings	0.15%	0.55%	
	iii. Design & Drawings for Services	0.15%		
e.	On completion of construction			
	i. On Completion of Foundation work	0.10%		
	ii. On Completion of 100% Super structure	0.15%		
	iii. On Completion of work	0.25%	1.00%	
	iv. On obtaining required statutory approvals after completion of works	0.25%		
	v. On handing over to Client	0.25%		
B)	Completion of Civil Development Work			
(i)	External Site Development (Pathway & Landscape)	72.40%		
(ii)	External Sewerage System	3.80%		
(iii)	Water Supply System (Filtered Water Supply, Distribution Line Upto 100Mm Dia + Peripheral Grid 150Mm To 300 Mm Dia Pipes + Unfiltered Water Supply Distribution Lines)	7.50%	88.50%	88.50%
(iv)	Horticulture Operations I/C 30 Cm Earth Filling, Grassing, Tree Plantation/Shrubs And Potted Plants Etc.	4.80%		
D)	COMPLETION AND HANDING OVER			
(i)	Testing & Commissioning	4.50%	4.5%	9.0%
(ii)	Handing over	4.50%	4.5%	
	Total(2)		100.00%	100.00%
3	Planning, Designing, and Construction on EPC Basis of MUSEUM EXTERNAL FACADE WORK _(17.45% of the project Cost) with support services & allied facilities by incorporating stipulated specifications, all services including handing over complete as per scope of work and directions of Engineer In charge.			
A)	Planning, Design & Engineering Works- Investigation, Planning, Designing and obtaining approvals for works.			2.50%
B)	External Façade Elevational Work (Civil work)			
i	Supply of equipment / material		53.10%	88.50%
ii	On installation of all materials		35.40%	
C)	COMPLETION AND HANDING OVER			
(i)	Testing & Commissioning		4.5%	9.0%
(ii)	Handing over		4.5%	
	Total(3)			100.00%
4	Planning, Designing, and Construction on EPC Basis of FAÇADE LIGHTING WORKS _(8.25% of the project Cost) with support services & allied facilities by incorporating stipulated specifications, all services including handing over complete as per scope of work and directions of Engineer In charge.			

A)	Planning, Design & Engineering Works- Investigation, Planning, Designing and obtaining approvals for works.			2.50%
B)	Façade Lighting Works			
i	Supply of equipment / material		66.40%	88.50%
ii	On installation of all materials		22.10%	
C)	COMPLETION AND HANDING OVER			
(i)	Testing & Commissioning		4.5%	9.0%
(ii)	Handing over		4.5%	
	Total(4)			100.00%
5	Planning, Designing, and Construction on EPC Basis of MUSEUM EXHIBITS _(26.65% of the project Cost) with support services & allied facilities by incorporating stipulated specifications, all services including handing over complete as per scope of work and directions of Engineer In charge.			
A)	Planning, Design & Engineering Works- Investigation, Planning, Designing and obtaining approvals for works.			2.50%
B)	Museum Exhibits			
i	Supply of equipment / material		66.40%	88.50%
ii	On installation of all materials		22.10%	
C)	COMPLETION AND HANDING OVER			
(i)	Testing & Commissioning		4.5%	9.0%
(ii)	Handing over		4.5%	
	Total(5)			100.00%

N.B.: In case any activity though specifically not covered in Schedule of Quantities & Rates descriptions but the same is covered under scope of work/ scope of supply/ specification/ drawings etc. no extra claim on this account shall be entertained, since Schedule of Quantities & Rates is to be read in conjunction with all other documents forming part of the Contract.

PART-G
FINANCIAL QUOTE

PART-G
SCHEDULE OF QUANTITIES

Name of Work : Construction of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati, Assam on Engineering, Procurement and Construction (EPC) Mode-I Basis.					
S.No	Description of Items	Qty	Unit	Rate	Amount
A.	BUILDING WORK COMPLETE				
1.	<p>Planning, Designing, and Construction on EPC Basis Construction Of Bhupen Hazarika Museum at Srimanta Sankardev Kalashetra, Guwahati (Assam),with support services & allied facilities by incorporating stipulated specifications including handing over complete as per scope of work and directions of Engineer-in-charge by incorporating stipulated specification and adopting NBC-2016 norms , NMC norms & IS Codes and guidelines complete in all respect.</p> <p>Note :- Plinth Area shall be measured for the actual constructed.</p>	1	Job		