

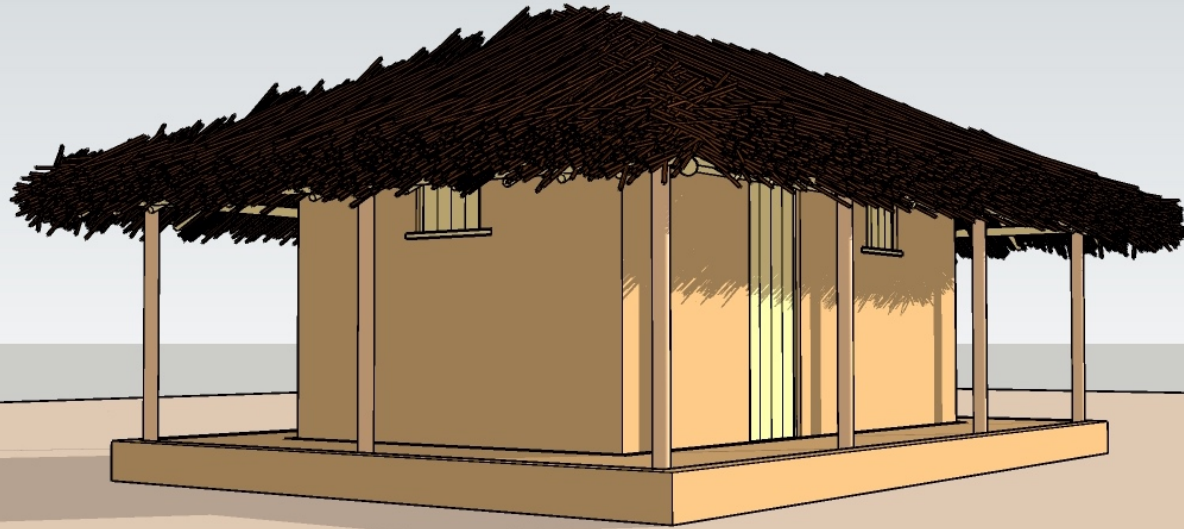


Affordable Housing for Flood Risk and Heavy Rain



Building Back Better



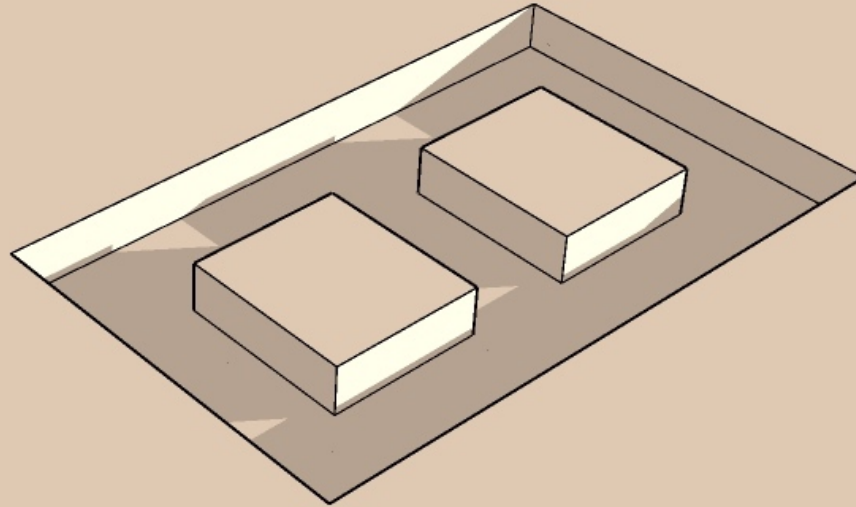


STANDARD DESIGN: THATCHED ROOF



Building Back Better



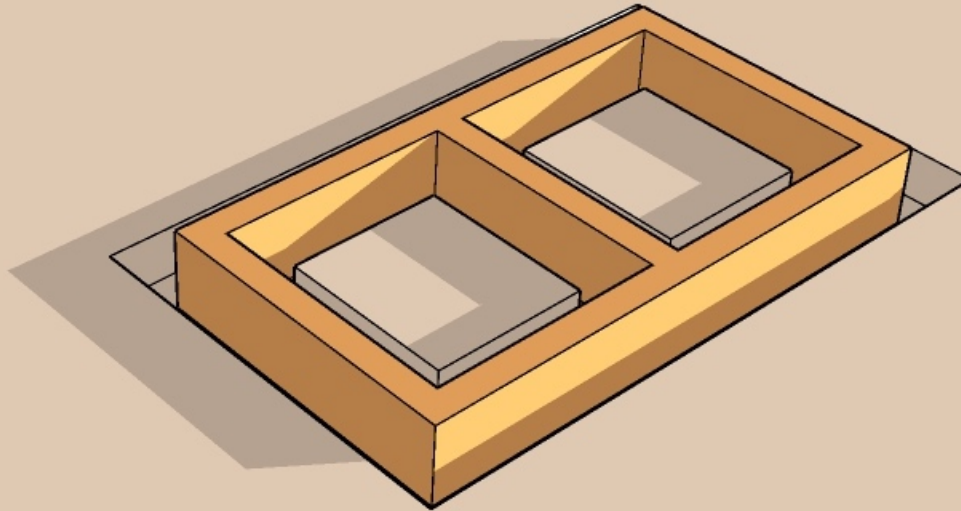


Foundations must be excavated to a depth to achieve the following:

- Firm sub soil base
- No roots
- No made up ground
- **Minimum 50cm deep**

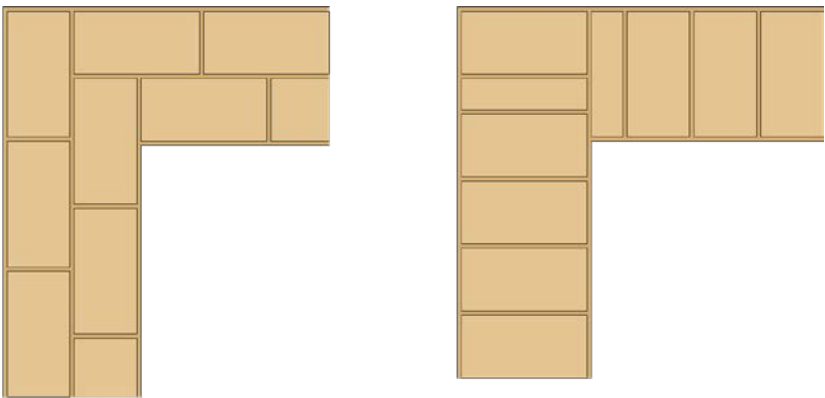


Building Back Better



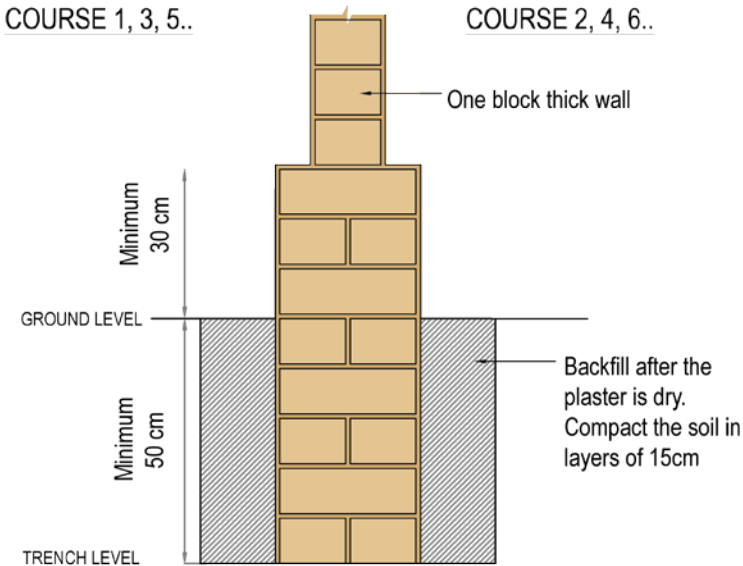
- Foundations walls are **2 blocks wide**.
- Foundation extends **above ground by at least 30 cm**.
- Foundations walls should be constructed to the same standard as walls above ground.
- Care taken to **compact mortar** in all the joints and back fill around the foundation walls by **compacting sub soil** in layers. This reduces the impact of moisture on the blocks.



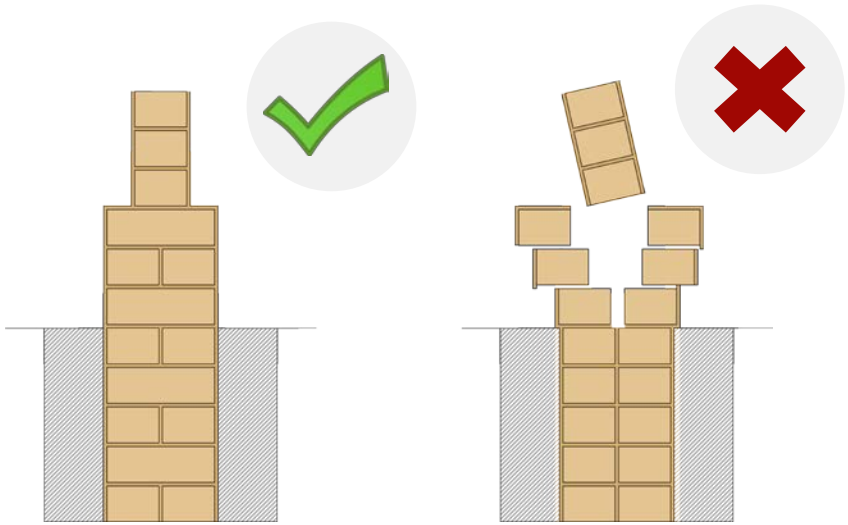


FOUNDATION DETAILS

- The foundation is 2 blocks wide and the wall is 1 block wide
- The blocks should be perpendicular in each layer. If course 1, 3, 5 consists of sleepers, course 2, 4, 6 will consist of headers.



CROSS SECTION



GOOD PRACTICE

Laying courses perpendicular to each other

BAD PRACTICE

Laying courses along the same orientation, the foundation may split under loading

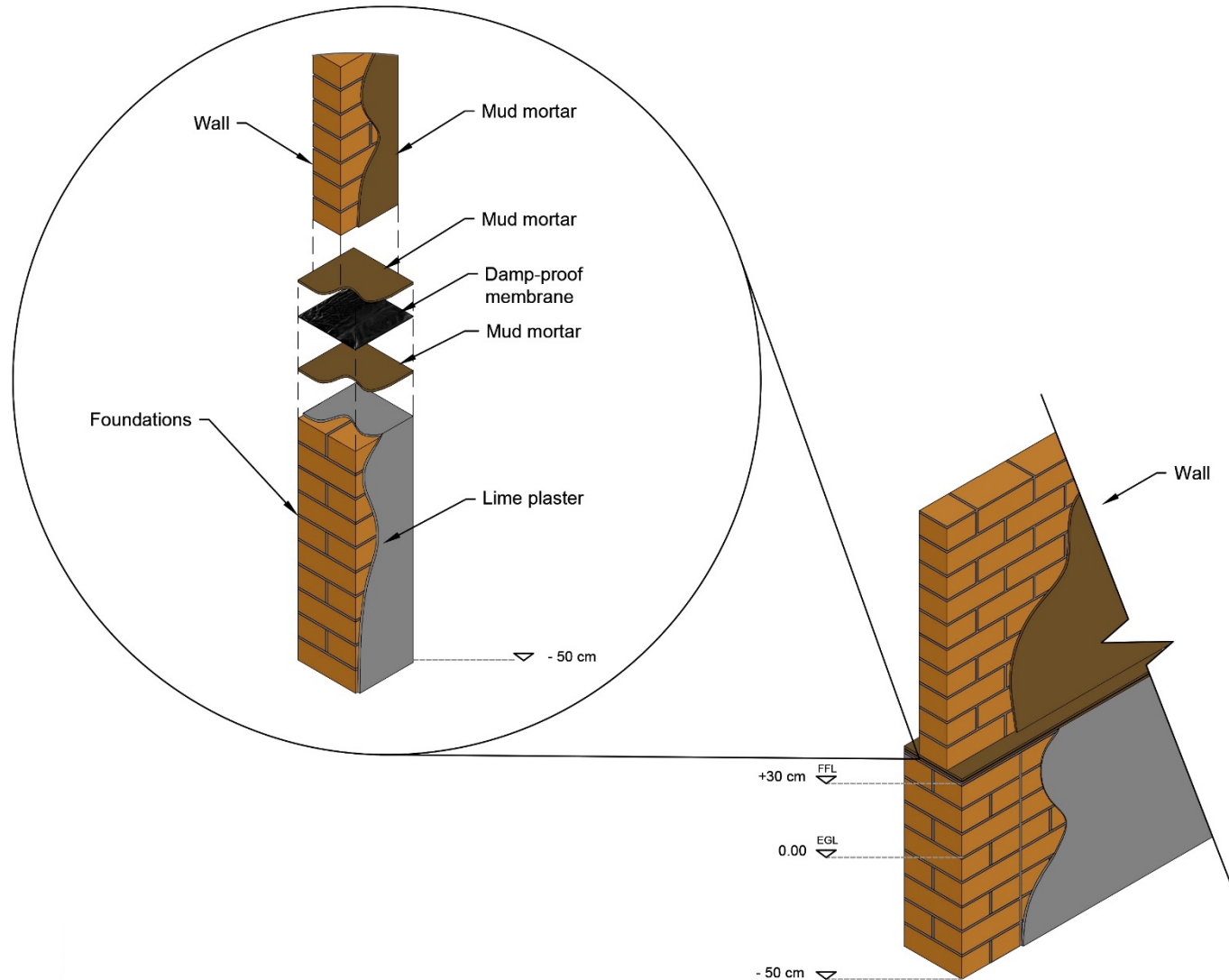


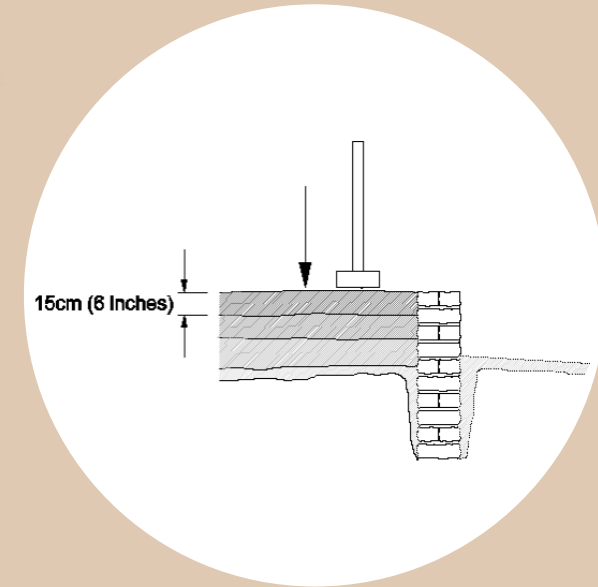
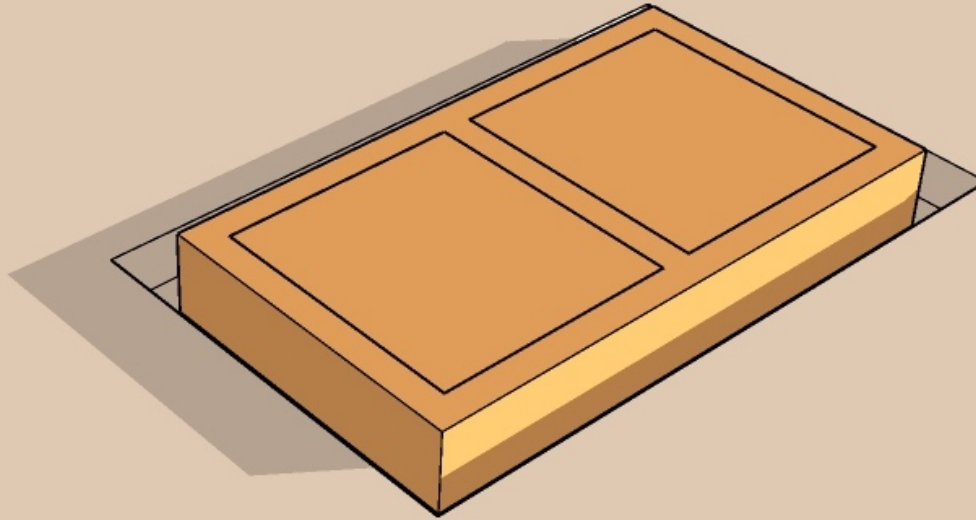
Building Back Better



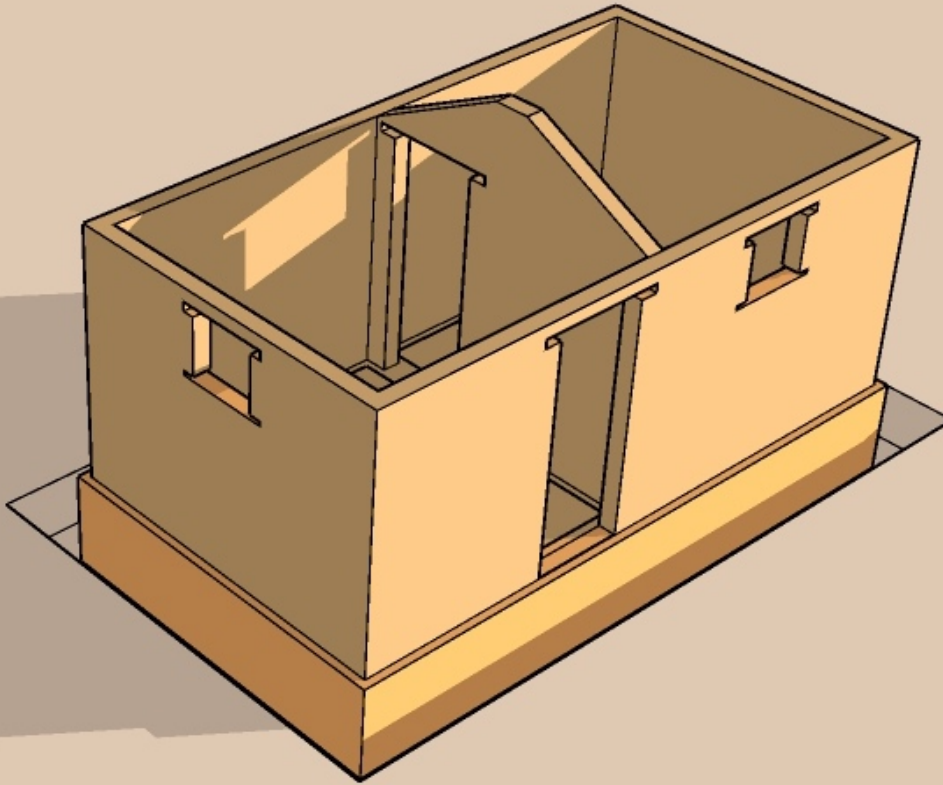
FOUNDATION DETAILS

1. **Lime plaster** around the foundation, including at the top.
2. Allow **3 days** for lime plaster to dry.
3. Add a layer of **mud mortar** above the lime plaster on the top (width of foundation).
4. Put a **DPM** (Damp-proof membrane) above the mud mortar (width of foundation).
5. Add another layer of **mud mortar** on top of the DPM for building wall above (width of the wall).
6. Mud mortar is needed both **below and on top** of DPM so as to minimize the chance of it being damaged by unsmooth surface.
7. Cover the wall with **mud plaster**.



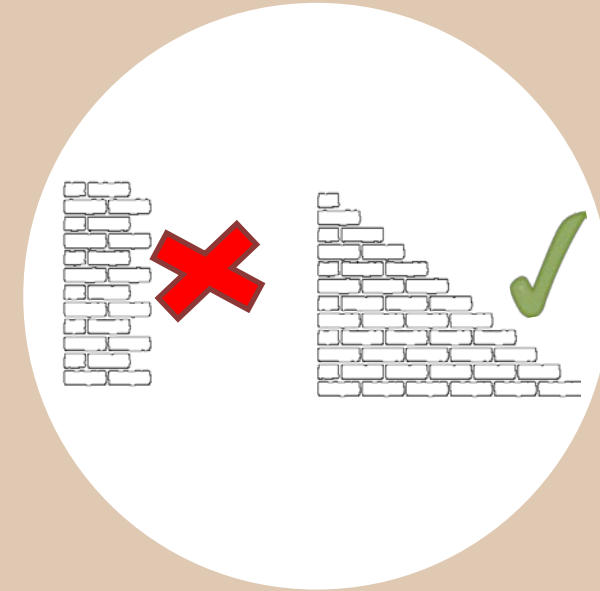
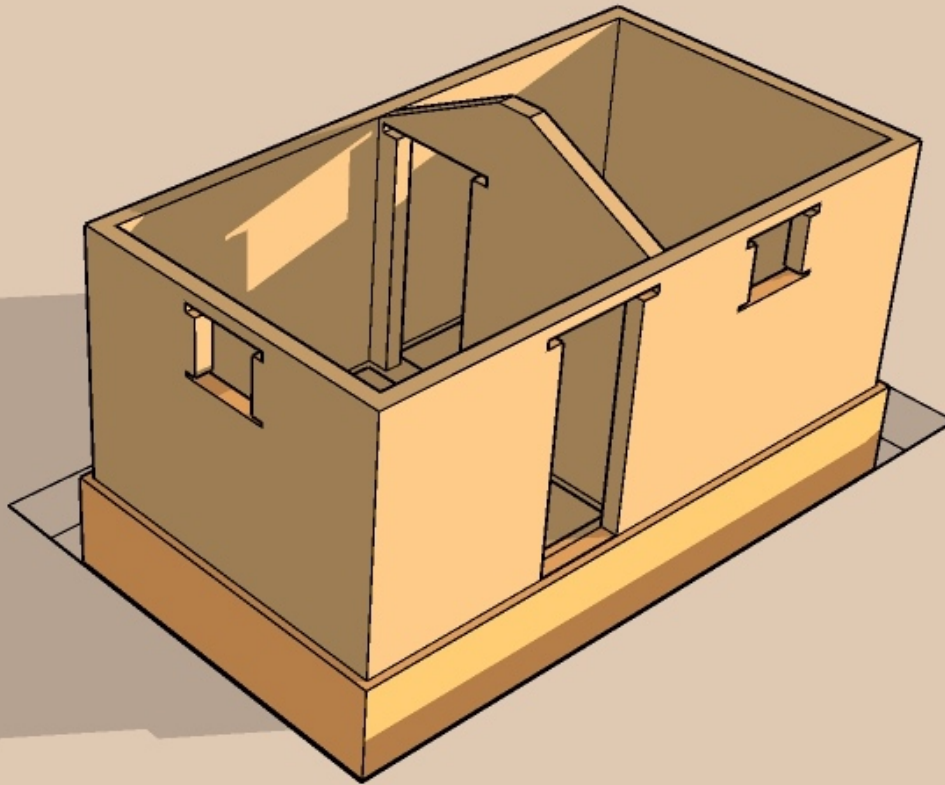


- Fill the base with subsoil and **compact in layers of no more than 15cm.**
- Topsoil or soil with roots and vegetation **should not** be used.



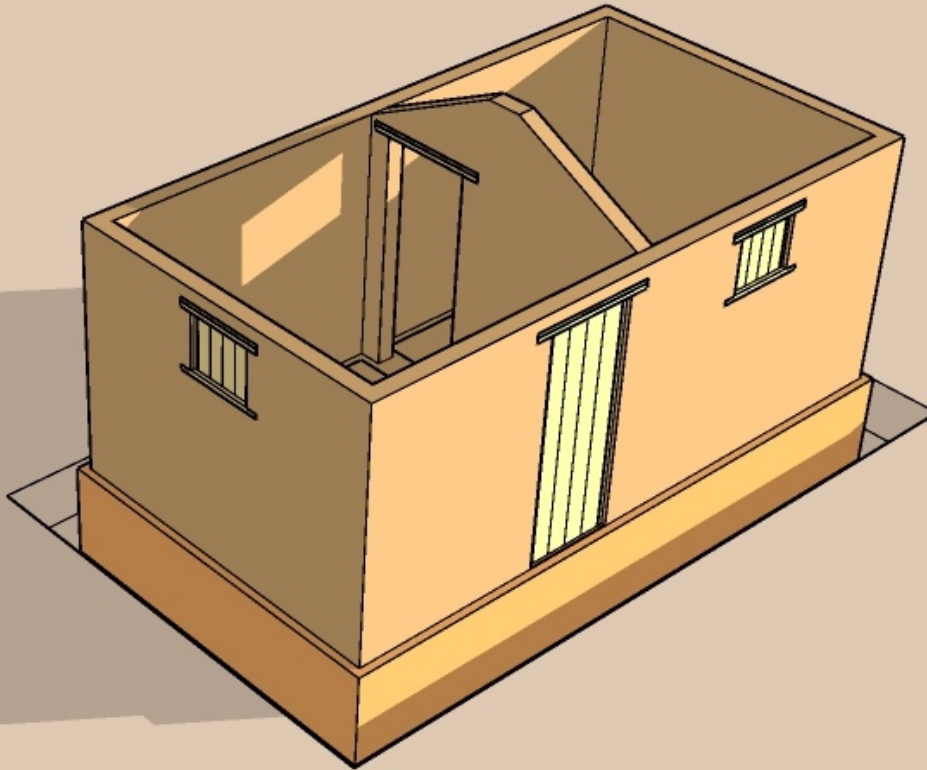
The 1 block thick wall sits in the middle above the foundation centre line





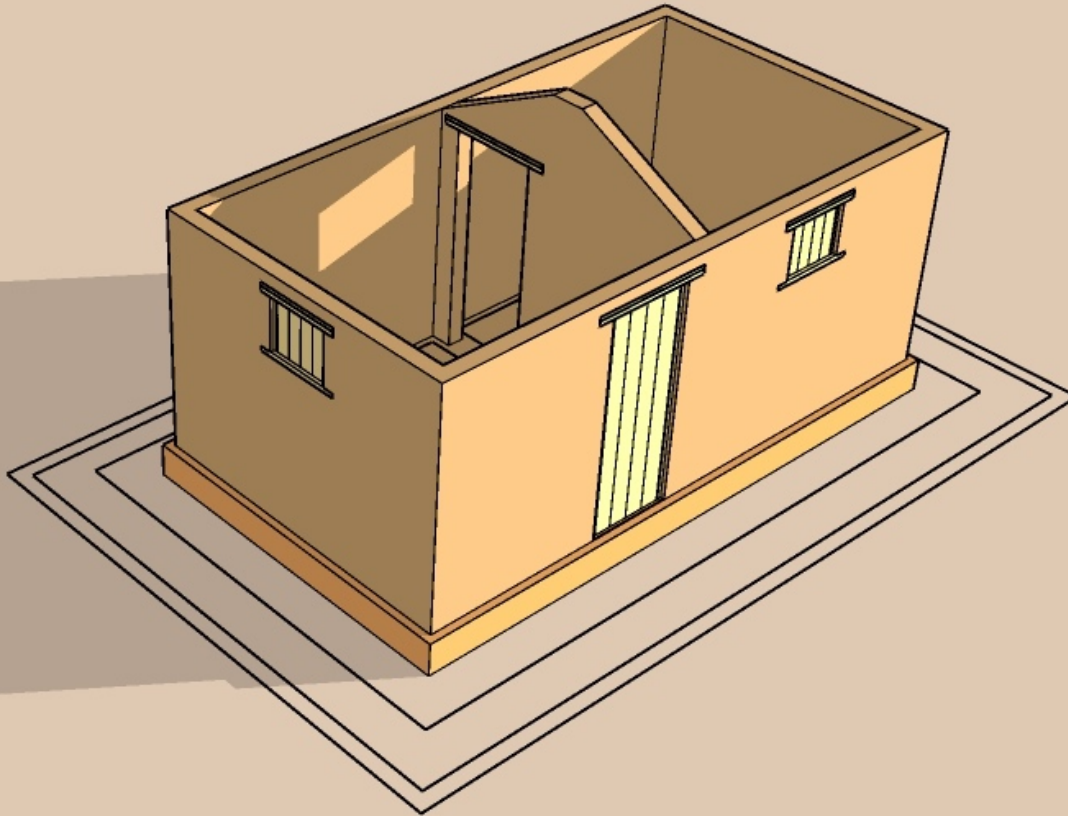
- Walls to be constructed following good practices.
- Corners should be constructed as steps not toothed (as shown above).
- Mortar must be the same quality of soil as used for the brick production.
- All joints must be fully filled with mortar.





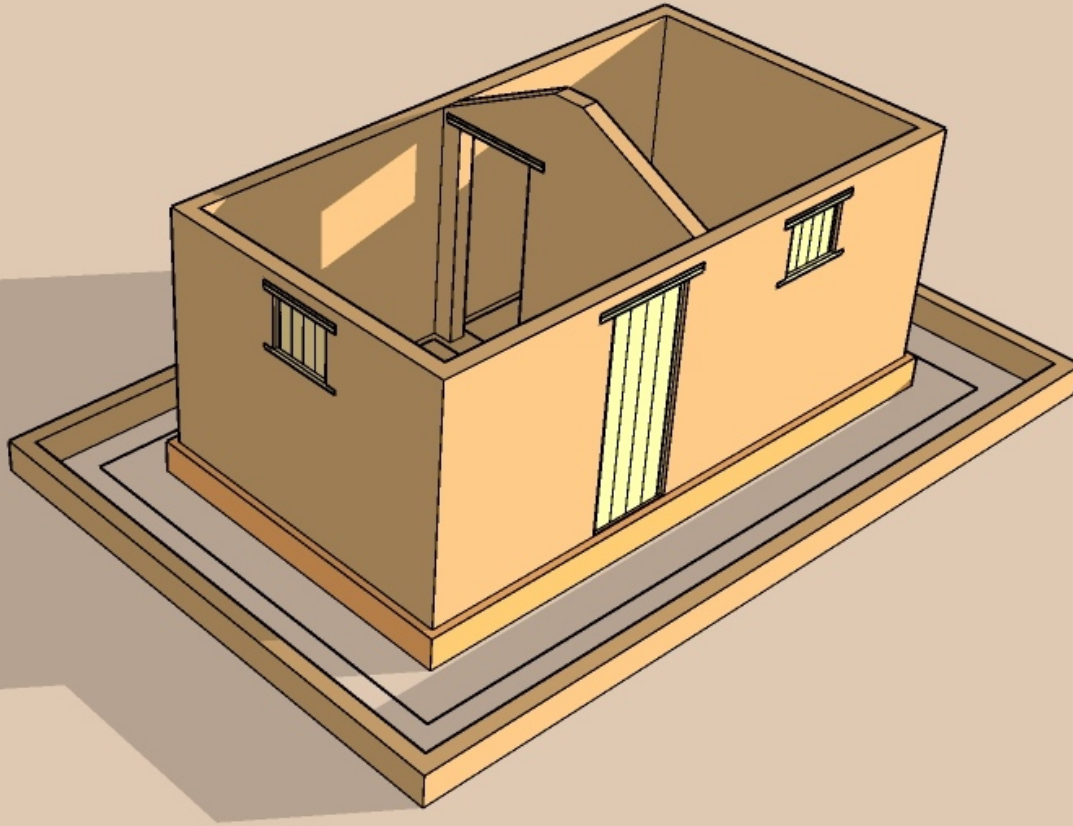
- All doors and windows must have suitable lintels.
- Use 2 poles as lintels, each pole should be minimum 5cm thick.
- The strongest timber should be selected for the lintel above the internal wall opening, as it supports the most load and does not have a door frame underneath.





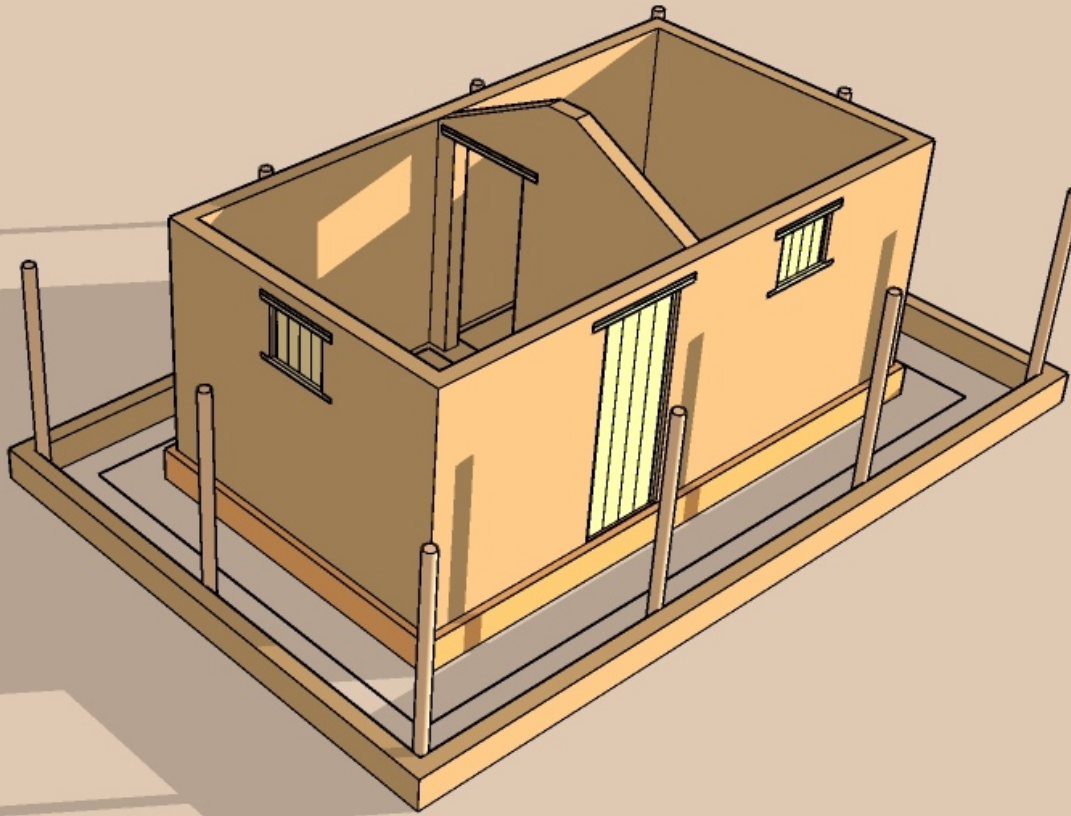
Dig foundation trench for verandah.





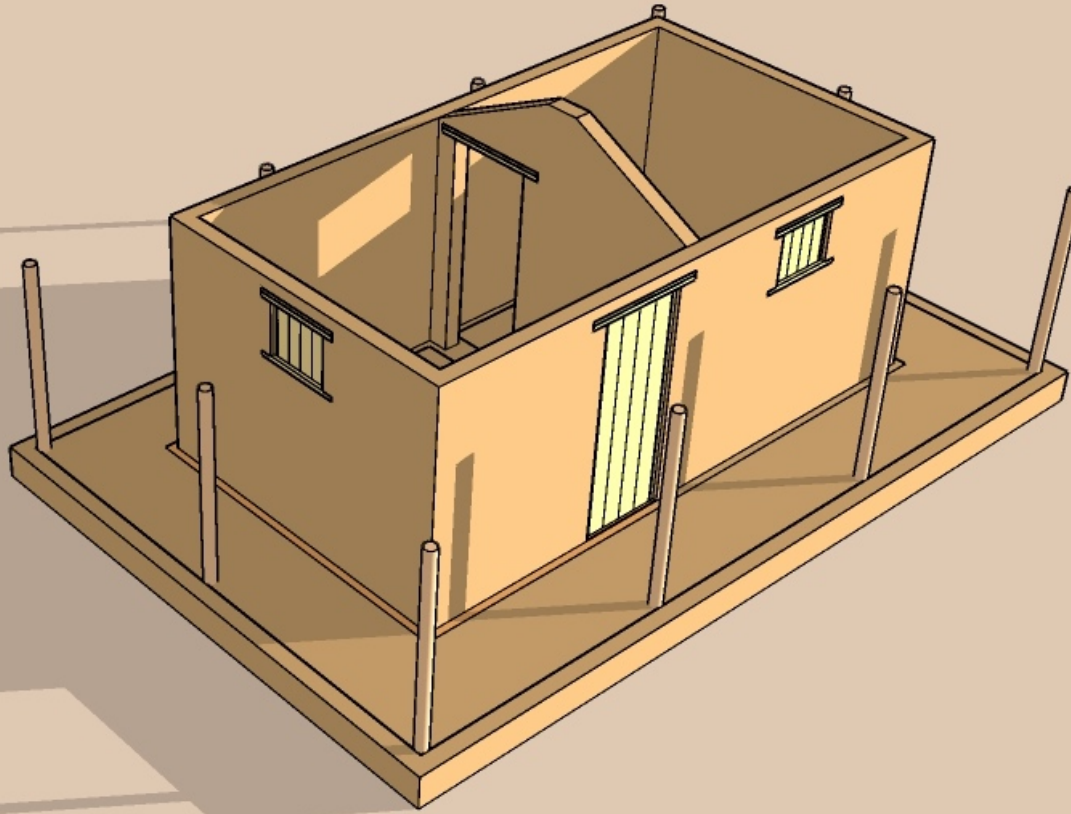
One block thick foundation wall, **minimum 20cm below ground and 30cm above ground level**





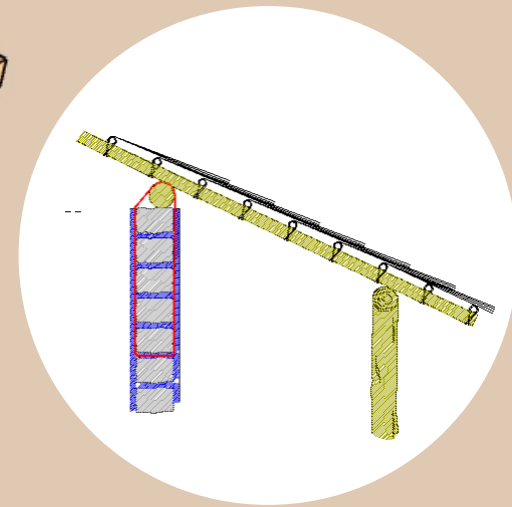
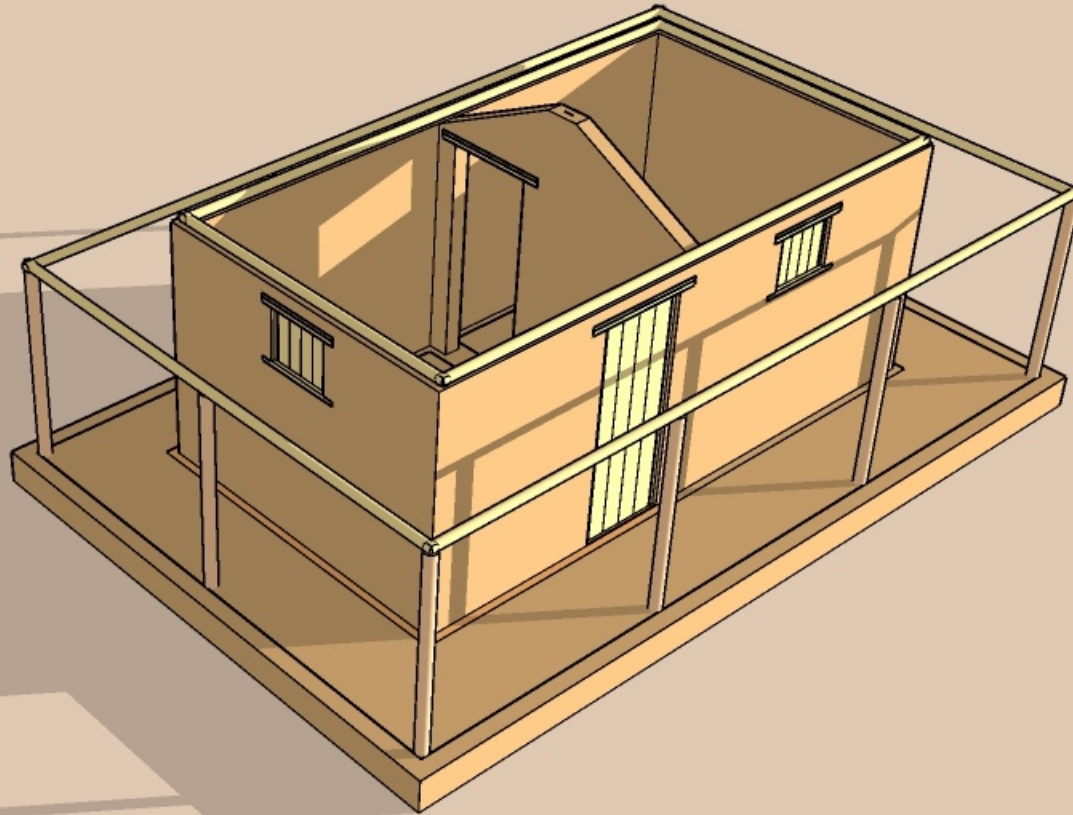
- Blue gum (eucalyptus) posts to be **treated for termite** by heat treatment or termiticides.
- Posts laid **minimum 50cm below ground level**





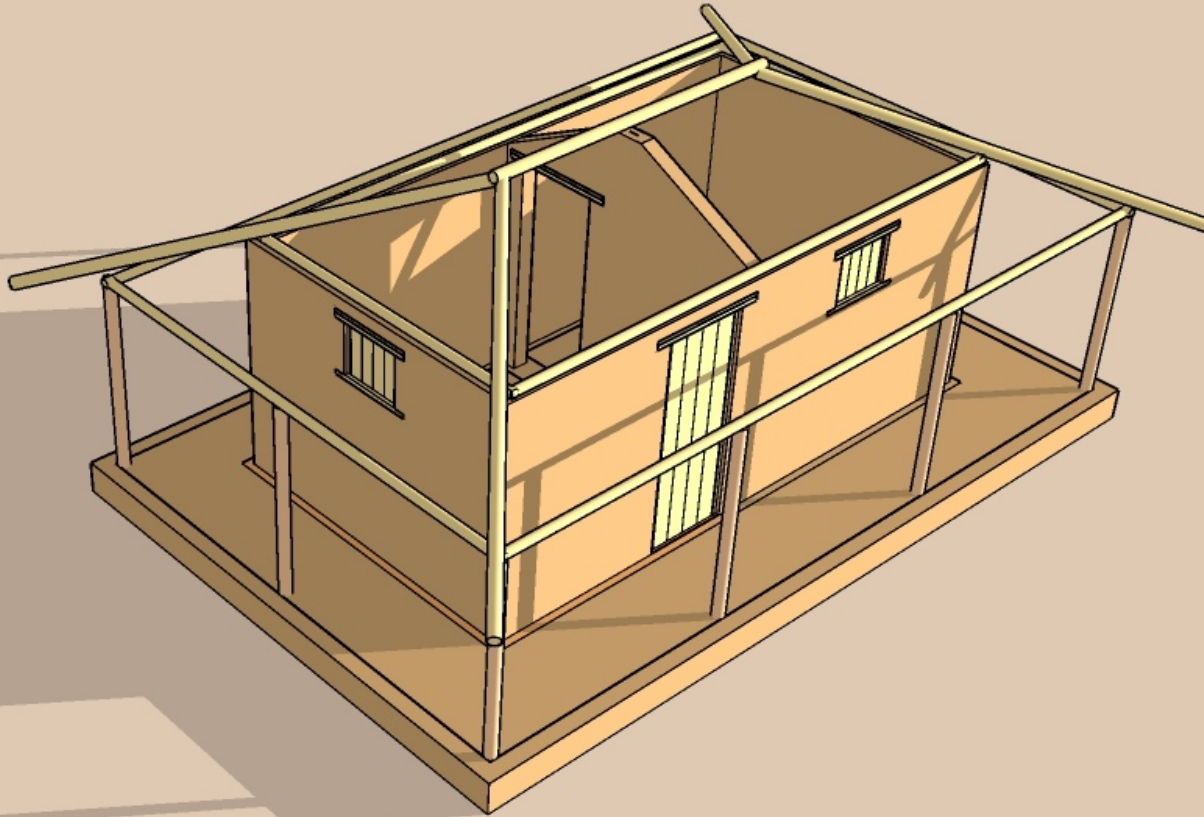
Compacted earth filling for plinth.





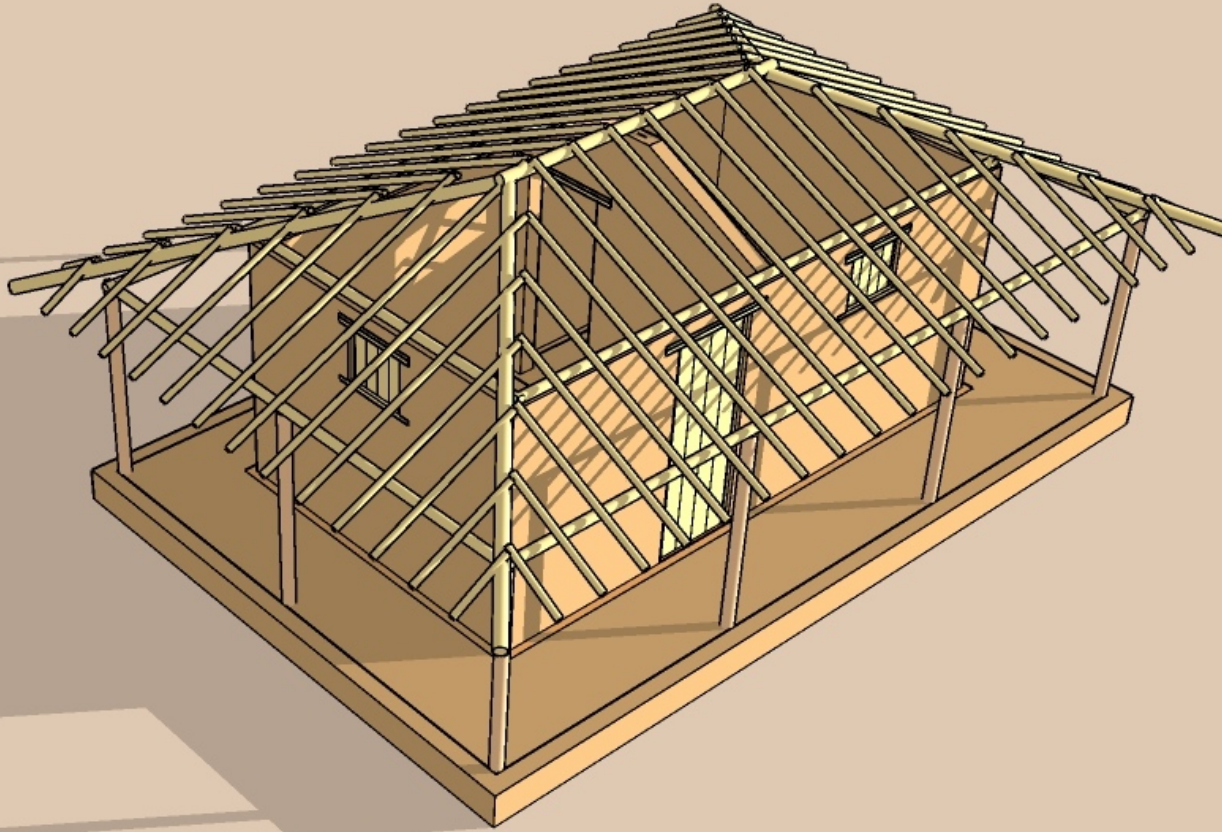
Install wall plates.

- Wall plates to **fitted securely to posts** and wall plate to be **fixed to the walls with tie wire**.
- Check that the **wall plates are level**.
- Timber wall plates to be **treated for termite** by heat treatment or termiticides.

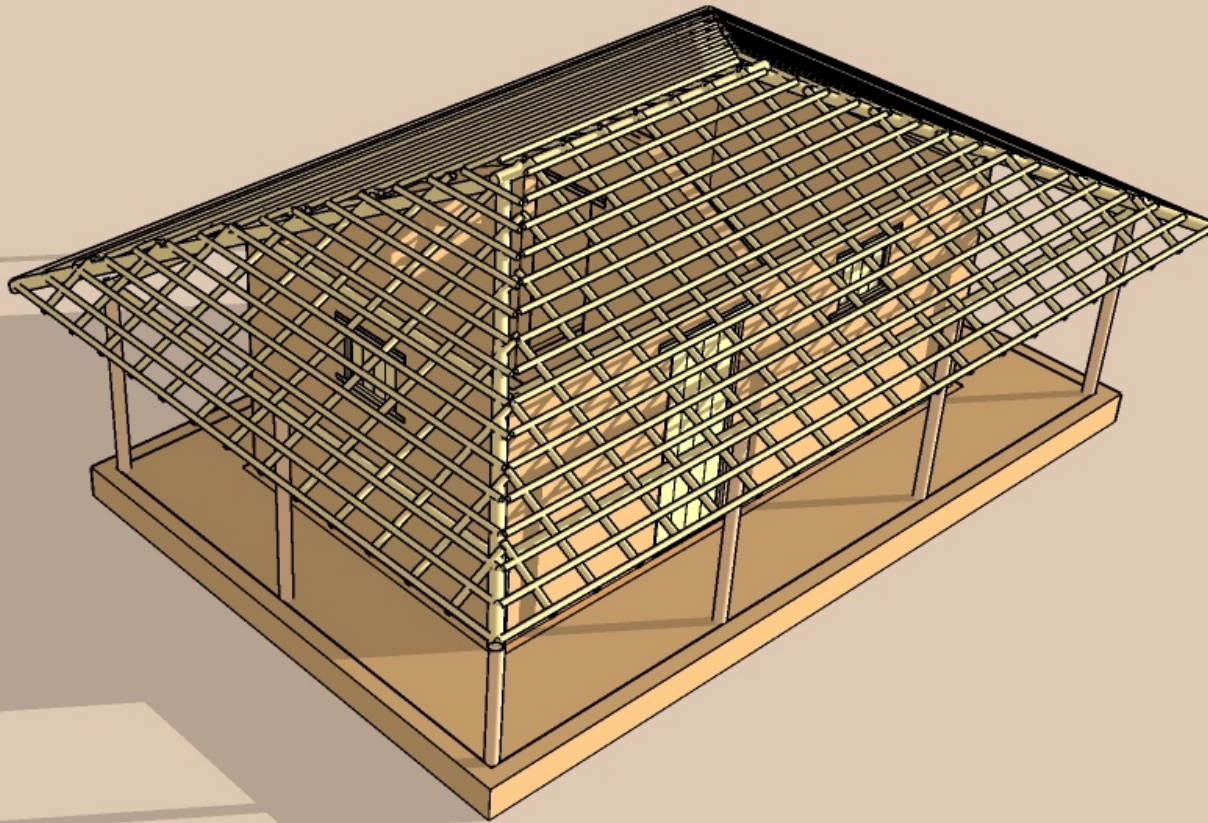


- Ridge and hip beams fitted as shown.
- Select the **strongest piece** of timber for the **ridge beam**.
- The ridge beam to be supported at the top of the internal wall and **fixed in position by tie wire**.





- Rafters fitted as shown.
- Spacing of the rafters depending on the size of the timber or bamboo.

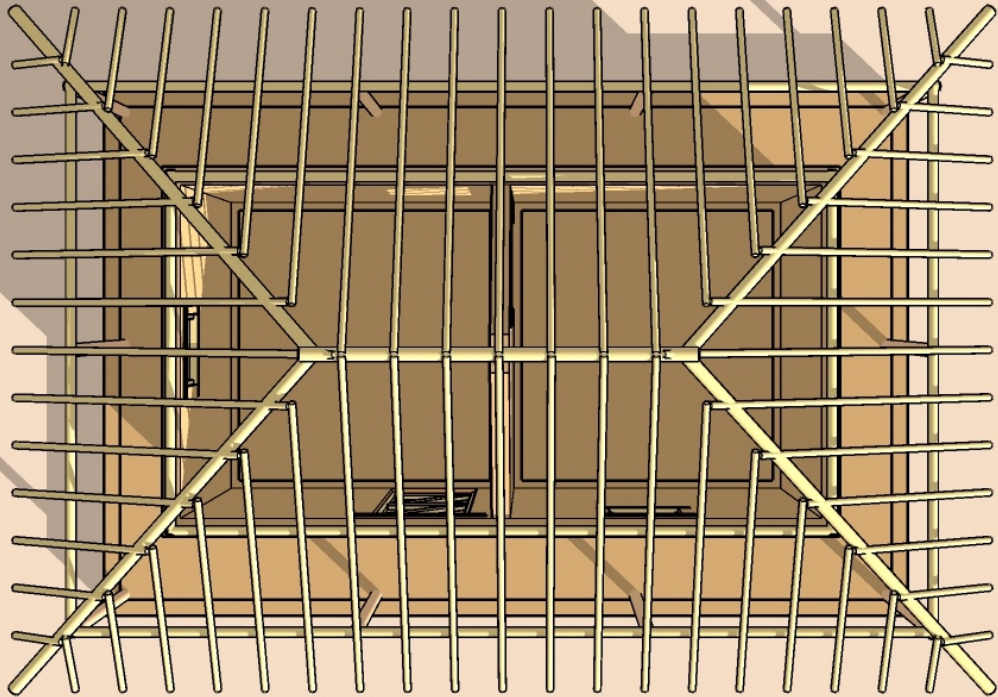


Thatch battens fitted as shown.



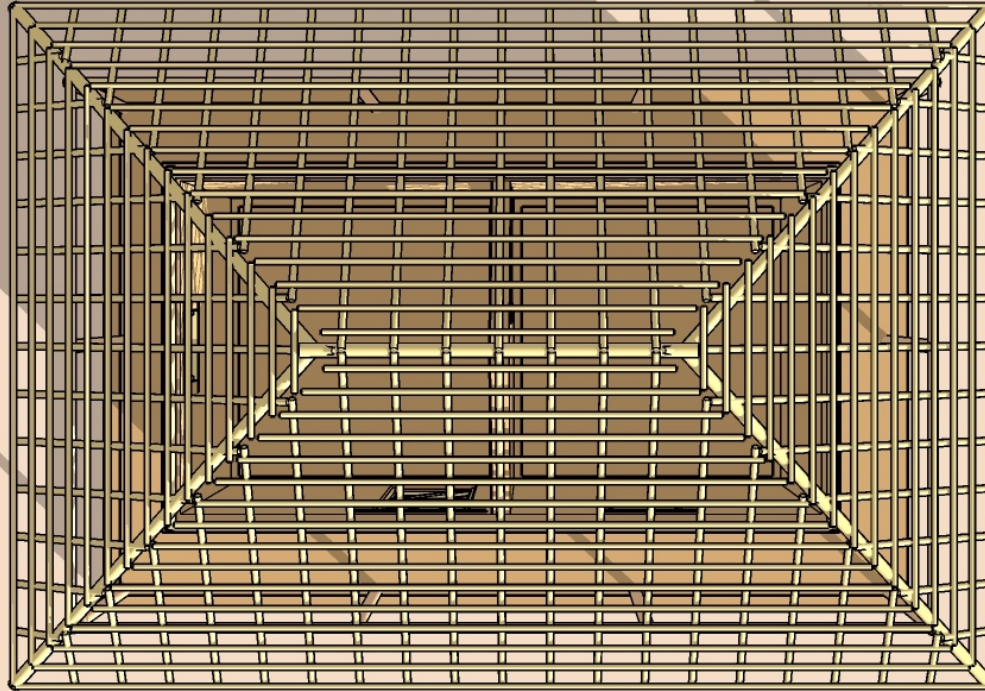
Building Back Better

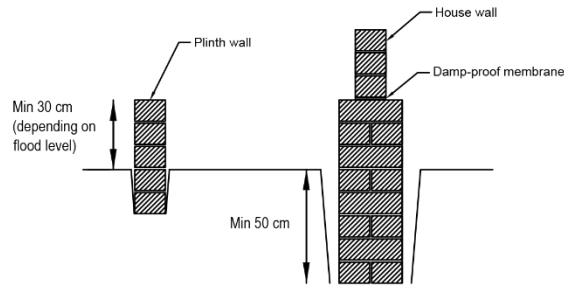
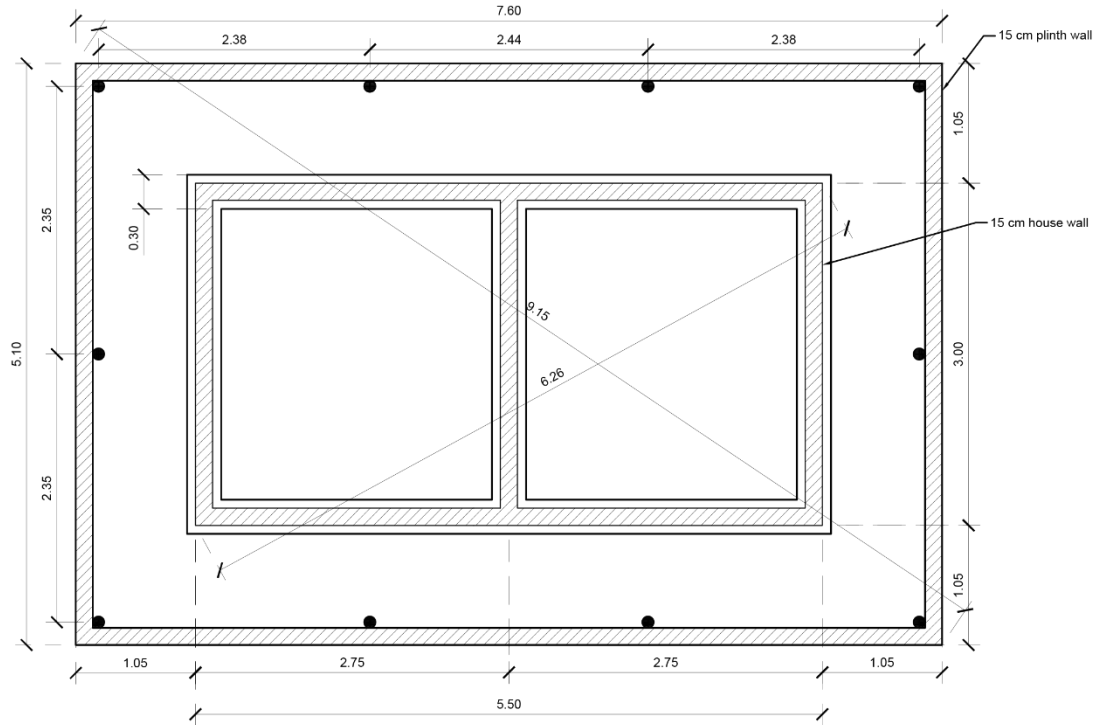





Building Back Better

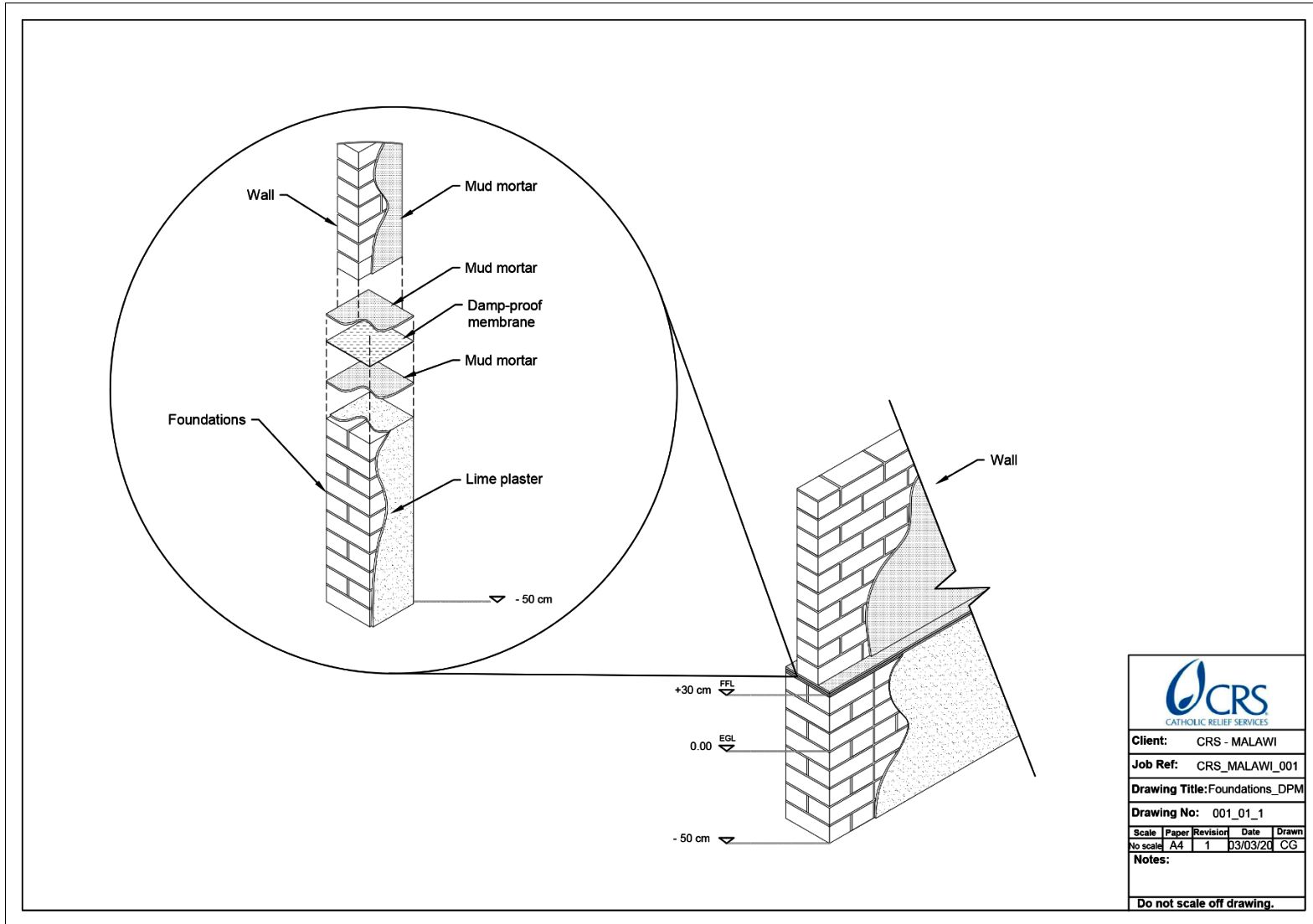


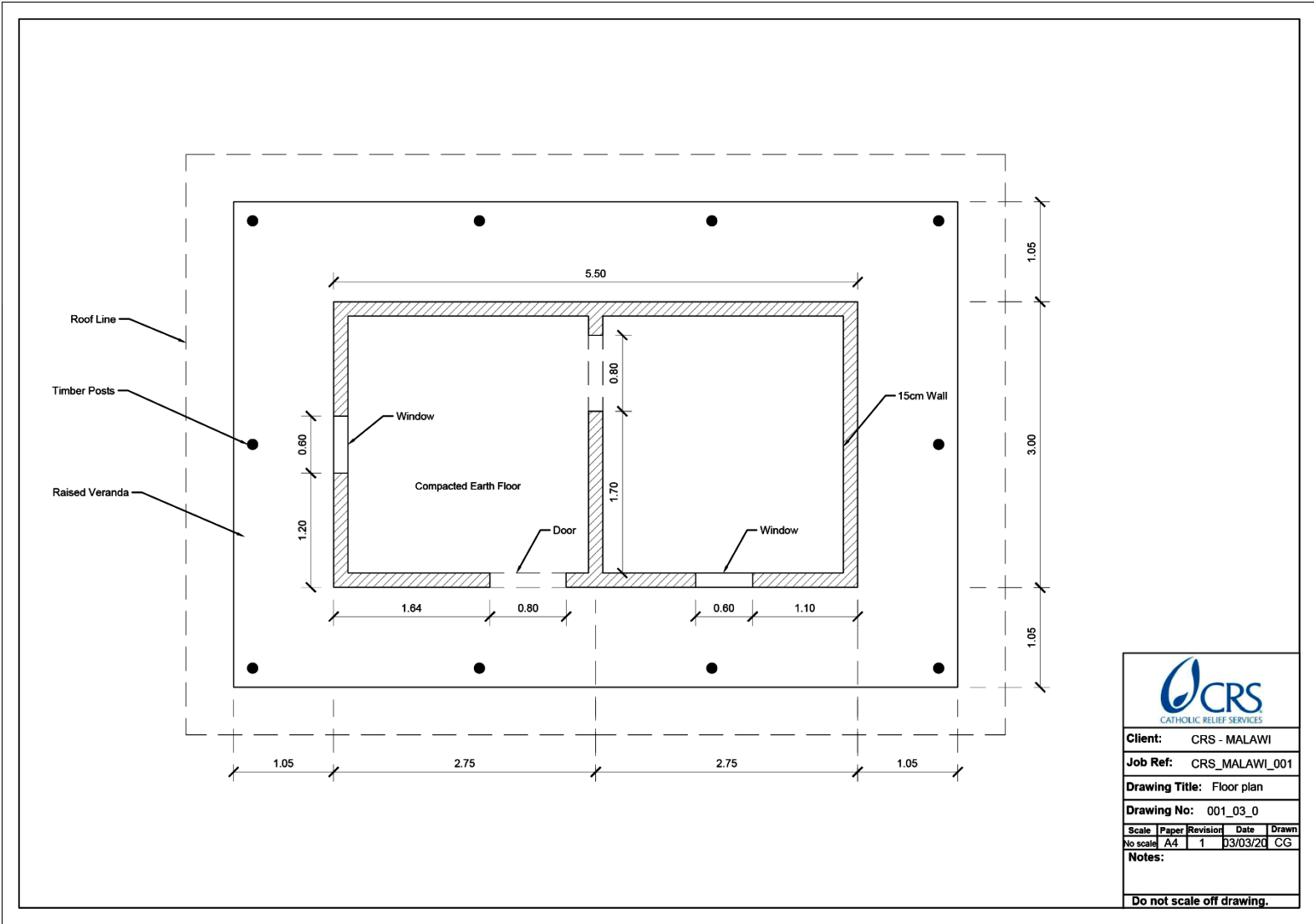




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| Drawing No: 001_01_0 | | | | |
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| Notes: | | | | |
| Do not scale off drawing. | | | | |

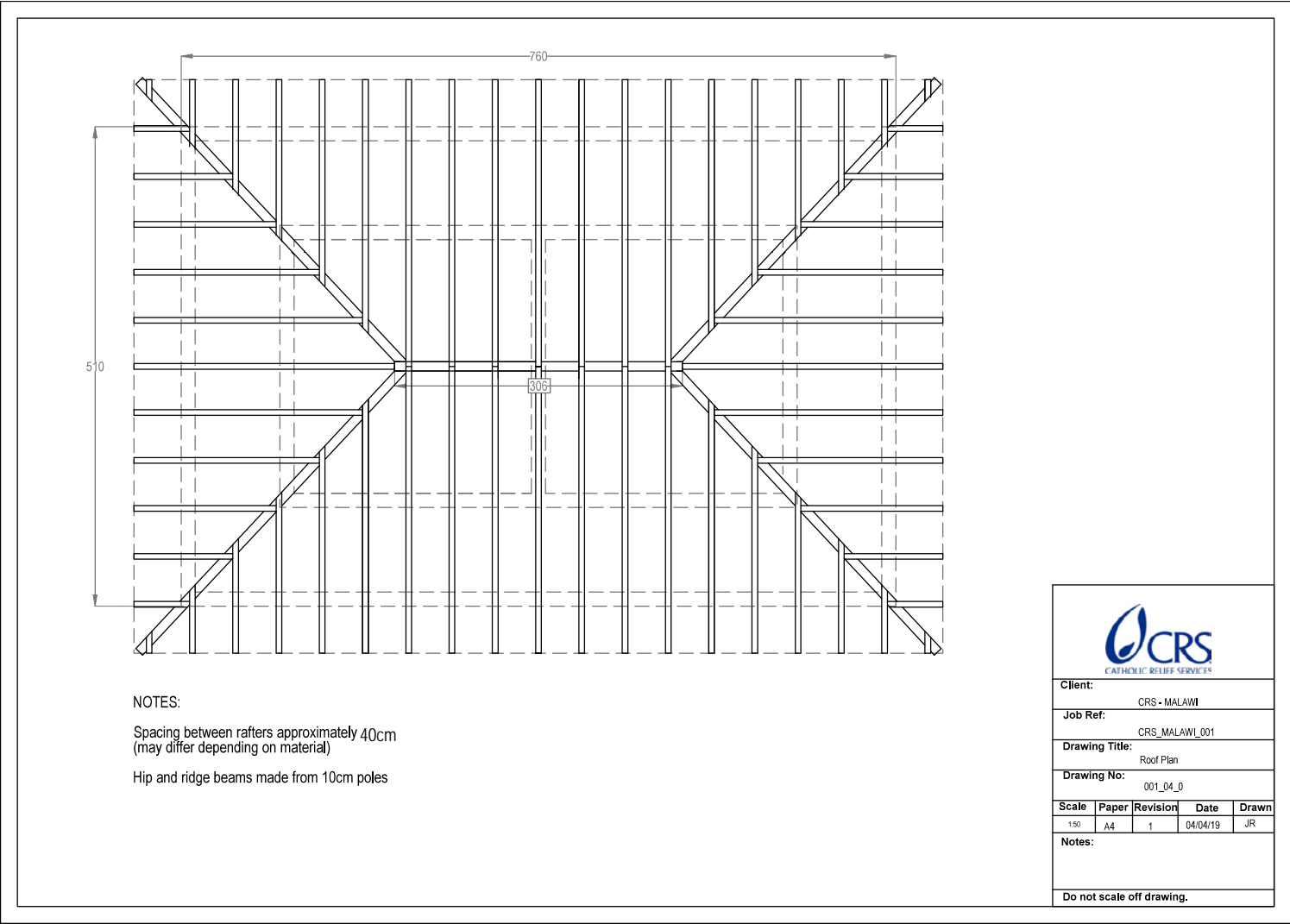






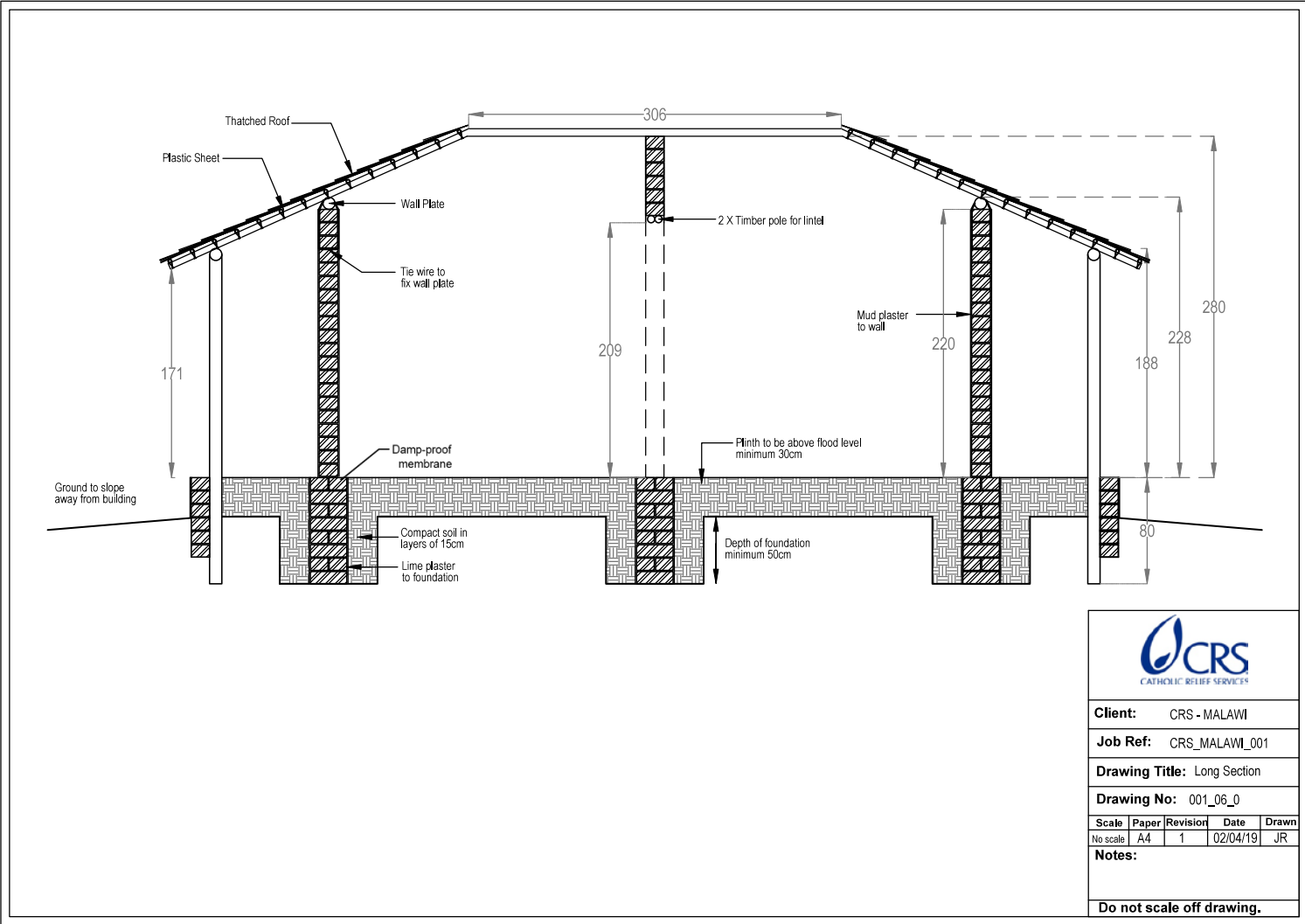
Building Back Better





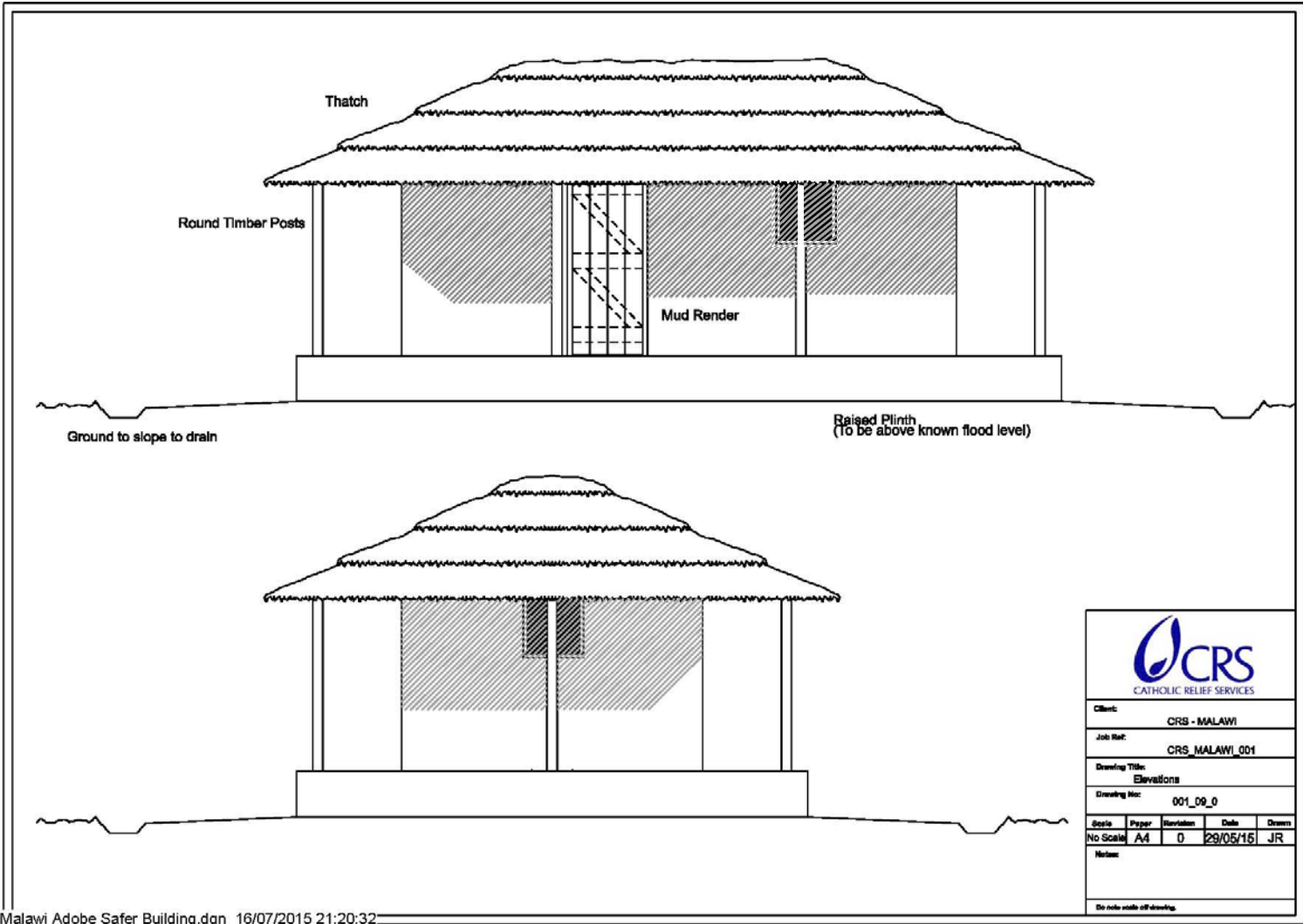
Building Back Better





Building Back Better





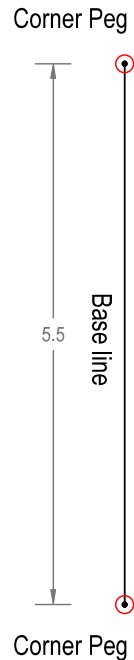
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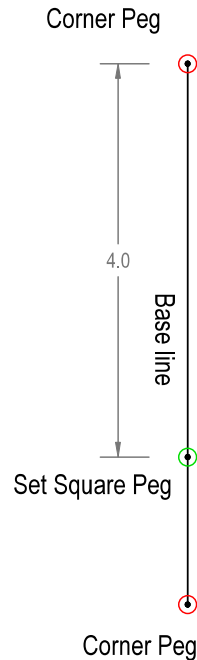
Building Back Better



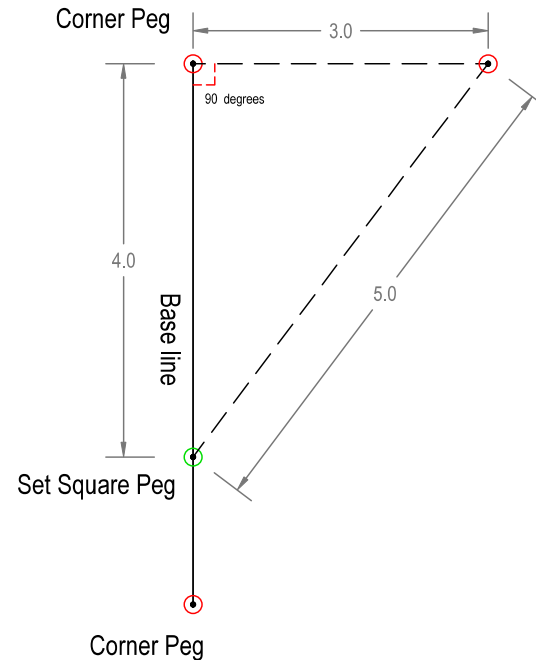
Setting Out by 3-4-5 Method



1. Put in two pegs on the line of the longest wall to mark the 2 corners of the house

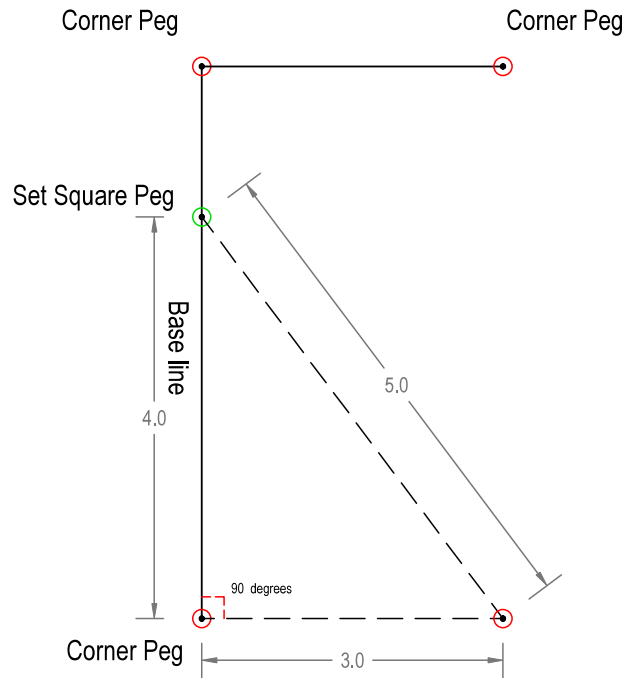


2. From the first corner peg measure 4m and fit in a temporary Set Square Peg with a nail in the top to mark the exact position

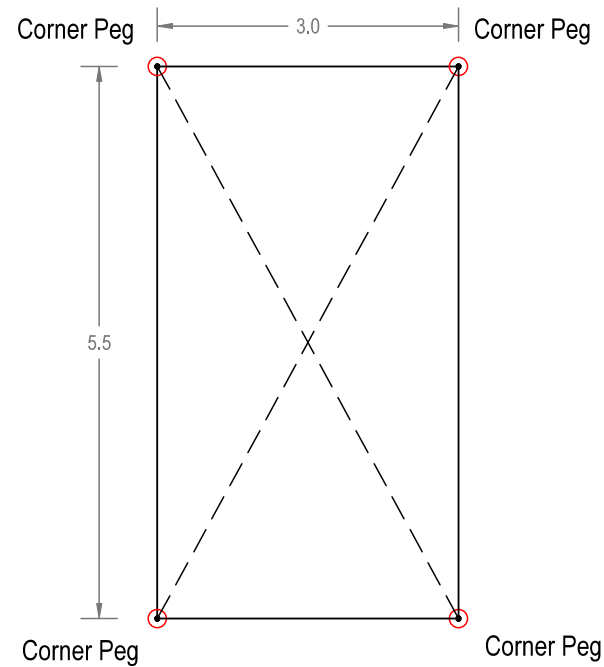


3. Using 2 x tapes or measured lengths of string, find the point where the 5m and 3m length join. Fit a corner peg in this position and mark with a nail the exact position. This is the third corner of the house

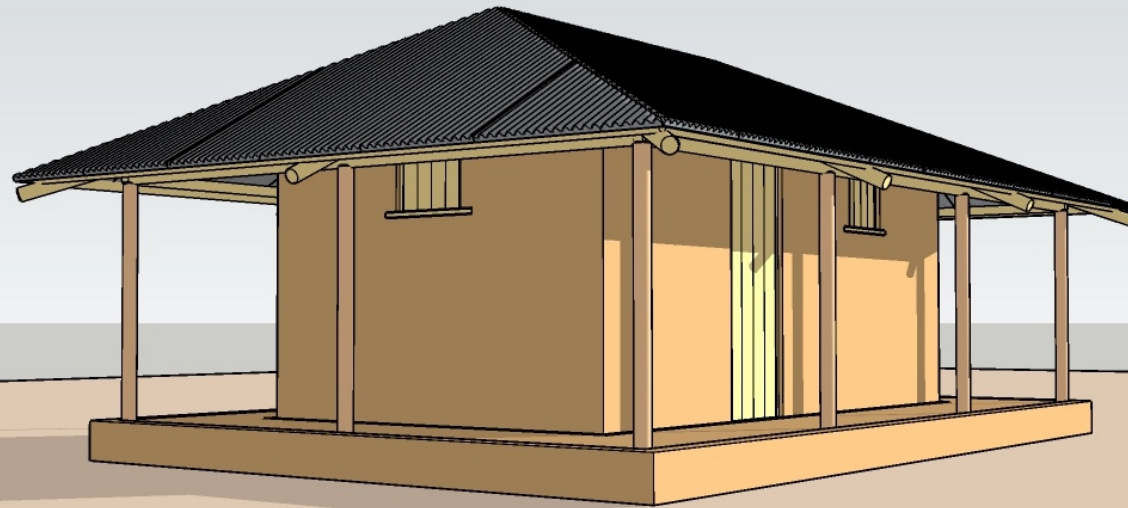
Setting Out by 3-4-5 Method



4. Again use two tapes or measured string to find the position of the last corner peg.



5. Final check the house dimensions to make sure the setting out is accurate. Check the diagonal measures, if the corners are at right angle the measures will be the same.

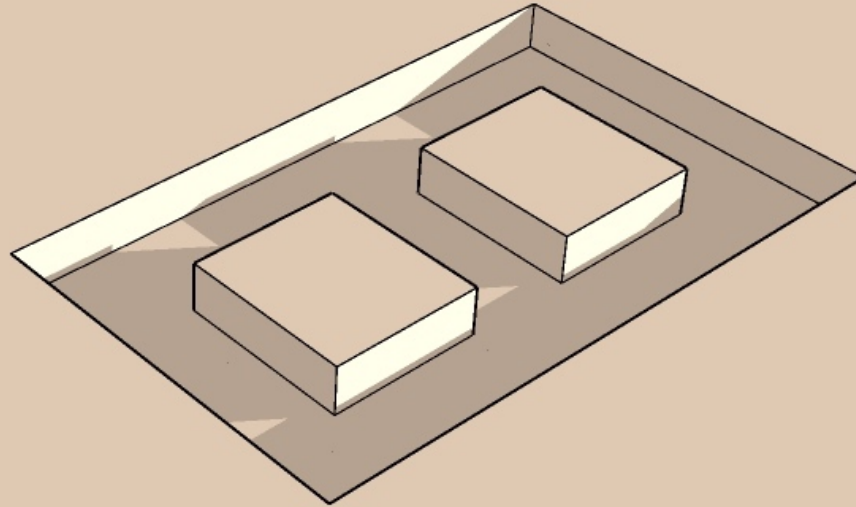


DESIGN FOR SPECIAL CASES: CGI ROOF



Building Back Better



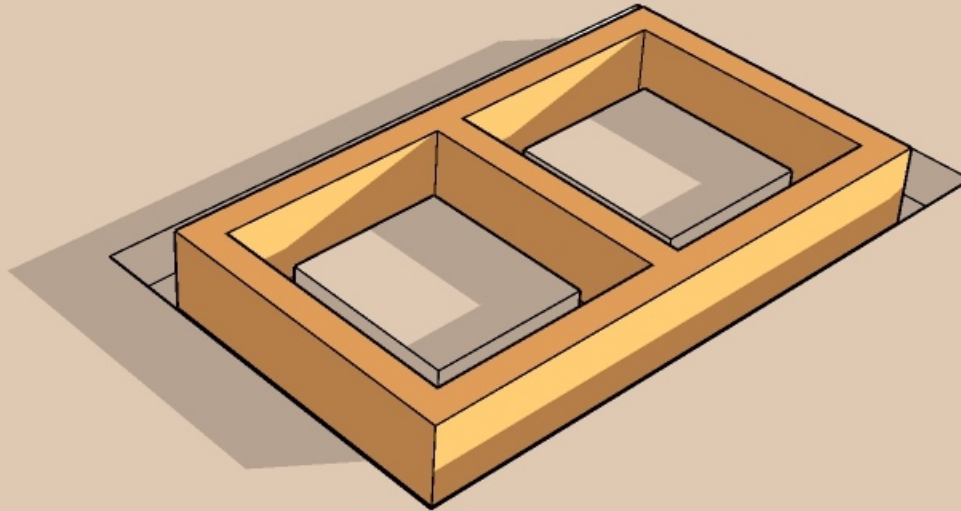


Foundations must be excavated to a depth to achieve the following:

- Firm sub soil base
- No roots
- No made up ground
- **Minimum 50cm deep**

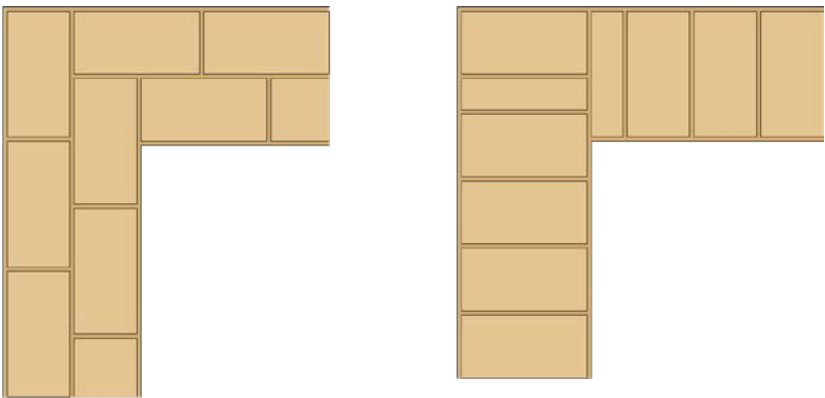


Building Back Better



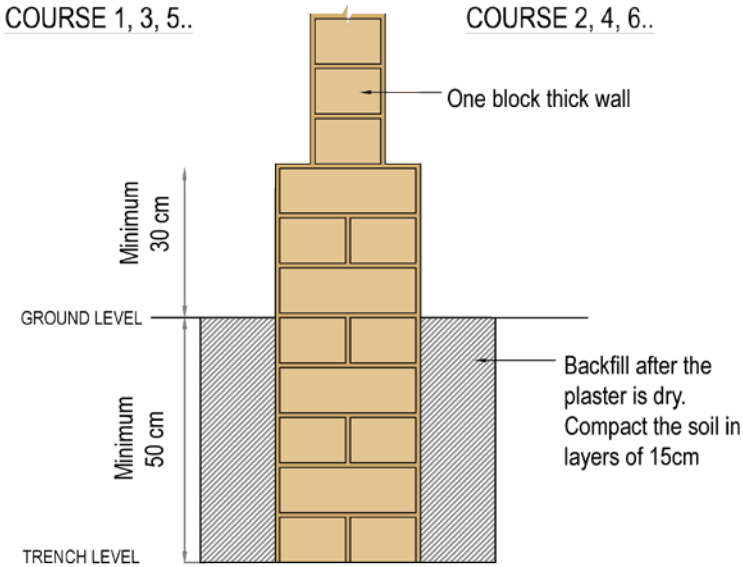
- Foundations walls are **2 blocks wide**.
- Foundation extends **above ground by at least 30 cm**.
- Foundations walls should be constructed to the same standard as walls above ground.
- Care taken to **compact mortar** in all the joints and back fill around the foundation walls by **compacting sub soil** in layers. This reduces the impact of moisture on the blocks.



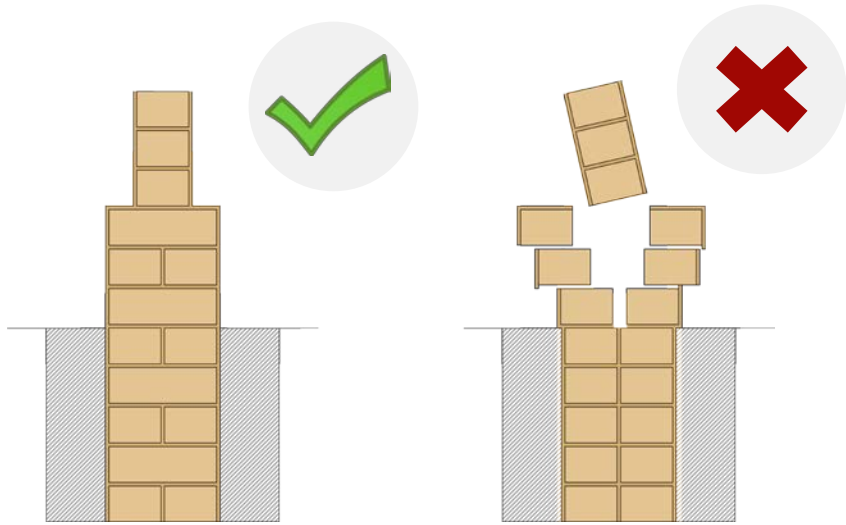


FOUNDATION DETAILS

- The foundation is 2 blocks wide and the wall is 1 block wide
- The blocks should be perpendicular in each layer. If course 1, 3, 5 consists of sleepers, course 2, 4, 6 will consist of headers.



CROSS SECTION



GOOD PRACTICE

Laying courses perpendicular to each other

BAD PRACTICE

Laying courses along the same orientation, the foundation may split under loading

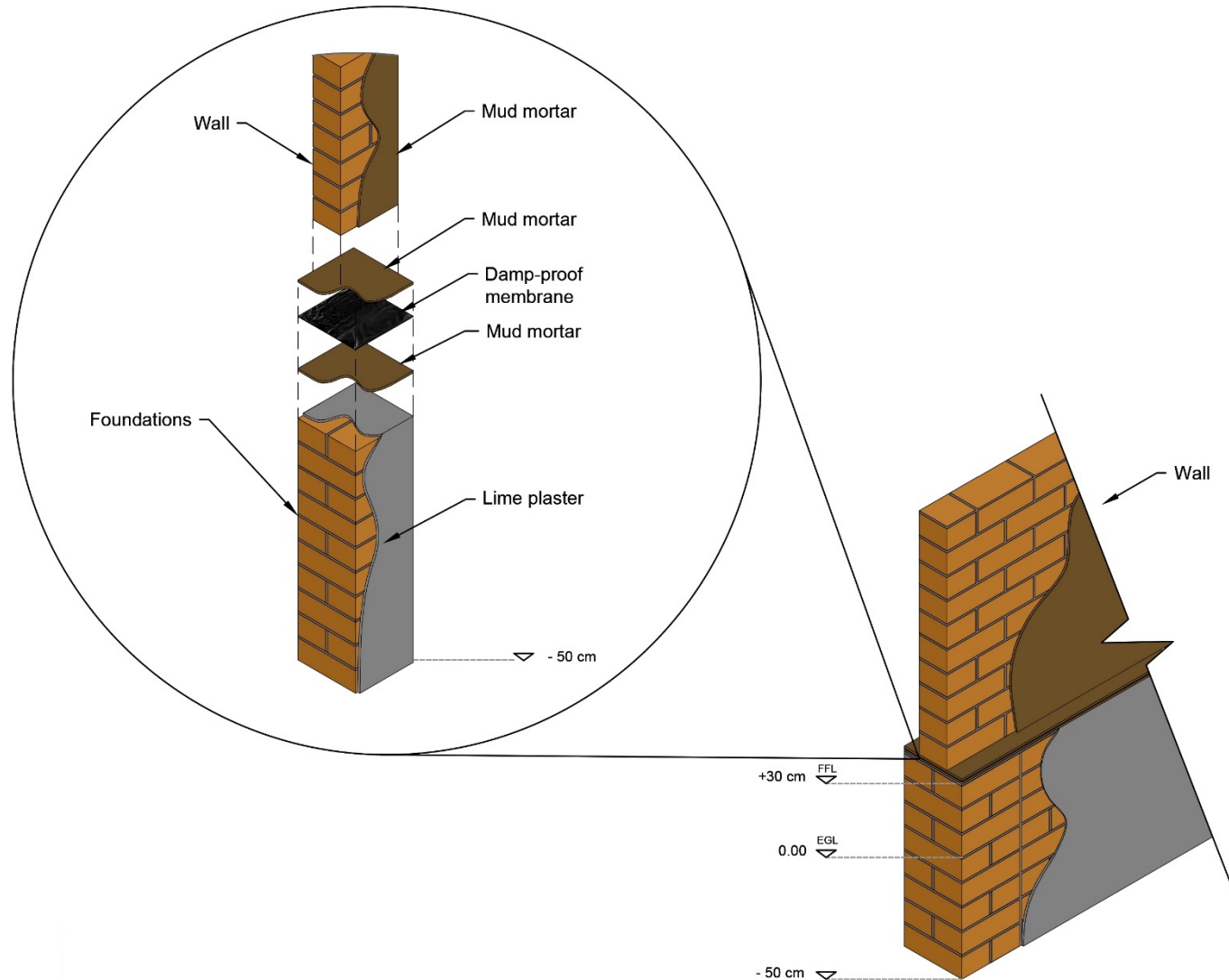


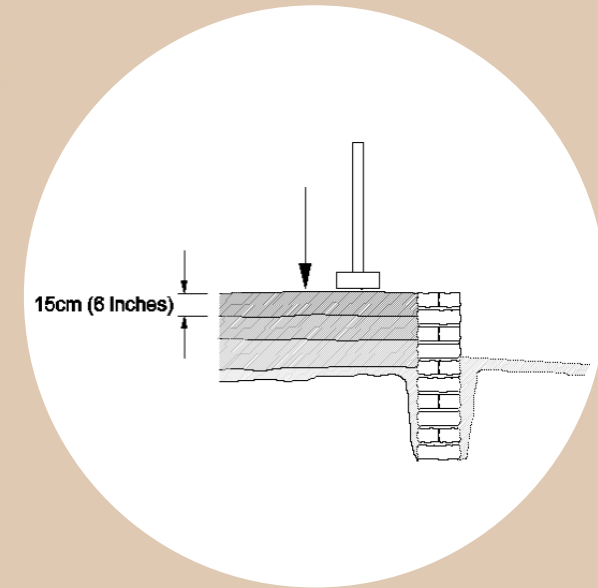
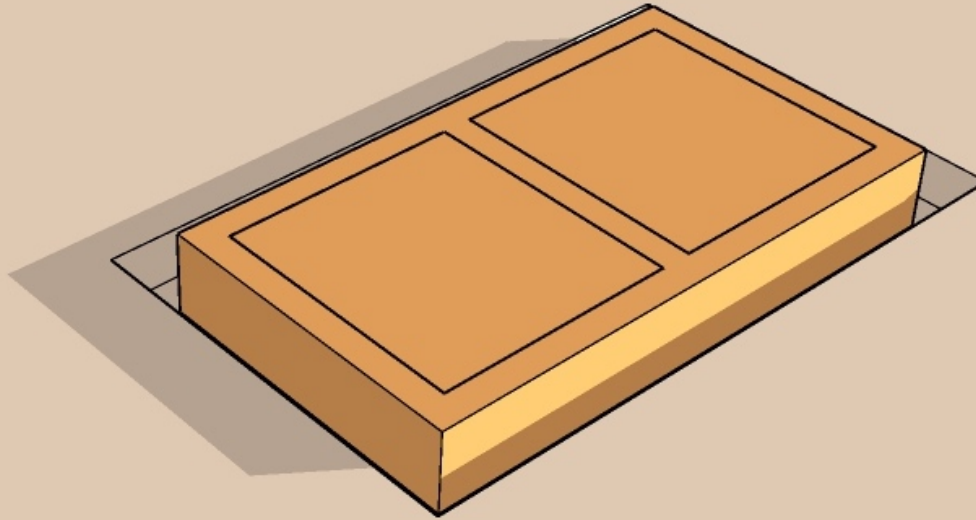
Building Back Better



FOUNDATION DETAILS

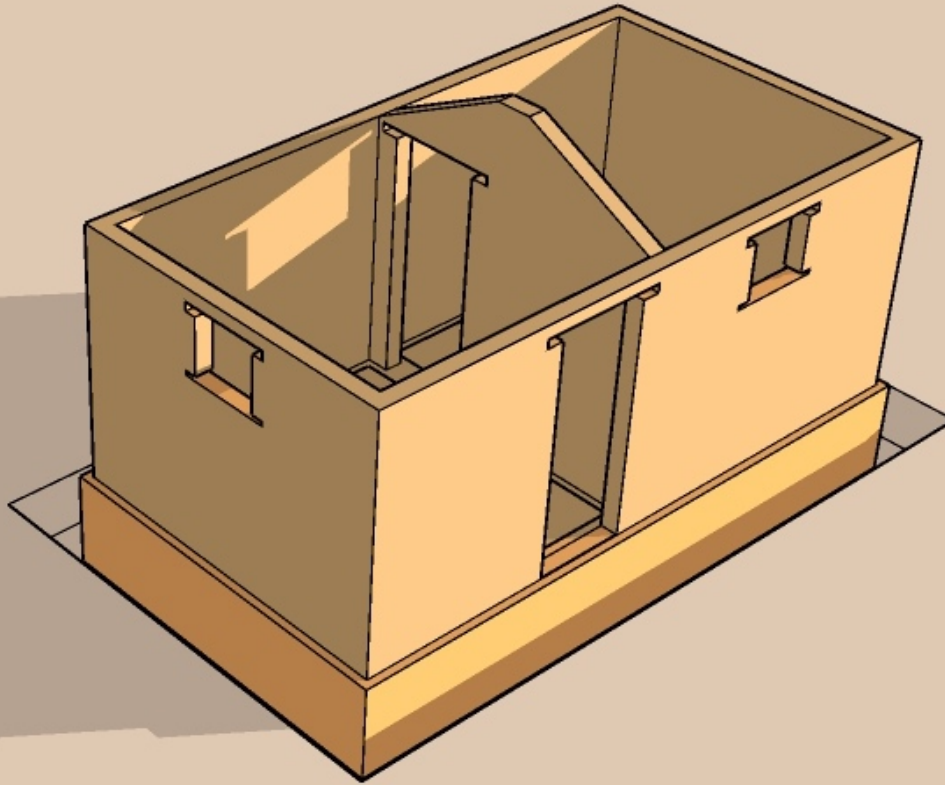
1. **Lime plaster** around the foundation, including at the top.
2. Allow **3 days** for lime plaster to dry.
3. Add a layer of **mud mortar** above the lime plaster on the top (width of foundation).
4. Put a **DPM** (Damp-proof membrane) above the mud mortar (width of foundation).
5. Add another layer of **mud mortar** on top of the DPM for building wall above (width of the wall).
6. Mud mortar is needed both **below and on top** of DPM so as to minimize the chance of it being damaged by unsmooth surface.
7. Cover the wall with **mud plaster**.





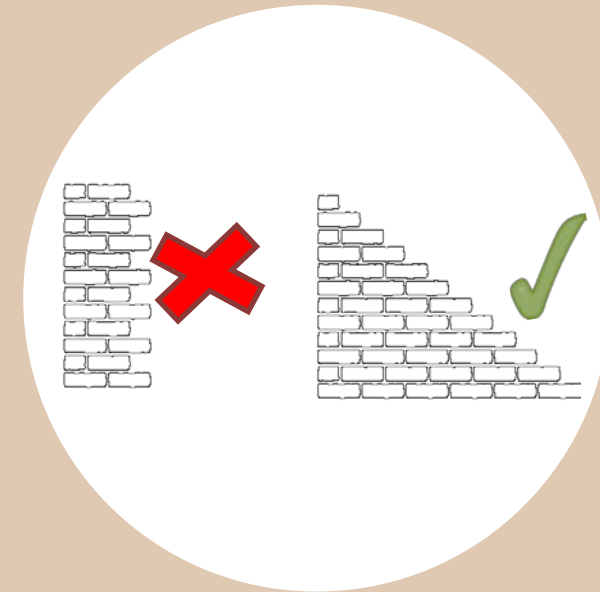
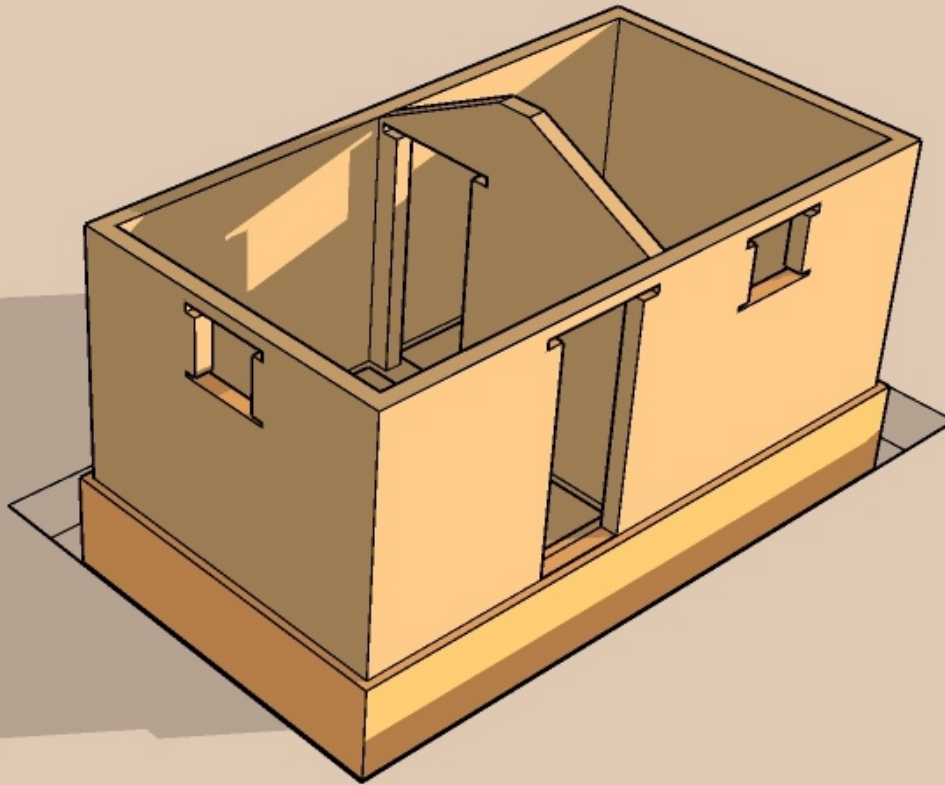
- Fill the base with subsoil and **compact in layers of no more than 15cm.**
- Topsoil or soil with roots and vegetation **should not** be used.





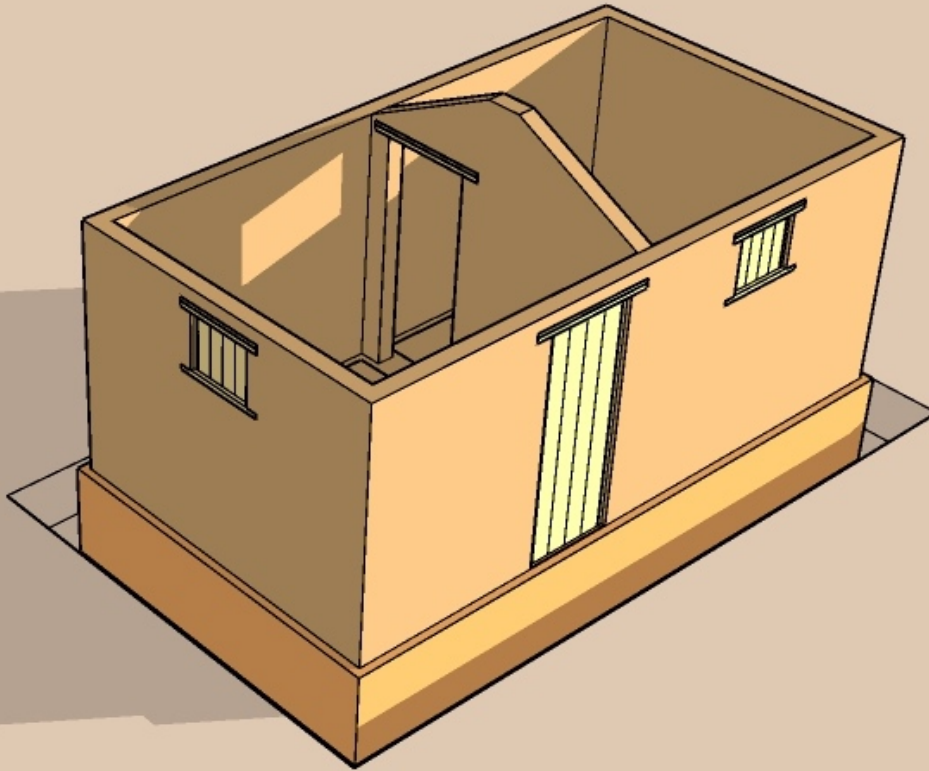
The 1 block thick wall sits in the middle above the foundation centre line





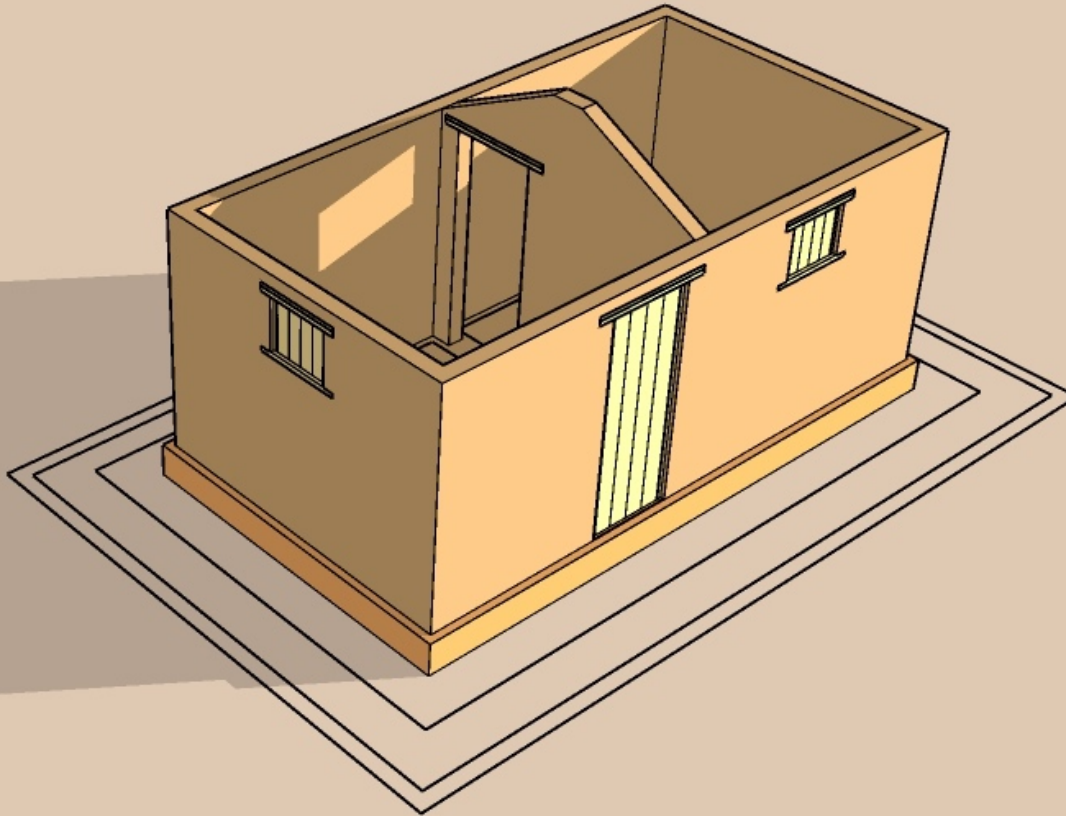
- Walls to be constructed following good practices.
- Corners should be constructed as steps not toothed (as shown above).
- Mortar must be the same quality of soil as used for the brick production.
- All joints must be fully filled with mortar.





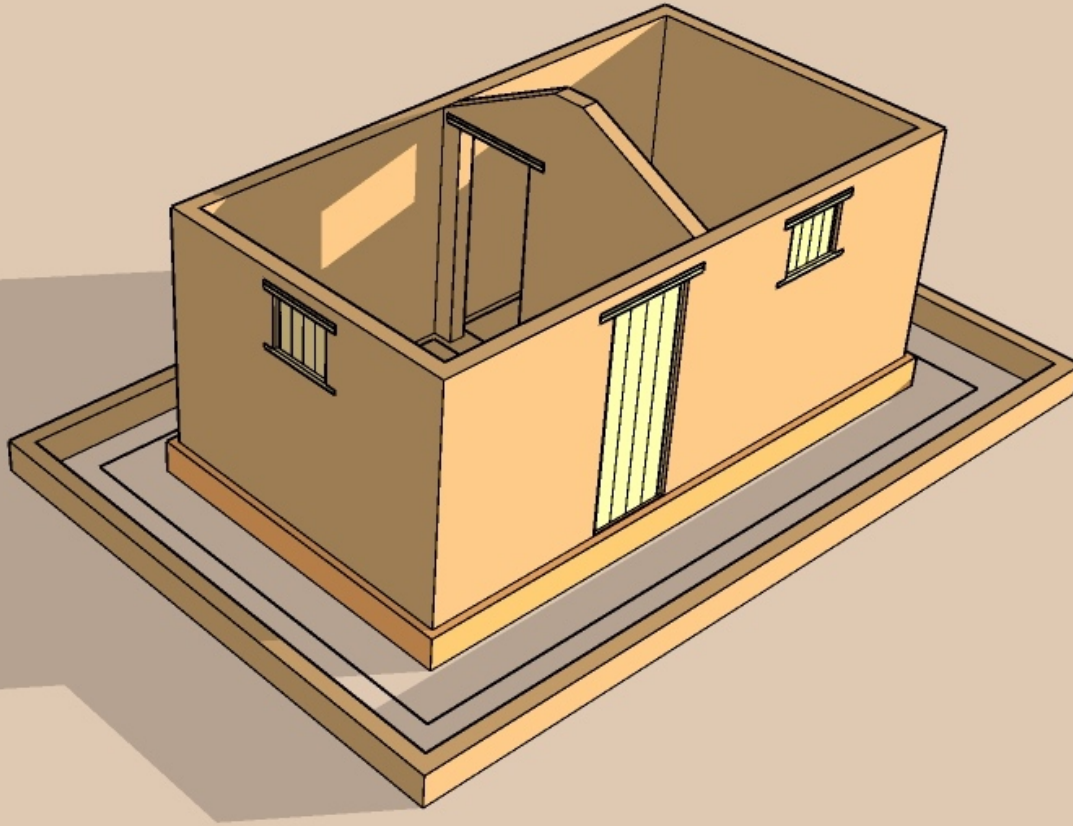
- All doors and windows must have suitable lintels.
- Use 2 poles as lintels, each pole should be minimum 5cm thick.
- The strongest timber should be selected for the lintel above the internal wall opening, as it supports the most load and does not have a door frame underneath.



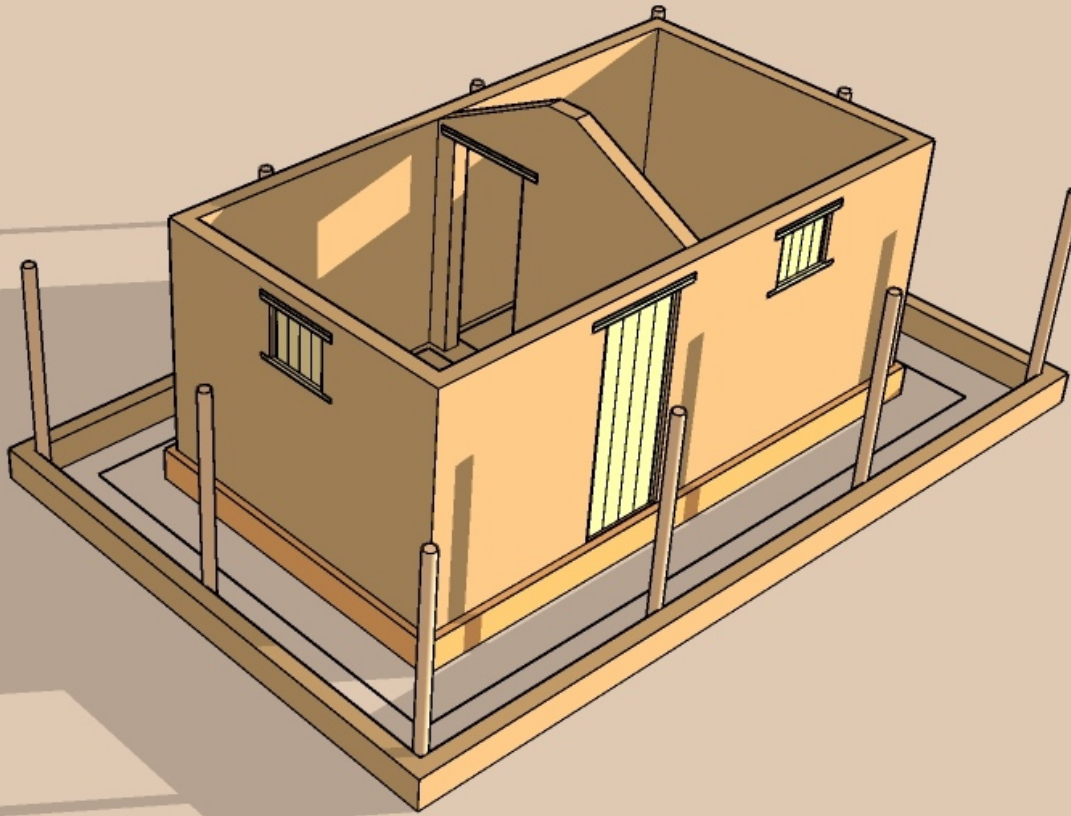


Dig foundation trench for verandah.



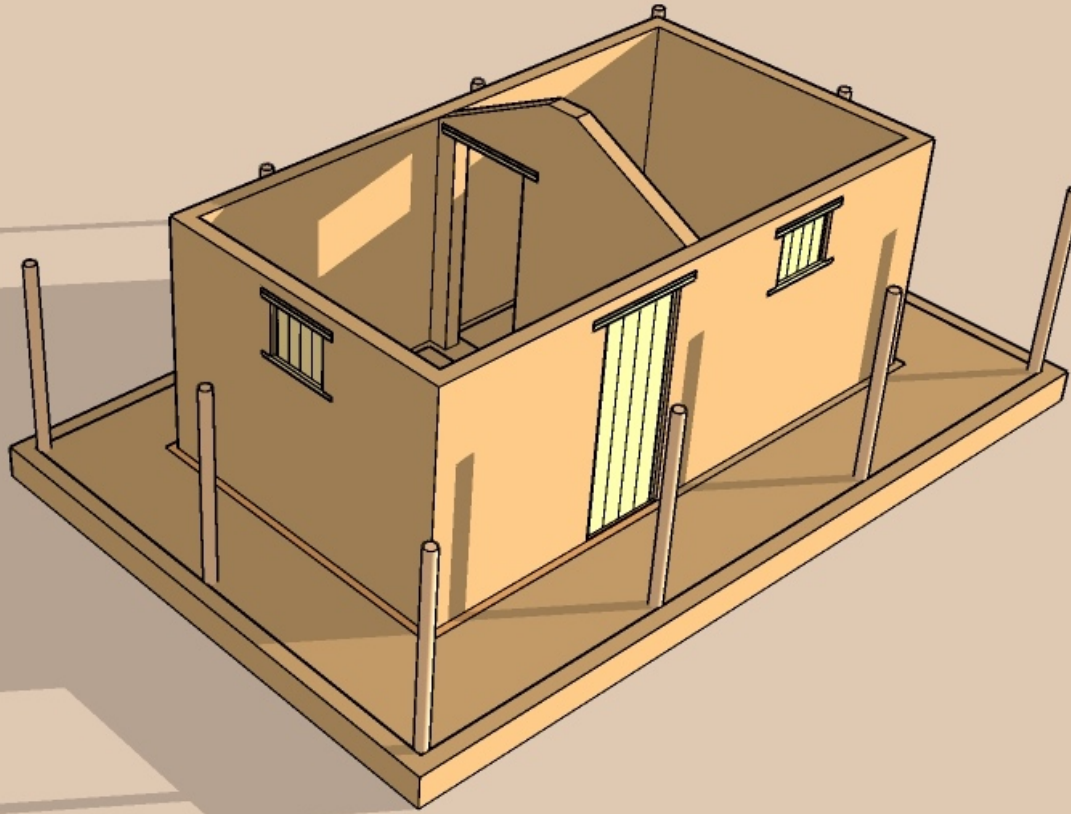


One block thick foundation wall, **minimum 20cm below ground and 30cm above ground level**



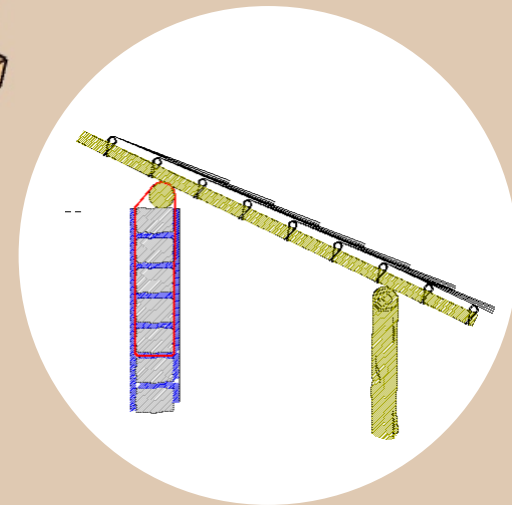
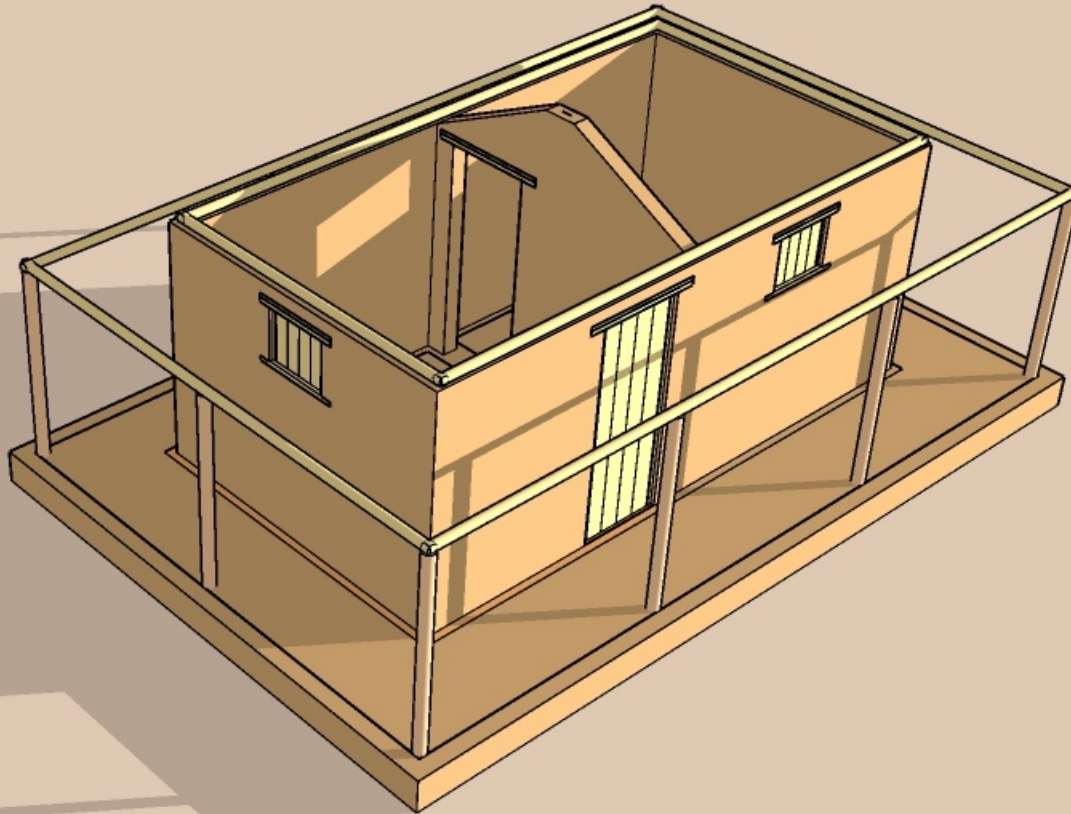
- Blue gum (eucalyptus) posts to be **treated for termite** by heat treatment or termiticides.
- Posts laid **minimum 50cm below ground level**





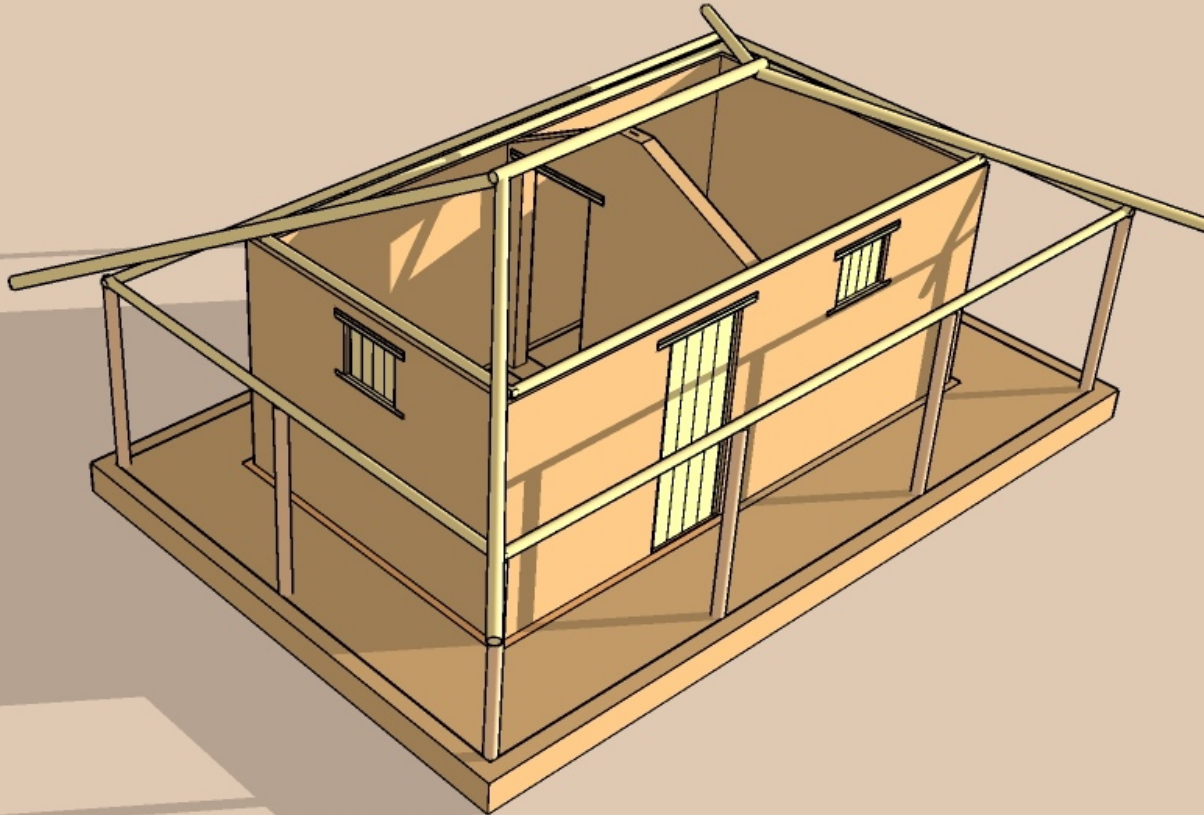
Compacted earth filling for plinth.





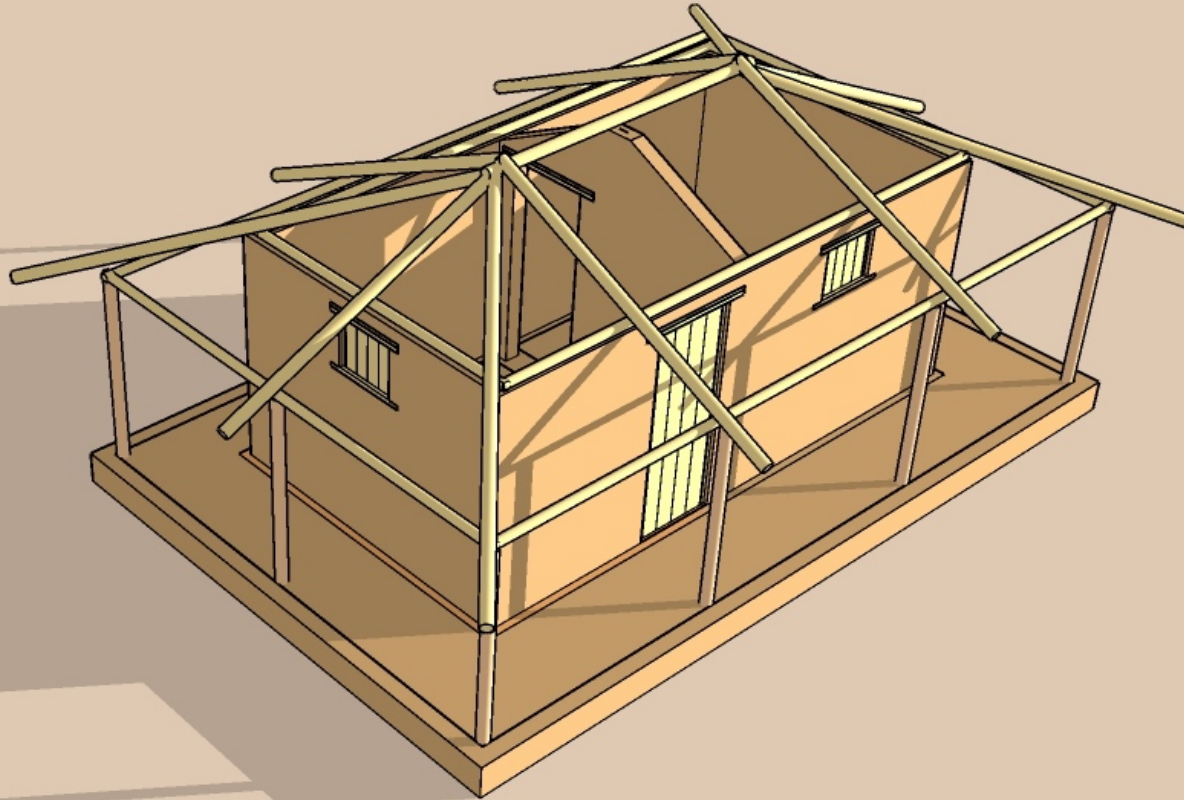
Install wall plates.

- Wall plates to **fitted securely to posts** and wall plate to be **fixed to the walls with tie wire**.
- Check that the **wall plates are level**.
- Timber wall plates to be **treated for termite** by heat treatment or termiticides.

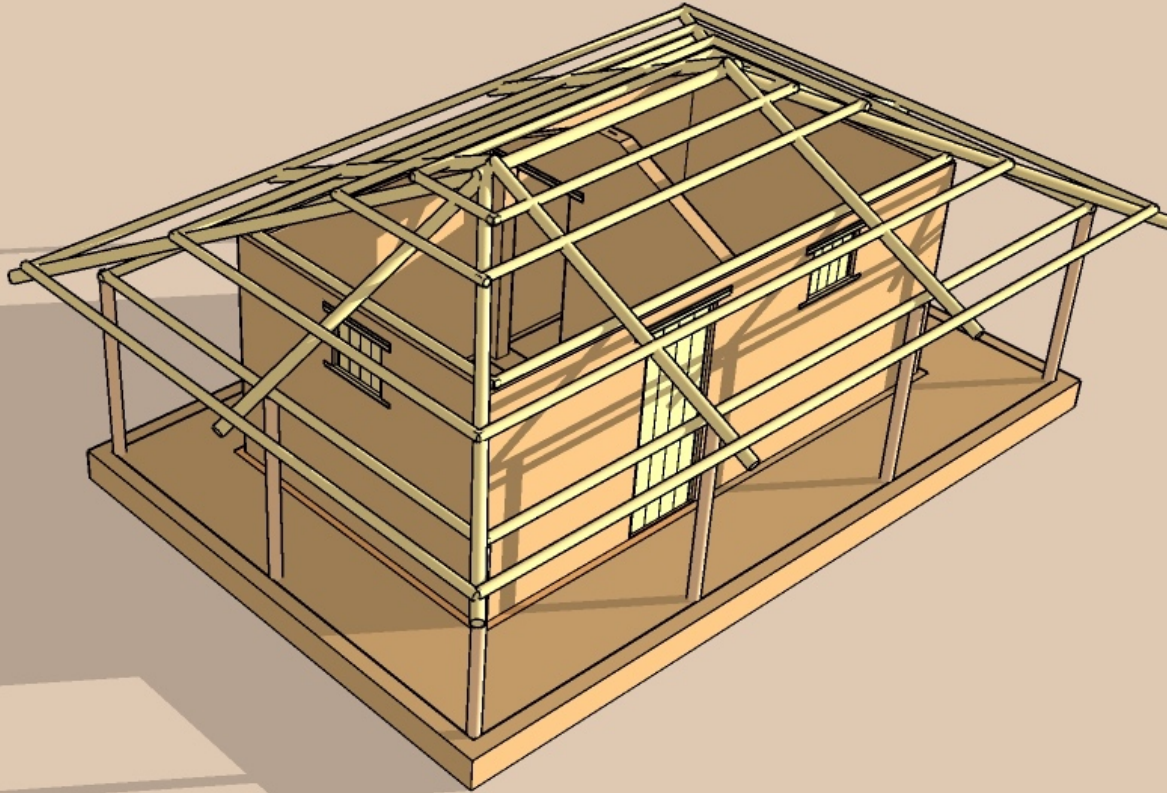


- Ridge and hip beams fitted as shown.
- Select the **strongest piece** of timber for the **ridge beam**.
- The ridge beam to be supported at the top of the internal wall and **fixed in position by tie wire**.

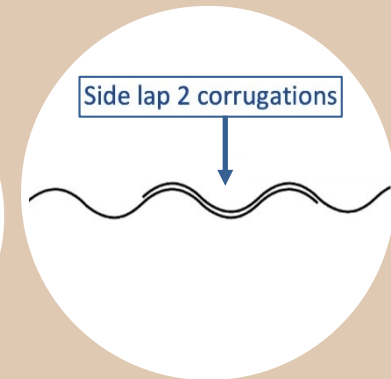
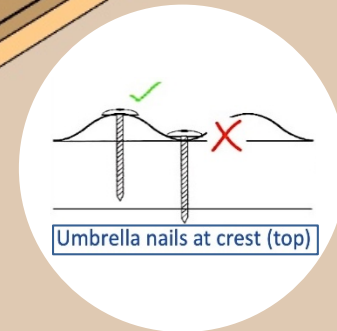
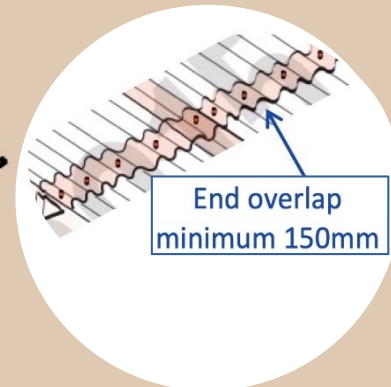
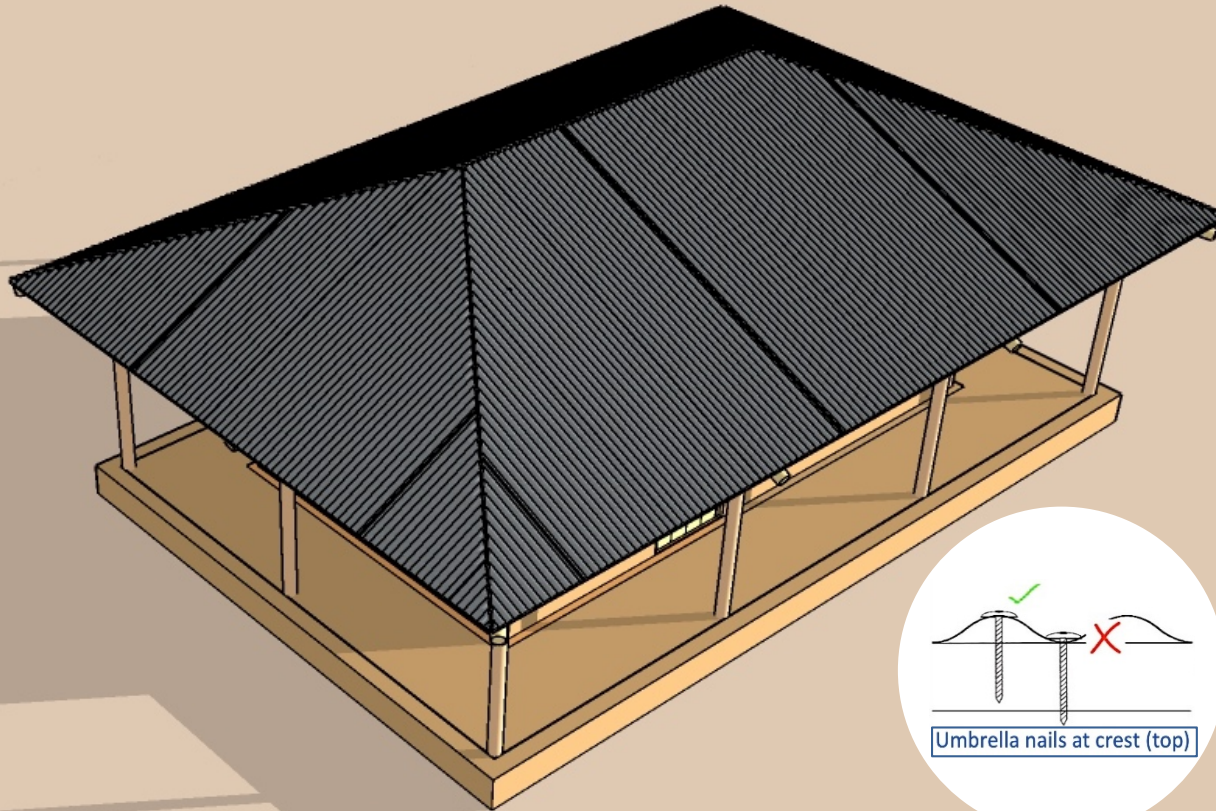




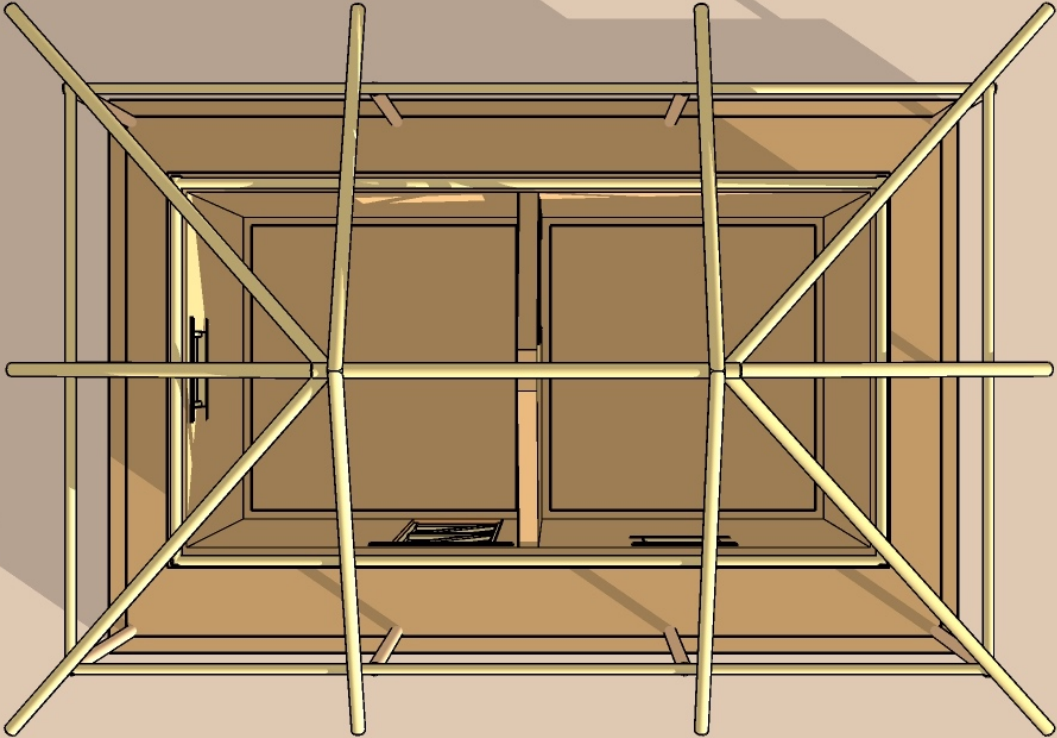
- Rafters fitted as shown.
- Spacing of the rafters depending on the size of the timber.



Battens fitted as shown.

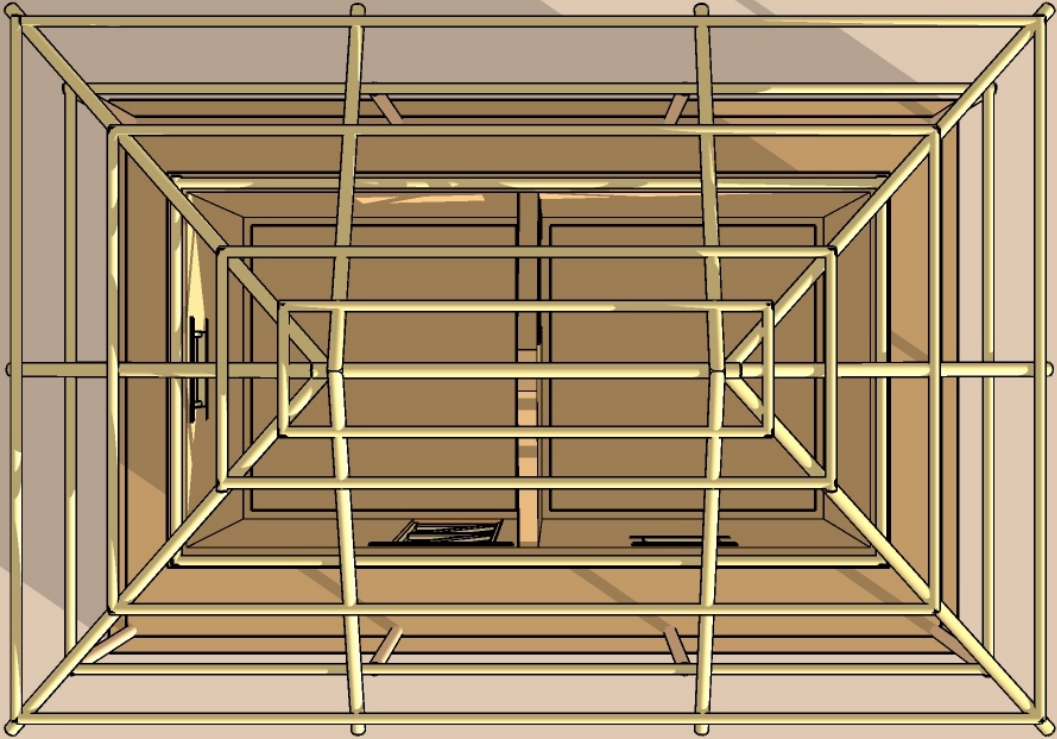


- Fix the CGI sheets to the battens with umbrella nails.
- The **nails should always** be placed at the **crest** (top of corrugation) to avoid water infiltration.
- There should be a 12cm overlap (**2 corrugations** approximately).
- For the galvanized ridge caps, the overlap should be of **20cm**.
- Place them on top of the ridge beam and hips.



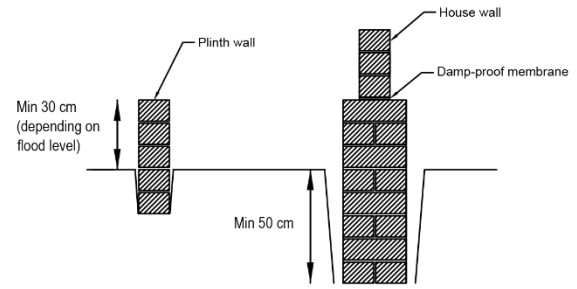
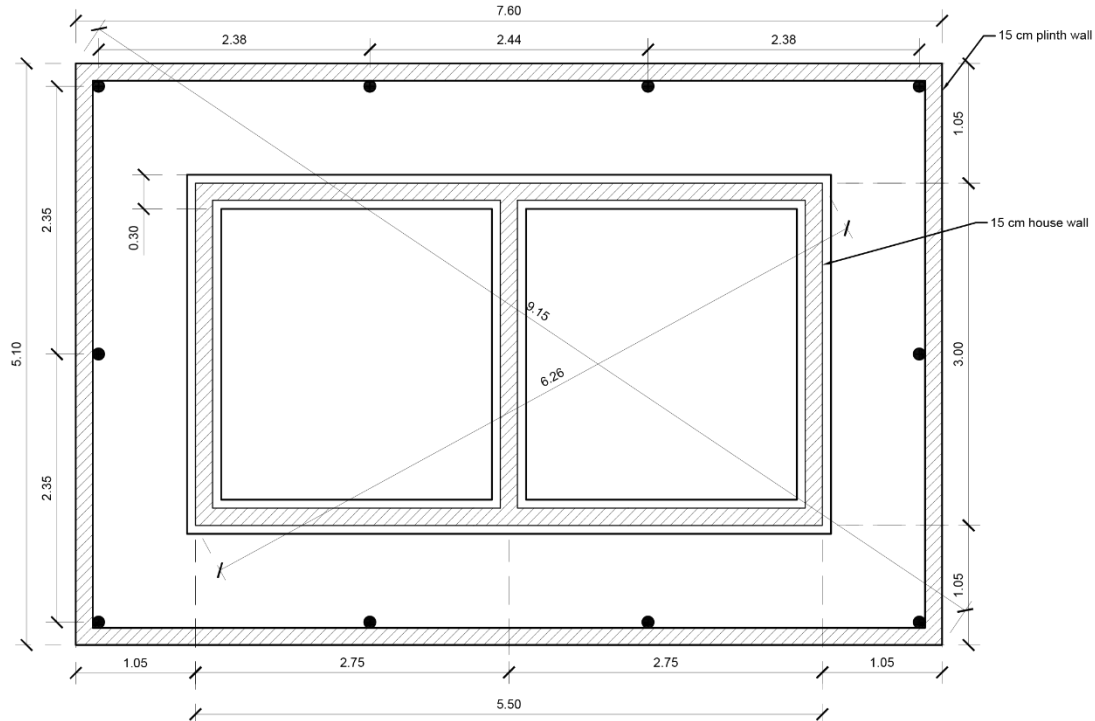
Building Back Better






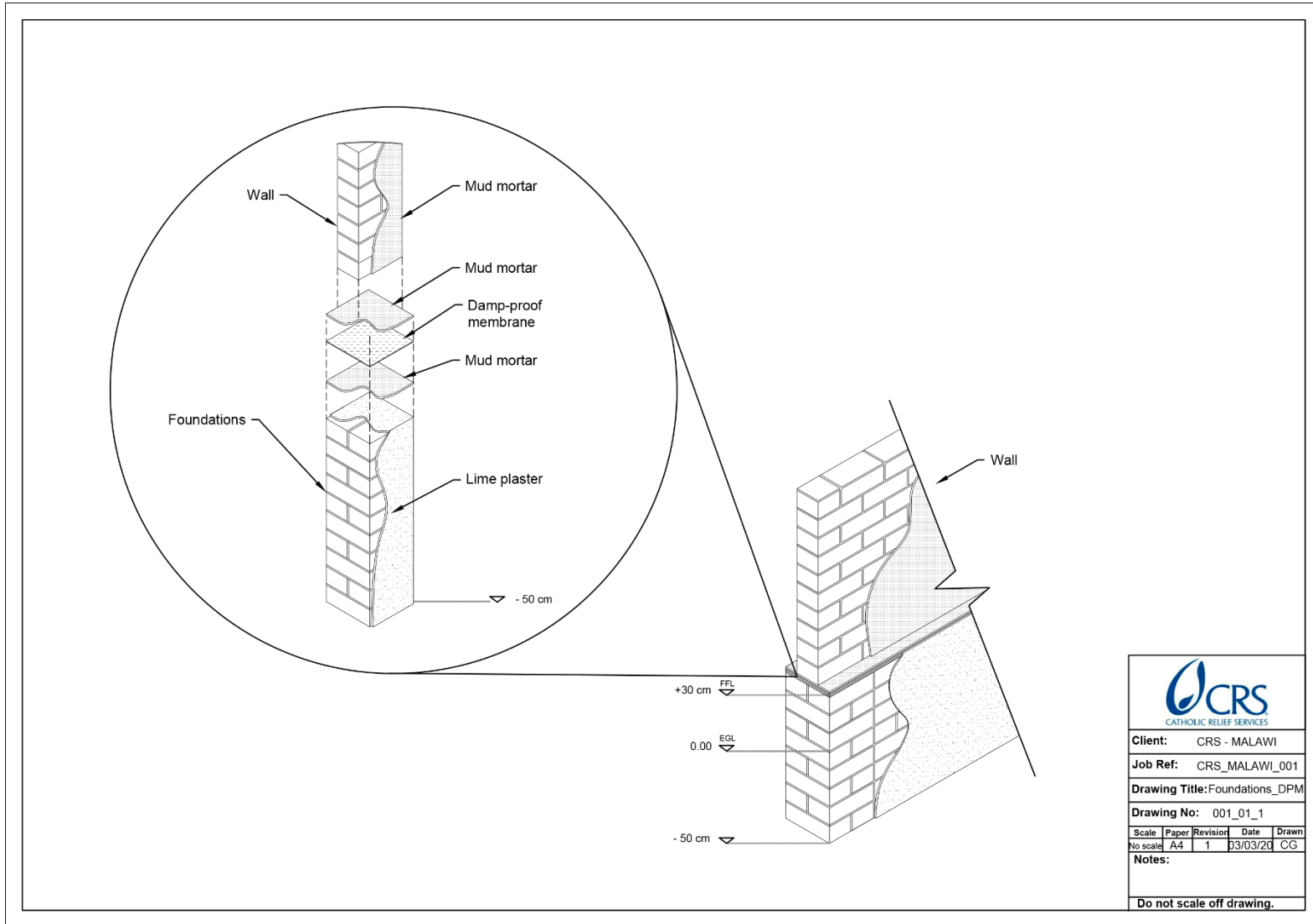
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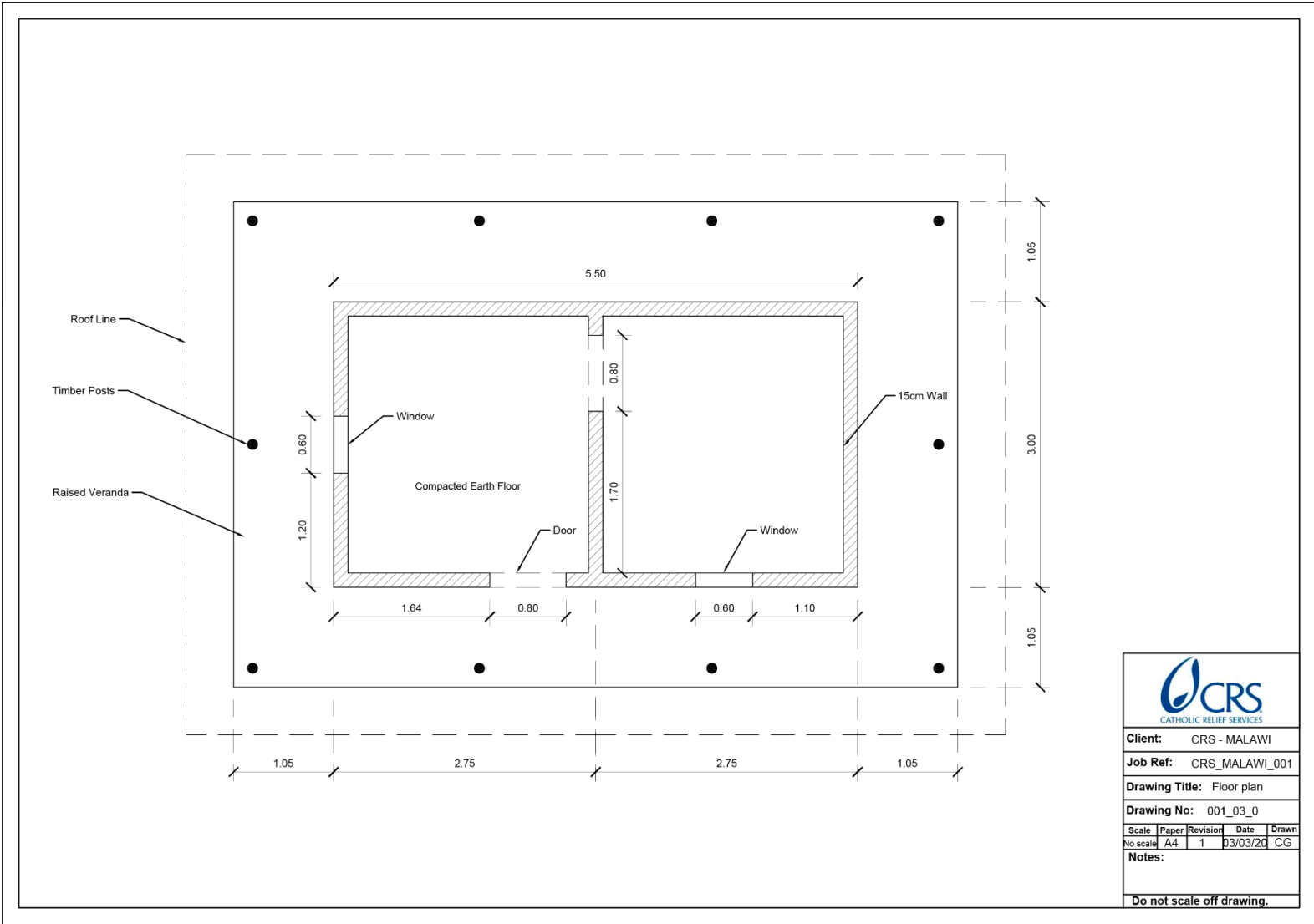




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| Job Ref: CRS_MALAWI_001 | | | | |
| Drawing Title: Foundations | | | | |
| Drawing No: 001_01_0 | | | | |
| Scale | Paper | Revision | Date | Drawn |
| No scale | A4 | 2 | 05/03/20 | CG |
| Notes: | | | | |
| Do not scale off drawing. | | | | |

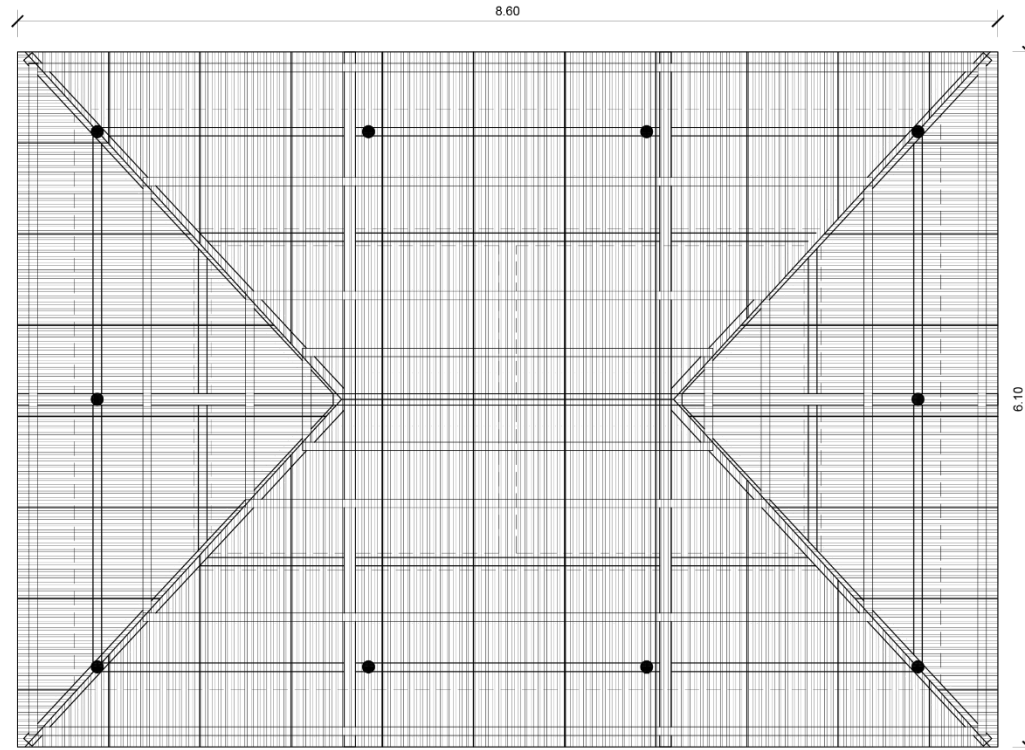




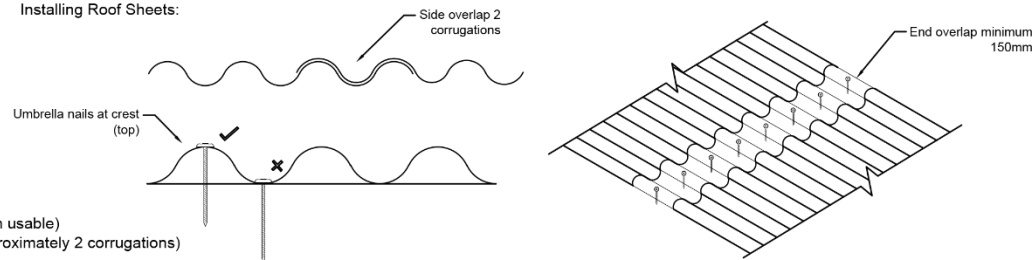


Building Back Better






Installing Roof Sheets:

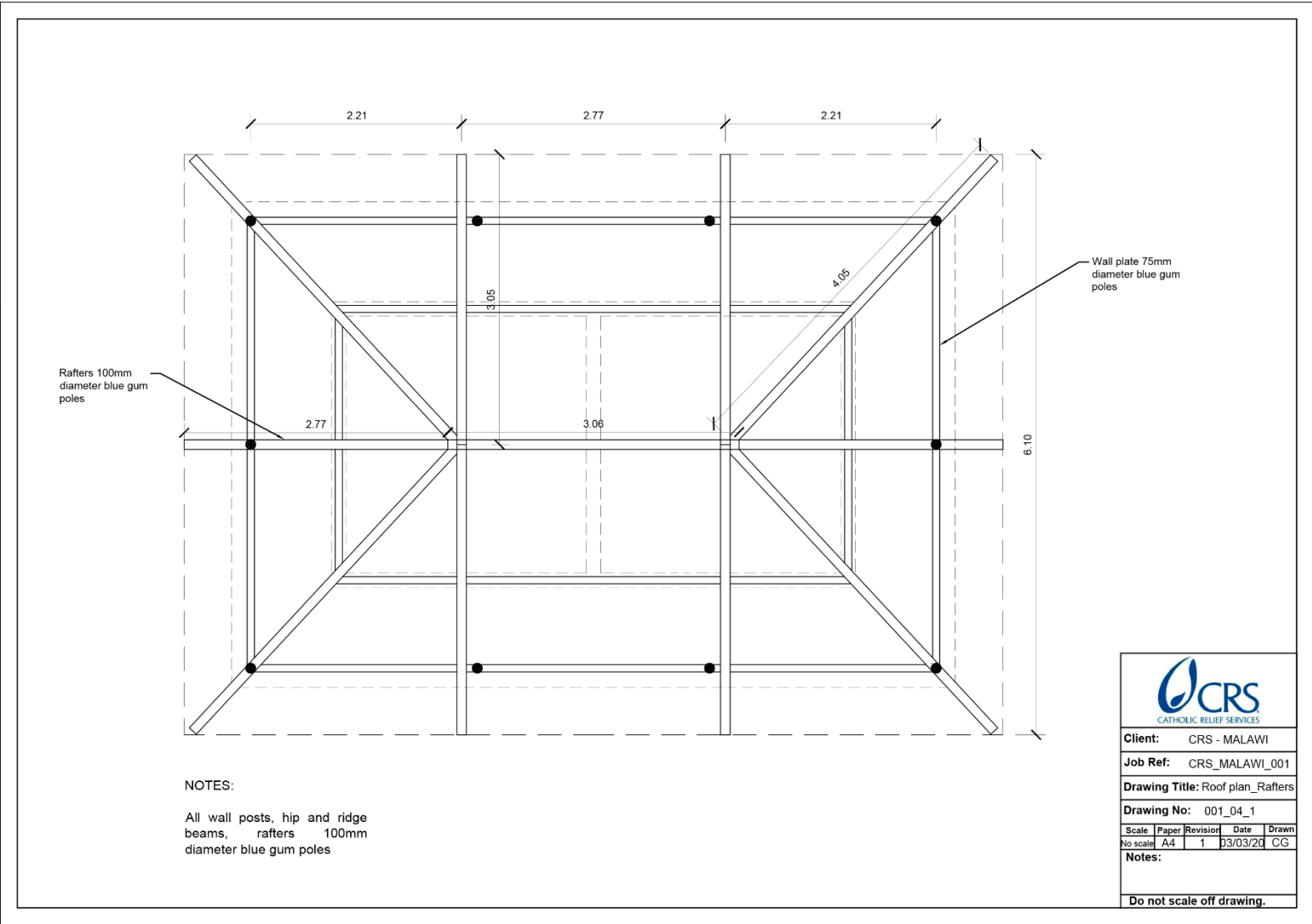


NOTES:

CGI sheets 32 gauge
 3.66m x 0.92m (0.80m usable)
 Overlap = 12 cm (approximately 2 corrugations)

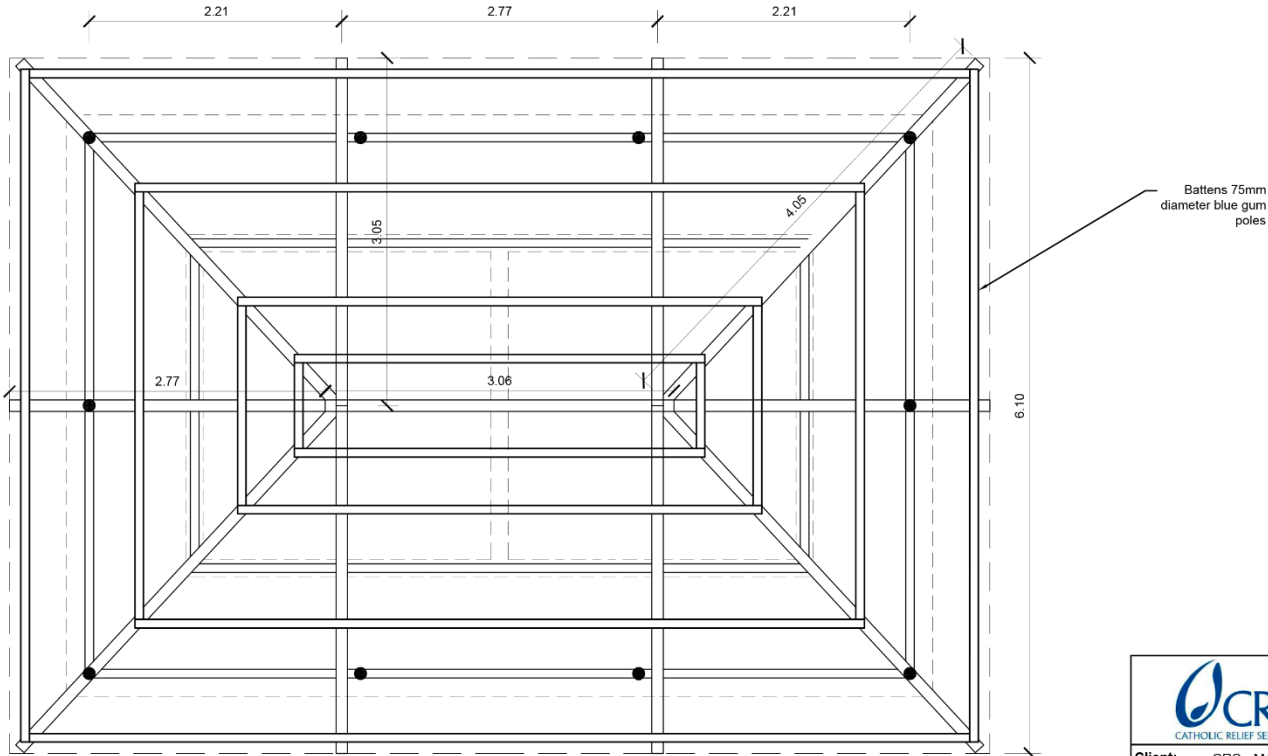
| | | | | |
|---|-------|----------|----------|-------|
|  CATHOLIC RELIEF SERVICES | | | | |
| Client: CRS - MALAWI | | | | |
| Job Ref: CRS_MALAWI_001 | | | | |
| Drawing Title: Roof plan CGI | | | | |
| Drawing No: 001_04_0 | | | | |
| Scale | Paper | Revision | Date | Drawn |
| No scale | A4 | 2 | 25/03/20 | CG |
| Notes: | | | | |
| Do not scale off drawing. | | | | |






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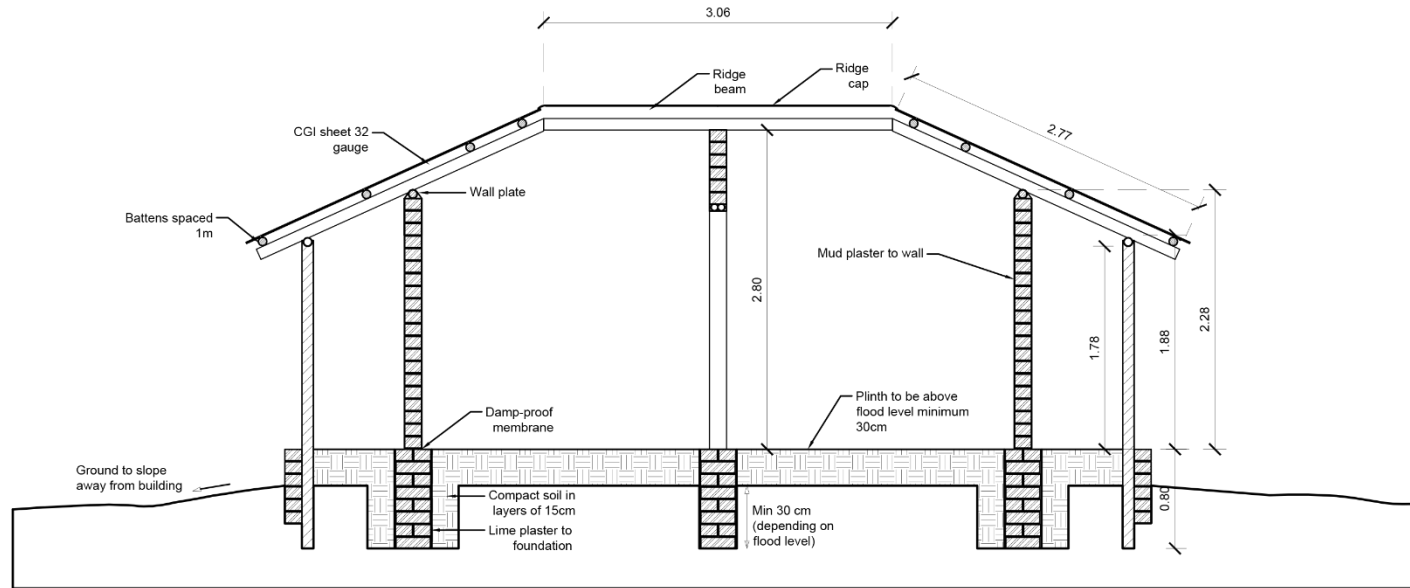




NOTES:
 All battens and wall plate
 75mm diameter blue gum
 poles
 Battens spaced 1 m

| | | | | |
|---|-------|----------|----------|-------|
|  CATHOLIC RELIEF SERVICES | | | | |
| Client: CRS - MALAWI | | | | |
| Job Ref: CRS_MALAWI_001 | | | | |
| Drawing Title: Roof plan_Battens | | | | |
| Drawing No: 001_04_2 | | | | |
| Scale | Paper | Revision | Date | Drawn |
| No scale | A4 | 1 | 03/03/20 | CG |
| Notes: | | | | |
| Do not scale off drawing. | | | | |





CRS
CATHOLIC RELIEF SERVICES

Client: CRS - MALAWI

Job Ref: CRS_MALAWI_001

Drawing Title: Long Section

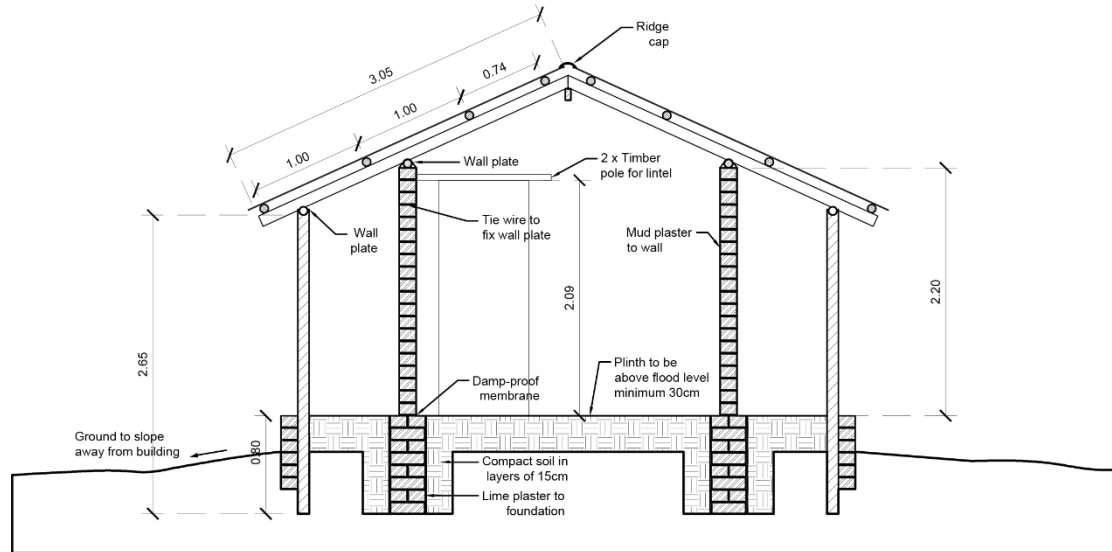
Drawing No: 001_06_0


| Scale | Paper | Revision | Date | Drawn |
|----------|-------|----------|----------|-------|
| No scale | A4 | 2 | 05/03/20 | CG |

Notes:

Do not scale off drawing.



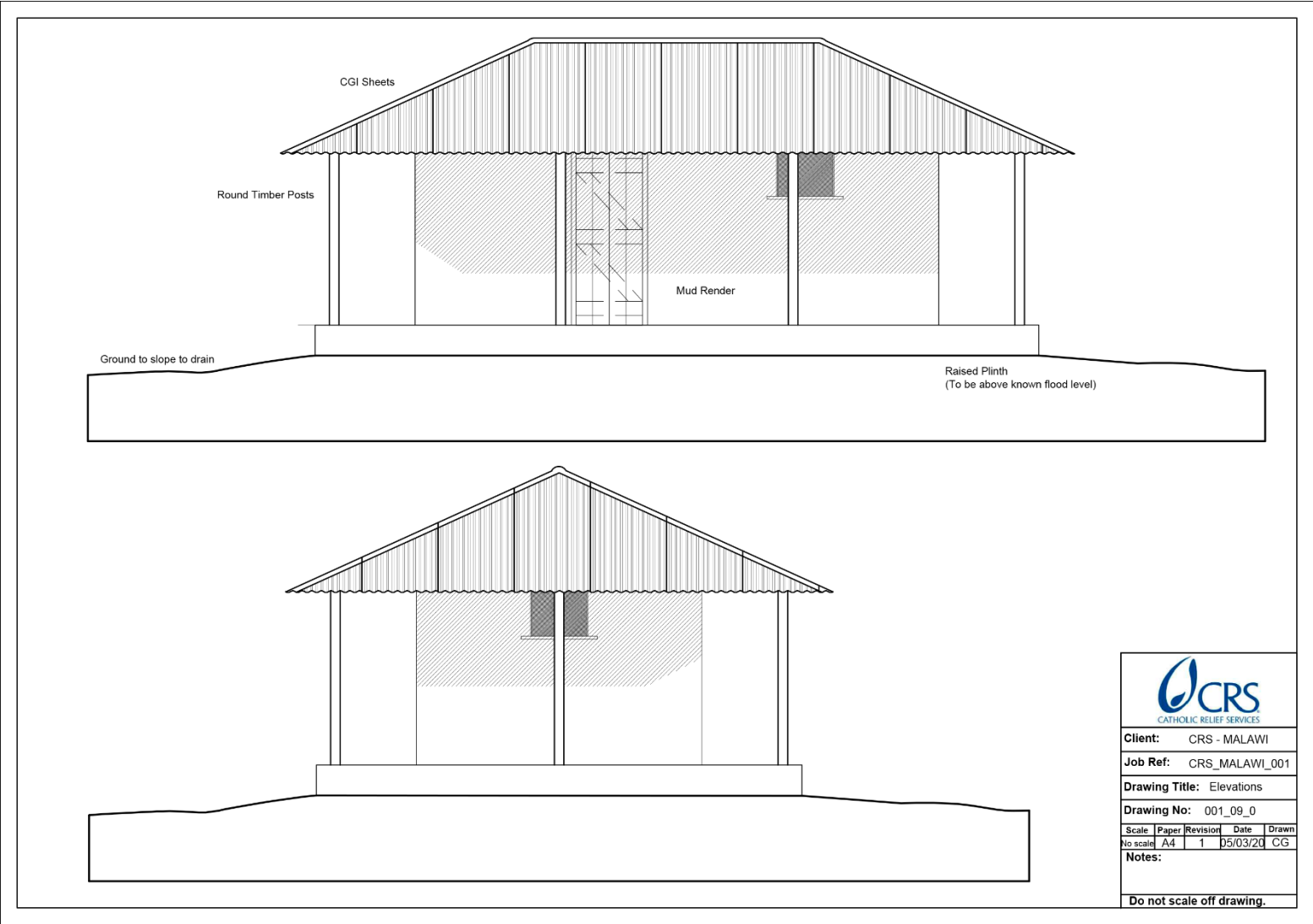


| | | | | |
|---|---------------|------------------|--------------|---------------|
|  CATHOLIC RELIEF SERVICES | | | | |
| Client: CRS - MALAWI | | | | |
| Job Ref: CRS_MALAWI_001 | | | | |
| Drawing Title: Cross Section | | | | |
| Drawing No: 001_06_1 | | | | |
| Scale: | Paper: | Revision: | Date: | Drawn: |
| No scale | A4 | 1 | 03/03/20 | CG |
| Notes: | | | | |
| Do not scale off drawing. | | | | |



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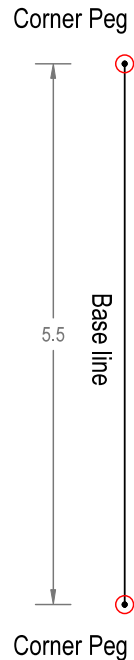




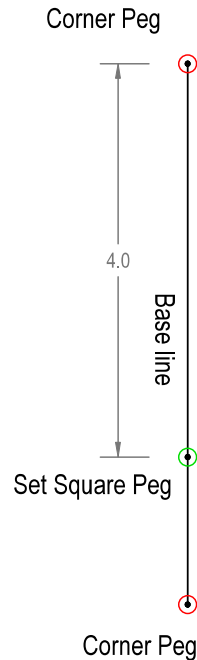
Building Back Better



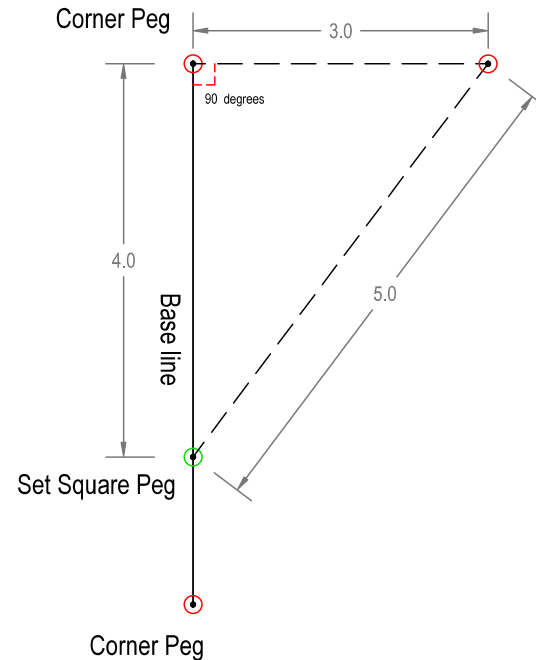
Setting Out by 3-4-5 Method



1. Put in two pegs on the line of the longest wall to mark the 2 corners of the house

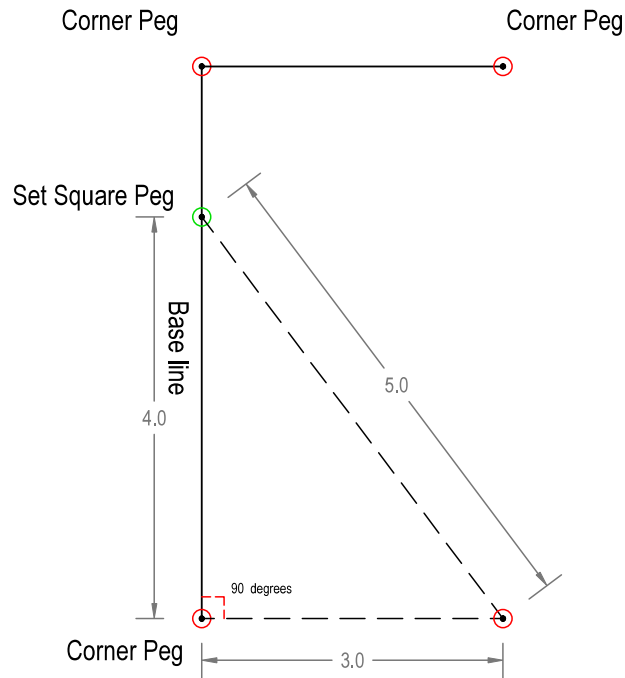


2. From the first corner peg measure 4m and fit in a temporary Set Square Peg with a nail in the top to mark the exact position

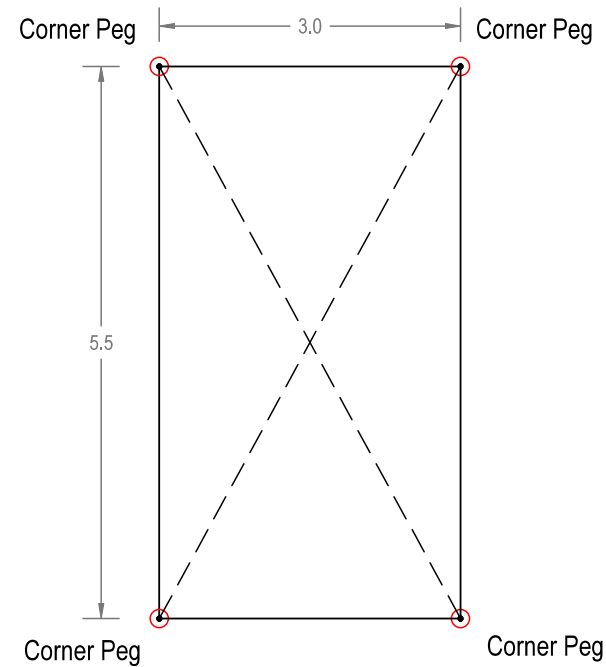


3. Using 2 x tapes or measured lengths of string, find the point where the 5m and 3m length join. Fit a corner peg in this position and mark with a nail the exact position. This is the third corner of the house

Setting Out by 3-4-5 Method



4. Again use two tapes or measured string to find the position of the last corner peg.



5. Final check the house dimensions to make sure the setting out is accurate. Check the diagonal measures, if the corners are at right angle the measures will be the same.