

C O N S T R U C T I O N

G U I D E

1 PRELIMINARY WORKS 2017

1.1 FOUNDATION PREFABRICATION ELEMENT	4
1.2 RCC STRUCTURE PREFABRICATION	5-6

2 FOUNDATION 2017

2.1 EARTHWORKS LAYOUT	7
2.2 EXCAVATION	8
2.3 LOWER PILLARS SET UP	9
2.4 STONE FOUNDATION	10

3 LOWER CONCRETE BEAM 2017

3.1 RCC BEAM LAYOUT & LINKS	11
3.2 POURING LOWER RING BEAM	12

4 WALLS 2017

4.1 RCC PILLARS	13
4.2 STONE & CEMENT WALLS	14
4.3 BACKFILL & DPC	15

5 PRELIMINARY WORKS 2018

5.1 CARPENTRY WORK	16
5.2 RCC STRUCTURE PREFABRICATION	17

6 RAISING WALLS 2018

6.1 BRICK WALLS	19
6.2 WINDOW & DOOR SET UP	20

7 UPPER CONCRETE BEAM 2018

7.1 UPPER RCC BEAM LAYOUT	21
7.2 UPPER RCC BEAM POURING	22

8 CARPENTRY WORK 2018

8.1 TRUSS SET UP	23
8.2 JOIST FRAMING	24
8.3 UPPER WALLS	25
8.4 WOODEN FLOORING & INSULATION	26

9 ROOFING WORKS 2018

9.1 PURLIN LAYOUT	27
9.2 ROOFING	28

10 FINISHING 2019

10.1 LANDSCAPING	29
10.2 OUTSIDE FINISHING	30
10.3 INSIDE FINISHING	31

APPENDIX : good construction practices

A / BRICK BOND	32
B / REINFORCEMENT	33
C / RCC CONNECTORS	34
D / CONCRETE MAKING	35


SCALE DRAWINGS

A / GLOBAL PLAN	37
B / SECTIONS	39
C / FRONT VIEWS	41
D / SECTION & BATHROOM	42
E / CARPENTRY DRAWING : WINDOW FRAME	43
F / CARPENTRY DRAWING : COMPOSITE FRAME	47
G / WOODEN FRAME LAYOUT	53
H / ELECTRICITY PLAN	54
I / ROOFING PLAN	55

MATERIALS AND QUANTITIES

A / TOTAL QUANTITIES	58
B / QUANTITIES DETAILS	

REMOVABLE DRAWINGS

CARPENTRY DRAWING	
RCC STRUCTURE 2017	
RCC STRUCTURE 2018	
ELECTRICITY PLAN	

1 PRELIMINARY WORKS

1.2 RCC STRUCTURE PREFABRICATION

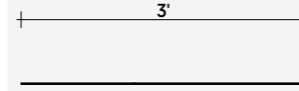


Refers to **APPENDIX B**
to figure out rules of
reinforcement making.

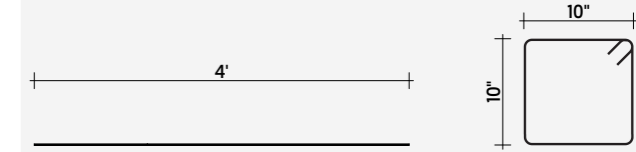
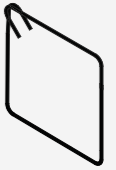


- ① Iron rings **R1 & R2**
- ② Lower iron beam **LB20, LB16, LB14, LB7 & LB6**
- ③ Horizontal U connector **UH**

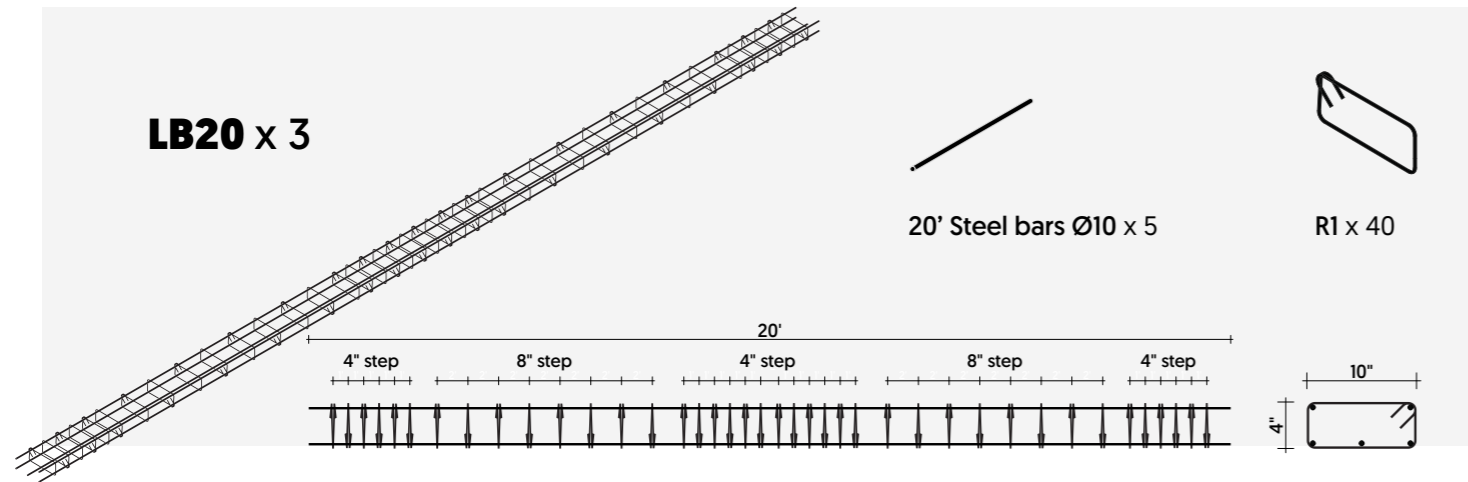
R1 x 990



R2 x 400



LB20 x 3

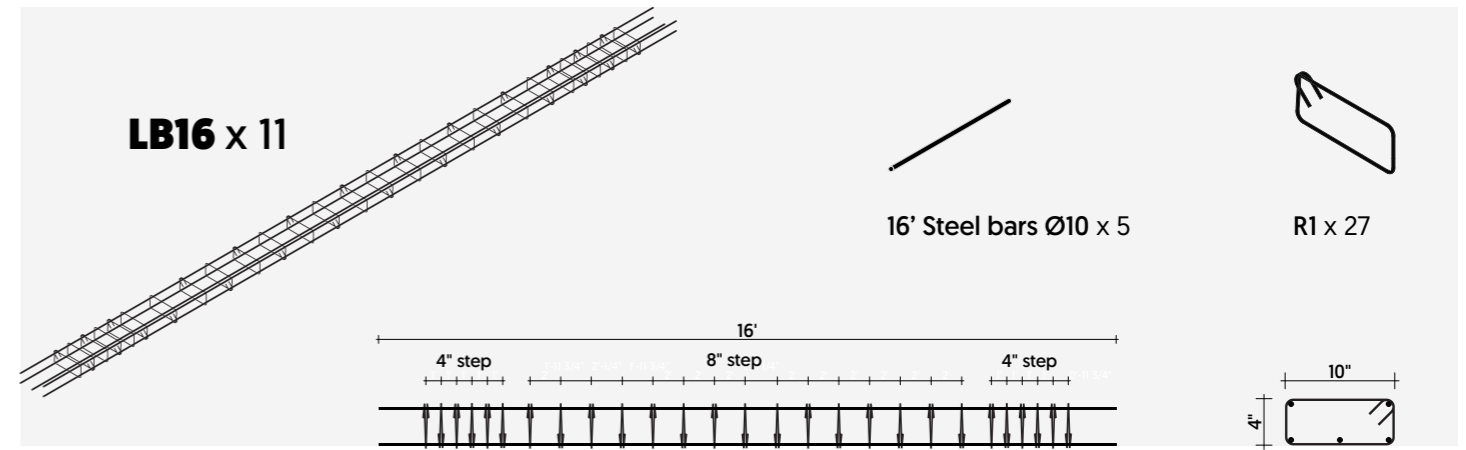


20' Steel bars $\text{Ø}10 \times 5$



R1 x 40

LB16 x 11

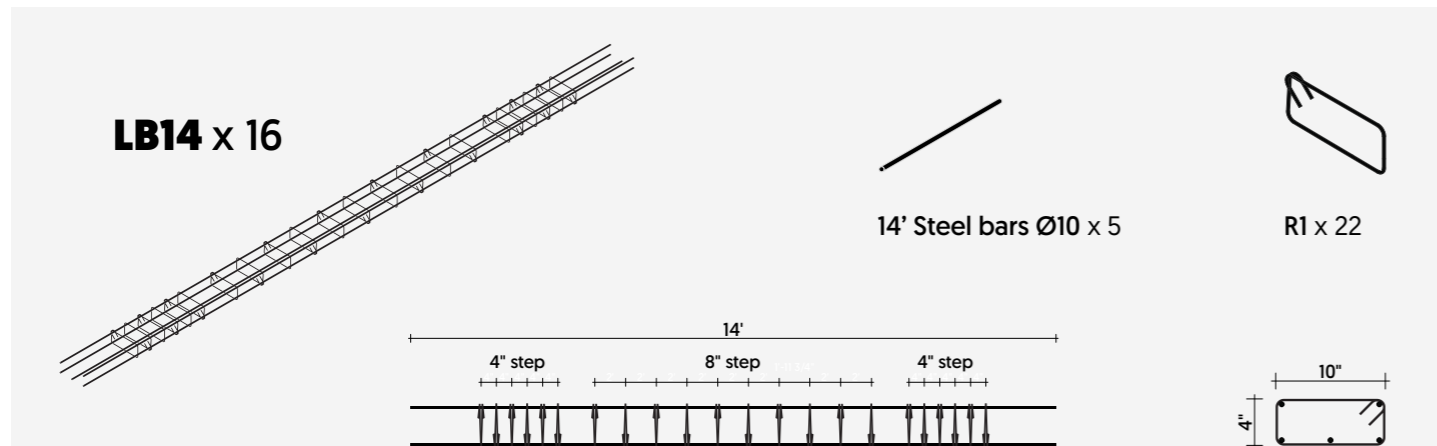


16' Steel bars $\text{Ø}10 \times 5$



R1 x 27

LB14 x 16

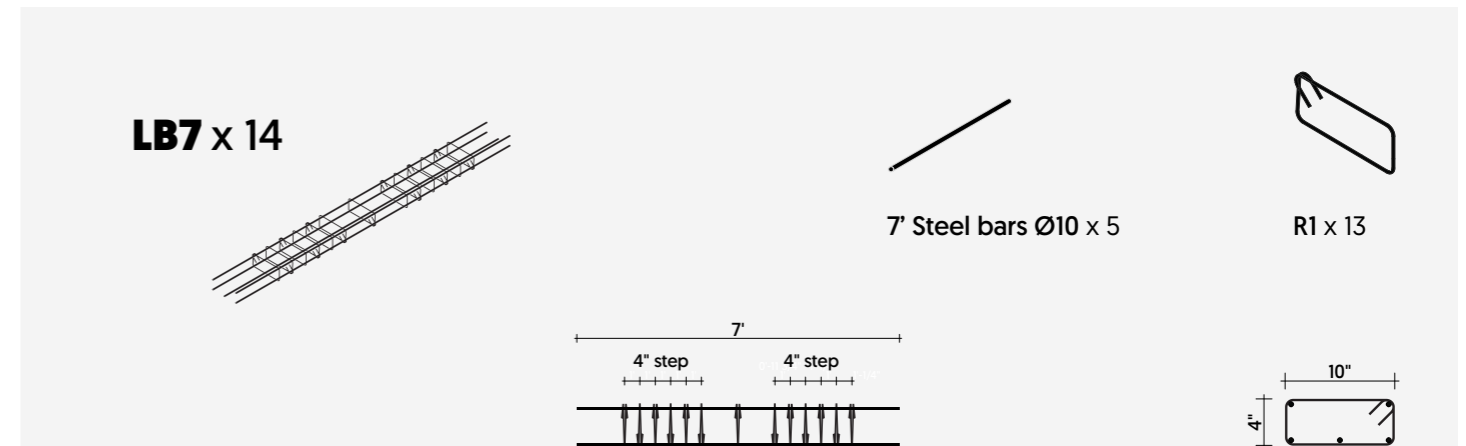


14' Steel bars $\text{Ø}10 \times 5$



R1 x 22

LB7 x 14

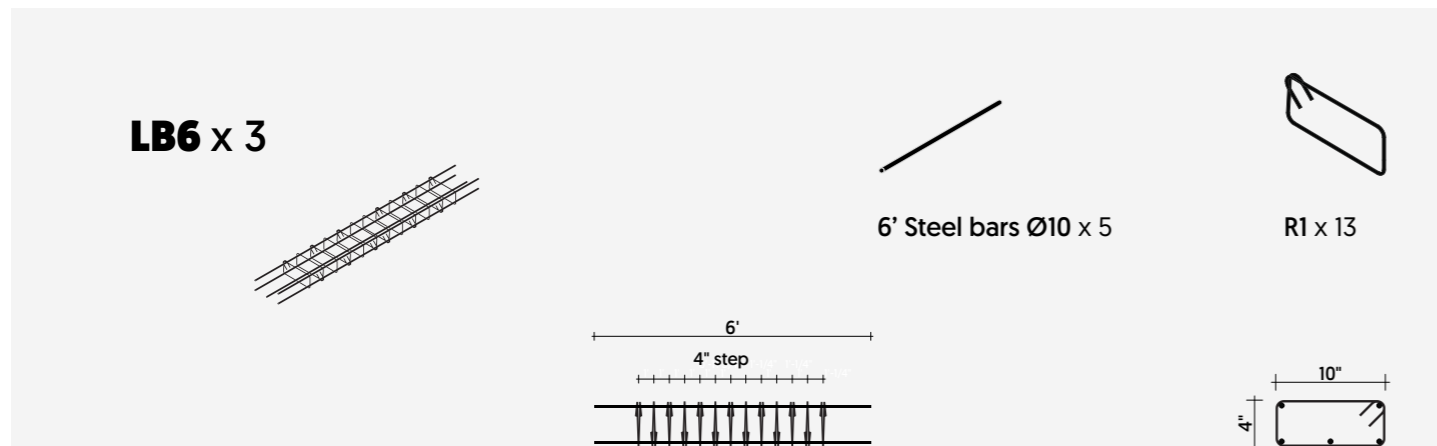


7' Steel bars $\text{Ø}10 \times 5$



R1 x 13

LB6 x 3

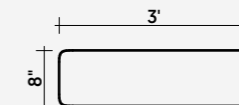
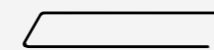


6' Steel bars $\text{Ø}10 \times 5$



R1 x 13

UH x 134



7'-4" Steel bars $\text{Ø}10$

1 PRELIMINARY WORKS

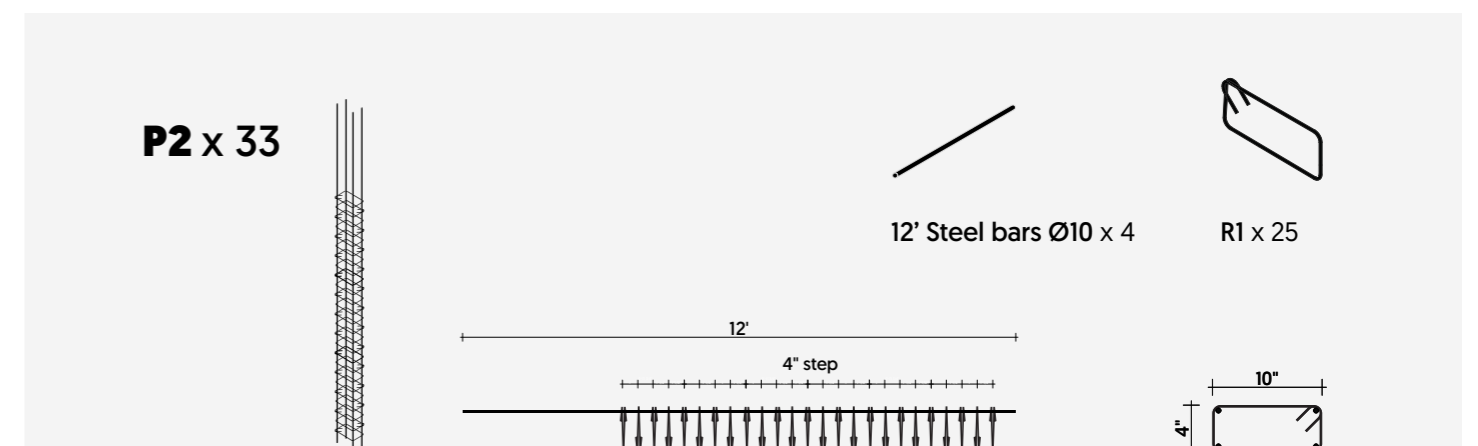
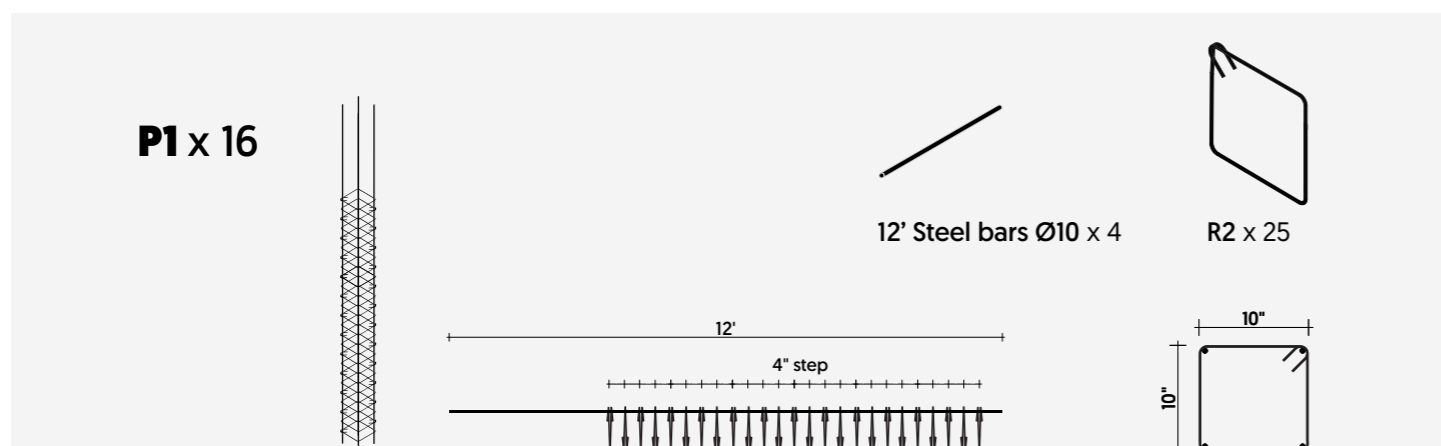
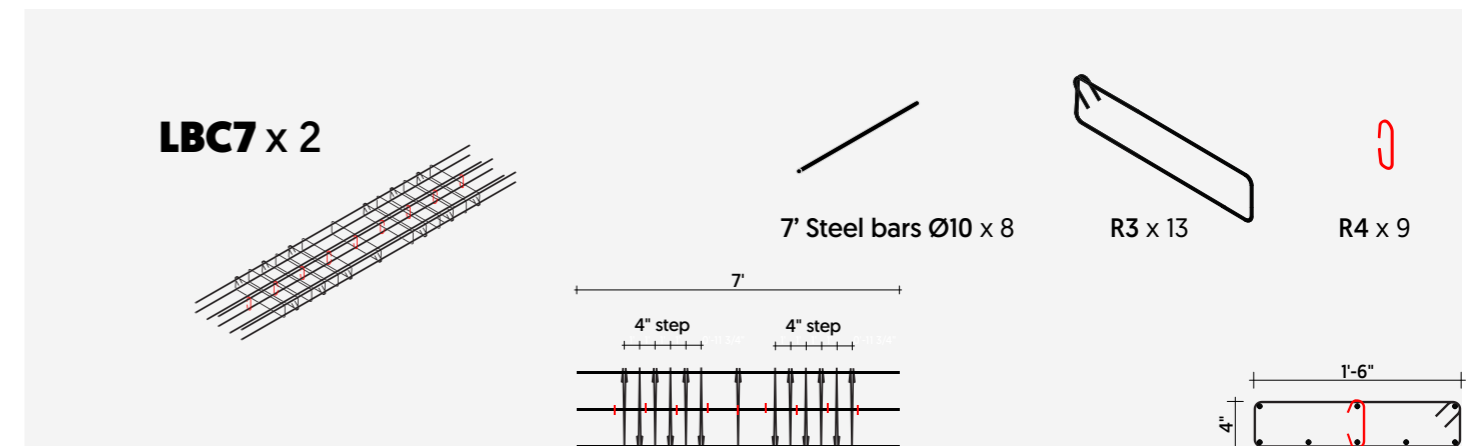
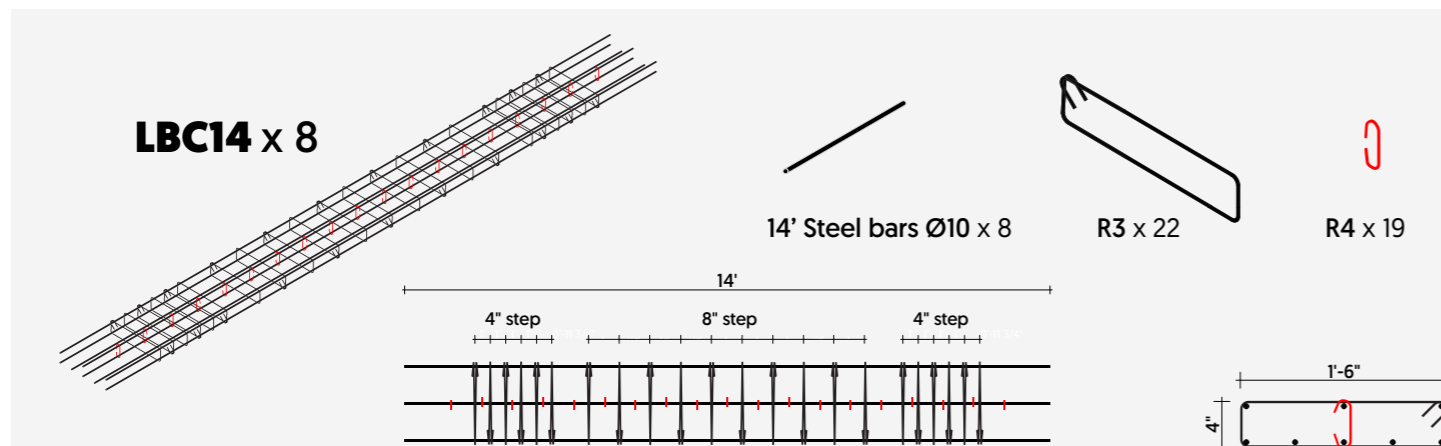
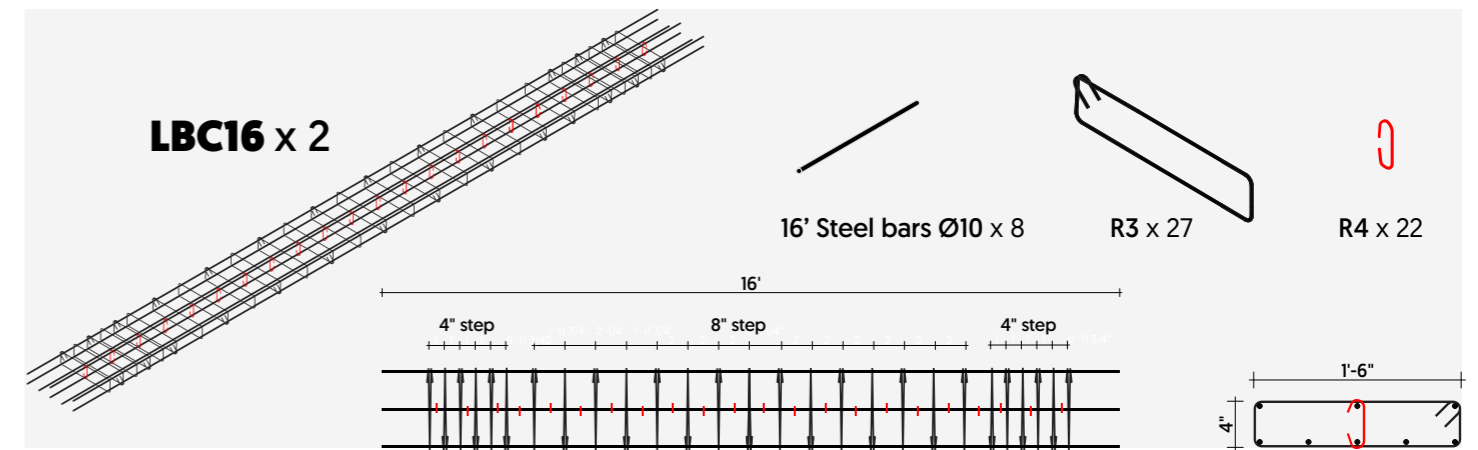
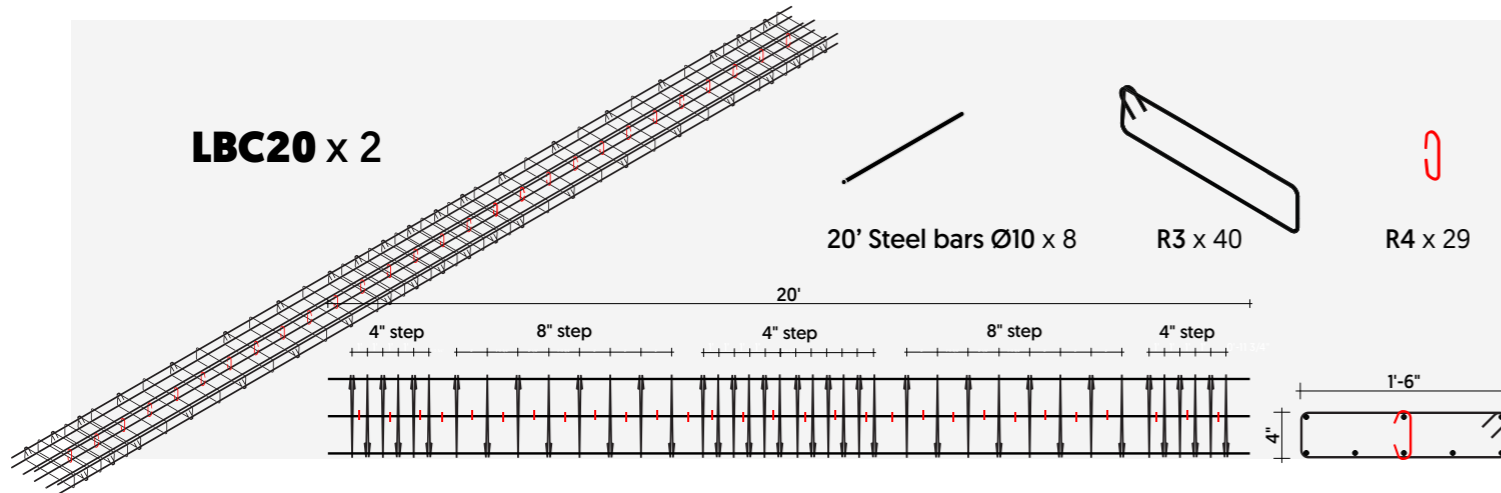
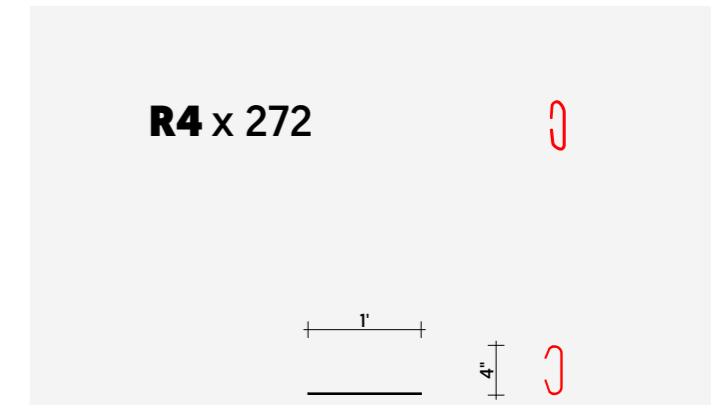
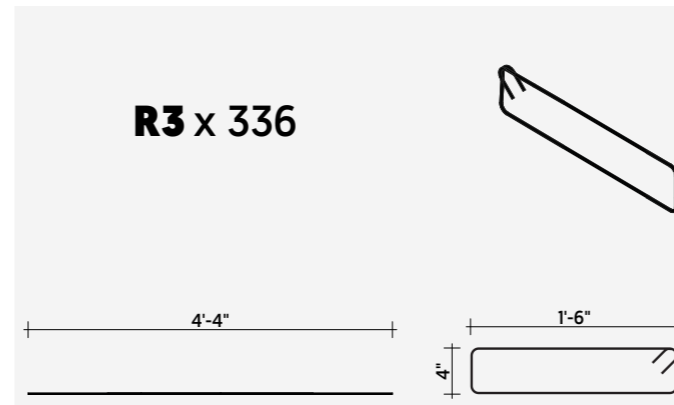
1.3 RCC STRUCTURE PREFABRICATION



Refers to **APPENDIX B** to figure out rules of reinforcement making.



- ① Iron rings **R3 & R4**
- ② Lower iron beam composite **LBC20, LBC16, LBC14 & LBC7**
- ③ Iron pillars **P1 & P2**

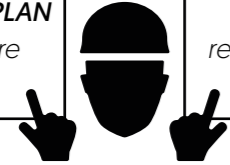


2 FOUNDATION

Scale 1/150 North

2.1 EARTHWORK LAYOUT

Refer to the **FOUNDATION PLAN** to check more cotations.



Keep central axis line position as reference until wall building stage.

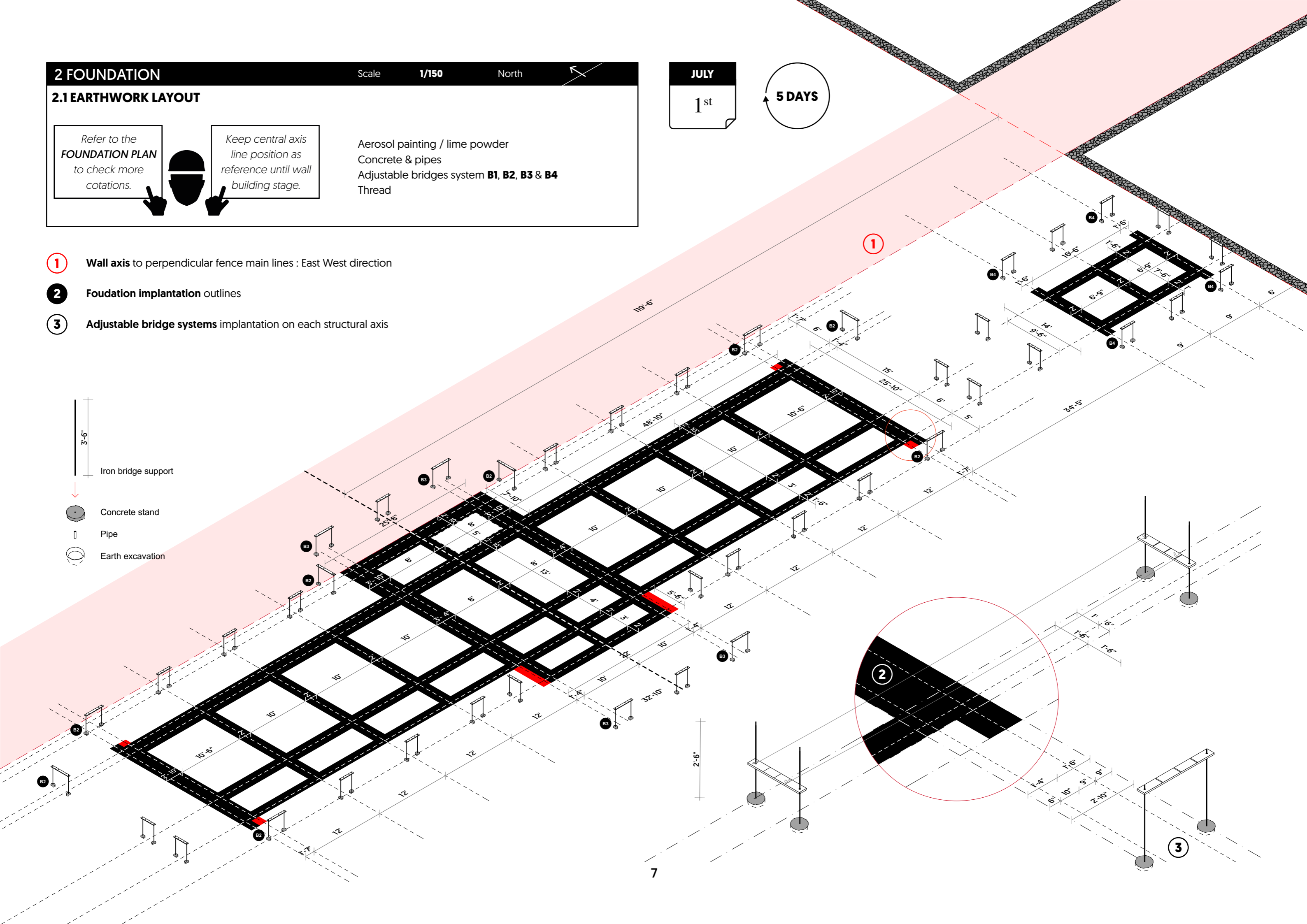
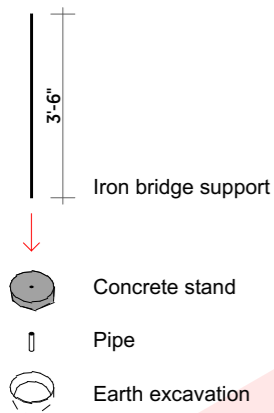
Aerosol painting / lime powder
Concrete & pipes
Adjustable bridges system **B1, B2, B3 & B4**
Thread

JULY

1st

5 DAYS

- 1 Wall axis to perpendicular fence main lines : East West direction
- 2 Foudation implantation outlines
- 3 Adjustable bridge systems implantation on each structural axis



2 FOUNDATION

Scale

1/150

North



2.2 EXCAVATION



Cross-check with
FOUNDATION PLAN
for more accurate
measures.



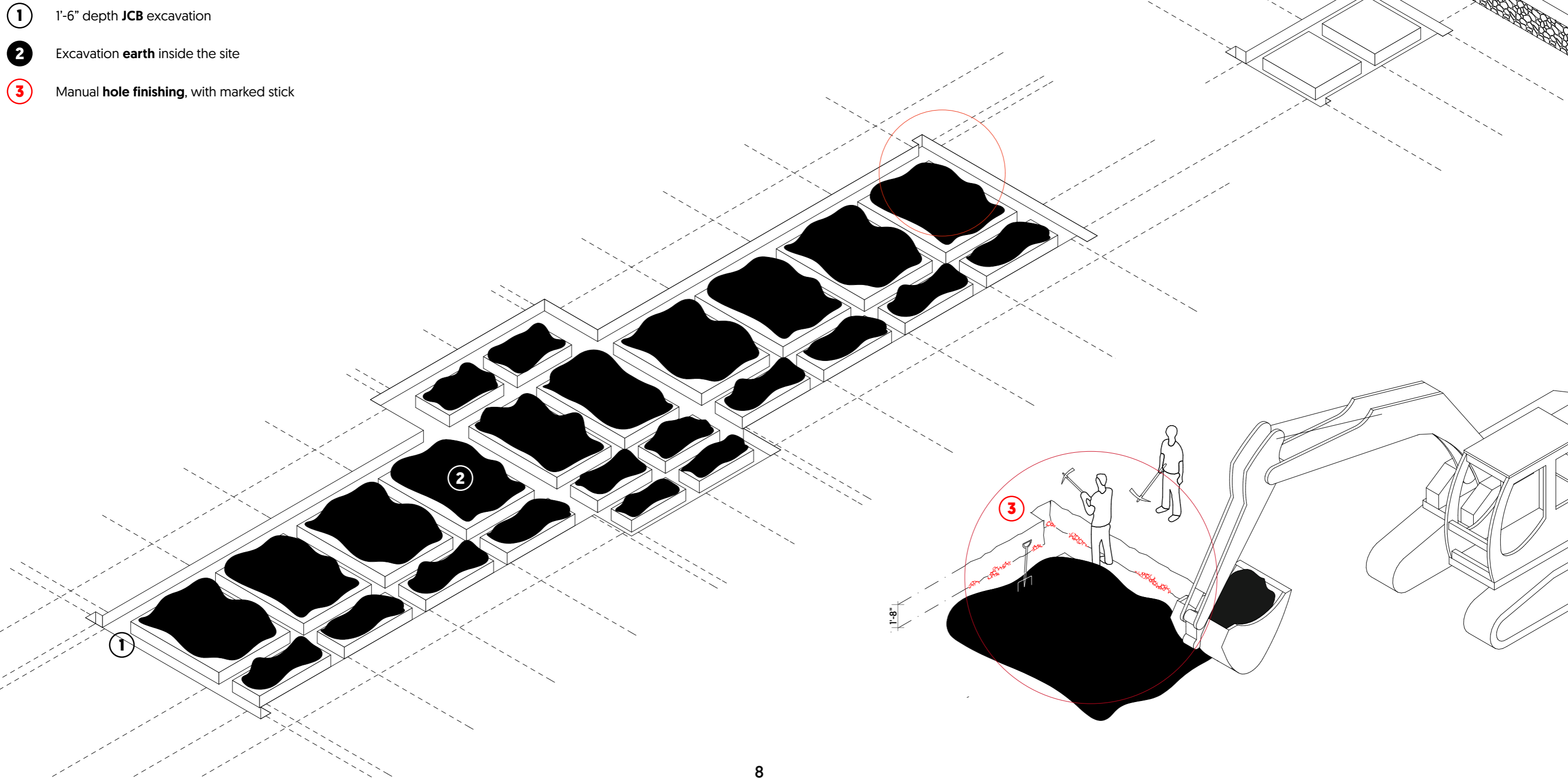
JCB excavator with 2 pot size
1'-6" Marked stick
Pickax
Shovel

JULY

5th

3 DAYS

- 1 1'-6" depth JCB excavation
- 2 Excavation **earth** inside the site
- 3 Manual **hole finishing**, with marked stick



2 FOUNDATION

Scale

1/150

North



2.3 LOWER PILLARS SET UP



Adjust every bridge system threads to obtain wall & pillar thickness.



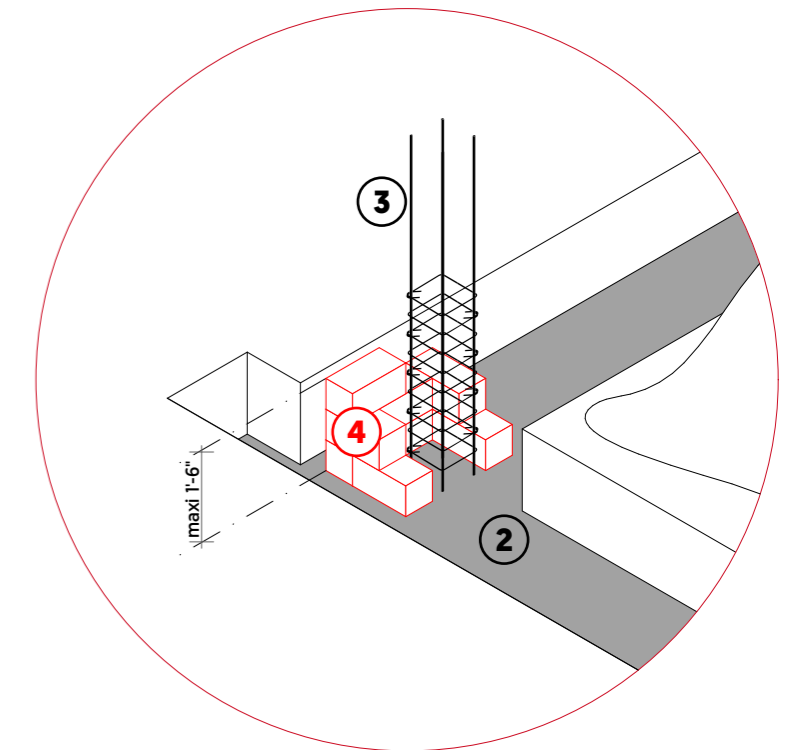
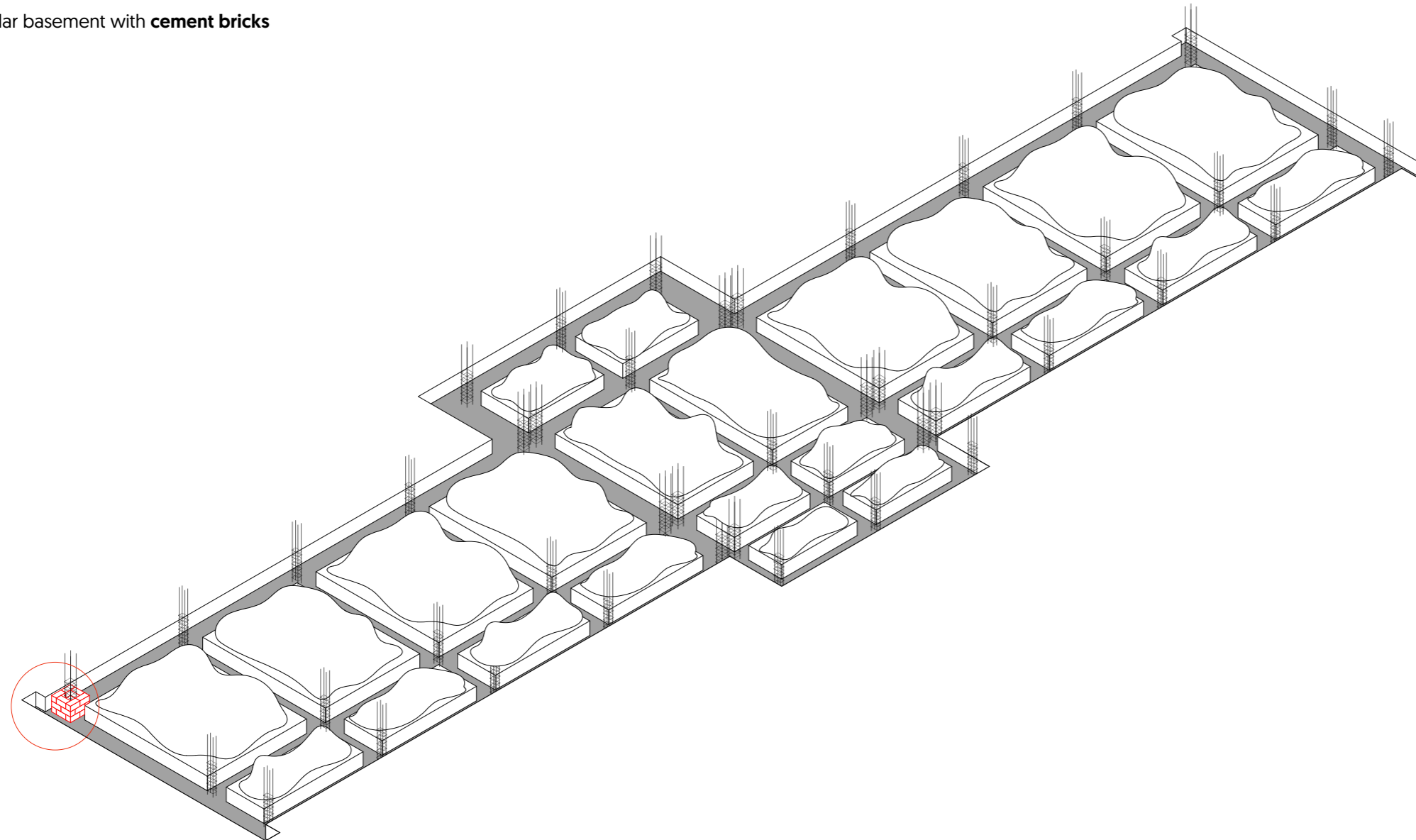
Concrete
Cement bricks
Lower iron pillars **LP1 & LP2**

JULY

8th

4 DAYS

- 1 Steel bar pillars location according structure plan (optional)
- 2 Concrete bedding 1" thickness
- 3 Pillars marking and layout
- 4 Pillar basement with **cement bricks**

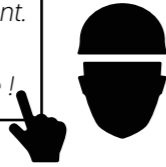


2 FOUNDATION

Scale 1/150 North

2.4 STONE FOUNDATION

Use well shaped stones for external facade of basement.
Check concrete pillars finishings on south facade!



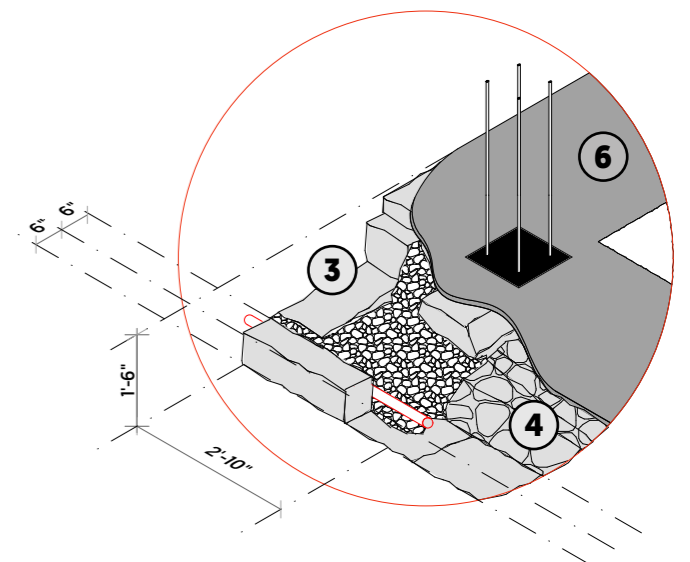
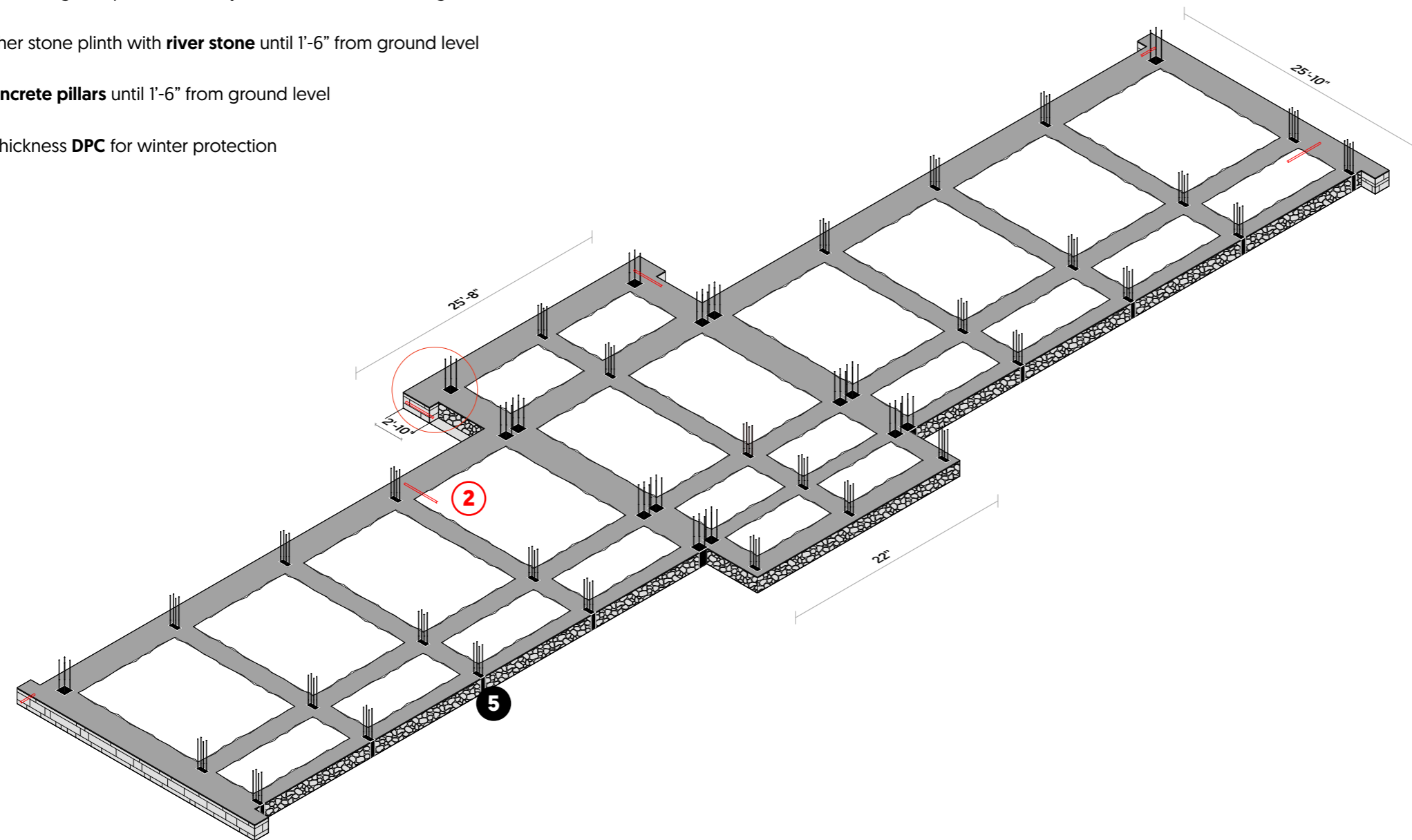
Shaped stone & river stone
Pipes D4"
Level checking laser or pipe
Wooden formwork
Concrete

JULY


12th

10 DAYS

- 1 Underground foundation with **rough cutted stone** wall, laid with **cement mortar**
- 2 **Sloped pipes** for water outlet and rain water, 2" from ground level
- 3 Outside big wall plinth with **shaped stone** until 1'-6" from ground level
- 4 Other stone plinth with **river stone** until 1'-6" from ground level
- 5 **Concrete pillars** until 1'-6" from ground level
- 6 1" thickness **DPC** for winter protection



3 LOWER CONCRETE BEAM

Scale **1/150** North 

3.1 RCC BEAMS LAYOUT & LINKS



Refers to junction details
in **APPENDIX C**.
The more you use it,
the stronger it will be.



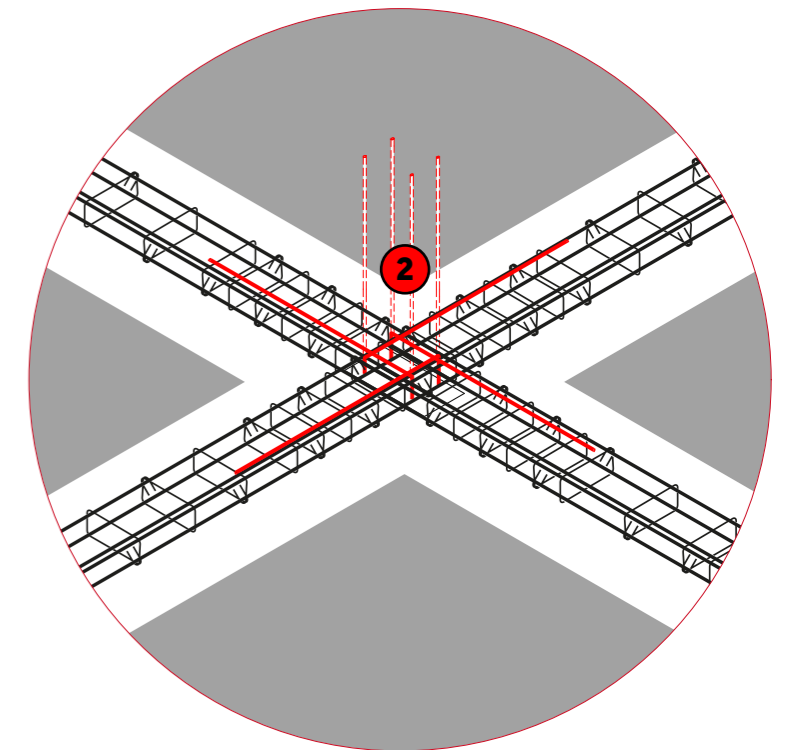
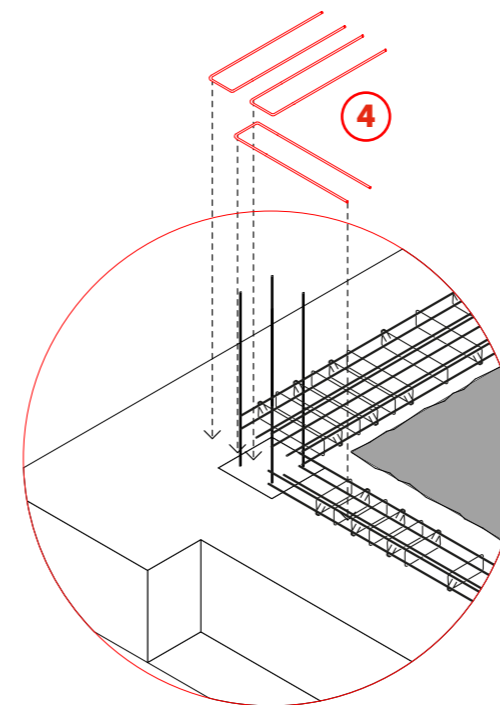
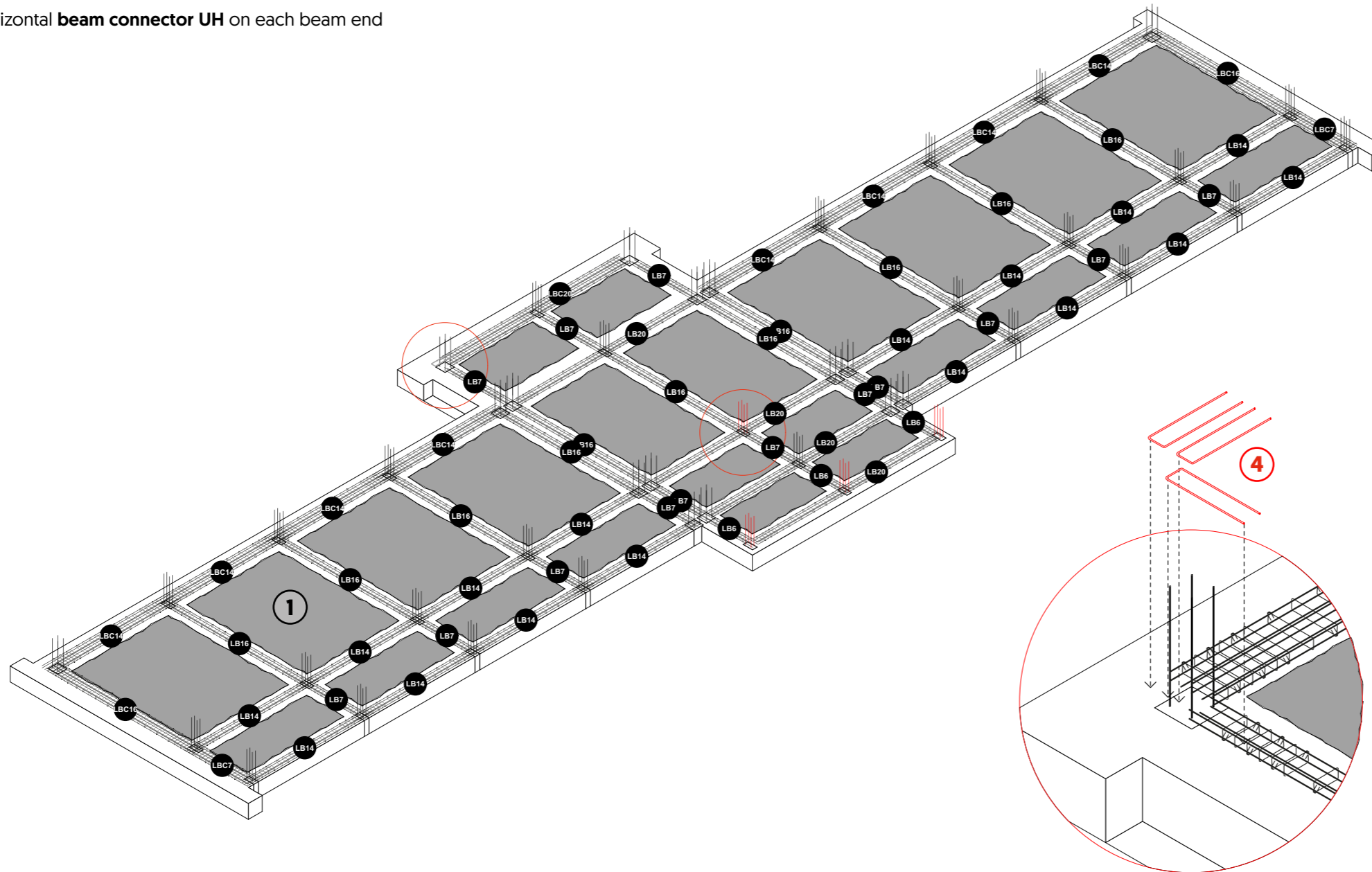
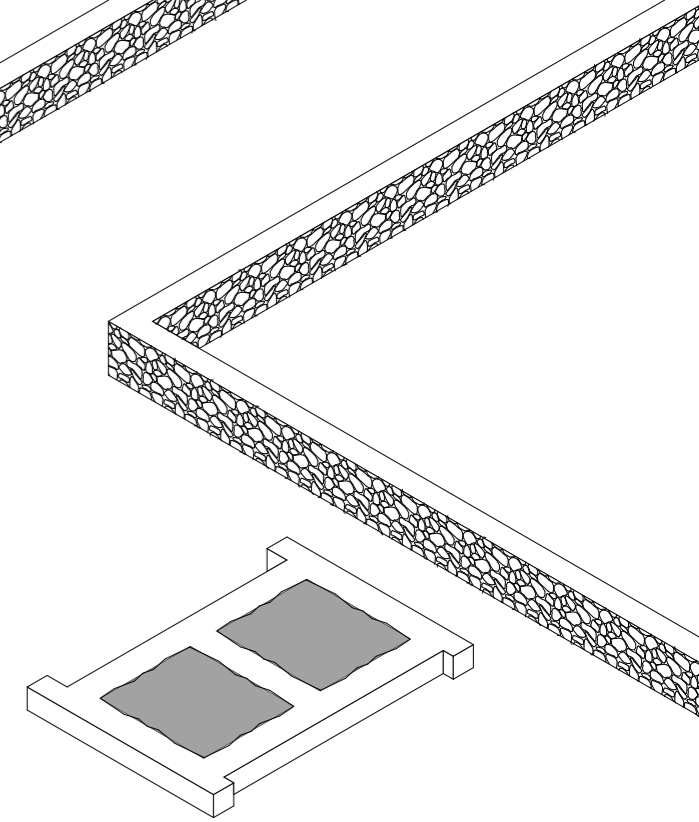
Iron beam 20'	LBC20 x 1	LB20 x 3
Iron beam 16'	LBC16 x 2	LB16 x 11
Iron beam 14'	LBC14 x 8	LB14 x 16
Iron beam 7'	LBC7 x 2	LB7 x 14
Iron beam 6'	LB6 x 3	
Horizontal beam connector	UH x 145	

JULY

22nd

2 DAYS

- 1** Backfill with excavation **earth**
- 2** Folded **steel bars**
- 3** Lower **iron beam LB** and **LBC** layout
- 4** Horizontal **beam connector UH** on each beam end



3 LOWER CONCRETE BEAM

Scale 1/150 North

3.2 POURING LOWER RING BEAM



Before pouring concrete,
put vertical links for next
coming pilars



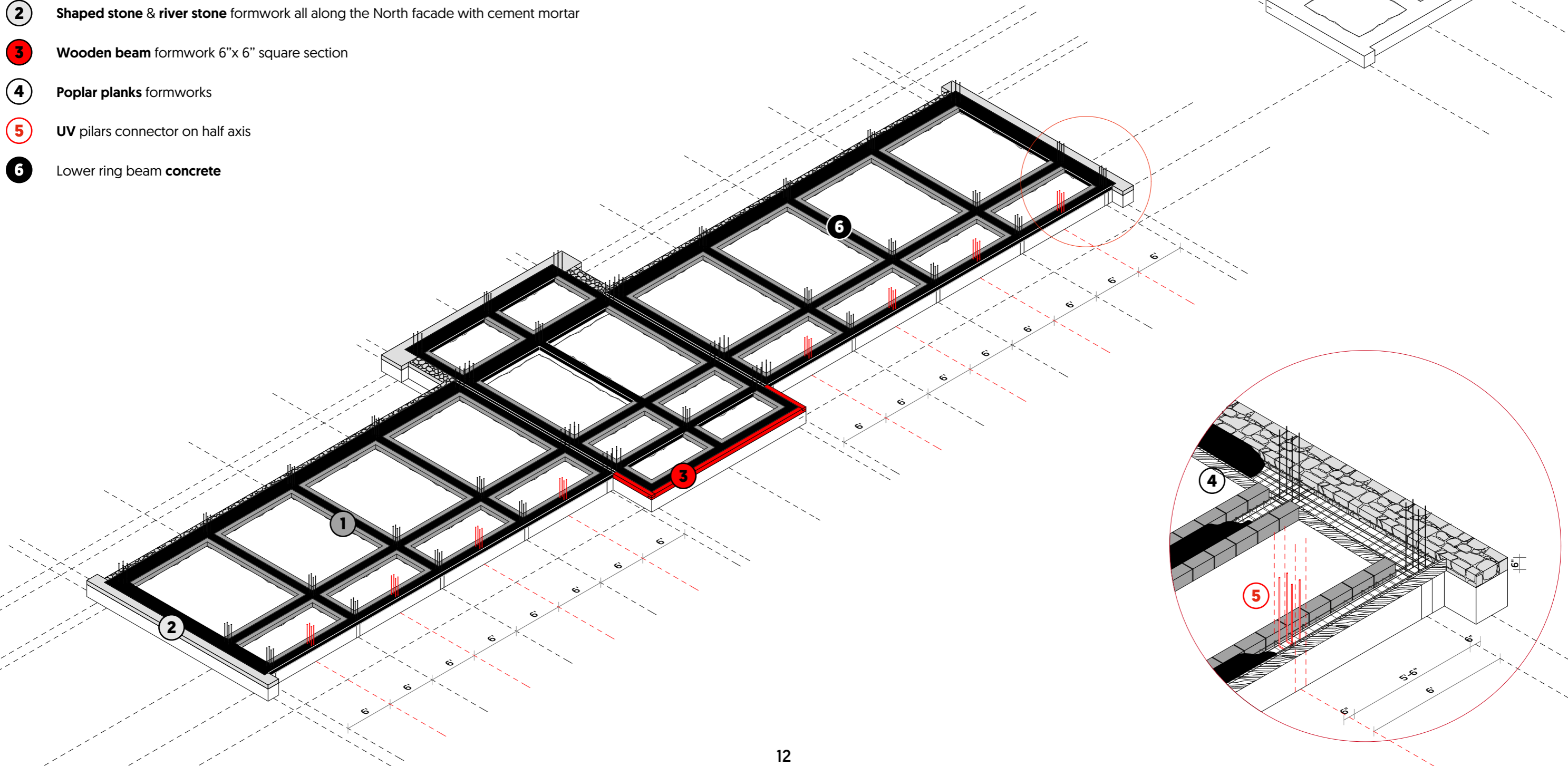
Cement bricks
Shaped stone & river stone
Wooden beam 6"x 6" section
Poplar planks formwork 1"x 6" section
Vertical pillar connector **UV** x 16
Concrete

JULY

24th

5 DAYS

- 1 Cement bricks formworks with cement mortar
- 2 Shaped stone & river stone formwork all along the North facade with cement mortar
- 3 Wooden beam formwork 6"x 6" square section
- 4 Poplar planks formworks
- 5 UV pilars connector on half axis
- 6 Lower ring beam concrete



4 WALLS

Scale 1/150 North

4.1 RCC PILLARS



Pillar feet have to be well cleaned from mortar before pouring concrete.



Iron pillars 1 **IP1** x 29
Iron pillars 2 **IP2** x 16

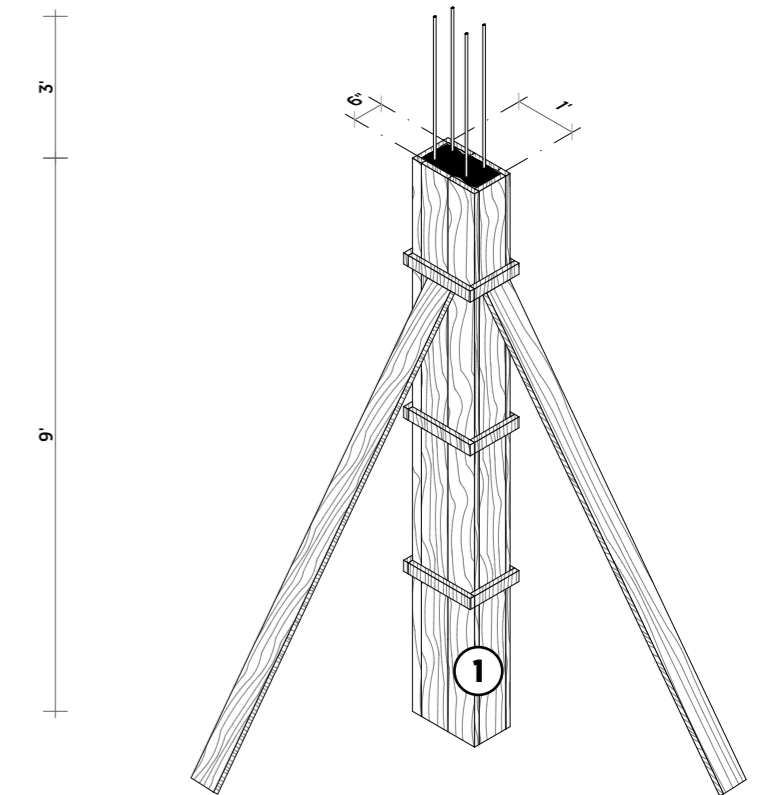
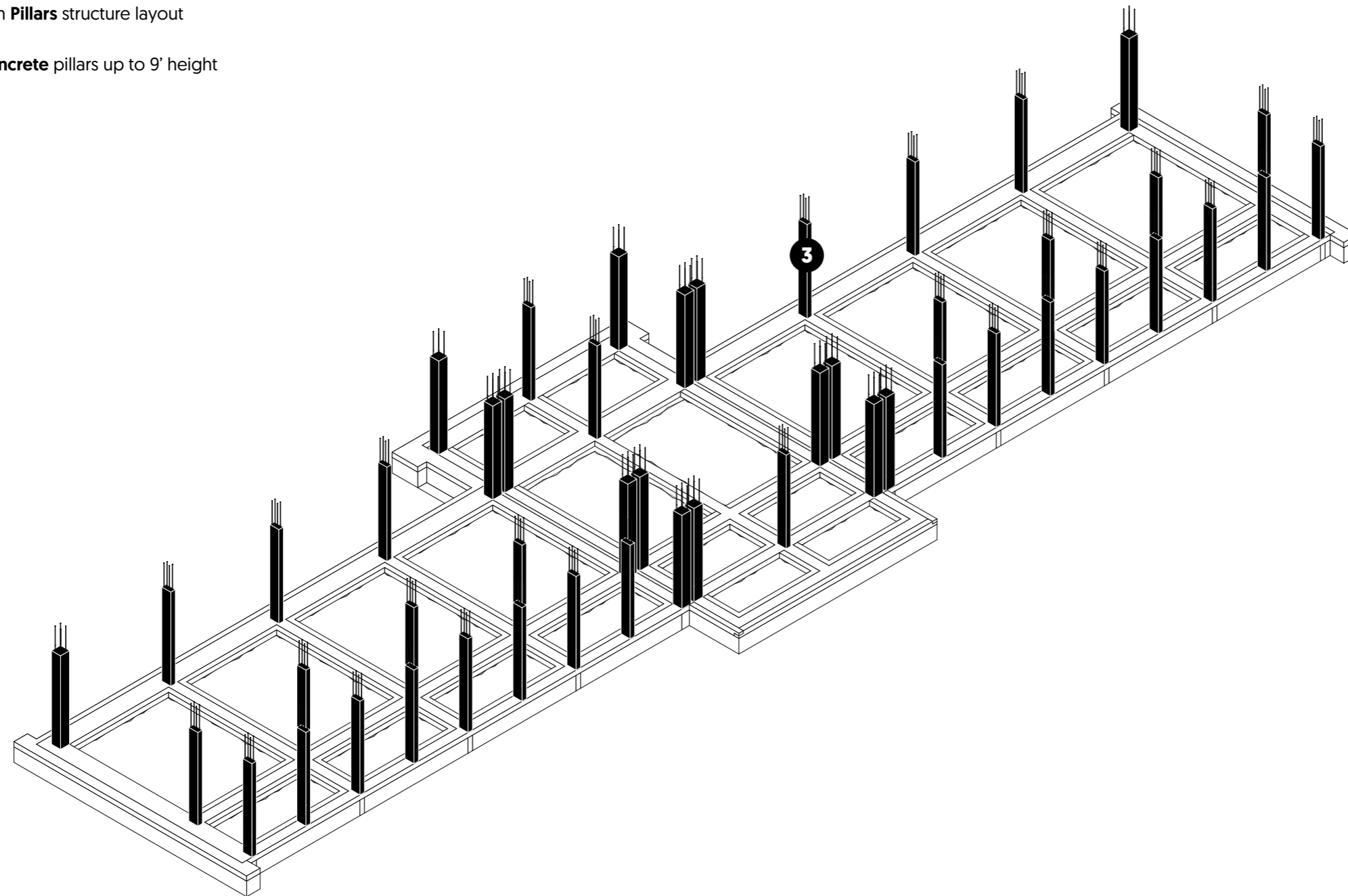
Formworks & brace planks 9' height
Concrete

JULY

29th

10 DAYS

- 1 Half quantity **formworks** 9' height
- 2 Iron **Pillars** structure layout
- 3 **Concrete** pillars up to 9' height



4 WALLS

Scale

1/150

North



4.2 STONE & CEMENT WALL

Refer to **APPENDIX A** for brick bond & **PLANS** for wall dimensions.



All external wall are double wall with gap for insulation reinforcement !

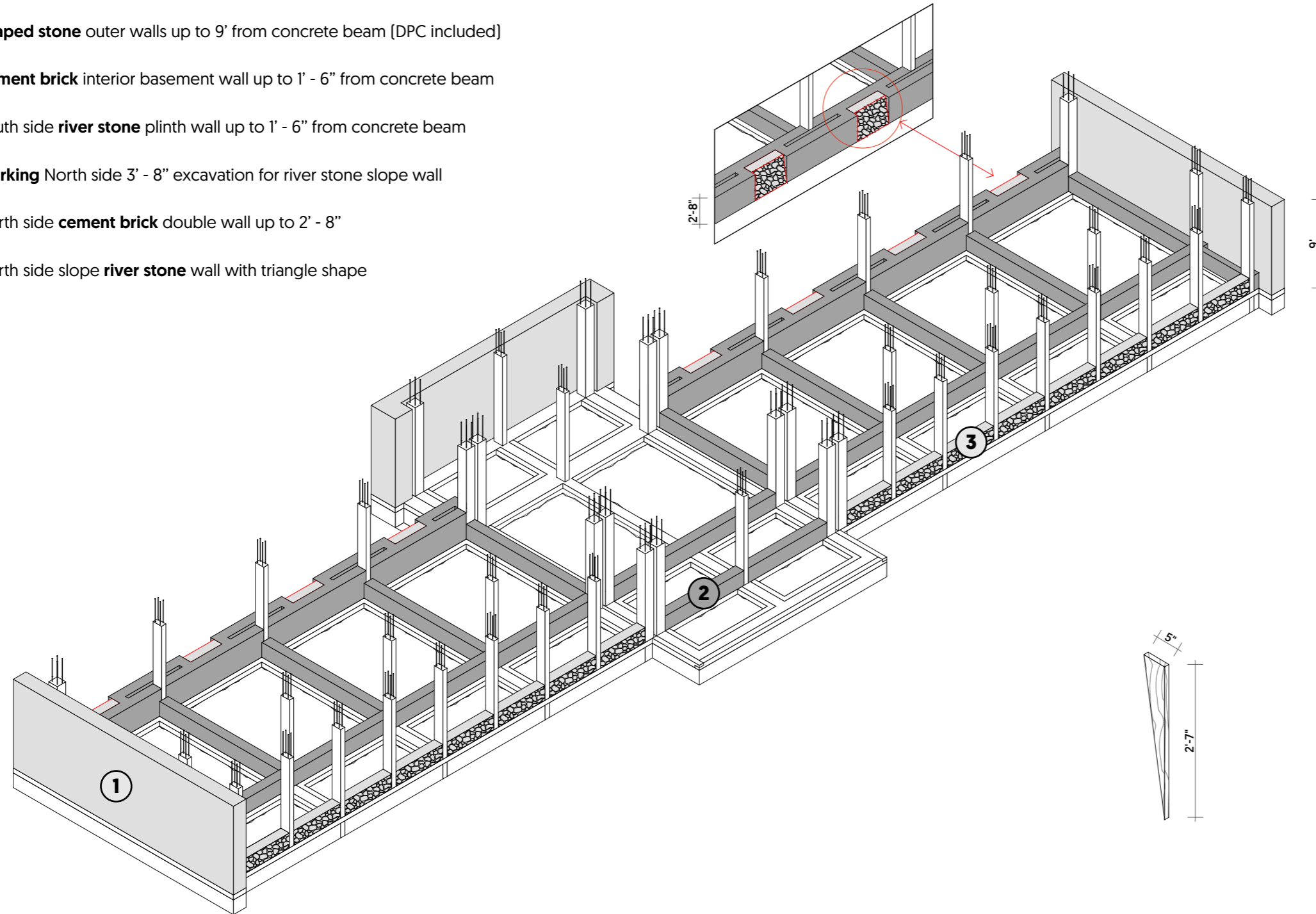
- Cement bricks
- Mud bricks
- Shaped stone
- River stone
- Marker & wooden plank triangle shape

AUGUST

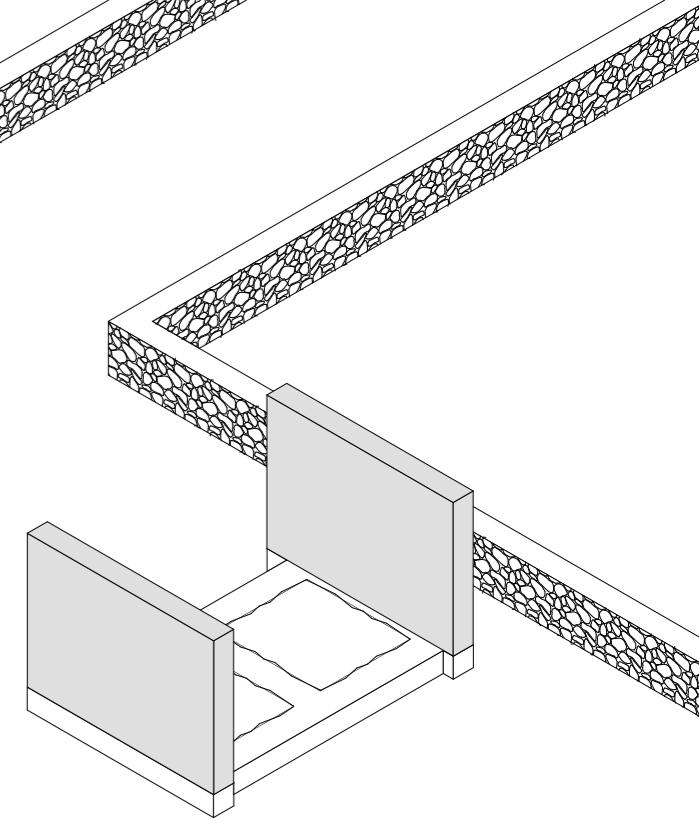
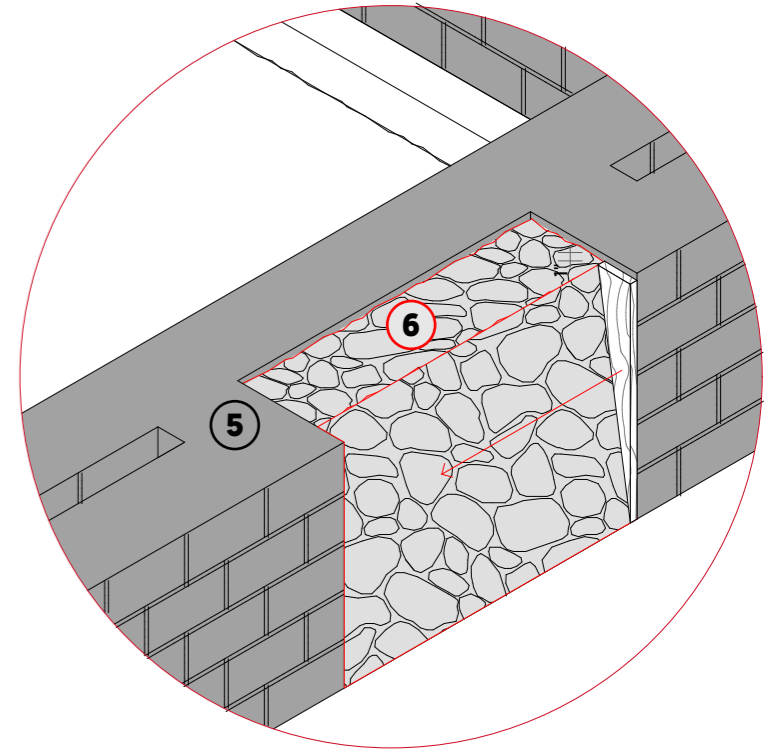
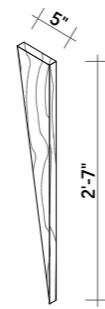
8th


12 DAYS

- 1 Shaped stone outer walls up to 9' from concrete beam (DPC included)
- 2 Cement brick interior basement wall up to 1' - 6" from concrete beam
- 3 South side river stone plinth wall up to 1' - 6" from concrete beam
- 4 Marking North side 3' - 8" excavation for river stone slope wall
- 5 North side cement brick double wall up to 2' - 8"
- 6 North side slope river stone wall with triangle shape




9'



4 WALLS Scale **1/150** North 

4.3 BACKFILL & DPC

Backfilling is important before winter to take time to subside.



DPC is a wall protection until next year.

Shovel

JCB excavator

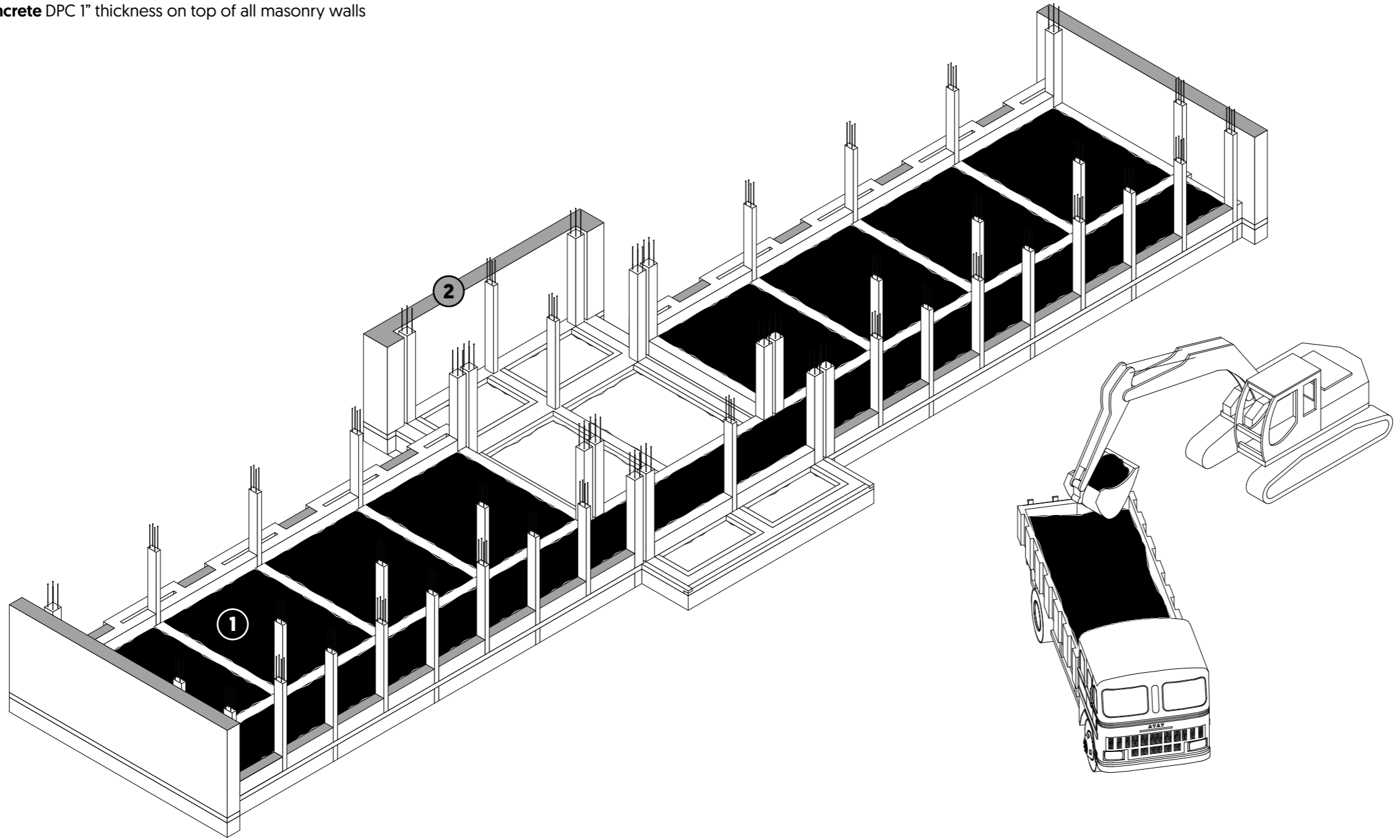
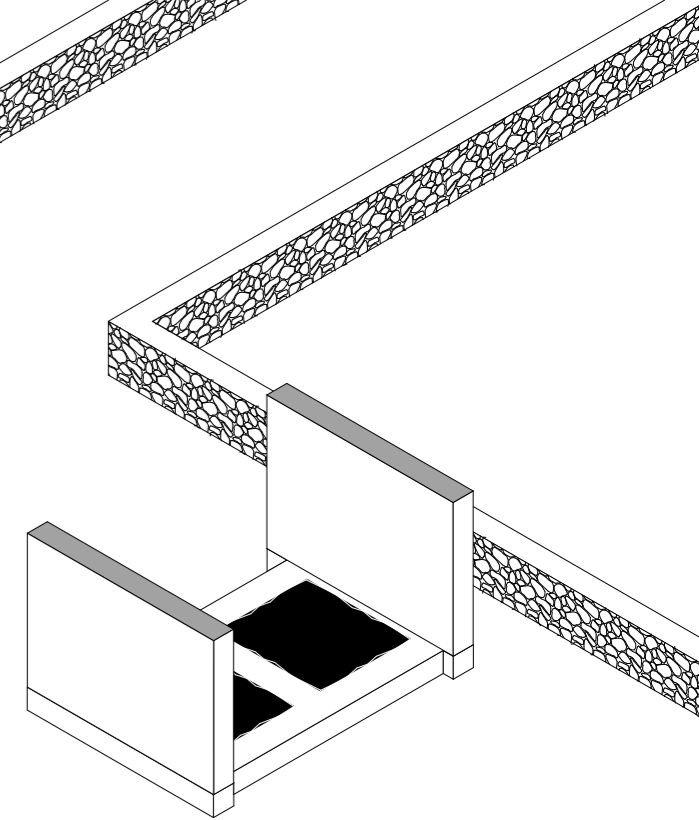
Concrete

AUGUST

20th

4 DAYS

- 1** JCB backfilling and shovel spreading
- 2** Concrete DPC 1" thickness on top of all masonry walls



5.1 CARPENTRY WORK

Make sure you have got all the **WOOD** required for roof structure... as well as **WINDOW FRAMES** from the carpenter.

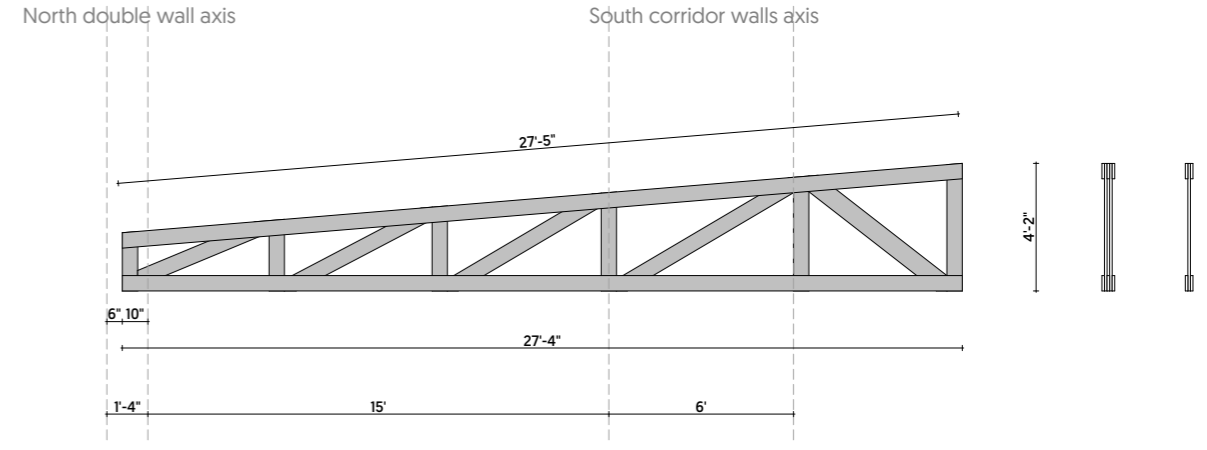
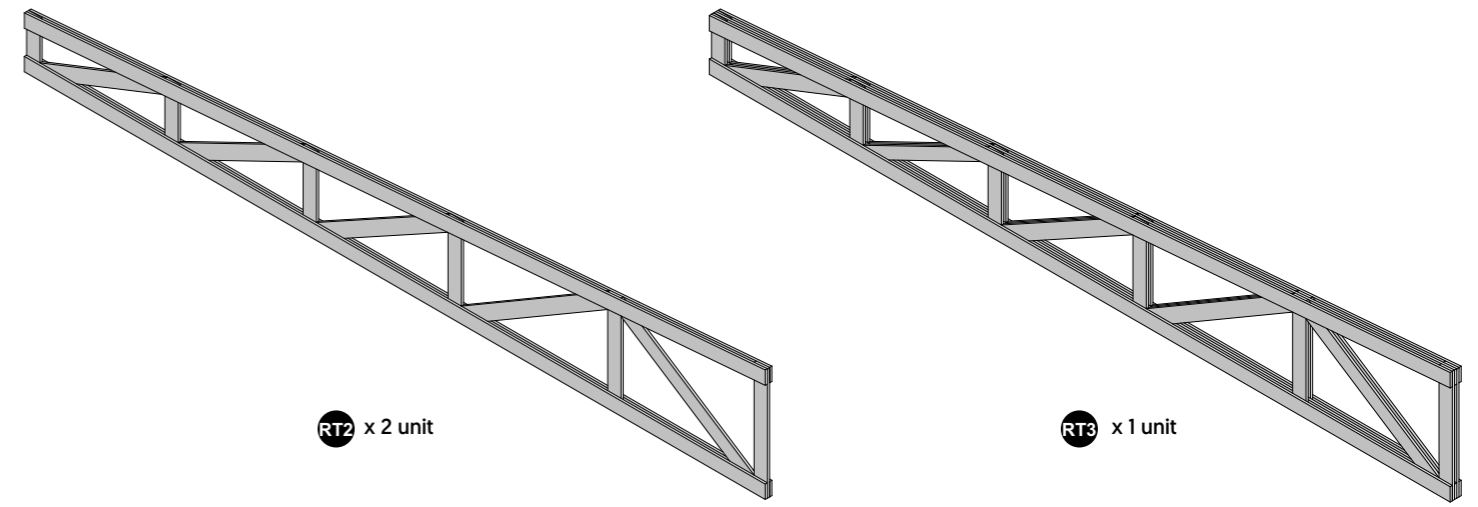
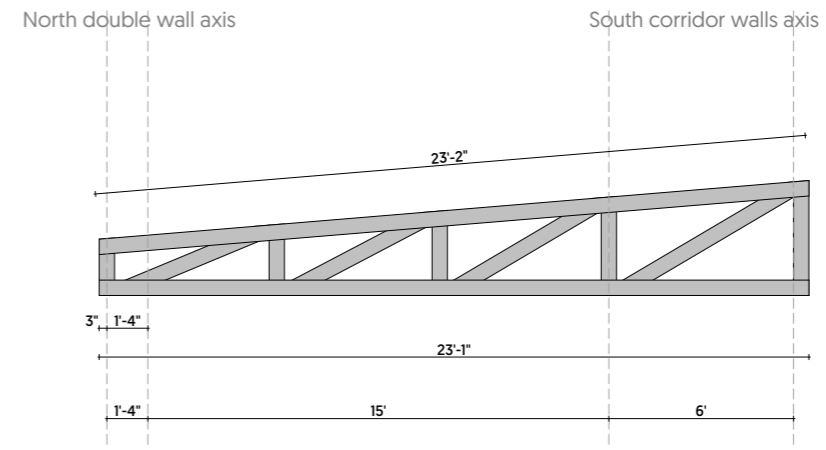
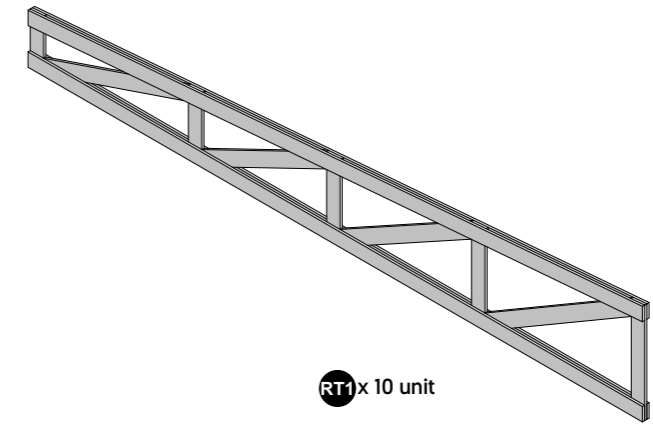
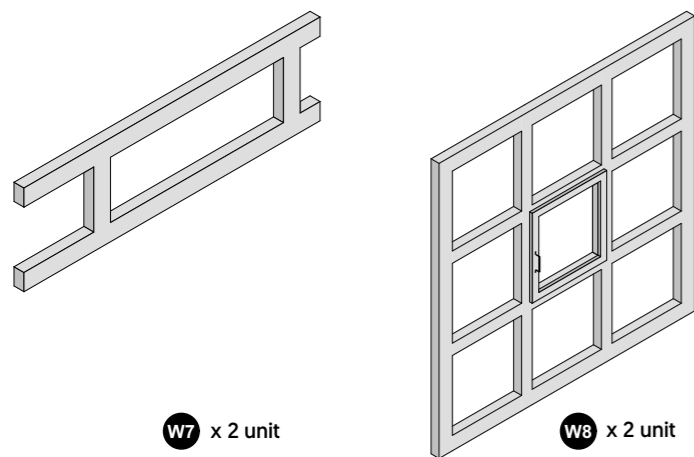
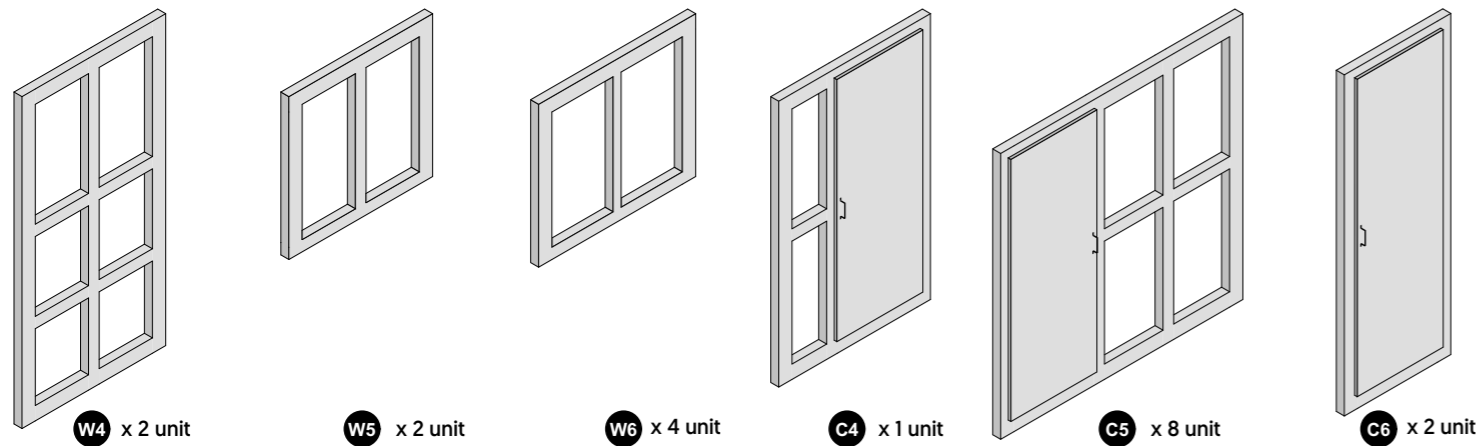
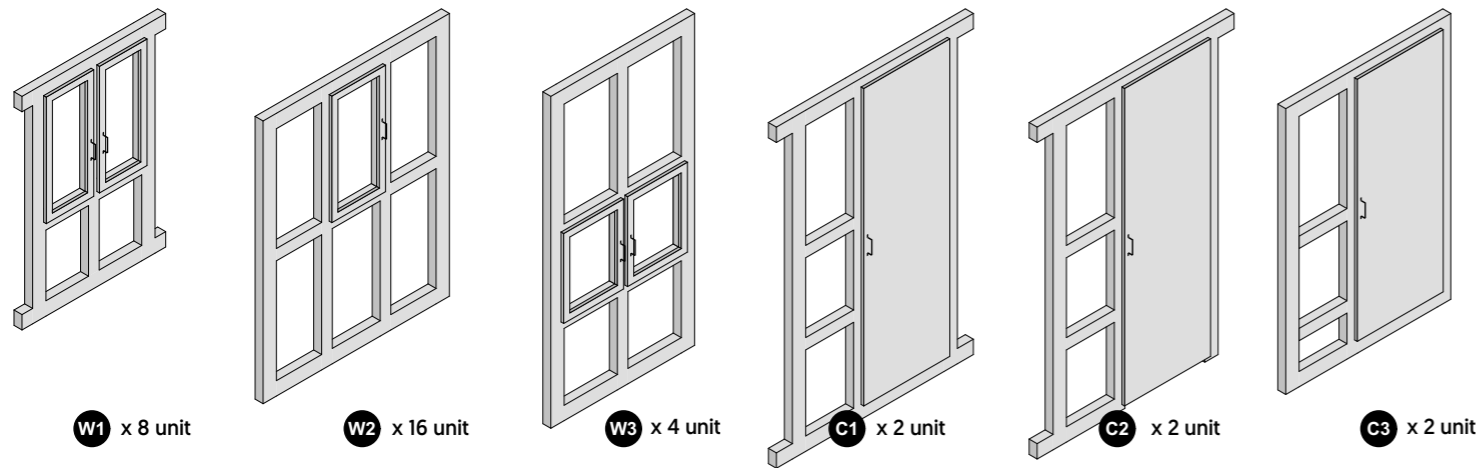


Now, start **RCC STRUCTURE** at first.

ALL DOORS, WINDOWS & COMPOSITE FRAMES

WOODEN TRUSS MATERIALS

Wooden planks 1" x 6" section
Effective wood length : 2 000'
Effective wood volume : 85 cft

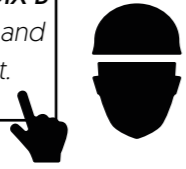


5 PREFABRICATION

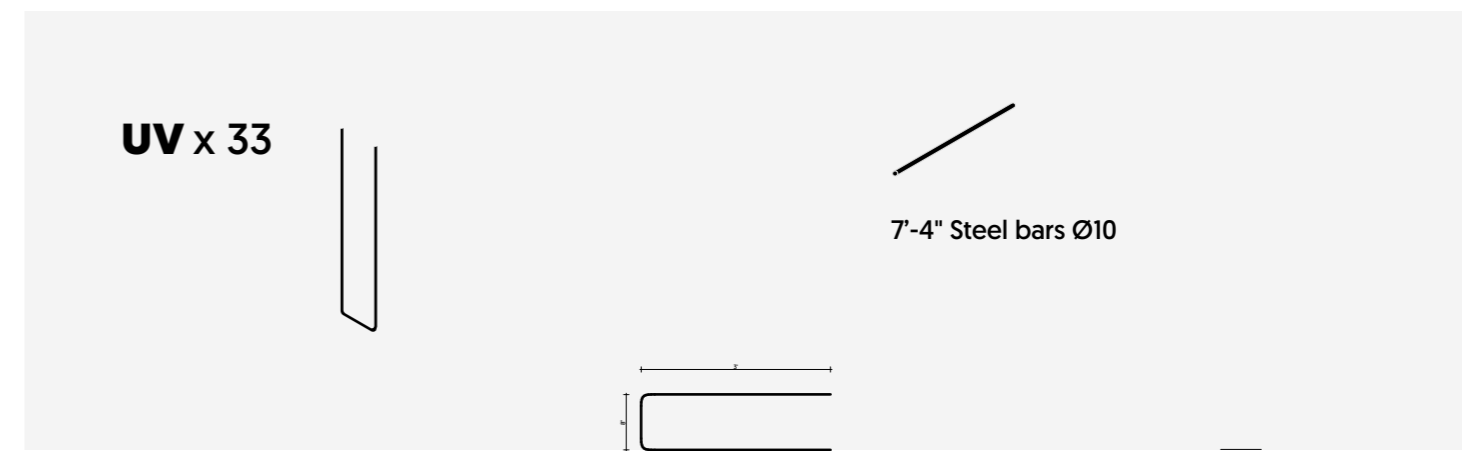
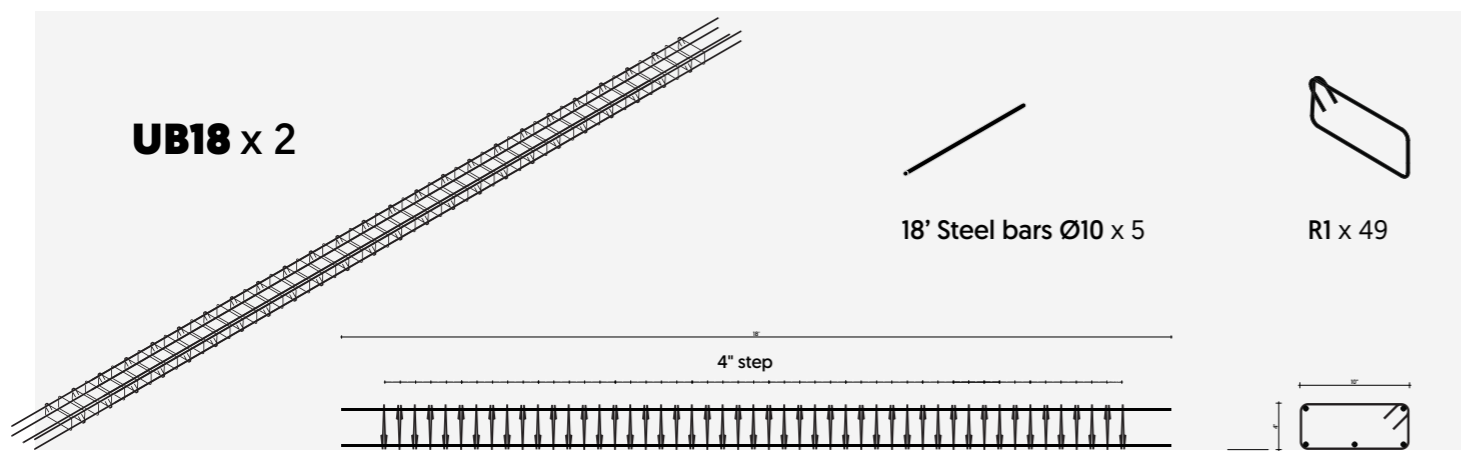
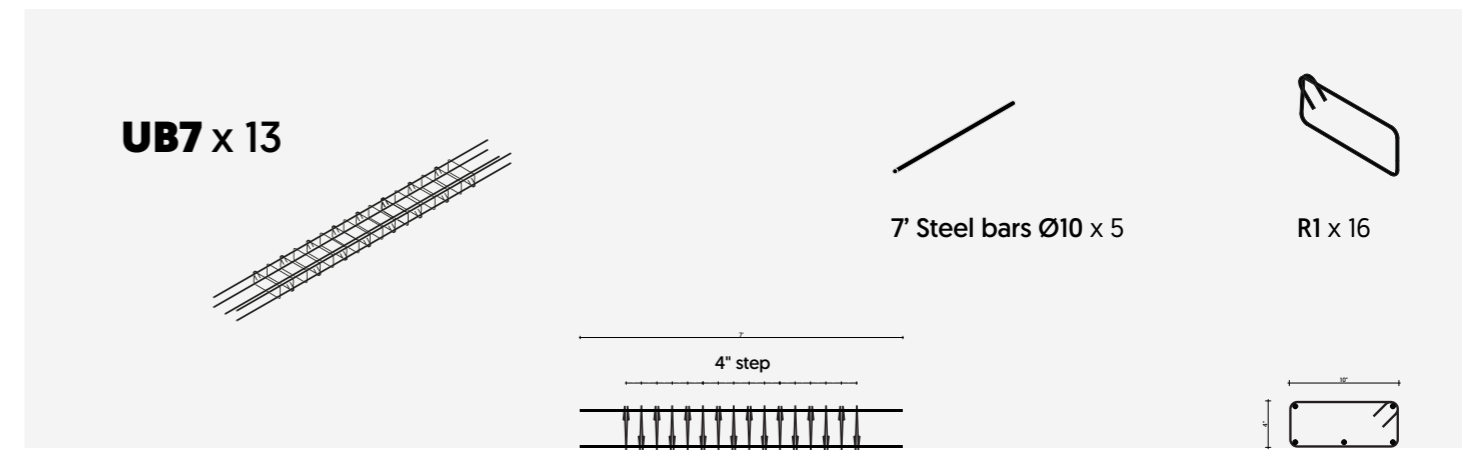
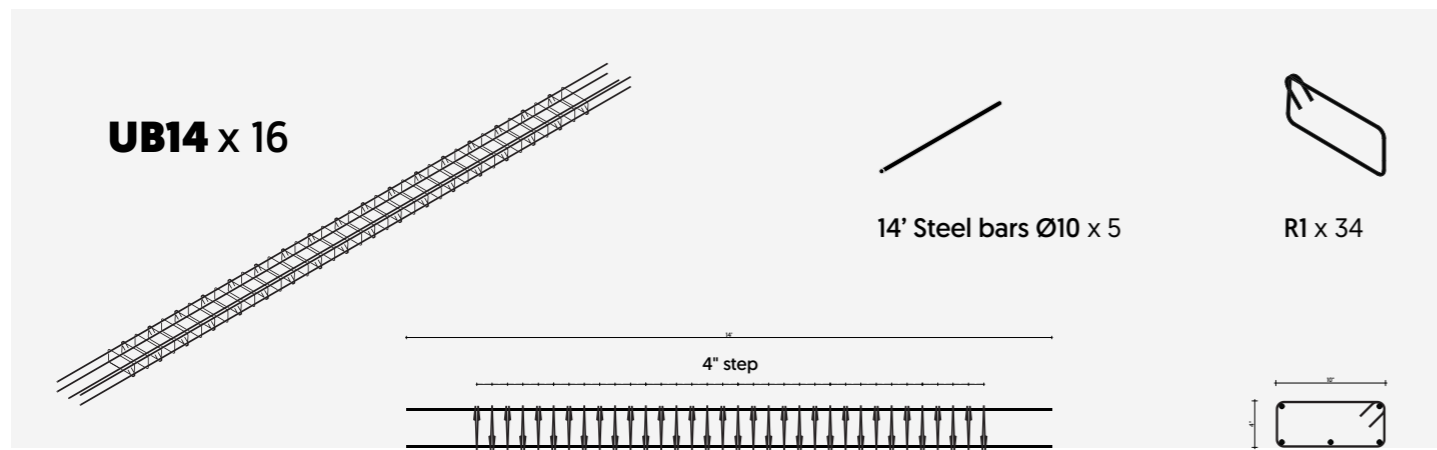
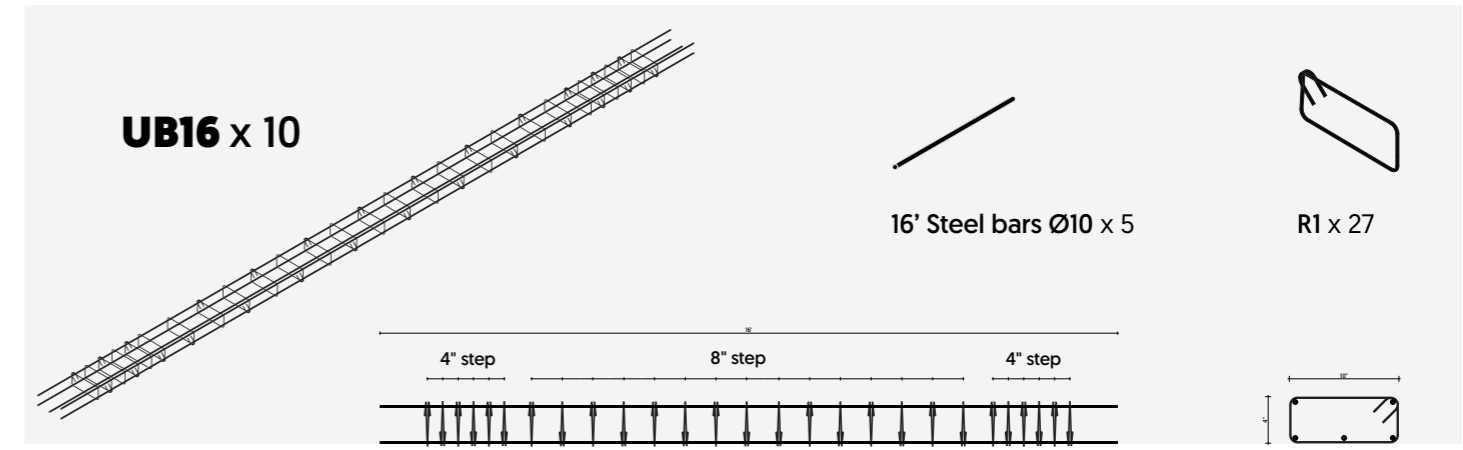
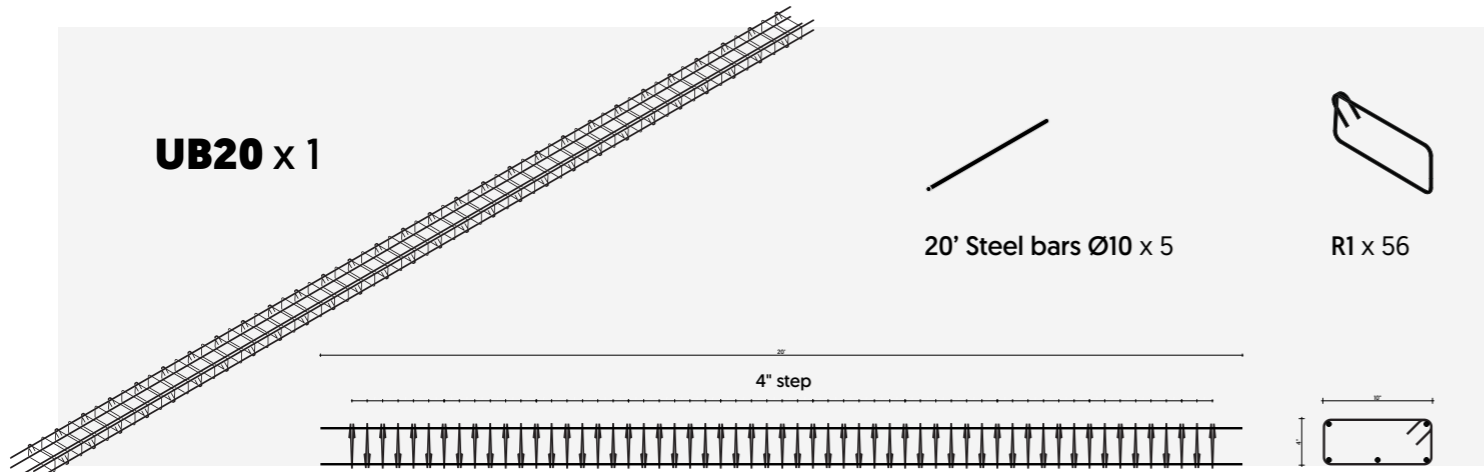
5.2 RCC STRUCTURE PREFABRICATION



Refers to the **APPENDIX B** to see how to make and use reinforcement.



- ① Iron ring **R1**
- ② Upper iron beam **UB20, UB16, UB14, UB7 & UB18**
- ③ Vertical U connector **UV**



5 PREFABRICATION

5.2 RCC STRUCTURE PREFABRICATION

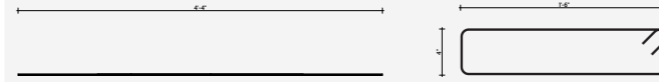
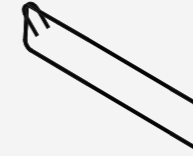


Refers to the **APPENDIX B** to see how to make and use reinforcement.

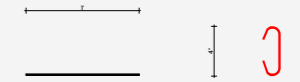


- ① Iron rings **R3 & R4**
- ② Upper iron beam composite **UBC20a, UBC20b, UBC16, UBC14 & UBC7**

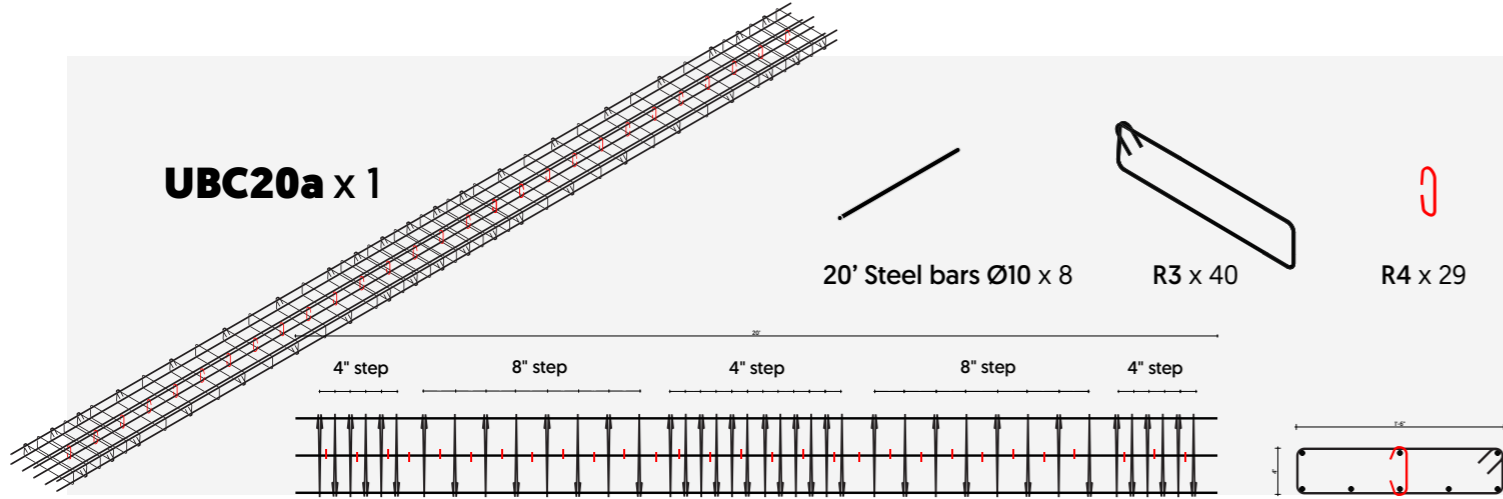
R3 x 452



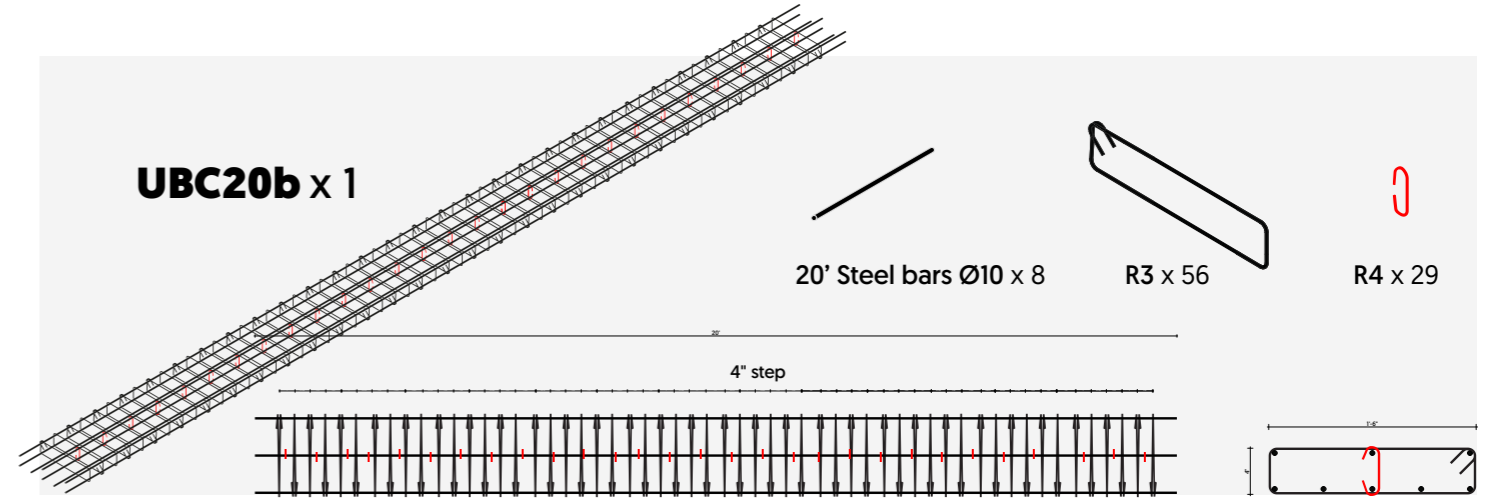
R4 x 270



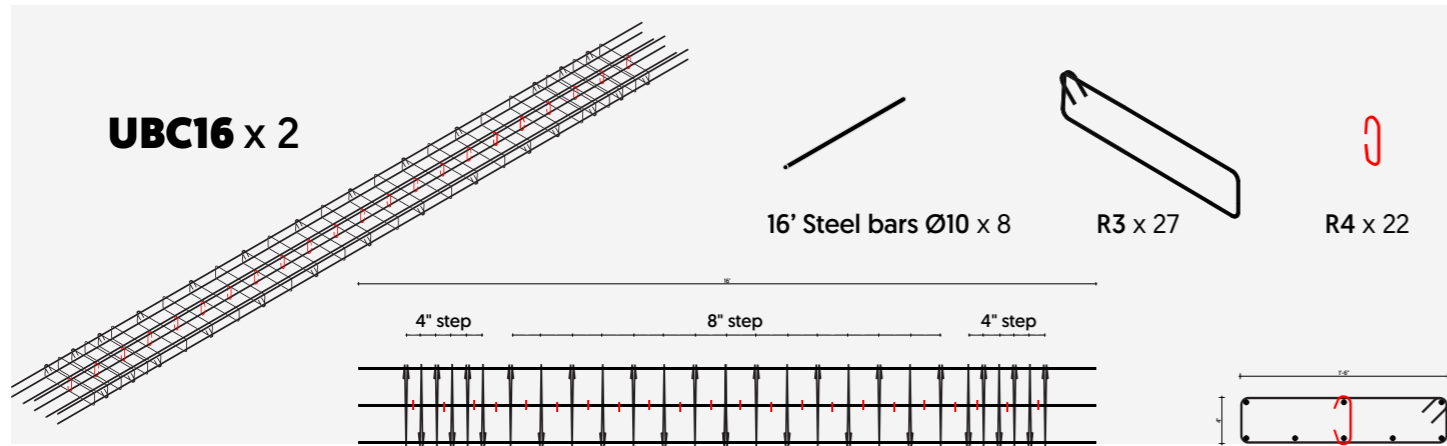
UBC20a x 1



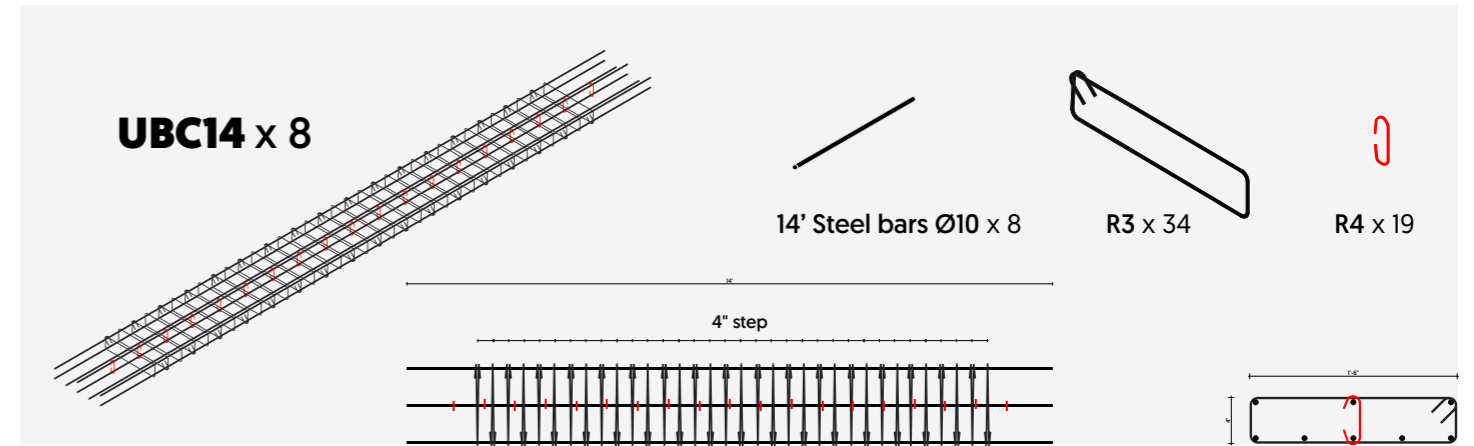
UBC20b x 1



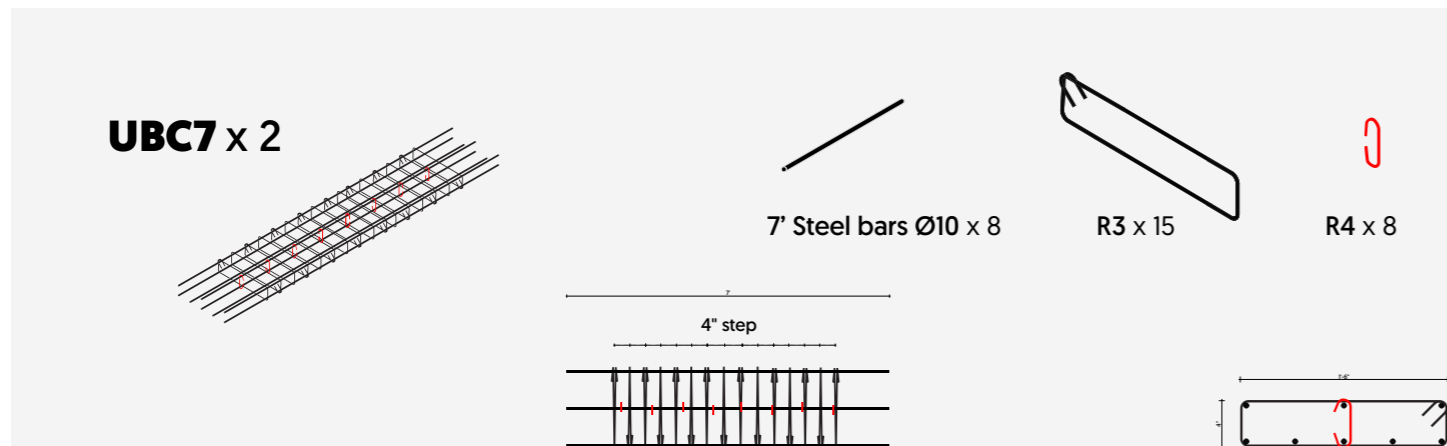
UBC16 x 2



UBC14 x 8



UBC7 x 2



6 RAISING WALLS

Scale

1/150

North



6.1 BRICK WALLS

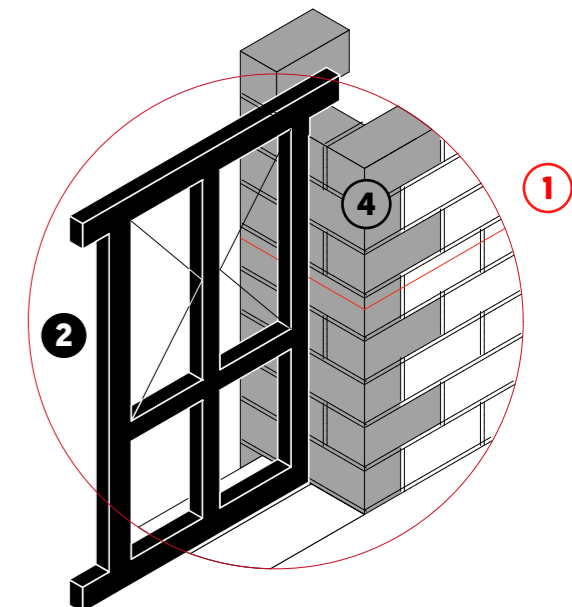
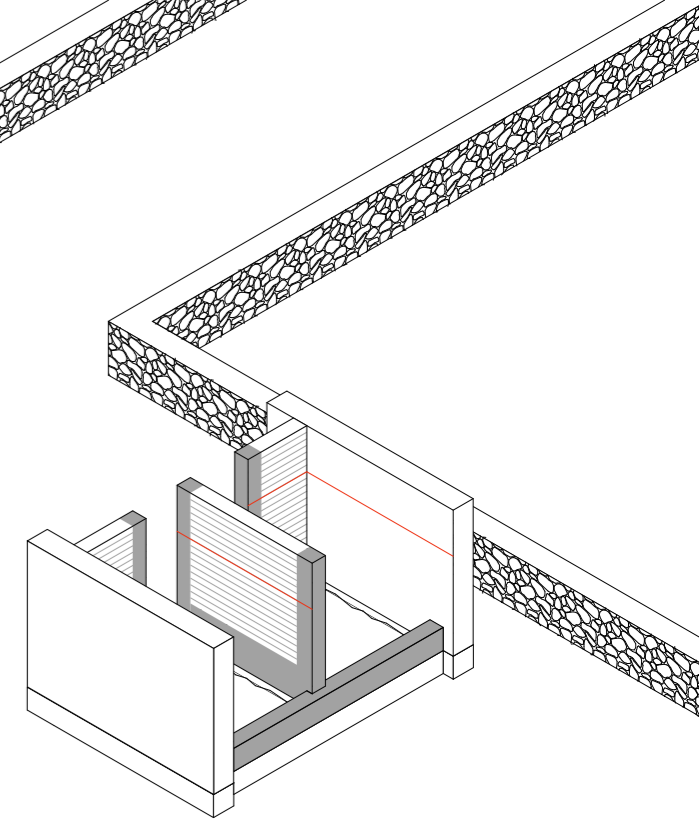
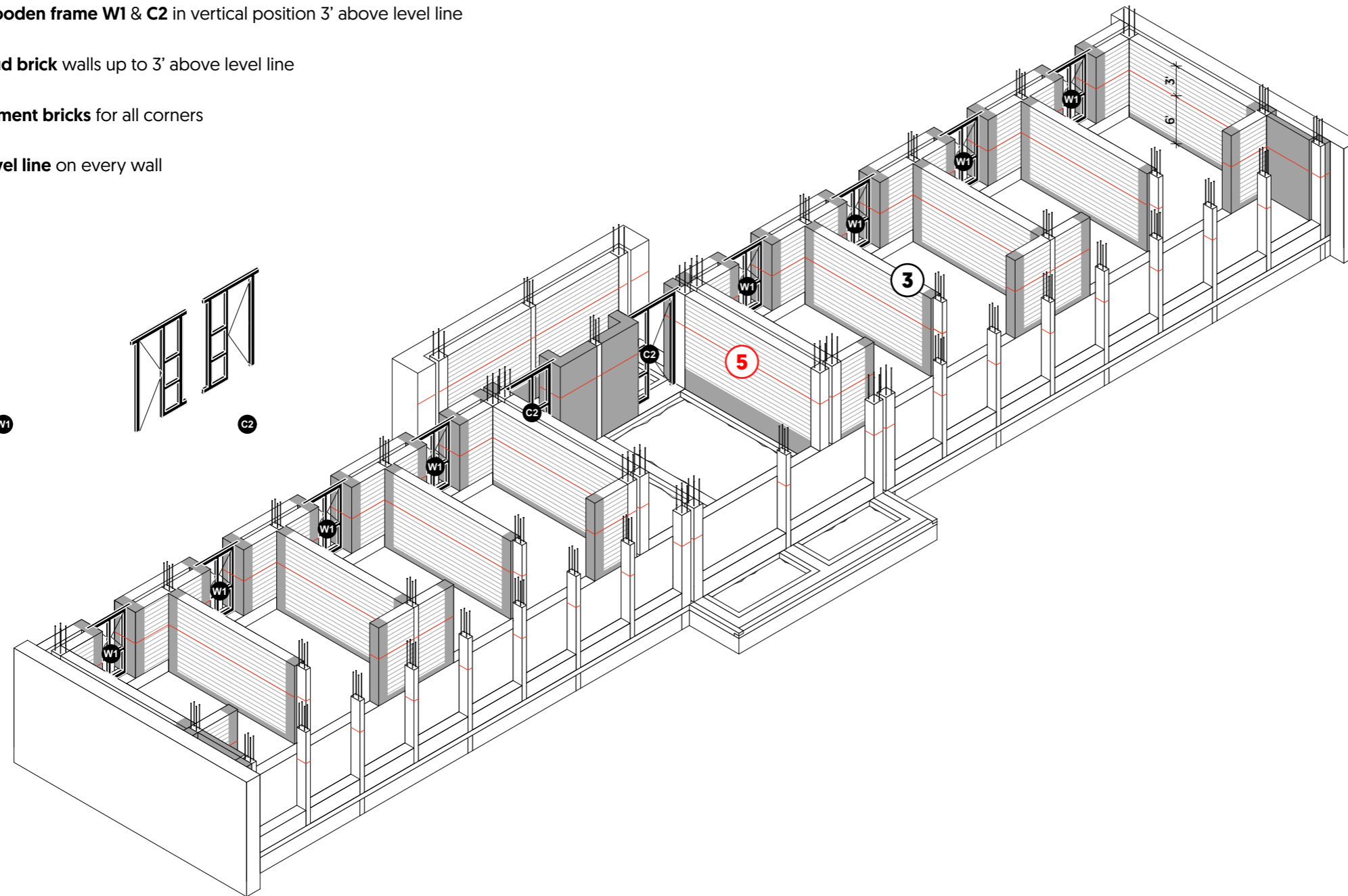
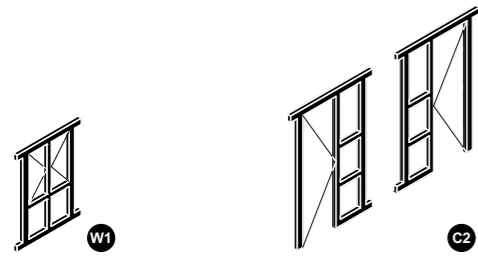


Refer to **APPENDIX A** for brick bond & **WOOD FRAME LAYOUT** for window position.



Wooden frame **W1** & **C2**
Mud bricks
Cement bricks
Marker aerosol or cordex
Mud mortar

- 1 Level line 3' below upper ring beam or 6' above lower ring beam
- 2 Wooden frame **W1** & **C2** in vertical position 3' above level line
- 3 Mud brick walls up to 3' above level line
- 4 Cement bricks for all corners
- 5 Level line on every wall



6 RAISING WALLS

Scale

1/150

North



6.2 WINDOW & DOOR SETUP



Refer to **WOODEN FRAME LAYOUT PLAN** to check dimension from level reference line.



Sawdust insulation

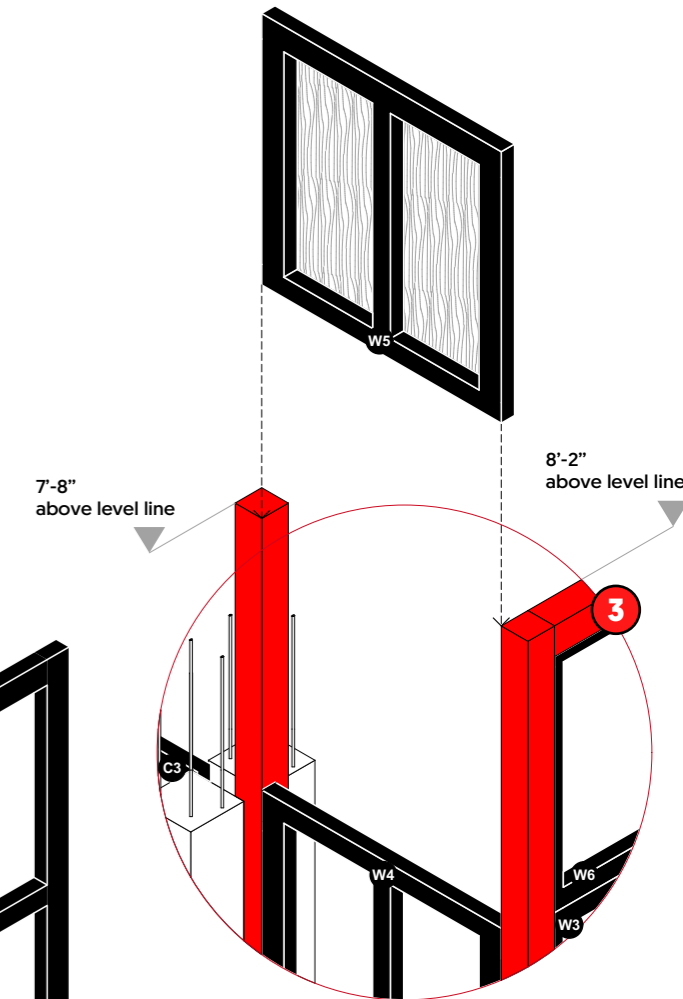
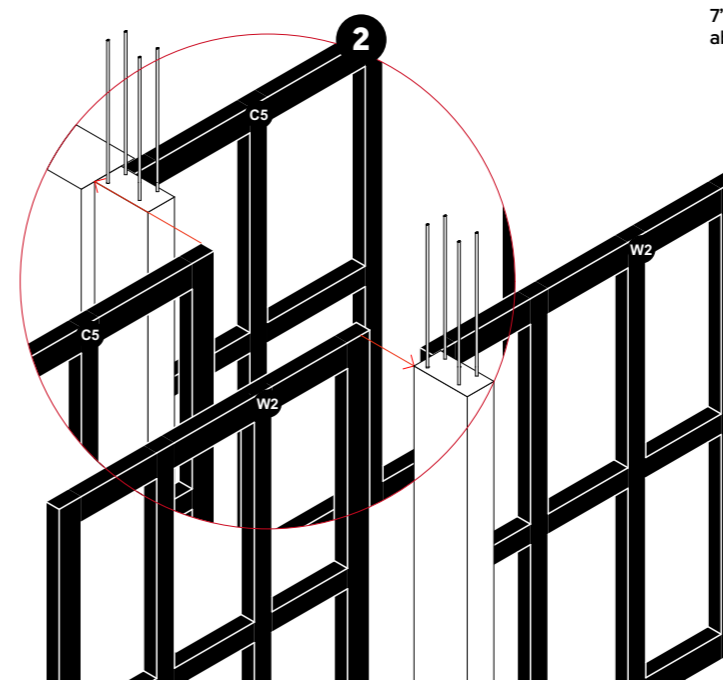
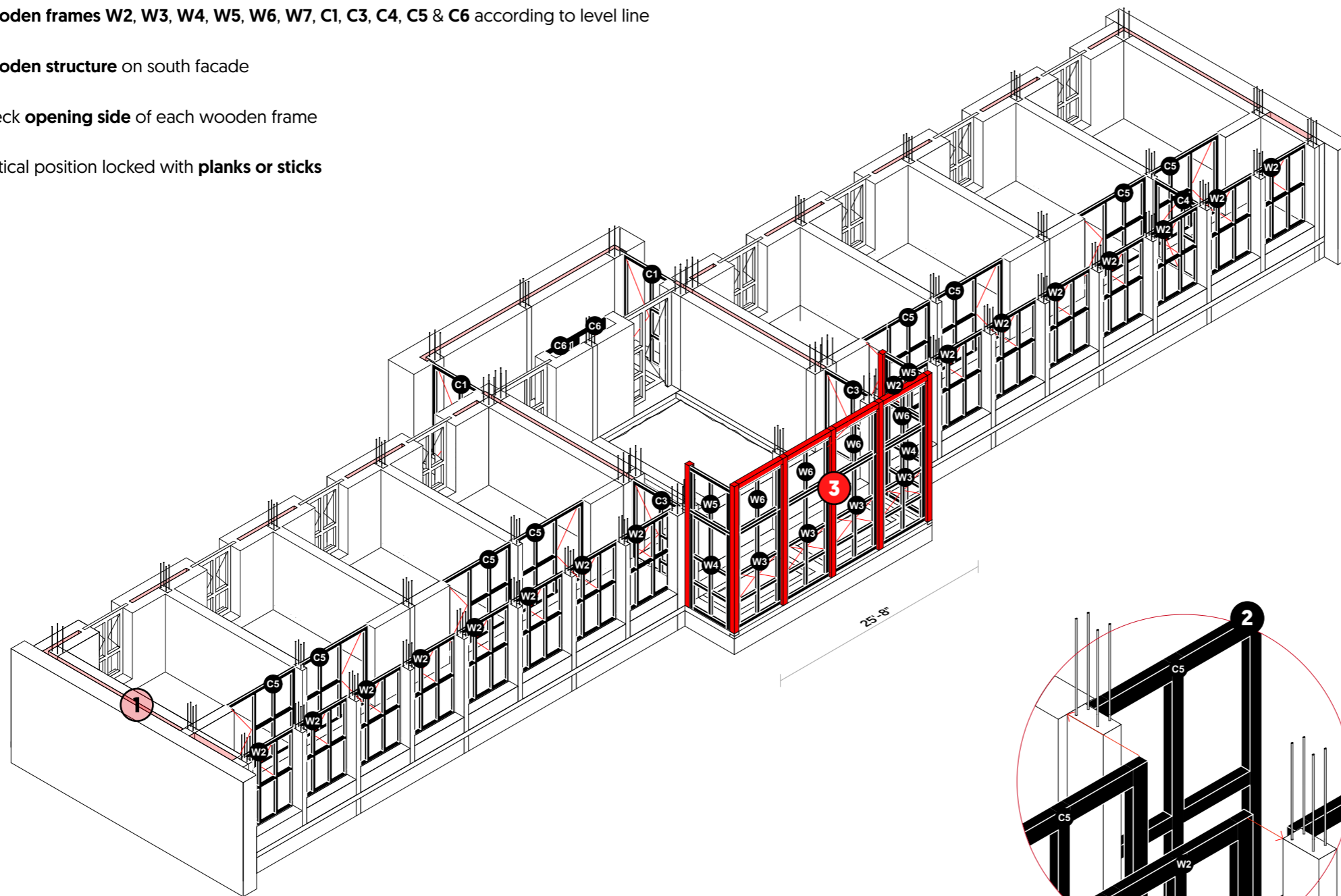
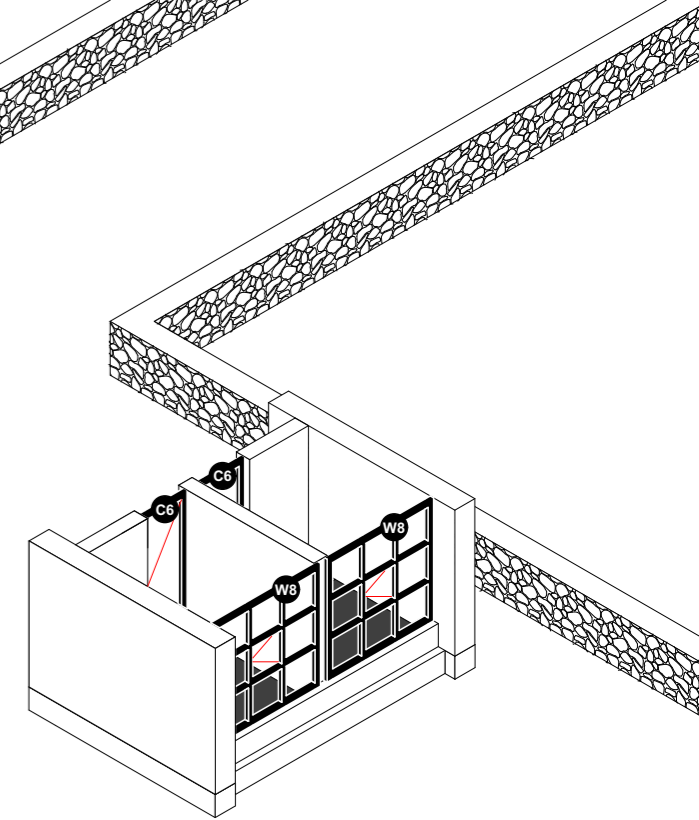
All wooden frames

14'-2" Wooden structure 6" x 6" section x 6 unit

13'-8" Wooden structure 6" x 6" section x 2 unit

Wooden planks or sticks

- 1 Sawdust wall insulation
- 2 Wooden frames W2, W3, W4, W5, W6, W7, C1, C3, C4, C5 & C6 according to level line
- 3 Wooden structure on south facade
- 4 Check opening side of each wooden frame
- 2 Vertical position locked with planks or sticks



7 UPPER CONCRETE BEAM

Scale

1/150

North



7.1 UPPER RCC BEAM LAYOUT

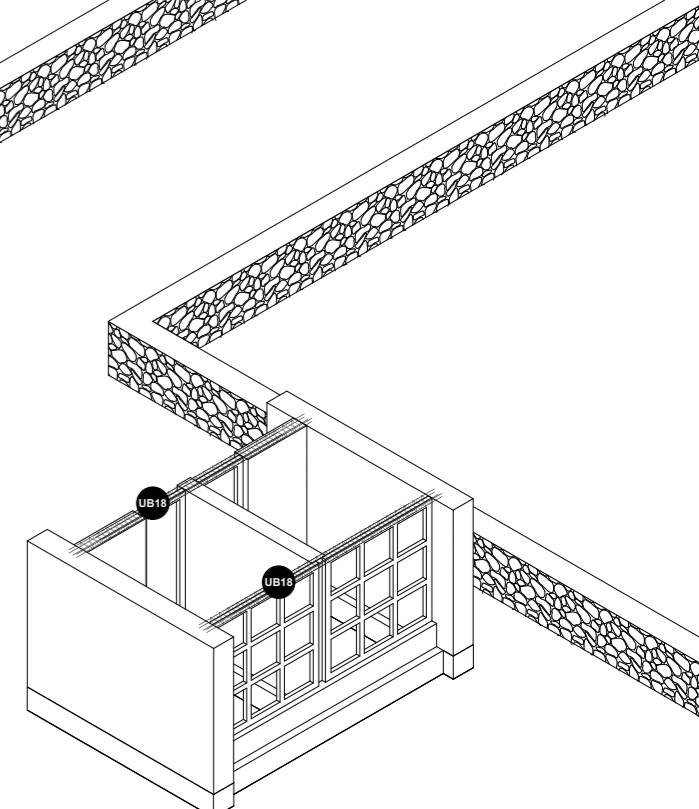
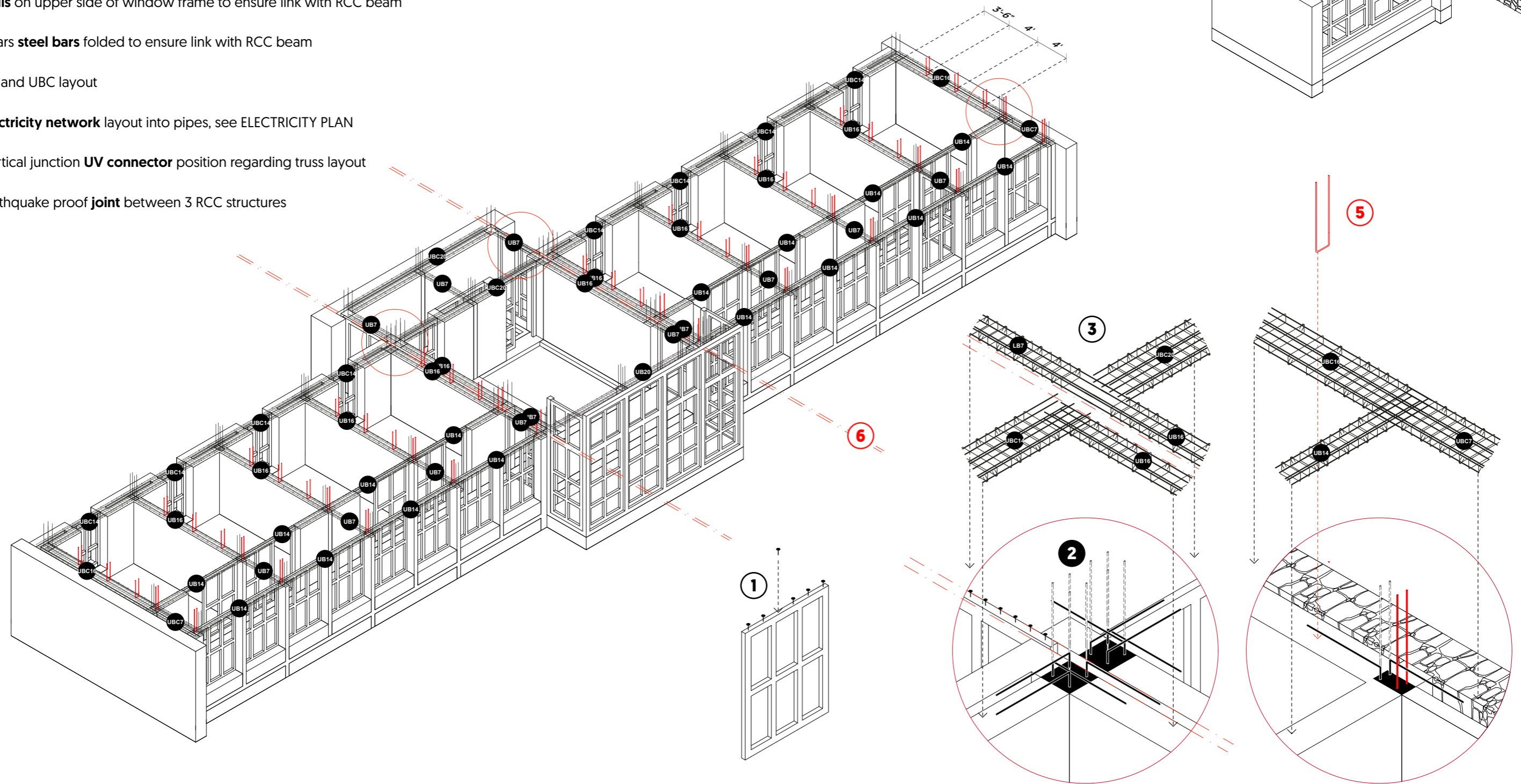


UBP is built according to earthquake-resistant standard, therefore the structure is divided into 3 parts.



Big nails
Spanner wrench
Upper iron beam **UBC & UB**
Pipes and electricity cables
UV connectors x 30

- 1 Nails on upper side of window frame to ensure link with RCC beam
- 2 Pillars **steel bars** folded to ensure link with RCC beam
- 3 UB and UBC layout
- 4 **Electricity network** layout into pipes, see ELECTRICITY PLAN
- 5 Vertical junction **UV connector** position regarding truss layout
- 6 Earthquake proof **joint** between 3 RCC structures



7 UPPER CONCRETE BEAM

Scale

1/150

North



7.2 UPPER RCC BEAM POURING

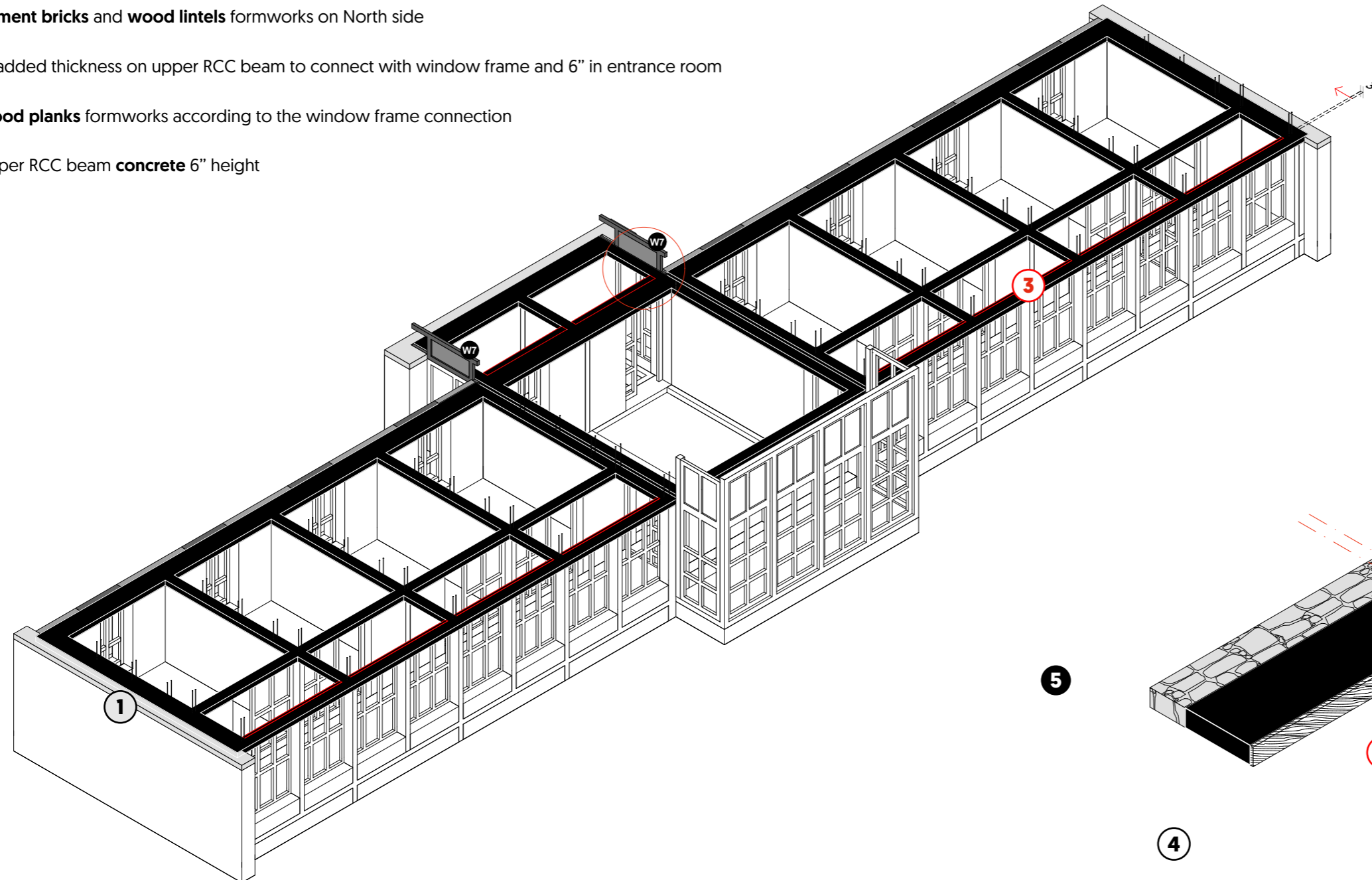


Mind the earthquake proof gap around central concrete structure!

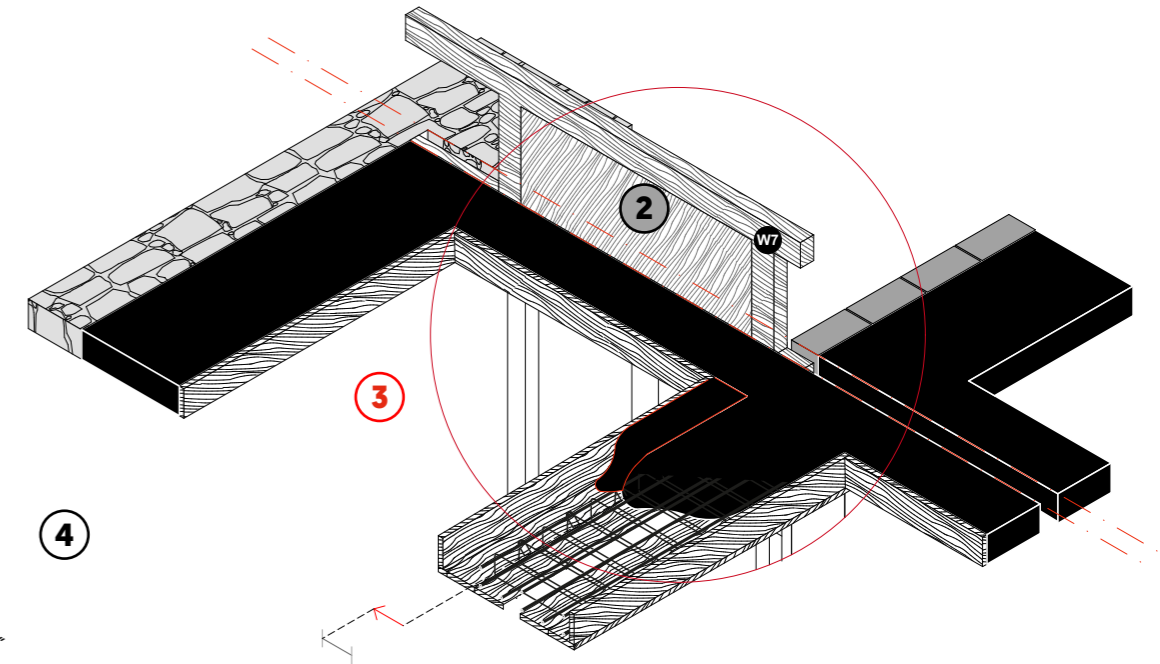


Shaped stone
Cement bricks
Wooden lintel 6" x 3" section
Formwork planks 6" x 1" section
Concrete

- 1 Shaped stone for formwork on Est, West and North stone walls
- 2 Cement bricks and wood lintels formworks on North side
- 3 3" added thickness on upper RCC beam to connect with window frame and 6" in entrance room
- 4 Wood planks formworks according to the window frame connection
- 5 Upper RCC beam concrete 6" height



5



4

3

2

8 CARPENTRY WORK

Scale

1/150

North



8.1 TRUSS SET UP

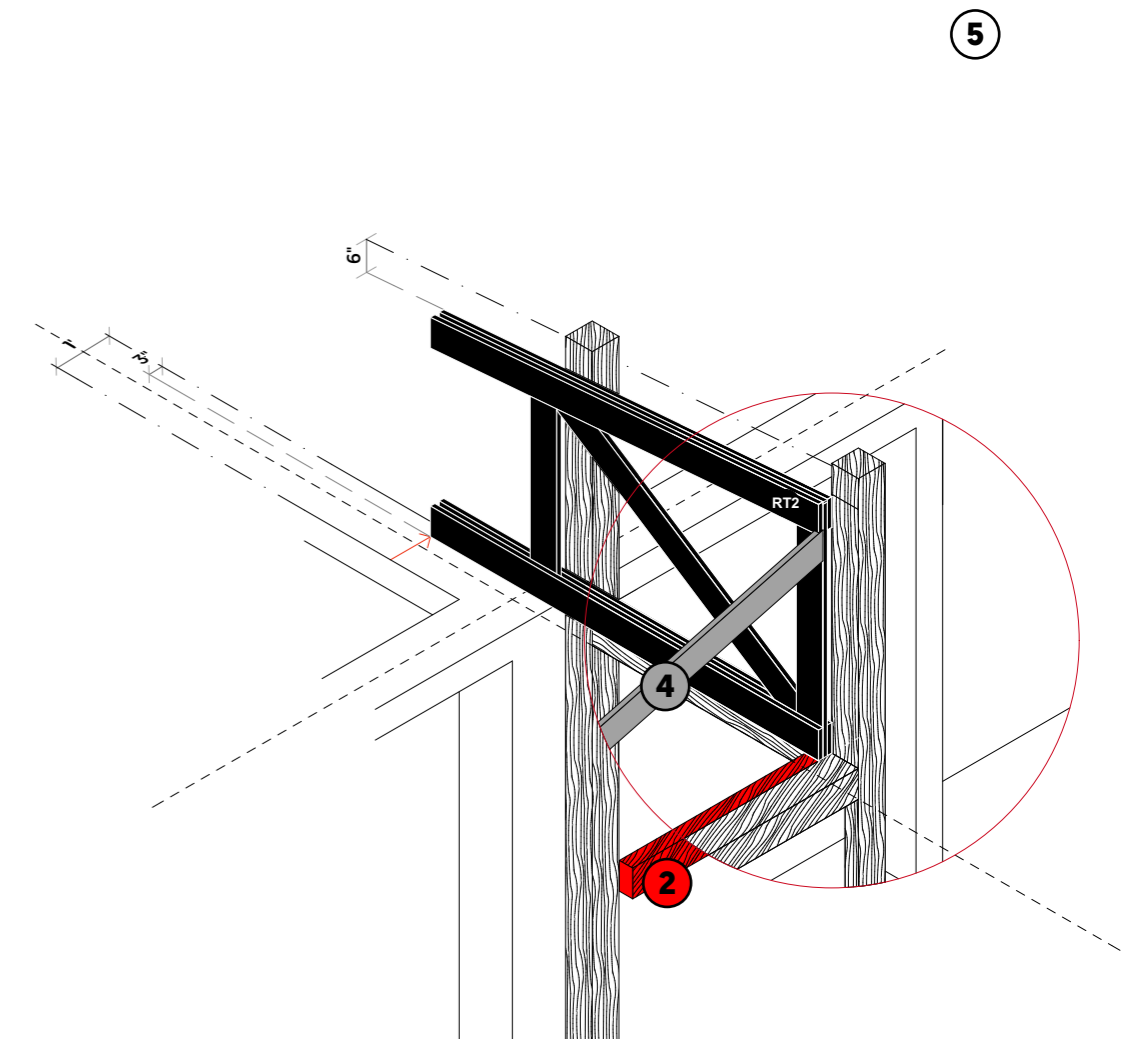
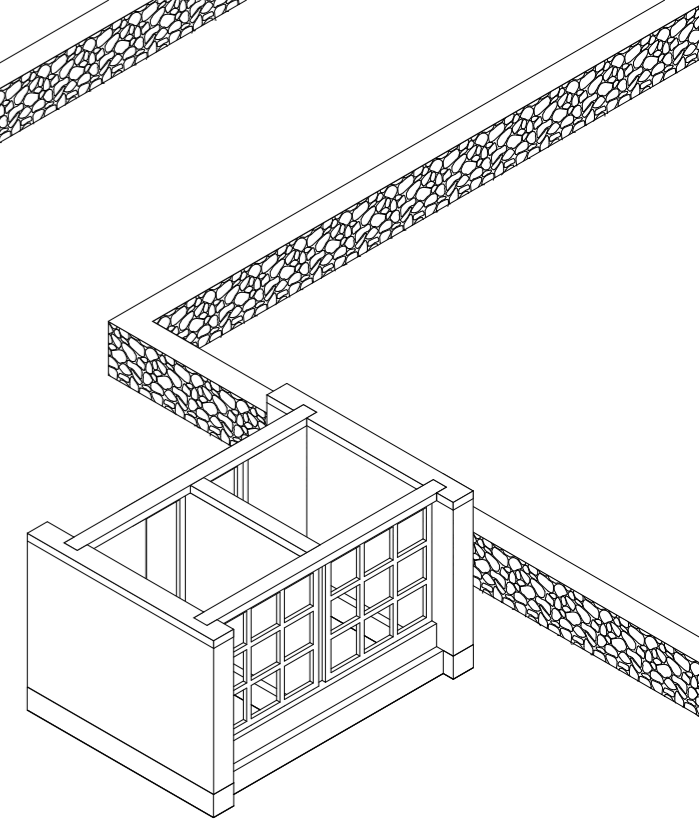
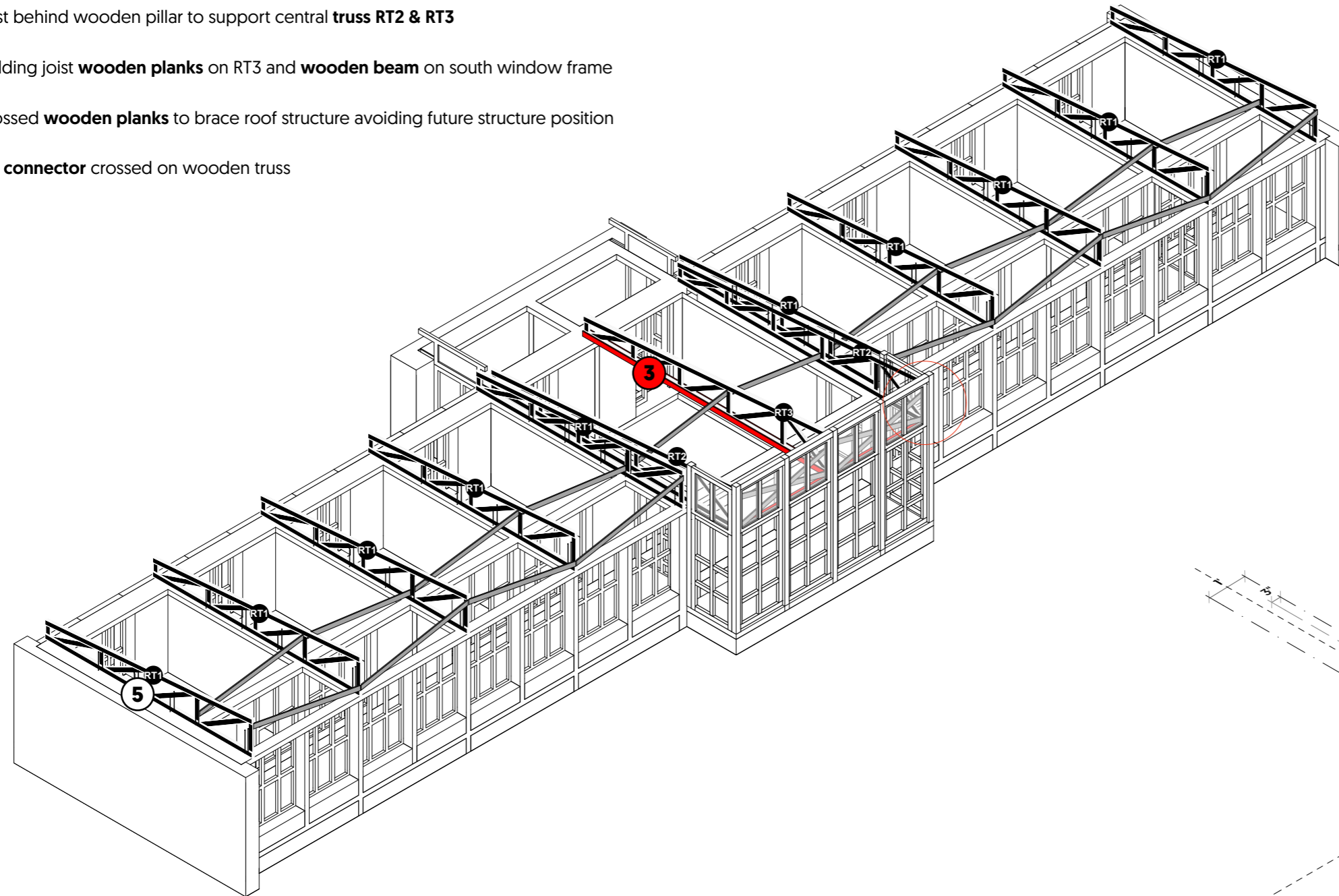


Middle truss is thicker to support joist load.



Normal roof truss RT1 x 10
Big roof truss RT2 x 2 & RT3 x 1
Wooden planks 1" x 6" section
Wooden beam 3" x 6" section
Brace wooden planks 1" x 6" section

- 1 Truss RT1 set up on wall middle axis
- 2 Joist behind wooden pillar to support central truss RT2 & RT3
- 3 Holding joist wooden planks on RT3 and wooden beam on south window frame
- 4 Crossed wooden planks to brace roof structure avoiding future structure position
- 5 UV connector crossed on wooden truss



8 CARPENTRY WORK

Scale

1/150

North



8.2 JOIST FRAMING



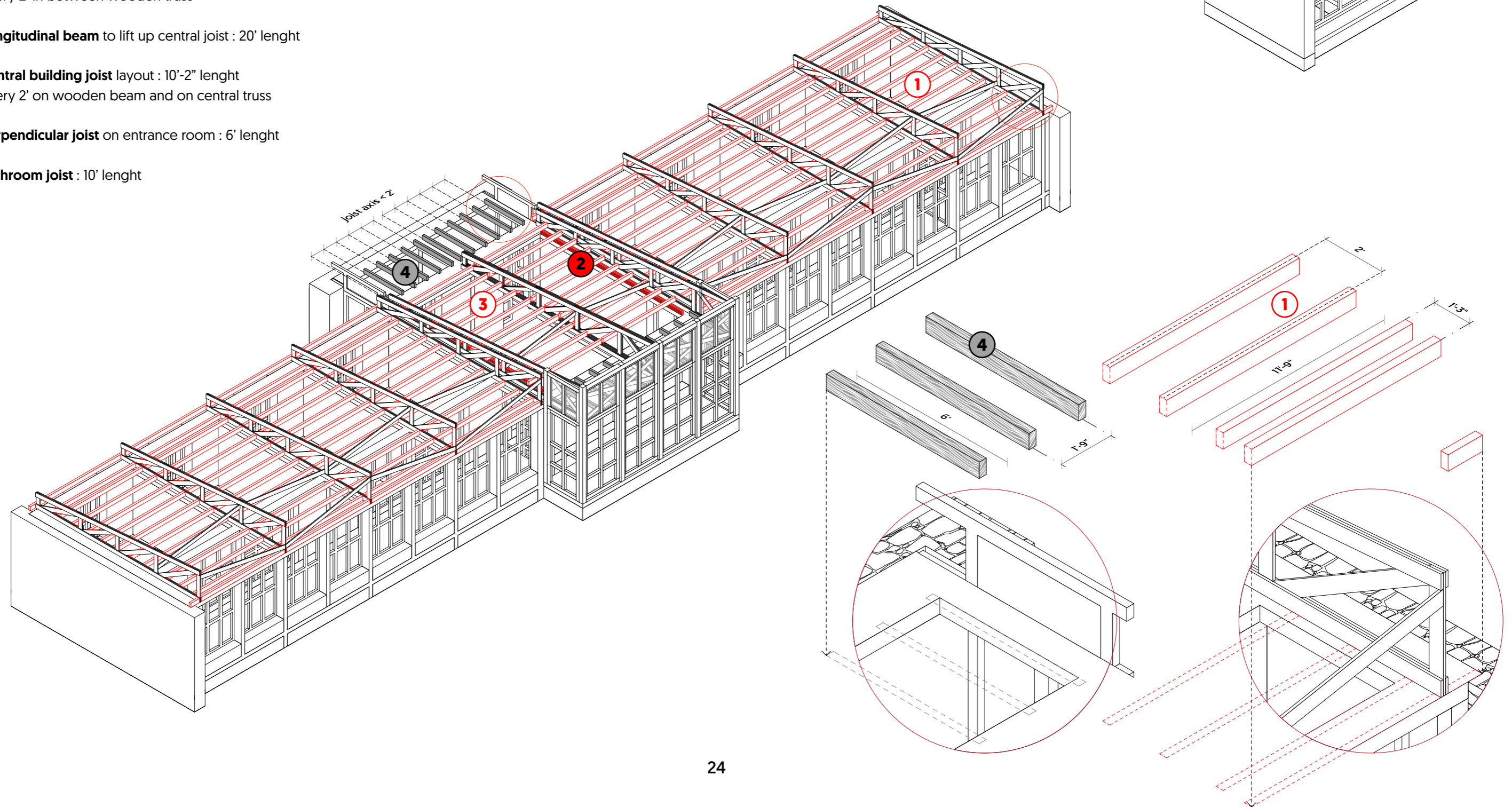
Pay attention with last South and North joist position !



Wooden joist 6"x3" section :

- 20' lenght x 2 unit
- 11'-9" lenght x 104 unit
- 10'-2" lenght x 20 unit
- 6' lenght x 22 unit
- 10' lenght x 10 unit

- 1** Regular joist layout : 11'-9" lenght every 2' in between wooden truss
- 2** Longitudinal beam to lift up central joist : 20' lenght
- 3** Central building joist layout : 10'-2" lenght every 2' on wooden beam and on central truss
- 4** Perpendicular joist on entrance room : 6' lenght
- 5** Bathroom joist : 10' lenght



8 CARPENTRY WORK

Scale

1/150

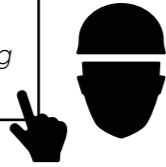
North



8.3 UPPER WALLS

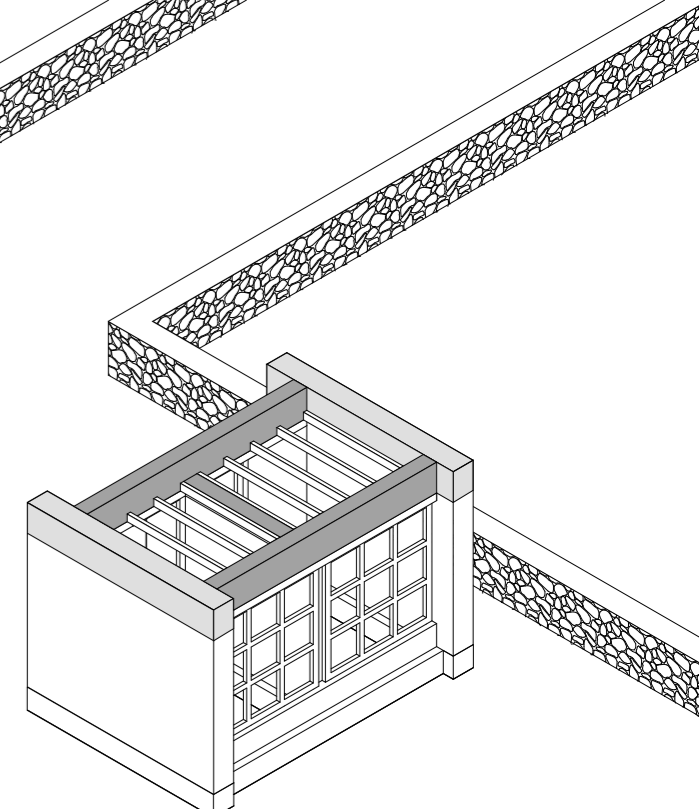
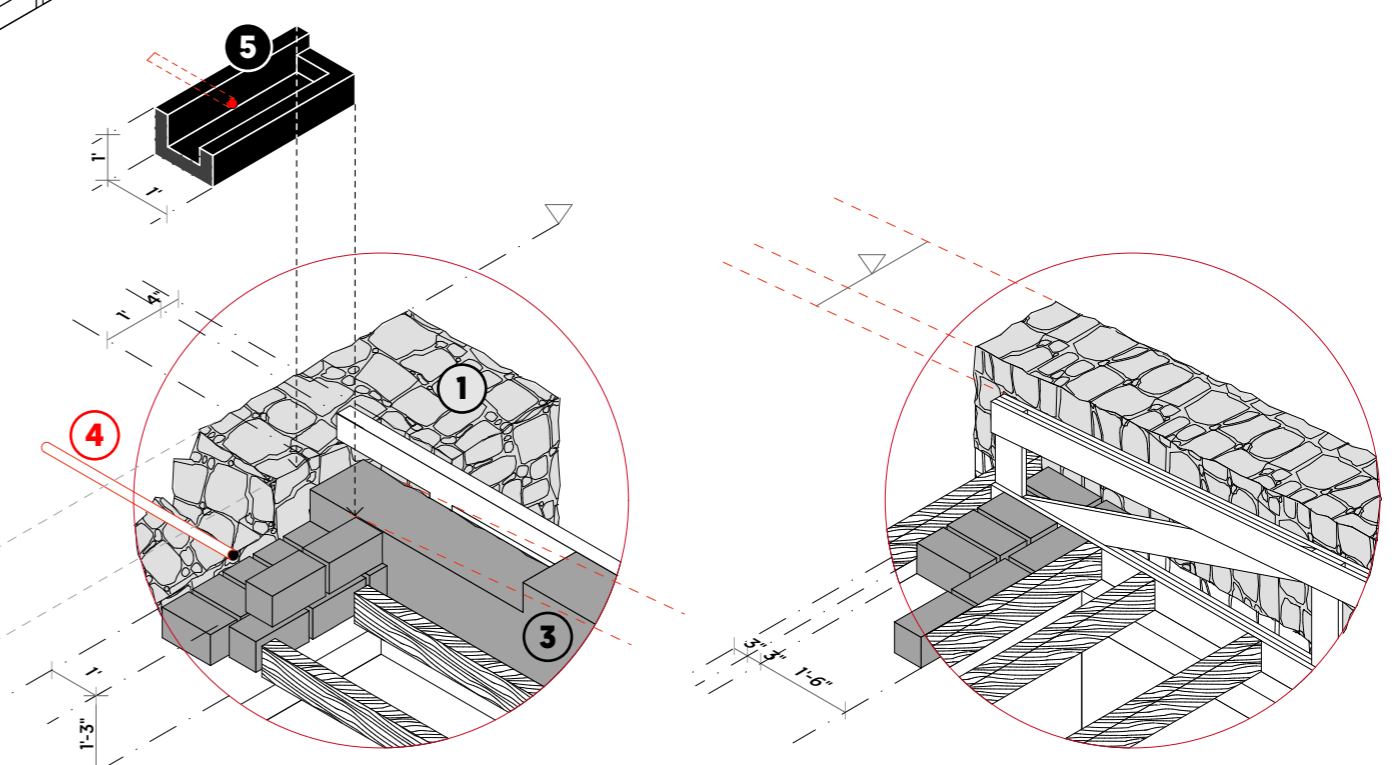
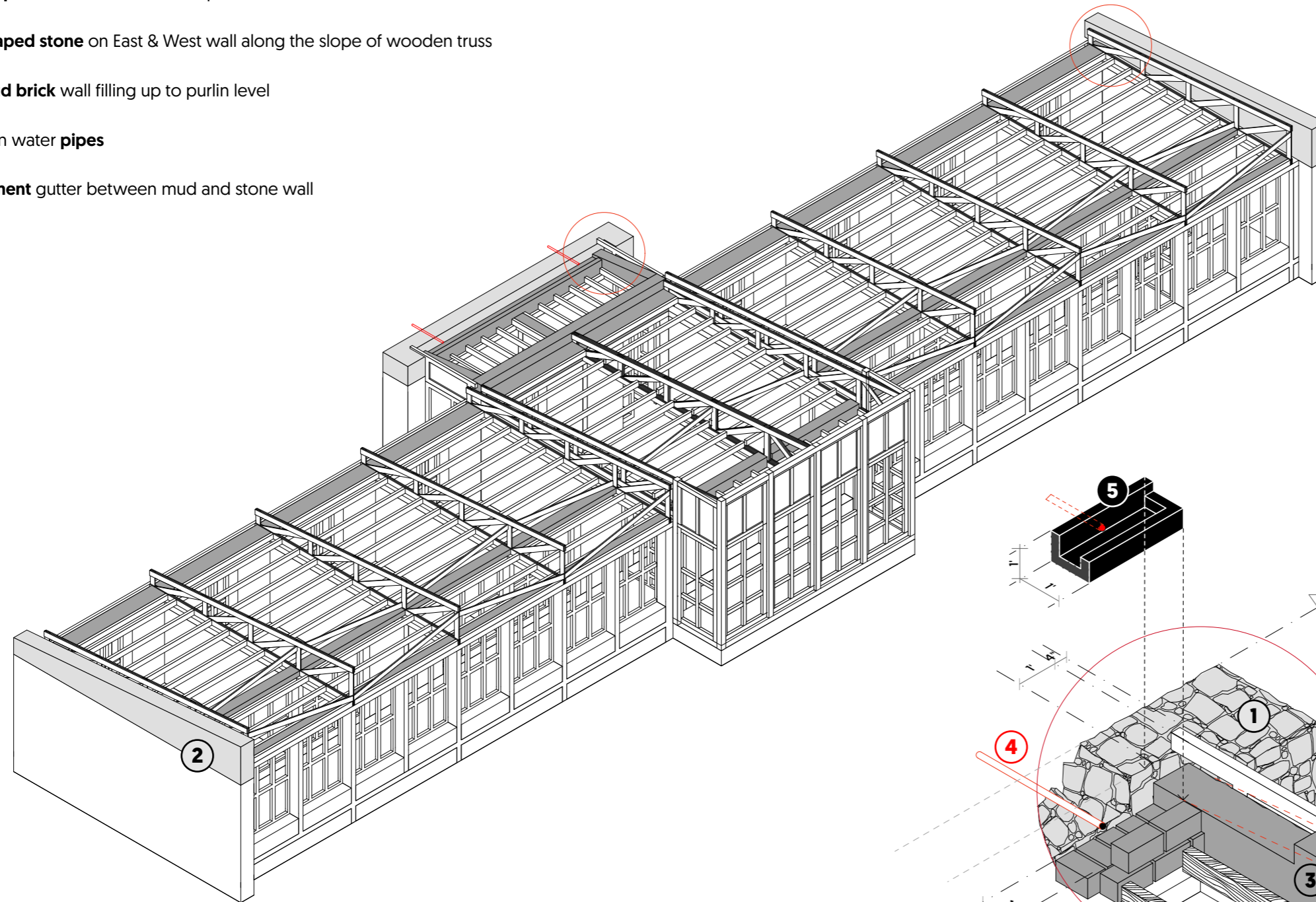


Mud wall finishings on RCC beams are essential for building insulation.



Mud bricks
Shaped stone
Pipes
Ciment

- 1 Shaped stone on North wall up to 5'-6" above level line
- 2 Shaped stone on East & West wall along the slope of wooden truss
- 3 Mud brick wall filling up to purlin level
- 4 Rain water pipes
- 5 Ciment gutter between mud and stone wall



8 CARPENTRY WORK

Scale

1/150

North



8.4 WOODEN FLOORING & INSULATION

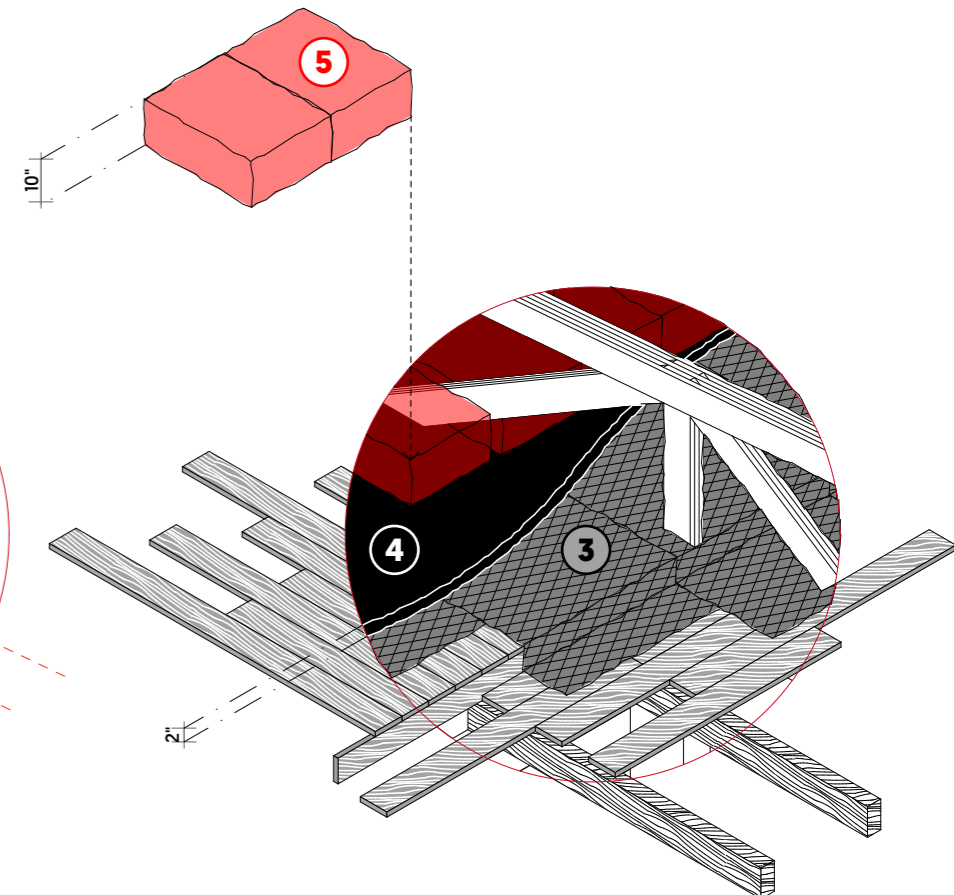
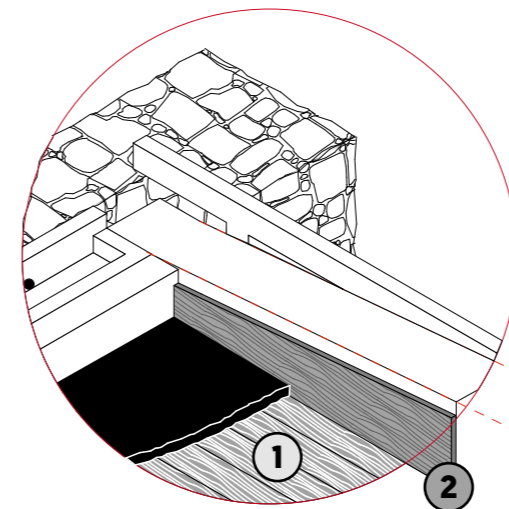
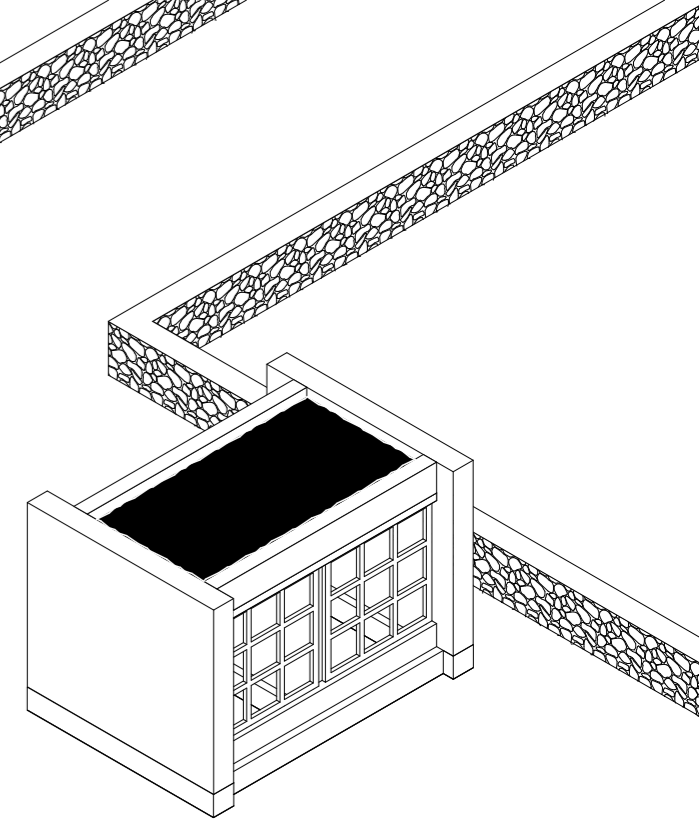
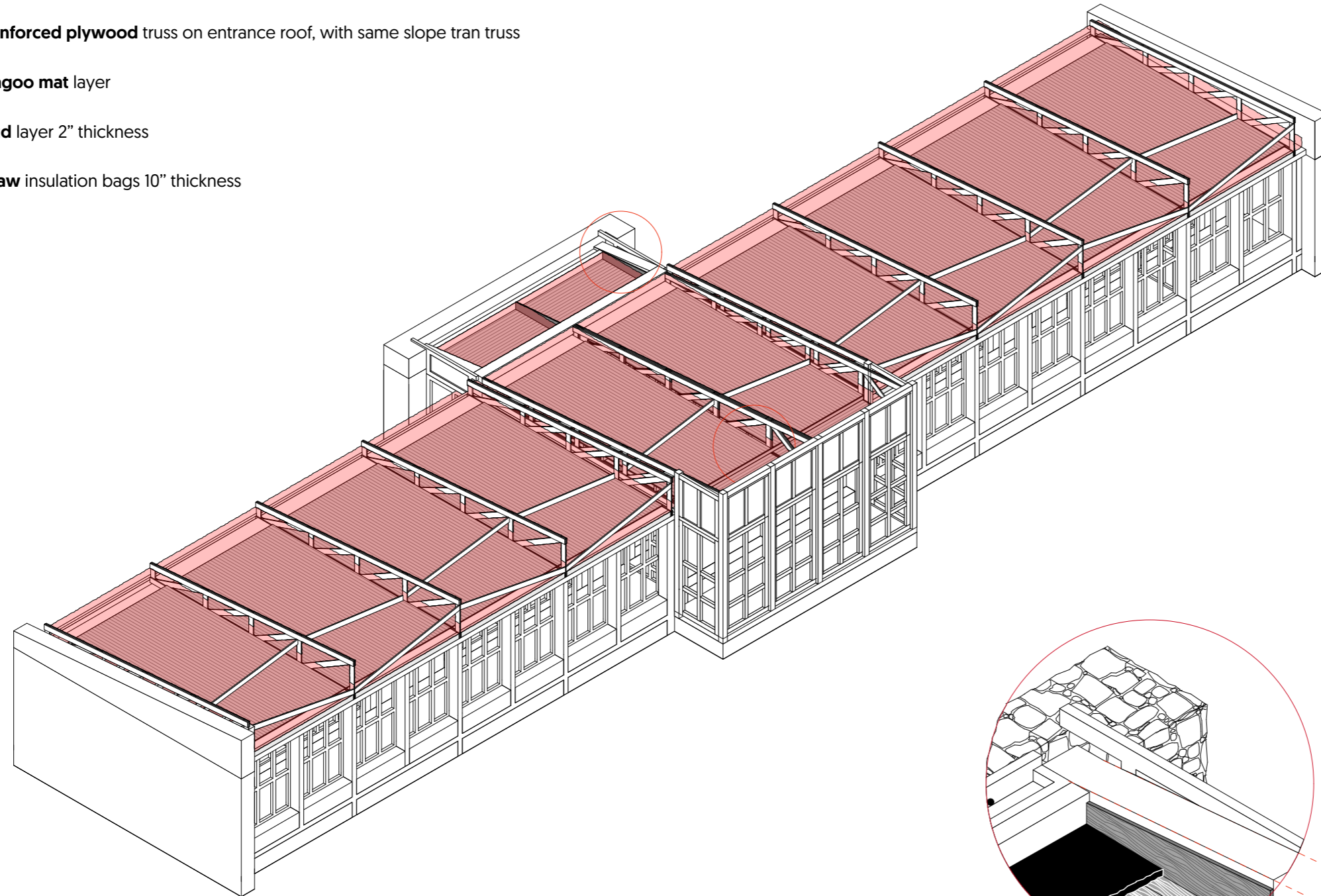


Insulation has to be thick and lightweight such as straw. Make sure there are no gap!



Wooden planks 1" x 6" section
Plywood
Wagoo mat
Mud
Straw insulation bags

- 1 Wooden planks flooring
- 2 Reinforced plywood truss on entrance roof, with same slope tran truss
- 3 Wagoo mat layer
- 4 Mud layer 2" thickness
- 5 Straw insulation bags 10" thickness



9 ROOFING WORK

Scale

1/150

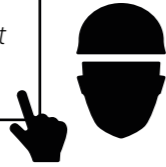
North



9.1 PURLIN LAYOUT



Purlin axis has to match with GI sheet dimension.



Wooden purlins 6" x 3" section :

12'-3" minimum length x 102 unit

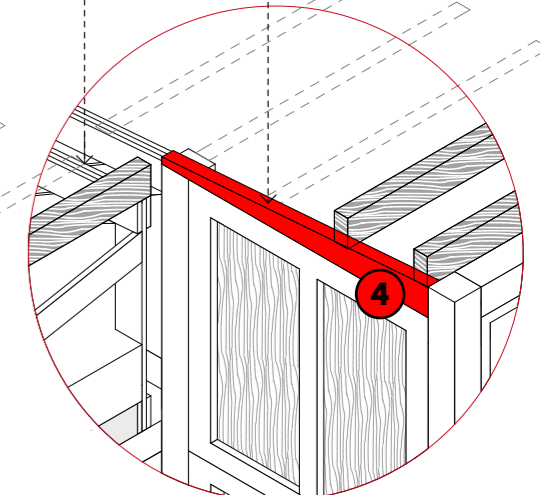
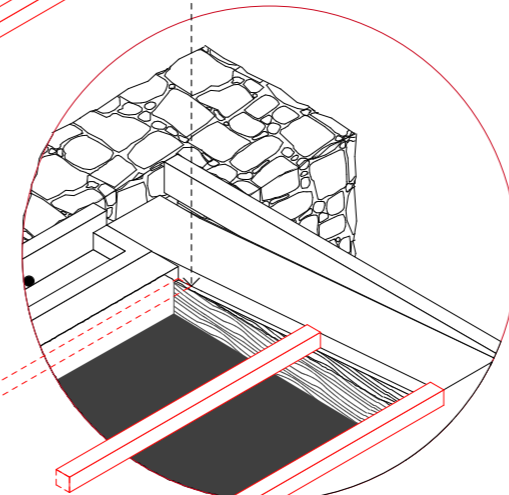
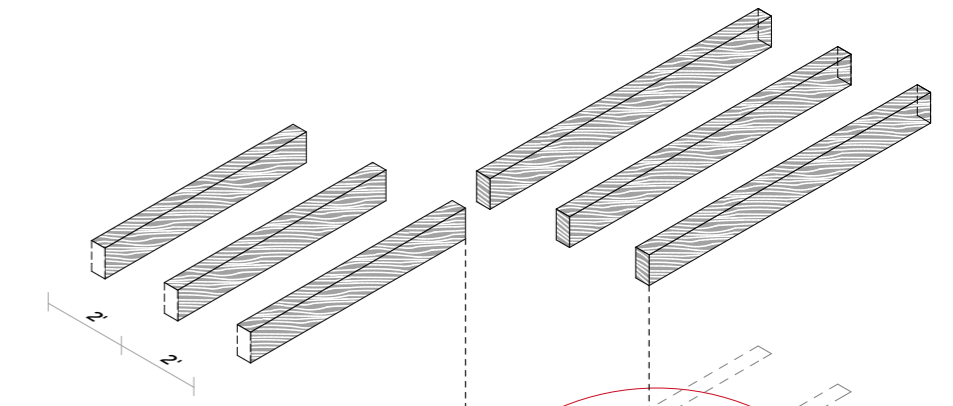
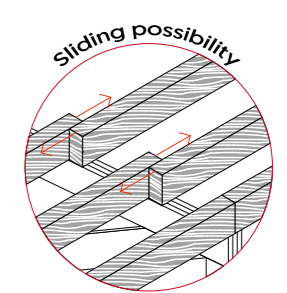
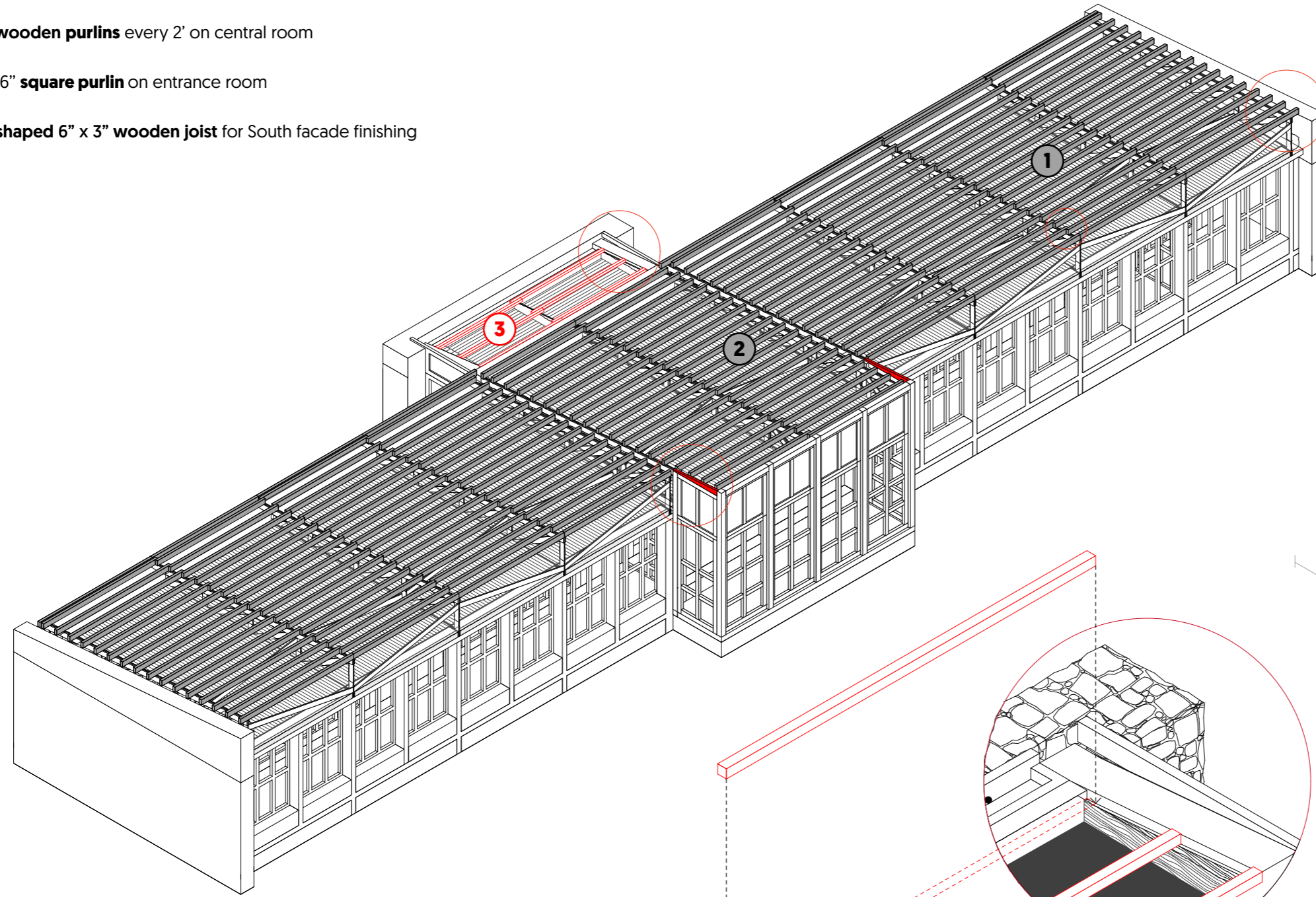
13' length x 34 unit

11' length x 40 unit

Wooden purlins 4" x 4" section :

10'-6" length x 6 unit

- 1 12'-3" wooden purlins on wings every 2', longest on Eastern & Western sides
- 2 11' wooden purlins every 2' on central room
- 3 10'-6" square purlin on entrance room
- 4 Reshaped 6" x 3" wooden joist for South facade finishing



9 ROOFING WORK

Scale

1/150

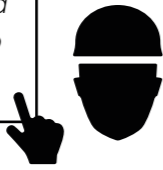
North



9.2 ROOFING

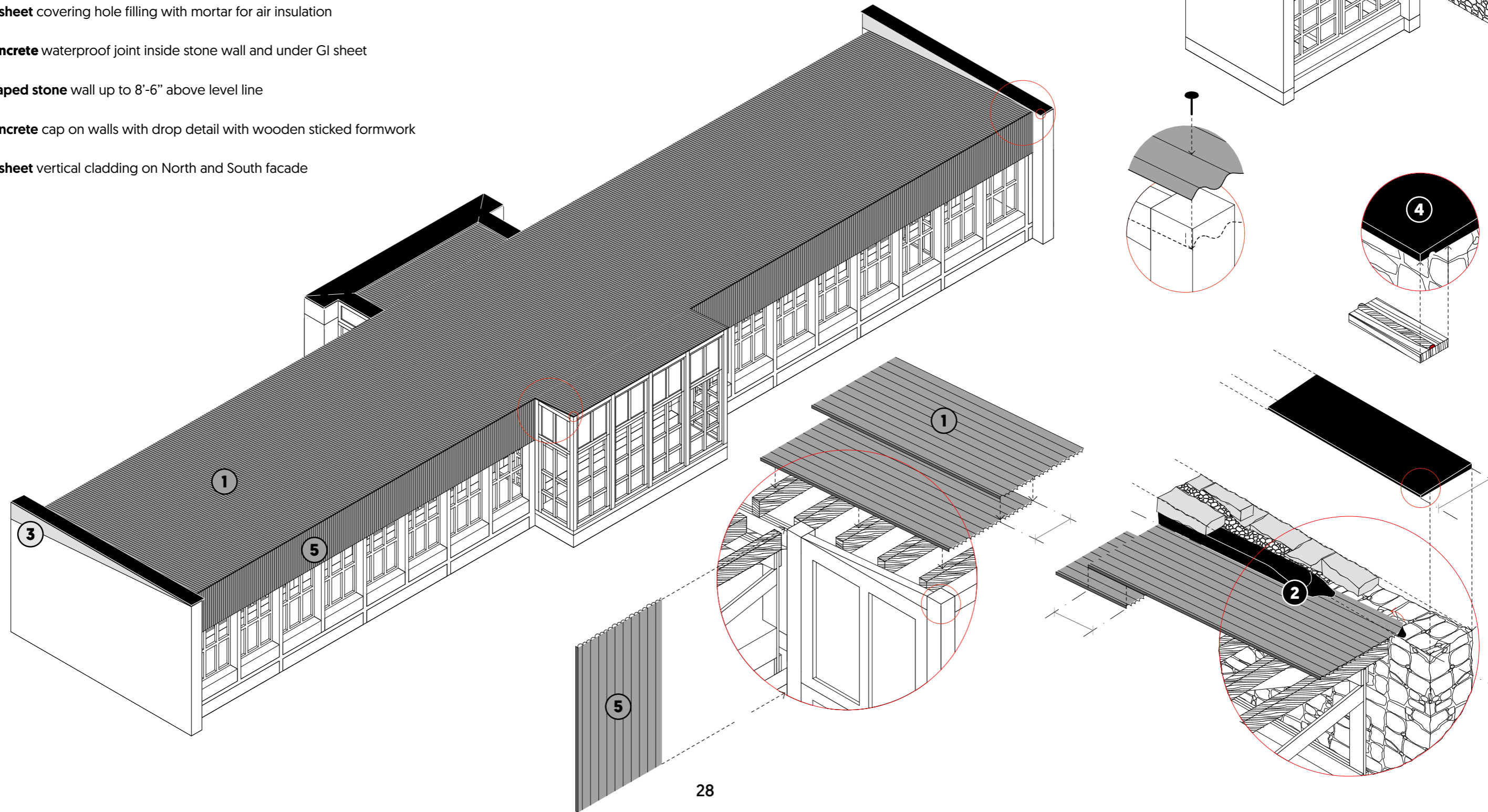


The sheet are not joined together along the two earthquake proof joint.



- Nails
- GI sheet 8' x 3'
- Wooden planks 1" x 6" section
- Concrete
- Stone

- 1 GI sheet covering hole filling with mortar for air insulation
- 2 Concrete waterproof joint inside stone wall and under GI sheet
- 3 Shaped stone wall up to 8'-6" above level line
- 4 Concrete cap on walls with drop detail with wooden sticked formwork
- 5 GI sheet vertical cladding on North and South facade



10 FINISHING

Scale

1/150

North

10.1 LANDSCAPING

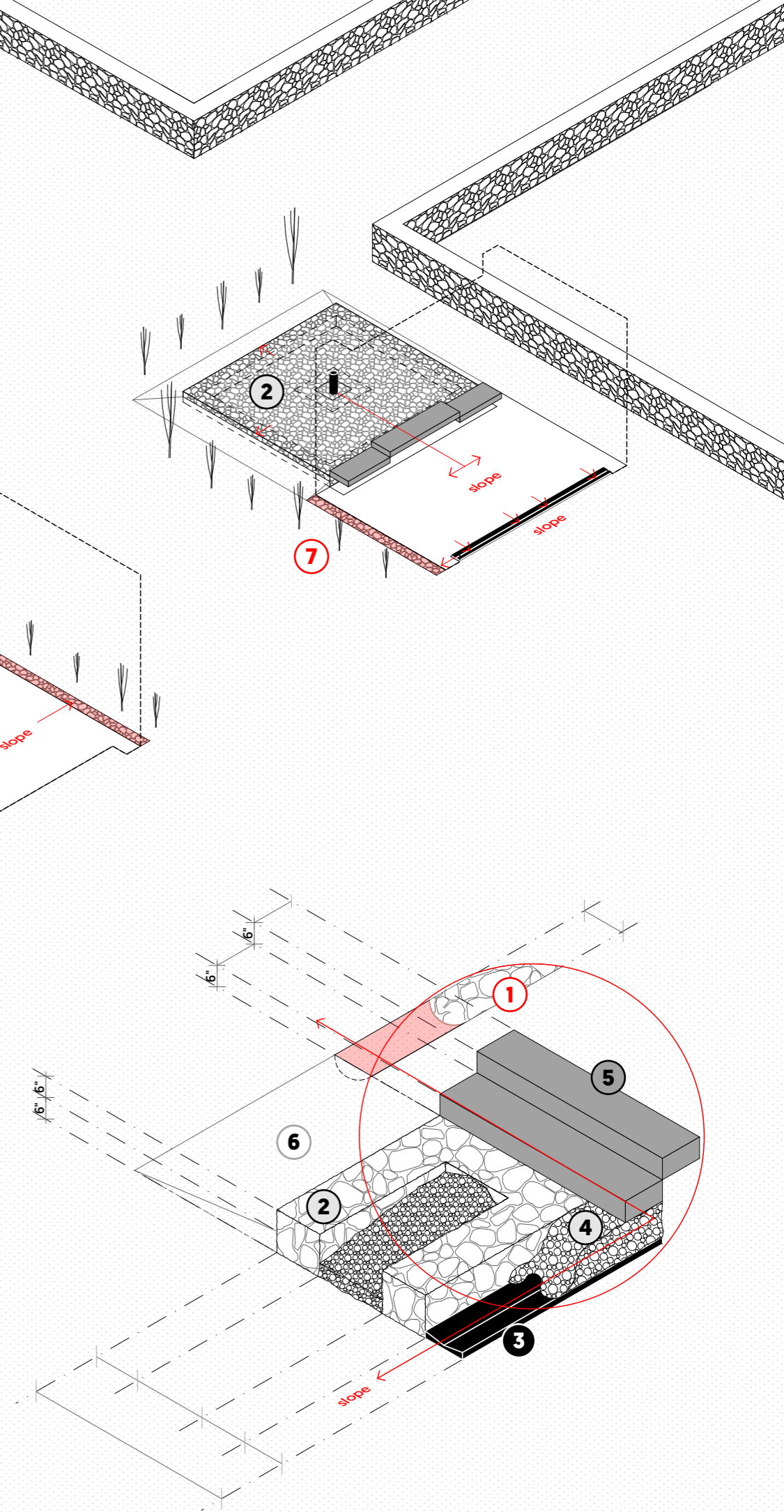
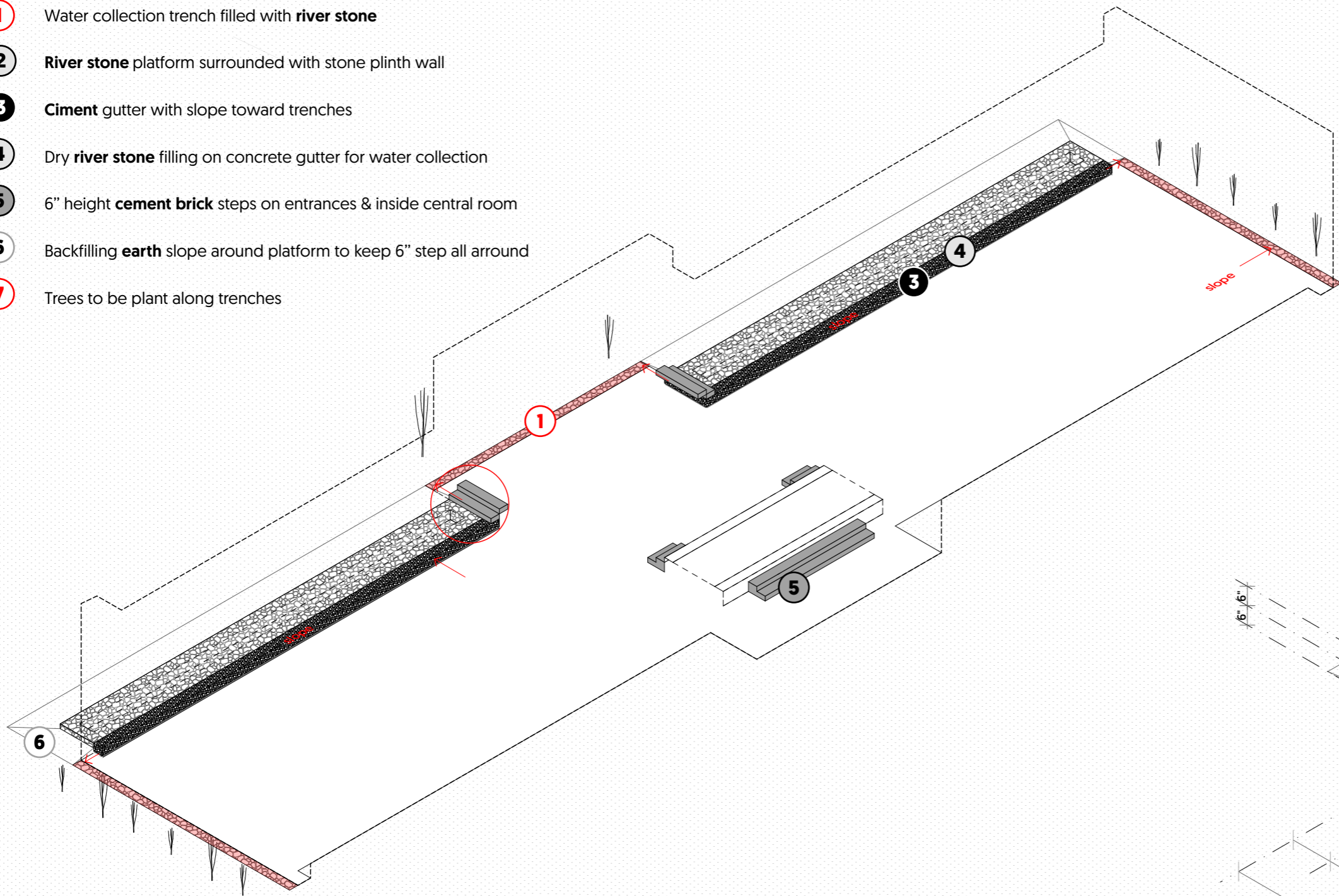


Trenches for water collection is necessary for tree to grow up.



River stone
Concrete
Cement brick
Excavation earth
Trees

- 1 Water collection trench filled with **river stone**
- 2 **River stone** platform surrounded with stone plinth wall
- 3 **Ciment** gutter with slope toward trenches
- 4 Dry **river stone** filling on concrete gutter for water collection
- 5 6" height **cement brick** steps on entrances & inside central room
- 6 Backfilling **earth** slope around platform to keep 6" step all around
- 7 Trees to be plant along trenches



10 FINISHING

Scale

1/150

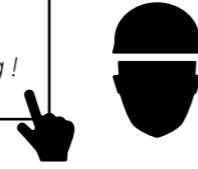
North



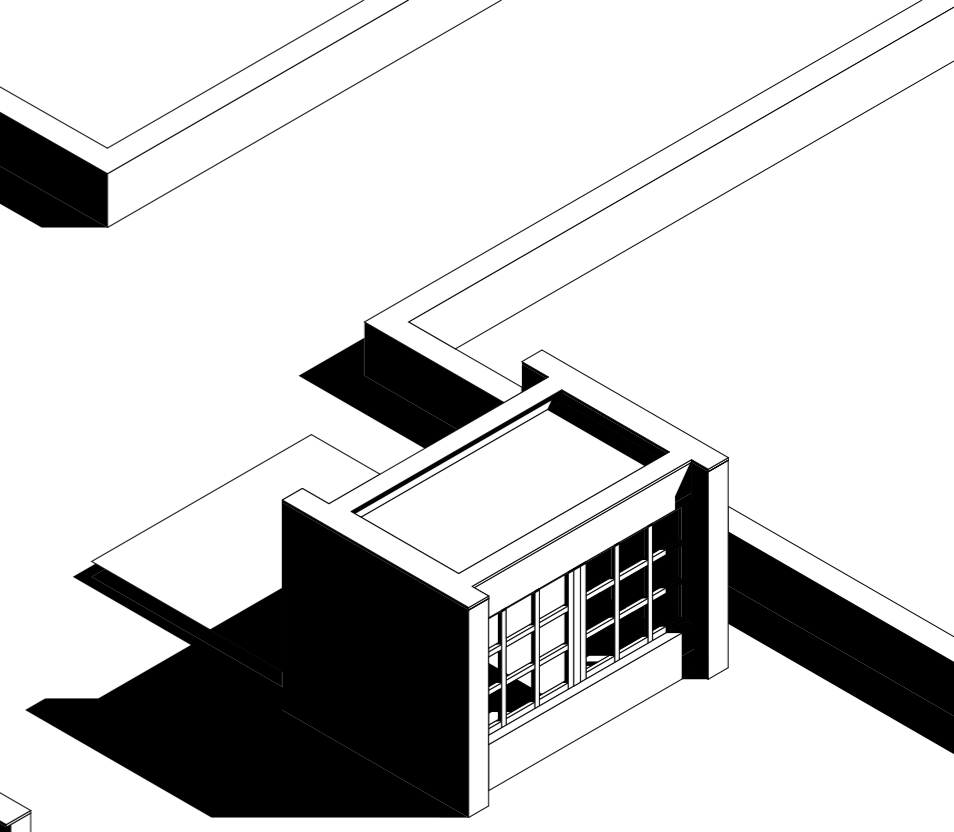
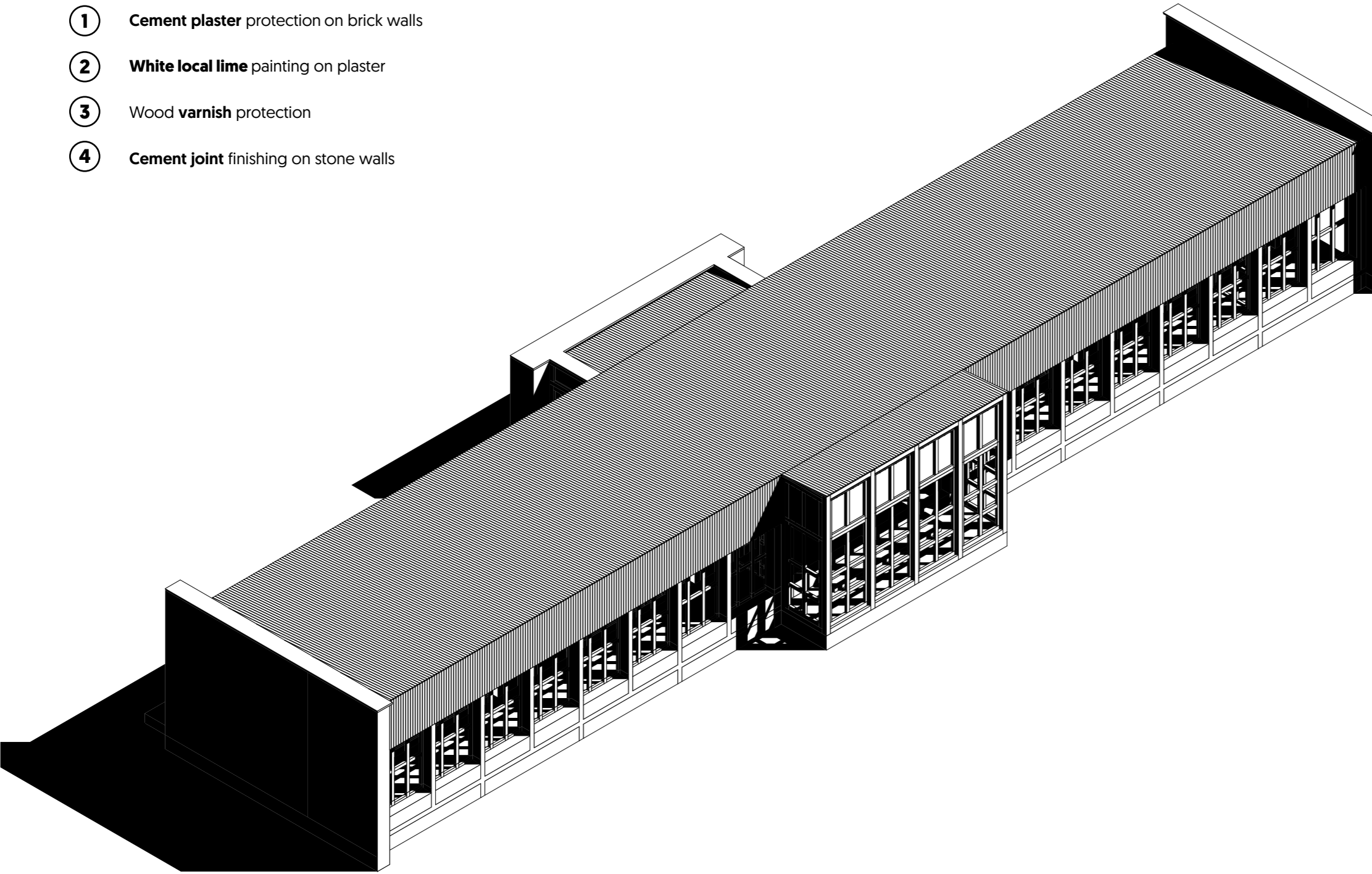
10.2 OUTSIDE FINISHING



Pay attention to finishings, they are essential for airproof and solar passive performance of the building !



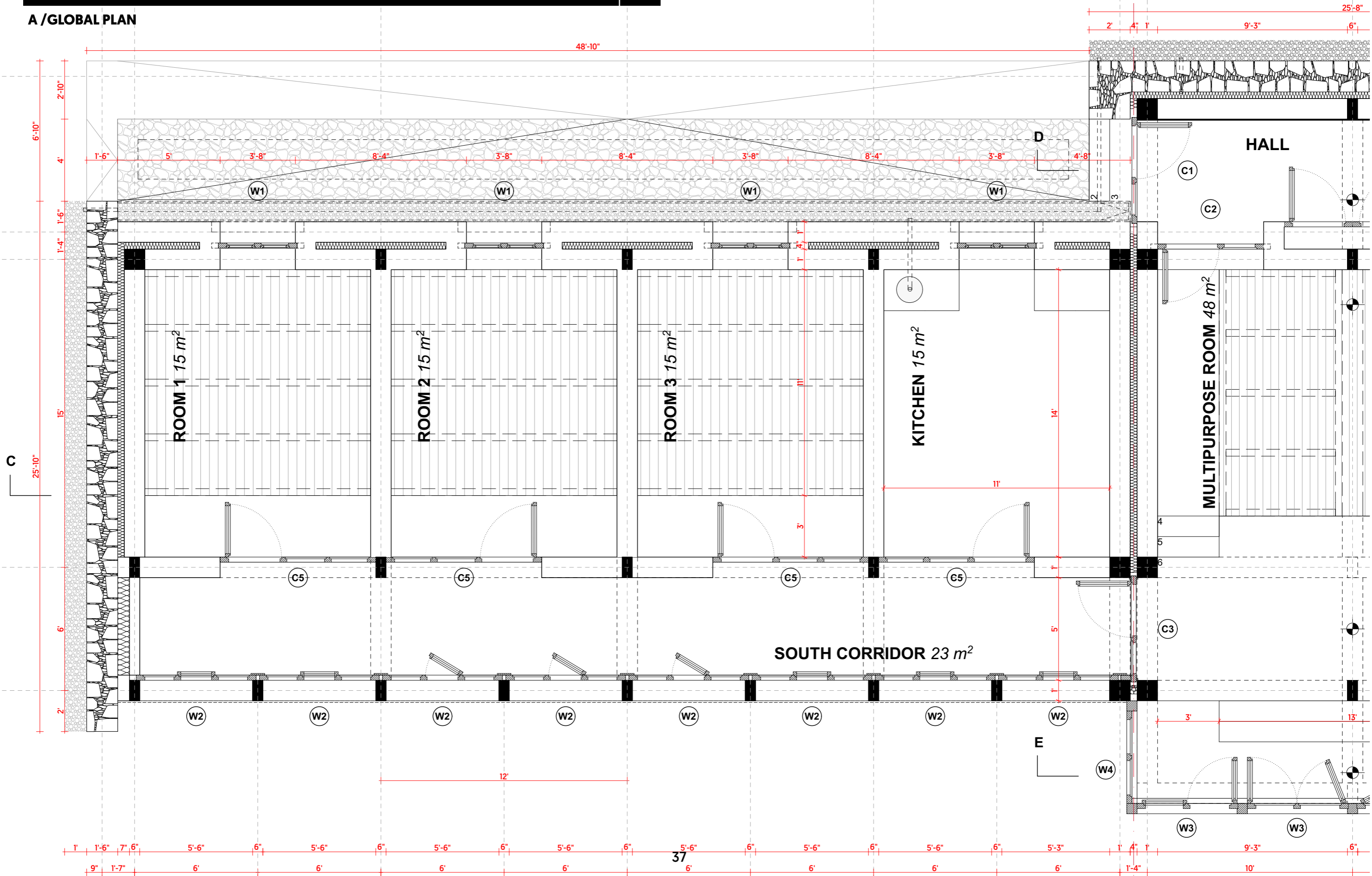
- ① **Cement plaster** protection on brick walls
- ② **White local lime** painting on plaster
- ③ Wood **varnish** protection
- ④ **Cement joint** finishing on stone walls

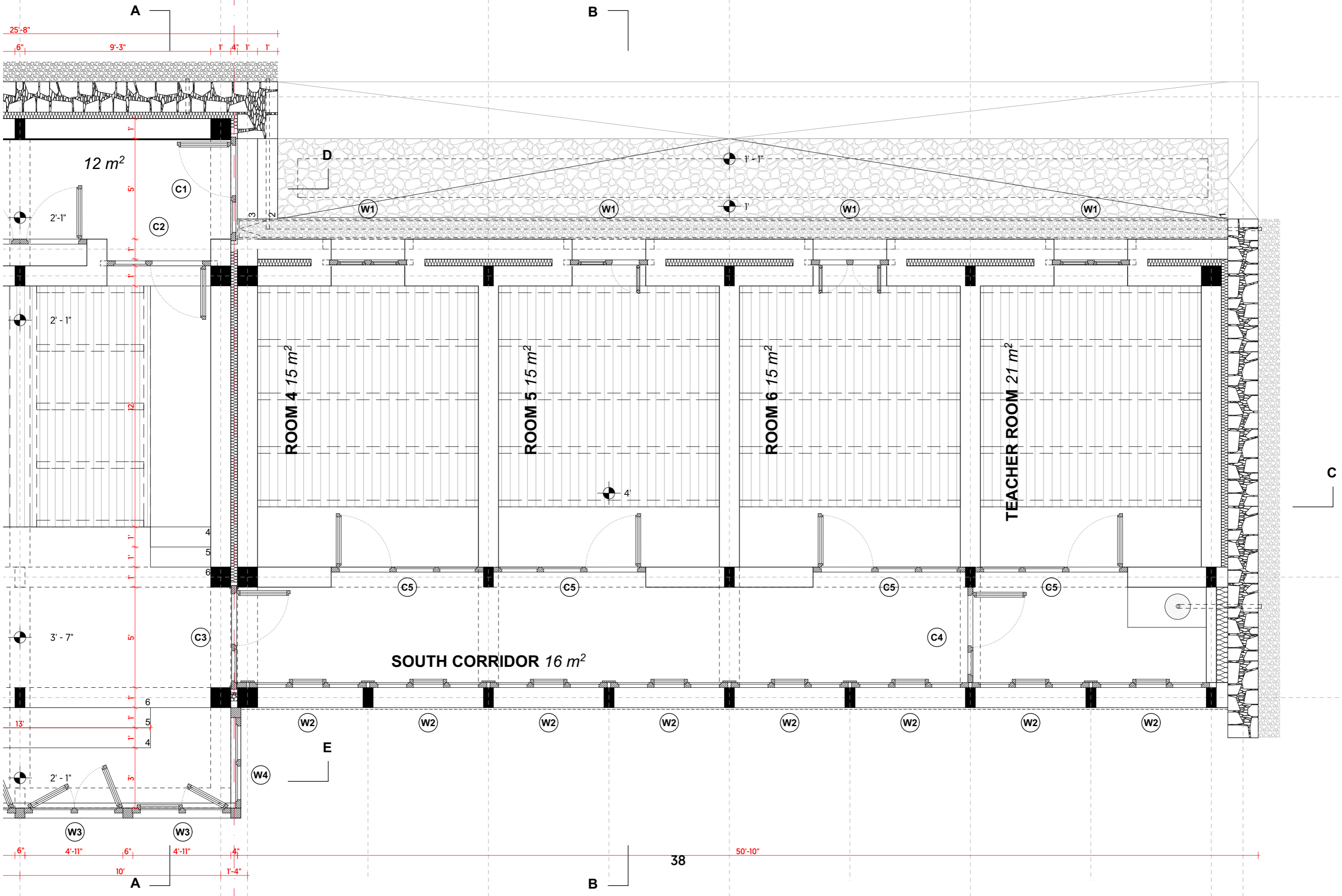


SCALE DRAWING

Scale 1/50 North

A / GLOBAL PLAN





25'-8"
6"
9'-3"
1'
4"
1'
1'

12 m²
2'-1"
C1
C2

2'-1"
12"
4
5
6

3'-7"
5
6
13'
1'
5
4

2'-1"
W3
W3
6"
4'-11"
6"
4'-11"
4"
10'
1'-4"

D
W1
W1
W1
W1

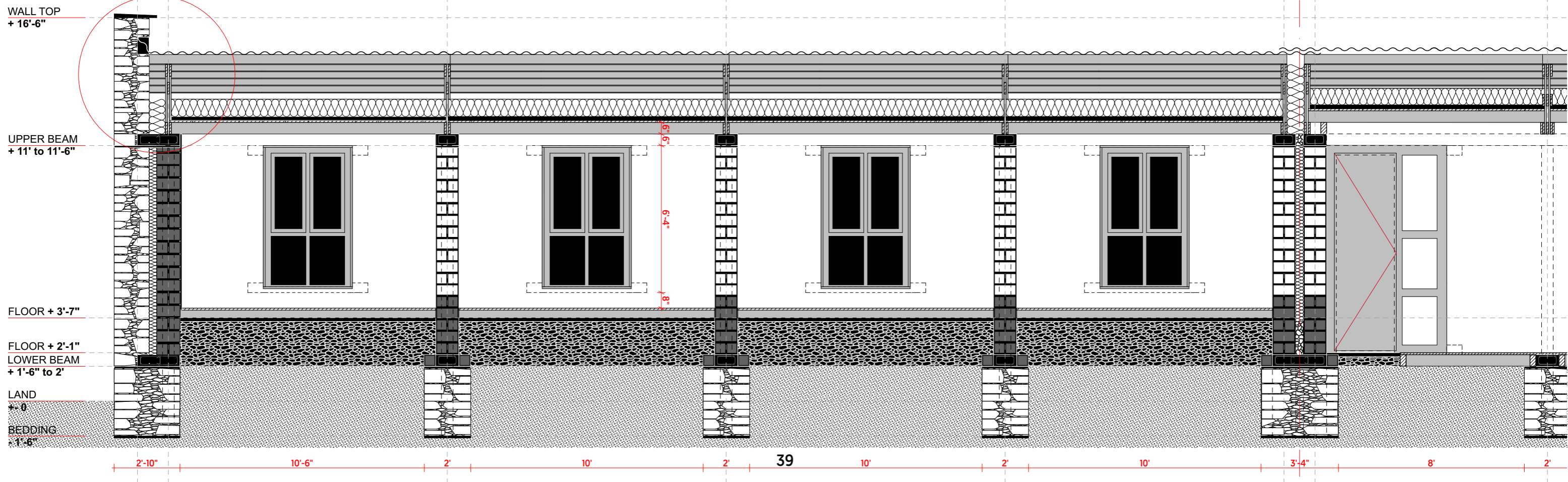
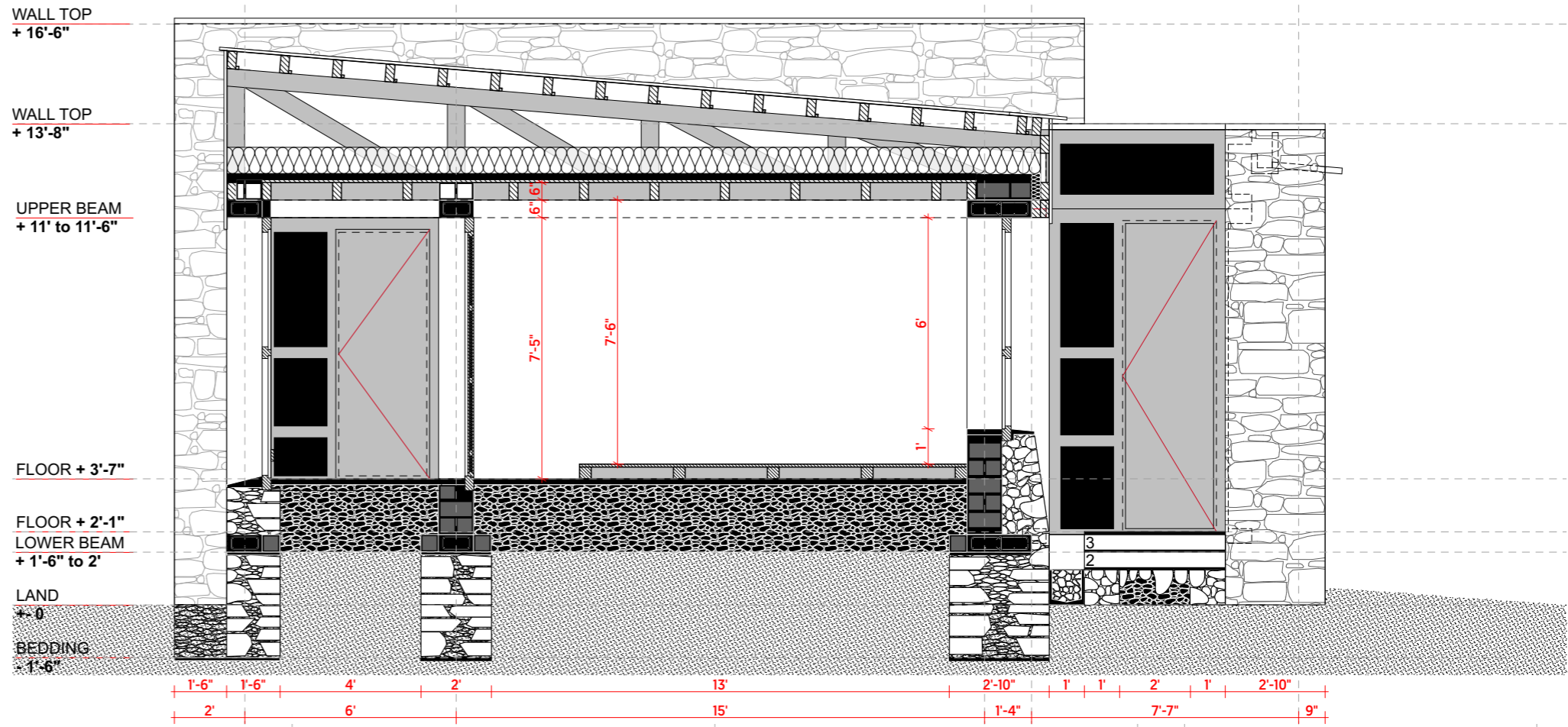
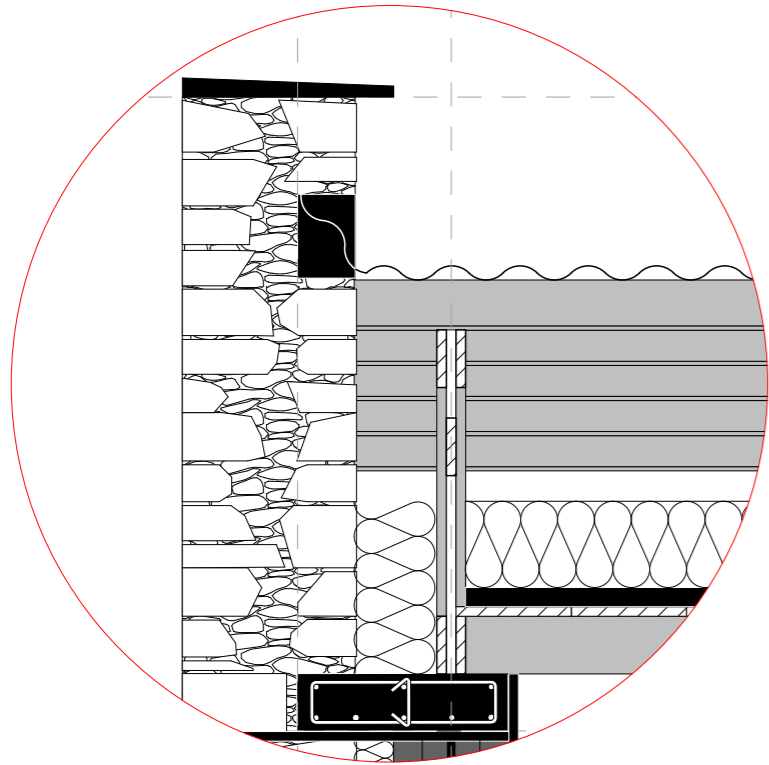
ROOM 4 15 m²
ROOM 5 15 m²
ROOM 6 15 m²
TEACHER ROOM 21 m²
4
C5
C5
C5
G5
C4

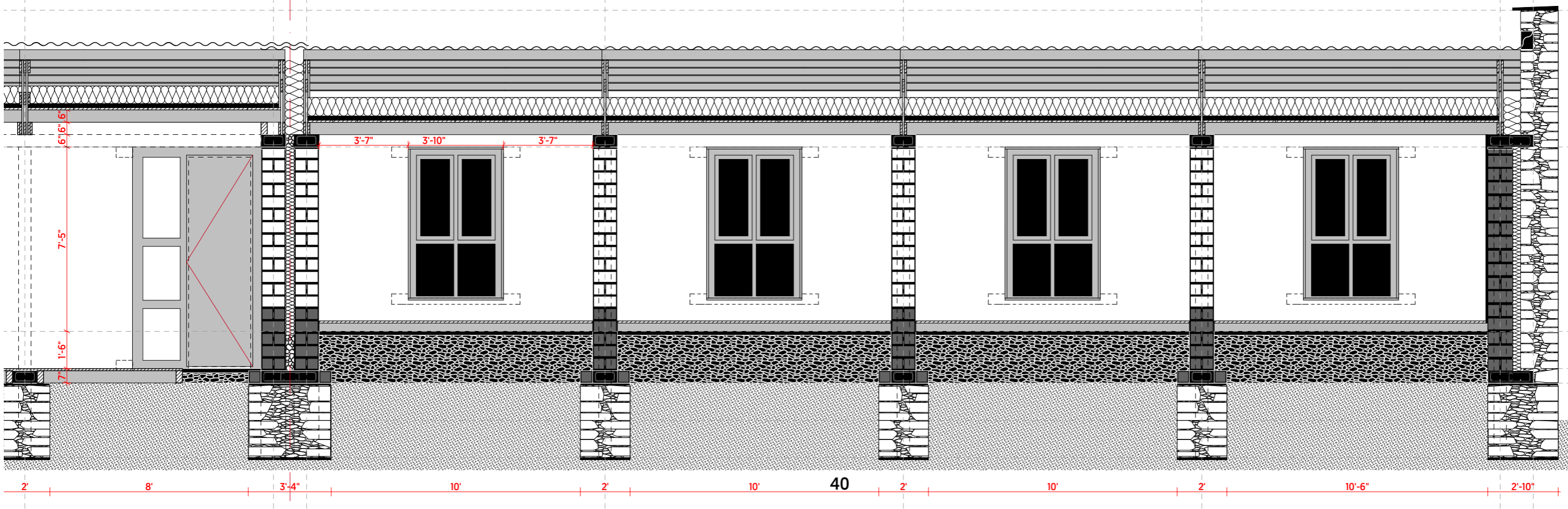
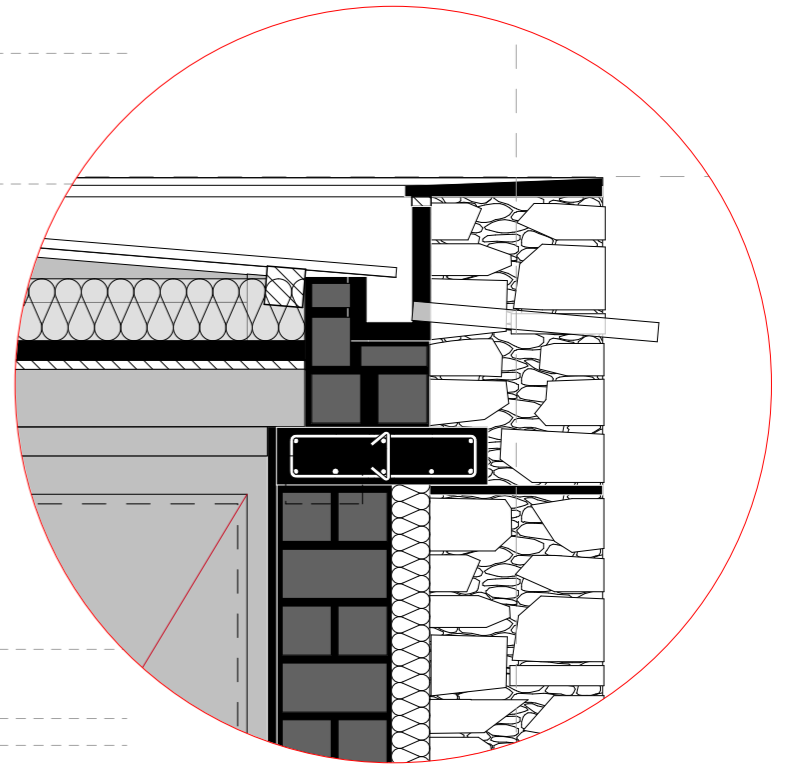
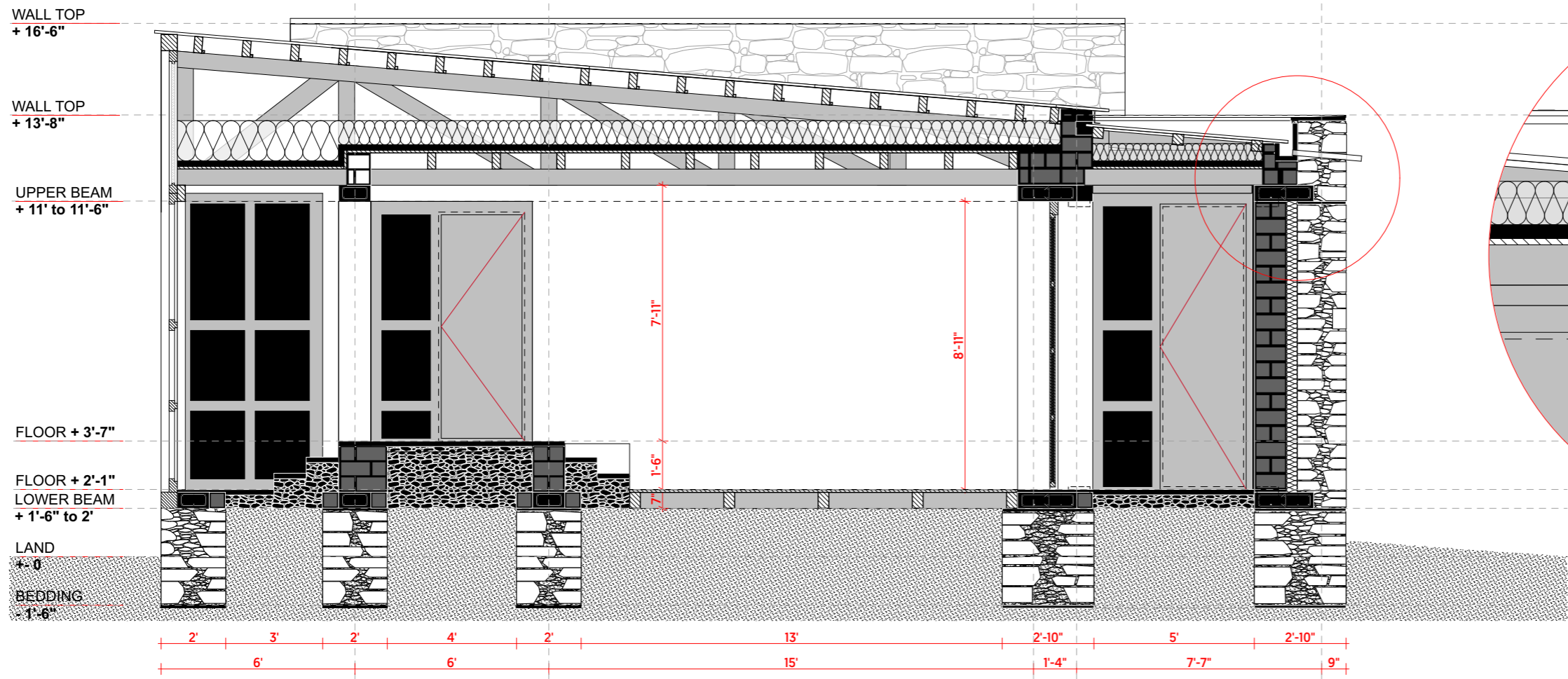
SOUTH CORRIDOR 16 m²
W2
W2
W2
W2
W2
W2
W2
W2
W2
W4
E

38
50'-10"

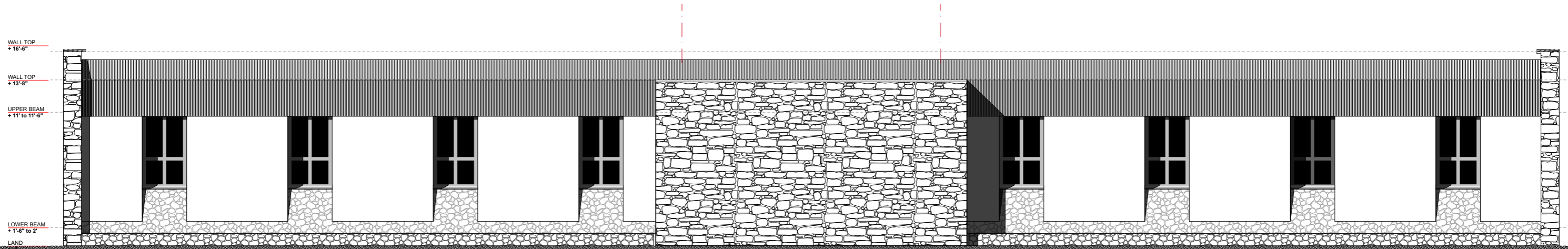
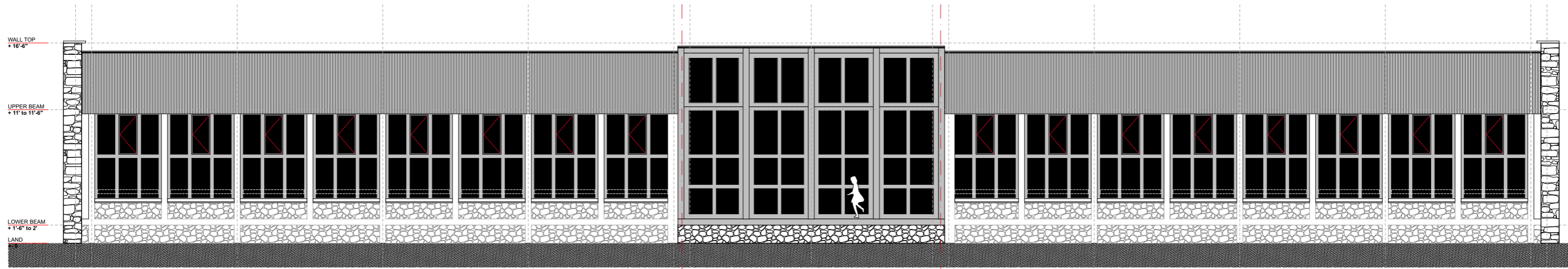
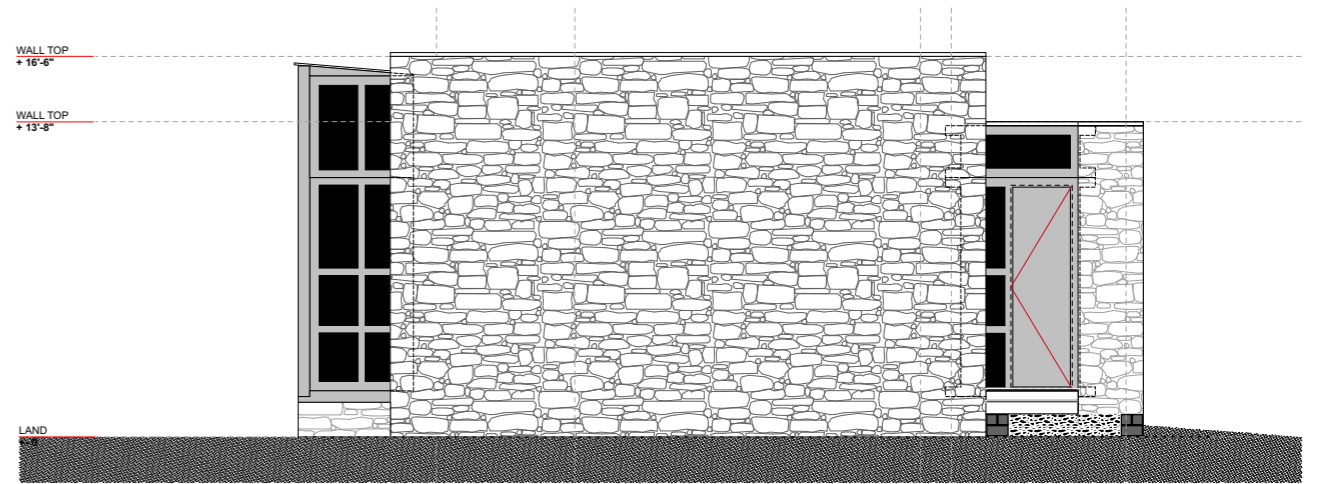
C

B /SECTIONS





C / FRONT VIEW



I / ROOFING PLAN

