

Engineering Cell
DELHI TECHNOLOGICAL UNIVERSITY
 (Formerly Delhi College of Engineering)
 Shahbad Daulatpur, Main Bawana Road, Delhi-42



Dated:

No. File No. DTU/Engg.Cell/3610/22-23/Comp.

CORRIGENDUM

Name of Work: Construction of New Gate near Canal, Security Towers and Boundary Wall at DTU Campus, Bawana Road, Delhi (Composite Work).

Tender Reference Number: DTU/ENGC/3610/22-23/Composite

Tender ID No : 2023_DTU_241048_1

Due to administrative reasons, the following amendments have been made in the above referred NIT:

S.No.	Item	As per NIT	Amended As
1.	Last date & Time of submission of bid, EMD and other documents as specified in the NIT.	Up to 3:00 PM on 01.06.2023	Up to 3:00 PM on 16.06.2023
2.	Time & date of opening of eligibility bid	Up to 3:30 PM on 01.06.2023	Up to 3:30 PM on 16.06.2023

1. This Corrigendum shall be the part of the NIT.
2. Rest of the Terms and conditions and specifications of NIT shall continue to remain same.
3. The above amendments/clarifications are issued for the information and applicable to all the intending bidders.

Anjan
11/6/23
Chief Project Officer/DTU

No. File No. DTU/Engg.Cell/3610/22-23/Comp.

Dated:

Copy to:

1. P.S. to Hon'ble V.C. for kind information of Hon'ble V.C., DTU.
2. Registrar, DTU
3. Controller of Finance, DTU
4. Sr. A.O./DDO, DTU
5. AE/JE (Civil)
6. JE (Electrical)
7. Guard File

[Signature]
01/06/2023
Assistant Engineer/DTU

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PART-A

CPWD-6, CPWD 7 i/c Schedule A to F for the work, standard CPWD,G.C.C. 2020 for construction works as amended/modified up to the last date of submission of bid including extension, if any

COMPOSITE NOTICE INVITING TENDER

N.I.T. No.	DTU/Engg.Cell/2022-23/Composite/	
Name of work	Construction of New Gate near Canal, Security Towers and Boundary Wall at DTU Campus, Bawana Road, Delhi (Composite Work).	
Estimated Cost	For Civil Works:-	Rs.7,65,37,429/-
	For Electrical works	Rs.84, 35,723/-.
	Total:	Rs.8,49,73,152/-
Earnest Money	Rs.16, 99,463/- (in favour of Registrar DTU, Delhi.) (2% of Estimated Cost)	
Performance Guarantee	3% of tendered and accepted value of the work.	
Security Deposit	2.5% of the Gross Amount of the bill.	
Time Allowed	07 (Seven) Months	

This NIT for Composite work amounting to **Rs.8, 49, 73,152/-** (Eight Crore Forty Nine Lakh Seventy Three Thousand One Hundred and Fifty Two only) contains pages from 01 to 123 (One to One Hundred Twenty Three Only).

J.E. (Civil)/ (Electrical)

Consultant (Civil)/ (Electrical)

A.E. (Civil)

P.O (Elec.)

Chief Project Officer

INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR E-TENDERING FORMING PART OF BID DOCUMENT AND TO BE POSTED ON WEBSITE

The Chief Project Officer, Delhi Technological University, Bawana Road, Delhi on behalf of DTU invites online percentage rate bids in two bid system from approved and eligible contractors of CPWD enlisted in appropriate category/class and those of appropriate list of M.E.S., BSNL, Railway, DDA and State PWD (B&R) in appropriate category/class who full fill the edibility criteria for the following work (s):

S. No.	NIT No.	Name of work & Location	Estimated cost put to tender	Earnest money	Period of completion	Last date & time of submission of bid. EMD, e-tender processing fee and other documents as specified in the Press Notice.	Time & date of opening of bid
1	2	3	4	5	6	7	8
1.	DTU/Engg. Cell/2022-23/	Construction of New Gate near Canal, Security Towers and Boundary Wall at DTU Campus, Bawana Road, Delhi (Composite Work).	Rs.8,49,73,152/-	Rs.16,99,463/-	07 (Seven) Months	Up to 03.00 PM On 01.06.2023	At 03.30 PM On 01.06.2023

1. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
2. Information and Instructions for bidders posted on website shall form part of bid document.
3. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website <http://govtprocurement.delhi.gov.in> free of cost.
4. Those contractors are required to get registered themselves on website mentioned above for tendering. If needed they can be imparted training on online bidding process as per details available on the website.
5. The intending bidder must have valid digital signature to submit the bid.
6. On opening date, the contractor can login and see the bid opening process. After opening of bids he will receive the comparative bid sheets.

List of Documents to be scanned and uploaded within the period of bid submission:

1. Payment of Bid Security (Earnest Money Deposit): The EMD may be submitted through FDR/ECS/RTGS/NEFT direct to receipt account of Registrar, DTU as detail given below and receipt of proof of ECS/RTGS/NEFT shall be uploaded with documents.

DTU EMD Account No.	30875679275 (Registrar, DTU)
Name of Bank	State Bank of India
Bank Address	DCE Campus, Shahbad Daulatpur, Bawana Road, Delhi- 110042.
IFSC CODE	SBIN0010446
BRANCH CODE	10446
MICR CODE	110002438
SWIFT CODE	SBININBB544

This amount shall be refunded in case of rejection of the bid. Photocopy of proof of ECS/RTGS/NEFT shall be sent to DTU up to Last Date and Time for receipt of tenders through e-procurement solution.

2. Scanned copy of valid CPWD enlisted in appropriate category/class and those of appropriate list of M.E.S., BSNL, Railway, DDA and State PWD (B&R) in appropriate category/class.
3. Scanned copy of performance certificate from the client for successfully completed similar composite works preferably in educational university/PSU's, Govt./semi-govt. for reckoning towards works experience during last seven years ending previous day of last date of submission of bid. Similar work means "**Construction of building works (Composite Category)**".
Three similar work each costing not less than 40% of estimated cost put to tender.
OR
Two similar work each costing not less than 60% of estimated cost put to tender.
OR
One similar work each costing not less than 80% of estimated cost put to tender.
4. Scanned copy of average annual financial turnover during the immediate last three consecutive financial years ending March-2022 (Scanned copy of Certificate from CA to be uploaded) should not be less than 50% of Estimated Cost. Scanned copy of solvency or net worth certificate:-
(a) Solvency of the amount equal to 50% of Estimated Cost put to tender (ECPT)
OR
(b) Net worth Certificate of the Estimated Cost put to tender issued by certified by Chartered Accountant (Scanned copy of original solvency Minimum 50% / net worth Certificate Minimum 10% to be uploaded).
5. Certificate of Registration for G.S.T. and acknowledgement of up to date filed return.
6. Scanned copy of valid certificate of ISO 9001:2015.
7. Scanned copy of PAN Card issued by Income Tax Department.
8. Scanned copy of Affidavit as given in this NIT (page no.06) (To be executed in presence of Public notary on non- judicial stamp paper of the value of Rs.100/-. The stamp paper has to be in the name of the tenderer)

Further details can be seen at <https://dtu.ac.in>

Chief Project Officer/DTU

CPWD-6 FOR e-TENDERING

The Chief Project Officer, Delhi Technological University, Bawana Road, Delhi on behalf of DTU invites online percentage rate bids in two bid system from approved and eligible contractors of CPWD enlisted in appropriate category/class and those of appropriate list of M.E.S., BSNL, Railway, DDA and State PWD (B&R) in appropriate category/class who fulfil the eligibility criteria for the work:- **Construction of New Gate near Canal, Security Towers and Boundary Wall at DTU Campus, Bawana Road, Delhi (Composite Work).**

Criteria of eligibility for submission for bid documents.

1. 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.
- 1.1 The work is estimated to cost **Rs.8,49,73,152/-**
- 1.2.1 a) Should have successfully completed similar composite works preferably in educational university/PSU's, Govt./semi-govt. for reckoning towards works experience during last seven years ending previous day of last date of submission of bid. Similar work means "**Construction of building works (Composite Category)**".

Three similar work each costing not less than 40% of estimated cost put to tender.

OR

Two similar work each costing not less than 60% of estimated cost put to tender.

OR

One similar work each costing not less than 80% of estimated cost put to tender.
- b) Average annual financial turnover during the immediate last three consecutive financial years ending March-2022 should not be less than 50% of Estimated Cost.
- c) solvency or net worth certificate.

Solvency of the amount equal to 50% of Estimated Cost put to tender (ECPT)

OR

Net worth Certificate of the Estimated Cost put to tender issued by certified by Chartered Accountant.
- d) Certificate of Registration for G.S.T. and acknowledgement of up to date filed return.
- e) Certificate of ISO 9001:2015.
- f) PAN Card issued by Income Tax Department
- g) CPWD enlisted in appropriate category/class and those of appropriate list of M.E.S., BSNL, Railway, DDA and State PWD (B&R) in appropriate category/class.
- 1.2.2 **To become eligible for bid, the bidders shall have to furnish an affidavit as under:-**
 1. I/We undertake and confirm that eligible similar works(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 DTU 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 Earnest Money Deposit/Performance Guarantee. (Scanned copy to be uploaded at the time of submission of bid)
Bidder's Pre-Qualification terms:
 2. Agreement shall be drawn with the successful bidders on prescribed Form No. **CPWD 7** (or other Standard Form as Mentioned) which is available as a Govt. of India Publication and also available on website **www.cpwd.gov.in**. Bidders Shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
 3. The time allowed for carrying out the work will be **07 (Seven) Months** from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
 4. (i) The site for the work shall be made in available phase manner.
(ii) The architectural and structural drawings shall be made available in phased manner, as per requirement of the same as per approved program chart of completion submitted by the contractor after award of work.
 5. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen on website **http://govtprocurement.delhi.gov.in** free of cost.
 6. After submission of the bid, the contractor 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, contractor 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.

8. Bids are invited in under two bid system i.e. Technical bid and Financial bid.
9. **Earnest Money shall be deposited through ECS/RTGS/NEFT mode only as mentioned in page no. 5.** The original receipt of EMD deposited with all original documents should be deposited in the office of Chief Project Officer, DTU by lowest bidder within the period of submission.
- Copy of Enlistment Order and certificate of work experience and other documents as specified in the press notice shall be scanned and uploaded to the e-Tendering website within the period of bid submission. **However, All bidder shall submit certified copy of all the scanned and uploaded documents as specified in press notice in the office of Chief Project Officer, DTU.**
- Online bid documents submitted by intending bidders shall be opened only of those bidders, whose original EMD and other documents deposited in the office of E.E. /DTU and other documents scanned and uploaded are found in order.
- The bid submitted shall be opened on **01.06.2023 at 03:30 PM**
10. The bid submitted shall become invalid if:
- (i) The bidder is found ineligible.
 - (ii) The bidder does not deposit original EMD with other related documents in office of Chief Project Officer, DTU.
 - (iii) The bidder does not upload all the documents (including G.S.T. etc.) 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 entire bidder in the office of bid opening authority.
 - (v) If a tenderer quotes NIL rates against each items in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section/sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
11. The contractor whose bid is accepted will be required to furnish **performance guarantee of 3% (Three Percent)** of the tendered and accepted value of the work 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 of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F', including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The earnest money deposited along with bid shall be returned after receiving the aforesaid performance guarantee.
12. **The description of the work is as follows:**
Name of Work:- Construction of New Gate near Canal, Security Towers and Boundary Wall at DTU Campus, Bawana Road, Delhi (Composite Work).
 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 bidders shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge 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 a bid by a bidders 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 of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.
13. The competent authority on behalf of the Delhi Technological University 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 the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidders shall be summarily rejected.
14. Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable for rejection.
15. The competent authority on behalf of the Delhi Technological University 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.
16. The contractor shall not be permitted to bid for works in the DTU (Division in case of contractors of Horticulture/Nursery category) responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of C.P.O, A.E. and Junior Engineer. 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 Delhi Technological University or in the Govt. of NCT of Delhi. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
17. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from

Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.

18. **The bid for the works shall remain open for acceptance for a period of Seventy Five (75) days from the date of opening of technical bids.** If any bidders withdraws his bid before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the bid which are not acceptable to the department, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the bidders shall not be allowed to participate in the rebidding process of the work. (Modified vide OM DG/CON/279 Dt. 09.05.2014)
19. This notice inviting bid shall form a part of the contract document. The successful bidders/contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of:-
- (a) The Notice Inviting bid, all the documents including additional conditions, 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.
- (b) Standard C.P.W.D. Form 7 or other Standard C.P.W.D. Form as applicable.

20. For Composite Bids

- 20.1.1 The Chief Project Officer (CPO) is in-charge of the both component i.e. major component and minor component will call bids for the composite work. The cost of bid document and Earnest Money will be fixed with respect to the combined estimated cost put to tender for the composite bid.
- 20.1.2 The bid document will include following three components:
- Part A:-** CPWD-6, CPWD-7/8 including schedule A to F for the major component of the work electrical, Standard General Conditions of Contract for CPWD 2020 for construction works as amended/modified up to the last date of submission of bid, including extension, if any.
- Part B:-** General / specific conditions, specifications and schedule of quantities applicable to major component of the work.
- Part C:-** Schedule A to F for minor component of the work civil. (CPO/EE in charge of major component shall also be competent authority under clause 2 and clause 5 as mentioned in schedule A to F for major components), General/specific conditions, specifications and schedule of quantities applicable to minor component(s) of the work.
- 20.1.3 The bidders must associate himself, with agencies of the appropriate class eligible to bid for each of the minor component individually.
- 20.1.4 The eligible bidders shall quote rates for all items of major component as well as for all items of minor components of work.
- 20.1.5 After acceptance of the bid by competent authority, the Chief Project Officer (CPO) in charge of the work shall issue letter of award on behalf of the Delhi Technological University. After the work is awarded, the main contractor will have to enter into an agreement with CPO/EE.
- 20.1.6 Entire work under the scope of composite bid including major and all minor components shall be executed under one agreement.
- 20.1.7 Security Deposit will be worked out on the basis of estimated cost put to tender for composite work.
- 20.1.8 The main contractor has to associate agency(s) for minor component(s) conforming to eligibility criteria as defined in the bid document and has to submit detail of such agency(s) to Engineer-in-charge of minor component(s) within prescribed time. Name of the agency(s) to be associated shall be approved by Engineer-in-charge of minor component(s).
- 20.1.9 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 Engineer-in-charge of minor component. The new agency/agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in-charge 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.
- 20.1.10 The main contractor has to enter into agreement with contractor(s) associated by him for execution of minor component(s). Copy of such agreement shall be submitted to CPO/EE, DTU in charge of both component. In case of change of associate contractor, the main contractor has to enter into agreement with the new contractor associated by him.
- 20.1.11. 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. (Added vide OM DG/MAN/270 dt. 01.05.2013)

GUIDELINES REGARDING SIGNING OF INTEGRITY PACT BY THE BIDDER AT THE TIME OF SUBMISSION OF BID (Vide No. DG/CON/255A dated 10.08.2011)

Sub: Clarification regarding Introduction of Integrity Pact introduced vide OM No. CON255 dated 23.05.2011

A new provision of Integrity Pact (IP) was introduced in GCC-2014 vide OM No. CON/255 dated 23.05.2011. In the OM it is mentioned that at the time of submission of bid, it shall be mandatory to sign the pact by the bidder failing which the bidder will stand disqualified from the tendering process and such bid would be summarily rejected.

Some field Units has raised their doubts regarding submission of duly signed Integrity Pact by the bidder at the time of submission of bid. In this regard it is clarified that:-

1. Submission of duly signed Integrity Pact by the bidder is applicable in case of manual tendering where e-tendering is not followed.
2. In case of manual tendering Chief Project Officer should sign the first page addressed to the intending bidder at the time of issue of tender form and before submission of the bid, each bidder shall sign IP at respective places and submit the bid. If duly signed IP is not submitted by the bidder, such bid shall not be considered.
3. In case of e-tendering, Integrity Pact shall be treated in the same manner as other components of the bid document. In e-tendering, the intending bidder does not sign any document physically and entire bid document is submitted through digital signature. Since IP is a part of bid document no separate physical submission is required with other documents to be submitted in the office of tender opening authority. In addition to other component of bid document, the Integrity Pact shall also be signed between Chief Project Officer and successful bidder after acceptance of bid.

TENDER

I/We have read and examined the notice inviting tender, schedule, A, B, C, D, E & F Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, of 2020 with amendments up to the last date of submission of tenders, clauses of contract, Special conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work “**Construction of New Gate near Canal, Security Towers and Boundary Wall at DTU Campus, Bawana Road, Delhi (Composite Work).**”

I/We hereby tender for the execution of the work specified for the President of India within the time specified in Schedule ‘F’ viz., schedule of quantities and in accordance in all respect with the specifications, designs, drawing and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the **Conditions of contract of 2020** with amendments up to the last date of submission of tender 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 tender open for **Seventy Five (75)** days from the date of opening of technical bid and not to make any modification in its terms and conditions.

A sum of **Rs.16,99,463/-** is hereby forwarded in fixed deposit receipt of scheduled bank/demand draft of a scheduled bank as earnest money. If I/We fail to furnish the prescribed performance guarantee within prescribed period, I/We agree that the said DTU or his successors representatives, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/We fail to commence work as specified, I/We agree that DTU or the successors representatives in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said the performance guarantee absolutely. The said performance Guarantee shall be a guarantee to execute all the works referred to in the tender 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 12.2 and 12.3** of the tender form. Further, I/We agree that in case of forfeiture of Earnest Money & Performance Guarantee as aforesaid, I/We shall be debarred for participation in the re-tendering process of the work.

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 tendering in DTU 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 Earnest Money Deposit/ Performance Guarantee.

I/We hereby declare that I/We shall treat the tender documents drawings and other records connected with the work as secret/confidential documents and shall not communicate information/derived there from to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Dated:**.....

Signature of Contractor **

Witness: **

Address: **

Postal Address **

Occupation: **

ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for an on behalf of the **Delhi Technological University** 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 Delhi Technological University

Signature

Dated:

Designation

PROFORMA OF SCHEDULES

SCHEDULE 'A'

Schedule of quantities as per Page No. Civil **78 to 98** and Electrical Works **112 to 118**.

SCHEDULE 'B'

Schedule of materials to be issued to the contractor.

S. No.	Description of item	Quantity	Rates in figures & words at Which the material will be charged to the contractor	Place of issue
NIL				

SCHEDULE 'C'

Tools and plants to be hired to the contractor

S. No.	Description	Hire charges per day	Place of Issue
NIL			

SCHEDULE 'D'

Extra schedule for specific requirements /document for the work, if any :- NIL

SCHEDULE 'E'

Reference to General Conditions of Contract: General Conditions of Contract 2020 for construction works read along with correction slips/amendments issued up to the last date of submission of tender including extension, if any.

Name of work	Construction of New Gate near Canal, Security Towers and Boundary Wall at DTU Campus, Bawana Road, Delhi. (Composite Work)
---------------------	---

Estimated cost of work

I.	Estimated Cost	Rs.8,49,73,152/- (Civil:- Rs.7,65,37,429/- & Electrical:- Rs.84,35,723/-)
II.	Earnest Money	Rs.16,99,463/- (2% of Estimated Cost)

I.	Performance Guarantee :	3% of tendered and accepted value of the work.
II.	Security Deposit	2.5% of Gross Amount of bill.

SCHEDULE 'F' (GENERAL RULES & DIRECTIONS)

Officer inviting tender: Chief Project Officer, DTU, Bawana Road Delhi,

Email id: cpo@dtu.ac.in

Definitions:

1. Engineer-in-Charge	The Chief Project Officer, DTU, Bawana Road, Delhi.
2. Accepting Authority	Vice Chancellor, DTU, Bawana Road, Delhi.
3. Percentage on cost of materials and Labour cover all to overheads and profits	15%

4.	Standard Schedule of Rates	1.CPWD DSR 2016 (Civil), read along with correction slips/amendments issued up to the last date of submission of tender including extension, if any, 2. CPWD DSR-2016 (E&M)
5.	Department	Delhi Technological University.
6.	Standard CPWD Contract Form:	CPWD Form 7 & GCC 2020 for construction work read along with correction slips/amendments issued up to the last date of submission of tender including extension, if any.

Clause 1

1.	Time allowed for submission of Performance Guarantee from the date of issue of letter of acceptance	07 (Seven) days
2.	Maximum allowable extension beyond the period provided in (i) above	3 (Three) days with late fee @ 0.1% per day of the PG amount.

Clause 2

Authority for fixing compensation under clause 2	Vice Chancellor, DTU, Bawana Road, Delhi.
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Clause 2A

Whether Clause 2A shall be applicable	Not Applicable
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Clause 5:-**Applicable**

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 site whichever is later
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Clause-5**Mile stones for composite work**

S. No.	Description of Milestone (Financial)	Time allowed in months (from date of start)	Amount to be with-held in case of non-achievement of each mile stone (% of contract amount of Civil component)
1	1/8 th of Contract amount	1/4 th time	01% of contract amount
2	3/8 th of Contract amount	1/2 th time	--do--
3	3/4 th of Contract amount	3/4 th time	--do--
4	100% of Contract amount	Full time	--do--

Withheld amount shall be released if and when subsequent milestone is achieved within respective time specified. The main contractor will ensure that all electrical components of the work are executed in time without giving any chance for slippage of milestone an account of delay in execution of associated electrical works by him. However, in case milestones are not achieved by the contractor for the work, the amount shown against milestone shall be withheld by the Engineer-In-Charge of the respective components.

Note: Intending tenderer may submit phasing of activities / milestones on the basis of their resources and methodology at the time of tendering corresponding to physical milestones / stages indicated in the above table. These shall form part of the agreement after approval of the accepting authority; otherwise it would be assumed that agency agrees with the above mentioned physical milestones.

Time allowed for execution of work- 07 (Seven) Months.

Authority to decide:

(i)	Extension of time :-	Vice Chancellor, DTU, Bawana Road, Delhi.
(ii)	Rescheduling of mile stones :-	Vice Chancellor, DTU, Bawana Road, Delhi.
(iii)	Shifting of date of start in case of delay in handing over of site:	Vice Chancellor, DTU, Bawana Road, Delhi.

Clause 6,

Clause applicable - (6)	(computerized measurement book to be submitted by agency)
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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.	<u>Rs. 100 lacs for composite work</u>
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Clause 7A

No running Account Bill shall be paid for the work till the applicable registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable are submitted by the contractor to the Engineer-in-Charge.	Applicable
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Clause 10A

List of testing equipment to be provided by the contractor in the lab at each site of work as per [TABLE-1] of Annexure-I attached. (Page- 20-21)

Clause 10 B (ii)

Whether Clause 10 B (ii) shall be applicable	Not Applicable
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Clause 10 C- Applicable

Component of labour expressed as percent of value of work	25%
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Clause 10 CA: - Applicable

S.No.	Materials Covered under this clause:	Nearest Materials (other than cement*, reinforcement bars, the structural steel and POL) for which All India Wholesale Price Index to be followed:	Base Price and its corresponding period of all the Materials covered under clause 10 CA* (Mar. 2023)
1.	Cement (OPC)	-----NIL-----	5156 per MT
2.	Reinforcement bars TMT Fe500 D (Primary Producers)	-----NIL-----	55500 per MT
3.	Structural Steel	-----NIL-----	61110 per MT

Clause 10 CC: - Not-Applicable**Clause 11:-**

Specifications to be followed for execution of work	CPWD Specifications 2019 volume- I & II read along with up to date correction slips/amendments issued up to the last date of submission of tender including extension, if any Rules and Acts as applicable, amended up to date
	CPWD General Specifications for Electrical Works (Part-I Internal) & Part-IV Sub Station.

Clause 12

Type of work: Construction work.
 Authority to be decided deviation up to 1.5 times the tender amount Vice Chancellor, DTU, Bawana Road, Delhi.

Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2, 12.3 :Please refer below

12.2. & 12.3	&	Deviation limit beyond which clauses 12.2 & 12.3 shall apply for building work (except earth work)	
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12.5	(1) Deviation limit beyond which clauses 12.2 & 12.3 shall apply for foundation work (except earth work) (ii) Deviation Limit for items in earth work or related items	100%
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Clause 16

Competent Authority for deciding reduced rates.	Vice Chancellor, DTU, Bawana Road, Delhi.
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Clause 18

List of mandatory machinery, tools & plants to be deployed by the contractor at site: - All plants, equipment and machinery required for smooth and efficient progress of work as per direction of Engineer-in-Charge.

Clause 19:- (C,D,G,K) (To deciding the penalty) :- Applicable Hon'ble Vice Chancellor, DTU

Clause 25

Constitution of Dispute Redressal Committee: - To be constituted by the Hon'ble Vice Chancellor, DTU at the time of arises of dispute, if any.

Clause: 32

S. No.	Minimum qualification of Technical Representative	Discipline	Designation (Principal technical / Technical representative)	Minimum experience	Number	Rate at which recovery shall be made from the contractor I the event of not fulfilling provision of Clause 36(I)	
						Figures	Words
1	Graduate Engineer	Civil & Electrical	Principal technical representative	5 Years	1	Rs. 25,000/- (Per month)	Rs. Twenty Five thousand per month
2	Graduate Engineer Or Diploma Engineer	Civil & Electrical	Project/Site Engineer and	2 Years	2 } 2 }	Rs. 15,000/- (Per month)	Rs. Fifteen thousand per month
		Civil & Electrical	Project Planning/billing Engineer	5 Years			

Assistant Engineer 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 co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

Clause: 38

(i)	(a)	Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates	1. DSR 2016 for Civil works will read along with correction slips/amendments issued up to the last date of submission of tender including extension, if any. 2. DSR-2016 for Electrical with up to date correction slips/amendments.
(ii)		Variations permissible on theoretical quantities:	
	(a)	Cement	
		For works with estimated cost put to tender more than Rs. 5 lakh.	2% (Two percent) plus / minus.
		Bitumen for all works	2.5% (Two point five percent) plus only and nil on minus side.
	(b)	Steel Reinforcement and structural steel sections for each diameter, section and	2% (Two percent) plus / minus
	(c)	All other materials	Nil

ANNEXURE –I**(TABLE-1)**

Equipment's for Testing of Materials & Concrete at Site Laboratory (on each site of work)

Note: individual site shall be considered as a separate site of work.

All necessary equipment for conducting all necessary tests shall be provided at the site in the well-furnished site laboratory of minimum size 25 feet X 15 feet by the contractor at his own cost The following minimum laboratory equipment shall be set up at site office laboratory:-

Sl. No.	Equipment	Numbers (Minimum)
1.	100 MT compression testing machine, electrical-cum-manually operated)	1
2.	Slump cone, steel plate, tamping rod, steel scale, scoop	3
3.	Vicat's apparatus with Desk pot	1
4.	Weighing scale platform type 100 Kg capacity	1
5.	Graduated glass measuring cylinder	As per requirement
6.	Sets of sieves of 450mm internal dia for coarse aggregate [100mm, 80mm, 40mm; 20mm; 12.5mm, 10mm; 4.75mm complete with lid and pan]	1
7.	Sets of sieves of 200mm internal dia for fine aggregate [4.75mm; 2.36mm; 1.18mm; 600 microns; 300 microns & 150 micron , with lid and pan]	1
8.	Sieve Brushes and sieve shaker capable of 200mm and 300mm dia sieves , manually operated with timing switch assembly	1
9.	Cube moulds size 70mmx70mmx70mm	6
10.	Cube moulds size 150mmx150mmx150mm	30
11.	Hot air oven temp. Range 50°C to 300°C- sensitivity 1 degree	1
12.	Electronic balance 600gx0.1g., 10 kg and 50 kg each	1 Each
13.	Physical balance weight upto 5 kg	1
14.	Air Content of concrete testing machine	1
15.	Measuring jars 100ml, 200ml, 500ml	3 nos each size
16.	Gauging trowels 100mm & 200mm with wooden handle	2
17.	Spatula 100mm & 200mm with long blade wooden handle	2
18.	Vernier calipers 12" & 6" size	1 each
19.	Digital PH meter least count 0.01mm	1each
20.	Digital Micrometer least count. 0.01mm	1 each
21.	Digital paint thickness meter for steel 500 micron range	1
22.	GI tray 600x450x50mm, 450x300x40mm,300x250x40mm	1 no each
23.	Electric Motor mixer 0.25 cum capacity	1
24.	Screw gauge 0.1mm-10mm, least count 0.05	2
25.	Water testing kit	1
26.	Motorized sieve shaker	1
27.	Pruning Rods 2 Kg weight length 40 cm and ramming face 25 mm ²	1
28.	Extra Bottom plates for 15 cm cube mould	4
29.	Standard Vibration Table for gauging the cubes	1
30.	Pocket concrete penetrometer 0 to 50kg/ sq.cm	1
31.	Concrete temperature measuring thermometer with Brass protection sheath 0- 100 degree centigrade	1
32.	Mortar Cube vibrator	1
33.	Dial type spring balance preferable with zero correction knob capacity 100 kgs reading to ½ kg.	1
34.	Counter scale capacity 1 kg and 10 kg	1

35.	Iron Weight of 5 kg, 2 kg, 1 kg, 500 gm, 200 gm, 100 gm	1 each
36.	Brass Weight of 50 gm, 20 gm, 10 gm, 5 gm, 2 gm, 1 gm	1 each
37.	Measuring cylinder TPX or Poly propylene capacity 100 ml, 500 ml, 250 ml, 100 ml	1 each
38.	Pyrex, corning or Borosil beakers with cover capacity 500 ml, 200 ml, 50 ml	1 each
39.	Wash Bottles capacity 500 ml	1
40.	Thermometers 1-100 degree centigrades/ max. and Min/ Dry and wet with table	1
41.	Set of box spanner ratchet	1
42.	Hammer 1lb& 2lb	2 each
43.	Rubber Hammer	2
44.	Hacksaw with 6 blades	2
45.	Measuring tape 2 mtr	5
46.	Depth gauge 20cm	3
47.	Shovels& Spade	3
48.	Steel plates 5 mm thick 75x75 cm	2
49.	Plastic or G.I. Buckets 15 ltr, 10 ltr, 5 ltr	1 each
50.	Wheel Barrow	1
51.	Floor Brushes, hair dusters, scrappers, wire brush, paint brushes, shutter steel plat oil, kerosene with stove etc.	2 each
52.	Any other equipment for site tests as outlined in BIS codes and as directed by the Engineer-in-charge.	

List of mandatory machinery, tools & plants to be deployed by the contractor at site

Table -2

All plants, equipment's and machinery required for smooth and efficient progress of work as per direction of Engineer-in-Charge.

(TABLE- 3)

RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION

S. No.	Description of Item	Rates in figures and words at which recovery shall be made from the Contractor	
		Excess beyond permissible variation	Less use beyond permissible variation
1.	Cement (OPC)	Nil	Not permitted
2.	Steel Reinforcement TMT Bar of all diameters	Nil	Not permitted
3.	Structural Sections	Nil	Not permitted

Items which are to be executed through specialized agency:

For Civil:

- a) RCC
- b) Structural Steel
- c) ACP Wall Panelling
- d) Waterproofing Treatment
- e) Road Work
- f) Fountain Work
- g) Stainlees Steel Work

For Electrical

- a) Lights fixture
- b) High Mast Light
- c) Decorative Pole/Light

The specialized agency for the specialized work as detailed above shall be got approved from the NIT approving authority by the main contractor on the basis of criteria mentioned below: -

- i) One similar completed works of value not less than 80% of quoted amount of that specialized work/sub head.
Or
- ii) Two similar completed works of value not less than 60% of quoted amount of that specialized work/sub head.
Or
- iii) Three similar completed works of value not less than 40% of quoted amount of that specialized work/sub head.

Sub: Clarification regarding Introduction of Integrity Pact introduced vide OM No. CON255 dated 23.05.2011

A new provision of Integrity Pact (IP) was introduced in GCC-2014 vide OM No. CON/255 dated 23.05.2011. In the OM it is mentioned that at the time

of submission of bid, it shall be mandatory to sign the pact by the bidder failing which the bidder will stand disqualified from the tendering process and such bid would be summarily rejected.

Some field Units has raised their doubts regarding submission of duly signed Integrity Pact by the bidder at the time of submission of bid. In this regard it is clarified that:-

Submission of duly signed Integrity Pact by the bidder is applicable in case of manual tendering where e-tendering is not followed.

In case of manual tendering Chief Project Officer should sign the first page addressed to the intending bidder at the time of issue of tender form and before submission of the bid, each bidder shall sign IP at respective places and submit the bid. If duly signed IP is not submitted by the bidder, such bid shall not be considered.

In case of e-tendering, Integrity Pact shall be treated in the same manner as other components of the bid document. In e-tendering, the intending bidder does not sign any document physically and entire bid document is submitted through digital signature. Since IP is a part of bid document no separate physical submission is required with other documents to be submitted in the office of tender opening authority. In addition to other component of bid document, the Integrity Pact shall also be signed between Chief Project Officer and successful bidder after acceptance of

PART-B
CONDITIONS &
SPECIFICATIONS OF
CONTRACT AND
SCHEDULE OF QUANTITIES
OF MAJOR
COMPONENT OF WORK

SPECIAL CONDITIONS

GENERAL

1.1 The Contractors are advised to inspect and examine the site and its surroundings and satisfy themselves with the nature of site, the means of access to the site, the constraints of space for stacking material / machinery, labour etc. constraints put by local regulations, if any, weather conditions at site, general ground / subsoil conditions etc. or any other circumstances which may affect or influence their tenders. The Contractor shall carry out survey of the work area, at his own cost, setting out the layout and fixing of alignment of the building as per architectural and Structural drawings in consultation with the Engineer-in-Charge. Any discrepancy between the architectural drawings and actual layout at site shall be brought to the notice of the Engineer-in-charge. It shall be responsibility of the Contractor to ensure correct setting out of alignment. Nothing extra shall be payable on this account. No claims, whatsoever, shall be entertained at a later date for any errors found, on plea that the information supplied by the Department in the tender is insufficient or is at variance with the actual site conditions.

1.2 The Contractor shall, if required by him, before submission of the tender, inspect the drawings in the Office of The Chief Project Officer, DTU, Bawana, road Delhi. Department shall not bear any responsibility for the lack of knowledge and also the consequences, thereof to the Contractor. The information and data shown in the drawings and mentioned in the tender documents have been furnished, in good faith, 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. No claim, whatsoever, shall be entertained from the Contractor, if the data or information furnished in tender document is different or in-correct otherwise or actual working drawings are at variance with the drawings available for inspection or attached to the tender documents. It is presumed that the Contractor shall satisfy himself for all possible contingencies, incidental charges, wastages, bottlenecks etc. likely during execution of work and acts of coordination, which may be required between different agencies. Nothing extra shall be payable on this account.

1.3 The nomenclature of the item given in the schedule of quantities gives in general of the work content but is 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 may be several incidental works, which are not mentioned in the nomenclature of each item but will be necessary to complete the item in all respect. All these incidental works / costs which are not mentioned in item nomenclature but are necessary to complete the item shall be deemed to have been included in the rates quoted by the contractor for various items in the schedule of quantities. 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.

1.4 The contractor(s) shall give to the local body, police and other authorities all necessary notices etc. that may be required by law and obtain all requisite licenses for temporary obstructions, enclosures etc. and pay all fee, taxes and charges which may be available on account of these operations in executing the contract. He shall make good any damage to the adjoining property whether public or private and shall supply and maintain lights either for illumination or for cautioning the public at night.

1.5 The contractor(s) shall execute the work simultaneously at all sites. He has to establish site office along with all necessary arrangements at all sites simultaneously.

1.6 The contractor(s) shall cordon off the area suitably so that the college remains functional during execution of the work.

1.7 Staff/labour shall be deployed for each site of work independently by the contractor.

1.7.1 The contractor shall quote his rates for the work inclusive of all taxes including Goods and services tax (G.S.T.) etc. Nothing extra shall be paid on any account over and above the quoted rates.

BY-LAWS AND REGULATIONS

All work shall conform to the statutory Bye-laws and Regulations of the concerned authority/Municipality, Delhi Fire Services as applicable to the Project. If the tender specifications and drawings are more stringent than required as per the Local Authorities then the tender specifications and drawings shall be followed. In the other case, if the local authorities more stringent specifications than those specified in the tender specifications, then the set by-laws and regulations shall be followed at no extra cost.

Proper temporary barricading by fencing with G.I. sheets, shall be carried out by the Contractor at the start of work to physically define the boundaries of the plot for restricted entry to only those involved in the work and also to prevent any accidents, at the same time without causing any inconvenience to the traffic and the users of the buildings in the adjacent plots. It shall be done by providing, erecting, maintaining temporary protective barricading of minimum 2.0 metres in height, made in panels, with each panel having MS frames / MS scaffolding pipes of suitable size and stiffness, with 24 gauge thick GI corrugated sheet or suitably stiffened plain GI sheet fixed on frames. Such panels shall be suitably connected to each other for stability with nuts and bolts, hooks, clamps etc. and fixed firmly to the ground at about 2 metres spacing, for the entire duration till completion of the work. He shall also provide and erect temporary protective barricades within the plot, if required, to prevent any accident. Temporary protective roofing near the Entrance to the building, under construction, shall be made to protect the visiting officials from getting hurt by falling debris etc. Also, one or more coat of enamel paint of shade as approved and directed by the Engineer-in-Charge shall be applied on the panels and "DTU"

shall be painted over that in suitable sizes, shapes and numbers as directed by the Engineer-in-Charge. It shall be dismantled and taken away by the Contractor after the completion of work at his own cost with the approval of the Engineer-in-Charge. Nothing extra shall be payable on this account.

1.8 The Contractor(s) shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night. In case of any accident of labours/ contractual staffs the entire responsibility will rest on the part of the contractor and any compensation under such circumstances, if becomes payable, shall be entirely borne by the contractor.

1.9 The work shall generally be carried out in accordance with the "CPWD Specifications 2009 Vol. I & II" with correction slips issued up to the last date of submission of tender, additional/Particular Specifications, architectural/Structural drawings, mechanical, electrical, plumbing and as per instructions of Engineer-in-Charge. Any additional item of the work, if taken up subsequently, shall also confirm to the relevant CPWD specifications as mentioned above.

1.10 The several documents forming the tender are to be taken as mutually complementary to one another. Detailed drawings shall be followed in preference to small scale drawings and figured dimensions in preference to scale dimensions.

1.11 There be any difference or discrepancy between the description of items as given in the schedule of quantities, particular specifications for individual items of work (including special conditions) and I.S. Codes etc., the following order of preference shall be observed.

Description of items as given in Schedule of quantities

Particular specifications

Special conditions

Additional Condition

Tender drawings attached

CPWD Specifications including correction slips issued up to the last date of uploading/submission of tender.

General Conditions of Contract for CPWD work including correction slips issued up to the last date of submission of tender.

Indian Standards Specifications of B.I.S.

ASTM, BS, or other foreign origin code mentioned in tender document.

Manufacturer's specifications and as decided by the Engineer-in-Charge.

Sound Engineering practices or well established local construction practices.

1.12 The works to be governed by this contract shall cover delivery and transportation up to destination, safe custody at site, insurance, erection, testing and commissioning of the entire works.

The works to be undertaken by the contractor shall inter-alia include the following:

Preparation of detailed SHOP drawings and AS BUILT drawings wherever applicable.

Obtaining of Statutory permissions where-ever applicable and required.

Pre-commissioning tests as per relevant standard specifications, code of practice, Acts and Rules wherever required.

Warranty obligation for the equipments and / or fittings/fixtures supplied by the contractor. Contractor shall provide all the shop drawings or layout drawings for all the coordinated services before starting any work or placing any order of any of the services etc. These shop drawings/layout drawings shall be got approved from Engineer-in-charge before implementation and this shall be binding on the contractor. The contractor shall submit material submittals along with material sample for approval of Engineer-in-Charge prior to delivery of material at site.

1.13 The work shall be carried out in accordance with the approved architectural drawings, structural drawings, MEP services drawings to be issued from time to time, by the Engineer-in-Charge, and approved shop drawings prepared by the Contractor. 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 from there 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 by the department on this account.

1.14 Unless otherwise provided in the Schedule of quantities the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths of the building and nothing extra shall be payable to him on this account.

1.15 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.

1.16 The contractor shall engage specialized agency for carrying out specialized items as listed in para 1.48 below, covered in the schedule of Quantity Immediately after award of work, the contractor shall submit for the approval of NIT approving authority, the name of the agency along with their working experience and credentials, presentation on method statement and materials being used

for execution of such items etc. Delay on the part of contractor in submitting the proposal for approval of competent authority shall be his responsibility and no extension of time shall be granted on this account.

1.17 The Contractor shall bear all incidental charges for cartage, storage and safe custody of materials, if any, issued by department as well as to those materials also arranged by the contractor.

1.18 Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been built in the items and nothing extra shall be payable or extra cement considered in consumption on this account.

1.19 The contractor shall give performance test of the entire installation(s) as per the specifications 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 such test.

1.20 Water tanks, taps, sanitary, water supply & drainage pipes, fittings & accessories should conform to bye-laws of local body/corporation, where CPWD specifications are not available. The Contractor 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 shall submit for the approval of the NIT approving authority, the name of the plumbing agency (along with their working experience in recent past) proposed to be engaged by him.

1.21 The contractor shall make his own arrangements for water and for obtaining electric connections otherwise action will take after as per electricity act 2003 Regulation No. 135 or required and make necessary payments directly to the State Govt. departments concerned. Contractor shall get the water tested from laboratory approved by the Engineer-in-charge at regular interval as per the CPWD Specifications 2009. All expenses towards collection of samples, packing, transportation and testing charges etc. shall be borne by the contractor. Agency shall neither be allowed to use existing bore well, if any. They may have to arrange water through tankers from any outside source after taking due permission from concerned authority.

1.22 PREVENTION OF NUISANCE AND POLLUTION CONTROL

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 from pollutants like smoke, dust, noise. The contractor shall use such methodology and equipment so as to cause minimum environmental pollution of any kind during and minimum hindrance to road users and to occupants of the adjacent properties or other services running adjacent/near vicinity. The contractor 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 due to the execution of the work or by traffic brought 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.

Control on Air Pollution of dust from construction and demolition activities: Guidelines of National Green Delhi and DPCC, Delhi issued time to time shall be followed by the agency for which nothing extra shall be paid.

1.23 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 nearby occupants/users of building(s), if any.

1.24 SECURITY AND TRAFFIC ARRANGEMENTS

In the event of any restrictions being imposed by the Security agency, CPWD, Traffic or any other authority having jurisdiction in the area on the working or movement of labour /material, the contractor shall strictly follow such restrictions and nothing extra shall be payable to the contractor on such accounts. The loss of time on these accounts, if any, shall have to be made up by augmenting additional resources whatever required.

1.25 If as per the rules of the local authority, the huts for labour are not to be erected at the site of work by the contractors, the contractors are required to provide such accommodation as is acceptable to local bodies and nothing extra shall be paid on this account. No accommodation is available at the site of work. The labour huts shall not be erected on the plot and the Contractor shall make his own arrangements to provide such accommodation as per the rules of the local bodies. He shall make his own arrangements for stores, field office etc. Before tendering, he shall visit the site and assess the manner in which he is able to arrange the above facilities. The Engineer-in-Charge shall in no way be responsible for any delay on this account and no claim, whatsoever, on this account shall be entertained.

1.26 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 the work for which 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.

1.27 The contractor shall construct suitable godowns, yard at the site of work for storing all other materials so as to be safe against damage by sun, rain, damages, fire, theft etc. at his own cost and also employ necessary watch and ward establishment for the purpose at his cost.

1.28 All materials obtained from contractor shall be got checked by the representative of Engineer-in-Charge on receipt of the same at site before use.

1.29 Royalty at the prevalent rates shall have to be paid by the contractor on all the boulders, metals, shingle sand and bajri etc. collected by him for the execution of the work, direct to the Revenue authority or authorized agent of the State Government concerned or Central Government.

1.30 The contractor shall be responsible for the watch and ward/guard of the buildings, safety of all fittings and fixtures including all equipments, services provided by him against pilferage and breakage during the period of Installations and thereafter till the building is physically handed over to the Engineering Cell of DTU, New Delhi – the Client Department. No extra payment shall be made on this account and no claim shall be admissible on this account.

1.31 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 / DDA / MCD 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. The extra sewerage charges (one time charges for commencement of work) required to be paid to the Municipal Corporation/ other statutory bodies shall be paid by the department and need not be considered by the contractor. 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 General conditions of contract for CPWD works are applicable to the tender. 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.

1.32 For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of water is required the contractor shall do the same at his own cost and nothing extra shall be paid except otherwise provided in the items of Schedule of Quantities.

1.33 The Contractor shall make all necessary arrangements for protecting from rains, fog or likewise extreme weather conditions, the work already executed 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.

1.34 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 contract agreement. Also, the Contractor shall make good, at his own cost, the damages caused, if any. Further, no claims for hindrance shall be entertained on this account.

1.35 The contractor will take reasonable precautions to prevent his workman and employees from removing and damaging any flora (plant/vegetation) from the project area.

1.36 **SETTING OUT**

(i) 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 the Engineer-in-charge, architectural drawings and actual layout at site shall be 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.

(ii). The Contractor shall establish, maintain and assume responsibility for grades, lines, levels and benchmarks. He shall report any errors or inconsistencies regarding grades, lines, levels, dimensions etc. to the Engineer -in-Charge before commencing work. Commencement of work shall be regarded as the Contractor's acceptance of such grades, lines, levels, and dimensions and no claim shall be entertained at a later date for any errors found.

(iii). 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.

(iv). Though the site levels are indicated in the drawings 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.

(v). 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.

(vi). The Contractor shall be entirely and exclusively responsible for the horizontal, vertical and other alignments, 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 entire satisfaction of the Engineer - in-Charge.

(vii). The rates quoted by the Contractor are deemed to be inclusive of site clearance, setting out work (including marking of reference points, center lines of buildings), construction and maintenance of reference bench mark(s), taking spot levels, construction of all safety and protection devices, barriers, barricading, signage, labour safety, labour welfare and labour training measures, preparatory works, working during monsoon, working at all depths, height and location etc. and any other incidental works required to complete this work. Nothing extra shall be payable on this account.

(viii) The contractor(s) shall study the soil investigation report for the site, available in the office of the Engineer-in-Charge 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.

1.37 A site laboratory with the minimum equipments as specified in CPWD specifications/in this agreement shall be established, made functional and maintained within a week from the award of work as per without any extra cost to the department. In case of non compliance / delay in compliance in this, a recovery @ Rs. 500/- per day will be imposed which will be recovered from the immediate next R/A Bill of the Contractor.

1.38 COORDINATED DRAWINGS

Before taking up the work, the contractor shall prepare shop drawings for the works listed below for various civil and electrical services showing details of lay out in plan including sections & elevations & large scale details and contractor shall plan and mobilize his resources as per these drawings and as per actual site conditions to facilitate convenient execution, installation as well as maintenance of these items.. Nothing extra shall be payable on this account.

SHOP DRAWINGS

The bill of quantities, technical specifications and drawings together shall be considered as a tender requirement and the work shall be carried out as per good for construction (GFC) drawings, issued by Engineer-in-charge. The contractor shall study the GFC drawings and taking into account actual site conditions and selected material and requirements shall prepare shop drawings for the following works, as fully coordinated drawings, as given above.

For Civil:

- a) RCC
- b) Structural Steel
- c) ACP Wall Panelling
- d) Waterproofing Treatment
- e) Road Work
- f) Fountain Work
- g) Stainlees Steel Work

For Electrical

- d) Lights fixture
- e) High Mast Light
- f) Decorative Pole/Light

The shop drawings shall be prepared timely by contractor and submitted for approval to achieve the milestones provided.

Within the time frame agreed with the Engineer-in-charge, the contractor shall prepare shop drawings using latest version of Auto CAD. Shop drawings shall show all layouts, details in plans & sections showing all connections, junctions, bends, supports, clearances. Fixing arrangements with dimensions room, etc shall be prepared by the contractor on AutoCAD based on the architectural drawings and site measurements. All measurable items quantities shall be mentioned on each shop drawing being submitted for approval by the contractor. 3 sets of shop drawings (soft copy also) shall be submitted for approval and Seven sets of final shop drawings after approval by Engineer-in-charge shall be submitted by the contractor along with the soft copy. The shop drawings, shall be prepared as per schedule given in CPM/PERT Chart.

Technical submittals of manufacturer's catalogues and technical data shall be submitted for approval. The contractor shall designate an Engineer responsible for issue and preparation of shop drawings and control of GFC drawings.

1.39 TOOLS AND PLANTS

The bidder should have own constructions equipment required for the proper and timely execution of the work. Nothing extra shall be paid on this account.

No tools and plants including any special T&P etc. shall be supplied by the Department and the Contractor shall have to make his own arrangements at his own cost. No claim of hindrance (or any other claim) shall be entertained on this account.

1.40 **SCAFFOLDING**

For the execution of work, all the scaffolding shall be provided and suitably fixed, by the Contractor. It shall be provided strictly with steel double scaffolding system, suitably braced for stability, with all the accessories, gangways, etc. with adjustable suitable working platforms to access the areas with ease for working and inspection. It shall be designed to take all incidental loads. It should cater to the safety features for workmen. Nothing extra shall be payable on this account. It shall be ensured that no damage is caused to any structure due to the scaffolding except for the work of vertical extension where vertical & horizontal scaffolding along with screen to prevent pollution and debris from following along with proper access to be provided for which payment shall be made.

1.41 The Contractor shall do proper sequencing of the various activities by suitably staggering the activities within various pockets in the plot so as to achieve early completion. The agency to deploy adequate equipment, machinery and labour as required for the completion of the entire work within the stipulated period specified. Also ancillary facilities shall be provided by contractor commensurate with requirement to complete the entire work within the stipulated period. Nothing extra shall be payable on this account. Adequate number/sets of equipment in working condition, along with adequate stand-by arrangements, shall be deployed during entire construction period. It shall be ensured by the Contractor that all the equipment, Tools & Plants, machineries etc. provided by him are maintained in proper working conditions at all times during the progress of the work and till the completion of the work. Further, all the constructional tools, plants, equipment and machineries provided by the Contractor, on site of work or his workshop for this work, shall be exclusively intended for use in the construction of this work and they shall not be shifted/ removed from site without the permission of the Engineer-in-Charge.

1.42 The Contractor shall maintain all the work in good condition till the completion of entire work. The Contractor shall be responsible for and shall make good, all damages and repairs, rendered necessary due to fire, rain, traffic, floods or any other causes. The Engineer-in-Charge shall not be responsible for any claims for injuries to person/workmen or for structural damage to property happening from any neglect, default, want of proper care or misconduct on the part of the Contractor or of any other of his representatives, in his employment during the execution of the work. The compensation, if any, shall be paid directly to the Department / authority / persons concerned, by the Contractor at his own cost.

1.43 **ROYALTY**

Royalty at the prevalent rates shall be paid by the Contractor to the RMC supplier as per the terms of supply between them, on all materials such as boulders, metals, all sizes stone aggregates, brick aggregates, coarse and fine sand, moorum, river sand, gravels 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.

1.44 **PRESERVATION AND CONSERVATION MEASURES**

(i) Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services, if any, 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, expenditure incurred in doing so shall be payable to the contractor. The contractor shall work out the cost, get the same approved by Engineer-in-Charge before taking up actual execution. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services.

(ii) All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on project location during excavation/construction shall be the property of the Government, and shall be dealt with as per provisions of the relevant legislation. The contractor will take reasonable precaution to prevent his work men or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaint the Engineer-in-charge of such discovery and carry out the official instructions of Engineer-in- charge for dealing with the same, till then all work shall be carried out in a way so as not to disturb/damage such article or thing.

1.45 **RESPONSIBILITY**

(i) He shall protect and indemnify the Department / DTU 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.

(ii) The fee payable to statutory authorities for obtaining the various permanent service connections and Building Use Certificate for the building shall be borne by the DTU.

(iii) The Contractor shall assume all liability, financial or otherwise in connection with this contract and shall protect and indemnify the Department from any and all damages and claims that may arise on any account. The Contractor shall indemnify the Department 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.

1.46 **CO-OPERATION WITH OTHER CONTRACTORS/SPECIALIZED AGENCIES/ SUB-CONTRACTORS**

(i) The Contractor shall take all precautions to abide by the environmental related restrictions imposed by any statutory body having jurisdiction in Delhi as well as prevent any pollution of streams, ravines, river bed and waterways. All waste or superfluous materials shall be transported by the Contractor, entirely to the satisfaction of the Engineer- in-Charge and disposed at designated places only. 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 adjoining buildings. No claim what so ever on account of site constraints mentioned above or any other site constraints, lack of public transport, , inadequate availability of skilled, semi-skilled or unskilled workers in the near vicinity, non-availability of construction machinery spare parts and any other constraints not specifically stated here, shall be entertained from the Contractor. Therefore, the Tenderers are advised to visit site and get first-hand information of site constraints. Accordingly, they should quote their tenders. Nothing extra shall be payable on this account.

(ii) The Contractor shall cooperate with and provide the facilities to the sub-Contractors and other agencies working at site for smooth execution of the work. The contractor shall indemnify the Department (DTU) against any claim(s) arising out of such disputes. The Contractor shall:

- (a) Allow use of scaffolding, toilets, sheds etc.
 - (b) Properly co-ordinate their work with the work of other Contractors.
 - (c) Provide control lines and benchmarks to his Sub-Contractors and the other Contractors.
 - (d) Provide electricity and water at mutually agreed rates.
 - (e) Provide hoist and crane facilities for lifting material at mutually agreed rates.
 - (f) Co-ordinate with other Contractors for leaving inserts, making chases, alignment of services etc. at site.
 - (g) Adjust work schedule and site activities in consultation with the Engineer-in- Charge and other Contractors to suit the overall schedule completion.
 - (h) Resolve the disputes with other Contractors/ sub-contractors amicably and the Engineer-in-Charge shall not be made intermediary or arbitrator.
- (iii) The work should be planned in a systematic manner so as to ensure proper co-ordination of various disciplines viz. sanitary & water supply, drainage, rain water harvesting, electrical, firefighting, information technology, communication & electronics and any other services.
- (iv) Other agencies as employed by the contractor, will also simultaneously execute and install the works of sub-station / generating sets, air-conditioning, lifts, 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 and includes provision of inserts 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.
- (v) 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 off the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and in a proper co -ordination manner and shall perform it in proper sequence to the complete satisfaction of others.

1.47 SUPERVISION OF WORK

The Contractor shall depute Site Engineer & skilled workers as required for the work. 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 to the representatives of the Contractor at New Delhi itself 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.

1.48 Specialized Agencies

(i) The composite tender comprises of two main components: viz. civil work and E & M works. The list of specialized agencies for civil works is as below:

For Civil:

- a) RCC
- b) Structural Steel
- c) ACP Wall Panelling
- d) Waterproofing Treatment
- e) Road Work

- f) Fountain Work
- g) Stainless Steel Work

For Electrical

- a) Lights fixture
- b) High Mast Light
- c) Decorative Pole/Light

The contractor shall submit the credential of specialized agency well in advance for the approval of NIT Approving Authority as per the direction of Engineer-in-charge. After verification of the same, written approval will be conveyed to main contractor in this regard. The quantum of credentials will be broadly in line with CPWD guidelines. The main contractor shall not change the specialized agency. However, if the change is warranted, he may do so, with permission of NIT approving authority. However before making any such change he has to enter into similar agreement as with previous agency & submit the same to Engineer - in – Charge for approval. This shall however be without any change in the accepted rates of the contract agreement and without any cost implications to the Department.

(ii) 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 or any dispute amongst them.

1.49 RATES

The rates quoted by the Contractor are deemed to be inclusive of site clearance, setting out work, profile, setting lay out on ground, establishment of reference bench mark(s), installing various signage, taking spot levels, survey with total station, construction of all safety and protection devices, compulsory use of helmet and safety shoes, and other appropriate safety gadgets by workers, imparting continuous training for all the workers, barriers, preparatory works, construction of clean, hygienic and well ventilated workers housings in sufficient numbers as per drawing supplied by Engineer in charge, working during monsoon or odd season, working beyond normal hours, working at all depths, height, lead, lift, levels and location, implementation of green building norms to achieve desired GRIHA Rating etc. and any other unforeseen but essential incidental works required to complete this work. Nothing extra shall be payable on this account and no extension of time for completion of work shall be granted on these accounts.

The contractor shall quote his rates for the work inclusive of all taxes including Goods and services tax (G.S.T.) etc. Nothing extra shall be paid on any account over and above the quoted rates.

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.

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, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, liaison and pursuing for obtaining various No Objection Certificates, completion certificates from local bodies etc., protection works, testing facilities / laboratory at site of work, facilities for all field tests and for taking samples etc. during execution or any other activity which is necessary (for execution of work and as directed by Engineer-in-Charge), shall be deemed to be included in rates quoted by the Contractor, for various items 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 and other storage, steel fabrication yard, site laboratory, water tank, etc.

For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, not with-standing the fact that the Contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour and other statutory bodies regulations and the agreement entered upon by the Contractor with them.

All material shall only be brought at site as per program finalized with the Engineer-in- Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.

1.50 SAFETY PRACTICES

i) **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.

ii) **SIGN BOARDS:** The Contractor shall provide and erect a display board of size and shape as required 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 15 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.

iii) Necessary protective and safety equipments shall be provided to the Site Engineer, Supervisory staff, labour and technical staff of the contractor by the Contractor at his own cost and to be used at site.

iv) No inflammable materials including P.O.L shall be allowed to be stored in huge quantity at site. Only limited quantity of P.O.L may be allowed to be stored at site subject to the compliance of all rules / instructions issued by the relevant authorities and as per the direction of Engineer -in- Charge in this regard. Also all precautions and safety measures shall be taken by the Contractor for safe handling of the P.O.L products stored at site. All consequences on account of unsafe handling of P.O.L shall be borne by the Contractor.

1.51 QUALITY ASSURANCE

The proposed building 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 equipment to execute the work. Many items like specialized flooring work, Polysulphide sealant and backer rod fixing in expansion joints, factory made door- window shutters, proper slope maintaining in toilet units, sanitary- water supply installation, textured finishing, grit plastering with aluminum channel insertions, water proofing treatment with APP Extruded Polystyrene insulation boards, will specially require engagement of skilled workers having experience particularly in execution of such items.

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. 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.

In addition to the supervision of work by DTU engineers, the Consultants deployed by the DTU shall also be carrying out regular and periodic inspection of the ongoing activities in the work and deficiencies, shortcomings, inferior workmanship pointed out by them shall be communicated by DTU engineers to the contractor. Upon receipt of instructions from Engineer in Charge these are also to be made good by necessary improvement, rectification, replacement upto his complete satisfaction. Special attention shall be paid towards line and level of internal and external plastering, exposed smooth surface of RCC members by providing fresh shuttering plates, rubberized linings to all the shuttering joints, accurate joinery work in wooden doors and windows, thinnest joints in stone/ tiling / cladding work, non-hollowness in floor and dado tiles work, protection of scratches over flooring by impounding layer of plaster of Paris, water tight pipe linings, absence of hollow vertical joints in brick masonry, proper compaction of filled up earth etc. to achieve an Institution of International standards and up keeping of quality assurance shall be of paramount importance, as such.

The Contractor shall submit, within 07 (Seven) days after the date of award of work, a detailed and complete method statement for the execution, testing and Quality Assurance, of such items of works, as directed by the Engineer-in-Charge. All the materials to be used in the work, to give the finished work complete in all respects, shall comply with the requirements of the specifications and shall pass all the tests required as per specifications as applicable or such specifications / standards as directed by the Engineer-in- Charge. However, keeping the Quality Assurance in mind, the Contractor shall submit, on request from the Engineer-in- Charge, his own Quality Assurance procedures for basic materials and such items, to be followed during the execution of the work, for approval of the Engineer-in-Charge.

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 suggested list of brand names given in the tender document / particular specifications for approval of Engineer-In-Charge. For all other items, materials and fittings of ISI Marked shall be used with the prior 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 of Engineer-In-Charge.

The Contractor shall procure and provide all the materials from the manufacturers / suppliers as per the list attached with the tender documents, as per the item description and particular specifications for the work. The equivalent brand for any item shall be permitted to be used in the work, only when the specified makes are not available. This is, however, subject to documentary evidence produced by the contractor for non-availability of the brand specified and also subject to independent verification by the Engineer-in-Charge. In exceptional cases, where such approval is required, the decision of Engineer-in-Charge as regards equivalent make of the material shall be final and binding on the Contractor. No claim, whatsoever, of any kind shall be entertained from the Contractor on

this account. Nothing extra shall be payable on this account. Also, the material shall be procured only after written approval of the Engineer-in-Charge.

All materials whether obtained from Govt. stores or otherwise shall be got checked by the Engineer-in-Charge or his authorized supervisory staff on receipt of the same at site before use.

The tests, as necessary, shall be conducted in the following laboratory. The samples shall be taken for carrying out all or any of the tests stipulated in the particular specifications and as directed by the Engineer-in-Charge or his authorized representative.

- Delhi Technological University (Formerly known as Delhi College of Engineering).IIT Delhi.
- IIT Delhi
- CRRI, Delhi.
- National Council for Cement and Building Materials, Ballabh Garh.
- CPWD Lab, Delhi.
- Shree Ram Testing Laboratories Delhi
- Any other NABL approved lab as approved by the NIT approving authority.

All the registers of tests carried out at Construction Site or in outside laboratories and all material at site (MAS) registers including cement register shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-charge. All the entries in the registers will be made by the designated Engineering Staff of the contractor and same should be regularly reviewed by J.E/A.E./CPO. Contractor shall be responsible for safe custody of all the registers.

The Contractor shall at his own risk and cost make all arrangements and shall provide all such facilities including material and labour, the Engineer-in-Charge may require for collecting, preparing, forwarding the required number of samples for testing as per the frequency of test stipulated in the contract specifications or as considered necessary by the Engineer-in-Charge, at such time and to such places, as directed by the Engineer-in-Charge. Nothing extra shall be payable for the above.

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 result of such tests and consequences thereon shall be binding on the Contractor. The Contractor or his authorized representative shall remain in contact with the Engineer-in-Charge or his authorized representative associated for all such operations. No claim of payment or claim of any other kind, whatsoever, shall be entertained from the Contractor.

All the testing charges shall be borne by the contractor:-

(a) The contractor shall get the water tested with regard to its suitability and conforming to the relevant I.S. Code. The contractor shall obtain written approval from the Engineer-in-Charge before proceeds by using the same for execution of work. The testing charges shall be borne by the contractor.

All the hidden items such as water supply lines, drainage pipes, conduits, sewers etc. are to be properly tested as per the design conditions before covering and their measurements in computerized measurement book duly test checked shall be deposited with Engineer in charge or his authorized representative, prior to hiding these items.

Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should confirm to bylaws and municipal body / corporation where CPWD Specifications are not available. The contractor should engage 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 shall give performance test of the entire installation(s) as per the standing specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test.

The contractor shall have to execute guarantee bonds in respect of water proofing works and other specialized works as per Performa enclosed.

The Contractor shall arrange electricity at his own cost for testing of the various electrical installations as directed by Engineer-in-Charge and for the consumption by the contractor for executing the work. Also all the water required for testing various electrical installations, fire pumps, firefighting/ firefighting equipment's, fire sprinklers etc. and also testing water supply, sanitary and drainage lines, water proofing of underground sump, overhead tanks, water proofing treatment etc. shall be arranged by the contractor at his own cost. Nothing extra shall be payable on this account.

The quality of water in the nearby areas is not fit for construction work, therefore, water treatment plant of suitable capacity shall be installed by the contractor at each site of work. He would also be required to create capacity for storage for a period not less than 3 days for construction and curing purpose, for which nothing extra shall be paid to the contractor.

- (i) 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. He should also keep at site at least one set of BIS Codes and other relevant codes at site and produce the same if asked for by Engineer-In-Charge. In case of non compliance, these codes will be purchased from the Market and actual cost of purchase will be recovered from the next RA Bill of the Contractor.
- (ii) The Contractor shall make available four (04) sets of completed Building Drawings, "As Built Drawings" along with literatures, manuals, warranty certificates etc. of various installed fittings, fixtures and equipment for the completed projects. This shall be the prerequisite for payment of final bill.
- (iii) The Contractor shall make available three (03) sets of all services drawings including Electrical & HVAC work internal and external services i.e. Water Supply, Sanitary line and Drainage lines. This shall be the prerequisite for payment of final bill. These drawings shall have the following information:
 - (iv) Run off for all piping and their diameters including soil, waste pipes and vertical stacks.
 - (v) Ground and invert level of all drainage pipes together with locations of all manholes and connections, up to outfall.
 - (vi) Run off for all water supply lines with diameters location of control valves, access panels etc.
 - (vii) The contractor shall make available four (04) sets of computerized Standard Measurement Books (SMBs) having measurement of all the permanent standing in a building.
 - (viii) The Performance Guarantee shall not be released to the contractor until the aforesaid drawings are submitted to the Engineer-in-Charge.
 - (ix) The contractor will submit computerized measurement sheet for the work carried out by him for making payment as per Clause – 6A of the CPWD General Conditions of Contract 2020 (with correction slips up to the last date of submission of tender). For casting of RCC members and other hidden items the corrected and duly test checked measurement sheets of reinforcement or that of other hidden items shall be deposited with Engineer in charge or his authorized representative, before casting of RCC or other hidden items. The delay in submission of corrected and duly checked measurement sheet may, therefore, delay casting of RCC or execution of hidden item for which no hindrance shall be recorded.
 - (x) To avoid delay, contractor should submit all samples well in advance so as to give timely orders for procurement.

1.53 Program Chart:

The Contractor shall prepare an integrated program chart within seven days of issue of award letter including civil as well as E & M activities 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 program within the stipulated period and submit the same for approval of the Engineer-In-Charge within seven days of the award of the work. These shall be submitted by the contractor through electronic media besides forwarding hard copies of the same. The integrated program chart so submitted should not have any discrepancy with the physical milestones attached in the contract agreement. The program chart should include the following: -

- (i) Descriptive note explaining sequence of various activities.
- (ii) Construction Program prepared on PRIMAVERA Software or any other equivalent software decided by the Engineer-in-Charge, which will indicate resources in financial terms, manpower and specialized equipment for every important stage.
- (iii) Program for procurement of materials by the contractor.
- (iv) Program for arranging and deployment of manpower both skilled and unskilled so as to achieve targeted progress.
- (v) Program of procurement of machinery/equipment having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor.
- (vi) Program for achieving fortnightly micro milestones and periodic milestones.
- (ix) If at any time, it appears to the Engineer-In-Charge that the actual progress of work does not conform to the approved program referred above, the contractor shall produce a revised program showing the modifications to the approved program by additional inputs to ensure completion of the work within the stipulated time.
- (x) The submission for approval by the Engineer-In-Charge of such program or the furnishing of such particulars shall not relieve the contractor of any of his 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.
- (xi) Apart from the above integrated program chart, the contractor shall be required to submit fortnightly progress report of the work in a computerized form on 1st and 16th of every month. The progress report shall contain the following, apart from whatever else may be required as specified above:

(a) Construction schedule of the various components of the work through a bar chart for the next fortnight (or as may be specified), showing the micro- milestone/milestones, targeted tasks (including material and labour requirement) and up to date progress. At least 10 digital photographs showing all the parts of construction site along with at least 5 minutes video of executions of different items in soft copy has to be submitted in every fortnightly progress report.

(b) Progress chart of the various components of the work that are planned and achieved, for the fortnight as well as cumulative up to the fortnight under reckoning, with reason for deviations, if any in a tabular format.

(c) Plant and machinery statement, indicating those deployed in the work.

(d) Manpower statement indicating:

Individually the names of all the staff deployed on 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 i.e. blocks.

(e) Financial statement, indicating the broad details of all the running account payment received up to date, such as gross value of work done, advances taken, recoveries effected, amount withheld, net payments details of cheque payment received, extra/substituted/deviation items if any, etc.

(xii) In case of non compliance / delay in compliance in submission of fortnightly, a penalty @ Rs. 1000/- per fortnightly report will be imposed which will be recovered from the immediate next R/A Bill of the Contractor.

1.54 TEMPORARY WATER/ ELECTRICITY/ TELEPHONE CONNECTION

(i) Arrangement of temporary telephone connection, water and electricity required by Contractor, shall be made by him at his own cost and also necessary permissions shall be obtained by him directly from concerned authorities, under intimation to the Department. Also, all initial cost and running charges, and security deposit, if any, in this regard shall be borne by him. The Contractor shall abide by all the rules/ bye laws applicable in this regard and he shall be solely responsible for any penalty on account of violation of any of the rules/byelaws in this regard. Nothing extra shall be payable on this account.

(ii) The Contractor shall be responsible for maintenance and watch and ward of the complete installation and water / electricity meter and shall also be responsible for any pilferage, theft, damage, penalty etc. in this regard. The Contractor shall indemnify the Department against any claim arising out of pilferage, theft, damage, penalty etc. whatsoever on this account. Security deposit for the work shall be released only after No Dues Certificates are obtained from the local Authorities from whom temporary electric/ water / telephone connection have been obtained by the Contractor. Nothing extra shall be payable on this account.

(iii) 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

1.55 CLEANLINESS OF SITE

i) The Contractor shall not stack building material/malba/muck on the land or road of the local development authority or on the land owned by the others, as the case may be. So the muck, rubbish etc. shall be removed periodically as directed by the Engineer-in-Charge, from the site of work to the approved dumping grounds as per the local byelaws and regulations of the concerned authorities and all necessary permissions in this regard from the local bodies shall be obtained by the Contractor. Nothing extra shall be payable on this account. In case, the Contractor is found stacking the building material/malba as stated above, the Contractor shall be liable to pay the stacking charges/penalty as may be levied by the local body or any other authority and also to face penal action as per the rules, regulations and bye-laws of such body or authority. The Engineer –in-Charge shall be at liberty to recover, such sums due but not paid to the concerned authorities on the above counts, from any sums due to the Contractor including amount of the Security Deposit and performance guarantee in respect of this contract agreement.

ii) The contractor 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.

iii) The site of work shall be always kept clean due to constraints of space and to avoid any nuisance to the users of buildings in the adjacent plots. The Contractor shall take all care to prevent any water- logging at site. The waste water, slush etc. shall not be allowed to be collected at site. It may be directly pumped into the creek with prior approval of the concerned authorities. For discharge into public drainage system, necessary permission shall be obtained from relevant authorities after paying the necessary charges, if

any, directly to the authorities. The work shall be carried out in such a way that the area is kept clean and tidy. All the fees/charges in this regard shall be borne by the Contractor. Nothing extra shall be payable on this account.

1.56 INSPECTION OF WORK

- i) In addition to the provisions of relevant clauses of the contract, the work shall also be open to inspection by Senior Officers of DTU & the representative of the Consultants. The contractor shall at times during the usual working hours and at all times at which reasonable notices of the intention of the Engineer-in-charge or other officers as stated above to visit the works shall have been given to the contractor, either himself be present to receive the orders and instructions or have a responsible representative duly accredited in writing, to be present for that purpose.
- ii) Inspection of the work by Consultant appointed by the DTU.

The consultant appointed by DTU, shall be inspecting the works including workshops and fabrication factory to ensure that the works are in general being executed according to the design, drawings and specifications laid down in the contract. His observations shall be communicated by DTU engineering staff and compliance is to be reported to DTU.

The consultant appointed by DTU shall certify on completion of particular building that it has been constructed according to the approved drawings design and specifications.

- iii) Senior Officers of DTU, Dignitaries from Central Ministry / Department, Client Authorities shall be inspecting the on-going work at site at any time with or without prior intimation. The contractor shall, therefore, keep updated the following requirements and detailing.

Display Board showing detail of work, weekly progress achieved with respect to targets, reason of shortfall, status of manpower, wages being paid for different categories of workers.

Entrance and area surrounding to be kept cleaned.

Display layout plan key plan, Building drawings including plans, elevations and sections.

Upto date displays of Bar chart, CPM and PERT etc.

Keep details of quantities executed, balance quantities, deviations, possible Extra item, substituted Item etc.

Keep plastic / cloth mounted one sets of building drawings.

Set of Helmets and safety shoes for exclusive use for officers/dignitaries visiting at site.

1.57 FINAL TESTING OF THE INSTALLATION

The Contractor shall demonstrate trouble free functioning of all the Civil and E & M installations and services. The Engineer-in-Charge or his authorized representatives shall carry out final inspection of the various Civil and E & M services and installations. Any defect(s) noticed during demonstration shall be rectified by the Contractor at his own cost to the entire satisfaction of the Engineer-in-Charge. Nothing extra shall be payable on this account.

1.58 SUBMISSION OF AS BUILT DRAWINGS AND OBTAINING OCCUPATION CERTIFICATE

The contractor shall coordinate and facilitate consultant for obtaining occupation certificate / completion certificate from local bodies including getting the required site visits conducted by such authorities with a view to obtain the same.

1.59 REFUND OF PERFORMANCE GAURENTEE

The performance guarantee shall be refunded to the contractor soon after the completion of work and recording of the completion certificate by the competent authority.

1.60 DEALING WITH INCONSISTENT RATES

- i) The Contractors shall quote same rates for the identical items which may inadvertently appear in more than one place if different rates are quoted by the tenderers for such identical items, the same shall be rationalized by considering the lowest quoted rate for such items, for evaluation and acceptance of tender.
- ii) Wherever any reference to any Indian Standards occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued thereto or revisions thereof, if any, up to the date of receipt of tenders.
- iii) Unless otherwise specified in the schedule of quantities, the rates for all items of work shall be considered, as inclusive of pumping out or bailing out water, if required throughout the construction period for which no extra payment shall be made. This shall also include water encountered from any source such as rains, floods, sub soil water table being high and/or due to any other cause whatsoever.
- iv) All stone aggregate and stone ballast shall be of hard stone variety to be obtained from approved quarries.
- v) Coarse sand should be obtained from approved sources. The same shall be clean and sharp angular grit type. The coarse sand shall be screened before using, if required. If the sand brought to site is dirty, it must be washed in clean water to bring the sand to the required specifications. Nothing extra shall be payable on this account.
- vi) The rates for all items of work, shall unless clearly specified otherwise, include cost of all operations and all inputs of labour, material, T & P, scaffolding, wastages, watch and ward, other inputs, all incidental charges, all taxes GST etc. required for execution of the work.

1.61 PRODUCT DELIVERY, STORAGE AND HANDLING OF CHEMICALS

The contractor shall construct storage space for Chemicals materials to ensure that the storage conditions are as recommended by the manufactures.

All the materials shall be procured and delivered in sealed containers with labels legible and intact.

All the chemicals {polymers, epoxy, water proofing compound, plasticizer, Polysulphide, SBR based elastomeric, APP (Atactic Polypropylene Polymer), all exterior and interior paints, polish etc.) shall be procured in convenient packs say 20 litres/Kgs.) capacity packing only or as approved by the Engineer-in-Charge, and not in bigger capacity containers, say 200 litres (Kgs.) drums unless otherwise specifically permitted by the Engineer-in-Charge. One sample from each lot of the chemical procured by the contractor shall be tested in a laboratory as approved by the Engineer-in-charge

All material required for the execution of the work shall be got approved, procured and deposited with the Departmental supervisory staff. The materials shall be kept in joint custody of the contractor and the Department. The watch and ward of such material shall, however, remain to be the responsibility of the contractor and no claim, whatsoever, on this account shall be entertained. Different containers of each chemical shall be serially numbered on packing and also consumed in that order. Day-to-Day account of receipt, issue and balance shall be regulated by the Department and proper account shall be maintained at site of work in the prescribed form as per the standard practice.

All the chemicals shall be procured by the contractor directly from the manufacturer. In exceptional circumstances, the contractor may be allowed to procure the materials from the authorized dealers of the manufacturers, if specifically permitted by the Engineer-in-Charge.

The original copies of challan/cash memos and manufacturer's test reports towards the quantity of various chemicals procured shall be made available by the contractor to the Engineer-in-Charge before making payments for work consuming the said material and a copy of the same shall be kept in record.

The Name of manufacturers, manufacturer's product identification, and manufacturer's mixing instructions, warning for handling and toxicity and date of manufacturing and shelf life shall be clearly and legibly mentioned on the labels of the each container.

The contractor shall submit for the chemicals procured, manufacturer's and / or authorized dealer's certificate regarding supplying and verifying conformance to the material specifications, as specified.

All filled containers shall be handled in safe manner and in a way to avoid breaking container seals.

Empty containers of the chemicals should not be removed from site till the completion of work and shall be removed only with the written approval of the Engineer-in-Charge.

All arrangements for measuring, dosing and mixing of material / chemicals at site have to be made by the contractor.

Contractor shall suitably advise his site Engineer and all the workers as regards safe handling of chemicals. Necessary protective and safety equipments in form of hand gloves, goggles etc. shall be provided by the contractor and be also used at site.

All incidental charges of any kind including cartage, storage and wastage and safe custody of material etc. shall be borne by the contractor and no claim, whatsoever, shall be entertained on this account.

The chemicals shall be tested in an independent laboratory as approved by the Engineer-in-charge at the frequency as specified. If required, more samples may have to be tested as per the directions of the Engineer-in-Charge. Nothing extra shall be payable on this account. However testing charges shall be borne by the department for the samples satisfying the requirements specified in the tender.

1.62 De-watering

(i) De-watering required, if any, shall be done conforming to BIS Code IS: 9759 (guide lines for de-watering during construction) and / or as per the specifications approved by the Engineer-in-Charge. Design of an appropriate and suitable dewatering system shall be the Contractor's responsibility. Such scheme shall be modified / augmented as the work proceeds based on fresh information discovered during the progress of work, at no extra cost. At all times during the construction work, efficient drainage of the site shall be carried out by the Contractor and especially during the laying of plain cement concrete, taking levels etc. The Contractor shall also ensure that there is no danger to the nearby properties and installations on account of such lowering of water table. If needed, suitable precautionary measures shall be taken by the Contractor. Also the scheme of dewatering adopted shall have adequate built in arrangement to serve as stand-bye to attend to repair of pumps etc. and disruption of power / fuel supply. Nothing extra shall be payable on this account.

(ii) In trenches where surface water is likely to get into cut / trench during monsoons, a ring bund of puddle clay or by any other means shall be formed outside, to the required height, and maintained by the Contractor. Also, suitable steps shall be taken by the Contractor to prevent back flow of pumped water into the trench. Nothing extra shall be payable on this account.

1.63 INSURANCE POLICIES

Before commencing the execution of work, the Contractor shall, without in any way limiting his obligations and liabilities, insure at his own cost and expense against any damage or loss or injury, which may be caused to any person or property, at site of work. The Contractor shall obtain and submit to the Engineer-in-Charge proper Contractor All Risk Insurance Policy for an amount 1.25 times the contract amount for this work, with Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the Contractor (who shall be second beneficiary). Also, he shall indemnify the Department from any liability during the execution of the work. Further, he shall obtain and submit to the Engineer-in-Charge, a third party insurance policy for maximum Rs.10 lakh for each accident, with the Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the Contractor (who shall be second beneficiary). The Contractor shall, from time to time, provide documentary evidence as regards payment of premium for all the Insurance Policies for keeping them valid till the completion of the work. The Contractor shall ensure that Insurance Policies are also taken for the workers of his Sub-Contractors / specialized agencies also. Without prejudice to any of its obligations and responsibilities specified above, the Contractor shall within 10 days from the date

of letter of acceptance of the tender and thereafter at the end of each quarter submit a report to the Department giving details of the Insurance Policies along with Certificate of these insurance policies being valid, along with documentary evidences as required by the Engineer-in-Charge. No work shall be commenced by the Contractor unless he obtains the Insurance Policies as mentioned above. Also, no payment shall be made to the Contractor on expiry of insurance policies unless renewed by the Contractor. Nothing extra shall be payable on this account. No claim of hindrance (or any other claim) shall be entertained from the contractor on these accounts.

1.64 Training of the Personnel

The contractor shall arrange at no extra cost to the Department to train two persons from the department (DTU) one each for civil and electrical works, on how to operate and carryout preventive maintenance of the systems (both civil and electrical) . The contractor shall arrange this training from well qualified and experience personnel for at least seven days.

1.65 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 duly approved by the Engineer-in-Charge.

1.66 Recording of Hindrance & Maintenance of Hindrance Register –

i) Whenever any hindrance whether on part of department or on part of contractor, comes to the notice of the Assistant Engineer, he shall at once make a note of such hindrance in the register kept at site, and immediately make a report to the Chief Project Officer within a week.

ii) The following points shall be kept in mind while entering the hindrances in the Hindrance Register:

The entry of date of start of hindrance and date of removal of hindrance shall be made on the same day as the hindrance takes place or the cause of the hindrance is removed, respectively.

The Chief Project Officer shall work out the over lapping period, net if hindrance and of each hindrance within 15 days of removal of the cause of hindrance. For work outside headquarters, this shall be done as and when he visits the site.

The items of work affected due to any hindrance shall be clearly mentioned in the Hindrance Register by the Assistant Engineer, and the weightage shall be allowed on this basis.

Each hindrance shall be entered in the hindrance Register, which shall be authenticated by the Chief Project Officer and Contractor.

The hindrance on part of contractor shall also to be entered in the Hindrance Register.

The hindrance shall be recorded carefully in the Hindrance Register after considering its effect on completion of work.

Review of hindrance register shall be compulsory in division office by EE and AAO at the time of payment of each Running Account Bill and final bill and certificate shall be recorded that all up to date hindrances on part of department and contractor have been recorded in the hindrance register.

The net delay on part of department or contractor shall be worked out after considering all the hindrances recorded in the hindrance register.

The Superintending Engineer shall review the hindrance Register whenever he visits site of work.

1.67 Safety, Health and Environment

Over and above the provisions made in CPWD Safety Code (part of General Conditions of contract for CPWD works 2014) the following will also be applicable:

In respect of all workmen directly or indirectly employed in the work for the performance of the contractor's part of this agreement, the contractor shall at his expense arrange for the safety provisions as per Indian Standard Safety codes shown below and shall at his own expense provide for all facilities in connection there with. In case the contractor fails to make arrangement and provide necessary facilities, he shall be liable to pay compensations prescribed under Workmen's Compensation Act 1923 as amended from time to time for each default and in addition the Engineer-in-charge shall be at liberty to make arrangement and provide facilities as aforesaid and recover the cost incurred on that behalf from the contractor, and no claims what so ever shall be entertained.

Details regarding some special provisions to be followed by contractor are as follows:

a) Usage of quality Personal Protection Equipments (PPEs) through approved vendors. PPEs would include amongst others the following items:

Safety Helmets.

Hearing Protection.

Respiratory Protection.

Eye Protection.

Protective Gloves.

Safety Footwear.

High Visibility Clothing (Jacket) with approved Logo

All the items should be got approved before issued to the use in the work. Safety Jacket should have DTU Logo as per the size approved.

The contractor shall provide all the PPE (Personnel Protective Equipment) and safety appliances required to carry out the job to all the workmen deployed by the contractor and also ensure that his workmen use those PPE and safety appliances while on the job. The contractor shall not pay any cash amount in lieu of PPE to the workers/sub-contractors and expect them to buy and use during work. If the contractor fails to ensure provision of safety appliances and its workmen do not use the PPE and safety appliances as needed for safe working, the owner may ask the contractor to stop the work and comply with safety requirements first. The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Employer during

the inspections. Failing to do so shall invite appropriate compensations as per the provisions of under Workmen's Compensation Act 1923 as amended from time to time.

It is always the duty of the contractor to provide required PPEs for all visitors. Towards this required quantity of PPEs shall be kept always at the security post.

Colour coding for helmets

Safety Helmet Color Code (Every Helmet should have the LOGO* affixed /painted)	Person to use
White	DTU staffs, All Designers, Architect, Consultants, etc.
Violet	Main Contractors (Engineers / Supervisors)
Blue	All Sub-contractors (Engineers / Supervisors)
Red	Electricians (Both Contractor and Sub-contractor)
Green	Safety Professionals (Both Contractor and Sub-contractor)
Orange	Security Guards / Traffic marshals
Yellow	All workmen
White (with "VISITOR" sticker)	Visitors

Note: LOGO*

- i) Logo shall have its outer dimension 2"X2" and shall be conspicuous.
- ii) Logo shall be either painted or affixed.
- iii) No words shall come either on Top / Bottom of Logo.

b) Working at Heights

Contractor shall ensure that work at height is properly planned for any emergencies and rescue appropriately supervised, and carried out in a manner, which is reasonably practicable safe. Contractor shall ensure that work at height is carried out only when the weather conditions do not jeopardize the health or safety of persons involved in the work. Guardrail, Toe-board, Barrier or similar collective means of protection shall be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable.

Working Platform shall be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area-having regard to the work being carried out there. Possess a suitable surface and, in particular, be so constructed that the surface of the working platform has no gap through which a person, material or object could fall and injure a person. A working platform and any supporting structure shall not be loaded so as to give rise to a risk of collapse or to any deformation, which could affect its safe use. Strength and stability calculations for scaffolding shall be carried out by the contractor. The dimensions form and layout of scaffolding decks shall be appropriate to the nature of the work to be performed and suitable for the loads to be carried and permit work and passage in safety.

A personal fall protection system designed for use with an anchor shall be securely attached to at least one anchor, and each anchor and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of supporting any foreseeable loading. Suitable and sufficient steps shall be taken to prevent any person falling or slipping from a personal fall protection system. Any other steps in the opinion of engineer-in-charge suggested will also be taken in Protection system

Only metal ladders shall be allowed. Any surface upon which a ladder rests shall be stable, firm, of sufficient strength and of suitable composition safely to support the ladder so that its rungs or steps remain horizontal, and any loading intended to be placed on it. A ladder shall be so positioned as to ensure its stability during use. A suspended ladder shall be attached in a secure manner and so that, with the exception of a flexible ladder, it cannot be displaced and swinging is prevented. No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.

c) Lifting appliances and gears.

The contractor shall maintain a register for record of examinations and test details of all lifting appliances. This register should also contain a system of identification of all tools and tackles, its date of purchase, safe working load etc. Contractors can utilize the services of any competent person as defined in Factories Act, 1948 and approved by Chief Inspector of Factories with the permission of the Employer.

d) Automatic safe load indicators

Every lifting appliances and gears like cranes, hydras etc, if so constructed that the safe working load may be varied by raising or lowering of the jib or otherwise shall be attached with an automatic indicator of safe working loads approved by Bureau of Indian standards/ International certifying bodies which gives a warning to the operator and arrests further movements of the lifting parts.

e) Qualification of operator of lifting appliances and of signaler etc.

The contractor shall not employ any person to drive or operate a lifting machine like crane, hydra etc whether driven by mechanical power or otherwise or to give signals to work as a operator of a rigger or derricks unless he is above twenty-one years of age and possesses a valid heavy transport vehicle driving license as per Motor Vehicle Act and Rules, is absolutely competent and reliable, possesses the knowledge of the inherent risks involved in the operation of lifting appliances by undergoing a formal training at any institution of national importance, is medically examined periodically.

1.68 Existing Services:

Existing drains, pipes, electricity cables, overhead wires and telephone cables, sewer lines, water lines and similar services encountered in the course of the execution of the work shall be protected/ maintained against the damage by the contractor. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. In case temporary shifting/supporting of such services is required to facilitate the work, the contractor at no extra cost shall do the same. The decision of the Engineer-in-Charge in this regard shall be final and binding.

1.69 All works pertaining to services including rerouting/diversion of services, routine testing, installation etc., completed in one or more than one process shall be subject to examination and approval to each stage thereof by the Engineer-in-charge or concerned department as would be notified by the Engineer-in-charge or his authorized representative when such stage is ready. In default of such notice the Engineer-in-Charge shall be entitled to appraise the quantity and extent thereof and the decision of Engineer-in-Charge or his authorized representative in this regard shall be final and binding.

1.70 For utilities which are required to be removed or permanently shifted to new position, in the opinion of the Engineer-in-charge, shall be removed / shifted by the contractor in consultation with the service provider agency. Payment for this shall be made as per terms and conditions of the contract. No claim for delay or otherwise due to above reasons shall be entertained on this account.

1.71 The contractor shall make his own arrangement for the disposal of the spoils, waste of bentonite, all dismantled material, slush and foul materials, surplus earth to such place where the same shall not cause nuisance or any environmental problems anywhere and should be acceptable to the authorities concerned. No extra claim whatsoever shall be entertained due to above. The road connected to site should be kept nuisance or environmental problem free.

1.72 The contractor shall make his own arrangement at his own cost for the provision of telephone facilities at the site of works or at any other place.

1.73 The contractor shall make his own arrangements for obtaining electric & water connection(s) if required and make necessary payment directly to department concerned. The department will however make all reasonable recommendations to the authority concerned in this regard.

1.74 The contractor shall bear all incidental charges for cartage, storage and safe custody of materials brought to site.

1.75 The work shall be carried out in accordance with the Architectural drawings, structural and services drawings, to be issued from time to time, by the Engineer-in-Charge. Before commencement of any item of work, the contractor shall correlate all the relevant architectural, structural drawing and services issued for the work, nomenclature of items, specifications etc. and satisfy himself that the information available there from is complete and unambiguous. The figures & the written dimensions of the drawing shall super cede the measurement by scale. The discrepancy, if any, shall be brought to the notice of the Engineer-In-Charge for immediate decision 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.

The contractor shall have registration with EPFO and ESIC. The ESI and EPF contributions on the part of employer in respect of this contract shall be paid by the contractor. These contributions on the part of the employer paid by the contractor shall be reimbursed by the Engineer-in-charge to the contractor on actual basis.

No payment shall be made to the contractor for cutting holes in 40 mm thick sand stone slab for electric installations and fixtures such as electric MCB DB's and firefighting pipes as well as civil plumbing work being the new work unless otherwise provided in schedule of quantity.

The payment for shuttering at the edges of slab at all levels shall be made under schedule item of centering and shuttering

2.0 SPECIAL CONDITIONS FOR GREEN BUILDING

2.1 Pre-construction Stage

Construction Vehicles, Equipment and Machinery

All vehicles, equipment and machinery to be procured for construction shall conform to the relevant Bureau of India Standard (BIS) norms.

Emission from the vehicles must conform to environmental norms.

Dust produced from the vehicular movement and other site activities is to be mitigated by sprinkling of water.

Noise limits for construction equipments shall not exceed 75 dB(A), measured at one meter from the edge of the equipment in free area, as specified in the Environment Protection Act, 1986, schedule VI part E, as amended on 9th May, 1993. The maximum noise levels near the construction site should be limited to 65 dB (A) Leq (5 min) in project area.

2.2 Construction Stage

Construction Wastes Disposal

(i) The pre-identified dump locations will be a part of solid waste management plan to be prepared by the Contractor in consultation with Engineer -in-charge.

(ii) Contractor shall get approved the location of disposal site prior to commencement of the excavation on any section of the project location.

(iii) Contractor shall ensure that any spoils of material will not be disposed off in any municipality solid waste collection bins.

2.3 Procurement of Construction Materials

(i) All vehicles delivering construction materials to the site shall be covered to avoid spillage of materials and maintain cleanliness of the roads.

(ii) Wheel Tyres of all vehicles used by of the contractor, or any of his sub-contractor or materials supplies shall be cleaned and washed clear of all dust/mud before leaving the project premises. This shall be done by routing the vehicles through tyre washing tracks.

(iii) Contractor shall arrange for regular water sprinkling at least twice a day (i.e. morning and evening) for dust suppression of the construction sites and unpaved roads used by his construction vehicles.

2.4 Water Pollution

(i) The Contractor shall take all precautionary measures to prevent the wastewater during construction to accumulate anywhere.

(ii) The wastewater arising from the project is to be disposed off in the manner that is acceptable to the Engineer -in-charge.

2.5 Air and Noise Pollution

Contractor shall use dust screens and sprinkle water around the construction site to arrest spreading of dust in the air and surrounding areas.

(i) Contractor shall ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm that emission levels comply with environmental emission standards/norms.

(i) For controlling the noise from Vehicles, Plants and Equipments, the Contractor shall confirm the following:

(iii) All vehicles and equipment used in construction will be fitted with exhaust silencers.

(iv) Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced.

(v) Noise emission from compactors (rollers) front loaders, concrete mixers, cranes (movable), vibrators and saws should be less than 75 dB(A).

(vi) As per the standards/guidelines for control of Noise Pollution from Stationary Diesel Generator (DG) sets, noise emission in dB(A) from DG Set (15-500 KVA) should be less than $94+10 \log_{10} (KVA)$. The standards also suggest construction of acoustic enclosure around the DG Set and provision of proper exhaust muffler with insertion loss of minimum 25 dB(A) as mandatory.

(vii) Control of Air Pollution of Dust from construction and demolition activities as per NGT guidelines.

2.6 Personal Safety Measures for Labour

Contractor will provide the following items for safety of workers employed by contractor and associate agencies:

Protective footwear and gloves to all workers employed for the work on mixing, cement, lime mortars, concrete etc. and openings in water pipeline/sewer line.

Welder's protective eye-shields to workers who are engaged in welding works.

Safety helmet and Safety harness/ belt .Provide adequate sanitation/safety facilities for construction workers to ensure the health and safety of the workers during construction, with effective provisions for the basic facilities such as sanitation, drinking water and safety equipments or machinery.

All the workers should be wearing helmet and shoes all the time on site.

Masks and gloves should be worn whenever and wherever required.

Adequate drinking water facility should be provided at site, adequate number of decentralized latrines and urinals to be provided for construction workers.

Full time workers residing on site should be provided with clean and adequate temporary hutment.

First aid facility should also be provided.

Overhead lifting of heavy materials should be avoided. Barrow wheel and hand-lift boxes should be used to transport materials onsite.

Tobacco and cigarette smoking should be prohibited onsite.

All dangerous parts of machinery are well guarded and all precautions for working on machinery are taken.

Maintain hoists and lifts, lifting machines, chains, ropes and other lifting tackles in good condition. Provide safety net of adequate strength to arrest falling material down below.

Use of durable and reusable formwork systems to replace timber formwork and ensure that formwork where used is properly maintained.

Ensure that walking surfaces or boards at height are of sound construction and are provided with safety rails and belts. Provide protective equipments such as helmets.

Provide measure to prevent fire. Fire extinguisher and buckets of sand to be provided in fire-prone area and elsewhere.

Provide sufficient and suitable light for working during night.

Ensure that measures to protect workers from materials of construction, transportation, storage and other dangers and health hazards are taken

Ensure that the construction firm/division/company have sound safety policies.

Comply with the safety procedure, norms and guidelines (as applicable) as outlined in NBC 2005 (BIS 2005c).

Adopt additional best practices and prescribed norms as in NBC 2005 (BIS2005).

2.7 Identify roads on-site that would be used for vehicular traffic. Update vehicular roads (if these are unpaved) by increasing the surface strength by improving particle size, shape and mineral type 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%. Limit vehicular speed on site 10km/h. Nothing extra will be payable for this.

- 2.8 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.
- 2.9 Spills of dirt or dusty materials shall 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/cleaned up immediately before they can infiltrate into the soil/ground or runoff in nearby areas.
- 2.10 Ensure that water spraying is carried out by wetting the surface by spraying water on:
- (i) Any dusty material.
 - (ii) Areas where demolition work is carried out.
 - (iii) Any unpaved main-haul road and.
 - (iv) Areas where excavation or earth moving activities are to be carried out.
- 2.11 The contractor shall ensure the following:
- (i) Cover and enclose the site by providing dust screen, sheeting or netting to scaffold along the perimeter of a building.
 - (ii) Covering stockpiles of dusty material with impervious sheeting.
 - (iii) Covering dusty load on vehicles by impervious sheeting before they leave the site.
 - (iv) Transferring, handling/storing dry loose materials like bulk cement and dry pulverized fly ash inside a totally enclosed system.
 - (v) Spills of dirt or dusty materials shall be cleaned up promptly so that the spilled material does not become a source of fugitive dust and also to prevent 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 / cleaned up immediately before they can infiltrate into the soil/ground or runoff in nearby areas.
 - (vi) Clear vegetation only from areas where work will start right away.
 - (vii) Vegetate/mulch areas where vehicles do not ply.
 - (viii) Apply gravel / landscaping rock to the areas where mulching/paving is impractical.
- 2.12 Adopt measures to prevent air pollution in the vicinity of the site due to construction activities. There is no standard reference for this. The best practices should be followed (as adopted from international best practice documents and codes)
- 2.13 Provide sheet covering/barricading of site of not less than 3m height along the site boundary, next to a road or other public area. Nothing extra will be paid for this.
- 2.14 The contractor shall provide experienced personnel with suitable training to ensure that these methods are implemented. Prior to the commencement of any work, the method of working, plant equipment and air pollution control system to be used on -site should be made available for the inspection and approval of the Engineer -in-Charge to ensure that these are suitable for the project.
- 2.15 Employ measures to segregate the waste on-site into inert, chemical or hazardous wastes. Recycle the unused chemical/hazardous wastes such as oil, paint, batteries and asbestos. The inert waste is to be disposed off to Municipal Corporation/local bodies dump yard and landfill sites.
- 2.16 To preserve the existing landscape and protect it from degradation during the process of construction. Select proper timing for construction activity to minimize the disturbance such as soil pollution due to spilling of the construction material and its mixing with rainwater. The construction management plan including soil erosion control management plan shall be prepared accordingly for each month. The application of erosion control measures includes construction of gravel pits and tier washing bays of approved size and specification for all vehicular site entry/exits, protection of slopes greater than 10%. Sedimentation Collection System and run-off diversion systems shall be in place before the commencement of construction activity. Preserve and protect the existing vegetation by not-disturbing or damaging to specified site areas during construction.
- 2.17 The Contractor should follow the construction plan as proposed by the Engineer-in-charge / landscape consultant 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.
- 2.18 Spill prevention and control plans should clearly state measures to stop the source of the spill. Measures to contain the spill and measures to dispose the contaminated material and hazardous wastes. It should also state the designation of personnel trained to prevent and control spills. Hazardous wastes include pesticides, paints, cleaners and petroleum products.
- 2.19 A soil Erosion and Sedimentation Control Plan (ESCP) should be prepared prior to construction and should be applied effectively.
- 2.20 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.
- 2.21 The contractor shall ensure that no construction leaches (Ex: cement slurry) 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).
- 2.22 All lighting installed by the contractor around the site and at the labour quarters during construction shall be CFL bulbs of the appropriate illumination levels. This condition is a must, unless specifically prescribed otherwise.
- 2.23 All paints, adhesives and sealants should comply with the VOC limits prescribed by GRIHA, as follows:

Table 1- VOC limits for paints, adhesives and sealants

Paints	VOC Limit (g/l)	Adhesives	VOC Limit (g/l)
Non-flat paints	150	Wood flooring Adhesive	100
Flat (Mat) paints	50	Tile Adhesive	65
Anti-corrosive/anti-rust paints	250	Indoor Carpet Adhesive	50
Varnish	350	Wood	30
Lacquer	550	Stains Water proofing sealer	250 250

2.24 All the building materials and systems used on site must be as per the specifications and approved makes by the Engineer-In-Charge.

2.25 Nothing extra shall be payable for above provisions unless otherwise specified in Schedule of Quantity

3.0 ADDITIONAL CONDITIONS AND PARTICULAR SPECIFICATION FOR CIVIL COMPONENT

ADDITIONAL CONDITION AND PARTICULAR SPECIFICATION FOR STEEL WORK

STRUCTURAL STEEL

3.1 This specification covers the fabrication and transportation to site and erection on prepared foundations and structural steel work consisting of beams, columns, purlins, vertical trusses, bracings, shear connections etc.

3.2 Fabrication, erection and approval of steel structures shall be in compliance with:

General Specifications mentioned in CPWD specifications and IS : 800 – 1984. For the guidance on general fabrication and erection of structural steel work, Chapter 11 of IS: 800 (1984) must be followed. As far as safety is concerned guidance could be obtained from Indian safety code for structural steelwork IS:7205(1974). Before the commencement of the erection, all the erection equipment tools, shackles, ropes etc. should be tested for their load carrying capacity. Such tests if needed may be repeated at intermediate stages also.

Drawings and supplementary drawings to be supplied to the contractors during execution of the work.

3.3 Providing shop primer coat for steel structures. Grouting of holding-down bolt pockets and below base plates where required.

3.4 In case of conflict between the Clauses mentioned here and the Indian Standards, those expressed in this specification shall govern.

3.5 Scope

The fabrication and erection of the steel work consists of accomplishing of all jobs here-in enumerated including providing all labour, tools and plant all materials and consumables such as welding electrodes, bolts and nuts, oxygen and acetylene gases, oils for cleaning etc. of approved quality as per relevant IS. The work shall be executed according to the drawings, specifications, relevant codes etc. in an expeditious and workman like manner, as detailed in the specifications and the relevant Indian Standard Codes and Standard Practice and to the complete satisfaction of the Engineer-in-charge .

3.6 Fabrication Drawings

(i) The contractor shall prepare all fabrication and erection drawings on the basis of design drawings supplied to him and submit the same in triplicate to the Engineer-in-charge for review, Engineer-in-charge shall review and comment, if any, on the same. Such review, if any, by the Engineer-in-charge, does not relieve the contractor of any of his required guarantees and responsibilities. The contractor shall however be responsible to fabricate the structural strictly conforming to specifications and reviewed drawings.

(ii) Fabrication drawings shall include but not limited to the following:

- Member sizes and details
- Types and dimensions of welds and bolts
- Shapes and sizes of edge preparation for welding
- Details of shop and field joints included in assemblies.

(iii) Bill of material

Quality of structural steels, welding electrodes, bolts, nuts and washers etc. to be used.

Erection assemblies, identifying all transportable parts and sub-assemblies, associated with special erection instructions, if required.

Calculations where asked for approval.

(iv) Connections, splices etc. other details not specifically detailed in design drawings shall be suitably given on fabrication drawings considering normal detailing practices and developing full member strengths. Where asked for calculations for the merit shall also be submitted for approval.

(v) Any alternate design or change in section is allowed when approved in writing by the Engineer-in-charge.

However, if any variation in the scheme is found necessary later, the contractor will be supplied with revised drawings. The contractor shall incorporate these changes in his drawings at no extra cost and resubmit for review.

(vii) Engineer-in-charge review shall not absolve the contractor of his responsibility for the correctness of dimensions, adequacy of details and connections. One copy will be returned reviewed with or without comments to the contractor for necessary action. In the former case further three copies of amended drawings shall be submitted by the contractor for final review.

(viii) The contractor shall supply three prints each of the final reviewed drawings to the Engineer-in-charge within a week since final review, at no extra cost for reference and records.

(ix) The Engineer-in-charge will verify the correct interpretation of their requirements.

(x) If any modification is made in the design drawing during the course of execution of the job, revised design drawings will be issued to the contractor. Further changes arising out of these shall be incorporated by the contractor in the fabrication drawings already prepared at no extra cost and the revised fabrication drawings shall be duly got reviewed as per the above Clauses.

3.7 Materials

All structural steel shall be procured from primary producers.

(i) Rolled Sections

The following grades of steel shall be used for steel structures:

Structural steel will generally be of standard quality conforming to IS: 226/IS:2062. Whenever welded construction is specified plates of more than 20 mm thickness will generally conform to IS: 2062.

(ii) Welding Materials

Welding electrodes shall conform to IS: 814.

Approval of welding procedures shall be as per IS: 823.

(iii) Bolts, Nuts & Washers

Bolts and nuts shall be as per IS: 1367 and tested as per IS:1608. It shall have a minimum tensile strength of 44 Kg/mm² and minimum elongation of 23% on a gauge length of 5.65 (A- Original cross sectional area of the gauge length). Washers shall be as per IS: 2016.

(iv) All materials shall conform to their respective specifications. The use of equivalent or higher grade or alternate materials will be considered only in very special cases subject to the approval of the Engineer-in-charge in writing.

(v) Receipt & Storing of Materials

Steel materials supplied by the contractor must be marked for identification and each lot should be accompanied by manufacturer's quality certificate, conforming chemical analysis and mechanical characteristics.

All steel parts furnished by supplier shall be checked, sorted out, straightened, and arranged by grades and qualities in stores.

Structural with surface defects such as pitting, cracks, laminations etc. shall be rejected if the defects exceed the allowable tolerances specified in relevant standards or as directed by the chief Engineer-in-charge.

Welding wire and electrodes shall be stored separately by qualities and lots inside a dry and enclosed room, in compliance with IS: 816 - 1969 and as per instructions given by the Engineer-in-charge. Electrodes shall be perfectly dry and drawn from an electrode even, if required.

(vi) Checking of quality bolts of any kind as well as storage of same shall be made conforming to relevant standards.

Each lot of electrodes, bolts, nuts, etc. shall be accompanied by manufacturer's test certificate.

The contractor may use alternative materials as compared to design specification only with the written approval of the chief Engineer-in-charge.

(vii) Material Tests

The contractor shall be required to produce manufacturer's quality certificates for the materials supplied by the contractor. Notwithstanding the manufacturer's certificates, the Engineer-in-charge may ask for testing of materials in approved test houses. The test results shall satisfy the requirements of the relevant Indian Standards.

Whenever quality certificates are missing or incomplete or when material quality differs from standard specifications the contractor shall conduct all appropriate tests as directed by the Engineer-in-charge at no extra cost.

Materials for which test certificates are not available or for which test results do not tally with relevant standard specifications, shall not be used.

3.8 Fabrication

The Contractor will submit the credential with full particulars about work completed by fabricator to be deployed for this work for approval of Engineer-in-charge. After written approval is communicated in respect of fabricator, then only the jobs should be a signed to him. Fabrication shall be in accordance with IS: 800 Section V in addition to the following:

Fabrication shall be done as per approved fabrication drawings adhering strictly to work points and work lines on the same. The connections shall be welded or bolted as per design drawings. Work shall also include fabricating built up sections.

Any defective material used shall be replaced by the contractor at his own expense, care being taken to prevent any damage to the structure during removal.

All the fabricated and delivered items shall be suitably packed to be protected from any damage during transportation and handling. Any damage caused at any time shall be made good by the Contractor at his own cost.

Any faulty fabrication pointed out at any stage of work shall be made good by the contractor at his own cost.

(i) Preparation of Materials

Prior to release for fabrication, all rolled sections warped beyond allowable limit shall be pressed or rolled straight and freed from twists, taking care that an uniform pressure is applied.

Minor warping, corrugations etc. in rolled sections shall be rectified by cold working.

The sections shall be straightened by hot working where the Engineer-in-charge so direct and shall cooled slowly after straightening.

Warped members like plates and flats may be used as such only if wave like deformation does not exceed $L/1000$ but limited to 10 mm (L-Length).

Surface of members that are to be jointed by lap or fillet welding or bolting shall be even so that there is no gap between overlapping surfaces.

(ii) Marking

Marking of members shall be made on horizontal pads, of an appropriate racks or supports in order to ensure horizontal and straight placement of such members. Marking accuracy shall be at least + 1 mm.

(iii) Cutting

Members shall be cut mechanically (by saw or shear or by oxyacetylene flame).

All sharp, rough, or broken edges, and all edges of joints which are subjected to tensile or oscillating stresses, shall be ground. No electric metal arc cutting shall be allowed.

All edges cut by oxyacetylene process shall be cleaned of impurities prior to assembly.

Cutting tolerances shall be as follows:

- a) For members connected at both ends + 1 mm.
- b) Elsewhere + 3 mm.

The edge preparation for welding of members more than 12 mm thick shall be done by flame cutting and grinding. Cut faces shall not have cracks or be rough.

Edge preparation shall be as per IS : 823 - 1964.

(iv) Drilling

Bolts holes shall be drilled.

Drilling shall be made to the diameter specified in drawings.

No enlarging of holes filling, by man rolling or oxyacetylene flame shall be allowed.

Allowed variations for holes (out-of-roundness, eccentricity, plumb-line deviation) shall be as per IS:800.

- Maximum deviation for spacing of two holes on the same axis shall be + 1 mm.
- Two perpendicular diameters of any oval hole shall not differ by more than 1 mm.

(v) Drilling faults in holes may be rectified by reaming the holes to the next upper diameter, provided that spacing of new hole centers and distance of hole centers to the edges of members are not less than allowed and that the increase of hole diameter does not impair the structural strength. Hole reaming shall be allowed if the number of faulty holes does not exceed 15% of the total number of holes for one joint.

Welding:

Preparation of Members for Welding

All welding in mild steel work shall be done with electrodes and / or by methods recommended by the suppliers of the metals being welded in accordance with corresponding Indian Standards. Type, size and spacing of welds, shall be as specified. All welding consumables shall be in accordance with the I.S. standards.

Welds behind finished mild steel surfaces shall be so done as to eliminate distortion and / or discoloration on the finished side.

Weld spatter and welding oxides on finished surfaces shall be removed by descaling and / or grinding. Plug, puddle or spot welding shall not be permitted. If weld beads are visible on exposed finished surfaces, the surfaces shall be ground and polished to match and blend with finish on adjacent parent metal.

Structural welds shall be made by certified welders and shall conform to I.S. code. The welds shall be tested by the Contractor to ensure quality and integrity of the structural welds. However, welding tests shall be carried out as below: and the contractor shall maintain records for Visual testing – 100 % of the welds for size and quality. Fillet weld testing- 30 % of the welds for MPI or Dye penetration test

Dirt grease, lubricant, or other organic material shall be removed by vapor degreasing or suitable solvent.

Joints rejected because of welding defects may be repaired only by re welding. Defective welds shall be removed by chipping or machining. Flame cutting shall not be allowed.

Assembly of structural members shall be made with proper jigs and fixtures to ensure correct positioning of members (angles, axes nodes etc.)

Sharp edges, rust of cut edges, notches, irregularities and fissures due to faulty cutting shall be chipped or ground or filled over the length of the affected area, deep enough to remove faults completely.

Edge preparation for welding shall be carefully and accurately made so as to facilitate a good joint.

Generally no special edge preparation shall be required for members under 8 mm thick.

Edge preparation (beveling) denotes cutting of the same so as to result in V, X K or U seam shapes as per IS: 823.

The members to be assembled shall be clean and dry on the welding edges. Under no circumstances shall wet, greasy, rust or dirt covered parts be assembled. Joints shall be kept free from any foreign matter likely to get in to the gaps between members to be welded.

Before assembly the edges to be welded as well as adjacent areas extending for at least 20 mm shall be cleaned (until metallic polish is achieved).

When assembling members, proper care shall be taken of welding shrinkage and distortions, as the drawing dimensions cover finished dimensions of the structure.

The elements shall be got checked and approved by the Engineer-in-charge or their authorized representative before assembly.

The permissible tolerances for assembly of members preparatory to welding shall be as per IS: 823-1964.

After the assemble has been checked, temporary tack welding in position shall be done by electric welding, keeping in view finished dimensions of the structure.

(vii) Welding procedures

Welding shall be carried out only by fully trained and experienced welders as tested and approved by the Engineer-in-charge. Any test carried out either by the Engineer-in-charge or their representative or the inspectors shall constitute a right by them for such tests and the cost involved thereon shall be borne by the contractor himself.

Qualification tests for welders as well as tests for approval of electrodes will be carried out as per IS: 823. The nature of test for performance qualification of welders shall be commensurate with the quality of welding required on this job as judged by the Engineer-in-charge.

The steel structures shall be automatically, semi-automatically or manually welded as per direction of Engineer-in-charge.

Welding shall begin only after the checks mentioned in Clause herein have been carried out.

The welder shall mark with his identification mark on each element welded by him.

When welding is carried out in open air, steps shall be taken to protect the face of welding against wind or rain. The electrodes, wire and parts being welded shall be dry.

Before beginning the welding operation, each joint shall be checked to ensure that the parts to be welded are clean and root gaps provided as per IS: 823.

For continuing the welding of seems discontinued due to some reason, the end of the discontinued seem shall be melted in order to obtain a good continuity. Before resuming the welding operation, the groove as well as the adjacent parts shall be well cleaned for a length of approx. 50 mm.

For single butt welds (in V, 1/2 V or U) and double butt welds (in K, double U etc.) the re-welding of the root is mandatory but only the metal deposit on the root has been cleaned by back gouging or chipping.

The welding seams shall be left to cool slowly. The contractor shall not be allowed to cool the welds quickly by any other method.

For multi-layer welding, before welding the following layer, the formerly welded layer shall be cleaned metal bright by light chipping and wire brushing. Backing strips shall not be allowed.

The order and method of welding shall be so that -

- No unacceptable deformation appears in the welded parts.
- Due margin is provided to compensate for contraction due to welding in order to avoid any high permanent stresses. The defects in welds must be rectified according to IS: 823 and as per instruction of Engineer-in-charge.

(viii) Weld Inspection

The weld seams shall satisfy the following :

- Shall correspond to design shapes and dimensions.
- Shall not have any defects such as cracks, incomplete penetration and fusion, under-cuts, rough surfaces, burns, blow holes and porosity etc. beyond permissible limits.

During the welding operation and approval of finished elements, inspections and tests shall be made as shown in annexure-B. The mechanical characteristics of the welded joints shall be as in IS: 823.

(ix) Preparation of Members for Bolting

The members shall be assembled for bolting with proper jigs and fixtures to sustain the assemblies without deformation and bending. Before assembly, all sharp edges, shavings, rust dirt, etc. shall be removed. Before assembly, the contacting surfaces of the members shall be cleaned and given a coat of primer as per IS: 2074. The members which are bolt assembled shall be set according to drawings and temporarily fastened with erection bolts (minimum 4 pieces) to check the coaxiality of the holes. The members shall be finally bolted after the deviations have been corrected, after which there shall not be gaps. Before assembly, the members shall be checked and got approved by the Engineer-in-charge. The difference in thickness of the sections that are butt assembled shall not be more than 3% or maximum 0.8 mm whichever is less. If the difference is larger, it shall be corrected by grinding or filling. Reaming of holes to final diameter or cleaning of these shall be done only after the parts have been check assembled. As each hole is finished to final dimensions (reamed if necessary) it shall be set and bolted up. Erection bolts shall not be removed before other bolts are set.

(x) Bolting up

Final bolting of the members shall be done after the defects have been rectified and approval of joints obtained. The bolts shall be tightened starting from the centre of joint towards the edge.

(xi) Planning of Ends

Planning of ends of members like column ends shall be done by grinding when so specified in the design. Planning of butt welded members shall be done after these have been assembled, the spare edges shall be removed with grinding machines or files. The following tolerances shall be permitted on member that have been planed.

- On the length of the member having both ends planed, maximum + 2 mm with respect to design.
 - Level differences of planed surfaces, maximum 0.3 mm.
 - Deviation between planed surface and member's axis maximum 1/1500.

(xii) Holes for Field Joints

Holes for field joints shall be drilled in the shop to final diameters and tested in the shop, with trial assemblies. When three-dimensional assembly is not possible in the shop, the holes for field joints may be drilled in shop and reamed on site after erection, on approval by the Engineer-in-charge. For bolted steel structures, trial assembly in shop is mandatory. The tolerance for spacing of holes shall be + 1 mm.

(xiii) Tolerances

All tolerances regarding dimensions, geometrical shapes and sections of steel structures, shall be as per Annexure B, if not specified in the drawing.

(xiv) Marking for Identification

All elements and members prior to dispatch for erection shall be shop marked. The members shall be visibly marked with a weather proof light coloured paint. The size and thickness of the numbers shall be chosen as to facilitate the identification of members. For the small members that are delivered in bundles or crates, the required marking shall be done on small metal tags securely tied to the bundle, while the crates shall be marked directly. Each bundle or crate shall be packed with members for one and the same assembly; in the same bundle or crate, general utility members such as bolts, nuts etc. may be packed. All bill of materials showing weight, quality and dimension of contents shall be placed in the crates.

The members shall be marked with a durable paint, in a visible location, preferably at one end of the member so that these may be easily checked during storage and erection. All members shall be marked in the shop before inspection and acceptance. When the member is being painted, the marking area shall not be painted but bordered with white paint. The marking and job symbol shall be registered in all shop delivery documents (transportation, for erection etc.)

(xv) Shop Test Pre-assembly

For steel structures that have the same type of welding the shop test pre-assembly shall be performed on one out of every 10 members minimum. For bolted steel structures, shop test pre-assembly is mandatory for all elements as well as for the entire structure in conformity with previous Clause .

3.9 Shop Inspection and Approval

(i) General

The Engineer-in-charge or their representative shall have free access at all responsible times to the contractors fabrication shop and shall be afforded all reasonable facilities for satisfying himself that the fabrication is being undertaken in accordance with drawings and specifications. Technical approval of the steel structure in the shop by the Engineer-in-charge is mandatory. The contractor shall not limit the number and kinds of tests, final as well as intermediate once, or extra tests required by the Engineer-in-charge. The contractor shall furnish necessary tools, gauges, instruments etc. and technical non-technical personnel for shop tests by the Engineer-in-charge, free of cost.

(ii) Shop Acceptance

The Engineer-in-charge shall inspect and approve at the following stages:

The following approvals may given in shop:

- Intermediate approvals of work that cannot be inspected later.
- Partial approvals
- Final approvals

Intermediate approval of work shall be given when a part of the work is preformed later:

- Cannot be inspected later
- Inspection would be difficult to perform and results would not be satisfactory.

Partial approval in the shop is given on members and assemblies of steel structures before the primer coat is applied and includes:

- Approval of materials
- Approval of field joints
- Approval of parts with planed surfaces
- Test erection
- Approval of members
- Approval of markings
- Inspections and approvals of special features, like Rollers, loading platform mechanism etc.

During the partial approval, intermediate approvals as well as all former approvals, shall be taken in to consideration.

(iii) Final approval in the Shop

The final approval refers to all elements and assemblies of the steel structures, with shop primer coat, ready for delivery from shop to be loaded for transportation, or stored.

The final approval comprises of:

- Partial approvals
- Approval of shop primer coat
- Approval of mode of loading and transport
- Approval of storage (for materials stored)

3.10 Painting and Delivery

(i) Preparation of parts for shop painting: Painting shall consist of providing at least one coat of red oxide zinc chromate primer to steel members before despatch from shop. Primer coat shall not be applied unless:

- Surface have been wire brushed, cleaned of dust, oil, rust or sand blasted as per the requirement and direction of Engineer-in-charge etc.
- Erection gaps between members, spots that cannot be painted or where moisture or other aggressive agents may penetrate, have been filled with an approved type of oil and putty.
 - The surface to be painted are completely dry.
- The parts where water of aggressive agents may collect (during transportation, storage, erection and operation) are filled with putty and provided with holes for drainage of water.
 - Members and parts have been inspected and accepted
 - Welds have been accepted.

The following are not to be painted or protected by any other product :

- Surface which are in the vicinity of joints to be welded at site.
- Surfaces bearing markings
- Other surfaces indicated in the design.

The following shall be given a coat of hot oil or any approved resistant lubricant only.

- Planed surfaces
- Holes for links

The surfaces that are to be embedded or in contact with the concrete shall be given a coat of cement wash. The surfaces which are in contact with the ground, gravel or brick work and subject to moisture, shall be given bituminous coat. The other surfaces shall be given a primer coating.

Special attention shall be given to locations not easily accessible, where water can collect and which after assembly and erection cannot be inspected, painted and maintained. Holes shall be provided for water drainage and in accessible box type sections shall be hermetically sealed by welds.

If specified elsewhere, in the schedule of quantities, the contractor shall paint further coats of red-oxide after erection and placing in position of the steel structures.

(ii) Packing, transportation, delivery

After final shop acceptance and marking, the item shall be packed and loaded for transportation. Packing must be adequate to protect item against warping during loading and unloading. Proper lifting devices shall be used for loading, in order to protect items against warping. Slender projecting parts shall be braced with additional steel bars, before loading, for protection against warping during transportation. Loading and transportation shall be done in compliance with transportation rules. If certain parts cannot be transported in the lengths stipulated in the design, the position and type of additional splice joints shall be approved by the Engineer-in-charge. Items must be carefully loaded on platforms of transportation means to prevent warping, bending or falling during transportation. The small parts such as fish-plates, quests etc. shall be securely tied with wire to their respective parts. Bolts, nuts and washers shall be packed and transported in crates. The parts shall be delivered in the order stipulated by the Engineer-in-charge and shall be accompanied by document showing:

- Quality and quantity of structure or members
- Position of member in the structure
- Particulars of structure
- Identification number job symbol.

3.11 Field Erection

The erection work shall be permitted only after the foundation or other structure over which the steel work will be erected is approved and is ready for erection.

The contractor shall satisfy himself about the levels, alignment etc. for the foundations well in advance, before starting the erection. Minor chipping etc. shall be carried out by the contractor on his expense.

Any faulty erection done by the contractor shall be made good at his own cost.

Approval by the Engineer-in-charge or their representatives at any stage of work does not relieve the contractor of any of his required guarantees of the contract.

Storage and preparation of parts prior to erection

The storage place for steel parts shall be prepared in advance and got approved by the Engineer-in-charge before the steel structures start arriving from the hop. A platform shall be provided by the Contractor near the erection site for preliminary erection work. The contractor shall make the following verifications upon receipt of material at site.

- For quality certificates regarding materials and workmanship according to these general specifications and drawings.
- Whether parts received are complete without defects due to transportation, loading and unloading and defects, if any, are well within the admissible limit.

For the above work sufficient space must be allotted in the storage area which will be arranged by the contractor without any extra cost to the department. Steps shall be taken to prevent warping of items during unloading. The parts shall be unloaded, stored and stored so as to be easily identified. The parts shall be stored according to construction symbol and markings so that these may be taken out in order or erection. The parts shall be at least 150 mm clear from ground on wooden or steel blocks for protection against direct contact with ground and to permit drainage of water. If rectification of members like straightening etc. are required, these shall be done in a special place allotted which shall be adequately equipped. The parts shall be clean when delivered for erection.

(vi) Erection & Tolerances

Erection in general shall be carried out as required and approved by the Engineer-in-charge. Positioning and levelling of the structure, alignment and plumbing of the stanchion and fixing every member of the structure shall be in accordance with the relevant drawings and to the complete satisfaction of the Engineer-in-charge.

The following checks and inspection shall be carried out before during and after erection.

- damage during transportation
- accuracy of alignment of structures
- erection according to drawings and specifications
- progress and workmanship.

In case there be any deviations regarding positions of foundations or anchor bolts, which would lead to erection deviations, the Engineer-in-charge shall be informed immediately. Minor rectifications in foundations, orientation of bolts holes etc. shall be carried out as part of the work, at no extra cost. The various parts of the steel structure shall be so erected so to ensure stability against inherent weight, wind and erection stresses. The structure shall be anchored and final erection joints completed after plan and elevation positions of the structural members have been verified with corresponding drawings and approved by the Engineer-in-charge. The bolted joints shall be tightened so that the entire surface of the bolt heads and nuts shall rest on the member. For parts with sloping surfaces tapered washers shall be used.

3.12 Final acceptance and handing over the structure

(i) At acceptance, the contractor shall submit the following documents:

- Shop and erection drawings – four sets soft copy and hard copies
4 copies of each of the following:
 - Shop acceptance documents quality certificate for structurals, plates, etc. (electrodes, welding wire, bolts, nuts, washers etc.)
 - List of certified welders who worked on erection of structures.
 - Acceptance and intermediate control procedure of erection operations.
- (ii) Approval by the Engineer-in-charge at any stage of work does not relieve the contractor of any of his required guarantees of the contract.

3.13 Method of Payments

Payment for steel work shall be made on basis of admissible weight of the structure accepted, the weight being determined as described below:

The rate for supply, fabrication and erection, shall include cost of all handling and transportation to Owner's store/site of work where supply and fabrication only are involved, trimming, straightening, edge preparation, preparation and getting reviewed of fabrication drawings, and providing one or more coat of Red-oxide zinc chromate primer as specified in the schedule of quantity.

In the case, Owner supplies materials the rate shall include cost of steel materials taking delivery of the materials, from owner's store all handling and rehandling, loading and unloading, transport to site or work, returning of surplus materials to owner's stores etc. complete as well as the cost of all handling and transport, scaffolding, temporary supports, tools and tackles, touching up primer coat, grouting etc.

The actual lengths installed shall be measured and the weight of structural material/plate shall be calculated wherever necessary on the basis of IS handbook. If sections are different from IS section, then manufacturers handbook shall be adopted. No allowance in weights shall be made for rolling tolerance.

Sections built out of plates, structural shall be paid on the actual weight incorporated except for gussets which will be paid on the weight of the smallest rectangle enclosing the shape. No deductions shall be made for skew cuts in rolled steel sections.

Welds, bolts, nuts, washers, etc. shall not be measured. Rate for structural steel work shall be deemed to include the same.

No other payment either for temporary works connected with this contract or for any other item such as welds, shims, pacing plates etc. shall be made. Such item shall be deemed to have been allowed for in the rate quoted for steel work.

3.14 Grouting of Pockets

(i) Grouting of pockets and under base plates will be done only after the steel work has been levelled and plumbed and the bases of stranchions are supported by steel shims. The space below the base plate and pockets shall be thoroughly cleaned.

(ii) The mortar used for grouting shall not be leaner than 1:2 (1 cement : 2 sand) (grade 300 in case of concrete) or as is specified and shall be mixed to the minimum consistency required. It shall be poured under suitable head and tamped until the space has been completely filled.

3.15 Tolerances allowed in the erection of building without cranes

The maximum tolerances for line and level of the steel work shall be + 3.00 mm on any part of the structure. The structure shall not be out of plumb more than 3.5 mm on each 10 M. section of height and not more than 7.0 mm per 30 M. section. These tolerances shall apply to all parts of the structure unless the drawings issued for erection purposes state otherwise.

3.16. Contractor to submit shop drawing for all structural steel work for approval. The work at site should commence only after getting the shop approved.

3.17. Contractor to get erection scheme approved before commencement of erection of trusses.

B. REINFORCEMENT BARS:

3.1 The contractor shall procure TMT bars of Fe500D grade from primary producers such as SAIL, Tata Steel Ltd., RINL, JSPL & JSW. The TMT bars procured from primary producers shall confirm to manufacture's specifications/ BIS specifications.

3.2 The specifications of TMT bars procured from primary producers shall meet the provisions of IS 1786 : 2008 pertaining Fe 500D grade of steel as specified in the tender.

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

3.4 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 as defined, 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. Else the department shall remove it and recover double the cost of removal from the contractor.

3.5 The steel reinforcement bars shall be brought to the site in bulk supply of 20 tonnes or more, or as decided by the Engineer - in-charge.

3.6 The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their 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.

3.7 Coating of aqueous exhibitor.

3.8 For physical and chemical test, specimens of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified below:

Size of Bar	or Consignment below 100 tonnes	For consignments above 100 tonnes
Under 10 mm dia bars	One sample (Three specimen) for each 25 tonnes or part thereof	One sample for each 40 tonnes or part thereof
10 mm to 16 mm dia bars	One sample (Three specimen) for each 35 tonnes or part thereof	One sample for each 45 tonnes or part thereof
Over 16 mm dia bars	One sample (Three specimen) for each 45 tonnes or part thereof	One sample for each 50 tonnes or part thereof

3.8 The contractor shall supply free of charge the steel required for testing including its transportation to testing laboratories. The cost of tests shall be borne by the contractor:

3.9 The actual issue and consumption of steel on work shall be regulated and proper accounts maintained as provided in the contract. The theoretical consumption of steel shall be worked out as per procedure prescribed in clause 42 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 shall to be made.

3.10 The steel brought to site and the steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.

3.11 For the purpose of payment, the actual weight of steel reinforcement / structural steel sections/ plates / bolts and nuts shall be measured as below:

(i) Unit weight for reinforcement bars: The actual weight per meter of the reinforcement of various diameters shall be measured for three random samples collected (for each diameter of steel reinforcement) from each lot of particular diameter of steel reinforcement brought to the site for use in the work. For this, each sample (one sample consisting of three specimens) for each diameter of steel reinforcement shall be cut to require lengths and weighed and average weight calculated and recorded. The average weight for each type of steel section and steel reinforcement of each diameter shall be taken as the actual weight per metre for that steel section and that diameter of steel reinforcement.

(ii) In case actual unit weight is less than standard unit weights mentioned in CPWD Specifications 2009 Volume 1, but within variation, in such cases payment shall be made on the basis of actual unit weight. However, if actual unit weight is more than standard unit weights mentioned in CPWD Specifications 2009 Volume 1, then payment shall be made on the basis of standard unit weight in such cases. In such case nothing extra shall be paid for difference in actual weight and standard weight.

3.12 Contractor to submit Bar Bending Schedule (BBS) for reinforcement steel work for approval. The RCC work should commence only after getting the BBS approved and signing of pour card by Engineer-in-charge.

3.13 The work shall be carried out as per the CPWD specifications.

4.0 ADDITIONAL CONDITIONS AND PARTICULAR SPECIFICATION FOR CEMENT

4.1 The contractor shall procure 43 grade (conforming to IS:8112) ordinary Portland cement as required in the work, from reputed manufacturers of grey cement having a production capacity of one million tonnes or more per annum holding licence to use ISI certification mark for their product. Supply of cement shall be taken in 50 Kg. bags bearing manufacturer's name and ISI marking.

4.2 Every delivery of cement shall be accompanied by producer's certificate confirming that the supplied cement conforms to relevant specifications. These certificates should be endorsed to Engineer-in-charge for his record.

4.3 For each grade, cement bags shall be stored in two separate godowns, one for tested cement and the other for fresh cement (under testing) constructed by the contractor at his own cost as per sketch given in General Conditions of Contract for CPWD 2010 with weather proof roofs and walls. The actual size of godown shall be as per site requirements and as per the direction of the Engineer in charge and nothing extra shall be paid for the same. The decision of the Engineer-in-charge regarding the capacity required/needed will be final. However, the capacity of each godown shall not be less than 100 tonnes or as decided by Engineer-In-Charge.

4.4 Each godown shall be provided with a single door with two locks. The keys of one lock shall remain with CPWD Engineer-in-charge or his authorized person 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 the 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 of its correctness. The contractor shall be responsible for the watch & ward and the safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-charge any time.

4.5 The contractor shall supply free of charge the cement required for testing including its transportation cost to testing laboratories. 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. The cement shall be used on the work only after satisfactory test results have been received. In case the test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected, and it 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.

4.6 The cost of tests shall be borne by the contractor.

4.7 4.8 The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in clause 42 of the contract and shall be governed by conditions therein. No payment for excess consumption of cement will be allowed. However for consumption lesser than permissible theoretical variation, a recovery shall be made in accordance with conditions of contract of schedule A to F without prejudice to action for acceptance of work/item of reduced rate or rejection, as the case may be.

4.9. For non-schedule items, the decision of the Engineer-in-charge or successor thereof regarding theoretical quantity of cement which should have been actually used shall be final and binding on the contractor.

4.10 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.

4.11. Damaged /settled/expired 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.

5.0 ADDITIONAL conditions and particular specification for R.C.C. WORK (DESIGN MIX CONCRETE)

GENERAL:-

5.1 The RCC work shall be done with RMC Of Design Mix Concrete, unless otherwise specified in the nomenclature of items, wherever letter M has been indicated, the same shall imply for the Design Mix Concrete. The Ready Mix Concrete shall be as per IS : 4926 and as per CPWD Specification and guide lines. For the nominal mix in RCC, CPWD specification shall be followed. The Design Mix Concrete will be designed based on the principles given in IS : 456, 10262 and SP 23. The contractor shall carry out design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting requirements specified. The cement shall be actually weighed as presumption of each bag having 50 kg shall not be allowed. In case of use of admixture, the mix shall be designed with these ingredients as well. The specification mentioned herein below shall be followed for Design Mix Concrete.

INGREDIENTS

- i) Coarse Aggregate :- As per CPWD Specifications
- ii) Fine Aggregate :- As per CPWD Specifications.
- iii) Water :- As per requirements laid down in IS 456-2000 and CPWD specifications.
- iv) Cement: Cement arranged by the contractor will be OPC (in bags) conforming to IS : 8112.

5.2 Admixture:- Admixtures shall not be used without approval of Engineer-in-Charge. Wherever required, admixtures of approved quality shall be mixed with concrete to achieve the desired workability within specified water cement ratio. The admixture shall conform to IS:9103. The chloride content in the admixture shall satisfy the requirement of BS : 5075. The total amount of chlorides in the admixture mixed concrete shall also satisfy the requirements of IS : 456-2000

5.3 The contractor shall not be paid anything extra for admixture required for achieving desired workability without any change in specified water cement ratio for RCC / CC work.

5.4 Grade of concrete:- The characteristic compressive strength of various grades of concrete shall be given as below :-

Sl. No	Grade Designation	Compressive strength on 15cm cubes min 7 days (N/mm ²)	Specified characteristic compressive strength at 28 days (N/mm ²)	Minimum cement content (Kg per cum)	Maximum water cement ratio
(i)	M-15	As per Design	15	240	0.5
(ii)	M-25	As per Design	25	330	0.4
(iii)	M-30	As per Design	30	340	0.4

5.5 The Concrete mix will be designed for minimum workability as specified in para 7 of IS-456-2000

5.6 WORKABILITY OF CONCRETE (UNLESS OTHERWISE SPECIFIED ELSEWHERE OR AS DECIDED BY ENGINEER IN CHARGE.

Placing Conditions	Degree of Workability	Slump (mm)
(1)	(2)	(3)
Lightly reinforced sections in slabs, beams, walls, columns	Low	25-75
Heavily reinforced section in slabs, beams, walls, columns.	Medium	50-100
Pumped concrete	Medium	75-100

5.7 The recommended values of slump for various members to confirm IS 456

5.8 In the designation of concrete mix letter M refers to the mix and the number to the specified characteristic compressive strength of 15 cm – Cube at 28 days expressed in N/mm². It is specifically highlighted that in addition to above requirement the maximum cement concrete for any grade shall not exceed 430 kg/cum.

5.9 The concrete design mix with or without admixture will be carried out by the contractor through **IIT Delhi** or NCBM Ballabgarh and as per direction of Engineer-In-Charge.

5.10 The various ingredients for mix design/laboratory tests shall be sent to the lab / test houses through the Engineer-In-Charge of the project and got it tested in approved laboratories as may be decided by the Engineer-in-charge immediately after award of work and the samples of such aggregate sent shall be preserved at site by the department. The admixture if used by contractor shall be at his own cost without any extra payment.

5.11 * Note : The Cement content means OPC Cement.

5.12 The contractor shall submit the mix design report from any of above approved laboratories like IIT Delhi, NCCBM Ballabgarh PEC Chandigarh, Shree Ram Testing Lab Delhi for approval of Engineer in charge within 30 days from the date of issue of letter of acceptance of the bid. No concreting shall be done until the mix design is approved.

5.13 In case of change of source or characteristic properties of the ingredients used in the concrete mix during the work, a revised laboratory mix design report conducted in approved by Engineer-In-Charge shall be submitted by the contractor as per the direction of the Engineer in charge.

APPROVAL OF DESIGN MIX

(i) The mix design 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.

(ii) 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 per IS relevant IS Standards/ Codes.

(iii) 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.

5.15 CHARGES FOR DESIGN MIX

(i) All cost of mix designing and testing connected therewith including charges payable to the laboratory shall be borne by the contractor.

5.16 DESIGN MIX CONCRETE FROM FULLY AUTOMATIC COMPUTERISED CONCRETE BATCHING AND MIXING PLANT

(i) Proportioning Concrete

In proportioning cement concrete, the quantity of both cement and aggregates shall be determined by weight. The cement shall be weighed separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean and serviceable condition. The amount of mixing water shall be adjusted to compensate for moisture content in both coarse and fine aggregates. The moisture content of aggregates shall be determined in accordance with IS: 2386 (Part III). Suitable adjustments shall also be made in the weights of aggregates to allow for the variation in weight of aggregates due to variation in moisture content.

(ii) Production of Concrete

The concrete shall be RMC produced in a central batching and mixing plant with, computerized printing for contents and admixture dosage. The batching plant shall be fully automatic. 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 has been reached. The batching plant shall have automatic arrangement for dispensing the admixture and shall also be capable of discharging water in more than one stage. A print out from the batching plant for every lot shall be submitted. A batching plant essentially shall consist of the following components: Separate storage bins for different sizes of aggregates, silo for cement; and water storage tank.

Batching equipment

Mixers

Control panels

Mechanical material feeding and elevating arrangements

The Contractor shall arrange for inspection of automatic batching plant within seven days of issue of letter of award to facilitate inspection and approval of same by Engineer-In-Charge. Nothing extra will be paid for this.

(iii) 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 watertight and provided with necessary air vent, aeration fittings for proper flow of cement & emergency cement 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 drawdown. The batch bins shall in general conform to the requirements of IS :4925.

(iv) The batching equipment shall be capable of determining and controlling the prescribed amounts of various constituent materials for concrete accurately i.e. water, cement, sand, individual size of coarse aggregates etc. The accuracy of the 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 aggregate in each batch
Measurement of Admixture	±3% of the quantity of admixture in each batch

5.17 Mixing Concrete

The mixer in the batching plant shall be so arranged that mixing action in the mixers can be observed from the operator's station. The mixer shall be equipped with a mechanically or electrically operated timing, signaling 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.

5.18 Transportation, Placing and Compaction of Concrete

(i) Mixed concrete from the batching plant shall be transported to the point of placement by transit mixers or through concrete pumps or steel closed bottom buckets capable of carrying 6 cum concrete. In case the concrete is proposed to be transported by transit mixer, the mixer 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 as 70 m / minute 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 revolutions 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 requirements shall conform to IS : 5892.

(ii) In case concrete is to be transported by pumping, the conduit shall be primed by pumping a batch of mortar / thick cement slurry 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.

(iii) Materials for pumped concrete shall be batched consistently and uniformly. Maximum size of aggregate shall not exceed one-third of the internal diameter of the pipe. Grading of aggregate shall be continuous and shall have sufficient ultra fine materials (materials finer than 0.25mm). Proportion of fine aggregates passing through 0.25mm shall be between 15 & 30% and that passing through 0.125 mm sieve shall not be less than 5% of the total volume of aggregate. When pumping long distances and through hot weather, set- retarding admixtures may be used. Admixtures to improve workability can be added. Suitability of concrete shall be through pumping shall be verified by trial mixes and by performing pumping tests.

5.19 PREPARATION OF MIXES AS PER APPROVED DESIGN MIX AND CONDUCTING CONFIRMATORY TEST AT FIELD LAB.

(i) The contractor shall make the cubes of trial mixes as per approved Mix design at site laboratory for all grades, in presence of Engineer in charge using sample of approved materials proposed to be used in the work prior to commencement of concreting and get them tested in his presence to his entire satisfaction for 7 days and 28 days. Test cubes shall be taken from trial mixes as follows.

For each mix, a set of six cubes shall be made from each of the three consecutive batches. Three cubes from each set of six shall be tested at age of 7 days and remaining three cubes at age of 28 days. The cubes shall be made, cured, transported and tested strictly in accordance with specifications. The average strength of nine cubes at age of 28 days shall exceed the specified target mean strength for which design mix has been approved, the evaluation of test results will be done as per IS : 456-2000.

5.20 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 specimen, three of which shall be tested at 7 days and remaining three at 28 days. Additional samples shall be prepared, if required, as per direction of Engineer in charge for testing samples cured by accelerated method as described in IS : 9103.

TEST RESULTS OF SAMPLE

The test results of the sample shall be the average of the strength of three specimen. The individual variation shall not be more than + - 15 percent of the average. If more, the test results of the sample are 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 Government Engineering colleges, or in any other approved laboratory as directed by the Engineer-in-charge.

5.21 STANDARD FOR ACCEPTANCE

- i) Standard of acceptance shall be same as specified in clause 16 of IS 456-2000.
- ii) In order to keep the floor finish as per direction of Engineer-in-charge and as per Architectural drawings and to provide required thickness of the flooring as per specification, the level of top surface of RCC shall be accordingly adjusted at the time of its centering, shuttering and casting for which nothing extra shall be paid to the contractor.

5.22 Ultrasonic Pulse Velocity Method of Test for RCC

i) The underlying 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 uniformity 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.

ii) 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.

Velocity criterion for Concrete Quality Grading.

Sl. 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

Note : In Case of "doubtful" quality it may be necessary to carry further tests.

iii) Pulse velocity method of test of concrete is to be conducted for CPWD 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.

iv) 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.

v) 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.

5.23 MEASUREMENT

As per CPWD specifications.

5.24 TOLERANCES

As per CPWD specifications

5.25 RATE :-

i) The rate includes the cost of materials and labour involved in all the operations described above except for the cost of centering, shuttering and reinforcement, which will be paid separately.

ii) In case of actual average compressive , strength being less than specified strength which shall be governed by para ‘ Standard of Acceptance’ as above the rate payable shall be worked out accordingly on prorata basis.

iii) 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 contractors. However, the Engineer in charge may order for additional tests (like cutting cores, ultrasonic pulse velocity test, load test on structure or 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. However, for payment, the basis of rate payable to contractor shall be governed by the 28 days cube test results and reduced rates shall be regulated in accordance with para 5.4.13 of Revised CPWD specification 2009, Vol.-I.

iv) As per general engineering practice, level of floors in toilet / bath, balconies, shall be kept 12 to 20mm or as required, lower than general floors shuttering should be adjusted accordingly. The landing level of mumti / Staircase cabin shall be Kept one riser level higher than adjoining slab level so as to accommodate water proofing treatment over terrace slab. In case of kitchen slab the portion of floor trap below kitchen platform be kept at lower level as per drawings. Nothing extra is payable on this account.

v) For the execution of centering and shuttering, the contractor shall use propriety “Reebol” chemical mould release agent of FOSROC or equivalent as shuttering oil as approved by Engineer-in-charge and nothing extra shall be paid on this account.

5.26 COVER/SPACER BLOCK

The contractor shall provide approved type of support for maintaining the bars in position and ensuring required spacing and correct cover of concrete to reinforcement as called for in the drawings, spacer blocks of required shape and size. Chairs and spacer bars shall be used in order to ensure accurate positioning of reinforcement. Spacer blocks shall be cast well in advance with approved proprietary pre-packed free flowing mortars (Conbextra as manufactured by M/S Fosroc Chemicals India Ltd. or equivalent as approved by the Engineer-in-charge at his discretion)of high early strength and same colour as surrounding concrete, Pre-cast cement mortar/concrete blocks/blocks of polymer shall not be used as spacer blocks unless specially approved by the Engineer-in-charge, rate of RCC items is inclusive of cost of such cover blocks.

6.1 FALSE CEILING

(i) General

Work shall in general be carried out as per the CPWD specification. Modular and acoustical false ceiling shall be provided and installed in all areas. All ceilings in the office areas, pantry and all service areas shall be openable, where provided in drawing and nothing extra shall be payable for provision for access panels.

The false ceiling material shall be of Gyp board, metal, acoustic modular tiles or calcium silicate mineral fibre ceiling tiles. The technical assistance and guidance is to be taken from the respective approved manufacturers and work shall be done strictly according to the manufacturers specifications and manuals. Material from original source shall only be used.

The false ceiling shall be got executed through authorized applicator of approved manufacturer only.

A sample of each finish shall be got approved before proceeding for bulk production. GI framing shall be erected as per recommendation of the manufacturer specification and approval of CPWD

No sagging, unlevelled stretch of work or chipped tiles shall be accepted. Contractor shall take full responsibility for its firmness with the structure.

The false ceiling comprises of Gypsum board, Acoustical Ceiling Tiles and Metallic Tiles. The Gypsum board false ceiling is to be in different shapes. Such as Vaults, Coffers, cove's and Plain in unison with Acoustical Ceiling Tiles and Metallic Tiles Ceiling. The technical assistance and guidance is to be taken from manufacturers and work has to be done according to the manufacturer's specifications and manuals. A sample of each finish shall be got approved before proceeding for bulk production. GI framing shall be erected as per recommendation of the manufacturer specification and approval of the Engineer-in-charge. The main contractor shall engage specialized agency and submit its credentials to Engineer-in-charge for approval. The criteria for setting the terms and conditions shall be broadly in line with CPWD criteria for similar works. The work shall be taken up only when specialized agency is approved in writing by Engineer-in-charge. False ceiling work shall be carried out in accordance with the actual site conditions at different /split-levels. Any sagging, unlevelled stretch of work shall be redone /replaced and made good, at no extra charge, to the satisfaction of Engineer-in-charge. No compensation shall be paid on account of provision /coverage of openings for lighting fixtures, air-conditioning ducts and the likes as detailed in drawings and /or directed.

6.2 GLASS AND GLAZING WORK GENERAL

A sensitive use of clear glass and glass with frosted 3M film shall be used in the interiors to admit natural light and give privacy to areas. All glass above 300mm x 300mm should be tempered/ toughened. Frameless glass used should be highly polished edges using CNC machines.

a) Glazing

The contractor shall furnish all labour, material and equipment required completing the installation of all glass and related items. A glass shall be of the type, quality, and substance specified in the schedule of quantities. The contractor shall cut glass sizes by field measurements or dimensions of the approved shop drawings. The responsibility for correct glass sizes shall rest with the contractor. No cracked, chipped or disfigured glass shall accepted, and the contractor shall replace all breakages or faulty installation without extra cost.

The glass shall be set in wood or metal glazing straps and metal sash with elastic glazing and compound. The glass shall be beaded first and so installed as to achieve a completely watertight result. The opaque glass, where called for, shall be set with the smooth surface outside. At the completion of the work all glass shall be thoroughly cleaned off paint and other marks removed. No cracked, chipped or disfigured glass shall be accepted, and the contractor shall replace all breakage or faulty installation without extra cost to the owner before acceptance of fit-out.

All vision glasses shall be float glass of specified thickness. The edges shall be beveled as indicated in drawings and shall be done at approved source.

The Etching wherever specified in drawings, shall be done at approved sources as per full-scale drawing approved by Engineer-in-charge / Project Manger. The etched panel shall be chemically washed /treated as per specialist specifications to have a permanent dust free surface.

The Contractor shall be responsible for protecting all mirrors and glasses fixed by him and shall replace at his own expense any broken or damaged mirror / glass caused through lack of adequate protection or care in installation or handling.

b) Tempered / Toughened Glass:

Tempered /Toughened glass shall be examined by the glass manufacturer to detect and discard any glass which exceeds the following tolerance: 1.5mm bow in 600mm; 3mm bow in 1500mm; 6mm bow in 3000mm; 9 mm bow in 4500mm. Where the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed 0.13 mm and the difference between adjacent peaks shall not exceed 0.13mm. Where bow tolerance and wave tolerance differ, the stricter requirements shall govern. Direction of ripples shall be consistent and in conformance with architectural design.

Following test shall be also carried out by the contractor at his own cost as per following provisions.

Thickness	Impact Strength	Fragmentation	Surface Compression	Bending Strength
IS-2835-1987	IS-2553-	IS-2553-	ASTM C-1048-90	DIN 1249-

	PART-I	PART-I		PART – 12
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c) Float Glass

Glass that gives distorted reflections will not be accepted. Reflections due to pressure, paints poor manufacturing process, uneven thickness or poor storage are some of the reasons for distortion. All clear float glass quality should conform to BS – 952 and ASTM C 1036 – 90.

d) Mirrors

Mirrors shall be fabricated from best clear plate or float glass of approved quality in imported variety and shall match the International Standards. All fixed panel mirrors shall be +/- 0.30mm tolerance. The edges of mirrors shall be polished and beveled and mitered as per I.S. specifications wherever, it's indicated in the drawing.

6.3 FLOORING:-

All work in general shall be carried out as per CPWD Specification. Only machine cut stone slabs of marble, granite, kota, jaiselmer etc. shall be used for flooring work.

Wherever flooring is to be done in patterns of 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.

Different stones/tiles used in pattern flooring shall be measured separately as defined in the nomenclature of the item and nothing extra for laying pattern flooring shall be paid over and above the quoted rate. No additional wastage, if any, shall be accounted for any extra payment.

Nothing extra shall be payable for using combination of marble, granite, kota, sand stone slabs & ceramic tiles in the required pattern at various locations.

Nothing extra will be paid for the additional thickness of bed mortar that will be required to achieve uniform finished surface on account of difference in specified thickness of marble, granite, kota stone, sand stone & ceramic tiles.

Flooring in toilets, verandah, kitchen, courtyard etc. shall be laid to the required slope/gradient as per the directions of the Engineer-in-charge.

Samples of the materials shall be got approved from the Engineer-in-charge well in time and kept in safe custody at the site till completion of work.

The pattern, spacing and locations of joints shall be as per drawings and direction of the Engineer-in-charge. Nothing extra on this account shall be payable.

Projections shall be rounded at the edges or half rounded as per drawings and directions of Engineer-in-charge for which payment shall be made separately if necessary.

The samples of flooring dado & skirting as per approved pattern shall be prepared and got approved from the Engineer-in-charge before execution of work.

Kota/ marble/granite stone used over the treads/risers of the stair cases shall be as per pattern approved by Engineer-in-charge. Nothing extra on this account shall be payable.

Whenever the Kota stone/marble/granite stone flooring are to be provided in treads of staircase. It should be provided in one piece with pre finished nosing and pre polished exposed surfaces and edges.

Whenever Kota stone 25mm thick is used in skirting. It should be executed by making shallow chase in wall to given flush surface.

6.4 FINISHING

1 General

a) The work shall be done in accordance with CPWD Specifications -2009 Vol. I to Vol. II with upto date correction slips and the manufacturer's specifications where CPWD specifications are not available.

b) The quantity of paint required as per the theoretical consumption including wastages, if any, shall be procured from the approved manufacturer or his authorized dealers and deposited with the representative of the Engineer-in-Charge at site.

c) The paint shall be obtained in smaller packing (around 20 litre).

d) The paint shall be kept in the joint custody of the Department and the Contractor and day- to-day account of receipt and issue shall be maintained. However, the safe custody and watch and ward shall remain to be the responsibility of the Contractor. Nothing extra shall be payable on this account.

e) The name of the manufacturer, manufacturer's product identification, manufacturer's mixing instructions, warnings and instructions for handling and application, toxicity and date of manufacturing and shelf life shall be clearly and legibly mentioned on the labels of each container. These details shall be kept in record. The material shall be consumed in the order of material brought to site, first come first consume basis. The Contractor shall obtain and submit to the Department the manufacturer's certificate for compliance of the various characteristics of the materials as per the manufacturer's specifications and also copy of the manufacturer's test report for the record.

f) Empty containers of the paints shall not be removed from site till the completion of the work unless otherwise permitted and shall be removed only with the permission of the Engineer-in-Charge or his authorized representative at site of work.

- g) All arrangements for measuring, dosing etc. at site shall be made by the Contractor. Nothing extra shall be payable on this account.
- h) The Contractor shall apply samples of each kind of paint for the approval of shade and colour as per the directions of the Engineer-in-Charge before procuring the paint in mass.
- i) All incidental charges of cartage, storage, wastage, safe custody, scaffolding, cost of samples and mock ups etc. shall be borne by the Contractor and no claim, whatsoever, shall be entertained on this account.
- j) For the item of Epoxy paint, it is clarified that the surface for painting shall be prepared by shot blasting. The metal surface shall be cleaned off any rust using sand/ emery paper and also by mechanical brush / power tool cleaning using grinder as required as per the manufacturer's specifications etc. The sand blasting as such is not required to be carried out on the surface. However the epoxy primer shall be applied immediately after the surface preparation.
- k) For the item of melamine polish, the item includes all the sand papering required to be carried out and wiped properly for cleaning all the loose dust particles. Necessary masking tapes are to be provided where different finishing work is to be carried out, so that the melamine polish does not spread to the other surfaces. Care should be taken while removing the masking tape, so that the surface is not damaged. Cost of melamine polish includes the cost of providing and removing the masking tapes wherever required. The surface shall be sand papered using emery paper no. 180, 320 and 400 as required. Any staining required shall be carried out by applying Apcolite Wood Stain or equivalent, to achieve the required colour and shade as directed by the Engineer-in-Charge. The item of melamine polish is deemed to include cost of such staining. Where French spirit polish is to be carried out the rate is inclusive of cost of staining and wood filler (Apcolite wood filler of Asian Paints or Asian NC Clear Wood filler or equivalent of other brands ICI and Pidilite Industries) if required. Nothing extra shall be payable on this account.

QUALITY ASSURANCE

For Quality Assurance the Contractor shall ensure that color and texture of finish coats, shall match the approved sample. Also, Color of priming coat shall be lighter than body coat.

Color of body coat shall be lighter than finish coat.

Color prime and body coats as required so as not to show through the finish coat and to mask surface imperfections.

Before starting application of each type of paint, the Contractor shall apply the paint to a specimen area, not to exceed 10 square meter and get finish and texture approved and shall use it as a sample for the remainder of the work.

6.5 STAINLESS STEEL HAND RAIL

The work shall be got executed as per CPWD Specifications and as per the manufacturer's specification through specialized agency as approved by the Engineer-in-Charge.

i) Providing, fabricating and fixing in position welded built –up section using stainless steel section/pipes and connecting plates, of Grade S.S 304 (SS 316 Grade shall be used for exterior applications) and of required diameter & thickness as per the Engineer-in-chargeural Drawings and details, at the junctions of doors, on walls, other locations as directed etc. including cutting, welding, grinding, bending to required profile and shape, finish, hoisting, buffing and polishing, cutting chase / embedding in RCC / Masonry, fixing using stainless steel screws, nuts, bolts and washers or stainless steel fasteners as required to make it rigidly fixed & stable and making good the plaster/ flooring etc. all complete, at all floors and all levels as directed by the Engineer-in – Charge. Prototype samples to be approved by Engineer-in-charge before mass fabrication.

ii) Rate includes cost of all inputs of materials, labour, T&P, etc. involved in the work and all incidental charges to execute this item. However, for the purpose of payment only the actual weight of the stainless pipes and stainless steel plates provided and fixed shall be measured in kg.

7 PARTICULAR SPECIFICATION AND ADDITIONAL CONDITIONS FOR WATER PROOFING WORK

7.1. The work shall be got executed as per CPWD Specifications and as per the manufacturer's specification through specialized agency as approved by the Engineer-in-Charge.

The contractor shall furnish the following particulars immediately after the issue of letter of acceptance by the Department.

The name of the specialized firm.

The trade names of the product, which would be used.

List of works where the treatment has been used.

Quantity of chlorides and sulphides used in the product.

7.2.1 GENERAL

All the water proofing treatment shall be got executed through the specialized agencies. The specialized agencies shall be got approved from the Chief Engineer. The contractor shall furnish the following particulars immediately after the issue of letter of acceptance by the Department.

The name of the specialized firm.

The trade names of the product, which would be used.

List of works where the treatment has been used.

Quantity of chlorides and sulphides used in the product.

7.2.2 The water proofing treatment for the U.G. sump, terrace tank etc. shall be tested by filling the tanks completely with potable water and observing for leakage for minimum 72 hours. All the arrangements for testing including supplying water, closing all the outlets temporarily and restoring after the test etc. shall be made by the contractor at his own cost. The contractor at his own cost rectify any leakage noticed.

7.2.3 The specialist agency for waterproofing shall also grout the Nothing extra shall be payable on this account.

7.2.4 The water proofing treatment over the terrace slab, in the sunk / depressed slabs shall be tested by ponding water as specified for curing as well as observing for leakage for minimum 2 weeks. All the arrangements for testing including supplying water, making temporary bunds using mortar, removing bunds after testing etc. shall be made by the contractor at his own cost. The contractor at his own cost shall rectify any leakage noticed. Nothing extra shall be payable on this account.

7.3 Water proofing treatment for the basement walls and rafts.

7.3.1 The water proofing items shall be got executed through one of the approved agencies as per the list of approved agencies attached with the tender. The integral cement based water proofing treatment shall be as per the item description and as directed by Engineer-in-Charge.

7.3.2 The specialist agency for water proofing work shall provide necessary sleeves made out of G.I pipes / M.S. puddle flanges (payment for which shall be made under relevant item) in the water proofing treatment at base and the raft for release of uplift pressure till the pressure is taken by the rock anchors and the dead weight of the building. The necessary provisions shall be made for filling these sleeves with cement concrete of same grade and then pressure grouting these holes with polymer modified cement slurry using aluminum nipples etc. at a later date. However, the agency shall ensure complete watertight ness of the raft and the water proofing treatment below raft. Junctions of the rock anchors with the concrete of the basement raft. Nothing extra shall be payable on this account and shall not be measured separately for payment.

7.3.3 The specialist agency for water proofing work shall also grout the junctions of the various service lines entering or coming out through the basement wall. Nothing extra shall be payable on this account and shall not be measured separately for payment.

7.3.4 The reinforced cement concrete provided in the base and walls of under ground tanks shall be admixed with water proofing compound conforming to IS 2645. The guarantee for the water proofing treatment shall include dismantling and relaying the Reinforced cement concrete, if required for rectifying any defect in the water proofing treatment. Nothing extra shall be payable on this account and shall not be measured separately for payment.

7.3.5 Layout and Design: The layout and design of raft foundation shall be as per structural design / drawing to be supplied by the Engineer-in-Charge. The structural drawing shall be properly correlated with the architectural drawing of the work before actual execution. The discrepancy if any, thus notice shall be brought to the notice of Engineer-in-Charge for necessary correction.

7.3.6 The work shall be in general carried out in accordance with CPWD specifications with up-to-date correction slips. However if the said specifications differ from those detailed in the specifications of the particular item in the schedule of quantities attached or from the particular specifications given here under the later shall prevail.

7.3.7 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.

7.3.8 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.

GUARANTEE FOR WATER PROOFING TREATMENT

7.4 The contractor shall be fully responsible for and shall guarantee proper performance of the entire waterproofing system for a period of 10 (Ten) years from the final completion of works. In addition, specific 10 years written guarantee (to be furnished in a non-judicial stamp paper of value not less than Rs.100/-) in approved proforma shall be submitted for the performance of the system, before final payment and shall not in any way limit any other rights the Employer may have under the contract .Guarantee for water proofing shall comprises of all the items described above in particular specification.

7.5 All water-proofing work shall be carried out through approved specialist agency as per method of working approved by the Engineer-in-charge. However the Contractors shall be solely responsible for waterproofing treatment until the expiry of the above guarantee period.

7.6 Ten years guarantee in prescribed proforma attached shall be given by the contractor for the water proofing treatment. In addition 10% (ten percent) of the cost of these items of water proofing under this sub head shall be retained as guarantee to watch the performance of the work executed. However, half of this amount (withheld) would be released after five years from the date of completion of the work, if the performance of the waterproofing works is satisfactory. The remaining withheld amount shall be released after completion of ten years from the date of completion of work, if the performance of the waterproofing work is satisfactory. If any defect is noticed during the guarantee period, it should be rectified by the contractor within seven days of issuing of notice by the Engineer-in-Charge and, if not attended to, the same shall be got done through other agency at the risk and cost of the contractor and recovery shall be effected from the amount retained towards guarantee. In any case, the contractor and the specialist agency, during the guarantee period, shall inspect and examine the treatment once in every year and make good any defect observed and confirm the same in writing. The security deposit can be released in full, if bank guarantee of equivalent amount, valid for the duration of guarantee period, is produced and deposited with the Department.

8 PARTICULAR SPECIFICATIONS – ALUMINIUM WORK

FOR DOORS, WINDOWS AND PARTITIONS

8.1 The material for the work shall be procured from the approved manufacturer as per the list attached with the tender documents. The Contractor shall procure and submit samples of various materials to be used in the work for the approval of Engineer-in-Charge and no work shall commence before such samples are approved. Samples of un-anodized as well as anodized aluminium sections, neoprene gaskets, glass, stainless steel screws, anchor fasteners, hardware and any other material or components requiring approval of samples, in opinion of Engineer-in-Charge, shall be submitted for the approval as mentioned above. The above samples shall be retained as standards of materials and workmanship. The cost of the above samples shall be borne by the Contractor.

8.2 The Contractor shall prepare the shop drawings for the aluminium windows giving details of the various aluminium sections, neoprene gaskets, cleats, anchor fasteners, hardware, sealants, glass etc. and submit the same for the approval of Engineer-in-Charge. Nothing extra shall be payable on this account.

8.3 Only after the approval of the samples and the shop drawings by the Engineer-in-Charge, the Contractor shall procure the material for the work. All materials brought to the site by the Contractor, for use in the work, as well as fabricated components shall be subject to inspection and approval by Engineer-in-Charge. The Contractor shall, if required by the Engineer-in-Charge, produce manufacturer's test certificates for any material or particular batch of materials supplied by him.

8.4 The Contractor shall prepare a finished sample of the aluminium window along with glazing panel and fittings etc. for approval of workmanship and material. Nothing extra shall be payable on this account.

8.5 The Contractor shall get the necessary tests carried out in an approved laboratory, as specified. The tests carried out shall be as per relevant specifications / Standard Codes. One test for each lot of anodized aluminium section of each type shall be carried out. However, this is subject to at least one test for every 1,000 Kg or part thereof, for each type of section.

8.6 Aluminium sections to be used for doors, windows, ventilators and fixed glazing, partitions, false ceiling etc. shall be appropriate to meet technical, structural, functional and aesthetic considerations. The anodizing shall be carried out in an approved factory / workshop as specified in the tender documents.

8.7 The aluminium extruded sections shall conform to I.S. Designations HEIWP / HVIWP alloy, with chemical composition and technical properties as per I.S. 733 and I.S. 1285.

For sectional weight tolerance limits shall be (-) 0.5%. However, payment for extruded aluminium sections on weight basis shall be as per paras 10.25 (I) & (II).

FABRICATION

All joints shall be accurately fabricated and be hairline in appearance. The finished surface shall be free from visible defects.

8.11 Taking into consideration varying profiles of aluminium sections being extruded by approved manufacturers, the Contractor shall prepare detailed shop drawings of his proposal using suitable sections based on architectural design / drawings, adequate to meet the requirements / specifications laid down and as proposed by the manufacturer and these detailed shop drawings shall be subject to approval of the Engineer – in – Charge.

8.12 All hardware used shall conform to the relevant specifications and as per samples approved by the Engineer-in-Charge. Design, quality, type, number and fixing of hardware shall be generally in accordance with architectural drawings and as approved by the Engineer-in-Charge before use.

8.13 All doors, windows, ventilators and glazing etc. shall be made water tight with neoprene gaskets and weather silicone sealants to the satisfaction of the Engineer-in-Charge, for which nothing extra shall be payable.

8.14 The frames shall be strictly as per Architectural drawings, the corners of the frame being fabricated to the true right angles. Both the fixed frames and openable shutter frames shall be fabricated out of sections cut to required length, mitered and mechanically jointed for satisfactory performance. All members shall be accurately machine milled and fitted to form hairline joints. The jointing accessories such as aluminium cleats, stainless steel screws etc. shall not to cause any bi-metallic reaction by providing separators, wherever required. Nothing extra shall be payable for jointing accessories.

8.15 Mitered joints of the doors, windows, ventilators shutters and frames shall be either corner crimped or fixed with self tapping stainless steel screws of approved make and quality to heavy duty extruded aluminium cleats and sealed with weather silicone sealant, for which nothing extra shall be payable.

8.16 Vertical members of the aluminium frame work shall be embedded in the floors, wherever required, by cutting and making good of the floor. Nothing extra shall be payable on this account.

8.17 FIXING OF ALUMINIUM FRAME WORK

8.18 The screws used for fixing fixed aluminium frames of the aluminium windows to masonry walls / RCC members and aluminium members to other aluminium members shall be of stainless steel of approved make and quality and of stainless steel grade 304. Threads of machine screws used shall conform to requirement of I.S. 4218.

8.19 The aluminium frames of the gypsum board partition and the wooden rafter ceiling shall be fixed to masonry walls / RCC members using stainless steel anchor fasteners of grade 316, of Kundan or Arrow make and aluminium members to other aluminium members shall be fixed using stainless steel screws of approved make and quality and of stainless steel grade 304.

8.20 For the aluminium windows, the gap between the aluminium frames and the R.C.C / Masonry and also any gaps in the various sections shall be filled with weather silicone sealant DC 795 of Dow Corning or equivalent in the required bite size, to ensure water

tightness including providing and fixing backer rod, wherever required. The weather silicone sealant shall be of such approved colour and composition that it would not stain or streak the masonry / R.C.C. work. It should not sag or flow and shall not set hard or dry out under any conditions of weather and shall be tooled properly. The weather silicone sealant shall be used as per the manufacturer's specifications and shall be of approved colour and shade. Any excess sealant shall be removed / cleared. Nothing extra shall be payable for the above.

8.21 Fixing of glass panes shall be designed in such a way that replacing damaged / broken glass panes is easily possible without having to remove or damage any members or interior finishing materials.

ANODIZING

(I) Aluminium sections shall be anodized as per I.S. 7088 – 1973. Anodizing to be as per grade AC 20 and not less than 20 microns thick when measured as per I.S. 6012, in colour and shade as approved by the Engineer-in-charge.

(II) The anodic coating shall be properly sealed by steam or dipping in de-ionized water as per I.S. 1868-1982 and / or I.S. 6057. Sealing quality shall be tested in accordance with the relevant standards. Nothing extra shall be payable on this account.

(III) The Contractor shall satisfy himself by checking in the factory that the thickness of the anodic coating is found to be minimum 20 microns and sealing quality is appropriate everywhere. The testing shall be done in an approved laboratory by EDDY CURRENT METHOD as per I.S. 6012 for thickness. For testing the thickness of anodic coating of the anodized aluminium sections, the calibration shall be done on bare (un-anodized) aluminium sections of same type. If any material is found sub-standard, it shall be rejected.

(IV) All anodized aluminium works shall conform to relevant I.S. Codes relating to materials, workmanship, fabrications, finishing, erection, installations etc. In this connection I.S. Codes including I.S. 1868 – 1982, I.S. 733 – 1983, I.S. 1948-1961, I.S. 7088-1973, I.S. 6012-1970, I.S. 1285 – 1975, I.S. 740-1975 are considered relevant and applicable.

The exposed surface of the aluminium sections shall be protected against surface damage, dents, scratches etc. It shall, therefore, be provided with protective tape. After fixing and assuring of proper functioning of doors, windows, frame work for partitions / false ceiling etc. such protective tape shall be cleaned out / removed as per the directions of Engineer-in-Charge. Nothing extra shall be payable for above.

8.23 Glazing

(I) All glass panes shall be retained within aluminium framing by use of exterior grade neoprene gaskets. Use of glazing or caulking compounds around the perimeter of glass will not be permitted. There shall be no whistling or rattling. Before installation of glass, Contractor shall ensure the following:

All glazing rebates shall be square, to plumb, true to plane, dry and free from dust.

Glass edge shall be clean and cut to exact size and grounded

Annealed float glass in doors, windows, ventilators and fixed glazing etc. shall be of approved make and standard quality conforming to C.P.W.D. Specifications.

4 mm thick glass panes shall be provided for openings not exceeding 0.5 sqm. For openings exceeding 0.5 sqm in area, 5.0 mm thick glass panes shall be provided unless specified otherwise.

8.24 PROTECTIONS AND CLEANING:

(I) After erection and removal of protective layer, all aluminium works including glass panes shall be moist cleaned with a de-ionized water to clean all marks, stains and blemishes.

8.25 MEASUREMENT AND RATES:

(I) For aluminium framework, the length of each member of the frame shall be measured correct to half a centimetre. The weight shall then be calculated on the basis of unit weight specified in the manufacturer's catalogue.

(II) The actual weight per metre of the respective aluminium sections shall be measured for three random samples collected for each type of aluminium section used in the work, cut to required lengths and weighed and average weight calculated and recorded. The average weight for each type of aluminium section shall be taken as the actual weight per metre for that aluminium section. The decision of the Engineer-in-Charge as regards the random samples and average weight shall be final and binding on the Contractor and no claim of any kind shall be entertained from the Contractor in this regard.

(III) The quantity of the aluminium, to be paid for, shall be the least of the two weights calculated on the basis of above two paras – 11.25 (I) & (II).

(IV) For glazing, the actual area of the glass panels excluding the portion in the beading shall be measured in sqm upto two decimal places, for payment.

(V) Stainless steel adjustable friction hinges and the aluminium handles for the openable side-hung windows shall be of "Earl Bihari", make or equivalent as approved by the Engineer-in-Charge. 2 nos. friction hinges shall be provided per shutter.

(VI) The cost of designing and preparation of shop drawings, all the samples, mock up of window etc. is deemed to be included in the cost of the relevant items. Nothing extra shall be payable on this account.

(VII) The item for aluminium for fixed portions for aluminium windows, frame work for partitions and wooden rafter ceiling shall include cost of all inputs of labour, material (anodized aluminium sections, including cleats, other fixtures, weather silicone sealants, stainless steel screws, nuts, bolts, rawl plugs, backer rods, polyethylene tapes etc. which shall be required for fabrication and erection of aluminium work) T & P, all incidental charges, wastages etc. involved in the work. However, for the purpose of payment, the weight of aluminium sections for the fixed window frame, frame work for partitions and wooden rafter ceiling, shall be measured in Kg. The aluminium cleats, stainless steel screws, nuts, bolts, separators etc. shall not be measured separately for payment and their cost is deemed to be included in the cost of this item. The item for aluminium for frame work for fixed partitions and wooden rafter ceiling shall also include cost of providing and fixing stainless steel anchor fasteners as required.

(IX) The item of aluminium for the openable aluminium shutters for windows and doors etc., shall include cost of all inputs of labour, material (anodized aluminium sections, including such as cleats / angles, other fixtures, stainless steel screws nuts, bolts,

stainless steel hinges, weather silicone sealant etc. which shall be required for fabrication of aluminum work) T & P, all incidental charges, wastages etc. involved in the work. However, for the purpose of payment, the weight of aluminium sections for the window shutter (sash frame) shall be measured in Kg. The aluminium cleats, stainless steel anchor fasteners, screws, nuts, bolts, separators, stainless steel hinges, etc. shall not be measured separately for payment and their cost is deemed to be included in the cost of this item. The anodized aluminium snap beading for fixing glass panels in the openable shutters of the windows shall be measured separately (on weight basis) and paid under this item of aluminium frame work for window shutters.

(X) The glass shall be paid for separately under relevant item. The cost providing and fixing neoprene gasket, felt etc. is included in the cost of this item and shall not be measured separately for payment .

The item for the aluminium frame work includes cost of making provision for fixing fittings, wherever required, as per the item description (The cost for providing fitting (handle and buffer) shall be paid for separately under relevant item).

9. PARTICULAR SPECIFICATIONS FOR ROAD WORK

Roadwork shall, in general, be carried out as per the CPWD Specifications.

TREMIX FLOORING

The work in general shall be carried out as per the CPWD specifications for CC pavements. The work shall be got executed through specialized applicators having similar experience in executing tremix flooring using vacuum dewatering system. Before taking up the work, the Contractor shall, therefore, submit the credentials of the applicators along with the details of the similar works executed by them for the approval of Engineer-in-Charge.

The Contractor or their applicators shall have adequate machinery for laying and vibrating concrete including vacuum dewatering system etc.

The concrete shall be of specified grade ready mix cement concrete with specified cement content per cubic metre of concrete with slump 70 to 80 mm. The concrete shall not have air-entrainment more than 2%. The concrete shall be levelled to required slope using bull float. The excess water shall be removed using vacuum dewatering process. After the concrete has stiffened to the point of supporting floating operation the surface shall be power floated using IRONITE no. 9.3.

The flooring shall be done in panels of sizes not more than 20 x 4 metre. The construction joints shall, therefore, be formed with square edges using the steel formwork. Each panel shall then be divided into smaller panels of size not more than 3 x 2 metre by providing contraction joints by cutting grooves of size 3 mm x 20 mm deep using mechanical saw. The cutting of the grooves shall be done as soon as the concrete is set.

The top surface of the flooring shall be sprinkled with IRONITE no. 3 (non coloured) @ 3 kg. per sqm. It shall be sprinkled when the concrete is green, before troweling. Two-third quantity of the dry shake (metallic floor hardener) shall be sprinkled in the first pass and floated with power trowel and one third of the dry shakes shall be sprinkled in the 2nd pass and floated with power trowel to smooth finish. The first shake shall be allowed to remain unworked until it has absorbed moisture and then power floated. Similar operation shall be done for the 2nd shake. The surface then shall be textured to brush finish in a workman like manner with uniform grains generally in one direction.

The surface shall then be cured for minimum 10 days.

All precautions shall be taken to avoid any marks, impressions, scratches, stains etc. to the finished surface.

One test for wear resistance (abrasion test) as per IS 1237 shall be carried out on the sample (3 specimen) core cut from the pavement. One core sample shall be tested for every 10,000 sqm or part thereof. The average wear shall not exceed 2 mm and 2.5 mm for individual specimen. Besides, other tests for concrete shall be carried out as per the CPWD specifications. All arrangements for taking out core samples and other samples shall be made by the Contractor. The core holes shall then be filled properly with the concrete of the same mix in a workman like manner and cured properly. Nothing extra shall be paid on this account.

The joints (expansion and contraction) / grooves shall then be filled with joint sealing compound conforming to grade B of IS 1834 or equivalent in workmanlike manner. It shall not be measured separately for payment.

10. The item includes cost of all inputs of material, labour, T & P, all incidental charges, wastages and testing etc. involved in the work.

10.0 PARTICULAR SPECIFICATIONS FOR BACK UP RODS, JOINTS SEALING COMPOUNDS, INSERTS AND EMBEDMENTS

10.1 BACK UP RODS / WATERBARS

I. Where water-bars are shown on the drawings, the joints shall incorporate an approved PVC external type water-bar complete with all necessary moulded or prefabricated intersection pieces assembled in accordance with the drawings with bends and butt joints in running lengths made by heat welding in an electrically heated jig.

II. Jointing and fixing of water-bars shall be carried out strictly in accordance with the manufacturer's instructions.

III. The water-bars shall be installed so that they are securely held in their correct position during the placing and compacting of the concrete.

IV. Where reinforcement present adjacent to water-bars, adequate clearance shall be left between the reinforcement and water-bars to facilitate compaction of the concrete.

V. Double headed nails may be used in the edge of the water-bar outside the line of the external grooves for fixing purposes, but no other holes shall be permitted through the water-bar.

10.2 Joint Sealing Compounds

I. Joint sealing compounds shall seal joints in concrete against the 40 passage of water, prevent the ingress of grit or other foreign material and protect the joint filler. The compound shall have good extensibility and adhesion to concrete surfaces and shall be resistant to flow and weathering.

II. Poly sulphide joints where specified on the drawings shall be sealed with polysulphide liquid polymer, stored, mixed, handled applied and cured strictly in accordance with the manufacturer's written instructions, such joints shall be formed to the correct dimensions, thoroughly cleaned and treated with recommended primer strictly in accordance with the manufacturer's written instructions prior to sealing. The Contractor shall use only competent personnel experienced in the application of polysulphide for such work.

III. Where specified in the drawings, rubber/bituminous based sealants shall be of an approved manufacture. The treatment of the joint and the use of sealing compound shall be strictly in accordance with the manufacturer's written instructions. The entire work shall be carried out as per is: 3414, is: 6509, is: 11433.

10.3 INSERTS AND EMBEDMENTSHIP

Various steel inserts and embedment's are required under the contract to be fabricated, positioned and secured firmly into place inside the formwork prior to concrete being poured. There are also requirements of jointing, threading, bolting and welding inserts and embedment of different concrete and structural steel elements in order to establish structural continuity and connection. Great care shall be exercised by the contractor in executing all aspects of the work related to inserts and embedment, including tolerances, so that the final assembly of the concrete elements can meet satisfactorily the continuity and contiguity requirements intended in the structure.

11.0 PARTICULAR SPECIFICATION FOR ACOUSTICS

11.1 Acoustical Treatment

Acoustical treatment to ceilings and walls shall be carried out using very low, medium and high frequency absorption materials, as specified in the Schedule of Quantities. The work shall be carried out generally as per CPWD specifications-2019 Vol I & Vol. II with upto date correction slips, with additional recommendations of specialist manufacturers.

11.2 The work of acoustical treatment shall be got executed through authorized applicator of approved manufacturer only.

12.0 PLUMBING

The work shall be carried out generally as per CPWD specifications-2019 Vol I & Vol. II with upto date correction slips, with additional recommendations of specialist manufacturers.

13.0 Particular Specifications of PUF panels:-

13.1 The PUF panels should be confirming to PUR (1) material as per IS Code 12436-1988. The n-Pentane blowing agent shall be used to make the panel CFC free. PUF material shall be self-extinguishing. The PUF panel manufacturing company should have in house testing laboratory to test required parameters such as K value, adhesion strength, and compressive strength. The PPGL sheet should be in accordance with Indian standard code for Galvanized steel sheets (plain & corrugated) as per IS 277:2003 or as per Bureau of Indian standards for pre-painted Galvanized steel sheets & coils as per IS 14246 (IOS 77.14050) with up to date and latest amendments.

13.2 Roof Panel: 40/68mm thick PUF insulated Corrugated Panel with 0.5mm PPGL sheet both sides in 40±2 Kg Density. The PU panel shall be CFC free using n-Pentane as a blowing agent. Panel shall have PPGL sheet on both side of Polyurethane Foam confirming to IS 12436:1988. The pre coated sheet shall be of minimum 550 mpa steel grade confirming to IS 14246:1995 and shall have zinc coating of minimum 120 gsm as per IS : 513,5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 micron. The PPGL sheet shall have plastic protective guard film of minimum 25 microns to avoid scratches during transportation. The PU Foam shall be self-extinguishing, fire retardant type having minimum density of 40 Kg/Cu.mt (+, -2 Kgs) Each PUF panel shall be reinforced within with two MS square tubes of size 40x40x1.2mm Hot dip galvanised of thickness 80 microns @ 500mm c/c along the width of panel.

13.3 Ridge :

1. Outer ridge 610 mm (305mmx305mm) should made of 0.5 mm PPGL OF THE SAME COLOR AS THAT OF ROOF PANEL.
2. Inner ridge 450mm (225mm x225mm) should made of 0.5 mm PPGL OF THE SAME COLOR AS THAT OF ROOF PANEL.

13.4 Flashings:

1. Gable end profile flashing will in 610 mm girth
2. End cap as per panel profile in 0.5 mm pppl will be provided

13.5 TECHNICAL SPECIFICATION OF PUF PANEL

SR.NO.	PARAMETERS	VALUE	STANDARD
1	Density	40± 2 kg/m ³	ASTM-D 1622-98
2	Compressive Strength at 10% Deformation (Perpendicular to Rising)	≥110 kpa	ASTM-D1621-94

2	Compressive Strength at 10% Deformation (Parallel to Rising)	≥ 210 kpa	ASTM-D1621-94
3	Adhesion Strength (Foam to Steel)	≥ 100 kpa	ASTM-D1623-78
4	Dimension Stability	Overall Max. 2 %	ISO 2796 / IS 11239 (part 2)1985
5	Closed Cell Content	Min. 85%	IS 11239(part 5)1985
6	Thermal Conductivity	0.023 W/m.K AT 23 C	ASTM-C518-98 DIN18164
7	(Fire Retarded Foam Chemical) Not Easily ignitable as per BS : 476 Pt.5 & class –I as per BS: 476 pt. 7 (For Panels)	Self Extinguishing, NO easily ignitable	BS 476,BS 4735 IS 11239
8	Water absorption	Max .2 %	ISO 2896
9	Water Vapor Permeability	5.5 ng/pasm	IS 11239-IV-1985
10	Polyurethane foam	Cfc free	

13.6 Technical Specification of PPGL Sheet

SR.NO.	PARAMETERS	VALUE
1	YIELD STRENGTH	550-650 Mpa
2	TENSILE STRENGTH	570-700 Mpa
3	HARDNESS	93 \pm 5 Hrb
4	PENCIL HARDNESS	2H
5	BEND TEST	4T
6	DFT (TOP SIDE)	24 Micron
7	DFT (BOTTOM SIDE)	10 Micron
8	ELONGATION	2.60%

GUARANTEE TO BE EXECUTED BY CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION OF WORK IN RESPECT OF WATER PROOFING WORKS.

This agreement made this _____ day of _____ two thousand and between _____, _____ (Name of the contractor, hereinafter call Guarantor of the one part) and the PRESIDENT OF INDIA (hereinafter called the Government of the other part).

Whereas this agreement is supplementary to a contract (hereinafter called the Contract) dated _____ and made between the GUARANTOR of the one part and the GOVERNMENT of the other part where by the Contractor inter alia, undertook to render the buildings and structures in the said contract recited completely water and leak proof.

And whereas the Guarantor agreed to give a guarantee to the effect that the said structures will remain water / leak proof for ten years from the date of completion of work.

Now the Guarantor hereby guarantees that water proofing treatment given 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 completion of work.

Provided that the Guarantor will not be responsible for leakage caused by earthquakes or structural defects or misuse of roof or alterations and for such purpose

- a) Misuse of roof shall mean by operation, which will damage roofing treatment, like chopping of firewood and things of the same nature, which might cause damage to the roof.
- b) Alteration shall mean construction of an additional storey or a part of roof or construction adjoining to existing roof, where by roofing treatment is removed in parts.
- c) The decision of the Engineer-in-Charge with regard to cause of leakage shall be final.

During this period of guarantee, the Guarantor shall make good all defects and in case of any defects being found, render the building water proof at his own cost, to the satisfaction of the Engineer-in- Charge 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 Department through 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 is the Guarantor fails to execute the necessary rectification or commits breach there under then the Guarantor will indemnify the Principal and his successors against all loss, damage, cost expense or otherwise which may be incurred by him by reasons of any default on the part of 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 the parties.

In witness where of these presents has been executed by the Obligor _____ and _____ by _____ and for and on behalf of the PRESIDENT OF INDIA on the day month and year first above written.

Signed, sealed and delivered by (OBLIGOR) in the presence of:

1.

2.

Signed for and _____ on behalf of THE PRESIDENT OF INDIA BY _____ in the presence of:

1.

2.

14.00 GUARANTEE FOR ALUMINIUM WORK, FALSE CEILING WORKS, WALL PANELLING WORK, PROFILESHEET, PUF ROOFING/SECTION WINDOWS AND ALUMINIUM WORK/ACP/STRUCTURAL STEEL/ROAD WORK/STAINLESS STEEL/STRUCTURAL GLAZING

14.01 The contractor shall be fully responsible for and shall guarantee proper performance of the entire Aluminium work, False Ceiling works, Wall Paneling work, Profile Sheet and Carpet work for a period of 05 (Five) years from the final completion of works. In addition, specific 05 years written guarantee (to be furnished in a non-judicial stamp paper of value not less than Rs.100/-) in approved proforma shall be submitted for the performance of the system, before final payment and shall not in any way limit any other rights the employer may have under the contract. Guarantee for Aluminium work, False Ceiling works, Wall Paneling work, Profile Sheet and Carpet work shall comprises of all the items described above in particular specification.

14.02 All Aluminium work, False Ceiling works, Wall Paneling work, Profile Sheet PUF ROOFING/SECTION WINDOWS AND ALUMINIUM WORK/ACP/STRUCTURAL STEEL/ROAD WORK/STAINLESS STEEL/STRUCTURAL GLAZING shall be carried out through approved specialist agency as per method of working approved by the Engineer-in-charge. However the Contractors shall be solely responsible for waterproofing treatment until the expiry of the above guarantee period.

14.03 Five years guarantee in prescribed proforma attached shall be given by the contractor for the water proofing treatment. In addition 05% (five percent) of the cost of these items of Aluminium work, False Ceiling works, Wall Panelling work, Profile Sheet and Carpet work under this sub head shall be retained as guarantee to watch the performance of the work executed. However, same would be released after five years from the date of completion of the work, if the performance of the Aluminium work, False Ceiling works, Wall Panelling work, Profile Sheet and Carpet work is satisfactory. If any defect is noticed during the guarantee period i.e. 05 years, it should be rectified by the contractor within seven days of issuing of notice by the Engineer-in-Charge and, if not attended to, the same shall be got done through other agency at the risk and cost of the contractor and recovery shall be effected from the amount retained towards guarantee. In any case, the contractor and the specialist agency, during the guarantee period, shall inspect and examine the treatment once in every year and make good any defect observed and confirm the same in writing. The security deposit can be released in full, if bank guarantee of equivalent amount, valid for the duration of guarantee period, is produced and deposited with the Department.

**GUARANTEE BOND
GUARANTEE TO BE EXECUTED BY THE CONTRACTOR
FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF
STONE WORK/GRANITE WORK / TILE WORK.**

The agreement made this..... day of Two Thousand betweenS/o(hereinafter called the GUARANTOR on the one part) and the President of India (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 affect 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 obligator and by for and on behalf of the President of India 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 PRESIDENT OF INDIA BY in the presence of :-

- 1.
- 2.

GUARANTEE BOND
GUARANTEE TO BE EXECUTED BY THE CONTRACTOR
FOR REMOVAL OF DEFECTS AFTER COMPLETION
IN RESPECT OF FALSE CEILING/ WALL PANELING/PUF ROOFING/SECTION WINDOWS AND
ALUMINIUM WORK/ACP/STRUCTURAL STEEL/ROAD WORK/STAINLESS STEEL/STRUCTURAL
GLAZING

The agreement made this..... day of Two Thousand betweenS/o(hereinafter called the GUARANTOR on the one part) and the PRESIDENT OF INDIA (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 affect that the said work will remain structurally stable, leak proof and guaranteed against faulty material and workmanship, defective anodizing /pre-painting/ Powder coating/ colouring and finishing for 5 (Five) 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 galvanising 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 thereunder, 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 PRESIDENT OF INDIA 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 PRESIDENT OF INDIA BY..... in the presence of :-

- 1.
- 2.

13. APPROVED MAKES OF MATERIALS (CIVIL)

The Contractor shall obtain prior approval from the Engineer-in-charge before placing order for any specific material or engaging any of the specialized agencies. The Contractor shall make a detailed submission with catalogues and proposed specifications, as well as full details of the works executed by the specialized agency, as specified.

Unless otherwise specified, the brands/makes of the material as specified in the item nomenclature, in the list of approved materials attached in the tender and in the particular specifications shall be used in the work.

In case of non-availability of the brands specified in the contract the Contractor may be allowed to use alternate equivalent brand of the material by Engineer-in-Charge with the prior approval of NIT Approving Authority subject to submission of documentary evidence of non - availability of the specified brands by contractor. The necessary cost adjustments on account of above change shall be made for the same.

3. The contractor would submit original bills and manufacturer's test certificate for all lots of material procured for the work, payments would be released only for the items for which original bills & manufacturer's test report for the material consumed has been submitted to Engineer-in-Charge. Department shall also get random testing of material from testing Laboratory of its choice.

LIST OF APPROVED MAKES OF MATERIALS [CIVIL WORK]

S. NO.	MATERIAL	MANUFACTURERS NAME
	CIVIL ITEMS	
1.	CEMENT	ACC, ULTRATECH, VIKRAM, AMBUJA, JAYPEE, J.K., LAFARGE, L&T, BIRLA, CCI, BINANI, JK LAKSHMI
2.	REINFORCEMENT STEEL-TMT BARS-FE-500D GRADE	SAIL, TATA STEEL, RINL, JSW, JSPL
3.	STRUCTURAL STEEL SECTIONS	SAIL, TISCO, RINL, JSW, JINDAL STEEL & POWER, JINDAL, TATA
4.	STRUCTURAL STEEL TUBES/PIPES	JINDAL, TATA, APL APOLLO, ELECTRO STEEL, G.S.F., PRAKASHSURYA, LLOYDS
5.	LGSF VENDORS	M/S INTERARCH BUILDING PRODUCTS PVT. LTD., M/S TATA BLUESCOPE STEEL LTD., M/S MGI INDIA PVT. LTD., M/S JSPL, M/S EVEREST INDUSTRIES LTD., M/S WOOTZ BUILDSYS LLP., M/S EPACK POLYMERS.
6.	READY MIXED CEMENT CONCRETE	ACC, LAFARGE, ULTRATECH, SHREE, ALCHON, L&T GRASIM, NSCONCRETE, RMC READYMIX (INDIA), SHAILA ENTERPRISES, RDC CONCRETE, TECHNO PRIME RMC PVT LTD, VK READY MIX CONCRETE, ASHTECH, SHRI RAM READY MIX CONCRETE
7.	ANTI-TERMITE TREATMENT AGENCY	PEST CONTROL INDIA LTD, GODREJ PEST CONTROL, CAPITAL PEST CONTROL (INDIA)
8.	CHEMICAL TO BE USED FOR 20% E.C.ANTI-TERMITE TREATMENT	DE-NOCIL AND BAYER
9.	SHUTTERING PLY	GREENPLY SHUTTERING PLY, ARCHID SHUTTERING PLY, EURO SHUTTERING PLY
10.	SUPERPLASTICIZERS	MC BAUCHEMIE/FOSROC/SIKA/BASF/ CHRYSO/VELOSIT/PIDILITE
11.	WHITE CEMENT	BIRLA WHITE , J.K. WHITE, TRAVANCORE
12.	AAC BLOCK	SHREE, INSTABLOCK, BILTECH, MAGICRETE, SIPROX, BIRLA AEROCON, J.K., CLAVECON INDIA PVT. LTD., J.K. LAKSHMI, B.G. SHIRKE/ INDO BHUTANCONSTRUCTION SOLUTION, ULTRATECH XTRALITE,

13.	BLOCK JOINTING MORTAR	JK LAKSHMI, BIRLA AEROCON SMARTFIX, MYK SCHOMBURG, ULTRATECH, FERROUSCRETE, ARDEX
14.	GLAZED CERAMIC TILES	RAK CERAMICS, SOMANY, KAJARIA, NITCO, ORIENT BELL, JOHNSON, ASIAN (AGL)
15.	VITRIFIED TILES	RAK CERAMICS, SOMANY, KAJARIA, ORIENT BELL, JOHNSON, ASIAN (AGL), RESTILE
16.	WALL PUTTY	JK WHITE, BIRLA WHITE, SARA PUTTY, STP LTD., SHALIMAR, ASIAN, BERGER, BIRLA AEROCON SMARTPUTTY, SAKARNI WALL GUARD
17.	PLASTER OF PARIS	JK LAKSHMI, SAKARNI, SHRIRAM, NIRMAN
18.	GYPSUM PLASTER	SAINT GOBAIN, SAKARNI, J.K. LAKSHMI
19.	ANCHOR PLUG SOIL/ ROCK ANCHOR	BBR, VSL, FREYSSINET
20.	PORCELAIN TILES	JOHNSON, ASIAN (AGL)
21.	CHEQUERED TILE	NITCO, ULTRA, UNISTNOE, MODERN
22.	CC PAVERS, PRECAST CC KERB STONE, CC TILES, RCC SLAB	NITCO, BHARAT, HINDUSTAN, ULTRA, KJS CONCRETE, DURACRETE, KK MANHOLE & COVERS, TERRA FIRMA, PAVER INDIA, DALAL, UNISTONE, CECO, S&S, MOON LIGHT, SWASTIK, ECOCRETE
23.	GRASS PAVER	UNISTONE, ULTRA, HINDUSTAN, KK, KJS
24.	SFRC/PRECAST C.C. COVERS	KK MANHOLE & COVERS, JAIN, PRAGATI, HINDUSTAN
25.	FLYASH BRICKS	POWER BRICK, YBW PROJECT, ASHTECH INDUSTRIES PVT. LTD.
26.	GLASS MOSAIC TILES	PALLADIO, CORAL, MRIDUL, BISAZZA, MMG TILES
27.	INSULATION FOR PIPE, RUBBER INSULATION	KAIFLEX, ARMAFLEX, CAREFLEX, VIDEOFLEX AFLEX
28.	COPPER TUBES/ PIPES	RAJCO, MEXFLOW, DELHI METAL, ABC
29.	READY MIX PLASTER	BIRLA AEROCON, ULTRATECH, RAMCO, WEBER, LATICRETE
30.	RAISED / CAVITY FLOORING	UNI FLOOR, UNITILE INDIA, TATE, ZTFLOOR, ACCESS FLOOR SYSTEMS
31.	DECK SHEET	JSW, TATA BLUESCOPE, INTERARCH, JSPL, ROOFCLAD
32.	SELF-DRILLING SCREWS	TW BUILDEX & BOUSTED, CORROSHIELD, ATUL FATERNERS LTD.
CONSTRUCTION CHEMICALS		
1	WATERPROOFING COMPOUND	VELOSIT, FOSROC, PIDILITE, SIKA, SUNANDA SPECIALITY COATINGS, MYK SCHOMBERG, STP LTD, X-CALIBUR CONSTRUCTION SYSTEMS INC, SUPREME BITUCHEM INDIA PVT LTD, MC BAUCHEMIE, RACHTR CHEMICALS, CHOWGULE, FIRESTONE, ARDEX ENDURA
2	ADMIXTURES	FOSROC, SIKA, VELOSIT, CICO, BASF, STP LTD., SUNANDA SPECIALITY COATINGS, MYK SCHOMBURG, HEADWAY CHEMICALS INDIA PVT LTD, SUPREME BITUCHEM INDIA PVT. LTD, MC BAUCHEMIE, CHOWGULE, ARDEX ENDURA
3	TILE ADHESIVE	ARDEX ENDURA, LATICRETE, FOSROC, SUNANDA SPECIALITY COATINGS, MAGICRETE, VELOSIT, HEADWAY

		CHEMICALS INDIAPVT LTD, SUPREME BITUCHEM INDIA PVT LTD, RACHTR CHEMICALS, CHOWGULE, STP LTD.
4	GROUTING COMPOUND	ARDEX ENDURA, PIDILITE, LATICRETE, SUNANDA SPECIALITY COATINGS, FOSROC, CICO, STP LTD. VELOSIT, WEBBER, MYK SCHOMBURG, HEADWAY CHEMICALS INDIA PVT LTD, SUPREMEBITUCHEM INDIA PVT. LTD, RACHTR CHEMICALS, CHOWGULE, STP LTD.
5	EPOXY MORTAR	FOSROC, VELOSIT, SIKA, SUNANDA SPECIALITY COATINGS, CICO, HEADWAY CHEMICALS INDIA PVT LTD, SUPREME BITUCHEM INDIA PVT LTD, MYK SCHOMBURG, RACHTR CHEMICALS, CHOWGULE, STP LTD.
6	HIGH PERFORMANCE EPOXY BASED RESIN ANCHORSYSTEM	BASF, FOSROC, HILTI, SUNANDA SPECIALITY COATINGS, X CALIBUR CONSTRUCTION SYSTEMS INC, SUPREME BITUCHEMINDIA PVT LTD, RACHTR CHEMICALS, CHOWGULE, STP LTD.
7	POLYSULPHIDE / SILICON SEALANT	GE, DOW CORNING, PIDILITE, WACKER, SUNANDA SPECIALITY COATINGS, CONSTRUCTION PRODUCTS INDIA LTD, HEADWAY CHEMICALS INDIA PVT LTD, SUPREME BITUCHEM INDIA PVT. LTD, BENGAL BITUMEN, MYK SCHOMBURG, STP LTD.
8	SOLVENT BASED SILICONE REPELLENT COATING	PIDILITE, GE, MC BAUCHEMIE, WACKER, VELOSIT, SUNANDA SPECIALITY COATINGS, X CALIBUR CONSTRUCTION SYSTEMS INC, RACHTR CHEMICALS, CHOWGULE, MYK SCHOMBURG, STP LTD.
9	FLOOR HARDENER	PIDILITE, FOSROC, SIKA, MC BAUCHEMIE, VELOSIT, MYK SCHOMBURG, X CALIBUR CONSTRUCTION SYSTEMS INC, SUPREME BITUCHEM INDIA PVT LTD, RACHTR CHEMICALS, STP LTD. , ARDEX ENDURA
10	FIRE RETARDANT PAINT	SUNANDA SPECIALITY COATINGS, AKZONOBEL, PROMAT
11	APP MEMBRANE WATERPROOFING	PIDILITE, SIKA, STP LTD., TEXSA BITUMAT CO. LTD., SUNANDASPECIALITY COATINGS, HEADWAY CHEMICALS INDIA PVT LTD, SUPREME BITUCHEM INDIA PVT LTD, BENGAL BITUMEN, CHOWGULE, MYK SCHOMBURG
12	A. INTEGRAL CRYSTALLINE ADMIXTURE FOR CONCRETE WATERPROOFING TREATMENT	VELOSIT, PENETRON, KRYTON, SUNANDA SPECIALITY COATINGS, X CALIBUR CONSTRUCTION SYSTEMS INC, MC BAUCHEMIE, CHOWGULE, MYK SCHOMBURG, STP LTD. , ARDEX ENDURA
	B. CRYSTALLINE POWDER WATERPROOFING COATING	VELOSIT, PENETRON, KRYTON, SUNANDA SPECIALITY COATINGS, X CALIBUR CONSTRUCTION SYSTEMS INC, BENGAL BITUMEN, CHOWGULE, MYK SCHOMBURG, STP LTD. , ARDEX ENDURA
13	ADHESIVES	FEVICOL, ANCHOR, DUNLOP, 3M, PIDILITE, SIKA, THERMOSHIELD, VAMORGANIC, MYK SCHOMBURG, VELOSIT, XCALIBUR CONSTRUCTION SYSTEMS INC, RACHTR CHEMICALS, CHOWGULE, STP LTD.
14	WEATHER SILICON SEALANT	WACKER, DOW CORNING, MCCOY, SOUDAL, SUNANDASPECIALITY COATINGS, RACHTR CHEMICALS, STP LTD.
15	BACKER ROD	SUPREME IND.LTD., SYSTRANS POLYMERS, RACHTR CHEMICALS

16	BITUMEN, CRMB-55, CRMB-60, PMB	INDIAN OIL, HINDUSTAN PETROLEUM, BHARAT, PETROLEUM, SWASTIK, SHIVA ASPHALT, OOMS PMR PVT LTD, BENGAL BITUMEN, STP LTD.
17	NON METALIC SURFACE HARDNER	FORSOC, SIKA, VELOSIT, MC BAUCHEMIE, SUNANDA SPECIALITY COATINGS, X CALIBUR CONSTRUCTION SYSTEMS INC, SUPREME BITUCHEM INDIA PVT LTD, MYK SCHOMBURG, RACHTR CHEMICALS, STP LTD.
18	SUNKEN PORTION / TERRACE WATERPROOFING CEMENTITIOUS TREATMENT	VELOSIT, FORSOC, SIKA, MC BAUCHEMIE, SUNANDA SPECIALITY COATINGS, X CALIBUR CONSTRUCTION SYSTEMS INC, SUPREME BITUCHEM INDIA PVT LTD, MYK SCHOMBURG, BENGAL BITUMEN, CHOWGULE, FIRESTONE, STP LTD.
19	PVDF COATING	RADIANT, ANODIZERS, AKZONOBLE, VALSPAR
20	CURING COMPOUND	FORSOC, VELOSIT, SUNANDA SPECIALITY COATINGS, SIKA, BASF, MC BAUCHEMIE, SUPREME BITUCHEM INDIA PVT LTD, MYK SCHOMBURG, RACHTR CHEMICALS, STP LTD., ARDEX ENDURA
21	ACCESS FLOOR SYSTEM	KEBAO, COMFLOOR, M-FLOOR, MC BAUCHEMIE
22	PVC WATER STOPS	FOXOPAM, MARUTI RUBBER, VELOSIT, X CALIBUR CONSTRUCTION SYSTEMS INC.
23	CORROSION INHIBITING ADMIXTURE (ASTM G1, ASTM G3, ASTM G 109)	SUNANDA SPECIALITY COATINGS, BASF, FOSROC, SIKA, MYK SCHOMBURG, VELOSIT, STP LTD.
24	LIQUID APPLIED MODIFIED PU WATERPROOFING MEMBRANE FOR BRIDGE DECK WATERPROOFING / TERRACE WATERPROOFING	VELOSIT, SUNANDA SPECIALITY COATINGS, BASF, X CALIBUR CONSTRUCTION SYSTEMS INC, BENGAL BITUMEN, CHOWGULE, MYK SCHOMBURG, FIRESTONE, STP LTD., ARDEX ENDURA
25	ANTICARBONATION COATINGS	SUNANDA SPECIALITY COATINGS, VELOSIT, BASF, FOSROC, ICI LTD, HEADWAY CHEMICALS INDIA PVT LTD, SUPREME BITUCHEM INDIA PVT LTD, MC BAUCHEMIE, CHOWGULE, ICI LTD, NEROLAC, BERGER, ASIAN PAINTS, MYK SCHOMBURG, STP LTD., ARDEX ENDURA
26	FOOD GRADE EPOXY COATING	SUNANDA SPECIALITY COATINGS, SIKA, BASF, VELOSIT, X CALIBUR CONSTRUCTION SYSTEMS INC, RACHTR CHEMICALS, CHOWGULE, MYK SCHOMBURG, STP LTD., ARDEX ENDURA
27	EPOXY FLOORING	SUNANDA SPECIALITY COATINGS, SIKA, BASF, RACHTR CHEMICALS, CHOWGULE, MYK SCHOMBURG, STP LTD., ARDEX ENDURA
28	PU FLOORING	SUNANDA SPECIALITY COATINGS, SIKA, BASF, VELOSIT, X CALIBUR CONSTRUCTION SYSTEMS INC, RACHTR CHEMICALS, CHOWGULE, MYK SCHOMBURG, STP LTD., ARDEX ENDURA
29	INTUMESCENT FIRE COATINGS FOR STEEL STRUCTURE	SUKRI, NEWCHEM, SAPC INDIA, PROMAT, AKZO NOBEL, FSI LTD,
30	PU COATINGS FOR STRUCTURAL STEEL	SUNANDA SPECIALITY COATINGS, SIKA, VELOSIT, X CALIBUR CONSTRUCTION SYSTEMS INC, CHOWGULE, STP LTD
31	EPOXY COATINGS FOR STRUCTURAL STEEL	SUNANDA SPECIALITY COATINGS, SIKA, X CALIBUR CONSTRUCTION SYSTEMS INC, RACHTR CHEMICALS, STP LTD.

32	EPDM & SILICON GASKET	HANU, ANAND, RAVEN, ZERO, ROOP, LESCUYER, BENGAL BITUMEN, AMEE RUBBER, OSAKA, ELTECH, AVIGIRI
	PAINTS	
1	WATER-PROOFING CEMENT PAINT	ASIAN, ICI LTD, BERGER, NEROLAC, SNOWCEM, RACHTR CHEMICALS, CHOWGULE, STP LTD
2	TEXTURED EXTERIOR PAINT	ASIAN, BERGER, NEROLAC, SUNANDA SPECIALITY COATINGS, ICI, CHOWGULE, STP LTD
3	SYNTHETIC ENAMEL PAINT	ASIAN, ICI LTD, BERGER, NEROLAC
4	PLASTIC/ACRYLIC EMULSION PAINT	ASIAN, ICI LTD, BERGER, NEROLAC, SUNANDA SPECIALITYCOATINGS, MYK SCHOMBURG, STP LTD
5	OIL BOUND DISTEMPER/ACRYLIC DISMTEMPER	ASIAN, ICI LTD, BERGER, NEROLAC,
6	CEMENT PRIMER	ASIAN, ICI LTD, BERGER, NEROLAC, SNOWCEM INDIA LTD.
7	PREMIUM ACRYLIC SMOOTH EXTERIOR PAINTEMULSION	BERGER, ASIAN, SUNANDA SPECIALITY COATINGS, NEROLAC, ICILTLD
8	STEEL/ WOOD PRIMER	ASIAN, ICI LTD, BERGER, NEROLAC,
9	EPOXY PAINT	ASIAN, ICI LTD, BERGER, NEROLAC, SNOWCEM INDIA LTD,SUNANDA SPECIALITY COATINGS, RACHTR CHEMICALS
10	WOOD FINISH (MELAMINE & PU POLISH)	ASIAN, ICI LTD, BERGER, NEROLAC, PIDILITE, WEMBLEY, STP LTD.
11	THERMOPLASTIC PAINTS	ASIAN PAINTS, BERGER, RELIANCE THERMOPLAST, S.N. IND.OSCAR, AUTOMARK (INDIA) INDUSTRIES LTD, STP LTD
12	ROAD MARKING PAINT	NEROLAC, ASIAN, SHALIMAR, BERGER, STP LTD.
13	VACUUM DEWATERING SYSTEM	SWITECH INDIA PVT LTD, TREMIX FLOORING,
	WOOD WORK	
1	PLY BOARD, PLYWOOD	GREEN PLY/ GREEN PANEL, DURO, CENTURY, ARCHID, MERINO, NATIONAL, KITLAM
2	LAMINATE	ARCHID, MERINO, GREEN, CENTURY, KITLAM, FORMICA, NATIONAL
3	VENEER PLY, NATURAL WOOD VENEERS	MERINO, GREEN LAM, DURO, CENTURY, SONEAR, TRU-WOOD,MAYUR,ARCHID, KITLAM
4	PRELAMINATED PARTICLE BOARD	CENTURY, KITLAM, MERINO, ACTION TESA, ARCHID, NATIONAL,ECOBOARD, ANCHOR, BHUTAN BOARD, GREEN LAM
5	FLUSH DOOR	CENTURY, ARCHID, MERINO, KITLAM, NATIONAL, SWASTIK,CORBETT, KUTTY FLUSHDOOR, DURO, GREEN
6	GYPSUM BOARD	LAFARGE, SAINT GOBAIN GYPROC INDIA PVT. LTD, USG BORAL, AMF
7	LOCKS, LETCH	GODREJ, HARRISON, PLAZA, YALE, HETTICH, HARDWYN, DORMA
8	FRICTION STAY HINGES, BALL BEARING HINGES &SPRING HINGES	EARL-BIHARI, EBCO, GODREJ, DORMA, HAFELE, GEZE

9	NUTS, BOLTS & SCREWS	GKW, KUNDAN, PRIYA, ATUL, PUJA
10	DASH, ANCHORING FASTENERS & CRAMP	HILTI, FISCHER, TRIXEL FROM AXELINDIA, CANON, BOSCH
11	MDF/HDF BOARD	NIJWOOD, DURATUFE BAJAJ, MERINO, CENTURY, GREENPANEL
12	FRAME SYSTEM FOR INTERNAL PARTITION	SAINT GOBAIN GYPROC INDIA PVT. LTD, GYPROC, USG BORAL, AMF
13	WALL PAPER	ROSELLE, EGOWALL PAPERES VESCOM
14	ACOUSTIC MINERAL FIBRE CEILING AND GRIDSYSYTEM	USG BORAL, AMF, ARMSTRONG
15	THERMAL INSULATION BOARDS	U.P TWIGA FIBERGLASS LTD, LLOYD, ROCKWOOL INDIA, TWIGAINSLATING INDIA
16	PREMIXED FORMULATED GYPSUM LIGHTWEIGHTPLASTER	ELITE-90 - GYPROC GOBAIN, FERRO – 700 GYPSUM PLASTER - FERROUS CRETE, RED TOP - USG BORAL BUILDING PRODUCTS (I) PRIVATE LIMITED,
17	IPE WOOD PANELS	TIMBER TRENDZ, KBJ INTERIORS, GRID FLOORS PVT LTD
18	PU POLISH FOR WOOD WORKS	ICA, ASIAN PAINTS, DULUX
19	TOILET CUBICLES	GREENLAM, MERINO, CENTURY
	ALUMINIUM, STEEL, FALSE CEILING, ROOF AND GLASS WORK	
1.	STAINLESS STEEL HARDWARE FITTINGS (HEAVYDUTY)	DORMA, OZONE, GODREJ, GEZE, HAFELE, BLUM, DORSET,PERGO
2.	ALUMINIUM SECTIONS FOR DOORS, WINDOWS&PARTITIONS ETC.	JINDAL , HINDALCO, INDALCO, NALCO, BHORUKA, INDAL,
3.	ALUMINUM SHEET	NOVELIS, EURAMAX
4.	ANODISED/POWDER COATED ALUMINIUM HARDWARE (HEAVY DUTY)	NU-LITE, SARGENT, EVERITE, GODREJ, HARDIMA, HARDWARE,CLASSIC,ALKA, JINDAL, PULSE
5.	CLEAR/FLOAT/FROSTED GLASS	MODI, SAINT GOBAIN, ASAHI, PILKINGTON, GOLD PLUS,GLAVERBEL (BELGIUM)
6.	FIRE RETARDANT ALUMINIUM COMPOSITE PANEL	ALSTRONG, REYNOBOND, ALPOLIC, ALUDECOR, ALUCOBOND, ALSTONE, CROSS BOND, ALUBOND DACS
7.	STAINLESS STEEL SECTION	JINDAL, KICH, ESSAR, NSTYLE-D-LINE, FABRINOX, SALES STEEL, DORMA, GEZE, OZONE
8.	HIGH PERFORMANCE SOLAR TOUGHENED GLASS	SAINT GOBAIN, ASAHI, PILKINGTON
9.	REFLECTIVE GLASS/LACQUE RED GLASS	SAINT GOBAIN , ASAHI, PILKINGTON, GLAVERBEL (BELGIUM),MODIGUARD, ATUL
10.	FALSE CEILING- GYPSUM	SAINT GOBAIN GYPROC INDIA PVT. LTD., LAFARGE, GYROC/BORAL
11.	FALSE CEILING- METAL WITH SUPPORTING GRID	SAINT GOBAIN, ARMSTRONG, DEXUNE, USG BORAL, ECOPHONE,DECOSONIC, DAIKEN, UNI-MAT
12.	ACOUSTICAL FALSE CEILING SYSTEM	ARMSTRONG, AMF, USG BORAL, SAINT GOBAIN, KNAUF DANOLINE
13.	AXIOMS	ARMSTRONG, AMF, USG BORAL, SAINT GOBAIN
14.	METAL MODULAR FALSE CEILING SYSTEM	ARMSTRONG, HUNTER DOUGLAS, TECHNO ACOUSTICS

15.	WOODEN METAL BAFFLE CEILING SYSTEM	ARMSTRONG, HUNTER DOUGLAS, TECHNO ACOUSTICS, DURLUM
16.	CALCIUM SILICATE FALSE CEILING SYSTEM	RAMCO HILUX, AEROLITE
17.	FIRE RATED GLASS/ HARDWARE	ST. GOBAIN, PILKINGTON, SCHOTT, SUKRITI
18.	TWO HOUR FIRE RATED METAL GLASS DOOR/HARDWARE	ST. GOBAIN, PILKINGTON, SCHOTT, SUKRITI
19.	UPVC WINDOW/DOORS	FENESTA, REHAU, ALUPLAST, PRIZMA, DUROPLAST, WINTECH, VEKA INDIA, KOMMERLING, APARNA PROFILES PVT LTD (OKOTECH)
20.	FIRE DOOR/HARDWARE	GODREJ, SHAKTI, NAVAIR, SUKRITI, PROMAT, KUTTY DOOR, BECKER FIRE SOLUTION
21.	PVC DOORS	RAJSHREE, FINOLEX PLASTICS, E-PLANTA, POLYLINE, DUROPLAST, SINTEX, FIBREWAYS, JAYNA
22.	FRP DOOR	FIBREWAYS, ASHOO MODEL ARTS, NAVIER, SUKARI PROMAT, KUTTY, JINDAL STAINLESS, BHATT FIBREWAYS, JAYNA, SELECTED
23.	FACTORY MADE SECTION WINDOW	(I) M/S UNITED ENGG. WORKS, RAM NAGAR (II) M/S METAL WINDOW CORP. ROHTAK (III) M/S SKS STEEL INDUSTRIES PIRGARHI (IV) ANY OTHER ISI MARKED FACTORY MADE (V) JANGID ENGINEERING WORKS (JAIPUR)
24.	PUFF INSULATED PANEL	LLOYD INSULATION, JINDAL, METECNO, SYNERGY, ROOFCLAD
25.	ANTI STATIC HIGH PRESSURE LAMINATE	FORMICA, MERINO, ANALCO, CENTURY, BAKELITE HYLAM, DECOLAM, SUNMICA (AICA)
26.	MIRROR	SAINT GOBAIN, MODIGUARD, AIS, ATUL, GOLDEN, PILKINGTON
27.	ROCKWOOL/GLASSWOOL INSULATION	TWIGAFIBER, LLYOD INSULATION, SUPREME, SIPLA, UNIFEB
28.	FRAME SYSTEM FOR INTERNAL	SAINT GOBAIN GYPROC, BOROL, AMS
29.	WIRE MESH	HAVER STANDARD, GRAND METAL, STRELING, TRIMURTYWELDED MESH, TIGER
30.	HYDRAULIC DOOR CLOSURE/FLOOR SPRING	HARDWYN, GODREJ, YALE, EVERITE, DOORKING, KELWIN, DORMA HAFELE, GEZE, DORSET, BECKER FIRE SOLUTION
31.	S.S. RAILING	JINDAL, ICICH, ESSAL, DORMA, CONNECT ARCHT., FABRINOX, STEEL N STYLE
32.	G.I. SHEET	SAIL, TATA, JINDAL, ISPAT, ROOFCLAD
33.	FIBRE GLASS SHEET	SIMCRYL(SIMBA), FIBREWAYS, ADVANCE FIBRE, ROOFCLAD
34.	ROLLING SHUTER	RAMA ROLLING SHUTTER, JYOTI ROLLING SHUTTER, ANANDINDST. SHRI RAM ROLLING SHUTTER
35.	M.S. DOOR, FITTINGS	ASHISH, OFFORD, GRAG, ADARSH
36.	SMOKE SEAL STRIP	IMPORTED PROMAT, ASTRO FLAME
37.	DOOR CLOSE LOCK	INGEROLL RAND, DORMA, DORSET, BECKER FIRE SOLUTION

38.	PANIC EXIT DEVICE	INGEROLL RAND, MONARCH, BECKER FIRE SOLUTION
39.	DOOR COORDINATOR	UL-LISTED, MONARCH
40.	TEMPERED GLASS	MODIFLOAT, SAINT GOBAIN, ASAHI, GLAVERBEL
41.	DOORS & WINDOW FIXTURE	EVERITE, GODREJ, HARDIMA, HARDWARE, KLASSIC, ALKA, JINDAL
42.	METAL FIRE CHECK DOORS	NAVAIR, SHAKTI-MET, GODREJ
43.	STEEL WINDOW	(I) M/S UNITED ENGG. WORKS, RAM NAGAR (II) M/S METAL WINDOW CORP. ROHTAK (III) M/S SKS STEEL INDUSTRIES PIRGARHI (IV) ANY OTHER ISI MARKED FACTORY MADE (V) JANGID ENGINEERING WORKS (JAIPUR)
44.	MS PRECOATED ROOFING SHEET	TATA BLUESCOPE, INTERRARCH MULTICOLOR STEEL, LLYODSTEEL, ISPAT STEEL, ROOFCLAD, FIBREWAYS, JSW
45.	FIBRE CEMENT BOARD (FLEX-O-BOARD)	HYDERABAD INDUSTRY LTD., VISHAKHA, EVEREST INDUSTRYLTD., JAMES HARDIE, SHERA
46.	LGSF FRAME	TATA BLUE SCOPE, J.S.W, ESSAR, ISPAT STEEL
47.	FABRICATORS FOR ALUMINIUM GLAZING, STRUCTURAL GLAZING, ALUMINIUM DOOR & WINDOWS, ACP WORK.	ALUMAX, WINDORZ INDIA PVT. LTD, JANGID ENGINEERINGWORKS (JAIPUR)
48.	STAINLESS STEEL FABRICATORS	VETERAN INDUSTRIES (INDIA), KANZ, D LINE, EARL BEHARI, ANAND
49.	GALVANISING	JENCO/STEEL LINE, LITE, KARAMTARA
50.	LAMINATE FLOORING	ARMSTRONG, PERGO, FLORENCE, ACTION TESA
51.	PVC FLOORING & VINYL WALL	ARMSTRONG, FORBO, GERELOR, INPROCORP
52.	WELDING ELECTRODE	RAAJRATNA ELECTRODES, ESAB INDIA, ADORE WELD LTD, HONAVAR ELECTRODE
53.	GLASS DOOR FITTINGS	DORSET, OZONE, HARDWYN, DORMA, HETTICH
54.	PVB OR SGP LAMINATION	DUPONT KURARRAY, SOLUTIA
55.	SPACER TAPE (OPEN PU CELL)	NORTON, TREMCO, BOW
56.	SPANDREL INSULATION	U.P TWIGA FIBERGLASS LTD, LLOYD, ROCKWOOL INDIA, TWIGA INSULATING INDIA
57.	ROCK WOOL (FIRE STOP)	ROCKWOOL INDIA, ROXUL ROCKWOOL.
58.	SMOKE SEAL INTUMUSCENT	HILTI, SIKA
59.	SMOKE SEAL SEALANT	HILTI, SIKA, DOW CORNING
60.	REVOLVING DOORS	DORMA, GEZE, KONE, BOONEDAM
61.	GLASS RAILING	Q RAIL, NEKI, KICH, FAÇADE ONE, ALLY DZINE SERVICES PVT. LTD
62.	CASEMENT WINDOW HINGES	GIESSE, ALUALPHA, LAVAL, SAVIO
63.	SS FRICTION HINGES	GIESSE, COTSWOLD, SECURISTYLE

64.	MULTIPOINT LOCKING SETS	GIESSE, ALUALPHA, LAVAL, SAVIO
65.	FLUSH LOCK FOR SLIDING'S	GIESSE, LAVAL, SOTRALU, ROTO, SAVIO
66.	ROLLERS FOR SLIDING'S WINDOWS / DOORS	GIESSE, LAVAL, SOTRALU, ROTO, SAVIO
67.	GLASS REINFORCE FIBRE CONCRETE MANUFACTURES AND INSTALLERS	SHENISHA CORPORATION, ARK INTERIOR AND CONSTRUCTION SOLUTIONS, YOGI GRC PRODUCTS PVT LTD
68.	FAÇADE CLEANING SYSTEM	CRADLE RUNWAYS INDIA PVT. LTD, APPLETREE
69.	GYPSUM PARTITION SYSTEM	SAINT GOBAIN GYPROC, USG BORAL
70.	INSULATION	U.P TWIGA FIBERGLASS LTD, LLOYD, ROCKWOOL INDIA
71.	MODULAR GLASS INTERIOR PARTITION SYSTEM	JEB, OTIC PARTITION, KUBIK, CETTERIO, DAMIAN
72.	TOUGHENED GLASS FOR PARTITIONS	SAINT GOBAIN, ASAHI INDIA GLASS, SCHOTT
73.	2HR FIRE RATED GLASS AND PARTITION SYSTEM	VETROTECH SAINT GOBAIN, SCHOTT TGS FIRE-RATED GLASS
74.	FIRE COATING FOR STEEL STRUCTURE	SUKRI. NEWCHEM
75.	WOODEN DOOR FRAME (FACTORY MADE)	KUTTY, DS DOOR, JAYNA, GOYALA INDUSTRIAL, GREEN
	WATER SUPPLY AND SANITARY WORKS	
1	FIRECLAY SINKS & DRAIN BOARDS	PARRY, SANFIRE
2	G.I. FITTING (MALLAEBLE CAST IRON)	UNIK, ICS, AMCO, KS, NVR
3	C.I. DOUBLE FLANGED NON-RETURN VALVES	KIRLOSKAR, SANT, KARTAR
4	PTMT FITTINGS	PRYAG, POLYTUF
5	KITCHEN LOFT TANK	SINTEX, TIRUPATI, KMS, PLANET, SRI KAMAKSHI, SREYAH NOVEL
6	PLASTIC SEAT COVER	HINDWARE, CERA, PARRYWARE, KOHLER, NYCER, JOHNSON PEDDAR, JAQUAR, ESSCO
7	PVC CISTERN	HINDWARE, CERA, PARRYWARE, KOHLER, NYCER, JOHNSON PEDDAR, JAQUAR, ESSCO
8	C.I. MANHOLES COVERS	BIC, KAPILANSH DHATU UDHYOG, NEECO, RIF, BCM,SKF, HIF
9	BRASS STOP & BIB COCK	ZOLOT, SANT, L&K, JAQUAR, ESSCO
10	BRASS BALL VALVE WITH FLOATS	ZOLOTO, LEADER, SANT
11	SS HINGED GRATING	GMGR, NEER, CHILLY
12	SANITARY ACCESSORIES	JAQUAR, KIMBERLY, CLARKE, DLINE, EURONICS, CARL-F, KOHLERSNEARLING, KEROVIT, PARKO, KINGSTON, PARK, PRAYAG, HINDWARE, ESSCO
13	BACK UP ROD	SUPREME INDUSTRIES
14	MASKING TAPES	SUNCONTROL, WONDER POLYMER

15	TREATMENT ON MS BRACKETS	GALVANISED BRACKETS AS PER IS :4759-1996,610
16	PVC CONTINUOUS FILLET FOR PERIPHERY PACKING OF GLAZING CURTAIN WALL	ROOP, ANAND, FOREX PLASTIC
17	C.P. ACCESSORIES	GEM, PARKO, KINGSTON, HINDWARE, CERA, JAQUAR, ESSCO,
18	MOISTURE RESISTANT BOARD	ST-GOBAIN, GYPROC, USG BORAL,
19	STAINLESS STEEL MESH	GKD/WMW
20	FLOOR TRAP	JAINA, CHILLY, NIRALE
21	VITREOUS CHINA SANITARYWARE AND FITTINGS	HINDWARE, CERA, PARRYWARE, KOHLER, NY CER, JOHNSONPEDDAR, SOMANY, JAQUAR, ESSCO
22	STAINLESS STEEL SINKS	NEELKANTH, JAYNA, FRANKE, ANUPAM, NIRALI, COBRA, ALEX, JAYNA, AMC, PRAYAG, CERA, KINGSTONE
23	C.P. BRASS FITTINGS	JAQUAR, SOMANY, PARRYWARE, GROHE, KOHLER, GEM, PARKO, KINGSTON, PARK, PRAYAG, HINDWARE, JOHNSON, ESSCO
24	CENTRIFUGALLY CAST (SPUN) IRON PIPES & FITTINGS	NECO, RIF, SKF, ACL, HEPSCO, MARC, GEM, BIC, HIF, JAISWAL, BC
25	CENTRIFUGALLY CAST (SPUN) IRON PIPES (CLASS LA)	RIF, NECO, SKF, ACL, HIF
26	CPVC PIPES & FITTINGS	ASTRAL, PRINCE, SUPREME, FINOLEX, PRAKASH, AJAY, ASHIRWAD, BIRLA AEROCON, KISAN, APL APOLLO
27	G. I. PIPES	TATA, JINDAL (HISSAR), ZENITH, PRAKASH SURYA, G.S.T., KALINGA,
28	G. I. FITTINGS	UNIK, ZOLOTO, KS, ICS, R, K.S, NVR, JINDAL, R BRAND, AMCO
29	UPVC PIPES & FITTINGS	ASTRAL, PRINCE, SUPREME, FINOLEX, PRAKASH, AJAY, ASHIRWAD, BIRLA AEROCON, KISAN, APL APOLLO
30	GUNMETAL VALVES	LEADER, SANT, ZOLOTO, KIRLOSKAR, CASTLE, KARTAR, KILBURN
31	BALL VALVES	LEADER, SANT, ZOLOTO, CASTLE, IBP, ARCO
32	BUTTERFLY VALVES	LEADER, SANT, ZOLOTO
33	C.I. SLUICE VALVES	KIRLOSKAR, IVC, BURN
34	SFRC MANHOLE COVER	KK, JAIN, PRAGATI, BIC, KAPILANSH DHATU UDHYOG, NECO, RIF, BCM, S.S. & CO.
35	RCC PIPES	JAIN, PRAGATI, KK, LAKSHMI, SOOD & SOOD, JAIN & CO., USHA, DIWAN SPUN PIPE,
36	LA (CI) PIPES	RIF, NEECO, ELECTRO STEEL, IISCO, NEECO, KAPLANSH
37	PPR PIPES	SFMC, SAFE, PIONEER INDST., SUPREME, RELIANCE
38	DUCTILE IRON PIPE (WATER SUPPLY)	ELECTRO STEEL, KESSO, KDUPL, ELECTRO SPUN
39	SEWERAGE & DRAINAGE PUMPS	KIRLOSKAR, KSB, CROMPTON GREARES
40	HDPE PIPES & FITTINGS	JAIN, ORIPLAST, KISAN
41	G.I. PIPE JOINTING MATERIALS	LOCTITE 55/DR. FIXIT, MC BAUCHEMIE

42	STONWARE PIPES AND GULLY TRAPS	PERFECT, BURN, ANAND, PARRY,SKINS GROHE, HIND
43	WATER PUMPS	KIRLOSKAR, KSB, HARRISON
44	ELECTRICAL MOTORS	SIEMENS, KIRLOSKAR, NGEF
45	PVC WATER TANK	SFMC/SINTEX/SPL, UNITEK, SHEETAL, POLYCON ELECTRO PLAST, STAR, LOTUS
46	SEWAGE WATER/RAIN WATER PIPES	ASTRAL, PRINCE, SUPREME, FINOLEX, PRAKASH, AJAY, ASHIRWAD, BIRLA AEROCON, KISAN
47	FIRE FIGHTING PIPES	JINDAL, TATA, APL APOLLO, PRAKASH SURYA
	STONE AND OTHER WORKS	
1	CLAMP SYSTEM FOR DRYSTONE CLADDING	HILTI, FISCHER, BOSCH, TRIXEL FROM AXEL INDIA
2	FRP CHAJJA, SHEET & DOORS, FRP SHUTTERS, RAILINGS, COVERS	FIBREWAYS, ASHOO MODEL ARTS, NAVIER, SUKARI PROMAT, KUTTY, JINDAL STAINLESS, BHATT FIBREWAYS
3	GRC/FRP SCREENS/RAILING/JALI/ CORNICES/STATUES/PANELS/MOULDING	TERRA FIRMA, JINDAL STAINLESS
4	POLY CARBONATE SHEET	SABIC LEXAN, BAYER, COXABELL, ROOFCLAD, MNF METALS
5	STONE SEALER	AQUA MIX SEALER FROM CHOICE GOLD, LATECRETE, ARDEX ENDURA, KERAKOLL, FOSROC
	MISCELLANEOUS ITEMS	
1	SIGNAGES	PROLITE, GLOLITE, VISTA
2	MODULAR FURNITURE ITEMS	GODREJ, HERMANMILLER, STEELCASE, DELLFORM, VITRA

The Agency is required to get prior approval of Engineer-in-charge for the make of the material to be used in the work. In case of non-availability of material from these manufacturers, the Hon'ble Vice Chancellor, DTU may allow use of alternative BIS approved manufacturer makes.

**Chief Project Officer
Delhi Technological University**

Schedule of Quantities of Major Components (Civil Works)

Schedule of Quantity (For Civil Works)

Name of Work- Construction of New Gate near Canal, Security Towers and Boundary Wall at DTU Campus, Bawana Road, Delhi.

S.No.	Description of Item	Quantity	Unit	Rate (Rs.)	Amount (Rs.)
1.00	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift upto 1.5 m, as directed by Engineer-in-charge. All kinds of soil.	2,995.00	Cum	125.95	3,77,220.00
2.00	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift upto 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m. All kinds of soil.	980.00	Cum	166.40	1,63,072.00
3.00	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth upto 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :All kinds of soil - Pipes, cables etc. exceeding 80 mm dia. but not exceeding 300 mm dia	160.00	Metre	225.45	36,072.00
4.00	Extra for excavating trenches for pipes, cables etc. in all kinds of soil for depth exceeding 1.5 m, but not exceeding 3 m. (Rate is over corresponding basic item for depth upto 1.5 metre).	20.00	Metre	127.00	2,540.00
5.00	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete. (Measurements to be taken of the face area timbered).				
5.01	Depth not exceeding 1.5 m	1,610.00	Sqm	108.55	1,74,766.00
5.02	Depth exceeding 1.5 m but not exceeding 3 m	545.00	Sqm	115.05	62,702.00
6.00	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m.	1,765.00	Cum	125.75	2,21,949.00
7.00	Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete.	19.00	Cum	917.75	17,437.00
8.00	Banking excavated earth in layers not exceeding 20 cm in depth, breaking clods, watering, rolling each layer with ½ tonne roller, or wooden or steel rammers, and rolling every 3rd and top-most layer with power roller of minimum 8 tonnes and dressing up, in embankments for roads, flood banks, marginal banks, and guide banks etc., lead upto 50 m and lift upto 1.5 m :All kinds of soil.	1,115.00	Cum	269.75	3,00,771.00

9.00	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level :				
9.01	1:4:8 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size)	175.00	Cum	4,478.15	7,83,676.00
9.02	1:3:6 (1 Cement : 3 coarse sand (zone-III): 6 graded stone aggregate 40 mm nominal size)	135.00	Cum	4,814.55	6,49,964.00
9.03	1:5:10 (1 cement : 5 coarse sand (zone-III): 10 graded stone aggregate 40 mm nominal size).	121.00	Cum	4,209.05	5,09,295.00
10.00	Centering and shuttering including strutting, propping etc. and removal of form work for :Foundations, footings, bases for columns	430.00	Sqm	193.95	83,399.00
11.00	Providing and laying cement concrete in retaining walls, return walls, walls (any thickness) including attached pilasters, columns, piers, abutments, pillars, posts, struts, buttresses, string or lacing courses, parapets, coping, bed blocks, anchor blocks, plain window sills, fillets, sunken floor etc., up to floor five level, excluding the cost of centering, shuttering and finishing :1:2:4 (1 Cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size).	16.00	Cum	6,547.70	1,04,763.00
12.00	Providing and laying damp-proof course 40mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand (zone-III): 4 graded stone aggregate 12.5mm nominal size)	27.00	Sqm	263.10	7,104.00
13.00	Providing & applying a coat of residual petroleum bitumen of grade of VG-10 of approved quality using 1.7kg per square metre on damp proof course after cleaning the surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil.	27.00	Sqm	91.90	2,481.00
14.00	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying , excluding the cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete,improve workability without impairing strength and durability as per direction of the Engineer-in-charge.(Note :- Cement content considered in this item is @ 330 kg/cum. Excess/less cement used as per design mix is payable/recoverable separately)				
14.01	All works upto plinth level	1,320.00	Cum	6,713.60	88,61,952.00
14.02	All works above plinth level upto floor V level	215.00	Cum	7,517.20	16,16,198.00

15.00	Extra for providing richer mixes at all floor levels.Note:- Excess/less cement over the specified cement content used is payable /recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum)	1,530.00	Cum	69.50	1,06,335.00
16.00	Reinforced cement concrete work in beams, suspended floors, roofs having slope up to 15° landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases above plinth level up to floor five level, excluding the cost of centering, shuttering, finishing and reinforcement, with 1:1.5:3 (1 cement : 1.5 coarse sand (zone-III) : 3 graded stone aggregate 20 mm nominal size).	3.00	Cum	7,390.80	22,172.00
17.00	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level.Thermo-Mechanically Treated bars of grade Fe-500D or more.	1,94,805	Kg	56.60	1,10,25,963.00
18.00	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo-Mechanically Treated bars of grade Fe-500D or more.	42,585	Kg	56.60	24,10,311.00
19.00	Centering and shuttering including strutting, propping etc. and removal of form for:				
19.01	Foundations, footings, bases of columns, etc. for mass concrete	1,550.00	Sqm	193.95	3,00,623.00
19.02	Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.	5,115.00	Sqm	378.60	19,36,539.00
19.03	Suspended floors, roofs, landings, balconies and access platform	75.00	Sqm	422.30	31,673.00
19.04	Lintels, beams, plinth beams, girders, bressumers and cantilevers	580.00	Sqm	342.90	1,98,882.00
19.05	Columns, Pillars, Piers, Abutments, Posts and Struts	1,960.00	Sqm	467.85	9,16,986.00
19.06	Edges of slabs and breaks in floors and walls Under 20 cm wide	70.00	Metre	467.85	32,750.00
20.00	Extra for additional height in centering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured).Suspended floors, roofs, landing, beams and balconies (Plan area to be measured)	12.00	Sqm	171.50	2,058.00
21.00	Add for plaster drip course/ groove in plastered surface or moulding to R.C.C. projections.	40.00	Metre	34.15	1,366.00
22.00	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and plinth in: Cement mortar 1:6 (1 cement : 6 coarse sand)	24.00	Cum	4,751.65	1,14,040.00

23.00	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in : Cement mortar 1:6 (1 cement : 6 coarse sand)	550.00	Cum	5,582.85	30,70,568.00
24.00	Half brick masonry with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level.Cement mortar 1:4 (1 cement :4 coarse sand)	20.00	Sqm	684.20	13,684.00
25.00	Extra for providing and placing in position 2 Nos 6mm dia. M.S. bars at every third course of half brick masonry.	20.00	Sqm	56.85	1,137.00
26.00	Brick work with common burnt clay machine moulded F.P.S. (non modular) bricks of class designation 12.5 in exposed brick work including making horizontal and vertical grooves 10 mm wide 12 mm deep complete in cement mortar 1:6 (1 cement : 6 coarse sand). Above plinth level upto floor V level	60.00	Cum	5,864.55	3,51,873.00
27.00	Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws	5.00	Sqm	2,488.95	12,445.00
28.00	Deduct for not providing hinges in doors, windows or clerestory window shutters with : Stainless steel butt hinges with stainless steel screws : For 2nd class teak wood and other class of wood shutters	5.00	Sqm	-150.25	-751.00
29.00	Extra for providing lipping with 2nd class teak wood battens 25 mm minimum depth on all edges of flush door shutters (over all area of door shutter to be measured).	5.00	Sqm	365.85	1,829.00
30.00	Providing and fixing M.S. grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to steel windows by welding	65.00	Kg	104.65	6,802.00
31.00	Providing and fixing aluminium sliding door bolts, ISI marked anodised (anodic coating not less than grade AC 10 as per IS : 1868), transparent or dyed to required colour or shade, with nuts and screws etc. complete : 300x16 mm	9.00	Each	212.45	1,912.00
32.00	Providing and fixing aluminium tower bolts, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete :				
32.01	250x10 mm	9.00	Each	88.10	793.00
32.02	150x10 mm	9.00	Each	64.30	579.00
32.03	100x10 mm	13.00	Each	49.20	640.00

33.00	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete :				
33.01	125 mm	18.00	Each	51.10	920.00
33.02	100 mm	13.00	Each	45.10	586.00
34.00	Providing and fixing aluminium hanging floor door stopper, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade, with necessary screws etc. complete. Twin rubber stopper	9.00	Each	38.00	342.00
35.00	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ± 1 mm), with wall thickness 2.0 mm (± 0.2 mm), corners of the door frame to be Jointed with galvanized brackets and stainless steel screws, joints mitred and Plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 X 19 mm and 1mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-charge Extruded section profile size 42x50 mm	37.00	Metre	205.20	7,592.00
36.00	Providing and fixing to existing door frames 25 mm thick PVC flush door shutters made out of a one piece Multi chamber extruded PVC section of the size of 762 mm X 25 mm or less as per requirement with an average wall thickness of 1 mm (± 0.3 mm). PVC foam end cap of size 23x10 mm are provided on both vertical edges to ensure the overall thickness of 25 mm. M.S. tube having dimensions 19 mm x 19 mm and 1.0 mm (± 0.1 mm) is inserted along the hinge side of the door. Core of the door shutter should be filled with High Density Polyurethane foam. The Top & Bottom edges of the shutter are covered with an end-cap of the size 25 mm X 11 mm. Door shutter shall be reinforced with special polymeric reinforcements as per manufacturer's specification and direction of Engineer-in-charge to take up necessary hardware and fixtures. Stickers indicating the locations of hardware will be pasted at appropriate places.	13.00	Sqm	2,154.75	28,012.00
37.00	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	34,845.00	Kg	67.60	23,55,522.00
38.00	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete. Electric resistance or induction butt welded tubes	66,710.00	Kg	112.20	74,84,862.00
39.00	Providing and fixing mild steel round holding down bolts with nuts and washer plates complete.	1,700.00	Kg	68.00	1,15,600.00

40.00	Steel work welded in built up sections/ framed work, including hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required. In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	5,900.00	Kg	85.95	5,07,105.00
41.00	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).	1,735.00	Kg	472.40	8,19,614.00
42.00	Providing and fixing M.S. Tubular frames for doors, windows, ventilators and cupboard with rectangular/ L-Type sections, made of 1.60 mm thick M.S. Sheet, joints mitred, welded and grinded finish, with profiles of required size, including fixing of necessary butt hinges and screws and applying a priming coat of approved steel primer. Fixing with carbon steel galvanised dash fastener of required dia and size (to be paid for separately)	100.00	Kg	115.30	11,530.00
43.00	Providing and fixing carbon steel galvanised (minimum coating 5 micron) dash fastener of 10 mm dia double threaded 6.8 grade (yield strength 480 N/mm ²), counter sunk head, comprising of 10 mm dia polyamide PA 6 grade sleeve, including drilling of hole in frame , concrete/ masonry, etc. as per direction of Engineer-in-charge. 10 x 160 mm	110.00	Each	125.65	13,822.00
44.00	Providing & fixing glass panes with putty and glazing clips in steel doors, windows, clerestory windows, all complete with :5.5 mm thick glass panes	8.00	Sqm	949.70	7,598.00
45.00	Providing and laying flamed finish Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge : Flamed finish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.	185.00	Sqm	2,887.85	5,34,252.00

46.00	Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building, all complete as per the architectural drawings, with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand), laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade, including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge. Polished Granite stone slab jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.	295.00	Sqm	2,937.70	8,66,622.00
47.00	Providing edge moulding to 18 mm thick marble stone counters, Vanities etc., including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge. Granite work	220.00	Metre	245.70	54,054.00
48.00	Extra for fixing marble /granite stone, over and above corresponding basic item, in facia and drops of width upto 150 mm with epoxy resin based adhesive, including cleaning etc. complete.	185.00	Metre	266.25	49,256.00
49.00	Extra for pre finished nosing to treads of steps of marble stone.	225.00	Metre	306.25	68,906.00
50.00	Providing and fixing 1st quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	134.00	Sqm	744.80	99,803.00
51.00	Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer) of 1st quality conforming to IS : 15622 of approved make in colours such as White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand), jointing with grey cement slurry @ 3.3kg/sqm including pointing the joints with white cement and matching pigment etc., complete.	37.00	Sqm	688.35	25,469.00
52.00	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS: 15622, of approved make, in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement : 4 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joints with white cement and matching pigments etc., complete. Size of Tile 600x600 mm	30.00	Sqm	1,119.40	33,582.00
53.00	Providing and fixing Glass mosaic tiles on finished plain wall surface of size 20 mm x 20 mm x 4 mm in all colour, design , fixing in approved design. The glass mosaic tiles shall be fixed on the wall surface with the help of approved adhesive applied at the rate of 2.5 kg per sqm and grouting of the same. All completed as per direction of Engineer-incharge.	25.00	Sqm	1,603.75	40,094.00

54.00	Stone work (machine cut edges) for wall lining etc. (vener work) upto 10 metre height, backing filled with a grout of average 12 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) including pointing in white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade : (To be secured to the backing and the sides by means of cramps and pins which shall be paid for separately) : White sand stone - Exposed face machine cut and table rubbed with rough backing. 30 mm thick	215.00	Sqm	3,352.15	7,20,712.00
55.00	Stone work (machine cut edges) for wall lining etc. (vener work) upto 10 metre height, backing filled with a grout of average 12 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) including pointing in white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade : (To be secured to the backing and the sides by means of cramps and pins which shall be paid for separately) :18-20 mm thick Grey Slate - Exposed face machine cut and table rubbed with rough backing.	110.00	Sqm	3,504.90	3,85,539.00
56.00	Providing and fixing stainless steel cramps of required size and shape for anchoring stone wall lining to the backing or securing adjacent stones in stone wall lining in cement mortar 1:2 (1 cement : 2 coarse sand), including making the necessary chases in stone and holes in walls wherever required.	135.00	Kg	521.10	70,349.00
57.00	Providing and fixing copper pins 7.5 cm long 6 mm diameter for securing adjacent stones in stone wall lining in cement mortar 1:2 (1 cement : 2 coarse sand), including making the necessary chases.	1,310.00	Each	29.80	39,038.00
58.00	12 mm cement plaster of mix :1:6 (1 cement: 6 fine sand)	4,285.00	Sqm	160.35	6,87,100.00
59.00	15 mm cement plaster on rough side of single or half brick wall of mix:1:6 (1 cement: 6 fine sand)	3,230.00	Sqm	185.20	5,98,196.00
60.00	6 mm cement plaster of mix :1:3 (1 cement : 3 fine sand)	842.00	Sqm	143.80	1,21,080.00
61.00	Neat cement punning.	11.00	Sqm	42.60	469.00
62.00	Providing and applying plaster of paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete.	240.00	Sqm	118.70	28,488.00
63.00	Finishing walls with textured exterior paint of required shade :New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including priming coat of exterior primer applied @ 2.20kg/10 sqm	8,420.00	Sqm	150.65	12,68,473.00
64.00	Distempering with 1st quality acrylic distemper, having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture, including applying additional coats wherever required, to achieve even shade and colour.Two coats	105.00	Sqm	49.65	5,213.00

65.00	Wall painting with acrylic emulsion paint, having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture, including applying additional coats wherever required, to achieve even shade and colour.Two coats	240.00	Sqm	73.90	17,736.00
66.00	Painting with synthetic enamel paint, having VOC (Volatile Organic Compound) content less than 150 grams/ litre, of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.Two coats	24.00	Sqm	75.00	1,800.00
67.00	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre	17.00	Sqm	38.45	654.00
68.00	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work	2,965.00	Sqm	122.50	3,63,213.00
69.00	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations:(a) Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300 mm height including cleaning the surface before treatment.(b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs.(c) After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge.(d) Finishing the surface with 20 mm thick jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300 x 300 mm square 3 mm deep. (e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineer-in-Charge :With average thickness of 120 mm and minimum thickness at khurra as 65 mm.	60.00	Sqm	1,034.65	62,079.00

70.00	Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., 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 ACI-212-3R-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 work shall be carried out all complete as per specification and the direction of the engineer-in-charge. The product performance shall carry guaranteed for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm per coat	25.00	Sqm	468.10	11,703.00
70.01	For horizontal surface one coat @ 1.10 kg per sqm.	2.00	Sqm	362.35	725.00
71.00	Designing, fabricating, testing, installing and fixing in position Curtain Wall with Aluminium Composite Panel Cladding, with open grooves for linear as well as curvilinear portions of the building , for all heights and all levels etc. including:(a) Structural analysis & design and preparation of shop drawings for pressure equalisation or rain screen principle as required, proper drainage of water to make it watertight including checking of all the structural and functional design.(b) Providing, fabricating and supplying and fixing panels of aluminium composite panel cladding in pan shape in metallic colour of approved shades made out of 4mm thick aluminium composite panel material consisting of 3mm thick FR grade mineral core sandwiched between two Aluminium sheets (each 0.5mm thick). The aluminium composite panel cladding sheet shall be coil coated, with Kynar 500 based PVDF / Lumiflon based fluoropolymer resin coating of approved colour and shade on face # 1 and polymer (Service) coating on face # 2 as specified using stainless steel screws, nuts, bolts, washers, cleats, weather silicone sealant, backer rods etc.(c) The fastening brackets of Aluminium alloy 6005 T5 / MS with Hot Dip Galvanised with serrations and serrated washers to arrest the wind load movement, fasteners, SS 316 Pins and anchor bolts of approved make in SS 316, Nylon separators to prevent bi-metallic contacts all complete required to perform as per specification and drawing The item includes cost of all material & labour component, the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working curtain wall with aluminium composite panel cladding, cleaning and protection of the curtain wall with aluminium composite panel cladding till the handing over of the building for occupation. Base frame work for ACP cladding is payable under the relevant aluminium item.s The Contractor shall provide curtain wall with aluminium composite panel cladding, having all the performance characteristics all complete, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge. However, for the purpose of payment, only the actual area on the external face of the curtain wall with Aluminum Composite Panel Cladding	510.00	Sqm	3,405.90	17,37,009.00

	(including width of groove) shall be measured in sqm. up to two decimal places."				
72.00	<p>Designing, fabricating, testing, protection, installing and fixing in position semi (grid) unitized system of structural glazing (with open joints) for linear as well as curvilinear portions of the building for all heights and all levels, including:(a) Structural analysis & design and preparation of shop drawings for the specified design loads conforming to IS 875 part III (the system must passed the proof test at 1.5 times design wind pressure without any failure), including functional design of the aluminum sections for fixing glazing panels of various thicknesses, aluminium cleats, sleeves and splice plates etc. gaskets, screws, toggles, nuts, bolts, clamps etc., structural and weather silicone sealants, flashings, fire stop (barrier)-cum-smoke seals, microwave cured EPDM gaskets for water tightness, pressure equalisation & drainage and protection against fire hazard including:(b) Fabricating and supplying serrated M.S. hot dip galvanised / Aluminium alloy of 6005 T5 brackets of required sizes, sections and profiles etc. to accommodate 3 Dimensional movement for achieving perfect verticality and fixing structural glazing system rigidly to the RCC/ masonry/structural steel framework of building structure using stainless steel anchor fasteners/ bolts, nylon seperator to prevent bimetallic contacts with nuts and washers etc. of stainless steel grade 316, of the required capacity and in required numbers.(c) Providing and filling, two part pump filled, structural silicone sealant and one part weather silicone sealant compatible with the structural silicone sealant of required bite size in a clean and controlled factory / work shop environment , including double sided spacer tape, setting blocks and backer rod, all of approved grade, brand and manufacture, as per the approved sealant design, within and all around the perimeter for holding glass.(d) Providing and fixing in position flashings of solid aluminium sheet 1 mm thick and of sizes, shapes and profiles, as required as per the site conditions, to seal the gap between the building structure and all its interfaces with curtain glazing to make it watertight.(e) Making provision for drainage of moisture/ water that enters the curtain glazing system to make it watertight, by incorporating principles of pressure equalization, providing suitable gutter profiles at bottom (if required), making necessary holes of required sizes and of required numbers etc. complete. This item includes cost of all inputs of designing, labour for fabricating and installation of aluminium grid, installation of glazed units, T&P, scaffolding and other incidental charges including wastages etc., enabling temporary structures and services, cranes or cradles etc. as described above and as specified. The item includes the cost of getting all the structural and functional design including shop drawings checked by a structural designer, dully approved by Engineer-in-charge. The item also includes the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working structural glazing as specified, cleaning and protection till the handing over of the building for occupation. In the end, the Contractor shall provide a water tight structural glazing having all the performance characteristics etc. all complete as required, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer- in-Charge. Note:- 1. The cost of providing extruded aluminium frames, shadow boxes, extruded aluminium section capping for fixing in the</p>	50.00	Sqm	2,409.90	1,20,495.00

	grooves of the curtain glazing and vermin proof stainless steel wire mesh shall be paid for separately under relevant items under this sub- head. However, for the purpose of payment, only the actual area of structural glazing (including width of grooves) on the external face shall be measured in sqm. up to two decimal places.				
	Note:- 2. The following performance test are to be conducted on structural glazing system if area of structural glazing exceeds 2500 Sqm from the certified laboratories accredited by NABL(National Accreditation Board for Testing and Calibration Laboratories), Department of Science & Technologies, India. Cost of testing is payable separately. The NIT approving authority will decide the necessity of testing on the basis of cost of the work, cost of the test and importance of the work. Performance Testing of Structural glazing system Tests to be conducted in the NBL Certified laboratories				
	(1) Performance Laboratory Test for Air Leakage Test (-50pa to -300pa) & (+50pa to +300pa) as per ASTM E-283-04 testing method for a range of testing limit 1 to 200 mVhr				
	(2) Static Water Penetration Test. (50pa to 1500pa) as per ASTM E-331-09 testing method for a range up to 2000 ml.				
	(3) Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01-05 testing method for a range upto 2000 ml				
	(4) Structural Performance Deflection and deformation by static air pressure test (1.5 times design wind pressure without any failure) as per ASTM E-330-10 testing method for a range upto 50 mm				
	(5) Seismic Movement Test (upto 30 mm) as per AAMA 501.4-09 testing method for Qualitative test. Tests to be conducted on site.				
	(6) Onsite Test for Water Leakage for a pressure range 50 kpa to 240 kpa (35psi) upto 2000 ml				
73.00	Preparation and consolidation of sub grade with power road roller of 8 to 12 tonne capacity after excavating earth to an average of 22.5 cm depth, dressing to camber and consolidating with road roller including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earthwith lead upto 50 metres.	1,265.00	Sqm	90.10	1,13,977.00
74.00	Extra for compaction of earth work in embankment under optimum moisture conditions to give at least 95% of the maximum dry density (proctor density).	1,115.00	Cum	10.70	11,931.00
75.00	Dry stone pitching 22.5 cm thick including supply of stones and preparing surface complete.	70.00	Sqm	499.65	34,976.00

76.00	Providing and laying design mix cement concrete of M-30 grade, in roads/ taxi tracks/ runways, using cement content as per design mix, using coarse sand and graded stone aggregate of 40 mm nominal size in appropriate proportions as per approved & specified design criteria, providing dowel bars with sleeve/ tie bars wherever required, laying at site, spreading and compacting mechanically by using needle and surface vibrators, levelling to required slope/ camber, finishing with required texture, including steel form work with sturdy M.S. channel sections, curing, making provision for contraction/ expansion, construction & longitudinal joints (10 mm wide x 50 mm deep) by groove cutting machine, providing and filling joints with approved joint filler and sealants, complete all as per direction of Engineer-in-charge (Item of joint fillers, sealants, dowel bars with sleeve/ tie bars to be paid separately).Note:- Cement content considered in M-30 is @ 340 kg/cum. Excess/ less cement used as per design mix is payable/ recoverable separately.Cement concrete manufactured in automatic batching plant (RMC plant) i/c transportation to site in transit mixer	265.00	Cum	7,160.40	18,97,506.00
77.00	Providing and fixing concertina coil fencing with punched tape concertina coil 600 mm dia 10 metre openable length (total length 90 m), having 50 nos rounds per 6 metre length, upto 3 m height of wall with existing angle iron 'Y' shaped placed 2.4 m or 3.00 m apart and with 9 horizontal R.B.T. reinforced barbed wire, stud tied with G.I. staples and G.I. clips to retain horizontal, including necessary bolts or G.I. barbed wire tied to angle iron, all complete as per direction of Engineer-in-charge, with reinforced barbed tape(R.B.T.) / Spring core (2.5mm thick) wire of high tensile strength of 165 kg/ sq.mm with tape (0.52 mm thick) and weight 43.478 gm/ metre (cost of M.S. angle, C.C. blocks shall be paid separately)	1,200.00	Metre	255.00	3,06,000.00
78.00	Providing, laying and making kerb channel 30 cm wide and 50 mm thick with cement concrete 1:3:6 (1 cement: 3 coarse sand:6 graded stone aggregate 20 mm nominal size) over 75mm bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including finishing the top smooth etc. complete and as per direction of Engineer-in-charge.	160.00	Sqmt.	382.05	61,128.00
79.00	Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).	29.00	Cum	5,012.65	1,45,367.00

80.00	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	265.00	Cum	2,080.15	5,51,240.00
81.00	Construction of dry lean cement concrete sub base over a prepared sub-grade with coarse and fine aggregate conforming to IS:383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per specifications, cement content not to be less than 150 Kg/cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, for all leads & lifts, laid with a mechanical paver, compacting with 8-10 tonne vibratory roller, finishing and curing etc. complete as per direction of Engineer-in-charge.	160.00	Cum	3,331.95	5,33,112.00
82.00	Taking out existing kerb stones of all types from footpath/ central verge, including removal of mortar etc., disposal of unserviceable material to the dumping ground, for which payment shall be made separately and stacking of serviceable material within 50 metre lead as per direction of Engineer-in-Charge.	125.00	Metre	16.05	2,006.00
83.00	Taking out existing CC interlocking paver blocks from footpath/ central verge, including removal of rubbish etc., disposal of unserviceable material to the dumping ground, for which payment shall be made separately and stacking of serviceable material within 50 metre lead as per direction of Engineer-in-Charge.	75.00	Sqm	53.95	4,046.00
84.00	Laying old cement concrete interlocking paver blocks of any design/ shape laid in required line, level, curvature, colour and pattern over and including 50 mm thick compacted bed of coarse sand, filling the joints with fine sand etc. all complete as per the direction of Engineer-in-charge. (Old CC paver blocks shall be supplied by the department free of cost).	78.00	Sqm	209.20	16,318.00
85.00	Laying at or near ground level old kerb stones of all types in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement : 3 coarse sand), including making joints with or without grooves (thickness of joints, except at sharp curve, shall not be more than 5 mm), including making drainage opening wherever required etc. complete as per direction of Engineer-in-charge. (Length of finished kerb edging shall be measured for payment). (Old kerb stones shall be supplied by the department free of cost)	125.00	Metre	48.90	6,113.00

86.00	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge. 80 mm thick C.C. paver block of M-30 grade with approved color design and pattern.	1,194.00	Sqmt.	638.95	7,62,906.00
87.00	Providing, laying and jointing glazed stoneware pipes class SP-1 with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete :150 mm diameter	35.00	Metre	327.05	11,447.00
88.00	Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete :				
88.01	250 mm dia. R.C.C. pipe	95.00	Metre	482.05	45,795.00
88.02	300 mm dia. R.C.C. pipe	100.00	Metre	518.55	51,855.00
89.00	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) up to haunches of S.W. pipes including bed concrete as per standard design :				
89.01	250 mm diameter RCC Pipe	95.00	Metre	656.60	62,377.00
89.02	300 mm diameter RCC Pipe	100.00	Metre	757.60	75,760.00
90.00	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top slab with 1:1.5:3 mix (1 cement : 1.5 coarse sand (zone- III) : 3 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand (zone- III) : 8 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design : Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weight of cover 23 kg and weight of frame 15 kg) :With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	7.00	Each	8,634.10	60,439.00
90.01	Extra for depth for manholes : Size 90x80 cm With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Metre	4,911.80	9,824.00

92.00	Constructing brick masonry circular type manhole 0.91 m internal dia at bottom and 0.56m dia at top in cement mortar 1:4 (1 cement : 4 coarse sand), inside cement plaster 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement, foundation concrete 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size), and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design : 0.91 m deep with S.F.R.C. cover and frame (heavy duty, HD-20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg., fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete. (Excavation, foot rests and 12mm thick cement plaster at the external surface shall be paid for separately) : With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	14.00	Each	8,683.75	1,21,573.00
93.00	Extra depth for circular type manhole 0.91m internal dia (at bottom) beyond 0.91 m to 1.67 m With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.50	Metre	4,911.80	2,280.00
94.00	Constructing brick masonry circular manhole 1.22 m internal dia at bottom and 0.56 m dia at top in cement mortar 1:4 (1 cement :4 coarse sand) inside cement plaster 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement foundation concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design : 1.68 m deep with SFRC Cover and frame (heavy duty HD-20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg. fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete. (Excavation, foot rests and 12 mm thick cement plaster at the external surface shall be paid for separately) : With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Each	16,560.80	3,122.00
95.00	Extra depth for circular type manhole 1.22 m internal dia (at bottom) beyond 1.68 m to 2.29 m: With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	1.00	Metre	6,362.65	6,363.00

96.00	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910, on 12 mm dia steel bar conforming to IS: 1786, having minimum cross section as 23 mmx25mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufacture's permanent identification mark to be visible even after fixing, including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) complete as per design.	58.00	Each	327.90	19,018.00
97.00	Making connection of drain or sewer line with existing manhole including breaking into and making good the walls, floors with cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) cement plastered on both sides with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement and making necessary channels for the drain etc. complete : For pipes 250 to 300 mm diameter	10.00	Each	463.45	4,635.00
98.00	Constructing brick masonry road gully chamber 50x45x60 cm with bricks in cement mortar 1:4 (1 cement : 4 coarse sand) including 500x450 mm pre-cast R.C.C. horizontal grating with frame complete as per standard design :With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	18.00	Each	4,043.10	72,776.00
99.00	Providing and fixing white vitreous china pedestal type water closet (European type W.C. pan) with seat and lid, 10 litre low level white P.V.C. flushing cistern, including flush pipe, with manually controlled device (handle lever), conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required : W.C. pan with ISI marked white solid plastic seat and lid	7.00	Each	3,418.70	23,931.00
100.00	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required : One urinal basin with 5 litre white P.V.C. automatic flushing cistern	5.00	Each	3,494.15	17,471.00
101.00	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require: White Vitreous China Flat back wash basin size 550x400 mm with single 15 mm C.P. brass pillar tap	7.00	Each	1,817.35	12,721.00
102.00	Providing and fixing 8 mm dia C.P. / S.S. Jet with flexible tube upto 1 metre long with S.S. triangular plate to European type W.C. of quality and make as approved by Engineer - in - charge.	7.00	Each	254.80	1,784.00

103.00	Providing and fixing P.V.C. waste pipe for sink or wash basin including P.V.C. waste fittings complete.Flexible pipe - 32 mm dia	7.00	Each	73.25	513.00
104.00	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.	7.00	Each	817.95	5,726.00
105.00	Providing and fixing toilet paper holder : C.P. brass	4.00	Each	385.35	1,541.00
106.00	Providing and fixing soil, waste and vent pipes : 100 mm dia - Hubless centrifugally cast (spun) iron pipes epoxy coated inside & outside IS:15905	16.00	Metre	925.55	14,809.00
107.00	Providing and fixing bend of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete. 100 mm dia - Hubless centrifugally cast (spun) iron pipes epoxy coated inside & outside IS:15905	14.00	Each	489.45	6,852.00
108.00	Providing and fixing plain bend of required degree. 100 mm dia - Hubless centrifugally cast (spun) iron pipes epoxy coated inside & outside IS:15905	14.00	Each	489.45	6,852.00
109.00	Providing and fixing trap of self cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors : 100 mm inlet and 100 mm outlet - Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905	7.00	Each	677.60	4,743.00
110.00	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge. Internal work - Exposed on wall 25 mm nominal outer dia Pipes	40.00	Metre	216.20	8,648.00
111.00	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge. Concealed work, including cutting chases and making good the walls etc. 20 mm nominal outer dia Pipes	45.00	Metre	284.85	12,818.00
112.00	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. External work 32 mm nominal outer dia Pipes	20.00	Metre	250.55	5,011.00

113.00	Making connection of G.I. distribution branch with G.I. main of following sizes by providing and fixing tee, including cutting and threading the pipe etc. complete : 25 to 40 mm nominal bore	4.00	Each	394.15	1,577.00
114.00	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete : 20 mm nominal bore	7.00	Each	327.05	2,289.00
115.00	Providing and fixing uplasticised PVC connection pipe with brass unions : 30 cm length - 20 mm nominal bore	18.00	Each	65.20	1,174.00
116.00	Providing and placing on terrace (at all floor levels) polyethylene water storage tank, IS : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank. Circular tank	2,750.00	Per Litre	7.25	19,938.00
117.00	Providing and fixing PTMT bib cock of approved quality and colour. 15mm nominal bore, 86 mm long, weighing not less than 88 gms	7.00	Each	103.30	723.00
118.00	Providing and fixing PTMT stop cock of approved quality and colour. 15 mm nominal bore, 86 mm long, weighing not less than 88 gms	21.00	Each	103.30	2,169.00
119.00	20 mm nominal bore, 89 mm long, weighing not less than 88 gms	14.00	Each	134.65	1,885.00
120.00	Demolishing cement concrete manually/ by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in - charge.				
120.01	Nominal concrete 1:3:6 or richer mix (i/c equivalent design mix)	18.00	Cum	997.05	17,947.00
120.02	Nominal concrete 1:4:8 or leaner mix (i/c equivalent design mix)	100.00	Cum	615.15	61,515.00
121.00	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge. In cement mortar	615.00	Cum	842.75	5,18,291.00
122.00	Demolishing stone rubble masonry manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge : In cement mortar	850.00	Cum	1,005.70	8,54,845.00
123.00	Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means, including loading, transporting, unloading to approved municipal dumping ground or as approved by Engineer-in-charge, beyond 50 m initial lead, for all leads including all lifts involved.	1,160.00	Cum	120.55	1,39,838.00
				Total=	60681285.00
				Add applicable rate of GST @ 18% in place of 12%(Multiplying factor 1.0633) on DSR items i.e. Rs.6,06,81,285/-	64522410.34
				Add Cost Index on DSR 2016 Items @ 31.27%=	20176157.71

				Total=	84698568.05
				Less @9.5% as per Delhi Govt. Order on DSR 2016 Items=	-8046363.97
				Grand Total (A)=	76652204.09
124.00	Credit for old bricks obtained from the dismantling and demolishing of old and existing boundary wall and to be taken away from the site .The old bricks shall be the property of the agency and removed from the work site at its own cost as per the direction of Engineer-in-charge.	1,51,910	Nos.	-2.50	-3,79,775.00
125.00	Construction and making of waterfall/gyser fountain including providing and placing necessary water lines, water jets, water pump and all necessary arrangement for making the fountain functional all complete as per drawing, design, manufacturer's specification and direction of Engineer-in-charge.	1.00	Each	2,65,000.00	2,65,000.00
				Total (B)=	-114775.00
				Total (A+B)=	76537429.09
				Grand Total=	76537429.09
				Say=	76537429.00

Junior Engineer (Civil)

Consultant (Civil)

Assistant Engineer, (Civil)

Chief Project Officer

Chief Project Officer
Delhi Technological University

PART-C

**Technical Specifications, Additional
Conditions of
Electrical Works**

GENERAL TERMS AND CONDITIONS FOR ALL E & M Works

1. The work shall be generally carried out in accordance with tender specifications and the following specification rules, unless otherwise specified the latest amended edition of all such codes/specification/manuals on the last date of submission of the tender would be applicable.
 - a) CPWD General Specifications for Electrical Works Part I Internal - 2020 as amended up to date.
 - b) CPWD general specification for electrical work part II External 1994 as amended up to date.
 - c) General Specifications for Electrical Works (Part-III-Lifts & Escalators) - 2003 as amended up to date.
 - d) CPWD general specification for electrical work part IV Sub-Station 2013 as amended up to date.
 - e) CPWD General Specifications for Electrical Works Part VII D.G. Sets - 2013 as amended up to date.
 - f) General Specifications for Heating, Ventilation & Air-Conditioning (HVAC) - 2017 as amended up to date.
 - g) Indian Electricity Act 2003 amended up to date.
 - h) National Electrical Code 2008 and NFPA (National Fire Protection Association).
 - i) Indian Electricity Rule 1956 amended up to date.
 - j) National Building Code 2016
 - k) BIS codes as applicable.
 - l) Other standards and codes as applicable in the electrical and mechanical works.
2. The contractor is advised to visit the site of work to have an idea of the execution of work; failure to do so shall not absolve their responsibility to do the work as specified in agreement.
3. **Rates:**
 - 3.1 The work shall be treated as on works contract basis and the rates tendered shall be before complete items of work (except the materials, if any, stipulated for supply by the department) inclusive of all taxes (including GST, works contract tax, if any), duties, and levies etc. and all charges for items contingent to the work, such as packing, forwarding, insurance, freight and delivery at site for the materials to be supplied by the contractor, watch and ward of all materials (including those supplied by the department, if any) for the work at site etc.
4. **Taxes and Duties:**
 - 4.1 Being an indivisible works contract tax, GST etc. are not payable separately.
 - 4.2 The GST for works contract tax shall be deducted from the bills of the contractor as applicable in the State in which the work is carried out, at the time of payments.
- 5.0 **Mobilization Advance:**

No mobilization advance shall be paid for the work, unless otherwise stipulated in tender papers for any individual works/ composite work.
- 6.0 **Completeness of Tender:**

All sundry fittings, assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various components of the work shall be deemed to have been included in the tender, whether such items are specifically mentioned in the tender documents or not.
- 7.0 The contractor shall make his own arrangement of tools for maintenance of Sub Station/Electrical Installations equipments & following T&P shall always be available at the site of work by the contractor: -
 - a) Tong tester
 - b) Gloves- 4 Sets
 - c) First Aid Box
 - d) Crimping Tool Kit
 - e) Meggar (5kV HT and 500 Volts LT)
 - f) Spanner Set
 - g) Screw Driver set
 - h) LN Keys set
 - i) Earth Tester
 - j) Blower
 - k) Hammer, Drill Machine & Spade
 - l) Welding set with all materials.
 - m) Different size of aluminum ladder for maintaining the campus street light of different height and fans & fittings.

- n) Every wireman/operator should have plier, screw driver of different size, tester for during the execution work.
- o) All necessary and other required proper tool must be carried out by the workman.

8.0 Works to be done by the contractor:

Unless and otherwise mentioned in the tender documents, the following works shall be done by the contractor, and therefore their cost shall be deemed to be included in their tendered cost of respective items: -

- (i) Foundations for equipments and components where required, including foundations bolts.
- (ii) Cutting and making good all damages caused during installation and restoring the same to their original finish.
- (iii) Sealing of all floor openings provided by him for pipes and cables, from fire safety point of view, after laying of the same. During laying the cable caution tap and barricades must be placed and cable root marker also exist.
- (iv) Painting at site of all exposed metal surfaces of the installation other than pre-Painted, items like fittings, fans, Switchgear / distribution gear items, cubicle Switch board etc. damages to finished surfaces of these items while handling and erection, shall however be rectified to the satisfaction of the Engineer-in-Charge.
- (v) Maintaining the Cleanliness safety and Hygiene standards as per applicable local bylaws and National standards.
- (vi) Testing and commissioning of each of the individual system and Final Integrated System Test (IST) and Handover of complete installation.
- (vii) Reports and Documentation submission post IST which includes Pre-commissioning, Commissioning, Test-Reports, IST and SOPs (Standard Operating Procedures) for system and Operational manuals.
- (viii) Storage space for all equipment's, components and materials for the work.
- (ix) During the execution of work contractor shall be maintained all safety rules and regulation as per CEA, 2010 as a minded on date.

9.0 Storage and Custody of Materials:

- (i) The contractor has to make his own arrangement for the storage of the material at site & necessary watch and ward of the electrical installation during the execution of work till the same is handed over to the department. No extra payment will be made on this account. The storage space shall however be arranged by the department at site, if available.
- (ii) The main contractor shall arrange for proper storage of the electrical fans and fittings at site and that double lock system shall be arranged for the fans and fittings after receipt at site until the time they are taken for installation. The contractor shall however be responsible for proper storage and safe custody of the same till their installation and completion of work to the department.

10.0 Electric Power Supply and Water Supply:

Power and water supply will be arranged by the contractor at the site for installation purpose. Otherwise action shall be taken according to electricity Act 2003 Regulation no. 135 for direct threat of electricity. However, for testing purpose after complete installation of the electrical items, electricity supply will be made available free of cost to the contractor. Contractor will take due care to ensure safety of electrical installation during execution of work.

11.0 Tools for handling and Erecting:

All tools and tackles required for handling of equipments and materials at site of work as well as for their assembly and erection and also necessary test instruments shall be the arranged by the contractor at his own cost.

12.0 Co-ordination with other agencies:

- 13.0 The contractor shall co-ordinate with all other agencies involved in the building work so that the building work is not hampered due to delay in his work. Recessed conduit and other works, which directly affect the progress of building work, should be given priority

14.0 1 2.1 Care of buildings:

Care shall be taken by the contractor to avoid damage to the building during execution of his part of the work. He shall be responsible for repairing all damages and restoring the same to their original finish at his own cost. He shall also remove, at his costs, all unwanted and waste materials arising out of his work, from the site.

13.0 Structural Alterations to Buildings:

- (i) No structural member in the building shall be damaged/altered, without prior approval from the competent authority through the Engineer-in-charge.
- (ii) Structural provisions like openings, cutouts, if any, provided by the department for the work, shall be used.

Where these required modifications, or fresh provisions are required to be made, such contingent works shall be carried out by the contract at his cost.

- (iii) All such openings in floors provided by the department shall be closed by the contractor after installing the cables/conduits/rising mains etc. as the case may be, by any suitable means as approved by the Engineer-in-charge without any extra payment.
- (iv) All chases required in connection with the Electrical Works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings.

14.0 Addition to an installation:

Any addition, temporary or permanent, to the existing electrical installation shall not be made without a properly worked out scheme/design by a qualified Electrical Engineer to ensure that such addition does not lead to overloading, safety violation of the existing system.

15.0 Work in occupied buildings:

- (i) When work is executed in occupied buildings, there would be minimum of inconvenience to the occupants. The work shall be programmed in consultation with the Engineer-in-charge and the occupying department. If so required, the work may have to be done even before and after the office hours.
- (ii) The contractor shall be responsible to abide by the regulations or restrictions set in regard to entry into, and movement within the premises.
- (iii) The contractor shall not tamper with any of the existing installations including their Switching operations or connections there to without specific approval from the Engineer-in-charge.

16.0 Drawings:

- (i) The work shall be carried out in accordance with the drawings of site and the tender documents and also in accordance with modification thereto from time to time as approved by the Engineer-in-charge.
- (ii) All wiring diagrams shall be deemed to be 'Drawings' within the meaning of the term as used in Clause 11 of the conditions of contract (**PWD 7**). They shall indicate the main Switch board, the distribution boards (with circuit numbers controlled by them), the runs of various mains and sub mains and the position of all points with their controls.
- (iii) All circuits shall be indicated and numbered in the wiring diagram and the points shall be given the same number as the circuit to which they are electrically connected.

17.0 Conformity to IE act, IE Rules, and standards:

17.1 All E&M Works shall be carried out in accordance with the provisions of Indian Electricity Act, 1910 and Indian Electricity Rules, 1956 amended up to date (Date of call of tender unless specified otherwise). List of rules of particular importance to electrical installations under these General Specifications is given in Appendix C for reference.

17.2 General requirements of components:

18.0 Quality of material: All materials and equipments supplied by the contractor shall be new and manufacturing date shall not be prior to six month from date of approval of sample/make. They shall be of such design, size and materials as to satisfactorily function under the rated conditions of operation and to withstand the environmental conditions at site or as specified in the tender.

18.1 Inspection of materials and equipments:

19.0 Materials and equipments to be used in the work shall be inspected by the departmental officers. Such inspection will be of following categories:

- (i) Inspection of materials/ equipments to be witnessed at the Manufacturer's premises in accordance with relevant BIS/ Agreement Inspection Procedure.
- (ii) To receive materials at site with Manufacturer's Test Certificate(s) for specific part of equipment supplied under the scope.
- (iii) To inspect materials at the authorized dealer's go downs to ensure delivery of genuine materials at site.
- (iv) To receive materials after physical inspection at site.

19.1 Adequate care to ensure that only tested and genuine materials of proper quality are used in work shall be ensured by firm. The firm shall ensure that:

- (i) Material will be ordered & delivered at site only with the prior approval of the department to ensure timely delivery.
- (ii) As and when the order is placed for the fittings/ fixtures, cables, Switchgears, poles, rising main, other main items etc, its copy shall be endorsed to the Engineer-in-charge.
- (iii) The firm will be required to procure material like exhaust fans, MCB 's & DB' s, Switches & sockets, wires & cables, conduits and Switchgears etc directly from the manufacturer/ authorized dealers to ensure genuineness & quality and as per the approved makes only. Proof in this regard shall be submitted by the contractor if required by the department.
- (iv) Inspection at factory or at go down of the manufacturer, as required, shall be arranged by the firm for a

mutually agreed date. Certificate for genuineness of the fittings shall have to provided duly signed by the manufacturer's officer not below the rank of Regional Manager (Note:- Waiver off inspection can be allowed after taking approval from the competent authority) .

- (v) Delivery of material shall be taken up only with the consent of department, after clearance of the material.
- (vi) Department shall reserve the right to waive inspection in lieu of suitable test certificate, at its discretion.
- (vii) Contractor shall get the samples/models of luminaires/fans/fittings approved from the Engineer-in-charge before bringing at site for execution.

19.2 Similarly, for fabricated equipment s, the contractor will first submit dimensional detailed drawings for approval before fabrication is taken up in the factory. Suitable stage inspection at factory also will be made to ensure proper use of materials, workmanship and quality control.

20.0 Ratings of components:

- 20.1** All components in a wiring installation shall be of appropriate ratings of voltage, current and frequency, as required at the respective sections of the electrical installations in which they are used.
- 20.2** All conductors, Switches and accessories shall be of such size as to be capable of carrying the maximum current, which will normally flow through them, without their respective ratings being exceeded.

21.0 Conformity to standards:

- 21.1** All components shall conform to relevant Indian Standard Specifications wherever existing. Materials with ISI certification mark shall be preferred.
- 21.2** Relevant Indian Standards including amendments or revisions thereof up to the date of tender acceptance shall be applicable in the respective contracts for respective items, firm to ensure its compliance.

22.0 Interchange ability:

Similar parts of all Switches, lamp holders, distribution fuse boards, Switch gears, ceiling roses, brackets, pendants, fans and all other fittings of the same type shall be interchangeable in each installation.

23.0 Workmanship:

- 23.1** Good workmanship is an essential requirement to be complied with. The entire work of manufacture/fabrication, assembly and installation shall conform to sound engineering practice.
- 23.2** Proper supervision/skilled workmen: The contractor shall be a licensed electrical contractor of appropriate class suitable for execution of the electrical work. He shall engage suitably skilled/licensed workmen of various categories for execution of work supervised by supervisors / Engineer of appropriate qualification and experience to ensure proper execution of work. They will carry out instruction of Engineer-in-charge and other senior officers of the Department during the progress of work.
- 23.3** Use of quality materials: Only quality materials of reputed make as specified in the tender will be used in work.
- 23.4** Fabrication in reputed workshop: Switch boards and LT panels shall be fabricated in a factory/ workshop having modern facilities like quality fabrication, seven tank process, powder/epoxy paintplant, proper testing facilities, manned by qualified technical personnel. These shall be as per make/ item approved.

24.0 Testing:

All testes prescribed in this General Specification, to be done before, during and after installation, as part of pre-commissioning stage, shall be carried out, and the test results shall be submitted to the Engineer-in-charge in prescribed Performa, forming part of the Completion Certificate.

25.0 Commissioning on completion:

After the work is completed, it shall be ensured that the installation is tested and commissioned Recording of Completion certificate of following Electrical & Mechanical Services as follows:

26.0 Completion plan and completion certificate:

- 26.1** For all works completion certificate after completion of work as given in Appendix -E of CPWD Specification shall be submitted to the Engineer-in-charge.
- 26.2** Completion As-built plan drawn to a suitable scale in tracing cloth with ink indicating the following, soft copy in storing device (two nos) along with three blue print copies of the same shall also be submitted.
 - (i) General layout of the building.
 - (ii) Locations of main Switchboard and distribution boards, indicating the circuit numbers controlled by them.
 - (iii) Position of all points and their controls.
 - (iv) Types of fittings, viz. fluorescent, pendants, brackets, bulk head, fans, exhaust fans etc.
 - (v) Location of substation equipments cable route layout etc.
 - (vi) Name of work, job number, tender reference, actual date of completion, names of Division/ Sub-division and name of the firm who executed the work with their signature.

27.0 Guarantee

The installation will be handed over to the department after necessary testing and commissioning. The installation will be guaranteed against any defective design/workmanship. Similarly, the materials supplied by the contractor will be guaranteed against any manufacturing defect, inferior quality. The guarantee period will be for a period of 12 months from the date of completion of work. Installation/equipments or components thereof shall be rectified/ repaired to the satisfaction of the Engineer-in-charge. The firm will be required to submit guarantee of fans and fittings from the manufacturer to the department.

28.0 Supply of fittings, fixtures & other material:

The procurement of material for the works will be programmed as per the progress of work in consultation with Engineer-in-Charge. The firm will be required to submit a detailed programme and prior to the procurement will seek approval of the department. The direction of the department regarding timing & necessity of getting such material will be final & binding on the firm.

The LED fittings shall be covered under comprehensive warranty for a period of two years from the date of successful SITC/ replacement of such light. The contractor shall furnish such warranty from the OEM. However, ultimate responsibility for the warranty shall rest on the contractor and in case of any complaint the user department shall contact the contractor only who shall attend the defect within a period of 7 (seven) days of the complaint. In case of delay in attending the complaints, a **penalty @ Rs. 100/- per day per light** shall be levied and recovered from any amount due to the contractor. Decision of the Vice-Chancellor, DTU shall be final and binding on the contractor in respect of the levy of such penalty.

29.0 For each E & M services the defect liability period shall be for 12 months after a final certificate of completion of work has been given for entire project by the Engineer-In-Charge or from the actual date of completion of work.

30.0 Interpreting specifications

In interpreting the specifications, the following order of preference shall be followed in case of contradictions:

- a) Nomenclature of item as per Schedule of Quantities
- b) Additional/Special Conditions.
- c) Particular Specifications and List of Makes.
- d) CPWD Specifications.
- e) Architectural Drawings.
- f) National Building code 2016, ECBC 2017, Relevant BIS standards all as modified up to date. (Note: The specification mentioned in relevant code or CPWD specification or NBC 2016 or ECBC 2017 whichever is more stringent will be followed).
- g) OEM specification.

INTERNAL ELECTRICAL INSTALLATION WORKS

Additional Conditions

1. The work shall be carried out strictly in accordance with CPWD specifications for E&M Works 2020 (internal) and 1994 (External) as amended upto date and in accordance with Indian Electricity Act, 1910 as amended upto date and as per instructions of the Engineer-in-Charge including as below and nothing will be paid extra.
2. All materials to be used on this work shall be ISI marked as per schedule format & shall be got approved from the Technical sanctioning authority/Engineer-in-Charge before installation at site unless otherwise deducted the payment as per rule.
3. PVC insulated class 2 copper conductor wire used shall be multi-standard FRLS grade for which nothing extra shall be paid.
4. The work shall be carried out according to approved drawings/details which shall be subsequently issued to the successful tenderer for execution of work and as per instructions of Engineer-in-Charge who will have the right to change the layout as per requirement at site and the contractor shall not have any claim due to change in layout. The work shall be executed by skilled person Licensed by the approved authorities.
5. All damages done to the building during execution of E&M work shall be the responsibility of the contractor and the same will be made good immediately at his own cost to the satisfaction of the Engineer-in-Charge. Any expenditure incurred by the department in this condition shall be recovered from the contractor and decision of the Engineer-in-Charge about recovery shall be final.
6. The bad workmanship will not be accepted and defects shall be rectified at contractor's cost to the satisfaction of the Engineer-in-Charge. The programme of E&M Works is to be co-ordinated in accordance with the building work and no claim for idle labour shall be entertained.
7. All the debris of the E&M Works should be removed and the site should be cleared by the contractor immediately after the accruing of debris. Similarly any rejected material should be immediately cleared off from the site by the contractor.
8. The contractor or his representative is bound to sign the site order book as and when required by the Engineer-in-Charge and to comply with the remarks therein.
9. The size of conduit and wiring shall be got approved from the Engineer-in-Charge before taking up the execution.
10. The contractor shall make his own arrangement at his own cost for E&M / general tools and plants required for the work.
Main Board and Main Distribution Board:
The work shall be carried out according to the drawings / details as approved by the Engineer-in-Charge. The contractor shall have to get the samples approved before the whole lot is brought to site and it shall include all inter connections etc. All termination of electrical cables in panel / feeder pillars DB's, cable-looping box etc. shall have to be done with proper thimbles / lugs using crimping process. Copper thimbles / reducer shall be used for copper cable and Aluminium cable nothing extra will be paid for the same.
11. All materials shall be supplied and used in items of works by the contractor should be of approved make and approved quality. They should be got approved from the Engineer-in-Charge or his authorized representative before installation otherwise no payment will be made for an unapproved or rejected material used on the works and the same shall be removed at his cost from site or work.
12. The contractor shall have to prove bonafides of the make of materials by producing necessary documentary evidence. They are advised to obtain prior approval of Engineer-in-Charge for proposed make of material, before bringing material to site work.
13. Location of Light fixtures, All Electrical Equipments, cable routes etc. should be got approved from the Engineer-in-Charge before execution.
14. All interconnection in the panel, DB, cable-looping boxes shall be carried out with suitable cable commensurate with the current carrying capacity of incoming and outgoing cables complete with thimbles etc. as required for which nothing extra shall be paid.
15. All panels, DB's, cable-looping boxes will be numbered and marked with paint / name plate and

- nothing extra will be payable on this amount.
- 16 All MCB, MCCB, MCB, DB's, RCBO's, RCCB with DB's shall be of same make / manufacturer and the MCB's shall be central trip mechanism type.
- 17 Modular Switch / Socket's / Plates / Computer outlet / Telephone outlet and all accessories shall be of the single make only be provided. The contractor shall have to make the edges around the boxes wherever required shall have to be made by the contractor for which nothing extra shall be paid. The galvanized metal box shall be of the standard thickness as the GI boxes besides other requirement.
- 18 All the material should be ISI Marked unless otherwise clarification is not available.
- 19 All concealed works shall have to be done in the presence of Engineer-in-Charge or his authorized representative.
- 20 The contractor shall make his own arrangement for storage and carriage of material at the site.
- 21 The entire installation shall be at the risk and responsibility of the contractor until these are tested and handed over to the department.
- 22 Notwithstanding the schedule of quantities, all items of interrelated works considered necessary to make the installation complete and operative are deemed to be included shall be provided by the contractor at no extra cost.
- 23 The connection, inter connection, earthing and inter earthing shall be done by the contractor wherever required and nothing extra shall be paid on this account. All repairs & patch work shall be neatly carried out to match with the original finish & all damages caused to the building installation during the execution of work shall have to be made good by the contractor immediately at his own cost to the entire satisfaction of Engineer-in-charge. In case contractor fails to comply with the instructions of the Engineer-in-charge, Engineer-in-charge shall be at liberty to get the work done by any other Contractor and recover such amount as paid to the other Contractor from the bill(s) of the contractor. Contractor shall have no claim, whatsoever, on the extent of such amount.
- 24 The contractor shall have to provide the fish wire after removing the choking of the conduits. Even if subsequently the conduits are found choked, the choking will be get removed and / or the new conduits shall be provided at the risk and cost of the contractor.
25. The makes of material have been indicated in the list of acceptable makes. No other make will be acceptable. The material to be used in the work shall be got approved from the Engineer-in-Charge before use at site. The Engineer-in-Charge shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not as per specifications.
26. No material shall be brought to site without the approval of Engineer-in-Charge. All fixtures and fittings shall be procured just before the installation or as per direction of Engineer-in-charge.
- 27 Wherever ceiling roses are not required to be provided in the light/fan/exhaust fan points, due to site conditions, the contractor shall use suitable three pin connectors for which nothing extra shall be paid. Wiring shall be carried out with FRLS wires.
- 28 Contractor shall provide polythene/PVC plastic cover for all MDB's/SDB's/DB's, panels, feeder pillars etc to protect them from rust/damages, during execution of work till the work is actually completed and handed over to the department.
- 29 Makes of all items that are not covered in the schedule of work/additional specifications shall be got approved from the Engineer-in-charge and shall conform to relevant Indian Standard as applicable.
- 30 The contractor shall ensure that the staff employed by him for execution of the E&M work, possess the valid electrical license issued by competent authority. Consequences arising due to the default of the contractor in not complying with the above condition shall be the responsibility of the contractor.
- 31 Copper lugs shall be provided for terminating copper/aluminium/GI earth wire to all Switchboards for which nothing extra shall be paid. All multi-stranded/stranded wires shall be terminated through copper lugs.
- 32 All concealed work and earthing shall be done in the presence of the Engineer-in-charge or his authorized representative.
- 33 The schematic diagram/dimensional drawings of the various electrical cubical panels shall be got approved from the Engineer-in-charge before fabrication and shall comply with CPWD specifications and Indian Electricity Rules. All panels shall be powder coated inside out, in shade approved by the Engineer-in-charge.
- 34 All floor-mounted panels shall be mounted on M.S. channel (size as per item) on all the sides. It shall have a continuous earth bus of the same size and material as the main phase running continuously

- along the length of the panel extending on either side for earth connection.
- 35 The doors of all cubicle panels shall be hinged type including those of bus bar chambers and cable alleys. The locking shall be with chrome plated metal key locks. All doors shall be earthed with copper conductor wire as approved by the Engineer-in-charge.
- 36 The work shall be carried out according to drawing approved by the Engineer-in-charge. The layout once approved can only be changed by the Engineer-in-charge as per requirement at site. It shall be the responsibility of the contractor to plan the layout and get the approval from the Engineer-in-charge before laying the conduits etc.
- 37 The MCB should be of the same make as that of MCB DB's and having a minimum breaking capacity of 10 KA. Contractor shall obtain approval of the Engineer-in-charge before procurement of MCB DB's.
- 38 All model of modular accessories required for the work shall be got approved from the Engineer-in-charge from among the approved makes. The base plate shall be preferably in sheet steel or otherwise in unbreakable polycarbonate. The cover plates shall be screw less type in shade approved by the Engineer-in-charge.
- 39 Contractor shall have to check the Site Order Book for any instructions of the Engineer-in-charge or his authorized representative and sign the site order book. He shall be bound to ensure compliance with the instructions recorded therein.
- 40 MCCBs shall be used with terminal spreaders and all terminals shall be shrouded to avoid direct contact.
- 41 All measuring and indicating instruments shall be protected through MCB's and isolating Switches.
- 42 General arrangement drawing of the Switchboard shall be got approved from the Engineer-in-Charge before commencement of manufacturing.
- 43 For the items like LT panels, feeder pillars and accessories, etc, the firm shall arrange for inspection in the factory and provide for all facilities for testing. The cost of the visit of Engineer-in-Charge or his representative shall be borne by department. However, firm will be responsible for arranging the inspections as required.
- 44 Conduit layout, circuiting layout, DB detail with load balance as per Switching arrangement shall be prepared by contractor and got approved from the Engineer-in-Charge before slab casting.
- 45 Conduit and termination to SDB and main board adapter box i/c connection wires to MCB's inter connection between SDB and main board etc shall be included in the tendered rates and nothing extra shall be paid for the same.
- 46 The contractor shall provide junction boxes / looping boxes of required sizes and such boxes shall be measured as part of conduit / batten wiring without any extra payment. Connectors, Ceiling Rose, Hylem sheets, T-cover, fan box cover, loose wire box cover are provided as per site requirement nothing shall be paid extra on this account.
- 47 M.S. dash fastener shall be used for installation of fittings and fixtures in ceiling and for providing suspenders for the angle support, conduiting, cable tray etc. for which nothing extra shall be paid.
- 48 All CI/metal boxes & junction boxes should be cleaned properly and painted from inside before wiring & fixing the accessories.
- 49 Cables:-
- (a) Cables shall be bought from manufacturer only as per approved NIT.
 - (b) The length of the cables required shall be measured w.r.t. site condition and these shall be delivered in section of approved length only, to avoid jointing as far as possible.
 - (c) Cable delivery shall be scheduled in consultation with department only.
 - (d) All cable's shall be offered for inspection by department prior to dispatch, department reserve the right to waive of inspection so required in lieu of proper test certificates.
50. Maximum group control of five numbers lights will be made at site by the first/primary light point.
51. The work shall be carried out after approval of the shop drawings & technical data sheet of all equipment's / items from the Engineer-in-Charge / project consultant and according to the instructions issued.
52. All electrical safety measures must be followed as per CEA 2010 as amended upto like, Safety shoes, helmet, gloves, harness, ladder etc. otherwise penalty shall be imposed as under:
1st offence Rs.500/- per unsafe act and unsafe condition 2nd offence Rs.1000/- per unsafe act and condition 3rd offence Rs.2000/- with warning letter, 4th offence tender shall be cancelled.

EXTERNAL / INTERNAL LIGHTING WORK TERMS AND CONDITIONS FOR COMPOUND LIGHTS

1. **CONFIRMATION TO SPECIFICATIONS: -**
The work shall be carried out as per CPWD specifications for E&M Work's part – I internal works 2013. Part – II External Works 1994, as amended up to date and as per Additional specifications and conditions. The installation shall comply with the requirement of Indian Electricity Rules 1956 as amended upto date.
2. **WORKS TO BE DONE BY THE CONTRACTOR**
 - 1) The tenderers are advised to visit the site to access the requirement of the site and probable difficulties in execution of the work, before tendering.
 - 2) Unless otherwise mentioned in the tender documents, the following works shall be done by the contractor, and therefore their cost shall be deemed to be included in their tendered cost.
 - a) Cutting and making good all the damages caused during installation and restoring the same to their original finish.
 - b) Temporary shed and storage space required for the storage with locking arrangement thereof and watch and ward of the materials and completed installation till completion of the work.
 - c) Testing and Commissioning of complete installation.
3. **TAXES AND DUTIES**
 - i) The rates are inclusive of all taxes i.e. GST, excise duty, work contract tax etc.
 - ii) Works contract tax, if any, for the work shall be included within the quoted rates for the various items. The GST/works contract tax shall be deducted from the bills of the contractor, if applicable in the State in which the work is carried out.
4. All the material brought by the contractor for use in the work shall be of good quality and ISI marked wherever applicable and would be got approved from the Engineer- in-charge before use in the work.
5. All the rejected material will have to be removed from site by the contractor without any delay.
6. Failure to do so will compel the department to remove the material from site. It will be done at the risk and cost of the contractor. The department will not be responsible for any loss to the contractor in such eventuality.
7. Persons executing E&M Works should have Electrical License as required under I.E. Act and also technical qualifications.
8. The earthing shall invariably be done in presence of the Engineer-in-charge or his authorized representatives.
9. No T & P shall be issued by the department.
10. Water & Electricity required for execution of work shall be arranged by the contractor at his own cost. However for testing of system, electricity shall be given by the department at one point only free of cost.
11. No claim for the idle labour shall be entertained by the department.
12. All the debris/ malba due to electrical work shall be removed and sites shall be cleared by the contractor as soon as work is over for the day. Any damages to civil work due to execution of electrical work shall have to be made good by the electrical contractor without any extra cost.
13. The contractor shall take all precautions for safety of the workmen. If any accident / miss-happening occur the department shall not be responsible for the same. If any compensation is to be paid to the victim the firm shall pay the same and no claim in this account shall be entertained by the department.
14. The successful tenderer shall be responsible for the transportation handling and erection of Poles at site. Any special tools tackles/ lifting arrangement etc. required in this connection shall be his responsibility.
15. Working drawing of feeder pillar shall be submitted by the firm within 30 days after award of work for approval of Engineer-in-charge.
16. The work shall be carried out after approval of the shop drawings & technical data sheet of all equipments / items from the Engineer-in-Charge / project consultant and according to the instructions issued.

**SPECIAL CONDITIONS TO COMPLY DIRECTIVES OF HON'BLE NATIONAL
GREEN TRIBUNAL**

1. The contractor shall not store/ dump construction material or debris on metalled road.
2. The contractor shall get prior approval from Engineer-in-Charge for the area where the construction material or debris can be stored beyond the metalled 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 storage.
3. 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.
4. 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 enroute their destination, the dust, sand or any other particles are not released in air/ contaminate air.
5. The contractor shall provide mask to every worker working on the construction site and involved in loading, unloading and carriage of construction material and construction debris to prevent inhalation of dust particles.
6. 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.
7. The contractor shall ensure that C&D waste is transported to the C&D waste site only and due record shall be maintained by the contractor.
8. The contractor shall compulsory use of wet jet in grinding and stone cutting.
9. The contractor shall comply all the preventive and protective environmental steps as stated in the MoEF guidelines, 2010.
10. The contractor shall carry out on-Road-Inspection for black smoke generating machinery. The contractor shall use cleaner fuel.
11. The contractor shall ensure that all DG Sets comply emission norms notified by MoEF.
12. The contractor shall ensure that the construction material is covered by tarpaulin. The contractor shall take all other precaution to ensure that no dust particles are permitted to pollute air quality as a result of such storage.
13. The paving of the path for plying of vehicles carrying construction material is more permanent solution to dust control and suitable for longer duration projects. The NIT approving authority shall carry out cost benefit ratio analysis of the same.

LIST OF ELECTRICAL MATERIALS OF APPROVED MAKES

The materials of first / standard quality from the following approved makes, or as specified in the particular item of work in the schedule of quantity are to be used. In case it is established that the brands specified below are not available in the market, the contractor shall submit alternative proposal for the approval of the Engineer-in-Charge.

S.No.	Description	Makes
1	MS conduit (ISI Marked)	BEC/AKG/NIC
2	MS Conduit accessories (ISi marked)	RAMA/ AKG / BEC/NIC
3	Modular Plate ,Modular Switch/ Sockets, TV Socket outlet, Telephone socket outlet, Lan socket outlet, GI Boxes, Fan Regulator, Industrial Socket Outlet(ISI marked)	Legrand(Myrus)/MK (Wrapround) /Schneider(Zendelo)/Northwest (Stylus)
4	1.1 KV Grade PVC insulated FRLS single core cable/wire (ISI Marked)	RRKabel/Polycab/Finolex
5	PVC conduit with accessories (ISI marked)	Precision/ AKG/BEC
6	Moulded Case Circuit Breaker (MCCB)	Siemens (3VA)/ Legrand (DPX3)/ Schneider (Compact NSX)/ L&T (D-Sine)
7	MCB / Distribution Boards/ Isolator/ ELCB /RCCB	Legrand/ ABB/ L&T
8	Lighting Conductor/Protection & Earthing System	JMV/ABB /Nimbus
9	Cable Tray (Factory Fabricated)	Legrand/OBO/KME
10	Floor Race Ways System	Legrand /OBO/MK /Schneider Electric
11	LED Light Fixture	Wipro/Philips /Havells
12	LED makes in LED fittings	Nishia/Cree/Philips Ltd.
13	Ceiling Fan/Wall Fans/Exhaust Fans/ Pedestal Fans	Almonard/ Havells /Usha
14	External Lighting/ Lighting Fixtures	Osram/Philips/Havells
15	External lighting Pole	Volmount/BPP/Schneider
16	High Mast Pole	Phillips/ Bajaj/Volmount
17	Motor & Pumps	Kirloskar / Crompton Greaves / Alstom
18	RJ-45 Modular Socket with Plate	Schneider/ Siemon/ Systimax
19	Polycarbonate Junction Box	Sintex/MK/Legrand/Hensel/Neptune
20	MV Panel/ LT Panel/Feeder Pillar	Neptune/ Tricolite/C&S/SPC(Electrotech)/Risha Power Control
21	Rubber Gaskets	CIC/Varuna/Jyoti/Agni
22	Selector Switch's	L&T /Kaycee/ AE/Salzer /Siemens
23	LED Indication Lamps/Push button	Schneider Electric/ Siemens/L& T/Conserve/C&S
24	APFC/Capacitor Panel	/ABB/L&T/Siemens
25	Capacitors	Epcos/L&T/BCH/Neptune
26	CT's /PT's	Automatic Electric/ L&T/ Neptune
27	Electronic Digital Meters (A/V/PF/Hz/KW/KWH} with LED Display	Schneider Electric/Neptune/L&TSecure/

28	Automatic Transfer Switch	ASCO/Cummins/L&T/ ABB/Socomec
29	SPD (Surge Protector)	Mersen/Eaton/Weidmuller/LPI/ERICO/Indelac/ABB
30	Earth Leakage Protection relay/Aux. Relay /APFC Relay/PLC	L&T /Schneider /Legrand /C&S /Neptune/ Siemens
31	Digital Astra Timer Legrand/L&T/C&S/ABB/Havells	L&T /Schneider /Legrand /C&S /Neptune/ Siemens
32	Power Contactor / Aux. Contactor L&T/Siemens/Legrand/Schneider/C&S (Model to be compelled with System)	L&T /Schneider /Legrand /C&S /Neptune/ Siemens
33	Single Phase Preventer Minilec/Siemens /Legrand/ L&T	L&T /Schneider /Legrand /C&S /Neptune/ Siemens
34	XLPE Aluminium/copper Conductor Armoured LT cables upto 1100 V Grade(ISI Marked)	Havells/Polycab/ Grandley/Finolex
35	AL. Conductor XLPE HT Cable (ISI Marked)	Polycab/Havells/National/Finolex/Universal
36	End Termination/ Brass compression gland	Dowell's/Comet/Raychem/Gripwell/ ABB
37	HDPE Pipe (ISI Marked)	Rex/ Duraline/Tirupati/GF
38	Jointing Kit /Cable Gland /Lugs /Thimbles /Compression Glands (HT/LT)	Comet /Dowells/Raychem /ABB/ Jainson
39	Fuse Switch Units	L&T / Siemens/ Havell's
40	Pole Boxes	Sintex / Hensel / Havells

Chief Project Officer
Delhi Technological University

SCHEDULE OF WORK

Name of work :- Construction of New Gate near Canal, Security Towers and Boundary Wall at DTU Campus, Bawana Road, Delhi (Electrical work)

S. No.	Description of Items	Qty.	Unit	RATE	Amount
1	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed steel conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. Group -C	70	Point	994.00	69580.00
2	Wiring for group controlled (looped) light point/fanpoint/exhaust fan point/ call bell point (without independent switch etc.) with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed steel conduit, and earthing the point with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable etc. as required. Group C	30	Point	415.00	12450.00
3	Wiring for twin control light point with 1.5 sq.mm FRLS PV insulated copper conductor single core cable in surface / recessed medium class PVC conduit, 2 way with modular switch, modular plate, suitable size GI. box and earthing thepoint with 1.5 sq.mm. FRLS PVC insulated copper conductor single core cable etc. as required.	20	Point	168.00	3360.00
4	Wiring for light/ power plug with 2X4 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed steel conduit alongwith 1 No. 4 sq. mm FRLS PVC insulated copper conductor single core cable for loop earthing as required.	450	Metre	239.00	107550.00
5	Wiring for light/ power plug with 4X4 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed steel conduit alongwith 2 Nos. 4 sq. mm FRLS PVC insulated copper conductor single core cable for loop earthing as required	250	Metre	366.00	91500.00
6	Wiring for circuit/ submain wiring alongwith earth wire with the following sizes of FRLS PVC insulated copper conductor, single core cable in surface/ recessed steel conduit as required.				0.00
a	2 X 1.5 sq. mm + 1 X 1.5 sq. mm earth wire	360	Metre	151.00	54360.00
b	2 X 2.5 sq. mm + 1 X 2.5 sq. mm earth wire	360	Metre	206.00	74160.00
c	2 X 10 sq. mm + 1 X 6 sq. mm earth wire	360	Metre	392.00	141120.00
7	Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.				
a	20 mm	200	Metre	126.00	25200.00
b	25 mm	200	Metre	147.00	29400.00
8	Supplying and fixing two module stepped type electronic fan regulator on the existing modular plate switch box including connections but excluding modular plate etc. as required.	7	Each	288.00	2016.00

9	Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as reqd	20	Each	24.00	480.00
10	Supplying and fixing following size/ modules, GI box alongwith modular base & cover plate for modular switches in recess etc. as required.				
a	1 or 2 Module (75mmX75mm)	10	Each	125.00	1250.00
11	Supplying and fixing following Modular base & cover plate on existing modular metal boxes etc. as required.				
11	1 or 2 Module	10	Each	83.00	830.00
12	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 A modular socket outlet and 5/6 A modular switch, connections etc. as required.	12	Each	113.00	1356.00
a	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 A modular socket outlet and 15/16 A modular switch, connections etc. as required	6	Each	406.00	2436.00
13	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.				
		200	mtrs	244.00	48800.00
a	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/submain wiring/ cable as required	2000	mtrs	44.00	88000.00
b	Jointing copper / G.I. tape (with another copper/ G I tape, base of the finial or any other metallic object) by riveting / nut bolting/sweating and soldering etc. as required.	4	Sets	67.71	270.84
c	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or on surface of wall for lightning conductor complete as required.(For horizontal run)	200	mtrs	78.41	15682.00
d	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or on surface of wall for lightning conductor complete as required.(For vertical run)	100	mtrs	118.80	11880.00
e	Providing and fixing testing joint, made of 20 mm X 3 mm thick G.I. strip, 125 mm long, with 4 Nos. of G.I. bolts, nuts, chuck nuts and spring washers etc. complete as required.	1	Sets	86.73	86.73
14	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 kV grade of following size direct in ground including excavation, sand cushioning, protective covering and refilling the trench etc. as required.				
a	Upto 35 sq. mm	1000	mtrs	206.00	206000.00
b	Above 35 sq. mm and upto 95 sq. mm	1000	mtrs	214.00	214000.00
16	Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator)				
a	6 way, Double door	2	Each	2206.00	4412.00
b	8 way, Double door	1	Each	2573.00	2573.00

17	Supplying and fixing of following ways surface/ recess mounting, vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 A, tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCBs (but without MCBs and incomer) as required. (Note : Vertical type MCB TPDB is normally used where 3 phase outlets are required.)				
a	8 way (4 + 24), Double door	1	Nos	256.00	256.00
18	Supplying and fixing following rating, 240/415 V, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a	Single Pole (5A to 32 A)	38	Each	270.00	10260.00
b	Double pole	4	Each	691.00	2764.00
c	Supplying and fixing following rating, double pole, (single phase and neutral), 240 V, residual current circuit breaker (RCCB), having a sensitivity current 30 mA in the existing MCB DB complete with connections, testing and commissioning etc. as required. 40 A	3	Each	2783.0	8349.00
Total					1230381.57
Add applicable rate of GST @ 18% in place of 12%(Multiplying factor 1.0633) on DSR items i.e. Rs.6,06,81,285/					1308264.72
Add Cost Index on DSR 2016 Items @ 31.27%					409094.38
Total					1717359.10
Less 9.5% on DSR 2016					-163149.11
Total of (A)					1554209.99
Sub Head-2 : LIGHTING FIXTURES & FANS					
19	Supplying and fixing of following LED fitting on recess/surface made of metallic CRCA powder coated steel / aluminium body, minimum system efficacy 100 Lumens/watt. Electronic in buit driver, PF>0.9, suitable for 220V-240V 50Hz A.C. supply, in the existing false ceiling with S.S. chain hanging arrangements/ on surface as per site condition including making connections with 3x1.5sq.mm FRLS copper conductor cable in steel flexible pipe, testing and commissioning etc. required.				
19.2	22 watt LED luminaire 1200 mm long (Wall/Ceiling mounted)	20	Each	990	19800
19.3	12 W LED RECESSED / SURFACE MOUNTED DOWNLIGHTER	27	Each	1132	30564
19.4	9 W BULK HEAD LIGHT	10	Each	1297	12970
19.5	10 W LED luminaire (mirror light) 600 mm long	10	Each	600.00	6000.00
19.6	Security tower light revolving Light superior quality search light have been used in watch tower and high security zone. Its single revolving system will cover all area upto a range of 2000-5000 meters. Our products have high intensity with strong beam to focus and weatherproof technology. Works on AC Mains 220 Volts 50 Hz	5	Each	50000.00	250000

20	Supplying, installation, testing & Commissioning of SITC of IP - 65 LED Post Top fitting aesthetically designed with symmetrical light distruction acrylic cover pressure die cart aluminium base with minimum 4950 lumens output with efficacy 110 l/w ,CRI>80,PF>0.9, operating Voltage Range of 140 - 270 VAC, Minimum Internal Surge Protection of 2.0KV, the luminaries shall be following LM79 and LM 80 report issued by LED manufacturer etc.complete as required. Make- Twinkle/Havells/Philips	34	Each	7913.18	269047.96
21	Supplying and fixing of 120 Watt Decorative Twinkle make Urban Ornamental Led drop down Luminaire made of aluminum housing duly powder coated/PU painted with PC/PMMA Clear/Frosted diffuser for high illuminance/glare free lighting High Lumen LEDs are directly mounted on aluminum heat sinks Special decorative cast aluminium emblem is fixed at upper part of fixture Including dismantling of existing fixture etc. as reqd. Twinkle/Havells/Philips	20	Each	37069.40	741388.03
22	Supplying of 40 Watt LED Post top luminaires Urban Straight Line LED Post Top Luminaire having circular casted aluminum body with Polycarbonate clear/opal diffuser for glare free lighting etc. as reqd. Make Twinkle/Havells/Philips	2	Each	37800.58	75601.16
23	Supply, Installation, Testing and Commissioning of 1200 mm sweep, BEE 5 star rated, ceiling fan with Brush Less Direct Current (BLDC) Motor, class of insulation : B, 3 nos. blades, 30 cm long down rod, 2 nos. canopies, shackle kit,safety rope, copper winding, Power Factor not less than 0.9, Service Value(CM/M/W) minimum 6.00, Air delivery minimum 210 Cum/Min, 350 RPM (tolerance as per IS : 374-2019), THD less than 10%, remote or electronic regulator unit for speed control and all remaining accessories including safety pin, nut bolts,washers, temperature rise=75 degree C (max.), insulation resistance more than 2 mega ohm, suitable for 230 V, 50 Hz, single phase AC Supply, earthing etc. complete as required.	7	Each	2730.00	19110.00
24	Supply, installation, Testing & commisssioning of following sweep Ventilation fan in the exisiting opening including making good the damage, connection, testing & commissioning 250 mm etc. as required	6	Each	1716.00	10296.00
25	Supplying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade etc as required.				
a	3.5C x 25 sq.mm.	1000	Meter	338.19	338194.98
b	3.5C x 70 sq.mm.	1000	Meter	756.80	756799.95

26	<p>Fabrication, supply, installation, testing & commissioning of outdoor type compartmentalized feeder pillar tapered (hut type) made out of 2mm thick CRCA sheet having separate cable and bus bar alley double door arrangement with two leaf door on front side and single door with double leaf on rear side with locking arrangement, having 100 amp TPN Aluminum bus bar of full length with base frame made out of 50x50x6mm thick angle iron having 150 mm legs duly erection in ground with construction of cement concrete complete with connection and interconnection with copper conductor PVC insulated cables / insulated copper conductor strip of appropriate size and terminals blocks (on outgoing) including supplying and fixing following switch gears & accessories there in powder coating, labeling, earthing etc complete as required. Having minimum size = 850mm x600mm x300mm deep.</p> <p>a) 100Amps, 415V, 25KA, TPN MCCB with earth fault protection (Incomer) (Cat No- SL986050000, DH – 100, L & T d)</p> <p>40 Amps. DP MCB having short circuit, earth leakage and overload protection = 3 Nos.</p> <p>e) Earthing studs - 2 Nos.</p> <p>f) Danger plate - 2 Nos.</p> <p>(Make – As per CPRI norms) Make) = 1 No</p> <p>b) 100 Amps. 415V, 3 phase AC, TP power contactor = 1 No. (MNX type, Cat No. ST – 19003, L & T Make)</p> <p>c) Astronomical digital time setting switch for 24 hours cycles – 1 No. (ET-100,415v, 3-10seconds</p>	2	each	95443.00	190886.00
27	<p>Supplying, Erection and testing of 9.0mtr. (9000mm) height decorative cast iron pole in which the bottom portion 1.0mtr long made of cast iron and the top portion 4.0mtr. long made of galvanized steel tube with CI embellishment duly welded. The bottom CI portion should have round mounting base of not less than 385mm dia and must be provided with service window comprising of 4way, 25Amp connector terminal and a MCB. The top portion should not less than 90mm dia the pole should be duly polyster / Pu painted black colour etc as required.)</p>	15	each	49650.00	744750.00
28	<p>Supply and installation of advanced maintenance free Earthing System consisting of 1 Nos UL Listed CPRI tested copper bonded steel electrode of 17.0 mm dia. With a min. coating thickness of 250 microns and length of 3 meters. 50 kgs/Electrode of earth enhancing compound needs to be considered to fill the 100-125mm augured hole surrounding to the electrode. The rate shall include excavation of earth, filling with back fill compound, and earth pit marking. The Complete installation shall be as per the drawing and technical specifications. Test report for UL, CPRI & IEC test report must be submitted along with material.</p>				
a	Heavy duty Pit cover tested for 5000Kg SWL				
b	Supply of Earth enhancing compound(OEC 2 25) tested as per IEC 62561-7				
c	Supply of UL Listed CPRI Tested 17.0 mm dia. Copper bonded steel core Electrode with Min coating thickness of copper 250 micron tested according to IEC 62561-	5	job	5745.00	28725.00

d	Installation of 4 mtr long with help of bocky 17.0 mm dia copper steel bonded rod with 50 kg chemical for chemical earthing as per in engineer charge etc. as reqd.	5	job	2878.00	14390.00
e	Providing and fixing of pole mounted box (300x200x105mm) size made out of (SMC) sheet moulded compound dust and whether proof (Sintex make GSJB-3020)	2	Nos	1620.00	3240.00
29	Providing and laying in position 1:2:4 reinforced cement concrete foundation of size 750 mm.(L) X 750 mm. wide and 1600 mm. deep i/c excavation of earth, providing cutting, bending and placing in position, reinforcement of cold twisted bars of 12 mm. dia- 1760mm long (approx)- 8 Nos. and reinforcement ring of cold twisted bar of 8mm dia - 2800mm (approx) - 10nos. (with 150mm spacing) as required with positioning of foundation bolts (as per item below) and providing 75 mm. (O.D) DWC, HDPE Pipe for cable entry & exit as required.	15	Nos	9650.00	144750.00
30	Fabrication, Desinging, Supplying & Fixing of Galvanized double cross arm bracket 2000 mm long single over hang with tightening bolt etc. as per approved by Engineer-In-	5	Nos	5000.00	25000.00
31	Supplying & Fixing of surface-mounted luminaire Lumipad with LED (Light Emitting Diode) system power: 45 W, luminous flux of luminaire 3600 lm, Colour temperature of 3000 K, Warm white, CRI>80, 24 V, 70% of luminous flux after 50,000 operating hours, energy efficient LEDs, direct light emission, support profile in aluminium, powder-coated black, Toughened glass cover with lens and a beam angle of 15 x 45°, electronic control gear, Protection class I, IP 65, SDCM>3. L = 1000 mm, B = 40 mm, H = 25 mm, for facade light	80	Meter	40000.00	3200000.00
32	Supply,erection , testing commissioing of 150 watt Energy saving, environment friendly long lige exclusive innovative presssure die cast aluminium IP65 flood light with high power LED as light source suitable for highlighting features or retail spaces on existing poles. BVP122 LED160 CW FLNB FG PSU A1	20	Nos	21241.50	424830.00

33	<p>Supply Erection, testing and commissioning of 12 M high pole along with bracket suitable for 6 Nos.s light fixture and with following specifications and components :- Hot Dip galvanized Octagonal pole of 12 Meters height made out of 5 MM thick sheet having bottom 270 MM A / F and top 125 MM A / F and base plate 400 MM X 400 MM X 25 MM along with Brackets suitable for mounting 6 Nos.s. Sports Flood light in two direction as per drawing . Octagonal poles designed as per ILE TR7 & BS5649 for structural design & as per IS875 (Part III), 1987 for dynamic loading. The pole shall be installed in cement concrete foundation 1:2:4 (1: cement: 2 coarse sand and 4 graded stone with the help of anchor bolts of 24 MM dia. (Foundation should be of width 0.80 m x length 0.80 x height 2.20 mtr with steel 12 mm bar). By laying Iron bar mesh fabricated with 6 M M dia. Iron bar earthing of pole, including connection, & numbering etc. complete as reqd. The welding will be done as per BS 5135 / IS 9595. Nos. circumferential welding shall be allowed in the pole shaft. The structure shall be single hot dip galvanized as per BS 729 / IS 2629. A suitably designed door shall be provided at 600mm height from the pole base. Foundation accessories will be as per IS 1367.including supply and installation of 6 ways-20A connector & 6A MCB mounted on 6mm thick painted M.S/GI plate, insulated, and fixed inside the pole suitable for termination of armoured aluminium cable as required and wiring to Luminaries from the 6A MCB, with 3x4 sq.mm. PVC insulated copper, stranded conductor (P+N+PE) double sheathed wire including terminations.</p>	1	Nos	143273.00	143273.00
Total (B)					6881513.08
Grand Total (A)+(B)					8435723.07
Say					8435723.00

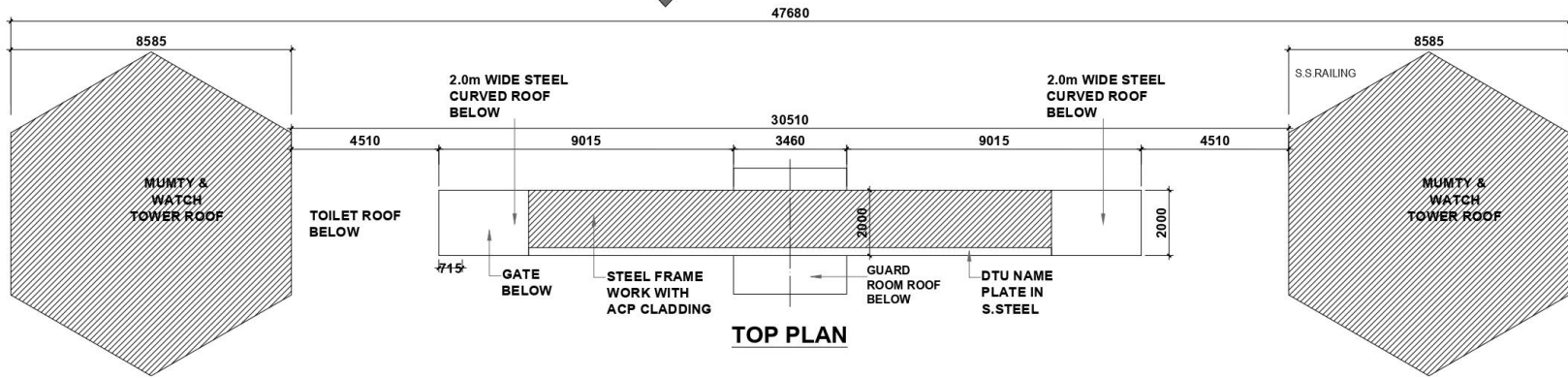
J.E. Electrical)

Consultant Electrical

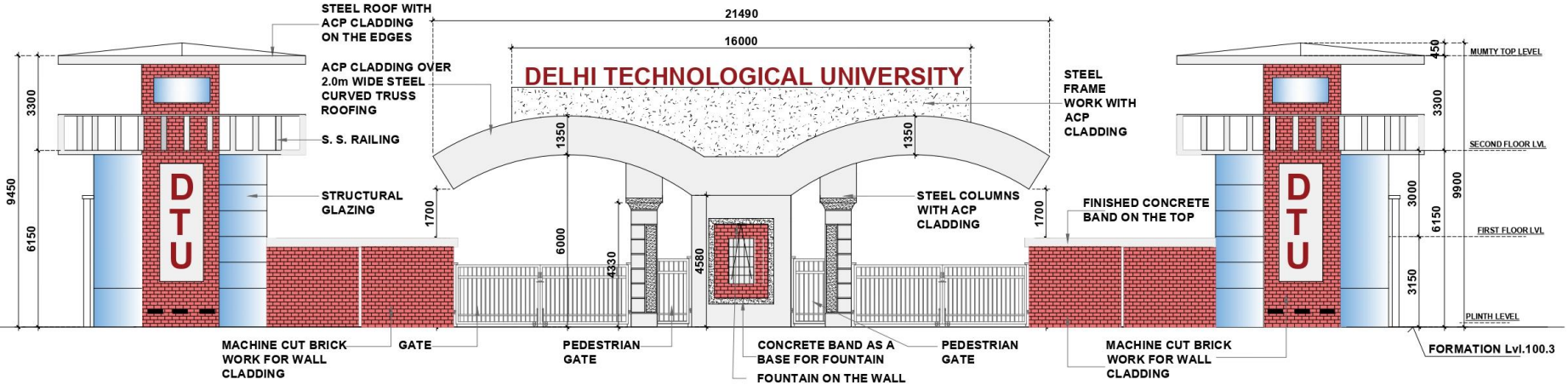
Project Officer (Electrical)

Chief Project Officer

ELE- A FROM BRIDGE SIDE



TOP PLAN



**FRONT ELEVATION - A
(FROM BRIDGE)**

NOTE :-
 1. DO NOT SCALE THE DRAWING, FOLLOW WRITTEN DIMENSION ONLY.
 2. ALL DIMENSIONS IN MM.
 3. ANY DISCREPANCY IN THIS DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE ARCHITECT.
 4. ALL SPECIFICATIONS AS PER AGREEMENT CONDITIONS.
 5. ALL MEASUREMENT MUST BE CHECKED AT SITE BY CONTRACTOR.
 6. FOR STAIRCASE, DOOR & WINDOW, COUNTERS ETC. REFER SEPARATE DETAIL DRGS.
 7. FOR STRUCTURE ELECTRICAL, PLUMBING & HVAC, REFER RESPECTIVE DRAWINGS.
 8. THIS IS A PRELIMINARY DETAILED DRAWING, MINOR CHANGES MIGHT BE REQUIRED ACCORDING TO THE EXECUTION WORK.

REVISIONS	DATE	DESCRIPTIONS

CLIENT:-
 THE EXECUTIVE ENGINEER ,
 PWD DTU CAMPUS
 (BAWANA ROAD ,
 DELHI)

PROJECT NAME:-
CONSTRUCTION OF DTU GATE

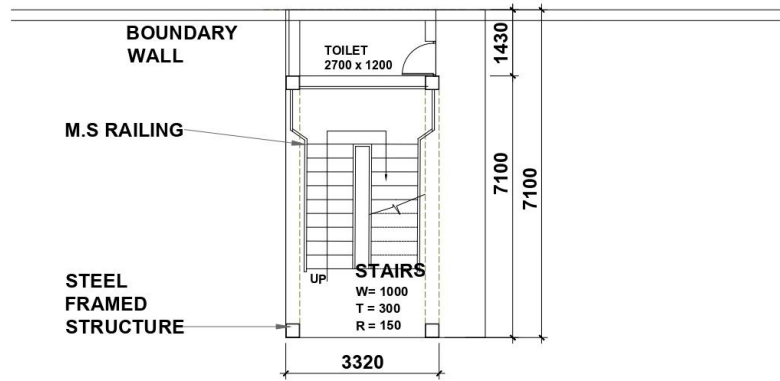
CONSULTANT:-

SWATI STRUCTURE SOLUTIONS PVT. LTD.
 503, SACHDEVA CORPORATE TOWER,
 PLOT NO-8, SECTOR-8, ROHINI,
 DELHI-110085 Ph.47528888
 E-mail:-swaticonsultant@gmail.com

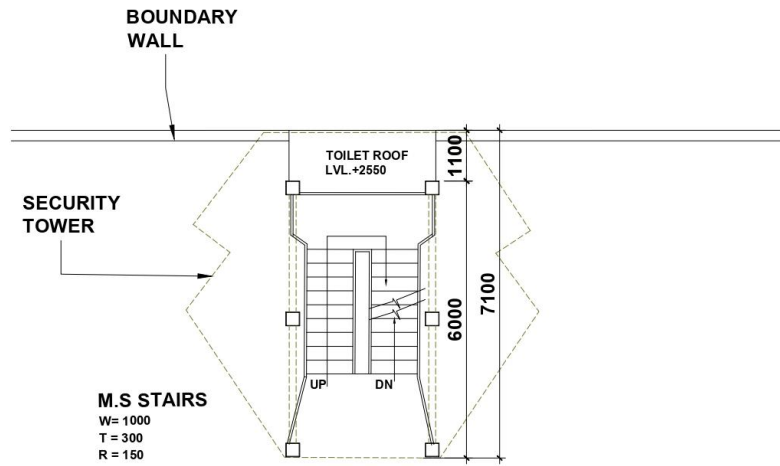
DRAWING TITLE:-
TOP PLAN & FRONT ELEVATION (from Bridge) (REAR GATE)

DRAWN BY:- SAKSHI
CHECKED BY:- ANITA KHARKHODI
DATE: 07.01.2023

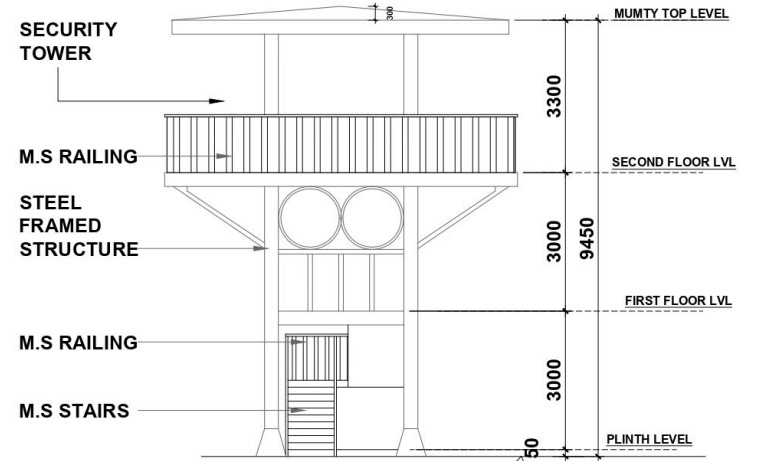
DRO NO. - 0822/SSSPL/DTU/RGT/PSP-04
SCALE SHEET NO. 01 REV. R0



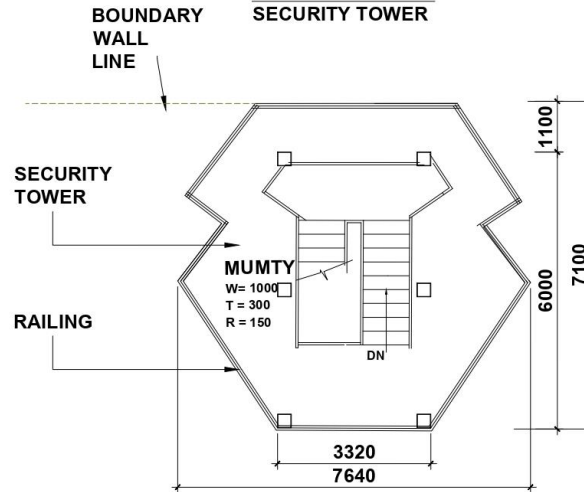
GROUND FLOOR PLAN SECURITY TOWER



FIRST FLOOR PLAN SECURITY TOWER



FRONT ELEVATION SECURITY TOWER




SECOND FLOOR PLAN SECURITY TOWER

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 7. FOR STRUCTURE, ELECTRICAL, PLUMBING & HVAC, REFER RESPECTIVE DRAWINGS.
 8. THIS IS A PRELIMINARY DETAILED DRAWING, MINOR CHANGES MIGHT BE REQUIRED ACCORDING TO THE EXECUTION WORK.

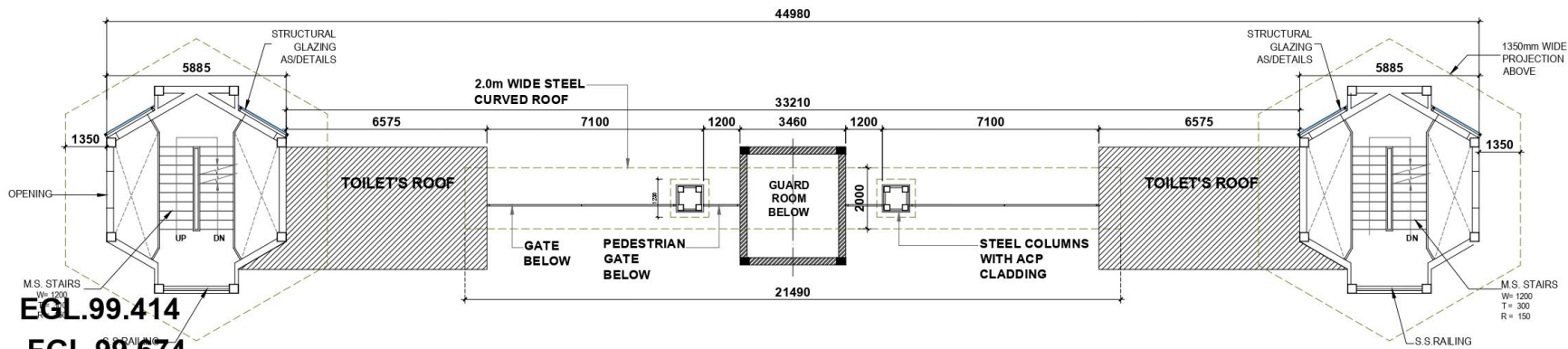
REVISIONS	DATE	DESCRIPTIONS

CLIENT:-
 THE EXECUTIVE ENGINEER,
 PWD DTU CAMPUS (BAWANA
 ROAD, DELHI)

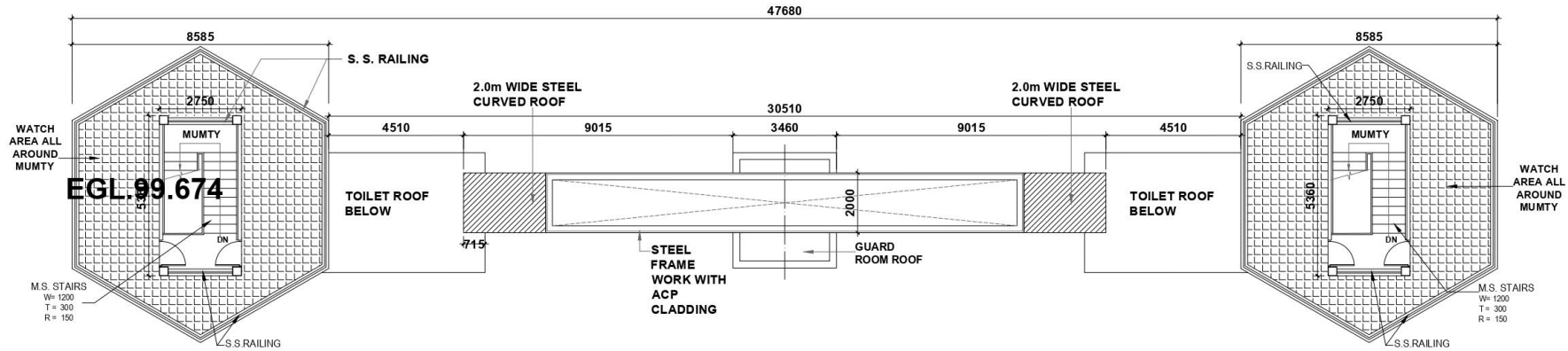
PROJECT NAME:-
**CONSTRUCTION OF
 DTU GATE**

CONSULTANT:-

**SWATI STRUCTURE
 SOLUTIONS PVT. LTD.**
 503, SACHDEVA CORPORATE
 TOWER,
 PLOT NO-8, SECTOR-8, ROHINI,
 DELHI-110085 Ph.47528888
 E-mail:-swaticonsultant@gmail.com

DRAWING TITLE:-		NORTH
TYPICAL SECURITY TOWER DETAILS		
DRAWN BY:-	SAKSHI	
CHECKED BY:-	ANITA KHARKHODI	
DATE:	28.12.2022	
DRG NO - 0822/SSSPL/DTU/RGT/WT-05		
SCALE	SHEET NO. 01	REV. R0



FIRST FLOOR PLAN



SECOND FLOOR PLAN

NOTE :-
 1. DO NOT SCALE THE DRAWING, FOLLOW WRITTEN DIMENSION ONLY.
 2. ALL DIMENSIONS IN MM.
 3. ANY DISCREPANCY IN THIS DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE ARCHITECT.
 4. ALL SPECIFICATIONS AS PER AGREEMENT CONDITIONS.
 5. ALL MEASUREMENT MUST BE CHECKED AT SITE BY CONTRACTOR.
 6. FOR STAIRCASE, DOOR & WINDOW, COUNTERS ETC. REFER SEPARATE DETAIL DRGS.
 7. FOR STRUCTURE ELECTRICAL, PLUMBING & HVAC, REFER RESPECTIVE DRAWINGS.
 8. THIS IS A PRELIMINARY DETAILED DRAWING, MINOR CHANGES MIGHT BE REQUIRED ACCORDING TO THE EXECUTION WORK.

REVISIONS	DATE	DESCRIPTIONS

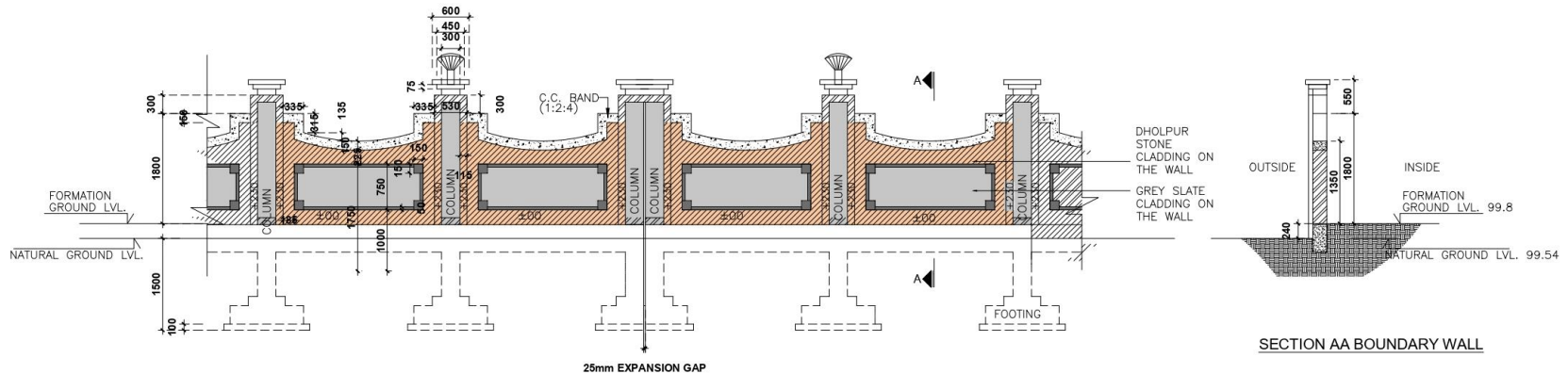
CLIENT:-
 THE EXECUTIVE ENGINEER ,
 PWD DTU CAMPUS
 (BAWANA ROAD ,
 DELHI)

PROJECT NAME:-
CONSTRUCTION OF DTU GATE

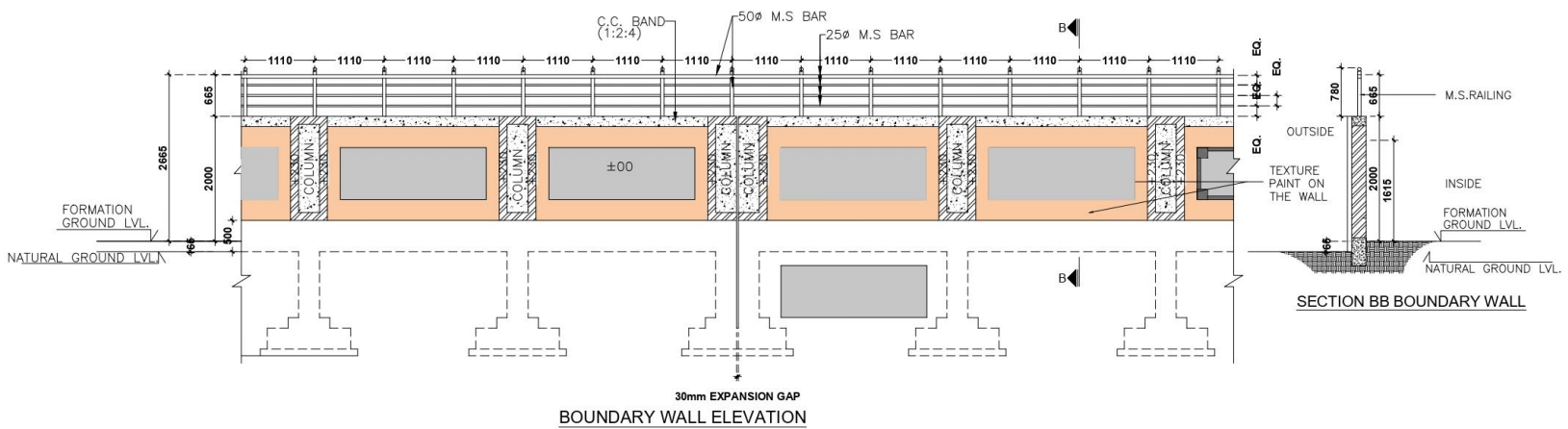
CONSULTANT:-

SWATI STRUCTURE SOLUTIONS PVT. LTD.
 503, SACHDEVA CORPORATE TOWER,
 PLOT NO-8, SECTOR-8, ROHINI,
 DELHI-110085 Ph.47528888
 E-mail:-swaticonsultant@gmail.com

DRAWING TITLE:-		NORTH
FLOOR PLANS (REAR GATE)		
DRAWN BY:-	SAKSHI	
CHECKED BY:-	ANITA KHARKHODI	
DATE:	07.01.2023	
DRG NO. - 0822/SSSPL/DTU/RGT/PSP-03		
SCALE	SHEET NO. 01	REV. R0



DECORATIVE BOUNDARY WALL ELEVATION



BOUNDARY WALL ELEVATION

NOTE :-
 1. DO NOT SCALE THE DRAWING, FOLLOW WRITTEN DIMENSION ONLY.
 2. ALL DIMENSIONS IN MM.
 3. ANY DISCREPANCY IN THIS DRAWING SHOULD BE BROUGHT TO THE NOTICE OF THE ARCHITECT.
 4. ALL SPECIFICATIONS AS PER AGREEMENT CONDITIONS.
 5. ALL MEASUREMENT MUST BE CHECKED AT SITE BY CONTRACTOR.
 6. FOR STAIRCASE, DOOR & WINDOW, COUNTERS ETC. REFER SEPARATE DETAIL DRGS.
 7. FOR STRUCTURE ELECTRICAL, PLUMBING & HVAC, REFER RESPECTIVE DRAWINGS.
 8. THIS IS A PRELIMINARY DETAILED DRAWING, MINOR CHANGES MIGHT BE REQUIRED ACCORDING TO THE EXECUTION WORK.

REVISIONS	DATE	DESCRIPTIONS

CLIENT:-
**THE EXECUTIVE ENGINEERS
 PWD DTU CAMPUS (BAWANA ROAD,
 DELHI)**

PROJECT NAME:-
CONSTRUCTION OF DTU GATE

CONSULTANT:-
SWATI STRUCTURE SOLUTIONS PVT. LTD.
 503, SACHDEVA CORPORATE TOWER,
 PLOT NO-8, SECTOR-8, ROHINI,
 DELHI-110085 Ph.47528888
 E-mail:-swaticonsultant@gmail.com

DRAWING TITLE:- BOUNDARY WALL DETAILS (REAR GATE)		NORTH
DRAWN BY:-	SAKSHI
CHECKED BY:-	ANITA KHARKHODI
DATE:	07.01.2023
DRG NO. :- 0822/SSSP/DTU/RGT/BW-01		
SCALE	SHEET NO. 01	REV. R0

CORRIGENDUM TO FORM-7 (CPWD)

S.No.	FOR	READ
1.	Govt. of India	Govt. of National Capital Territory of Delhi.
2.	President of India	Board of management, DTU
3.	Superintending Engineer/ Chief Engineer	Hon'ble, V.C. Delhi Technological University
4.	Department	Delhi Technological University
5.	Administrative Head	Hon'ble, V.C. Delhi Technological University
6.	Ministry of Works & Housing	Govt. of National Capital Territory of Delhi.
7.	Engineer-in-Charge	Chief Project Officer, DTU

J.E(E)/J.E.(C)

Signature Not Verified

Correction.....
 Digitally signed by Mohit Dey.....
 Date: 2023.05.16 12:25:10 IST.....
 Location: NCD of Delhi-DL