

Lightning Ridge Local Aboriginal Land Council, Community Building Project, May 2021

Supervisor from Australia:
Lectures in Czech Republic:
Subject:
Semester:

Dr. Steve Burroughs, Engineering Faculty, University of Wollongong
Ing. Jan Růžicka, Ph.D., Prof. Ing. Petr Hájek, CSc., FENG. Ing. David Šulc, Doc. Ing. Michal Kabrhel, Ph.D.
Specialized Project 2
Summer 2021

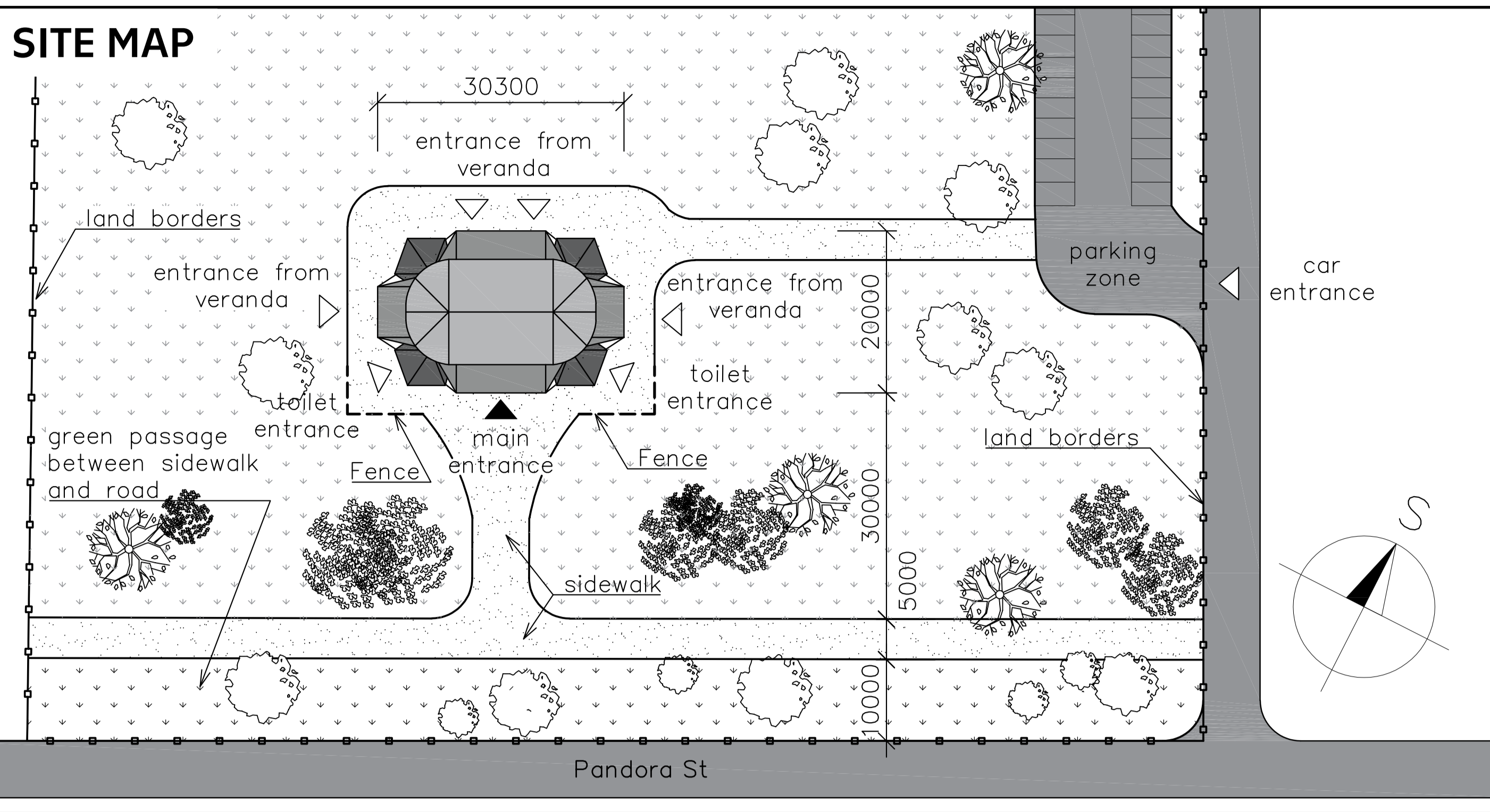
NAME: BC. ELIZAVETA FATYANOVA

ABOUT OBJECT

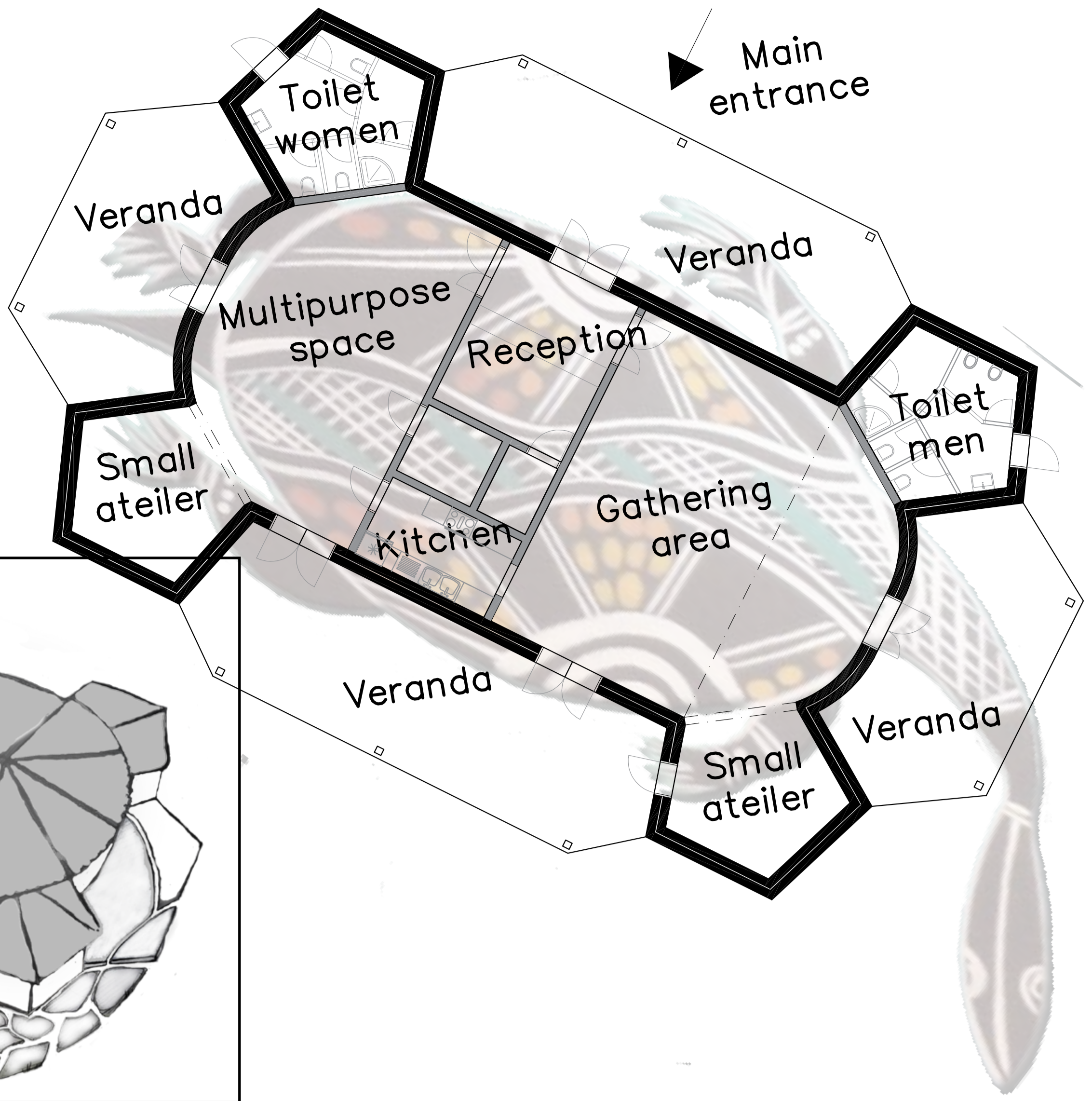
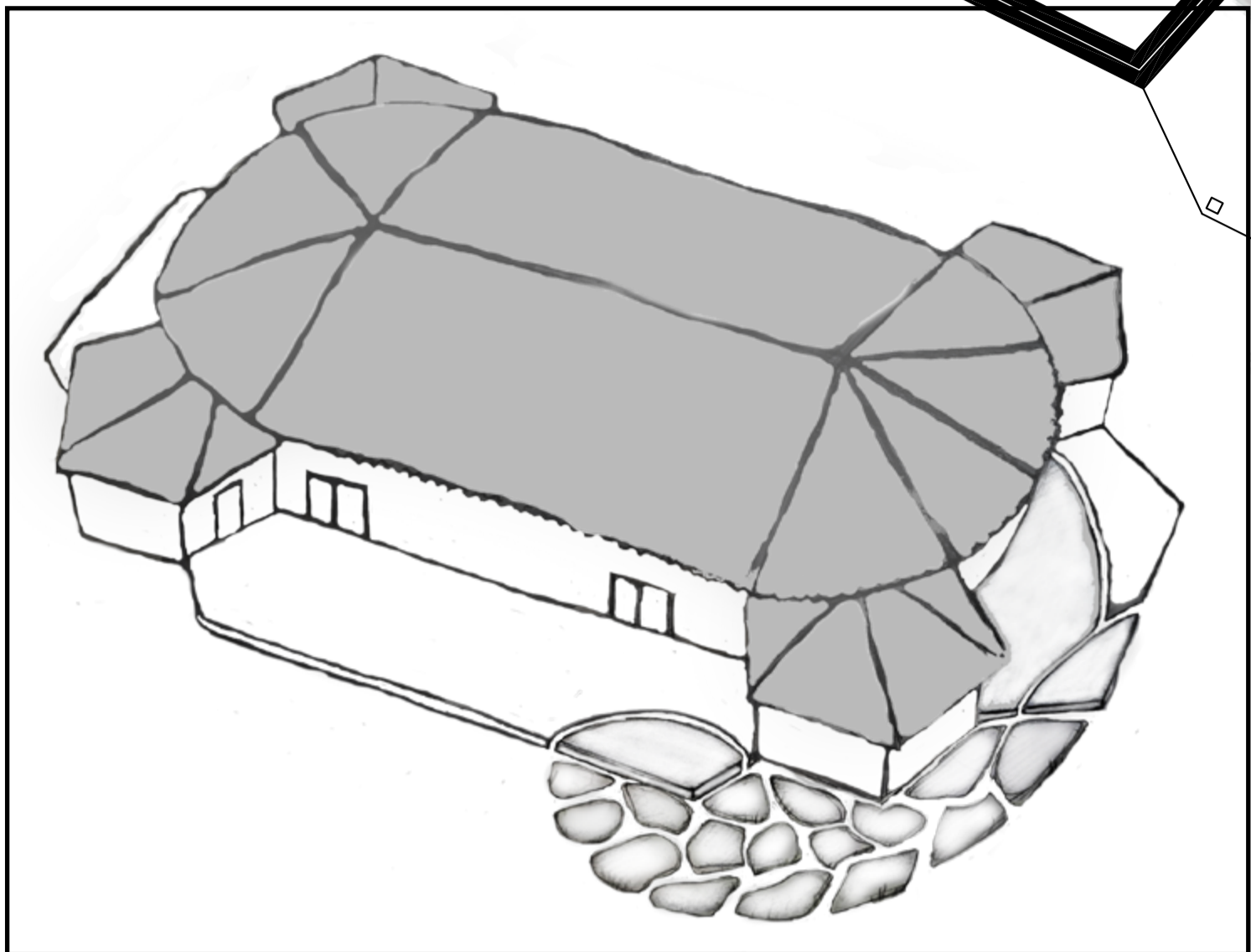
Project of new building for LR LALC for various activities during the day, evening, and weekends. Area is separated to two parts for possibility of different activities (for guarantee privacy).

- Object contains:
- reception/office area (3x4 m)
 - gathering area for council meetings or special occasions (6x10m)
 - verandas around the structure (4,5 m in width)
 - toilets for males and females with separate entrances at opposite ends of building
 - multipurpose spaces for different activities and small kitchen

SITE MAP



LONG NECK TURTLE CONCEPT



PERSPECTIVE FROM THE FRONT SIDE



SIDE VIEW



BACK VIEW



CONCEPT OF CONSTRUCTION

The roof trusses, roofing sheets and shading structures on the verandas will all be made of steel. The roof trusses are placed on the masonry via steel columns located between the windows.

In the upper part of the building will be made a strip window of glass blocks all around the construction.

The load-bearing walls are made of two layers of compressed earth blocks, each layer 220 mm thick with an air gap of 50 mm. The masonry will be reinforced in the corners and at the points of connection of the roof structure.

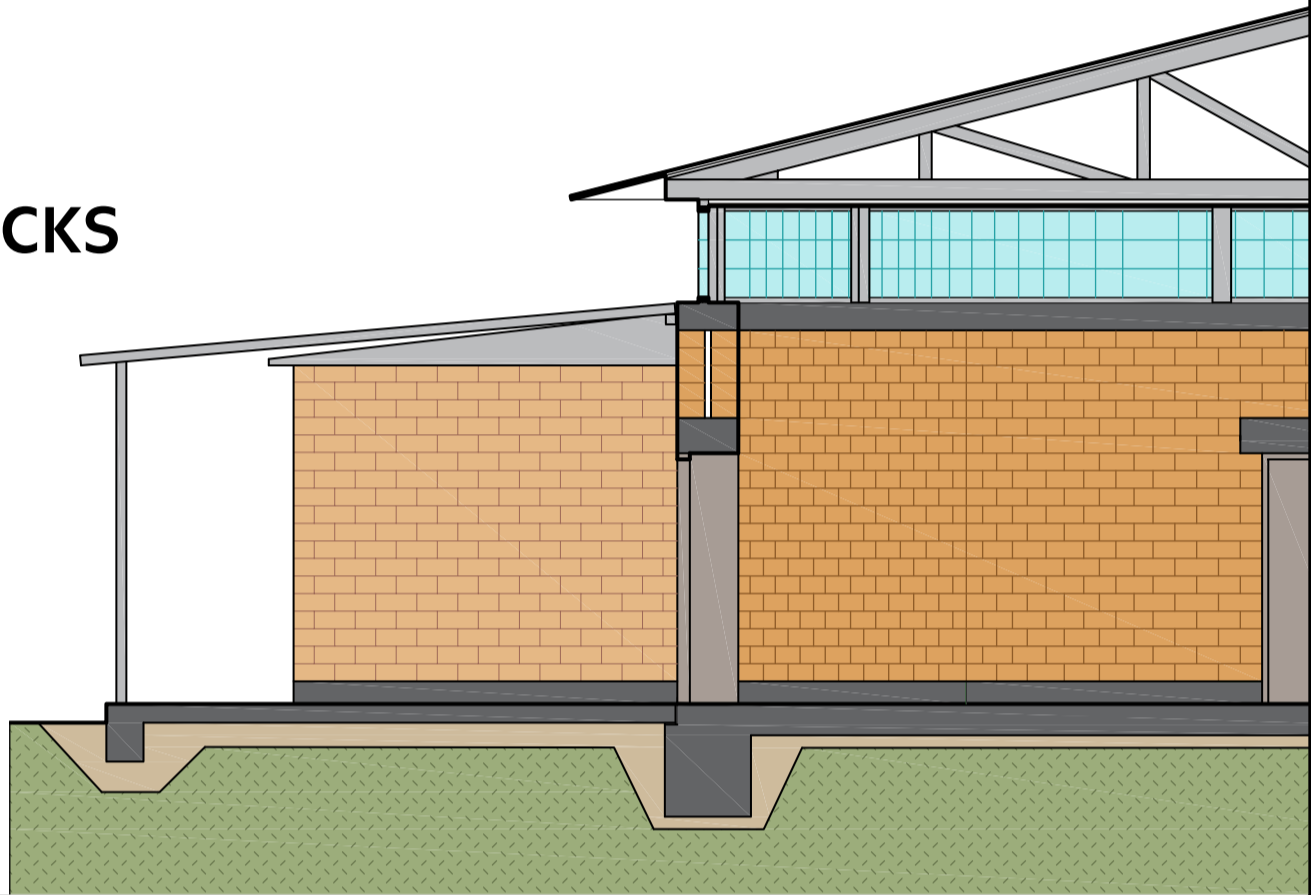
The foundations and reinforcing elements of the load-bearing walls are made of concrete. Floors and porches forming polished concrete slabs.

STEEL

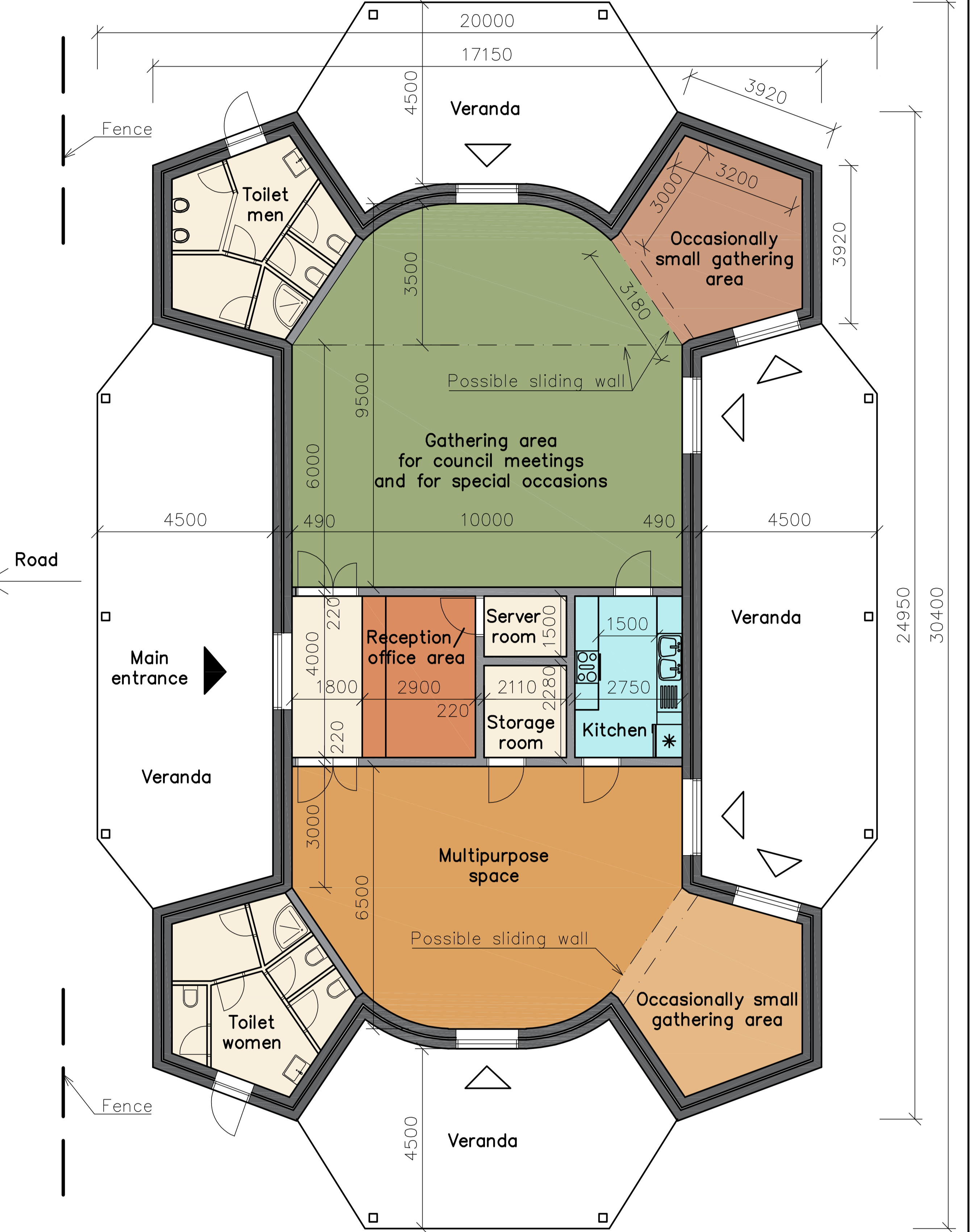
GLASS BLOCKS

CEB

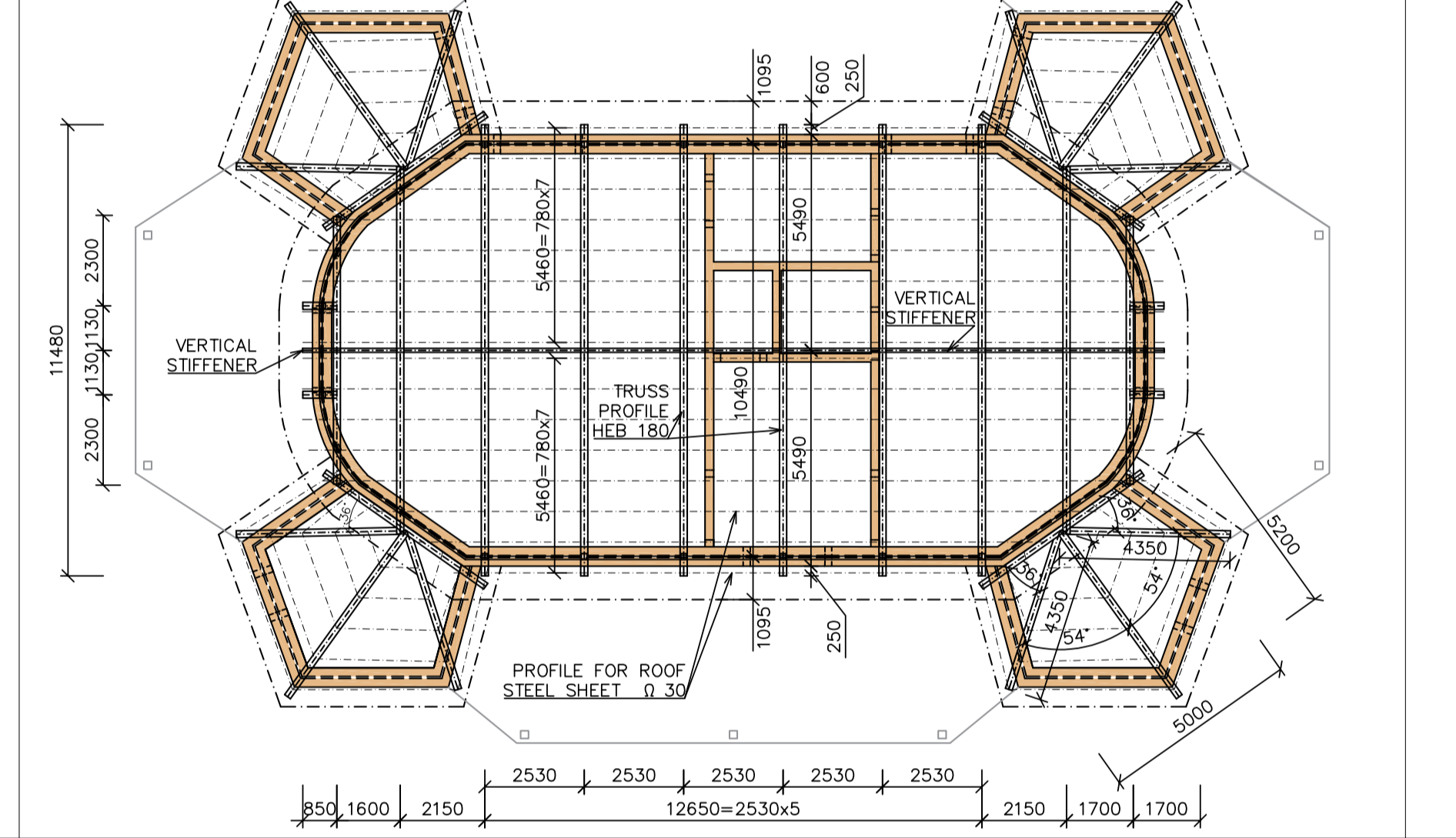
CONCRETE



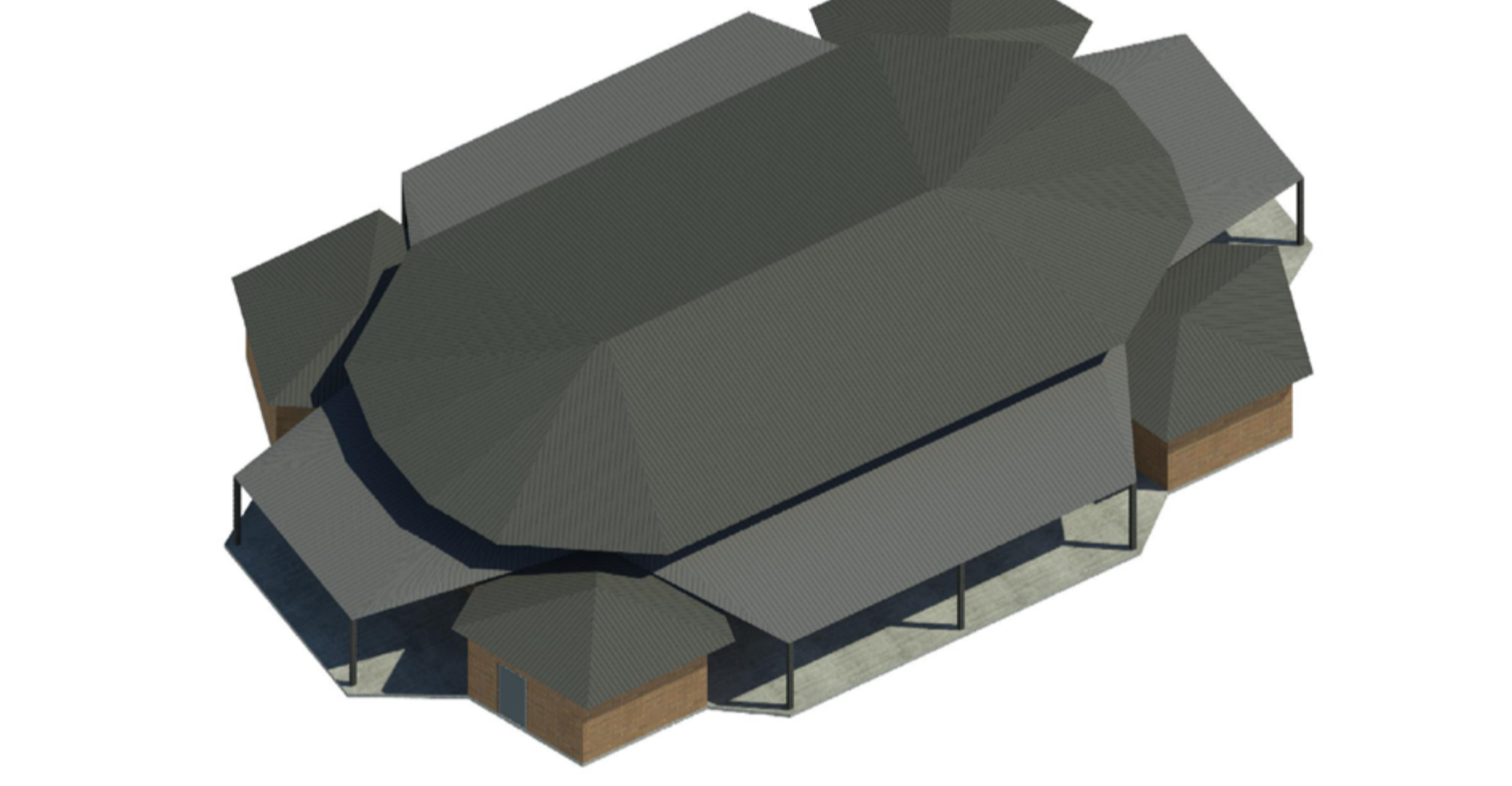
FLOOR PLAN



ROOF CONSTRUCTION



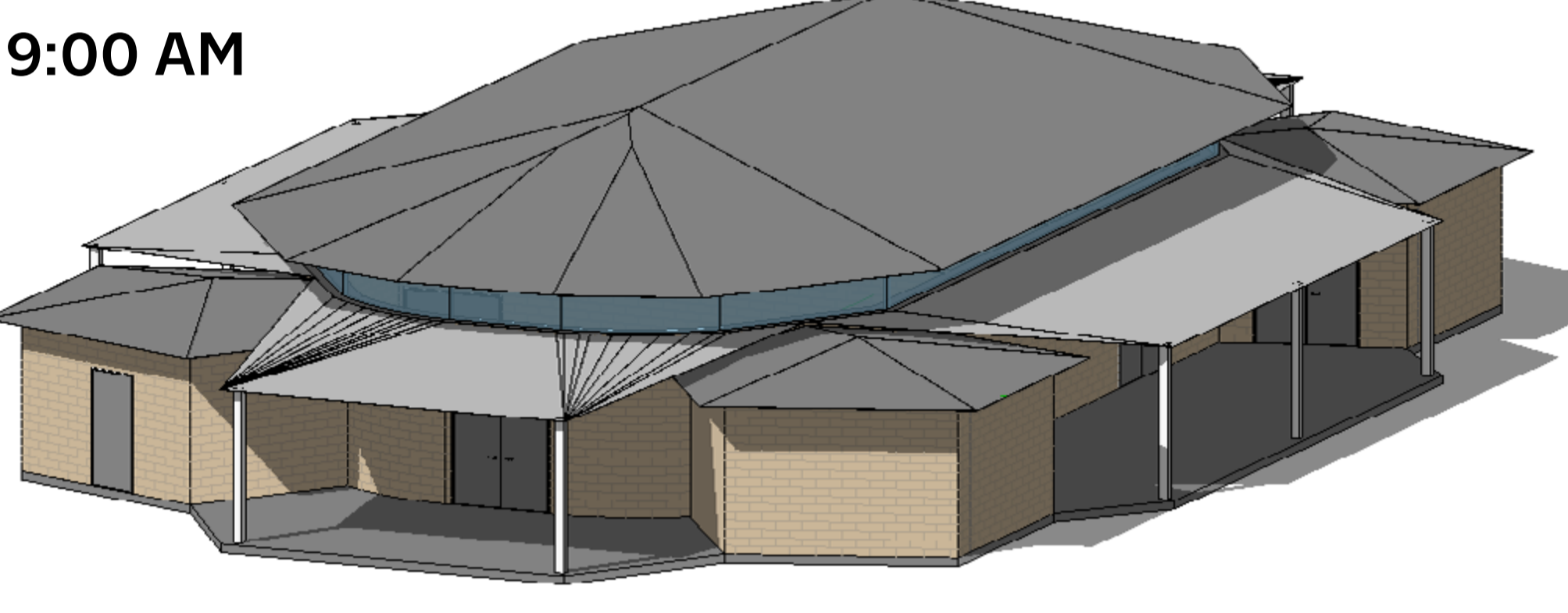
VIEW OF THE ROOF



SHADOW DIAGRAMS FOR 21. OF DECEMBER

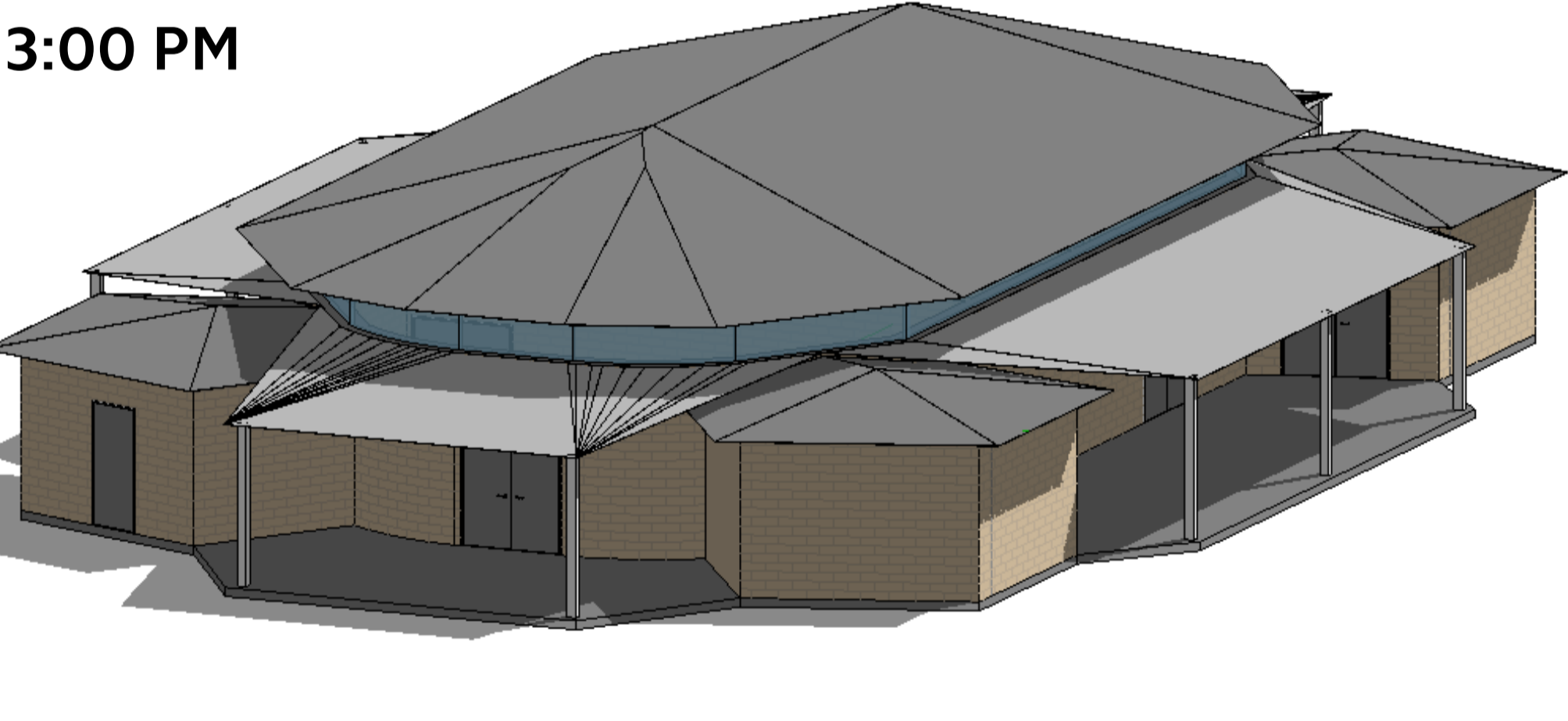
MORNING

9:00 AM



AFTERNOON

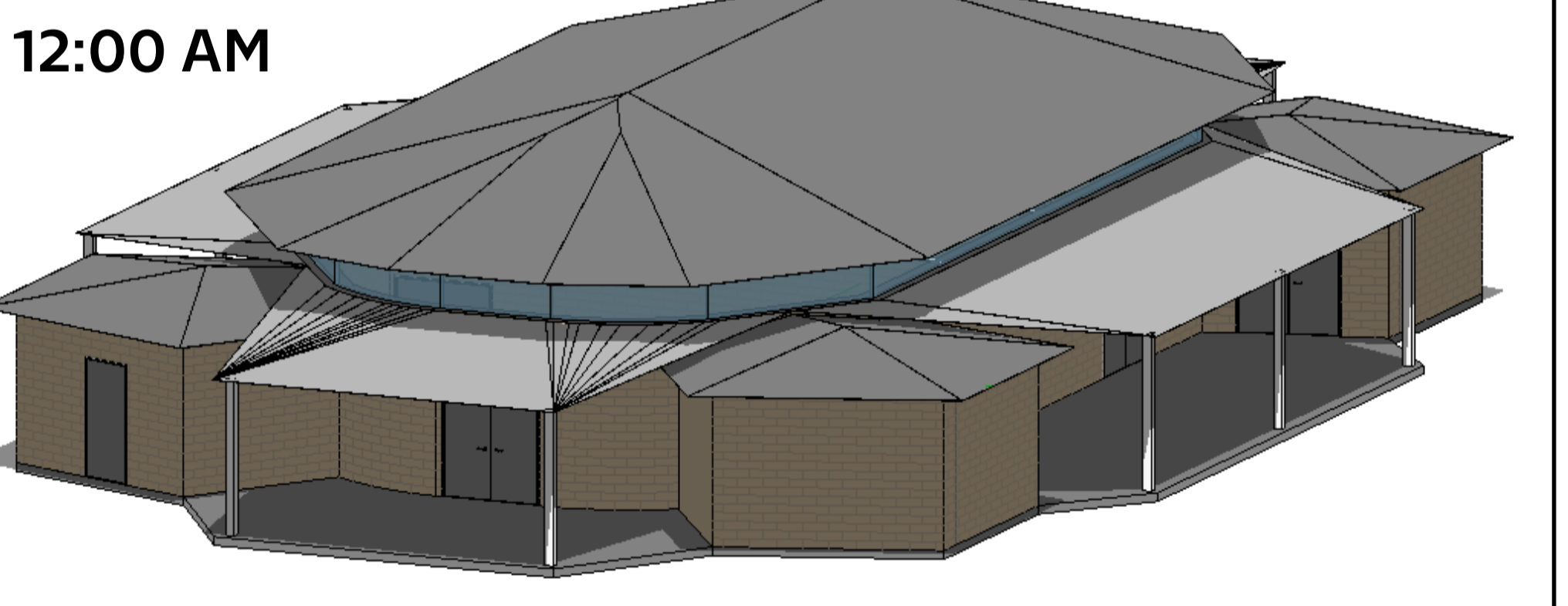
3:00 PM



(VIEW FROM THE GARDEN)

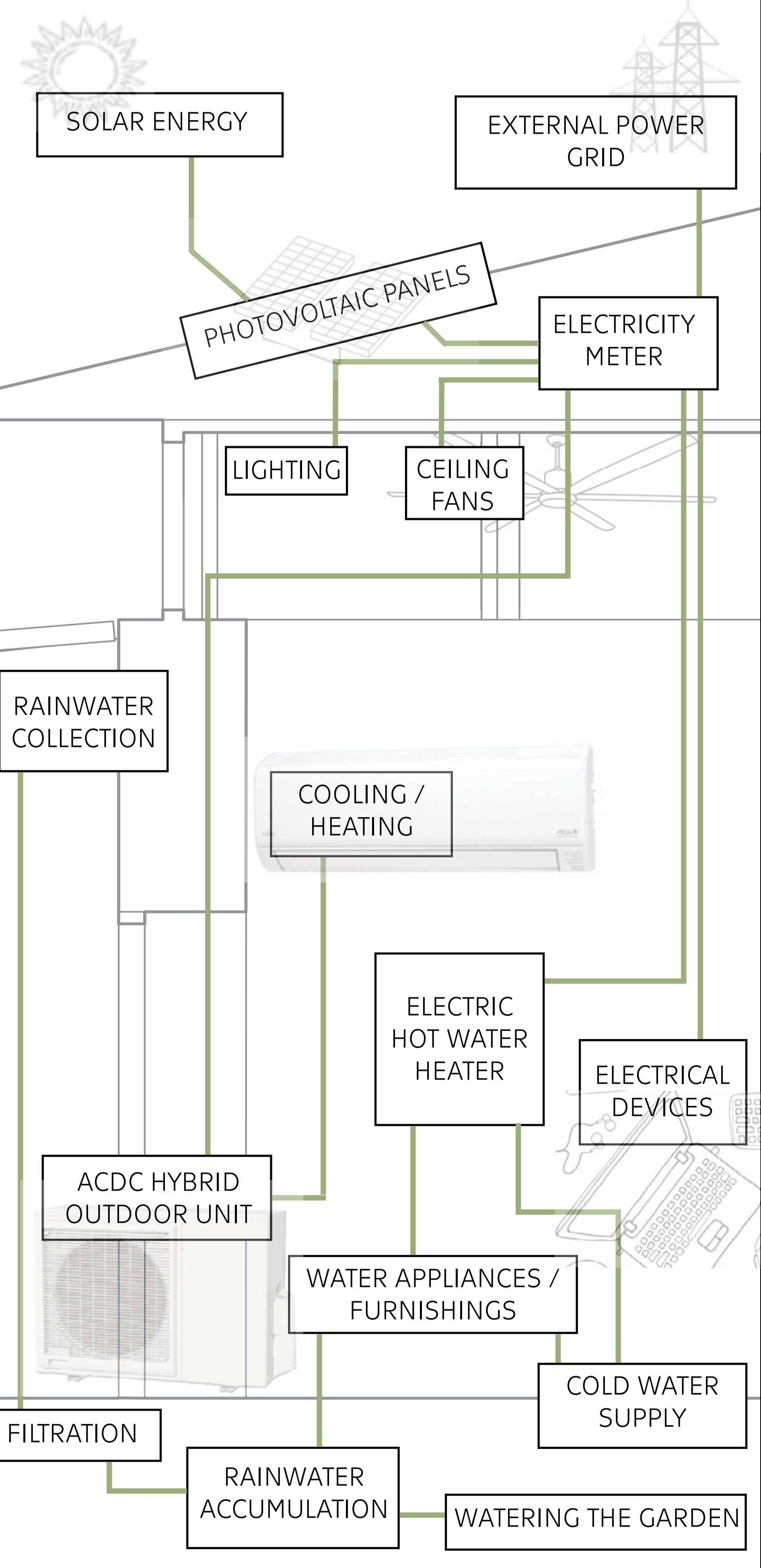
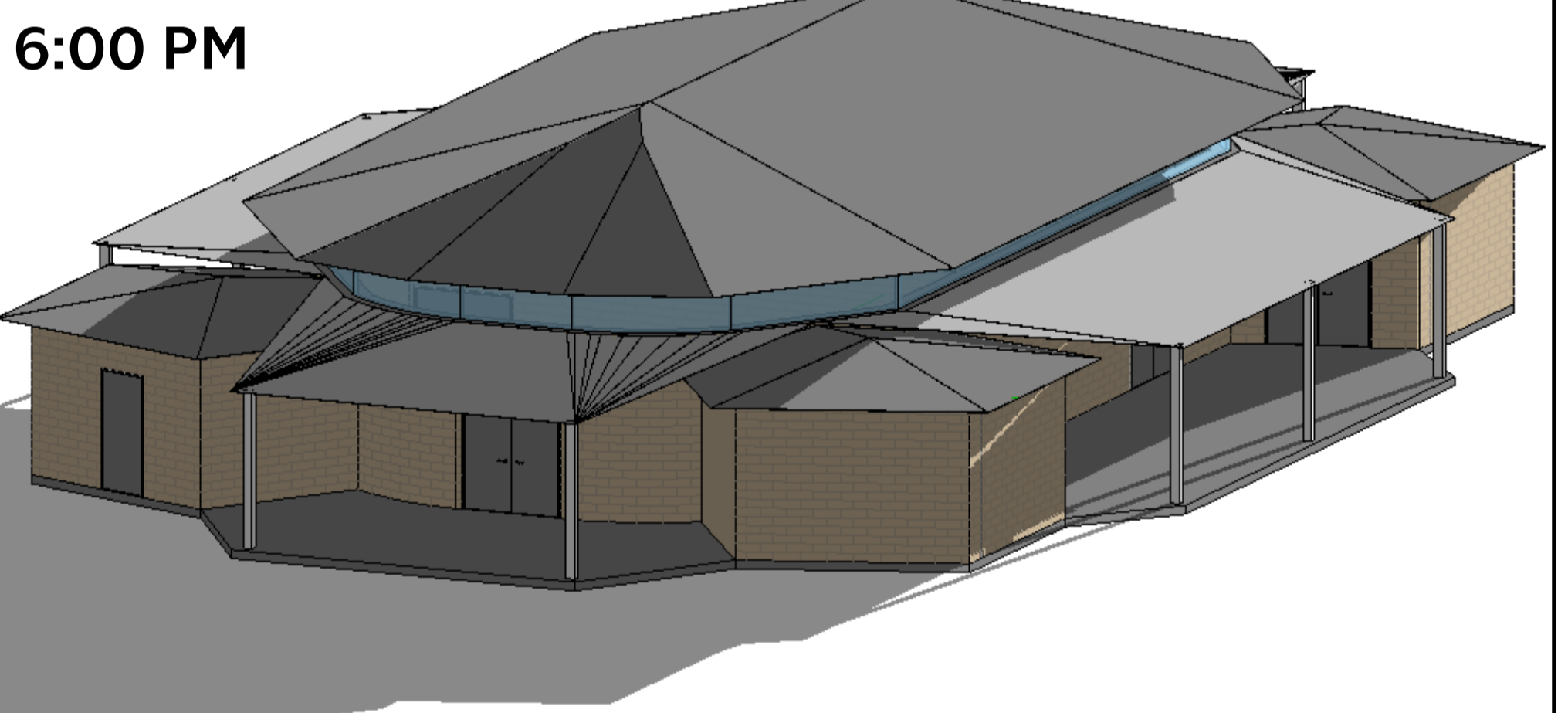
MIDDAY

12:00 AM

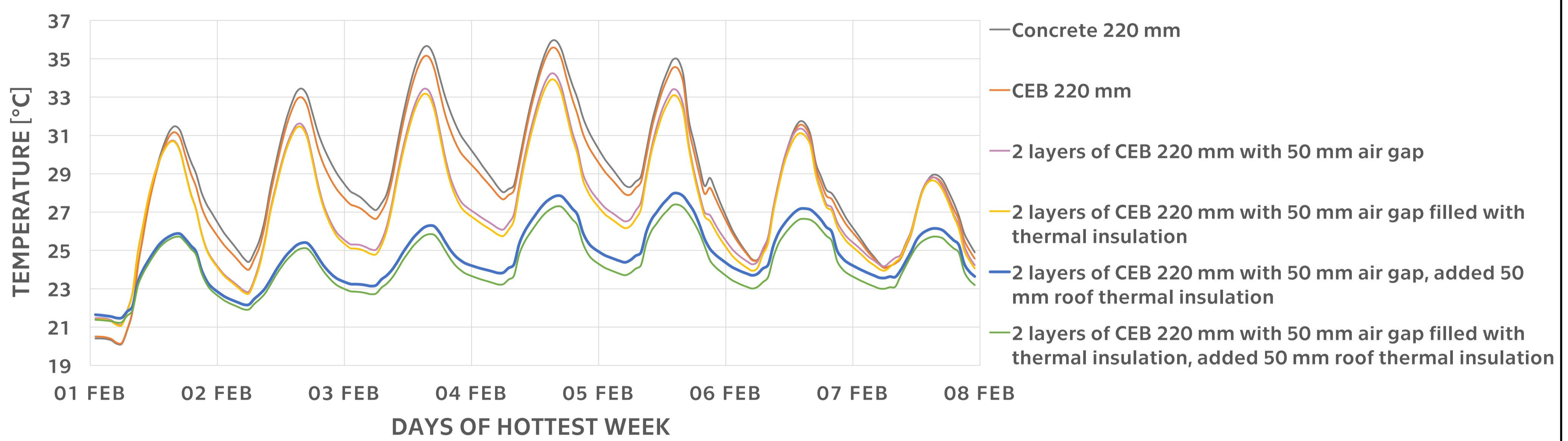


EVENING

6:00 PM



INTERIOR TEMPERATURES IN THE HOTTEST WEEK FOR DIFFERENT WALL CONSTRUCTIONS

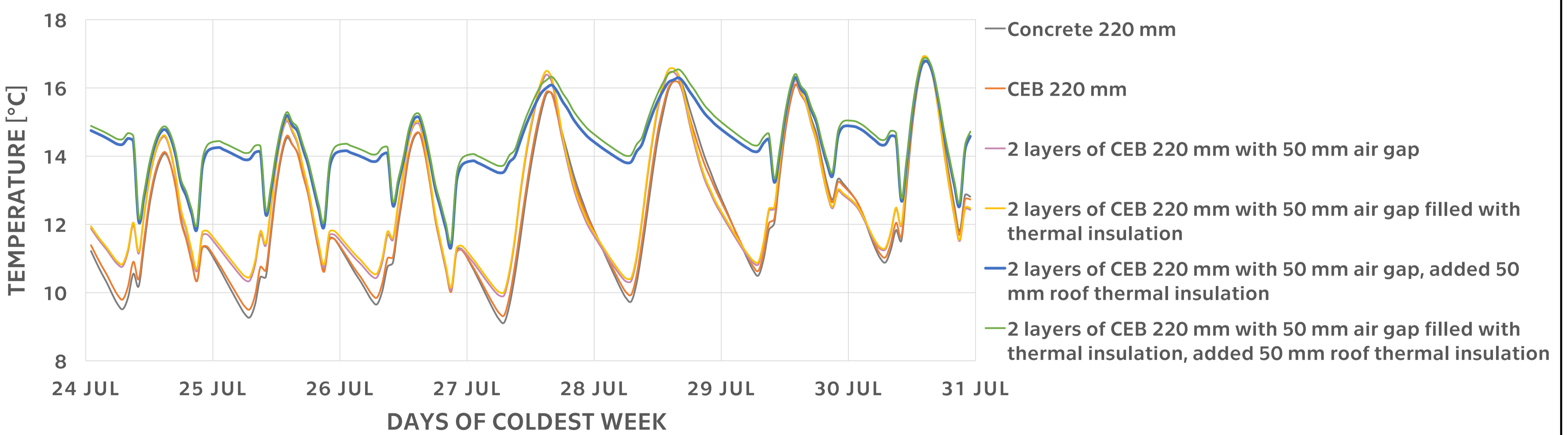


THE CHOSEN OPTION: 2 layers of CEB 220 mm with 50 mm air gap, added 50 mm roof thermal insulation

The average indoor and outdoor temperatures for the selected variant during the hottest week are shown in the following table

DAY	1 FEB	2 FEB	3 FEB	4 FEB	5 FEB	6 FEB	7 FEB
INDOOR TEMPERATURES AT 15:00	25,7 °C	25,3 °C	26,2 °C	27,7 °C	27,4 °C	27,2 °C	26,1 °C
OUTDOOR TEMPERATURES AT 15:00	34,9 °C	37,1 °C	39,5 °C	38,9 °C	37,0 °C	31,6 °C	29,4 °C

INTERIOR TEMPERATURES IN THE COLDEST WEEK FOR DIFFERENT WALL CONSTRUCTIONS

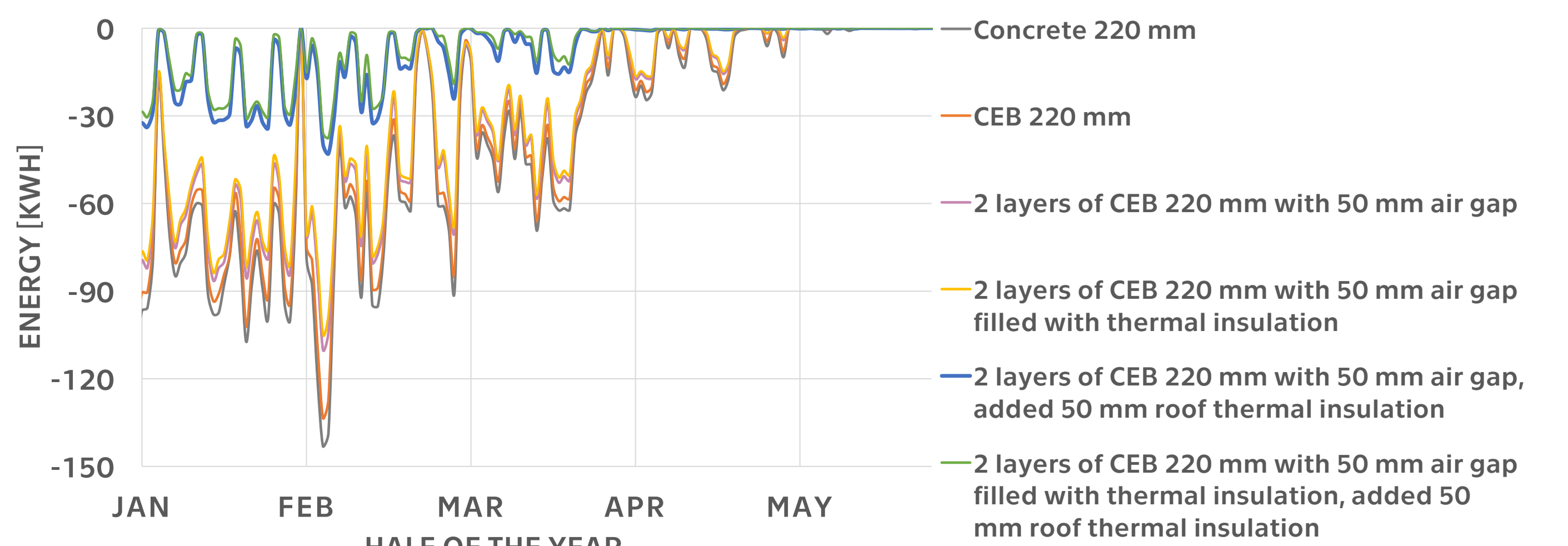


THE CHOSEN OPTION: 2 layers of CEB 220 mm with 50 mm air gap, added 50 mm roof thermal insulation

The average indoor and outdoor temperatures for the selected variant during the coldest week are shown in the following table

DAY	24 JUL	25 JUL	26 JUL	27 JUL	28 JUL	29 JUL	30 JUL
INDOOR TEMPERATURES AT 8:00	14,5 °C	14,1 °C	14,0 °C	13,8 °C	14,1 °C	14,4 °C	14,6 °C
OUTDOOR TEMPERATURES AT 8:00	2,2 °C	2,9 °C	4,0 °C	2,4 °C	4,0 °C	4,6 °C	3,4 °C

ENERGY USAGE FOR COOLING FOR DIFFERENT WALL CONSTRUCTIONS



Energy usage for cooling on various wall structures per year are shown in the following table.

WALL CONSTRUCTION	Concrete 220 mm	CEB 220 mm	2 layers of CEB 220 mm with 50 mm air gap	2 layers of CEB 220 mm with 50 mm air gap filled with thermal insulation	2 layers of CEB 220 mm with 50 mm air gap, added 50 mm roof thermal insulation	2 layers of CEB 220 mm with 50 mm air gap filled with thermal insulation, added 50 mm roof thermal insulation
TOTAL COOLING [kWh]	8 750	8 150	7 100	6 800	1 750	1 400

AVERAGE INTERNAL AND OUTDOOR DAILY TEMPERATURES IN QUARTERS OF THE YEAR

