Government of the People's Republic of Bangladesh
**Office of the Refugee Relief and Repatriation Commissioner**
Cox's Bazar
www.rrrc.gov.bd

No: 51.04.2200.005.00.032.24- 3333 Date: 15 September 2025

Sub: **Approval of Shelter Models under GoB-Approved TSS Application**

Ref: ISCG's letter no.-(1) ISCG/2025/46, date: 17 August 2025
(2) ISCG/2025/40, date: 17 July 2025

In reference to the above-mentioned subject and letter, the office of the RRRC acknowledges receipt of your letter dated 17 August 2025 regarding the request for approval of four Temporary Safer Shelter (TSS) models in line with the Government of Bangladesh–approved TSS application. After careful review and consideration, the RRRC office is pleased to approve for the implementation of the following two TSS models:

Model 3: **Upgraded Mid-Term Shelter (MTS) with TSS Features**
Model 4: **CGI Roofing & Cement-Soaked Geotextile Shelter (CR&CS-GS)** – New TSS Model

2. However, regarding the model 1 (Mud Tally Shelter-MTS) and Model 2 (Waste Revive Resilient Shelter-WRRS), it has been decided to resubmit the drawing, design and BoQ according to the approved guidelines.

Thank you for your continuous support and cooperations.

**Muhammad Talut**
(Deputy Secretary)
Mobile: 01847-424197
E-mail: contact@rrrc.gov.bd

**Mr. David Bugden**
Principal Coordinator
Inter Sector Coordination Group (ISCG)
Cox's Bazar

Copy for kind information:

1. **Additional Refugee Relief and Repatriation Commissioner**, this office
2. **Camp-in-Charge (all),** Ukhiya/Teknaf, Cox's Bazar.
3. **PS to RRRC** (For kind attention of RRRC).
4. Office Copy.

# TSS (Temporary Safer Shelter)
# CGI Roofing with Cement Soaked Geo Textile Shelter

## General Notes

**Shelter size-**10'x15'(150 sft)
Flooring: Sand & Cement
**Plinth Beam:**Cement & sand mortar
**Wall:** Bamboo mat with cement soaked Geo-textile wall
**Structure:** Metal frame, Precast RCC post footing foundation footing foundation
**Roofing:** CGI sheet with cement soaked geo textile insulation

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Rohingya Refugee Response Bangladesh
SHELTER & CCCM SECTOR Cox's Bazar, Bangladesh

Coordination Hub, Kabita Soroni, Motel Road, Cox's Bazar-4700, Bangladesh

| |
|---|
| **Project Title:**TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter |
| **Project No:** 01 |
| **Drawing No:** |
| **Scale:** |
| **Sheet No: Top Sheet** |
| **Date:** June, 2025. |

SAVE WATERLAND PLANT TREES FOR NEXT GENERATION

LEGEND:

- Woven Bamboo Mat wall
- RCC Post
- Cement Soaked Geo Textile
- Metal Frame
- CGI Sheet
- Plain Sheet

0 1m 2m

| |
|---|
| **Sketch & Planning by:** [Shelter taskforce Team] |
| **Drawn by:** [Meer Md.Ferdous Islam, Syed Navid Zaman & Umi Das] |
| **Design & Checked by :** & Shelter taskforce Team |
| **Technical Support & Validated by:** SCCCM Sector-ISCG and RRRC |

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

Muhammad Talut
Deputy Secretary
RRRC Office, Cox's Bazar

## General Notes

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| |
|---|
| **Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter** |
| **Project No:** 01 |
| **Drawing No:** |
| **Scale:** 1:1 |
| **Sheet No:** 3D View |
| **Date:** June, 2025. |

SAVE WATER AND PLANT TREES FOR NEXT GENERATION

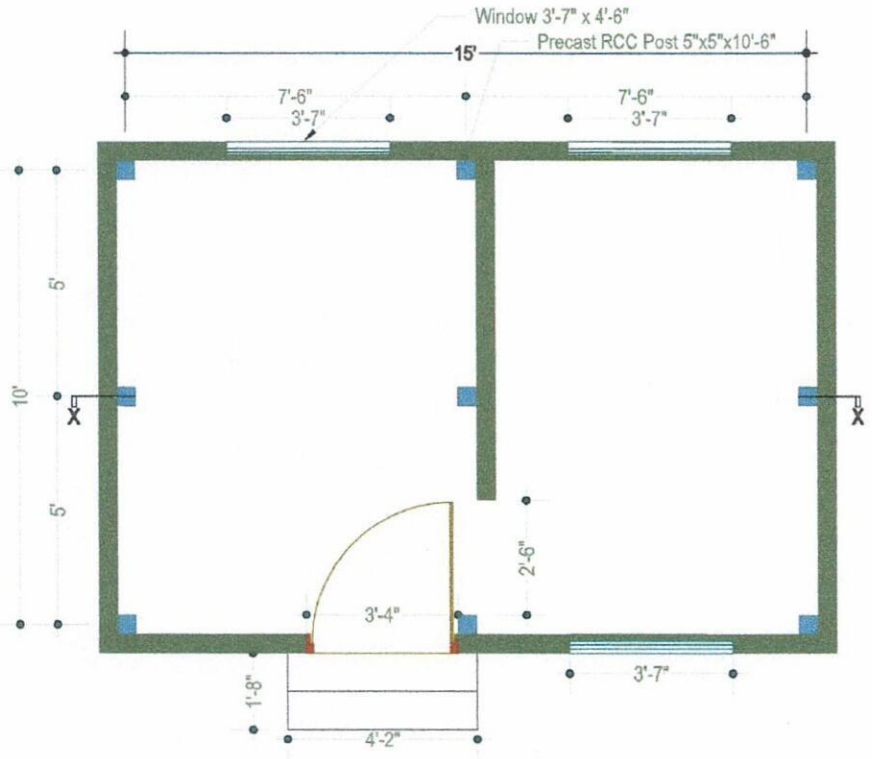
LEGEND:
Woven Bamboo Mat wall
RCC Post
Cement Soaked Geo Textile
Metal Frame
CGI Sheet
Plain Sheet

0 1m 2m

| |
|---|
| **Sketch & Planning by:** [Shelter taskforce Team] |
| **Drawn by:** [Meer Md.Ferdous Islam, Syed Nauid Zaman & Urmi Das] |
| **Design & Checked by :** & Shelter taskforce Team |
| **Technical Support & Validated by:** SCCCM Sector-ISCG and RRRC |

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

Muhammad Talut
Deputy Secretary
RRC Office, Cox's Bazar




**SHELTER PLAN**

## General Notes

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| |
|---|
| Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter |
| Project No: 01 |
| Drawing No: 01 |
| Scale: 1:1 |
| Sheet No: 01 |
| Date: June, 2025. |

| |
|---|
| Sketch & Planning by: [Shelter taskforce Team] |
| Drawn by: [Meer Md.Ferdous Islam, Syed Nawid Zaman & Umi Das] |
| Design & Checked by : & Shelter taskforce Team |
| Technical Support & Validated by: SCCCM Sector-ISCG and RRRC |

SAVE WATERLAND PLANT TREES FOR NEXT GENERATION

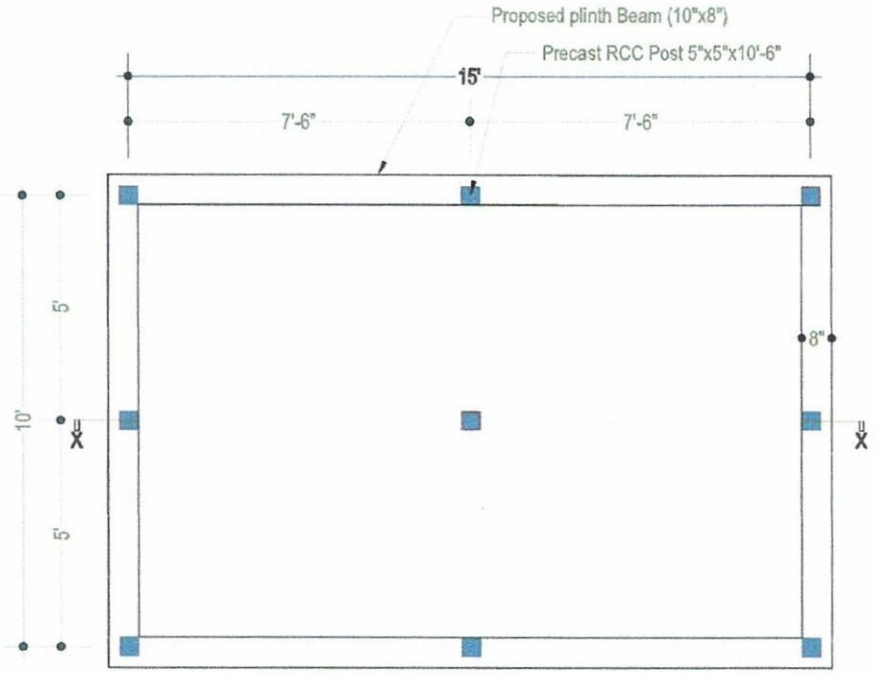
LEGEND:

- Woven Bamboo Mat wall
- RCC Post
- Cement Soaked Geo Textile
- Metal Frame
- CGI Sheet
- Plain Sheet

0 1m 2m

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

-mmad Talut
-ity Secretary
Cox's Bazar




**PLINTH BEAM LAYOUT PLAN**

## General Notes

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| |
|---|
| **Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter** |
| **Project No:** 01 |
| **Drawing No:** 02 |
| **Scale:** 1:1 |
| **Sheet No:** 02 |
| **Date:** June, 2025. |

| |
|---|
| Sketch & Planning by: [Shelter taskforce Team] |
| Drawn by: [Meer Md.Ferdous Islam, Syed Navid Zaman & Umi Das] |
| Design & Checked by : & Shelter taskforce Team |
| Technical Support & Validated by: SCCCM Sector-ISCG and RRRC |

SAVE WATER AND PLANT TREES FOR NEXT GENERATION

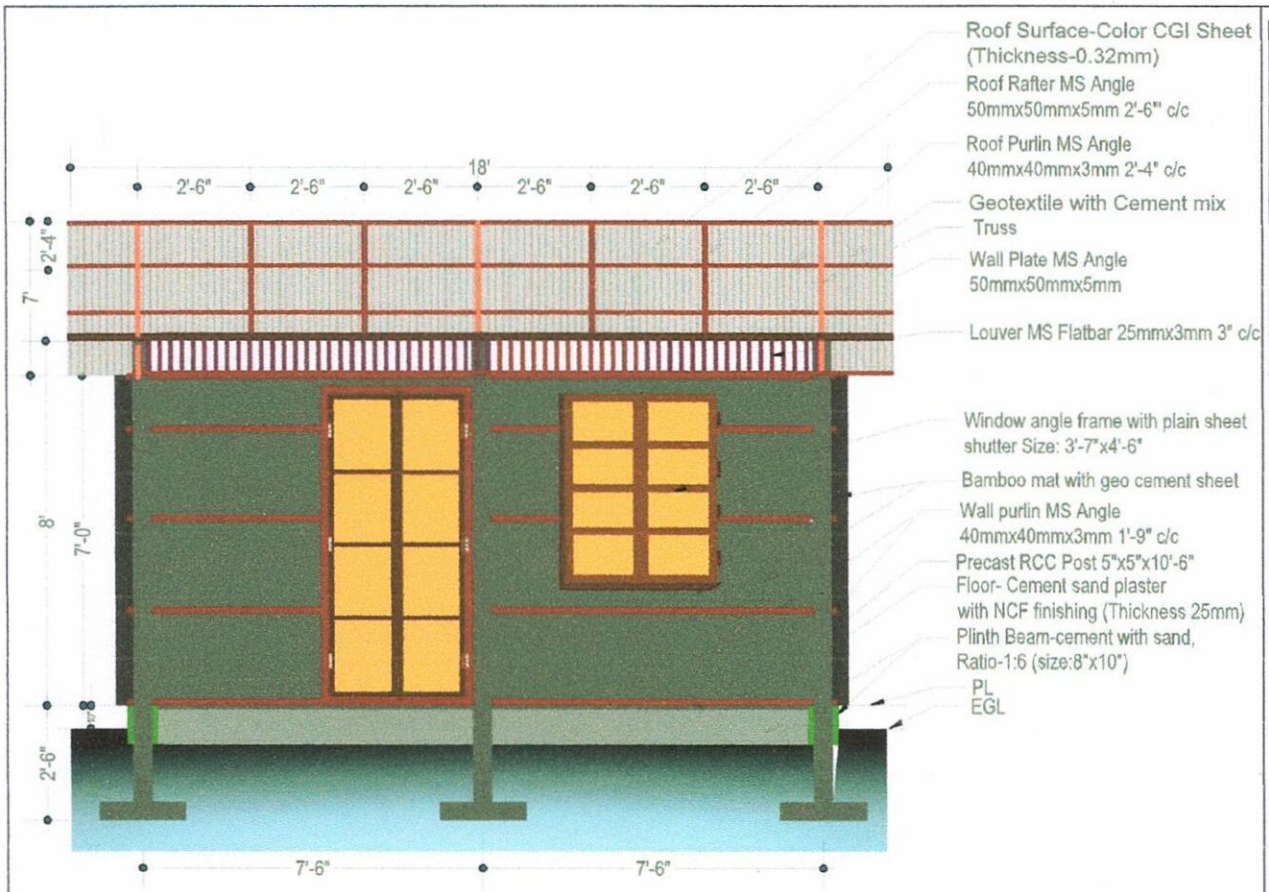
LEGEND:

- Woven Bamboo Mat wall
- Metal Frame
- RCC Post
- CGI Sheet
- Cement Soaked Geo Textile
- Plain Sheet

0 1m 2m

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

Muhammad Talut
Deputy Secretary
RRC Office, Cox's Bazar




SECTION (X-X) DETAILS

## General Notes

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| |
|---|
| Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter |
| Project No: 01 |
| Drawing No: 03 |
| Scale: 1:1 |
| Sheet No: 03 |
| Date: June, 2025. |

Sketch & Planning by: [Shelter taskforce Team]
Drawn by: [Meer Md.Ferdous Islam, Syed Nawid Zaman & Umi Das]
Design & Checked by : & Shelter taskforce Team
Technical Support & Validated by: SCCCM Sector-ISCG and RRRC

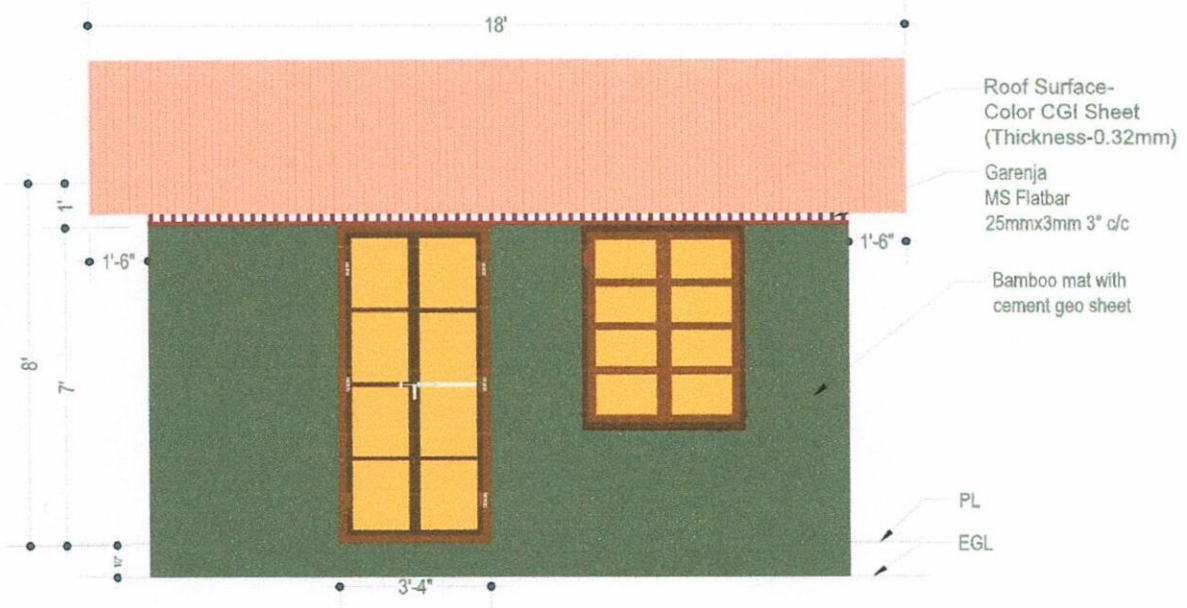
SAVE WATER AND PLANT TREES FOR NEXT GENERATION

LEGEND:
Woven Bamboo Mat wall
RCC Post
Cement Soaked Geo Textile
Metal Frame
CGI Sheet
Plain Sheet

0 1m 2m

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

Muhammad Talut
Deputy Secretary
RRRC Office, Cox's Bazar




FRONT ELEVATION

## General Notes

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|---|
| **Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter** |
| **Project No:** 01 |
| **Drawing No:** 04 |
| **Scale:** 1:1 |
| **Sheet No:** 04 |
| **Date:** June, 2025. |

| |
|---|
| **Sketch & Planning by:** [Shelter taskforce Team] |
| **Drawn by:** [Meer Md.Ferdous Islam, Syed Nawid Zaman & Urmi Das] |
| **Design & Checked by :** & Shelter taskforce Team |
| **Technical Support & Validated by:** SCCCM Sector-ISCG and RRRC |

SAVE WATER,AND PLANT TREES FOR NEXT GENERATION

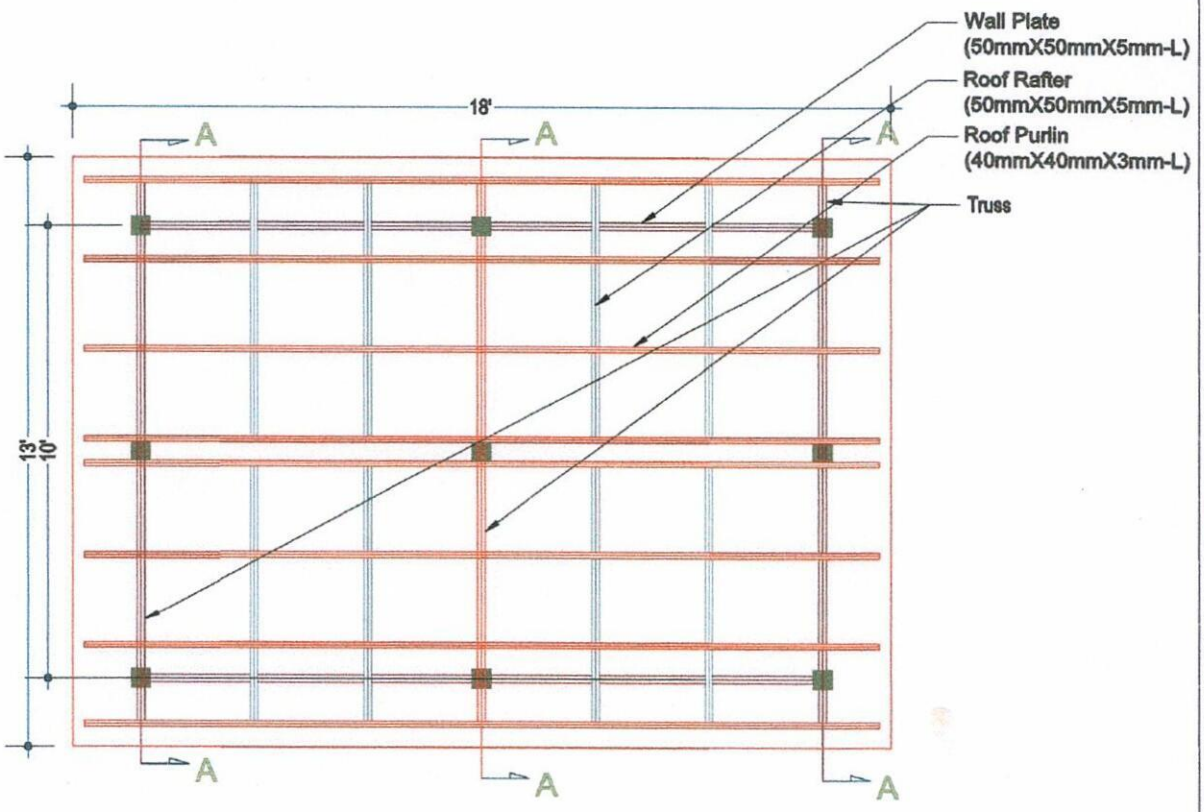
LEGEND:

- Woven Bamboo Mat wall
- RCC Post
- Cement Soaked Geo Textile
- Metal Frame
- CGI Sheet
- Plain Sheet

0 1m 2m

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

Muhammad Talut
Deputy Secretary
RRRC Office, Cox's Bazar




ROOF FRAME DETAILS

LEGEND:

- Woven Bamboo Mat wall
- RCC Post
- Cement Soaked Geo Textile
- Metal Frame
- CGI Sheet
- Plain Sheet

0 1m 2m

SAVE WATER AND PLANT TREES FOR NEXT GENERATION

## General Notes

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|---|---|
| Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter | |
| Project No: 01 | |
| Drawing No: 05 | |
| Scale: 1:1 | |
| Sheet No: 05 | |
| Date: June, 2025. | |
| Sketch & Planning by: [Shelter taskforce Team] | |
| Drawn by: [Meer Md.Ferdous Islam, Syed Nawid Zaman & Urmi Das] | |
| Design & Checked by : & Shelter taskforce Team | |
| Technical Support & Validated by: SCCCM Sector-ISCG and RRRC | |

Md. Ismail Hossain
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Muhammad Talut
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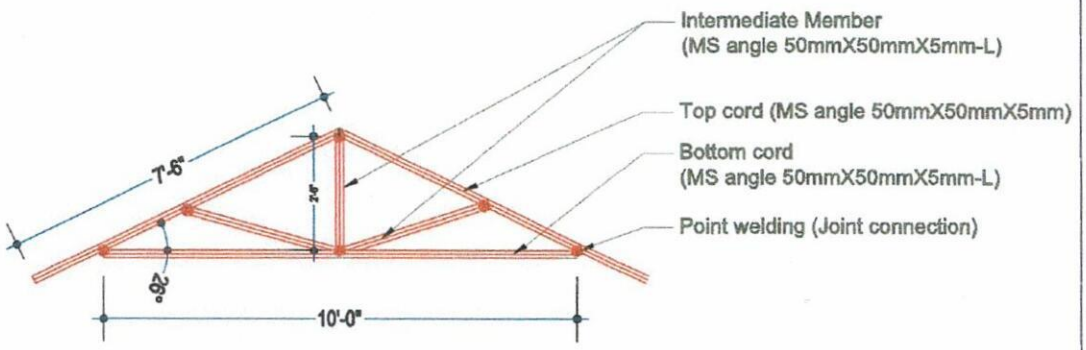


**TRUSS DETAILS**

## General Notes

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Coordination Hub, Kabita Soroni, Motel Road, Cox's Bazar-4700, Bangladesh


| |
|---|
| **Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter** |
| **Project No:** 01 |
| **Drawing No:** 06 |
| **Scale:** 1:1 |
| **Sheet No:** 06 |
| **Date:** June, 2025. |

| |
|---|
| Sketch & Planning by: [Shelter taskforce Team] |
| Drawn by: [Meer Md.Ferdous Islam, Syed Navid Zaman & Urmi Das] |
| Design & Checked by : & Shelter taskforce Team |
| Technical Support & Validated by: SCCCM Sector-ISCG and RRRC |

SAVE WATER AND PLANT TREES FOR NEXT GENERATION

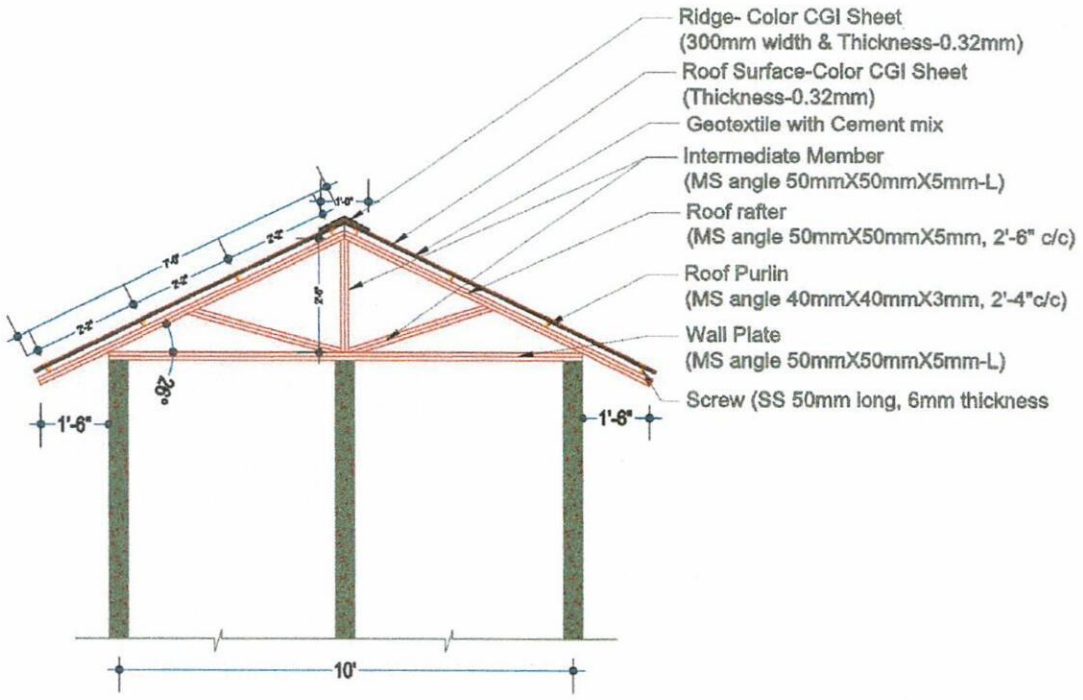
LEGEND:

- Woven Bamboo Mat wall
- RCC Post
- Cement Soaked Geo Textile
- Metal Frame
- CGI Sheet
- Plain Sheet

0 1m 2m

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

Muhammad Talut
Deputy Secretary
RRRC Office, Cox's Bazar




## ROOF SECTION (A-A) DETAILS

### General Notes

**Shelter size-**10'x15'(150 sft)
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| |
|---|
| **Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter** |
| **Project No:** 01 |
| **Drawing No:** 07 |
| **Scale:** 1:1 |
| **Sheet No:** 07 |
| **Date:** June, 2025. |

| |
|---|
| **Sketch & Planning by:** [Shelter taskforce Team] |
| **Drawn by:** [Meer Md.Ferdous Islam, Syed Nawid Zaman & Umi Das] |
| **Design & Checked by :** & Shelter taskforce Team |
| **Technical Support & Validated by:** SCCCM Sector-ISCG and RRRC |

LEGEND:

- Woven Bamboo Mat wall
- RCC Post
- Cement Soaked Geo Textile
- Metal Frame
- CGI Sheet
- Plain Sheet

0 1m 2m

SAVE WATER AND PLANT TREES FOR NEXT GENERATION

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

Muhammad Talut
Deputy Secretary
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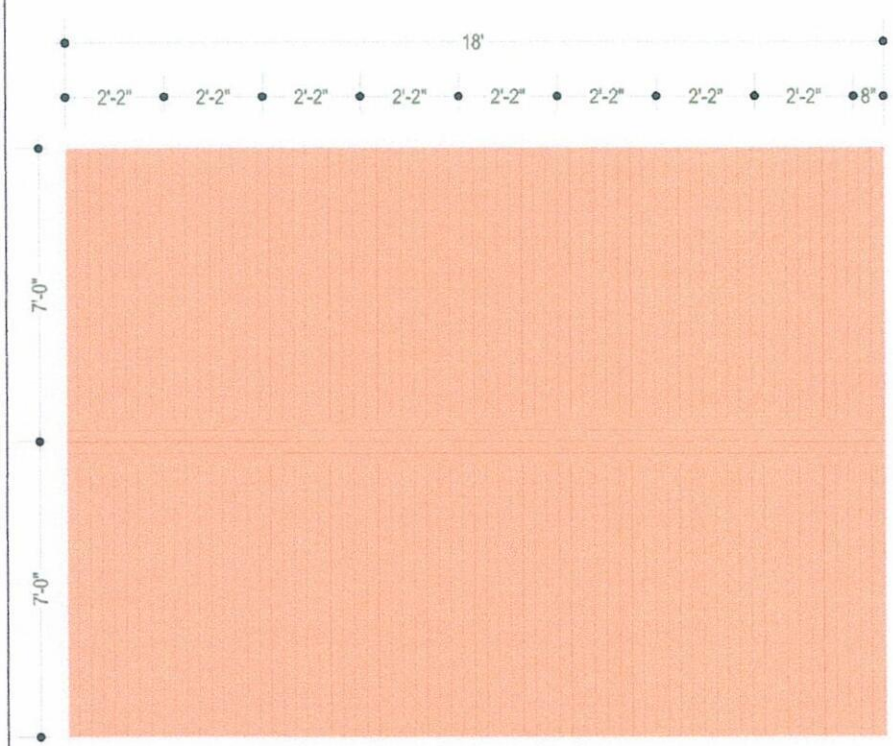


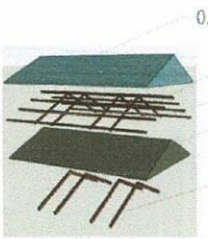


## ROOF CGI SHEET PLAN & LAYER DETAILS

### General Notes

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SHELTER & CCCM SECTOR Cox's Bazar, Bangladesh

Coordination Hub, Kabita Soroni, Motel Road, Cox's Bazar-4700, Bangladesh

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|---|
| **Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter** |
| **Project No:** 01 |
| **Drawing No:** 08 |
| **Scale:** 1:1 |
| **Sheet No:** 08 |
| **Date:** June, 2025. |

| |
|---|
| Sketch & Planning by: [Shelter taskforce Team] |
| Drawn by: [Meer Md.Ferdous Islam, Syed Navid Zaman & Umi Das] |
| Design & Checked by : & Shelter taskforce Team |
| Technical Support & Validated by: SCCCM Sector-ISCG and RRRC |

SAVE WATER AND PLANT TREES FOR NEXT GENERATION

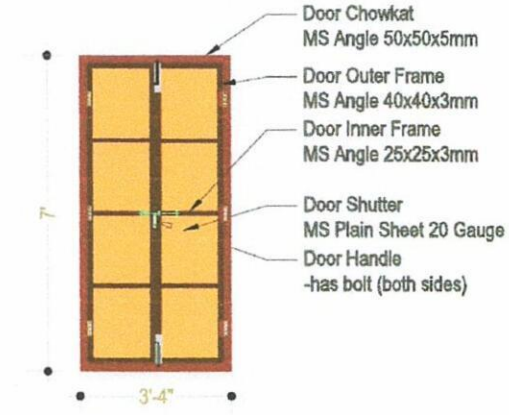
LEGEND:

| | | |
|---|---|---|
| Woven Bamboo Mat wall | RCC Post | Cement Soaked Geo Textile |
| Metal Frame | CGI Sheet | Plain Sheet |

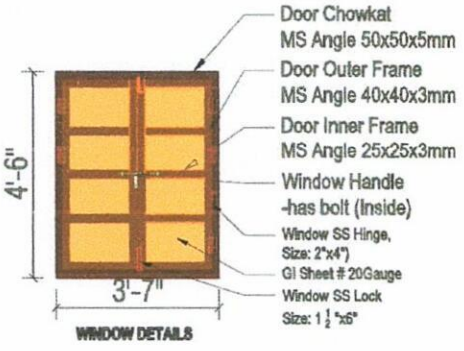
0 1m 2m

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

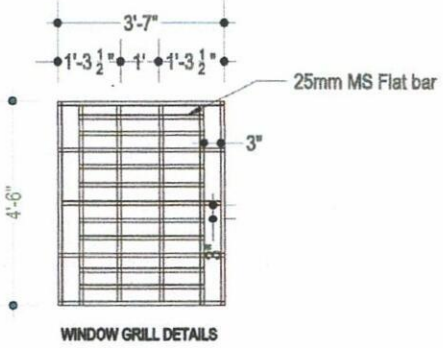
Muhammad Talut
Deputy Secretary
RRRC Office, Cox's Bazar




MAIN DOOR DETAILS (METAL)




WINDOW DETAILS




WINDOW GRILL DETAILS

## General Notes

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|---|
| **Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter** |
| **Project No:** 01 |
| **Drawing No:** 09 |
| **Scale:** 1:1 |
| **Sheet No:** 09 |
| **Date:** June, 2025. |

| |
|---|
| Sketch & Planning by: [Shelter taskforce Team] |
| Drawn by: [Meer Md.Ferdous Islam, Syed Nawid Zaman & Umi Das] |
| Design & Checked by : & Shelter taskforce Team |
| Technical Support & Validated by: SCCCM Sector-ISCG and RRRC |

SAVE WATER AND PLANT TREES FOR NEXT GENERATION

LEGEND:

- Woven Bamboo Mat wall
- Metal Frame
- RCC Post
- CGI Sheet
- Cement Soaked Geo Textile
- Plain Sheet

0 1m 2m

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

Muhammad Talut
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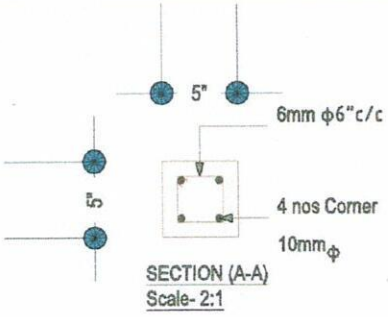


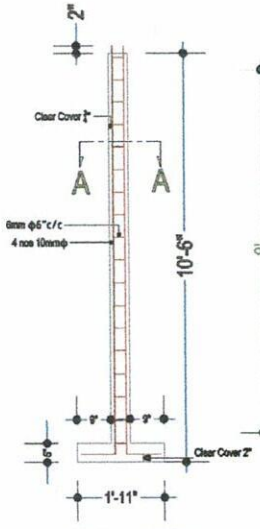

SECTION (A-A)
Scale- 2:1

MATERIAL REQUIREMENTS
cement: portland cement (PCC CEMII), fresh (≤2 months old).
sand: sand (FM-1.2–1.5mm),
clean, sharp-edged, and silt-free (max 3% silt content).
Aggregate: Coarse aggregate (size-20mm down well graded),
clean, sharp-edged, and dust-free
water: clean, ph 6–8 (no salinity/organic matter).
Reinforcement: 6mm–10mm mild steel deformed bars (grade 60).
Form work: form work -Steel/wood shutter

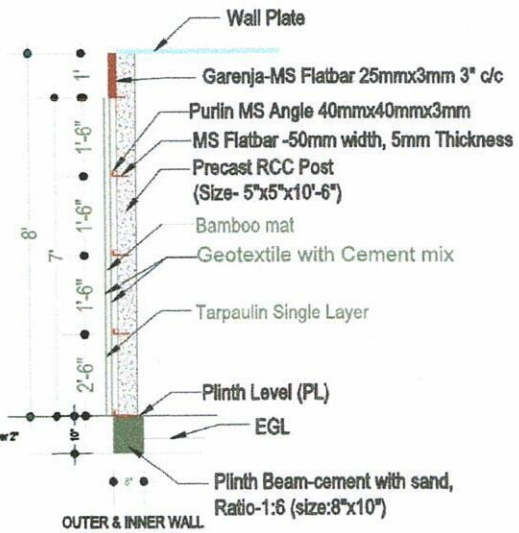
MORTAR MIX PROPORTION
ratio:1 part cement :1.5 parts sand :3 parts aggregate(by volume).
consistency: concrete slump 40–60mm
Curing: submerged by water/covered by wet hessian cloths/
water spray 5x/day for minimum 14 days; avoid direct sunlight

TECHNICAL PERFORMANCE
compressive strength: ≥20 mpa at 28 days.

QUALITY CONTROL CHECKS
before casting: ensure clear cover & verify bar overlap
(min. 400mm), no rust on steel.
during casting: ensure mix proportion, shutter work,
no voids; use needle vibrator if needed.
post-casting: ensure curing




RCC PRECAST POST
Longitudinal Details




OUTER & INNER WALL
SECTION DETAILS

## General Notes

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SCCCM Sector Standards - Bangladesh

Rohingya Refugee Response Bangladesh — SHELTER & CCCM SECTOR Cox's Bazar, Bangladesh

Coordination Hub, Kabita Soroni, Motel Road,
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|---|
| **Project Title:TSS(Temporary Safer Shelter) CGI Roofing with Cement Soaked Geo Textile Shelter** |
| **Project No:** 01 |
| **Drawing No:** 10 |
| **Scale:** 1:1 |
| **Sheet No:** 10 |
| **Date:** June, 2025. |

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| **Sketch & Planning by:** [Shelter taskforce Team] |
| **Drawn by:** [Meer Md.Ferdous Islam, Syed Navid Zaman & Urmi Das] |
| **Design & Checked by :** & Shelter taskforce Team |
| **Technical Support & Validated by:** SCCCM Sector-ISCG and RRRC |

SAVE WATERLAND PLANT TREES FOR NEXT GENERATION

LEGEND:
Woven Bamboo Mat wall
Metal Frame
RCC Post
CGI Sheet
Cement Soaked Geo Textile
Plain Sheet

0 1m 2m

Md. Ismail Hossain
Care & Maintenance Officer
RRRC Office, Cox's Bazar

Muhammad Talut
Deputy Secretary
RRRC Office, Cox's Bazar

## COST ESTIMATION FOR TEMPORARY SAFER SHELTER- CGI ROOFING & CEMENT SOAKED GEOTEXTILE

Rohingya Refugee Response Bangladesh — SHELTER & CCCM SECTOR — Cox's Bazar, Bangladesh

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|---|---|
| **Flooring** | Sand and cement plaster with NCF finishing |
| **Footing** | RCC Precast Post with T Shape |
| **Structure (post) +** | RCC Precast Post |
| **Wall Plate + Rafter + Beam + Purlin** | MS Angle |
| **Walling** | Bamboo Mat with Geo textile cement Sheet |
| **Roofing** | CGI Sheet with geo textile cement sheet and MS angle frame |

### BoQ - CGI ROOFING & CEMENT SOAKED GEOTEXTILE 150 Sq-ft

| SL No. | Items | Size/Specification | Location /Item | Unit | Quantity |
|---|---|---|---|---|---|
| **Substructure:** | | | | | |
| 1 | Earth Excavation | Earthwork in excavation of foundation trenches, including layout, by excavating earth to the lines, grades and elevation as shown in the drawing providing center lines, local bench mark pillars, fixing bamboo spikes and marking layout with chalk powder filling baskets, carrying and disposing of all excavated materials at a safe distance designated by the E-I-C in all types of soils except rocky, gravelly, slushy or organic soil, leveling, ramming, dressing and preparing the base, etc. all complete for an initial excavation depth of 2m and an initial lead not exceeding 20m, including arranging all necessary tools and equipment at work site, etc. complete as per direction of the E-I-C. | Footing | cft | 46.89 |
| 2 | Precast RCC Post | Supplying, fitting & fixing of Precast Reinforced Cement Concrete Post size-5" x 5" x 10'- 6" (T -Shape) - including 5nos clamp (cement PCC: coarse sand FM-1.2:Aggregate first class brick chips 20mm down graded) LAA value not exceeding 30, including shuttering, mixing by concrete mixer machine, casting, laying compacting, curing for the requisite period etc. all complete as per design, drawing, specification and direction of the E-I- C.Including the cost of reinforcement. Strength of concrete should not be less than 20 MPa (suggested mix proportion 1:1.5:3). | Footing with column | Pcs | 9 |
| 3 | Sand Filling | Sand filling in foundation trenches and plinth with sand having F.M. 0.5 to 0.8 in 150mm layers including leveling, watering and compaction to achieve minimum dry density of 95% with optimum moisture content (Modified proctor test) by ramming each layer up to finished level as per design supplied by the design office only etc. all complete and accepted by theEngineer-in- charge.. | Flooring | cft | 124.95 |
| 4 | Plinth Beam | Supplying, making of plinth beam -8" x 10" x L -(cement PCC: coarse sand FM-1.2: including shuttering by bamboo slice with polythene sheet, mixing, laying compacting, curing for the requisite period etc. all complete as per design, drawing, specification and direction of the E-I-C. (suggested Cement :sand mix proportion 1:8). | Plinth Beam | cft | 27.39 |
| 5 | Plaster work 25mm with NCF finishing | Minimum 25mm thick cement plaster (1:4) & neat cement finishing with Portland Composite cement (CEM II/AM, 42.5N) and best quality sand (minimum FM1.2) to dado, Plinth Floor or any where directed with neat cement finishing in/c washing of sand, racking out joint and picking up cement morter i/c finishing the edges and corners and curing for the requisite period etc. all complete as per direction of the E-I-C. | Flooring | sft | 150 |
| **Superstructure:** | | | | | |
| 6 | Geo Textile with cement mix sheet | Supplying, fitting & fixing of Geo Textile with cement mix sheet (cement PCC, 300gsm geo textile) including mixing with water & cement, water:cement ratio: 1:1.5, soaking period 25 miniutes, laying/fixixg with botom ot roof CGI sheet and bamboo mat, curing for the requisite period etc. all complete as per design, drawing, specification and direction of the E-I-C. | Walling & Roofing | sft | 1152 |
| 7 | Woven Bamboo Mat | Supplying, fitting & fixing of Single Layer woven muli bamboo mat including Labor all complete as per design, drawing, speccification and direction of the E-I-C. | Walling | sft | 364 |
| 8 | Tarpaulin | Supply,Fitting & fixing of Tarpaulin Size: Width 4 m ± 1% net width,Length 6m minimum net length, Weight: 200g/m² ± 20g under ISO 3801 (equivalent to 180g/m² minimum to 210g/m² maximum. Colour: White sun reflective on both sides of the sheet. Grey coating on the outside of the bands. Inner black fibres to ensure opacity.Need to follow Red cross approved specification. | Walling | pcs | 2 |
| 9 | CGI Color Sheet | Supplying, fitting and fixing of CGI Color Sheet 0.32mm thick, corrugated galvanized colour iron sheet (Bangladesh made)having minimum weight 50-53 kg per bundle (2'-6" width 70 – 72 rft long) roofing fitted and fixed on metal purlins with Approximately 13 roofing screws with sealing washer, rubber/m2, Nails, limpet washers, bitumen washers and putty etc. all complete as per design, drawing, speccification and direction of the E-I-C.<br>CGI Color sheet: 7' long, 0.32mm thick | Roofing | sft | 252 |
| 10 | Ridge | Supplying, fitting and fixing of ridge 300mm width 0.32mm thick corrugated galvanized colour iron sheet ridging with 300mm lap on either side fitted and fixed with galvanized bolts and nuts etc. all complete as per design, drawing, speccification and direction of the E-I-C.<br>Ridge: 6' Long, 300mm width, 0.32mm thick | Roofing | pcs | 4 |

| SL No. | Items | Size/Specification | Location /Item | Unit | Quantity |
|---|---|---|---|---|---|
| 11 | MS Angle | Supplying, fitting & fixing of MS Angle with nut bolt connection joint including fabrication and conforming to ASTM A36, with a minimum yield strength of 250 MPa application of red/grey-oxide primer etc. all complete as per drawing, specification and direction of Engineer-in-charge.<br>MS Angle, L 50mmx50mmx5mm<br>MS Angle, L 40mmx40mmx3mm | wallplate, Rafter and wall & roof purlin | kg | 575 |
| 12 | MS Flat Bar | Supplying, fitting & fixing of MS Flatber including fabrication and conforming to ASTM A36, with a minimum yield strength of 250 MPa application of red/grey-oxide primer etc. all complete as per drawing, specification and direction of Engineer-in-charge.<br>MS Flatber,25mmx3mm | Walling Garenja | kg | 35 |
| 13 | Nut ,Bolt & Washer | Supplying, fitting & fixing of 25mm dia Nut ,50mm long 8mm dia Bolt & 25m dia Washer etc. all complete as per Design, Specification & direction of the E-I-C. | Walling & Roofing | set | 150 |
| 14 | GI wire | Supplying, fitting & fixing of GI wire #18 dia1.00mm thickness | for fixing bamboo | Kg | 8 |
| 15 | Lock | Small durable padlock with 2 keys 40mm width, 30mm height & thickness 13mm | For door locking | Set | 1 |
| 16 | Door | Door(Double Shutter-Size: 3'-4" x 7'): Supplying, fitting and fixing door as per design angle frame, plain sheet shutter with fixing 6 nos. of 100mm size iron hinges and 200mm long lock with the vertical members of the frame for double leaf shutter, painting all iron & shutter faces both side in 2 coats over a coat of priming with enamel paint of approved colour and quality in/c cutting, sizing, welding for all floors, etc. all complete as per Design, Drawing, Specification & direction of the E-I-C. | Door | Nos | 1 |
| 17 | Window | Window (Double Part, Size:3'-4"x4'-6"): Supplying, fitting and fixing of window angle frame, plain sheet shutter with fixing 100x50mm size 8 nos. of ss hinge, 150mm long ss lock 2 nos, angle frame- Chowkat, Outer frame & inner frame size as per design, with the vertical members of the frame for double leaf 18 gauge MS Plain shutter, including window MS grill, Enamel painting all metal & shutter faces both side in 2 coats of approved colour and quality in/c cutting, sizing, including necessary fixing materials for all floors, etc. all complete as per Design, Specification & direction of the E-I-C. | Window | Nos | 3 |
| 18 | Nail | 1" length, SS type | joints | kg | 1 |
| | | | | | |

# Methodologies & Quality Assurance

| Step | Description of work | Methodology | Quality Assurance method | Remarks |
|---|---|---|---|---|
| 1 | Layout | 1. The site should be cleared from all debris.<br>2. Layout should be provided following the layout plan and site plan.<br>3. bamboo sticks and ropes may be used for demarcation | 1. The layout should be cross-checked to ensure the proper allignment.<br>2. No layout will be provided in high-risk area. | |
| 2 | Column installation | 1. Column should be constructed as per the specification and properly cured for atleast 14 days which will be delivered by the vendor.<br>2. The earth excavation to be done as per the layout plan to install the columns properly. | 1. The columns must be checked while casting & receiving.<br>2. During installation the column should be straight at 90 degree.<br>3. face of the column should be as per the plan. | |
| 3 | Plinth improvement | 1. The plinth is to be dugged along the perifery of the shelter to get a clear 10"X8" size<br>2. Muli bamboo (from shelter waste) made formwork to be laid with single layer polythene inside<br>3. A mix of cement and sand of ratio (1:6) is poured in the formwork and compacted properly. | 1. The earth cutting should be well aligned.<br>2. Ramming should be done properly before laying formwork.<br>3. compaction to be done properly so that no void remains.<br>4. Proper curing has to be done. | |
| 4 | Skeletal element installation | 1. All the angles should be cut as per specification mentioned in the design.<br>2. The joints are to be done by point welding.<br>3. All the metal components should be painted with led-oxide to avoid corrosion. | 1. Safety gears is a must for all the labors during the whole process.<br>2. The welding should be done properly at all the joints. | |
| 5 | Wall installation | 1. The woven bamboo mat is to be prepared as per the dimension mentioned in the drawings.<br>2. Provision for doors and windows should be maintained as per the drawing details.<br>3. The bamboo mat panels can be put in place and tied with the columns by using GI wires.<br>4. The geotextile sheet needs to be cut in size depending on the size of each wall.<br>5. Tarpaulin are to be put on the outer part of the mat and tied properly.<br>6. The geotextile sheets are to be soaked in cement slurry comprising of Cement and water at 1.5:1 ratio for 25 mins.<br>7. The soaked geotextile sheet are to be put on mats on both sides and tied with GI wire. | 1. While cutting the geotextile it needs to be cutted 4~5" more than the actual panel size to avoid reducing area due to shrinkage.<br>2. The soaking should be carried out for minimum 25 minutes.<br>3. The geotextile sheets should be properly soaked ensuring no dry space.<br>4. while wrapping the bamboo mat the tying with GI wire to be ensured properly to reduce the gap between mat and geotextile sheet after drying.<br>5. Proper curing is a continuous process upto end of construction time, which is 14 days but atleast 7 days curing should be done.<br>6. The labour should use safety gears during installation. | |

| Step | Description of work | Methodology | Quality Assurance method | Remarks |
|---|---|---|---|---|
| 6 | Roof installation | 1. A layer of cement soaked geotextile to be put over the rafters and tied very tightly to avoid sagging.<br>2. The geotextile sheets are to be soaked in cement slurry comprising of Cement and water at 1.5:1 ratio for 25 mins.<br>3. After drying the geotextile sheet for 2~3 days the CGI sheets are to be placed properly above the cement-soaked geotextile sheet and fitted properly with the angles using screws. | 1. While cutting the geotextile it needs to be cutted 4~5" more than the actual panel size to avoid reducing area due to shrinkage.<br>2. The soaking should be carried out for minimum 25 minutes.<br>3. The geotextile sheets should be properly soaked ensuring no dry space.<br>4. All components should be tied properly using GI wire.<br>5. The screws should be placed tightly with caps to avoid any leakage.<br>6. Proper curing is a continuous process upto end of construction time, which is 14 days but atleast 7 days curing should be done.<br>7. The labour should use safety gears during installation. | |
| 7 | Floor making | 1. The earth should be properly compacted by ramming.<br>2. A layer of polythene should be laid on floor.<br>3. A layer of cement sand mixture of ratio 1:4 would be laid on floor at a thickness of 1" and a layer of cement slurry to be put on as neat cement finishing layer. | 1. The compaction should be done properly or else crack may appear after casting.<br>2. Proper curing has to be done. | |