E-TENDER

For

Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using Emerging Technology Including on site Infrastructure Works at Ratanpur, Chhattisgarh under PMAY-U 2.0

(Bid No. BMT/S/2026/DHP-Chhattisgarh)

BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL

Ministry of Housing & Urban Affairs, Govt. of India

Core-5A, First Floor, India Habitat Centre

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INDEX

S.No.	Description	Page
Part1	**Instruction to Bidders**	3
1.	Tender Notice	4
2.	Detailed Tender Notice	5
3.	Instructions for online bid submission	7
4.	Minimum Eligibility criteria	10
	ANNEXURE-I : List of technologies recommended under GHTC-India	14
	ANNEXURE- II: Bank details of BMTPC	19
	ANNEXURE- III: Form of Performance Security (Guarantee)	20
5.	General information and instructions to bidders	22
6.	List of documents to be Uploaded	30
	ANNEXURE-IV: Proforma for Agreement	32
Part 2	**Technical Bid**	35
1.	Brief Particulars of Works	36
2.	Information & Guidelines for Bidders	38
	Appendix – I: Detailed Criteria for Evaluation of the Performance of Bidders for Pre-Eligibility	42
3.	Templates of Forms	43
	ANNEXURE – V: Integrity Pact	56
	ANNEXURE –VI: Un- Conditional Letter of acceptance of Bid Conditions Memorandum	62
	ANNEXURE –VII: Acceptance of BID by BMTPC	64
	ANNEXURE –VIII: Memorandum	65
	ANNEXURE-IX: Proforma for JVA	67
	ANNEXRE-X: Establishing site laboratory and testing of materials	70
	ANNEXURE-XI: A Suggestive List of Plant & Equipment at Site	71
	ANNEXURE-XII: Minimum Requirements of Technical Representative at Site	72
Part 3	**Contract & Other Conditions and Specifications**	73
1.	Contract Conditions	74
2.	Special Conditions for Use of Emerging Technologies and Works	135
3.	General Conditions for Planning & Designing	140
4.	General & Special Condition and Specification of Civil, Electrical and Infrastructure Works	145
5.	List of Approved Makes	155
	Appendix – II: Guarantee for Removal of defects of water proofing works	161
6.	Schedule of Finishes & Specifications	163
Part 4	**Payment Schedule**	177
1.	Payment Schedule	178

Part 5	**Financial Bid**	180
	Financial Bid	181
Part 6	**Soil Investigation Report**	205
	Soil Investigation Report	206
Part 7	**Architectural Drawings**	242
	Architectural Drawings	243
Part 8	**Technical Specifications of Emerging Technologies**	287
1	Technical Specifications of Technologies Recommended under GHTC -India by Ministry of Housing and Urban Affairs	288

It is certified that this bid document contains cover page and 325 pages.

Part-1

Instructions to Bidders

Building Materials & Technology Promotion Council
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1. TENDERNOTICE

BMTPC invites online E-Tenders in Two-Bid system from reputed, experienced, technically and financially sound. Technology/system providers (single business entity)or Joint Venture/ consortia of firms / companies (hereafter called Agency) for Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using emerging technology listed at **ANNEXURE – I** including onsite infrastructure works at Ratanpur, Chhattisgarh under PMAY-U 2.0 of Ministry of Housing & Urban Affairs, Govt. of India..

Location	Estimated Project Cost put to bid (Rs. inLakhs)	Tender Fee (in Rs.) (Non-refundable)	EMD (Rs. In Lakhs)	Stipulated period of completion of work	Uploading online bid Document	Last Date for online Submission of Tender	Technical bid opening
					Date	Date/Time	Date/Time
Ratanpur, Chhattisgarh	865.18	5000+ 18% GST	17.30	12 Months	As per CPP Portal	As per CPP Portal	As per CPP Portal

1. The Tender document for the work can be seen and downloaded from CPP Portal (https://eprocure.gov.in/eprocure/app). This Tender Document is also available on BMTPC website www.bmtpc.org.
2. The intending bidder must read the terms and conditions of tender carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
3. Pre-Bid meeting will be held on date as per CPP Portal in Conference Room, Building Materials & Technology Promotion Council, Core-5A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi or through virtual mode.
4. Conditional Tenders hall not be accepted.
5. Those bidders not registered on the website of eprocure.gov.in, are required to get registered before submitting the Bid online. If needed they can be imparted training on online bidding process as per details available on the website.
6. The intending bidder must have valid digital signature to submit the bid.
7. Hard copies of online submitted Technical Bid along with all documents, proof of online deposited tender fees and EMD shall be submitted to Executive Director, Building Materials & Technology Promotion Council, Core-5A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi- 110003 by Courier/post/Hand Delivery on or before 20-05-2026 by 1700 hrs.
8. The Bidder/s having valid MSME/NSIC certificate are exempted from payment of Tender Fee and Earnest Money Deposit only.
9. Corrigendum/ Addendum/ Minutes of Pre-bid Meeting, if any, would appear on the CPP Portal (https://eprocure.gov.in/eprocure/app) and website of BMTPC (www.bmtpc.org) and shall not be published in any “News Paper”.
10. The Executive Director, BMTPC reserves the right to accept or reject any or all tenders without assigninganyreasonthereof.ThisTendernoticeshallformapartofcontractdocument.

Executive Director, BMTPC

2. DETAILED TENDER NOTICE

BMTPC invites online E-Tenders in Two-Bid system from reputed, experienced, technically and financially sound Technology/system providers (single business entity) or Joint Venture/ consortia of firms / companies (hereafter called Agency) for construction of Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using emerging technology listed at **ANNEXURE – I** including onsite infrastructure works at Ratanpur, Chhattisgarh Under PMAY-U 2.0 of Ministry of Housing & Urban Affairs, Govt. of India as detailed below:

In case, one proposed unique technology is not suitable for the site as per structural and local geo-climatic requirement, the bidder/s may use hybrid construction system other than conventional system (In situ RCC framed structure) subject to proof of its structural integrity, fire safety, thermal performance and fulfilment of other functional requirements of the buildings. The bidder/s required to submit a detailed note on specifications and code of practice and how the particular technology can be effectively used in proposed DHP.

1)	Bid document No.	**BMT/S/2026/DHP-Chhattisgarh**
2)	Name of Work	Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using emerging technology listed at **ANNEXURE – I** including onsite infrastructure works at Ratanpur, Chhattisgarh Under PMAY-U 2.0
3)	Brief Scope of work	Design and Construction of Demonstration Housing Project as per the approved architectural and structural drawings using emerging technology listed at **ANNEXURE–I** including on site infrastructure work. To get the Design and Drawings of structure vetted by Technical / Research institutions of repute such as IITs, NITs, Govt. Engineering Colleges, CSIR Labs, Govt. Research Institutions. Arranging required material, machinery and manpower so as to complete the work in stipulated time. Maintenance of building and onsite infrastructure works during defect liability period of Five Years.
4)	Estimated cost put to tender	**Rs. 865.18 lakhs**
5)	Tender fee (Non Refundable)	Rs. 5,000/- Plus 18%GST to be deposited in the account of BMTPC through NEFT/ RTGS as per details given at **ANNEXURE - II**
6)	Earnest Money Deposit	Rs. 17.30 lakhs to be deposited in the account of BMTPC through NEFT/ RTGS as per details given at **ANNEXURE – II** or Bank Guarantee in favour of BMTPC with a validity of 6 months from the date of submission of tender as per **Annexure-III**.
7)	Tender validity period	120 days.
8)	Period of completion	12.0 Months (1.5 months for Architectural planning & Structural designing, vetted structural design and

		taking statuary approvals from local authorities + 10.50 months for construction of building and onsite infrastructure works from the date of handing over the site and all statutory approvals)
9)	Last date & Time of online Submission of tender	As per CPP portal
10)	Date of Pre-Bid meeting & Venue	As per CPP Portal, Conference Room, Building Materials & Technology Promotion Council, Core-5A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi– 110003 or through virtual mode.
11)	Last date, Time & Place for submission of Hard copy of online submitted Technical Bid along with all documents, proof of online deposited tender fees and EMD	20.05.2026 by 1700 hrs, Building Materials & Technology Promotion Council, Core-5A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi - 110003.
12)	Time & date of online opening of technical bid	As per CPP Portal,
13)	Time & date of online opening of financial bid of technically qualified bidders	To be intimated later
14)	Performance Guarantee	Performance Guarantee @3% of the tendered amount to be deposited in the account of BMTPC through NEFT/ RTGS as per details given at **ANNEXURE–II** or in the form of Bank Guarantee from any Indian Scheduled/Commercial Bank in prescribed format given at **ANNEXURE-III**(To be submitted at the time of agreement)
15)	Security Deposit (SD)	2.5% of the contract value shall be deducted from the each R.A. Bill till SD reaches 2.5% of the contract value. Bank Guarantee from any Indian Scheduled/Commercial Bank in prescribed format given at **Annexure III** can also be submitted against security deposit for prescribed period.
16)	Net worth Certificate	Minimum 15% of the estimate cost put to tender issued by the certified Chartered Accountant (on the format prescribed in form B
17)	Defect liability and maintenance period	**5 (five) years** after issue of completion certificate and provision of security guard till handing over of project to State Govt. (without payment of any extra cost)
18)	Compensation for delay	As per Clauses of Contract
19)	Contact office	Executive Director, Building Materials & Technology Promotion Council, Core-5A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi - 110003.

3. INSTRUCTIONS FOR ONLINE BID SUBMISSION

1) All Bidders are requested to register themselves with the portal http://eprocure.gov.in and enrol their digital certificate with the user ID for participation in the bid.

2) The Bidders are requested to read following conditions in conjunction with various conditions, wherever applicable appearing with this bid invitation for e-Biding. The conditions mentioned here in under shall supersede and shall prevail over the conditions enumerated elsewhere in the bid document.

3) How to submit On-line Bids/Offers electronically against e-Biding?

Bidders are advised to read the following instructions for participating in the electronic bids directly through internet:

i. Late /delayed Bids/Offers after due date/time shall not be permitted in e-Biding system. No bid can be submitted after the last date and time of submission of bid. The system time (Indian Standard Time [IST]) that will be displayed on e-biding web page shall be the time and no other time shall be taken into cognizance.
ii. Bidder/s are advised in their own interest to ensure that bids are uploaded in e-biding system well before the closing date and time of bid.
iii. Bid shall not be modified after the due date for submission of bids.
iv. Manual bids/offers along with electronic bids / offers shall not be permitted.

4) What is a Digital Signature?

This is a unique digital code which can be transmitted electronically and primarily identifies a unique sender. The objective of digital signature is to guarantee that the individual sending the message is who he or she really claims to be just like the written signature. The Controller of Certifying Authorities of India (CCA) has authorized certain trusted Certifying Authorities (CA) who in turn allots on a regular basis Digital Signature Certificates (DSC)

5) Documents which are signed digitally are legally valid documents as per Indian IT Act (2000).

6) Why is a Digital Signature required?

In order to bid for e-bids, all vendors are required to obtain a legally valid Digital Certificate as per Indian IT Act from the licensed Certifying Authorities (CA) operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India. The Digital Certificates is issued by CA in the name of a person authorized for filing Bids/Offers on behalf of his Company. Bidder can submit their Bids/Offers on-line only after digitally signing the bid/documents

with the above allotted Digital Signature.

7) Bidders have to procure Digital Signature Certificate (Class 3 or 2 with signing key uses) from any of the certifying Authorities in India.

8) Submission of Documents

i. Bidders must submit on line offers by the date and time mentioned in the tender at the website address stated therein.

ii. E-Bid will provide access to Technical as well as Financial part of bid. Along with the Technical part, Bidders can attach the required documents listed at page 31 of this bid document along with scan copy of the proof of submission of tender fee and EMD with the bid in line with the Bid document.

iii. The successful bid submission can be ascertained once acknowledgement is given by the system through bid submission number after completing all the process and steps.

iv. The technical bids shall be submitted online as well as physical submission too. However, documents which necessarily have to be submitted in originals like Technical Proposal, Proof of submission of Tender fee & EMD and any other documents mentioned in the bid documents have to be submitted offline. Financial Bid should not be submitted physically. BMTPC shall not be responsible in any way for failure on the part of the bidder to follow the instructions.

v. Financial Bid shall contain only price as per Schedule of Quantities (in form of an excel sheet) without any condition. The lump sum rate / item rates along with tax and other components shall be filled up in figures and the total amount shall be automatically calculated and rounded off to the nearest rupee. It is to be noted that the Financial Bid shall contain only PRICES and no conditions whatsoever.

vi. The online bid shall be uploaded through digital signatures by someone legally authorized to enter into commitment on behalf of the Bidder. The Bidder shall upload among other documents, Power of Attorney in favour of the person who is authorized to enter into commitments on behalf of the Bidder.

vii. It is advised that the bidder upload small sized documents at a time to facilitate in easy uploading into e-biding site. BMTPC does not take any responsibility in case of failure of the bidder to upload the documents within specified time of bid submission.

viii. The Bidder(s) shall submit the Technical Bids in the format as mentioned in Tender documents online and also submit its hard copy in sealed envelope and mark the envelope as "**Tender for Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using emerging technology including onsite infrastructure works at Ratanpur, Chhattisgarh Under PMAY-U 2.0"**. The hardcopy shall be submitted to the Executive Director, Building Materials & Technology Promotion Council, Core-5A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi – 110003 on 20-05-2026 by 1700 hrs and shall clearly mention name of Project, Bid No. and Bidders details.

ix. The bid shall comprise a sealed single packet containing the online submitted technical bid along with all documents and proof of online deposited tender fees & EMD shall be placed in hard binding and the pages shall be numbered serially. The document shall clearly mention Name of Bidder and Emerging Technology proposed. Each page thereof shall be initialled in blue ink by the authorized signatory. The Bid shall be marked as Original on right hand corner of Cover page of proposal in Tender in Red ink along with required documents.

4.MINIMUM ELIGIBILITY CRITERIA

The bidder should meet the following minimum qualifying criteria:

A) Work Experience:

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

a. Three similar works each costing not less than 40% of the estimated cost put to bid

OR

b. Two similar works each costing not less than 60% of the estimated cost put to bid

OR

c. One similar work costing not less than 80% of the estimated cost put to bid.

ii. The definition of similar work shall mean construction of "Residential/Non-Residential buildings using proposed emerging technology/hybrid proposed technology/any conventional technology.

iii. The past experience in similar nature of work should be supported by certificates issued by the client's organization. In case the work experience is of Private sector the completion certificate shall be supported with copies of Letter of Award and copies of corresponding TDS certificates. In case of foreign firms, necessary evidences with respect to taxes may be attached appropriately.

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

v. If any information furnished by the Bidder is found incorrect at a later stage, the bidder shall be liable to be debarred from further bidding and taking works. The BMTPC reserves the right to verify the contents / particulars furnished by the bidder independently including inspection of work completed by them.

B) In order to promote MAKE IN INDIA Mission of Govt. of India, the Bidder must have manufacturing facilities of the proposed technology in India. Bidder has to provide details such as production capacity of manufacturing unit, complete address of unit with telephone no., email etc.

C) The purpose of the Demonstration Housing Projects (DHP) is to popularise all innovative construction technologies available in the country for speedier,

durable and affordable construction. Therefore, each DHP will be executed with different technology.

D) Technology for the project

The DHP will be constructed by using one of the 54 technologies recommended by MoHUA under GHTC -I as listed at **Annexure –I.**

E) The technologies which have been selected in earlier 9 DHP projects i.e. 1) Panchkula, Haryana (Light Gauge Steel Framed Structure with fibre cement board on both side and infill of rockwool – M/s Nipani Infra and Industries Pvt. Ltd.); 2) Agartala, Tripura (Stay-in-Place Formwork System- Coffor - M/s Coffor Construction Technology Pvt. Ltd); 3) Ahmedabad, Gujarat (Integrated Hybrid Solution – ONE (IHS – ONE - M/s Adlakha Associates Pvt. Ltd.); 4) Bhopal, Madhya Pradesh (Insulating Concrete Forms- M/s Reliable Building Solutions); 5) Ayodhya, Uttar Pradesh (Ayodhya-LGS Framing with various walling & roofing options -M/s Everest Industries Ltd.); 6) Bhalwal, Jammu & Kashmir (EPS core panel using Quikbuild Panels as walling and EPS roof/slab Panel with concreting – M/s Beardsell Limited); 7) Tiruppur, Tamil Nadu (Precast concrete construction system - M/s Teemage Builders (P) Ltd.); 8) Dimapur, Nagaland (Fly ash EPS (Beads)Cement Sandwich Panel wall & slab - M/s Bhargava Infrastructure Pvt. Ltd., Surat) and 9) Guwahati, Assam (Light Gauge Steel Frame Structure with V-infill concrete wall M/s Vishaka Industries Ltd.) shall not be considered to construct each DHPs with different technologies.

BMTPC has recently floated 2 tenders for Construction of Demonstration Housing Projects at Alwar, Rajasthan and Villianur, Puducherry. The technology which will be selected in DHPs at Alwar, Rajasthan and Villianur, Puducherry shall also not be considered in this project (DHP at Ratanpur, Chhattisgarh).

F) Financial Strength:

i) The Average annual financial turnover of last consecutive fiscal years for last immediate 5 years shall be at least 50% of the estimated cost put to bid. The requisite Turnover shall be duly certified by a Chartered Accountant with his Seal/ signatures and registration number.

ii) Net Worth of the participating agency as on 31st March of previous Financial Year should be positive

iii) Net worth of minimum 15% of the ECPT (Estimated Cost Put to Tender) issued by the certified Chartered Accountant.

iv) The bidder should not have incurred any loss in more than two years during available last five consecutive balance sheets. The bidder/s are required to

upload and submit page of summarized Balance Sheet (Audited) and also page of summarized Profit& Loss Account (Audited) for last five years.

G) In case of Joint-venture/consortia of firms/companies:

i) A Consortium of a maximum of 3 (Three) members comprising one Lead Member with two other members shall be allowed and shall hereinafter be referred as "Consortium".

ii) The Bidder should submit a Power of Attorney authorizing the signatory of the application to commit the Bidder.

iii) Bids submitted by a Consortium should comply with the following additional requirements:

a) The number of members in the Consortium would be limited to three (3);
b) The Application should contain the information required from each member;
c) The Application should include a description of the role sand responsibilities of all the members;
d) Members of the Consortium shall nominate one member as the Lead Member and that member must be an entity as defined above;
e) The Bidder who has participated in this bid in its individual capacity or as part of a Consortium cannot participate as a separate agency of any other Consortium participating in this bid;
f) The members of the Consortium shall execute a Power of Attorney for Lead Member of Consortium.
g) The JV will be registered within one month from the date of award of work.
h) The members of the Consortium shall enter into a Memorandum of Understanding (MoU), for the purpose of submission of the bid.The MoU should, inter alia,
   - Clearly outline the proposed roles and responsibilities of each member of the Consortium; and
   - Include a statement to the effect that all members of the Consortium shall be liable jointly and severally for the assignments arising out contract agreement therefore;
   - A copy of the MoU signed by all members should be submitted along with the technical bids. The MoU entered between the members of the Consortium should contain the above requirements, failing which the bid shall be considered non-responsive.

iv) A Bidder which has earlier been barred by BMTPC or blacklisted by any State /UT Government or Central Government / department / agency in India from participating in Bidding Process shall not be eligible to submit bids, either individually or as member of a Consortium, if such bar subsists as

on the submission Due Date. The Bidder or consortium shall be required to furnish an affidavit that there is no such bar imposed and existing as on date.

v) A Bidder or member of Consortium should have, during the last three years, neither failed to perform on any agreement, as evidenced by imposition of a penalty or a judicial pronouncement or arbitration award against the Bidder or member of Consortium, nor been expelled from any project or agreement nor have had any agreement terminated for breach by such Bidder or member of Consortium.

vi) The Application and all related correspondence and documents should be furnished by the bidder with the Application may be in any other language provided that these are accompanied by appropriate translations of the pertinent passages in the English language by approved/authorized/ licensed translator. Supporting material, which are not translated into English, may not be considered. For the purpose of interpretation and evaluation of the Application, the English language translation shall prevail.

vii) Bidder /consortium should be profit making organization. The audited balance sheet for the last five years maybe attached with the technical bids, otherwise bids will be rejected.

H) Foreign Work Experience Certificate:

i. In case the work experience is for the work executed outside India, the Bidder have to submit the completion/experience certificate issued by the owner duly signed &stamped and affidavit to the correctness of the completion/experience certificates. The Participating Agency shall also get the completion/experience certificates attested by the Indian Embassy/Consulate/High Commission in the respective country.

ii. In the event of submission of completion /experience certificate by the Bidder in a language other than English, the English translation of the same shall be duly authenticated by Chamber of Commerce of the respective country and attested by the Indian Embassy/Consulate / High Commission in the respective country.

iii. For the purpose of evaluation of Bidder, the conversion rate of such a currency into INR shall be the daily representative exchange rate published by the IMF as on 7 (Seven) days prior to the Last Date of Submission of bid including extension(s) given if any.

ANNEXURE – I

LIST OF TECHNOLOGIES RECOMMENDED UNDER GHTC -INDIA BY MINISTRY OF HOUSING AND URBAN AFFAIRS, GOVT. OF INDIA

Sl No	Technology Broad Specification	Applicants	Recommendations
A. Precast Concrete Construction System - 3D Precast volumetric (4)			
01	Pre-cast concrete system with columns, beams, walls, slabs, hollow core slabs 86 also 3D Volumetric components	Katerra	Suitable up to seismic zone IV.
02	Vertical structural modules cast in Plant/Casting yard are assembled together through casting of floor panel. The unit is transported & installed at site.	Moducast Pvt. Ltd	Suitable up to seismic zone IV. Requires proper access to site & special transport logistic. Suitable up to G+3 due to limited hoisting capacity
03	3D Modular casting using steel mould and high performance concrete of building modules in factory. These pods are transported to the construction site & assembled	Magicrete Building Solutions	Suitable up to seismic zone IV. Site must have accessibility & technology needs special transport logistics.
04	Modules with 3D Volumetric Precast concrete unit, various units make on house	Ultra-tech Cement Ltd	Suitable up to seismic zone IV Site must have accessibility & technology needs special transport logistics.
B. Precast Concrete Construction System - Precast components assembled at site (8)			
05	Precast Large Concrete Panel (PLCP) System with structural members (wall, slab etc.) cast in a factory/ casting yard and brought to the building site for erection & assembling	Larsen & Toubro	Suitable up to seismic zone IV.
06	Pre-cast Concrete Structural system comprising of pre-cast column, beam, precast concrete / light weight slab, AAC blocks/ infill concrete walls.	B.G. Shirke Construction Technology Pvt. Ltd	Suitable up to seismic zone IV.
07	Optimal Pre-cast concrete System through structural Analysis, design & equipment support	Elematic India	Suitable up to seismic zone IV. The firm needs to tie up with a construction Agency.
08	Precast concrete construction system using precast walls with precast plank floor	PG Setty Construction Technology Pvt Ltd.	Suitable up to seismic zone IV
09	Pre cast components comprising of beams, columns, staircase, slab, hollow core slab etc. manufactured in plant & erected on sit **(not to be considered)**	Teemage	

10	Pre-cast sandwich panel system & Light weight Pre cast Light Weight concrete slab	Nordicflex	
11	Prefabricated Interlocking Technology (without mortar) with Roofing as Mechanized Precast R.C. Plank & Joist system **(not to be considered)**	Adalakha Associates Pvt. Ltd	Suitable up to G+3 storeys& Seismic Zone — IV
12	Large Hollow wall prefab concrete Panel (lightweight, interlocking, concrete panel) using factory produced large standard hollow interlocking concrete block	William Ling,	Suitable up to seismic zone IV
C. Light Gauge Steel Structural System & Pre-engineered Steel Structural System -(16)			
13	LGS Framing with various walling & roofing options	Mitsumi Housing Pvt. Ltd,	Suitable for G+ 3 storeys. Hybrid with steel frame for high rise Paneling materials to be used should meet the site specific quality and durability requirements.
14	LGS Framing with various walling & roofing options **(not to be considered)**	Everest Industries Ltd,	
15	LGS Framing with various walling & roofing options	JSW Steel Ltd.,	
16	LGS Framing with various walling & roofing options	Society for Development of Composites	
17	LGS Framing with various walling & roofing options	Elemente Designer Homes	
18	LGS Framing with various walling & roofing options	MGI Infra Pvt. Ltd.,	
19	LGS Framing with various walling & roofing options	RCM Prefab Pvt. Ltd,	
20	LGS Framing with various walling & roofing options**(not to be considered)**	Nipani Infra and Industries Pvt. Ltd.	
21	LGS Framing with various walling & roofing options	Strawcture Eco	
22	LGS Framing with various walling & roofing options **(not to be considered)**	Visakha Industries Ltd.	
23	Prefabricated steel structural system with Dry wall system as AAC panels, PUF panels etc.	RCC Infra Ventures Ltd.	Suitable technology
24	Hot rolled steel frame with speed floor	Jindal Steel &Power Ltd.	Suitable technology with accepted walling components
25	Hot rolled steel section with AAC Panels as floor & slab	HIL Ltd.	
26	AAC wall and roof panel system to provide integrated solution. AAC products are reinforced and used in both load and non-loadbearing applications.	Biltech Building Elements Ltd.	Suitable up to G+3 (Load bearing) Suitable with steel frame for high rise

27	AAC Panels are Wire mesh/ steel reinforced for use as wall & slab. Appears to be non-load bearing panels to be used with structural framing	SCG International India Pvt. Ltd	
28	Precast Light Weight Hollow-core wall Panel is a non-structural construction material with framed structures	Pioneer Precast Solutions Pvt Ltd.	Suitable with steel frame
D. Prefabricated Sandwich Panel System- (9)			
29	Reinforced Expanded Polystyrene sheet core Panel with sprayed concrete as wall & slab	Worldhaus	Suitable for G+ 3 storeys.
30	EPS Cement sandwich Panel wall & slab with EPS Cement sandwich Panel to be used with RCC or Steel structural frame. Load bearing upto G+3 storey**(not to be considered)**	Bhargav Infrastructure Pvt. Ltd.	Suitable up to G+3 (Load bearing) Hybrid with Steel/RCC frame for multi storey
31	EPS Cement sandwich Panel): wall & slab with EPS Cement sandwich Panel to be used with RCC or Steel structural frame. Load bearing upto G+3 storey	Rising Japan Infra Private Limited	
32	Reinforced Expanded Polystyrene sheet core Panel with sprayed concrete as wall & slab	Bau Panel Systems India Pvt Ltd.	Suitable for G+ 3 storeys.
33	Reinforced Expanded Polystyrene sheet core Panel with sprayed concrete as wall & slab	BK Chemtech Engineering	
34	Reinforced Expanded Polystyrene sheet core Panel with sprayed concrete as wall & slab	MSN Construction	
35	Reinforced Expanded Polystyrene sheet core Panel with sprayed concrete as wall & slab**(not to be considered)**	Beardshell Ltd.	
36	Pre-fab PIR (Poly-isocyanurate) based Dry Wall Panel System" as non-load bearing wall	Covestro India Pvt. Ltd.,	Suitable with steel frame
37	Sandwich panels as wall & slab	Project Etopia Group	Suitable for G+ 3 storeys.
E. Monolithic concrete Construction (9)			
38	Aluminium form work for Monolithic System Concrete construction	Maini Scaffold systems	Suitable Technology
39	Aluminium form work for Monolithic System Concrete construction	Kumkangkind India Pvt. Ltd.	
40	Aluminium form work for Monolithic System Concrete construction	S-Form India Pvt. Ltd.	
41	Aluminium form work for Monolithic System Concrete construction	ATS Infrastructure Ltd.	
42	Aluminium form work for Monolithic System Concrete construction	Innovative housing	

		&Infrastructure Pvt. Ltd.	
43	Aluminium form work for Monolithic System Concrete construction	MFS formwork Systems Pvt. Ltd.	
44	Aluminium form work for Monolithic System Concrete construction	Knest Manufacturers LLP	
45	'Tunnel form' construction technology, an cast in situ RCC system, based on the use of high-precision, reusable room-sized, steel forms or moulds for monolithic concrete construction	Outinord Formworks Pvt. Ltd.	Suitable Technology
46	Aluminium form work for Monolithic System Concrete construction	Brilliant Etoile	Suitable Technology
F. Stay In Place Formwork System (8)			
47	Expanded-Steel Panel reinforced with all-galvanised Steel Wire-Sturts serving both as the load- bearing steel structure and as the stay-in-place steel formwork filled with EPS-alleviated concrete	JK Structure	Suitable for G+3 storeys
48	Factory made prefab Glass fiber reinforced Gypsum cage panels suitable for wall & slab with reinforcement & concrete as infill as per the requirement	FACT RCF Building Products Limited	Suitable up to 10 storeys in seismic zone—III, & up to 6 storeys in seismic zone-V if conforming to design requirements
49	Structural Stay In Place Galvanized Steel formwork system for walling with the same bottom single layer Formwork for slabs/ in-situ slab**(not to be considered)**	Coffor construction Technology Pvt. Ltd.	Suitable for G+3 storeys
50	Factory produced PVC Stay in place formwork with concrete & reinforcement in walling units with cast in-situ RCC Slab	Joseph Jebastin (Novel Assembler Private Limited),	Suitable Technology
51	Fully load bearing walls with 150 mm monolithic concrete core sandwiched inside two layers of EPS as walling The forms are open ended hollow polystyrene interlocking blocks which fits together to form shuttering system **(not to be considered)**	Reliable Insupack	Suitable up to G+3 in Seismic Zone V and higher storeys in Seismic Zone IV as per design
52	Ready to use Stay in place polymer formwork, light weight, with flooring slab(combination of ferro –cement and natural stone) placed on RCC precast joists)	Kalzen Realty Pvt. Ltd.	Not suitable as the system presented by the applicant does not qualify as a proven technology. However, it is suitable technology as Stay in place pre –assembled PVC wall forms along with cast in-situ RCC slab.
53	Fast Bloc, Insulated Concrete Form	Fast block	Suitable up to G+3 in Seismic

	(ICF), acts as formwork for concrete and rebar, Column/post and beam construction, creating an strong skeleton in the walls.	Building Systems	Zone V and higher storeys in Seismic Zone IV as per design
54	Formwork system "Plaswall" with Two fibre cement boards (FCB) & HIMI (High Impact Molded Inserts) bonded between two sheets of FCB in situ and erected to produce a straight-to-finish wall with in-situ concrete	FTS Buildtech Pvt. Ltd	Suitable up to G+3 in Seismic Zone V and higher storeys in Seismic Zone IV as per design

Note: The alternate & innovative technologies are technologies which will replace the conventional construction practices such as:

i. Load bearing masonry building, i.e., walls built with masonry made of brick, cement concrete solid, hollow blocks and any other masonry, and with roof made of RC.

ii. Cast in-situ Reinforced Concrete (RC) frame building with masonry infill walls and cast in-situ RC slab.

ANNEXURE-II

BANK DETAILS OF BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL, NEW DELHI FOR NEFT/RTGS

Name of the Account Holder	**Building Materials & Technology Promotion Council, New Delhi**
Account No.	62054931366
Bank Name	State Bank of India
Bank Address	Pragati Vihar, Delhi Branch, Ground Floor, Core 6, SCOPE Complex, Lodi Road, New Delhi – 110 003
IFSC Code	SBIN0020511
Type of Account	Savings
Branch Code	20511
GST No.	07AAATB0304Q1ZW

ANNEXURE III

(On non-judicial stamp paper of minimum of Rs. 100)

Form of Earnest Money / Performance Security /Security Deposit
Bank Guarantee Bond

BG No. _____
Dated _____
Due on_____
For Rs. _____

In consideration of the Building Materials & Technology Promotion Council (hereinafter called "BMTPC") having offered to accept the terms and conditions of the proposed agreement between **Building Materials & Technology Promotion Council** and ..... (hereinafter called "the said Agency") for the **work .....** (hereinafter called "the said agreement") having agreed to production of an irrevocable Bank Guarantee for Rs. ..... (Rupees: .....only) as Earnest Money / Performance Security / Security Deposit from the Agency for compliance of his obligations in accordance with the terms and conditions in the said agreement.

1. We, **.....** (hereinafter referred to as "the Bank") hereby undertake to (indicate the name of the bank) pay to the BMTPC an amount not exceeding Rs. ..... (Rupees: .....only) on demand by the BMTPC.

2. We, **.....**(indicate the name of the Bank) do hereby undertake to pay the amounts due and payable (indicate the name of the bank) under this guarantee without any demure, merely on a demand from BMTPC stating that the amount claimed as required to meet the recoveries due or likely to be due from the said agency. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ..... (Rupees: .....only)

3. We, the said bank further undertake to pay the BMTPC any money so demanded notwithstanding any dispute or disputes raised by the agency in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the agency shall have no claim against us for making such payment.

4. We, ... (indicate the name of the Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the BMTPC under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Competent Authority on behalf of BMTPC certified that the terms and conditions of the said agreement have been fully and properly carried out by the said Agency and accordingly discharges this guarantee.

5. We, ... (indicate the name of the Bank) further agree with BMTPC that BMTPC shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Agency from time to time or to postpone for any time or from time to time any of the powers exercisable by BMTPC against the said Agency and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Agency or for any forbearance, act of omission on the part of BMTPC or any indulgence by BMTPC to the said Agency or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Agency.

7. We, ...(indicate the name of the Bank) lastly undertake not to revoke this guarantee except with the previous consent of the BMTPC in writing.

8. This guarantee shall be valid up to ……unless extended on demand by the BMTPC. Notwithstanding anything contained herein above:

   i. Our liability under this guarantee shall not exceed to Rs. ..... (Rupees: .....only)
   ii. This bank guarantee shall be valid upto ……..
   iii. We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if you serve upon us a written claim or demand on or before ……. (mention period of the Guarantee as found under clause(ii) above plus claim period.

For .....

DATE .....

SIGNATURE

WITNESS .....

SEAL OF THE BANK

(SIGNATURE, NAME AND ADDRESS)

5. GENERAL INFORMATION AND INSTRUCTIONSTOBIDDERS

1. The tender document shall be accepted only by E- Tendering on CPP Portal (https://eprocure.gov.in/eprocure/app).

2. The tender document consisting of general specifications 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 CPP Portal (https://eprocure.gov.in/eprocure/app) and BMTPC website www.bmtpc.org. Those bidders not registered on CPP Portal (https://eprocure.gov.in/eprocure/app) are required to get registered before submitting the tender online.

3. The amount of tender fee will not be refunded under any circumstances.

4. EMD in the form specified in Bid document only shall be accepted.

5. The tender offer shall be valid for 120 days from the last date of submission of Bid.

6. Tender offer without Tender fees, EMD and other required documents or any of the condition or submitted incomplete documents in any respect liable to be rejected.

7. The bidder/s are required to quote strictly as per terms and conditions, specifications, standards of emerging technologies provided in the bid documents and not to stipulate any deviations.

8. The bidder/s are advised to submit complete details with their bids as Technical Bid Evaluation will be done on the basis of documents uploaded on website by the bidder with the bids. The information should be submitted in the prescribed proforma. Bids with Incomplete /Ambiguous information will be rejected.

9. The bidder/s are advised in their own interest to submit their bid documents well in advance from last date/time of submission of bids so as to avoid problems which the bidder may face in submission at last moment /during rush hours.

10. When it is desired by BMTPC to submit revised financial bid within the validity period then it shall be mandatory to submit revised financial bid. If not submitted then the bid submitted earlier shall become invalid and EMD will be forfeited.

11. If the bidder/s is found ineligible after opening of bids, his bid shall become invalid and cost of tender fee shall not be refunded.

12. Notwithstanding anything stated above, BMTPC reserves the right to assess

the capabilities and capacity of the bidder to perform the contract, in the overall interest of BMTPC. In case, bidder capabilities and capacities are not found satisfactory, BMTPC reserves the right to reject the bid.

13. Certificate of Financial Turnover: At the time of submission of bid, the bidder shall upload Affidavit/Certificate from Chartered Accountant mentioning Financial Turnover of last 5 years or for the period as specified in the bid document. There is no need to upload entire voluminous balance sheet. However, one page of summarised balance sheet (Audited) and one page of summarized Profit &Loss Account (Audited) for last 05 years shall be uploaded and submitted in hard copy also.

14. The bidder/s if required, may submit queries, if any, through E-mail and in writing to the bid inviting authority to seek clarifications upto date of pre-bid meeting from the date of uploading of bid document on website. BMTPC will reply to only those queries which are essentially required for submission of bids. BMTPC will not reply to the queries which are not considered fit like replies of which can be implied/found in the NIT/ Bid Documents or which are not relevant or in contravention to NIT/Bid Documents, queries received after 7days from the date of uploading of Bid on website. Technical Bids are to be opened on the scheduled dates. Requests for Extension of opening of Technical Bids will not be entertained.

15. Pre-bid meeting shall be held with the eligible and intending bidder at stated time and venue as mentioned earlier in NIT. As a result of pre-bid meeting, certain modifications may be issued to all eligible bidder/s by BMTPC corrigendum, if felt necessary. All modifications/addendums/ corrigendum issued regarding the bidding process shall be uploaded on CPP Portal (https://eprocure.gov.in/eprocure/app) and website of BMTPC www.bmtpc.orgonly and shall not be published in any Newspaper.

16. Attending the pre-bid meeting is optional. The Pre-Bid meeting shall be attended by the intending bidder/s only. Further, the intending bidder/s should depute their authorized representative with authorization letter in original to attend the pre-bid meeting.

17. All the uploaded documents should be in readable, printable and legible form, failing which the Bids shall not be considered for evaluation. The relevant Annexure may be tabled with proper indexing.

18. No Clarification will be sought in case of non-submission of tender fee & EMD or Unconditional letter of acceptance or Affidavit for correctness of document/information. In such cases the bid shall be rejected out rightly without seeking any further clarification/document.

19. All the uploaded and submitted documents shall be considered as duly signed by authorized representative of Bidder.

20. The bid submitted shall become invalid if:
    i. The bidder/s is found ineligible.
    ii. The bidder/s does not deposit tender fee and EMD with BMTPC
    iii. The bidder/s does not upload all the documents as stipulated in the bid document.
    iv. If any discrepancy is noticed between the documents as uploaded at the time of submission of bid.
    v. Bidder/s bid with deviation or conditional bid.

21. UNFAIR ADVANTAGE- Penalty for use of Undue influence: -The bidder/s undertakes that it has not given, offered or promised to give, directly or indirectly, any gift, consideration, reward, commission, fees, brokerage or inducement to any person in service of the BMTPC or otherwise in procuring the Contracts or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of the present Contract or any other Contract with the BMTPC for showing or forbearing to show favour or disfavour to any person in relation to the present Contract or any other Contract with BMTPC. Any breach of the aforesaid undertaking by the bidder/s or any one employed by him or acting on his behalf (whether with or without the knowledge of the bidder/s) or the commission of any offers by the bidder/s or anyone employed by him or acting on his behalf, as defined in Chapter IX of the Indian Penal Code, 1860 or the Prevention of Corruption Act,1986 or any other Act enacted for the prevention of corruption shall entitle the BMTPC to cancel the contract and all or any other contracts with the bidder/s and recover from the bidder/s the amount of any loss arising from such cancellation. A decision of the BMTPC to the effect that a breach of the undertaking had been committed shall be final and binding on the bidder/s. Giving or offering of any gift, bribe or inducement or any attempt at any such act on behalf of the bidder/s towards any officer/employee of the BMTPC or to any other person in a position to influence any officer/employee of the BMTPC for showing any favour in relation to this or any other contract, shall render the bidder/s to such liability/ penalty as the BMTPC may deem proper, including but not limited to termination of the contract, imposition of penal damages, forfeiture of the all type of deposits by the bidder/s and refund of the amounts paid by the BMTPC.

22. Canvassing in connection with the bid are strictly prohibited, and such canvassed bids submitted by the bidder/s will be liable to be rejected and his earnest money shall be absolutely forfeited.

23. The Executive Director BMTPC reserves the right to reject any or all bids or cancel/withdraw the invitation for bid without assigning any reasons whatsoever thereof. No claim of the bidder/s whatsoever shall be entertained on this account.

24. All tendered rates shall be inclusive of all taxes and levies payable under respective statues.

25. The purpose of the Demonstration Housing Projects (DHP) is to popularise all innovative construction technologies available in the country for speedier, durable and affordable construction. Therefore, each DHP will be executed with different technology.

    i) The technologies which have been selected in earlier 9 DHP projects i.e. 1) Panchkula, Haryana (Light Gauge Steel Framed Structure with fibre cement board on both side and infill of rockwool – M/s Nipani Infra and Industries Pvt. Ltd.); 2) Agartala, Tripura (Stay-in-Place Formwork System- Coffor - M/s Coffor Construction Technology Pvt. Ltd); 3) Ahmedabad, Gujarat (Integrated Hybrid Solution – ONE (IHS – ONE - M/s Adlakha Associates Pvt. Ltd.); 4) Bhopal, Madhya Pradesh (Insulating Concrete Forms- M/s Reliable Building Solutions); 5) Ayodhya, Uttar Pradesh (Ayodhya-LGS Framing with various walling & roofing options -M/s Everest Industries Ltd.); 6) Bhalwal, Jammu & Kashmir (EPS core panel using Quikbuild Panels as walling and EPS roof/slab Panel with concreting – M/s Beardsell Limited); 7) Tiruppur, Tamil Nadu (Precast concrete construction system - M/s Teemage Builders (P) Ltd.); 8) Dimapur, Nagaland (Fly ash EPS (Beads)Cement Sandwich Panel wall & slab - M/s Bhargava Infrastructure Pvt. Ltd., Surat) and 9) Guwahati, Assam (Light Gauge Steel Frame Structure with V-infill concrete wall M/s Vishaka Industries Ltd.) shall not be considered to construct each DHPs with different technologies.

    BMTPC has recently floated 2 tenders for Construction of Demonstration Housing Projects at Alwar, Rajasthan and Villianur, Puducherry. The technology which will be selected in DHPs at Alwar, Rajasthan and Villianur, Puducherry shall also not be considered in this project (DHP at Ratanpur, Chhattisgarh).

26. Labour laws to be complied by the selected agency:
    i. The selected agency shall obtain a valid license under the Contract Labour (R&A) Act 1970, and the Contract Labour (Regulation and Abolition) Central Rules 1971,before the commencement of the work, and continue to have a valid license until the completion of the work. The selected agency shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act 1986. Bidder should submit duly signed the undertaking for the same, if not available readily.

    ii. The selected agency shall also comply with the provisions of the building and other construction workers (Regulation of Employment & Conditions of Service) Act, 1996 and the building and other construction workers Welfare Cess Act 1996.

27. The amount tendered for the work should be written in English only.

28. Payment to the contractor will be made stage wise as mentioned in part 4 attached with the bid document.

29. On acceptance of the tender, the name of the accredited representative of the

selected agency who will be responsible for taking instructions from the BMTPC's authorized official shall be communicated to BMTPC in writing.

30. GST, Labour Cess and any other tax in respect of the contract shall be payable by the contractor and BMTPC will not entertain any claim whatsoever in this respect.

31. The contractor shall keep necessary books of accounts and other documents for the purpose of the condition as may be necessary and shall allow inspection of the same by a duly authorized representative of BMTPC and further shall furnish such other information/document as the authorized representative of BMTPC require.

32. The bidder shall enter in to an Agreement with the BMTPC on Rs. 500 Stamp Paper as per **ANNEXURE- IV**.

33. The Bidder shall submit only one bid in his name. Submission of any additional bids, for the same work in the name of their partner/associates/group company etc. shall disqualify them.

34. Bidders shall submit PF registration certificate along with tender document.

35. BMTPC reserves the right to engage suitable Project Management Consultant &/or third Party Inspection agency to Engineering Review, monitor & supervise the said work. PMC/TPI will perform its duties as per scope of works /TOR proposed by BMTPC. The selected bidder has to submit all details to PMC.

36. Executive Director, BMTPC reserves the rights to increase /decrease the scope of work and contract without assigning any reason thereof, No claim to that effect shall be entertained.

37. The Bidder shall get the electrical works executed through the authorized Government approved / licensed electrical person or firm in appropriate category in accordance to contractual provisions.

38. The Civil & Electrical works shall be carried out strictly in accordance to the directives issued by the BMTPC.

39. The bidder shall not without the consent in writing of the Executive Director, BMTPC assign or sublet the contract nor make any sub-contract with any person or persons for the execution of the any portion of the work other than for raw materials/ Labour or for any part of the work of which the manufacturers are named on his contract.

40. In case of any dispute or clarification in specification of any tender items the decision of Executive Director, BMTPC shall be final.

41. All the bidders are requested to visit the site. The Cost/rates should be quoted such that expenditure to be done for levelling, removing debris if any, site clearance, retaining wall filling etc. should include in the quoted rate. No extra payment shall be given in any cases.

42. The site of work may be inspected by the bidder or his representative at his own cost. Technical persons of BMTPC may accompany the bidder, if convenient on prior intimation. The certificate regarding site visit shall be given by the bidder in the Form – 'I'.

43. Bidder shall have to make his own arrangements for water and electricity for the purpose of construction work at site at his own expenses.

44. The Bidder, whose tender is accepted, shall be required to furnish by way of Performance Guarantee/Security Deposit for due fulfilment of this contract at the following rate:-

    i. Performance Guarantee of 3% (Three percent) of the tendered amount to be deposited in BMTPC account or in the form of Bank Guarantee from any Indian Scheduled/Commercial Bank in prescribed format given at Annexure III for the proper performance of the Contract Agreement within 15 (Fifteen) days of issue of letter of intent. Maximum allowable 30 days. After 15 days a late fee @0.1% per day of PG amount shall be payable which shall be non-refundable. This amount may be deposited in the BMTPC Account as per details at **ANNEXURE–II** through NEFT/RTGS. Performance guarantee will be released as per clause 1 of Agreement i.e. 50% of 3% Performance Guarantee submitted by the agency shall be released on successful completion of work and balance 50% shall be retained as security deposit for defect liability and maintenance period i.e. 5 years after date of completion of the project and will be released as under:

    After 2.5 years of issue of completion certificate -0.75%
    After 5 years of issue of completion certificate -0.75%
    Provided that there is no defect detected within the said periods.

    ii. Security Deposit (SD) @ 2.5% of the tendered value, this shall be recovered from the running bills of the contractor at the rate of 2.5% till total SD reach 2.5%. Bank Guarantee from any Indian Scheduled/Commercial Bank in prescribed format given at **ANNEXURE-III** can also be submitted. 50% of the security deposit shall become refundable after successful completion of Maintenance period of 2.5 years. The remaining 50% of the security deposit shall be released after the completion of defects liability period and maintenance period of 5 years:

45. The layout plan & architectural drawings of the proposed building (G+2) is attached at Part 8. The same may deviate slightly according to technology requirement (due to change in thickness of external and internal walls) with the approval of BMTPC. However, the minimum carpet area of various rooms and other provisions including Dining hall with kitchen, Office with toilet, Activity room, Medical room with toilet, Caretaker room with toilet and circulation areas such as steps, entrance plateform, ramp, staircase, lobby and corridor/passage need to be maintained as per enclosed drawings in the tender. The Built Up area may vary accordingly. The architectural drawings in AutoCAD format shall be available on web site of BMTPC at www.bmtpc.org.

46. All Bidders are required to quote the rates in financial bid for both the works i.e. building& other provisions and on site Infrastructure works respectively. L1 will be decided on the basis of lowest total quoted amount of work, otherwise, bids will be considered as no-responsive and will be rejected without assigning any reason/s.

47. All the taxes such as TDS etc. as applicable under Govt. of India Rules shall be deducted from the running / final bills of the selected agency.

48. Integrity Pact duly signed by the bidder/s shall be submitted as per **ANNEXURE-V**. Any bid without signed integrity Pact shall be liable for rejection.

49. The earnest money deposited by all the bidders except the lowest bidder will be refunded immediately after the expiry of stipulated bid validity period or immediately after acceptance of the successful bidder, whichever is earlier.

50. The earnest money deposited along with bid by the successful bidder shall be either returned after receiving the Performance Guarantee or may adjusted against the Performance Guarantee.

51. The successful bidder shall deposit the Performance Guarantee within prescribed period as per tender document.

52. The Bidder/s having valid MSME/NSIC certificate are exempted from payment of Tender Fee and Earnest Money Deposit only.

53. The following documents and verifications required for each running & final bill:

    A. **1st RA bill shall be considered for payment on submission of the following documents:**

        i) Time & progress chart for each mile stone.
        ii) Architectural, Structural & infrastructure drawings along with internal detail drawings of sanitary, water supply, electrical & firefighting work etc.
        iii) Soil Test Report conducted before start of work.
        iv) Vetting of structural design from IIT / NIT/Govt. Engineering College.
        v) Approval of Architectural drawings from state level authority.
        vi) Labour Registration Certificate
        vii) EPF & ESIC detail of labour deployed at site.
        viii) PAN No. of all firms in case of Joint Venture.
        ix) GST Registration Certificate of State where work shall be carried out.
        x) Deployment of site engineer with its curriculum & contact details
        xi) Copy of attendance register of labour along with daily salary.
        xii) Calibration certificate of testing equipment.
        xiii) Design Mix Report

    B. **Following duly signed documents are required along with every running bill.**

        i) Brand of material used in work as per provision of Agreement.

ii) MTC of Steel, Cement, Technology material, Pump, Sanitary, water supply & electrical materials etc.
iii) Test reports of materials conducted at site / approved labs.
iv) Monthly details of hindrances occurred if any, along with signature of agency and site engineer of BMTPC.
v) Copy of site order book.
vi) Site progress report with photographs

C. The payment to the contracting agency shall be made on pro-rata basis with minimum value of work of Rs. 50.00 lakhs

D. The successful bidder shall ensure timely payment of GST. The next bill of payment will be considered only after submission proof of deposit of GST paid in previous bill

54. In case of any query, please contact on Ph. No. 011-24652416, 24636705 and E-mail:info@bmtpc.org.

Executive Director
BMTPC

6. LIST OF DOCUMENTS TO BE UPLOADED WITH TECHNICAL BID

1) Letter of Transmittal
2) Integrity pact duly signed by the bidder (**ANNEXURE-V**). The Bidder/s are required to download the Integrity Pact as uploaded in the bid documents, and sign on the same, put rubber stamp/seal and upload the signed copy on e-biding websites.
3) Unconditional Letter of Acceptance of Bid Conditions (in original) mentioned in **ANNEXURE-VI** (On Letter Head of the bidder)
4) Memorandum as **ANNEXURE-VIII**.
5) Financial information of Bidder - FORM-A.
6) Net worth Certificate duly certified by authorised Chartered Accountant in form B.
7) Details of Similar Works and work Experience Certificates duly certified by client/ department in FORM-C and FORM -D
8) Structure and Organization Details of Firm – FORM E
9) Proof of deposited of Tender Fee and EMD– FORM F
10) Balance sheet (Audited) and Profit &Loss Account (Audited) for last 05 years of bidder/s duly certifies by Chartered Accountant.
11) Income tax return of last 5 financial years of bidder (For all parties in case of JV).
12) Form-G of Contract Conditions –Affidavit duly notarized by Notary Public on Non Judicial Stamp Paper of Rs. 100 for correctness of Documents /Information.
13) Power of Attorney of the person authorized for signing/submitting the bid.
14) Copy of MOU/JV signed by the all members of JV along with Power of Attorney authorising the signatory of the bid to commit the bidder.
15) Certificate of registration of bidder.
16) Valid GST registration/EPF registration/PAN No. (For all parties in case of JV).
17) All pages of the entire Corrigendum (if any) duly signed by the authorized person.
18) Pre-bid clarifications, if any.
19) Registration Details of the participating agency as per GST Act in the State at the location of the Project– Form-H or duly signed undertaking for obtaining the same, if not readily available.
20) Certificate regarding site visit by the contractor in the FORM – 'I'
21) Details of Administrative and Technical staff to be associated in the project
22) Geographical presence of the Bidder
23) Valid License under Contract Labour (R&A) Act 1970 or duly signed undertaking for obtaining the same, if not readily available.
24) Complete details of proposed technology including specifications.
25) Details of manufacturing facilities of the proposed technology in India.
26) Complete detail of technology of proposed
27) Project brief on approach to design and construction work for this project.
28) Any other documents as deemed fit by bidder.

NOTE:

i) All the uploaded documents should be in readable, printable, legible and in the order mentioned above, failing which the Bids shall not be considered for evaluation.

ii) All the above documents duly paginated, signed, indexed and bound in one volume are also required to be submitted in physical form to BMTPC on or before last date of submission of bid.

ANNEXURE- IV

PROFORMA FOR AGREEMENT

(On Non-Judicial Stamp Paper of Rs. 500/-)

THIS AGREEMENT made this ……day of ……. between the BMTPC, established under the MoHUA, having its Office at Core 5A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi – 110003 (which expression shall mean and include its successor or successors in office and assignee) acting through the Executive Director, BMTPC, New Delhi hereinafter called, 'The Council' on the one part and M/s/Shri ……..... …….. hereinafter called the "Agency" which expression shall mean and include their heirs, executors, administrators and assignee) on the other part.

WHEREAS, BMTPC, is desirous of construction of **(NAME OF WORK)** (hereinafter referred to as the "PROJECT") on behalf of the **(NAME OF OWNER/MINISTRY)** (hereinafter referred to as "OWNER"), had invited tenders as per Tender documents vide NIT No. _____.

AND WHEREAS **(NAME OF CONTRACTOR)** had participated in the above referred tender vide their tender dated _____ and BMTPC has accepted their aforesaid tender and award the contract for (NAME OF PROJECT) on the terms and conditions contained in its Letter of Intent No. _____ and the documents referred to therein, which have been unequivocally accepted by **(NAME OF CONTRACTOR)** vide their acceptance letter dated _____ resulting into a contract.

NOW THEREFORE THIS DEED WITNESSETH AS UNDER:

ARTICLE 1.0 – AWARD OF CONTRACT

a. SCOPE OF WORK

BMTPC has awarded the contract to **(NAME OF CONTRACTOR)** for the work of **(NAME OF WORK)** on the terms and conditions in its letter of intent No. _____ dated _____ and the documents referred to therein. The award has taken effect from **(DATE)** i.e. the date of issue of aforesaid letter of intent. The terms and expressions used in this agreement shall have the same meanings as are assigned to them in the "Contract Documents" referred to in the succeeding Article.

ARTICLE 2.0 – CONTRACT DOCUMENTS

2.1 The contract shall be performed strictly as per the terms and conditions stipulated herein and in the following documents attached herewith (hereinafter referred to as "Contract Documents").

a) BMTPC Notice Inviting Tender No. _____ date _____and BMTPC's tender document consisting of:

i) _____

ii) _____

iii) _____

b) **(NAME OF CONTRACTOR)** letter proposal dated _____ and their subsequent communication:

i) Letter of Acceptance of Tender Conditions dated _____
ii) _____
iii) _____

2.2 BMTPC's detailed Letter of Intent No. _____ dated ____.

2.3 All the aforesaid contract documents referred to in Para 2.1 and 2.2 above shall form an integral part of this Agreement, in so far as the same or any part thereof column, to the tender documents and what has been specifically agreed to by BMTPC in its Letter of Intent. Any matter inconsistent therewith, contrary or repugnant thereto or deviations taken by the Contractor in its "TENDER" but not agreed to specifically by BMTPC in its Letter of Intent, shall be deemed to have been withdrawn by the Contractor without any cost implication to BMTPC. For the sake of brevity, this Agreement along with its aforesaid contract documents and Letter of Intent shall be referred to as the "Contract".

ARTICLE 3.0 – CONDITIONS & CONVENANTS

3.1 The scope of Contract, Consideration, terms of payments, advance, security deposits, taxes wherever applicable, insurance, a greed time schedule, compensation for delay and all other terms and condition contained in BMTPC's Letter of Intent No. _____ dated _____ are to be read in conjunction with other aforesaid contract documents. The contract shall be duly performed by the contractor strictly and faithfully in accordance with the terms of this contract.

3.2 The scope of work shall also include all such items which are not specifically mentioned in the Contract Documents but which are reasonably implied for the satisfactory completion.

3.3 Contractor shall adhere to all requirements stipulated in the Contract documents.

3.4 Time is the essence of the Contract and it shall be strictly adhered to. The progress of work shall conform to agreed works schedule /contract documents and Letter of Intent.

3.5 This agreement constitutes full and complete understanding between the parties and terms of the presents. It shall supersede all prior correspondence to the extent of inconsistency or repugnancy to the terms and conditions contained in Agreement. Any modification of the Agreement shall be effected only by a written instrument signed by the authorized representative of both the parties.

3.6 The total contract price for the entire scope of this contract as detailed in Letter of Intent is Rs._____ (Rupees _____ only), which shall be governed by the stipulations of the contract documents

ARTICLE 4.0 – NO WAIVER OF RIGHTS

4.1 Neither the inspection by BMTPC or the authorized representative of BMTPC or Owner or any of their officials, employees or agents nor order by BMTPC or the authorized representative of BMTPC for payment of money or any payment for or acceptance of, the whole or any part of the work by BMTPC or the authorized representative of BMTPC or any extension of time nor any possession taken by the authorized representative of BMTPC shall operate as waiver of any provisions of the contract, or of any power herein reserved to BMTPC, or any right to damage herein provided, nor shall any waiver of any breach in the contract be held to be a waiver or any other or subsequent breach.

ARTICLE 5.0 – GOVERNING LAW AND JURISDICTION

5.1 The Laws applicable to this contract shall be the laws in force in India and jurisdiction of Delhi Court (s) only.

5.2 Notice of Default

Notice of default given by either party to the other party under the Agreement shall be in writing and shall be deemed to have been duly and properly served upon the parties hereto, if delivered against acknowledgment due or by FAX or by registered mail duly addressed to the signatories at the address mentioned herein above.

IN WITNESS WHEREOF, the parties through their duly authorized representatives have executed these presents (execution whereof has been approved by the Competent Authorities of both the parties) on the day, month and year first above mentioned at New Delhi.

For and on behalf of: For and on behalf of:

SIGNED AND DELIVERED FOR AND ON BEHALF OF M/s /Shri
……

IN THE PRESENCE OF

WITNESS 1. 2.

SIGNED AND DELIVERED FOR AND ON BEHALF OF
BUILDING MATERIALS & TECHNOLOGY PROMOTION
COUNCIL (BMTPC)
IN THE PRESENCE OF

WITNESS 1. 2.

PART-2

Technical Bid

1. BRIEF PARTICULARS OF WORK

1. Salient details of the work for which bids are invited are as under:

Name of work	Estimated Project Cost put to bid (Rs. in Lakhs)	Stipulated period of completion of work
Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using emerging technology listed at **ANNEXURE – I** including onsite infrastructure works at Ratanpur, Chhattisgarh Under PMAY-U 2.0	865.18	12.0 Months

2. The site for work has been allotted by Municipal Council, Ratanpur

3. The salient features of the project are as under:

i.	No. of Dwelling units (DUs)	40 (G+2) having 2 rooms, pantry, bath, WC and balcony.
ii.	Other provisions	a dining room with kitchen, a activity room, a medical room, a caretaker room, an office and laundry room.
iii.	Plot area for DHP	3664 Sqmt.
iv.	Carpet Area of each unit	28.57 Sqmt.
v.	Total Built up area	2394.30 Sqmt. (25762.67 Sqft.)
vi.	Technology being used	One of the technology out of the technologies listed at **Annexure -I** and details of technologies are as Part 8
vii.	Infrastructure components (In consultation with State)	Roads & pavements, Boundary wall & Gate, Sewerage, External water supply, Drainage, Underground water tank, Septic Tank, Rain water Harvesting, External Electrification, Solar street lights, Fire-fighting works, Landscaping, etc.

4. The soil investigation report received from Municipal Council, Ratanpur is placed at Part-6. However, soil investigation report should be further verified by the bidder at site before start of any site activity.

5. The work for building including other provisions will be on lump sum basis and onsite infrastructure works will be on Item Rate basis.

6. Major components of scope of work are as under:
   i) Architectural design and obtaining all statutory/local body approvals required to start and execute the construction work.The layout plan & architectural drawings of the proposed building (G+2) is attached at Part-8. The same may deviate slightly according to technology requirement (due to change in thickness of external and internal walls) with the approval of BMTPC. However, the minimum carpet area of different rooms and other provisions including Dining hall with kitchen, Office with toilet, Activity room, Medical room with toilet, Caretaker room with toilet and circulation areas such as staircase, corridor/passage need to be maintained as per enclosed drawings in the tender. The Built Up area may vary accordingly. The Architectural drawings in AutoCAD format are available at BMTPC website www.bmtpc.org.

   ii) Structural design of the DHP as per proposed technology shall be carried out from a competent structural Engineer/firms.

   iii) Vetting of structural design by Technical / Research institutions of repute such as IITs, NITs, Govt. Engineering Colleges, CSIR Labs, Govt. Research Institutions.

   iv) Construction of building and other provisions including all associate facilities and services complete in all respect as per approved drawings and specification on Lump-Sum basis.

   v) Construction of onsite infrastructure works such as Roads & pavements, Boundary wall & Gate, Sewerage, External water supply, Drainage, Underground water tank, Septic Tank, Rain water Harvesting, External Electrification, Solar street lights, Fire-fighting works, Landscaping, Borewell, etc.as per approved drawings, specifications and basis of provision made in schedule of quantities on quoted item rates.

   vi) Arranging required material, machinery and manpower so as to complete the work in stipulated time.

   vii) Maintenance and defect liability period of structure and onsite infrastructure works of Five Years.

7. Work shall be executed according to Clauses of Contract of General Condition of Contract (GCC) (EPC) of CPWD 2024 with upto date amendments mentioned at Part – 3 and schedule of finishes & specifications given in Part -3 of this bid document and latest CPWD Specification with upto date amendments issued by CPWD till the last of submission of bid.

2. INFORMATION AND GUIDELINES FOR BIDDERS

1.0 General:

1.1 Letter of transmittal and forms for deciding eligibility are given at Section 3 (Page No. 44).

1.2 All information called for in the enclosed forms should be furnished against the relevant columns in the forms. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against the relevant column. Even, if no information is to be provided in a column, a 'nil' or 'no such case' entry should be made in that column. If any particulars/query is not applicable in case of the bidder, it should be stated as 'Not applicable'. The bidder are cautioned that not giving complete information called for in the application forms or not giving it in clear terms or making any change in the prescribed forms (or) deliberately suppressing the information may result in the bid being summarily disqualified. Bid made by telegram or telex and those received late will not be entertained.

1.3 The bid should be in English. The bidder should sign on each page of application, forms and documents before scanning& uploading and to ensure proper numbering and indexing.

1.4 Corrections if any should be made by neatly crossing out, initialing, dating and rewriting. Pages of the eligibility criteria document are numbered. Additional Sheets if any added by the bidder should also be numbered by him. They should be submitted as a package with signed letter of transmittal. Over writing should be avoided.

1.5 References, information and certificate from the respective clients certifying suitability, technical knowledge or capability of the bidder should be signed by an authorized officer.

1.6 The bidder may furnish any additional information, which he thinks is necessary to establish his capabilities to successfully complete envisaged work. He is however advised not to furnish superfluous information. No information shall be entertained after submission of eligibility criteria document unless it is called for by BMTPC.

1.7 If private works are shown in support of eligibility, certified copy of the TDS shall be submitted along with the experience certificate and the TDS amount shall tally with the actual amount of work done.

1.8 All bidder as a single entity or in JV/ Consortium have to meet all eligibility conditions mentioned in bid document comprehensively otherwise bid submitted will be rejected.

2.0 Definitions:

2.1 In this document the following words and expressions have the meaning hereby assigned to them.

2.2 Employer: Means the BMTPC acting through the Executive Director

2.3 Bidder: Means the Technology/system providers (single business entity) and Joint Venture/ consortia of firms / companies (hereafter called Agency)

2.4 "Year" means "Financial Year" unless stated otherwise

3.0 Final Decision Making Authority:

The BMTPC reserves the right to accept or reject any bid and to annul the process and reject all bids at any time without assigning any reason or incurring any liability to the bidder/s.

4.0 Addendum/ Corrigendum

Addendum/Corrigendum to the bid documents may be issued prior to the date of submission of the bid to clarify or effect modification in specification and/or contract terms included in various bid documents. The bidder/s shall suitably take into consideration such Addendum/Corrigendum while submitting his bid. The bidder shall upload / return such Addendum/Corrigendum duly signed and stamped as confirmation of its receipt & acceptance and submit along with the bid document. All Addendum/Corrigendum shall be signed and stamped on each page by the bidder and shall become part of the bid and contract documents.

5.0 Site Visit:

It is incumbent upon the bidder to visit the site at his own cost, and examine it and its surroundings by himself collect all information that is considered necessary for proper assessment, planning, design and construction of the project. It is expected that while bidding, the bidder will take utmost care and diligence by visiting the sites and collecting the required parameters necessary. In case of any discrepancies later, BMTPC will not be held responsible.

6.0 Evaluation Criteria:

6.1 The details submitted by the bidder will be evaluated in the following manner:-

6.1.1 The initial criteria prescribed in the bid document in respect of experience of similar work experience, eligibility, net worth and financial strength etc., will first be scrutinized and the bidder/s eligibility for the project will be determined.

6.1.2 The bidder/s qualifying the initial criteria as mentioned above will be

evaluated as per the criteria mentioned below by scoring method on the basis of details furnished by the bidder/s-

a. Financial strength (Form 'A'& 'B')- **Max.25 marks**
b. Experience in similar nature of work during last 7 years(Form 'C')- **Max.25 marks**
c. Performance on works (Time over Run) (Form 'D') –**Max.10 marks**
d. Performance on works (Quality) (Form 'D')- **Max.20 marks**
b. Assessment in terms of Technical Competency, plant and machinery, consulting capabilities, approach to design and construction and work plan– **Max 20 marks**

Total – 100marks

The Detailed criteria for evaluation of performance of Bidder for Pre-Eligibility is given at **Appendix – I**

6.1.3 To become eligible for short listing and for opening the Financial Bid, the bidder must secure at least 50% (Fifty percent)marks in each category and 60% (Sixty percent) marks in aggregate.

6.1.4 BMTPC, however reserves the right to restrict the list of such qualified Bidder to any number deemed suitable by it.

6.1.5 After evaluation of Technical Bids, Financial Bids will be opened only of technically qualified bidders as per the criteria defined above and the work will be awarded to the lowest quoted (L1)bidder.

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

7.0 Financial Information:

Bidder should furnish the following financial information:

i. Annual financial statement for the last Five years in Form 'A' and
ii. Net worth Certificate in form B.

8.0 Experiences in Works Highlighting Experience in Similar Works:

8.1 Bidder should furnish the following:

i. List of all works of similar nature successfully completed during last Seven years in Form 'C'

ii. Performance reports (corresponding to work mentioned in (Form-C) in Form-D. If needed, the bidder may attach a separate certificate in this regard from performance report issuing authority.

9.0 Organization Information:

9.1 Bidder is required to submit the information in respect of his/her/their organization in Form- 'E'.

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

10.0 Construction Plant and Equipment:

The Bidder should furnish the list of construction plant and equipment required to be used in carrying out the work.

11.0 Letter of Transmittal:

The Bidder should submit the letter of transmittal attached with the document.

12.0 Opening of Financial Bid:

After evaluation of pre-qualification documents, a list of short listed agencies who qualifies in technical bids will be prepared. There after the financial bids of only the qualified and technically acceptable bidder shall be opened at the notified time, date and place in the presence of the qualified bidders or their representatives if they desire to be present. The bid shall remain valid for 120 days from the date of opening of Technical bid (eligibility bid).

13.0 Award criteria:

13.1 The BMTPC reserves the right, without being liable for any damages or obligation to inform the bidder to:

13.1.1 Amend the scope and value of contract.

13.1.2 Reject any or all the applications without assigning any reason.

13.1.3 Any effort on the part of the bidder or his agent to exercise influence or to pressurize the BMTPC would result in rejection of his bid. Canvassing of any kind is prohibited.

Appendix - I

Detailed Criteria for Evaluation of the performance of bidders for Pre-Eligibility

S. No	Attributes	Max. Marks	Evaluation
1	**Financial Strength** **(Maximum 25 Marks)**	20 Marks	1. a). 60% marks for minimum eligibility criteria b) 100% marks for twice the minimum eligibility criteria or more In between (a) & (b) - on pro-rata basis
		05 Marks	2. Minimum 15% of the ECPT issued by the certified Chartered Accountant
2.	**Past Experience in similar work (Maximum 25 Marks)**	25 marks	a). 60% marks for minimum eligibility criteria b) 100% marks for twice the minimum eligibility criteria or more In between (a) & (b) - on pro-rata basis
3.	**Performance on works [Time Over Run (TOR)]: Maximum 10 marks**		

	Parameter	Calculation for points	Score				Maximum Marks
	If TOR =		1.00	2.00	3.00	>3.50	10
	(i) Without levy of compensation		10	7.5	5	5	
	(ii) With levy of compensation		10	2.5	0	0	
	(iii) Levy of compensation not Decided		10	5	0	0	
	TOR = AT/ST, where AT =Actual Time; ST= Stipulated Time. Note: Marks for value in between the stages indicated above is to be determined by straight line variation basis.						

4	**Performance of works (Quality): Maximum 20 Marks**	
	(i) Outstanding	20 Marks
	(ii) Very Good	15 Marks
	(iii) Good	10 Marks
	(iv) Poor	0 Marks
5	**Assessment in terms of Technical Competency, plant and machinery, consulting capabilities, approach to design and construction with work plan: Max 20 Marks** (Attach the list of technical staffs, existing consultation partners, plant and machinery details, geographical presence and other moveable and immovable assets)	
	i. Technical staffs, existing consultation partners	05 Marks
	ii. Plant and machinery details	05 Marks
	iii. Geographical presence and other moveable and immovable assets	05 Marks
	iv. Approach to design and construction, work plan based on design philosophy mentioned in scope of work	05 Marks
	Grand Total	**100 Marks**

3. TEMPLATE OF FORMS

LETTER OF TRANSMITTAL

From:

_____

_____

To,

Executive Director,
Building Materials & Technology Promotion Council (BMTPC)
Core 5A, 1st Floor, India Habitat Centre,
Lodhi Road, New Delhi – 110 003

Name of Work: Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using Emerging technology including on site Infrastructure Works at Ratanpur, Chhattisgarh under PMAY – U 2.0.

Sir,

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

1. I/We hereby certify that all the statements made and information supplied in the enclosed Forms A to J and accompanying statement are true and correct.

2. I/we have furnished all information and details necessary for eligibility and have no further pertinent information to supply.

3. I/we submit the requisite net worth certificate by certified chartered accountant and authorize the BMTPC to approach the CA issuing the net worth certificate to confirm the correctness thereof. I/We also authorize BMTPC to approach individuals, firms and corporation to verify our competence, work experience, and general reputation.

I/we submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following eligible similar works:

S.No.	Name of work	Certificate from
1		

Certificate

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

Enclosures:

Date of submission

Seal of Bidder& Signature(s)of bidder/s

FORM 'A'

FINANCIAL INFORMATION

Name of the firm/Bidder…….:

I. Financial Analysis-Details to be furnished duly supported by figures in balance sheet/profit & loss account for the last five years duly certified and audited by the Chartered Accountants, as submitted by the bidder to the Income Tax Department (Copies to be attached).

A. Partner-1(Lead member) **(Rs.in Lakh)**

Sl. No.	**Particulars**	**Financial Years**				
i)	Turnover of construction works	2020-21	2021-22	2022-23	2023-24	2024-25
ii)	Profit/ Loss					

B. Partner-2(Technology provider) **(Rs.in Lakh)**

Sl. No.	**Particulars**	**Financial Years**				
i)	Turnover of construction works	2020-21	2021-22	2022-23	2023-24	2024-25
ii)	Profit/ Loss					

C. Partner-3 (Other member) **(Rs.in Lakh)**

Sl. No.	**Particulars**	**Financial Years**				
i)	Turnover of construction works	2020-21	2021-22	2022-23	2023-24	2024-25
ii)	Profit/ Loss					

II. Financial arrangements for carrying out the proposed work.

Details:-

III. Net Worth Certificate from authorized CA of participating agency/ firm in the prescribed Form "B" for all members of J.V.

IV. Name of member/ firm whose financial information is to be considered for qualifying eligibility criteria.

SIGNATURE OF BIDDER/S

Signature of Chartered Accountant with Seal

FORM 'B'

FORM FOR CERTIFICATE OF NETWORTH FROM CHARTERED ACCOUNTANT

It is to certify that as per the audited balance sheet and profit & loss account during the financial year ……, Net Worth of M/s…… (Name & Registered Address of individual/firm/company), as on …… (the relevant date) is Rs. …… after considering all liabilities. It is further certified that the Net Worth of the company has not eroded by more than 30% in the last three years on (the relevant date.)"

Signature of Chartered Accountant

……

Name of the Chartered Account

……

Membership No. of ICAI

Date and Seal

FORM 'C'

DETAILS OF ELIGIBLE SIMILAR NATURE OF WORKSCOMPLETED IN LAST SEVEN YEARS ENDING PREVIOUS DAY OF LAST DATE OF SUBMISSION OF BIDTO BE CONSIDER FOR ELIGIBILITY

Name of the firm/Bidder…….

S. No	Name of work/project and location	Owner/ sponsoring organization	Cost of work1 (Rs. in Crores)	Date of commencement of work as per contract	Stipulated date of completion	Actual date of completion	*Litigation/arbitration cases pending /in progress with details	Name and Address (Postal & E-mail)/telephone number of officer to whom reference may be made	Whether the work was done on back to back basis
1.									
2.									
3.									
4.									
5.									

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

SIGNATURE OF BIDDER/S WITH STAMP

*indicate gross amount claimed and amount awarded by the Arbitrator.

FORM 'D'

PERFORMANCE REPORT OF WORKS REFERRED IN FORM-C

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

Competent Authority/
Client Department

Dated:

Note: This certificate should be issued by the owner of the project. However, the quality and performance shall be established by the BMTPC by conducting site visits to the selected project sites, if required.

FORM 'E'

STRUCTURE & ORGANIZATION

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

Signature of bidder/s with stamp

FORM 'F'

TENDER FEE AND EMD FORMAT

1. Name of Work: Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using Emerging technology including on site Infrastructure Works at Ratanpur, Chhattisgarh under PMAY – U 2.0.

2. BID No:BMT/S/2026/DHP-Chhattisgarh

3. Name of Bidder:

4. Details of Tender Fee Deposit through RTGS/NEFT in BMTPC account:

   Bank UTR No ----------, Date ----------, Name of Bank----------

   ----------, Amount----------

5. Details of Earnest Money Deposit through RTGS/NEFT in BMTPC account:

   Bank UTR No ----------, Date ----------, Name of Bank----------

   ----------, Amount----------

6. Last date of submission of bid:

Signature of bidder/s with stamp

Form-G

AFFIDAVIT

(To be submitted by bidder on non-judicial stamp paper of Rs.100/- (Rupees Hundred only) duly attested by Notary Public)

Affidavit of Mr. .....S/o ..... R/o .....

I, the deponent above named do hereby solemnly affirm and declare as under:

1. That I am the Proprietor/Authorized signatory of M/s …….Having its Head Office / Regd. Office at ……

2. That the information/documents/Experience certificates submitted by M/s……. along with the tender for …… (Name of work)…… to BMTPC are genuine and true and nothing has been concealed.

3. I shall have no objection in case BMTPC verifies them from issuing authority(ies). I shall also have no objection in providing the original copy of the document(s), in case BMTPC demands so for verification.

4. I hereby confirm that in case, any document, information & / or certificate submitted by me found to be incorrect / false / fabricated BMTPC at its discretion may disqualify / reject / terminate the bid/contract and also forfeit the Tender fee and EMD / All dues.

5. I hereby confirm that our firm /company is not blacklisted/ barred /banned from tendering by BMTPC. If this information is found incorrect, BMTPC at its discretion may disqualify / reject / terminate the bid/contract.

6. The person who has signed the tender documents is our authorized representative. The Company is responsible for all of his acts and omissions in the tender.

I, ..., the Proprietor / Authorised signatory of M/s..... do hereby confirm that the contents of the above Affidavit are true to my knowledge and nothing has been concealed there from..... and that no part of it is false.

DEPONENT

Verified at .....this.....day of ..... DEPONENT

ATTESTED BY (NOTARY PUBLIC)

FORM-H

GST Registration Details of Bidder	
Name	
Address (As per registration with GST)	
City	
Postal Code	
Region/State (Complete State Name)	
Permanent Account Number	
GSTIN ID/Provisional ID No.: (copy of Acknowledgement required)	
Type of Business (As per registration with GST)	
Service Accounting Code/HSN Code:	
Contact Person	
Phone Number and Mobile Number	
Email ID	
Compliance Rating (if updated by GSTN)	

FORM- 'I'

SITE VISIT CERTIFICATE

(To be submitted on the letter head of Bidder)

I ---------- authorised representative of M/s ---------- ---------- has /have visited the site of the project Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using Emerging technology including on site Infrastructure Works at Ratanpur, Chhattisgarh under PMAY – U 2.0.

We have inspected and evaluated the existing site with reference to its location, soil conditions, sub soil water table, etc. We have submitted this offer after satisfying ourselves about the local conditions, local costs, etc.

Signature of the Tenderer

FORM 'J'

FORMAT OF BANK GUARANTEE FOR MOBILISATION ADVANCE

(Clause 10 B(ii) of Contract Condition)

Bank guarantee made on this ……. Between …… (hereinafter called "the Bank") of the One Part and Building Materials & Technology Promotion Council (hereinafter called "the Implementing Agency ") of the other Part.

WHEREAS Building Materials & Technology Promotion Council has awarded the Bid No. BMT/S/2026/DHP-Chhattisgarh for "Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using Emerging technology including on site Infrastructure Works at Ratanpur, Chhattisgarh under PMAY – U 2.0" to M/s …… (hereinafter called "the Contractor"), having its registered office at ……..

AND WHEREAS vide Clause 10 B (ii) of contract condition, General Conditions of Contract, Mobilization Advance up to ---% (--- percent) of the original contract value of Rs…….. is payable to the contractor against Bank Guarantees, the contractor hereby applies for Mobilization Advance of --% (--- percent) amounting to Rs……../- (Rupees……..) of the Contract Price,

Now, we the undersigned, Bank of ……., being fully authorized to sign and to incur obligations for and on behalf of and in the name of Bank of ……..hereby declare that the said Bank will guarantee the Implementing agency the amount of Rs. ……../- (Rupees……..) as stated above.

We, Bank of ……., do hereby unconditionally, irrevocably and without demur guarantee and undertake to pay the Implementing agency immediately on demand any or all money payable by the contractor to the extent of Rs. ……./- (Rupees……..) without any demur, reservation, context, recourse or protest and/or without any reference to the contractor. Any such demand made by the Implementing agency on the Bank shall be conclusive and binding notwithstanding any difference between the Implementing agency and the contractor on any dispute pending before any court, Tribunal, Arbitrator or any other authority. We agree that the guarantee herein contained shall be irrevocable and shall continue to be enforceable till the Implementing agency discharges this guarantee.

This guarantee is valid till ……..

At any time during the period in which this guarantee still valid of the consultant fails to fulfill its obligation under the Contract, it is understood that the Bank will extend this guarantee under the same condition for the required time on demand by the Implementing agency at the cost of the contractor.

The Guarantee hereinbefore contained shall not be affected by any change in the constitution of the Bank or of the contractor.

The neglect or forbearance of the Implementing agency in enforcement of payment of any money, the payment whereof is intended to be hereby secured or the giving of time by the Implementing agency for the payment hereof shall in no way relieve the Bank of their liability under this Deed.

The expressions "the Implementing agency", "the Bank" and "the contractor" hereinbefore used shall include their respective successors and assigns.

Notwithstanding anything contained herein:

Our liability under this Bank Guarantee shall not exceed Rs……./- (Rupees…….)

this bank Guarantee shall be valid up to…….

We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before ……(date of expiry of Guarantee).

In witness whereof we of the Bank have signed and sealed this Guarantee on the ……day of …….. being herewith duly authorized.

For and on behalf of the Bank of…….

Signature of Authorized Bank Official

Name: _____

Designation _____

Stamp/Seal of the bank _____

Signed, sealed and delivered for and on behalf of the bank by the above named…….. in the presence of

Witness 1	Witness 2
Signature	Signature
Name	Name
Address	Address

Note:

1. The Bank guarantee should be furnished on stamp paper of value not less than Rs. 100/-.
2. The Stamp paper should have been purchased in the name of the Bank executing the Guarantee.

ANNEXURE-V

INTEGRITY PACT

To,

Executive Director,
Building Materials & Technology Promotion Council (BMTPC)
Core 5A, 1st Floor, India Habitat Centre,
Lodhi Road, New Delhi – 110 003

Sub.: Submission of Bid for the work of Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using Emerging technology including on site Infrastructure Works at Ratanpur, Chhattisgarh under PMAY –U 2.0.

Dear Sir,

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

I/We agree that the Bid document is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of bid documents, failing which I/We will stand disqualified from the biding process. I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE of this condition of the bid.

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

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

Yours faithfully

(Duly authorized signatory of the Bidder)

INTEGRITY AGREEMENT

(To be signed by the bidder and same signatory competent /authorized to sign the relevant contract on behalf of BMTPC)

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

BETWEEN

……..……,
……....., (Name of Office) BMTPC,
.....,
(Hereinafter referred as the 'Principal/Owner', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

.....
..... (Name and Address of the Individual/firm/Company)
through .....
(Hereinafter referred to as the (Details of duly authorized signatory)
"Bidder/Bidder" and which expression shall unless repugnant to the meaning or context hereof include its success or sand permitted assigns)

Preamble

WHEREAS the Principal / Owner has floated the Bid No……. (hereinafter referred to as "Bid/Bid") and intends toward, under laid down organizational procedure, contract for ……..
..... (Name of work)
hereinafter referred to as the "Contract".

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

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

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

Article 1: Commitment of the Principal/Owner

1. BMTPC commits itself to take all measures necessary to prevent corruption and to observe the following principles:

a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Bid, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

b) BMTPC will, during the Bid process, treat all bidder/s with equity and reason. BMTPC will, in particular, before and during the Bid process, provide to all bidder/s the same information and will not provide to any bidder/s)confidential / additional information through which the Bidder/s could obtain an advantage in relation to the Bid process or the Contract execution.

The Principal/Owner shall endeavor to exclude from the Bid process any person, whose conduct in the past has been of biased nature.

2. If BMTPC obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer/Competent Authority and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

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

1. It is required that each bidder/s(including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the biding process and throughout the negotiation or award of a contract.

2. The Bidder(s)/Bidder(s) commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Bid process and during the Contract execution:

a) The bidder/s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Bid process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Bid process or during the execution of the Contract.

b) The Bidder(s) will not enter with other bidder/s into any undisclosed agreement rounder standing, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitive enessor to cartelize in the bidding process.

c) The Bidder(s) will not commit any offence under the relevant IPC/PC Act. Further the bidders/ Contract(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

d) The Bidder(s)/Bidder(s) of foreign origin shall disclose the names and addresses of agents/ representatives in India, if any. Similarly Bidder(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the agent on behalf of the foreign principal or the foreign principal directly could bid in a bid but not both. Further, in cases where an agent participate in a bid on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent parallel bid for the same item.

e) The Bidder(s) will, when presenting is bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.

3. The Bidder(s)/Bidder(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

4. The bidder/s will not, directly or through any other person or firm indulge in fraudulent practice means a will full misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.

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

Article 3: Consequences of Breach

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

1. If the Bidder(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days notice to the bidder shall have powers to disqualify the Bidder(s)/Bidder(s) from the Bid process or terminate/determine the Contract, if already executed or exclude the Bidder/Bidder from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. Such exclusion may be forever or for a limited period as decided by the Principal/Owner.

2. Forfeiture of EMD/Performance Guarantee/Security Deposit: If the Principal/Owner has disqualified the Bidder(s) from the Bid process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal

rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Bidder.

3. Criminal Liability: If the Principal/Owner obtains knowledge of conduct of a Bidder or Bidder, or of an employee or a representative or an associate of a Participating agency or Bidder which constitutes corruption within the meaning of IPC Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

Article 4: Previous Transgression

1. The bidder/s declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Bid process.

2. If the Bidder makes incorrect statement on this subject, he can be disqualified from the Bid process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Bidder as deemed fit by the Principal/ Owner.

3. If the Bidder/Bidder can prove that he has resorted/recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Participating Agency/Participating agencies/Sub-bidder(s)

1. The Bidder(s)/Bidder(s) undertake(s) to demand from all sub bidder a commitment in conformity with this Integrity Pact. The Bidder/Bidder shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its sub bidder/sub-vendors.

2. The Principal/Owner will enter into Pacts on identical terms as this one with all Bidder and Bidder.

3. The Principal/Owner will disqualify Participating Agency, who do not submit, the duly signed Pact between the Principal/ Owner and the bidder, along with the Bid or violate its provisions at any stage of the Bid process, from the Bid process.

Article 6- Duration of the Pact

This Pact begins when both the parties have legally signed it. It expires for the Bidder/Vendor five years after the completion of work under the contract or till the continuation of defect liability period, whichever is more and for all other Participating Agency, till the Contract has been awarded. If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, BMTPC.

Article 7- Other Provisions

1. This Pact is subject to Indian Law, place of performance and jurisdiction is the Headquarters of the Division of the Principal/Owner, who has floated the Bid.

2. Changes and supplements need to be made in writing. Side agreements have not been made.

3. If the Bidder is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.

4. Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intensions.

5. It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement/ Pact, any action taken by the Owner/Principal in accordance with this Integrity Agreement/Pact or interpretation thereof shall not be subject to arbitration.

Article 8- LEGAL AND PRIOR RIGHTS

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

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

..... (For and on behalf of Principal/Owner)

.....(For and on behalf of Bidder/Bidder)

WITNESSES:

1. ..... (signature, name and address)

2. ..... (signature, name and address)

Place:
Dated:

ANNEXURE-VI

UNCONDITIONAL LETTER OF ACCEPTANCE OF BID CONDITIONS
(ON THE LETTERHEAD OF THE BIDDER)

Name of Work: **Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using Emerging technology including on site Infrastructure Works at Ratanpur, Chhattisgarh under PMAY – U 2.0.**

ii) To be uploaded on website: https://eprocure.gov.in/eprocure/app
ii) To be opened in the presence of bidders who may be present in the office of BMTPC.

I/We have read and examined the notice inviting bid, including all documents and amendments up to the last date of submission of bids, clauses of contract, special conditions, bill of quantities & other documents and rules referred to in the contract conditions and all other contents in the bid document for the work.

I/We hereby bid for the execution of the work specified for BMTPC within the time specified in …….. viz., schedule of quantities and in accordance in all respect with the specifications, designs, drawing and instructions and contract conditions given in this document.

We agree to keep the bid open for one hundred twenty **(120) days** from the date of opening of technical bid and not to make any modification in its terms and conditions.

A copy of receipt of deposit of tender fee and earnest money of Rs 5000/- Plus 18% GST and Rs. 17.30 lakhs respectively in BMTPC account through NEFT/RTGS is scanned and uploaded. If I/We, fail furnish to the prescribed performance guarantee within prescribed period, I/We agree that the said BMTPC or his successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said tender fee and EMD. Further, if I/We fail to commence work as specified, I/We agree that BMTPC or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee absolutely, the said performance guarantee shall be a guarantee to execute all the works referred to in the bid documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in clause 12.2 and 12.3 (as modified) of the bid form.

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

I/we undertake and confirm that eligible similar work(s) has/have not been got executed through another agency on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for bidding in BMTPC in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Competent Authority shall be free to forfeit the entire amount of Performance Guarantee.

I/We hereby declare that I/We shall treat the bid documents drawings and other records connected with the work as secret/confidential documents and shall not communicate information/derived there from to any person other than a person to whom I/We am/are

authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Dated: ……

Signature of Bidder……

Address:

Witness:

Postal Address

Occupation:

[to be filled by Bidder]

ANNEXURE-VII

ACCEPTANCE OF BID BY BMTPC

The above bid (as modified by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf of BMTPC 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 BMTPC

Signature ……

Dated: …….. Designation ……

ANNEXURE – VIII

MEMORANDUM

Sl. No.	Description	Values/Description to be Applicable for Relevant Clause(s) of contract as per Site
1)	Name of Work	**Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using emerging technology listed at Annexure–I including onsite infrastructure works at Ratanpur, Chhattisgarh under PMAY – U 2.0 of Ministry of Housing & Urban Affairs, Govt. of India.**
2)	Client/Owner	Building Materials and Technology Promotion Council, New Delhi
3)	Type of Bid	Design and Build basis (Dwelling units on lump sum cost basis and on site infrastructure works on Item Rate basis)
4)	Earnest Money Deposit	Rs. 17.30 lakhs
5)	Estimated Cost	Rs. 865.18 lakhs
6)	Time allowed for actual Construction of Work at site	10.50 Months from the date of handing over the site and approvals.
7)	Mobilization Advance	Admissible, Not exceeding10% of the project cost against Bank Guarantee of 110% with simple interest of 10% per Annum
8)	Secured Advance	Not exceeding 75% of the assessed value of Non Perishable materials brought on site
9)	Performance Guarantee	3% (Three Percent Only) of contract value within 15 days from the issue of Letter of Award maximum allowable 30 days. After 15 days, late fee @0.1% per day of PG amount shall be payable which shall be non-refundable.
10)	Security Deposit / Retention Money	2.50% (Five Percent Only) of the gross value of each running/final bill.
11)	Duration of the project	The date of start of contract shall be reckoned from the date of handing over the site i.e. 12 Months (One and half month for Structural designing/planning, vetted structural design and taking approvals from local authorities + 10.5 months for construction of building and onsite infrastructure works from the date of handing over the site and all statutory approvals)
12)	Escalation	No extra Item will be entertained for the building work and facility / community centre. However, for onsite infrastructure work extra items/substituted items may be permitted as per the utmost requirement of site condition and with the approval of BMTPC.

		Escalation cost towards any change in statutory taxes will be accepted.	
13)	Defect Liability and maintenance Period	Five Years after issuance of date of Completion Certificate by BMTPC.	
14)	Standard Schedule of rates	The latest Schedule of Rates issued by CPWD till the last date of submission of bid shall be followed wherever applicable	
15)	Specifications	As per Schedule of finishes and specifications mentioned at Part-3 of this bid document and specifications issued by CPWD till the last date of submission of bid shall be followed wherever applicable	
16)	Authority for fixing compensation under Clause-2, Extension of time, Rescheduling of Milestones and Shifting of date of start in case of delay in handing over of site and deciding reduced rates	Executive Director, BMTPC	
17)	Description of Milestone		
S. No.	Description of Milestones D = Date of Award of work D1 = Date of commencement of work on ground (D + 1.5 months)	Time Allowed in Months	Amount to be withheld in case of non-achievement of Milestone
1	Submission of complete Architectural /Structural drawings as per proposed technology and on site infrastructure works for approval of local body and approval of Vetted structural design by BMTPC	D+ 1.5 months	0.75%
2	Completion of excavation work, laying of foundation and reaching plinth level of building	D1 + 2.5 months	1.0 %
3	Completion of Civil works of super-structure of building	D1 + 7.5 months	2.0 %
4	Completion of building fit with all services, fixtures and fittings.	D1 + 9 months	0.75 %
5	Completion of all onsite infrastructure works and handing over the project to BMTPC	D1 + 10.5 months	0.5 %
	Note: In the event of non-achieving the necessary progress as assessed from the running payment, above amount will be withheld for failure of each milestone subject to Maximum 5% of contract value.		
18)	Technical Manpower required to be engaged at project site	As per **ANNEXURE - XII**	

ANNEXURE-IX

PROFORMAFOR JVA

JOINT VENTURE AGREEMENT (ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

JOINT VENTURE AGREEMENT BETWEEN M/S …… AND M/S …….. FOR SUCCESSFUL PERFORMANCE OF THE CONTRACT FOR ……(INSERT NAME OF CONTRACT, BRIEFDESCRIPTION OF WORKS AND NAME OF CLIENT)

This Joint Venture Agreement executed on this …….. day of …… two thousand and …… between M/s…….. …… a Company incorporated under the law of ……. And having its Registered Office at ……. (Member-1,Herein after called the "Lead member" Which expression shall include its successors, administrators, executors and permitted assigns) and M/s……. a Company incorporated under the law of …… and having its Registered Office at…….. (hereinafter called the" Members" which expression shall include its successor, administrators Executors and permitted assigns) for the purpose of submitting a bid and entering into a Contract (in case of award) against Bid document No…… invited by BMTPC.……

……..... AND

WHEREAS the Bidding Documents stipulates that the selected agency for participation in the Selection Process may be a single entity or a Joint Venture (JV) of not more than three entities. AND WHERAS the bid is being submitted to the BMTPC on behalf of the JV in accordance with the requirements of the Joint Venture criteria as stipulated in the Bid documents.

Role and Responsibilities of Member 1

Role and responsibilities of other Member/s

NOW THEREFORE, THIS DEEDWITNESSETH AS UNDER:

1. That All the responsibilities and obligations of each of the Members delineated in this agreement are expressly understood and agreed between the Members. The share of Lead Member shall be ……% and share of other Member shall be ……% in the Joint Venture.

2. That in consideration of the Award of Contract by BMTPC to the Member-1 on behalf of JV, we the members to the Joint Venture Agreement do hereby agree thatMember-1 shall act as lead member of the JV. The lead member is authorized to deal with the bid, make all correspondence with BMTPC and further to sign the agreement, enter into contract and similar such actions in respect of the bided work.

3. The lead member which shall represent the JV in all the dealings with BMTPC shall be solely and severally responsible for performance of the entire contract for and on behalf of any or both the members of the Joint Venture.

4. JVA shall be valid during the entire currency of the contract including the period of extension, if any. Both the members of the JV shall remain associated with the project till completion of the project. There shall be significant technical contribution of both the members for the project. However, after completion of the project, lead member shall be solely responsible for all responsibilities and liabilities of JV.

5. Once the bid is submitted, the JVA shall not be modified/altered/terminated during the validity of the bid. In case any member of the JV fails to observe /comply with this stipulation, the full Earnest Money Deposit (EMD) shall be liable to be forfeited. Similarly, after the contract is awarded, the constitution of JV shall not be allowed to be altered during the currency of contract. Failure to observe this stipulation shall be deemed to be the breach of contract with all contractual consequences.

6. No member of the JV shall have the right to assign or transfer the interest right or liability in respect of contract without the written consent of the other member and that of BMTPC.

7. In case of any breach of this Contract committed by any of the Members of the Joint Venture Agreement, both the Members do hereby undertake, declare and Confirm that both the members shall be solely and severally responsible for Performance of the works in accordance with the terms and conditions of the NIT, for the work of Bid Document and/or Contract and undertake to carry out all the obligations and responsibilities under this Joint Venture Agreement.

8. If the owner sustains any loss or damage on account of any breach of the contract, the lead member of Joint Venture undertake to pay such loss/damages, caused to the BMTPC on its written demand without any demur, reservation, contest or protest in any manner whatsoever. This is without prejudice to any rights of the BMTPC against the Joint Venture/lead member under the contract and/or guarantees.

9. We agree that this Agreement shall be without any prejudice to the various liabilities of the Joint Venture Members including the performance security as well as other obligations of Joint Venture members in terms of the contract.

10. The Joint Venture members will be fully governed by the terms and conditions of the contract and shall be responsible for the quality of all the works and timely execution thereof to meet the completion schedule under the contract.

11. This Agreement shall be construed and interpreted in accordance with the Laws of India and the respective courts of India shall have exclusive jurisdiction to adjudicate upon the disputes between the parties.

12. We, the Joint Venture members agree that this Agreement shall be irrevocable and shall form an integral part of the Contract. We further agree that this agreement

shall continue to be enforceable till the successful completion of contract and till the BMTPC discharges it.

13. On award of contract, a single Performance Bank Guarantee shall be submitted by the lead member on behalf of JV as per bid conditions.

14. This Agreement shall not be construed as establishing or giving effect to any legal entity such as, a company, a partnership, etc. It shall relate solely towards BMTPC/the BMTPC for submission of Bid/Bid and related execution of works to be performed pursuant to the contract and shall not extend to any other activities.

15. That this Agreement shall be operative from the effective date of the contract.

IN WITNESS WHEREOF, the Joint Venture members through their authorized Representatives have executed these presents and affixed common seal of their respective companies, on the day, month and year first mentioned above.

For M/s ……(Joint Venture- Lead Member)

Witness: 1. …… …….

For M/s ……(Joint Venture Member/s)

Witness: 1. ……

Note:- Mentioning the share percentage of each member of J.V. is mandatory.

ANNEXURE-X

ESTABLISHING SITE LABORATORY AND TESTING OF MATERIALS
(As per Proposed Technology)

Equipment for conducting necessary tests shall be provided and installed at site in the well-furnished site laboratory by the agency at its own cost to establish that the work is being done as per contract specifications and standards. It is also suggested that site laboratory need to be kept at Standard Atmospheric Temperature and humidity.

List of Laboratory & Testing Equipment (as per technology requirement)

1.

2.

3.

4.

5.

Note: Tests can also be carried out by the agency at NABL accredited Laboratory with the prior approval of Competent Authority in BMTPC.

ANNEXURE-XI

A SUGGESTIVE LIST OF PLANT AND EQUIPMENT AT SITE (As per Proposed Technology)- to be provided by the Selected agency

The plant and equipment as required for the technology are to be provided by selected agency here.

List of Plant & Equipment at site

1.

2.

3.

4.

5.

ANNEXURE-XII

Minimum Requirement of Technical Representative at Site

Requirement of Technical Representative(s) and Recovery Rates

S. No	Requirement of Technical Staff		Minimum Experience (Years)	Designation of Technical Staff	Rate at which recovery shall be made from the contractor in the event of not fulfilling the condition
	Qualification	Strength			
1.	Graduate Engineer (Civil)	1 No	5 (having 1 year experience of similar nature of work)	Project Manager	Rs. 60,000/- per Month
2.	Graduate Engineer Or Diploma Engineer (Civil Billing and Electrical Engineer)	1+1 No	2 or 5 respectively	Project planning / quality/billing Engineer	Rs. 40,000/- per Month per person
	Note: 1. The above given strength shall be required to be deployed as and when necessity arises at site or so directed by Competent Authority. 2. The Selected agency shall submit a certificate of employment of the technical representative(s) along with every account bill/final bill and shall produce evidence of regular physical availability of such engineers on the above project if at any times so required by the Competent Authority.				

Part-3

Contract & Other Conditions and Specifications

1. CONTRACT CONDITIONS

(As per General Condition of Contract (GCC) (EPC) 2024 of CPWD with up to date Amendments)

A. DEFINITIONS

The Contract means the documents forming the bid and acceptance thereof and the formal agreement executed between the competent authority on behalf of Building Materials and Technology Promotion Council (BMTPC), and the selected agency, together with the documents referred to therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by BMTPC and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.

1.1 Building Materials and Technology Promotion Council, hereinafter called 'BMTPC' propose to get the works executed as mentioned in the Contract as Implementing /Executing Authority.

1.2 In the contract, the following expressions shall, unless the context otherwise requires, have the meanings, hereby respectively assigned to them: -

a. BMTPC shall means Building Materials and Technology Promotion Council with its office at Core 5A, 1st Floor, India Habitat Centre, Lodhi Road, New Delhi - 110003 or its Administrative officers or other employees authorized to deal with any matter with which these persons are concerned and authorized on its behalf.

b. COMPETENT AUTHORITY means the Executive Director, BMTPC.

c. APPROVAL means approved in writing including subsequent written confirmation of previous verbal approval.

d. SCHEDULE OF QUANTITIES means the complete quantity statement forming or Schedule of Quantities forming part of the bid.

e. SELECTED AGENCY shall mean the individual, firm, LLP or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or LLP or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.

f. CONTRACT VALUE means the sum for which the bid is accepted as per the letter of Award.

g. DRAWINGS mean the drawings referred to in the contract document including modifications if any and such other drawings as may from time to time be furnished and/ or approved by BMTPC.

h. DATE OF COMMENCEMENT OF WORK: The date of start of contract shall be reckoned from the date of handing over of site and approvals.

i. LANGUAGE: All documents and correspondence in respect of this contract shall be in English Language.

j. "LETTER OF AWARD" shall mean BMTPC's letter or notification conveying its acceptance of the bid subject to such conditions as may have been stated therein.

k. MONTH means English Calendar month 'Day' means a Calendar day of 24 Hrs each.

l. OWNER/CLIENT means the BMTPC, who will be entering into the contract and getting the work executed.

m. SITE means the lands and other places on, under, in or through which the works are to be executed or carried out and any other lands or places provided by BMTPC or used for the purpose of the contract.

n. BID means the Selected agency's priced offer to BMTPC for the execution and completion of the work and the remedying of any defects therein in accordance with the provisions of the Contract, as accepted by the Letter of Award or Award letter. The word BID is synonymous with Bid and the word BID DOCUMENTS with "Biding Documents" or "offer documents".

o. WRITING means any manuscript typed, written or printed statement under or over signature and/or seal as the case may be.

p. Works or Work shall unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional.

q. Headings in the clauses/conditions of bid documents is for convenience only and shall not be used for interpretation of the clause/condition.

r. Words imparting the singular meaning only also include the plurals and vice versa where the context requires. Words importing persons or parties shall include firms and corporations and organizations having legal capacities.

s. Excepted Risk are risks due to riots (other than those on account of selected agency's employees), war (whether declared or not) invasion, act of foreign enemies, hostilities, civil war, rebellion revolution, insurrection, military or usurped power, any acts of Government, damages from aircraft, acts of God, such as earthquake, lightening and unprecedented floods, and other causes over which the selected agency has no control and accepted as such by the BMTPC.

t. Market Rate shall be the rate as decided by the Competent Authority on the basis of the prevailing cost of materials and labour at the site where the work is to be executed plus the percentage mentioned elsewhere in the bid document to cover, all overheads and profits.

B. CLAUSES OF CONTRACT

Clause 1.0 Performance Guarantee - Applicable

(i) The contractor shall submit an irrevocable Performance Guarantee at specified percentage of the tendered amount as mentioned in Schedule 'E', in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within period specified in Schedule 'F' from the date of issue of letter of acceptance. This period can be further extended by the BMTPC, Engineer up to a maximum period as specified in schedule 'F' on written request of the contractor stating the reason for delays in submitting the Performance Guarantee, to the satisfaction of the BMTPC, Engineer. This Guarantee shall be in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt or Bank Guarantee from any of the Commercial Banks. In case a fixed deposit receipt of any Bank is furnished by the contractor to the Government as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.

(ii) The Performance Guarantee shall be submitted by the contractor on format as per GCC and shall be initially valid up to the stipulated date of completion plus minimum 6 months beyond that. In case the time for completion of work gets enlarged, the contractor shall get the validity of Performance Guarantee extended to cover such enlarged time for completion of work. After recording of the completion certificate for the work by the competent authority, the performance guarantee shall be returned to the contractor, without any interest. However, in case of contracts involving maintenance of building and services/any other work after construction of same building and services/other work, then 50% of Performance Guarantee shall be retained as Security Deposit. The same shall be returned year wise proportionately.

(iii) The BMTPC, Engineer shall not make a claim under the performance guarantee except for amounts to which the Executive Director is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:

a) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the BMTPC, Engineer may claim the full amount of the Performance Guarantee.

b) Failure by the contractor to pay Executive Director any amount due, either as agreed by the contractor or determined under any of the Clauses/Conditions of the agreement, within 30 days of the service of notice to this effect to the contractor by BMTPC, Engineer.

(iv) In the event of the contract being determined or rescinded under provision of any of the Clause/Condition of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of the Executive Director.

(v) As per requirement of the client or otherwise specified in the contract, part completion certificate may be issued for the building(s)/ infrastructure

project for the part(s) which have been completed in all respect and are ready for use. However, statutory approvals, Completion drawing of various services, wherever required, shall be obtained before handing over of building(s)/ part(s) of the project. Scope of the completed part(s) shall be mentioned in such part completion certificate.

The part completion certificate shall include outstanding balance work that need to be completed in accordance with the provisions of the contract. This part completion certificate shall be recorded by the authority as per contract value of work. After recording of the part Completion Certificate for the work by the competent authority, the proportionate amount of 80% of performance guarantee shall be returned to the contractor, without any interest.

However in case of contracts involving Maintenance of building and services /any other work after construction of same building and services/ other work, then proportionate amount of 40% of performance guarantee shall be returned to the contractor without any interest after recording the part Completion certificate.

Clause 1A Recovery of Security Deposit – Applicable

The person(s) whose tender may be accepted (hereinafter called the contractor) shall permit Government at the time of making any payment to him for work done under the contract to deduct a sum at the rate of 2.5% of the gross amount of each running and final bill till the sum deducted will amount to security deposit of 2.5% of the tendered amount of the work. Such deductions will be made and held by Government by way of Security Deposit unless he/they has/have deposited the amount of Security at the rate mentioned above in the form of Government Securities or fixed deposit receipts. In case a fixed deposit receipt of any Bank is furnished by the contractor to the Government as part of the security deposit and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.

All compensations or the other sums of money payable by the contractor under the terms of this contract may be deducted from or paid by the sale of a sufficient part of his security deposit or from the interest arising there from, or from any sums which may be due to or may become due to the contractor by Government on any account whatsoever and in the event of his Security Deposit being reduced by reason of any such deductions as aforesaid, the contractor shall within 10 days make good by submitting Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque of commercial Banks or Government Securities (if deposited for more than 12 months) endorsed in favour of the BMTPC, Engineer any sum or sums which may have been deducted from or raised by sale of his security deposit or any part thereof. The security deposit shall be collected from the running bills and the final bill of the contractor at the rates mentioned above.

The security deposit as deducted above can be released against bank guarantee issued by a commercial bank, on its accumulations to a minimum of

Rs. 5 lac subject to the condition that amount of such bank guarantee, except last one, shall not be less than Rs. 5 lac. Provided further that the validity of bank guarantee shall be in conformity with provisions contained in clause 17 which shall be extended from time to time depending upon extension of contract granted under provisions of clause 2 and clause 5.

In case of contracts involving maintenance of building and services/any other work after construction of same building and services/other work, then 50% of Performance Guarantee shall be retained as Security Deposit. The same shall be returned year wise proportionately.
Note-1: Government papers tendered as security will be taken at 5% (five per cent) below its market price or at its face value, whichever is less. The market price of Government paper would be ascertained by the BMTPC, Engineer at the time of collection of interest and the amount of interest to the extent of deficiency in value of the Government paper will be withheld if necessary.

Note-2: Government Securities will include all forms of Securities mentioned in Rule No. 274 of the G.F. Rules except fidelity bond. This will be subject to the observance of the condition mentioned under the rule against each form of security.

Note-3: Note 1 & 2 above shall be applicable for both clause 1 and 1A.

Clause 2.0 Compensation for Delay – Applicable

If the contractor fails to maintain the required progress in terms of clause 5 or to complete the work and clear the site on or before the stipulated completion date or justified extended date of completion determined as per clause 5 (excluding any extension under clause 5.5) also considering any extension granted under clauses 12 and 15, he shall, without prejudice to any other right or remedy available under the law to the Government on account of such breach, pay as compensation, the amount calculated as below :

(i)	Compensation for delay of work	@ 0.75% of accepted tendered amount per month of delay (to be computed on per day basis)

Provided further that the total amount of compensation for delay to be paid under this condition shall not exceed 5 % (five percent) of the accepted Tendered Value of work or of the accepted Tendered Value of the Sectional part of work as mentioned in Schedule 'F' for which a separate period of completion is originally given.

The period of delay solely attributable to contractor shall be computed as the time taken by contractor going beyond the ‘justified date of completion’ as determined by the authority specified in schedule F under clause 5. Further, in case where the contractor is entitled to additional time under clause 12 and /or clause 15, that shall also be accounted for while deciding the net period of delay. In case, the authority specified in schedule F decides to levy compensation during the progress of work, the period of delay attributable to contractor shall be computed (by such authority) as the period by which the

progress is behind the schedule on date of such decision, after due consideration of justified extension at that stage of work.

In case no compensation has been decided by the authority in Schedule 'F' during the progress of work, this shall be no waiver of right to levy compensation by the said authority if the work remains incomplete on final justified extended date of completion. If the Engineer in Charge decides to give further extension of time allowing performance of work beyond the justified extended date the contractor shall be liable to pay compensation for such extended period. The levy of compensation under this clause shall be without prejudice to the right of action by the BMTPC, Engineer under clause 3 or any other clause in contract.

In case action under clause 2 has not been finalized and the work has been determined under clause 3, the right of action under clause 2 shall remain post determination of contract and in such case the levy of compensation shall be for days the progress is behind the schedule on date of determination, as assessed by the authority in Schedule F, after due consideration of justified extension. The compensation for delay, if not decided before the determination of contract, shall be decided after of determination of contract. Further, in such case where the contract has been determined, the total amount of recovery against compensation under clause 2 plus that under clause 3 (i.e. forfeiture of security deposit, performance guarantee) shall not exceed 8 % of the accepted tendered value of work.

The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the Government.

In case, the contractor does not achieve a particular milestone mentioned in schedule F, or the re-scheduled milestone(s) in terms of Clause 5, the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied as above. With-holding of this amount on failure to achieve a milestone, shall be automatic without any notice to the contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s), amount mentioned against each milestone missed subsequently also shall be withheld. The amount so withheld can be released against BG/ FDR from a commercial bank of equivalent amount. Further, no interest, whatsoever, shall be payable on such withheld amount.

Clause 3.0 When Contract can be Determined – Applicable

Subject to other provisions contained in this clause, the BMTPC, Engineer may, without prejudice to his any other rights or remedy against the contractor in respect of any delay, not following safety norms, inferior workmanship, any claims for damages and/or any other provisions of this contract or otherwise, and whether the date of completion has or has not elapsed, by notice in writing absolutely determine the contract in any of the following cases:

(i) If the contractor having been given by the BMTPC, Engineer a notice in writing to rectify, reconstruct or replace any defective work or that the work is being performed in an inefficient or otherwise improper or un-workman like manner shall omit to comply with the requirement of such notice for a period of seven days thereafter.

(ii) If the contractor has, without reasonable cause, suspended the progress of the work or has failed to proceed with the work with due diligence and continues to do so after a notice in writing of seven days from the BMTPC, Engineer.

(iii) If the contractor fails to complete the work or section of work with individual date of completion on or before the stipulated or justified extended date, on or before such date of completion; and the Engineer in Charge without any prejudice to any other right or remedy under any other provision in the contract has given further reasonable time in a notice given in writing in that behalf as either mutually agreed or in absence of such mutual agreement by his own assessment making such time essence of contract and in the opinion of BMTPC, Engineer the contractor will be unable to complete the same or does not complete the same within the period specified.

(iv) If the contractor persistently neglects to carry out his obligations under the contract and/ or commits default in complying with any of the terms and conditions of the contract and does not remedy it or take effective steps to remedy it within 7 days after a notice in writing is given to him in that behalf by the BMTPC, Engineer.

(v) If the contractor shall offer or give or agree to give to any person in Government service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract for Government.

(vi) If the contractor shall enter into a contract with Government in connection with which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission and the terms of payment thereof have been previously disclosed in writing to the BMTPC, Engineer.

(vii) If the contractor had secured the contract with Government as a result of wrong tendering or other non-bonafide methods of competitive tendering or commits breach of Integrity Agreement.

(viii) If the contractor being an individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do, or if any application be made under any Insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors.

(ix) If the contractor being a company shall pass a resolution or the court shall make an order that the company shall be wound up or if a receiver or a manager on behalf of a creditor shall be appointed or if circumstances shall arise which entitle the court or the creditor to appoint

a receiver or a manager or which entitle the court to make a winding up order.

(x) If the contractor shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days.

(xi) If the contractor assigns (excluding part(s) of work assigned to other agency(s) by the contractor as per terms of contract), transfers, sublets (engagement of labour on a piece-work basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer, sublet or otherwise parts with the entire works or any portion thereof without the prior written approval of the Engineer -in-Charge.

(xii) When the contractor has made himself liable for action under any of the aforesaid cases (i) to (xi), the BMTPC, Engineer on behalf of the Executive Director shall have powers:

c) To determine the contract as aforesaid so far as performance of work by the Contractor is concerned (of which determination notice in writing to the contractor under the hand of the BMTPC, Engineer shall be conclusive evidence). Upon such determination, the performance guarantee shall stand forfeited in full, Security Deposit already recovered and Security deposit recoverable shall be liable to be forfeited and shall be absolutely at the disposal of the Government.

d) After giving notice to the contractor to measure up the work of the contractor and to take such whole, or the balance or part thereof, as shall be un-executed out of his hands and to give it to another contractor to complete the work. The contractor, whose contract is determined as above, shall not be allowed to participate in the tendering process for the remaining work which may include any new items to complete the work. In the event of above courses being adopted by the BMTPC, Engineer, the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provision aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the BMTPC, Engineer has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

Clause 3A Applicable

In case, the work including planning designing and execution as per scope of contract cannot be started due to reasons not within the control of the contractor within 1/8th of the stipulated time for completion of work or 180 days whichever is higher, either party may close the contract by giving notice to the other party stating the reasons. In such eventuality, the Performance Guarantee of the contractor shall be refunded within 30 days of closing of the contract.

Neither party shall claim any compensation for such eventuality. This clause is not applicable for any breach of the contract by either party.

Clause 4.0 Contractor liable to pay Compensation even if action not taken under Clause 3 - Applicable

In any case in which any of the powers conferred upon the BMTPC, Engineer by Clause3 thereof, shall have become exercisable and the same are not exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor and the liability of the contractor for compensation shall remain unaffected. In the event of the BMTPC, Engineer putting in force all or any of the powers vested in him under the preceding clause he may, if he so desires after giving a notice in writing to the contractor, take possession of (or at the sole discretion of the BMTPC, Engineer which shall be final and binding on the contractor) use as on hire (the amount of the hire money being also in the final determination of the BMTPC, Engineer) all or any tools, plant, materials and stores, in or upon the works, or the site thereof belonging to the contractor or procured by the contractor and intended to be used for the execution of the work/or any part thereof, paying or allowing for the same in account at the contract rates, or, in the case of these not being applicable, at current market rates to be certified by the BMTPC, Engineer, whose certificate thereof shall be final, and binding on the contractor, clerk of the works, foreman or other authorized agent to remove such tools, plant, materials, or stores from the premises (within a time to be specified in such notice) in the event of the contractor failing to comply with any such requisition, the BMTPC, Engineer may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and his risk in all respects and the certificate of the BMTPC, Engineer as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the contractor.

Clause 5.0 Time and Extension for Delay - Applicable

The time allowed for execution of the Works as specified in the Schedule ‘F’ or the extended time in accordance with these conditions shall be the essence of the Contract. The execution of the work shall commence from such date as mentioned in schedule ‘F’ or from the date of handing over of the site, as notified by the BMTPC, Engineer, whichever is later. If the Contractor commits default in commencing the execution of the work as aforesaid and such default continues even after time period specified in the notice in writing by the Engineer in charge then the performance guarantee shall be forfeited by the Engineer in Charge and shall be absolutely at the disposal of the Government without prejudice to any other right or remedy available in law.

The contract shall stand determined when such decision regarding the forfeiture of the performance guarantee is issued to the contractor.

5.1 The contractor as soon as possible but within 7 (seven) days of issue of letter of award of work shall submit a time and progress chart to the BMTPC, Engineer. Such chart shall be made in due consideration of :

a) Schedule of handing over of site as specified in the Schedule 'F'
b) Schedule of issue of design(s) and drawing(s) as specified in the Schedule 'F',

(i) The Contractor shall submit a Time and Progress Chart for each milestone. The BMTPC, Engineer may within 7 (seven) days of receipt of such chart, make modifications thereafter, if any, and communicate the approved chart to the contractor, failing which the chart submitted by the contractor shall be deemed to be approved by the Engineer-in- Charge.

The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the work(s). It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the BMTPC, Engineer and the Contractor within the limitations of time imposed in the Contract documents.

(ii) In case of non-submission of time and progress chart by the contractor, the chart prepared by the Engineer-in- Charge shall be deemed to be final.

(iii) Such program by the BMTPC, Engineer shall not relieve the contractor of any of the obligations under the contract.

(iv) The contractor shall submit the Time and Progress Chart containing upto date progress of work using the mutually agreed software or in the format decided by BMTPC, Engineer. Such chart shall be submitted by the contractor on or before 5th day of each month failing which a recovery as mentioned in Schedule 'F' shall be made at the earliest from the next running account bill without any notice in this regard.

(v) While recording the hindrances in the progress of the work, due consideration should be given to the cause of hindrance. The hindrances shall be segregated in following categories :
(a) delays due to reasons beyond the control of both parties (sub- clause 5.2)
(b) delays attributable to the Department and concurrent delays (sub-clause 5.3).
(c) delays solely attributable to the contractor (sub-clause 5.5)

5.2 Delays due to reasons beyond the control of both parties:

If the work(s) are delayed by:-

(i) force majeure, or
(ii) abnormally bad weather, or
(iii) serious loss or damage by fire, or
(iv) civil commotion, local commotion of workmen, strike or lockout, affecting any of the trades employed on the work, or

(v) delay on the part of other contractors or tradesmen engaged by Engineer-in- Charge in executing work not forming part of the Contract, or

(vi) any other cause like above which, in the reasoned opinion of the BMTPC, Engineer is beyond the Contractor's control.

Then upon the happening of any such event causing delay, the contractor shall within 03 (three) days give online notice thereof through ERP Portal to the BMTPC, Engineer but shall nevertheless use constantly his best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the BMTPC, Engineer to proceed with the work(s).

The contractor shall have no claim on account of any hindrance in case notice(s) are not given by the contractor through ERP portal.

The BMTPC, Engineer, on receipt of such notice(s) after considering the factual ground situation, shall either acknowledge or reject the notice(s).

In case of rejection, the reason(s) for rejection shall be communicated by BMTPC, Engineer to the agency.

The decision of BMTPC, Engineer with regard to nature of event causing delay, its start date and end date, as has been finalized during acknowledgement of notice, shall be final and binding.

The end date of such events shall be recorded by BMTPC, Engineer either during acknowledgment of notice or subsequent to acknowledgement if end date of hindrance is after the date of acknowledgement of notice.

In absence of notice by the contractor, BMTPC, Engineer or his representative(s) may record the events causing delay within 05 (five) days of occurrence of hindrance on ERP portal provided further that not recording of events causing delay by the BMTPC, Engineer does not ipso facto entitle the contractor for any hindrance.

The contractor shall have no claim of damages against the delays listed in this sub clause i.e. sub clause 5.2. The contractor shall have no claim of damages for extension of time granted or rescheduling of milestone/s for events listed in sub clause 5.2.

5.3 Delays attributable to the Department and the Concurrent delays:

In case the work is hindered, in the opinion of the contractor, by the Department or for any reason / event, for which the Department is responsible, then upon the happening of such event causing delay, the Contractor shall within 3 (three) days give online notice there of through ERP Portal to the BMTPC, Engineer but shall nevertheless use constantly his best endeavours to prevent or make good the delay

and shall do all that may be reasonably required to the satisfaction of the BMTPC, Engineer to proceed with the work.

The contractor shall not be entitled for any hindrance in case notice(s) are not given by the contractor through ERP portal.

The BMTPC, Engineer, on receipt of such notice(s) after considering the factual ground situation, shall either acknowledge or reject the notice(s).

In case of rejection, the reason(s) for rejection shall be communicated by BMTPC, Engineer to the agency.

The decision of BMTPC, Engineer with regard to nature of event causing delay, its start date and end date, as has been finalized during acknowledgement of notice, shall be final and binding.

The end date of such events shall be recorded by BMTPC, Engineer either during acknowledgment of notice or subsequent to acknowledgement if end date of hindrance is after the date of acknowledgement of notice.

In absence of notice by the contractor, BMTPC, Engineer or his representative(s) may record the events causing delay within 05 (five) days of occurrence of hindrance on ERP portal provided further that not recording of events causing delay by the BMTPC, Engineer does not ipso facto entitle the contractor for any hindrance.

Such extension of time or rescheduling of milestone(s) shall be without prejudice to any other right or remedy of the parties in contract or in law, provided further that for concurrent delay(s) under this sub clause and sub clause 5.2 to the extent the delay is covered under sub clause 5.2, the contractor shall be entitled to only extension of time and shall have no claim of damages.

5.4 Rescheduling of milestone(s) and 'Justified extended date of completion'

The request for rescheduling the Milestone(s) and extension of time, shall be made by the Contractor through ERP Portal once in a month on the basis of hindrances accepted by BMTPC, Engineer under sub-clause 5.2 and sub-clause 5.3. The Contractor shall indicate in such a request number of days by which rescheduling of milestone(s) and/or extension of time is desired.

The authority as indicated in Schedule 'F', after examining the request, shall give a fair and reasonable 'justified extension of time for completion of work and simultaneously reschedule the milestone(s), if required so. The authority shall consider all the hindrances accepted by BMTPC, Engineer as per sub- clauses 5.2, 5.3 and 5.5.

The authority shall decide rescheduling of milestone(s) and extension of time within 21 (Twenty One) days of the request submitted by the contractor through ERP portal.

In event of no request by the contractor for rescheduling of milestone(s) and extension of time, the authority as indicated in Schedule F, after affording opportunity to the contractor, may give fair and reasonable extension of time based on hindrances accepted by BMTPC, Engineer and reschedule the milestone(s) once in a month. Such justified extension of time shall determine the 'justified extended date' of completion of work.

5.4.1 Provided that the end date of any event causing delay shall not fall beyond the date of request for extension of time or rescheduling of milestone(s) by the contractor. In case end date of event falls beyond the date of submission of said request, then period for extension up to date of application shall be considered in the said request for events eligible for consideration and remaining period shall be applied in subsequent request of extension of time or rescheduling of milestone(s).

BMTPC, Engineer shall finalize/ reschedule a particular mile stone before taking action against subsequent mile stone. Such extension or rescheduling of the milestones shall be communicated to the Contractor by the authority as indicated in Schedule 'F' in writing, within 21 (twenty one) days of the date of receipt of such request from the Contractor on ERP Portal.

5.5 Delays attributable solely to the contractor

In case the work is delayed by reasons solely attributable to the contractor, then BMTPC, Engineer or his representative(s) may record the event causing delay within 05 (five) days of occurrence of delay in the ERP portal. Contractor shall take the notice of the same for necessary action. He may submit his version, if any within 05 (Five) days. BMTPC, Engineer, considering the version of the contractor, will take decision on such recording of the event and the decision of the BMTPC, Engineer shall be final and binding.

The contractor shall be liable for levy of compensation for such delays i.e. for the period beyond the justified extended date of completion as determined in sub clause 5.4 and this default of contractor shall be dealt in conjunction with clause 2 of the contract.
In case the work is delayed, due to hindrances attributable solely to the contractor, beyond the justified extended date (as stated in sub clause 5.4), the authority indicated in Schedule 'F', without prejudice to provisions to take action under Clause 3, may grant extension of time required for completion of work without rescheduling of milestone(s) and extend the date of completion.

Clause 6.0 Computerized Measurement Book - Applicable

BMTPC, Engineer shall, except as otherwise provided, ascertain and determine by measurement the value of work done in accordance with the contract.

All measurements as per the stage payments mentioned in Schedule F having financial value shall be entered by the contractor and compiled in the shape of the Computerized Measurement Book having pages of A-4 size as per the format of the department so that a complete record is obtained of all the stages of works performed under the contract.

All such measurements recorded by the contractor or his authorized representative from time to time, during the progress of the work, shall be got checked by the contractor from the BMTPC, Engineer or his authorized representative as per interval or program fixed in consultation with BMTPC, Engineer or his authorized representative. After the necessary corrections made by the BMTPC, Engineer, the measurement sheets shall be returned to the contractor for incorporating the corrections and for resubmission to the BMTPC, Engineer for the dated signatures by the Engineer-in- Charge and the contractor or their representatives in token of their acceptance.

Whenever bill is due for payment, the contractor would initially submit draft computerized measurement sheets and these measurements would be got checked/test checked from the BMTPC, Engineer and/or his authorized representative. The contractor will, thereafter, incorporate such changes as may be done during these checks/test checks in his draft computerized measurements, and submit to the department a computerized measurement book, duly bound, and with its pages machine numbered. The Engineer-in-Charge and/or his authorized representative would thereafter check this MB, and record the necessary certificates for their checks/test checks.

The final, fair, computerized measurement book given by the contractor, duly bound, with its pages machine numbered, should be 100% correct. No cutting or over-writing in the measurements would thereafter be allowed. If at all any error is noticed, the contractor shall have to submit a fresh computerized MB with its pages duly machine numbered and bound, after getting the earlier MB cancelled by the department. Thereafter, the MB shall be taken in the Divisional Office records, and allotted a number as per the Register of Computerized MBs. This should be done before the corresponding bill is submitted to the Division Office for payment. The contractor shall submit two spare copies of such computerized MB's for the purpose of reference and record by the various officers of the department.

The contractor shall also submit to the BMTPC, Engineer separately his computerized Abstract of Cost and the bill based on these measurements, duly bound, and its pages machine numbered along with two spare copies of the bill. Thereafter, this bill will be processed by the Division Office and allotted a number as per the computerized record in the same way as done for the measurement book meant for measurements.

The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for checking of measurements by the Engineer-in- Charge or his representative.

Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the contract notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom.

The contractor shall give not less than seven days' notice to the BMTPC, Engineer or his authorized representative in charge of the work before covering up or otherwise placing beyond the reach of checking and/or test checking the measurement of any work in order that the same may be checked and/or test checked and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of checking and/or test checking measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the BMTPC, Engineer or his authorized representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of checking and/or test checking measurements without such notice having been given or the BMTPC, Engineer's consent being obtained in writing the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.

BMTPC, Engineer or his authorized representative may cause either themselves or through another officer of the department to check the measurements recorded by contractor and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.

It is also a term of this contract that checking and/or test checking the measurements of any item of work in the measurement book and/or its payment in the interim, on account of final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

Clause 7.0 Payment on Intermediate Certificate to be regarded as advances - Applicable

The running account bills shall be submitted by the contractor for the work executed on the basis of such recorded measurements as per Clause 6 on the format of the Department in triplicate on or before the date of every month fixed for the same by the BMTPC, Engineer.

The contractor shall not be paid any such interim payment if the gross work done together with net payment/ adjustment of advances for material collected, if any, since the last such payment is less than the amount specified in Schedule 'F', in which case the interim bill shall be prepared on the appointed date of the month after the requisite progress is achieved.

However, to expedite the progress of work, BMTPC, Engineer, on the request of contractor, may make interim payment(s) even before the net payment limit specified in schedule ‘F’ is achieved. In such case(s) no interest / compensation shall be recoverable from contractor.
Such payment by BMTPC, Engineer shall not be construed as waiver of limit specified in schedule ‘F’ for subsequent interim payment(s).

BMTPC, Engineer shall arrange to have the bill verified In the event of the failure of the contractor to submit the bills, no claims whatsoever due to delays on payment including that of interest shall be payable to the contractor. Payment on account of amount admissible shall be made by the BMTPC, Engineer certifying the sum to which the contractor is considered entitled by way of interim payment at such rates as decided by the BMTPC, Engineer.

An amount of ad-hoc payment not less than 75% of the net amount of the bill under check, shall be made within 10 working days of submission of the bill. The remaining payment is also to be made after final checking of the bill within 28 working days of submission of bill by the contractor. In case of delay in payment of intermediate bills after 45 days of submission of bill by the contractor, provided the bill submitted by the contractor found to be in order, a simple interest @ 5% (five percent) per annum shall be paid to the contractor from the date of expiry of prescribed time limit.

All such interim payments shall be regarded as payment by way of advances against final payment only and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be rejected, removed, taken away and reconstructed or re-erected. Any certificate given by the BMTPC, Engineer relating to the work done or materials delivered forming If the revised tendered amount (worked out on the basis of quoted rate of individual items) part of such payment, may be modified or corrected by any subsequent such certificate(s) or by the final certificate and shall not by itself be conclusive evidence that any work or materials to which it relates is/are in accordance with the contract and specifications. Any such interim payment, or any part thereof shall not in any respect conclude, determine or affect in any way powers of the BMTPC, Engineer under the contract or any of such payments be treated as final settlement and adjustment of accounts or in any way vary or affect the contract.

Pending consideration of extension of date of completion, interim payments shall continue to be made as herein provided without prejudice to the right of the department to take action under the terms of this contract for delay in the completion of work, if the extension of date of completion is not granted by the competent authority.

Clause 7A

No Running Account Bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable are submitted by the contractor to the BMTPC, Engineer.

Clause 7B Payment to third Party

If the exigencies of the work so demand, the BMTPC, Engineer may allow payment to a third party, who is creditor to the contractor, after fulfilling the following conditions.

(a) The contractor gives an authority letter addressed to the BMTPC, Engineer on a non-judicial stamp paper of Rs.100 in the format given below.

I/We authorize the Executive Engineer, ... BMTPC to pay directly on my/our behalf to ..... (name of the third party) an amount of Rs.....(Rupees .....in words) for the work done or supplies made by ..... (name of the third party). I/We shall be responsible for the quality and quantity of the same under the provisions of agreement number .....

Signature of the contractor

(b) The total payment to third party (or parties) shall not exceed 10% of the agreement cost of the work.

Clause 8.0 Completion Certificate and Completion Plans – Applicable

Within ten days of the completion of the work or on part completion of one or more building(s) out of independent building in a project or infrastructure project, as per requirement of client or otherwise specified in schedule F, the contractor shall give notice of such completion to the BMTPC, Engineer and within thirty days of the receipt of such notice, the BMTPC, Engineer shall inspect the work and shall furnish the contractor with a part or final completion certificate as the case may be, indicating defects (a) to be rectified by the contractor and/or (b) for which payment will be made at reduced rates. But no final certificate of completion shall be issued, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall be executed all scaffolding, surplus materials, rubbish and all huts and sanitary arrangements required for his/their work people on the site in connection with the execution of the works as shall have been erected or constructed by the contractor(s) and cleaned off the dirt from all wood work, doors, windows, walls, floor or other parts of the building, in, upon, or about which the work is to be executed or of which he may have had possession for the purpose of the execution, thereof, and not until the work shall have been measured by the BMTPC, Engineer. If the contractor fails to comply with the requirements of this Clause as to removal of scaffolding, surplus materials and rubbish and all huts and sanitary arrangements as aforesaid and cleaning off dirt on or before the date fixed for the completion of work, the BMTPC, Engineer may at the expense of the contractor remove such scaffolding, surplus materials and rubbish etc., and dispose off the same as he thinks fit and clean off such dirt as aforesaid, and the contractor shall have no claim in respect of scaffolding or surplus materials or final cleaning work as aforesaid except for any sum actually realized by the sale thereof.

Clause 8A Completion Plans to Submitted by the Contractor

The contractor shall submit completion plans for Internal and External Civil, Electrical and Mechanical Services within thirty days of the completion of the work.

In case, the contractor fails to submit the completion plan as aforesaid, he shall be liable to pay a sum of 0.1 % (zero point one percent) of Tendered Value or limit prescribed in Schedule F whichever is more as may be fixed by the authority as mentioned in Schedule F and in this respect the decision of the that authority shall be final and binding on the contractor.

Clause 9.0 Payment of Final Bill – Applicable

The final bill shall be submitted by the contractor in the same manner as specified in interim bills within three months of physical completion of the work or within one month of the date of the final certificate of completion furnished by the BMTPC, Engineer whichever is earlier. No further claims shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payments of those items of the bill in respect of which there is no dispute and of items in dispute, for quantities and rates as approved by BMTPC, Engineer, will, as far as possible be made within the period of three months the period being reckoned from the date of receipt of the bill by the Engineer-in- Charge or his authorized Asstt. Engineer.

If the final bill is submitted by the contractor within the period specified above and delay in payment of final bills is made by the department after prescribed time limit, a simple interest @ 5 % (five percent) per annum shall be paid to the contractor from the date of expiry of prescribed time limit, provided the final bill submitted by the contractor is found to be in order.

Clause 9A Payment of Selected agency's Bills to Banks

Payments due to the contractor may, if so desired by him, be made to his bank, registered financial, co-operative or thrift societies or recognized financial institutions instead of direct to him provided that the contractor furnishes to the BMTPC, Engineer (1) an authorization in the form of a legally valid document such as a power of attorney conferring authority on the bank, registered financial, co-operative or thrift societies or recognized financial institutions to receive payments and (2) his own acceptance of the correctness of the amount made out as being due to him by Government or his signature on the bill or other claim preferred against Government before settlement by the BMTPC, Engineer of the account or claim by payment to the bank, registered financial, co-operative or thrift societies or recognized financial institutions. While the receipt given by such banks registered financial, co-operative or thrift societies or recognized financial institutions shall constitute a full and sufficient discharge for the payment, the contractor shall whenever possible present his bills duly receipted and discharged through his bank, registered financial, co-operative or thrift societies or recognized financial institutions.

Nothing herein contained shall operate to create in favour of the bank, registered financial, co-operative or thrift societies or recognized financial institutions any rights or equities vis-a-vis the Executive Director.

Clause 10A Materials to be provided by the Contractor – Applicable

The contractor shall, at his own expense, provide all materials, required for the works other than those which are stipulated to be supplied by the Government.

The contractor shall, at his own expense and without delay supply to the BMTPC, Engineer samples of materials to be used on the work and shall get these approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the contract. The contractor shall, if requested by the Engineer-in-Charge furnish proof, to the satisfaction of the BMTPC, Engineer that the

materials so comply. The BMTPC, Engineer shall within thirty (30) days of supply of samples or within such further period as he may require intimate to the Contractor in writing whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the BMTPC, Engineer for his approval, fresh samples complying with the specifications laid down in the contract. When materials are required to be tested in accordance with specifications, approval of the BMTPC, Engineer shall be issued after the test results are received.

The Contractor shall at his cost submit the samples of materials to be tested or analyzed and shall not make use of or incorporate in the work any materials represented by the samples until the required tests or analysis have been made and materials finally accepted by the BMTPC, Engineer. The Contractor shall not be eligible for any claim or compensation either arising out of any delay in the work or due to any corrective measures required to be taken on account of and as a result of testing of materials.

The contractor shall, at his cost, make all arrangements and shall provide all facilities as the BMTPC, Engineer may require for collecting and preparing the required number of samples for such tests at such time and to such place or places as may be directed by the BMTPC, Engineer and bear all charges including testing charges. The BMTPC, Engineer or his authorized representative shall always have access to the works and to all workshops and places where work component is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the contractor shall afford every facility and every assistance in obtaining the right to such access.

The BMTPC, Engineer shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the BMTPC, Engineer shall be at liberty to employ at the expense of the contractor, other persons to remove the same without being answerable or accountable for any loss damage that may happen or arise to such materials. The BMTPC, Engineer shall also have full powers to require other proper materials to be substituted thereof and in case of default, the BMTPC, Engineer may cause the same to be supplied and all costs which may attend such removal and substitution shall be borne by the Contractor.

The contractor shall at his own expense, provide a material testing lab at the site for conducting routine field tests. The lab shall be equipped at least with the testing equipment as specified in schedule F.

Clause 10B (i) Secured Advance on Materials – Applicable

The contractor, on signing an indenture form specified in appendix XV, shall be entitled to be paid during the progress of the execution of the work up to 75% of the assessed value of any materials, which are in the opinion of the Engineer-in- charge non-perishable, non-fragile and non-combustible and are in accordance with the contract and which have been brought on the site in connection therewith and are adequately stored and/or protected against damage by weather or other causes but which have not at the time of advance been incorporated in the works. When materials on account of which an advance has been made under this sub-clause are incorporated in the work, the amount of such advance shall be recovered/deducted from the next payment made under any of the clause or clauses of this contract.

Such secured advance shall also be payable on other items of perishable nature, fragile and combustible with the approval of the BMTPC, Engineer provided the contractor provides a comprehensive insurance cover for the full cost of such materials. The decision of the BMTPC, Engineer shall be final and binding on the contractor in this matter. No secured advance, shall however, be paid on high-risk materials such as ordinary glass, sand, petrol, diesel.

Clause 10 B (ii) Mobilization Advance – Applicable

Mobilization advances not exceeding 10% of the tendered amount may be given, if requested by the contractor in writing within six months of the order to commence the work. Such advance shall be released in two or more instalments to be determined by the BMTPC, Engineer. The amount of any instalment shall not exceed 5% of the tendered amount of the work. The first instalment of such advance shall be released by the BMTPC, Engineer to the contractor on his request. The second and subsequent instalment(s) shall be released by the BMTPC, Engineer only after the contractor furnishes a proof of the satisfactory utilization of full amount of the earlier instalment(s) to the satisfaction of the BMTPC, Engineer. The mobilization advance will be utilized for the following:

Establishment of site office for contractor and CPWD staff, testing lab, testing lab equipment, labour camps & basic amenities, services for labour/staff, cement godown, reinforcement yard and stores etc.

Any other item as mentioned in NIT by the NIT approving authority.

90% of the price of new items and 50% of the depreciated price of old items will be considered for assessing the utilized amount of mobilization advance.

Expenditure incurred on items/ materials which are measureable and payable under agreement/extra items as well as materials eligible for secured advance will be excluded from utilized amount of mobilization advance, if any.

The assessment of BMTPC, Engineer in this respect shall be final and binding.

However clause 10B (ii) and clause 10B (iii) are mutually exclusive i.e. both cannot be operated for same material simultaneously.

Before any installment of advance is released, the contractor shall execute Bank Guarantee Bonds not more than 6 (six) in number from commercial Bank for the amount equal to 110% of the amount of advance and valid for the period till recovery of advance. This (Bank Guarantee from commercial Bank on prescribed format for the amount equal to 110% of the balance amount of advance) shall be kept renewed from time to time to cover the balance amount and likely period of complete recovery.

Clause 10 B (iii) Plant Machinery & Shuttering Materials Advance - Not-Applicable

An advance for plant, machinery & shuttering material required for the work and brought to site by the Contractor may be given if requested by the

contractor in writing within one month of bringing such plant and machinery to site. Such advance shall be given on such plant and machinery which in the opinion of the BMTPC, Engineer will add to the expeditious execution of work and improve the quality of work. The amount of advance shall be restricted to 5% of the tender value. In the case of new plant and equipment to be purchased for the work, the advance shall be restricted to 90% of the price of such new plant and equipment paid by the contractor for which the contractor shall produce evidence satisfactory to the BMTPC, Engineer. In the case of second hand and used plants and equipment, the amount of such advance shall be limited to 50% of the depreciated value of plant and equipment as may be decided by the Engineer-in- Charge. The contractor shall, if so required by the BMTPC, Engineer, submit the statement of value of such old plant and equipment duly approved by a Registered Valuer recognized by the Central Board of Direct Taxes under the Income Tax Act, 1961. No such advance shall be paid on any plant and equipment of perishable nature and on any plant and equipment of a value less than Rs. 50,000/-. Seventy five percent of such amount of advance shall be paid after the plant & equipment is brought to site and balance twenty five percent on successfully commissioning the same.

Leasing of equipment shall be considered at par with purchase of equipment and shall be covered by tripartite agreement with the following:

(a) Leasing company which gives certificate of agreeing to lease equipment to the contractor.
(b) Engineer in Charge, and
(c) The contractor.

This advance shall further be subject to the condition that such plant and equipment (a) Are considered by the BMTPC, Engineer to be necessary for the works; (b) and are in working order and are maintained in working order; (c) hypothecated to the Government as specified by the BMTPC, Engineer before the payment of advance is released. The contractor shall not be permitted to remove from the site such hypothecated plant and equipment without the prior written permission of the Engineer in- Charge. The contractor shall be responsible for maintaining such plant and equipment in good working order during the entire period of hypothecation failing which such advance shall be entirely recovered in lump sum. For this purpose, steel scaffolding and form work shall be treated as plant and equipment The contractor shall insure the Plant and Machinery for which mobilization advance is sought and given, for a sum sufficient to provide for their replacement at site. Any amounts not recovered from the insurer will be borne by the contractor.

The Plant, Machinery & Shuttering Material Advance will be utilized for the following:

For purchase of any type of tool, plant and machinery required for execution of work such as concrete batch mix plant, mixtures, transit mixtures, loader, excavators, dumpers, DG sets, vibrators, hot mix bitumen plant, paver, rollers and any other equipment etc.

Barricading of site and procurement of centring / shuttering / staging material etc.

Any other item as mentioned in NIT by the NIT approving authority.

90% of the price of new items and 50% of the depreciated price of old items will be considered for assessing the utilized amount of Plant, Machinery & Shuttering Material Advance.

The assessment of BMTPC, Engineer in this respect shall be final and binding.

However clause 10B (ii) and clause 10B (iii) are mutually exclusive i.e. both cannot be operated for same material simultaneously.

Clause 10 B (iv) Interest and recovery – Not Applicable

(i) The mobilization advance and plant and machinery advance in (ii) & (iii) above bear simple interest at the rate of 8 percent per annum and shall be calculated from the date of payment to the date of recovery, both days inclusive, on the outstanding amount of advance. Recovery of such sums advanced shall be made by the deduction from the contractors bills commencing after first ten percent of the gross value of the work is executed and paid, on pro-rata percentage basis to the gross value of the work billed beyond 10% in such a way that the entire advance is recovered by the time eighty percent of the gross value of the contract is executed and paid, together with interest due on the entire outstanding amount up to the date of recovery of the installment.

(ii) If the circumstances are considered reasonable by the BMTPC, Engineer, the period mentioned in (ii) and (iii) for request by the contractor in writing for grant of mobilization advance and plant and equipment advance may be extended at the discretion of the BMTPC, Engineer.

Clause 10CC Price adjustment for works – Not Applicable

If the prices of materials and/or wages of labour required for execution of the work increase, the contractor shall be compensated for such increase as per provisions detailed below and the amount of the contract shall accordingly be varied, subject to the condition that such compensation for escalation in prices and wages shall be available only for the work done during the stipulated period of the contract including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2. Such compensation for escalation in the prices of materials and labour, when due, shall be worked out based on the following provisions:

(i) The base date for working out such escalation shall be the last stipulated date of receipt of tenders including extension, if any.
(ii) The cost of work on which escalation will be payable shall be reckoned as below :
   a) Gross value of work done up to this quarter : (A)
   b) Gross value of work done up to the last quarter : (B)
   c) Gross value of work done since previous quarter (C)= (A-B)
   d) Full assessed value of Secured Advance fresh paid in this quarter :

(D)

e) Full assessed value of Secured Advance recovered in this quarter : (E)
f) Full assessed value of Secured Advance for which escalation Payable in this quarter, (F)= (D-E)
g) Advance payment made during this quarter: (G)
h) Advance payment recovered during this quarter: (H)
i) Advance payment for which escalation is payable in this Quarter (I)= (G-H)
j) Amount paid based on prevailing market rates due to deviations/variations as per clause 12 during this quarter:(J)

Then, M = C+F+I-J

Cost of work for which escalation is applicable(W)=0.85M

Components for materials, labour, etc. shall be pre-determined for every work and incorporated in the conditions of contract attached to the tender documents included in Schedule 'F'. The decision of the BMTPC, Engineer in working out such percentage shall be binding on the contractors.

(iii) The following principles shall be followed while working out the payment/recovery on account of variation of prices of materials and/ or wages of labour.

a) The compensation for escalation shall be worked out at quarterly intervals and shall be with respect to the cost of work done as per bills paid during the three calendar months of the said quarter. The date of submission of bill by the contractor to the department shall be the guiding factor to decide the bills relevant to the quarterly interval. The first such payment shall be made at the end of three months after the month (excluding the month in which the letter of commencement of work is issued by the BMTPC, Engineer) and thereafter at three months' interval. At the time of completion of the work, the last period for payment might become less than 3 months, depending on the actual date of completion.
b) The indices as defined below (excluding LI) relevant to any quarter/period for which such compensation is to be paid shall be the arithmetical average of the indices relevant to the three calendar months. If the period up to the date of completion after the quarter covered by the last such installment of payment, is less than three months, the indices shall be the average of the indices for the months falling within that period.
c) The minimum wage of an unskilled Mazdoor shall be the higher of the wage notified by Government of India, Ministry of Labour and that notified by the local administration both relevant to the place of work and the period of reckoning.
d) The escalation for labour also shall be paid at the same quarterly intervals when escalation due to increase in cost of materials is paid under this clause. If such revision of minimum wages takes place during any such quarterly intervals, the escalation

compensation shall be payable at revised rates only for work done in subsequent quarters;

e) Irrespective of variations in minimum wages of any category of labour, for the purpose of this clause, the variation in the rate for an unskilled Mazdoor alone shall form the basis for working out the escalation compensation payable on the labour component.

(iv) In the event the price of materials and/or wages of labour required for execution of the work decreases, there shall be a downward adjustment of the cost of work so that such price of materials and/or wages of labour shall be deductible from the cost of work under this contract and in this regard the formula herein stated below under this Clause 10CC shall mutatis mutandis apply.

(v) The contract price shall be adjusted for increase or decrease in rates and prices of labour, cement, steel reinforcement bar, fuel and lubricants and other input materials as per percentage of materials/labour specified in schedule F and in accordance with the principles, procedures and formulae specified below:

a) Price adjustment for change in cost shall be paid in accordance with the following formulae:

(i) For Construction:

VW= W*(1/100)*[CP * (CI-CO)/CO + LP* (LI-LO)/LO+CMP*(CMI-CMO)/CMO+EMP*(EMI-EMO)/ EMO +FP* (FI-FO)/FO+SP* (SI- SO)/SO+ Bp *(BI- Bo)/BO]

(ii) For Maintenance:

VW=W *(1/100)*[LP* (LI-LO)/LO +CMP* (CMI-CMO)/CMO+EMP* (EMI-EMO)/EMO + Bp*(BI- Bo)/BO]

Where, W=cost of work done as per para (ii) above.

VW (Variation of cost of Work) =Increase or decrease in the cost of works during the period under consideration due to change in the rates for relevant components.

Percentage components of materials & labour as specified in the schedule F are defined as under:-

CP- Cement component,

LP - Labour component,

CMP- Civil component of other construction materials,

EMP- E & M component of construction materials

FP-POL (Diesel) component

SP- Reinforcement steel bars/TMT bars/structural steel (including strands and cables) component

BP- Bitumen component

Indices for various components of materials & labour to be used for the purpose of this Clause are defined as under:

CO= Wholesale Price Index for Pozzolana Cement published

by office of the Economic Adviser, Ministry of Industry & Commerce valid for the month of last date of receipt of tender including extension, if any.

CI= Wholesale Price Index for Pozzolana Cement published by office of the Economic Adviser, Ministry of Industry & Commerce for the period under consideration.

LO= Minimum daily wage in rupees of an unskilled adult mazdoor, fixed under any law, statutory rule or order as on the last date of receipt of tender including extension, if any.

LI= Minimum wage in rupees of an unskilled adult mazdoor, fixed under any law, statutory rule or order as applicable on the last date of the quarter previous to the one under consideration.

CMO= Price Index for civil components of other construction materials valid for the month of the last date of receipt of tender including extension, if any, as issued by the office of CE CSQ (Civil) or successor.

CMI= Price Index for civil components of other construction materials for the period under consideration and as issued by the office of CE CSQ (Civil) or successor.

EMO= Price Index for E & M components of construction materials valid for the month of the last date of receipt of tender including extension, if any, as issued by the office of CE CSQ (Electrical) or successor.

EMI= Price Index for E & M components of construction materials for the period under consideration and as issued by the office of CE CSQ (Electrical) or successor.

FO= Wholesale Price Index of HSD (High Speed Diesel) published by office of the Economic Adviser, Ministry of Industry & Commerce valid for the month of the last date of receipt of tender including extension, if any.

FI= Wholesale Price Index of HSD (High Speed Diesel) published by office of the Economic Adviser, Ministry of Industry & Commerce for the period under consideration.

SO= Wholesale Price Index of Mild Steel-long products published by office of the Economic Adviser, Ministry of Industry & Commerce valid for the month of the last date of receipt of tender including extension, if any

SI= Wholesale Price Index of Mild Steel-long products published by office of the Economic Adviser, Ministry of Industry & Commerce for the period under consideration.

BO= Wholesale Price Index of Bitumen published by office of the Economic Adviser, Ministry of Industry & Commerce valid for the month of the last date of receipt of tender including extension, if any

BI= Wholesale Price Index of Bitumen published by office of the Economic Adviser, Ministry of Industry & Commerce for the period under consideration.

Clause 10D Dismantled Materials Govt. Property – Applicable

The contractor shall treat all materials obtained during dismantling of a structure, excavation of the site for a work, etc. as Government's property and such materials shall be disposed off to the best advantage of Government according to the instructions in writing issued by the BMTPC, Engineer.

Clause 11.0 Work to be Executed in Accordance with Specifications, Drawings, Orders as per mode mentioned in schedule F - Applicable

The contractor shall execute the whole and every part of the work in the most substantial and workmanlike manner both as regards materials and otherwise in every respect in strict accordance with the specifications. The contractor shall also conform exactly, fully and faithfully to the design, drawings and instructions in writing in respect of the work issued by the BMTPC, Engineer. Contractor shall be furnished free of charge one copy of the contract documents.

The contractor shall comply with the provisions of the contract and with the care and diligence execute and maintain the works and provide all labour and materials, tools and plants including for measurements and supervision of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as the necessity for providing these, is specified or is reasonably inferred from the contract. The Contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction.

The 3D Architectural Models of the project will be prepared on any BIM applications with minimum LOD 350 and IFC format of the same shall be made available for interoperability of building information to all stake holders of the project.

The 3D Architectural BIM Model Information(s) shall be used for structural, MEP services and horticulture design. The comprehensive BIM model with minimum LOD 350 of project shall have all the architectural, structural, horticulture and MEP services element.

All the BIM Models shall be uploaded on CPWD ERP Collaboration portal by the contractor and shared with the BMTPC, Engineer on CPWD ERP collaboration portal.

All architectural and MEP drawings (2 D) shall be generated from BIM model. All the structural drawings shall be in conformity with BIM model.

Project or work shall be executed using 2D drawings generated from BIM model.

The provisions of BIM shall be applicable in the project only if, the same is mentioned in schedule ‘F’.

Clause 12.0 Deviations/ Variations Extent and Pricing – Not Applicable

The BMTPC, Engineer shall have power (i) to make alterations in, additions to or substitutions for the original scope of work as defined in the contract,

that may appear to him to be necessary or advisable during the progress of the work, and (ii) to omit a part of the works in case of non-availability of a portion of the site or due to any other reason (save except Clause-13), the contractor shall be bound to carry out the works in accordance with any instructions given to him in writing signed by the BMTPC, Engineer and such alterations, omissions, additions or substitutions shall form part of the contract as if originally provided therein and any change in the scope of work as defined in the contract, which the contractor may be directed to do in the manner specified above as part of the works, shall be carried out by the contractor on the same terms and conditions in all respects, except for increase/decrease in the cost and additional time due to change of scope, to be determined based on the sub-clauses hereunder :

12.1 The time for completion of the works shall, in the event of any deviations resulting in additional cost over the tendered value sum being ordered, be extended, if requested by the contractor, as follows :

(i) In the proportion which the additional cost of the altered, additional or substituted work, bears to the original tendered value plus

(ii) 25% of the time calculated in (i) above or such further additional time as may be considered reasonable by the BMTPC, Engineer.

12.2 Payment of deviations/variations beyond 0.25% of the accepted tendered amount.

In case there is any change in scope as defined in the contract, the contractor shall carry out the changes as per direction of Engineer in Charge and nothing extra shall be payable to the contractor on account of same if the additional cost of such work is up to 0.25% (zero point two five percent) of the accepted tendered amount and worked out as per sub-clause 12.3 below. Variations/deviations upto 0.25% (zero point two five percent) of the accepted tendered amount shall be deducted from overall variations/deviations for making payment.

12.3 DETERMINATION OF RATES

In the event, there is any deviations/variations in work as defined in the contract, the contractor shall submit the complete proposal to BMTPC, Engineer within 15 days duly supported with :-

(a) Analysis of rates for items involved, along with relevant documents, rates of materials, tools/plants and labour, etc.

(b) The impact, if any, which the deviations/variations is likely to have on the project completion schedule,

On receipt of such proposal, either individually or covering group of items, the BMTPC, Engineer shall examine the proposal regarding its admissibility and finalize the proposal/rates within 45 days after receipt of proposal with all requisite details and documents from the contractors, after giving due consideration to the proposal, analysis and rates of

materials and labours, etc.

12.3.1 The increase/decrease in the rates due to deviations/variations shall be decided based on the following criteria:-

(i) Pricing of deviations

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

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

(ii) Pricing of variations

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

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

12.4 Restrictions on Deviations/Variations

(i) Work(s) due to deviations/variations shall be executed only after getting the instructions of BMTPC, Engineer, save except to meet any work of emergent nature.
(ii) Notwithstanding anything to the contrary in this clause 12, any change arising from default of the contractor in the performance of his obligations under this agreement shall not be deemed to be deviations/variations, and shall not result in any adjustment of the contract price or the project completion schedule.

Clause 13.0 Foreclosure of contract due to Abandonment or Reduction in Scope of Work - Applicable

If at any time after acceptance of the tender or during the progress of work, the purpose or object for which the work is being done changes due to any supervening cause and as a result of which the work has to be abandoned or reduced in scope, the BMTPC, Engineer shall give notice in writing to that effect to the contractor stating the decision as well as the cause for such decision and the contractor shall act accordingly in the matter. The contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the works in full but which he did not derive in consequence of the foreclosure of the whole or part of the works.

The contractor shall be paid at contract rates, full amount for works executed at site and, in addition, a reasonable amount as certified by the BMTPC, Engineer for the items hereunder mentioned which could not be utilized on the work to the full extent in view of the foreclosure;

(i) Any expenditure incurred on preliminary site work, e.g. temporary access roads, temporary labour huts, staff quarters and site office; storage accommodation and water storage tanks.
(ii) Government shall have the option to take over contractor's materials or any part thereof either brought to site or of which the contractor is legally bound to accept delivery from suppliers (for incorporation in or incidental to the work) provided, however Government shall be bound to take over the materials or such portions thereof as the contractor does not desire to retain. For materials taken over or to be taken over by Government, cost of such materials as detailed by Engineer-in-Charge shall be paid. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the contractor.
(iii) Reasonable compensation for transfer of T & P from site to contractor's permanent stores or to his other works, whichever is less. If T & P are not transported to either of the said places, no cost of transportation shall be payable.
(iv) Reasonable compensation for repatriation of contractor's site staff and imported labour to the extent necessary.

The contractor shall, if required by the Engineer- in-Charge, furnish to him, books of account, wage books, time sheets and other relevant documents and evidence as may be necessary to enable him to

certify the reasonable amount payable under this condition.

The reasonable amount of items on (i), (iii) and (iv) above shall not be in excess of 2% of the cost of the work remaining incomplete on the date of closure, i.e. total stipulated cost of the work as per accepted tender less the cost of work actually executed under the contract and less the cost of contractor's materials at site taken over by the Government as per item (ii) above. Provided always that against any payments due to the contractor on this account or otherwise, the BMTPC, Engineer shall be entitled to recover or be credited with any outstanding balances due from the contractor for advance paid in respect of any tool, plants and materials and any other sums which at the date of termination were recoverable by the Government from the contractor under the terms of the contract.

In the event of action being taken under Clause 13 to reduce the scope of work, the contractor may furnish fresh Performance Guarantee on the same conditions, in the same manner and at the same rate for the balance tendered amount and initially valid up to the extended date of completion or stipulated date of completion if no extension has been granted plus minimum 180 days beyond that. Wherever such a fresh Performance Guarantee is furnished by the contractor the BMTPC, Engineer may return the previous Performance Guarantee.

Clause 14.0 Pre-Construction Activities – Applicable

The data supplied by the Department, if any, are for General Guidance only. The contractor shall be responsible for carrying out pre- construction activities for construction of work as defined in the tender documents. The contractor shall also carry out site investigations to verify site details / Data at his own cost.

Since start of pre-construction activities contractor has to deploy Building Information Model (BIM) professional having knowledge of using Building Information Model (BIM) of minimum LOD 350.

Clause 15.0 Suspension of Work - Applicable

(i) The contractor shall, on receipt of the order in writing of the BMTPC, Engineer, (whose decision shall be final and binding on the contractor) suspend the progress of the works or any part thereof for such time and in such manner as the BMTPC, Engineer may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof for any of the following reasons:

(a) on account of any default on the part of the contractor or;
(b) for proper execution of the works or part thereof for reasons other than the default of the contractor; or
(c) for safety of the works or part thereof. The contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer in- Charge.

(ii) If the suspension is ordered for reasons (b) and (c) in sub-para (i) above:

(a) the contractor shall be entitled to an extension of time equal to the period of every such suspension plus 25%, for completion of the item or group of items of work for which a separate period of completion is specified in the contract and of which the suspended work forms a part, and;

(b) If the total period of all such suspensions in respect of an item or group of items or work for which a separate period of completion is specified in the contract exceeds thirty days, the contractor shall, in addition, be entitled to such compensation as the Engineer-in- Charge may consider reasonable in respect of salaries and/or wages paid by the contractor to his employees and labour at site, remaining idle during the period of suspension, adding thereto 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer-in- Charge within fifteen days of the expiry of the period of 30 days.

(iii) If the works or part thereof is suspended on the orders of the BMTPC, Engineer for more than three months at a time, except when suspension is ordered for reason (a) in sub para (i) above, the contractor may after receipt of such order serve a written notice on the BMTPC, Engineer requiring permission within fifteen days from receipt by the Engineer in- Charge of the said notice, to proceed with the work or part thereof in regard to which progress has been suspended and if such permission is not granted within that time, the contractor, if he intends to treat the suspension, where it affects only a part of the works as an omission of such part by Government or where it affects whole of the works, as an abandonment of the works by Government, shall within ten days of expiry of such period of 15 days give notice in writing of his intention to the BMTPC, Engineer. In the event of the contractor treating the suspension as an abandonment of the contract by Government, he shall have no claim to payment of any compensation on account of any profit or advantage which he might have derived from the execution of the work in full but which he could not derive in consequence of the abandonment. He shall, however, be entitled to such compensation, as the BMTPC, Engineer may consider reasonable, in respect of salaries and/or wages paid by him to his employees and labour at site, remaining idle in consequence adding to the total thereof 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the BMTPC, Engineer within 30 days of the expiry of the period of 3 months.

Clause 16.0 Action in case Work not done as per Specifications - Applicable

All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of the Engineer-in charge, his authorized subordinates in charge of the work and all the superior officers, officer of the Quality Assurance Unit of the Department or any organization engaged by the Department for Quality Assurance and of the Chief Technical Examiner's Office, and the

contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for that purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

If it shall appear to the BMTPC, Engineer or his authorized subordinates in charge of the work or to the Chief Engineer in charge of Quality Assurance or his subordinate officers or the officers of the organization engaged by the Department for Quality Assurance or to the Chief Technical Examiner or his subordinate officers, that any work has been executed with unsound, imperfect, or unskillful workmanship, or with materials or articles provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within twelve months (six months in the case of work costing Rs. 10 Lac and below except road work) of the completion of the work from the BMTPC, Engineer specifying the work, materials or articles complained of, notwithstanding that the same may have been passed, certified and paid for, forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the failing to do so within a period specified by the Engineer-in- Charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as specified under clause 2 of the contract (for non-completion of the work in time) for this default.

In such case the BMTPC, Engineer may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the authority specified in schedule ‘F’ may consider reasonable during the preparation of on account bills or final bill or any other amount due to the contractor, if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and/or get it along with other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Decision of the BMTPC, Engineer to be conveyed in writing in respect of the same will be final and binding on the contractor.

Clause 17.0 **Damages and defect liability –** Applicable (As per BMTPC, Para 14 of “Special Condition for use of Emerging Technologies and Works”)

Clause 18A **Recovery of Compensation paid to Workmen –** Applicable

In every case in which by virtue of the provisions under sub- section (1) of section 12 of the Workmen's Compensation Act. 1923, Government is obliged to pay compensation to a workman employed by the contractor, in execution of the works , Government will recover from the contractor , the amount of the compensation so paid and, without prejudice to the rights of the Government under sub- section(2) of section 12 of the said Act, Government shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Government to the contractor whether under this contract or otherwise. Government shall not be bound to contest any claim made against it under sub- section (1) of

section 12, of the said Act, except on the written request of the contractor and upon his giving to Government full security for all costs for which Government might become liable in consequence of contesting such claim.

Clause 18B Ensuring Payment and Amenities to Workers if Contractor fails – Applicable

In every case in which by virtue of the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, Government is obliged to pay any amounts of wages to a workman employed by the contractor in execution of the works, or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act, and the rules, under Clause 19H or under the CPWD Contractor's Labour Regulations, or under the Rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by CPWD Contractors, Government will recover from the contractor, the amount of wages so paid or the amount of expenditure so incurred; and without prejudice to the rights of the Government under sub-section(2) of Section 20, and sub-section (4) of Section 21, of the Contract Labour (Regulation and Abolition) Act, 1970, Government shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Government to the contractor whether under this contract or otherwise Government shall not be bound to contest any claim made against it under subsection (1) of Section 20, sub-section (4) of Section 21, of the said Act, except on the written request of the contractor and upon his giving to the Government full security for all costs for which Government might become liable in contesting such claim.

Clause 19.0 Labour Laws to be complied by the Contractor – Applicable

The contractor shall comply with the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971. The contractor shall also obtain a valid license under the said Act before the commencement of the work, and continue to have a valid license until its completion.

The contractor shall also comply with provisions of the Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979.

The contractor shall also abide by the provisions of the Child and Adolescent Labour (Prohibition and Regulation) Act, 1986, amended by Amendment Act No. 35 of 2016 and thereafter time to time.

The contractor shall also comply with the provisions of the building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 and the building and other Construction Workers Welfare Cess Act, 1996.

The contractor shall also comply with the provisions of Sexual Harassment of Women at Workplace (Prevention Prohibition and Redressal) Act, 2013 and amendment thereafter time to time.

Any failure to fulfill these requirements shall attract the penal provisions of

the relevant act and in this contract.

Clause 19A

No person below the age of fourteen years shall be employed on the work. However Adolescent Persons can be employed on non-hazardous works/process.

Clause 19B – Payment of Wages

(i) The contractor shall pay to labour employed by him either directly or through subcontractors, wages not less than fair wages as defined in the C.P.W.D. Contractor's Labour Regulations or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and the contract Labour (Regulation and Abolition) Central Rules, 1971 and Gazette Notification 19.01.2017, S.O 188 (E) extra ordinary part 2 – sec. 3 (ii) amended time to time.

Thus higher of the wages either notified by Govt. of India, Ministry of Labour and/or that notified by the local administration of the State Govt. both relevant to the place of work and the period of reckoning shall be paid by the contractor to the labourer.

(ii) The contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wage to labour indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work, as if the labour had been immediately employed by him.

(iii) In respect of all labour directly or indirectly employed in the works for performance of the contractor's part of this contract, the contractor shall comply with or cause to be complied with the Central Public Works Department contractor's Labour Regulations made by Government from time to time in regard to payment of wages, wage period, deductions from wages recovery of wages not paid and deductions unauthorizedly made, maintenance of wage books or wage slips publication of scale of wage and other terms of employment, inspection and submission of periodical returns and all other matters of the like nature or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable

(iv) (a) The BMTPC, Engineer concerned shall have the right to deduct from the moneys due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of nonfulfillment of the conditions of the contract for the benefit of the workers, nonpayment of wages or of deductions made from his or their wages which are not justified by their terms of the contract or non-observance of the Regulations.

(b) Under the provision of Minimum Wages (Central) Rules, 1950, the contractor is bound to allow to the labours directly or indirectly employed in the works one day rest for 6 days continuous work and

pay wages at the same rate as for duty. In the event of default, the BMTPC, Engineer shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labours and pay the same to the persons entitled thereto from any money due to the contractor by the BMTPC, Engineer concerned.

In the case of Union Territory of Delhi, however, as the all inclusive minimum daily wages fixed under Notification of the Delhi Administration No.F.12(162)MWO/DAB/43884-91, dated 31-12-1979 as amended from time to time are inclusive of wages for the weekly day of rest, the question of extra payment for weekly holiday would not arise.

(v) The contractor shall comply with the provisions of the Payment of Wages Act, 1936, Minimum Wages Act, 1948, Employees Liability Act, 1938, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947, Maternity Benefits Act, 1961, and the Contractor's Labour (Regulation and Abolition) Act 1970, Gazette Notification 19.01.2017, S.O 188 (E) extra ordinary part 2 – sec. 3 (ii) and the modifications thereof or any other laws relating thereto and the rules made there under from time to time.

vi) The contractor shall indemnify and keep indemnified Government against payments to be made under and for the observance of the laws aforesaid and the CPWD Contractor's Labour Regulations without prejudice to his right to claim indemnity from his subcontractors.

(vii) The laws aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.

(viii) Whatever is the minimum wage for the time being, or if the wage payable is higher than such wage, such wage shall be paid by the contractor to the workmen directly without the intervention of Jamadar and that Jamadar shall not be entitled to deduct or recover any amount from the minimum wage payable to the workmen as and by way of commission or otherwise.

(ix) The contractor shall ensure that no amount by way of commission or otherwise is deducted or recovered by the Jamadar from the wage of workmen.

Clause19C

In respect of all labour directly or indirectly employed in the work for the performance of the contractor's part of this contract, the contractor shall at his own expense arrange for the safety provisions as per CPWD Safety Code framed from time to time and shall at his own expense provide for all facilities in connection therewith. In case the contractor fails to make arrangement and to provide necessary facilities as aforesaid, he shall be liable to pay a penalty as mentioned in Schedule ‘F’ for each default and in addition, the BMTPC, Engineer shall be at liberty to make arrangement and provide facilities as aforesaid and recover the cost incurred in that behalf from the contractor.

Clause 19D

The contractor shall submit by the 4th and 19th of every month, to the BMTPC, Engineer, a true statement showing in respect of the second half of the preceding month and the first half of the current month respectively:

(1) the number of labourers employed by him on the work,
(2) their working hours,
(3) the wages paid to them,
(4) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them, and
(5) the number of female workers who have been allowed maternity benefit according to Clause 19F and the amount paid to them.

Failing which the contractor shall be liable to pay to Government, a sum as mentioned in Schedule F for each default or materially incorrect statement. The decision of the Divisional Officer shall be final in deducting from any bill due to the contractor, the amount levied as fine and be binding on the contractor.

Clause 19E

In respect of all labour directly or indirectly employed in the works for the performance of the contractor's part of this contract, the contractor shall comply with or cause to be complied with all the rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by the CPWD and its contractors.

Clause 19F

Leave and pay during leave shall be regulated as follows:

1. Leave :

   (i) in the case of delivery - maternity leave not exceeding 8 weeks, 4 weeks up to and including the day of delivery and 4 weeks following that day,
   (ii) in the case of miscarriage - upto 3 weeks from the date of miscarriage.

2. Pay :

   (i) in the case of delivery - leave pay during maternity leave will be at the rate of the women's average daily earnings, calculated on total wages earned on the days when full time work was done during a period of three months immediately preceding the date on which she gives notice that she expects to be confined.

   (ii) in the case of miscarriage - leave pay at the rate of average daily earning calculated on the total wages earned on the days

when full time work was done during a period of three months immediately preceding the date of such miscarriage.

3. Conditions for the grant of Maternity Leave:

No maternity leave benefit shall be admissible to a woman unless she has been employed for a total period of not less than six months immediately preceding the date on which she proceeds on leave.

4. The contractor shall maintain a register of Maternity (Benefit) in the Prescribed Form as shown in appendix -I and II, and the same shall be kept at the place of work.

Clause 19G

In the event of the contractor(s) committing a default or breach of any of the provisions of the CPWD, Contractor's Labour Regulations and Model Rules for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filing any statement under the provisions of the above Regulations and' Rules which is materially incorrect, he/they shall, without prejudice to any other liability, pay to the Government a sum as mentioned in Schedule F for every default, breach or furnishing, making, submitting, filing such materially incorrect statements and in the event of the contractor(s) defaulting continuously in this respect, the penalty may be enhanced to as mentioned in Schedule F per day for each day of default subject to a maximum of 5 percent of the estimated cost of the work put to tender. The decision of the BMTPC, Engineer shall be final and binding on the parties.

Should it appear to the BMTPC, Engineer that the contractor(s) is/are not properly observing and complying with the provisions of the CPWD Contractor's Labour Regulations and Model Rules and the provisions of the Contract Labour (Regulation and Abolition) Act 1970, and the Contract Labour (R& A) Central Rules 1971, for the protection of health and sanitary arrangements for work-people employed by the contractor(s) (hereinafter referred as "the said Rules") the BMTPC, Engineer shall have power to give notice in writing to the contractor(s) requiring that the said Rules be complied with and the amenities prescribed therein be provided to the work-people within a reasonable time to be specified in the notice. If the contractor(s) shall fail within the period specified in the notice to comply with and/ observe the said Rules and to provide the amenities to the work-people as aforesaid, the BMTPC, Engineer shall have the power to provide the amenities hereinbefore mentioned at the cost of the contractor(s). The contractor(s) shall erect, make and maintain at his/ their own expense and as per approved standards all necessary huts and sanitary arrangements required for his/their work-people on the site in connection with the execution of the works, and if the same shall not have been erected or constructed according to approved standards, the BMTPC, Engineer shall have power to give notice in writing to the contractor(s) requiring that the said huts and sanitary arrangements be remodeled and/or reconstructed according to approved standards, and if the contractor(s) shall fail to remodel or reconstruct such huts and sanitary

arrangements according to approved standards within the period specified in the notice, the BMTPC, Engineer shall have the power to remodel or reconstruct such huts and sanitary arrangements according to approved standards at the cost of the contractor(s).

Clause 19H

The contractor(s) shall at his/their own cost provide his/their labour with a sufficient number of huts (hereinafter referred to as the camp) of the following specifications on a suitable plot of land to be approved by the BMTPC, Engineer.

(i) (a) The minimum height of each hut at the eaves level shall be 2.10m (7 ft.) and the floor area to be provided will be at the rate of 2.7 sq.m. (30 sq.ft.) for each member of the worker's family staying with the labourer.

(b) The contractor(s) shall in addition construct suitable cooking places having a minimum area of 1.80m x 1.50m (6'x5') adjacent to the hut for each family.

(c) The contractor(s) shall also construct temporary latrines and urinals for the use of the labourers each on the scale of not less than four per each one hundred of the total strength, separate latrines and urinals being provided for women.

(d) The contractor(s) shall construct sufficient number of bathing and washing places, one unit for every 25 persons residing in the camp. These bathing and washing places shall be suitably screened.

(ii) (a) All the huts shall have walls of sun-dried or burnt-bricks laid in mud mortar or other suitable local materials as may be approved by the BMTPC, Engineer. In case of sun-dried bricks, the walls should be plastered with mud gobri on both sides. The floor may be kutcha but plastered with mud gobri and shall be at least 15 cm (6") above the surrounding ground. The roofs shall be laid with thatch or any other materials as may be approved by the BMTPC, Engineer and the contractor shall ensure that throughout the period of their occupation, the roofs remain water-tight.

(b) The contractor(s) shall provide each hut with proper ventilation.

(c) All doors, windows, and ventilators shall be provided with suitable leaves for security purposes.

(d) There shall be kept an open space of at least 7.2m (8 yards) between the rows of huts which may be reduced to 6m (20 ft.) according to the availability of site with the approval of the BMTPC, Engineer. Back to back construction will be allowed.

(iii) Water Supply - The contractor(s) shall provide adequate supply of water for the use of labourers. The provisions shall not be less than

two gallons of pure and wholesome water per head per day for drinking purposes and three gallons of clean water per head per day for bathing and washing purposes. Where piped water supply is available, supply shall be at stand posts and where the supply is from wells or river, tanks which may be of metal or masonry, shall be provided. The contractor(s) shall also at his/ their own cost make arrangements for laying pipe lines for water supply to his/ their labour camp from the existing mains wherever available, and shall pay all fees and charges therefore.

(iv) The site selected for the camp shall be high ground, with removed from jungle clearances, if required.

(v) Disposal of Excreta - The contractor(s) shall make necessary arrangements for the disposal of excreta from the latrines by trenching or incineration which shall be according to the requirements laid down by the Local Health Authorities. If trenching or incineration is not allowed, the contractor(s) shall make arrangements for the removal of the excreta through the Municipal Committee/authority and inform it about the number of labourers employed so that arrangements may be made by such Committee/authority for the removal of the excreta. All charges on this account shall be borne by the contractor and paid direct by him to the Municipality/authority. The contractor shall provide one sweeper for every eight seats in case of dry system.

(vi) Drainage - The contractor(s) shall provide efficient arrangements for draining away sullage water so as to keep the camp neat and tidy.

(vii) The contractor(s) shall make necessary arrangements for keeping the camp area sufficiently lighted to avoid accidents to the workers.

(viii) Sanitation - The contractor(s) shall make arrangements for conservancy and sanitation in the labour camps according to the rules of the Local Public Health and Medical Authorities.

Clause 19 I

The BMTPC, Engineer may require the contractor to dismiss or remove from the site of the work any person or persons in the contractors' employ upon the work who may be incompetent or misconduct himself and the contractor shall forthwith comply with such requirements. In respect of maintenance/repair or renovation works etc. where the labour have an easy access to the individual houses, the contractor shall issue identity cards to the labourers, whether temporary or permanent and he shall be responsible for any untoward action on the part of such labour.

Clause 19J

It shall be the responsibility of the contractor to see that the building under construction is not occupied by unauthorized person(s) during construction, and is handed over to the BMTPC, Engineer with vacant possession of complete building. If such building though completed is occupied illegally, then the BMTPC, Engineer shall have the option to refuse to accept the said building/buildings in that position. Any delay in acceptance on this account will be treated as the delay in completion and for such delay, a compensation shall be levied as per clause 2 of the agreement, by the Superintending

Engineer/ Chief Engineer whose decision shall be final both with regard to the justification and quantum and be binding on the contractor.

However, the Superintending Engineer/ Chief Engineer, through a notice, may require the contractor to remove the illegal occupation any time on or before construction and delivery.

Clause 19K

The contractor shall, at all stages of work, deploy skilled/semi-skilled tradesmen who are qualified and possess certificate in particular trade from National CPWD Academy, Industrial Training Institute, National Institute of construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed or certified by State/Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled/semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer in charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from BMTPC, Engineer. Failure on the part of contractor to obtain approval of BMTPC, Engineer or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate specified in schedule 'F' per such tradesman per day. Decision of Engineer in Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.

The contractor shall arrange on site training as per National Skill Development Corporation (NSDC) norms for at least 30% of the unskilled workers engaged in the project in coordination with the CPWD Regional Training Institute & National Skill Development Corporation (NSDC) for certification at the level of skilled/semi-skilled tradesmen. The cost of such training as stated above shall be borne by the Government. The necessary space and workers shall be provided by the contractor and no claim what so ever shall be entertained.

Clause 19L

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 BMTPC, Engineer to the contractor on actual basis. The verification of deployment of labour will be done through biometric attendance system or any other suitable method by the BMTPC, Engineer. The applicable and eligible amount of EPF & ESI shall be reimbursed preferably within 7 days but not later than 30 days of submission of documentary proof of payment provided same are in order.

Clause 19 M

The contractor shall comply with all provision(s) and guideline(s) of Sexual Harassment of Women at Workplace (Prevention Prohibition and Redressal) Act, 2013 and amendment thereafter time to time or any other rules framed under any labour law affecting women worker(s).

Clause 20.0 Minimum Wages Act to be complied with - Applicable

The contractor shall comply with all the provisions of the Minimum Wages Act, 1948, and Contract Labour (Regulation and Abolition) Act, 1970, Gazette Notification 19.01.2017, S.O188 (E) extra ordinary part 2 – sec. 3 (ii) amended from time to time and rules framed there under and other labour laws affecting contract labour that may be brought into force from time to time.

Clause 21.0 Work not to be sublet. Action in case of insolvency - Applicable

The contract shall not be assigned or sublet without the written approval of the BMTPC, Engineer. And if the contractor shall assign or sublet his contract, or attempt to do so, or become insolvent or commence any insolvency proceedings or make any composition with his creditors or attempt to do so, or if any bribe, gratuity, gift, loan, perquisite, reward or advantage pecuniary or otherwise, shall either directly or indirectly, be given, promised or offered by the contractor, or any of his servants or agent to any public officer or person in the employ of Government in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract, the BMTPC, Engineer on behalf of the Executive Director shall have power to adopt the course specified in Clause 3 hereof in the interest of Government and in the event of such course being adopted, the consequences specified in the said Clause 3 shall ensue.

Clause 22.0 Quality Assurance and Supervision for Execution Part of Work – Applicable

22.1 Quality of Materials and Workmanship

(i) The Contractor shall ensure that the Materials and workmanship are in accordance with the requirements specified in this Agreement, Specifications and Standards and Sound Engineering practice. The work shall be of the specified quality and standard, both in respect of ingredients as well as the intended functions it is supposed to perform for service life.

(ii) The Contract warrants that all Materials shall be new, unused, not reconditioned, unless otherwise allowed as per contract or by BMTPC, Engineer, and in conformity with Specification and Standards, Applicable Laws and Sound Engineering Practice, and that the Contractor shall not use any materials which are generally recognized as being deleterious under Sound Engineering Practice.

22.2 Quality Assurance System

The Contractor shall devise a quality assurance mechanism to ensure compliance with the provisions of this Agreement (the "Quality Assurance Plan" or "QAP").

(i) The Contractor shall, submit to the BMTPC, Engineer, its Quality Assurance Plan 15(fifteen) days in advance of start of the execution stage specified in the NIT. The BMTPC, Engineer shall convey its comments to the Contractor within a period of 7 (seven) days of receipt of the QAP stating the modifications, if any, required and the Contractor shall incorporate those in the QAP conforming with the provisions of this clause. The QAP shall include the following:

(a) Contractor's Organization & structure, duties and responsibilities of individual key personnel, quality policy of contractor, procedure for control of nonconformities and corrective action, inspections and documentation.
(b) Internal quality audit system.
(c) Machinery, Shuttering, other Tool & Plants, etc. required to be deployed at site.
(d) Method statement of important activities. These can be submitted as per the sequencing of the activities of the work.
(e) Quality control mechanism including sampling and testing of Materials, test frequencies, standards, acceptance criteria, testing facilities, reporting, recording and interpretation of test results, approvals, proforma for testing and calibration in accordance with the Specifications and Standards and Sound Engineering Practice; and Material Lot size, number of required tests and frequency of testing for different construction materials.

All the relevant and applicable codes, specifications and standards, as well as the acceptance criteria for various items of work, workmanship, materials and process employed needs to be mentioned.
(f) Check-list for various items and materials.
(g) Formats for site documentation, monthly reports on implementation of QAP.

(ii) Sampling of materials

All samples of materials including Cement Concrete Cubes shall be taken by the QA engineers deployed by the Contractor and shall be witnessed by the BMTPC, Engineer or his authorized representatives as specified in NIT. All the necessary assistance, facilities and safety shall be provided by the contractor. Cost of sample of materials and testing charges shall be borne by the contractor and he/she is responsible for safe custody of samples to be tested at site.

(iii) Testing of Materials

The contractor shall establish temporary field laboratory of adequate size with all necessary facilities. Field laboratory shall be equipped with the testing equipment for conducting routine field tests as per this contract. It will also have copies of standards, BIS codes, IRC codes, relevant publications.

All the tests in field lab setup at construction site shall be carried out by the QA Staff deployed by the contractor and shall be witnessed by the BMTPC, Engineer or his authorized subordinates as specified in NIT. The contractor shall provide all necessary facility to them for witnessing the tests in the field laboratory. In general, contractor shall carry out 90% of field tests in site laboratory and 10% tests shall be got carried out from outside laboratory as indicated below. Contractor shall endeavour to obtain test reports for tests conducted from outside laboratory in a reasonable time.

(iv) Maintenance of Register of Test –

(a) All the entries in the register of test are to be made by the designated QA Engineers of the contractor and same is to be regularly reviewed by the field officers as well as the BMTPC, Engineer. The contractor shall allow inspection of such records any time as desired by BMTPC, Engineer or his authorized representative.

(b) All the tests carried out at construction site or outside laboratories are to be maintained by the contractor in the prescribed format in the test registers provided by the contractor and duly authenticated by BMTPC, Engineer. The test reports shall also be maintained in hard file.

(c) Contractor is responsible for maintenance and safe custody of all the test registers and test records.

(d) Mandatory test conducted as per approved proforma shall be attached with each Running bill. Submission of copy of all test registers and material at site register along with each alternate Running Account Bill and with Final Bill is mandatory.

(v) Maintenance of Material at Site (MAS) Register-

MAS register of the key materials including Cement and Steel Registers shall be maintained in the proforma approved by BMTPC, Engineer. All the entries in the MAS registers are made by the designated staff of the contractor and same is regularly reviewed by the field officers as well as the BMTPC, Engineer. Contractor is responsible for maintenance and safe custody of MAS registers.

(vi) The Contractor shall procure all relevant codes, publications, apparatus and instruments, fuel, consumables, water, electricity, labour, materials, samples and qualified personnel as are necessary for examining and testing the Works, Materials and workmanship in accordance with the Quality Assurance Plan.

(vii) All the cost of testing including cost of samples, packaging, transportation, testing charges of Construction, Materials and workmanship under this clause shall be borne by the contractor.

(viii) The contractor shall submit monthly quality progress report on implementation of the provisions of Quality Assurance Plan on the format approved by the Engineer-in- Charge.

22.3 Samples

The Contractor shall, at its own expense and without delay, provide the samples of Materials and relevant information like Manufacturer's test reports, standard samples of manufactured Materials and Samples of such other Materials as the BMTPC, Engineer may require for review and approvals in accordance with Clause 10A of GCC before actual use.

22.4 Test

(i) For determining that the Works conform to the Specifications and Standards, the BMTPC, Engineer shall require the Contractor to carry out or cause to be carried out tests, at such time and frequency and in such manner as specified in this Agreement and in accordance with sound engineering practice for quality assurance. Frequency and the manner in which tests shall be conducted shall be in the following order of preference:

(a) Contract provisions.
(b) CPWD specifications.
(c) BIS codes.
(d) IRC codes.
(e) MoRTH Specifications.
(f) International Codes.
(g) Manufacturer's specifications.

Outside tests shall be conducted at Government labs /IITs/NITs and other approved laboratories by the BMTPC, Engineer for testing of materials

(ii) The Contractor shall, with due diligence, carry out all the tests in accordance with the Agreement and furnish the results thereof to the BMTPC, Engineer. The BMTPC, Engineer or his authorized representative shall witness or participate during the testing as

specified in NIT. The contractor shall provide all necessary assistance for witnessing/participating in the field tests.

(iii) In the event that results of any tests conducted under this clause establish any defects or deficiencies in the Works, the Contractor shall carry out remedial measures at its own cost and furnish a report to the BMTPC, Engineer in this regard. The BMTPC, Engineer shall require the Contractor to carry out or cause to be carried out tests to determine that such remedial measures have brought the works into compliance with the Specifications and standards and the procedure shall be repeated until such Works conform to the Specifications and Standards.

22.5. Method Statement

The 'Method statement' is a statement by which the construction procedures for important activities are stated, checked, and approved. The method statement shall be prepared for important activities as identified by the contractor as mentioned in QAP or any other activity as instructed by Engineer-in Charge. The 'Method statement', should have a description of the item with elaborate procedure in steps to implement the same, the specifications of the materials involved, equipment to be deployed, measures for ensuring safety, their testing and acceptance criteria, precautions to be taken, mode of measurement, etc. The Contractor shall, at least 15 (fifteen) days prior to the commencement of activities, submit to the BMTPC, Engineer for review, the method statements proposed to be adopted for executing the various items of work. The BMTPC, Engineer shall complete the review and convey its comments, if any, to the Contractor within a period of 07 (seven) days from the date of receipt of the proposed methodology from the Contractor.

22.6 Inspection & review by the BMTPC, Engineer and External Audit.

The BMTPC, Engineer, his authorized subordinates, senior officers of department, QA unit or any other third party may inspect and review the progress and quality of the work and issue appropriate directions to the Contractor for taking remedial action in the event the work is not in accordance with the provisions of this Agreement. The work may be inspected at any time/stage by external inspection teams like CTE or TE, Third Party Quality assurance agency, CPWD team etc. may conduct inspection of the quality of the works. The findings of the inspections shall be notified to the Contractor for taking remedial action in accordance with the agreement. The Contractor shall provide all assistance as may be required by the inspection teams in the conduct of its inspection here under. Suitable actions shall be taken as per the provisions contained in the relevant clauses of the agreement, if the work is not found to be as per specifications or quality as specified in the agreement.

22.7 Inspection of records

The BMTPC, Engineer or his authorized representative shall have the right to inspect the records of the Contractor relating to the works.

22.8 Inspection of Works

(i) The BMTPC, Engineer and his authorized subordinates shall at all times;
   (a) have full access to all parts of the site and to all places from which natural materials are being obtained for use in the works; and
   (b) during production, manufacture and construction at the site and at the place of production, be entitled to examine, inspect, measure and test the materials and workmanship and to check the progress of the manufacturer of Materials.

(ii) The Contractor shall give the BMTPC, Engineer and its authorized representative access, facilities and safety equipment for carrying out their obligations under this Agreement.

22.9 Examination of work before covering up/ Test Check of item of Work

In respect of the work which the BMTPC, Engineer or his authorized representatives are required to examine, inspect, measure or test before it is covered up or put out of view or any part of the work is placed thereon, the Contractor shall give notice to the BMTPC, Engineer whenever any such work is ready and before it is covered up. The BMTPC, Engineer shall then either carry out the examination, inspection or testing without unreasonable delay within 7 days, or promptly give notice to the Contractor that the BMTPC, Engineer does not require him to do so. Provided, however, that if any work is of a continuous nature where it is not possible or prudent to keep it uncovered or incomplete, the Contractor shall notify the schedule of carrying out such work to give sufficient opportunity, not being less than 3(three) business days' notice, to the BMTPC, Engineer to conduct its inspection, measurement or test while the work is continuing. Provided further that in the event the Contractor receives no response from the BMTPC, Engineer within a period of 3 (three) business days from the date on which the Contractor's notice hereunder is delivered to the BMTPC, Engineer, the Contractor shall be entitled to assume that the BMTPC, Engineer would not undertake the said inspections.

22.10 Rejection

(i) If, as a result of an examination, inspection, measurement or testing, any Plant, Materials, design or workmanship is found to be defective or otherwise not in accordance with the provisions of this Agreement, the BMTPC, Engineer may reject such piece of work, Plant, Materials, design or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the defect and ensure that the rejected item complies with the requirements of this Agreement.

(ii) If the BMTPC, Engineer requires a Piece of work, Plant, Material, design or workmanship to be retested, the tests shall be repeated on the same terms and conditions, as applicable in each case. If the

rejection and retesting cause the department to incur any additional costs, such costs shall be recoverable by the BMTPC, Engineer from the Contractor and may be deducted by the BMTPC, Engineer from any amount due to be paid to the Contractor.

(iii) The Contractor shall not be entitled to any extension of time on account of rectifying any defect or retesting as specified in this clause.

(iv) Examination, inspection, measurement or testing of any Plant, Material, design or workmanship by the BMTPC, Engineer or its failure to convey its observations or to examine, inspect, measure or test shall neither relieve the Contractor of its obligations and liabilities under this Agreement in any manner nor shall the BMTPC, Engineer be liable for the same in any manner.

22.11 Remedial work

(i) Notwithstanding any previous test or certification, the BMTPC, Engineer may instruct the Contractor to:

(a) remove from the site and replace any piece of work, plant or materials which are not in accordance with the provisions of this Agreement.

(b) remove and re-execute any work which is not in accordance with the provisions of this Agreement and the Specification and Standards; and

(c) execute any work which is urgently required for the safety of the Project, whether because of an accident, unforeseeable event or otherwise.

(ii) If the Contractor fails to comply with the instructions issued by the BMTPC, Engineer under aforesaid para, within the time specified in the notice or as mutually agreed, the BMTPC, Engineer may get the work executed by another agency. The cost so incurred by the BMTPC, Engineer for undertaking such work shall, without prejudice to the rights of the BMTPC, Engineer to recover damages in accordance with the provisions of this Agreement, be recoverable from the Contractor and may be deducted by the BMTPC, Engineer from any amount due to be paid to the Contractor.

22.12 Quality Control Records

The Contractor shall hand over authenticated copy of all its quality control records and documents to the BMTPC, Engineer before the Completion Certificate is issued.

22.13 Video recording

During the Construction Period, the Contractor shall provide to the BMTPC, Engineer for every calendar quarter, a video recording which will be compiled into a 15 (fifteen) minutes digital video covering the status and progress of work in that quarter. Video recording should show different activities, stage of work, quality assurance activities etc. including animation, graphs, digital maps, commentary, sub titles, etc. spread over the quarter. The video recording shall be provided to the BMTPC, Engineer no later than 15 (fifteen)

days after the close of each quarter to be reckoned from next full month of date of start of work.

22.14 Suspension of unsafe Construction Works

(i) Upon recommendation of the BMTPC, Engineer to this effect, or on his own volition in cases of emergency or urgency, the BMTPC, Engineer may by notice require the Contractor to suspend forthwith the whole or any part of the Works if, in the reasonable opinion of BMTPC, Engineer, as the case may be, such work threatens the safety of the Users and or other persons on or about the Project. Provided, however, that in case of an emergency, the BMTPC, Engineer may suomoto issue the notice referred to hereinabove.

(ii) The Contractor shall, pursuant to the notice under above para, suspend the Works or any part thereof for such time and in such manner as may be specified by the BMTPC, Engineer and thereupon carry out remedial measures to secure the safety of suspended works, the Users, other persons and vehicles on or about the Project. The Contractor by notice require the BMTPC, Engineer to inspect such remedial measures forthwith and request for revocation of suspension. Upon reviewing the remedial measures, the BMTPC, Engineer shall either revoke such suspension or instruct the Contractor to carry out such other and further remedial measures as may be necessary and reasonable and the procedure set forth in this Clause shall be repeated until the suspension hereunder is revoked.

(iii) Subject to other provisions of the agreement, all reasonable cost incurred for maintaining and protecting the Works or part thereof during the period of suspension (the “Preservation Costs”) shall be borne by the contractor, if in the opinion of BMTPC, Engineer suspension is on account of reasons attributable to the contractor.

(iv) If suspension of Work is for reasons not attributable to the Contractor, the BMTPC, Engineer shall determine any Time Extension, if required, in accordance with the provisions of clause-5.

22.15 Online maintenance of Site records including testing records.

The BMTPC, Engineer may require the contractor to upload all the site records in any online system devised by him. The contractor shall have to ensure that all the required site records, as desired by the BMTPC, Engineer shall be uploaded in this online system. Nothing extra on this account shall be payable to the contractor. In case these records are to be maintained in any online module then contractor shall comply with this.

Clause 23.0 Changes in firm’s Constitution to be intimated - Applicable

Where the contractor is a partnership firm/company/LLP, the prior approval in writing of the BMTPC, Engineer shall be obtained before any change is made in the constitution of the firm/company/LLP. Where the contractor is an individual or a Hindu undivided family business concern, such approval as aforesaid shall likewise be obtained before the contractor enters into any

partnership agreement where under the partnership firm would have the right to carry out the works hereby undertaken by the contractor. If previous approval as aforesaid is not obtained, the contract shall be deemed to have been assigned in contravention of clause 21 hereof and the same action may be taken, and the same consequences shall ensue as provided in the said clause 21.

Clause 24.0 Life Cycle Cost – Not Applicable

Deleted vide OM No. DG/CON/329 dated 03.06.2022

Clause 25.0 Settlement of Disputes by Conciliation and Arbitration – Applicable

Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions hereinbefore mentioned and as to the quality of workmanship or materials used in the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned hereinafter.

25.1 Conciliation: If the contractor considers any work demanded of him to be outside the requirements of the contract, or disputes any drawing, record or decision given in writing by the BMTPC, Engineer; or if the BMTPC, Engineer considers any act or decision of the contractor on any matter in connection with or arising out of the contract or carrying out of the work to be unacceptable and disputed; such party may promptly refer such disputes and amount claimed for each dispute to the Conciliator (Special Director General or the Additional Director General concerned with the work, as applicable) in the proforma prescribed in Appendix XVII mentioned in Schedule F, under intimation to the other party. The Conciliator may then request each party to submit to him a brief written statement describing the disputes and the points at issue. Each party shall send a copy of such statement to the other party. At any stage of the conciliation proceedings, the Conciliator may request a party to submit to him such additional information as he deems appropriate. When it appears to the Conciliator that there exist elements of a settlement which may be acceptable to the parties, he shall formulate the terms of a possible settlement and submit them to the parties for their observations. After receiving the observations of the parties, he may re-formulate the terms of a possible settlement in the light of such observations. If the parties reach agreement on a settlement of the disputes, they may draw up and sign a written settlement agreement on non-judicial stamp paper as per Stamp Act. The Conciliator shall authenticate the settlement agreement and furnish a copy thereof to each party. The termination of conciliation proceedings shall be in accordance with Section 76 of The Arbitration and Conciliation Act, 1996. No party shall be represented before the said Conciliator by an advocate or legal counsel. The conciliation proceedings shall be completed within 45 days from the receipt of reference. This time may be enlarged by 15

days by the Conciliator. The conciliation proceedings shall be deemed to have been terminated at the end of 60 days from the receipt of reference.

25.2 Arbitration: If the aforesaid conciliation proceedings fail or the Conciliator fails to give proposal for settlement within the aforesaid period, either party may promptly give notice in the proforma prescribed in Appendix XVIII, under intimation to the other party, to the Chief Engineer or the Superintending Engineer concerned with the work (as applicable), hereinafter referred to as the Arbitrator Appointing Authority as indicated in Schedule F, for appointment of Arbitrator.

However, a party may seek appointment of Arbitrator without taking recourse to the process of conciliation mentioned in sub-clause 25.1 above.

In the event of either party giving a notice to the Arbitrator Appointing Authority for appointment of Arbitrator, the said Authority shall appoint Arbitrator as per the procedure given below and refer such disputes to arbitration.

(a) Number of Arbitrators: If the contract amount is less than Rs.100 crore, the disputes may be referred for adjudication by a sole Arbitrator. If the contract amount is Rs.100 crore or more, the disputes may be referred to an Arbitral Tribunal of three Arbitrators.

(b) Qualification of Arbitrators: It is a term of this contract that each member of the Arbitral Tribunal shall be Graduate Engineer with experience in execution of public works engineering contracts, and he should have worked earlier at a level not lower than the Chief Engineer (equivalent to level of Joint Secretary to the Government of India).

The aforesaid educational qualification and work experience shall be mandatory for appointment as Arbitrator.

The age of Arbitrator at the time of appointment shall not exceed 75 years. An Arbitrator may be appointed notwithstanding the total number of active arbitration cases with him.

(c) Parties to select Arbitrator: Based on the criteria specified above, a list of empanelled Arbitrators has been prepared in CPWD, and the parties shall have option to select an Arbitrator from the list sent to them.

25.3 Appointment of Sole Arbitrator: The parties may opt for appointment of the Arbitrator of the Ministry of Housing and Urban Affairs. In such cases, the party seeking arbitration has to submit an express agreement in writing as per Appendix XIX towards waiver of Section 12(5) of the Arbitration and Conciliation Act, 1996 along with the notice for appointment of Arbitrator in the proforma prescribed in Appendix XVIII, under intimation to the other party. The Arbitrator Appointing Authority shall, within 30 days of receipt of the said notice, appoint Arbitrator of the Ministry of Housing and Urban Affairs as Arbitrator in the matter, provided the other party also submits waiver of Section 12(5), ibid in Appendix XIX within 7 days of the receipt of the said notice.

Where any one of the parties does not opt for the Arbitrator of the Ministry of Housing and Urban Affairs, or does not submit the waiver agreement, the Arbitrator Appointing Authority shall propose five Arbitrators from the list of CPWD Empanelled Arbitrators to the party seeking arbitration under intimation to the other party within 15 days of receiving the notice. The party seeking arbitration shall give his choice for one of them within 15 days of receiving the list, and the Arbitrator Appointing Authority shall appoint the chosen person as the Sole Arbitrator within 15 days of the receipt of choice.

It is a term of this arbitration agreement that if the parties fail to select, within the period prescribed above, an Arbitrator of their choice from the list of CPWD Empanelled Arbitrators forwarded to them, the Arbitrator Appointing Authority shall himself select and appoint Arbitrator from the said list.

25.4 **Appointment of Arbitral Tribunal of three Arbitrators:** The Arbitrator Appointing Authority shall prepare two separate lists of five Arbitrators each from the list of CPWD Empanelled Arbitrators, and send one to the party seeking arbitration and other to the responding party, within 15 days of the receipt of notice. The parties will then choose any one Arbitrator from the list provided to them within 15 days of receipt of the list. The Arbitrator Appointing Authority shall then appoint those chosen by the respective parties as Arbitrators and also a third Arbitrator from the list of CPWD Empanelled Arbitrators to act as presiding Arbitrator, within 15 days of receipt of choice from both the parties.

It is a term of this arbitration agreement that if the parties fail to select, within the period prescribed above, an Arbitrator of their choice from the list of CPWD Empanelled Arbitrators forwarded to them, the Arbitrator Appointing Authority shall himself select and appoint Arbitrator from the said list.

25.5 **Applicable Law:** The provisions of the Arbitration and Conciliation Act, 1996 (Act 26 of 1996) and any further statutory modification or re-enactment thereof shall be applicable. Further, the fast-track procedure for arbitration contained in Section 29B of the said Act shall apply.

25.6 **Fee payable to Arbitrator(s):** The fee payable to the arbitral tribunal shall be as per CPWD OM No.2/2006/SE(TLC)/CSQ/137 dated 19.11.2019 (or latest amendment), and shall be shared equally by both the parties.

25.7 **Place of Arbitration**: The place of arbitration shall preferably be as mentioned in Schedule F. However, the Arbitral Tribunal may decide the place in consultation with both the parties.

25.8 **Terms of reference:** The Arbitral Tribunal shall adjudicate on only such disputes as are referred to it by the Arbitrator Appointing Authority and give separate award against each dispute referred to him and shall give reasons for the award in all cases where the total amount of the claim by any party exceeds Rs.1,00,000.

25.9 **Interest on Arbitration award**: It is also a term of this arbitration agreement that where the Arbitral award against any dispute is for the payment of money,

no pre-suit and pendent elite interest shall be payable on any part of the Arbitral award.

Clause 26.0 Contractor to indemnify Govt. against Patent Rights – Applicable

The contractor shall fully indemnify and keep indemnified the Executive Director against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract. In the event of any claims made or action brought against Government in respect of any such matters as aforesaid, the contractor shall be immediately notified thereof and the contractor shall be at liberty, at his own expense, to settle any dispute or to conduct any litigation that may arise there from, provided that the contractor shall not be liable to indemnify the Executive Director if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the BMTPC, Engineer in this behalf.

Clause 27.0 Withholding and lien in respect of sum due from Contractor - Applicable

(i) Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the contractor, the BMTPC, Engineer or the Government shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any deposited by the contractor and for the purpose aforesaid, the BMTPC, Engineer or the Government shall be entitled to withhold the security deposit, if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the contractor, the BMTPC, Engineer or the Government shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred to above, from any sum or sums found payable or which may at any time thereafter become payable to the contractor under the same contract or any other contract with the BMTPC, Engineer of the Government or any contracting person through the BMTPC, Engineer pending finalization of adjudication of any such claim.

It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above by the BMTPC, Engineer or Government will be kept withheld or retained as such by the BMTPC, Engineer or Government till the claim arising out of or under the contract is determined by the arbitrator (if the contract is governed by the arbitration clause) by the competent court, as the case may be and that the contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to above and duly notified as such to the contractor. For the purpose of this clause, where the contractor is a partnership firm or a limited company, the BMTPC, Engineer or the Government shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company as the case may be, whether in his individual capacity or otherwise.

Government shall have the right to cause an audit and technical examination of the works and the final bills of the contractor including all supporting vouchers, abstract, etc., to be made after payment of the final bill and if as a result of such audit and technical examination any sum is found to have been overpaid in respect of any work done by the contractor under the contract or any work claimed to have been done by him under the contract and found not to have been executed, the contractor shall be liable to refund the amount of over-payment and it shall be lawful for Government to recover the same from him in the manner prescribed in sub-clause (i) of this clause or in any other manner legally permissible; and if it is found that the contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by Government to the contractor, without any interest thereon whatsoever.

Provided that the Government shall not be entitled to recover any sum overpaid, nor the contractor shall be entitled to payment of any sum paid short where such payment has been agreed upon between the Superintending Engineer or Executive Engineer on the one hand and the contractor on the other under any term of the contract permitting payment for work after assessment by the Superintending Engineer or the BMTPC, Engineer

Clause 28.0 **Lien in respect of claims in other Contracts –** Applicable

Any sum of money due and payable to the contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the BMTPC, Engineer or the Government or any other contracting person or persons through BMTPC, Engineer against any claim of the BMTPC, Engineer or Government or such other person or persons in respect of payment of a sum of money arising out of or under any other contract made by the contractor with the Engineer- in-charge or the Government or with such other person or persons. It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the BMTPC, Engineer or the Government will be kept withheld or retained as such by the BMTPC, Engineer or the Government or till his claim arising out of the same contract or any other contract is either mutually settled or determined by the arbitration clause or by the competent court, as the case may be and that the contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.

Clause 29.0 **Employment of coal mining or controlled area labour not Permissible – Not Applicable**

The contractor shall not employ coal mining or controlled area labour falling under any category whatsoever on or in connection with the work or recruit labour from area within a radius of 32 km (20 miles) of the controlled area. Subject as above the contractor shall employ imported labour only i.e., deposit imported labour or labour imported by contractors from area, from which import is permitted.

Where ceiling price for imported labour has been fixed by State or Regional Labour Committees, not more than that ceiling price shall be paid to the labour by the contractor.

The contractor shall immediately remove any labourer who may be pointed out by the Engineer in-Charge as being a coal mining or controlled area labourer. Failure to do so shall render the contractor liable to pay to Government a sum calculated at the rate of Rs.100/- per day per labourer. The certificate of the BMTPC, Engineer about the number of coal mining or controlled area labourer and the number of days for which they worked shall be final and binding upon all parties to this contract.

It is declared and agreed between the parties that the aforesaid stipulation in this clause is one in which the public are interested within the meaning of the exception in Section 74 of Indian Contract Act, 1872.

Explanation:- Controlled Area means the following areas: Districts of Dhanbad, Hazaribagh, Jamtara - a Sub-Division under Santhal Pargana Commissionery, Districts of Bankuara, Birbhum, Burdwan, District of Bilaspur.

Any other area which may be declared a Controlled Area by or with the approval of the Central Government.

Clause 30.0 **Water for Works –** Applicable

The contractor(s) shall make his/their own arrangements for water required for the work and nothing extra will be paid for the same. This will be subject to the following conditions.

(i) That the water used by the contractor(s) shall be fit for construction purposes to the satisfaction of the BMTPC, Engineer.

(ii) The BMTPC, Engineer shall make alternative arrangements for supply of water at the risk and cost of contractor(s) if the arrangements made by the contractor(s) for procurement of water are in the opinion of the BMTPC, Engineer, unsatisfactory.

Clause 31.0 **Alternate water arrangements –** Applicable

The contractor shall be allowed to construct temporary wells in Government land for taking water for construction purposes only after he has got permission of the Engineer-in- charge in writing. No charges shall be recovered from the contractor on this account, but the contractor shall be required to provide necessary safety arrangements to avoid any accidents or damage to adjacent buildings, roads and service lines. He shall be responsible for any accidents or damage caused due to construction and subsequent maintenance of the wells and shall restore the ground to its original condition after the wells are dismantled on completion of the work.

Clause 32.0 **Employment of Technical Staff and employees –** Applicable

Contractors Superintendence, Supervision, Technical Staff & Employees

(i) The contractor shall provide all necessary superintendence during execution of the work and all along thereafter as may be necessary for proper fulfilling of the obligations under the contract.

As per tendered amount (worked out on the basis of quoted rate of individual items) and before commencement of the work, intimate in writing to the BMTPC, Engineer, the name(s), qualifications, experience, age, address(s) and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. Minimum requirement of such technical representative(s) and their qualifications and experience shall not be lower than specified in Schedule 'F'. Even of the contractor (or partner(s) in case of firm/ company)is himself / herself an Engineers, it is necessary on the part of the contractor to Employ principal technical representative / technical representative(s) as per stipulation in Schedule 'F'.

The BMTPC, Engineer shall within 3 days of receipt of such communication intimate in writing his approval or otherwise of such a representative(s) to the contractor. Any such approval may at any time be withdrawn and in case of such withdrawal, the contractor shall appoint another such representative(s) according to the provisions of this clause. Decision of the tender accepting authority shall be final and binding on the contractor in this respect. Such a principal technical representative and other technical representative(s) shall be appointed by the contractor soon after receipt of the approval from BMTPC, Engineer and shall be available at site before start of work.

All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s). The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all times when any construction activity is in progress and also present himself/themselves, as required, to the BMTPC, Engineer and/or his designated representative to take instructions. Instructions given to the principal technical representative or other technical representative(s) shall be deemed to have the same force as if these have been given to the contractor. The principal technical representative and other technical representative(s) shall be actually available at site fully during all stages of execution of work, during recording/checking/test checking of measurements of works and whenever so required by the BMTPC, Engineer and shall also note down

instructions conveyed by the BMTPC, Engineer or his designated representative(s) in the site order book and shall affix his/their signature in token of noting down the instructions and in token of acceptance of measurements/checked measurements/ test checked measurements. The representative(s) shall not look after any other work. Substitutes, duly approved by BMTPC, Engineer of the work in similar manner as aforesaid shall be provided in event of absence of any of the representative(s) by more than two days.

If the BMTPC, Engineer, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representative(s) is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (non-refundable) shall be effected from the contractor as specified in Schedule 'F' and the decision of the BMTPC, Engineer as recorded in the site order book and measurement recorded checked/test checked in Measurement Books shall be final and binding on the contractor. Further if the contractor fails to appoint suitable technical Principal technical representative and/or other technical representative(s) and if such appointed persons are not effectively present or are absent by more than two days without duly approved substitute or do not discharge their responsibilities satisfactorily, the BMTPC, Engineer shall have full powers to suspend the execution of the work until such date as suitable other technical representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor shall submit a certificate of employment of the technical representative(s) (in the form of copy of Form-16 or CPF deduction issued to the Engineers employed by him) along with every on account bill/ final bill and shall produce evidence if at any time so required by the BMTPC, Engineer.

(ii) The contractor shall provide and employ on the site only such technical assistants as are skilled and experienced in their respective fields and such foremen and supervisory staff as are competent to give proper supervision to the work.

The contractor shall provide and employ skilled, semiskilled and unskilled labour as is necessary for proper and timely execution of the work.

The BMTPC, Engineer shall be at liberty to object to and require the contractor to remove from the works any person who in his opinion misconducts himself, or is incompetent or negligent in the performance of his duties or whose employment is otherwise considered by the BMTPC, Engineer to be undesirable. Such person shall not be employed again at works site without the written permission of the BMTPC, Engineer and the persons so removed shall be replaced as soon as possible by competent substitutes.

(iii) For works with estimated cost more than Rs. 10 Crores and stipulated time period more than 6 months :

The contractor shall ensure that at least one deployed technical representative shall be trained in courses related to CPWD specifications, labour laws, safety rules etc. of duration not less than 5 working days either through National CPWD Academy (NCA) or National Institute of Construction Management and Research (NICMAR) or CIDC or any other similar reputed and recognized Institute managed or certified by State/Central Government. The training cost and other cost related to training shall be borne by the contractor. The contractor shall ensure that at least one technical representative is trained within six months of start of work. The time period of six months can be relaxed by the BMTPC, Engineer depending upon the frequency of training course organized by NCA.

If the contractor fails to ensure that at least one technical representative is trained in the above mentioned course till completion of work or one year from start of work, whichever is earlier, then a non-refundable recovery of Rs. 50,000/- shall be made from the bill of the contractor. Decision of BMTPC, Engineer in this regard shall be final and binding on the contractor.

(iv) Building Information Model (BIM) professional shall be deployed by the contractor for the work wherever BIM is applicable.

The BIM professional shall be available exclusively for this work from stipulated date of start and till actual date of completion of project.

The recovery shall be made from bill of contractor in case of non-deployment of BIM Professional as mentioned in Schedule 'F' of NIT without giving any notice in writing.

The decision of BMTPC, Engineer in this respect shall be final and binding on the contractor.

Clause 33.0 **Levy/Taxes payable by Contractor –** Applicable

(i) GST, Building and other Construction Workers Welfare Cess or any other tax, levy or Cess in respect of input for or output by this contract shall be payable by the contractor and Government shall not entertain any claim whatsoever in this respect except as provided under Clause 34.

(ii) The contractor shall deposit royalty and obtain necessary permit for supply of the red bajri, stone, kankar, stone aggregate, earth, sand etc. from local authorities.

(iii) If pursuant to or under any law, notification or order any royalty, cess or the like becomes payable by the Government of India and does not any time become payable by the

contractor to the State Government, Local authorities in respect of any material used by the contractor in the works, then in such a case, it shall be lawful to the Government of India and it will have the right and be entitled to recover the amount paid in the circumstances as aforesaid from dues of the contractor.

Clause 34.0 **Conditions for reimbursement of levy/taxes if levied after receipt of Tenders –** Applicable

(i) All tendered rates shall be inclusive of any tax, levy or cess applicable on last stipulated date of receipt of tender including extension if any. No adjustment i.e. increase or decrease shall be made for any variation in the rate of GST, Building and Other Construction Workers Welfare Cess or any tax, levy or cess applicable on inputs.

However, effect of variation in rates of GST or Building and Other Construction Workers Welfare Cess or imposition or repeal of any other tax, levy or cess applicable on output of the works contract shall be adjusted on either side, increase or decrease.

Clause 35.0 **Termination of Contract on death of Contractor –** Applicable

Without prejudice to any of the rights or remedies under this contract, if the contractor dies, the BMTPC, Engineer on behalf of the Executive Director shall have the option of terminating the contract without compensation to the contractor.

Clause 36.0 **If relative working in BMTPC then the Contractor not allowed to participate in the tendering process –** Applicable

The contractor (enlisted or non-enlisted in BMTPC) shall not be allowed to participate in the tender for work(s) in the BMTPC responsible for award and/or execution of contract(s) in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of the Chief Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working or are subsequently employed by him and who are near relatives to any Officer working in the BMTPC. Any breach of this condition by the contractor would render him liable to be debarred for a period upto two years from tendering in BMTPC as decided by the accepting authority mentioned in Schedule F and his decision will be excepted from clause 25.

NOTE: By the term "near relatives" is meant wife, husband, parents and grandparents, children and grandchildren, brothers and sisters, uncles, aunts and cousins and their corresponding in-laws.

Clause 37.0 **No Gazetted Engineer to work as Contractor within one year of retirement -** Applicable

No engineer of gazetted rank or other gazetted officer employed in

engineering or administrative duties in an engineering department of the Government of India shall work as a contractor or employee of a contractor for a period of one year after his retirement from government service without the previous permission of Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of Government of India as aforesaid, before submission of the tender or engagement in the contractor's service, as the case may be.

Clause 38.0 Theoretical consumption of Material – Not Applicable

(i) After completion of the work and also at any intermediate stage in the event of Non reconciliation of materials issued theoretical quantity of materials used in the work shall be calculated on the basis and method given hereunder:

(a) Quantity of cement & bitumen shall be calculated on the basis of quantity of cement & bitumen required for different items of work as shown in the Schedule of Rates mentioned in Schedule 'F'. In case any item is executed for which standard constants for the consumption of cement or bitumen are not available in the above mentioned schedule/statement or cannot be derived from the same shall be calculated on the basis of standard formula to be laid down by the BMTPC, Engineer.

(b) Theoretical quantity of steel reinforcement or structural steel sections shall be taken as the quantity required as per design or as authorized by Engineer-in- Charge, including authorized lappages, chairs etc. plus 3% wastage due to cutting into pieces, such theoretical quantity being determined and compared with the actual, each diameter wise, section wise and category wise separately.

(c) Theoretical quantity of G.I. & C.I. or other pipes, conduits, wires and cables, pig lead and G.I./M.S. sheets shall be taken as quantity actually required and measured plus 5% for wastage due to cutting into pieces (except in the case of G.I./M.S. sheets it shall be 10%), such determination & comparison being made diameter wise & category wise.

(d) For any other material as per actual requirements.

Over the theoretical quantities of materials so computed a variation shall be allowed as specified in Schedule 'F' For nonscheduled items, the decision of the Superintending Engineer regarding theoretical quantities of materials which should have been actually used, shall be final and binding on the contractor.

(ii) The said action under this clause is without prejudice to the right of the Government to take action against the contractor under any other conditions of contract for not doing the work according to the prescribed specifications.

Clause 39.0 **Compensation during war like situations –** Applicable

The work (whether fully constructed or not) and all materials, machines, tools and plants, scaffolding, temporary buildings and other things connected therewith shall be at the risk of the contractor until the work has been delivered to the BMTPC, Engineer and a certificate from him to that effect obtained. In the event of the work or any materials properly brought to the site for incorporation in the work being damaged or destroyed in consequence of hostilities or warlike operation, the contractor shall when ordered (in writing) by the BMTPC, Engineer to remove any debris from the site, collect and properly stack or remove in store all serviceable materials salvaged from the damaged work and shall be paid at the contract rates in accordance with the provision of this agreement for the work of clearing the site of debris, stacking or removal of serviceable material and for reconstruction of all works ordered by the Engineer- in-Charge, such payments being in addition to compensation upto the value of the work originally executed before being damaged or destroyed and not paid for. In case of works damaged or destroyed but not already measured and paid for, the compensation shall be assessed by the Divisional Officer upto Rs.2,00,000/- and by the next higher officer concerned for a higher amount. The contractor shall be paid for the damages/destruction suffered and for restoring the material at the rate based on analysis of rates tendered for in accordance with the provision of the contract. The certificate of the BMTPC, Engineer regarding the quality and quantity of materials and the purpose for which they were collected shall be final and binding on all parties to this contract.

Provided always that no compensation shall be payable for any loss in consequence of hostilities or warlike operations (a) unless the contractor had taken all such precautions against air raid as are deemed necessary by the A.R.P. (Air Raid Precaution) Officers or the BMTPC, Engineer (b) for any material etc. not on the site of the work or for any tools, plant, machinery, scaffolding, temporary building and other things not intended for the work. In the event of the contractor having to carry out reconstruction as aforesaid, he shall be allowed such extension of time for its completion as is considered reasonable by the Divisional Officer.

Clause 40.0 **Apprentices Act provisions to be complied with –** Applicable

The contractor shall comply with the provisions of the Apprentices Act, 1961 and the rules and orders issued there under from time to time. If he fails to do so, his failure will be a breach of the contract and the Superintending Engineer may, in his discretion, cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions of the said Act.

Clause 41.0 **Release of Security deposit after labour clearance –** Applicable

The Security Deposit of the work shall be refunded if no labour complaint has been received from the labour officer till the due date of its payment. lf a labour complaint is received during this period, the

BMTPC, Engineer shall, after issue of notice in this regard to the contractor, deduct the amount required to settle the complaint from his security deposit and refund the balance amount.

In case, if part completion certificate of work is recorded then security deposit shall be released only after recording final completion certificate of the work and after completion of defect liability period whichever is later or specified otherwise in the contract.

Note:

i. In General Condition of Contract (GCC) (EPC)-2024 with amendments, wherever, appears it will be meant as Executive Director, BMTPC.
ii. In place of Government / Technical examiner it will be BMTPC in this case.
iii. "Applicable" or "Not Applicable" mentioned means that relevant clause/s will be followed or will not be followed respectively as per clauses of General Condition of Contract (GCC) (EPC)-2024 of CPWD with up to date amendments.
iv. In case of any discrepancies between Hindi and English version, English version shall prevail.

2. SPECIAL CONDITIONS FOR USE OF EMERGING TECHNOLOGIES AND WORKS

1. The bidder shall use one of the Emerging technology out of 54 technologies recommended by MoHUA under GHTC -I as listed at **Annexure –I** of this bid document.

2. In case, one proposed unique technology is not suitable for the site as per structural and local geo-climatic requirement, the bidder/s may use hybrid construction system other than conventional system (In situ RCC framed structure) subject to proof of its structural integrity, fire safety, thermal performance and fulfillment of other functional requirements of the buildings. The bidder/s required to submit a detailed note on specifications and code of practice and how the particular technology can be effectively used in proposed DHP.

3. It will be the responsibility of the bidder to establish that the proposed technology is worth adopting for this work and shall provide value addition in respect of quality and time.

4. The bidder shall provide detailed specifications and execution methodology to be adopted for the execution of the work. The bidder shall support the proposal along with the details where this technology has been successfully used in the prescribed proforma given in this bid. The bidder shall make their own sufficient arrangements for visit to the site at own expense.

5. The bidder shall be responsible for the performance of the technology used and buildings constructed by using this. If bidder fails to complete the work with the proposed technology then bidder shall be liable to complete the work by using other technology/s as suggested by Competent Authority. The cost incurred in doing so shall be borne by the bidder completely.

6. The bidder shall engage professionals with experience of proposed technology as per list mentioned in Annexure-XII.

7. All necessary measures like thermal comfort, fire-fighting provisions, natural light and ventilation, etc. shall be taken by the bidder to provide as per NBC 2016 and as defined in Scope of work earlier in the bid document.

8. The necessary suggestions if any, given by the Competent Authority for carrying out the construction work with emerging technology shall be incorporated by the bidder for which nothing extra shall be payable.

9. The bidder shall submit the list of laboratories equipment for test and locations of the same along with the proposal of technology. The decision of Competent Authority shall be final in this matter.

10. The bidder shall provide the list and numbers of T&P/ equipment etc. likely to be used for completing the work. The bidder shall engage the same

during the execution.

11.0 Project Management

11.1 The Selected Agency shall prepare the phase wise (monthly) resource chart (materials, manpower and machinery) based on the project execution schedule as mentioned in contract conditions.

11.2 The Selected Agency shall submit the photographs & videos of progress of work on fortnightly basis to make it possible to create a short film of the entire execution of the work to be kept in archive.

11.3 Selected Agency shall submit a detailed monthly progress & program report to the Competent Authority.

11.4 The Selected agency shall stick to the construction schedule, if there is any hindrance or delay due to any reason the same shall be mitigated through engaging extra manpower, material and machinery.

12.0 Contract Coordination Procedures, Coordination Meetings and Progress Reporting

The selected agency shall prepare and finalize in consultation with BMTPC, a detailed contract coordination procedure within 15 days from the date of issue of Letter of Award for the purpose of execution of the contract. The selected agency shall have to attend all the meetings at his own cost with BMTPC or consultants of BMTPC during the period of the contract, as and when required and fully cooperate with such personal and agencies involved during these discussions.

a) The project would be evaluated and documented by reputed technical Institution such as IIT/NIT/ Government engineering college. The cost of such evaluation will be borne by BMTPC.

b) The selected agency will facilitate any visits by such Technical Institutes and provide necessary data

13.0 Organization of Sensitization / Capacity Building Programme/s

BMTPC will organize need based sensitization / capacity building programme/s at project site/ other place on new / alternate technologies for the benefit of working professionals and local construction workforce in the region. The cost of such programme/s will be borne by BMTPC. The selected agency will fully cooperate in successful organization of such programme/s.

14.0 Defect liability:

The defects liability period for all structural / non-structural defects to ensure structural integrity of the building will be of 5 years and for balance items as listed below will be of 2.5 years from the date of completion of the project. Further, the maintenance period shall be 5 years from the final date of completion of the project. The list of defect liability as follows:

Sr. No.	Description	Defect Liability
i.	Proposed structural system alongwith Walls and roof of building using proposed technology	Rectification of all structural/non-structural defects to ensure structural integrity of the building.
ii.	Concrete	a) Rectification of structural / superficial / non-structural cracks. b) Rectification of dampness / seepage in roof slab / junctions & sunken portion. c) Rectification of cracks in beam, shade, column.
iii.	Walls as per proposed technology / Brick work	a) Rectification of cracks in panel wall / portion. b) Cracks / settlement of dwarf walls. c) Rectification of efflorescence.
iv.	Joinery	a) Replacement of warped joinery. b) Cracks in panels, rails / styles etc.
v.	Building Hardware	a) Repairs / Replacement of loosened / pre-mature failure of fittings. b) Tightening / Replacement of sag in mosquito proof net.
vi.	Steel & Iron work	a) Rectification / Replacement of defective part of pressed steel door frames, rolling shutter. b) Redoing of defective portion in fabrication / welding including painting. c) Grills, gates etc. – defects to be rectified.
vii.	UPVC windows	Rectification / Replacement of defective parts
viii.	Roof treatment	Rectification of leakage / seepage of roof slab including covering at junction till guarantee period.
ix.	Plastering	a) Rectification of structural / superficial cracks if any. b) Rectification of protruding / peeling off plaster if any. c) c) Rectification of efflorescence
x.	Flooring	a) Rectification of sinking portion of plinth protection including saucer drain. b) Settlement of foundation & floors.
xi.	Plumbing /Sanitary fittings	a) Making good of leakage through soil / waste pipe joints. b) Replacement of looking mirror if found wavy. c) Rectification of leakage of over head tanks. d) Leakage / seepage of sunken floor, blockage of taps / pipes, non-functioning of cistern.
xii.	Finishing	Making good of defective / dissimilar patches of painting to match with remaining surfaces.
xiii.	Internal Supply	a) Repairs / Replacement of defective taps /

		fittings. b) Repair to leakage of CPVC water pipe lines including joints. c) Removal of blockage of PVC pipe lines.
xiv.	Roads	Repair of sinking portion of road & potholes, if any
xv.	Sewage	a) Rectification of slope / system if found defective during use. b) Rectification of major blockage in Sewer lines. c) Cracks & settlement of sewage lines.
xvi.	Drains	a) Repair to Drains. b) Settlement of Drains
xvii.	External Supply	Repairs to installations & fittings.
xviii.	Horticulture works	To maintain the plants and grass in good condition
xix.	General	All manufacturing defects of structures / fixtures / fittings / equipment other than listed above.
xx	Pumps	Maintenance and repair of pumps
xxi	Firefighting equipments and accessories	Maintenance of firefighting and accessories as per the fire safety norms

15.0 Conditions for environment protection

15.1 The selected agency shall not store/dump construction material or debris on the metalled road.

15.2 The selected agency shall get prior approval from Competent Authority 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 selected agency that no accidents occur because such permissible storage.

15.3 The selected agency shall ensure that all the trucks or vehicles of any kind which are used for construction purposes/or are carrying construction material like material like cement, sand and other allied material are fully covered. The selected agency shall take every necessary precaution 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.

15.4 The selected agency 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.

15.5 The selected agency shall comply all the preventive and protective environmental steps as stated in the MoEF guidelines 2010 and / or any other guidelines issued later on.

15.6 The selected agency shall carry out on- road-inspection for

black smoke generating machinery. The selected agency shall use cleaner fuel.

15.7 The selected agency shall use vehicles having pollution under control certificate. The emissions can be reduced by a large extent by reducing the speed of a vehicle to 20Kmph. Speed bumps shall be used to ensure speed reduction. In case where speed reduction cannot effectively reduce fugitive dust, the selected agency shall divert traffic to nearby paved areas.

15.8 The selected agency shall ensure that the construction material is covered by tarpaulin. The selected agency shall take all other precaution to ensure that no dust particles are permitted to pollute air quality because of such storage.

15.9 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.

15.10 It is mandatory to use of wet jet in grinding and stone cutting.

15.11 The selected Agency 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.

15.12 Any violation of orders of MoEF including guidelines of State Government, SPCB or any officer of any department shall lead to stoppage of work for which selected Agency shall be responsible and no hindrance shall be accounted in this regard.

3. GENERAL CONDITIONS FOR PLANNING & DESIGNING

1.0 Scope of Work

1.1 The layout plan & architectural drawings of the proposed work is attached at Part -8. The same may slightly deviate as per technology requirement (due to change in thickness of external and internal walls) with the approval of BMTPC. However, the minimum carpet area of dwelling units and other provisions including kitchen/pantry, toilet, balcony/ verandah, circulation and community centre areas such as steps, entrance plateform, ramp, staircase, lobby and corridor/passage need to be maintained as per enclosed drawings in the tender. The Built Up area may vary. The work is on design and build basis from design to completion and handing over in fit conditions

1.2 The site for work has been allotted by Municipal Council, Ratanpur. The land is free from encroachment and all encumbrances and there is no hindrance to execute the work. The agency shall fix a permanent bench mark at the site of work. All necessary approvals will be provided by local Administration on request of selected agency.

1.3 Scope of the work shall include but not limited to the following:

1.3.1 To carry out survey of the site handed over for execution of the project and shall verify the site dimensions as per the layout plan provided with bid document

1.3.2 The selected agency shall have to prepare the architectural drawings as per the proposed technology for building and related infrastructure facilities as per prevailing local building bye-laws and development control norms in the area of the State. The selected agency shall prepare all drawings and get all statutory approvals from concerned authorities.

1.4 The soil Investigation report received from Municipal Council, Ratanpur is placed at Part-6. However, soil investigation report should be further verified by the bidder at site.

1.5 To prepare complete structural design drawings for foundations, superstructure, services, taking into consideration the protection against seismic/ wind forces required for disaster resistant structures. The structural design shall be vetted by Technical / Research Institutions of repute such as IITs, NITs, Govt. Engineering Colleges, CSIR Labs, Govt. Research Institutions and submitted to the Competent Authority. The structural drawings shall got approved from Competent Authority After approval of the structural drawings by Competent Authority, if any modification in design/drawing is needed, as per site conditions, the agency shall do/re-do without any extra cost. The decision of the Competent Authority shall be final and binding. No claim whatsoever shall be entertained on this account.

1.6 Planning, designing and execution of all internal services like internal sanitary, water supply, drainage system, Electrical work, firefighting works etc. complete for the buildings planned including all its fittings, fixtures, testing etc.

1.7 Planning and Designing of onsite infrastructure works such as Roads & pavements, Boundary wall & Gate, Sewerage, External water supply, Drainage, Underground water tank, Septic Tank, Rain water Harvesting, External Electrification, Solar street lights, Fire-fighting works, Landscaping, Borewell, etc.as per attached drawings including making connections with the peripheral services after getting the services design approved from the local bodies.

1.8 The structural design shall be carried out in terms of latest editions and up-to-date correction/amendment/errata of BIS Codes (Bureau of Indian Standards), other relevant seismic/other codes for making building hazard resistant for hazard such as earthquake, cyclone, flood, landslide or any other natural calamity, sound engineering practices. The selected agency will get proof checking of structural drawings with IITs or NITs or reputed govt. Engineering Colleges for proof checking of structural drawings/proposals prepared by the structural Engineer/firms. The consultant will liaison and co-ordinate with such Institute as and when required and as per the direction of Competent Authority.

1.9 Complete leveling/dressing including filling of earth, its supply, disposal of surplus earth is to be completed as directed by the Competent Authority.

1.10 Planning, designing and construction of boundary walls, MS gates, sign boards, Numbering of rooms etc. all complete as per the drawing approved and direction of Competent Authority.

1.11 Setting up a testing laboratory at site equipped with the apparatus needed for day to day testing of construction materials during construction period as directed by the Competent Authority.

1.12 Taking all precautionary measures to safeguard safety measures against any accidents for the agency's employees, labour, public and staff by providing all necessary safety equipment, helmets etc. at work site.

1.13 The scope as described above is only indicative and not exhaustive. In additions to the above, the agency shall be responsible for executing all the items required for completing the project in all respect to make the dwelling units habitable and ready for occupation with electrical, horticultural works complete as per direction of Competent Authority.

1.14 The design and construction shall consider the requirements of Rating 3 of GRIHA Affordable Housing Standards.

2.0 Planning and Designing in purview of Vulnerability Atlas of India

Vulnerability Atlas of India (VAI) is a comprehensive document which provides existing hazard scenario for the entire country and presents the digitized State/UT –wise hazard, maps with respect to earthquakes, winds and floods for district-wise identification of vulnerable areas. It also includes additional digitized maps for thunderstorms, cyclones and landslides. The main purpose of this Atlas is its use for disaster preparedness and mitigation at policy planning and project formulation stage.

This Atlas is one of its kind single point source for the various stakeholders including

policy makers, administrators, municipal commissioners, urban managers, engineers, architects, planners, public etc. to ascertain proneness of any city/location/site to multi-hazard which includes earthquakes, winds, floods thunderstorms, cyclones and landslides. While project formulation, approvals and implementation of various urban housing, buildings and infrastructures schemes, this Atlas provides necessary information for risk analysis and hazard assessment.

The Vulnerability Atlas of India has been prepared by Building Materials and Technology Promotion Council under Ministry of Housing and Urban Affairs, Government of India and available at their website www.bmtpc.org.

It is mandatory for the bidders to refer Vulnerability Atlas of India for multi-hazard risk assessment and include the relevant hazard proneness specific to project location while planning and designing the project in terms of:

i) Seismic zone (II to V) for earthquakes,
ii) Wind velocity (Basic Wind Velocity: 55, 50, 47, 44, 39 & 33 m/s)
iii) Area liable to floods and Probable max. surge height
iv) Thunderstorms history
v) Number of cyclonic storms/ severe cyclonic storms and max sustained wind specific to coastal region
vi) Landslides incidences with Annual rainfall normal
vii) District wise Probable Max. Precipitation

3.0 Improving Thermal Performance & Energy Efficiency in Residential Buildings

In pursuit of advancing the thermal performance and comfort standards in the building sector, it is imperative to adopt principles which are important from energy efficiency standpoint and ensures optimal thermal comfort for occupants. The **high-performance building envelope** is one significant step in this direction. Therefore, the key document which serve as benchmarks for sustainability, thermal comfort and energy efficiency in building design, and help achieve sustainability of living environment for the occupants, need to be integrated at planning and design stage of construction of residential projects, which is

"Eco-Niwas Samhita (ENS)-2018: Energy Conservation Building Code for Residential Buildings, Part-1, issued by Bureau of Energy Efficiency, Ministry of Power"

Eco-Niwas Samhita (ENS), introduced in 2018 for residential buildings, aims to foster energy efficiency in design and construction. This building code, designed to improve energy efficiency in the residential sector, helps addresses India's growing energy demands and environmental concerns. More importantly, it supports India's commitments to reducing carbon emissions and promoting sustainable development, thus impacting the nation's ecological footprint and energy security.

Specific applicable Item-wise design data and specifications for Thermal Performance:

S. No.	Item of Work	Specification
1.	**External Envelope (Except Roof)**	i. For Building Envelope (except roof), the maximum Residential Envelope Transmittance Value (RETV) shall be 15 W/m2 as per Section 3.4 of ENS 2018, as applicable for four climate zones: Composite Climate, Hot-Dry Climate, Warm-Humid Climate, and Temperate Climate. RETV takes into account; i) Heat conduction through opaque building envelope components (wall, opaque panels in doors, windows, ventilators, etc.), ii) Heat conduction through non-opaque building envelope components (transparent/translucent panels of windows, doors, ventilators, etc.), & iii) Solar radiation through non-opaque building envelope components (transparent/translucent panels of windows, doors, ventilators, etc.). ii. For Cold Climates, the thermal transmittance of the building envelope (except the roof) shall comply with the maximum of 1.8 W/m2K as per the Section 3.5 of ENS 2018.
2.	**Windows and Ventilators**	i. In the design of Windows and Ventilators, the recommendations from **Section 3.1, *Openable Window-to-Floor Area Ratio* (WFR_{op}) of the ENS 2018, shall be followed**. ii. For non-opaque building envelope components (transparent/translucent panels in windows, doors, ventilators, etc.), the minimum Visible light transmittance (VLT) requirement values for different Window to Wall Ratios (WWR) shall comply with **Table 2 of the ENS 2018.** Along with the above: a) For WWR ≤ 0.15, the minimum VLT should be 40%; & b) The WWR in residential buildings may not exceed 0.40.
3.	**Roof Slab**	i. The Thermal transmittance of the roof shall comply with the **maximum U_{roof} value of 1.2 W/m^2K as per Section 3.3** of ENS 2018.
4.	**As Applicable (Other Thermal Comfort Requirements)**	ii. Provisions of Ceiling fan in each room is mandatory iii. Each openable window must have at least 600 mm horizontal overhangs

The Agency is required to submit the following details including vetted design report for required Thermal Performance;

- Bidders to provide details on how the proposed construction materials contribute to the specified thermal performance and occupant comfort.

- The awarded agency needs to submit a vetted design report from any specialised institutions (SPAs, CEPT, IITs, NITs, CSIR Research Laboratories or any reputed Govt. or Private Institution) regarding compliance of the specified thermal performance measures. The client may undertake third-party verification of thermal performance post-construction to ensure that the buildings meet the promised energy efficiency and thermal comfort levels.

Note:

List of preferred materials may be updated to include products that are recognized for their energy efficiency and contribution to thermal comfort, such as low-emissivity (Low-E) glass for windows, thermally efficient roofing materials, and insulation products that meet or exceed the requirements of ENS. The suitable options may be explored by the Agencies through various sources. https://ciigreenpro.com/ gives some information on the same.

4. GENERAL & SPECIAL CONDITIONS AND SPECIFICATIONS OF CIVIL, ELECTRICAL AND INFRASTRUCTURE WORKS

General

Site office -The Selected agency shall be provided functional site office at their own expenses for BMTPC site staff with following facilities:

i. For Quality Control Measures, Checking of Bills and Monitoring the Quality:

   a) A Computer having Intel core i5, latest processor, MS-Windows-10 & internet connection.
   b) LaserJet Printer of A-4 size with Scanners, photocopier & UPS etc.

ii. The Agency shall construct/provide one site office of suitable size (semi-permanent structure) with toilet for BMTPC Site Engineer. The site office shall not create any obstruction in the work and plan of same shall be got approved from BMTPC.

iii. The Agency shall provide light fixtures, wiring & fan/ AC etc. within 15 days of award of work. All running & maintenance charges (i/c AMC of all equipment's etc.) including electricity bills, water supply bills, Internet bill & stationary charges etc. shall be borne by the agency. Nothing extra charge shall be payable on this account.

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

   a) Office Tables 1 Nos.
   b) Office Chair with arms 1 No.
   c) Visitor chairs 2 Nos.
   d) Steel Almirah – 1 No.

1.0 Conditions for Civil Works

1.1 The work in general shall be carried out in accordance with the schedule of finishes and specifications attached at Part-3 with document and CPWD Specifications (corrected up to the last date of submission/uploading of bid) hereinafter referred as CPWD Specifications.

1.2 Selected Agency(s) shall provide permanent bench marks, flag tops and other reference points for the proper execution of work and these shall be preserved till the end of the work. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings. On completion of work, the Selected Agency(s) shall submit two prints of "as built" drawings to the Competent Authority.

1.3 The selected agency(s) should engage approved, licensed Electrician / plumbers for the work and get the materials (fixtures/fittings) tested, by the local electricity deptt./municipal Body/Corporation authorities wherever required at his own cost. The selected agency(s) shall submit for the approval of the Competent Authority, the name of the electric/plumbing agency proposed to be engaged by him.

1.4 The selected agency shall give performance test of the entire installation(s) as per the specifications in the presence of the Competent Authority or his authorized representative before the work is finally accepted and nothing extra what-so-ever shall be payable to the selected agency for the test.

1.5 The work shall be carried out in accordance with the Architectural drawings and structural drawings as approved by the Competent Authority.

1.6 Before commencement of any item of work the selected agency shall correlate all the relevant architectural and structural drawings, and specifications etc. and satisfy himself that the information available is complete and unambiguous. The selected agency alone shall be responsible for any loss or damage occurring by the commencement of work based on any erroneous and or incomplete information and no claim whatsoever shall be entertained on this account.

1.7 The work of dwelling units with other provisions including its services and on site infrastructure works may be executed simultaneously.

1.8 If the work is carried out in more than one shift or during night, no claim on this account shall be entertained. The selected agency must take permission from the police authorities etc. if required for work during night hours, no claim/hindrance on this account shall be considered if work is not allowed during night time.

1.9 The selected agency shall be responsible for the watch and ward/guard of the buildings safety, fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the department. No extra payment shall be made on this account.

1.10 Sample of building materials, fittings and other articles required for execution of work shall be got approved from the Competent Authority before use in the work. The quality of samples brought by the selected agency shall be judged by standards laid down in the relevant CPWD/BIS specifications. All materials and articles brought by the selected agency to the site for use shall conform to the samples approved by the Competent Authority which shall be preserved till the completion of the work.

1.11 ISI marked materials except otherwise specified shall be subjected to quality test at the discretion of the Competent Authority besides testing of other materials as per the specifications described for the item/material. Wherever ISI marked materials are brought to the site of work, the selected agency shall, if required, by the Competent Authority, furnish manufacturer's test certificate or test certificate from approved testing laboratory to establish that the material/procured by the selected agency for incorporation in the work satisfies the provisions of specifications/BIS codes relevant to the material and/or the work done.

1.12 The selected agency shall procure the required materials in advance so

that there is sufficient time to testing of the materials and clearance of the same before use in the work. The selected agency shall provide at his own cost suitable weighing and measuring arrangements at site for checking the weight/dimensions as may be necessary for execution of work.

1.13 Regarding testing of civil & electrical materials, the testing of materials shall be conducted in Govt. Laboratory/Govt. colleges/IITs/NITs or from the laboratory approved by Competent Authority. The charges of testing of materials in approved laboratory shall be borne by the selected agency.

1.14 Selected Agency shall submit minimum Quality Control/ Quality Assurance plan within45days after award of work which shall be consisting of:

1.14.1 Required tests and frequency of components/ products of proposed technology shall be as per national/ international standards as applicable for proposed technology.

1.14.2 Lot-size, number of required tests and frequency of testing. While deciding these criteria CPWD specifications & provisions of BIS Code and standard practices may be referred. Volume of work, practical difficulties and site conditions etc. may also be kept in view. The lot size, number of tests and frequencies of testing can be altered or modified by the Competent Authority from the prescribed limits.

1.14.3 It should clearly indicate the machinery and other Tool & plants required to be deployed at site by the selected agency. Entire machinery and T&P may not be required at the start of work, therefore, a proper time schedule by which each machinery and T&P is to be brought at site should also be indicated.

1.14.4 Receipt of Material, testing of the same &maintenance of Register of Tests.

1.14.5 All the registers of tests carried out at construction site or in outside laboratories shall be maintained by the selected agency, which may be inspected by Competent Authority or his/her designee at any point of time.

1.14.6 The selected agency shall allow access to Third Party Quality Assurance Agency (TPQAA) engaged by Competent Authority to have a control on quality and methodology of execution. In case of sample collection for testing, all arrangements for transporting and getting them tested shall be made by the selected agency.

1.14.7 All the test in field lab setup at construction site shall be carried out by the Quality control team to be engaged by the selected agency which can be witnessed by Competent Authority or his/her designee. A daily report of Tests to be conducted on a day shall be submitted to Competent Authority or his/her designee.

1.14.8 All the entries in the registers will be made by the designated Engineering Staff of the selected agency.

1.14.9 Selected Agency shall be responsible for safe custody of all the test registers.

1.14.10 Submission of copy of all test registers, material at site register and hindrance register along with each alternate running account bill and final bill shall be mandatory.

1.14.11 Selected agency will submit manufacturer test certificate for each and every lot materials brought to the site including walling and roofing system of the proposed technology.

1.15 Method Statement

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

1.16 Check-list for Execution of work

1.16.1 As and when any important item is taken up for execution, the selected agency shall submit the specifications and develop a checklist and other relevant details. This sample checklist should be got approved from the Competent Authority and should be used at site. This check list should be shown to the Competent Authority or his/her designee during inspection. This procedure is not restricted to the proposed technology and its components but also to be followed for all hidden items, CC/RCC work, Steel-reinforcement, shuttering, cast-in-situ mosaic flooring, doors & windows, plumbing, including water supply pipe lines, roof treatment, earth filling etc.

1.16.2 The selected agency shall be responsible for all documenting the total sequence of this project by way of photography, slides, audio-video recording etc. nothing extra shall be payable to the selected agency on this account.

1.16.3 General

The selected agency shall acquaint himself with the proposed site of work, its approach roads, working space available before quoting his rates.

i. No Entry/exit/roads other than specified by the Competent Authority for purpose of construction activities will be allowed to be used for construction activity purposes or movement of trucks/lorries/load-carriers and nothing extra/delay whatsoever will be accounted for on this part.

ii. 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 selected agency shall be fully responsible for any damage to the govt. property and work for which the payment has been advanced to him under the contract and he shall make good the same at his risk and cost. The selected agency shall be fully responsible for safety and security of his material, T&P, machinery brought to the site by him.

iii. The selected agency shall ensure that no construction leach ate (e.g. cement slurry etc.), is allowed to percolate into the ground. Adequate precautions are to be taken to safeguard against this including, reduction of wasteful curing processes, collection, basic filtering and reuse. The selected agency 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).

iv. The selected agency shall comply with the safety procedures, norms and guidelines (as applicable) as outlined in the document Part 7Constructional Practices and Safety- 2016, National Building code of India and Bureau of Indian Standards. A copy of all pertinent regulations and notices concerning accidents, injury and first-aid shall be prominently exhibited at the work site. Depending upon the scope & nature of work, a person qualified in first-aid shall be available at work site to render and direct first-aid to causalities. A telephone may be provided to first-aid assistant with telephone numbers of the hospitals displayed. Complete reports of all accidents and action taken thereon shall be forwarded to the competent authorities.

1.16.4 The selected agency shall ensure the following activities for construction workers safety, among other measures:

i. Guarding all parts of dangerous machinery.
ii. Precautionary signs for working on machinery.
iii. Ensuring that walking surfaces or boards at height are of sound construction and are provided with safety rails or belts.
iv. Provide protective equipment; helmets etc.
v. Provide measures to prevent fires. Fire extinguishers and buckets of sand to be provided in the fire-prone area and elsewhere.
vi. Provide sufficient and suitable light for working during night time.

1.16.5 The selected agency shall provide for adequate number of garbage bins around the construction site and the workers facilities and will be responsible for the proper utilization of these bins for any solid waste generated during the construction. The selected agency shall ensure that the site and the workers facilities are kept litter free. Separate bins should be provided for plastic, glass, metal,

biological and paper waste and labeled in both Hindi and English with suitable symbols.

1.17 Miscellaneous

1.17.1 A sample unit with proposed technology shall be made ready in the proposed building. The sample unit should be finished in all respect with doors and windows including fittings, painting of hardware, flooring, painting, electrical services, etc. Nothing extra shall be payable for the sample unit.

1.17.2 Selected Agency shall arrange water for construction from its own sources within the ambit of laws and guidelines issued by the competent authority in this regard. Effort should also be made by selected agency for using recycled water for construction.

2.0 Specifications for Civil Works

2.1 The broad specifications of emerging technologies to be used for construction of project are attached in the bid document at Part-7 and need to be followed. As regards procurement and use of cement, steel reinforcement, design mix concrete from batching plant/RMC Plant, etc. and any other required material shall be as per applicable CPWD specifications, relevant Indian Standards and this Bid.

2.2. Waterproofing

2.2.1 The work shall be got executed through the specialized agency as approved by the Competent Authority.

2.2.2 Selected Agency shall also submit the names of water proofing specialist along with information about their technical capabilities and list of similar works executed by the specialized agency in the past for the approval of Competent Authority within 30 days from the date of award of work who have executed satisfactorily a minimum of three works of value not less than 40% of total work of water proofing to be executed each or two works of value not less than 60% of total work of water proofing to be executed each or one work of value not less than 80% of total work of water proofing to be executed in the last seven years.

2.2.3 Total quantity of the water proofing compound required shall be arranged only after obtaining the prior approval of the make by Competent Authority 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.

2.2.4 The finished surface after water proofing treatment shall have adequate smooth slope as per the direction of the Competent Authority.

2.2.5 Before commencement of treatment on any surface, it shall be

ensured that the outlet drain pipes / spouts have been fixed and the spout openings have been eased and rounded off properly for easy flow of water.

2.2.6 The approved specialized agency for the work of water proofing will have to execute a guarantee bond in prescribed Proforma enclosed at Appendix-III for removing any defects for at least 5years.Guarantee bond shall be signed by both the specialized agencies as approved by the Competent Authority and the agency to meet there liability under the guarantee bond. However, the sole responsibility about the efficiency of water proofing treatment shall rest with the agency.

2.2.7 If the performance of the work done is found un satisfactory and any defects noticed during the guarantee period, they shall be rectified by the agency within seven days of receipt of intimation of defects in the work. If the defects pointed out are not attended to within the specified period, the same will be got done from another agency at the risk and cost of the agency.

3.0 General Scope &Specifications of E&M works

3.1 Scope of work

3.1.1 Scope of work covers planning, designing, supply, installation, testing and commissioning of all E&M services such as IEI, Firefighting systems pumps etc. required to be provided in the said project as per norms of various IS codes/NBC 2016/CPWD specifications/ECBC/CEA, various byelaws and norms of local bodies. The work shall be carried out as per scope & specifications of E& M works given hereafter and given in respective head/part of the scheme sub-head. If any services required to make the building /scheme habitable is not covered in the scope of services same shall either be pointed out in pre- bid meeting else, it shall be presumed that the same shall be provided within the quoted cost and nothing extra shall be paid on this account.

3.1.2 The scope of works also covers the preparation of layout plans, drawings for E&M schemes and approval of the same from the respective local bodies/CFO etc. before the commencement of work. During execution, if the local bodies etc. require a modification, the same shall be executed without any extra cost. Finally, after execution, approvals/NOCs/clearances from local bodies etc. shall be the responsibility of successful agency for which nothing extra is payable in case any modification/ extra work is required. All statutory fees/charges required for obtaining clearances from /Local Bodies shall be paid by the agency.

4.0 General

4.1 These additional terms & conditions are applicable to all the Electrical works.

4.1.1 The agency must study specifications and conditions carefully. The work shall be executed in close coordination with the progress

of building work.

4.1.2 The work shall be carried out as per CPWD specifications, if specifications are not available, IS codes shall be followed.

4.1.3 All equipment shall be delivered with (i) manufacturer's test certificate, (ii) manufacturer's technical catalogues, and installation / instruction (O&M) manuals.

4.1.4 Scaffolding & any other T&P required for execution of work shall be arranged by the agencies and nothing extra shall be payable on that account.

4.1.5 The layout plans/drawings/other documents pertaining to Electrical services shall have to be submitted for evaluation & approval, within 45days of award of work.

5.0 Inspection before Dispatch

All routine tests shall be conducted before dispatch of equipment. No equipment shall be dispatched from the manufacture's premises without such tests being conducted and test result recorded. These test certificates shall be given along with the supply of equipment. The authorized representative of BMTPC shall, if he so desires inspect and witness the pre-delivery tests. For this purpose, the agency shall give 15 days' notice. Agency shall arrange for inspection by the department. Department shall bear expenses of its officials for inspection as far as traveling, boarding and / lodging is concerned. However, waiver if any, for inspection shall be at the discretion of the department without any cost implication but Routine Test & Type Test certificates shall have to be submitted for equipment.

Prior to dispatch, all equipment shall be adequately protected & insured for the whole period of transit, storage and erection against corrosion and incidental damages etc. from the effect of vermin, sunlight, rain, heat and humid climate.

6.0 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 all risk insurance Policy for an amount equivalent to 110% of the contract amount for this work, to Executive Director, BMTPC. The insurance shall be obtained in their name also, he shall indemnify the Department from any liability during the execution of the work. Further, he shall obtain and submit to BMTPC a third-party insurance policy for maximum Rs. 20 lakhs for each accident, The insurance shall be obtained in the Contractor name. 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 including subcontractors shall provide comprehensive group insurance cover for all the workers and their supervisory staff deployed at site. The details of insurance cover to be provided shall be submitted by the contractor / associate agencies within 20 days of the date of start. In case of a default appropriate action will be taken against the contractor by BMTPC. Without prejudice to any of its obligations and responsibilities specified above, the Contractor shall within 15 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. 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.

7.0 Quality of material and workmanship

All parts of the equipment shall be of such design, size and material to function satisfactorily under all rated conditions of operation. All components of the equipments shall have adequate factor of safety. The work of fabrication and assembly shall conform to sound engineering practice and based on "Fail Safe Design". The mechanical parts subject to wear and tear shall be easily replaceable type. The construction of the equipments shall be such as to facilitate effortless operation, inspection, maintenance and repairs. All connections and contacts shall be designed to minimize risk of accidental short circuits caused by animals, birds and vermin etc. All identical items and their component parts should be completely, interchangeable including spare parts.

8.0 Inspection and testing at site

8.1 The installation shall be subject to necessary inspection during every stage of erection, by the Competent Authority. The successful agency shall provide all facilities and assistance for the purpose.

8.2 The completed installation shall be inspected and tested by the Competent Authority in the manner as will be laid down by him, in consultation with the agency.

8.3 All instruments and facilities necessary for the tests shall be provided by the agency.

9.0 Completeness of work

9.1 The installations shall be completed in all respects and put in to operation even where certain details have not been mentioned/left out in these specifications. Any discrepancy may be brought out in pre-bid meeting.

9.2 All E&M services such as Internal Electrical installations, Firefighting System, pumps shall be declared as completed after completion of trial run of 1 month.

10.0 Internal Electric Installation (IEI)

10.1 The work will be carried out as per proposed technology specifications for the internal electric installation. Where such specifications are not available, CPWD specifications shall be adopted.

10.2 FRLS PVC insulated Copper conductor wires will be used for points, circuit & sub-main wiring.

10.3 Agency shall execute the work as per scale of amenities given elsewhere in document after obtaining necessary approval of the

layout for internal electrification of all houses, common areas and staircases from Competent Authority. The staircase lighting shall be in group control system.

10.4 Modular type switches, sockets and stepped type electronic fan regulators, bell push along with matching mounting boxes of same make shall be used.

10.5 TV outlet point wiring of each house shall be terminated in suitable size of G.I. box along with splitter at every floor. The interconnections of all splitter boxes fixed at all floors shall be done properly with conduits to form proper distribution system with the prior approval of competent authority.

10.6 Suitable rain protection covers made of 16 SWG galvanized MS sheet wherever required shall be provided.

10.7 Meter Boards & Main Distribution Boards as per local body specification/requirement shall also be provided by the agency. Dwelling units shall be provided with single phase 230 V supply.

10.8 A separate Meter Rooms is to be provided at suitable location in the building block with the prior approval of layout by Competent Authority.

10.9 Laying of HDPE / DWC /Hume pipes for road crossing or in pucca portion & CC path etc. for electric/street lighting cables complete with adequate number of cable chambers shall be provided by the agency.

10.10 After completing the work, necessary test results as envisaged in CPWD General Specifications Part-I (Internal)-2005&Indian Electricity Rules 2005, shall be recorded and submitted to BMTPC. The results shall be within the permissible limits. Test report forms duly signed by authorized person for obtaining electric connections (energy meters) from Power Distribution Company by the agency shall be given to the authority.

11. Firefighting System

11.1 Fire protection systems shall be designed and provided as per NBC-2016 with amendments, updated BIS code and fire bylaws. NOC for the project from local fire service department shall be obtained by the selected agency.

5. LIST OF APPROVED MAKES

Apart from the proposed technology the following specification/brands names of materials to be used as listed wherever required. The efforts should be made by the agency to use indigenous products. The agency should also consider the availability of spares parts/components for maintenance purposes while proposing any brand / manufacturer. The materials of any other brand/manufacturer may be proposed for use by the agency in case the brands specified below are not available in the market and/or agency intends to use some other brand better than the brands mentioned in this list. The alternate brand can be used only after the approval of Competent Authority. The list of approved make for Civil Works is given below:

Sr. No.	Materials	Brands
1.	PPC / OPC Cement	ACC/ Ultratech/ Vikram/ Shree Cement/ Ambuja/ Jaypee Cement/ Century Cement/ J. K. Cement/ Dalmia Cement/ Ramco/ Coromandel Cement/Priya Cement
2.	White Cement	Ambuja/ACC / Birla / Ultra teck/ J.K. white
3.	White Cement Putty	Birla/JK/Asian/Berger/ Nerolac/ICI
4.	Reinforcement Bar	Confirming to IS: 1786-2008 with upto date amendments (Test report of each lot of steel to be submitted as per CPWD testing frequency along with MTC)
5.	Structural Steel Sections	Confirming to relevant IS code of practice (Test report of each lot of steel to be submitted as per CPWD testing frequency along with MTC)
6.	Kota Stone/Marble/Granite/ Jaisalmer Stone	As per approved sample
7.	Ceramic Tiles (Coloured)	Somani / Kajaria/ NITCO/AGL/Varmora/Johnson.
8.	Vitrified Tiles	Somany / Kajaria/ Johnson/ AGL/ NITCO/ Varmora/ RAK Full body doubly charged or super charged.
9.	Interlocking paver blocks / Grass Pavers / Kerb Stone	Unistone / Ultra / Hindustan/ KK/ Nitco/ Dalal/ Bharat Regency / Duracrete
10.	Commercial Block Board / Commercial Ply /Teak Ply	Greenply/ Novopan/ Kitply/ Century/Anchor/Duro/ Bhutan / Archid / Durian
11.	Laminates/Decorative laminates/Sun–Mica	Decolam/ Greenlam / Merinolam/ Formica/ National laminate/ Neoluxe/ Decolite/ Signature/ Skylam/ EURO /Royale Touche
12.	Pre laminated green board	Bhutan/ Novapan/ Eco board/ Bakelite/ Hylem Nepal board/ Green board/ Centuary / Kit Lam/Alstone
13.	Impregnated Fibre Board	Shalitex by Shalimar Tar Product or equivalent ISI mark
14.	Teak Veneer	Anchor/ Kitply/ Greenply or equivalent ISI mark
15.	Flush Doors	Century/ Green/ Kitply/ Duro / Merino / Mayur / Archid / Kutty/ Jain Doors
16.	Aluminium Section	Indal/ Hindal/ Jindal/ Hindalco/ Nalco
17.	All Aluminium Hardware, Fittings	Everite/Garnish/Arches/Kausal/Nu-lite/Alif/Shalimar (Bombay) Singla/ Opel/Bolt/ Arhish or ISI mark

18.	Stainless Steel Hardware's Fittings	Kitch/ Dorma/ Hafele/ Geze/ Godrej/ Ipsa/ Assa-abloy or ISI mark
19.	Glass/Float/Sheet	Saint Gobain/ Modi/ Hindustan Pilkington/ AIS/ Triveni/ Glaverbel
20.	Door Closer/Floor Spring	Godrej/ Everite/ Opel/ Doorking/ Hardwin/ Nulite/ Hyper/ Ezec/ Navkar or ISI mark
21.	Locks	Euro/ Godrej/ Harrison/ Plaza/ Golden/ Doorset/ Yale or ISI mark
22.	Polysulphide Sealant For Expansion Joints All Windows	Chokesy Chemical/ Structure Proofing Co Pidilite/ GESilicon/ Tuff sealor equivalent
23.	Synthetic Enamel Paints/Primer/ Oil bound Distemper	Nerolac/ Berger/ Asian Paint/ ICI Dulux
24.	Water Proof Acrylic Paints /Weather proof Acrylic Paints	Nerolac/ Berger/ Asian Paint/ ICI Dulux
25.	Water based Distemper (Washable)	Nerolac/ Berger/ Asian Paint/ ICI Dulux
26.	Polyurethane Paint	MRF/Alchemica or equivalent ISI mark
27.	Water Proofing Compound	'CICO'/ Fosroc/ GESillicon/ Pidilite/ MC-Bauchmie/ Sika/ Farmate/ Tape crete /Accoproof/ Impremo /Reoplast or ISI mark
28.	Weather Sealent /Silicon Sealant / Polyisobutyllene sealant	Fosroc/ Pidilite/MC-Bauchmie /Wecker789/ Dow corning789 or equivalent or ISI mark
29.	Hardeners	'Ironite'/' Ferrok'/' Hardonate' or equivalent or ISI mark
30.	Wire Mesh	Sterling Enterprises/Trimurti/Welded Mesh or equivalent or ISI mark
31.	Anti-Termite Treatment	Thyodinby Hoechest / Lyntricby Bayer India / Durmet by Cynamid India /Nocil Pyramid or equivalent ISI mark
32.	Pre coated Sheets	TataBluescope/ Multicolorsteels/ Interarch/ Kirby/ Tigersteel or equivalent
33.	Polyester Fibre	Recron3S/Formate or equivalent
34.	Welding Rod	Advani/ Philips /Sunarc /Eshab or equivalent
35.	Construction Chemicals	Fosroc/MC-Bauchmie/ Sika/ Pidilite/ Formate / Super plast SNF40/BASF or ISI mark
36.	AAC Block	Val-Kon-Cret/Biltech/ HIL/BrikOLite/Superlite/ Green /Powerlite or equivalent
37.	Chemical mortar/ AAC block jointer	Ultratech / Ferrouscrete / Bal Endura
38.	Polymer Modified Cementitious Grout	BalEndura / Webber / MykLaticrete or ISI mark
39.	Epoxy Mortar	Fosroc / Sika / Cico / Laticrete
40.	UPVC Windows/Doors /Ventilators	Encraft / Aluplast / Rehau / Duroplast/Fenesta/ Polywood/ Veka
41.	Wooden /Metal / Glaze- Fire Rated Door Shutters	Navair / Sukri / Promat / Kutty/Bhawani / Pacific
42.	Hinges & Brassware	Shalimar/ Indo-Brass / AmarbhoyDossaji / Earl Bihari / Magnum/Kich

43.	Fire-Rated Glass(Two Hour Fire Rating) Transparent Clear Glass	Glaverbel / Saint Gobbin / Pyroguard / Shott
44.	All Hardware And Fittings For All Types Of Glazing /Doors / Windows Etc.	Dorma / Hafele / Gezei / Kich / Godrej / Assa-Abloy
45.	Adhesives	Anchor / Dunlop / Pidilite- Fevicol
46.	SS wire Mesh	GKD / WMW
47.	Hardware Accessories For Fire Doors /Panic Bar / Panic Trim/ Door Closer /Hinges / Mortise Lock	IndersollRond / Dorma/ Geze / Hafele / Assa-Abloy / Kich
48.	Tile Adhesive /Epoxy Grouts	Ferrous Crete / BalllEndura / Pidilite / Lati Crete
49.	Bitumen	Indian Oil/ Hindustan Petroleum
50.	Dash Fastners	Hilti/ Fischer/ Bosch
51.	Stainless Steel Railing	Jindal Stainless Steel Ltd./ ICICH Industries/Essal
52.	Nuts, Bolts And Screws, Steel	Kundan/ Priya/ Atul or ISI mark
53.	EPDM Gasket	Hanu/ Anand/ Lescuyer
54.	Fire Glass For Vision Panels	Saint Gobain / Ashai India
55.	Fire Door	Godrej/ Shakti/ Navair
56.	Rolling Shutter	Rama Rolling Shutter/Jyoti Rolling Shutter/ Anand Industries
57.	POP (Plaster of Paris)	J K Laxmi/ Sriram Nirman/ Sakarni/ Trimurti/ ISI Mark
58.	PVC Doors	Fabricated From Rajshree/ Finolex Plastics / Sintex or ISI mark
59.	Factory Made Section Window	ISI Mark Product Only
60.	Powder Coated Aluminium Door Fittings	ISI Mark Only
61.	Gypsum Board	Gyproc by Saint Gobain / USG Boral / Knoff / Sakarni Gipskartion
62.	Calcium Silicate Board	Ramco Hil / Aerolite / HYSIL / Wedge India
63.	Bamboo Mat board	Shree Ganesh Udyog / Timpack Pvt. Ltd. / Patkai Bamboo Pvt. Ltd. / Grassply / Bamboobrook Crafts Private Limited
64.	Fibre Cement Board	Everest / Visaka/ Swastik or ISI mark
65.	Cement Bonded Particle Board	NCL Industries or equivalent ISI mark
66.	Project Management Software	Nadhi Information Technologies Pvt. Ltd/ Coaspect Solutions Pvt. Ltd/ Cognisite/ Quickspec/ Superwise Solutions Pvt. Ltd/ Builsys

LIST OF MATERIALS OF APPROVED BRAND / MANUFACTURER (ONLY FIRST QUALITY TO BE USED (WATER SUPPLY & SANITARY WORKS)

Sr. No.	Materials	Brands
1.	Vitreous China Ware	Hindware / Parryware / Cera / Johnson / Hindustan/ Neycer/ Varmora
2.	RCC Pipes	Pragati / Lakshmi / Sood & Sood / Jain & Co /Diwan
3.	UPVC / CPVC Pipes & Fittings	Supreme / Prince / Astral / Finolex / Surya Roshni / Ashirwad/ Prakash/Kisan
4.	Stainless Steel Sinks	Neelkanth / Nirali / Cera/Jayna/ Diamond / Cobra
5.	Spun Cast Iron Pipes & Fittings (IS:3989)	JaiswalNeco/ RIF / SKF / BIC
6.	Stoneware Pipes and Gully Traps	Perfect / Burn / Anand / Parry/ Hind
7.	Gunmetal Valves (Full Way Valve) Class-I	Zoloto / Castle/ Kartar/Leader /Sant/ Prima or ISI mark
8.	CI Double Flanged Sluice Valve	Kirloskar / IVC / Sondhi / Kejriwal/Burn or ISI mark
9.	CI Manhole Frame & Covers and CI Grating	Neco / RIF / SKF / BIC or ISI mark
10.	Sanitary CP Fittings & Accessories	Marc / Parryware / Kingston/Gem/Parko/ Hindustan /Cera or ISI mark
11.	Floor Traps (Jali)	Jayna / Chilly / Nirali or ISI mark
12.	PVC Water Tank	Sintex / Polycon / SPL/Reno/ Sheetal/ Kisan or ISI mark
13.	Flushing Cistern	CERA/Hindware/Johnson/Hindustan/Perryware or ISI mark
14.	E.W.C. Seats(Cover)	CERA/Hindware/Johnson/Hindustan/Perryware/EID/ Neycer/Varmora or ISI mark
15.	Mirrors	Modi Float glass/Asahi/SaintGobin/ Atul Glasswork or ISI mark
16.	Fibre reinforced R.C.C. Manhole cover	KK / Nitco/ Dalal or ISI mark
17.	C.I. Manhole cover with frame	ISI approved make or equivalent
18.	P.V.C. Pipes &Fittings	Astral/Supreme/Prince/Finolex /Ashirvad Pipes/Jain /Kisan or ISI mark
19.	Ball Cock	Zoloto/ Prima/ IBT/ RCO/Sant or ISI mark
20.	UPVC Pipes (Solvent Welded Joints)	Astral/ Supreme/Prince/Finolex/ Ashirvad Pipes/ Jain/Kisan/ KSR/ Precision /Ajay Dustron or ISI mark
21.	PTMT	Prayag/ Polytuf or equivalent ISI mark
22.	Ductile Iron Pipe (Water pipe)	Electro Steel/ Kesso/ Kdupl./ Electron Spun or ISI mark
23.	PVC Flushing Cistern	Hindware/ Steelbird / Jindal/ Seabird ISI mark

LIST OF MATERIALS OF APPROVED BRAND / MANUFACTURER (ONLY FIRST QUALITY TO BE USED (ELECTRICAL WORKS)

Sr. No.	Materials	Brands
1.	FRLS PVC Insulated Copper Wire /Power Cable / Xlpe Cable / Telephone Cable	L&T / Havel's / Polycab / Finolex / Sky Tone or ISI mark
2.	Co-Axial TV Cable	L&T / Havel's /Polycab / Finolex / Sky Tone or ISI mark
3.	Steel Conduit	RM Con / AKG/ BEC ISI Marked or ISI mark
4.	PVC Conduit	AKG / Polycab / Prince or ISI mark
5.	L. T. Panel / Meter Board	Adlecmundka / Associated Switchgears And Project Ltd. / SudhirGenset Ltd. / Control And Switchgears Pvt. Ltd / Kepl/Tricolite or ISI mark
6.	MCB/MCB DB, Prewired MCB Db And Sheet Steel Metal Enclosed Industrial Socket, Plug Top And Isolators	Legrand / Siemens / L&T / Abb / Schneider or ISI mark
7.	Modular Type Switch/Socket, Telephone Socket, Cable Tv Antenna Socket, Electronic Fan Regulator And Gi Boxes	Anchor / Vinay/Crabtree /Legrand (Mylinc / Havel's (Piccadilly) / Honeywell (Midas) /North West (Nova) or ISI mark
8.	LED Fitting	Philips / Crompton / Wipro / Ge / Zumpobel / Trilux or ISI mark
9.	Ceiling Fan / Exhaust Fan	Crompton Greaves / Almonard / Havells / Usha or ISI mark
10.	Octagonal Steel Pole	Bajaj/ Twinkle / Valmart or ISI mark
11.	Air Circuit Breaker / MCCB	L&T-U Power / Siemens-3wl / Abb- Emax / Schneider-Masterpact- Nw or ISI mark
12.	Alternator	Stamford / Leroy Somer / Caterpillar / Koel Green or ISI mark
13.	Copper Conductor Control Cable	Bonton / Lapp Cable / Havells / RrKabel / L&T / Rajni gandha or ISI mark
14.	Communication Cable / Signal Cable	Lapp Cable / Fusion Polymer / Beldon or ISI mark
15.	Motor/ Pumps	ABB/ Siemens/ Kirloskar Crompton Greaves or ISI mark
16.	Starter	L&T/ Siemens / Crompton/ GeAbb / Bch or ISI mark
17.	Armoured cables	Tropodure/ Incab/ torrent/ Finolex/ Unistar/ Avocab/ Havells/ Gloster or ISI mark
18.	Motor starter/Panel	L&T/Siemens/ Havells/ Galco/ Ellico/ BCH/C&S or ISI mark
19.	Fire Extinguisher	Safex/ Minimex/ Superex/ Ceasefire or ISI mark

20.	First Aid Hose Real, Nozzles, valves, Hose pipe and other fittings	ISI mark only

Notes:

a) The contractor shall produce samples of the materials for approval of the authorized representative of BMTPC. The materials of the makes out of the above as approved by the authorized representative of BMTPC shall be used on the work.

b) In respect of materials for which approved makes are not specified above, ISI make of materials to be used by taking approval from authorized representative of BMTPC. If ISI make materials are not available, materials to be approved by Competent Authority.

c) For all the material of approved brands necessary testing as per IS standards shall be done by the agency and no extra payment shall be paid for that.

Appendix-II

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

The agreement made this……..…….day of year two thousand and …….……between ……..……..…… (Hereinafter called the Guarantor of the one part) and the BMTPC (Hereinafter called the Implementing Agency 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 BMTPC of the other part, whereby the agency inter-alia, undertook to render the building and structures in the said contract recited completely water and leak proof.

AND WHEREAS THE GUARANTOR agreed to give guarantee to the affect that the said work will remain water and leak proof for five years from the date of giving of water proofing treatment.

NOW THE GUARANTOR hereby guarantee 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 after the maintenance period prescribed in the contract.

Provided that the guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse or alteration and for such purpose.

a) Misuse of roof shall mean any operation which will damage proofing treatment, like chopping of firewood and things of the same nature which might cause damage to the proof.
b) Alteration shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts.
c) The decision of the Competent Authority with regard to nature and cause of defects shall be final.

During this period of guarantee, the guarantor shall make good all defects and in case of any defect being found render the building water proof to the satisfaction of the Competent Authority at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from Competent Authority calling upon him to rectify the defects failing which the work shall be got done by the Department by some other agency at the Guarantors risk and cost. The decision of the Competent Authority as to the cost payable by the Guarantor shall be final and binding.

That if guarantor fails to execute the water proofing or commits breach there under; then the guarantor will indemnify the Principal and his successors against all loss, damage, cost 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 BMTPC,

the decision of the Competent Authority will be final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the selected agency …….. and ……By…….. For and on behalf of the BMTPC on the day, month and year first above written.

SIGNED, sealed and delivered by selected agency in the presence of :

1. …… 2. ……

SIGNED FOR AND ON BEHALF OF BMTPC

By …… in the presence of :

1. …… 2. ……

6. SCHEDULE OF FINISHES & SPECIFICATIONS

1.0 Specifications for Dwelling Units

The specification for construction of Dwelling Units/ social infrastructure shall be as under:

Sl.No	Item of Work	Specification
1.	**FOUNDATION & PLINTH (AS PER APPROVED DRAWING)**	
1.1	Excavation	All type of excavation will be part of work including site clearance, levelling of site, dewatering from trenches by pumping or other means etc. or clearing of site and cutting of shrubs / removal of vegetation /small trees etc.
1.2	Foundation & Plinth	Pile foundation, spread foundation or raft foundation, Strip foundation, isolated column footing as per approved structural design, drawings and soil investigation report. Plinth level- not less than 600 mm from existing road level.
1.3	Concrete in Foundation for Columns / walls	No concreting less than M25 strength will be used for foundation work either for frame structure or raft foundation as per design. The type of mix, thickness and width shall depend on approved structural design. The base/ lean concrete shall not be less than M7.5
1.4	Plinth Beam	Plinth beam to be provided(as per approved structural design requirement).The grade of concrete shall not be less than M25
1.5	Anti-termite	Anti-termite treatment / termite-mat will be as per CPWD specification/ relevant BIS code of practice.
1.6	Damp Proof Course over Plinth Beam	Damp-proof course should be 40mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand (zone-III): 4 graded stone aggregate 12.5mm nominal size), where ever required.
1.7(a)	Plinth Filling : a) Sand filling : / Concrete under floor :	Filling plinth with 150mm thick layer of locally available sand under floor including watering and ramming and 100mm thick layer of CC 1:4:8 (1 cement: 4 coarse sand: 8 stone aggregate 40 mm nominal size) or M7.5 under floor.
1.7(b)	Internal Filling	Internal filling will be done with excavated soil or with earth brought from outside in required quantity.
1.8	Brick work in foundation & plinth :	Brick of class designation 75 will be used in Brick Masonry provided with cement mortar shall be with coarse sand minimum 1:6 (1 cement: 6 course sand) or richer mixes subject to the provisions of the approved structural drawings or under plinth beam as toe wall on external walls.
2	**SUPER STRUCTURE WORK**	
2.1	Walling (As per Drawing)	As per specification of proposed Technology
2.2	Slab and Staircase including projections /lintel/sunshades(As	Reinforced Cement Concrete slab with Reinforcement as per the structural design and drawing (As per proposed Technology).

Sl.No	Item of Work	Specification
	per Drawing)	Grade of Steel and Concrete Shall be Fe 500 D and Minimum M25 strength respectively. Sunshades shall be provided to all windows/ opening in external facade.
2.3	Railing in staircase, Balcony, Physically handicap ramp and other places in building	1.10mts high S.S. grade 304 railing in balconies of all the units & staircase of approved pattern with hand rail 40 mm dia S.S. grade 304 Pipe. Minimum weight of railing shall be 14 kg per meter and vertical bars of 12 mm square bar at 100mm c/c embedded in waist slab with base plate or as per approved Drawing. The height of railing shall be 1.10mtr from finished level of Floor/steps and Physically handicap ramp (Drg. to be approved by BMTPC).
3.	**WOOD / STEEL WORK (DOOR, WINDOWS & VENTILATORS)**	
3.1	Door frame & electric shaft	The door frame shall be of pressed steel Profile door frame as per CPWD specification or wooden frame. The Door frame shall be of double rebate for external doors and single rebate for internal doors.
3.2	Door shutters & electric shaft	The door shutter will be of ISI marked flush door shutters conforming to IS: 2202 (Part I) Non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters. 35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws with 25mm thick lipping. External door Double shutters one safety grill single / double leaf door in SS-304 L grade frame with mosquito proof stainless steel wire-mesh of stainless steel -304 grade (Powder Coated) and stainless steel fittings and other with 35mm thick factory made exterior grade both side decorative veneered type flush door shutter with melamine polish. (including necessary lipping) Double leaf flush door shutter of 35mm thick for electric shaft with all fitting & locking arrangement.
3.2.1	Shops	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters. 80x1.25 mm M.S. laths with 1.25 mm thick top cover

Sl.No	Item of Work	Specification
3.2.2	Gates of Community centre and building in front of glass door & emergency exit door in building	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts, locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer
3.3	Toilet/Bath Door Frame:	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1mm), 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 BMTPC Extruded section profile size 42x50 mm
3.4	Toilet/Bath Door Shutters	30 mm thick factory made Polyvinyl Chloride (PVC) door shutter made of styles and rails of a uPVC hollow section of size 60x30 mm and wall thickness 2 mm (± 0.2 mm), with inbuilt decorative moulding edging on one side. The styles and rails mitred and joint at the corners by means of M.S. galvanised/ plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 25x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x30 mm and 2 mm (± 0.2 mm) wall thickness fixed to the shutter styles by means of plastic/ galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of BMTPC (WC & bathroom door shutters).
3.5	Door fittings	ISI marked powdered coated Aluminum fittings e.g. Tower bolts, handles, door stopper etc. (IS:1378) Handles 150 mm -2, Tower bolt 12mm dia 300mm length -2, L drop- 300mm long & 16mm dia-1, Stopper-1, Buffer -1, Peep hole with magic eye and security chain for external door only – 1each.
3.6	Windows and Ventilators (Frames & Shutters)	UPVC profile frame with openable window shutters with fully glazed panels (outside) & wire mesh shutter (inside) (SS grade 304) shutter with all necessary fittings and fixtures as per CPWD specifications.
3.7	Sills and Jambs lining	18 mm thick projected window/ventilator sill & jambs lining, in Green marble/granite of approved colour and shade (if

Sl.No	Item of Work	Specification
		permitted as per technology proposed).
3.8	Glass Door at main entrance of building & Community Centre	Providing and fixing 12 mm thick frameless toughened glass door shutter of approved brand and manufacture, including providing and fixing top & bottom pivot & double action hydraulic floor spring type fixing arrangement and making necessary holes etc. for fixing required door fittings, all complete as per direction of BMTPC.
3.9	Mumty Door Shutter	Providing and fixing 1mm thick M.S. sheet door with frame of 40x40x6 mm angle iron and 3 mm M.S. gusset plates at the junctions and corners, all necessary fittings complete, including applying a priming coat of approved steel primer. Using flats 30x6 mm for diagonal braces and central cross piece as required
3.10	Concrete Jali	Providing precast cement concrete Jali 1:2:4 (1 cement : 2 coarse sand(zone-III) : 4 graded stone aggregate 6mm nominal size), reinforced with 1.6 mm dia mild steel wire, including cantering and shuttering, roughening cleaning, fixing and finishing in cement mortar 1:3 (1 cement: 3 fine sand) etc. complete, excluding plastering of the jambs, sills and soffits. 40 mm thick
3.11	Cupboard	Providing and fixing built in cupboard with RCC / Kota stone / granite Precast panel having minimum 2 shelves upto 2100 m and shutter of 18 mm thick pre-laminated decorative particle board as shutter including all fittings, hanging SS rod and locking arrangement as per CPWD specification. Or wooden cupboard of approved design and specification with all fittings, fixtures and accessories.
3.12	Kitchen Cabinet	Built in cupboard without any shelves but with shutters of 18mm thick Pre laminated decorative particle board below cooking platform with all fixture and fittings as per approved architectural drawing.
	FLOORING	
4.1	Living Room, Bed Room,	Vitrified tile (pattern flooring) of size not less than 600x600 mm of approved make and color to be used.(To be approved by BMTPC).
4.2	Kitchen ,Toilet, Bath & Wash area and Physically handicap ramp	Toilet–anti skid ceramic tiles (minimum size 300x300mm) of approved make and colour including grouting (To be approved by BMTPC). Physically handicap ramp –Kota stone strip or chequered tiles/tactile tiles or combination of both.
4.3	Kitchen Counter Top	Providing and fixing 20mm thick mirror polished, machine cut for kitchen platforms, vanity counters facias and similar locations of required size of approved shade, colour and texture laid over 20

Sl.No	Item of Work	Specification
		mm thick base cement mortar 1:4 (1 cement :4 coarse sand) with joints treated with white cement, mixed with matching pigment-epoxy touch ups. Including rubbing, curing, moulding /noising and polishing etc. Complete at all levels. Raj Nagar Plain white marble/ Udaipur green marble/Zebra black marble or Granite stone (Area of slab over 0.50 Sqm)
4.4	Staircase	Pre-polished Kota stone/Granite slabs 20 mm thick in single length of tread and risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete with nosing.
4.5	Common space	Mirror polished Kota stone/Granite slab flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand).
4.6	Skirting :	18mm/21mm thick 100mm high skirting with same finish as flooring.
4.7	Dados	Ceramic tile of minimum size of 200 x 300 up to full height with decorative band in Toilets / bath shall be provided. Ceramic tile of size not less than 200 x 300 from floor to full wall height in kitchen shall be provided. Ceramic tile of minimum size of 200 x 300 up to full height with decorative band in Wash area shall be provided.
5	**ROOFING**	
5.1	Waterproofing in Sunken / Depressed Portion of WCs, Bath etc.	Providing and laying water proofing treatment in sunken portion of WCs, bathroom etc., by applying cement slurry mixed with water proofing cement compound consisting of applying : (a) First layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/ sqm. This layer will be allowed to air cure for 4 hours. (b) Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound @ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed with water curing for 48 hours. All work shall be as per CPWD specification.
5.2	Terrace Treatment :	Providing and laying water proofing treatment on roofs of slabs by applying cement slurry mixed with water proofing cement compound consisting of applying: (A) After surface preparation, two coats of mixed slurry to be applied to the set concrete @1.5-2 kg/m² by a masonry brush, roller or appropriate power spray equipment. This will be allowed to air cure for 4 hours followed by water curing for 48 hours. The entire treatment will be taken upto 30 cm on parapet wall and tucked into groove in parapet all around. (B) After complete curing, laying protection screed concrete in the ratio 1:2:4 not more the 50 mm in

Sl.No	Item of Work	Specification
		thickness. Flooded the entire slab for minimum curing period of 48 hours with hear resistance tiles or Koba treatment as per CPWD specifications and technology requirement.
5.2	Gola in C.C 1:2:4	Providing gola 75x75 mm in cement concrete 1:2:4 (1 cement: 2 coarse sand:4 stone aggregate 10mm and down gauge) including finishing with cement mortar 1:3(1 cement: 3 coarse sand)as per standard design In 75x75 mm deep chase
5.3	Rain Water Pipes	Providing and fixing on wall face un-plasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, including all required accessories and making of khurra 45 x 45cm. As per CPWD norms. It shall be responsibility of contractor to make essential arrangement for disposal of rain water by providing proper sloping of roof slab and by providing appropriate uPVC pipes and fittings all complete. Duct portion (if any) up to plinth level shall be constructed as collecting chamber and uPVC pipe/ uPVC shoe at bottom shall be fixed for disposal of rain water.
5.4	Parapet walls with coping	Parapet in proposed technology having height of 1.10 mt with 25mm thick CC coping in M25 grade concrete including neat cement plaster in cement mortar 1:6.
6	**FINISHING**	
6.1	Finishing Internal/ External walls (Wherever required)	12/15/20 mm cement plaster in 1:6 (1 cement : 6 fine sand)finished or as per technology provider's specification including admixture if required .
6.2	Finishing bottom of RCC slab	6 mm cement plaster1:3(1 cement : 3 fine sand) for Finishing bottom RCC Slab, beams, plaster to ceiling etc.
6.3	Painting :Internal finish on walls/Ceilings	Distempering with Oil Bound distemper over 2 mm thick POP/ acrylic putty on walls
6.4	Painting External finish on walls	Weather Proof Acrylic Emulsion paint on base of 2 mm thick external wall putty.
6.5	Primer :	As per CPWD Specification for walls, wood work and steel work. (Zinc chromate primer)
6.6	Painting on wood work & steel work:	Painting with synthetic enamel paint, of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour. Two or more coats.
6.7	False Ceiling along with mineral / rock wool (As per proposed Technology requirement)	Providing and fixing false ceiling at all height including providing and fixing of frame work made of special sections, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with flanges of 27 mm and 37mm, at 1200 mm centre to centre, one flange fixed to the ceiling with dash fastener 12.5 mm dia x

Sl.No	Item of Work	Specification
		50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25x10x0.50 mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I. channels 45x15x0.9 mm running at the spacing of 1200 mm centre to centre, to which the ceiling section 0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm centre to centre, shall be fixed in a direction perpendicular to G.I. intermediate channel with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm high having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/partition with the help of rawl plugs at 450 mm centre, with 25mm long drywall screws @ 230 mm interval, including fixing of gypsum board / to ceiling section and perimeter channel with the help of drywall screws of size 3.5 x 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound, jointing tapes, finishing with jointing compound in 3 layers covering upto 150 mm on both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification and also including the cost of making openings for light fittings, grills, diffusers, cut outs made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the authorized representative of BMTPC with painting with 12.5 mm thick tapered edge gypsum moisture resistant board. **OR** Providing and Fixing 15 mm thick densified tegular edged eco-friendly light weight calcium silicate false ceiling tiles of approved texture of size 595 x 595 mm in true horizontal level, suspended on inter locking metal grid of hot dipped galvanised steel sections (galvanising @ 120 grams per sqm including both side) consisting of main 'T' runner suitably spaced at joints to get required length and of size 24x38 mm made from 0.33 mm thick (minimum) sheet, spaced 1200 mm centre to centre, and cross "T" of size 24x28 mm made out of 0.33 mm (Minimum) sheet, 1200 mm long spaced between main 'T' at 600 mm centre to centre to form a grid of 1200x600 mm and secondary cross 'T' of length 600 mm and size 24 x28 mm made of 0.33 mm thick (Minimum) sheet to be inter locked at middle of the 1200x600 mm panel to from grid of size 600x600 mm, resting on periphery walls /partitions on a Perimeter wall angle pre-coated steel of size(24x24X3000 mm made of 0.40 mm thick (minimum) sheet with the help of rawl plugs at 450 mm centre to

Sl.No	Item of Work	Specification
		centre with 25 mm long drywall screws @ 230 mm interval and laying 15 mm thick densified edges calcium silicate ceiling tiles of approved texture in the grid, including, cutting/ making opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc., wherever required. Main 'T' runners to be suspended from ceiling using G.I. slotted cleats of size 25x35x1.6 mm fixed to ceiling with 12.5 mm dia and 50 mm long dash fasteners, 4 mm G.I. adjustable rods with galvanised steel level clips of size 85 x 30 x 0.8 mm, spaced at 1200 mm centre to centre along main 'T'. Bottom exposed with 24 mm of all T-sections shall be pre-painted with polyster baked paint, for all heights, as per specifications, drawings and as directed by Engineer-in-Charge. **OR** Providing and fixing at all height false ceiling of 4 mm thick phenol bonded Bamboo Mat board (595x595 mm) conforming to IS:13958-1994 including providing and fixing of frame work made of GI angle 25x25x0.4 mm thick all around suitably fixed to wall with the help of dash fastener and hanger frame (600x600 mm c/c) made GI slotted Tee having powder coating on bottom side (30x25x0.3 mm thick for main member & 25x25x0.3 mm for cross member) connected to ceiling with 2.64 mm GI wire and anchor fastener at every junction and also including cost of making openings for light fittings, grills, diffusers, cut outs made with frame of perimeter channels suitably fixed all complete as per direction of Engineer-in-charge.
7	**INTERNAL SANITARY / WATER SUPPLY INSTALLATIONS**	
7.1	W.C. Pan	White vitreous china pedestal type water closet (European type W.C. pan) with seat and lid, water jet with 10 litre low level white P.V.C. dual 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.
7.2	Water Supply Pipes Internal /External	CPVC Composite Pressure Pipes conforming to IS-15778 having thermal stability for hot & cold water supply, capable to with stand temperature up to 80^0 C, including all special fittings of composite material as per CPWD Specification. All Pipes sizes shall be as per drawing.
7.3	Fittings	Chromium plated Medium Weight Brass bib cocks/tap (min. Wt.0.34kg), Brass stop cocks (min. Wt.0.15kg) Brass flush cocks (min. Wt.0.64kg), Shower rose (min wt. 0.26kg) with shower arm (min wt. 0.125

Sl.No	Item of Work	Specification
		kg), Angle valve for geyser/basin/PVC flush tank – 15/20mm as per drawing and approved make.
7.4	Kitchen Sink	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink with CP brass Sink cock (min wt 0.70kg) as per IS : 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required : 470x420 mm bowl depth 178 mm without drain board
7.5	Wash Basin	White Vitreous China Flat back wash basin size 550x 400 mm with single 15 mm C.P. brass pillar tap(min wt 0.42kg) and PTMT Waste Coupling 31 mm dia of 79 mm length and 62mm breadth weighing not less than 45 gms for wash basin and ,of approved quality and colour. Complete as per specification
7.6	Mirror with PTMT glass shelf	Providing and fixing 600x450 mm levelled 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.
7.7	Towel Rail	Providing and fixing SS 450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm, weighing not less than 170 gms towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fittings arrangement as per CPWD specification and direction of BMTPC.
7.8	Soap Rack	Providing and fixing SS soap shelves 100 mm wide of standard shape with bracket of the same materials with snap fittings as per CPWD specification and direction of BMTPC.
7.9	Overhead Tank	HDPE water storage tank for drinking and non-drinking purpose of required capacity for each unit on raised platform of minimum 200mm height.
7.10	Fire tank at terrace	HDPE water storage tank for fire-fighting system of required capacity on raised platform of minimum 200mm height as per the NBC-2016 provisions / fire safety norms and connection with the underground tank with all required sizes of pipes and fittings. .
7.11	Set of pegs	In all toilets/bath & wardrobes.
7.12	Curtain rod with required accessories	Drapery rods on all windows and doors in all rooms except kitchen, toilets/bath/WC of Mac/ Vista.
8	**INTERNAL SEWERAGE**	
8.1	Pipes (No separate payment shall be allowed as it is a part of building work)	Providing and fixing on wall face unplasticised Rigid PVC soiled and waste pipes conforming to IS : 13592 Type B, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, including all required accessories Sizes of all pipes shall be as per drawings.
8.2	Manholes of size 80x90 mm 450mm deep (No separate	Manholes. with brick of class designation 75 of required size as per drawing in cement mortar 1:4 (1 cement: 4 coarse sand) with foundation concrete 1:3:6 (1 cement: 3 coarse sand: 6

Sl.No	Item of Work	Specification
	payment shall be allowed as it is a part of building work)	graded stone aggregate 20 mm nominal size) with stone aggregate inside cement plaster 1:4 (1 cement: 4 coarse sand) with floating coat of neat cement, outside (Refer Drawing) cement plaster 1:4 (1 cement: 4 coarse sand) with precast RCC cover heavy duty cover In sub-soil or adverse soil conditions, manholes & encasing pipes shall be as per approved credible structural design to avoid sinking and settlement of lines/manholes. All the manholes inside the building to be lined with sand stone lining from outside up to bottom level.
8.3	Gully Trap (No separate payment shall be allowed as it is a part of building work)	Providing and fixing square-mouth S.W. gully trap of required size as per drawing having class SP-1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300 x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design: 100 x 100 mm size P Type With common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 including excavation.
8.4	Floor Trap	Providing 76.2mm (3") NAHANY TRAP of PVC with SS 304 Jali (wt 50 gram) for Kitchen Toilets/ bath/WC and Balcony.
9	**NUMBERING OF HOUSES ETC.**	
9.1	Numbering of Units/ Pad Locks for Units / signage and Information board & sign board/ inaugural stone outside building/ specified place. (No separate payment shall be allowed as it is a part of building work)	The numbering of size 100mm in height shall be printed on glazed tiles above the entrance door and Pad locked shall be provided on entrance door of each unit, as per instructions of authorized representative of BMTPC. The information board & sign board / inaugural stone outside the building shall be provided by printing/ engraved on stone/ required information of suitable size letters including fixing etc complete in all respect (Design & size and its materials to be approved by BMTPC)

INTERNAL ELECTRIC INSTALLATION (IEI)(No separate payment shall be allowed as it is a part of building work)	
1.	The work will be carried out in recessed PVC conduit wiring system in accordance of latest CPWD General Specifications for Electrical Works with amendments up to the date of opening of tenders and the governing specifications including makes for some of the important materials to be used in the work. In case of ambiguity between the two, the specifications shall prevail. All Pipes sizes shall be as per drawing.
2.	FRLS PVC insulated Copper conductor wires will be used for points, circuit & sub-main wiring. (Sizes shall be as per drawing/requirement)
3.	Contractor shall execute the work as per attached inventory after obtaining necessary approval of the layout for internal electrification of houses staircase from BMTPC. The staircase lighting shall be in group control system.
4.	All internal electrification work will be carried out as per CPWD Specifications, NBC, IE Rules, IS Codes etc. as amended up to the date of tender. In case for any part of the work specification is not available in the aforesaid mentioned documents then part of the

	work will be carried out in accordance with sound engineering practice and as per directions of BMTPC.
5.	Cover plates at all junction and Points, Ceiling rose for fan point. Modular type plates, switches, sockets and stepped type fan regulators, bell push along with matching mounting boxes of same make shall be used. Points to be provided in each unit shall not be less than 28 Points.
6.	Modular Switches &Fixtures to be provided LED Tubelight fitting with tube - 1 in each room & 1 in Kitchen Ceiling fan – 1 in each room Provisions of Exhaust fan – 1 each in kitchen & Toilet / bath Bracket light with normal fitting including lamp/bulb -1 in each room, kitchen, toilet / bath Call Bell Point - 1 on main door, Cable TV Point & Telephone points– 1 in each room Plug Point(5 amp.) – 1 in each room, 2 in kitchen/ pantry, 1 in toilet, 1 in balcony Power Point(15 amp.6 pin) – 1 in each room, 1 in kitchen, 1 in toilet/ bath, 1 in balcony AC point with MCB - 1 in each room Geyser point – 1 in Kitchen and 1 in Toilet/ bath EDM/MCB (single phase) -1 for each Unit Bracket light / ceiling light with lighting fixture in common area and stair case. Community Centre In hall Ceiling Fan – 15 nos Ceiling Light (LED)- 24 nos LED Tubelight fitting with tube - 8 Nos Bracket light with normal fitting including lamp/bulb -8 Nos AC point with MCB - 6 nos Power Point(15 amp.6 pin- 6 Nos Plug Point(5 amp.) – 6 Nos Cable TV Point & Telephone points – 2 Nos Rooms , Office & Shops (In Each) Ceiling Fan – 1 No Ceiling Light (LED)- 1 no LED Tubelight fitting with tube - 1 No Bracket light with normal fitting including lamp/bulb -2 Nos AC point with MCB - 1 no Power Point(15 amp.6 pin- 1 Nos Plug Point(5 amp.) – 1 No Cable TV Point & Telephone points – 1 No Kitchen& store Ceiling Fan – 2 Nos Ceiling Light (LED)- 2 nos LED Tubelight fitting with tube - 3 Nos Bracket light with normal fitting including lamp/bulb -3 Nos Geyser point with MCB - 1 no Power Point(15 amp.6 pin- 2 No Plug Point(5 amp.) – 2 No Exhaust fan – 3nos

	Toilets Exhaust fan – 6 Nos Ceiling Light (LED)- 2 nos Bracket light with normal fitting including lamp/bulb -8 Nos Plug Point (5 amp.) – 6 Nos
7.	Suitable rain protection covers made of 16SWG galvanized MS sheet wherever required shall be provided.
8.	Bus Bar, Meter Boards & Main Distribution Boards with MCBs as per specification of Local Govt. shall also be provided by the contractor.
FIREFIGHTING SYSTEM (No separate payment shall be allowed as it is a part of building work)	
1.	Fire extinguishers of required capacity, type and number on each floor as per the provisions of NBC-2016/ Fire Safety Norms
2.	Swinging type First Aid Hose Real with double door hose cabinet of required size having front glass and lockable facilities, hose pipe/s, fire man axe etc. complete in all respect as per the provisions of NBC-2016/ Fire Safety Norms.
3.	MS pipe of suitable size and grade with all fittings, valves etc. complete in all respect as per the provisions of NBC-2016/ Fire Safety Norms.
4.	Bucket stand with sand / fire bucket in required numbers as per the provisions of NBC-2016/ Fire Safety Norms.
5.	Two way fire brigade connection with gun metal male instantaneous inlet coupling with cap and chain including MS pipe upto fire tank complete in all respect.
6.	Electrical driven terrace pump of 900 LPM at 35 meter head mounted MS fabricated common base plate including electrical control panel complete all respect

Note:

1. Before installation of Panel system, the agency shall have to produce evidence of quality of material at site if asked for. The testing of materials will be carried out at the cost of selected agency of BMTPC.
2. Any Material or Component (it's ratio thereof.) not defined or missing, may be adopted by the Agency in consultation & approval of BMTPC.
3. The items of works / specifications described above are only indicative and not exhaustive. In additions to the above the agency shall be responsible for executing all the items required for completing the work and other provisions in all respect to make the building habitable and ready for occupation as per direction of Competent Authority.

2.0 SPECIFICATIONS FOR ONSITE INFRASTRUCTURE WORKS

ROADS

a) Internal Roads: The internal roads feeding the houses will be of 100 mm thick concrete road of not less than M25 grade of concrete over a base course of PCC not less than M7.5 grade (100mm thick).

b) Peripheral Roads and pathways (as shown in drawing). “Factory made chamfered edge Rubber Moulded concrete coloured paver blocks of required strength, thickness & size/shape, made by table vibratory method, to attain superior smooth finish using PU or equivalent moulds, laid in required mix of colour& pattern over 50mm thick compacted bed of coarse 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 fine sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks, lawns, drive ways or light traffic parking etc. all complete as per manufacturer’s specifications & direction of Competent Authority: 60mm thick c.c. paver block of M-30 grade with approved colour &design”.

The work will be executed as per the specifications mentioned in the agreement & Schedule of quantities.

WATER SUPPLY

50 mm dia 6 kgf/cm2 CPVC including all required fitting etc. as required including connection with existing line.

SEWERAGE SYSTEM

160mm dia. uPVC or 250mm dia RCC pipes (as per provision made in payment schedule) and fittings as per IS:13592:2013Type B including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion with required number of Manholes etc. to be provided.

RAIN WATER HARVESTING TANK

Modular Rain Water Harvesting tank of required size will be constructed as per the specifications mentioned in the agreement & Schedule of quantities.

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EXTERNAL ELECTRIFICATION WORK

- Electric Panel: As necessary for the layout feeder Pillar Floor mounting totally enclosed compartmentalized cubical, dust vermin proof and outdoor type with required Earthing plate and bus bar complete including connections etc.
- Providing and Laying require Electrical cable for providing electrical supply to units, as approved.
- Providing and fixing street solar Lights as required including fixture and SL, as per CPWD specifications. Making required connections to Building and flats.
- Providing and fixing solar light connection in stair case and common area.
- P/Laying XLPE insulated / P.V.C. sheathed cable of 1.1 KV grade with aluminum conductor Armored of IS:7098-I/1554-1 approved make in ground as

per IS:1255 including excavation of30cmx75cm size trench, 25 cm thick under layer of sand, 2nd class bricks covering, refilling earth, compaction of earth, making necessary connection, testing etc. as required of size.

a. 35.0 Sq.mm 4 core
b. 6.0 Sq.mm 2 core
c. 4.0 Sq.mm 2 Core

BOUNDARY WALL WITH GATES

The selected agency may like to use his proposed alternate technology for construction of boundary walls. Its height shall be minimum 2.1 mtr. high and 0.6 mtr. barbed wire fencing having 9 horizontal rows, ensure proper water proofing and painting etc

Or

Flyash Brick / Concrete Block / AAC Block Masonry with R.C.C intermittent columns having grill of approved pattern and coping of CC 1:2:4 (1 cement: 2 Coarse sand: 4 graded stone aggregate) on top of wall with pointing as per approved drawing. Height of boundary wall shall be minimum 2.1 mtr. height solid wall and 0.6 mtr fencing above solid wall to make area secured.

Part-4

Payment Schedule

1. PAYMENT – SCHEDULE

1.0 All running /intermediate & final payments shall be made to the agency in accordance with the following schedule:

2.0 The basis of payment on "Pro rate basis" shall be worked out on the percentage of work done out of total scope of work

1.0 All running /intermediate & final payments shall be made to the agency in accordance with the following schedule:

2.0 The basis of payment on "Pro rate basis" shall be worked out on the percentage of work done out of total scope of work

S. No.	Particular	Stage wise percentage for payment
A.	**For Building Works**	
1.	On completion of preparation of structural design / architectural design, MEP & infrastructure drawings approved by the local authority and approval of vetted structural design	01
	On completion of the following:	
2.	Up to Plinth, complete in all respect with earth filling, lean concrete of Ground floor including anti termite treatment of dwelling units as well as community centre including extra height if any for columns & beams as per vetted structural design of foundation.	15
3.	Ground floor wall & roof slab casting including circulation & staircase area of dwelling unit and community centre.	13
4.	First Floor wall & roof slab casting including circulation & staircase area of dwelling unit complete with electrical conduits and water supply/sanitary pipes inside walls.	14
5.	Second Floor wall & roof slab casting including circulation & staircase area of dwelling unit complete with electrical conduits and water supply/sanitary pipes inside walls.	14
6.	Completion of Fixing of Doors & Windows etc.	05
7.	Completion of flooring & inside wall Cladding and tile work in Toilets, Kitchen, common areas etc. and water proofing work	05
8.	Completion of Internal Plaster, Putty & Painting etc. as applicable	03
9.	Completion of Wood Works like Wardrobes etc.	01
10.	fixing of china ware, water supply and sanitary fittings	05
11.	Internal Electrification & fixtures including common area and stair case area connected with solar panel etc. complete at	08

	all floors.	
12.	Water proofing of roof, Overhead water tanks: (for fire 5000 litters capacity) and 4 nos. tank of 2000 litters capacity each including fixing of fixtures and installation pipes, Mumty, parapet wall etc. complete.	05
13.	Installation of Fire Fighting System	01
14.	External cladding / painting complete in all respect (including community centre) as applicable	03
15.	Completion of all other works (other than mentioned above) as per the scope of this agreement to make the building habitable in all conditions).	02
16.	After site clearance, After Commissioning, submission of warranty documents, as built drawings, issuing of completion certificate and handing over	05
	Total	**100**
B.	**For Onsite infrastructure work**	As per site measurement

For and On Behalf of BMTPC

Accepted by me

Signature of Agency & Seal

Name:_____

Address:_____

Tel No. _____

Fax No. _____

Email_____

Part-5

Financial Bid

FINANCIAL BID

Name of Work: Construction of Demonstration Housing Project (G+2) for use as Night Shelters on Design & Build basis using Emerging technology including on site Infrastructure Work at Ratanpur, Chhattisgarh.

ABSTRACT OF COST

S.No	Sub-Head	Amount (in Rs.)
A	**DWELLING UNITS & OTHER PROVISIONS**	
1.	Total cost of construction of Buildings (Dwelling Units + Community Centre) including all associate facilities & services, fire-fighting, handicap ramp & staircase with stainless steel railing of grade 304, mumty, plinth protection and other provisions complete in all respect as per scope of work with specifications and drawings mentioned in Bid document & including GST, Labour Cess, other Taxes and complete maintenance for 5 years.	
	TOTAL "A"	
B	**ON SITE INFRASTRUCTURE WORKS**	
1.	Earth Filling	
2.	Road and Pavement	
3.	Boundary Wall with Entrance Gate	
4.	External Water Supply	
5.	External Sewerage	
6.	Drainage & Disposal	
7.	Underground Water Tank	
8.	Rain Water Harvesting	
9.	Horticulture	
10.	External Electrification Work	
11.	Tube well	
12.	Septic Tank	
	TOTAL "B"	
	GRAND TOTAL("A + B")	
	In Words	

SCHEDULE OF QUANTITIES

A DWELLING UNITS AND OTHER PROVISIONS

Sl. No.	Description of Work	Quantity	Unit	Rate in Rs.	Amount (in Rs.)
1.	Total cost of construction of Buildings (Dwelling Units + Community Centre) including all associate facilities & services, fire-fighting, handicap ramp & staircase with stainless steel railing of grade 304, mumty, plinth protection and other provisions complete in all respect as per scope of work with specifications and drawings mentioned in Bid document & including GST, Labour Cess, other Taxes and complete maintenance for 5 years.	1	L.S.		
	TOTAL "A"				

Note:

- Nothing extra shall be paid over and above the quoted rate. The rate is inclusive of all costs for completing the dwelling units, Community centre & other provisions.
- The contractor shall be responsible for Executing all items required for completing the dwelling units, Community centre and other provisions in all respect to make the same habitable & ready for occupation.

B. ONSITE INFRASTRUCTURE WORKS (on Item Rate Basis)

B	**ONSITE INFRASTRUCTURE WORKS (on Item Rate Basis)**				
	SUB-HEAD 1				
	EARTH FILLING				
1.	Excavating, supplying and filling of local earth (including royalty) by mechanical transport upto a lead of 5km also including ramming and watering of the earth in layers not exceeding 20 cm in trenches, plinth, sides of foundation etc. complete.	4402.00	Cum		
2.	Extra for lead beyond 5 km upto 15Km	3500.00	Cum		
3.	Rolling with power roller of minimum 8 tonnes for banking excavated earth in layers not exceeding 20 cm in depth	4402.00	Cum		
4.	Watering the excavated earth for banking	4402.00	Cum		
5.	Extra for Dewatering work (rate only)	40.00	Per Hour		
	TOTAL SUB-HEAD 1				
	SUB-HEAD 2				
	ROAD AND PAVEMENT				
6.	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 earth with lead upto 50 metres.				
	Road and Pavement	618.00	Sqm		
7.	Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5 m in width as well as 10 sqm on plan including getting out and disposal of excavated earth upto 50 m and lift upto 1.5 m, as directed by Engineer-in- Charge				

	All kinds of soil	331.00	Sqm		
8.	Disposal of surplus excavated earth within a lead of 5 km beyond the initial lead of 50m as directed by Competent authority	142.35	Cum		
9.	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering-all work upto plinth level.(100 mm thickness)				
	1:4:8 (1 Cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size).	61.80	Cum		
10.	Providing and laying C.C. pavement of mix M-25 with ready mixed concrete from batching plant. The ready mixed concrete shall be laid and finished with screed board vibrator , vacuum dewatering process and finally finished by floating, brooming with wire brush etc. complete as per specifications and directions of Competent authority. (100 mm thickness) (Note:- Cement content considered in this item is @ 330 kg/cum. Excess/ less cement used as per design mix is payable/ recoverable separately).	92.70	Cum		
11.	Brick edging in full brick width and half brick depth including excavation, refilling and disposal of surplus earth lead upto 50 metres.				
	with common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 (both sides)	353.00	Meter		
	Interlocking Paver				
12.	Providing and laying 60mm thick factory made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size, design & shape, laid in required	331.00	Sqm		

	colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of BMTPC or Site Engineer.				
	TOTAL SUB-HEAD 2				
	SUB-HEAD 3				
	BOUNDARY WALL WITH ENTRANCE GATE				
13.	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. For column footing for counterfort retaining walls	96.30	Cum		
14.	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering-all work upto plinth level.(100 mm thickness)				
	1:4:8 (1 Cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size).	12.84	Cum		
15.	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. above plinth level up to floor five level, excluding cost of centering, shuttering, finishing and reinforcement :				
	1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size). (Colum)	158.81	Cum		
16.	Centering and shuttering				

	including strutting, propping etc. and removal of form for :				
	Columns, Pillars, Piers, Abutments, Posts and Struts	237.69	Sqm		
17.	Lintels, beams, plinth beams, girders, bressumers and cantilevers	228.74	Sqm		
18.	Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc.	782.22	Sqm		
19.	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level & above				
	Thermo-Mechanically Treated bars of grade Fe-500D or more (@125cum)	12704.00	Kg		
20.	Providing and laying autoclaved aerated cement blocks masonry with 150mm/230mm/300 mm thick AAC blocks in super structure above plinth level up to floor V level with RCC band at sill level and lintel level with approved block laying polymer modified adhesive mortar all complete as per direction of BMTPC. (The payment of RCC band and reinforcement shall be made for separately). (RATE ONLY)	89.43	Cum		
	12 mm cement plaster of mix :				
	1:6 (1 cement: 6 coarse sand)	849.92	Sqm		
21.	Finishing walls with 100% Premium acrylic emulsion paint having VOC less than 50 gm/litre and UV resistance as per IS 15489:2004, Alkali & fungal resistance, dirt resistance exterior paint of required shade (Company Depot Tinted) with silicon additives.				
	New work (Two or more coats applied @ 1.43 litre/ 10sqm. Over and including priming coat of exterior primerapplied @ 0.90 litre/10 sqm	849.92	Sqm		

22.	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.				
	Entrance Gate	275.00	Kg.		
23.	Fencing with angle iron post placed at required distance embedded in cement concrete blocks, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with horizontal lines and two diagonals interwoven with horizontal wires, of barbed wire weighing 9.38 kg per 100 m (minimum), between the two posts fitted and fixed with G.I. staples, turn buckles etc. complete. (Cost of posts, struts, earth work and concrete work to be paid for separately). Payment to be made per metre cost of total length of barbed wire used.				
	With G.I. barbed wire	1525.00	Meter		
24.	Supplying at site Angle iron post & strut of required size including bottom to be split and bent at right angle in opposite direction for 10 cm length and drilling holes upto 10 mm dia. etc. complete	250.00	Kg.		
25.	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade :				
	Two or more coats on new work over an under coat of ordinary paint	315.00	Sqm		
	TOTAL SUB-HEAD 3				
	BOUNDARY WALL WITH PROPOSED TECHNOLOGY				
26.	Providing & installation of 2.1 meter high boundary wall of technology proposed for building	1	Meter		

	work over plinth beam with fixing fencing over it consisting of angle iron posts with 9 rows of G.I barbed wire including coping, finishing etc. all complete as per approved drawing and direction of BMTPC **(RATE ONLY).**				
	SUB-HEAD 4				
	EXTERNAL WATER SUPPLY				
27.	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 of BMTPC.				
28.	25 mm nominal outer dia pipes	5.8	Meter		
29.	40 mm nominal outer dia pipes	264.00	Meter		
30.	50 mm nominal outer dia pipes	6.00	Meter		
31.	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :				
	40 mm nominal bore.	5.00	Each		
32.	50 mm nominal bore.	1.00	Each		
	TOTAL SUB-HEAD 4				
	SUB-HEAD 5				
	SEWERAGE				
33.	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.				
	Depth upto 1.5 m	50.12	Cum		
34.	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	27.00	Each		
35.	Extra for depth for manholes :				
	Size 90x80 cm				
	With common burnt clay F.P.S. (non-modular) bricks of class designation 7.5	3.50	Meter		
36.	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	249.00	Meter		
37.	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.				
	Man holes	2.79	Cum		
38.	Providing and laying non-pressure NP2 class (light duty) R.C.C.pipes with collars jointed with stiff mixture of cement mortar in theproportion of 1:2 (1 cement : 2 fine sand) including testing of jointsetc. complete (uPVC may also be used of same dia) :				
	150 mm dia	249.00	Meter		
39.	Disposal of surplus excavated earth within a lead of 5 km beyond the initial lead of 50m as directed by Competent authority	30.00	Cum		
40.	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 :				
	150 mm diameter	160.00	Meter		
	TOTAL SUB-HEAD 5				
	SUB-HEAD 6				
	DRAINAGE AND DISPOSAL				
41.	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.				
	In all kinds of soil.				

	Depth upto 1.5 m	43.47	Cum		
42.	12 mm cement plaster finished with a floating coat of neat cement of mix :				
	1:4 (1 cement: 4 fine sand)	199.64	Sqm		
43.	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)	11.11	Cum		
44.	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering-all work upto plinth level (100 mm thickness).				
	1:4:8 (1 Cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size).	9.66	Cum		
45.	Providing and fixing factory made precast RCC perforated drain covers, having concrete of strength not less than M-25, of size 1000 x 450x50 mm, reinforced with 8 mm dia four nos. longitudinal & 9 nos. cross sectional T.M.T. hoop bars, including providing 50 mm dia perforations @ 100 to 125 mm c/c, including providing edge binding with M.S. flats of size 50 mm x 1.6 mm complete, all as per direction of Engineer-in-charge.	161.00	Each		
	TOTAL SUB-HEAD 6				
	SUB-HEAD 7				
	UNDER GROUND WATER TANK				
46.	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.				

	Depth upto 1.5 m				
	All kinds of soil	52.5	Cum		
47.	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering - All work upto plinth level :				
	1:4:8 (1 Cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size).	2.10	Cum		
48.	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level :				
	1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size).	14.66	Cum		
49.	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(@125/cum	1466	Kg.		
50.	Centering and shuttering including strutting, propping etc. and removal of form for :				
	Foundation, base of walls, columns etc.	4.20	Sqm.		
51.	Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc.	86.00	Sqm.		
52.	Suspended floors, roofs, landings, balconies and access platform	18.00	Sqm.		
53.	12 mm cement plaster of mix :				
	1:6 (1 cement: 6 fine sand)	43.00	Sqm.		
54.	12 mm cement plaster finished with a floating coat of neat cement of mix :				
	1:4 (1 cement: 4 fine sand)	57.00	Sqm.		
55.	Steel work welded in built up sections/ framed work, including cutting hoisting, fixing in position	120.00	Kg.		

	and applying a priming coat of approved steel primer using structural steel etc. as required.				
56.	Supply & Installation of Mono Block Pump with starter of approved brand complete (2HP)	2.00	Nos.		
	TOTAL SUB HEAD-7				
	SUB HEAD-8				
	RAIN WATER HARVESTING				
57.	Boring/drilling bore well of required dia for casing/ strainer pipe, by suitable method prescribed in IS: 2800 (part I), including collecting samples from different strata, preparing and submitting strata chart/ bore log, including hire & running charges of all equipments, tools, plants & machineries required for the job, all complete as per direction upto 90 metre depth below ground level. All types of soil				
	300 mm dia	40	Meter		
58.	Supplying, assembling, lowering and fixing in vertical position in borewell, un-plasticized PVC medium well casing (CM) pipe of required dia, conforming to IS: 12818, including required hire and labour charges, fittings & accessories etc. all complete, for all depths, asper direction				
	150 mm nominal size dia	40	Meter		
59.	Supplying, filling, spreading & levelling stone boulders of size range 5 cm to 20 cm, in recharge pit, in the required thickness, for all leads & lifts, all complete as per direction				
	RWH Pit (5x1.8x1.8 inside size)	5.85	Cum		
60.	Supplying, filling, spreading & levelling gravels of size range 5 mm to 10 mm, in the recharge pit, over the existing layer of boulders, in required thickness, for all leads & lifts, all complete as per direction				
	RWH Pit (5x1.8x1.8 inside size)	2.25	Cum		

61.	Supplying, filling, spreading & levelling coarse sand of size range 1.5 mm to 2 mm in recharge pit, in required thickness over gravel layer, for all leads & lifts, all complete as per direction				
	RWH Pit (5x1.8x1.8 inside size)	1.80	Cum		
62.	Gravel packing in tubewell construction in accordance with IS: 4097, including providing gravel fine/ medium/ coarse, in required grading & sizes as per actual requirement, all complete as per direction	2.12	Cum		
63.	Providing and fixing factory made precast RCC perforated drain covers,having concrete of strength not less than M-25, of size 1000 x 450x50mm, reinforced with 8 mm dia four nos. longitudinal & 9 nos. crosssectional T.M.T. hoop bars, including providing 50 mm dia perforations@ 100 to 125 mm c/c, including providing edge binding with M.S.flats of size 50 mm x 1.6 mm complete, all as per direction	24.00	Each		
64.	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 BMTPC or Site Engineer. All kinds of soil	29.55	Cum		
65.	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.	6.40	Cum		
66.	Brick masonry in foundation with	6.76	Cum		

	brick of class des.75 in CM 1:6				
67.	Cement plaster 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement.				
	20 mm cement plaster	31.41	Sqm		
68.	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering-all work upto plinth level.				
	1:4:8 (1 Cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size).	0.24	Cum		
69.	Dry brick on edge flooring in required pattern with bricks of class designation 7.5 on a bed of 12 mm mud mortar, including filling joints with Jamuna sand, with common burnt clay non modular bricks	9.00	Sqm.		
70.	Structural steel work in single section, fixed with or without connecting plate, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete	75.89	Kg.		
71.	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	258.00	Meter		
72.	Providing and fixing on wall face un-plasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS :				

	5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes.				
	110 mm diameter	514.00	Meter		
73.	Providing and fixing on wall face un-plasticised - PVC moulded fittings/ accessories for un-plasticised Rigid PVC rain water pipes conformingto IS : 13592 Type A, including jointing with seal ring conforming toIS : 5382, leaving 10 mm gap for thermal expansion				
	Bend 87.5°				
	150 mm diameter	20.00	Each		
	TOTAL SUB HEAD-8				
	SUB-HEAD 9				
	HORTILCULTURE				
74.	Supplying and stacking at site dump manure from approved source including all lead and lifts (manure measured in stacks will be reduced by 8% for payment) - screened through sieve of IS designation 20 mm.	20.00	Cum		
75.	Supplying & stacking sludge at site including royalty & carriage will all leads & lifts (sludge manure measured in stacks will be reduced by 8 % for payment)	20.00	Cum		
76.	Spreading of sludge / damp manure of / and good earth in required thickness (cost of sludge/ damp manure or / land good earth to paid separately)	40.00	Cum		
77.	Grassing with selection No. 1 grass including watering and maintenance of the lawn for 60 days or more till the grass forms a thick lawn, free from weeds and fit for mowing including supplying good earth.	450.00	Sqm.		
78.	Supplying and stacking of good earth at site including royalty and carriage upto 5 km complete (earth measured in stacks will be reduced by 20% for payment).	45.00	Cum		

79.	Supplying & Stacking of Selection No.1 doob grass at site fresh & free from weeds having proper roots in green including loading, unloading, carriage and all taxes paid etc. and as per direction of officer in charge.	450.00	Sqm.		
80.	Supply and Planting of Croton Golden plant, having ht. 45 cm to 60 cm with 2 to 3 branches, well developed, fresh and healthy foliage in 25 cm size of Earthen pot / Plastic pot as per direction of the officer-in-charge. (As per local conditions suitability)				
	Plants	65.00	Each		
	TOTAL SUB-HEAD 9				
	SUB-HEAD 10				
	EXTERNAL ELECTRIFICATION				
81.	P/Laying XLPE insulated / P.V.C. sheathed cable of 1.1 KV grade with aluminium conductor Armoured of IS:7098-I/1554-1 approved make in ground as per IS:1255 including excavation of 30cmx75cm size trench, 25 cm thick under layer of sand, 2nd class bricks covering, refilling earth, compaction of earth, making necessary connection, testing etc. as required of size.				
	35.0 Sq.mm	610.00	Metre		
	3.5 core				
82.	35.0 Sq.mm up to 95 Sq.mm	610.00	Metre		
	2 core				
83.	Supplying and making one end termination with heavy duty single compression brass gland SIBG type, aluminium lugs duly crimped with crimping tool, PVC tape etc. for following size of Armoured PVC insulated & PVC sheathed/XLPE aluminium conductor cable of 1.1 KV grade as required of size.				
	3.5 x 35.0 sq.mm	12.00	Set		

84.	2 x 6.0 sq.mm	20.00	Set		
85.	Supply and fixing of floor mounting, totally enclosed, compartmentalized, cubical, dust, vermin proof and outdoor type. Feeder pillar fabricated out of 2 mm thick cold rolled carbon annealed, sheet steel, internally strengthened with angle iron frame work with following incoming and outgoing feeders (fabricated out of 2 mm CRCA Sheet steel) including making connection / inter-connections with lugs / glands crimping tools, testing and commissioning of following items inside the panel:				
	Incommer				
	1 No. 200 Amp. 4 poles MCCB (25 Ka) with ON/OFF indications metre				
	Indication				
	Three (3) Nos. phase indicating (R.Y and B) lamps with protection 2A SP MCB's for protection having lens and lamp.				
	Outgoing				
	One (1) NO. 160 Amp. 4 pole MCCB (16 KA) with ON/OFF indications in the infront 15 nos. 32 A D.P. MCB (10 KA)				
	Control				
	4 Pole Contractor with a thermal rating of 32 - 1 no.				
	Time Switch with Daily dial, suitable for operation on 230 Volt, Single phase, 50 Hz, AC supply - 1 No.				
	Auto - Manual Selector switch - 1 No.				
	On / Off Push Buttons - 4 Nos.	1.00	Set		
86.	Plate Earthing as per IS:3043 with copper Earth plate of size 600mm x 600mm x 3.0mm by embodying 3 to 4 mtr. below the ground level with 20 mm dia. G.I. 'B' class watering Pipe including	3.00	Set		

	all accessories like nut, bolts, reducer, nipple ,wire meshed funnel, and C.C. finished chamber covered with hinged type with locking arrangement C.I. Cover, C.I. Frame of size300mm x 300mm complete with alternate layers of salt and coke/charcoal, testing of earth resistance as required.				
87.	Supply, installation and commissioning of SPV Solar Street Light (white LED Based) System as per specifications including supplying of 75 mm dia (nominal) (Medium class), 5.5 metre length (including accessories) complete with base plate and nipple including two coats of black bituminous paint upto 1 mtr. From bottom and two coats of aluminium paint above ground level etc. complete as required. Detail of pole: Planting depth - 1 Mtr and Height above ground level - 4.5 Mtr. over concrete pedestal, 15 Watt LED light Phillips/ Bajaj/ Crompton or Suitable Equivalent.	32.00	Nos.		
88.	Supply, installation and commissioning of Solar Panel with 500 Watt for 48 number lighting points in common areas (corridor & Staircase) at suitable locations including LED bulbs with 10 Watt	3.00	Job		
89.	Earth work in excavation in foundation, trenches etc. including dressing of sides and ramming of bottoms, including getting out the excavated material, refilling after laying pipe/ foundation and disposal of surplus excavated material at a lead upto 50m suitable site as per direction of Engineer for following depths below natural ground / Road top level.				

	In all types soils/ saturated soil such as moorum, sand, sandy silt, clay, black cotton soil, kankar, etc.				
	Depth upto 1.5 m	0.56	Nos.		
90.	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work upto plinth level :				
	1:2:4 (1 Cement : 2 coarse sand : 4 graded stone aggregate 40 mm nominal size).	0.16	Cum		
91.	Centering and shuttering including strutting, propping etc. and removal of form for : Foundation etc.	5.58	Sqm.		
92.	Supplying, installing on wall, testing and commissioning of following capacity made of 1.6 mm thick sheet steel enclosure duly painted with powder coating, wall straps bus bar 100 amp. of size 400 x 300 mm	2.00	Nos.		
93.	Supplying, installation, testing & commissioning of 200 KVA transformer including service connection and all basic infrastructure to make the transformer functional of approved brand & make by BMTPC complete in all respect.	1.00	Each		
	TOTAL SUB-HEAD 10				
	SUB-HEAD 11				
	TUBE WELL				
94.	Boring/drilling bore well of required dia for casing/ strainer pipe, by suitable method prescribed in IS: 2800 (part I), including collecting samples from different strata, preparing and submitting strata chart/bore log, including hire & running charges of all equipments, tools, plants & machineries required for the job, all complete as per direction of Engineer-in-charge, upto 90 metre depth below ground level				

	All types of soil				
	300 mm dia	120.00	Meter		
95.	Supplying, assembling, lowering and fixing in vertical position in bore well, un-plasticized PVC medium well casing (CM) pipe of required dia, conforming to IS: 12818, including required hire and labour charges, fittings & accessories etc. all complete, for all depths, as per direction				
	100 mm nominal size dia	120.00	Meter		
96.	Gravel packing in tubewell construction in accordance with IS: 4097, including providing gravel fine/ medium/ coarse, in required grading & sizes as per actual requirement, all complete as per direction	7.56	Cum		
97.	Development of tube well in accordance with IS : 2800 (part I) and IS:11189, to establish maximum rate of usable water yield without sand content (beyond permissible limit), with required capacity aircompressor, running the compressor for required time till well is fully developed, measuring yield of well by “V” notch method or any other approved method, measuring static level & draw down etc. by step draw down method, collecting water samples & getting tested in approved laboratory, i/c disinfection of tubewell, all complete, including hire & labour charges of air compressor, tools & accessories etc.,all as per requirement and direction of Engineer-in-charge.	40.00	Hour		
98.	Providing and fixing suitable size threaded mild steel cap or spot welded plate to the top of bore well housing/ casing pipe, removable as per requirement, all complete for borewell of:				
	100 mm dia	1.00	No.		

99.	Providing and fixing M.S. clamp of required dia to the top of casing/housing pipe of tubewell as per IS: 2800 (part I), including necessary bolts & nuts of required size complete.				
	100 mm dia	1.00	No.		
100.	Providing and fixing Bail plug/ Bottom plug of required dia to the bottom of pipe assembly of tubewell as per IS:2800 (part I).				
	100 mm dia	1.00	No.		
101.	Providing and fixing G.I. pipes complete with G.I. fittings including trenching and refilling etc.				
	25mm pipe	98.00	Meter		
102.	Submersible Pump-15HP	2.00	No.		
103.	Starter	2.00	No.		
104.	Electrical Flat Cable	12.00	Meter		
	TOTAL SUB-HEAD 11				
	SUB-HEAD 12				
	SEPTIC TANK				
105.	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 10sqm 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				
	Depth upto 1.5 m	31.50	Cum		
106.	Extra for additional depth of 1.5 m or part thereof in: All kind of soil	31.50	Cum		
107.	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering-all work upto plinth level.				
	1:4:8 (1 Cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size).	3.15	Cum		
108.	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)	9.15	Cum		
109.	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering - All work upto plinth level :				
	1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size21)	1.88	Cum		
110.	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level :				
	1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size).	2.22	Cum		
111.	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level & above				
	Thermo-Mechanically Treated bars of grade Fe-500D or more	511.88	Kg		
112.	Centering and shuttering including strutting, propping etc. and removal of form for :				
	Suspended floors, roofs, landings, balconies and access platform	12.50	Sqm		
113.	Half brick masonry with common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 in foundations and plinth in :				
	cement mortar 1:4 (1 cement : 4 coarse sand) sqm	2.50	Sqm		
114.	12 mm cement plaster finished with a floating coat of neat cement of mix :				
	1:4 (1 cement: 4 fine sand)	37.50	Sqm		
115.	Steel work welded in built up sections/ framed work, including cutting hoisting, fixing in position	60.00	Kg		

	and applying a priming coat of approved steel primer using structural steel etc. as required.				
116.	Making soak pit. 2.5 m dia 3 m deep with 45x45 cm dry brick honey comb shaft and S.W. drain pipe 100 mm diameter, 1.8 m long complete filled with laterite stone aggregate 125 to 180 mm surrounded by laterite stone aggregate of 40 mm and down gauge as per standard design.	1.00	No.		
	TOTAL SUB-HEAD 12				

Note:

All Bidders are required to quote the rates in financial bid for both the works mentioned at A & B i.e. Dwelling Units &Community Centre and on site Infrastructure works respectively. L1 will be decided after getting the rates for both the works, otherwise, bids will be considered as no-responsive and will be rejected without assigning any reason/s.

Part-6

Soil Investigation Report

Marshal Geo Test Laboratory - LLP

Since 2006

Geotechnical Investigation Report

REPORT

SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).

LOCATION

BOREHOLE BH 01

(22°16'48.4" N, 82°10'52.88" E)

CLIENT

THE CHIEF MUNICIPAL OFFICER,
MUNICIPAL COUNCIL RATANPUR,
RATANPUR (C.G.).

REPORT REF: - MGTL-LLP/GT/04-26/08/BH 01

APRIL – 2026

SUBMITTED BY

MARSHAL GEO TEST LABORATORY LLP
PS CITY ROAD, CHANGORABHATA
RING ROAD 1, RAIPUR (C.G.)

MARSHAL GEO TEST LABORATORY - LLP RAIPUR C.G.

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Marshal Geo Test Laboratory - LLP

Since 2006

Geotechnical Investigation Report

REPORT REF: - MGTL-LLP/GT/04-26/08/BH 01
LOCATION :- BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

TABLE OF CONTENTS

1.	Introduction	01
2.	Object and Scope of Work	01
3.	Project Details	01
4.	Field Investigations Details	02
5.	Sub Profile Analysis	03
6.	Laboratory Investigations	04
7.	Results of Laboratory Tests	04
8.	Discussion & Results	05
9.	Recommendations	06
10.	Precautions	07
11.	Limitations	07
12.	List of IS Codes	08

Annexure:

i.	Annexure I	- Field Bore log
ii.	Annexure II	- Laboratory data sheet.
iii	Annexure III	-Sample calculation

MARSHAL GEO TEST LABORATORY - LLP RAIPUR C.G.

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 01
LOCATION :- BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

1. INTRODUCTION

1.1 The Chief Municipal Officer, Municipal Council Ratanpur, Ratanpur (C.G.) has proposed Construction work of 40 Houses Under Demonstration Housing Project (DHPs) in Municipal Council Ratanpur (C.G.). Marshal Geo Test Lab LLP was entrusted with the job of soil investigation to generate the required Geotechnical parameters for design of suitable foundation.

1.2 This report is submitted based on the soil investigation work completed for one borehole at BH 01 location, as marked by client in the field.

2. OBJECT AND SCOPE OF WORK

The overall purpose of study was to investigate the stratigraphy at the site and suggest tentative geotechnical recommendations for foundation design and construction. To accomplish this purpose, the study was conducted in following phases.

a) Drilling the borehole of 5.00 m depth at BH 01 location. Location and depth of investigation was as per the instructions of the client. The soil samples were collected from the borehole for laboratory testing.

b) Testing the collected samples in the laboratory to determine relevant physical and engineering properties of soil.

c) Analyzing all field and laboratory data in order to classify soil and calculate safe bearing capacity at various depths.

d) Submission of geotechnical investigation report with tentative recommendations for foundation type.

3. PROJECT DETAILS

3.1 Site:

The site for the proposed construction work is situated **at Ratanpur Nagar Palika in Chhattisgarh state.**

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 01
LOCATION :- BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

3.2 Weather Condition:

The weather condition was hot during the period of field investigation which was carried out in the month of April 2026.

3.3 Seismic Zone:

The construction site is situated in Chhattisgarh state, which falls under seismic Zone II as per IS 1893 (Part I) -2002.

We have not considered any seismic effect in the calculation of results, however structural designer may adopt suitable factor of safety if so required.

4.0 FIELD INVESTIGATIONS

4.1 Bore Holes:

As per client's work order one Borehole of 150 mm casing diameter was drilled at specified location by Mechanically Operated Rotary Core Drilling technique. The bore was progressed through all types of soil as per the instruction of the client. Sequence of borehole drilled is mentioned below.

Table: 1 The borehole was terminated at the depth tabulated below

Borehole No.	Date of starting	Date of ending	Depth in Soil (m)	Depth in Rock (m)	Final Depth (m)
BH 01	13-04-2026	13-04-2026	5.00	0.00	5.00

4.2 Groundwater table:

Groundwater table is reported in Bore Data Sheet. However, information for water table in rainy season is to be collected by client from local authority office.

4.3 Sampling:

All the samples collected were sealed to prevent loss of moisture while transporting them to the laboratory.

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 01
LOCATION :- BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

4.4 Standard Penetration Test (SPT)

This is a field test to determine "penetration resistance of soil". This has been conducted in the borehole using procedures described in **IS:2131-2002**. In this test, driving bit was replaced by split spoon sampler confirming to **IS 9640-1980** (50.8 mm OD and 35mm ID). Sampler is then driven by dropping 63.50 kg hammer on top of driving collar with free fall of 75 cm. The length of sampler is 60 cm. Sampler is first driven in 15 cm as "seating drive". It is further driven in 30 cm. Number of blows required to drive the sampler for 30 cm beyond seating drive is termed as " Penetration Resistance, "N". "Refusal" means when sampler penetrates less than 2.5 to 4.0 cm under 50 blows, generally in the second and third segment of 15 cm after initial seating drive or negligible penetration after 100 blows.

Borehole Number	Depth (m) From EGL	Unit Weight of soil (gm/cc)	Overburden Pressure (T/m^2)	"N" Value from Field
BH 01	1.50	2.07	3.105	29
	2.00	2.01	4.140	12
	2.50	-	5.145	-
	3.00	2.03	6.150	15
	4.00	2.00	7.159	19
	5.00	1.98	8.156	23

From the SPT values recorded at testing depth, shear parameters are calculated as per Terzagi and Peck equation and **(IS 6403-1981, Clause 5.3, Figure-1) .**

5.0 SUB SOIL PROFILE ANALYSIS:

5.1 The general stratification is reported below after completing the boring work at 01 no. of borehole location up to maximum 5.00 m depth from EGL and as per samples recovered & tested in the laboratory.

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LOCATION :- BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

Borehole no. BH 01

At this location, there was Inorganic Clay of Medium to High Plasticity strata up to 3.60 m depth from EGL. Standard Penetration Test (SPT) was conducted at depths 1.50 m ("N" value recorded was N = 29), 2.00 m ("N" value recorded was N = 12) & 3.00 m ("N" value recorded was N = 15). Below this there was Sandy Clay strata up to 4.70 m depth. Standard Penetration Test (SPT) was conducted at 4.00 m depth ("N" value recorded was N = 19). This was followed by Silty Clay strata up to 5.00 m depth, i.e. up to final depth of investigation. Standard Penetration Test (SPT) was conducted at 5.00 m depth ("N" value recorded was N = 23). (Refer - Lab Data sheet - BH 01).

6. LABORATORY INVESTIGATIONS

6.1 Laboratory investigations were carried out to evaluate the Physical and Engineering properties of the sub soil strata which further provides data for making suitable suggestions for foundation design.

6.2 Following Laboratory tests were conducted on the soil samples collected:

a) Grain Size Analysis
b) Atterberg's Limits
c) Natural Moisture Content
d) Specific Gravity of soil
e) Bulk Density
f) Unconfined Compressive Strength of Soil

7.0 RESULTS OF LABORATORY TESTS:

7.1 Laboratory Tests were conducted on the Soil samples collected from Bore hole. The results of field and laboratory investigation are indicated in the Lab data sheets.

7.2 The lab data sheets include description and classification of Soil, sub soil profile at various depths etc.

7.3 Variation in the physical and strength properties of Soil are as given below:

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LOCATION :- BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

7.3.1 Grain Size Distribution

The range of Grain Size Distribution for soil strata is as follows. (As per IS 2720 part-IV).

BH No.	Depth From EGL (Mtr)	Grain Size Analysis (%)		
		Gravel	Sand	Silt & Clay
BH 01	1.50	0.00	14.00	86.00
	2.00	4.00	12.00	84.00
	3.00	0.00	10.00	90.00
	4.00	0.00	38.00	62.00
	5.00	0.00	18.00	82.00

7.3.2 Atterberg's Limits, Bulk Density and Specific Gravity of Soil

The Ranges of water content and Bulk Density of Soil are given below:

BH No.	Depth (Mtr)	Natural Moisture Content	Atterberg's Limit (%)			Bulk Density (T/m^3)
			W_L	W_P	I_P	
BH 01	1.50	10.04	48.76	20.85	27.91	2.07
	2.00	9.68	48.00	21.08	26.92	2.01
	3.00	18.87	47.58	21.24	26.34	2.03
	4.00	21.06	41.56	17.32	24.23	2.00
	5.00	20.14	40.17	17.37	22.70	1.98

8. DISCUSSION & RESULTS:

8.1 The general stratification of strata at this borehole location comprises of Clayey Soil strata up to 3.60 m depth from EGL. Below this there was C – Ø type of Soil strata up to 5.00 m depth, i.e. up to the final depth of exploration.

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 01

LOCATION :- BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

8.2 The Net Bearing Capacity for foundation depths 1.50 m, 2.00 m, 2.50 m & 3.00 m from EGL is calculated for footing size 2 m X 2 m, 3 m X 3 m & 4 m X 4 m. SBC has been calculated from shear failure criteria.

BH. No.	Df (m)	Description of Strata	Size of Footing (m)	Net Safe Bearing capacity (T/m^2)	Safe Bearing capacity (T/m^2)
BH 01	1.50	Inorganic Clay of Medium to High Plasticity	2 x 2	9.70	12.80
			3 x 3	9.31	12.41
			4 x 4	9.18	12.28
	2.00		2 x 2	10.28	14.42
			3 x 3	9.75	13.89
			4 x 4	9.55	13.69
	2.50		2 x 2	8.72	13.86
			3 x 3	10.19	15.33
			4 x 4	9.91	15.06
	3.00	Sandy Clay	2 x 2	8.87	15.02
			3 x 3	10.63	16.78
			4 x 4	10.28	16.43

9. RECOMMENDATION

On appraisal and analysis of the test results, soil profile at borehole location & the nature of structure under consideration, Isolated Footing Foundation / Raft Foundation can be recommended depending upon the loads on the columns and grids spacing. The provision of 600 mm thick Boulder Muroom soling below the foundation is recommended. The Net Bearing Capacity for foundation depths 1.50 m, 2.00 m, 2.50 m & 3.00 m for different footing sizes is reported in Clause No. 8.2 of this report.

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 01
LOCATION :- BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

10 PRECAUTIONS

10.1 Entire report should be studied before implementing the recommendations.

10.2 Special measures for proper drainage of water during construction must be adopted.

11. LIMITATIONS

11.1 The above suggestion is based on the field data collected from one bore hole location and up to the depth for which investigation has been conducted and result of laboratory test carried out on the samples recovered from the test bore hole.

In case the proposed structure are located away from the test location and/or the actual subsoil conditions varied during the excavation for various foundation and is found to be different from what has been reported above, Marshal Geo Test Laboratory LLP should be contacted for further advice.

Note:- *Any queries or clarifications related to this report should be communicated to Marshal Geo Test Laboratory LLP by E-Mail, Courier within 30 days of receipt of this Report.*

DATE : 21-04-2026

Compiled By:	Verified By:	Authorized Signatory:
Komal Shrawankar (Geotechnical Engineer)	**Avinash Vaishampayan** (T.M.)	**Arun T. Bhave** (C.E.O.)

Disclaimer – ***In no case shall Marshal Geo Test Laboratory LLP, Raipur be deemed responsible for any suggestions / recommendations made, except the ones mentioned in this report. The responsibility shall solely be of the client.***

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 01
LOCATION :- BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

12. LIST OF IS CODES REFERRED

IS 1892	1979	Code of practice for sub surface investigation for foundations.
IS 2131	1981	Method of standard penetration test for soils.
IS 2132	1986	Code of practice for thin walled tube Sampling of soil
IS 2720 (Part-1)	1983	Preparation of soil samples
IS 2720(Part-2)	1973	Determination of water content
IS 2720(Part-4)	1985	Grain Size Analysis
IS 2720(Part-5)	1985	Atterberg's Limits
IS 9143	1979	Unconfined Compression test of Rock Samples.
IS 1904	1978	Code of Practice for Structural safety of Buildings: Shallow Foundations
IS 2950(Part-1)	1981	Code of Practice for Design and Construction of Raft Foundation.
IS :2911 (Part 1/ Sec2)	2010	Code of Design and Construction of Pile Foundations.
IS 6403	1981	Code of Practice for determination of Bearing Capacity of Shallow Foundations.
IRC 78:2014	2014	Standard specifications and code of practice for road bridges

BOOKS

Sr No.	Author	Title
1	Gopal Ranjan and A.S.R. Rao	Basic And Applied Soil Mechanics
2	Narayan V. Nayak	Foundation Design Manual
3.	J.E. Bowles	Foundation Analysis and Design (McGraw Hill Publications) 5th Edition
4.	Braja M. Das	Foundation Engineering (Bearing Capacity of Layered Soil by Meyerhof and Hanna & Meyerhof)

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Marshal Geo Test Laboratory - LLP

Since 2006

Geotechnical Investigation Report

PROJECT : SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).

ANNEXURE - I (BORE LOG DATA SHEET)

Site : RATANPUR (C.G.).		Client: THE CHIEF MUNICIPAL OFFICER, MUNICIPAL COUNCIL RATANPUR, RATANPUR (C.G.).
Type of Boring	Wash Boring with Casing	Job No : MGTL-LLP/GT/04-26/08/BH 01
Dia of Hole (mm) :	125	Bore Hole No : BH 01
Depth (m)	0.00 - 5.00	Co-ordinates : 22°16'48.4" N, 82°10'52.88" E
Commenced on : 13.04.2026	Completed on: 13.04.2026	Reduced Level (RL) :
Structure : 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs)	Ground Water Table (GWT) : 3.10 m	Location of Borehole : BH 01

Sample Type	Depth of Strata	ThK. (m)	Description of Strata	Symbol	Sample Ref.No	SPT Record				SPT Curve	Core Recovery	RQD	Remarks
						0 - 150	150-300	300-450	N				
SPT	0.00 - 1.50	1.50	INORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY		SPT 1	11	14	15	29		-	-	
SPT	1.50 - 2.00	0.50			SPT 2	4	6	6	12		-	-	
SPT	2.00 - 3.00	1.00			SPT 3	5	7	8	15		-	-	
-	3.00 - 3.60	0.60			-	-	-	-	-		-	-	
SPT	3.60 - 4.00	0.40	SANDY CLAY		SPT 4	6	7	12	19		-	-	
-	4.00 - 4.70	0.70			-	-	-	-	-		-	-	
SPT	4.70 - 5.00	0.30	SILTY CLAY		SPT 5	6	8	15	23		-	-	

D- Disturbed Sample, U-Undisturbed Sample, P- Standard penetration Test, C-Core, W-Water Sample, V-Vane Test

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ANNEXURE - II

SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).

MARSHAL GEO TEST LABORATORY LLP
JOB NO. MGTL-LLP/GT/04- 26/08/BH 01
Date :- 13-04-2026 TO 13-04-2026

THE CHIEF MUNICIPAL OFFICER, MUNICIPAL COUNCIL RATANPUR, RATANPUR (C.G.).

LOCATION
BOREHOLE BH 01
22°16'48.4" N, 82°10'52.88" E

GROUND WATER TABLE - 3.10 M

TYPE OF SAMPLE	DEPTH (m) From Existing Ground Level	SUB SOIL PROFILE	SOIL DESCRIPTION	SPT 'N' VALUES	GRAIN SIZE DISTRIBUTION SIEVE ANALYSIS					ATTERBERG'S LIMITS			FIELD DENSITY - NMC					SHEAR PARAMETERS		SBC = NET SBC + OVERBURDEN										
					GRAVEL %	COARSE SAND %	MEDIUM SAND %	FINE SAND %	SILTY+CLAY %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	NATURAL MOISTURE CONTENT	BULK DENSITY t/m³	DRY DENSITY gm/cc	WATER ABSORPTION (%)	SPECIFIC GRAVITY	RELATIVE DENSITY	UNDRAINED COHESION (C_u) (t/M²)	UNDRAINED ANGLE OF FRICTION $Ø_u$	SAFE BEARING CAPACITY IN (T/m²) (2 m X 2 m)	SAFE BEARING CAPACITY IN (T/m²) (3 m X 3 m)	SAFE BEARING CAPACITY IN (T/m²) (4 m X 4 m)	RECOVERY RATIO (%)	ROCK QUALITY DESIGNATION (%)	CRU/COMP. STRENGTH (N/mm²)	ALLOWABLE BEARING PRESSURE (N/mm²)	ALLOWABLE BEARING PRESSURE / SAFE BEARING CAPACITY (T/m²)
SPT	1.50			29	0.00	3.00	2.00	9.00	86.00	48.76	20.85	27.91	10.04	2.07	1.82	-	2.69	-	4.50	5.00	12.80	12.41	12.28	-	-	-	-	-
SPT	2.00			12	4.00	2.00	5.00	5.00	84.00	48.00	21.08	26.92	9.68	2.01	1.78	-	2.70	-	4.50	5.00	14.42	13.89	13.69	-	-	-	-	-
-	2.50		INORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY	-	4.00	2.00	5.00	5.00	84.00	48.00	21.08	26.92	9.68	2.01	1.78	-	2.70	-	4.50	5.00	13.86	15.33	15.06	-	-	-	-	-
SPT	3.00			15	0.00	2.00	2.00	6.00	90.00	47.58	21.24	26.34	18.87	2.03	1.71	-	2.71	-	4.50	5.00	15.02	16.78	16.43	-	-	-	-	-
-	3.60			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPT	4.00			19	0.00	6.00	16.00	16.00	62.00	41.56	17.32	24.23	21.08	2.00	1.65	-	2.68	-	-	-	-	-	-	-	-	-	-	-
-	4.70		SANDY CLAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPT	5.00		SILTY CLAY	23	0.00	0.00	6.00	12.00	82.00	40.17	17.37	22.70	20.14	1.98	1.65	-	2.67	-	-	-	-	-	-	-	-	-	-	-

GWT variation is to be verified by Client. Classification of Rock is done as per IRC 78-2000, Ref Table No-2

ANNEXURE III

SAMPLE CALCULATION OF SAFE BEARING CAPACITY FOR FOUNDATION
(Reference: IS Code 6403 - 1981)

The depth factor, shape factor, load inclination factor and water table correction are mentioned below. The Ultimate net bearing capacity of soil for **BH 01 at 2.50 m** depth from EGL as per IS: 6403-1981 is given below as sample calculation.

$$qd = (2/3)C.N_c.s_c.d_c.i_c + q(N_q - 1).S_q.d_q.i_q + 0.5\,B_y.N_y.s_y.d_y.i_y.W'$$

>Corresponding values of N_c, N_q and N_y are obtained from bearing capacity table. (Clause 5.1.1)

N_C = 6.042
N_q = 1.381
N_Y = 0.300

>Shape factor for square footing.

S_C = 1.30
S_q = 1.20
S_Y = 0.80

>Depth factor (d_c=1+0.2 Dt/B √Nϕ and $d_q = d_y = 1$ for $\phi < 10^0$ or $d_q = d_y$ = 1+ 0.1 Dt/B √Nϕ for$\phi > 10^0$)

dc=1+0.2 Dt/B √Nϕ
dq = dy = 1 for $\phi < 10^0$
or dq= dy = 1+ 0.1 Dt/B √Nϕ for $\phi > 10^0$

>Inclination factor is considered as 1

>Water table correction considered as 0.5

>C_u = 4.50 T/m^2, ϕ_u = 5.00 ° $\emptyset_m$ = 3.34 ° Y = 2.01 g/cc

>Effective Surcharge (q) = (2.00 X 2.07) + (0.50 X 2.01)
= 5.145 T/m^2

>Width of foundation (B) = 3 m X 3 m

>**q_{nu}** = 2/3*4.50*6.042*1.3*1.18*1 + 5.145 (1.381 - 1)*1.2*1.00*1 +0.5*3*2.01*0.30*0.8*1.00*1.0*0.5

>q_{nu} = 27.85 + 2.35 + 0.36

>q_{nu} = 30.56 T/m^2

> Safe Bearing Capacity, $q_s = q_{nu}/3 + q$ (Adopting F.O.S. = 3.0)

>**q_s** = **15.33** T/m^2

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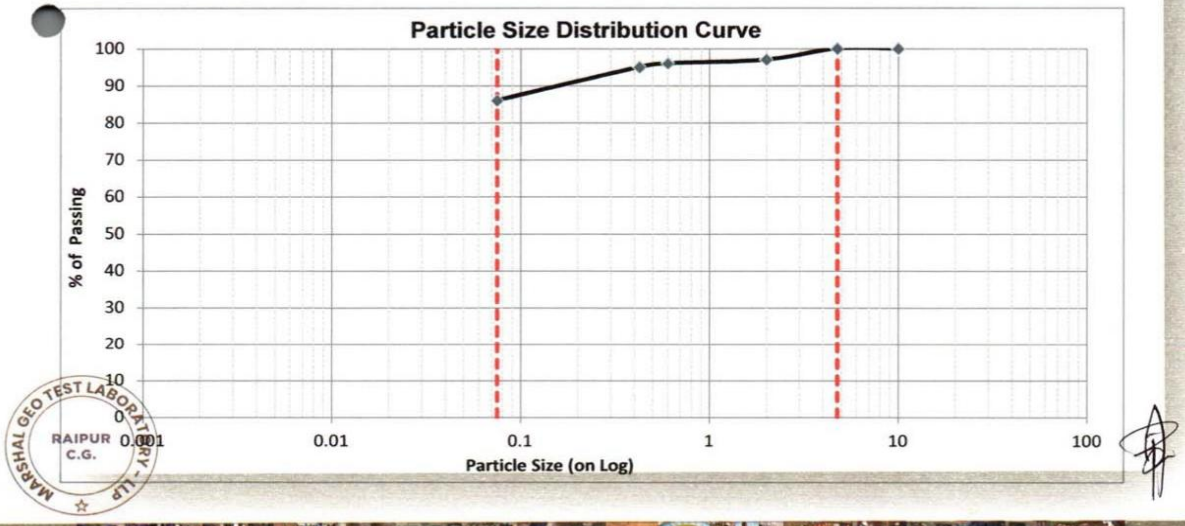
THE CHIEF MUNICIPAL OFFICER, MUNICIPAL COUNCIL RATANPUR, RATANPUR (C.G.).	SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).	LOCATION BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

BORE HOLE No.	BH 01	DEPTH	1.50 m

		100 gms			
S.No	Sieve Size mm	Weight Retained	Cumulative Weight Retained	Cum. Wt. of sample passing through sieve	Percentage of total passing
		Grams	Grams	Grams	
1	2	3	4	5	6
1	10	0.0	0.0	100	100
2	4.750	0	0	100	100.00
3	2.000	3	3	97	97.00
4	0.600	1	4	96	96.00
5	0.425	1	5	95	95.00
6	0.075	9	14	86	86.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
86.00	9.00	2.00	3.00	0.00



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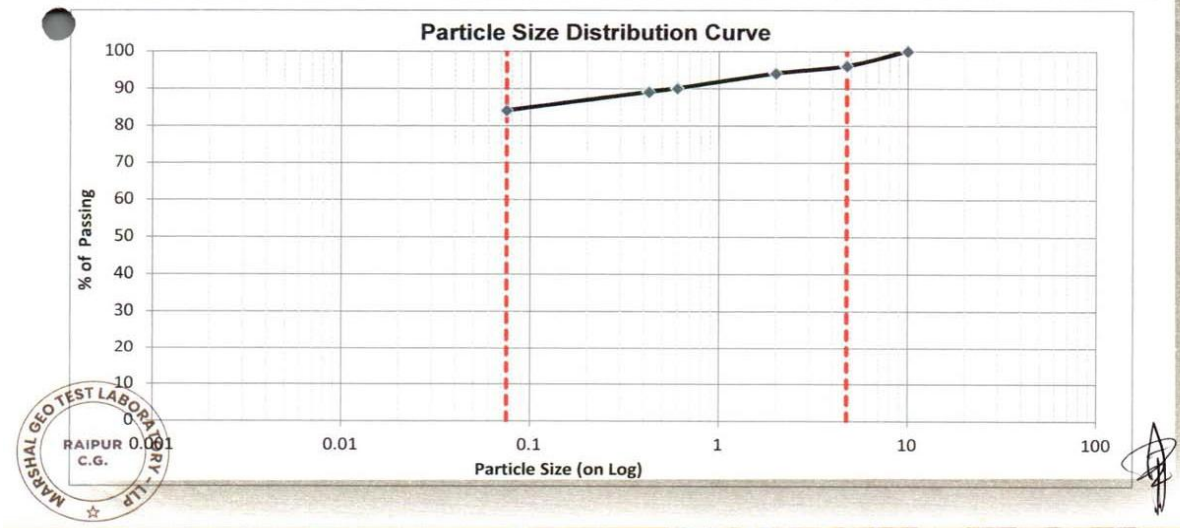
BORE HOLE No.	BH 01	DEPTH	2.00 m

100 gms

S.No	Sieve Size mm	Weight Retained Grams	Cumulative Weight Retained Grams	Cum. Wt. of sample passing through sieve Grams	Percentage of total passing
1	2	3	4	5	6
1	10	0.0	0.0	100	100
2	4.750	4	4	96	96.00
3	2.000	2	6	94	94.00
4	0.600	4	10	90	90.00
5	0.425	1	11	89	89.00
6	0.075	5	16	84	84.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
84.00	5.00	5.00	2.00	4.00



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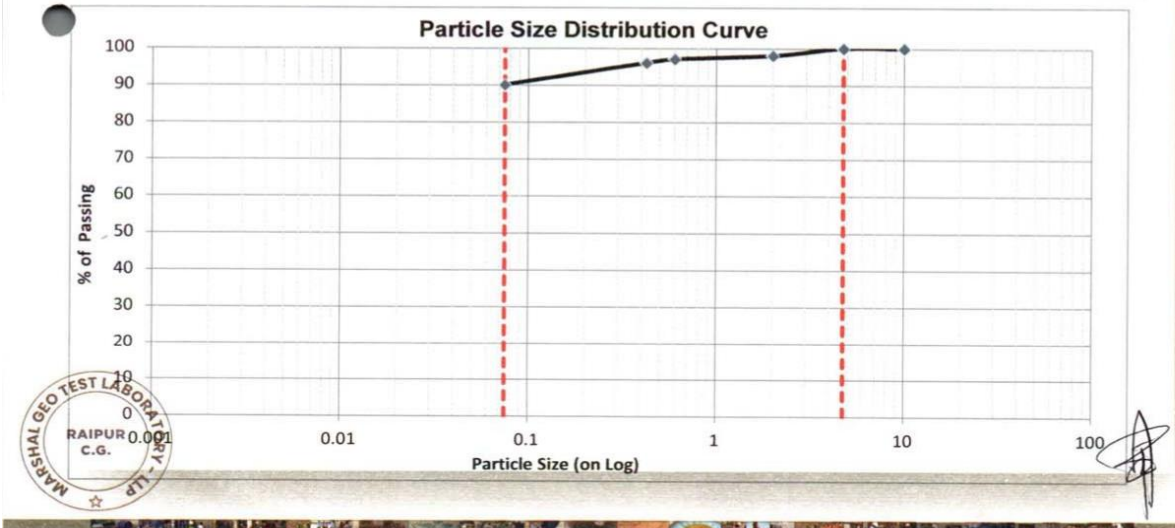
BORE HOLE No.	BH 01	DEPTH	3.00 m

100 gms

S.No	Sieve Size mm	Weight Retained Grams	Cumulative Weight Retained Grams	Cum. Wt. of sample passing through sieve Grams	Percentage of total passing
1	2	3	4	5	6
1	10	0.0	0.0	100	100
2	4.750	0	0	100	100.00
3	2.000	2	2	98	98.00
4	0.600	1	3	97	97.00
5	0.425	1	4	96	96.00
6	0.075	6	10	90	90.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
90.00	6.00	2.00	2.00	0.00



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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 01

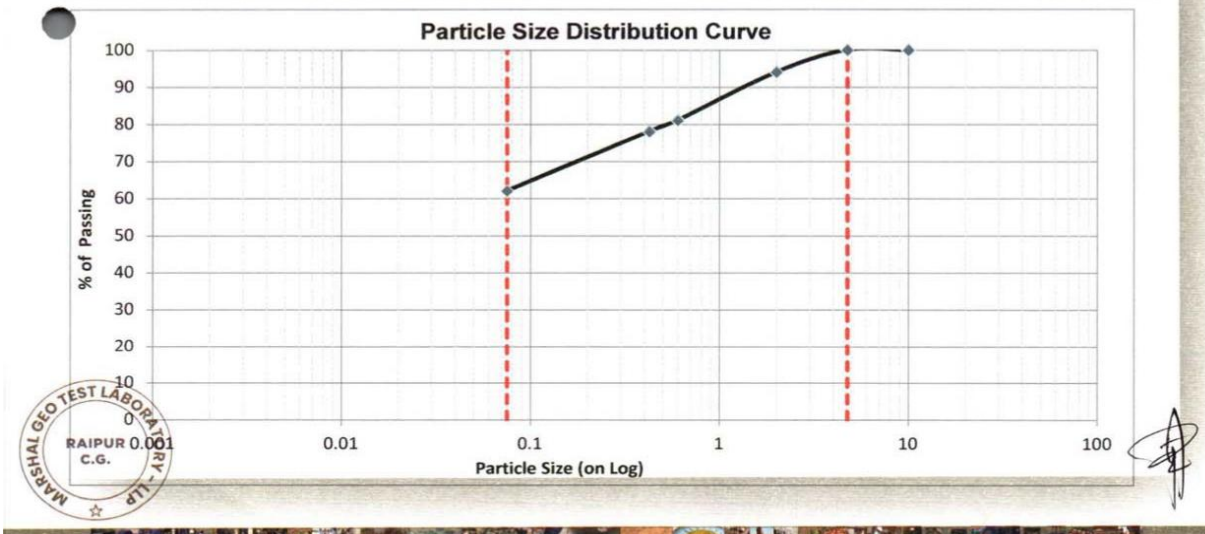
THE CHIEF MUNICIPAL OFFICER, MUNICIPAL COUNCIL RATANPUR, RATANPUR (C.G.).	SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).	LOCATION BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

BORE HOLE No.	BH 01	DEPTH	4.00 m

100 gms

S.No	Sieve Size mm	Weight Retained Grams	Cumulative Weight Retained Grams	Cum. Wt. of sample passing through sieve Grams	Percentage of total passing
1	2	3	4	5	6
1	10	0.0	0.0	100	100
2	4.750	0	0	100	100.00
3	2.000	6	6	94	94.00
4	0.600	13	19	81	81.00
5	0.425	3	22	78	78.00
6	0.075	16	38	62	62.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
62.00	16.00	16.00	6.00	0.00



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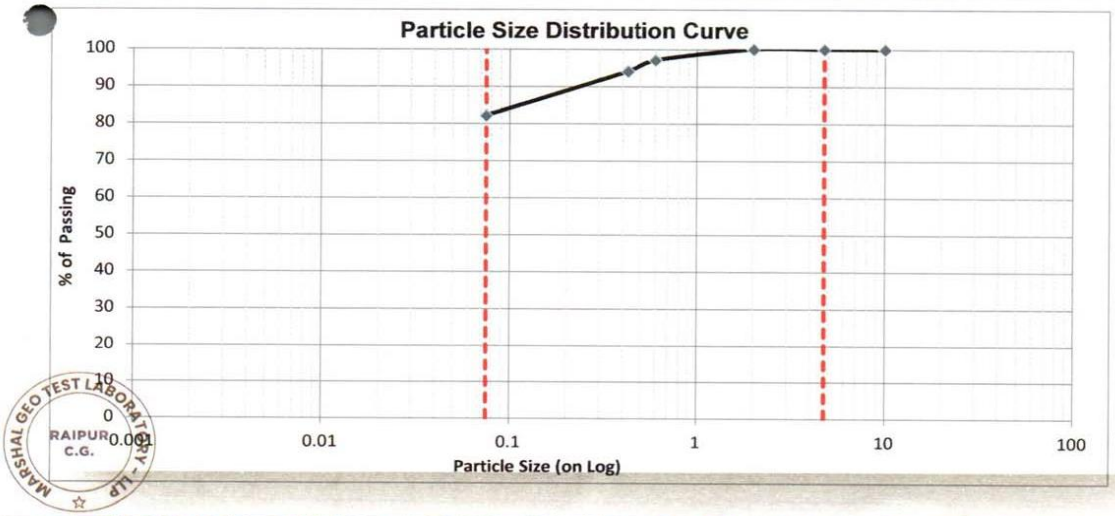
THE CHIEF MUNICIPAL OFFICER, MUNICIPAL COUNCIL RATANPUR, RATANPUR (C.G.).	SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).	LOCATION BOREHOLE BH 01 (22°16'48.4" N, 82°10'52.88" E)

BORE HOLE No.	BH 01	DEPTH	5.00 m

100 gms

S.No	Sieve Size mm	Weight Retained Grams	Cumulative Weight Retained Grams	Cum. Wt. of sample passing through sieve Grams	Percentage of total passing
1	2	3	4	5	6
1	10	0.0	0.0	100	100
2	4.750	0	0	100	100.00
3	2.000	0	0	100	100.00
4	0.600	3	3	97	97.00
5	0.425	3	6	94	94.00
6	0.075	12	18	82	82.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
82.00	12.00	6.00	0.00	0.00



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REPORT

SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).

LOCATION

BOREHOLE BH 02

(22°16'51.65" N, 82°10'17.95" E)

CLIENT

THE CHIEF MUNICIPAL OFFICER,
MUNICIPAL COUNCIL RATANPUR,
RATANPUR (C.G.).

REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02

APRIL – 2026

SUBMITTED BY

MARSHAL GEO TEST LABORATORY LLP
PS CITY ROAD, CHANGORABHATA
RING ROAD 1, RAIPUR (C.G.)

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02
LOCATION :- BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

TABLE OF CONTENTS

1.	Introduction	01
2.	Object and Scope of Work	01
3.	Project Details	01
4.	Field Investigations Details	02
5.	Sub Profile Analysis	03
6.	Laboratory Investigations	04
7.	Results of Laboratory Tests	04
8.	Discussion & Results	05
9.	Recommendations	06
10.	Precautions	07
11.	Limitations	07
12.	List of IS Codes	08

Annexure:

i.	Annexure I	- Field Bore log
ii.	Annexure II	- Laboratory data sheet.
iii	Annexure III	-Sample calculation

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02
LOCATION :- BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

1. INTRODUCTION

1.1 The Chief Municipal Officer, Municipal Council Ratanpur, Ratanpur (C.G.) has proposed Construction work of 40 Houses Under Demonstration Housing Project (DHPs) in Municipal Council Ratanpur (C.G.). Marshal Geo Test Lab LLP was entrusted with the job of soil investigation to generate the required Geotechnical parameters for design of suitable foundation.

1.2 This report is submitted based on the soil investigation work completed for one borehole at BH 02 location, as marked by client in the field.

2. OBJECT AND SCOPE OF WORK

The overall purpose of study was to investigate the stratigraphy at the site and suggest tentative geotechnical recommendations for foundation design and construction. To accomplish this purpose, the study was conducted in following phases.

a) Drilling the borehole of 5.00 m depth at BH 02 location. Location and depth of investigation was as per the instructions of the client. The soil samples were collected from the borehole for laboratory testing.

b) Testing the collected samples in the laboratory to determine relevant physical and engineering properties of soil.

c) Analyzing all field and laboratory data in order to classify soil and calculate safe bearing capacity at various depths.

d) Submission of geotechnical investigation report with tentative recommendations for foundation type.

3. PROJECT DETAILS

3.1 Site:

The site for the proposed construction work is situated **at Ratanpur Nagar Palika in Chhattisgarh state.**

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02
LOCATION :- BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

3.2 Weather Condition:

The weather condition was hot during the period of field investigation which was carried out in the month of April 2026.

3.3 Seismic Zone:

The construction site is situated in Chhattisgarh state, which falls under seismic Zone II as per IS 1893 (Part I) -2002.

We have not considered any seismic effect in the calculation of results, however structural designer may adopt suitable factor of safety if so required.

4.0 FIELD INVESTIGATIONS

4.1 Bore Holes:

As per client's work order one Borehole of 150 mm casing diameter was drilled at specified location by Mechanically Operated Rotary Core Drilling technique. The bore was progressed through all types of soil as per the instruction of the client. Sequence of borehole drilled is mentioned below.

Table: 1 The borehole was terminated at the depth tabulated below

Borehole No.	Date of starting	Date of ending	Depth in Soil (m)	Depth in Rock (m)	Final Depth (m)
BH 02	14-04-2026	14-04-2026	5.00	0.00	5.00

4.2 Groundwater table:

Groundwater table is reported in Bore Data Sheet. However, information for water table in rainy season is to be collected by client from local authority office.

4.3 Sampling:

All the samples collected were sealed to prevent loss of moisture while transporting them to the laboratory.

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02
LOCATION :- BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

4.4 Standard Penetration Test (SPT)

This is a field test to determine "penetration resistance of soil". This has been conducted in the borehole using procedures described in **IS:2131-2002**. In this test, driving bit was replaced by split spoon sampler confirming to **IS 9640-1980** (50.8 mm OD and 35mm ID). Sampler is then driven by dropping 63.50 kg hammer on top of driving collar with free fall of 75 cm. The length of sampler is 60 cm. Sampler is first driven in 15 cm as "seating drive". It is further driven in 30 cm. Number of blows required to drive the sampler for 30 cm beyond seating drive is termed as " Penetration Resistance, "N". "Refusal" means when sampler penetrates less than 2.5 to 4.0 cm under 50 blows, generally in the second and third segment of 15 cm after initial seating drive or negligible penetration after 100 blows.

Borehole Number	Depth (m) From EGL	Unit Weight of soil (gm/cc)	Overburden Pressure (T/m^2)	"N" Value from Field
BH 02	1.50	2.05	3.075	28
	2.00	2.00	4.100	30
	2.50	-	5.100	-
	3.00	2.16	6.148	31
	4.00	2.05	7.228	18
	5.00	2.10	8.253	51

From the SPT values recorded at testing depth, shear parameters are calculated as per Terzagi and Peck equation and **(IS 6403-1981, Clause 5.3, Figure-1) .**

5.0 SUB SOIL PROFILE ANALYSIS:

5.1 The general stratification is reported below after completing the boring work at 01 no. of borehole location up to maximum 5.00 m depth from EGL and as per samples recovered & tested in the laboratory.

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02
LOCATION :- BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

Borehole no. BH 02

At this location, there was Inorganic Clay of Medium to High Plasticity strata up to 2.70 m depth from EGL. Standard Penetration Test (SPT) was conducted at depths 1.50 m ("N" value recorded was N = 28) & 2.00 m ("N" value recorded was N = 30). Below this there was Gravelly Clayey Sand strata up to to 5.00 m depth, i.e. up to final depth of investigation. Standard Penetration Test (SPT) was conducted at depths 3.00 m ("N" value recorded was N = 31), 4.00 m ("N" value recorded was N = 18) & 5.00 m ("N" value recorded was N = 51). (Refer - Lab Data sheet - BH 02).

6. LABORATORY INVESTIGATIONS

6.1 Laboratory investigations were carried out to evaluate the Physical and Engineering properties of the sub soil strata which further provides data for making suitable suggestions for foundation design.

6.2 Following Laboratory tests were conducted on the soil samples collected:

a) Grain Size Analysis
b) Atterberg's Limits
c) Natural Moisture Content
d) Specific Gravity of soil
e) Bulk Density
f) Unconfined Compressive Strength of Soil

7.0 RESULTS OF LABORATORY TESTS:

7.1 Laboratory Tests were conducted on the Soil samples collected from Bore hole. The results of field and laboratory investigation are indicated in the Lab data sheets.

7.2 The lab data sheets include description and classification of Soil, sub soil profile at various depths etc.

7.3 Variation in the physical and strength properties of Soil are as given below:

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02
LOCATION :- BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

7.3.1 Grain Size Distribution

The range of Grain Size Distribution for soil strata is as follows. (As per IS 2720 part-IV).

BH No.	Depth From EGL (Mtr)	Grain Size Analysis (%)		
		Gravel	Sand	Silt & Clay
BH 02	1.50	4.00	16.00	80.00
	2.00	0.00	10.00	90.00
	3.00	16.00	78.00	6.00
	4.00	18.00	24.00	58.00
	5.00	12.07	37.93	50.00

7.3.2 Atterberg's Limits, Bulk Density and Specific Gravity of Soil

The Ranges of water content and Bulk Density of Soil are given below:

BH No.	Depth (Mtr)	Natural Moisture Content	Atterberg's Limit (%)			Bulk Density (T/m^3)
			W_L	W_P	I_P	
BH 02	1.50	15.60	49.83	21.65	28.18	2.05
	2.00	16.33	50.39	21.59	28.80	2.00
	3.00	19.82	Non – Plastic			2.16
	4.00	20.91	43.38	20.56	22.82	2.05
	5.00	19.24	41.13	19.47	21.66	2.10

8. DISCUSSION & RESULTS:

8.1 The general stratification of strata at this borehole location comprises of Clayey Soil strata up to 2.70 m depth from EGL. Below this there was C – Ø type of Soil strata up to 5.00 m depth, i.e. up to the final depth of exploration.

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02
LOCATION :- BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

8.2 The Net Bearing Capacity for foundation depths 1.50 m, 2.00 m, 2.50 m & 3.00 m from EGL is calculated for footing size 2 m X 2 m, 3 m X 3 m & 4 m X 4 m. SBC has been calculated from shear failure criteria.

BH. No.	Df (m)	Description of Strata	Size of Footing (m)	Net Safe Bearing capacity (T/m^2)	Safe Bearing capacity (T/m^2)
BH 02	1.50	Inorganic Clay of Medium to High Plasticity	2 x 2	10.27	12.34
			3 x 3	9.85	12.92
			4 x 4	9.70	12.77
	2.00		2 x 2	10.84	14.97
			3 x 3	10.24	14.37
			4 x 4	10.05	14.15
	2.50		2 x 2	9.15	14.25
			3 x 3	10.70	15.80
			4 x 4	10.40	15.50
	3.00	Gravelly Clayey Sand	2 x 2	12.03	18.18
			3 x 3	14.62	20.77
			4 x 4	14.76	20.91

9. RECOMMENDATION

On appraisal and analysis of the test results, soil profile at borehole location & the nature of structure under consideration, Isolated Footing Foundation / Raft Foundation can be recommended depending upon the loads on the columns and grids spacing. The Net Bearing Capacity for foundation depths 1.50 m, 2.00 m, 2.50 m & 3.00 m for different footing sizes is reported in Clause No. 8.2 of this report.

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02
LOCATION :- BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

10 PRECAUTIONS

10.1 Entire report should be studied before implementing the recommendations.

10.2 Special measures for proper drainage of water during construction must be adopted.

11. LIMITATIONS

11.1 The above suggestion is based on the field data collected from one bore hole location and up to the depth for which investigation has been conducted and result of laboratory test carried out on the samples recovered from the test bore hole.

In case the proposed structure are located away from the test location and/or the actual subsoil conditions varied during the excavation for various foundation and is found to be different from what has been reported above, Marshal Geo Test Laboratory LLP should be contacted for further advice.

Note:- *Any queries or clarifications related to this report should be communicated to Marshal Geo Test Laboratory LLP by E-Mail, Courier within 30 days of receipt of this Report.*

DATE : 21-04-2026

Compiled By:	Verified By:	Authorized Signatory:
Komal Shrawankar (Geotechnical Engineer)	**Avinash Vaishampayan** (T.M.)	**Arun T. Bhave** (C.E.O.)

Disclaimer – ***In no case shall Marshal Geo Test Laboratory LLP, Raipur be deemed responsible for any suggestions / recommendations made, except the ones mentioned in this report. The responsibility shall solely be of the client.***

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REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02
LOCATION :- BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

12. LIST OF IS CODES REFERRED

IS 1892	1979	Code of practice for sub surface investigation for foundations.
IS 2131	1981	Method of standard penetration test for soils.
IS 2132	1986	Code of practice for thin walled tube Sampling of soil
IS 2720 (Part-1)	1983	Preparation of soil samples
IS 2720(Part-2)	1973	Determination of water content
IS 2720(Part-4)	1985	Grain Size Analysis
IS 2720(Part-5)	1985	Atterberg's Limits
IS 9143	1979	Unconfined Compression test of Rock Samples.
IS 1904	1978	Code of Practice for Structural safety of Buildings: Shallow Foundations
IS 2950(Part-1)	1981	Code of Practice for Design and Construction of Raft Foundation.
IS :2911 (Part 1/ Sec2)	2010	Code of Design and Construction of Pile Foundations.
IS 6403	1981	Code of Practice for determination of Bearing Capacity of Shallow Foundations.
IRC 78:2014	2014	Standard specifications and code of practice for road bridges

BOOKS

Sr No.	Author	Title
1	Gopal Ranjan and A.S.R. Rao	Basic And Applied Soil Mechanics
2	Narayan V. Nayak	Foundation Design Manual
3.	J.E. Bowles	Foundation Analysis and Design (McGraw Hill Publications) 5th Edition
4.	Braja M. Das	Foundation Engineering (Bearing Capacity of Layered Soil by Meyerhof and Hanna & Meyerhof)

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PROJECT : SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).

ANNEXURE - I (BORE LOG DATA SHEET)

Site : RATANPUR (C.G.).		Client: THE CHIEF MUNICIPAL OFFICER, MUNICIPAL COUNCIL RATANPUR, RATANPUR (C.G.).
Type of Boring	Wash Boring with Casing	Job No : MGTL-LLP/GT/04-26/08/BH 02
Dia of Hole (mm) :	125	Bore Hole No : BH 02
Depth (m)	0.00 - 5.00	Co-ordinates : 22°16'51.65" N, 82°10'17.95" E
Commenced on : 14.04.2026	Completed on: 14.04.2026	Reduced Level (RL) :
Structure : 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs)	Ground Water Table (GWT) : 3.00 m	Location of Borehole : BH 02

Sample Type	Depth of Strata	ThK. (m)	Description of Strata	Symbol	Sample Ref.No	SPT Record 0 - 150	150-300	300-450	N	SPT Curve	Core Recovery	RQD	Remarks
SPT	0.00 - 1.50	1.50	INORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY		SPT 1	10	13	15	28		-	-	
SPT	1.50 - 2.00	0.50			SPT 2	8	12	18	30		-	-	
-	2.00 - 2.70	0.70			-	-	-	-	-		-	-	
SPT	2.70 - 3.00	0.30	GRAVELLY CLAYEY SAND		SPT 3	10	12	19	31		-	-	
SPT	3.00 - 4.00	1.00			SPT 4	6	8	10	18		-	-	
SPT	4.00 - 5.00	1.00			SPT 5	6	9	42	51		-	-	

D- Disturbed Sample, U-Undisturbed Sample, P- Standard penetration Test, C-Core, W-Water Sample, V-Vane Test

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ANNEXURE - II

MARSHAL GEO TEST LABORATORY LLP JOB NO. MGTL-LLP/GT/04- 26/08/BH 02 Date :- 14-04-2026 TO 14-04-2026			THE CHIEF MUNICIPAL OFFICER, MUNICIPAL COUNCIL RATANPUR, RATANPUR (C.G.).	SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).												GROUND WATER TABLE - 3.00 M				LOCATION BOREHOLE BH 02 22°16'51.65" N, 82°10'17.95" E			
TYPE OF SAMPLE	DEPTH (m) From Existing Ground Level	SUB SOIL PROFILE	SOIL DESCRIPTION	SPT 'N' VALUES	GRAIN SIZE DISTRIBUTION SIEVE ANALYSIS					ATTERBERG'S LIMITS			FIELD DENSITY - NMC		WATER ABSORPTION (%)	SPECIFIC GRAVITY	RELATIVE DENSITY	SHEAR PARAMETERS		SBC = NET SBC + OVERBURDEN				RECOVERY RATIO (%)	ROCK QUALITY DESIGNATION (%)	CRU/COMP. STRENGTH (N/mm²)	ALLOWABLE BEARING PRESSURE (N/mm²)	ALLOWABLE BEARING PRESSURE / SAFE BEARING CAPACITY (T/M²)
					GRAVEL %	COARSE SAND %	MEDIUM SAND %	FINE SAND %	SILT+CLAY %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	NATURAL MOISTURE CONTENT	BULK DENSITY t/m³	DRY DENSITY gm/cc				UNDRAINED COHESION (C_u) (t/M²)	UNDRAINED ANGLE OF FRICTION $Ø_u$	SAFE BEARING CAPACITY IN (T/m²) (2 m X 2 m)	SAFE BEARING CAPACITY IN (T/m²) (3 m X 3 m)	SAFE BEARING CAPACITY IN (T/m²) (4 m X 4 m)					
SPT	1.50		INORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY	28	4.00	5.00	5.00	6.00	80.00	49.83	21.63	28.18	15.60	2.05	1.77	-	2.70	-	5.00	4.00	13.34	12.92	12.77	-	-	-	-
SPT	2.00			30	0.00	2.00	4.00	4.00	90.00	50.39	21.59	28.80	16.33	2.00	1.72	-	2.72	-	5.00	4.00	14.94	14.37	14.15	-	-	-	-
-	2.50			-	0.00	2.00	4.00	4.00	90.00	50.39	21.59	28.80	16.33	2.00	1.72	-	2.72	-	5.00	4.00	14.25	15.80	15.50	-	-	-	-
-	2.70			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPT	3.00		GRAVELLY CLAYEY SAND	31	16.00	52.00	23.00	3.00	6.00	NON - PLASTIC			19.82	2.16	1.80	-	2.82	-	0.00	26.00	18.18	20.77	20.91	-	-	-	-
SPT	4.00			18	18.00	8.00	10.00	6.00	58.00	43.38	20.56	22.82	20.91	2.05	1.70	-	2.67	-	-	-	-	-	-	-	-	-	-
SPT	5.00			51	12.07	17.24	13.79	6.90	50.00	41.13	19.47	21.66	19.24	2.10	1.76	-	2.66	-	-	-	-	-	-	-	-	-	-

GWT variation is to be verified by Client. Classification of Rock is done as per IRC 78-2000, Ref Table No-2

ANNEXURE III

SAMPLE CALCULATION OF SAFE BEARING CAPACITY FOR FOUNDATION
(Reference: IS Code 6403 - 1981)

The depth factor, shape factor, load inclination factor and water table correction are mentioned below. The Ultimate net bearing capacity of soil for **BH 02 at 2.50 m** depth from EGL as per IS: 6403-1981 is given below as sample calculation.

$$qd = (2/3)C.N_c.s_c.d_c.i_c + q(N_q - 1).S_q.d_q.i_q + 0.5 B_y.N_y.s_y.d_y.i_y.W'$$

>Corresponding values of N_c, N_q and N_y are obtained from bearing capacity table. (Clause 5.1.1)

N_C = 5.861
N_q = 1.304
N_Y = 0.240

>Shape factor for square footing.

S_C = 1.30
S_q = 1.20
S_Y = 0.80

>Depth factor (d_c=1+0.2 Dt/B √Nϕ and $d_q = d_y = 1$ for $\phi < 10^0$ or $d_q = d_y = 1 + 0.1$ Dt/B √Nϕ for $\phi > 10^0$)

dc=1+0.2 Dt/B √Nϕ
dq = dy = 1 for $\phi < 10^0$
or dq= dy = 1+ 0.1 Dt/B √Nϕ for $\phi > 10^0$

>Inclination factor is considered as 1

>Water table correction considered as 0.5

>C_u = 5.00 T/m^2, ϕ_u = 4.00 ° ϕ_m = 2.67 ° Y = 2.00 g/cc

>Effective Surcharge (q) = (2.00 X 2.05) + (0.50 X 2.00)
= 5.100 T/m^2

>Width of foundation (B) = 3 m X 3 m

>q_{nu} = 2/3*5.00*5.861*1.3*1.18*1 + 5.100 (1.304 - 1)*1.2*1.00*1
+0.5*3*2.00*0.24*0.8*1.00*1.0*0.5

>q_{nu} = 29.94 + 1.86 + 0.29
= 32.09 T/m^2

> Safe Bearing Capacity, $q_s = q_{nu}/3 + q$ (Adopting F.O.S. = 3.0)

>q_s = **15.80** T/m^2

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MGTL Since 2006

Geotechnical Investigation Report

REPORT REF: - MGTL-LLP/GT/04-26/08/BH 02

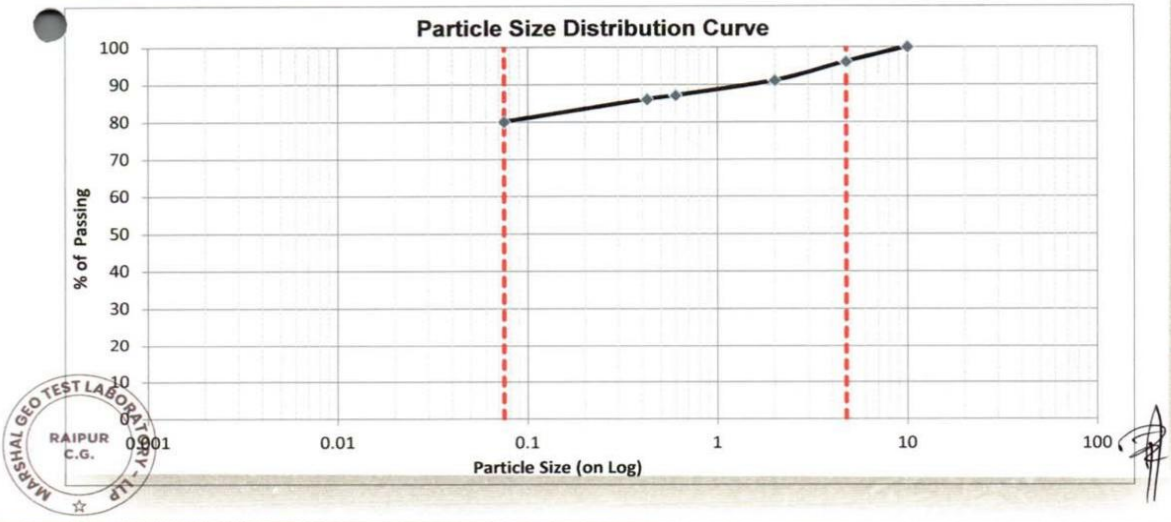
THE CHIEF MUNICIPAL OFFICER, MUNICIPAL COUNCIL RATANPUR, RATANPUR (C.G.).	SOIL INVESTIGATION WORK FOR THE PROPOSED CONSTRUCTION OF 40 HOUSES UNDER DEMONSTRATION HOUSING PROJECT (DHPs) IN MUNICIPAL COUNCIL RATANPUR (C.G.).	LOCATION BOREHOLE BH 02 (22°16'51.65" N, 82°10'17.95" E)

BORE HOLE No.	BH 02	DEPTH	1.50 m

100 gms

S.No	Sieve Size mm	Weight Retained	Cumulative Weight Retained	Cum. Wt. of sample passing through sieve	Percentage of total passing
		Grams	Grams	Grams	
1	2	3	4	5	6
1	10	0.0	0.0	100	100
2	4.750	4	4	96	96.00
3	2.000	5	9	91	91.00
4	0.600	4	13	87	87.00
5	0.425	1	14	86	86.00
6	0.075	6	20	80	80.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
80.00	6.00	5.00	5.00	4.00



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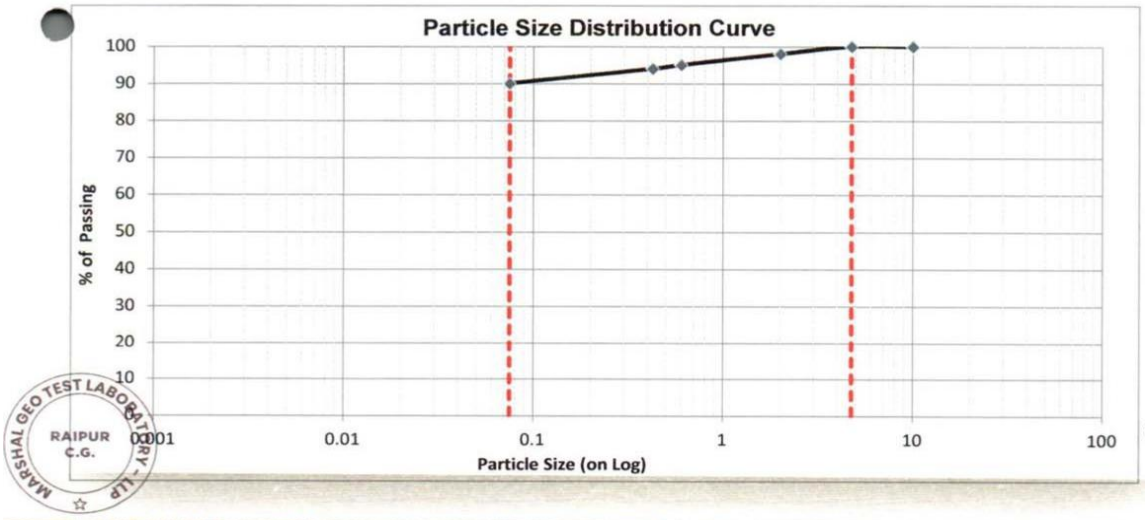
BORE HOLE No.	BH 02	DEPTH	2.00 m

		100 gms			
S.No	Sieve Size mm	Weight Retained Grams	Cumulative Weight Retained Grams	Cum. Wt. of sample passing through sieve Grams	Percentage of total passing
1	2	3	4	5	6
1	10	0.0	0.0	100	100
2	4.750	0	0	100	100.00
3	2.000	2	2	98	98.00
4	0.600	3	5	95	95.00
5	0.425	1	6	94	94.00
6	0.075	4	10	90	90.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
90.00	4.00	4.00	2.00	0.00



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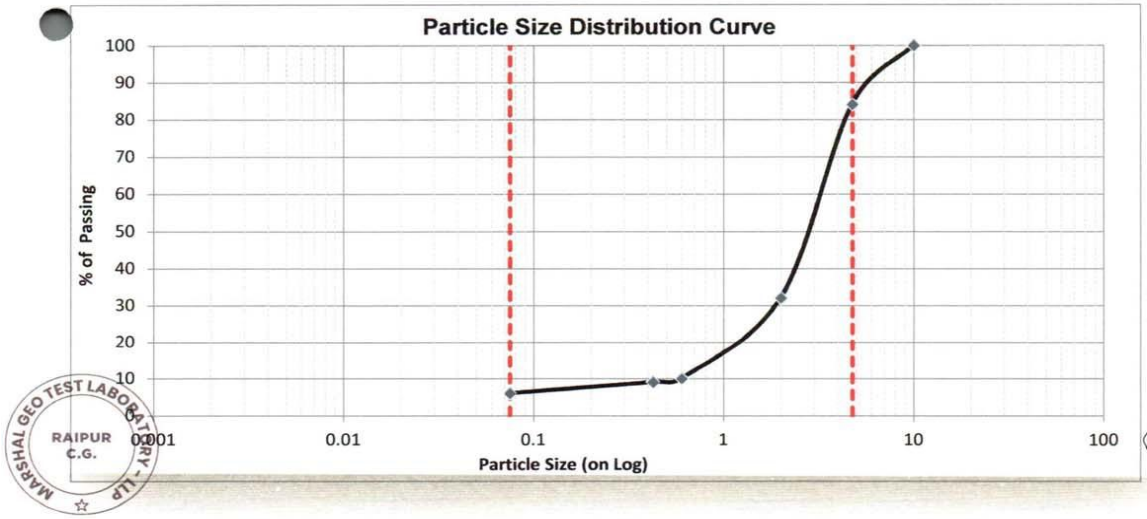
BORE HOLE No.	BH 02	DEPTH	3.00 m

100 gms

S.No	Sieve Size mm	Weight Retained Grams	Cumulative Weight Retained Grams	Cum. Wt. of sample passing through sieve Grams	Percentage of total passing
1	2	3	4	5	6
1	10	0.0	0.0	100	100
2	4.750	16	16	84	84.00
3	2.000	52	68	32	32.00
4	0.600	22	90	10	10.00
5	0.425	1	91	9	9.00
6	0.075	3	94	6	6.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
6.00	3.00	23.00	52.00	16.00



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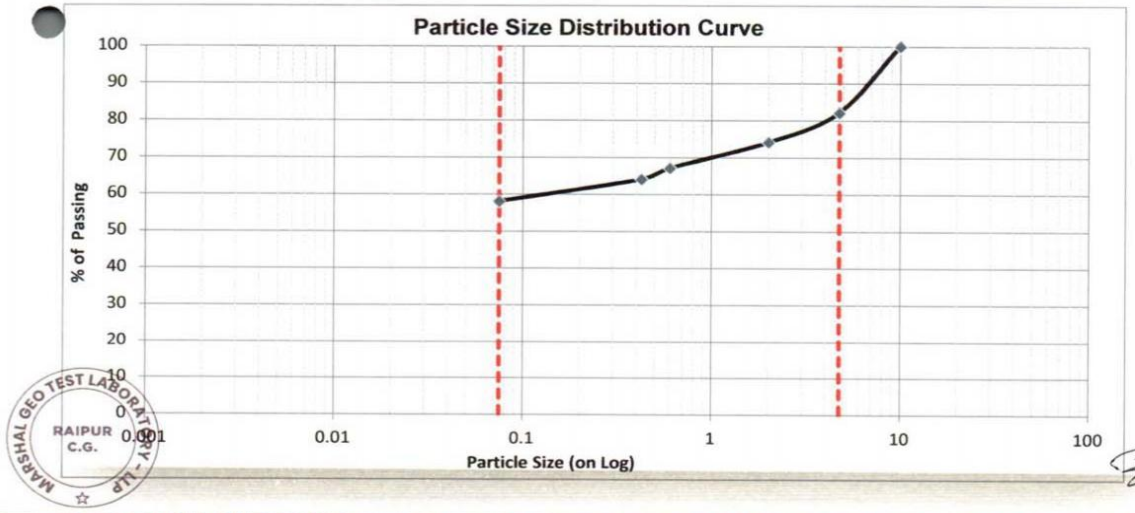
BORE HOLE No.	BH 02	DEPTH	4.00 m

		100 gms			
S.No	Sieve Size mm	Weight Retained Grams	Cumulative Weight Retained Grams	Cum. Wt. of sample passing through sieve Grams	Percentage of total passing
1	2	3	4	5	6
1	10	0.0	0.0	100	100
2	4.750	18	18	82	82.00
3	2.000	8	26	74	74.00
4	0.600	7	33	67	67.00
5	0.425	3	36	64	64.00
6	0.075	6	42	58	58.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
58.00	6.00	10.00	8.00	18.00



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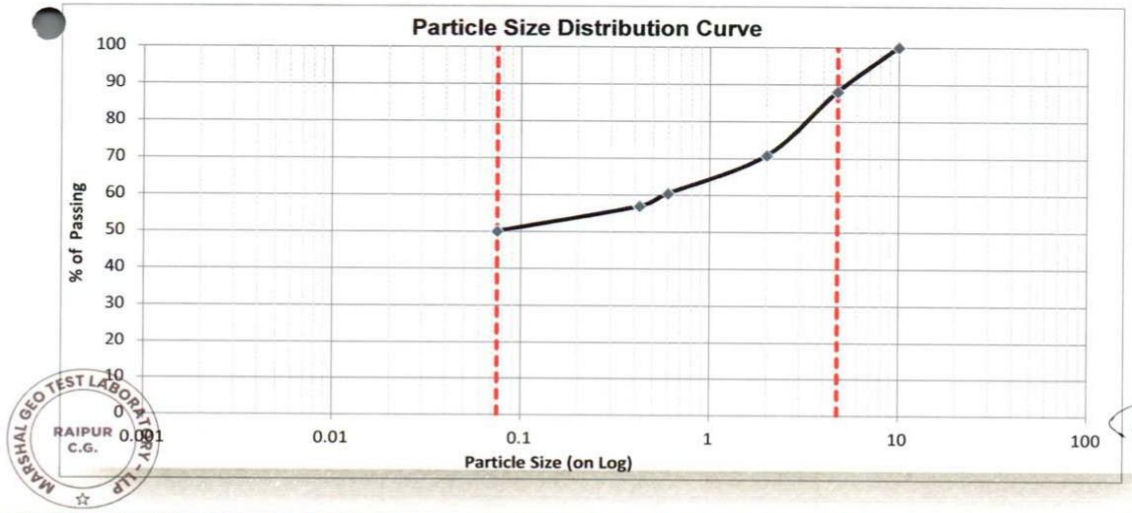
BORE HOLE No.	BH 02	DEPTH	5.00 m

58 gms

S.No	Sieve Size mm	Weight Retained Grams	Cumulative Weight Retained Grams	Cum. Wt. of sample passing through sieve Grams	Percentage of total passing
1	2	3	4	5	6
1	10	0.0	0.0	58	100
2	4.750	7	7	51	87.93
3	2.000	10	17	41	70.69
4	0.600	6	23	35	60.34
5	0.425	2	25	33	56.90
6	0.075	4	29	29	50.00

CLAY AND SILT %	SAND %			GRAVEL %
	Fine	Medium	Coarse	
50.00	6.90	13.79	17.24	12.07



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Part-7

Architectural Drawings

SL. NO	TITLE
1.	LAND LOCATION & DETAILS PROVIDED BY STATE GOVT.
2.	SITE LAYOUT PLAN
3.	TYPICAL UNIT PLAN
4.	GROUND FLOOR PLAN – BLOCK A
5.	TYPICAL FLOOR PLAN – BLOCK A
6.	ELEVATION- FRONT – BLOCK A
7.	ELEVATION – SIDE – BLOCK A
8.	SECTION-1– BLOCK A
9.	SECTION-2– BLOCK A
10.	TERRACE - BLOCK A
11.	GROUND FLOOR PLAN – BLOCK B
12.	TYPICAL FLOOR PLAN – BLOCK B
13.	ELEVATION- FRONT – BLOCK B
14.	ELEVATION – SIDE – BLOCK B
15.	SECTION-1– BLOCK B
16.	SECTION-2– BLOCK B
17.	TERRACE - BLOCK B
18.	GROUND FLOOR PLAN – BLOCK C
19.	TYPICAL FLOOR PLAN – BLOCK C
20.	ELEVATION – FRONT – BLOCK C
21.	ELEVATION – SIDE – BLOCK C

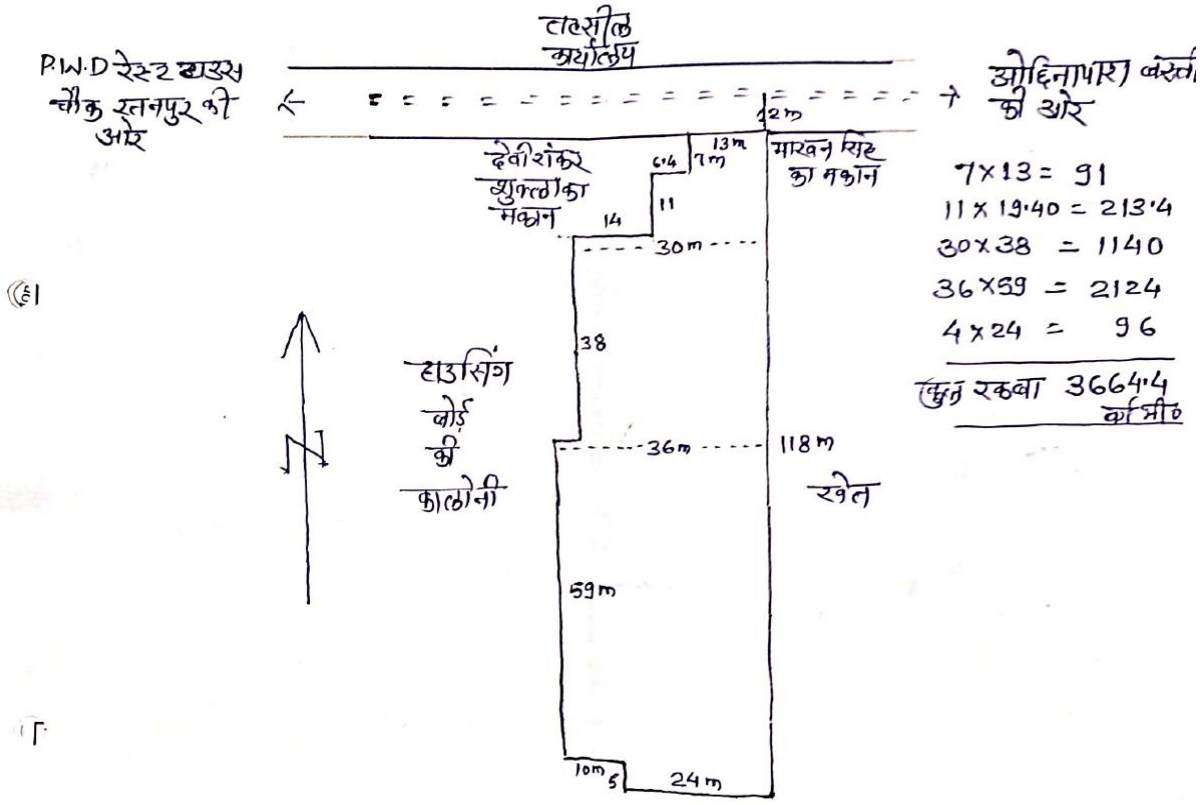
22.	SECTION-1– BLOCK C
23.	SECTION-2– BLOCK C
24.	TERRACE - BLOCK C
25.	GROUND FLOOR PLAN – COMMUNITY CENTRE
26.	ELEVATION – COMMUNITY CENTRE
27.	SECTIONS – COMMUNITY CENTRE
28.	SITE LAYOUT – DRAINAGE PLAN
29.	SITE LAYOUT – EXTERNAL ELECTRICITY
30.	SITE LAYOUT – SEWERAGE
31.	SEWERAGE – BLOCK –A
32.	SEWERAGE – BLOCK –B
33.	SEWERAGE – BLOCK –C
34.	SEWERAGE – COMMUNITY CENTER
35.	SITE LAYOUT – WATER SUPPLY
36.	SITE LEVELS
37.	SITE RETAINING WALL
	ALL TENTATIVE SERVICES DRAWINGS WILL BE HANDED OVER TO THE BIDDER BEFORE THE AWARD OF WORK

नजरी नक्शा

ग्राम- रतनपुर प०ह०नं० 12 रा०नि०मं० व तहसील रतनपुर

जिला- बिलासपुर

ख०नं० 6046/1 रकबा 0.405 हे० के रिक्त भाग शासकीय भूमि मद्धांस

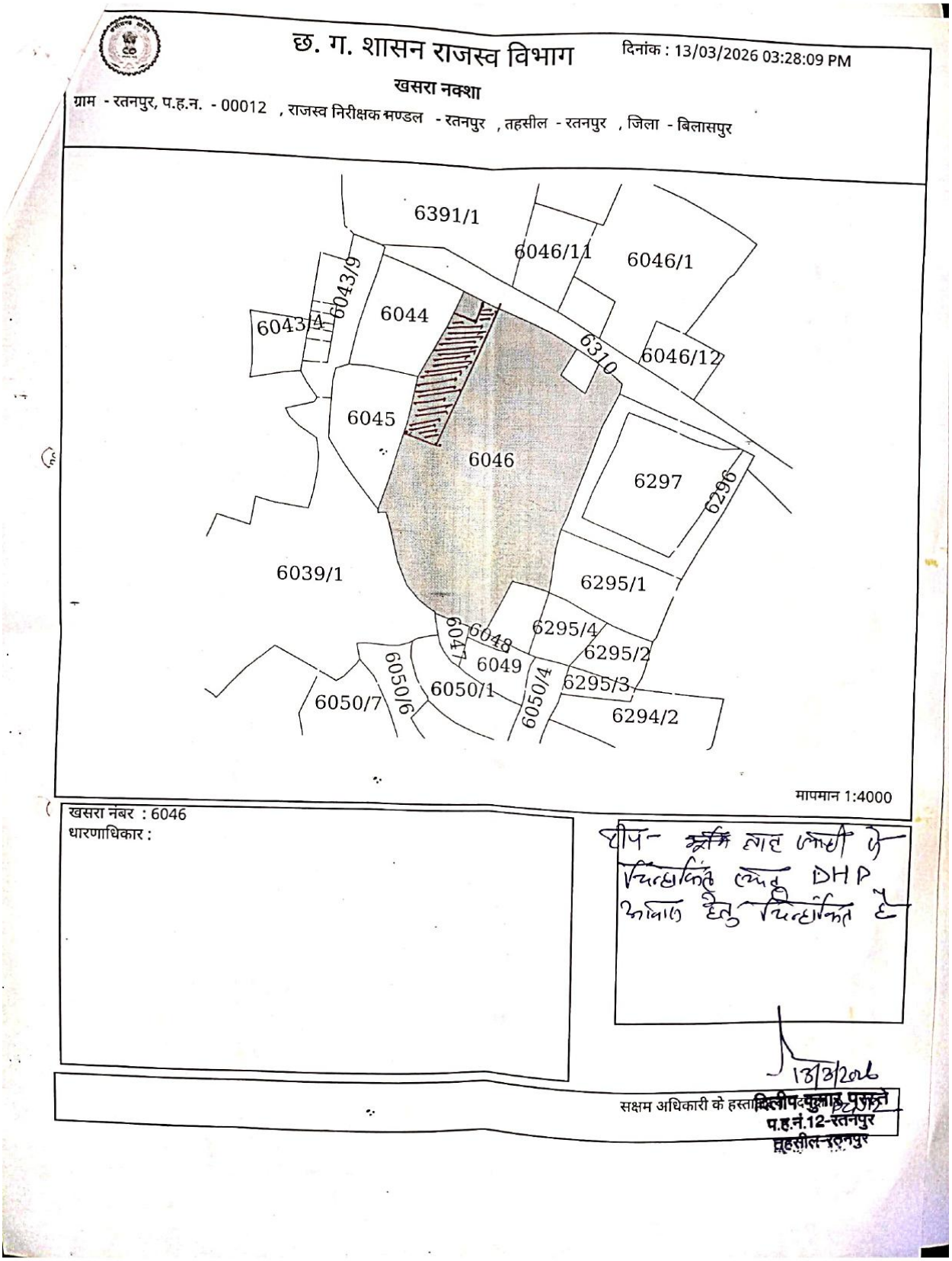


7×13 = 91
11×19.40 = 213.4
30×38 = 1140
36×59 = 2124
4×24 = 96

कुल रकबा 3664.4 वर्गमी०

13/1/2026

दिलीप कुमार परस्ते
प.ह.नं.12-रतनपुर
तहसील-रतनपुर


छ. ग. शासन राजस्व विभाग
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खसरा नक्शा
ग्राम - रतनपुर, प.ह.न. - 00012 , राजस्व निरीक्षक मण्डल - रतनपुर , तहसील - रतनपुर , जिला - बिलासपुर
6391/1
6046/11
6046/1
6043/9
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6043/4
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6050/7
6294/2
मापमान 1:4000
खसरा नंबर : 6046
धारणाधिकार :
दीप- ग्राम पंचायत की चिन्हांकित स्थल DHP आवास हेतु चिन्हांकित है
13/3/2026
सक्षम अधिकारी के हस्ता
दिलीप कुमार पुरस्ते
प.ह.नं.12-रतनपुर
तहसील-रतनपुर

दिनांक :11-Jul-2018

फॉर्म पी-II

(खसरा)

Document Id -20180711400400246

भूमि का स्वरूप हस्तरेखा में एवं कर्ता का स्वरूप रस्से पैमाने में
फसल की जानकारी पिछले वर्ष की है

ग्राम : रतनपुर हल्का : 00037 रा नि : रतनपुर तहसील : कोटा जिला : बिलासपुर वर्ष: 2017-18

भू-मापन क्रमांक	सेचयन (और दृष्टि भूमि जाती में सम्मिलित न हो तो उसका दर्शन)	कब्जेदार का नाम,उसके पिता का नाम या पति का नाम तथा नियास स्थान,अधिकार जिसके अंतर्गत भूमि धारण की गई और देय राजस्व का लगान	*	क्षेत्रफल जिसमें वर्ष के दौरान खराब पाई गई			पड़ती का क्षेत्रफल			जाते के बाहर के क्षेत्रों में बोई गई फसल का नाम तथा क्षेत्रफल	कैफियत
				फसल का नाम	फसल का क्षेत्रफल	दुःफसली क्षेत्रफल	चालू वर्ष की पड़ती	2 से 5 वर्ष तक की पड़ती	अन्य पड़ती		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
604/1	0.405	(1)शासकीय भूमि स्वामित्व - शासकीय भूमि;									

Signature Not Verified
Digitally signed by CHHATTI LAL KASHYAP
Date: 2018.07.11 22:17:17 IST
Reason: Certified to be TRUE COPY of the digitally published ROR

• किसी भूमि स्वामी या पट्टेदार या किसी मौरसी काश्तकार के उपर्युक्तार का नाम, पिता का नाम,लगान या पट्टे की रकम और उस-पर दिया गया आम का क्षेत्रफल

पृष्ठ क्रमांक: 1 / 1

June '23 ○ Saturday 03
WK - 22

* DHP Survey Ratanpur ULB

BS	IS	FS	HI	RL	TBM
0.04			100.04		100 ↓ (Assume)
		2.39		97.65	
0.06			97.71	97.65	(C.P.)
	0.84			96.87	
	1.235			96.475	
	1.48			96.23	
	1.785			95.96	

June '23 ☺ Sunday 04
Trinity Sunday WK - 22

	2.135			95.575
	2.19			95.52
	2.46			95.25
	2.75			94.96
	~~2.573~~	2.73		94.98

JUL 2023

M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						

05 Monday ○ June '23

WK - 23 The Yang di – Pertuan Agong's Birthday (Malaysia)

Note :- levels different sheet

① Main Road (NH Road) level – 100.00 m (Assum

② Approch Road level – 97.65 m

③ Land points level =>

① 96.87 m
② 96.475 m
③ 96.23 m
④ 95.96 m
⑤ 95.57~~5~~ m
⑥ 95.52 m
⑦ 95.25 m
⑧ 94.96 m
⑨ 94.98 m

~~Main Road to Approch road~~

* मेन रोड से Approch road 2.35 mts. नीचे है

* ~~रोड~~ Approch road से Land ~~levels~~ levels difference

① 0.78 m (down)
② 1.175 m (down)
③ 1.42 m (down)
④ 10.69 m (down)
⑤ 2.075 m (down)
⑥ 2.13 m (down)
⑦ 2.4 m (down)
⑧ 2.69 m (down)
⑨ 2.67 m (down)

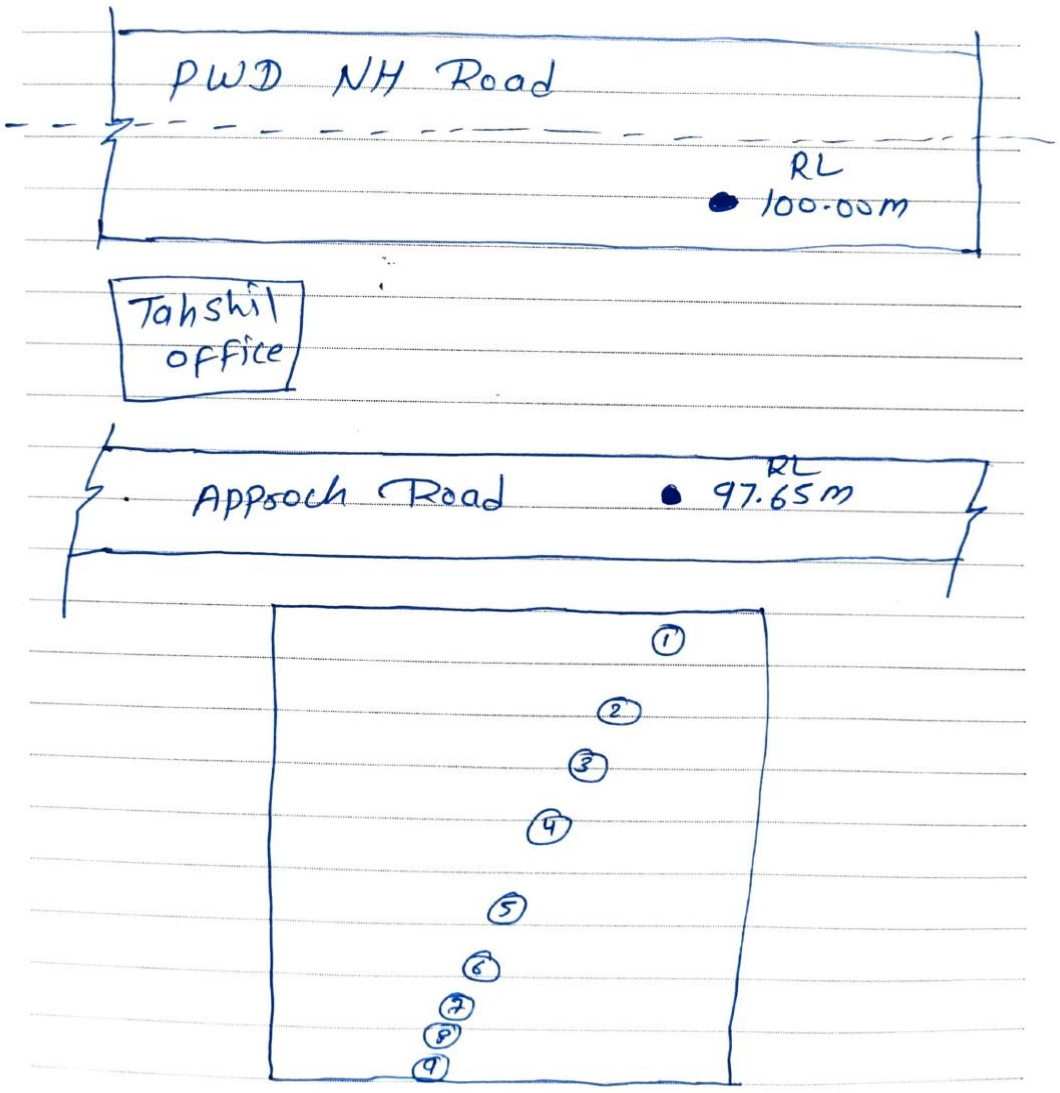
MAY 2023

M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
22	23	24	25	26	27	28	29	30	31											

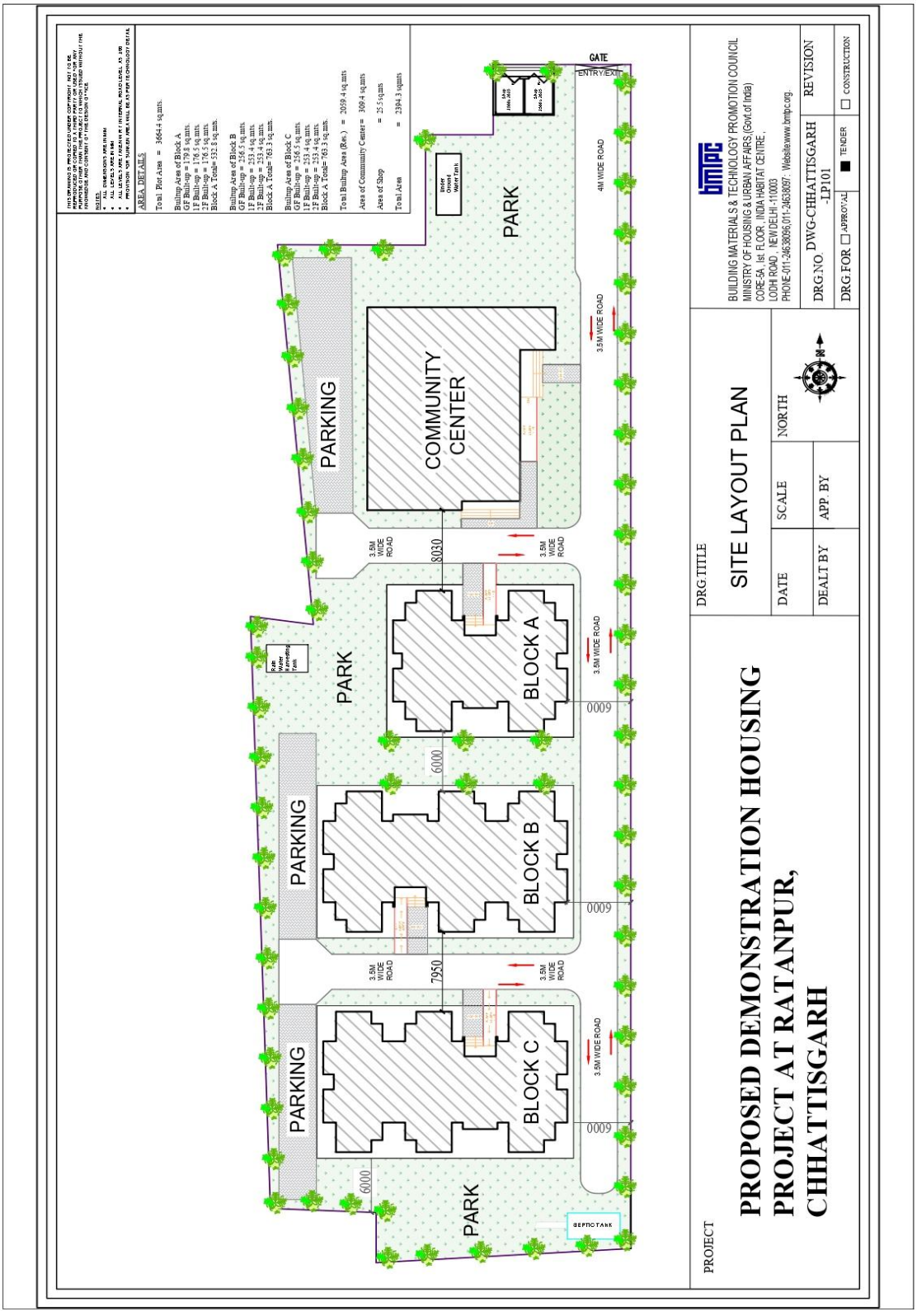
June '23 ○ Tuesday 06

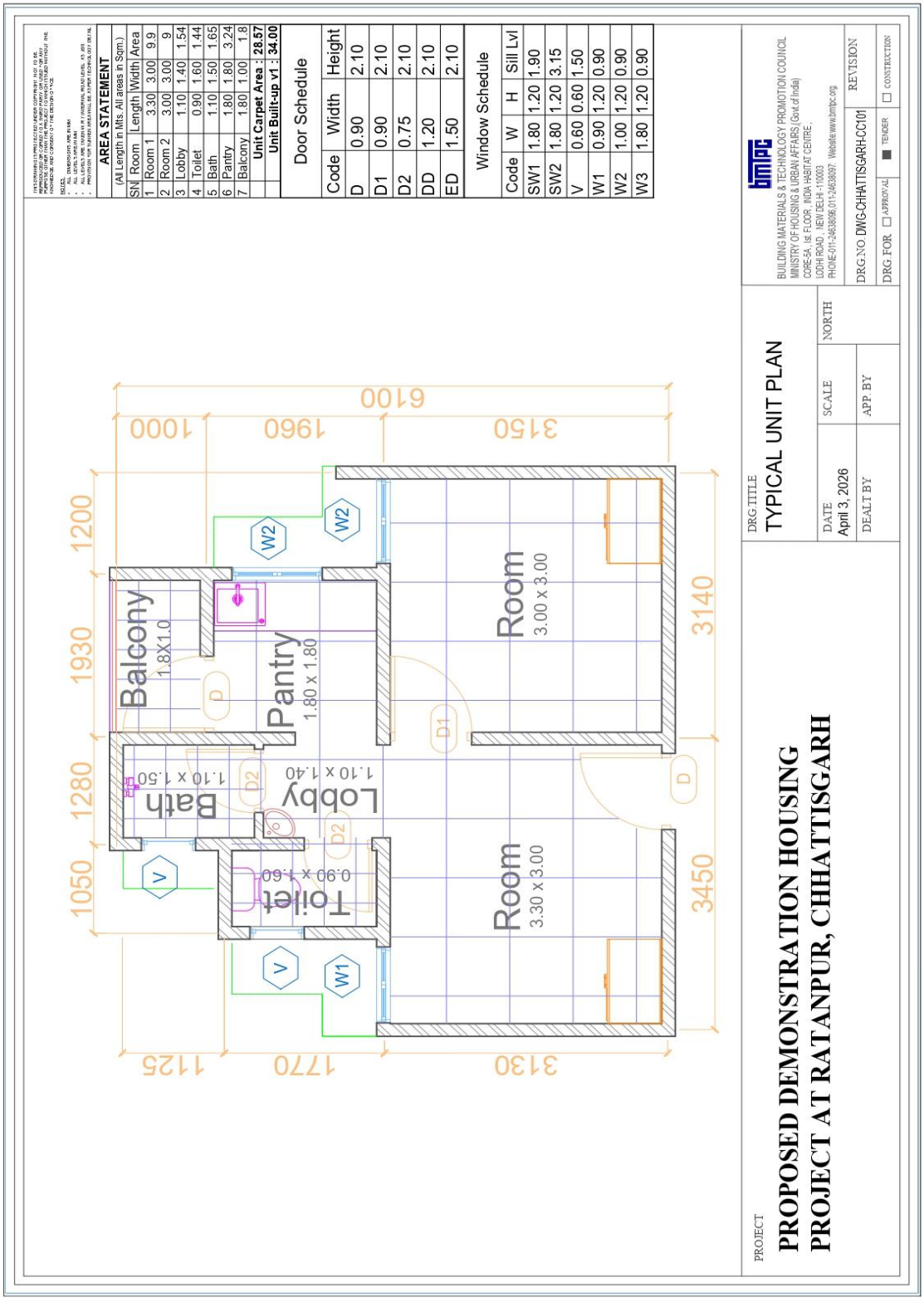
National Day (Sweden) WK - 23

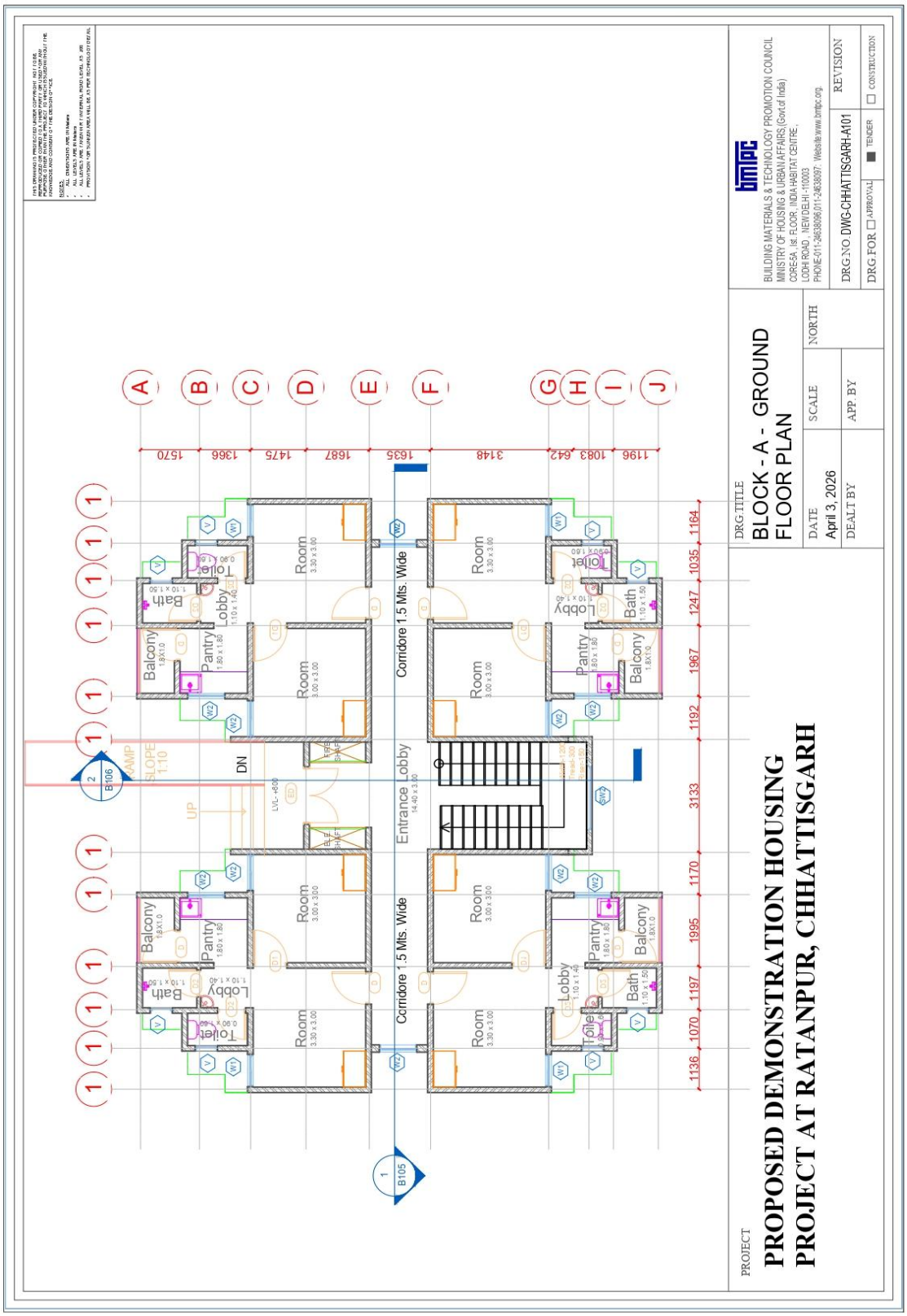
Note :- Land drawing

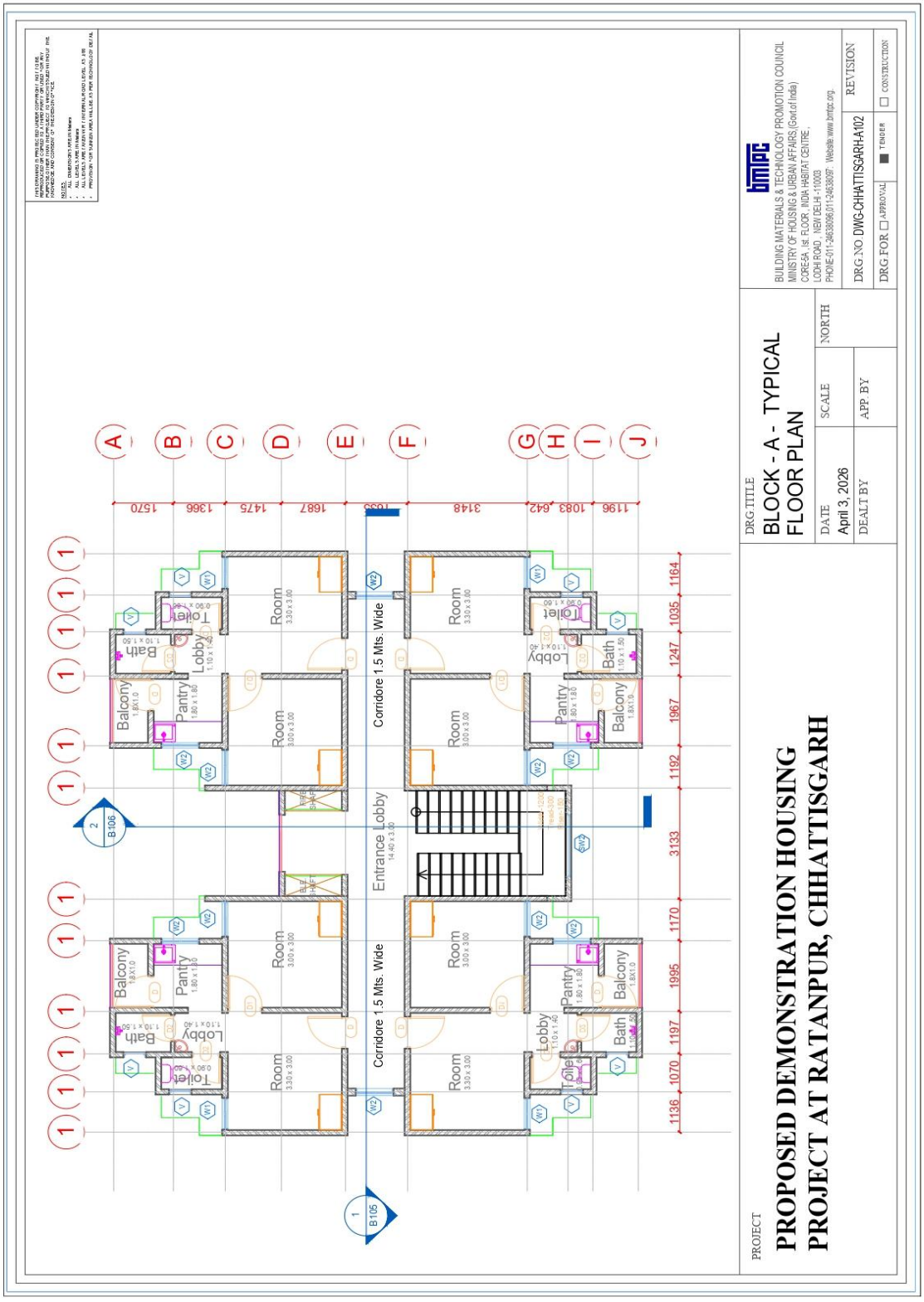


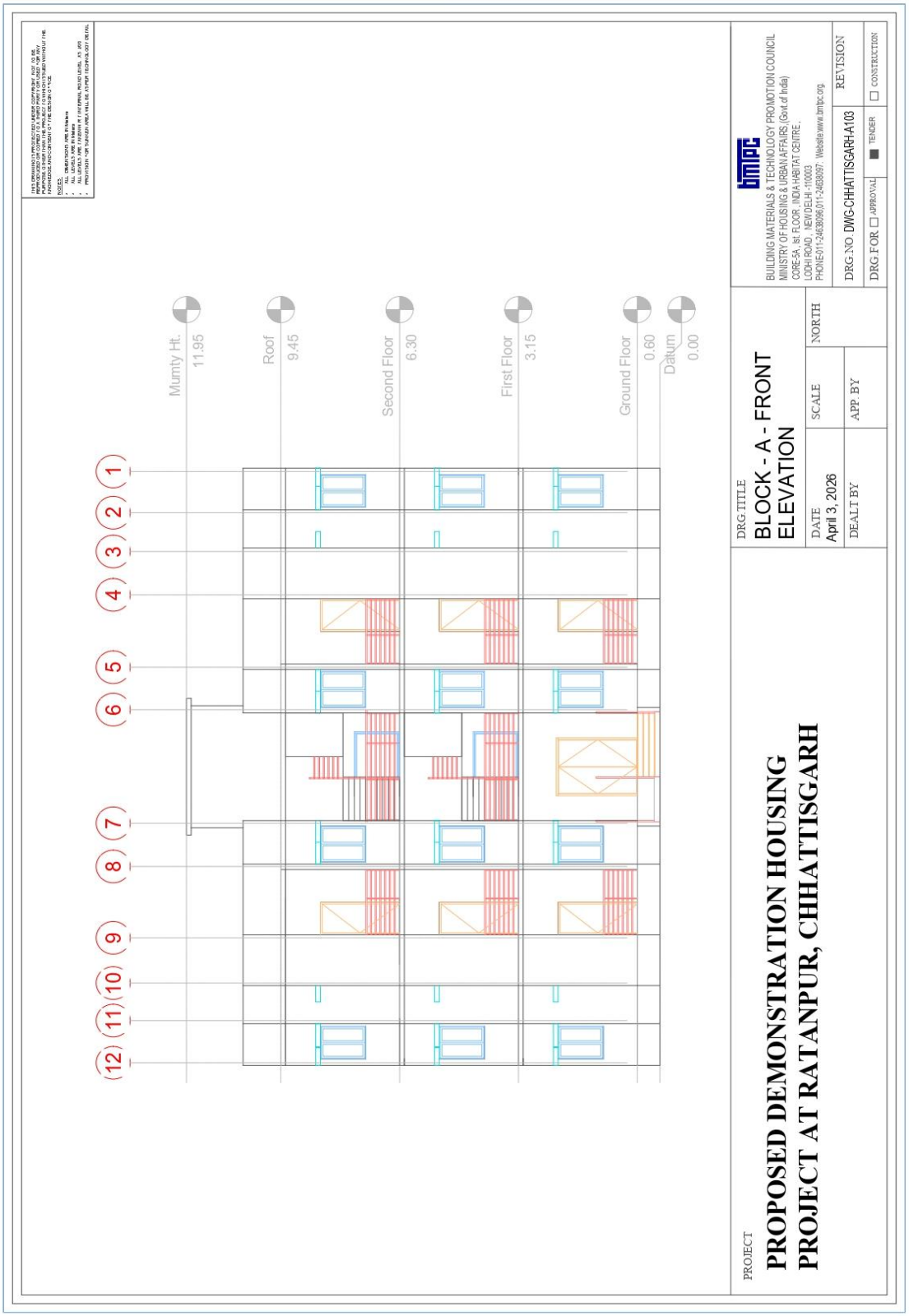
JUL 2023	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						

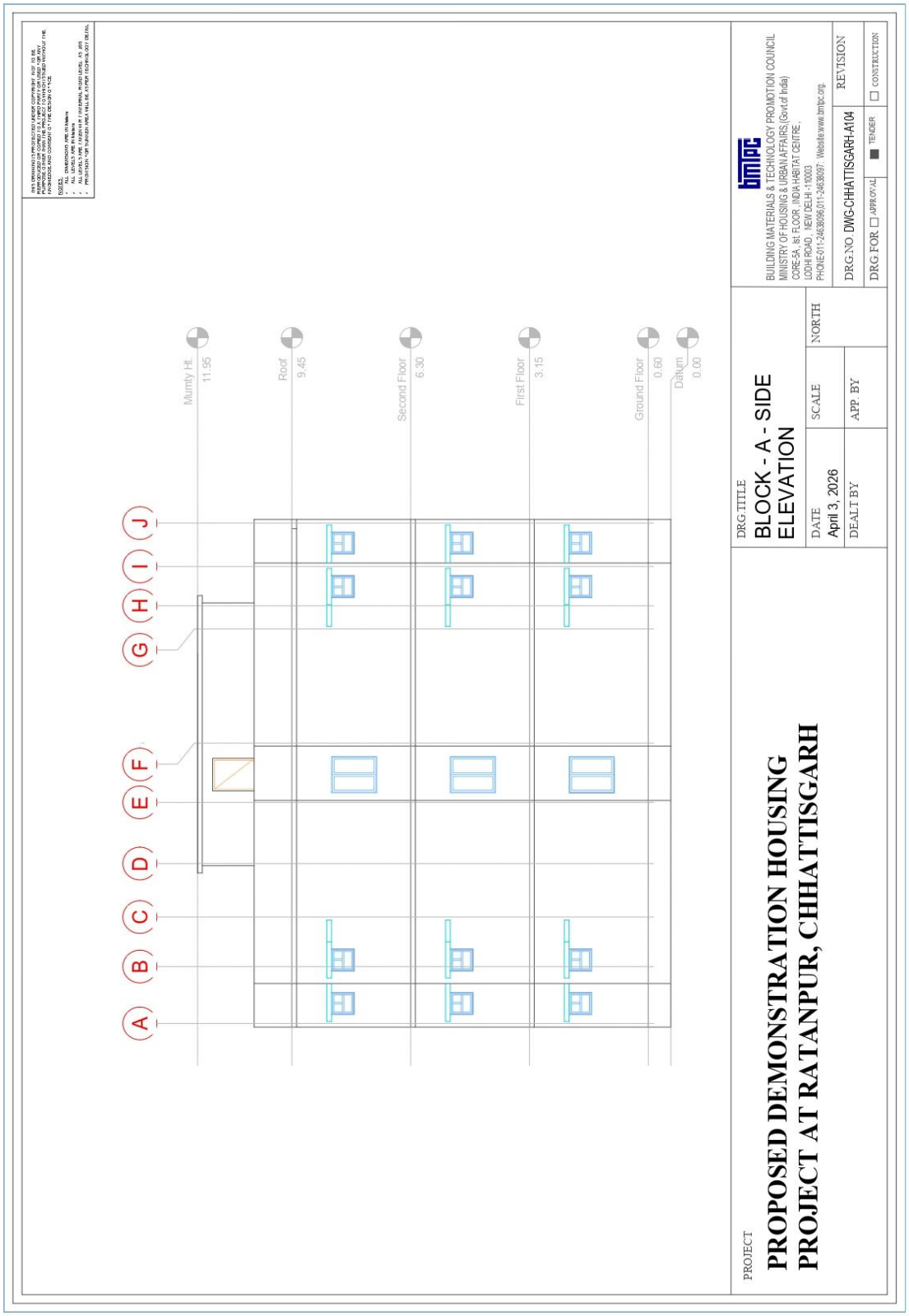

PROPOSED DEMONSTRATION HOUSING PROJECT AT RATANPUR, CHHATTISGARH
SITE LAYOUT PLAN
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS,(Govt.of India)
CORE-5A , Ist FLOOR , INDIA HABITAT CENTRE,
LODHI ROAD , NEW DELHI -110003
PHONE-011-24638096,011-24638097 . Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH -LP101
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION
DRG TITLE
PROJECT
DATE
DEALT BY
SCALE
APP. BY
NORTH
GATE ENTRY/EXIT
COMMUNITY CENTER
BLOCK A
BLOCK B
BLOCK C
PARKING
PARK
4M WIDE ROAD
3.5M WIDE ROAD
3.5M WIDE ROAD
8030
6000
7950
6000
0009
0009
0009
SEPTIC TANK
Under Ground Water Tank
Raw Water Harvesting Tank
AREA DETAILS
Total Plot Area = 36644 sq.mts.
Builtup Area of Block-A
GF Built-up = 178.8 sq.mts.
1F Built-up = 176.5 sq.mts.
2F Built-up = 176.5 sq.mts.
Block A Total= 532.8 sq.mts.
Builtup Area of Block B
GF Built-up = 256.5 sq.mts.
1F Built-up = 253.4 sq.mts.
2F Built-up = 253.4 sq.mts.
Block A Total= 763.3 sq.mts.
Builtup Area of Block C
GF Built-up = 256.5 sq.mts.
1F Built-up = 253.4 sq.mts.
2F Built-up = 253.4 sq.mts.
Block A Total= 763.3 sq.mts.
Total Builtup Area (Res.) = 2059.4 sq.mts
Area of Community Center = 309.4 sq.mts
Area of Shop = 25.5 sq.mts.
Total Area = 2394.3 sqmts

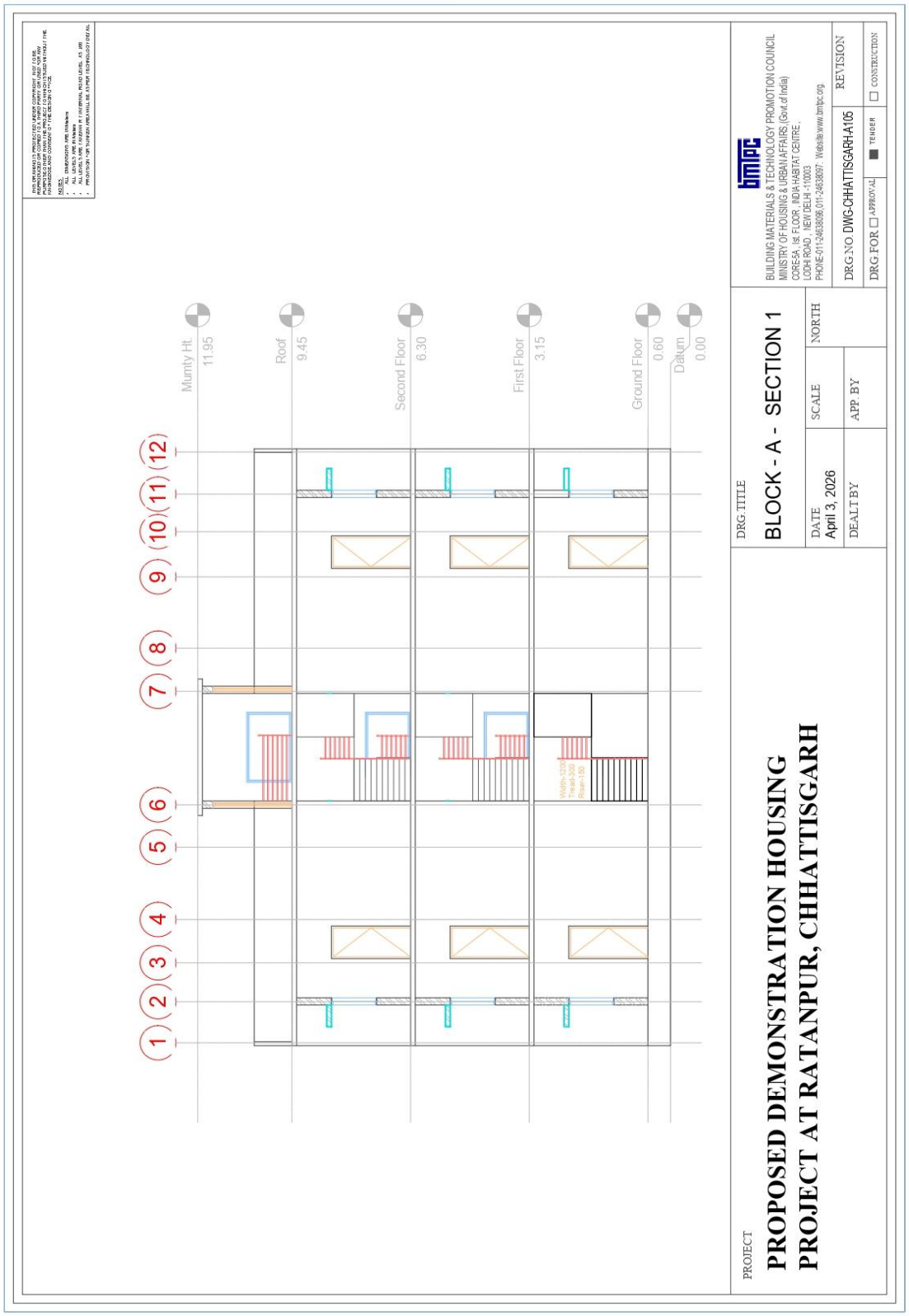

AREA STATEMENT
(All Length in Mts. All areas in Sqm.)
SN Room Length Width Area
1 Room 1 3.30 3.00 9.9
2 Room 2 3.00 3.00 9
3 Lobby 1.10 1.40 1.54
4 Toilet 0.90 1.60 1.44
5 Bath 1.10 1.50 1.65
6 Pantry 1.80 1.80 3.24
7 Balcony 1.80 1.00 1.8
Unit Carpet Area : 28.57
Unit Built-up v1 : 34.00
Door Schedule
Code Width Height
D 0.90 2.10
D1 0.90 2.10
D2 0.75 2.10
DD 1.20 2.10
ED 1.50 2.10
Window Schedule
Code W H Sill Lvl
SW1 1.80 1.20 1.90
SW2 1.80 1.20 3.15
V 0.60 0.60 1.50
W1 0.90 1.20 0.90
W2 1.00 1.20 0.90
W3 1.80 1.20 0.90
Balcony
1.8X1.0
Pantry
1.80 x 1.80
Bath
1.10 x 1.50
Lobby
1.10 x 1.40
Toilet
0.90 x 1.60
Room
3.00 x 3.00
Room
3.30 x 3.00
6100
1000
1960
3150
1200
1930
1280
1050
3140
3450
1125
1770
3130
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
TYPICAL UNIT PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt. of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE-011-24638086,011-24638097. Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-CC101
REVISION
DRG. FOR APPROVAL TENDER CONSTRUCTION

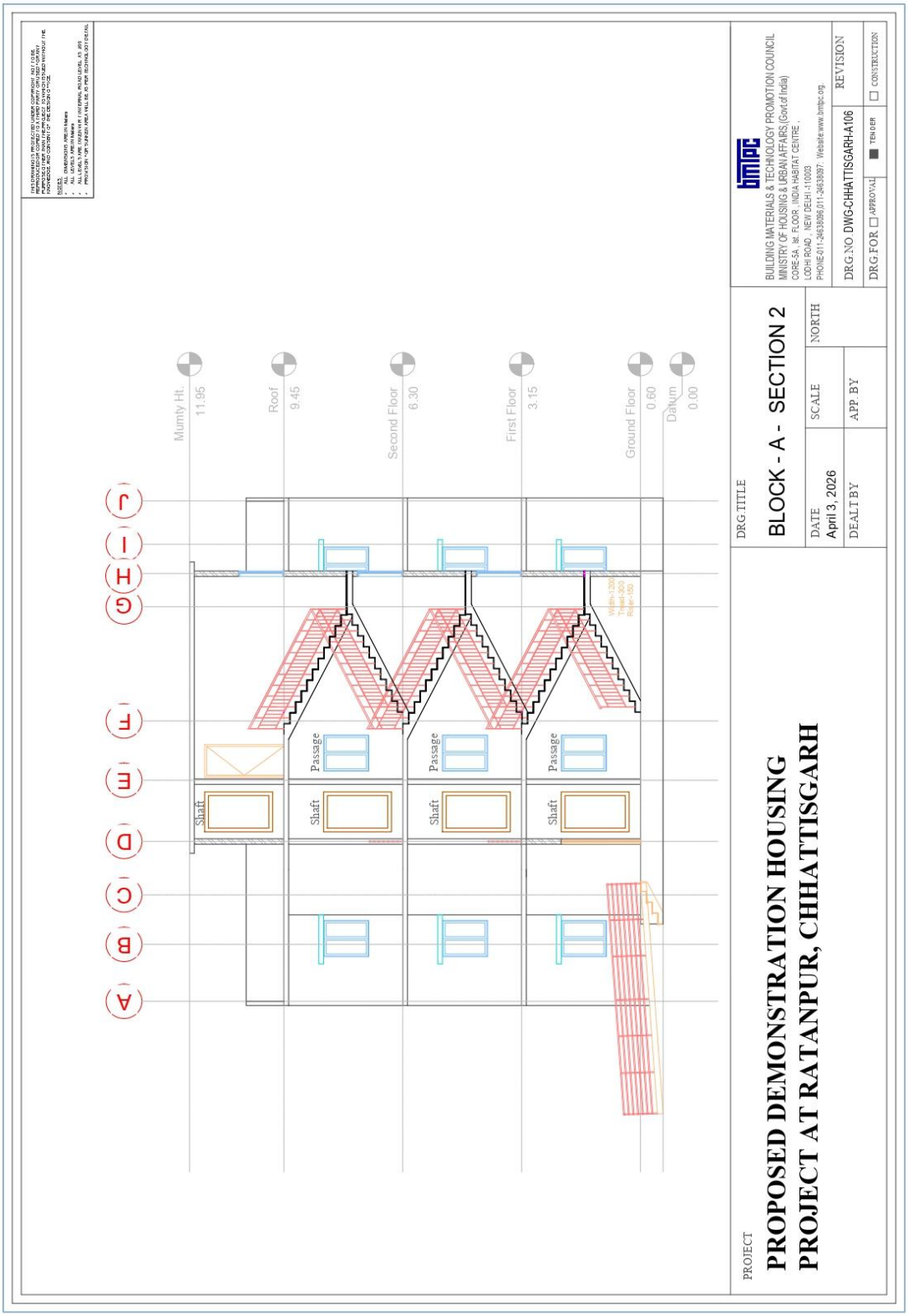

PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
BLOCK - A - GROUND
FLOOR PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
DRG.NO. DWG-CHHATTISGARH-A101
REVISION
DRG FOR APPROVAL
TENDER
CONSTRUCTION
Corridore 1.5 Mts. Wide
Entrance Lobby
Room
Balcony
Pantry
Bath
Toilet
Lobby
RAMP
SLOPE 1:10
UP
DN

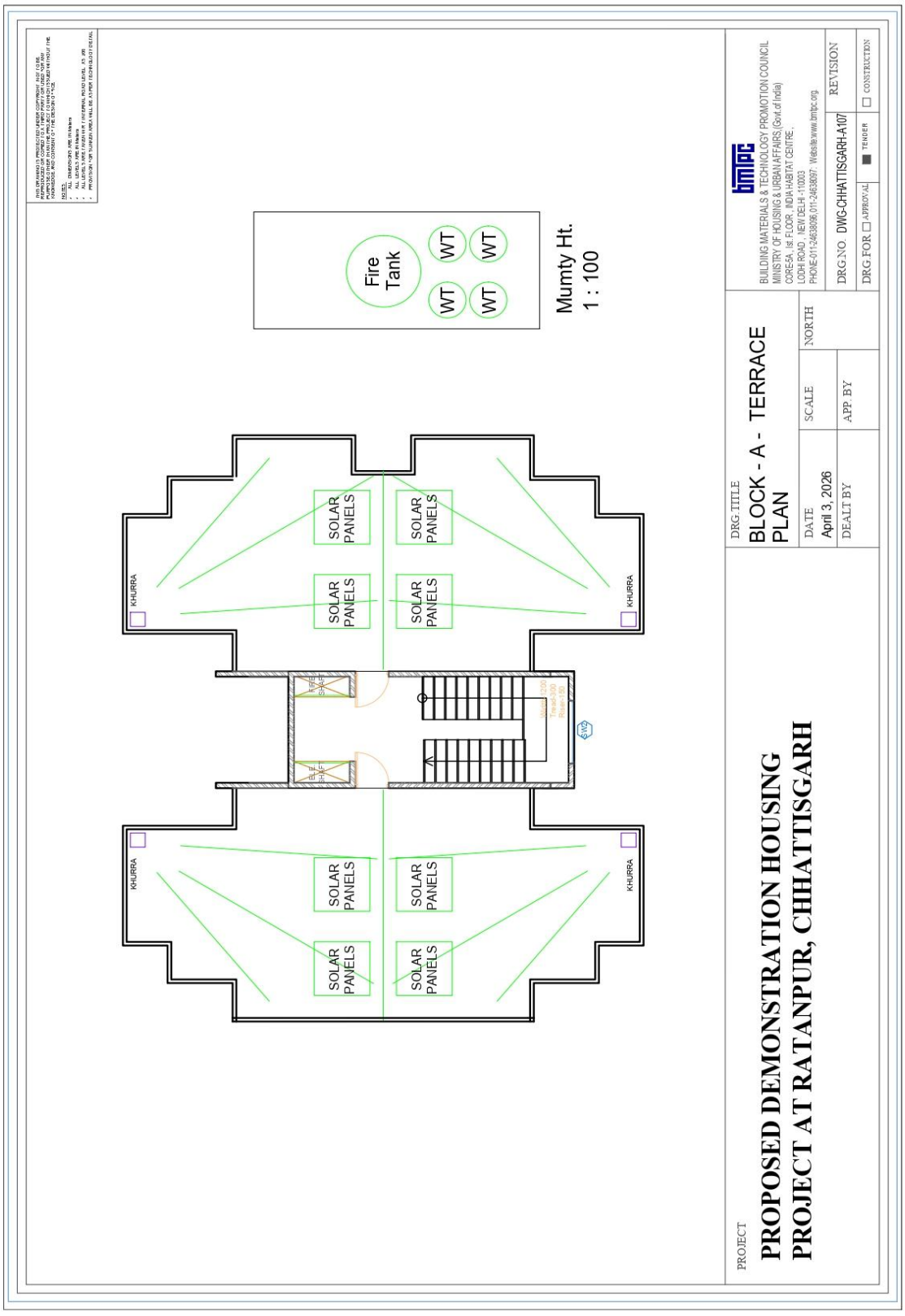

PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
BLOCK - A - TYPICAL
FLOOR PLAN
DATE
April 3, 2026
DEALT BY
SCALE
APP. BY
NORTH
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
DRG NO DWG-CHHATTISGARH-A102
REVISION
DRG. FOR
APPROVAL
TENDER
CONSTRUCTION
Entrance Lobby
Corridore 1.5 Mts. Wide
Corridore 1.5 Mts. Wide
Room
Toilet
Lobby
Bath
Pantry
Balcony

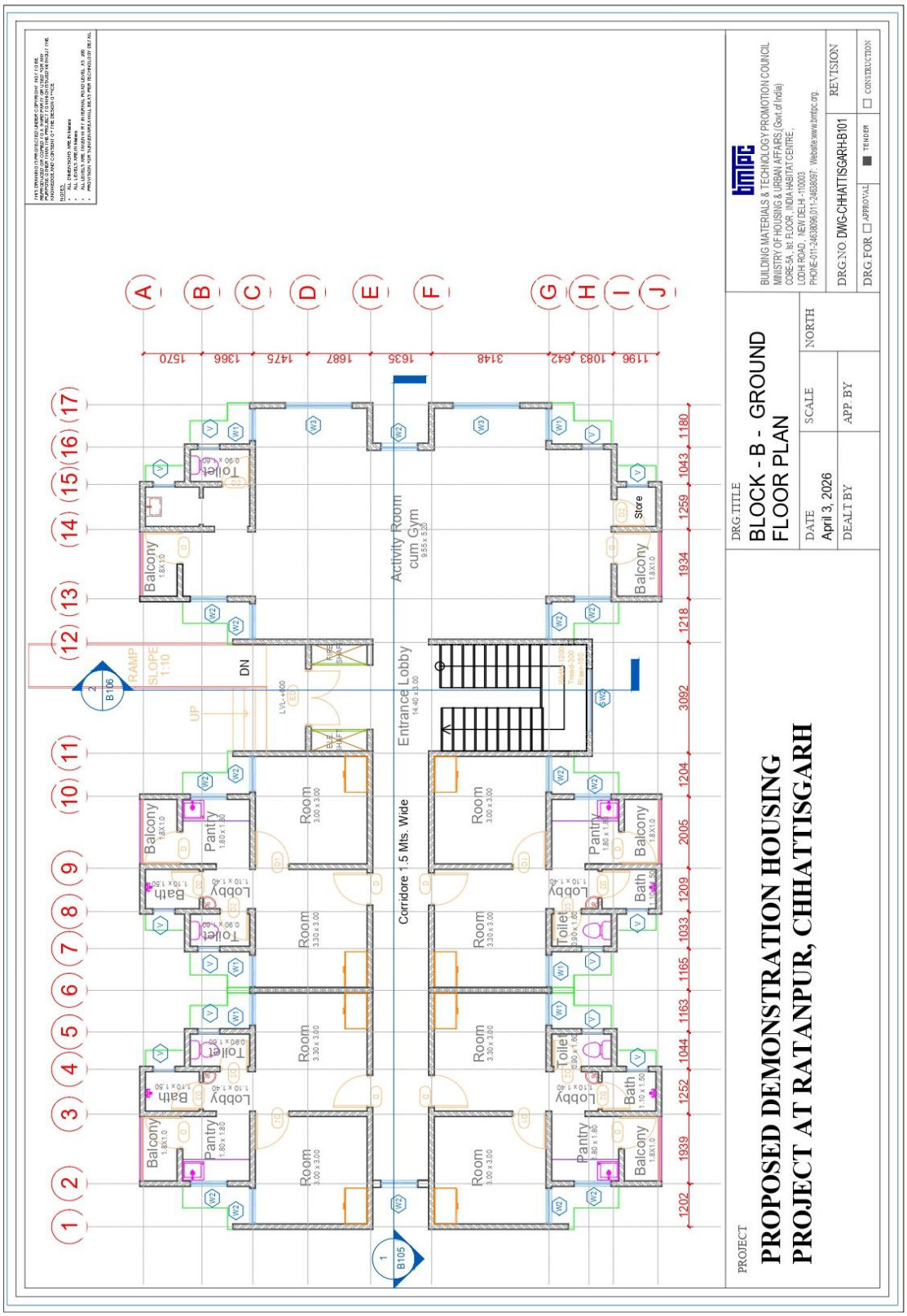

Mumty Ht.
11.95
Roof
9.45
Second Floor
6.30
First Floor
3.15
Ground Floor
0.60
Datum
0.00
(12) (11) (10) (9) (8) (7) (6) (5) (4) (3) (2) (1)
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - A - FRONT
ELEVATION
DATE
April 3, 2026
SCALE
NORTH
DEALT BY:
APP. BY:
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE:011-24638095,011-24638097 Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-A103
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION

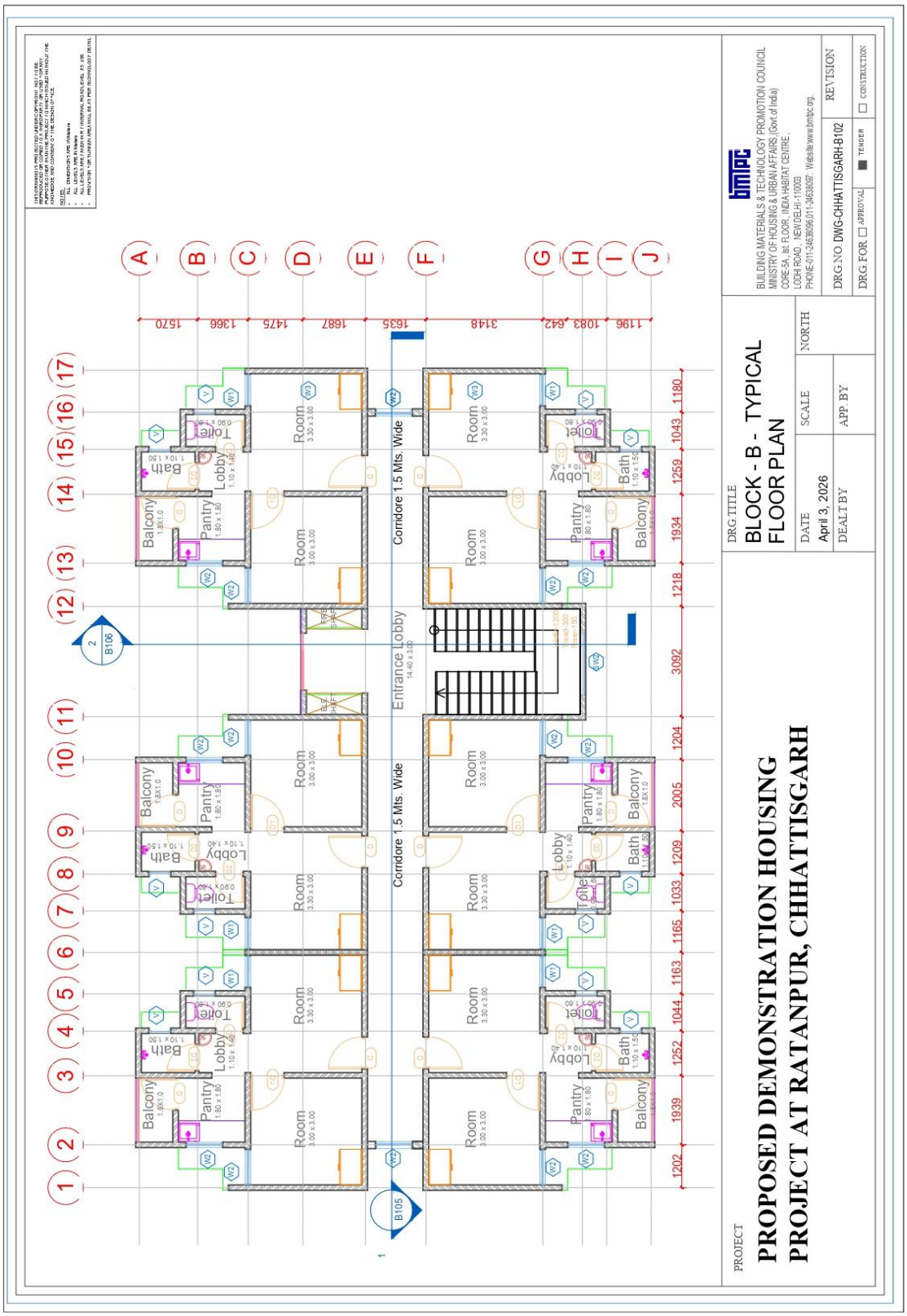

Mumty Ht.
11.95
Roof
9.45
Second Floor
6.30
First Floor
3.15
Ground Floor
0.60
Datum
0.00
A
B
C
D
E
F
G
H
I
J
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
BLOCK - A - SIDE
ELEVATION
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE:011-24638096,011-24638097 Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-A104
REVISION
DRG. FOR APPROV AL
TENDER
CONSTRUCTION

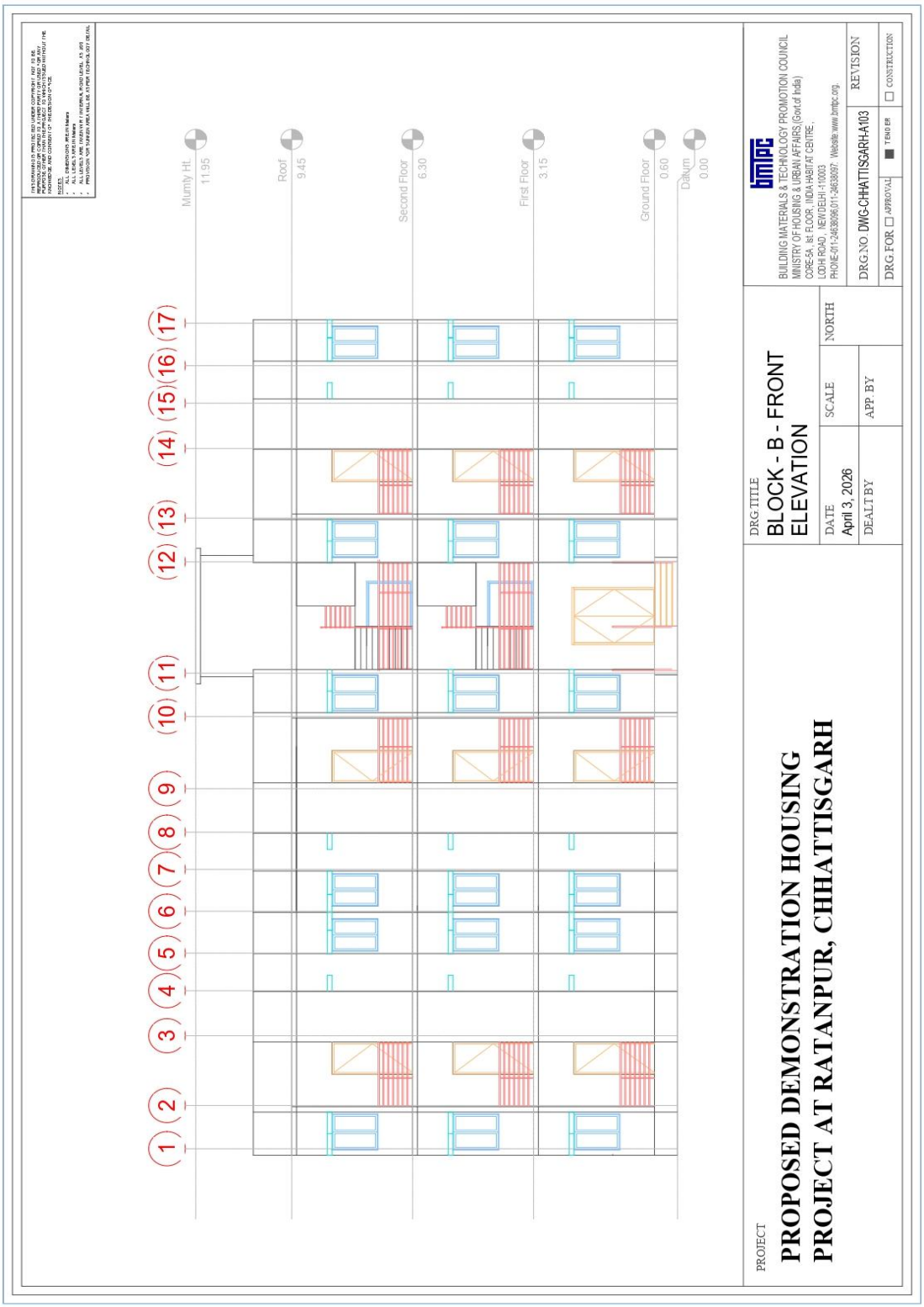

Munty Ht. 11.95
Roof 9.45
Second Floor 6.30
First Floor 3.15
Ground Floor 0.60
Datum 0.00
1 2 3 4 5 6 7 8 9 10 11 12
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
BLOCK - A - SECTION 1
DATE April 3, 2026
SCALE NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
DRG.NO. DWG-CHHATTISGARH-A106
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION

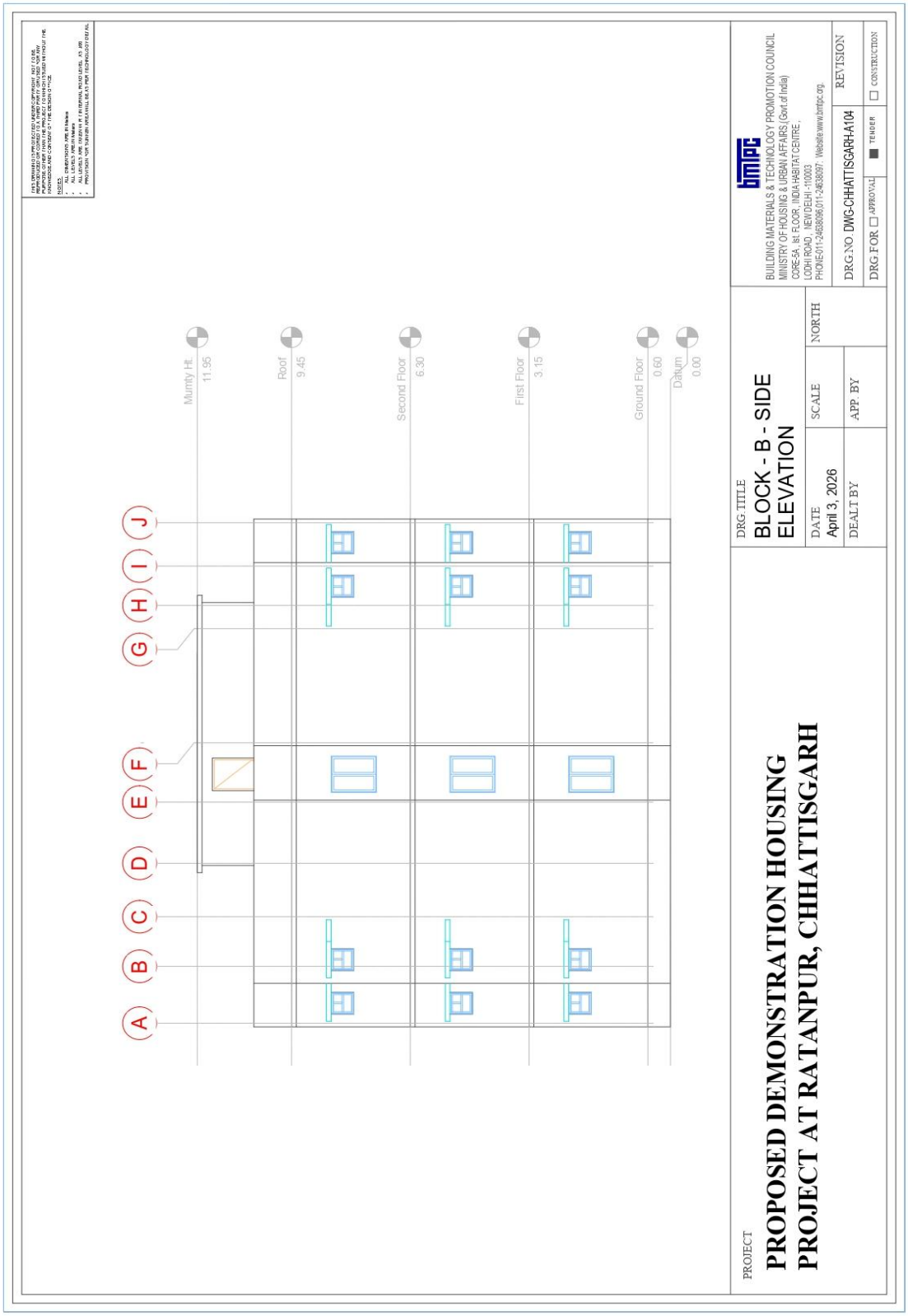

Mumty Ht. 11.95
Roof 9.45
Second Floor 6.30
First Floor 3.15
Ground Floor 0.60
Datum 0.00
J
I
H
G
F
E
D
C
B
A
Passage
Shaft
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A , Ist. FLOOR , INDIA HABITAT CENTRE ,
LODHI ROAD , NEW DELHI -110003
PHONE:011-24638096,011-24638097 Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-A106
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION
DRG TITLE
BLOCK - A - SECTION 2
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH

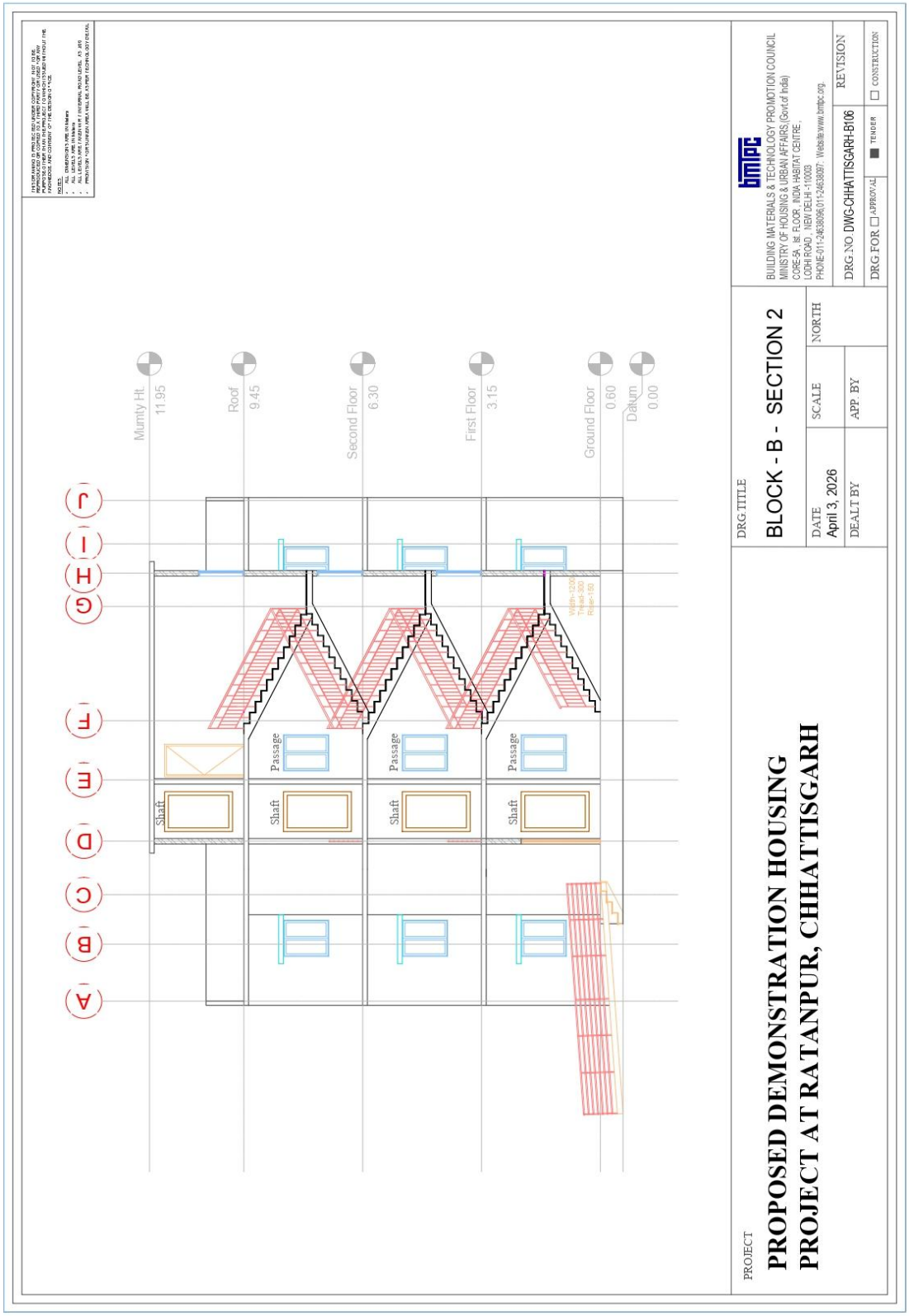

Fire Tank
WT
WT
WT
WT
Mumty Ht.
1 : 100
KHURRA
KHURRA
KHURRA
KHURRA
SOLAR PANELS
SOLAR PANELS
SOLAR PANELS
SOLAR PANELS
SOLAR PANELS
SOLAR PANELS
SOLAR PANELS
SOLAR PANELS
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
BLOCK - A - TERRACE PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt. of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE:-011-24638696,011-24638697, Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-A107
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION

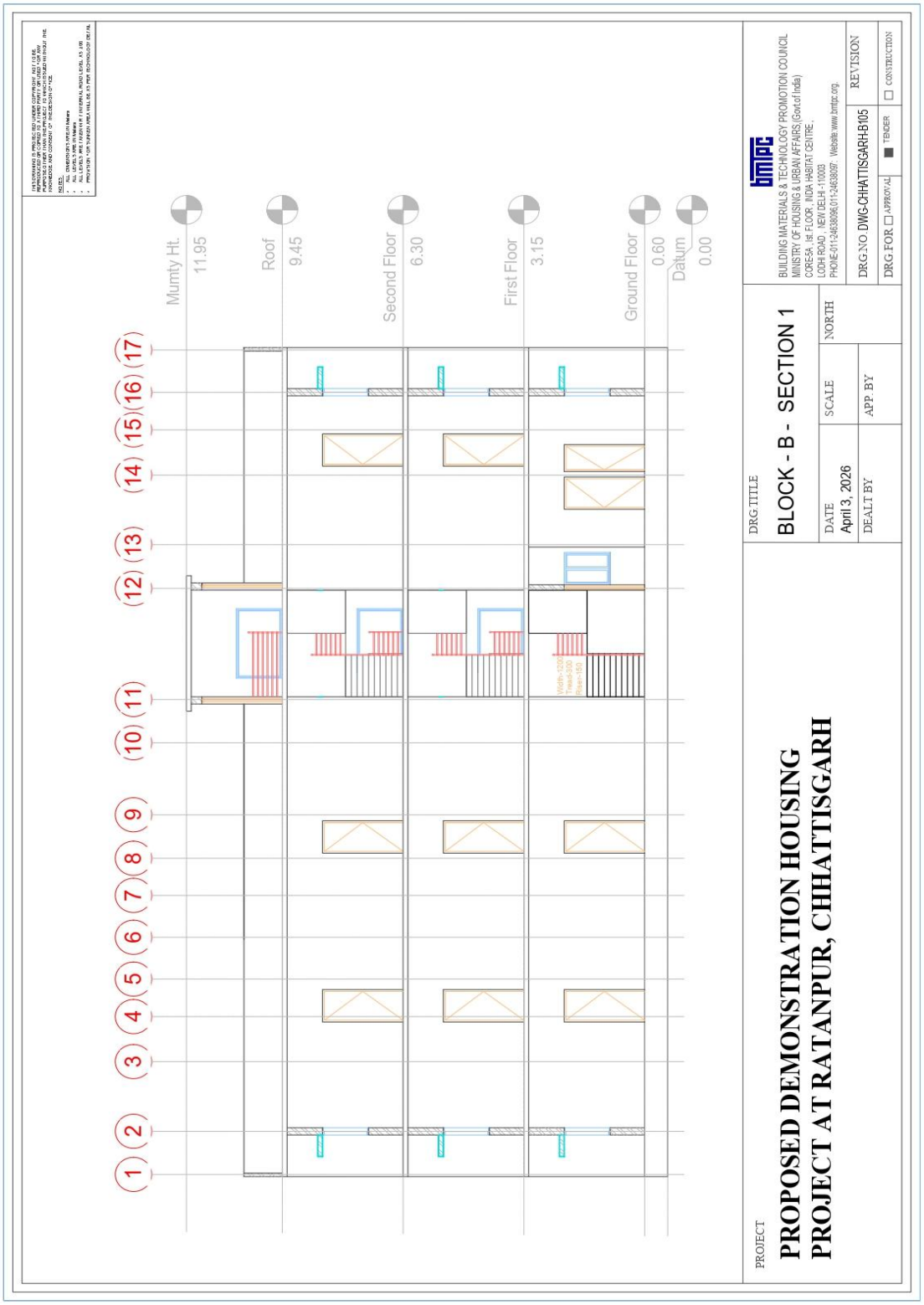

PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - B - GROUND
FLOOR PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE-011-24638096,011-24638097, Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-B101
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION
Activity Room cum Gym
Entrance Lobby
Corridore 1.5 Mts. Wide
RAMP SLOPE 1:10
UP
DN
Balcony
Pantry
Bath
Toilet
Lobby
Room
Store

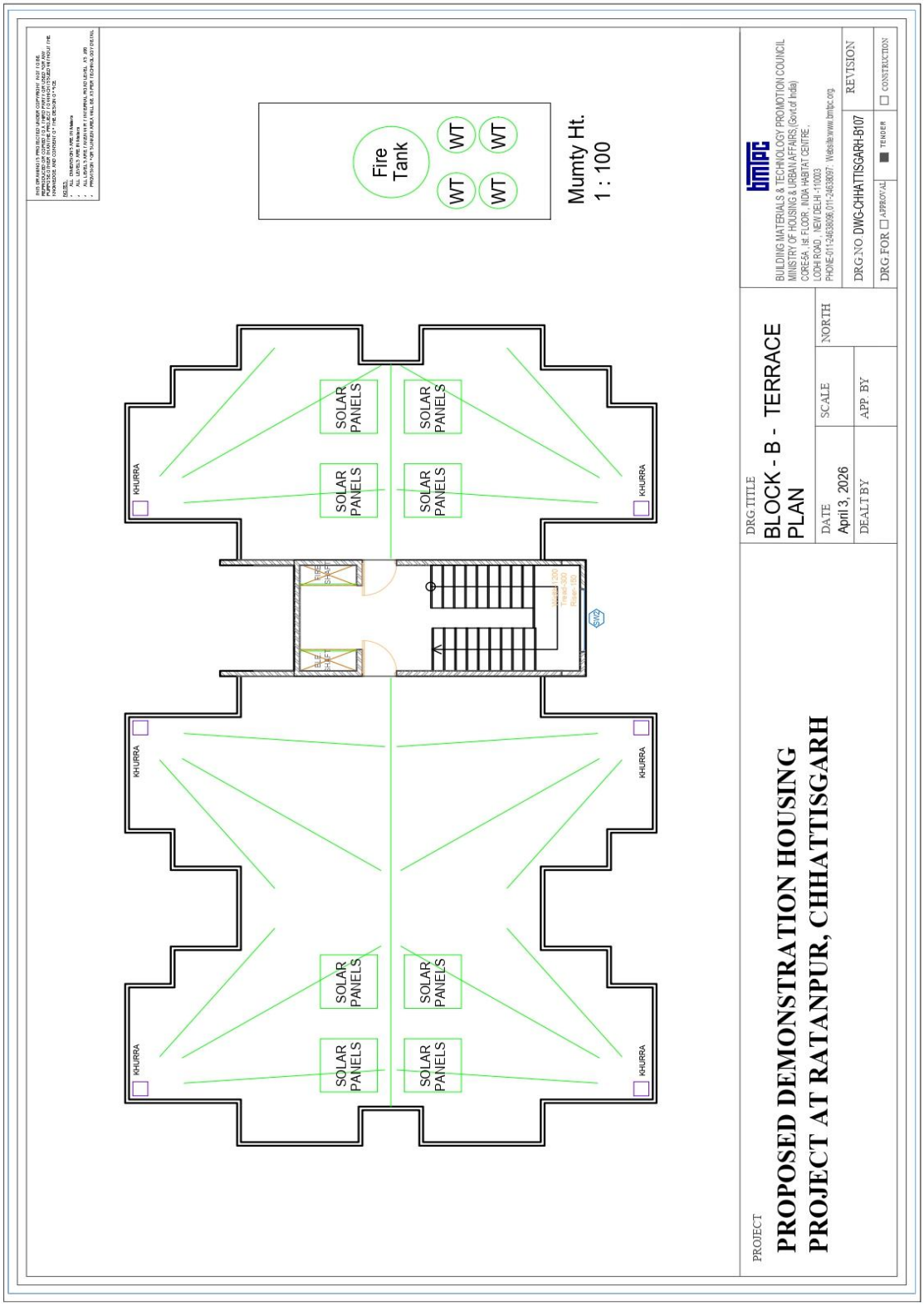

PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
BLOCK - B - TYPICAL
FLOOR PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt. of India)
CORE-5A , 1st FLOOR , INDIA HABITAT CENTRE ,
LODHI ROAD , NEW DELHI -110003
PHONE-011-24638096,011-24638097 Website:www.bmtpc.org,
DRG.NO. DWG-CHHATTISGARH-B102
REVISION
DRG FOR APPROVAL
TENDER
CONSTRUCTION
Corridore 1.5 Mts. Wide
Entrance Lobby
Room
Toilet
Lobby
Bath
Pantry
Balcony
B105
B106

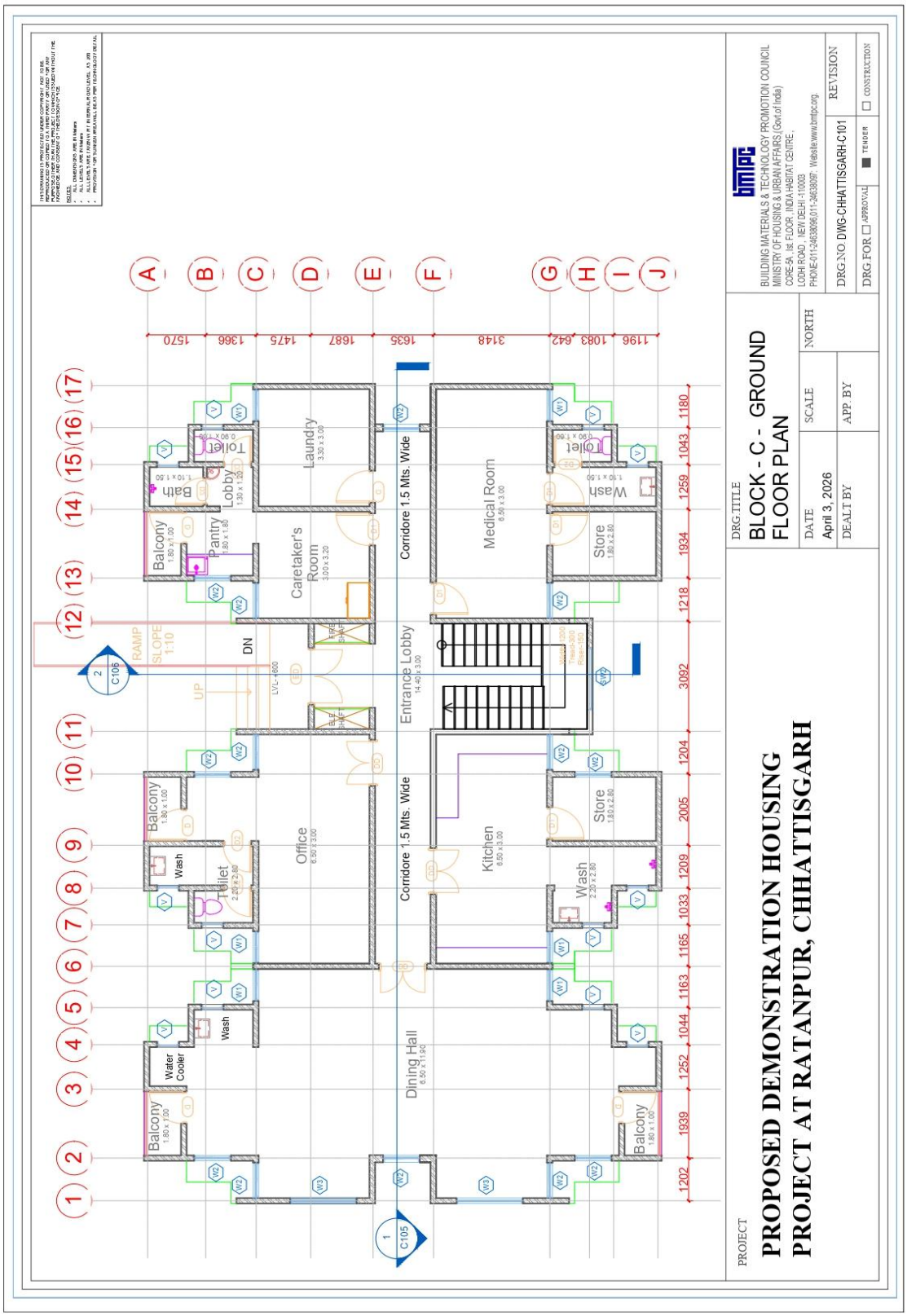

Mumty Ht 11.95
Roof 9.45
Second Floor 6.30
First Floor 3.15
Ground Floor 0.60
Datum 0.00
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17)
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
BLOCK - B - FRONT
ELEVATION
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE-91-11-24638096,91-11-24638097, Website www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-A103
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION

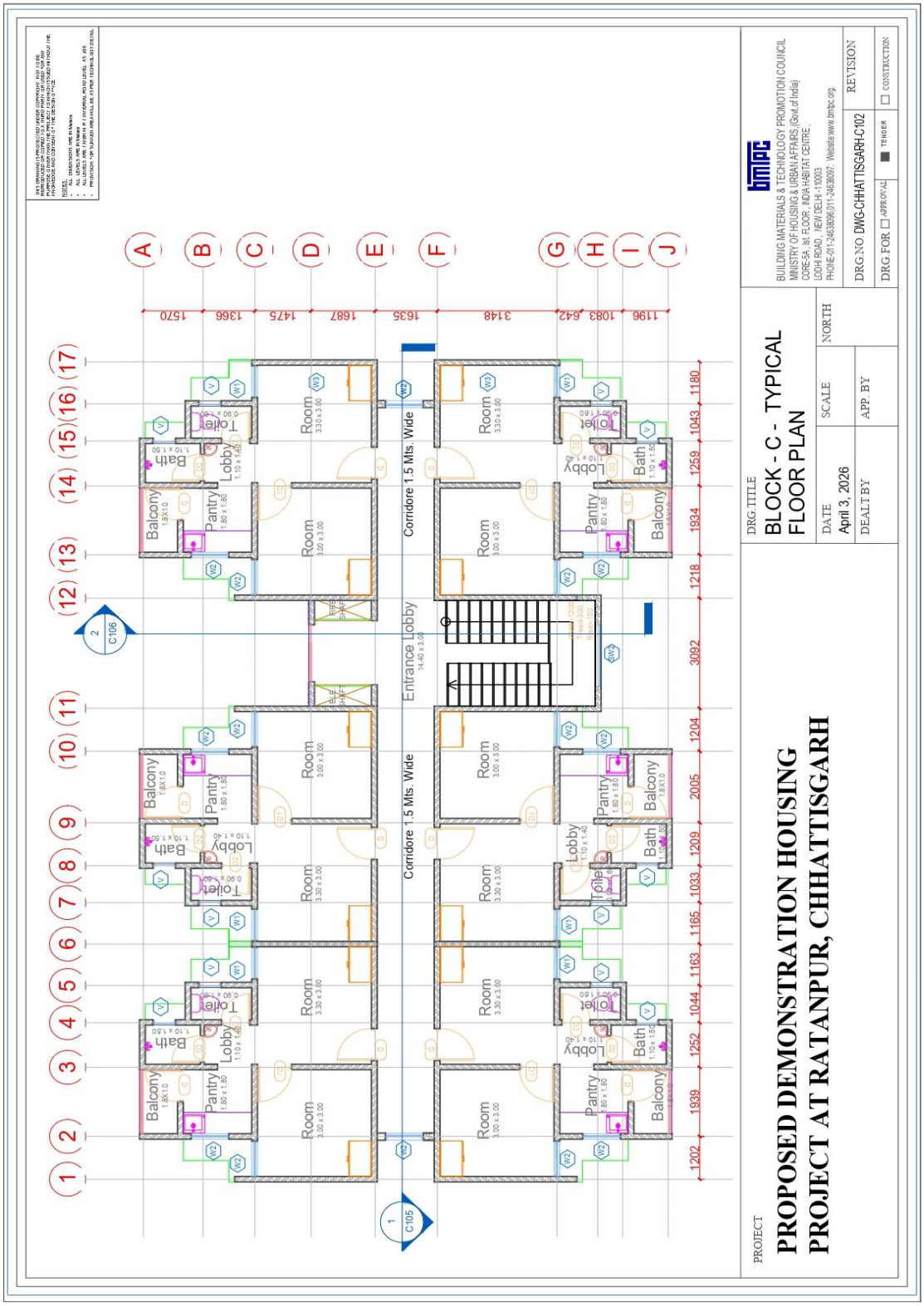

Mumty Ht. 11.95
Roof 9.45
Second Floor 6.30
First Floor 3.15
Ground Floor 0.60
Datum 0.00
A B C D E F G H I J
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
BLOCK - B - SIDE
ELEVATION
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE:011-24638096,011-24638097 Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-A104
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION


Mumty Ht. 11.95
Roof 9.45
Second Floor 6.30
First Floor 3.15
Ground Floor 0.60
Datum 0.00
A
B
C
D
E
F
G
H
I
J
Shaft
Passage
Width=1200
Tread=300
Rise=188
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - B - SECTION 2
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, Ist. FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE-011-24638096,011-24638097, Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-B106
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION

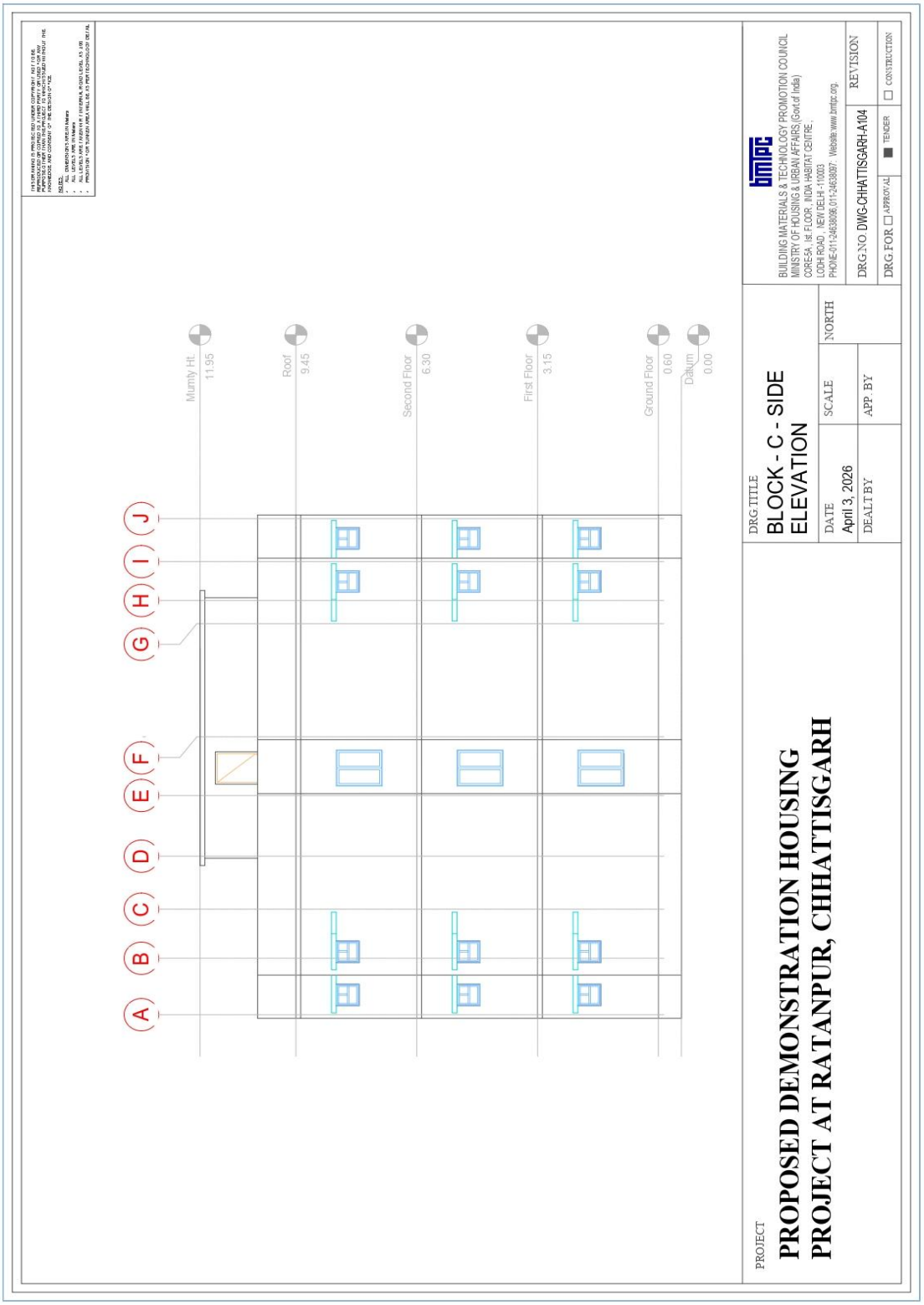

Mumty Ht.
11.95
Roof
9.45
Second Floor
6.30
First Floor
3.15
Ground Floor
0.60
Datum
0.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - B - SECTION 1
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE-91+24638096(01)+24638097, Website www.bmtpc.org.
DRG.NO. DWG-CHHATTISGARH-B105
REVISION
DRG FOR APPROVAL
TENDER
CONSTRUCTION

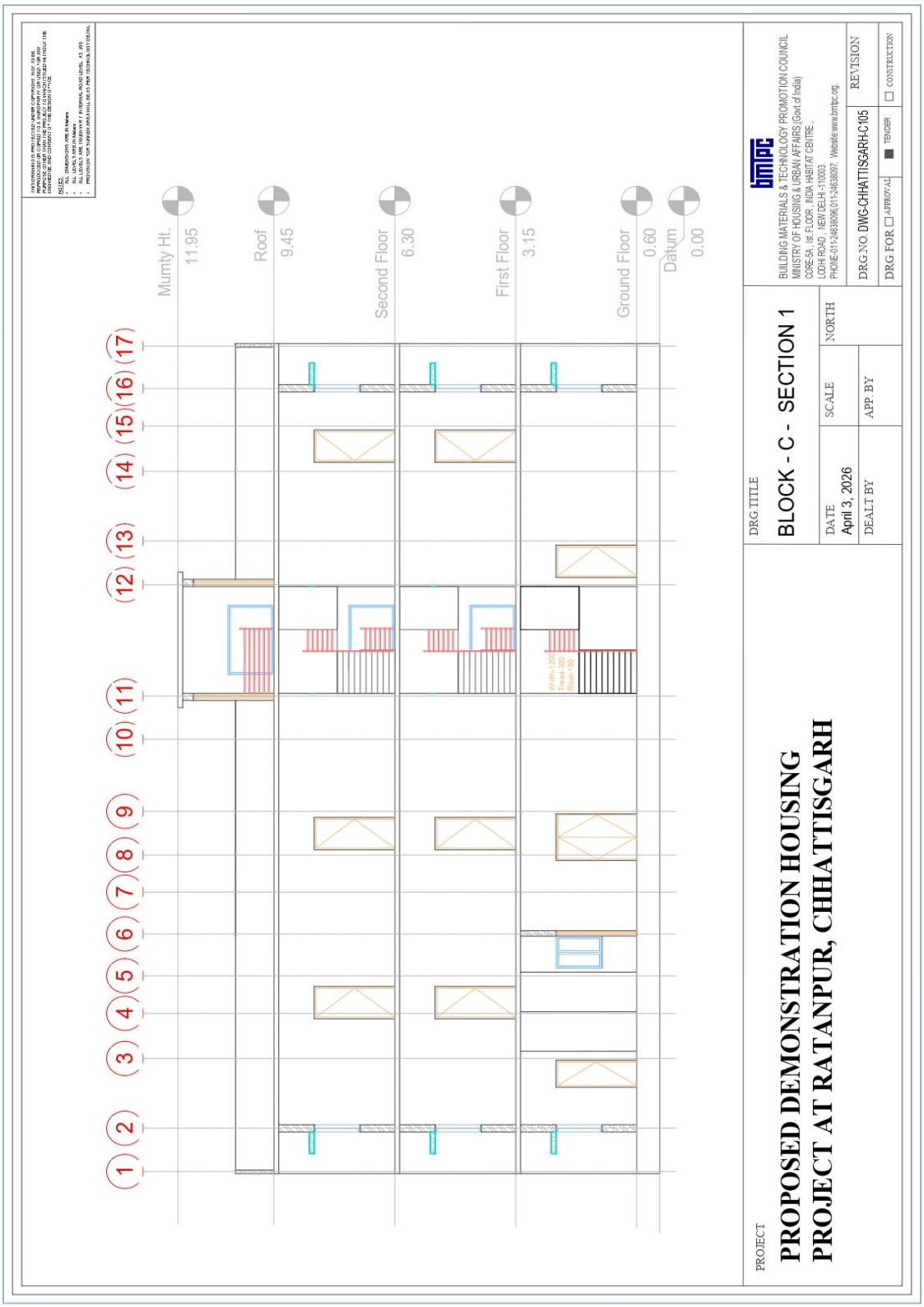

Fire Tank
WT
WT
WT
WT
Mumty Ht.
1 : 100
SOLAR PANELS
KHURRA
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
BLOCK - B - TERRACE PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
DRG.NO. DWG-CHHATTISGARH-B107
REVISION
DRG FOR
APPROVAL
TENDER
CONSTRUCTION

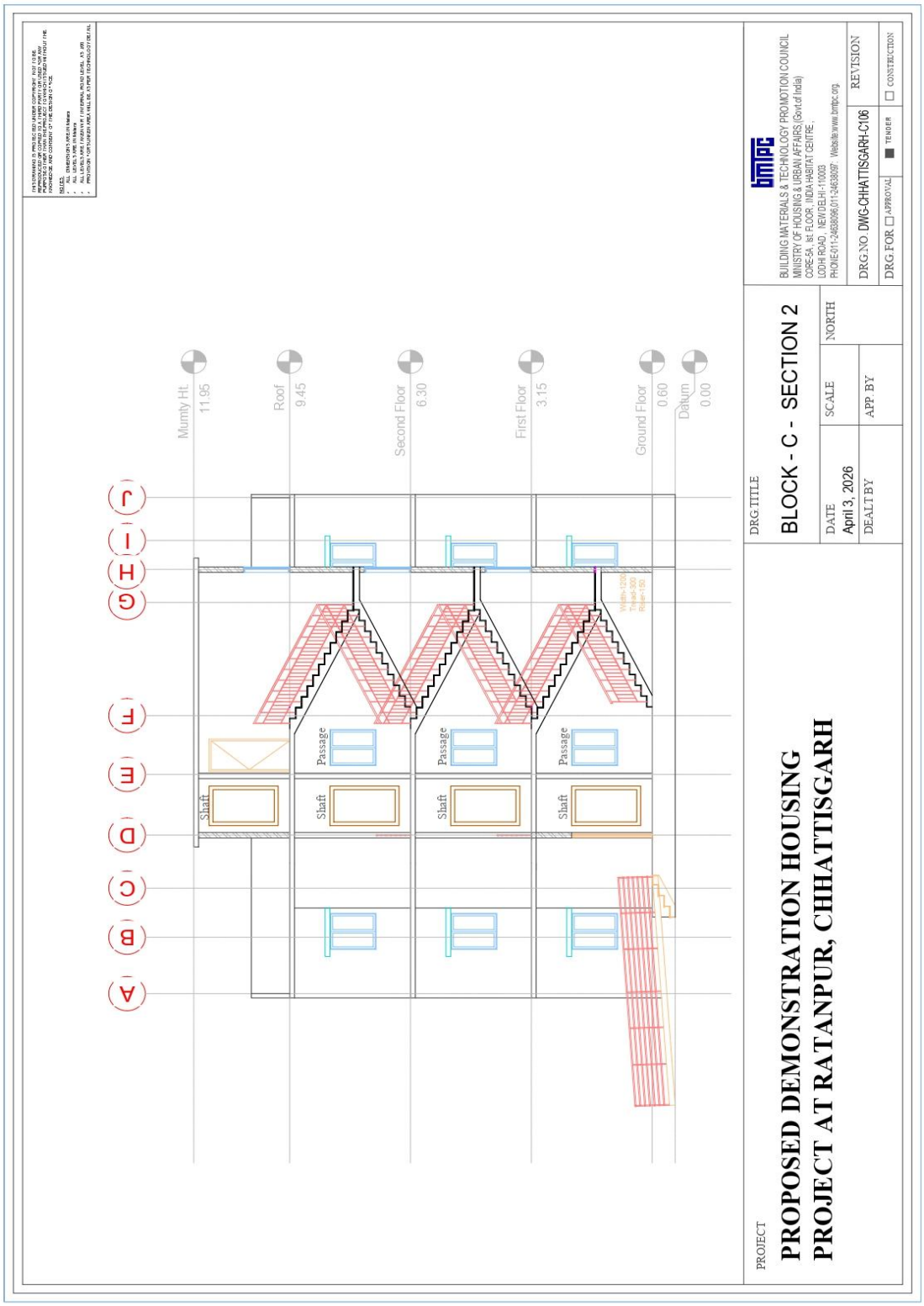

PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - C - GROUND FLOOR PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-8A , Ist FLOOR, INDIA HABITAT CENTRE ,
LODHI ROAD , NEW DELHI -110003
PHONE-011-24638095,011-24638097 Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-C101
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION
Corridore 1.5 Mts. Wide
Entrance Lobby
Medical Room
Kitchen
Office
Caretaker's Room
Laundry
Dining Hall
Balcony
Toilet
Wash
Store
Pantry
Lobby
Bath
Water Cooler
RAMP
SLOPE 1:10
UP
DN

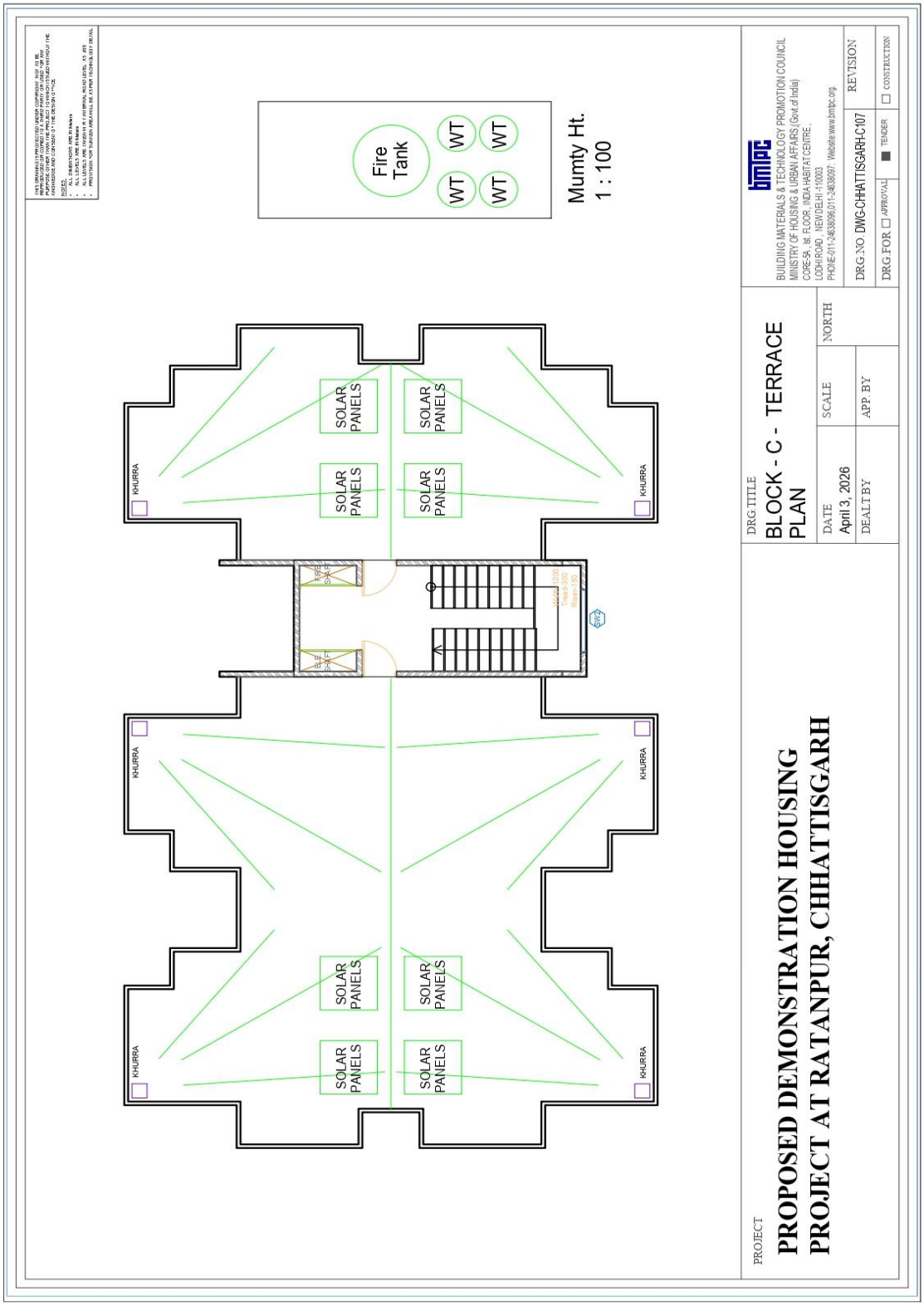

PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - C - TYPICAL
FLOOR PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE-91-11-24638396,011-24638397, Website:www.bmtpc.org
DRG.NO. DWG-C-HHATTISGARH-C102
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION
Corridore 1.5 Mts. Wide
Entrance Lobby
Corridore 1.5 Mts. Wide
Balcony
Pantry
Lobby
Bath
Toilet
Room

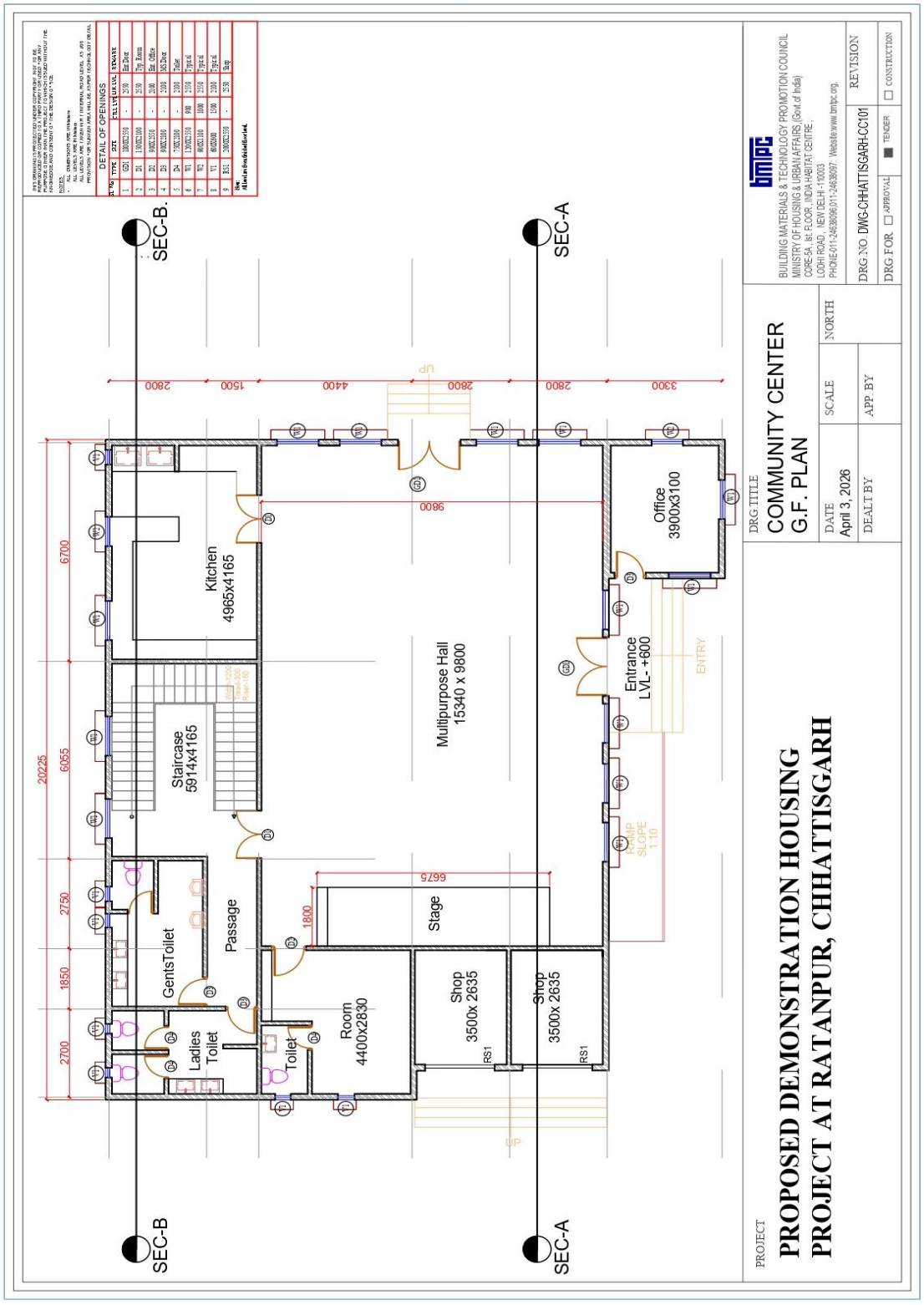
Mumty Ht. 11.95
Roof 9.45
Second Floor 6.30
First Floor 3.15
Ground Floor 0.60
Datum 0.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
BLOCK - C - FRONT ELEVATION
DATE April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS, (Govt.of India)
CORE-5A , Ist. FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD , NEW DELHI -110003
PHONE:011-24638696,011-24638697. Website:www.bmtpc.org
DRG.NO DWG-CHHATTISGARH-A103
REVISION
DRG FOR ☐ APPROVAL ■ TENDER ☐ CONSTRUCTION

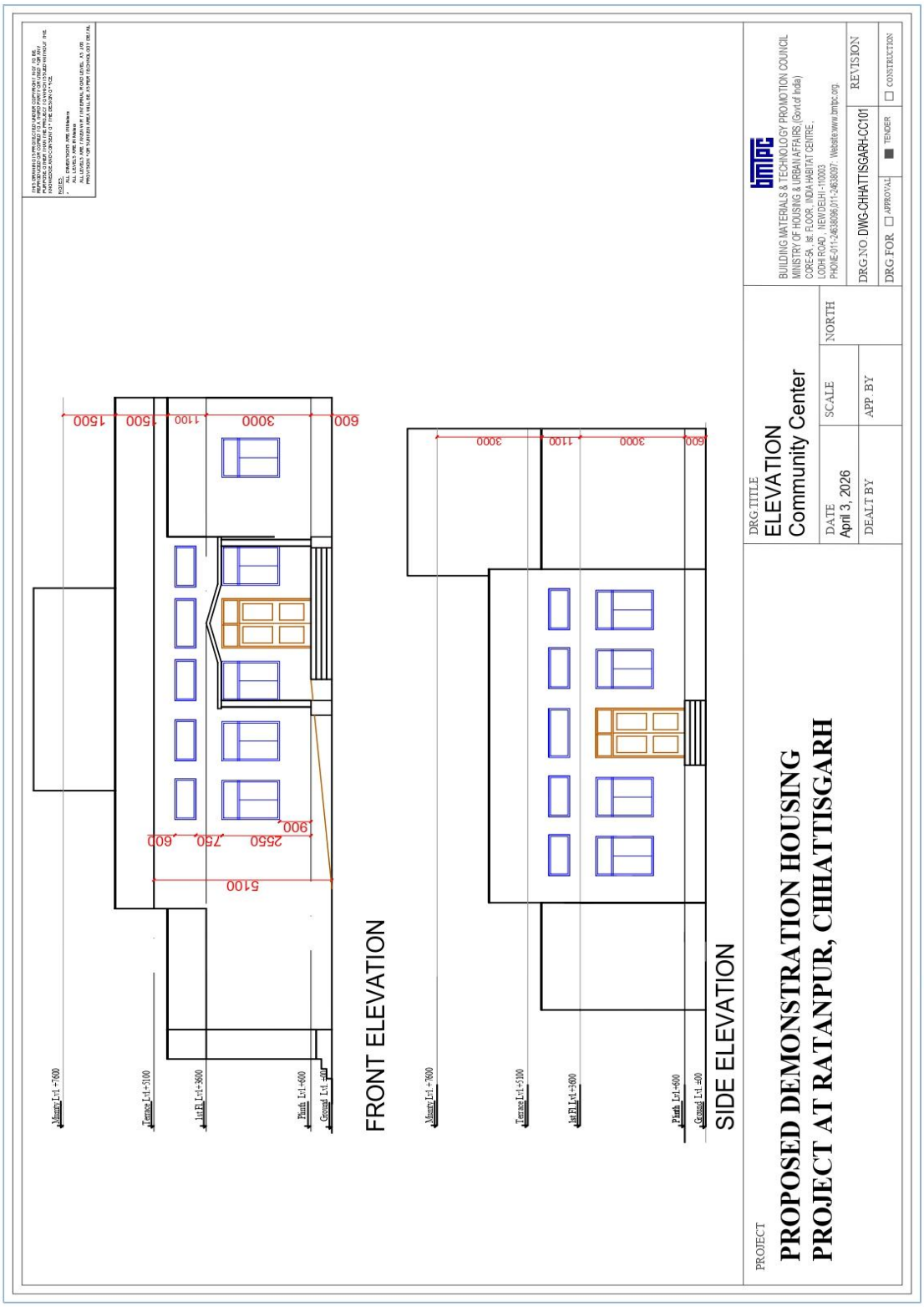

Mumty Ht. 11.95
Roof 9.45
Second Floor 6.30
First Floor 3.15
Ground Floor 0.60
Datum 0.00
A B C D E F G H I J
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - C - SIDE
ELEVATION
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A , Ist. FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD , NEW DELHI -110003
PHONE-91(11)24653586,91(11)24653587, Website:www.bmtpc.org.
DRG.NO. DWG-CHHATTISGARH-A104
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION

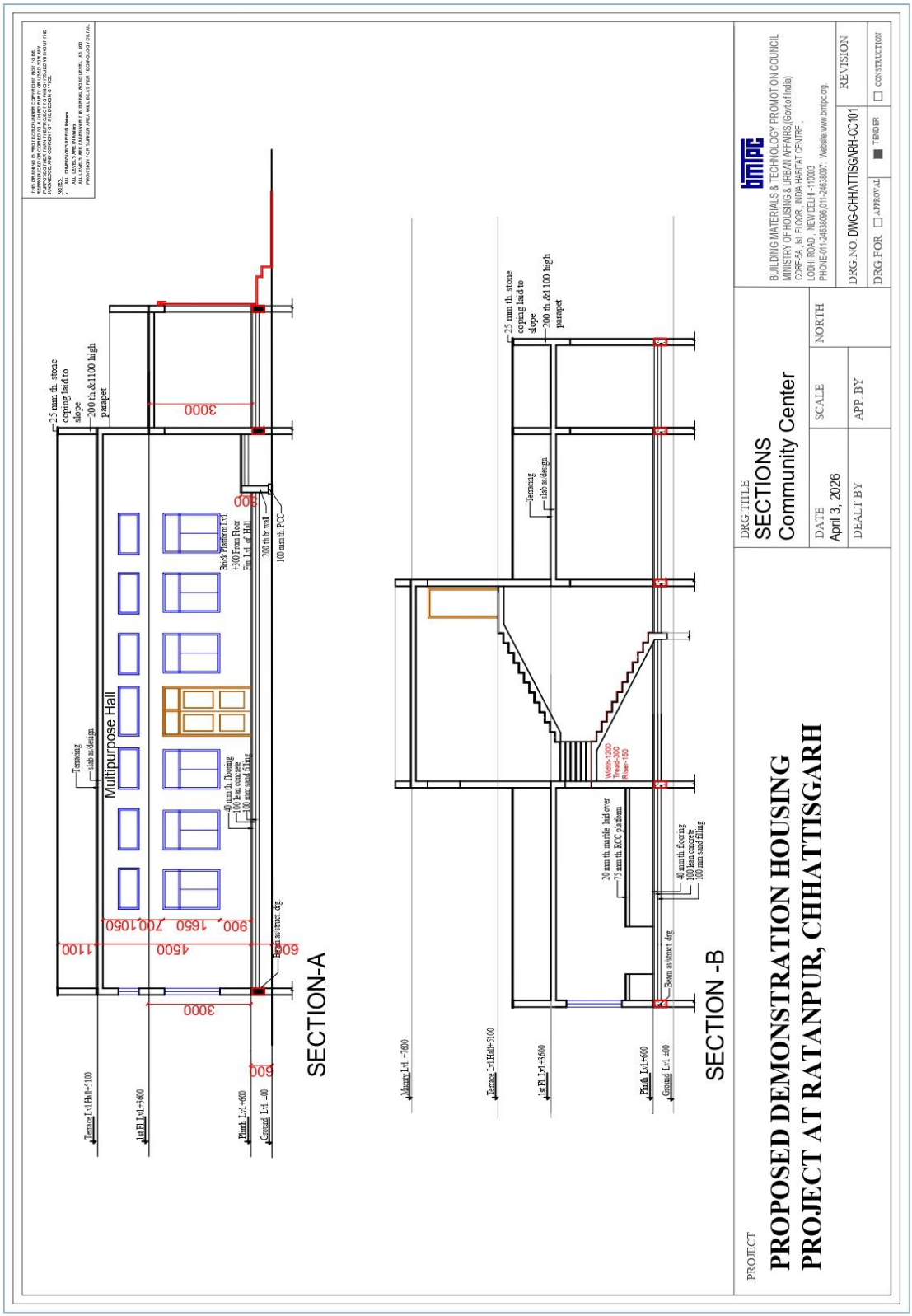

Mumty Ht. 11.95
Roof 9.45
Second Floor 6.30
First Floor 3.15
Ground Floor 0.60
Datum 0.00
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17)
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - C - SECTION 1
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE-91-24638096/011-24638097. Website:www.bmtpc.org.
DRG.NO. DWG-CHHATTISGARH-C105
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION

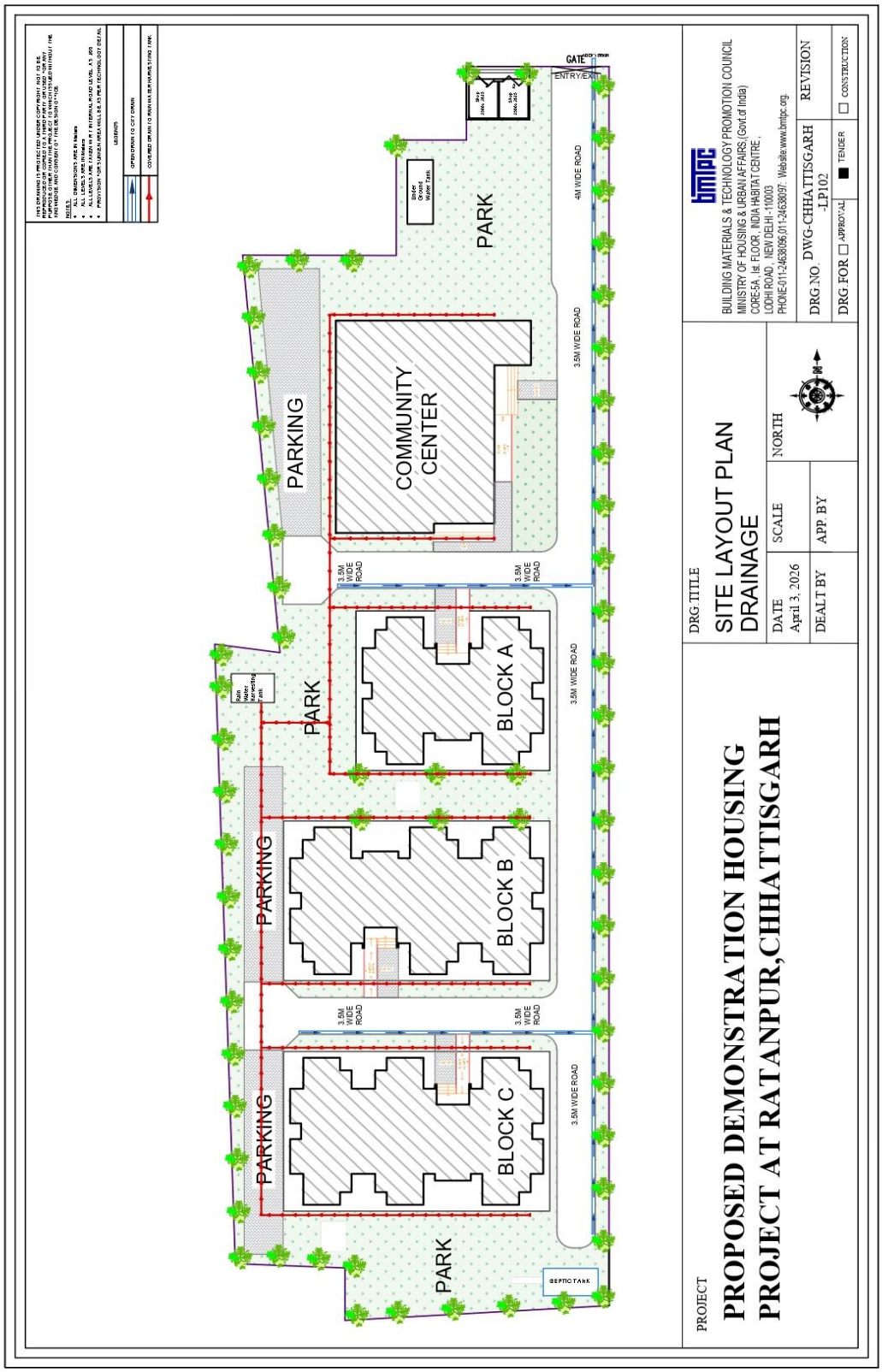

Mumty Ht. 11.95
Roof 9.45
Second Floor 6.30
First Floor 3.15
Ground Floor 0.60
Datum 0.00
J
I
H
G
F
E
D
C
B
A
Passage
Shaft
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - C - SECTION 2
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
DRG.NO. DWG-CHHATTISGARH-C106
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION

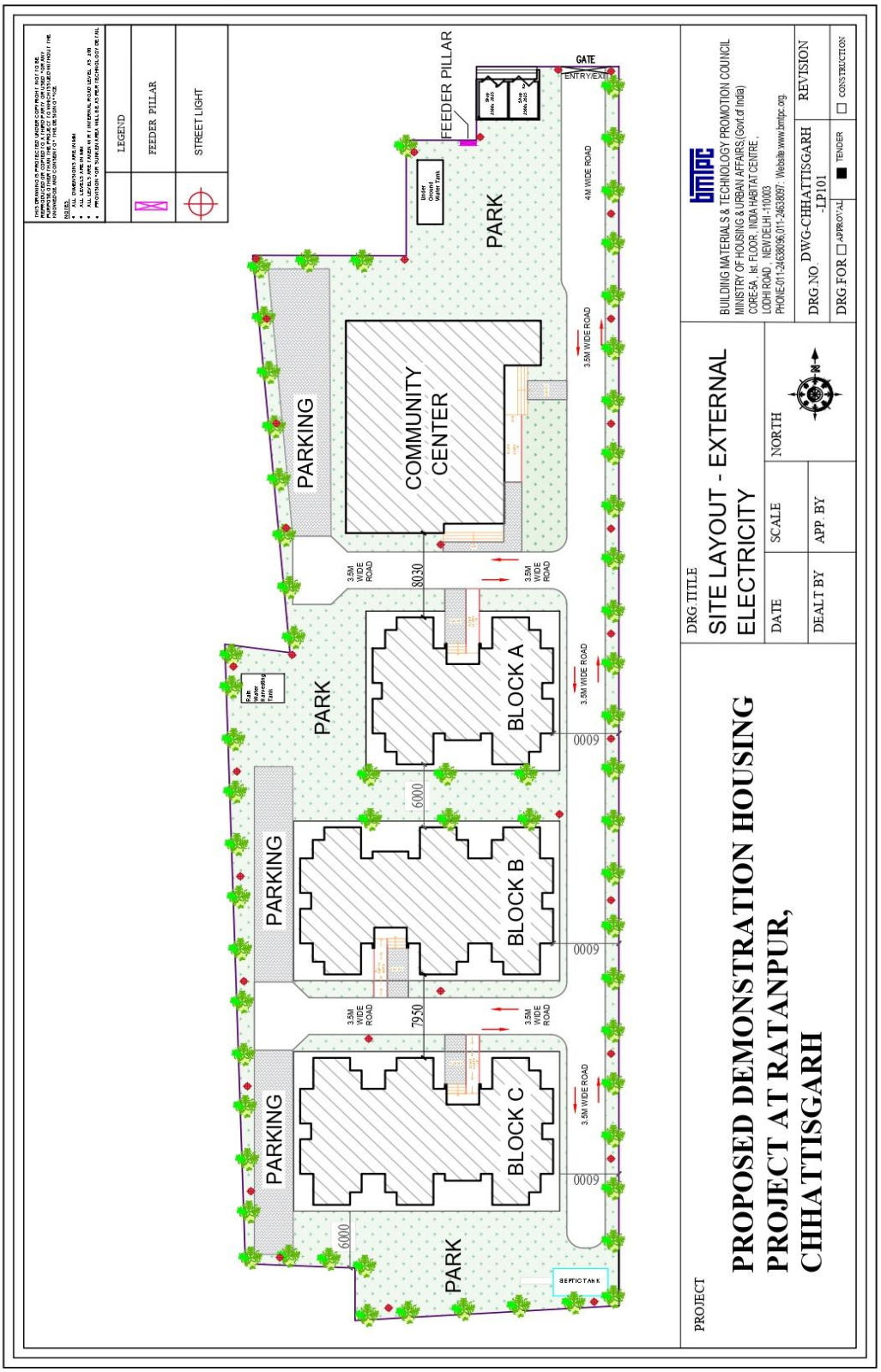

Fire Tank
WT
WT
WT
WT
Mumty Ht.
1 : 100
SOLAR PANELS
KHURRA
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
BLOCK - C - TERRACE PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE-91(-24638096)91(-24638097, Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-C107
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION

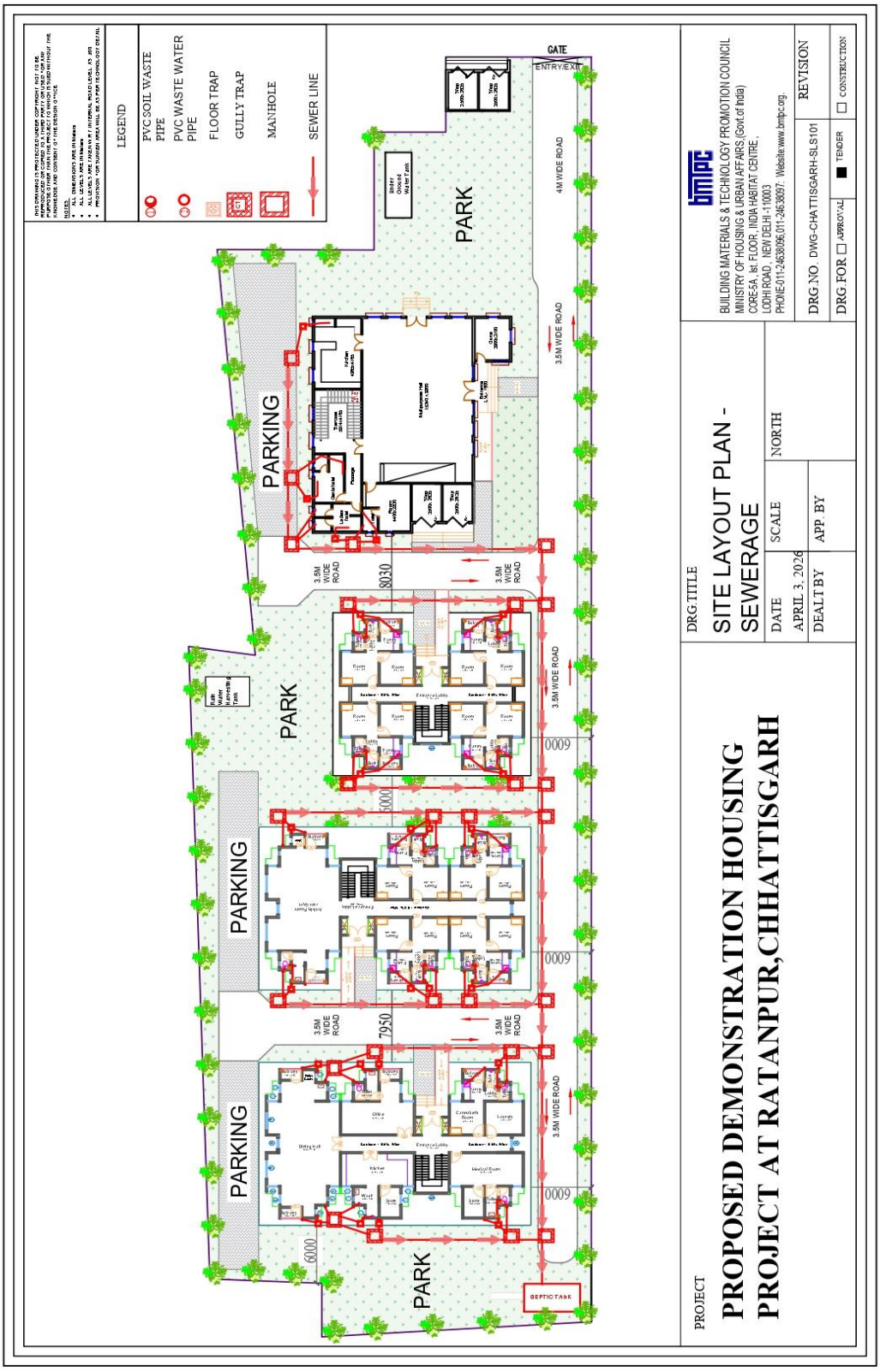

DETAIL OF OPENINGS
SEC-B.
SEC-A
SEC-B
SEC-A
Kitchen
4965x4165
Staircase
5914x4165
Multipurpose Hall
15340 x 9800
Office
3900x3100
Entrance
LVL- +600
ENTRY
RAMP
SLOPE
1:10
Stage
Passage
GentsToilet
Ladies
Toilet
Toilet
Room
4400x2830
Shop
3500x 2635
Shop
3500x 2635
RS1
RS1
UP
DN
20225
6700
6055
2750
1850
2700
2800
1500
4400
2800
2800
3300
9800
6675
1800
DRG TITLE
COMMUNITY CENTER
G.F. PLAN
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE-91(11)-24638096,91(11)-24638097, Website:www.bmtpc.org.
DRG NO. DWG-CHHATTISGARH-CC101
REVISION
DRG FOR
APPROVAL
TENDER
CONSTRUCTION

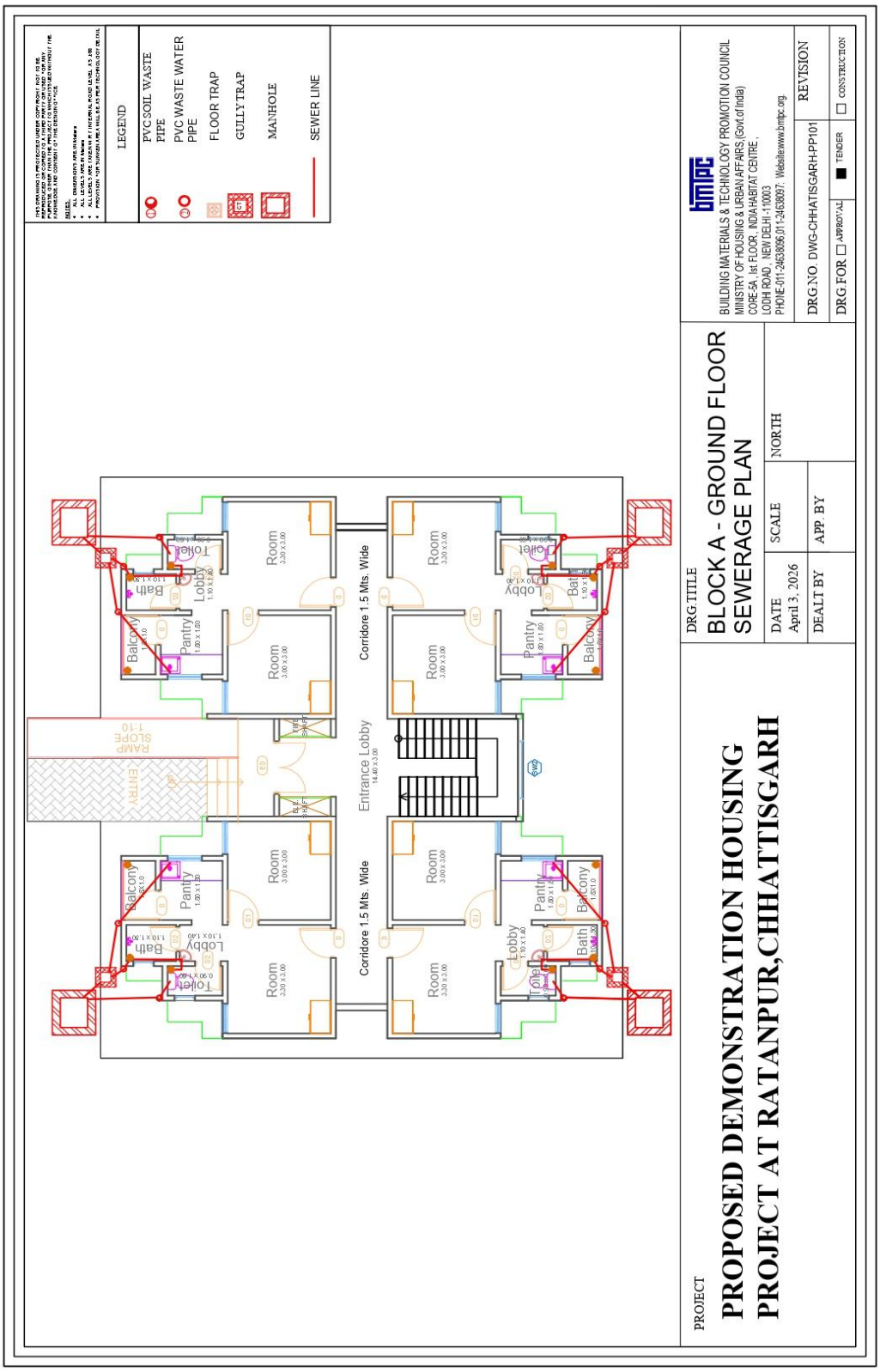

FRONT ELEVATION
SIDE ELEVATION
Terrace Lvl +9100
1st Fl Lvl +6000
Plinth Lvl +600
Ground Lvl ±00
3000
1100
1500
600
2550
750
900
5100
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
ELEVATION
Community Center
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, HUDA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE-91(11)24638096,91(11)24638097, Website:www.bmtpc.org.
DRG NO DWG-CHHATTISGARH-CC101
REVISION
DRG FOR APPROVAL TENDER CONSTRUCTION

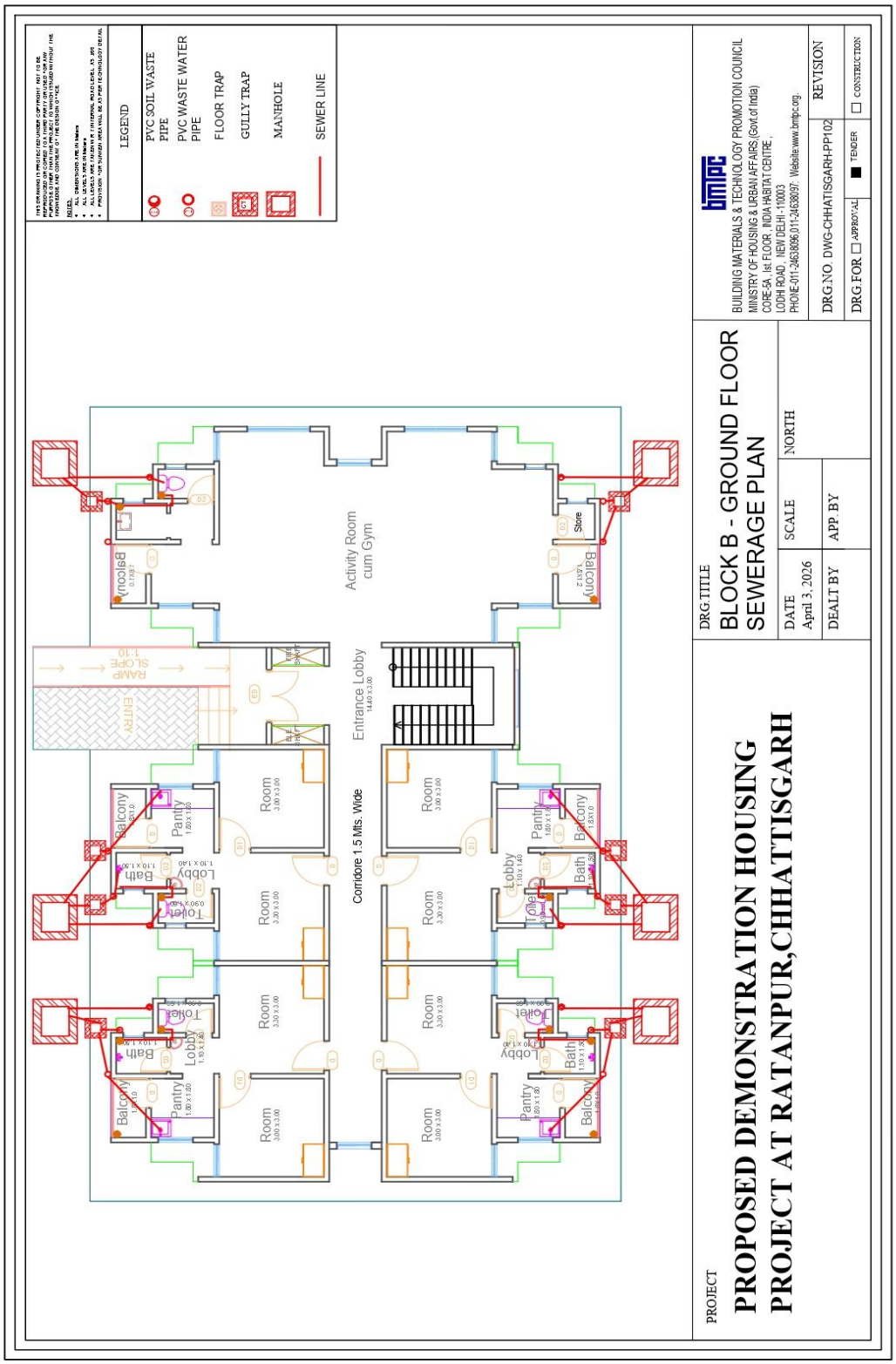

SECTION-A
SECTION -B
Multipurpose Hall
25 mm th. stone coping laid to slope
200 th.&1100 high parapet
Terrace
slab as design
40 mm th. flooring
100 beas concrete
100 mm sand filling
Brick Platform Lvl +100 From Floor Fin. Lvl of Hall
200 th.Br wall
100 mm th. PCC
Beam as struct. drg.
20 mm th. marble laid over 75 mm th. RCC plateform
Width-1200
Tread-300
Riser-150
Mumty Lvl. +7600
Terrace Lvl+Hall+5100
1st Fl. Lvl +3600
Plinth Lvl +600
Ground Lvl ±00
3000
4500
1100
900
1650
700
1050
600
500
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
SECTIONS
Community Center
DATE
April 3, 2026
DEALT BY
SCALE
APP. BY
NORTH
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS,(Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE-011-24638086,011-24638087 Website:www.bmtpc.org
DRG.NO DWG-CHHATTISGARH-CC101
REVISION
DRG FOR APPROVAL TENDER CONSTRUCTION

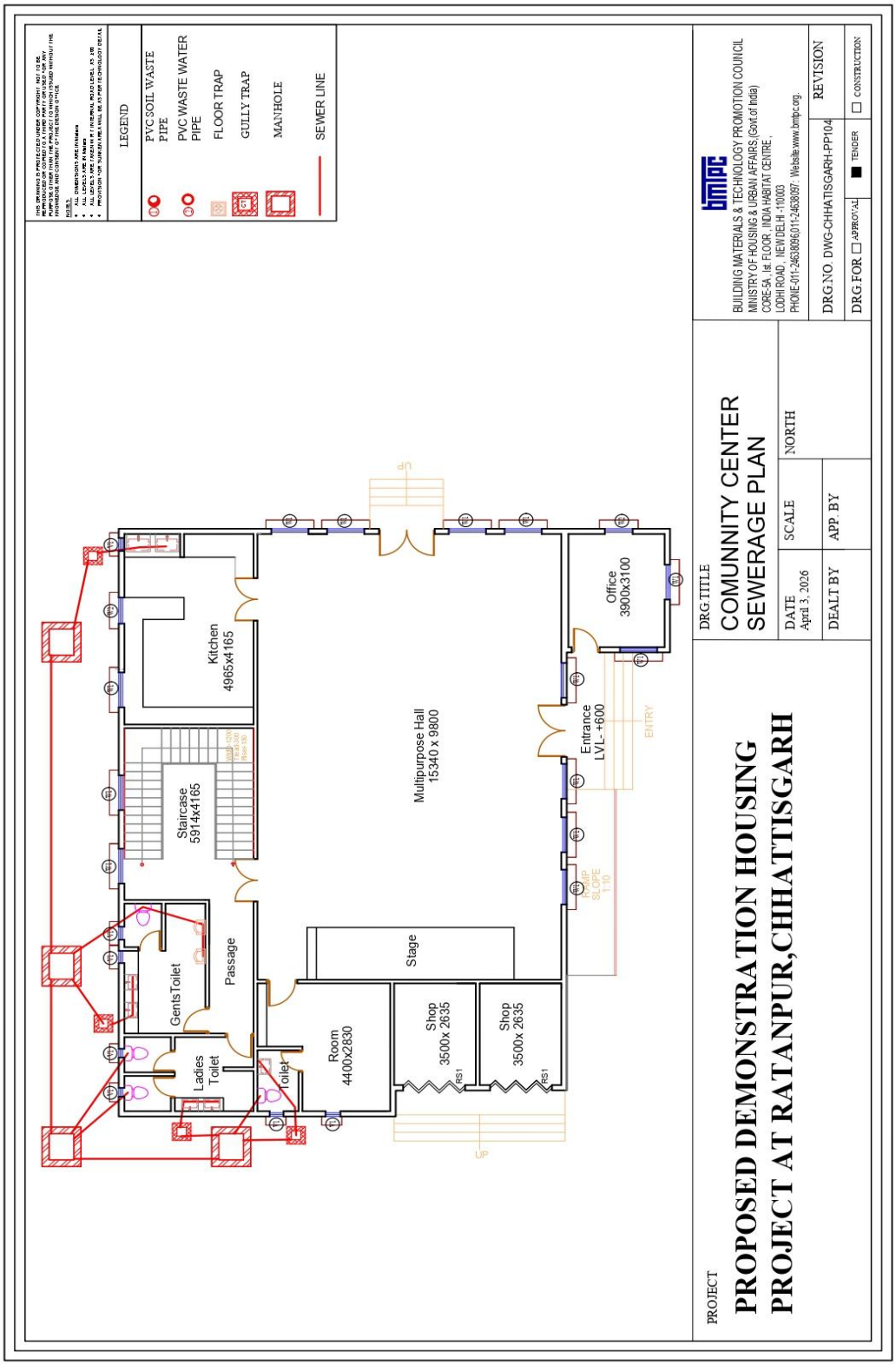

PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR,CHHATTISGARH
DRG TITLE
SITE LAYOUT PLAN
DRAINAGE
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS, (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE-011-24638096,011-24638097. Website:www.bmtpc.org
DRG NO. DWG-CHHATTISGARH -LP102
REVISION
DRG FOR APPROVAL
TENDER
CONSTRUCTION
GATE
ENTRY/EXIT
PARK
PARKING
COMMUNITY CENTER
BLOCK A
BLOCK B
BLOCK C
3.5M WIDE ROAD
4M WIDE ROAD
SEPTIC TANK

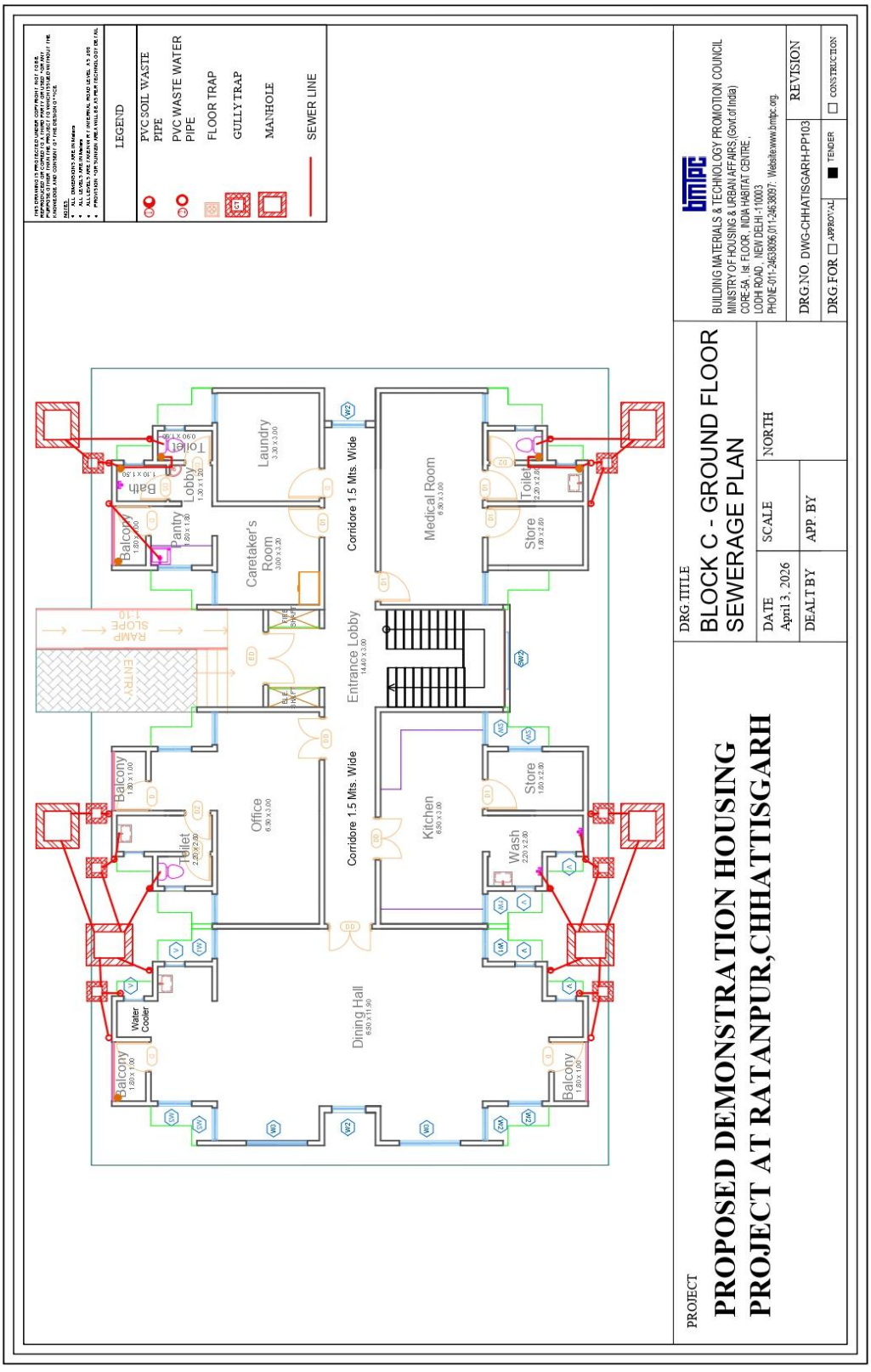

LEGEND
FEEDER PILLAR
STREET LIGHT
GATE
ENTRY/EXIT
FEEDER PILLAR
PARK
COMMUNITY CENTER
PARKING
BLOCK A
BLOCK B
BLOCK C
4M WIDE ROAD
3.5M WIDE ROAD
8030
7950
6000
0009
SEPTIC TANK
PROJECT
PROPOSED DEMONSTRATION HOUSING PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
SITE LAYOUT - EXTERNAL ELECTRICITY
DATE
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS,(Govt.of India)
CORE-5A, Ist. FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, , NEW DELHI -110003
PHONE-011-24638096,011-24638097 Website:www.bmtpc.org
DRG NO. DWG-CHHATTISGARH -LP101
REVISION
DRG FOR APPROVAL TENDER CONSTRUCTION

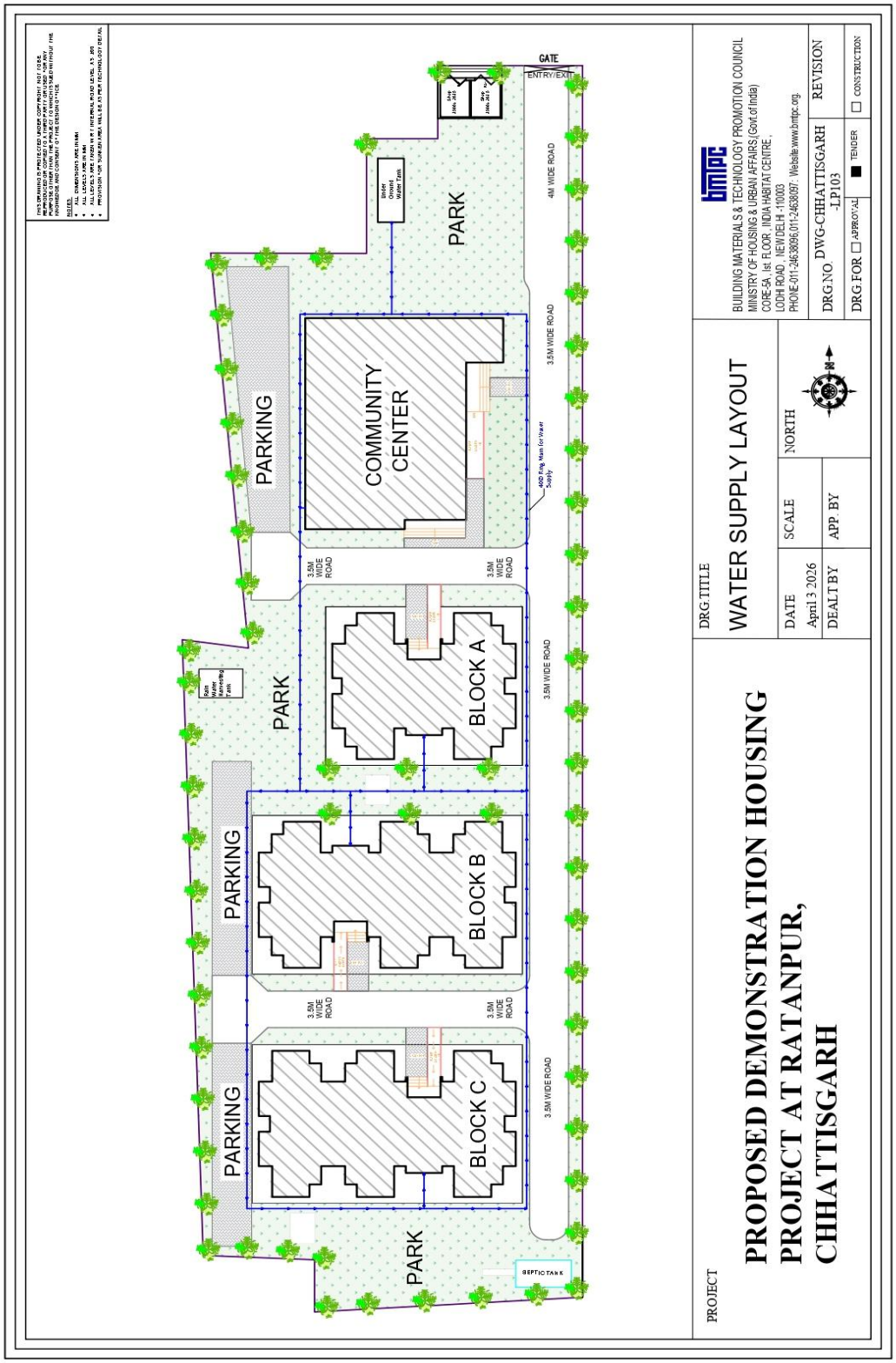

LEGEND
PVC SOIL WASTE PIPE
PVC WASTE WATER PIPE
FLOOR TRAP
GULLY TRAP
MANHOLE
SEWER LINE
GATE
ENTRY/EXIT
PARK
PARKING
4M WIDE ROAD
3.5M WIDE ROAD
3.5M WIDE ROAD
3.5M WIDE ROAD
3.5M WIDE ROAD
3.5M WIDE ROAD
8030
7950
6000
6000
0009
0009
0009
SEPTIC TANK
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS, (Govt.of India)
CORE-5A , Ist FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD , NEW DELHI -110003
PHONE-011-24638096,011-24638097 Website:www.bmtpc.org
DRG.NO. DWG-CHATTISGARH-SLS101
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION
DRG.TITLE
SITE LAYOUT PLAN - SEWERAGE
DATE
APRIL 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
PROJECT
PROPOSED DEMONSTRATION HOUSING PROJECT AT RATANPUR,CHHATTISGARH

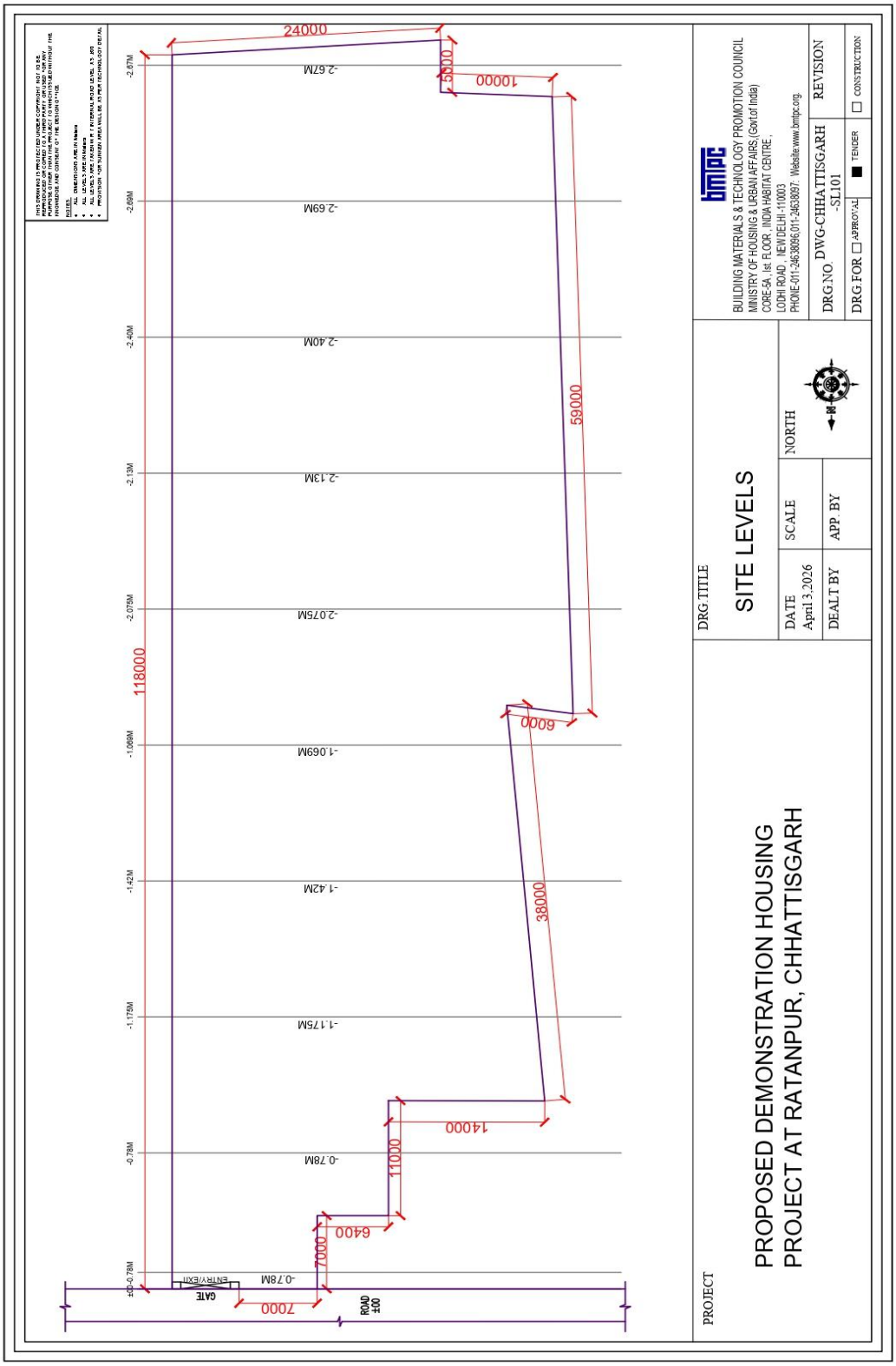

LEGEND
PVC SOIL WASTE PIPE
PVC WASTE WATER PIPE
FLOOR TRAP
GULLY TRAP
MANHOLE
SEWER LINE
Corridore 1.5 Mts. Wide
Entrance Lobby
Corridore 1.5 Mts. Wide
RAMP SLOPE 1:10
ENTRY
Room
Toilet
Bath
Lobby
Pantry
Balcony
PROJECT
PROPOSED DEMONSTRATION HOUSING PROJECT AT RATANPUR,CHHATTISGARH
DRG TITLE
BLOCK A - GROUND FLOOR SEWERAGE PLAN
DATE April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE-011-24638096,011-24638097, Website:www.bmtpc.org
DRG.NO DWG-CHHATISGARH-PP101
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION


LEGEND
PVC SOIL WASTE PIPE
PVC WASTE WATER PIPE
FLOOR TRAP
GULLY TRAP
MANHOLE
SEWER LINE
Activity Room cum Gym
Entrance Lobby
Corridore 1.5 Mts. Wide
RAMP SLOPE 1:10
ENTRY
Store
Balcony
Pantry
Room
Lobby
Toilet
Bath
PROJECT
PROPOSED DEMONSTRATION HOUSING PROJECT AT RATANPUR,CHHATTISGARH
DRG TITLE
BLOCK B - GROUND FLOOR SEWERAGE PLAN
DATE April 3, 2026
SCALE
NORTH
DEALT BY
APP BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE-011-24638096,011-24638097. Website:www.bmtpc.org
DRG.NO. DWG-CHHATISGARH-PPP102
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION


LEGEND
PVC SOIL WASTE PIPE
PVC WASTE WATER PIPE
FLOOR TRAP
GULLY TRAP
MANHOLE
SEWER LINE
Kitchen 4965x4165
Staircase 5914x4165
Multipurpose Hall 15340 x 9800
Office 3900x3100
Entrance LVL -+600
ENTRY
Gents Toilet
Passage
Ladies Toilet
Toilet
Room 4400x2830
Stage
Shop 3500x 2635
Shop 3500x 2635
UP
RAMP SLOPE 1:10
PROJECT
PROPOSED DEMONSTRATION HOUSING PROJECT AT RATANPUR,CHHATTISGARH
DRG TITLE
COMUNNITY CENTER SEWERAGE PLAN
DATE April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE-011-24638096,011-24638097, Website:www.bmtpc.org
DRG.NO. DWG-CHHATISGARH-PP104
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION


LEGEND
PVC SOIL WASTE PIPE
PVC WASTE WATER PIPE
FLOOR TRAP
GULLY TRAP
MANHOLE
SEWER LINE
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS,(Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI -110003
PHONE-011-24638096,011-24638097 Website:www.bmtpc.org
DRG.NO. DWG-CHHATISGARH-PP103
REVISION
DRG.FOR APPROVAL TENDER CONSTRUCTION
DRG.TITLE
BLOCK C - GROUND FLOOR SEWERAGE PLAN
DATE April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
PROJECT
PROPOSED DEMONSTRATION HOUSING PROJECT AT RATANPUR,CHHATTISGARH
Laundry
Toilet
Bath
Lobby
Balcony
Pantry
Caretaker's Room
Corridore 1.5 Mts. Wide
Medical Room
Toilet
Store
RAMP SLOPE 1:10
ENTRY
Entrance Lobby
Balcony
Office
Toilet
Corridore 1.5 Mts. Wide
Kitchen
Store
Wash
Water Cooler
Dining Hall
Balcony
Balcony


GATE
ENTRY/EXIT
PARK
4M WIDE ROAD
3.5M WIDE ROAD
COMMUNITY CENTER
PARKING
BLOCK A
BLOCK B
BLOCK C
3.5M WIDE ROAD
PARK
PARKING
PARKING
PARK
SEPTIC TANK
PROJECT
PROPOSED DEMONSTRATION HOUSING PROJECT AT RATANPUR, CHHATTISGARH
DRG TITLE
WATER SUPPLY LAYOUT
DATE
April 3 2026
SCALE
NORTH
DEALT BY
APP BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt of India)
CORE-5A , 1st FLOOR , INDIA HABITAT CENTRE ,
LODHI ROAD , NEW DELHI -110003
PHONE-011-24638096,011-24638097 . Website:www.bmtpc.org
DRG NO. DWG-CHHATTISGARH -LP103
REVISION
DRG FOR APPROVAL
TENDER
CONSTRUCTION


24000
5000
10000
59000
6000
38000
14000
11000
6400
7000
7000
118000
-2.67M
-2.69M
-2.40M
-2.13M
-2.075M
-1.069M
-1.42M
-1.175M
-0.78M
±00
-0.78M
GATE
ENTRY/EXIT
ROAD
±00
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG.TITLE
SITE LEVELS
DATE
April 3 ,2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A , 1st FLOOR , INDIA HABITAT CENTRE,
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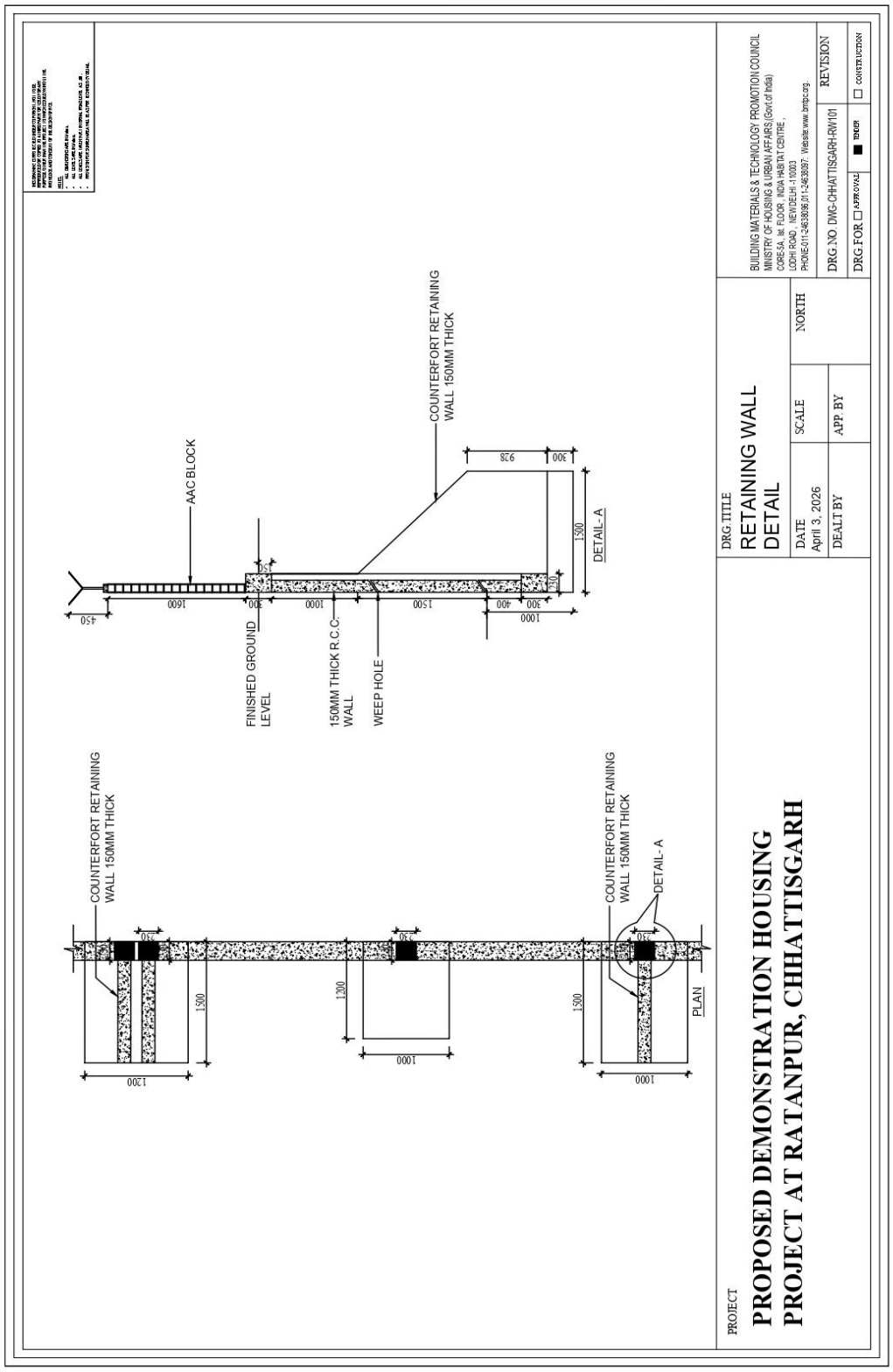
PHONE-011-24638096,011-24638097. Website:www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH -SL101
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION


AAC BLOCK
COUNTERFORT RETAINING WALL 150MM THICK
FINISHED GROUND LEVEL
150MM THICK R.C.C. WALL
WEEP HOLE
DETAIL- A
COUNTERFORT RETAINING WALL 150MM THICK
COUNTERFORT RETAINING WALL 150MM THICK
DETAIL- A
PLAN
PROJECT
PROPOSED DEMONSTRATION HOUSING
PROJECT AT RATANPUR, CHHATTISGARH
DRG. TITLE
RETAINING WALL DETAIL
DATE
April 3, 2026
SCALE
NORTH
DEALT BY
APP. BY
BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL
MINISTRY OF HOUSING & URBAN AFFAIRS (Govt.of India)
CORE-5A, 1st FLOOR, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI-110003
PHONE-011-24630836,011-24653387, Website: www.bmtpc.org
DRG.NO. DWG-CHHATTISGARH-RW101
REVISION
DRG.FOR APPROVAL
TENDER
CONSTRUCTION

Part-8

Technical Specifications of Emerging Technologies

DETAILS OF TECHNOLOGIES

RECOMMENDED UNDER

GHTC-INDIA

BY MINISTRY OF HUA

DETAILED TECHNICAL SPECIFICATIONS

A. PRECAST CONCRETE CONSTRUCTION SYSTEM - 3D PRECAST VOLUMETRIC

(1. M/s Katerra India Private Limited, 2. M/s Moducast Pvt. Ltd., 3. M/s Magicrete Building Solutions, 4. M/s Ultratech Cement Ltd.)

1. Manufacturing of 3D Volumetric Components

Fabrication and manufacturing of solid precast concrete modules (room, toilet ,kitchen, bathroom, stairs etc.) through 3D volumetric casting or structural modules cast in Plant/Casting yard assembled together through casting of wall and floor panels. Modules shall be manufactured in controlled factory environment with approved methodology including moulds, mixing, transporting and placing of concrete, vibrating, curing, finishing, making necessary cutout/holes of required sizes for services, yard handling & stacking all complete as per approved shop drawings and design mix as per the direction of Engineer-in-Charge.

2. Transportation of Modules

Transportation of Precast Elements by flat bed Trailor (Double / Triple axle 40ft Length with proper accessories like A frame etc.) from factory, including loading, unloading & stacking at site with the help of required capacity cranes.

3. Erection & Installation of Modules

Erection & Installation of Precast Concrete modules in correct & final position with proper line level and plumb at site making all arrangements (i.e cranes, push-pull jacks & all another T & P for lifting Placing & Alignment of elements, within erection tolerance as per IS 15916 (Building Design and Erection Using Prefabricated Concrete - Code of Practice) shall be as per approved shop drawings and all complete as per the direction of Engineer-in-Charge including all accessories, jointing, grouting complete. The structure shall be complete in all respect with all internal and external finishing as per approved drawings.

All relevant Indian Standards/ requirement of NBC shall be conformed for designing, casting, prefabrication ,erection and installation.

B. PRE-CAST CONCRETE CONSTRUCTION SYSTEM –PRE-CAST COMPONENTS ASSEMBLED AT SITE

(1. M/s Larsen & Toubro, 2. M/s B.G. Shirke Construction Technology Pvt. Ltd., 3. M/s Elematic India , 4. M/s PG Setty Construction Technology Pvt. Ltd. 5. M/s Teemage Builders Pvt. Ltd. 6. M/s Nordicflex House 7. M/s Adlakha Associates Pvt. Ltd. 8. M/s William Ling)

1. Manufacturing of Solid Pre-cast concrete Elements

Solid precast concrete elements shall be fabricated and manufactured with provisions of shear keys, connecting loops, dowel tubes and proper lifting accessories for walls, beams, slabs, stairs, column etc, of various thickness, shape and size of different concrete grades manufactured in controlled factory environment with approved methodology including moulds (Pallet system, Tilts form, table moulds, battery moulds, vertical moulds, beam moulds, column moulds, staircase moulds, Facade mould, etc.), mixing, transporting and placing of concrete, vibrating, curing, finishing, making necessary cutout/holes of required sizes for services, yard handling & stacking all complete as per IS 11447:1985 (Code of practice for construction with large panel prefabricates) and as per approved shop drawings and design mix as per the direction of Engineer-in-Charge. Minimum grade of Concrete for solid structural components shall be M-35.

2 Manufacturing of Pre-stressed Hollow core Slab

Prestressed Hollow Core slab (Hollow area 25 to 30%) of different thickness & modular width 1200 mm shall be fabricated & manufactured in controlled Factory Environment with approved methodology by using long line casting method having arrangement of proper steel bed. Concreting should be done by batch mixing plant capable of producing zero slump concrete, transported through automatic shuttels of standard make & layed on bed with the help of extruder/Slipformer, finishing, curing and also provision of steam curing. Cutting, making necessary cutout/holes of required sizes for services in slab element after achieving required strength, yard handling & stacking all complete as per approved shop drawings & design mix as per the direction of the Engineer-in-charge. Minimum grade of Concrete for prestressed hollow slab is to be M-40.

Prestressing steel strands (low relaxation) shall be provided & laid in position on hollow core bed by using mechanical pulling arrangement like Rabbit/ Bed master including all accessories for Stressing & destressing operations as per approved make conforming to IS1343 (Prestressed Concrete — Code of Practice) & grade FY-1860 etc, complete as per drawings and direction of Engineer -in-charge.

All relevant Indian Standards/ requirement of NBC shall be conformed.

2. Transportation of Pre-cast elements

Transportation of Precast Elements by flat bed Trailor (Double / Triple axle 40ft Length with proper accessories like A frame etc) from factory, including loading, unloading & stacking at site with the help of required capacity cranes.

3. Erection & Installation of Pre-cast elements

Precast/ Prestressed Concrete elements shall be erected & Installed in correct & final position with proper line level and plumb at site making all arrangements (i.e cranes, push-pull jacks & all another T & P for lifting placing & alignment of elements, within erection tolerance as per IS 15916 as per approved shop drawings and all complete as per the direction of Engineer-in-Charge Weather proof sealant shall be applied on outer joints of approved make confirming to relevant Indian Standard. Levelling sim pads of required sizes (5x5cm to 10x10cm) of PVC / Rubber to adjust level of bearing surface of supporting members shall be applied.

Grouting of dowel tubes / Shear keys / Joints of precast members with M-60 grade cementations grout (Non Shrink) of approved make by suitable means (Free flowing /pump) shall be done including curing etc.

C. LIGHT GAUGE STEEL STRUCTURAL SYSTEM & PRE ENGINEERED STEEL STRUCTURAL SYSTEM (LIGHT GAUGE STEEL FRAME STRUCTURE WITH FIBRE CEMENT BOARD ON BOTH SIDE AND ROCKWOOL AS INFILL WILL)

C-1) LIGHT GAUGE STEEL STRUCTURAL SYSTEM

(1. M/s Mitsumi Housing Pvt. Ltd., 2. M/s Everest Industries Ltd., 3. M/s JSW Steel Ltd., 4. Society for Development Composites, 5. Elemente Designer Home 6. M/s MGI InfraPvt. Ltd., 7. M/s RCM Prefab Pvt. Ltd., 8. M/s Nipani Infra and Industries Pvt. Ltd., 9. M/s Strawture Eco, 10. M/s Visakha Industries Ltd.)

1. Fabrication & Installation of LGSF Framing Components

Designing, providing, installing and fixing factory finished custom designed cold form Light Gauge Steel Framed super structure comprising of steel wall panel, trusses, purlins etc manufactured out of minimum 0.75 mm thick steel sheet as per design requirements. The steel sheet shall be galvanized (AZ-150 gms Aluminium Zinc Alloy coated steel having yield strength 300- 550 Mpa) conforming to AISI specifications and IBC 2009 for cold formed steel framing and construction and also as per IS: 875- 1987 (Part-I; Dead Load , Part-II; Imposed load, Part-III; wind load , Part-IV; Snow load, and Part-V; Special load & load combinations), IS 800-1984 (Code of practice for general construction in steel) and IS: 801- 1975 (Code of Practice for Use of Cold Formed Light Gauge Steel Structural Members In General Building Construction). The wind load shall be as per provisions of IS 875 (part -III). LGSFS frame shall be designed as per IS: 801 using commercially available software such as Frame CAD Pro-11.7/ STAAD PRO-V8i/ArchitekV2.5.16/ Revit architecture2011 or equivalent.

The framing section shall be cold form C-type having minimum web depth 89 mm x 39mm flange x 11mm lip in required length as per structural design requirement duly punched with dimple/slot at required locations as per approved drawings. The slots will be along centre line of webs and shall be spaced minimum 250mm away from both ends of the member. The frame can be supplied in panelized or knock down condition in specific dimensions and fastened with screws extending through the steel beyond by minimum of three exposed threads. All self drilling tapping screws for joining the members shall have a Type II coating in accordance with ASTM B633(13) or equivalent corrosion protection of gauge 10 & 12, TPI 16 & 8 of length 20mm. The frames shall be fixed to RCC slab or Tie beam over Neoprene rubber using self expanding carbon steel anchor bolt of dia as per approved drawings, design subject to minimum 12mm diameter and 121mm length conforming to AISI 304 and 316 at 500mm c/c with minimum embedment of 100mm in RCC and located not more than 300mm from corners or termination of bottom tracks complete in all respects.Hot rolled Steel sections as per design & conforming to IS 800 can be used for buildings higher than G+3.

2. Connections

Proper usage of Connection Accessories like Heavy duty tension Ties, Light duty Hold-ons, Twist Straps (to connect truss with wall frames), Strong Tie, Tie Rod, H-Brackets, Boxing Sections, L-Shaped Angles shall be ensured for required structural integrity & stability.

3. Walling Components

Walling with Fibre Cement board & Gypsum plaster board

Providing and fixing of external wall system on Light gauge steel frame work with outer face having 6mm thick heavy duty fiber cement board fixed on 9mm thick heavy duty fiber cement board confirming to IS 14862:2000, category IV type A (High pressure steam cured)as per standard sizes fixed with self-drilling / taping screws / fasteners@ 60cm c/c of approved make. A grove of 2 mm to 3mm shall be maintained and groves shall be sealed with silicon based sealant.

The board shall be fixed in a staggered pattern. Screws shall be of ounter sunk rib head of 1.60mm to 4 mm thick of 8 to 10 gauge of length varying from 25 to 45 mm and internal face 12.5mm thick gypsum plaster board fixed on 8mm thick fiber cement board confirming to IS 14862:2000 of category III type B (High pressure steam cured) as per standard sizes fixed with self-drilling / taping screws / fasteners @ 60cm c/c of approved make, proper taping and jointing to be done using fiber mesh tape and epoxy and acrylic based jointing compound for seamless finish.A breathable vapour barrier underneath the cement fiber board as per National Building Code2009 is to be provided complete as per direction of Engineer-in-charge.

Any other suitable in-fill walling materials can be used in the system, however it shall be such that the completed wall provides fire resistant & other properties as per the requirements given in National Building Code 2016.

4. Floor/ Slab

RCC floor/ roof slab as per design conforming IS 456 over deck sheet shall be provided. The thickness and profile of decking sheet shall be verified with the erection drawings. These are normally used as temporary supports for the concrete till hardens. Decking sheet has to be screwed to the joist with maximum spacing of 600 mm c/c for uniform action of concrete and joist. All the joints of decking sheets longitudinal direction require a minimum lap of 100 mm.

C-2) PRE-ENGINEERED STEEL STRUCTURAL SYSTEM (PEB)

(1. M/s RCC Infra Ventures Ltd.)

Pre-engineered Building (PEB) shall be of structural steel construction with columns, rafters, beams etc. as per design & conforming to and walls shall be of Autoclaved Aerated Concrete (AAC) blocks of approved composition, size and strength. Building shall be designed, manufactured, supplied and erected by the agency. The structural design shall be done as per the prevailing Indian standards and conforming to NBC 2016. Floor/roof slab shall be of RCC as per approved structural design. The structure will be complete in all respect with all plumbing, sanitary, electrical installations, painting and finishing as per approved drawings.

C-3) PRE-ENGINEERED STEEL STRUCTURAL SYSTEM (PEB) WITH SPEED FLOOR SYSTEM

(1. M/s Jindal Steel & Power Ltd.)

Pre-engineered Building (PEB) shall be of structural steel construction with columns, rafters, beams etc. and walls shall be of Autoclaved Aerated Concrete (AAC) blocks of approved

composition, size and strength. Building shall be designed, manufactured, supplied and erected by the agency. The structural design shall be done as per the prevailing Indian standards and conforming to NBC 2016. Floor/roof slab shall be of Speed Floor system which is a suspended concrete flooring system using a roll formed steel joist as an integral part of the final concrete and steel composite floor as per approved structural design. The Speed floor system is a hybrid concrete/steel tee-beam in one direction and an integrated continuous one-way slab in other direction. The joists of different depths are manufactured from pre- galvanized high tensile steel. The joist depth and the concrete thickness are varied depending on the span, imposed loads and other functional considerations. The structure will be complete in all respect with all plumbing, sanitary, electrical installations, painting and finishing as per approved drawings.

C-4) Aerated Cement Concrete Panel System With Steel Structural Framing System

(1. M/s HIL Ltd.,
(2. M/s Biltech Building Elements Ltd.,.
(3. M/s SCG International India Pvt. Ltd.)

1 Manufacturing & Fixing of Aerated Concrete Panel

Providing and fixing in position factory made non asbestos fibre reinforced aerated cement sandwich wall/roof/floor light weight solid core panels made of light weight cement concrete core composed of OPC cement, pulverized flyash, quick lime, cotton pulp & Gypsum in mortar state mixed with aeration agent in a preset mould. The outer face on both sides of the panels shall be non asbestos fibre cement board conforming to IS 14862:2000. These solid wall panels shall be installed using Galvanized iron steel tracks/C channel of 1mm thick of required sizes as recommended by manufacturer's and fixed to floor and RCC/ steel soffit in plumb to each other with steel screw/fasteners. The panel shall be fixed vertically with tongue & groove joint with cement based polymer modified jointing compound. The exposed surface finished with fibre mesh/glass fibre tape with polymer based jointing compound having superior flexibility. Panels should be used as floor & roofing with additional structural support, steel or RCC depending upon the design. All the operation shall be completed in all respect as per drawings, Manufacturers specifications and under the overall direction of Engineer-in-Charge

2 STEEL STRUCTURAL FRAMING SYSTEM

Steel structure frame as per design & conforming to IS: 800 shall be used in the construction. Steel tracks/ C channels as per manufacturer’s specification should be used to hold the panels with the structure firmly. All jointing need to ensure required structural stability & integrity.

All relevant Indian Standards/ requirements of NBC shall be conformed.

C-5) Pre-Cast Light Weight Hollow core wall panel

(1. M/s Pioneer Precast Solutions Pvt. Ltd.)

1. Manufacture of Hollow Core Panel

   Construction using “Hollow Core light weight concrete non-load bearing wall panels manufactured in controlled factory conditions using battery moulds, light weight concrete (density 675 to 750 kg/m^3) and other additives as per manufacturer’s specification. Panels

are pre-cured naturally for 12-24 hrs and then water cured for seven days before installation. Panels are provided with tongue and groove joints for easy assembly. Panels are Battery mould panels. Panels are produced in standard widths & thickness and in lengths suitable to room height. Standard width is 611 mm, height 2900 and thickness 65 mm, 80 & 100mm. Panels shall conform to tolerances w.r.t. Length : **+** 3mm, Width : **+** 2mm, Thickness : **+** 1mm, Squareness of end : **+**3mm. The structure will be complete in all respect with all plumbing, sanitary, electrical installations, painting and finishing as per approved drawings.

2. Structure Framing Section & Connection
   Being non-load bearing, these panels are used with structural steel frame designed as per relevant Indian Standards and conforming to NBC 2016. The connection to framing section shall ensure required structural integrity & stability.

3. Floor/ Roof slab
   RCC floor/ roof slab as per design conforming IS 456 over deck sheet shall be provided. The thickness and profile of decking sheet shall be verified with the erection drawings. Decking sheet has to be screwed to the joist with maximum spacing of 600 mm c/c for uniform action of concrete and joist. All the joints of decking sheets longitudinal direction require a minimum lap of 100 mm.

   All relevant Indian Standards/ requirement of NBC shall be conformed.

D PREFABRICATED SANDWICH PANEL SYSTEM

D-1) REINFORCED EXPANDED POLYSTYRENE CORE PANEL SYSTEM

(1. M/s Worldhaus, 2. M/s Bau Panel Systems India Pvt Ltd, 3. M/s BK Chemtech Engineering, 4. M/s MSN Construction, 5. M/s Beardshell Ltd.)

The technical specifications would be entirely based on design parameters, however, the minimum specification as given below is recommended to be adhered to;

1. Specifications of Raw Materials for EPS Panel

i) Zinc Coated cold drawn Steel Wire – Shall be of 2.5/3.0 mm dia and zinc coating galvanizing shall be of 60 gm/m2 ± 5 gm/m2

Mechanical characteristics

Yield stress	: > 600 N/mm2
Breaking load	: > 680 N/mm2
Elongation	: > 8%

Chemical characteristics

% C	: < 0.24
% P	: < 0.055
% S	: < 0.055
% Ceq	: < 0.52

ii) Expanded Polystyrene – Self-extinguishing type EPS 80 in accordance to UNI EN 13163:2013 (IS 4671: 1984) having density not less than 15 kg/m3

2. EPS Panels for wall

Walling shall be completed using factory made Expanded Polystyrene Core Panel (EPS) based electro welded wire mesh 3D panels manufactured using the specified EPS and Cold drawn wire and sprayed structural plaster. The specification of panel shall not be less than the values given in **fig. 1 & 2** below. Both the outer faces of the panel shall be finished by applying the layer of minimum 35 mm thick cement mortar 1:3 {1 cement: 3 coarse sand (not having more than 40% stone chips of size upto 6 mm)} with the help of shotcreting / guniting equipment etc at a pressure not less than 1 bar (100Kn/m2) and both surfaces finished with trowel. The composition of spray/ mortar shall be such as to give minimum characteristic strength of 25

N/mm^2. The maximum w/c ratio shall be 0.45. The thickness of the sprayed concrete & EPS wall shall be based on design requirements.

Single panel for structural uses

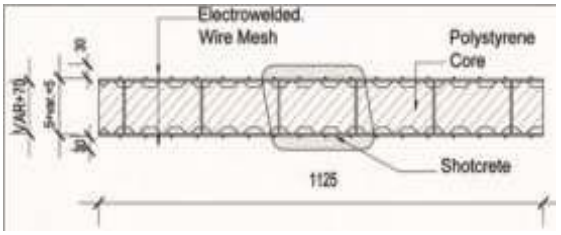
Longitudinal wire	Min 2.5 mm ø spaced @ 70 mm (Max.)	 Typical Drawing
Transverse wire	Min 2.5 mm ø spaced @ 70 mm (Max.)	
Cross steel wire	Min 3.0 mm ø approx 68 nos. / m^2	
polystyrene Core	Density >15 Kg/m^3, Thickness not less than 80 mm	
Finished Masonry	Not less than 150 mm thick	
Grade of Shotcrete	Minimum M-25	

Fig.1

Single panel for internal partition and insulation

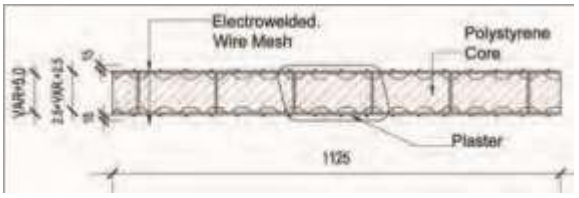
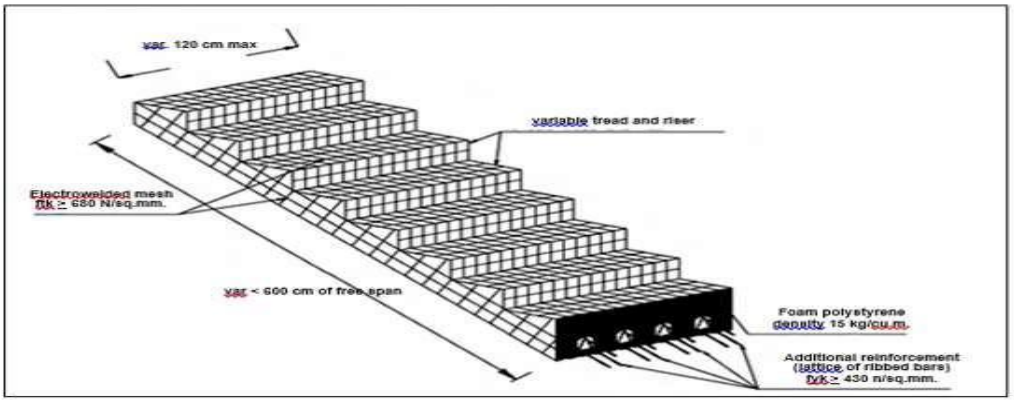
Longitudinal wire	Min 2.5 mm ø spaced @ 80 mm (Max.)	 Typical Drawing
Transverse wire	Min 2.5 mm ø spaced @ 75 mm (Max.)	
Cross steel wire	3.0 mm ø approx 45 nos. / m^2	
polystyrene Core	Density > 15 Kg/m^3, Thickness 40 mm to 320 mm	
Finished Masonry	Min 90 mm	

Fig 2

3. Staircase panel

The EPS panel based staircase would be preferred as per minimum specification given in **Fig.3**. However, the Agency can propose for construction of staircase in RCC or steel frame based staircase for approach on all floors up to terrace floor. The concrete thickness shall be as per as per design requirement & spary/mortar shall be minimum 30 mm.



Galvanized steel wire mesh:

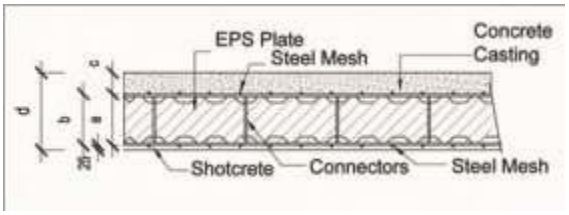
Longitudinal wires:	2.5 mm dia
Transversal wires:	2.5 mm dia
Cross steel wire:	3.0 mm dia
Polystyrene slab density:	> 15 kg/m³

Fig 3

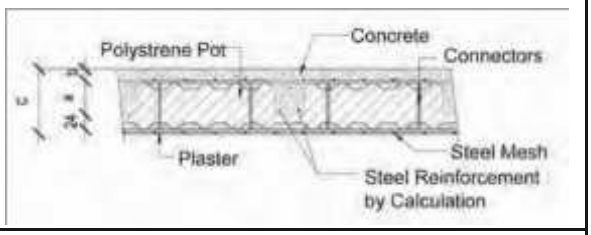
4. Flooring & Roofing

Intermediate floor shall be composite EPS as per specification and shall be designed for combined effect of dead load, imposed load & other loading conditions. The specification of panel shall not be less than the values given in below

Single Panel for horizontal structure for floor/ roof

Longitudinal wire	Min 2.5 mm ø spaced @ 80 mm	
Transverse wire	Min 2.5 mm ø spaced @ 75 mm	
Cross steel wire	Min 3.0 mm ø approx 68 nos. / m^2	
polystyrene Core	Density Min15 Kg/m^3 Thickness Min 80 mm	
Finished Masonry	Min 160 mm thick	
Grade of Shotcrete/ concrete	Min M-25	

Floor panel with reinforcement at joist

Longitudinal wire	Min 2.5 mm ø spaced @ 80 mm	
Transverse wire	Min 2.5 mm spaced @ 70 mm	
Cross steel wire	Min 3.0 mm ø approx. 68 nos. /m^2	
polystyrene Core	Density > 15 kg/m^3	

a = thickness of core; b = thickness of concrete; c = overall thickness

The Panels to be used for the floor and the roof system and reinforced in the joists with concrete casting on the site. The reinforcement of the panel can be integrated during the panel assembly by additional reinforcing bars inside the joists as per the design.

5. Connections;

Jointing of the panels shall be ensured in such a way to make it safe from vertical load, lateral loads and impact loads & to provide required structural integrity & stability. Jointing shall be sealed properly.

D-2) EPS CEMENT SANDWICH PANEL SYSTEM

(1. M/s Bhargav Infrastructure Pvt.Ltd, 2. M/s Rising Japa Infra Private Limited)

1. Manufacturing & Fixing of EPS (Beads) based Cement Panel

Providing and fixing in position factory made EPS cement sandwich wall/roof/floor light weight solid core panels made of core material of EPS granule balls/beads (conforming to IS 4671:1984 and shall have density not less than 15 kg per cum) adhesive, cement, sand, flyash and other bonding material in mortar state processed to form in a preset mould. The outer face on both sides of the panels shall be non asbestos fiber cement board conforming to IS 14862:2000 or Calcium silicate board conforming to EN 14306:2009 of 5mm thick each. Panel shall be laid on 6mm thick cement mortar (1 cement: 2 fine sand) mixed with chemical adhesive of 0.5kg per 50kg of cement or shall be preferably fixed into 'C' channel made of 1.2mm thick MS plate screwed/fastenened to the slab/column/beam etc. The panel shall fixed vertically with tongue and groove joint and horizontally locked with steel bar between each other and floors and filled with cement mortar and adhesive. Panels should be used as floor & roofing with additional structural support, steel or RCC depending upon the design. All the operation shall be completed in all respect as per drawings, manufacturers specifications and under the overall direction of Engineer-in-Charge

2. Steel Structural System

Steel structure frame as per design & conforming to IS: 800 shall be used in the construction. U type channels as per manufacturer's specification should be used to hold the panels with the structure. Additional clips may be welded with the frame pillars and beams to hold the U channel firmly with the pillars/beans and floor, to ensure structural integrity. PU glue may be applied to hold the panels firmly.

All relevant Indian Standards/ requirements of NBC shall be conformed for materials,design ,fabrication and erection.

D-3) Pre-fab PIR (Polyisocyanurate) based Dry Wall Panel System
(1. M/s Covestro India Pvt. Ltd.)

1. PIR Dry Wall Pre-Fab Panel raw material & Structural System

Construction with PIR Dry Wall Pre-Fab Panel non-load bearing walling system where two fibre cement boards (FCB) of 10 mm thickness shall be filled with insulation foam material namely Poly Isocyanurate (PIR) in-situ and erected to produce straight to finish walls.

Fibre Cement Board: Shall be 100% asbestos free and of Type A, Category 3 minimum. as stipulated in IS 14862:2000.(ii) Pre-painted Galvanized Iron (PPGI) sheet: Shall be 0.5mm thick and as conform to IS 14246:2013 (iii) Square Hollow Section (SHS)/C Channel: Shall be manufactured from pre-galvanized high tensile steel conforming to IS 277:2003. (iv) Fibre glass mesh: Shall be as per manufacturer specifications. (v) Acrylic based glue: Shall be as per manufacturer specifications. (vi) Galvanized MS screws: Shall be as per manufacturer specifications. (vii) Anchor fasteners: Shall be of 10mm to

12mm dia., 50mm to 75mm length and as per manufacturer specifications. (viii) Premix Putty: Shall conform to IS 419:1967.

PIR wall being non-loadbearing wall panels shall be supported with Steel Structural frame members as per approved structural design & conforming to IS 800 (Code of practice for general construction in steel).

2. Erection & Installation of Components

Erection & Installation of Steel sections in correct & final position with proper line level and plumb at site making all arrangements (i.e cranes, push-pull jacks & all another T & P for lifting Placing & Alignment of elements, as per approved shop drawings and all complete as per the direction of Engineer-in-Charge including all accessories, jointing, grouting complete. The structure shall be complete in all respect with all internal and external finishing as per approved drawings.

3. Floor/Roof

In-situ RCC slab or RCC slab over deck sheet as per design & relevant code shall be provided as per approved drawing.

D-4) Load Bearing Insulated Sandwich Panel System for Walling & Flooring
(1. M/s Project Etopia Group)

Brief of Housing System

It is proprietary 4Wall panelised construction system comprising of light weight load bearing insulated panels. The System is sustainable since the panels can be deconstructed & recycled. The system is energy positive (uses solar grids) with no carbon produced from running/operation of the building & it creates more energy than used, feeding back to main building. The system introduces daylight mimicry, creates perfect lighting environment irrespective of rain & shine condition. It has air purification system & smart control.

Specifications of the panel;

S. No.	Key Aspects of the system/panel	Values/details
1.	Strength	Structural loading strength of 825 KN/80 tonne
2.	Thermal Value	0.13 U value with light weight panel structure
3.	Structural Fire Resistance	66 minutes (40KN)
4.	Air Tightness	0.07 l/s/m2
5.	Panel Lightness	Heaviest panel weighs 97 Kg, meaning it can easily be lifted and transported

6.	Hurricane Resistance	Can handle/withstand winds exceeding 400 Mph

Structural Requirement

The structural design calculations should clearly demonstrate structural integrity and stability including connection details. In addition, any other requirements including safety against earthquake need to be ensured by the designer as per prevailing codal requirements. All relevant Indian Standards/ requirement of NBC shall be conformed.

E. MONOLITHIC CONCRETE CONSTRUCTION SYSTEM

(1. M/s Maini Scaffold Systems Pvt. Ltd., 2. M/ KumkangKind India Pvt. Ltd, 3. M/s S-form India Pvt. Ltd., 4. M/s ATS Infrastructure Ltd., 5. M/s Innovative housing & Infrastructure Pvt. Ltd 6. M/s MFS formwork Systems Pvt. Ltd. 7. M/s Knest Manufacturers LLP. 8. M/s Outinord Formworks Pvt. Ltd. 9. M/s Brilliant Etoile)

Aluminium Formwork System

The customized Aluminium formwork using grade 5052 aluminium with panel sheets of minimum 4 mm thick shall be used for monolithic construction of RCC members & for extruded sections grade 6061 (Type-6) aluminium shall be used. The panel sheets shall have repetitive usage of 100 times. The form work includes of beam components i.e. beam side panel, prop head for soffit beam, beams soffit panel, beam soffit bulk head and deck components i.e. deck panel, deck prop, prop length, deck mid, soffit length, deck beam bar and wall components i.e. wall panel, rocker, kiker and internal soffit corner, external soffit corner, external corner, internal corner etc., The panels are to be held in position by pin and wedge system that passes through holes in the out side rib of each panel. The tolerance of finished panels to be (-1 mm), and shall conform to IS 14687-1999 (Falsework for concrete structures – Guidelines). Pins and wedges to be made of high grade mild steel.

Modular Tunnel Form Work System

The Modular Tunnelform System shall consist of inverted L- shaped half tunnels (one vertical panel and one horizontal panel) joined together to create a tunnel. These forms are to be made up of factory cut, 80mm x 80 mm angle sections in accordance with the line of building forms. The panels shall be designed based on loading requirements with minimum 3 mm hot dip galvanized steel sheet, stiffened by folded sheet metal sections. All components shall meet relevant Indian Standards.

Structural Design

The structural design of plain & RCC shall be as per IS 456:2000 while IS 13920:2016 (Ductile detailing of reinforced concrete structures subjected to seismic forces -Code of practice) is referred for ductile detailing of reinforced concrete structure. Thickness of wall below plinth level should be minimum 200 mm with double layers reinforcement. The minimum thickness of RCC wall member shall be 120 mm. All relevant Indian Standards/ requirement of NBC shall be conformed.

F STAY IN PLACE FORMWORK SYSTEM

F-1) Expanded-Steel Panel reinforced with all Galvanized Steel Wire-Struts (M/s JK Structures)

Expanded-Steel Panel reinforced with all-galvanised Steel Wire-Struts serving both as the load-bearing steel structure and as the stay-in-place steel formwork filled with EPS-alleviated concrete.

Construction of monolithic structure completely “on site”, without formwork with 3D galvanized structural steel (as per manufacturer specification) panels assembled and reinforced with interlocked 3D steel studs and then injected with pumped-in and hand-finished EPS (expanded polystyrene) -alleviated concrete (as per approved mix design and manufacturer’s specification) combining in one single process a stay in place formwork with embedded columns and beams and bracing system. The EPS alleviated concrete is concrete produced with EPS beads. Erection & installation of the structure in correct & final position with proper line level and plumb at site making all necessary accessories & arrangements. per approved drawings and all complete as per the direction of Engineer-in-Charge including all accessories, jointing, grouting complete. The structure shall be complete in all respect with all internal and external finishing as per approved drawings. All relevant Indian Standards/ requirement of NBC shall be conformed

F-2) GFRG Panel Building System
(M/s FACT RCF Building Products Limited)

1. Providing & Erecting GFRG Panels

   Standard quality GFRG panel of 124 mm thickness with modular cavities procured from GFRG panel manufacturing plant in the country, cut to required wall sizes and floor/ roof slab sizes in correct length and height, including cutting of door, window and ventilator opening as per the cutting drawing prepared by architects /design engineers for the construction of GFRG building and loaded in stillages for transportation to the construction site. Panels to be unloading at site using suitable fork lift/ crane.
   Erection of GFRG Panels in walls in all floors using suitable crane as per instructions of Engineer-in-Charge, as per cutting drawings and structural drawings, in perfect line and plumb, above RCC plinth beam/GFRG panel below and provide necessary lateral/ slanting support to keep the wall panel in safe position, providing & tieing of Reinforcement as per structural drawings and applying a coat of water repellant coating Zycosil/equivalent or equivalent product (1 Zycosil/equivalent compound: 10 water) to saturation level over RCC plinth beam to provide water proofing treatment to joint between wall panel & plinth beam to make it sealed completely.

   Note:

   i. When cutting panel, “A” side is to be for outside or external surface of respective external wall and B side is to be for internal surface of wall
   ii. Erection of panel is to be with reference to both building plan & cutting drawing by following notational mark indicated in the cutting drawing as well as notional mark written on each panel cut as per cutting drawing

2. Filling of empty cavities

Filling of empty cavities (as shown in the structural design drawing) with quarry dust mixed with 5% cement (by volume). After initial infill of 50 mm thick with M25 concrete at base/bottom of cavities to seal off, infill wall panel cavities in 3 stages as detailed below,

i. 1st pour / infill to be limited to 0.3 to 0.50 m height from bottom of the panel.

ii. 2nd Pour/ infill: infilling shall be done only after 90 minutes interval between successive pours. The maximum height of infill shall be restricted to 1.5m height or up to the top level of door / window.

iii. 3rd pour/infill: After an interval of 90 minutes of second pour, infill or pour the balance height up to the bottom of embedded RCC tie beam. Pour enough water just required to dampen the dry mix enough to form cake form after each stage. (If any rain falls in between any stages of concrete pour, make sure to cover the panel top to prevent ingress of water or water falling into the cavities. In case of water collection over the concrete inside the panel, drill 10mm hole in GFRG panel immediately above concrete filled level to drain out water before pour/in-fill of balance concreting)

3. Laying of GFRG panel as roof / floor slab panel and staircase panel

Laying of GFRG panel as roof / floor slab panel and staircase panel using suitable crane as per instructions of Engineer-in-Charge, including providing support system with 25mm x 300mm-400 mm wide plywood, as runner with proper prop below proposed micro beams including

a. Cutting of top flange of panel to 180 mm wide (leaving 25mm projection on either side) to provide RCC embedded micro beam as per cutting drawings and structural drawings.

b. Reinforcement for micro beams and tie beams to be provided in position with proper anchorage as per structural drawings.

c. Provision for Electrical cabling, fan hooks and laying of pipes for plumbing work.

d. Concreting of Tie beam, micro beam and top of GFRG panels (50 mm thick) with M-25 cement concrete mix using coarse aggregate of size less than 20 mm including laying of 10 gauge 100mmx100mm size weld mesh with 25 mm effective cover from the panel top.

Supplying and fixing 10 Gauge weld mesh of size 100mm x100 mm for floor/roof slab concrete screed over the micro beams as reinforcement. The weld mesh shall be fixed as per drawing.

4. Waterproofing Applications & Sealing of Joints

i. Application of ZMB 60/equivalent solution (100 Kg ZMB 60/equivalent, 1 litre ZMB Nano Thinner, 20 litre water & 1 Litre Zycoprime/equivalent = 122 litre/kg) over already applied coat of Zycosil/equivalent & Zycoprime/ equivalent solution on the top of all the RCC plinth beams by brush/spray coat before erection of GFRG over RCC plinth beams in GF. In the case of upper floors 150 mm wide on floor slab for all the external walls, bath/toilet/ wet areas (3 hrs drying time) before erection of wall panel on upper floors including erection of parapet wall.

ii. After erection of GFRG wall panels, seal all GFRG wall joints with paper tape temporarily. Water proofing treatment of vertical joints with Zycosil/equivalent water

proofing Solution (1 litre of Zycosil/equivalent & 20 litres of water stirred first & 2 litres of Zycoprime/equivalent added and stirred (total 23 litres)) with 50 ml syringe till the gap and in filled concrete is completely saturated. After removing the paper seal, seal off the vertical joints with water proofing material “Grout RW/equivalent”.

iii. Filling of joints between RCC plinth beam / floor slab and wall panel of external walls, toilet / bath room / wet areas walls on all floor and parapet wall over roof slab, stair case head room at the time of erection of GFRG panels with Grout RW/equivalent sealant compound after the erection of panel before the infill of concrete in panel cavities and fine finish. This applies for all horizontal and vertical joints between GFRG wall and slab panels.

iv. Water proofing treatment of Vertical joints (of external side and internal side) between door frame, window & ventilator frames (on all four sides) of outer wall over the Zycosil/equivalent & Zycoprime/equivalent solution already applied (before the installation of door / window / ventilator frames in position) and fine finish with Grout RW/equivalent.

v. Water proofing treatment of RCC sunshade with Zycosil/ equivalent water proofing Solution (1 litre of Zycosil/ equivalent & 20 litres of water stirred first & 2 litres of Zycoprime/equivalent added and stirred (total 23 litres)) till it meets the saturation level and testing as per RILEM or by water drops test in which water drops do not absorb but drops remain or rolls.

vi. In-filling / sealing of joint between RCC lintel cum sunshade and wall (on external side) in all floors by pushing in Grout RW/equivalent in paste form and coving 20 mm x 20 mm after applying a coat of Zycosil/equivalent & zycoprime/equivalent solution before cement plastering of top, bottom and sides of RCC sunshade.

All relevant Indian Standards/ requirement of NBC shall be conformed.

F-3) Structural Stay In Place Galvanized Steel formwork system
(M/s Coffor Construction Technology Pvt. Ltd)

Brief Discription

The formwork system comprises of two filtering grids made of rib mesh reinforced by ‘C’ channel vertical stiffeners. The grids are connected by rebar which act as horizontal stiffeners and connector which act as a shear link. The grids on both faces act as sacrificial formwork in which concrete is poured in-situ. The vertical steel channels and horizontal steel bars act as steel reinforcement for load bearing wall. The connectors help to fold the formwork for easy transportation.

After the erection of formwork panels in alignment, corners, edges of doors and windows frame

are closed with rebar positioning & concrete of required grade is poured in the panels. The concreting may be done with a pump, bucket or with a shovel loader. The inside and outside walls are finished with cement plaster of suitable grade. The panels are prefabricated according to a structural plan (based on client's architectural plans) designed by structural engineers.

Product assembly Components in Structural Stay-in-Place Formwork Panel**:**

The various parts of Structural Stay-in-Place Formwork panel are explained briefly below:

C-Chanel

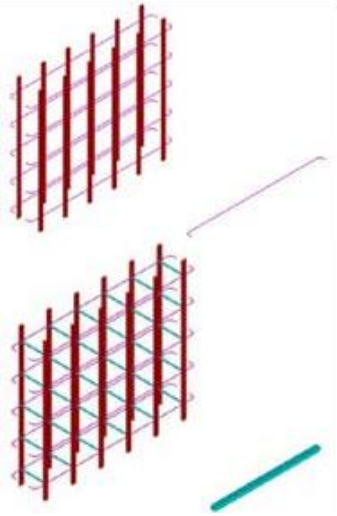
These are vertical stiffeners, work as vertical steel in Reinforced Concrete wall

It is made up of 0.6 mm thick galvanized sheet. The 180 GSM to 275GSM zinc coating is used based on geological location to prevent rusting of steel.

Area of profile is 60.6 mm^2 (i.e > 8 mm dia bar)

Placed at every 200 mm distance along the width

Rebar



Rebar's are horizontal stiffeners at every 200 mm or 100 mm centre to centre

It is 5 mm dia MS bars and work as distribution bar.

Made up of Fe 415 Grade steel

Connector

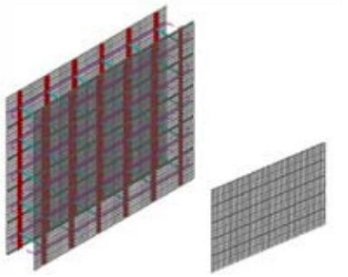
Connects C profile & Rebar.

It is made up of 1.6 thick Cold Rolled Cold Annealed (CRCA) plates of120 gm/m^2 zinc coated sheet to prevent rusting

Works as shear link to connect steel on both face of form work.

Also helps to avoid bulging of formwork during concrete pouring.

Part – 4: Rib Mesh



Rib meshes are filtering grids.

They are made up of 0.42 mm thick high galvanized sheet with 180

GSM to 275 GSM zinc coating used as per geological location to prevent rusting of steel

It works as reinforcement to plaster to prevent crack generated due to contraction and expansion.

Also provide good bonding to plaster

Size and Types of Panels

Panels are normally produced in sizes as given below (See Fig. 2): Width (W): 300mm, 500mm, 700mm, 900mm & 1100mm Height (H): 500mm to 5000mm in multiples of 100 mm. Thickness (T): 100mm, 140mm, 160mm, 200mm & 250mm. However, customized sizes also be made available on demand.

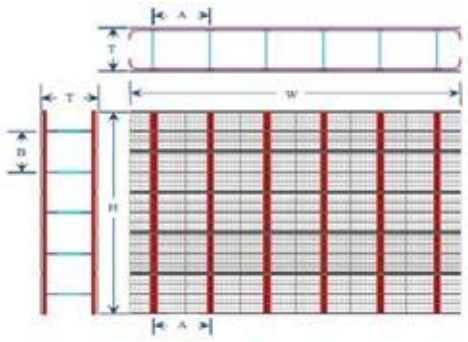


Fig.2

Panel Type	T mm	A mm	B mm	W mm	H mm
C10	100	200	100, 200	300,	Min.
C14	140	200	100, 200	500,	500
C16	160	200	100, 200	700,	then
C20	200	200	100, 200	900,	in multiples
C25	250	200	100, 200	1100	of 100

Types of panels are given below:

i. Standard single panels – These panels shall be used for slab shuttering but may also be

used as shuttering option for RCC wall having thickness of more than 350mm. (Fig. 3)

ii. Double panels – Double panels shall have inbuilt steel and not require extra reinforcement. In double panels, the grids shall be connected by articulated rebar loops and connectors that fold.

These panels are of two types:

a. Standard double panels shall be of fixed size and need to be cut on site for openings etc.
b. Customized double panels from the factory shall have required cutting for openings as per drawing and there is no need for cutting on site.
c. These panels create a monolithic structure as it allows pouring of walls and slab together. These panels shall be used for load bearing walls, retaining walls and shear walls. (Fig. 4)

iii. Insulated Double panel – These panels shall have an integrated insulation on the exterior side. The insulated material shall be of polystyrene or polyurethane of required thickness as per design.(Fig. 5)

iv. Fiber Cement Double panel – These panels shall have its interior face as fibre cement board which has smooth surface and avoid plastering of walls. (Fig.6). These panels may be used for water retaining structures.

Fig.3 Standard Single Panel

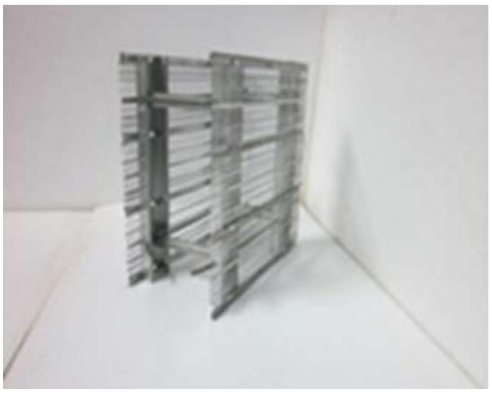


Fig.4 Standard Double Pane

Fig.5 Insulated Panel

Fig.6 Fiber Cement Panel

Foundation

Strip Footing or normal column and beam structure up to Plinth level based on soil condition.

In case of Strip footing, Coffor panels will start from foundation and on the top of strip concrete raft which increase speed to come out from the ground.

Installation of Panel:

Layout and Blocking

The alignment shall be traced with chalk on the two sides. Boards/batten shall be nailed on the ground to indicate the positioning of one face of the panels.

Positioning the Panel

- The Structural formwork panels shall be fitted over projecting vertical reinforcing rods. Each panel shall be held vertically with wood pieces (boards/battens) or metal pieces (L-sections/tubes). The minimum length of these bracing elements shall not be less than 1.80m. The panels shall preferably be positioned beginning from the angles and from the doors. Whenever length of the wall does not correspond to a multiple of width of the panels, the last panel shall be cut with a rotary saw to adjust to length of the wall. The horizontal battens shall be installed on a single side. The verticality shall be checked using a plumb line or level.

- Shuttering of Slab: after completion of Coffor panel installation of the wall, slab shuttering will start either with use of Coffor single panels or normal conventional shuttering for RCC or any other slab.

- Plumbing and Electrification: After installation of slab shuttering, electrical and plumbing conduits can be placed in between panels. For installing the electrical box, panels can be cut with small grinder machine.

- Panel alignment & slab steel needs to be checked & ensured prior to concreting.

- Concrete Pouring: The placing of concrete of specified grade is done in wall and slab in one go with either with Boom placer, stationary pump or manually. As all concreting is done in one go, a monolithic reinforced concrete structure is created.

Structural Requirements of the Construction

Design analysis of the Structural formwork walls, panels, floor slabs etc. shall be done using Staad Pro Software or equivalent. The Optimal result is obtained when walls shall be designed as braced construction elements whose horizontal loads are supported by other bracing elements belonging to the same construction e.g. shear walls. The panels with concrete shall act as “lightly reinforced RCC walls” as per clause 32 of IS 456:2000 and as “prefabricated concrete load bearing walls” as per IS 15916:2010 & IS 15917:2010 & amp; IS 15971:2010.

Structural design and analysis of the formwork shall be based on relevant Indian and International standards. The panel construction assembly shall be used for free standing walls when designed and anchored as cantilever walls. Panels shall be reinforced and tied at vertical joints to maintain alignment. Additional reinforcement and cement plaster shall be provided as per the design requirement. Foundation shall be specifically designed in accordance with provisions given in IS 1904:2005. All relevant Indian Standards/ requirement of NBC shall be conformed.

F-4) Stay-in-Place Formwork System PVC Form for Shear Walls
(M/s Joseph Jebastin (Novel Assembler Private Limited)

Brief Description

Stay in place PVC form wall System consists of rigid poly-vinyl chloride (PVC) based polymer components that serve as a permanent stay-in-place durable finished form-work for concrete walls. The extruded components slide and interlock together to create continuous formwork with the two faces of the wall connected together by continuous web members forming hollow rectangular components. The web members are punched with oval-shaped cores to allow easy flow of the poured concrete between the components. The hollow Wall components are erected and filled with concrete, in situ, to provide a monolithic concrete wall with enhanced curing capacity due to water entrapment, as the polymer encasement does not allow the concrete to dry prematurely with only the top surface of the wall being exposed to potential drying. The polymer encasement provides crack control vertically and horizontally for the concrete, and provides vertical tension reinforcement thus increasing the structural strength of the wall. Steel dowels are necessary to anchor the wall to the concrete foundation.

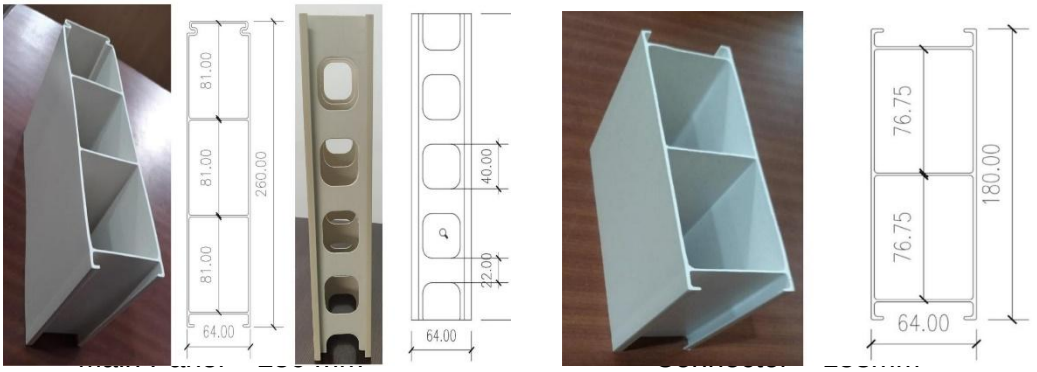
Size of Panels Size:

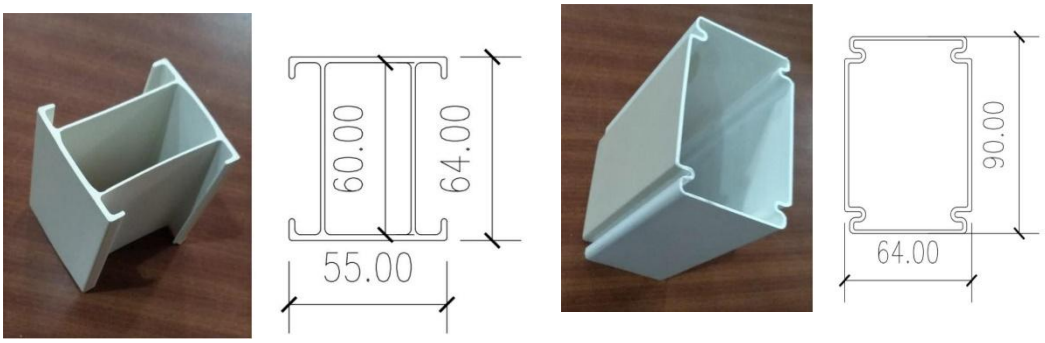
Wall Panels have been developed in various cross-sectional sizes as per project requirement. The common sizes are 64mm, 126mm, 166mm & 206mm. However available wall types are as follow:

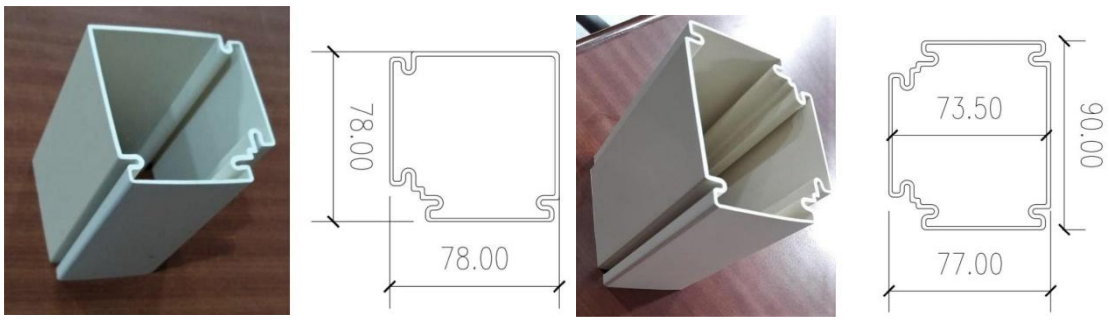
Wall components	Wall Thickness		
	Overall (Nominal)	Concrete Core	Insulation[1]
N64	64 mm	60 mm	0
N126	126 mm	120 mm	0

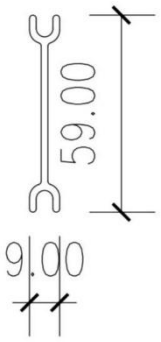
- N64 walls are erected individually and not preassembled, except for headers and sills.
- Pre-assembled walls sections are used for walls over 4300 mm (14') high
- The height of walls made with the Formwork vary according to the requirement.
- N126 walls less than 4300 mm (14') high are erected individually except for walls of unique projects and for headers and sills.

Panel Components

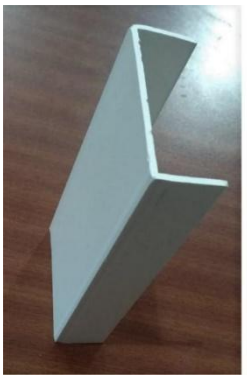


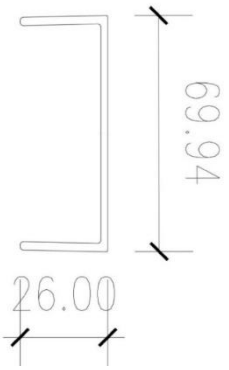




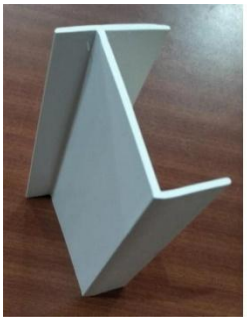


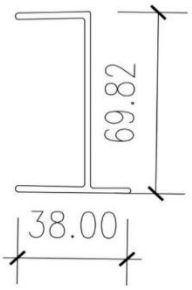
Jointer Connector



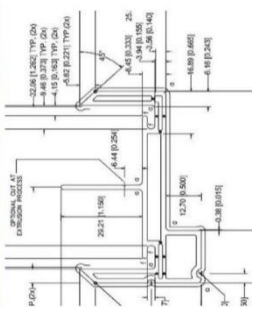


Basic Frame

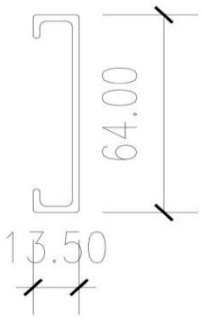




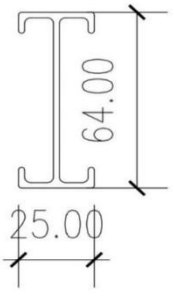
Window Frame



Azteca Frame



Starter



Jointer Panel

Design Consideration

General

The walls shall be designed to accommodate a wide range of axial, wind and seismic load conditions, using the equations developed for conventional and slender concrete walls. However, one of the unique properties of Novel walls is the ability of the permanent polymer formwork to provide concrete confinement and reinforce the concrete in tension. There are two main structural elements used in the wall, namely panel sections and box connectors. The panels come as three-cell sections 250 mm wide, while the box connectors are one-cell sections 64 mm wide. The webs of these elements have oval cores which allow lateral flow of the poured concrete between the adjacent cells and provide a mechanical transfer of forces between the concrete and the polymer thus creating a composite action.

Floor/Slab

In-situ RCC slab as per IS:456:2000 shall be provided.

Structural Aspects

The buildings constructed with the system walls shall be designed as reinforced concrete structure since the parameters required for their design are the same as needed for traditional reinforced concrete. The building shall be designed in accordance with IS 456:2000, as applicable.

The system shall be designed to provide the required performance against the loads to be taken into account in accordance with IS 875 (Parts 1-5):1987 and the data given by manufacturer for various panels. It shall also provide the required bearing resistance for earthquake and wind forces as per IS 875 (Part 3):2015 and IS 1893 (Part 1):216, wherever applicable.

Foundation shall be specifically designed in accordance with provision given in IS 1904:2005. Both single and double panels should have starter bars from either foundation or ground floor slab.

The structural design calculations should clearly demonstrate structural integrity and stability including connection details. In addition, any other requirement regarding safety against earthquake need to be ensured by the designer as per prevailing codal requirements. All relevant Indian Standards/ requirement of NBC shall be conformed.

F-5) Insulating Concrete Forms (ICF) System

(M/s Reliable Insupack Building Solutions)

Insulating concrete Forms (ICF) System comprises of a panel of two walls of *Expandable Polystyrene* (EPS) separated by a nominal distance of 150mm by hard plastic ties. These are assembled on site to hold reinforced concrete. The forms are open ended hollow polystyrene blocks which fit tightly together to form a shuttering system. Concrete poured into the hollow space to form a continuous wall. When cured, this wall supports the

structural loads from floors and roofs, and the shuttering provides thermal insulation. Reinforcing steel shall be as required as per the design parameters. Upper and lower surfaces of the polystyrene panels are castellated and the vertical mating surfaces are tongue-and-groove to form a tight fit when joined together. The rigid formwork does not require supporting falsework. Form locks are used for end stops. The outer surfaces are grooved vertically at 50 mm centres to aid cutting and trimming. Plan view of ICF is shown in Fig. 1.

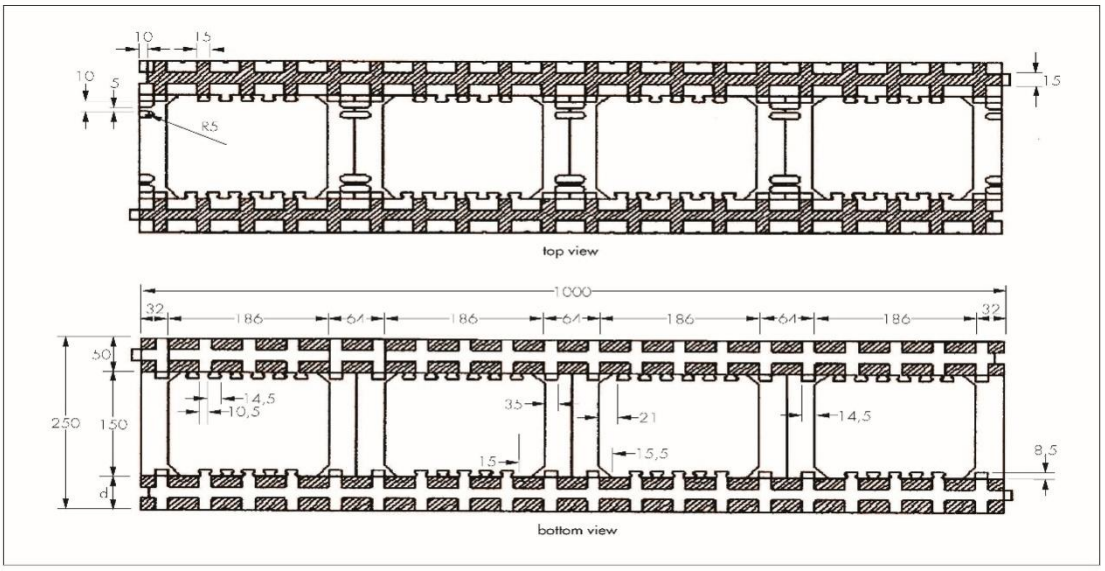


Fig. 1

Types of Forms

Standard Forms – These form bulk of the forms and have 50mm EPS panels on both sides with hard plastic ties holding the panels. Dimensions of these forms are 1000 x 250 x 250mm. (See Fig. 2)

Lintel Forms - In combination with Half Height forms, these form the top layer of all wall gaps and hold the concrete thus preventing thermal leaks. Dimensions of these forms are 1000 x 125 x 250mm. (See Fig. 3)

Half Height Forms **–**Together with the lintel, these form the top layer of all gaps in the wall and hold the required steel reinforcement. Dimensions of these forms are 1000 x 150 x 250mm. (See Fig. 4)

Floor Edge Forms – These form the top most layer, where the wall ends and floor begins. This envelopes the floor slab and thus prevents thermal bridging. Dimensions of these forms are 1000 x 375/125 x 250mm. (See Fig. 5)

Corner Forms – These constitute 90º corner of the building. The two sides are 50mm EPS panels held together with 8 hard ties. Dimensions of these forms are 750/500 x 250 x 250mm. (See Fig. 6)

End Forms – These create wall ending by fitting in inside the Standard or Corner form and provide a smooth and thermal bridge ending to the wall. Dimensions of these forms are 150 x 125 x 50mm. (See Fig. 7)

Fig. 2 Standard

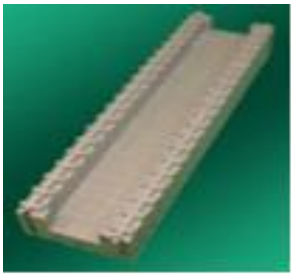


Fig. 3 Lintel

Fig. 4 Half Height

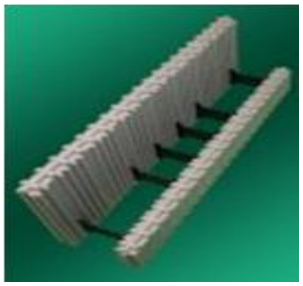


Fig. 5 Floor Edge

Fig. 6 Corner

Fig. 7 End

Typical construction

Construction process

The construction of most Insulating Concrete Forms (ICF) & Monolithic Insulated Concrete Systems (MICS) buildings is fundamentally a process of stacking lightweight blocks together in a similar manner to building bricks, laying reinforcement where necessary and pouring concrete into the voids of the block work.

Footings

The footings for Insulating Concrete Forms (ICF) & Monolithic Insulated Concrete Systems (MICS) buildings shall be reinforced concrete rafts or strips that are flat and even enough to enable stacking of the form blocks, with reinforcement starter bars set ready to connect with the concrete when poured into the formwork.

Load bearing walls

Any Insulated Concrete System/Forms wall can be designed to be load bearing.

Joints and connections

Joints and connections with other building elements shall be kept to a minimum, especially when the flooring or roofing elements are also made from Insulated Concrete System/Forms.

Fixings

The foam block work or formwork forms a poor basis for any fixings. Light loads are generally carried by the lining or facing materials, such as plasterboard, and heavier loads can be carried by supporting points drilled into the concrete that forms the inner material of the Insulated Concrete System/Forms.

Openings

Major openings for doors, windows, etc., shall be set out in the formwork as it is relatively difficult to make changes later, owing to the fundamentally monolithic nature of the structural elements. Once openings have been made, they can accommodate window and door frames of any type. A typical kind of fixing uses timber blocks set into the ends of the form blocks around the opening.Electrical conduit and plumbing is generally run in chasing in the depth of the form blocks.

Finishes

Finishes are dependent on the materials used to face the Insulated Concrete System/Forms units. Typically, the main finish is a render or render-equivalent covering or paint. Any additional cladding can be added to the Insulating Concrete Forms (ICF) & Monolithic Insulated Concrete Systems (MICS) walls subject to making appropriate sup- ports for it, although many sheet finishes, such as plasterboard, can be glued directly to the surface of the formwork. External renders require a base or skim coat embedded with fibreglass mesh, followed by a second coat and then a texture coating, finally finished with an ‘armour coat’.

RAW MATERIALS

- Expanded Polystyrene (EPS): Self-extinguishing type EPS shall conform to IS 4671: 1984 having density not less than 25 kg/m3 and valid Restriction of Hazardous Substance (ROHS) test certification.
- Polyurethane (PU) Foam Adhesive: Shall have Skin Formation of 8 min, Density 25 kg/m^3, Sound insulation 58 dB, Insulation factor 35 mW/mK, Shrinkage< 2%, Fire rating B3, Insulation factor 35 mW/m.K and Water absorption of 1 % volume
- Plasticizer: Slump retaining super plasticizer for self-compacting plastic concrete (CEMWET SP-3000) shall conform to IS 9103:1999
- Hard Plastic Tie: Shall be made with High density polyethylene ensuring stability
- Cast-in-place concrete: The ingredients, grade of concrete & slump for walls, floors and roofs shall be used as per IS 456:2000.

Structural Aspects

The Insulating Concrete Forms (ICF) & Monolithic Insulated Concrete Systems (MICS) may be designed using the appropriate design software. The buildings constructed with EPS shall be designed as reinforced concrete structure since the parameters required for their design are the same as needed for traditional reinforced concrete. In the calculation model, the building shall be designed in accordance with IS 456:2000, as applicable, as structure composed of load bearing walls with a box-like structure.

The system shall be designed to provide the required performance against the loads to be taken into account in accordance with IS 875 (Parts 1,2,4&5):1987. It shall also provide the required bearing resistance for earthquake and wind forces as per IS 875 (Part 3):2015 and IS 1893(Part1):2016, wherever applicable. All relevant Indian Standards/ requirement of NBC shall be conformed.

F-6) Building PVC wall material

(M/s Kalzen Realty Pvt. Ltd)

Brief Description

Stay-in-place formwork consisting of hollow-type rib- reinforced Poly-vinyl chloride (PVC) material comprising of two PVC panel facings with internal PVC ribs, are used as permanent formwork for concrete walls. The web members are punched with cores to allow easy flow of the poured concrete between the components. After putting vertical & horizontal reinforcement as per the design, the hollow Wall components are filled with concrete, in situ, to provide a monolithic concrete wall.

Standard Panels

The standard size of available panels is as follows;

Height	Standard panels: 3 meters or 3.3 meters heights All panels can be ordered to custom height Minimum 0.5m; Maximum 6m
Panel width	Standard wall panels: 400mm Half wall panels: 200mm Quarter panels: 100mm
Thicknesses of Profile	110, 150 and 200 mm
PVC thickness	2.5 mm
PVC density	1,300 kg/m^3
Concrete volume	110mm profile: 0.10 cum per sqm

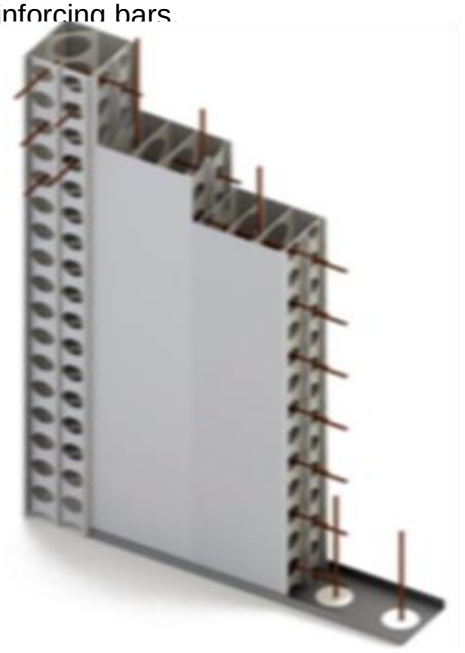
	150mm profile: 0.14 cum per sqm 200mm profile: 0.18 cum per sqm
Weight	110mm profile: 18.1 kgs per sqm 150mm profile: 21.6 kgs per sqm 200mm profile: 23 kgs per sqm

The product shall not be affected by exposure to sunlight either in storage or as part of finished product.

Walling System

The wall shall be erected by placing the panels side by side or sliding the new panel down from top and held by using the clipping mechanism. The panel shall have double-hole system ensuring the position of the horizontal and vertical steel reinforcing bars.

The horizontal bars shall be placed along with the laying of panel and vertical bars shall be placed by dropping from top to improve the accuracy and structure of the wall, and minimize variations in the concrete thickness surrounding the reinforcing bars. Once the wall is erected, the plumbing and electrical conducting is done as per the design. After this, concrete of required Garde as per structural design shall be poured into the cavities. Once filled, the system acts as structural element. The external surface shall have specified finish.



Wall panel

Floor/Slab

In-situ RCC slab as per IS:456:2000 shall be provided.

Structural Aspects

The buildings constructed with the system shall be designed as reinforced concrete structure since the parameters required for their design are the same as needed for traditional reinforced concrete. The building shall be designed in accordance with IS 456:2000, as applicable.

The system shall be designed to provide the required performance against the loads to be taken into account in accordance with IS 875 (Parts 1-5):1987 and the data given by manufacturer for various panels. It shall also provide the required bearing resistance for wind forces & earthquake as per IS 875 (Part 3):2015 and IS 1893 (Part 1):2016, wherever applicable.

Foundation shall be specifically designed in accordance with provision given in IS 1904:2005. Both single and double panels shall have starter bars from either foundation or ground floor slab.

The structural design calculations should clearly demonstrate structural integrity and stability including connection details. In addition, any other requirements including safety against

earthquake, cyclone shall be ensured by the designer as per prevailing codal requirements. All relevant Indian Standards/ requirement of NBC shall be conformed.

F-7) Fast Bloc Insulated Concrete Form (ICF)

(M/s Fast Bloc Building System)

Brief Description

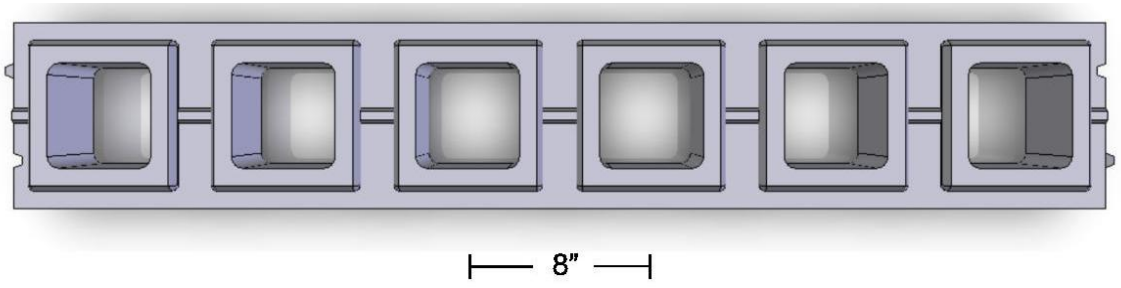
The FastBloc Building System (FastBloc) is stay-in-place, formwork for reinforced concrete, post and beam construction, thus creating skeleton with required strength within the wall. In the System, Expanded Polystyrene (EPS) blocks are stay in place forms which provide insulation and sound barrier. Concrete and rebar shall be installed along the wall as per design requirement.

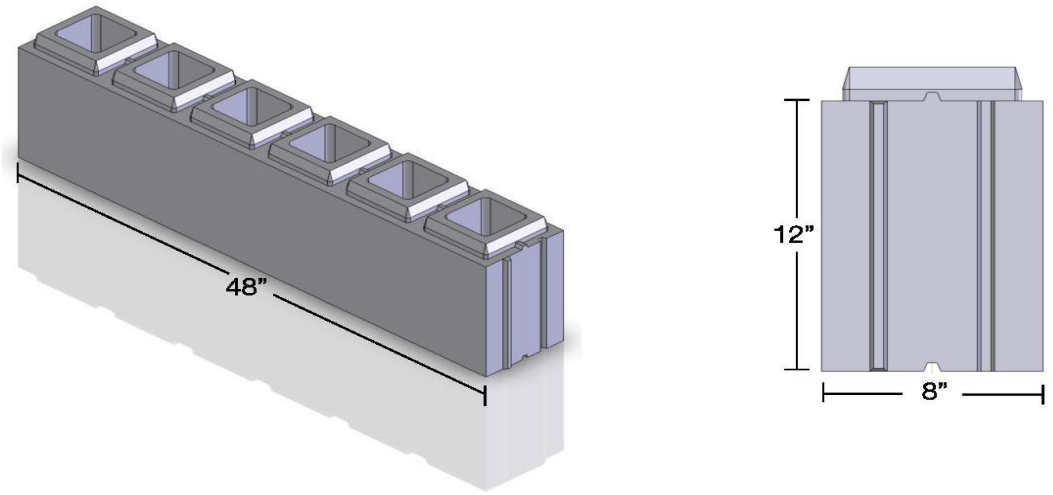
Standard Panels

Standard FastBloc has two different sizes as below;

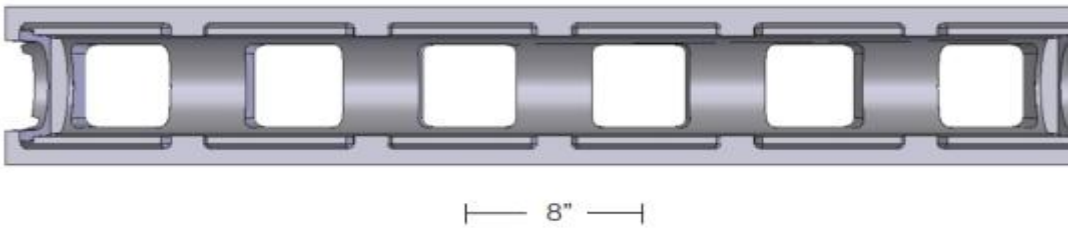
1. 15.10 cm (6 inches) x 30.50 cm (12 inches) x 121.00 cm (48 inches),
2. 20.32 cm (8 inches) x 30.50 cm (12 inches) x 121.00cm (48 inches)

These two sizes can be assembled to cater the needs of any project. The spacing of the cells allows for walls to be reinforced based on the needs of the project, location, number of stories, and other parameters based on structural design. As per the requirement, Lintel blocks shall be used.





FastBloc®



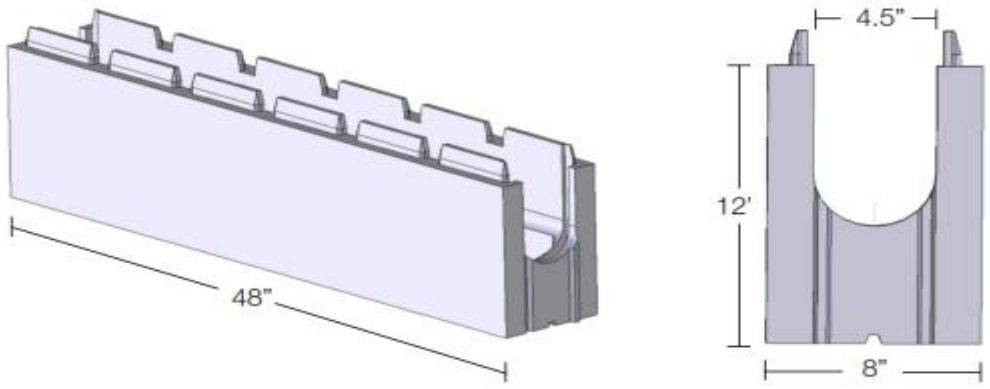


Fig. FastBloc® for Lintel

Walling System

To construct a FastBloc wall, parts shall be assembled similar to "Lego" blocks, by placing the pieces and form walls, known as "reinforced post and beam construction.”

The plugs need to be placed in the cells that do not have vertical rebar reinforcement (per structural calculations), so they are not filled with concrete. The end caps provide an enclosure for the lintel at the end of walls. The vertical cells that are not filled with concrete can be used for electrical and / or plumbing.

Before pouring concrete, end plugs shall also be placed in the lintel beams at the end of walls to seal the blocks horizontally.

Utility Installation

The utilities shall be inserted before filling the walls with concrete. The utilities need to be properly placed in the foundation prior to installation of FastBloc in order to align with the center of the wall and an open FastBloc cell. It is important that the utilities do not interfere with the cells used for concrete and rebar, otherwise the utilities could cause a discontinuity in the concrete and steel and create a cold joint. The large-diameter pipes shall be put outside of the wall. The electrical boxes or load centers are to be placed prior to casting of the walls so they are drowned in concrete. Holes can be cut into FastBloc® walls where utility outlets are required.

Floor/Slab

In-situ RCC slab as per IS:456:2000 shall be provided. Speed floor as per design may also be provided.

Structural Aspects

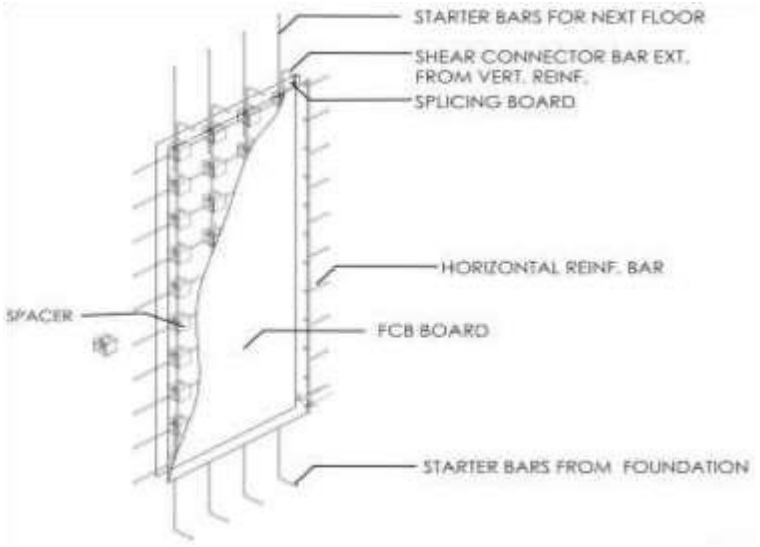
The buildings constructed with the system walls shall be designed as reinforced concrete structure since the parameters required for their design are the same as needed for traditional reinforced concrete. The building shall be designed in accordance with IS 456:2000, as applicable.

Foundation shall be specifically designed in accordance with provision given in IS 1904:2005. When performing the assembly of the foundation, depending on the type, vertical reinforcement rods (rebar) shall necessarily be inserted.
The structural design calculations should clearly demonstrate structural integrity and stability including connection details. In addition, any other requirement regarding safety against earthquake, cyclone shall be ensured by the designer as per prevailing codal requirements. All relevant Indian Standards/ requirement of NBC shall be conformed.

F-8) Plaswall Panel System

(M/s FTS Buildtech Pvt. Ltd)

Plaswall Panel System is a lost in place formwork, where two fiber cement boards (FCB) of 6mm thickness each and HIMI spacers (High Impact Molded Inserts) bonded between two sheets of FCB (in- situ) are erected to produce straight-to-finish panels. A monolithic structure is then created by filling the entire structure with M20 or higher grade of concrete as per the design. Additional load capacity can be obtained by providing extra reinforcing bars and/or by increasing grade of the concreteAn Isometric View of the Plaswall is shown in Fig. 1 below:



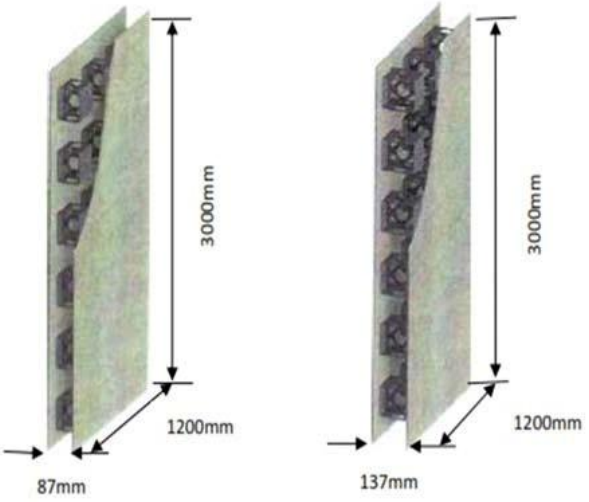
SIZE OF PANELS

Panels are normally produced in sizes and dimensions as below:

Length: 2400mm/3000 mm

Width: 1200 mm

Thickness: 87 mm, 112 mm, 137 mm, 162 mm & 230 mm including two fiber cement boards of 6mm thickness each and infill of concrete of 75mm, 100mm,125mm, 150mm and 218mm. The dimensional sketches are shown in



Raw Materials

- Fibre cement board shall be 100% asbestos free and conform to Type A, Category 3 min. as stipulated in IS14862:2000.

- Recycled plastic spacers made of High Impact Molded Inserts shall conform to the specifications of the Manufacturer.

- PU Adhesive Glue shall conform to the specifications of the manufacturer.

- Putty shall conform to IS 419:1967.

- Cement, sand, aggregate and reinforcement steel shall be as per the relevant Indian Standards.

Construction, Installation and Jointing Procedure of Plaswall

Foundation

The foundation type as raft, strip, isolated footing shall be decided based on bearing capacity of the soil, site condition, etc. However, the provision for starter bars for walls shall be ensured in all foundation scenarios. Typical sketch for starter bars from foundation are given below (Fig.7).

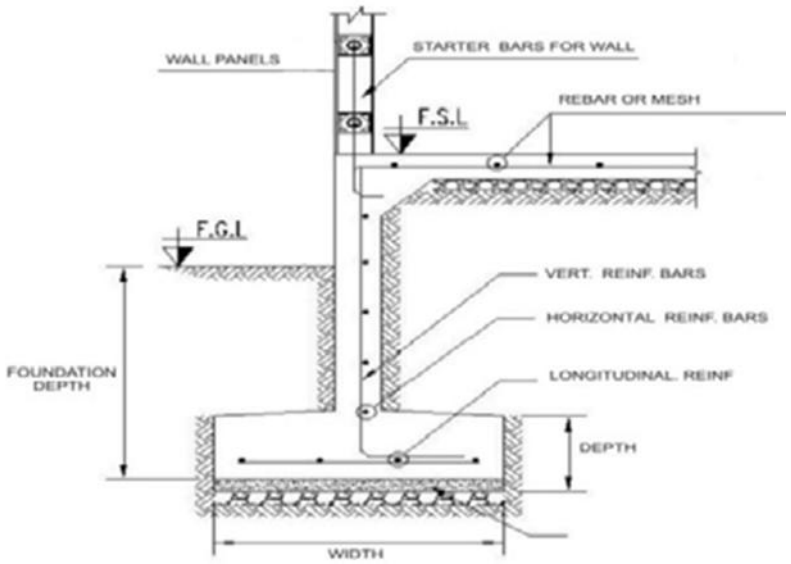


Fig. 7 Typical Strip footing

Panel Installation

Installation

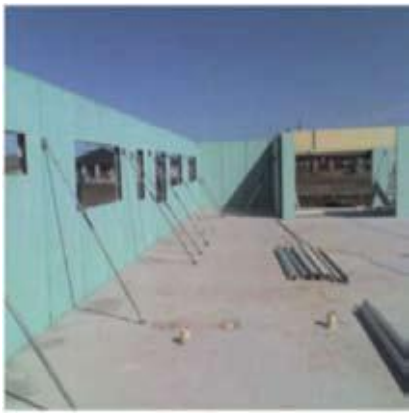
The panel shall be lifted slightly and then placed along the bottom angles. The panel shall be

plumbed at edge and face sides with provision of shims, if needed.

• The panel shall be screwed both sides at bottom at 250 mm center to center, while glue is applied & tacky.If glue is not available, spacing shall be kept at 200mm center to center.

• Support the temporarily angle installed on other side of panel to hold it in position for concreting (Fig. 8)

• Corner connection details shall be followed as shown in Fig. 9.



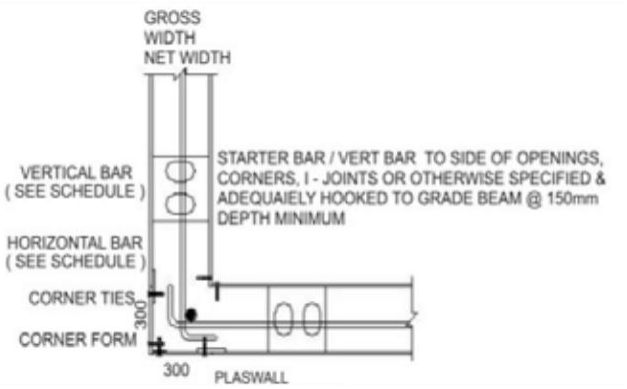


Fig. 8 Diagonal bracing ***Fig. 9 Corner connection***

T-Section

• After installing the primary walls, mark the place where corner will be constructed.

• The joiner stud shall be placed and marked by pencil to have a vertical line reference.

• The joiner stud shall be moved up by 60mm from slab to bottom of joiner stud. The stud hole shall be marked by pencil.

• The marked slots shall be cut by 100mm angle grinder with dry type diamond blade.

• Reinforced dowels shall be prepared, inserted & tied just after screwing the joiner stud corner connection.(Fig.9)

• In case, the holes intersect with panel stud of the primary wall, the portion of primary stud shall be cut to accommodate the marked holes for T-connection. One 12mm vertical bar shall be provided as replacement.

• In case of cross-connection, horizontal bars shall be provided.

Nib End Wall Detail

• For nib, end cap shall be provided.

- Glue shall be applied on end cap stud which shall be inserted to correct position and screwed. (Fig. 10)

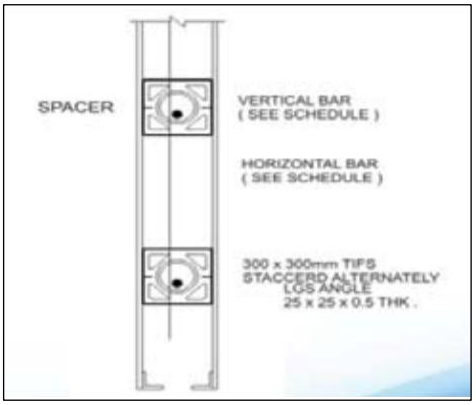


Fig. 10 Nib End Wall Detail

Fig. 11 Door & Window Jambs

Door & Window Jambs Installation

- Light gauge door & window jambs shall be provided for the panels Door jambs shall be installed along with the panel. (Fig. 11)
- Window jambs shall be installed (not fixed) to accommodate concrete at window sills. This will eliminate honey-comb and ease pouring of concrete.
- The window sill shall be overflowed by concrete and then push down window frame.
- The lintel panel shall be screwed to press down the window frame. Spacing of screws shall be the same.

Embedment of Services; After installation of the panels, electrical and plumbing pipes shall be inserted into the panel as per the drawings.

Placing of Reinforcement

Placing of reinforcement of required grade shall be as per the structural drawings and IS 456:2000 and IS 1139:1966.

Concreting

After placing of reinforcement and services in the panel, designed grade/mix of concrete shall be poured manually or by Pumping system. The concrete shall be poured from top of the wall or by cutting slit and attaching chute in the panel. Mix shall be prepared in accordance with section 9.2 of IS 456:2000. Agregate of max. size 6 to 10mm shall be used. Slump should be between 175mm to 200mm.

Pouring of concrete

- After proper mixing of concrete as per the mix, concrete shall be poured manually into the panel from top of the wall or by cutting slit and attaching chute in the panel. The first pour of concrete should be of 300mm height and after setting, concrete shall be poured up to 800mm as above.

- After setting time of each pour of concrete, keep pouring upto 800mm height and continue till height of the wall.
- Above process shall be followed horizontally for different walls. This will allow setting time of concrete for the previous wall while the next wall is being poured.
- Setting time of concrete shall be min. three hours but during that time other walls shall be poured. Since the project quantum will be big, there will be enough walls available to pour.
- Rubber mallet shall be used for tapping the wall while pouring the concrete to avoid honey comb/segregation.

Joint Treatment

After walls are completely filled and mix dried, joint treatment shall be done using fibre mesh tape and putty. (See Figs. 12 & 13)

Fig.12 Yellow Putty with Fibre mesh tape

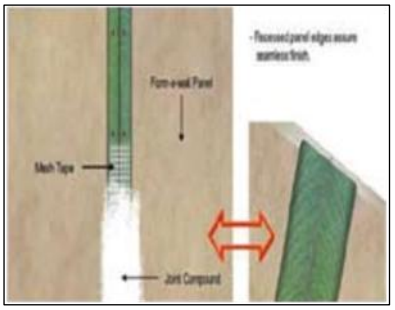


Fig.13 Joint Treatment

Construction of Slab**;** Once construction of panels is completed, slab construction shall be done as per the structural drawings with wall reinforcement and connection with slab reinforcement. ll relevant Indian Standard/ requirement of NBC shall be conformed.

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