

Group 7:

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Why women's health in district 8?



- Long-distance from the existing maternity clinic, general hospital, mother & child clinic
- 4.145 women in total
- 1.000 women from 12-39 years old
- Lack of Facilities dedicated for women's health and safety
- Women already gather in groups for communal purposes, we wanted to give them a more comfortable space dedicated for communal gatherings, cooking, workshops, classes etc.
- 20% of the refugees are in female-headed households.

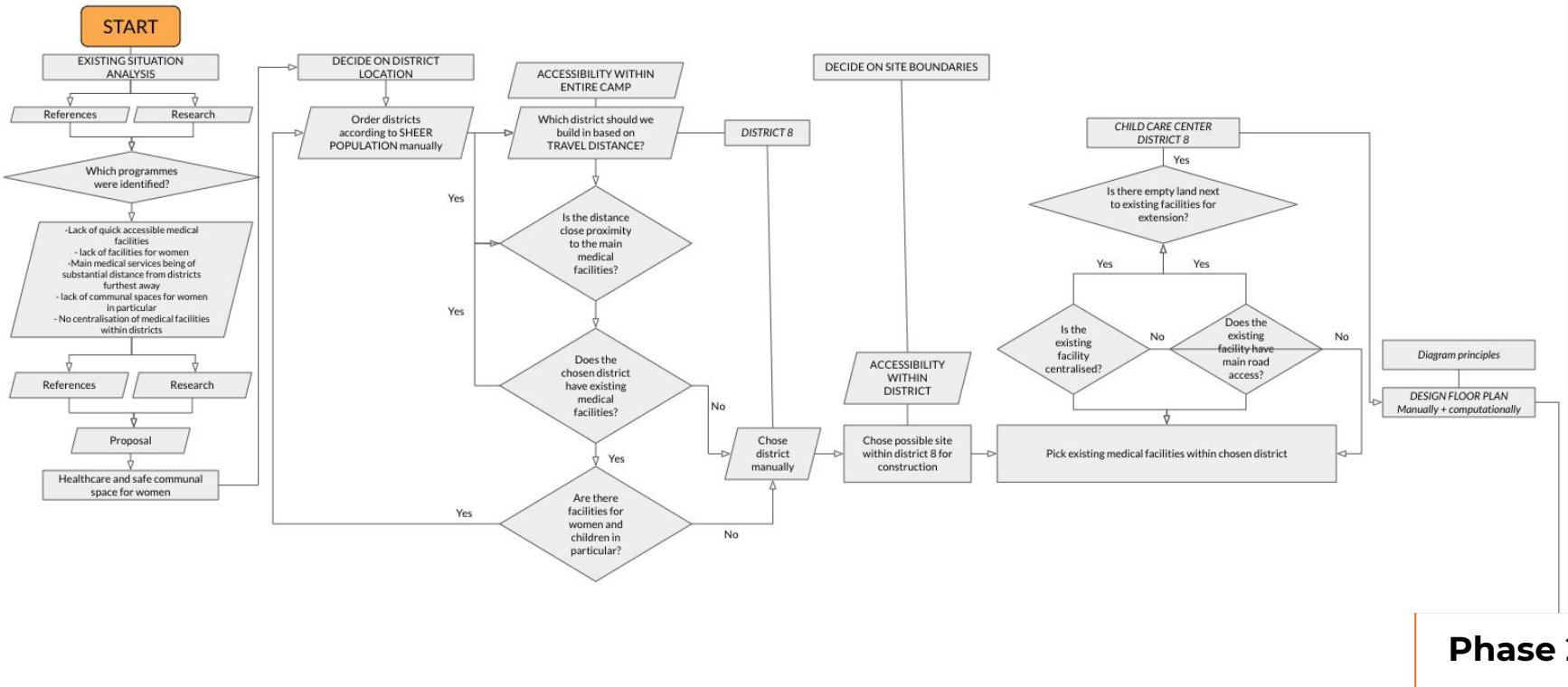


Location : Zaatari refugee camp

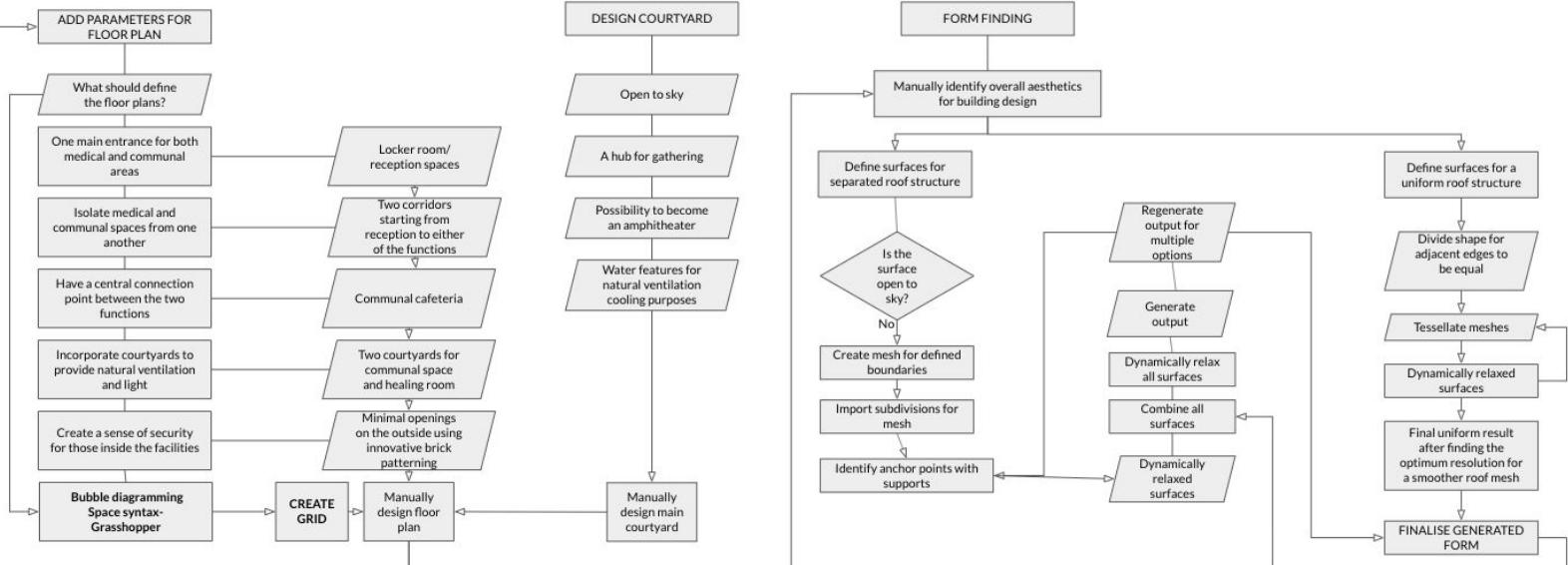
Women for Women center is located in district 8 as a solution which can be replicated in the other districts.

- Most populated district
- Long-distance from the existing maternity
- Existing facilities for youth and children.





Phase 1

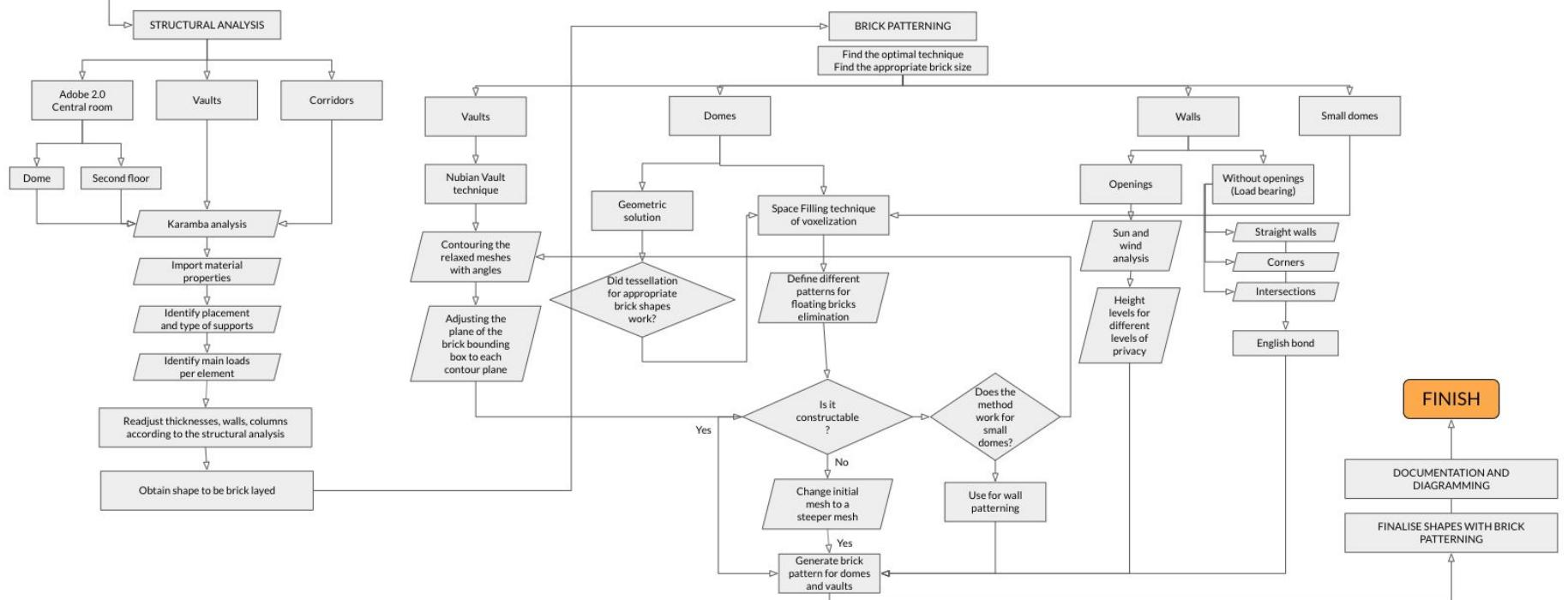


Phase 2

Flow chart (Diagramming to finalise form)

Phase 3

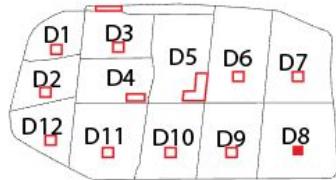
Phase 2



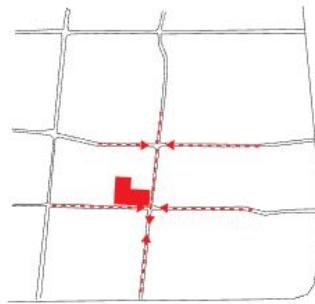
Phase 3

Flow chart (Finalised form to completion)

Configuring



DECENTRALIZATION



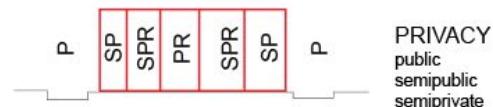
ACCESIBLE
PUBLIC SPACE



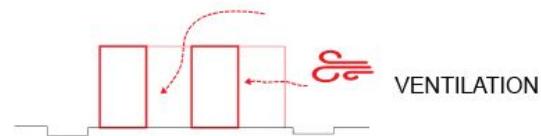
CLEAR ENTRANCE



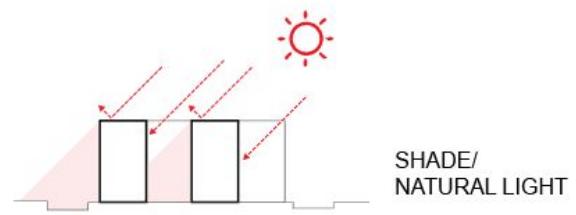
SAFETY



PRIVACY
public
semipublic
semiprivate
private



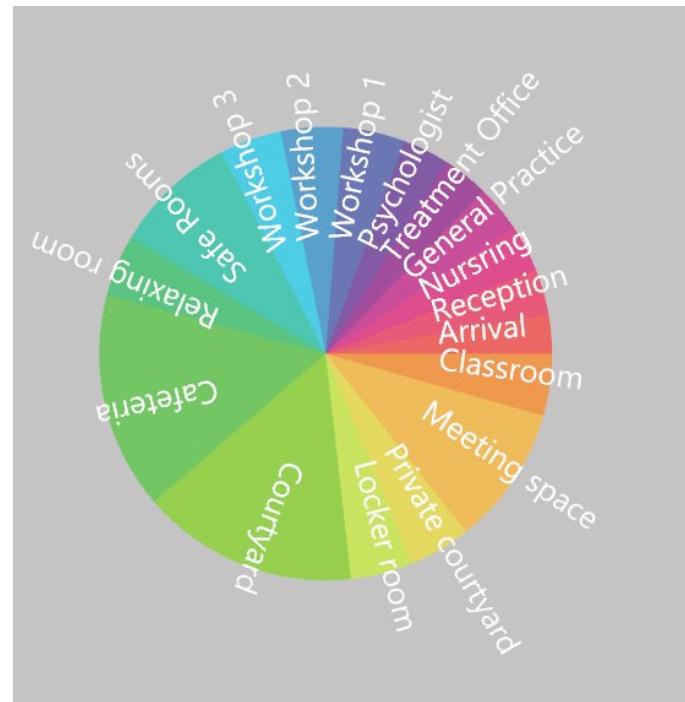
VENTILATION



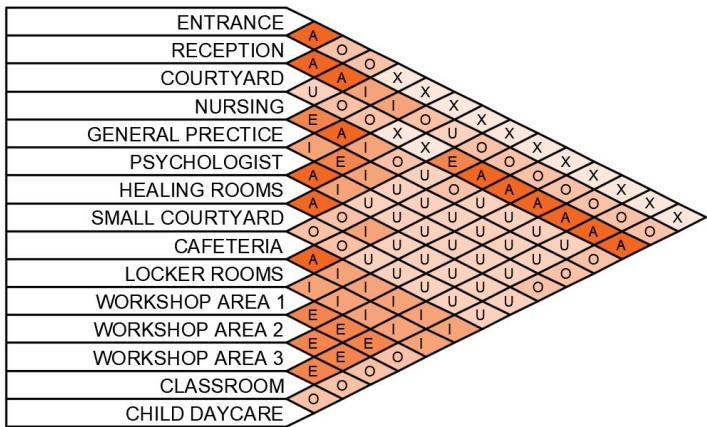
SHADE/
NATURAL LIGHT

Principles

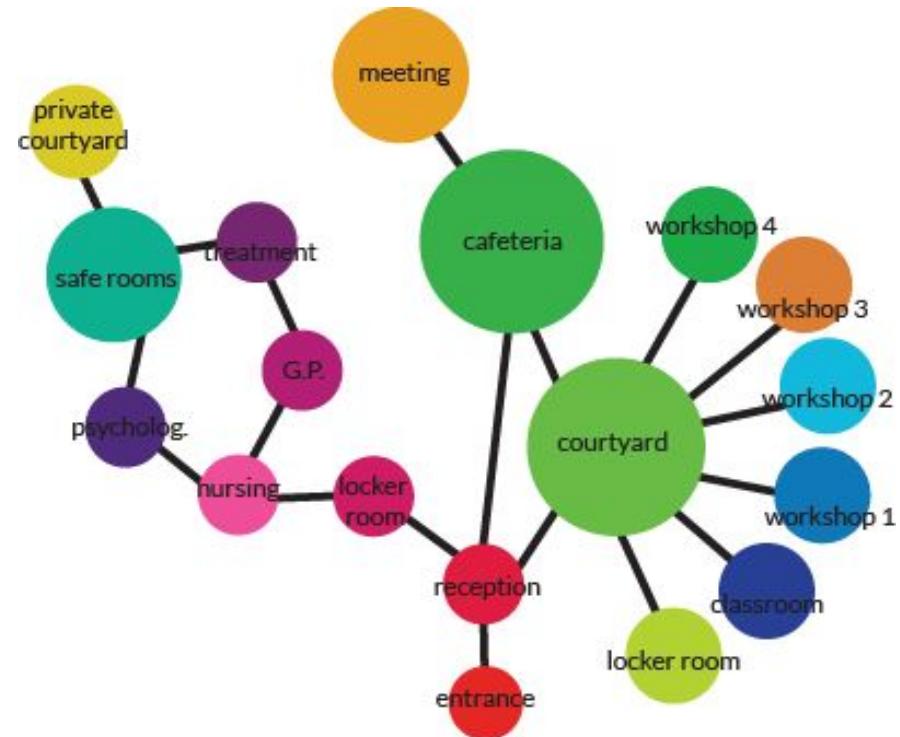
0: Arrival, 24sqm
1: Reception, 28sqm
2: Nursing, 28sqm
3: General Practice, 28sqm
4: Treatment Office, 28sqm
5: Psychologist, 28sqm
6: Workshop 1, 38sqm
7: Workshop 2, 38sqm
8: Workshop 3 , 38sqm
9: Safe Rooms, 76sqm
10: Relaxing room, 38sqm
11: Cafeteria, 134sqm
12: Courtyard, 134sqm
13: Locker room, 38sqm
14: Private courtyard, 38sqm
15: Meeting space, 86sqm
16: Classroom, 38sqm



Program




 A: Absolutely necessary
 E: Especially important
 I: Important and core
 O: Ordinary
 U: Unimportant
 X: Prohibited or Undesirable



Space syntax & REL Chart

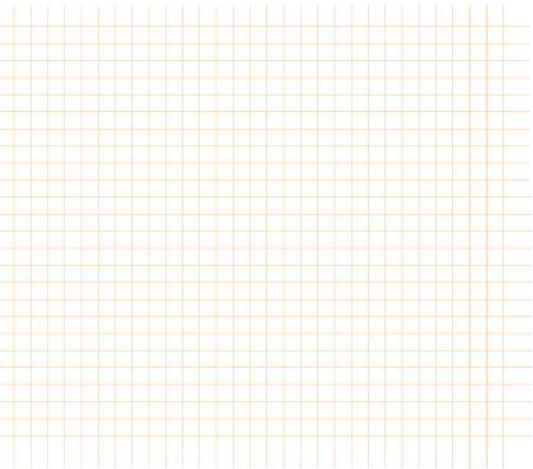


Diagram 1: Grid (1.5 m)

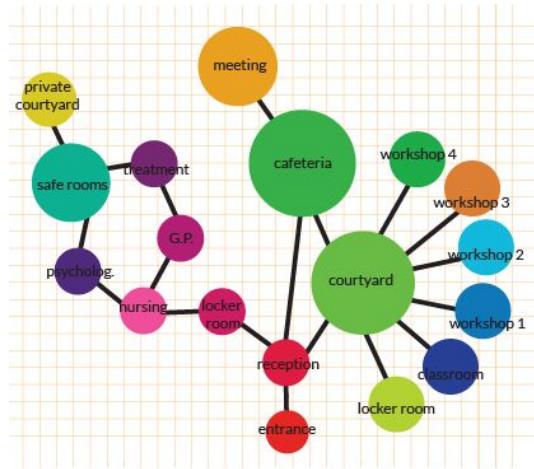


Diagram 2: Space syntax

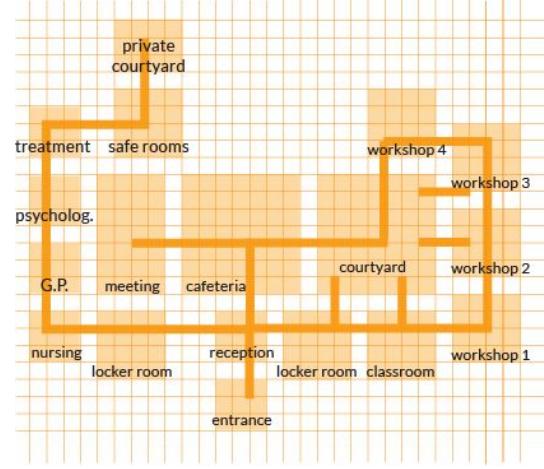


Diagram 2: Connections

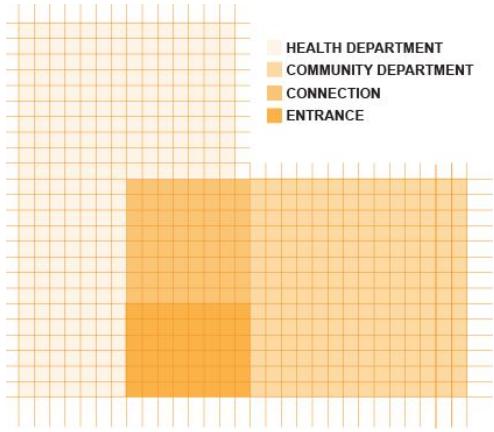


Diagram 3: Configuring

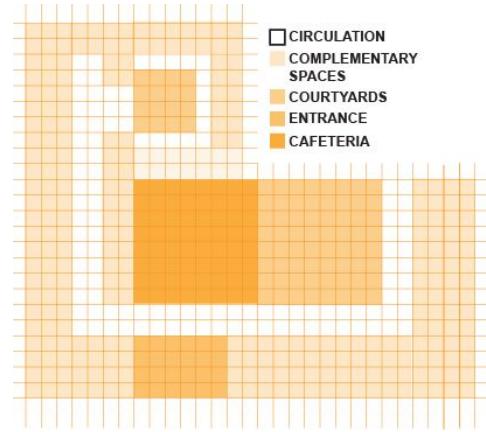
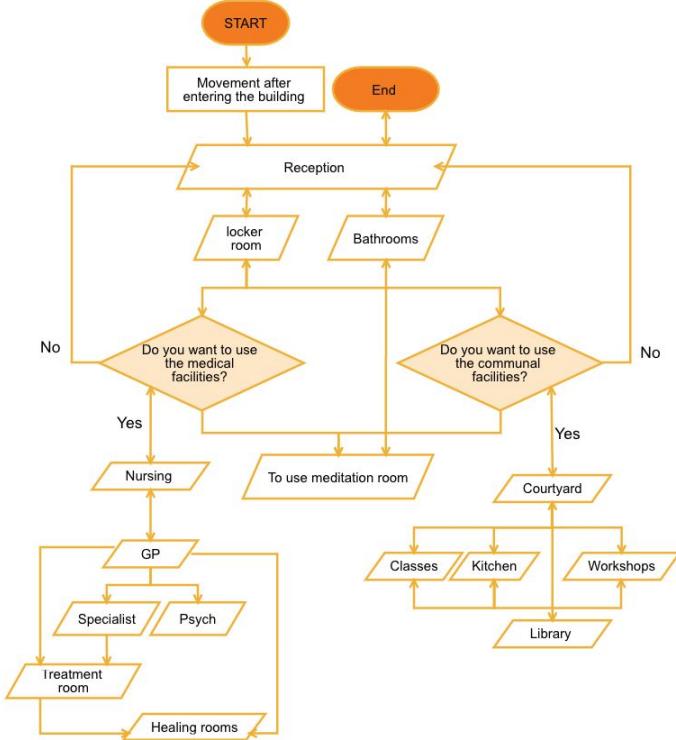


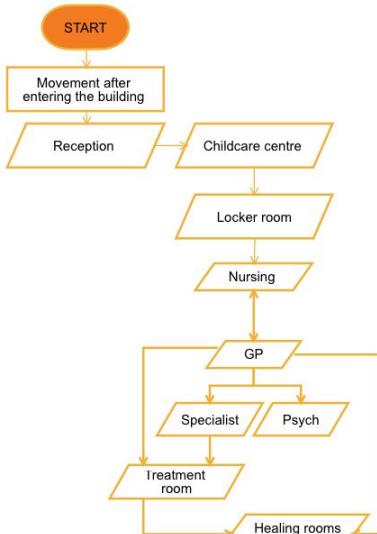
Diagram 3: Configuring

Configuring

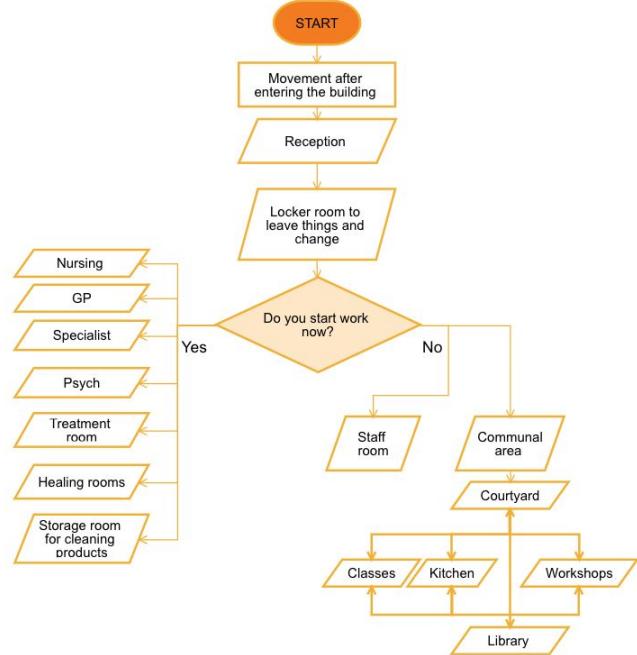
INTERNAL MOVEMENTS: Single woman with no children



INTERNAL MOVEMENTS: Woman with child needing special help



INTERNAL MOVEMENTS: Medical staff



User experiences

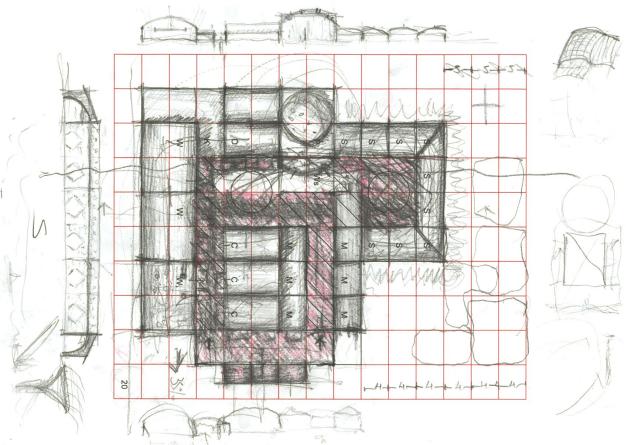


Image 1: Grid exploration

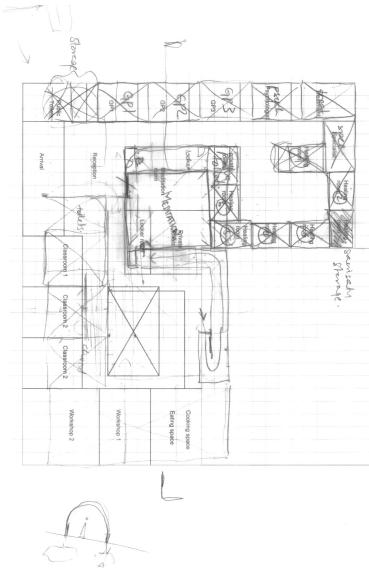


Image 3: Programme

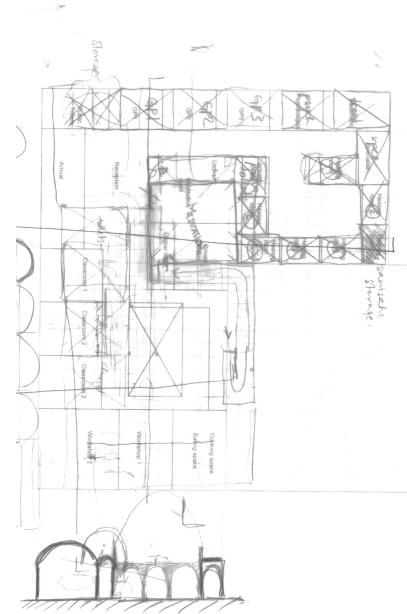


Image 4: Programme in section

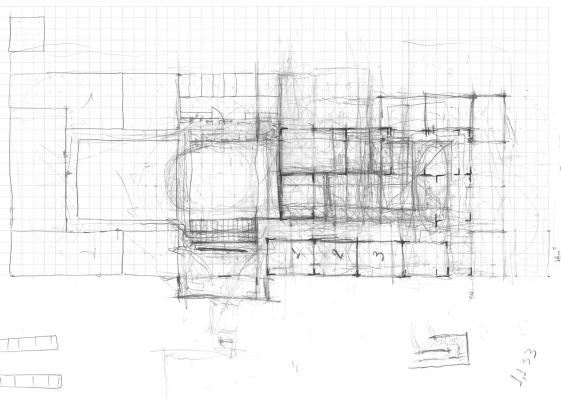


Image 2: Programme according to grid exploration

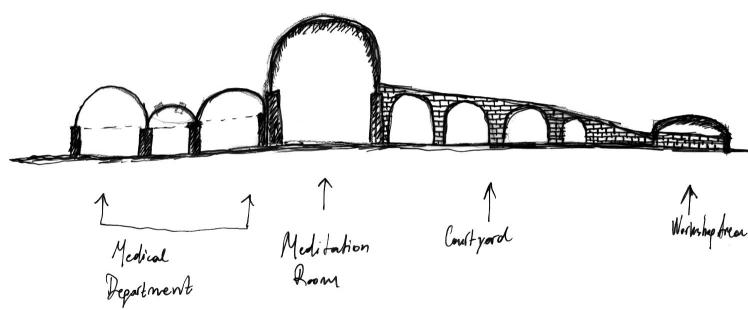


Image 5: Section

Sketch Process

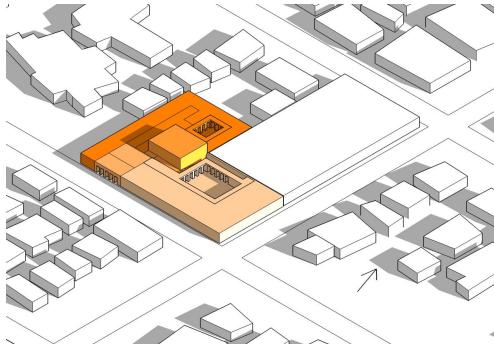


Diagram 1: Summer sun at 10 AM



Diagram 2: Summer sun at 6 PM

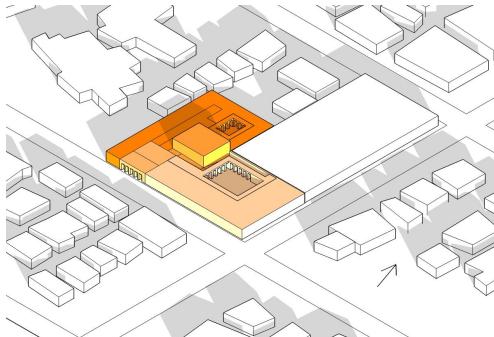


Diagram 3: Winter sun at 10 AM



Diagram 4: Winter sun at 6 PM



Diagram 5: Predominant wind direction (West)

Sun movement

Wind direction

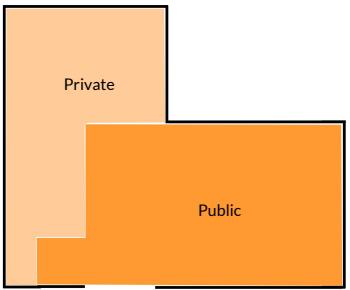


Diagram 1: Zoning

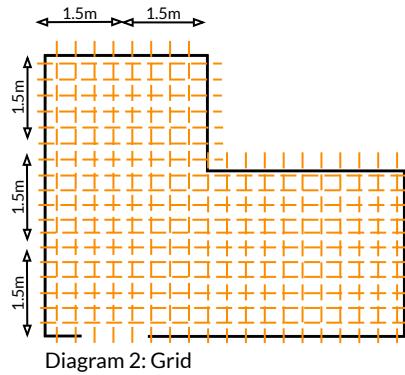


Diagram 2: Grid

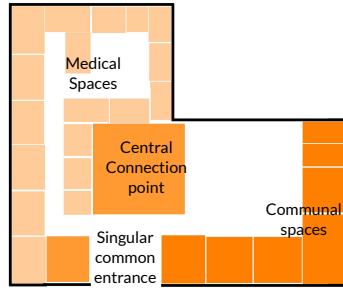


Diagram 3: Configuring

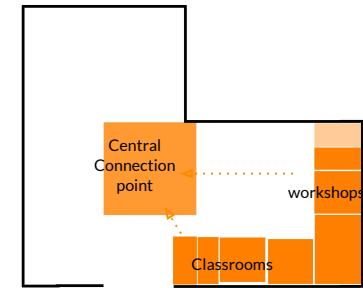


Diagram 3: Communal Configuring

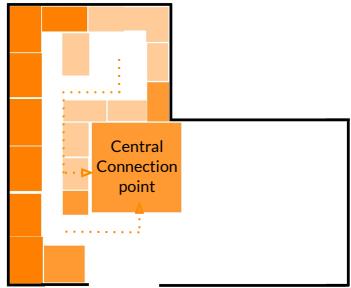


Diagram 4: Medical Configuring

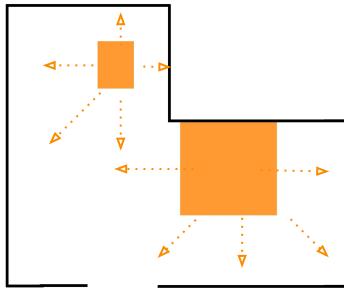


Diagram 5: Courtyard connections

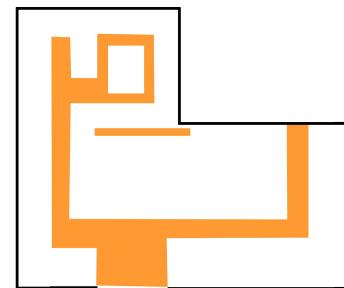
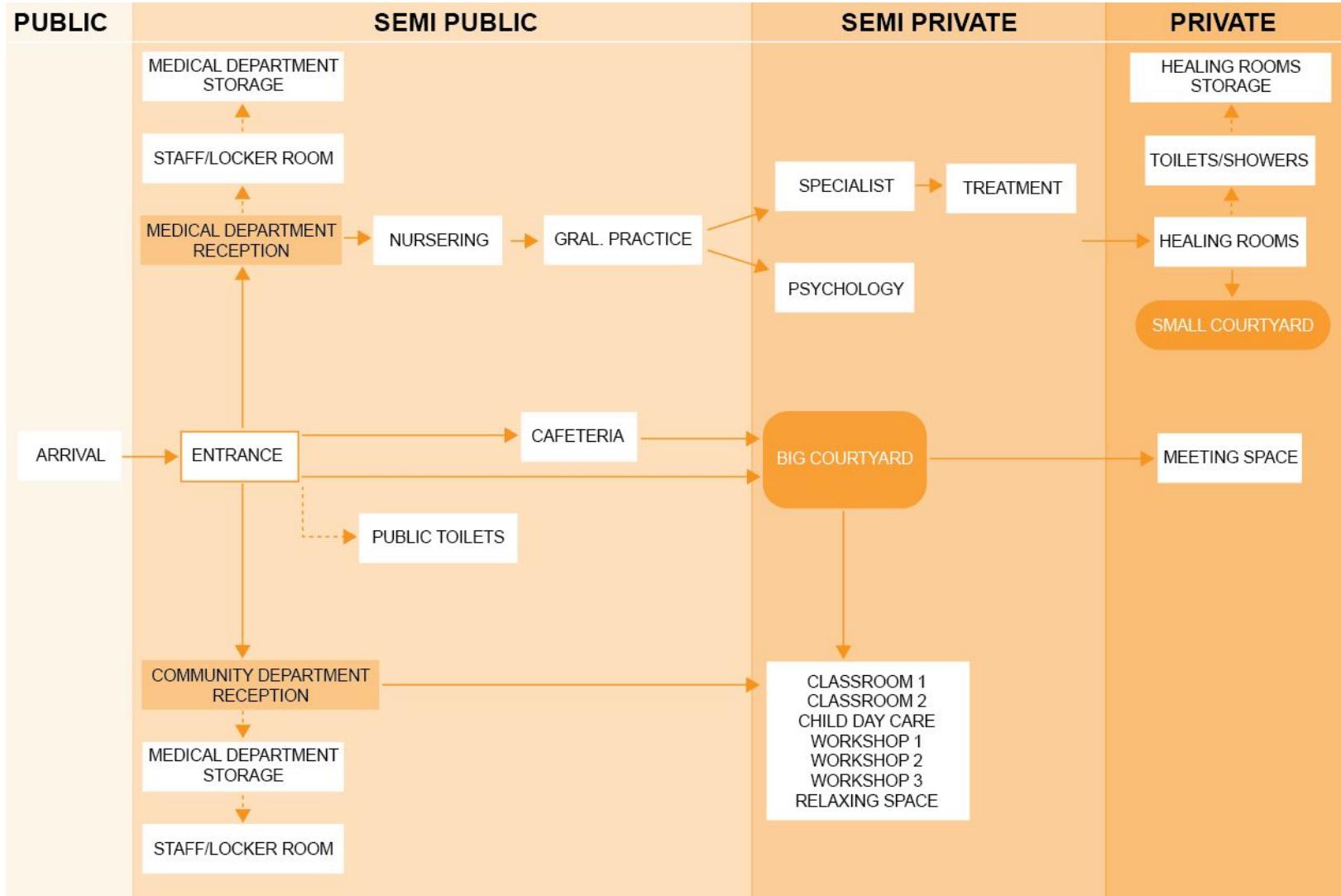


Diagram 6: Internal Movement corridors

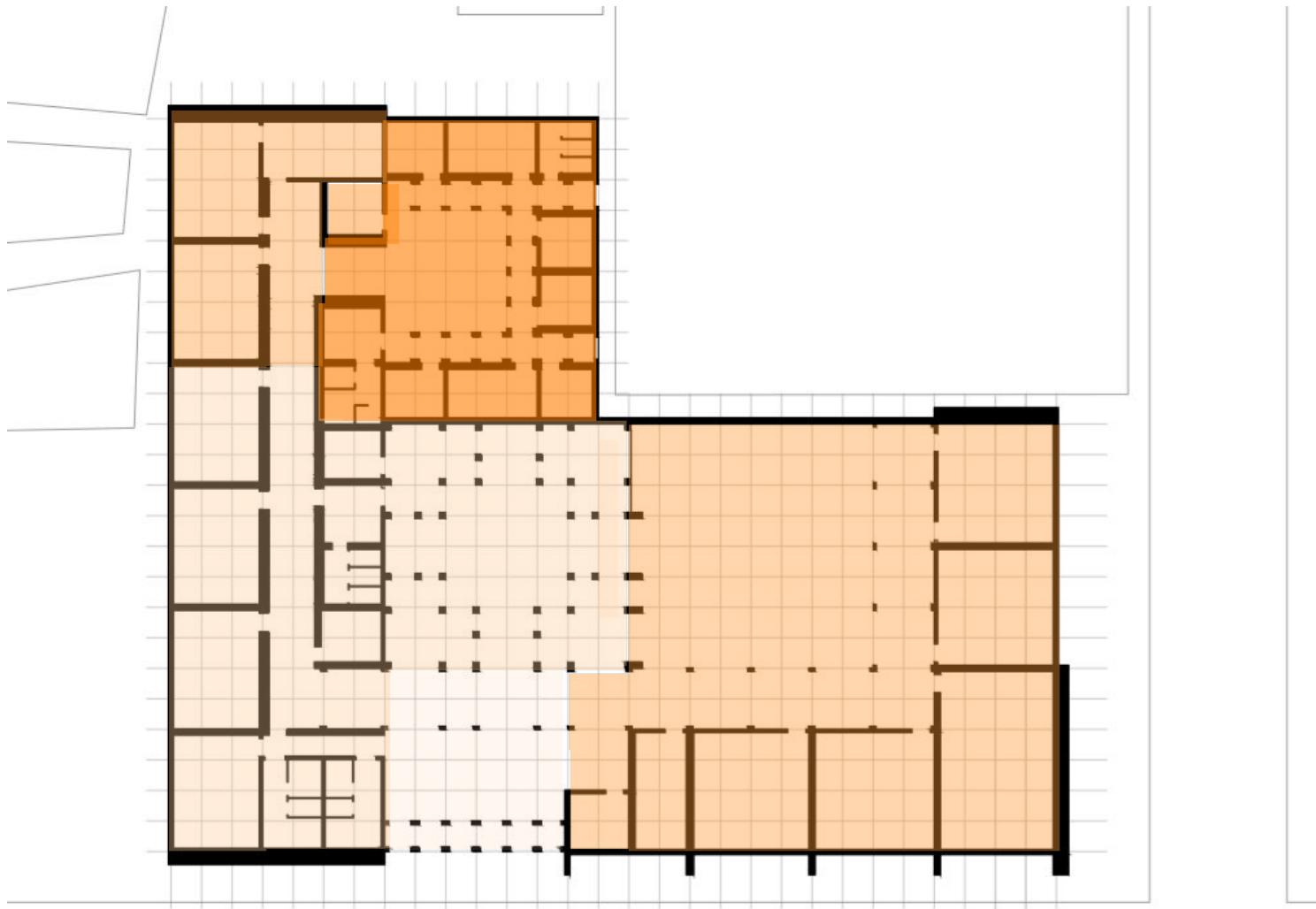
Internal programming



Floor Plan



Privacy diagram



Floor Plan

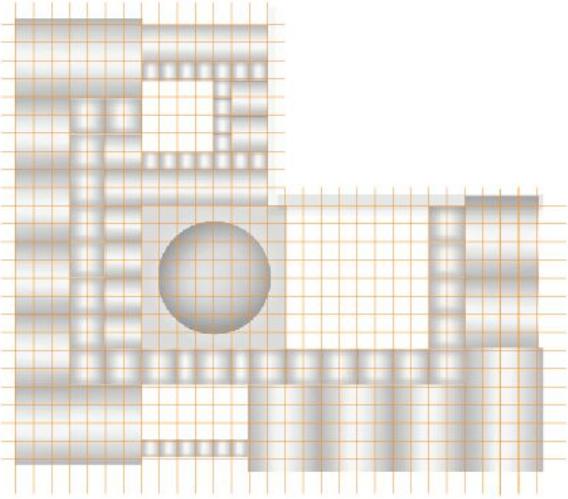


Diagram 1: Roofs configuration

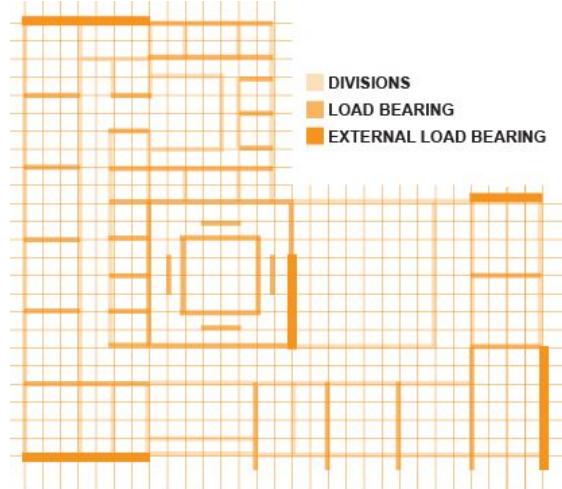
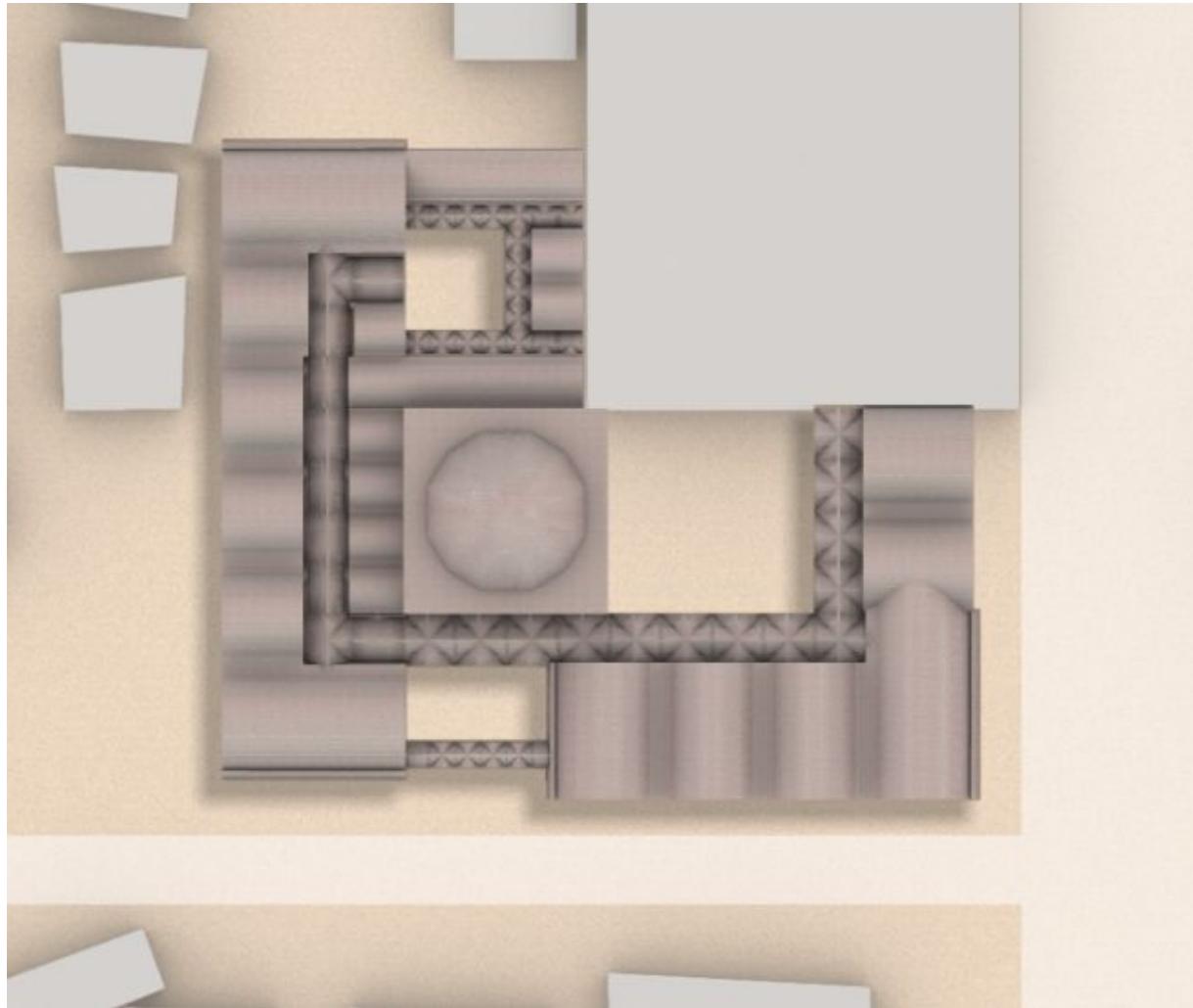
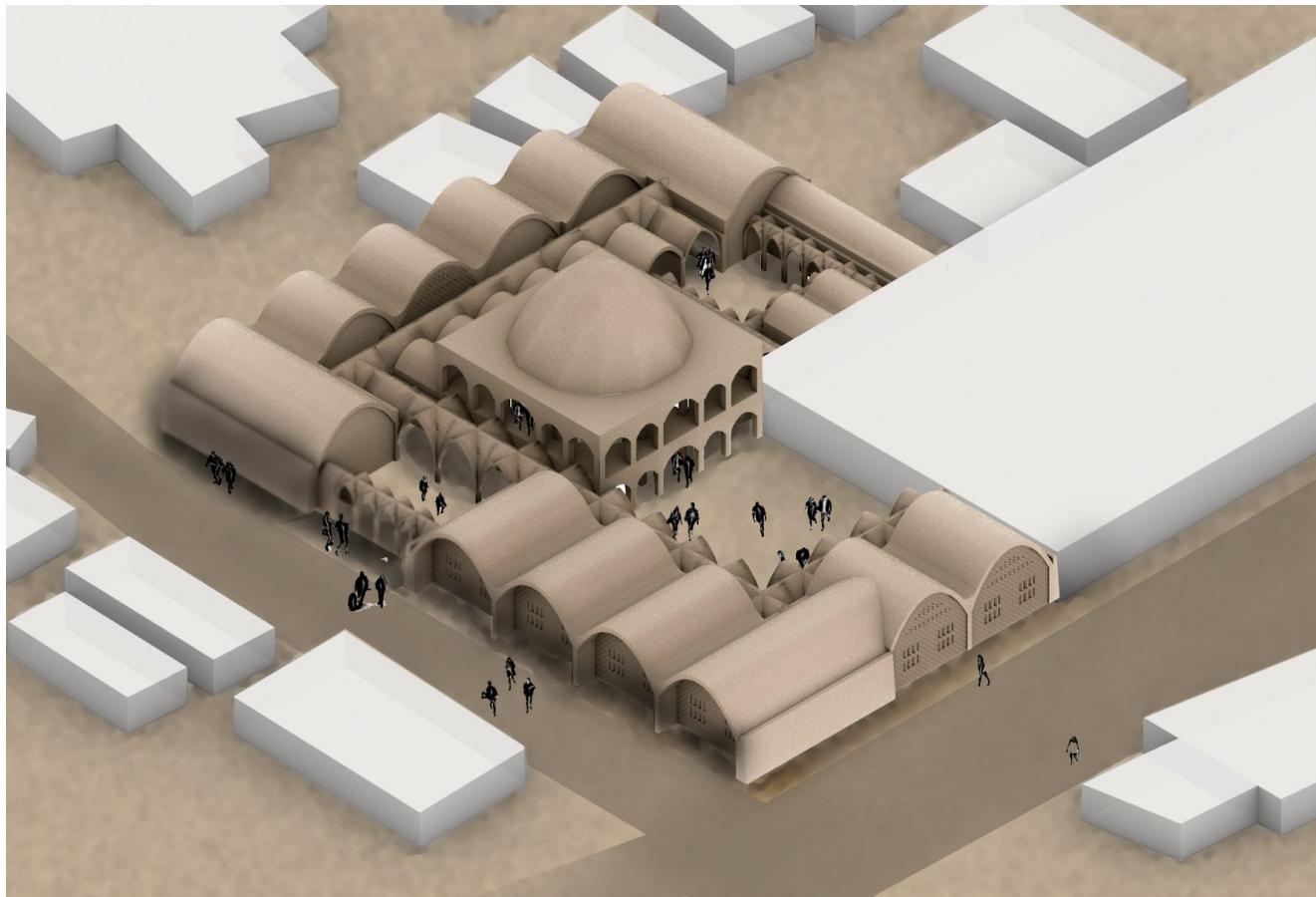


Diagram 2: Structure

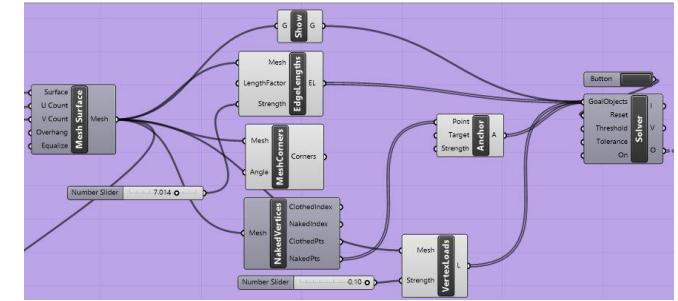
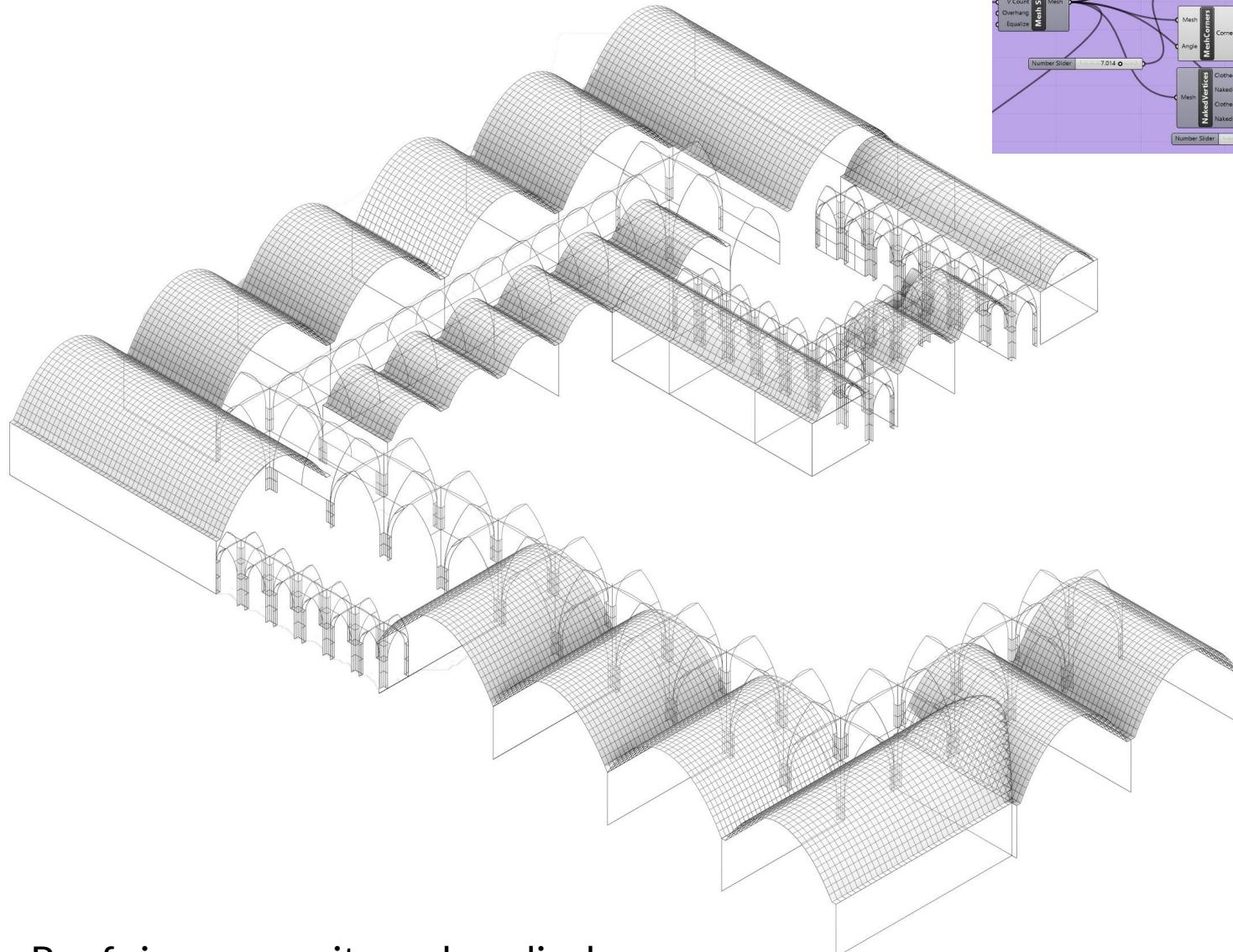
Roofs topology design



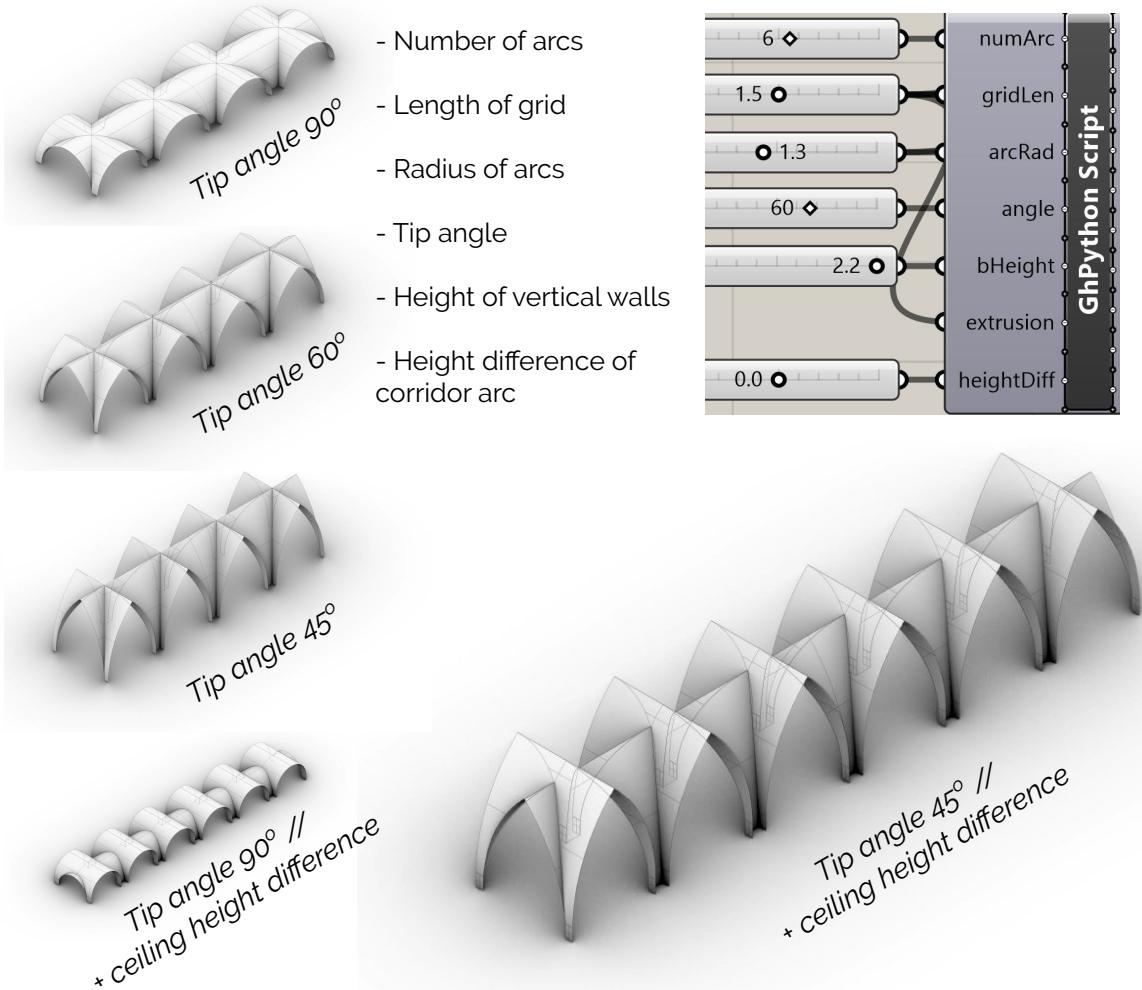
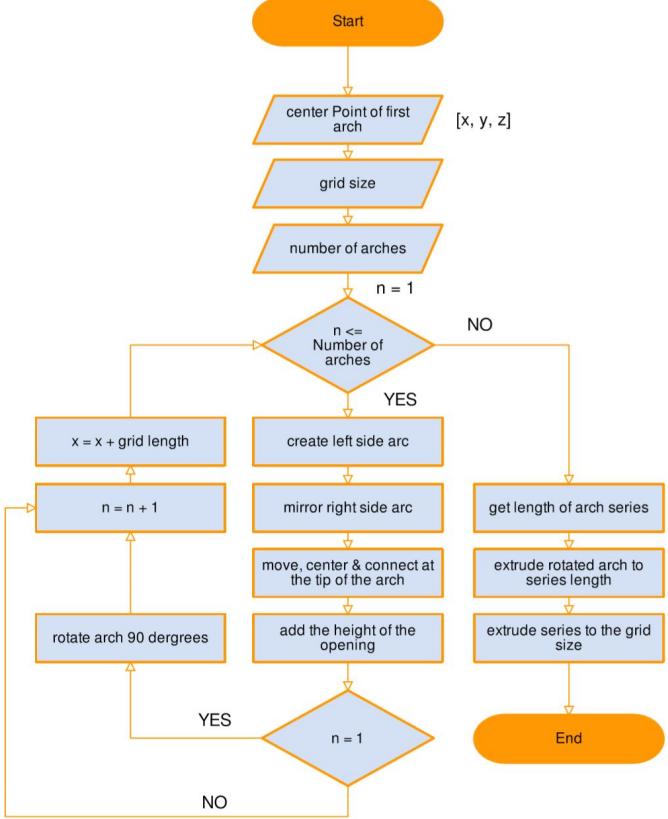
Roofs topology



Form finding

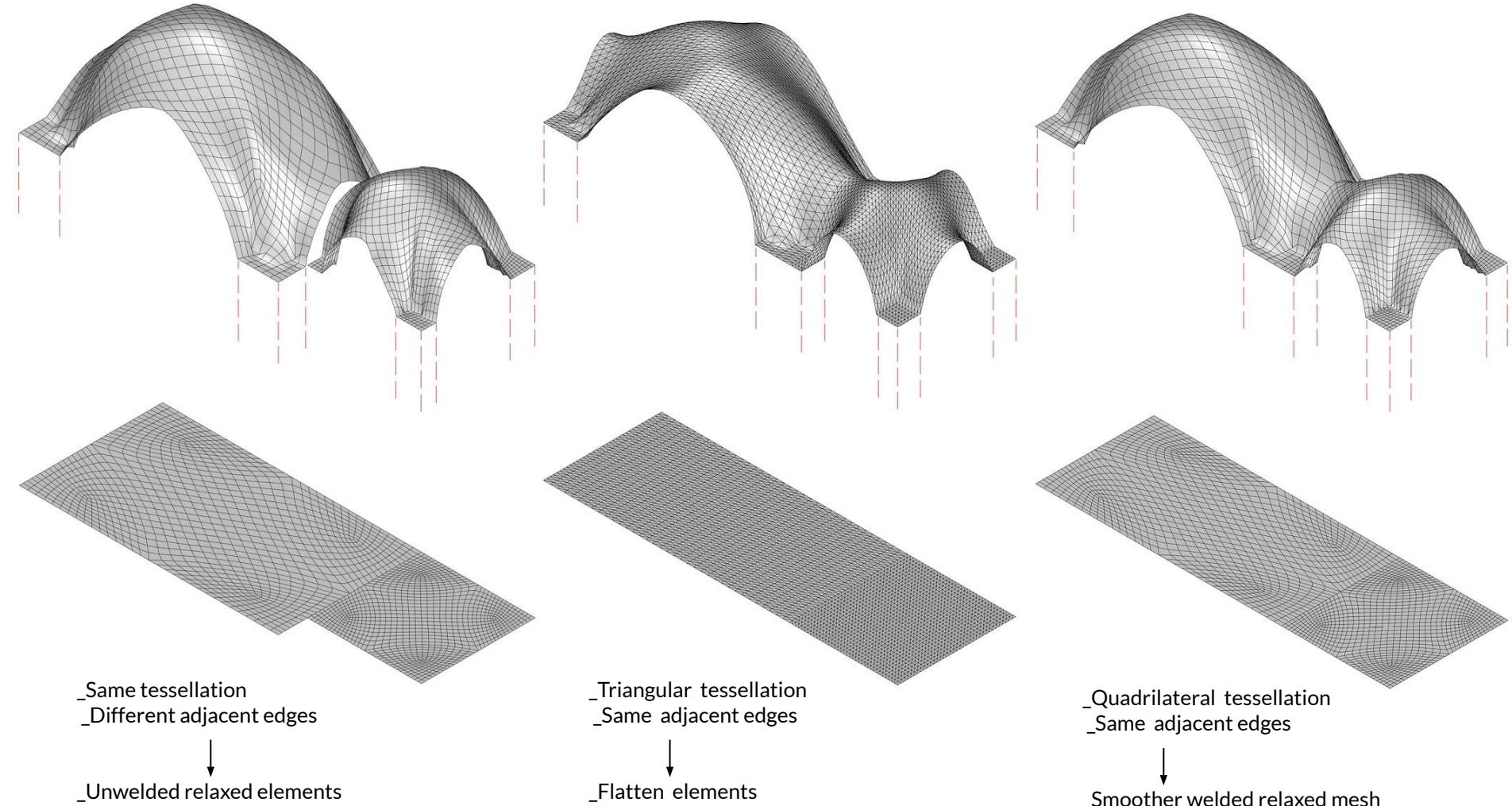


Roofs in community and medical spaces



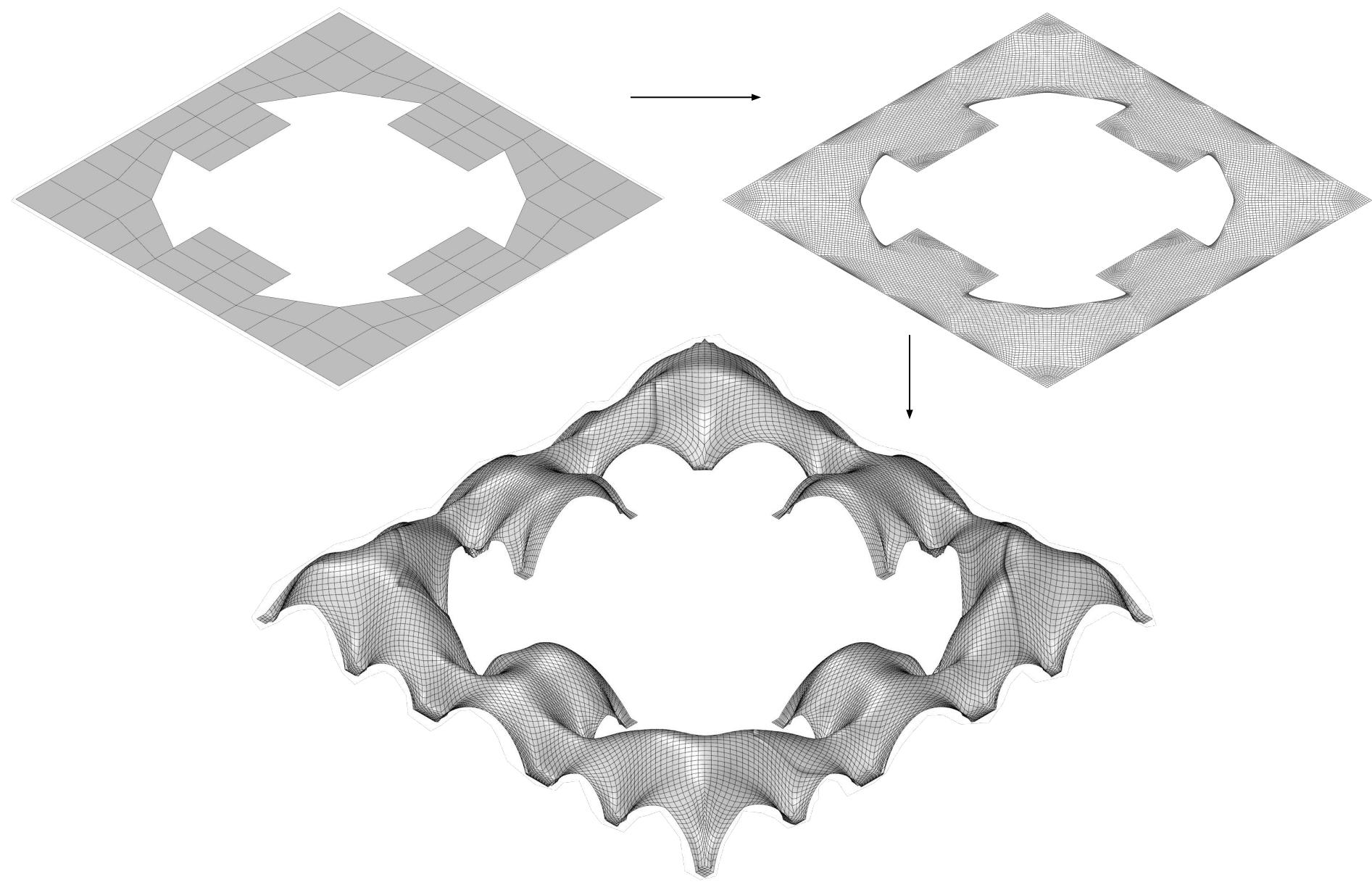
Python script component

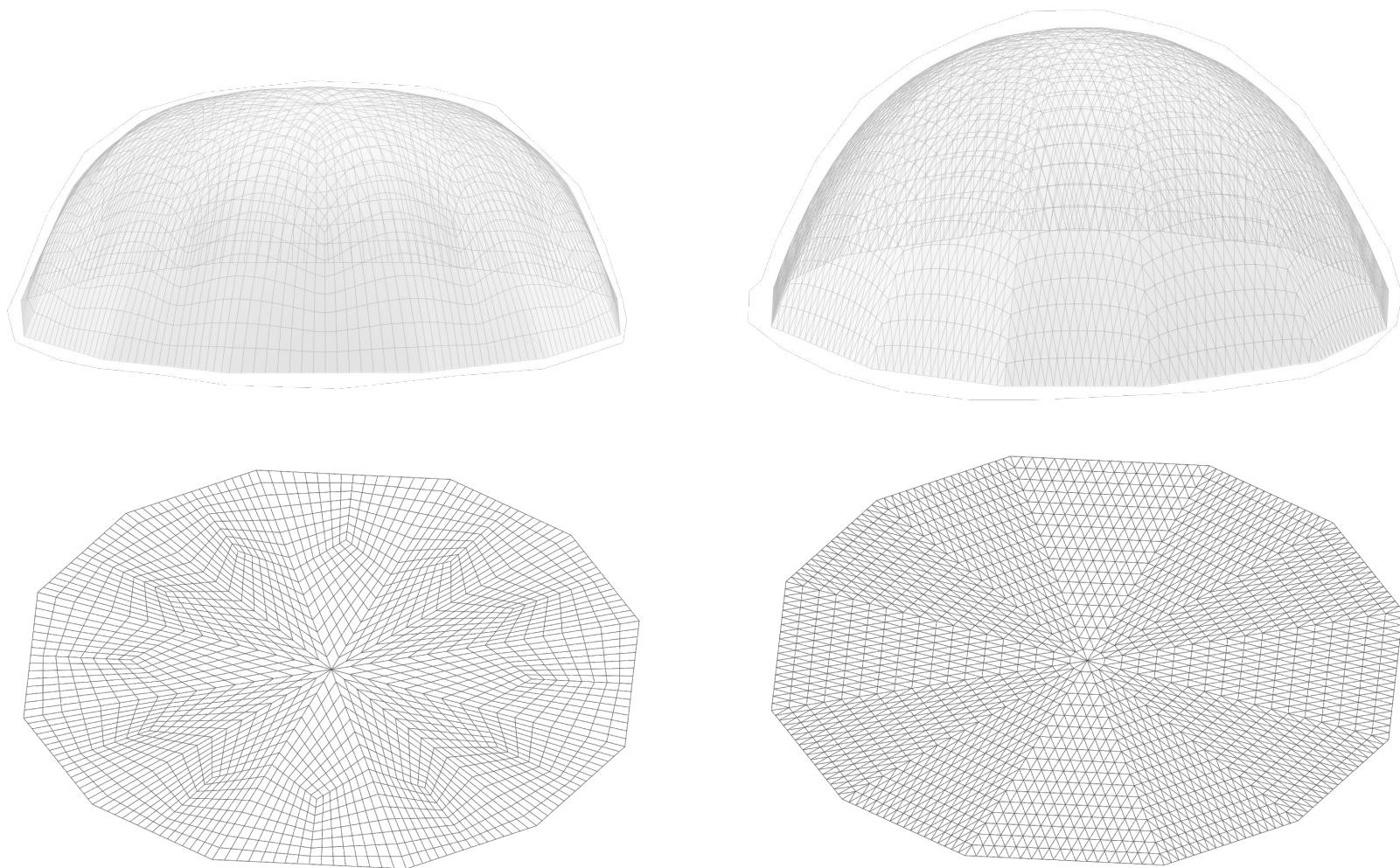
Ability to create various forms of curved arches, orientated for modular corridors



Further form finding_Central Room

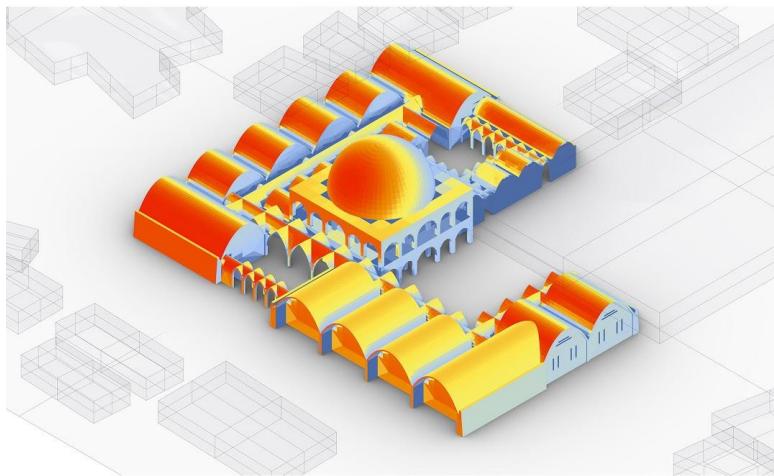
Different tessellations and meshes of the small domes



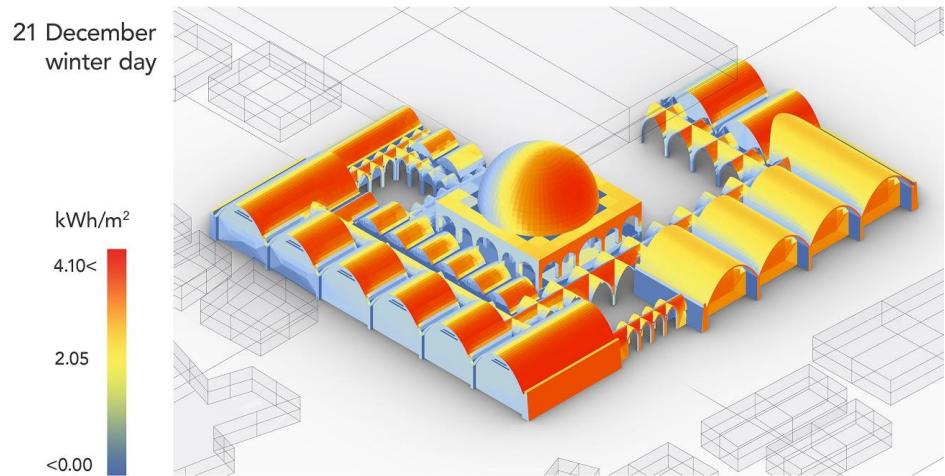


Further form finding_Central Room
Tessellation and mesh of the dome

SW isometric view

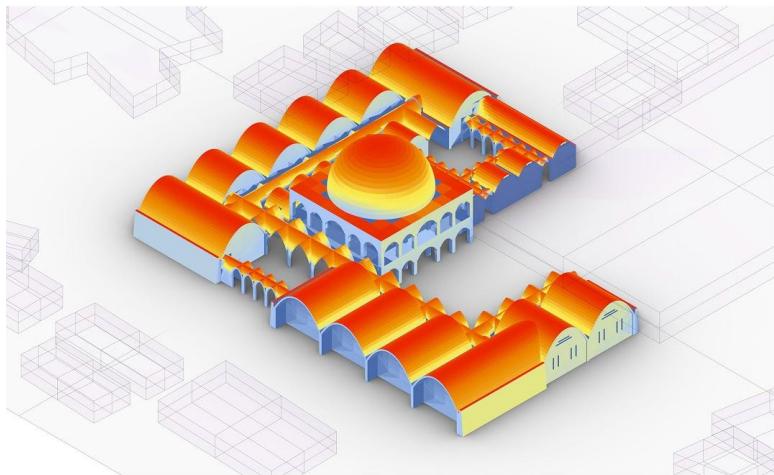


SE isometric view



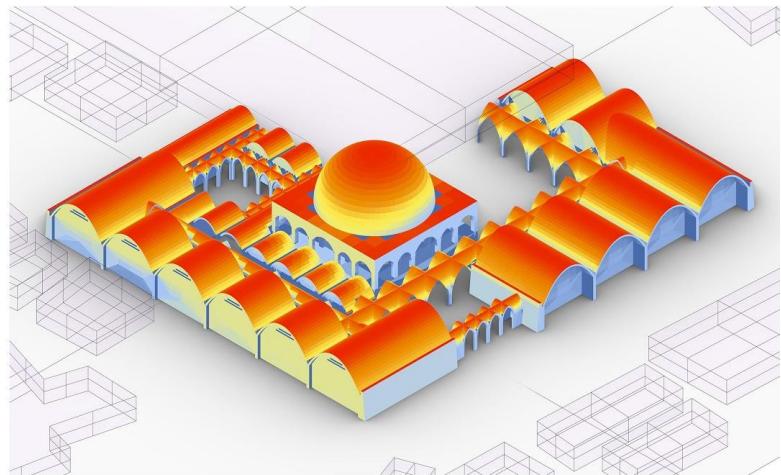
21 December
winter day

kWh/m²
4.10+
2.05
<0.00

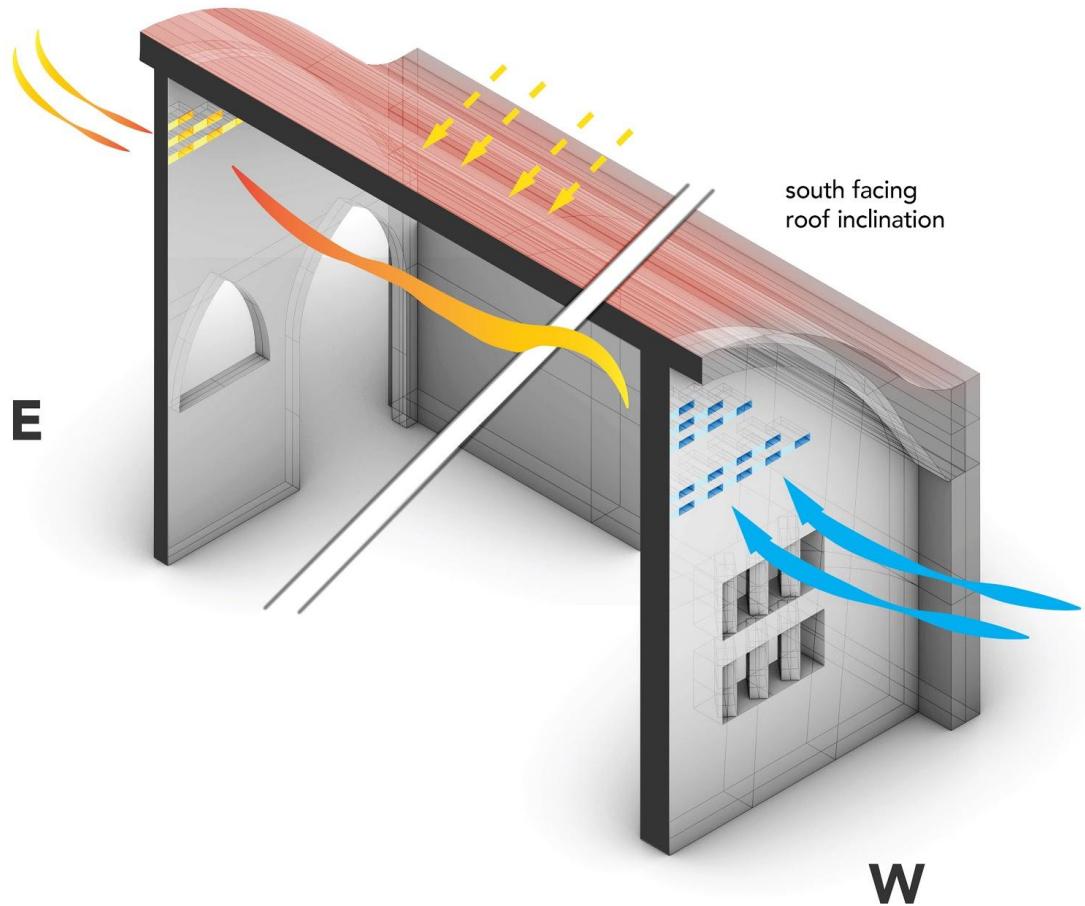
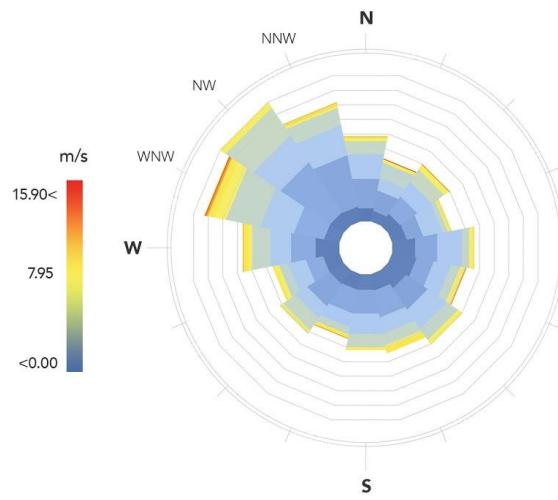


21 June
summer day

kWh/m²
7.97+
3.98
<0.00

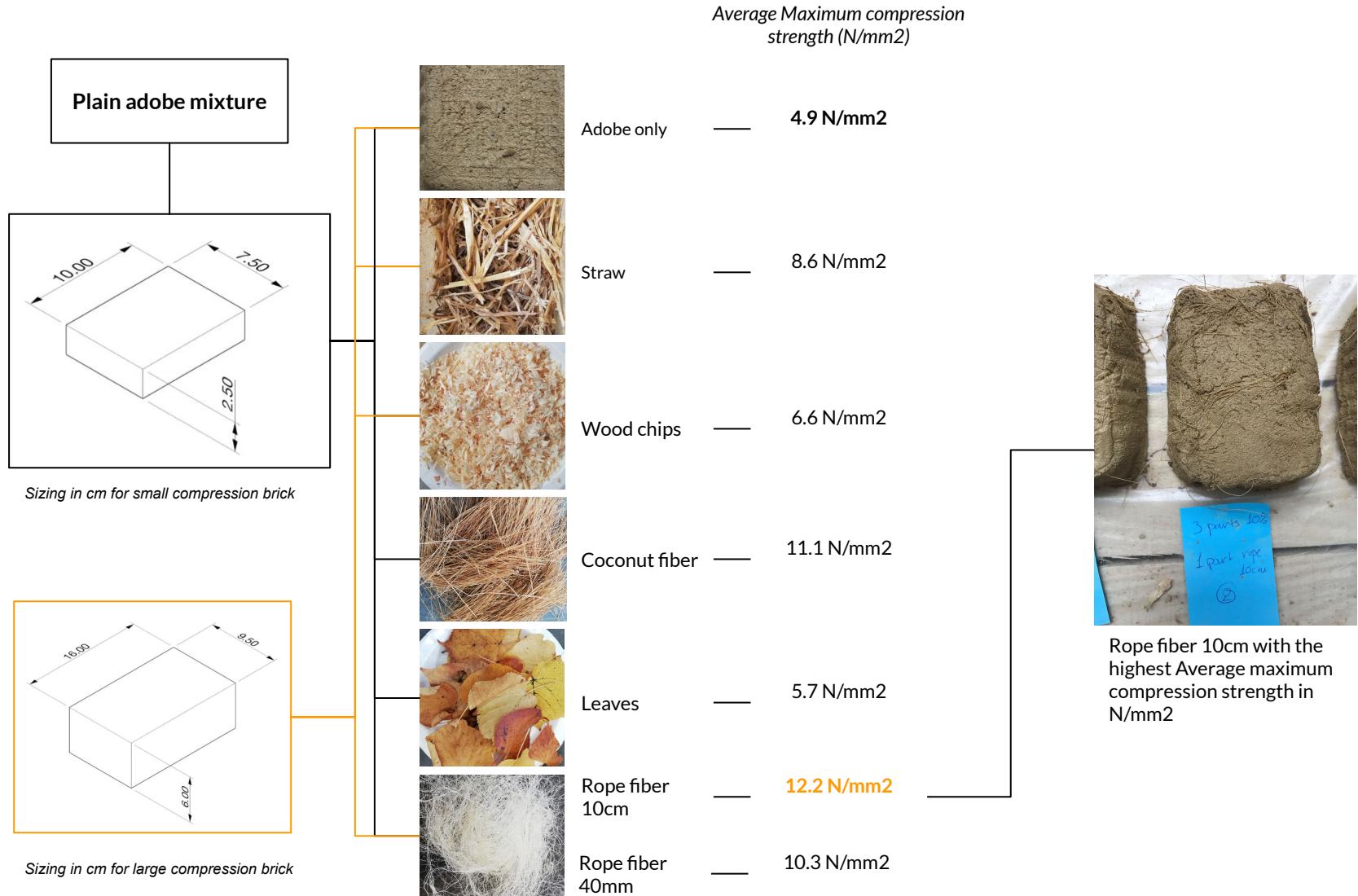


Solar radiation analysis



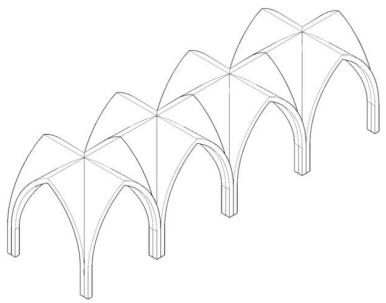
Ventilation of heated roofs

Adobe brick testing

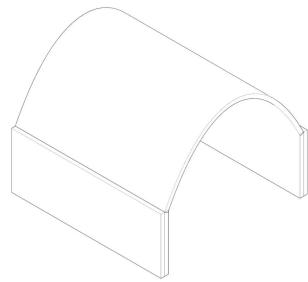


Adobe brick testing

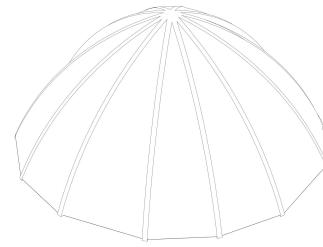
Structuring



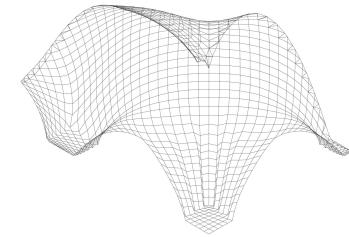
Rib Vault System



Catenary vault



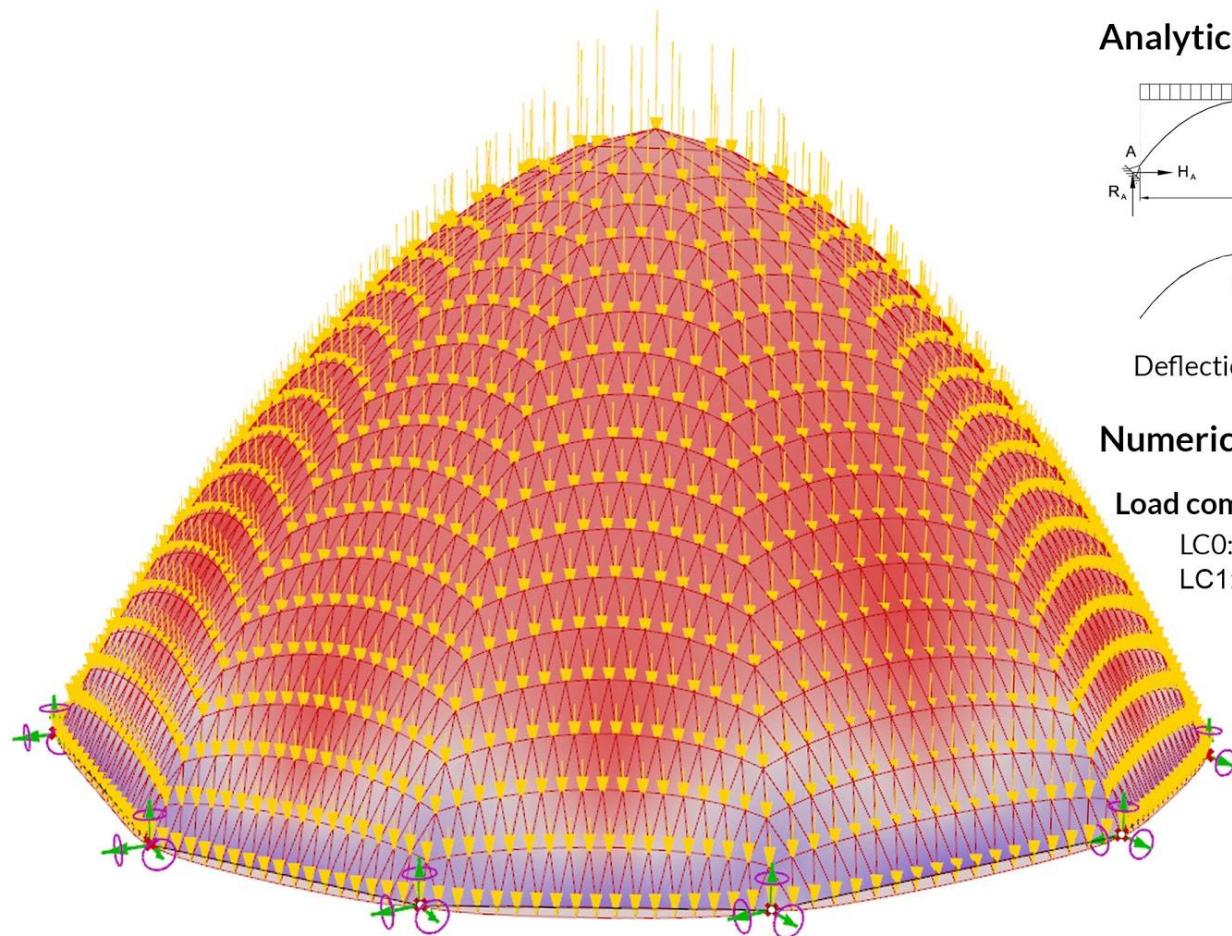
Large Catenary dome



Free form vault structure

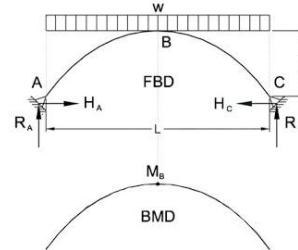
Structural elements

Dome and Vaults



Dome

Analytical calculation



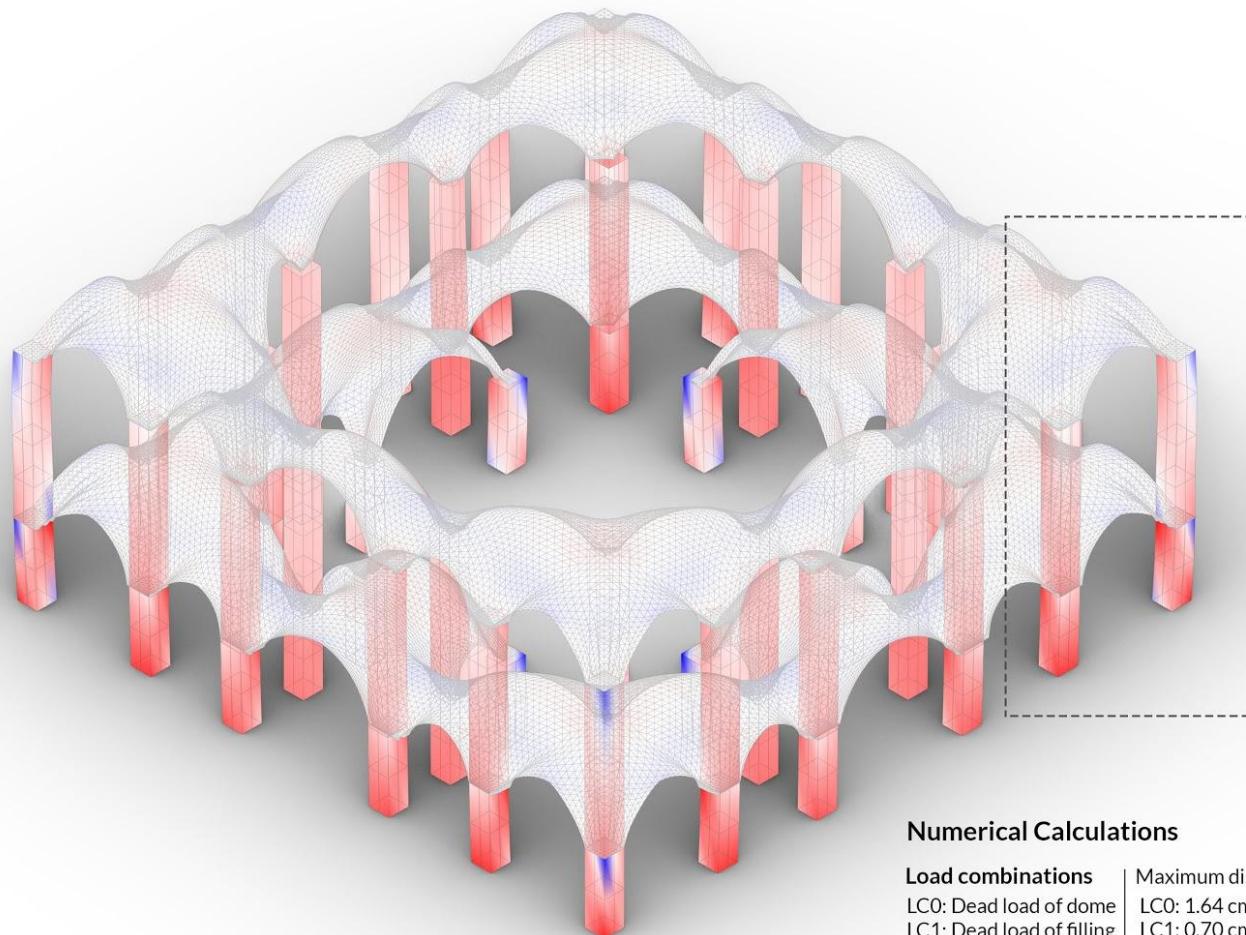
$$\text{Deflection limit} = L/250 = 10/250 = 4 \text{ cm}$$

Numerical Calculations

Load combinations

LC0: Gravity
LC1: Sand load

Maximum displacement
LC0: 0.75 cm
LC1: 0.32 cm
Maximum tensile stress
0.16 MPa
Maximum compression stress
0.08 MPa



Central room

Numerical Calculations

Load combinations

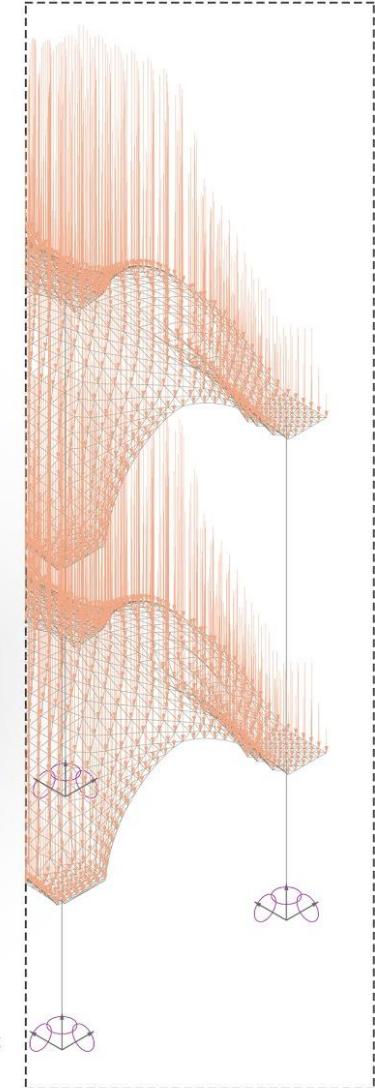
LC0: Dead load of dome
 LC1: Dead load of filling
 LC2: Live load

Maximum displacement

LC0: 1.64 cm
 LC1: 0.70 cm
 LC2: 0.32 cm

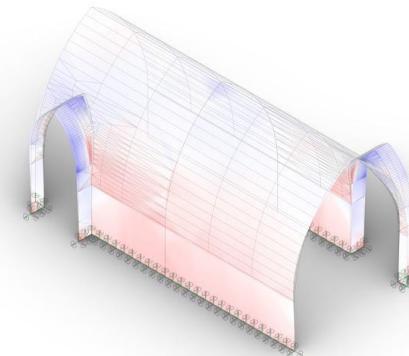
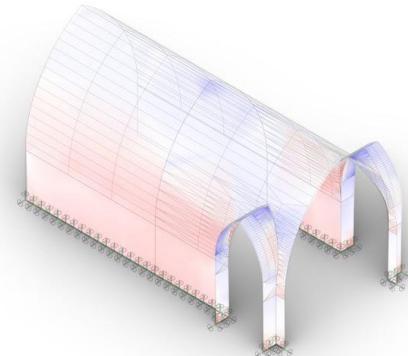
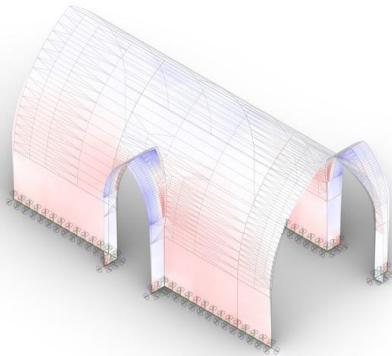
Maximum tensile stress
 Maximum compression
 stress

Shell	0.62 MPa	Columns	0.35 MPa
	0.38 MPa		1.09 MPa



Analytical calculation

Deflection limit = $L/250 = 2.6/250 = 1 \text{ cm}$

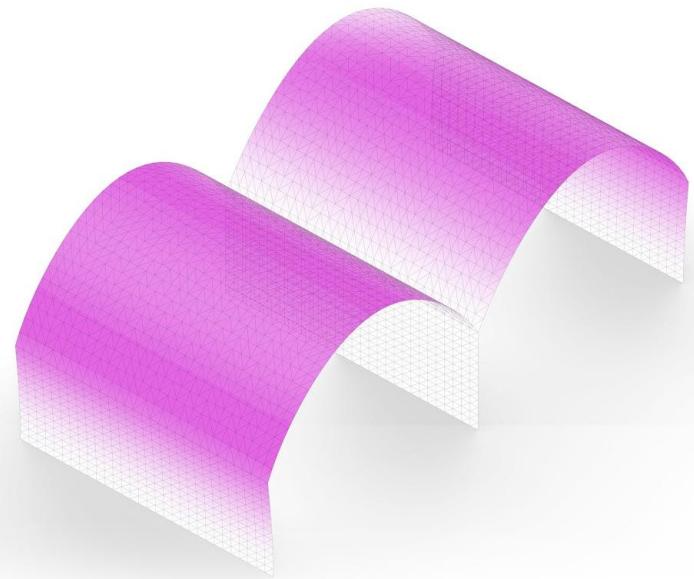
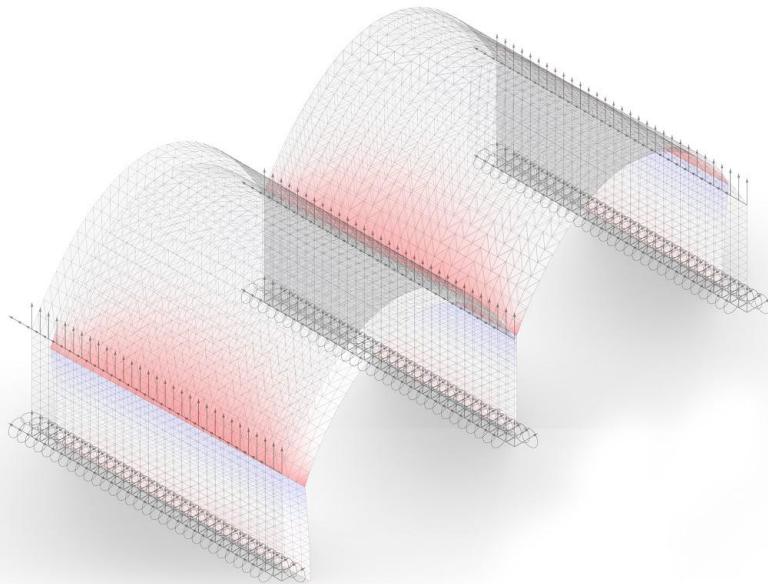


Numerical Calculations

Case 1 Initial plan openings' location	Maximum displacement 0.44 cm	Case 2 Symmetrical openings	Maximum displacement 0.40 cm	Case 3 Diagonally opposite	Maximum displacement 0.39 cm
	Maximum tensile stress 0.075 MPa Maximum compression stress 0.041 MPa		Maximum tensile stress 0.054 MPa Maximum compression stress 0.042 MPa		Maximum tensile stress 0.051 MPa Maximum compression stress 0.040 MPa

Structure analysis in Karamba Corridors

side walls : 70cm
middle walls : 30cm
plate : 16cm



Numerical calculations

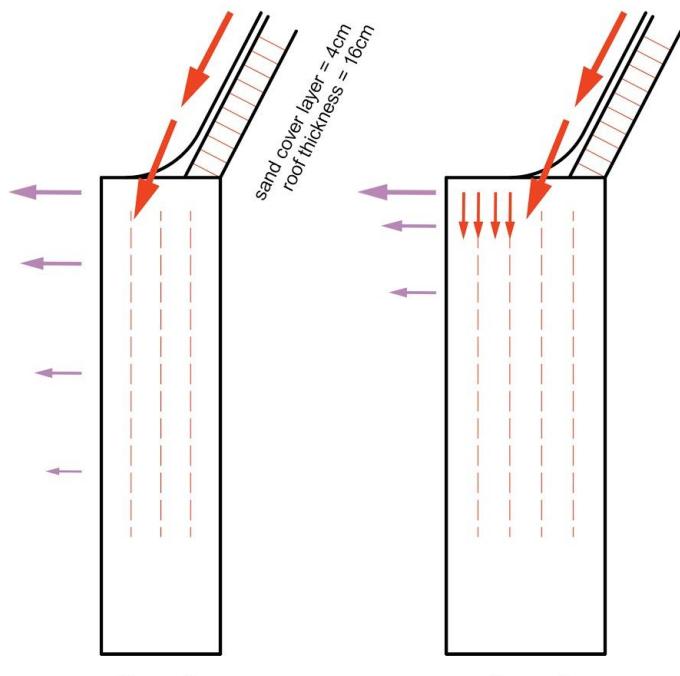
Maximum tensile stress
0.16 MPa

Maximum displacement
1.39cm

Maximum compression stress
0.049 MPa

Structure analysis in Karamba Vaults

load-bearing side walls optimization



Case 1

Thickness 60cm

Max displacement
2.10cm

Case 2

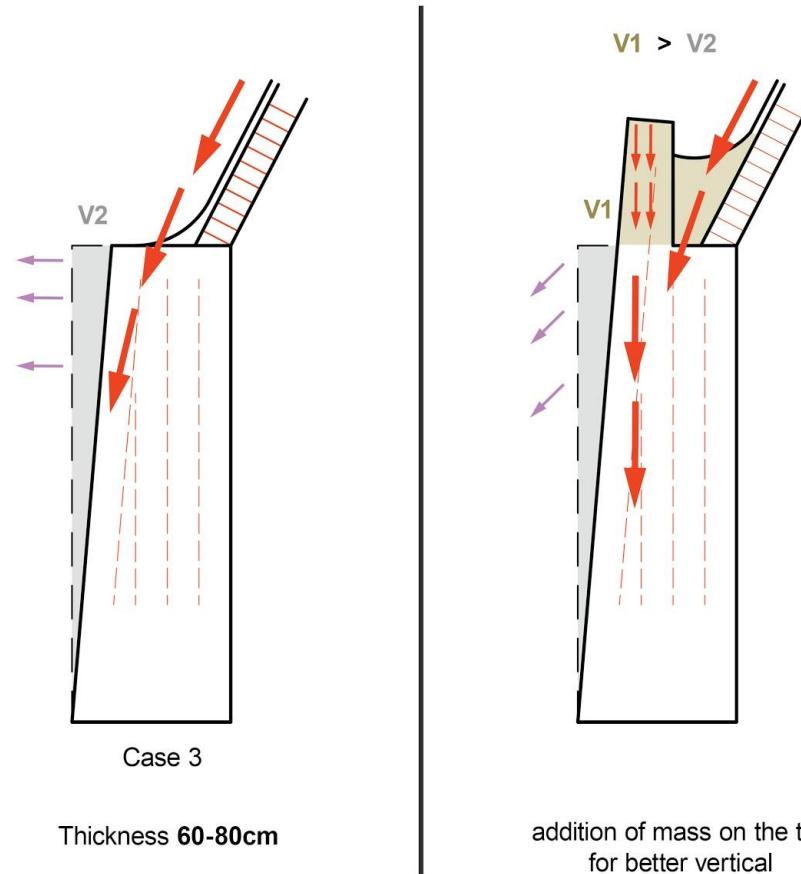
Thickness 80cm

Max displacement
1.00cm

Case 3

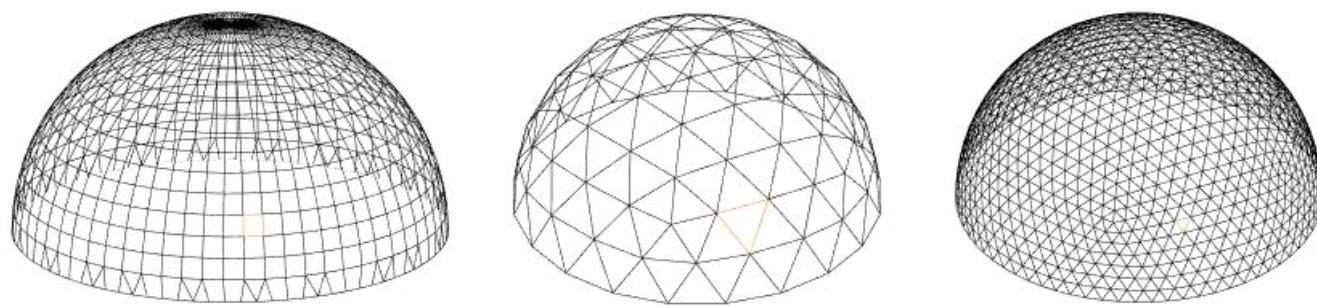
Thickness 60-80cm

Max displacement
<2.00cm

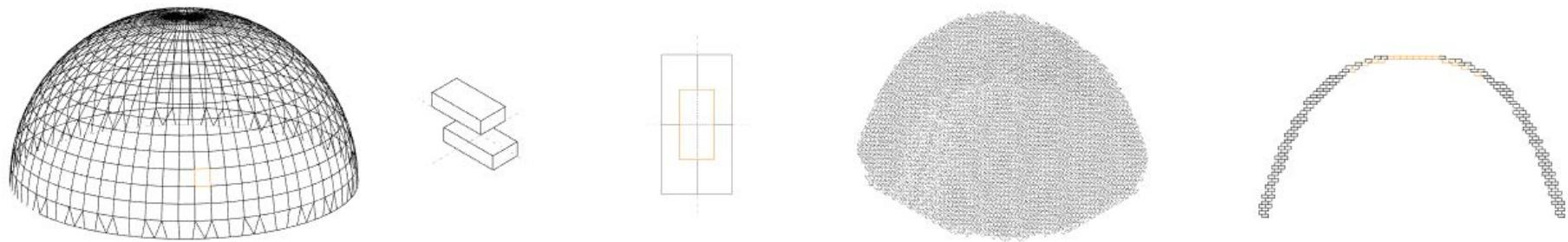


V1 > V2
addition of mass on the top
for better vertical
distribution of forces

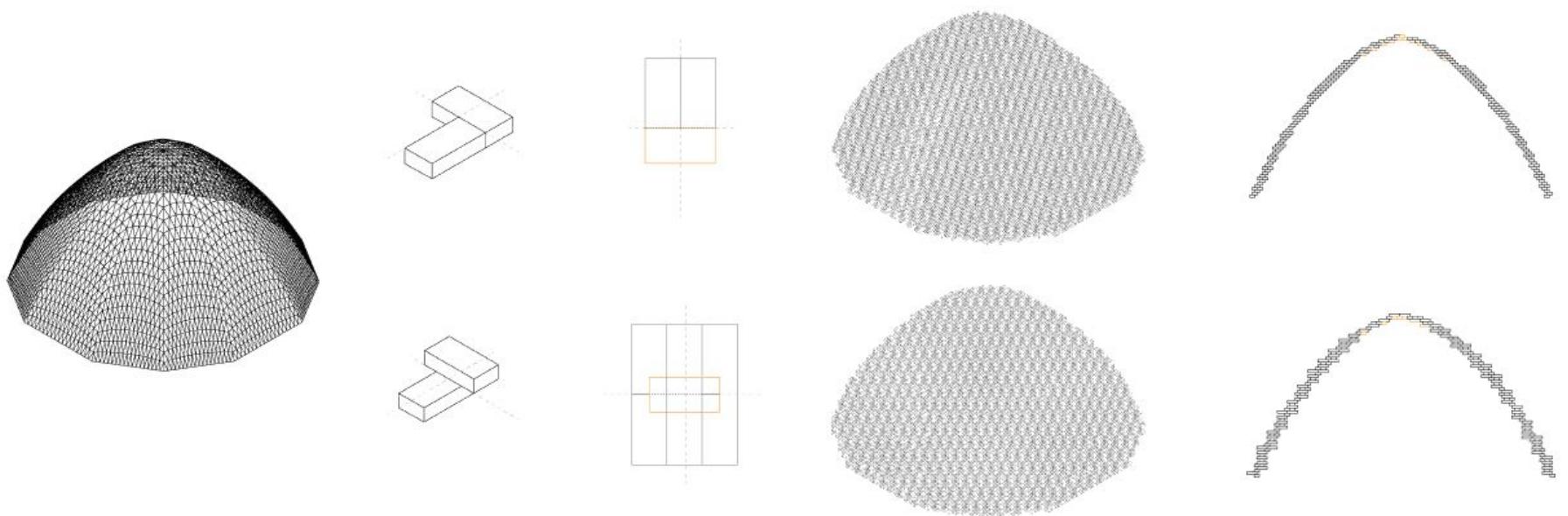
Brick Patterns



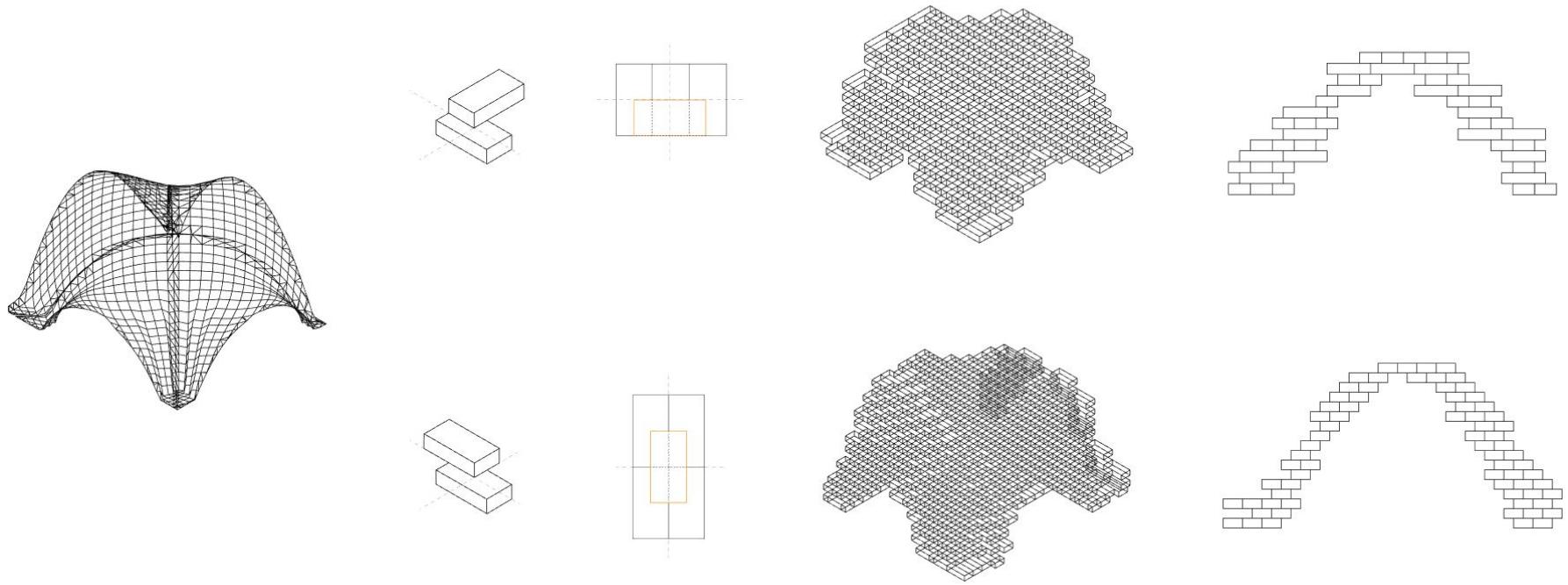
Brick pattern process
Dome_Geometrical approach



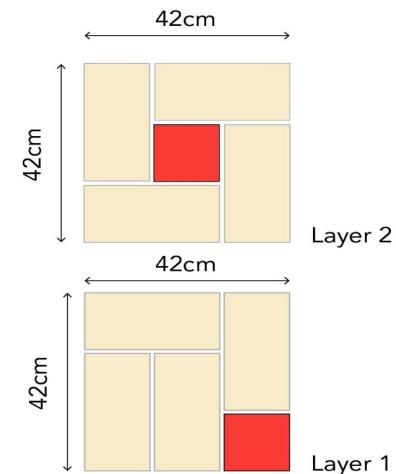
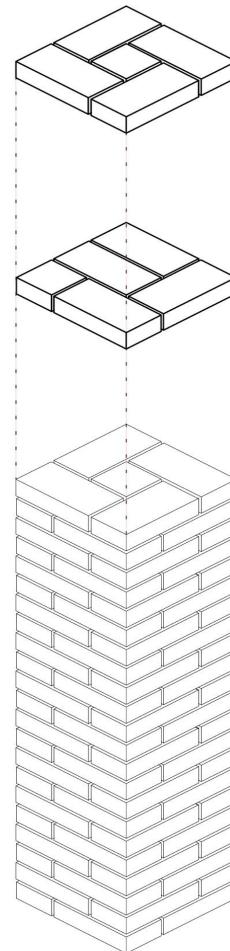
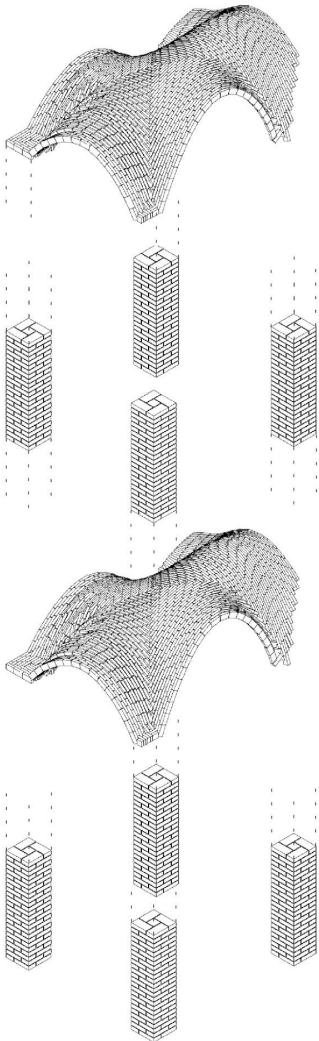
Brick pattern process
Dome_Topological Voxelization



Brick pattern process
Dome_Optimised mesh_Topo logical Voxelization

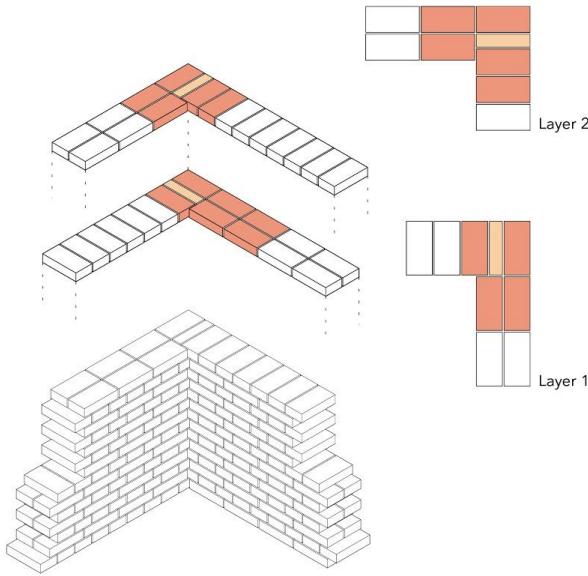


Brick pattern process
Optimised mesh_Topological Voxelization



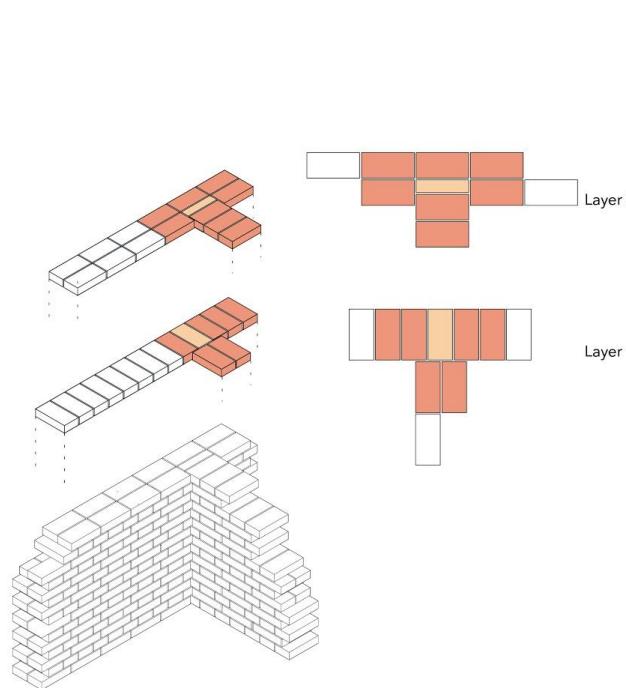
Brick pattern process
Central Room_Columns

Dimensions: 07x14x28 cm
*Pattern adjusted after
Karamba-Analysis*

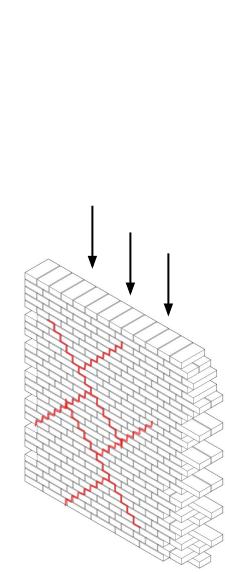


Corner Solution
Dimensions: 08x16x32 cm

Brick Pattern
Typical Room_English bond



Intersection solution
Dimensions: 08x16x32 cm



**Case of failure due to shear stress
Diagonal Cracking**

Constructability

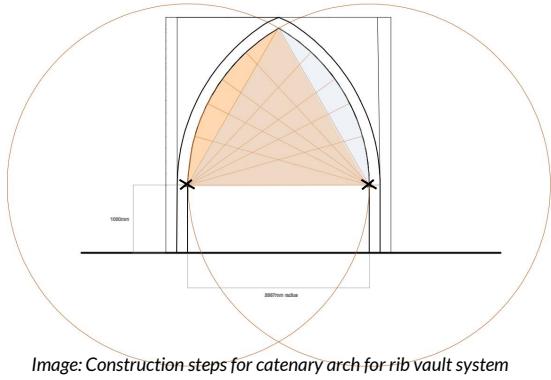


Image: Construction steps for catenary arch for rib vault system

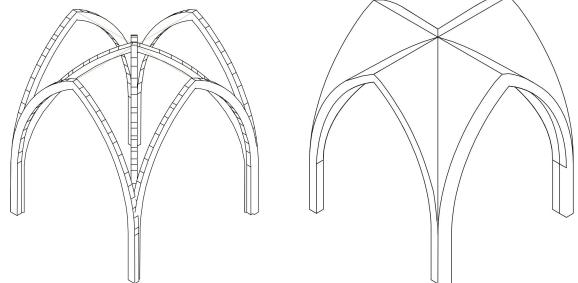
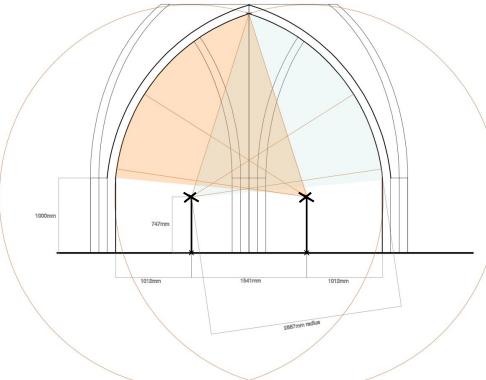


Image : Catenary arch rib system for rib vault

Image: Rib vault with brick filling

Rib vault system

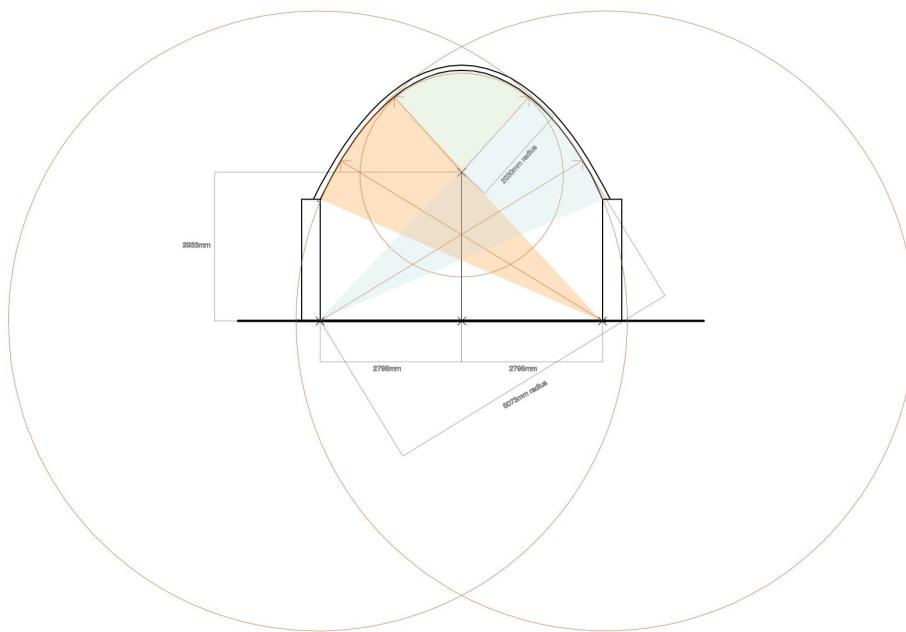


Image: Geometry simplified for compass method construction for catenary arch

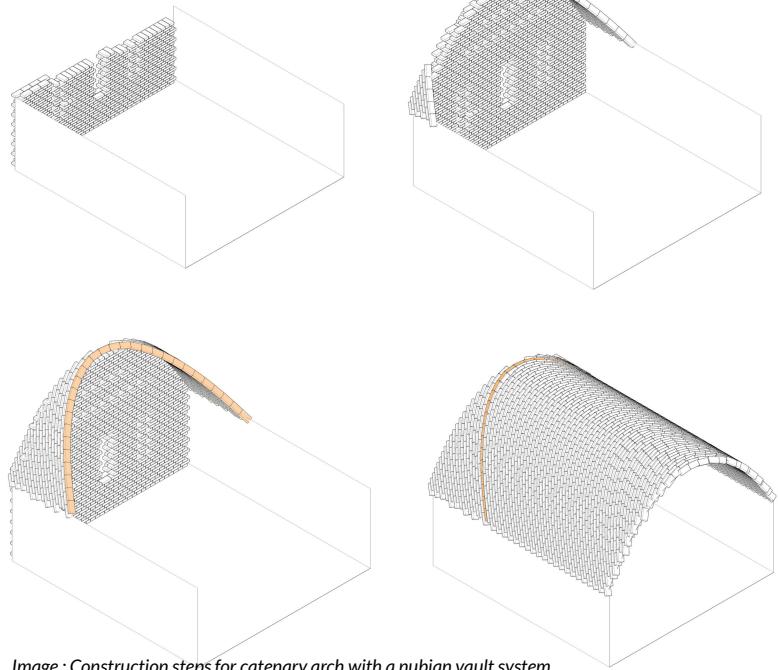
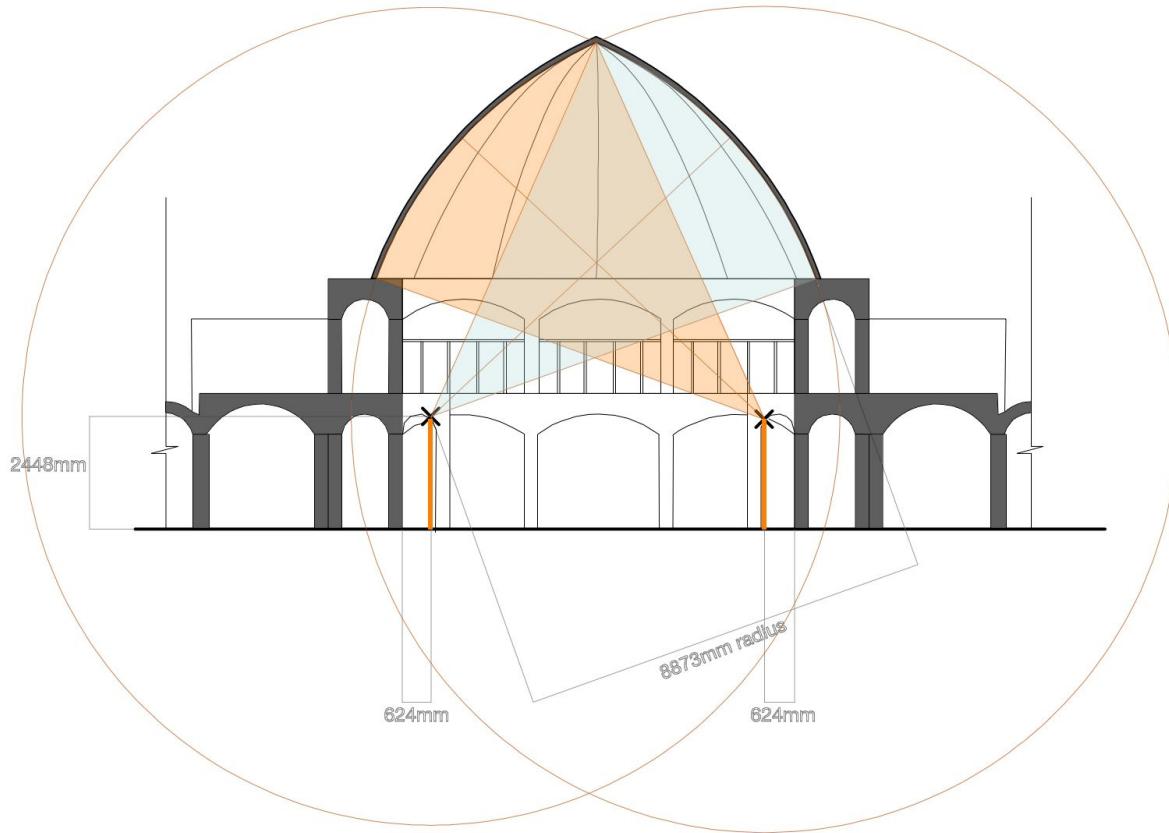


Image : Construction steps for catenary arch with a nubian vault system

Nubian vault system for Catenary arch ceiling



Large dodecagon catenary dome

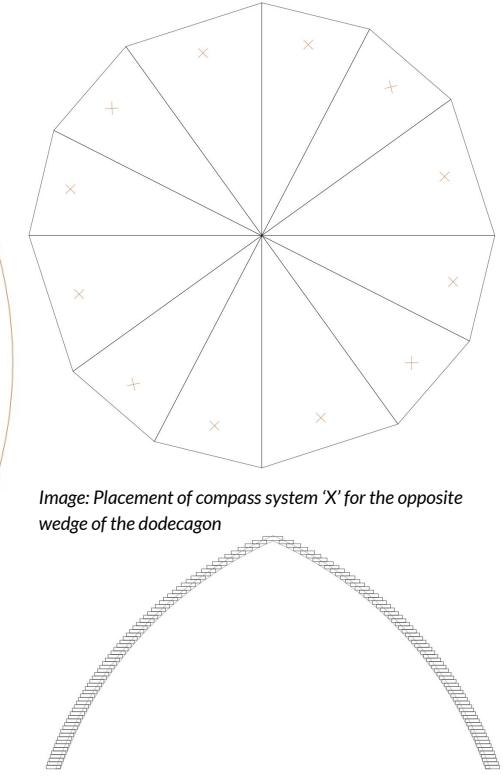


Image: Section of brick placement for either side of dodecagon wedges

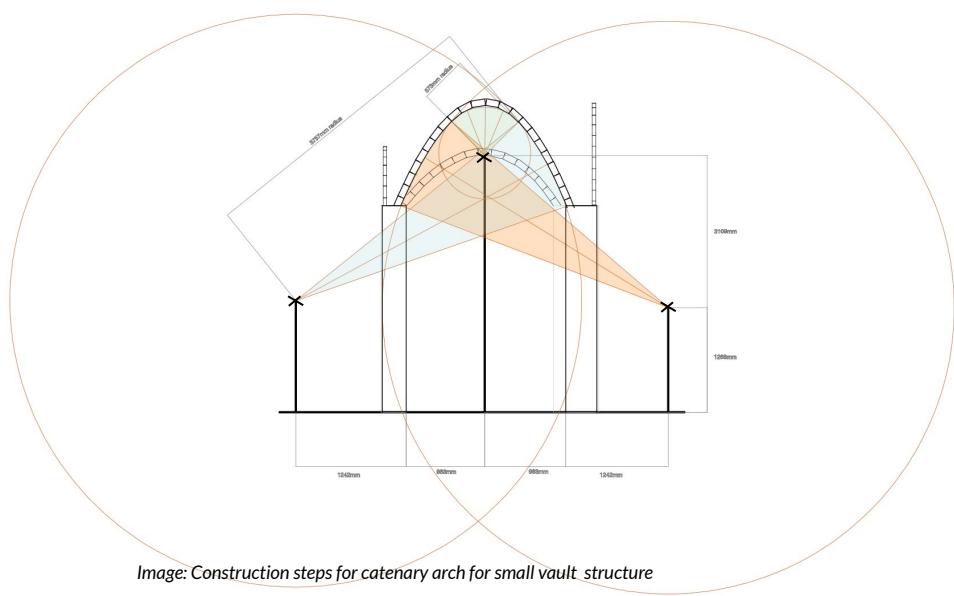


Image: Construction steps for catenary arch for small vault structure

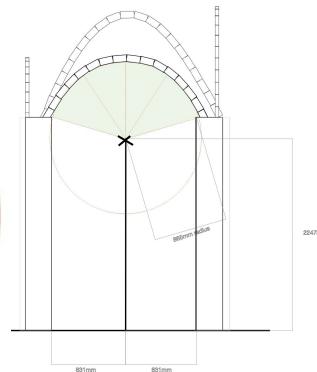


Image: Construction steps for basic arch for small vault structure

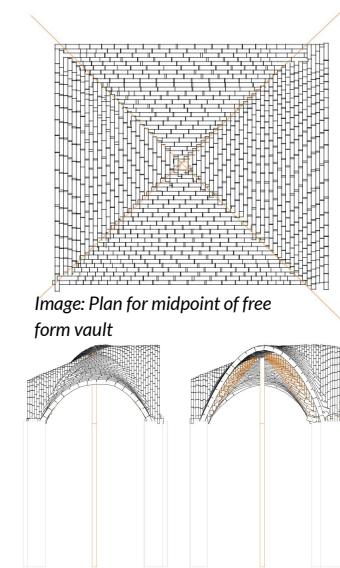


Image: Plan for midpoint of free form vault

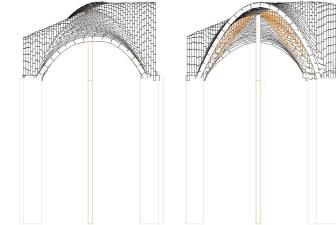


Image: Elevations showing mid point for free from vault

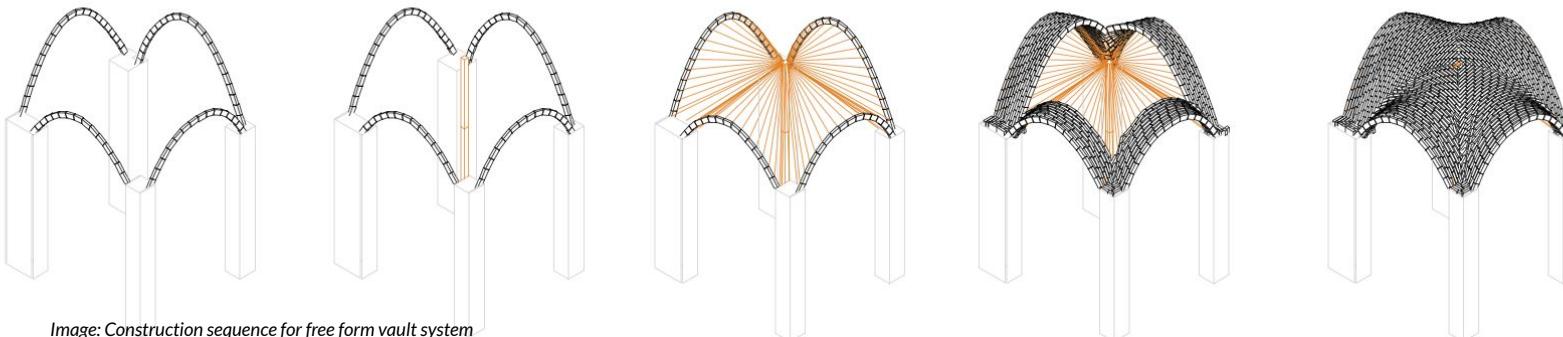


Image: Construction sequence for free form vault system

Free form vault structure



Main facade view



Big courtyard and workshops view



Main entrance view