ENVIRONMENT ANALYSIS OF LEBANESE VILLAGE

PREPARED BY:

SALLY SALAM YOUSIF

MAHA MATTE HANA

SUPERVIDE BY:

FENK DLAWER MIRAN

Content

- Introduction about site
- Sun analysis of the site
- Light analysis of single house
- Thermal analysis of building material
- Wind analysis
- Heat gain calculation by occupants
- Heat gain calculation by ventilation
- Main problem and suggestion solution

Lebanese Village Apartments

PEACE AND LIFE OVER 240 000 M2 IN ERBIL.

%40 of the project is green area

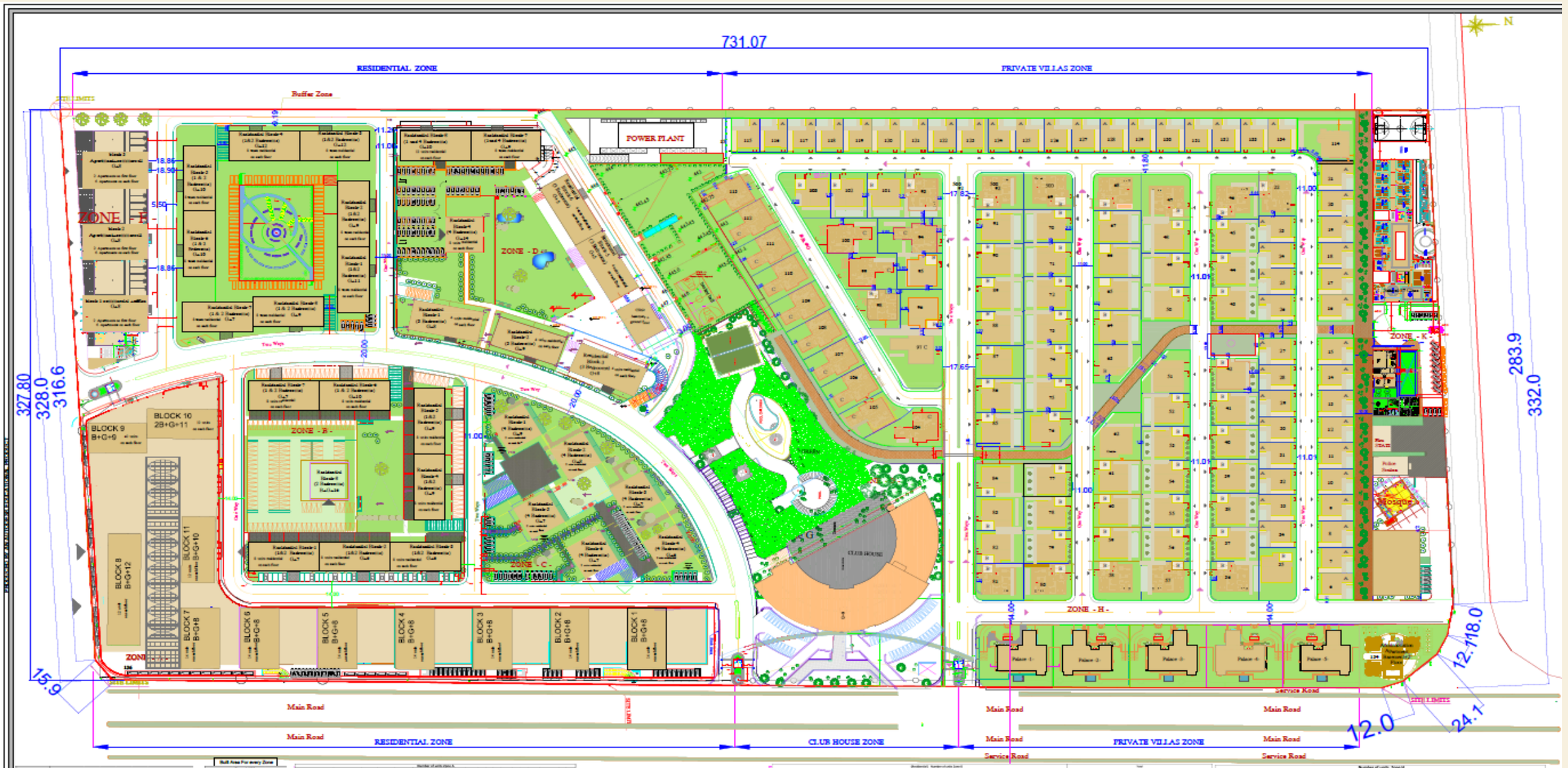
About the project …

The Lebanese Village is a residential and commercial, mixed use development situated in the rapidly growing province of Erbil, the capital of Kurdistan – Iraq.

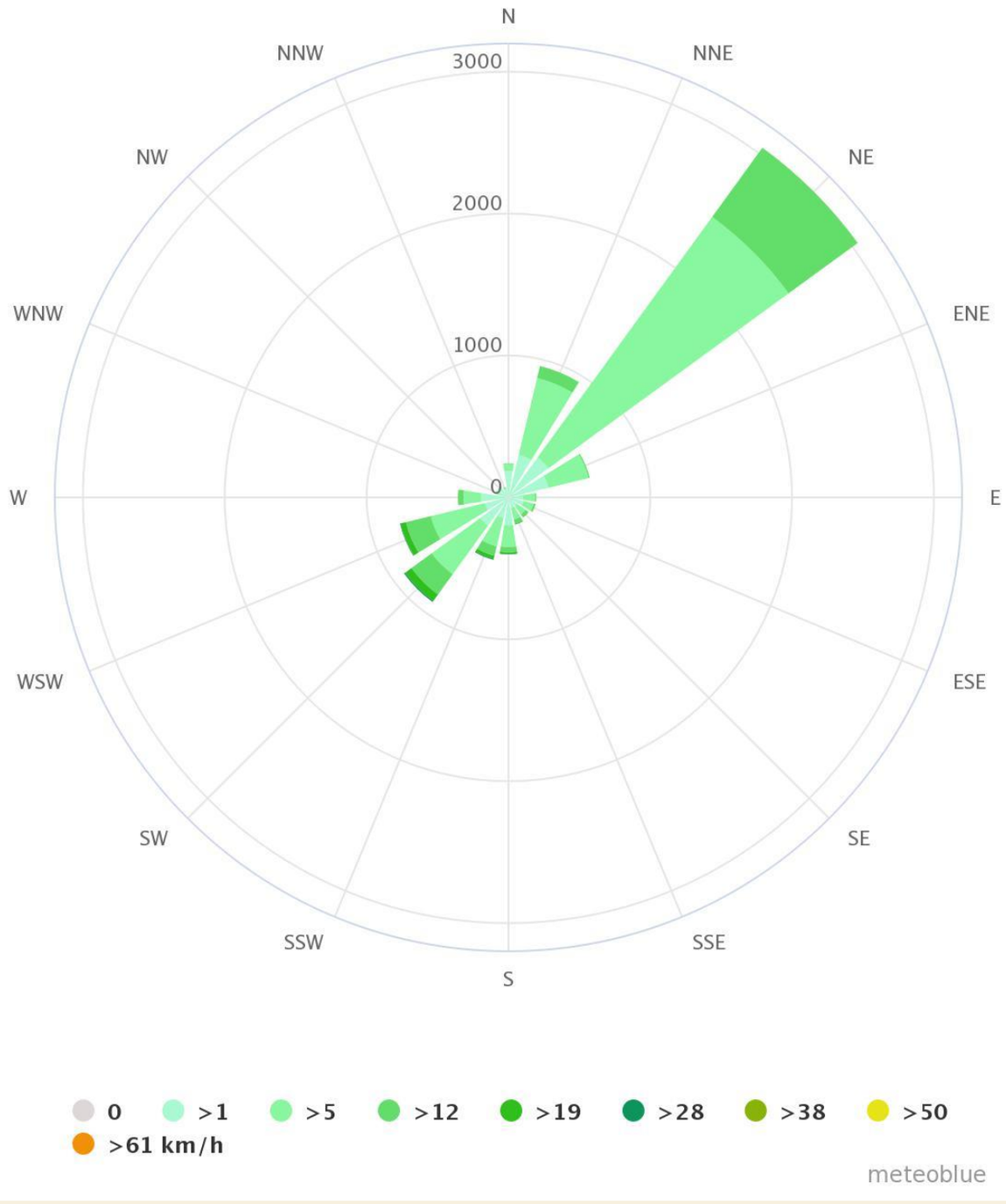
Over a build-up area of 240 000m2, the Lebanese Village is one of the most pioneering investments in Erbil, featuring 3400 residential units between spacious villas and apartments in different sizes promising a great family environment, a commercial component ready to accommodate various retail needs,well-appointed furnished apartments units, offices' areas in various sizes, and a community landscaped park with walkways.

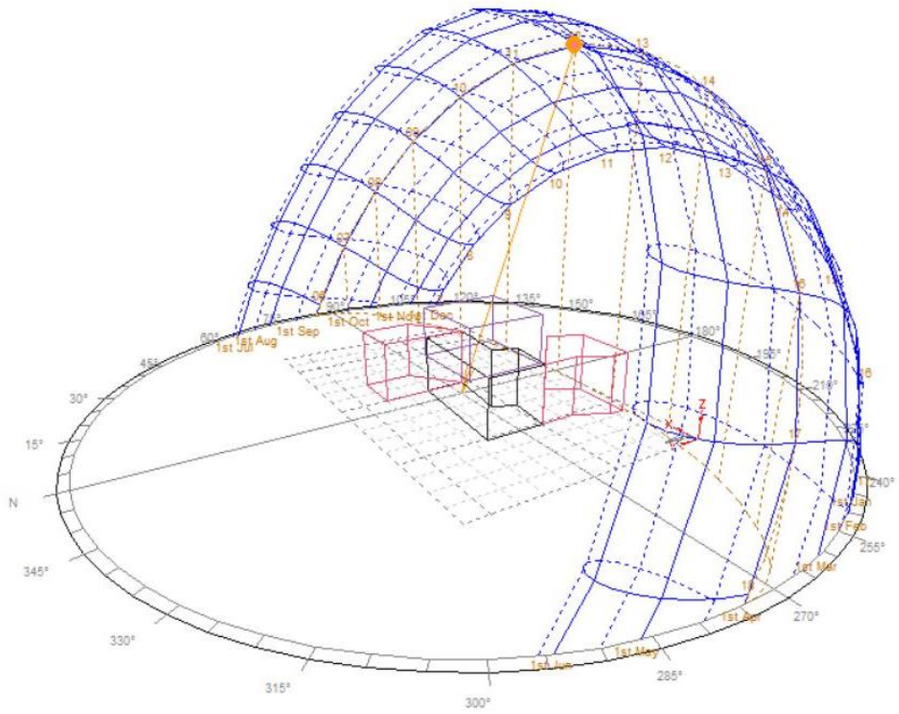
The project itself is a unique lifestyle center with a wide variety of recreational amenities and necessities, such as a health & sports club, restaurants, a clubhouse with an outdoor swimming pool, a nursery, a school, a medical center, and a mosque.

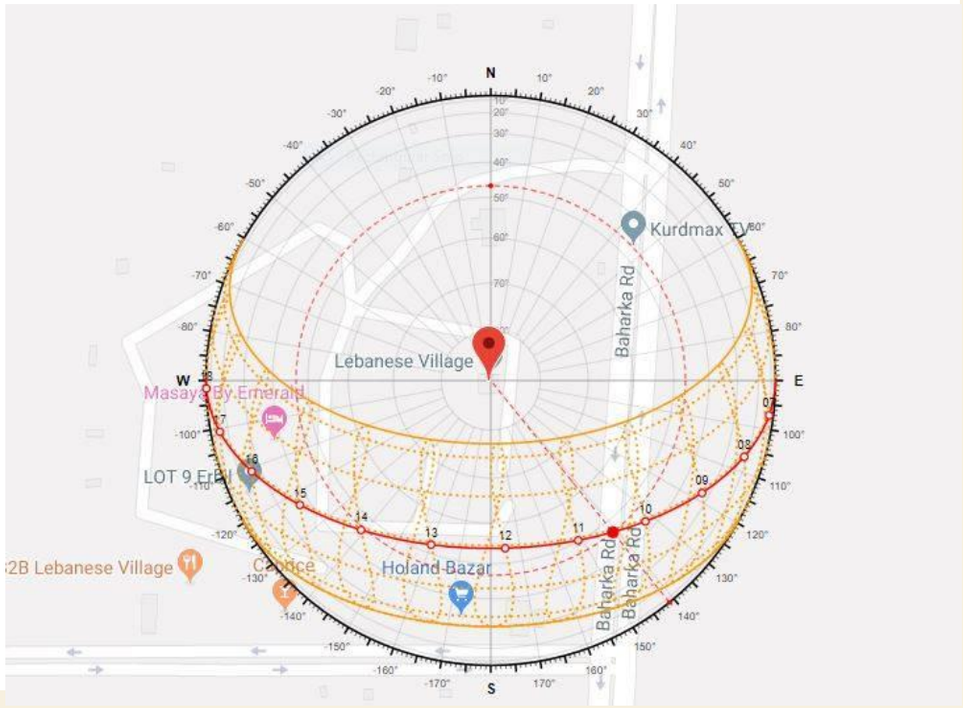
SITE PLAN ..

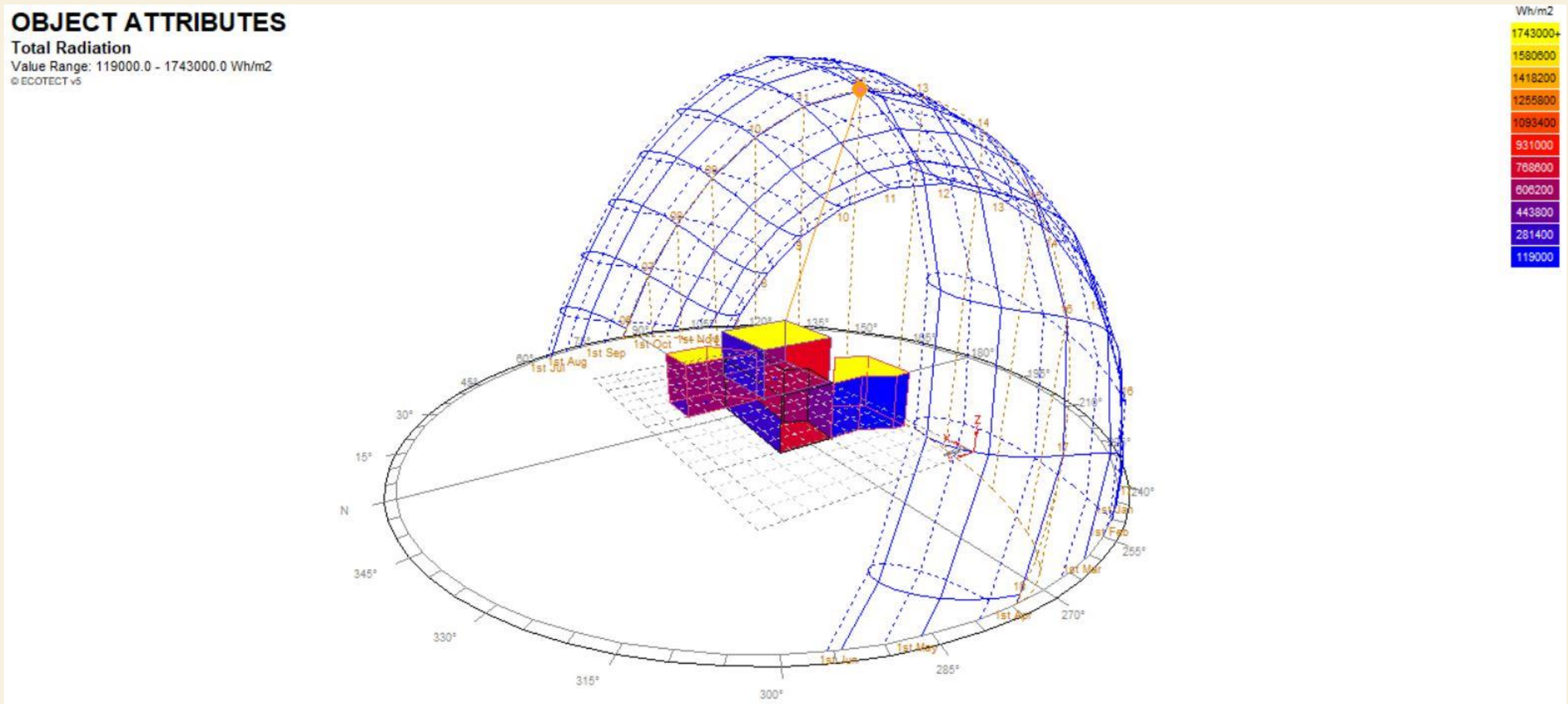


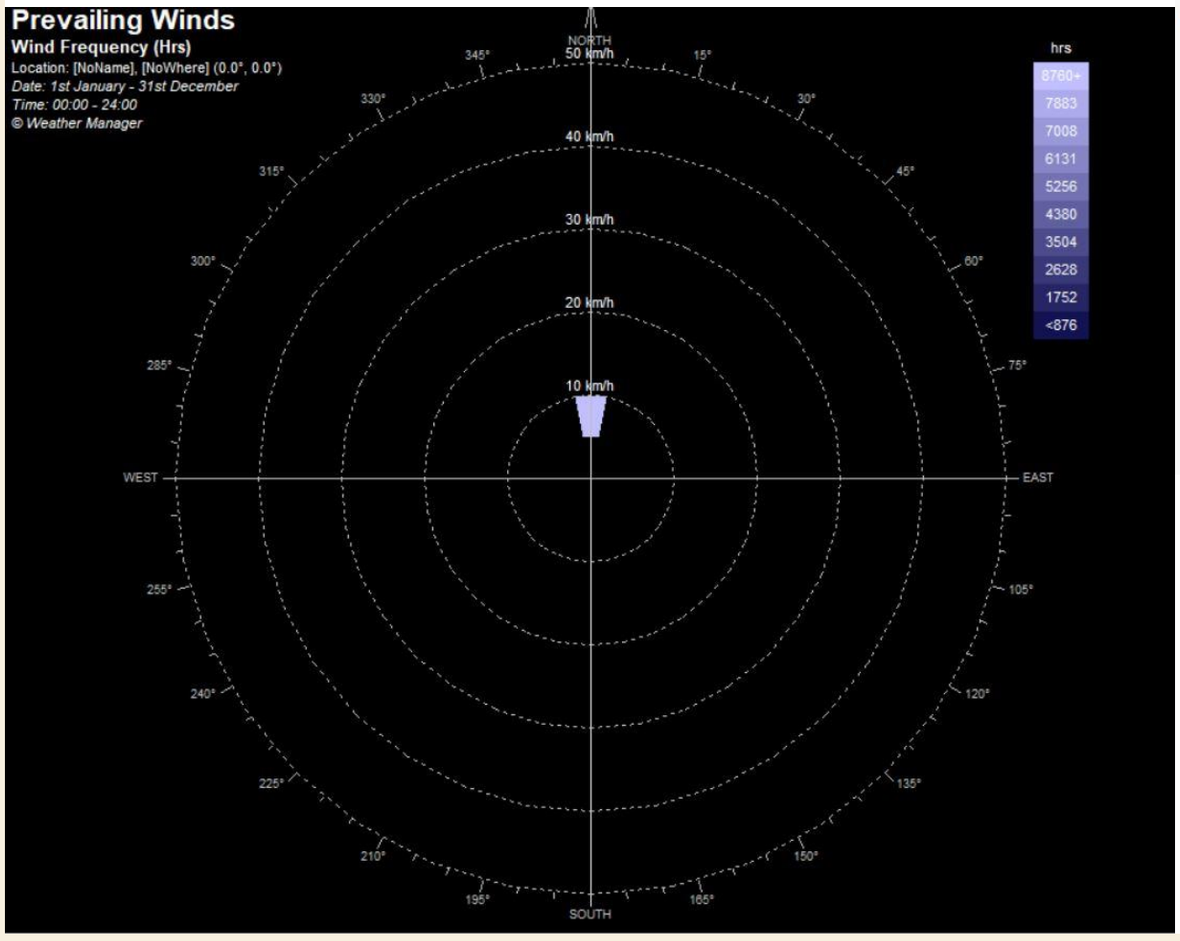
Sun and wind analysis of the site

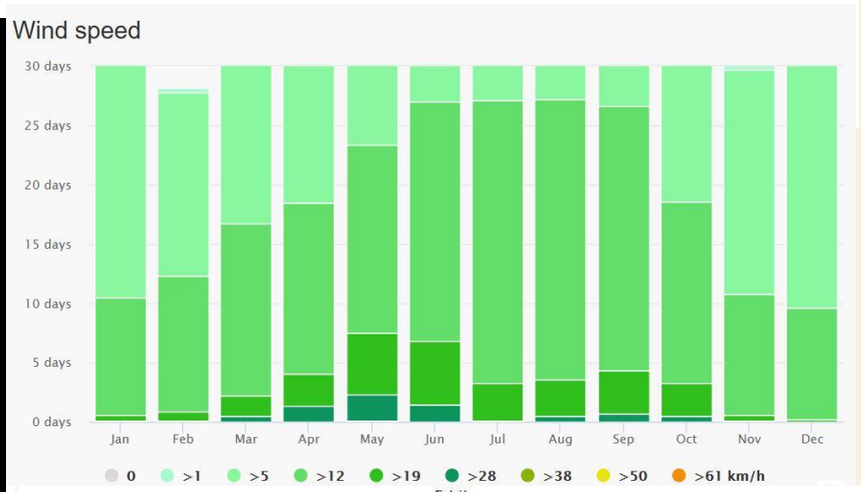







OBJECT ATTRIBUTES
Total Radiation
Value Range: 119000.0 - 1743000.0 Wh/m2
© ECOTECT v5
Wh/m2
1743000+
1580600
1418200
1255800
1093400
931000
768800
606200
443800
281400
119000
1st Jul
1st Aug
1st Sep
1st Oct
1st Nov
1st Dec
1st Jan
1st Feb
1st Mar
1st Apr
1st May
1st Jun
N
15°
30°
45°
60°
75°
90°
105°
120°
135°
150°
165°
180°
195°
210°
225°
240°
255°
270°
285°
300°
315°
330°
345°

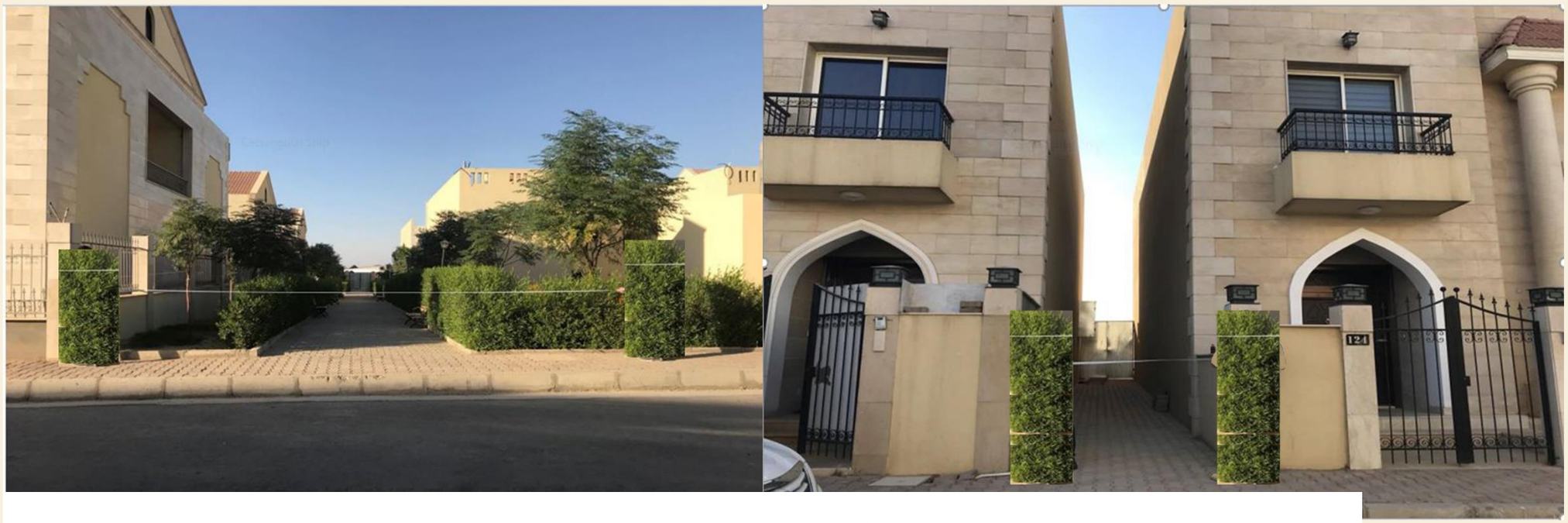

Prevailing Winds
Wind Frequency (Hrs)
Location: [NoName], [NoWhere] (0.0°, 0.0°)
Date: 1st January - 31st December
Time: 00:00 - 24:00
© Weather Manager
hrs
8760+
7883
7008
6131
5256
4380
3504
2628
1752
<876
NORTH
EAST
SOUTH
WEST
10 km/h
20 km/h
30 km/h
40 km/h
50 km/h

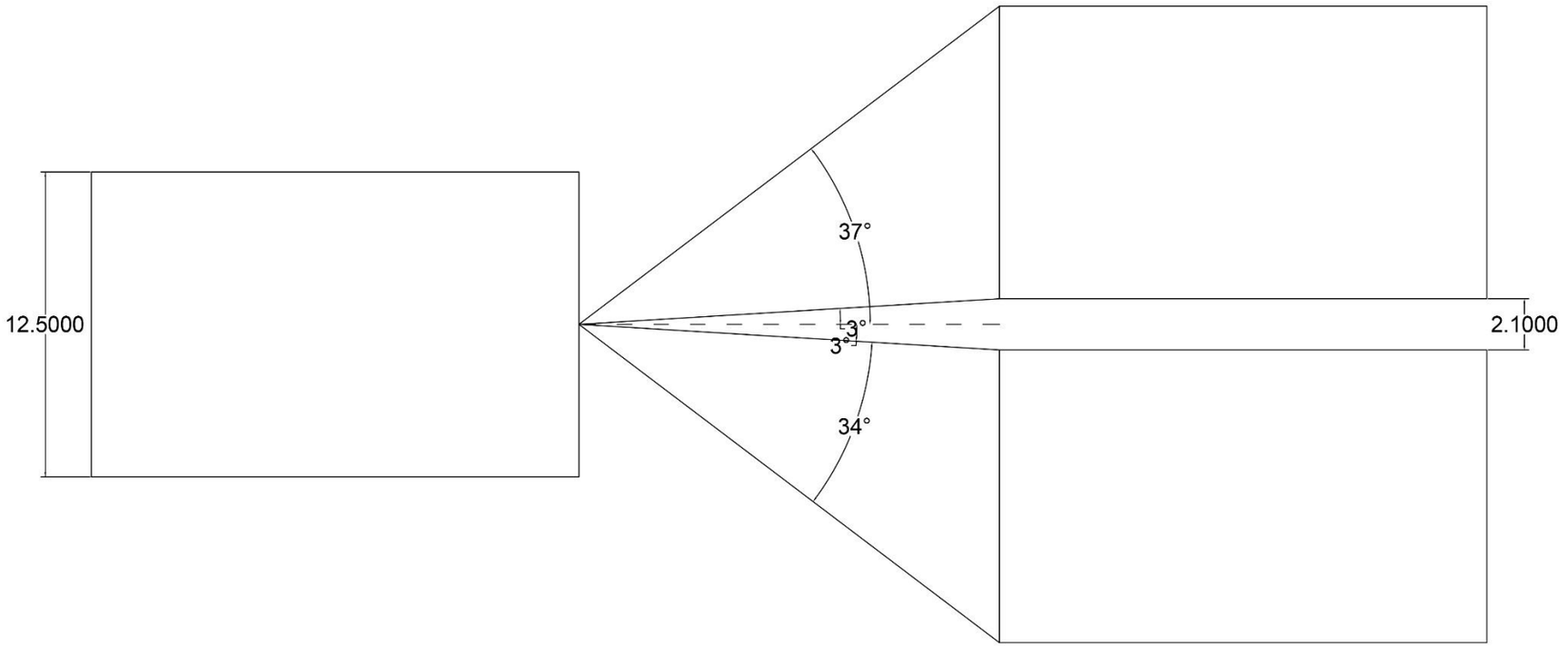

Wind speed
30 days
25 days
20 days
15 days
10 days
5 days
0 days
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
>1
>5
>12
>19
>28
>38
>50
>61 km/h


Erbil
Average and Max Wind Speed and Gust (kmph)
Zoom
1m
3m
6m
YTD
1y
All
20kmph
10kmph
5kmph
Avg Gust (kmph): 14.9
Max Wind (kmph): 13
Avg Wind (kmph): 8.9
August 2009
2011
2012
2013
2014
2015
2016
2017
2018
2019
Max Wind (kmph)
Avg Gust (kmph)
Avg Wind (kmph)

DISTANCE BETWEEN BLOCKS AND VILLAS …

- Between TYPE B VILLAS is 2 meters (semi detached)
-Between TYPE A VILLAS is 2.1 meters
-Between TYPE B BLOCKS is 21.5 meters of green
-area and sittings
-ZONE D distance between D1 and D2 is 660 cm

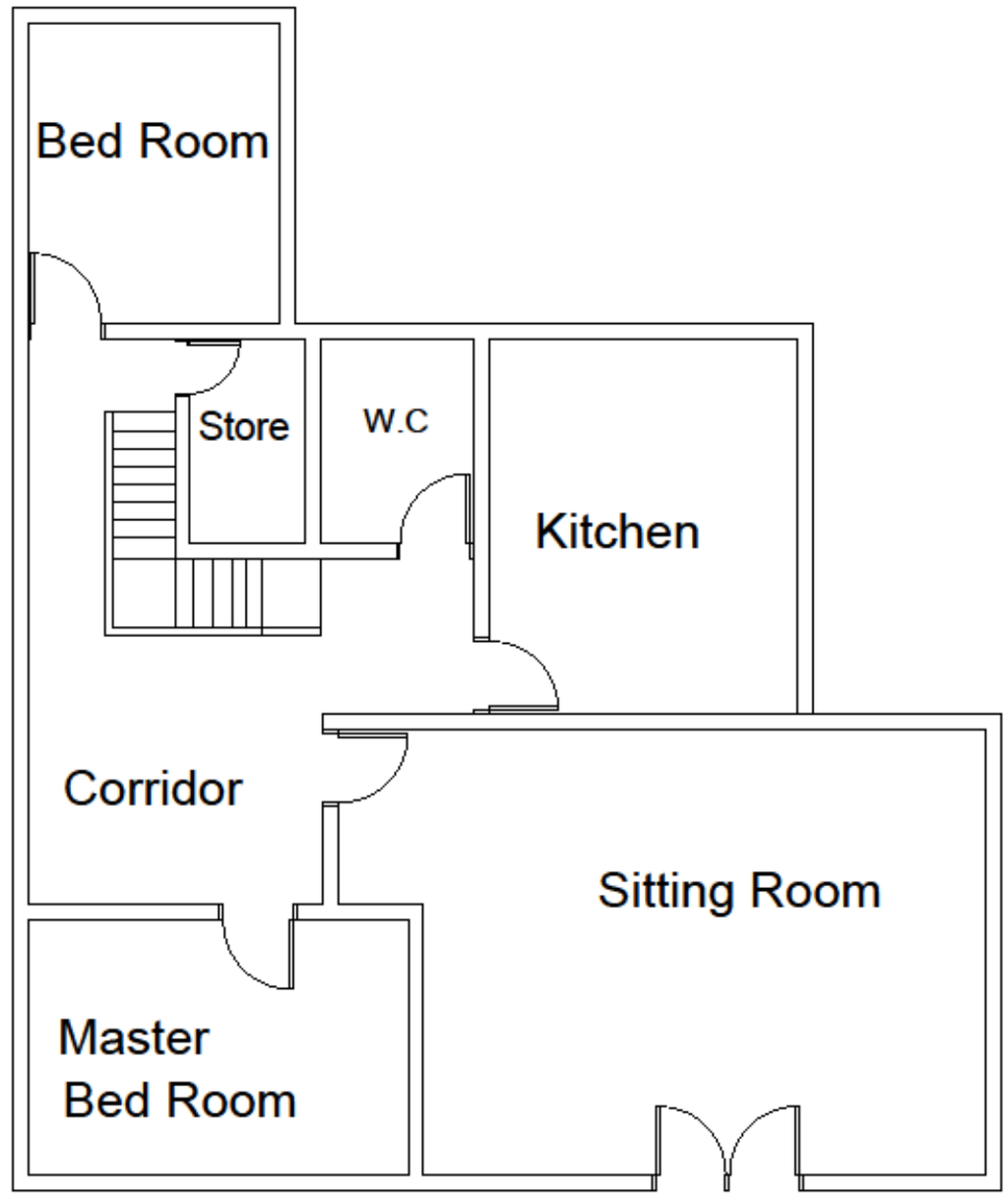




Light analysis of single house

$$\frac{\text{Total glazing window}}{\text{Total wall area}}$$

$$\frac{1090\ \text{mm}}{4110\text{mm}} = 0.2\ \text{mm}$$

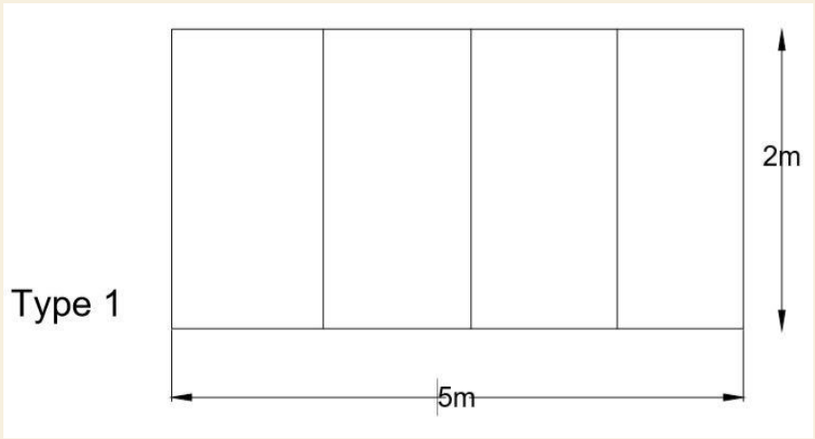


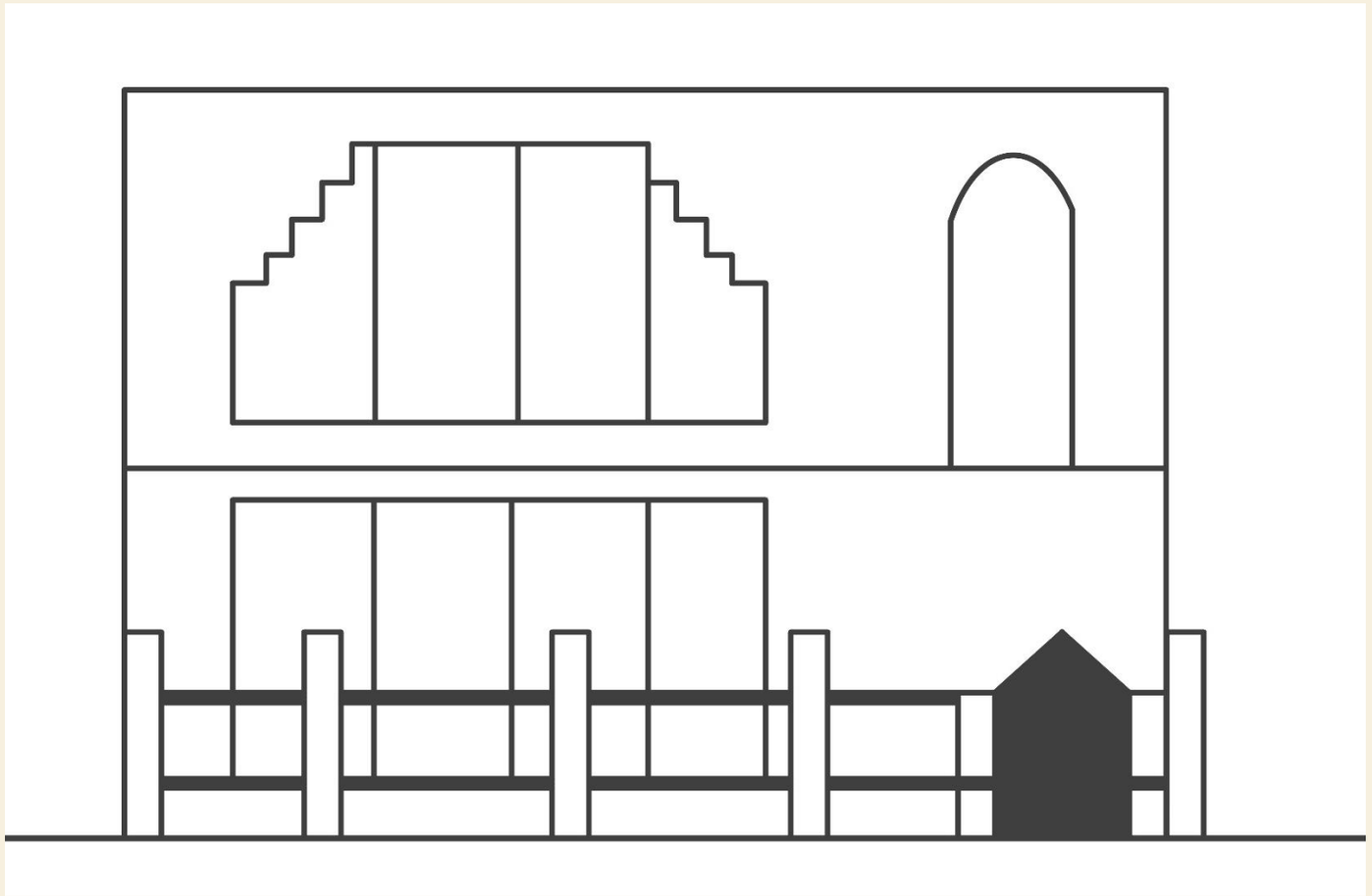
Ground Floor Plan

Windows Types

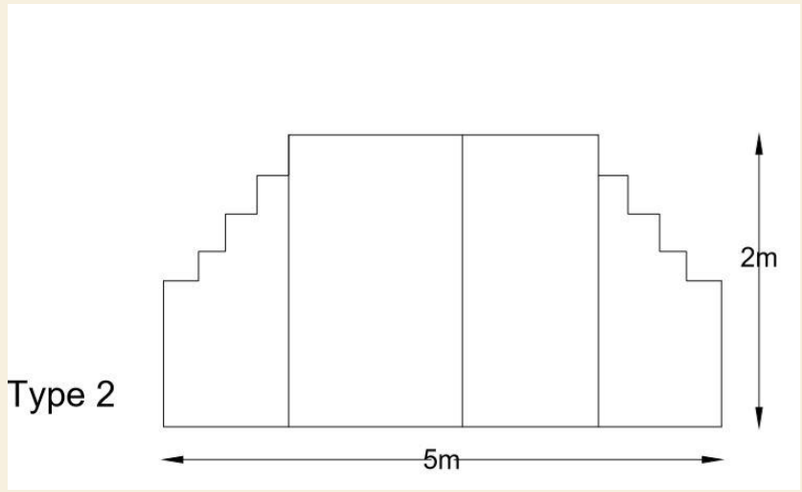
$$\frac{\text{Total glazing window}}{\text{Total wall area}}$$

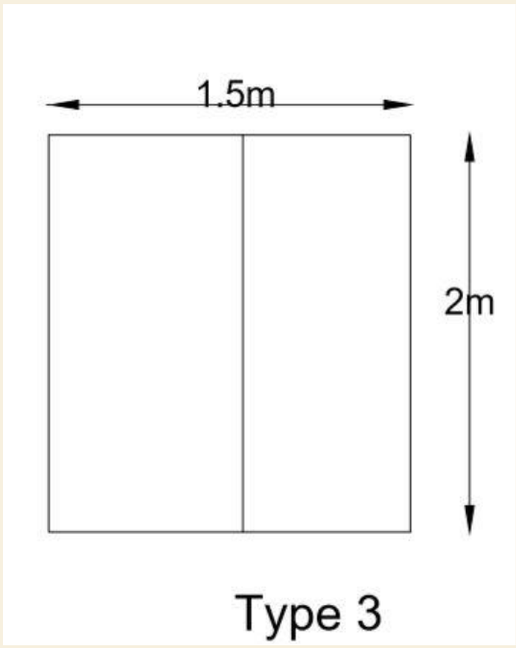
$$\frac{1090\ \text{mm}}{3500\text{mm}} = 0.3\ \text{mm}$$





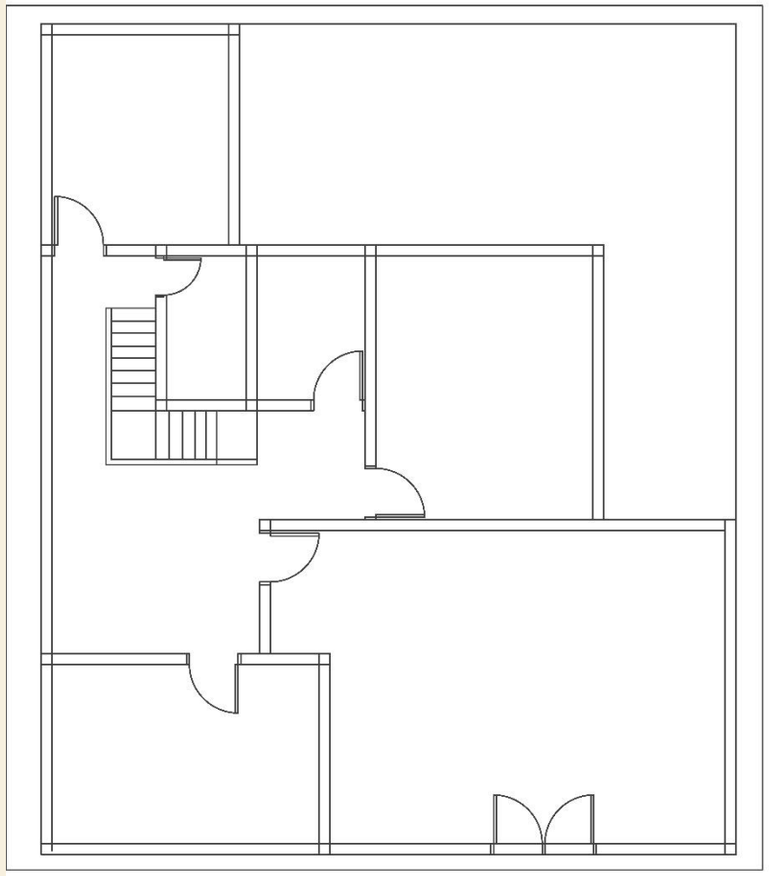
Elevation



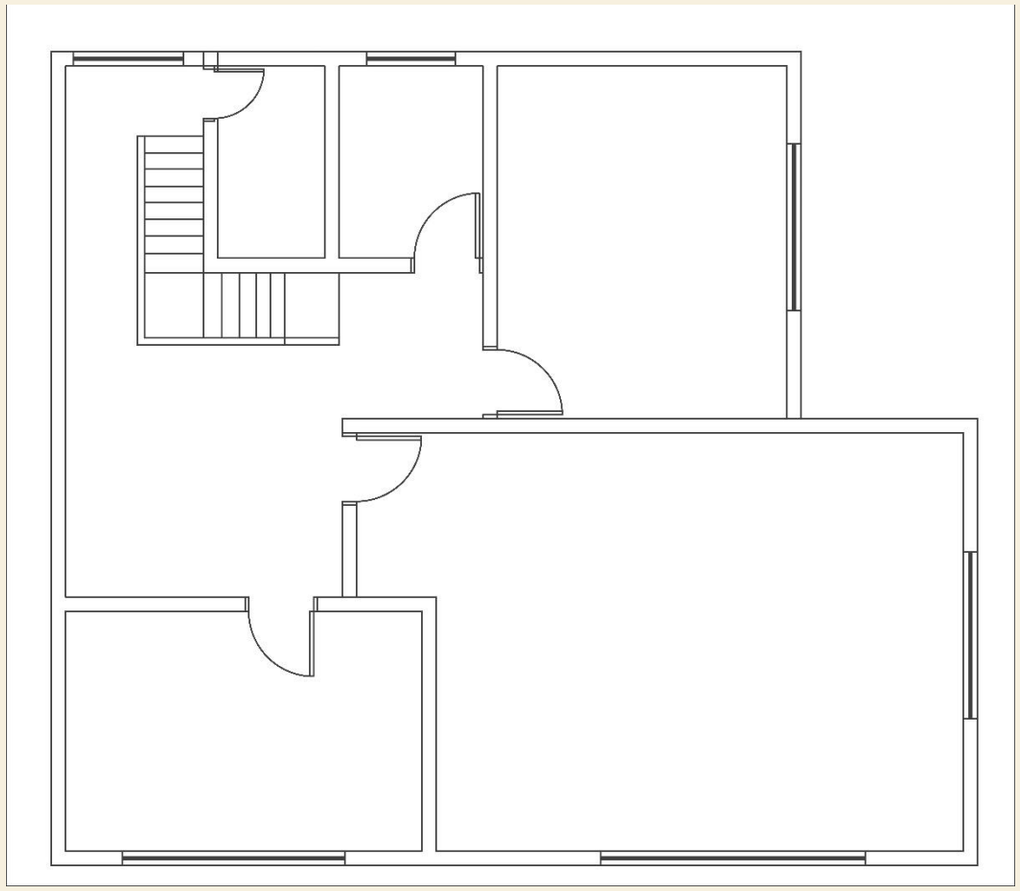


Shading Device

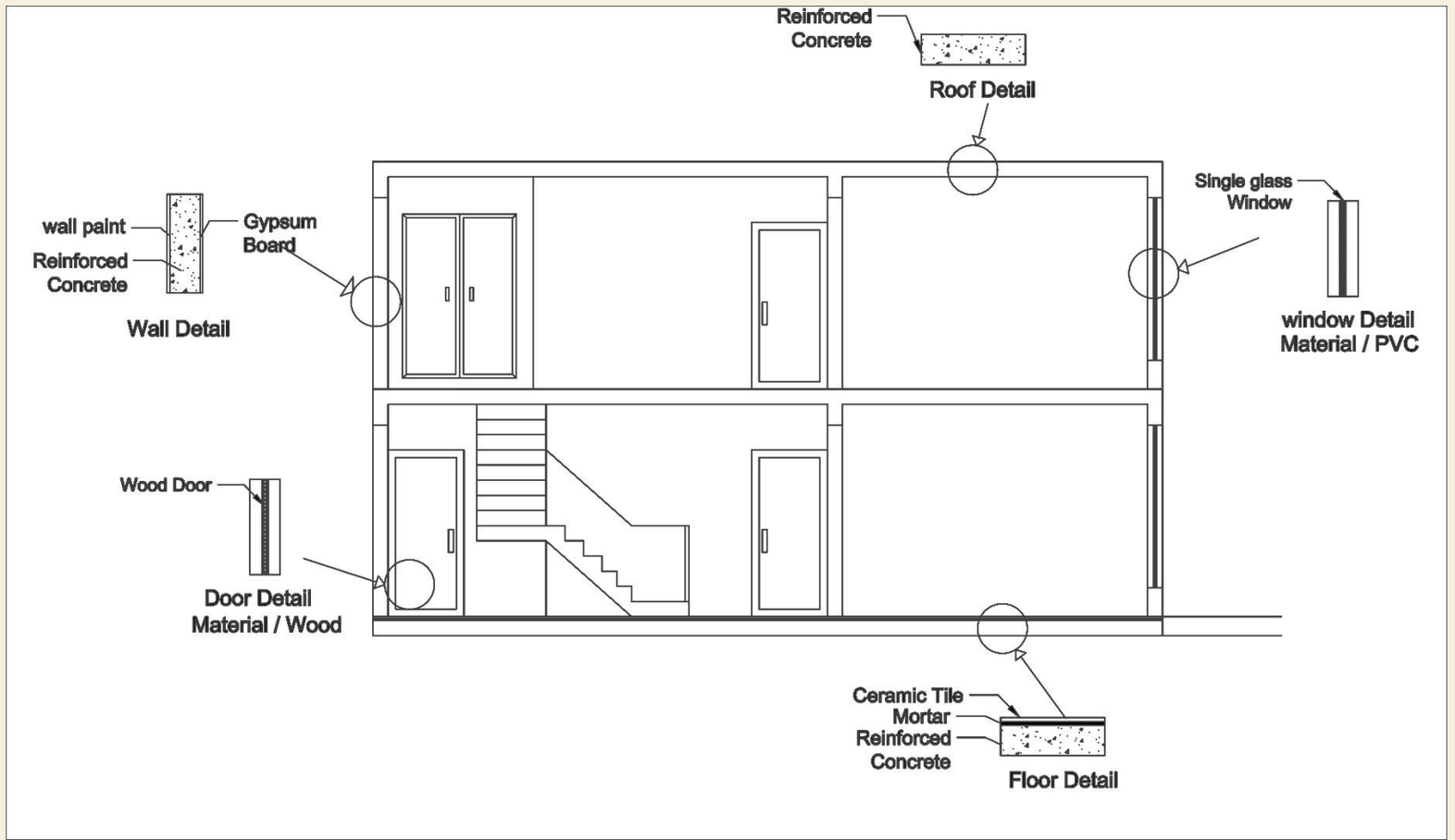
We Don’t have any Shading Device



Ground floor

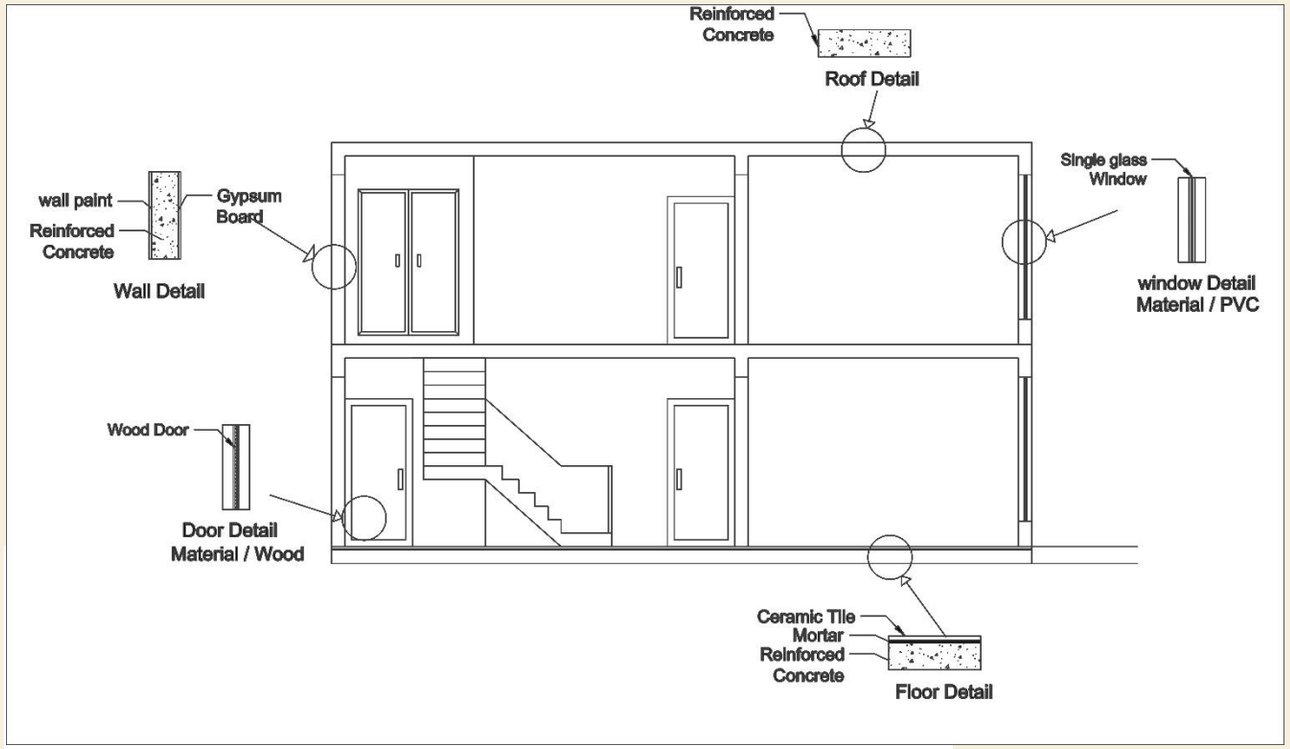


First floor



Section

Materials :



Layer	Thickness	conductivity	Resistance
Outside thermal resistance			0.04
inside thermal resistance			0.13
Single glass window	0.02	0.65	0.02/0.65=0.3
Total thermal resistance			0.47
Overall U value: U=1/R=1/0.47=2.13W/M.K			

Window

Layer	Thickness	conductivity	Resistance
Outside thermal resistance			0.04
inside thermal resistance			0.13
wood Door	0.04	0.17	0.04/0.17=0.235
Total thermal resistance			0.405
Overall U value: U=1/R=1/0.405=2.47W/M.K			

Door

Layer	Thickness	conductivity	Resistance
Outside thermal resistance			0.04
inside thermal resistance			0.13
concrete	0.2	0.5	0.2/0.5=0.4
gypsum board	0.02	0.25	0.02/0.25=0.8
wall paint	0.01	0.65	0.01/0.65=0.05
Total thermal resistance			1.42
Overall U value: U=1/R=1/ 1.42=0.70W/M.K			

wall

Layer	Thickness	conductivity	Resistance
Outside thermal resistance			0.04
inside thermal resistance			0.13
concrete	0.2	0.5	0.2/0.5=0.4
Mortar	0.02	0.719	0.02/0.719=0.0278
Ceramic Tile	0.03	1.196	0.03/1.196=0.025
Total thermal resistance			0.623
Overall U value: U=1/R=1/ 0.623=1.6W/M.K			

Floor

Layer	Thickness	conductivity	Resistance
Outside thermal resistance			0.04
inside thermal resistance			0.13
concrete	0.2	0.5	0.2/0.5=0.4
Total thermal resistance			0.57
Overall U value: U=1/R=1/0.57=1.75W/M.K			

Roof

Materials :

-Glass For Windows

-The Pattern of Window Is PVC

The Fence is made from concrete and painted with yellow color

The Roof is made from Red Tile

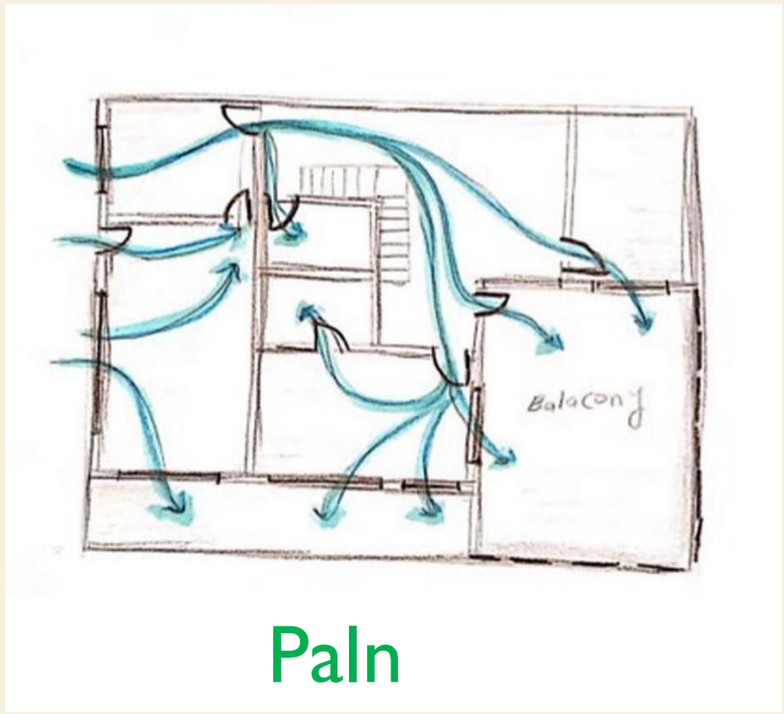
The elevation is made from ashlar

The Door Is made from Metal

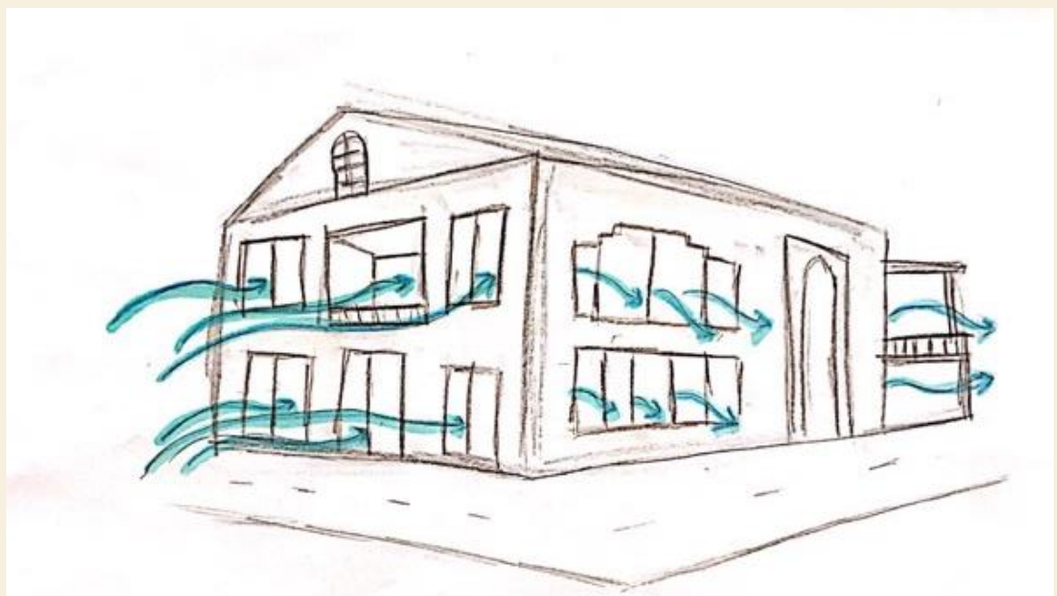
The Door of Garage is made from Aluminum

Wind analysis

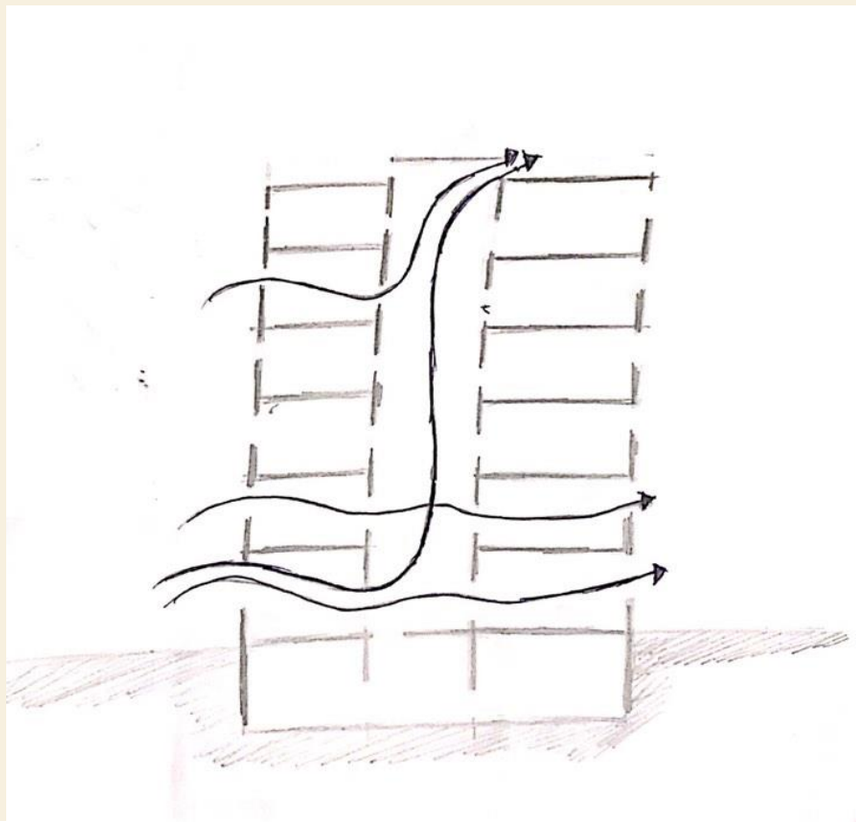
The trees surrounding the site can provide protection of hot and cold for **villas and houses**
But they cant provide for the **high rise buildings**



Paln

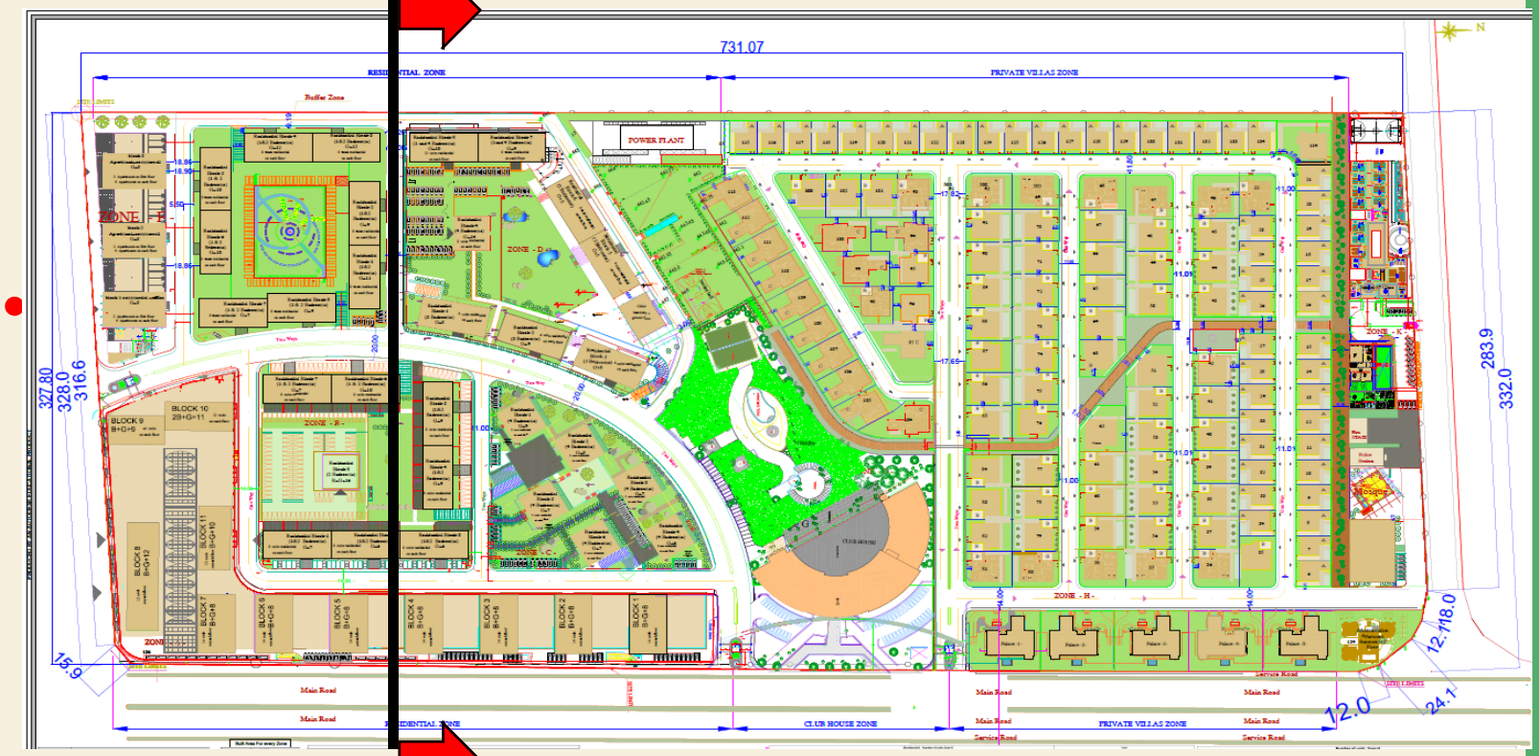


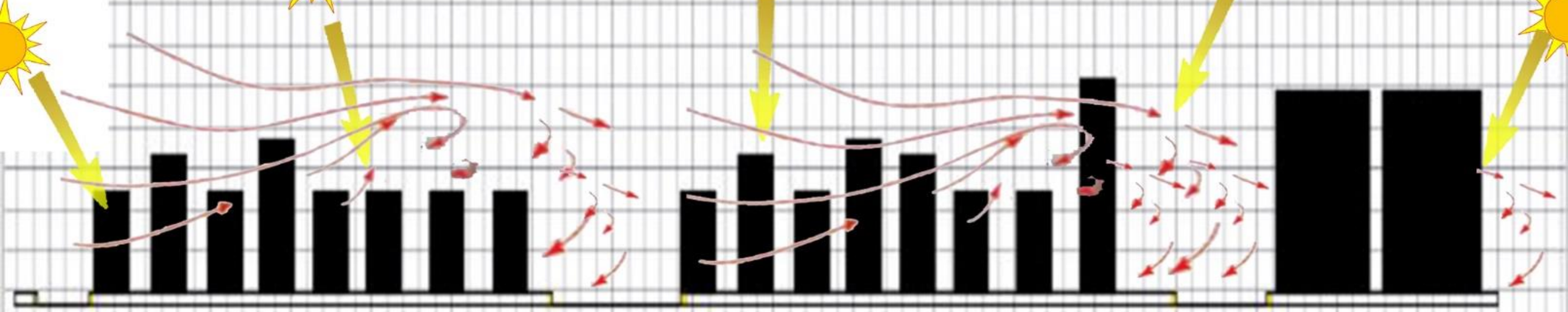
3D view



Solution for high rise building

STREET SECTION…

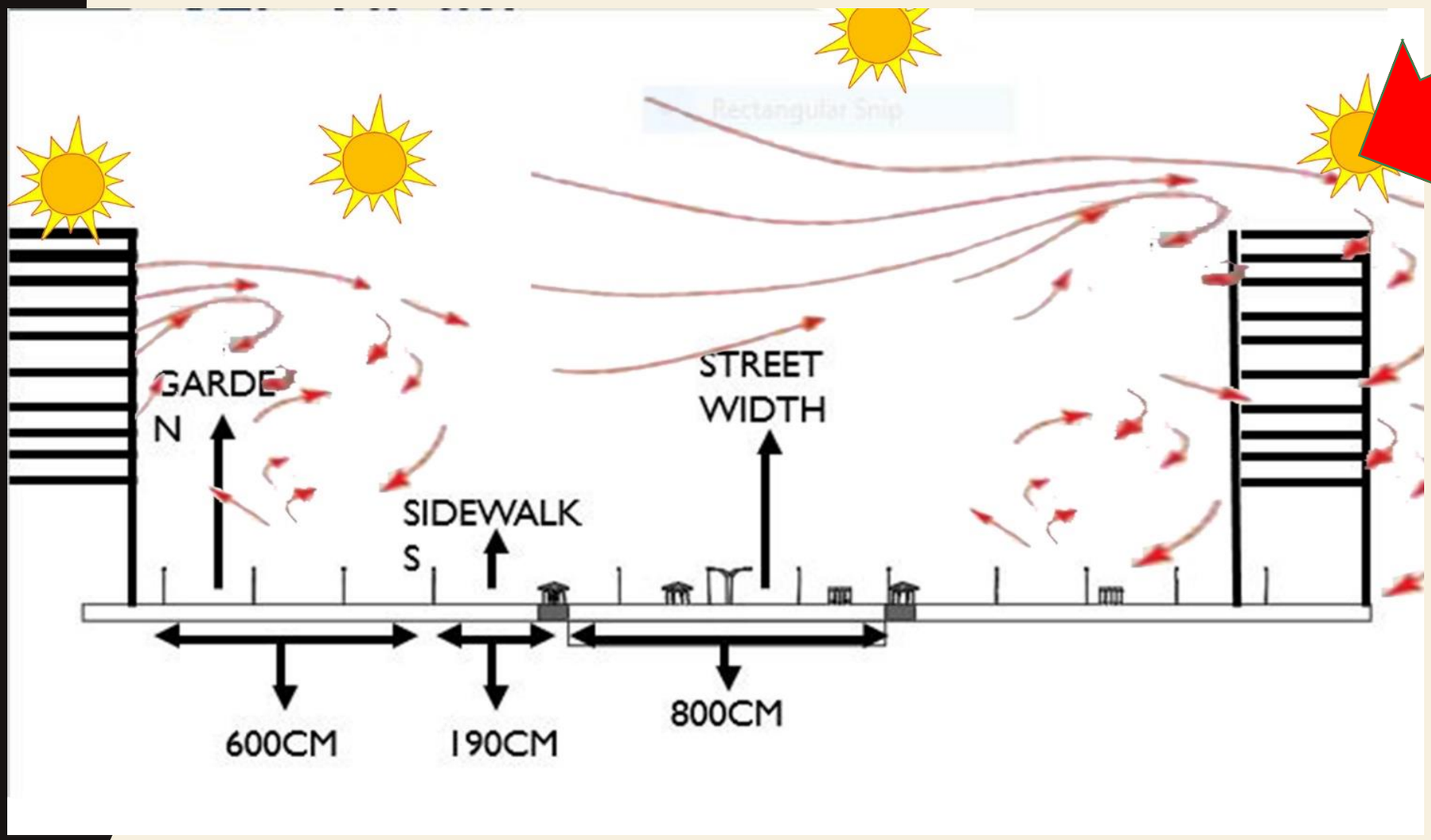




Wind Direction

Sun Direction

STREET SECTION …



The heat gain calc. by occuppants

kitchen (2 person)

Sensible heat gain = 78.5 w

Latent heat gain = 78.5 w

$$\text{Total sensible heat gain} = \frac{2*78.5}{1000} = 0.157 \text{ kw}$$

$$\text{Total latent heat gain} = \frac{2*78.5}{1000} = 0.157 \text{ kw}$$

Total heat gain = 0.157 + 0.157 = 0.314 kw

Store (1 person)

Sensible heat gain = 77.5 w

Latent heat gain = 71.5 w

$$\text{Total latent heat gain} = \frac{1*77.5}{1000} = 0.0775 \text{ kw}$$

$$\text{Total latent heat gain} = \frac{1*71.5}{1000} = 0.715 \text{ kw}$$

Total heat gain = 0.0775 + 0.715 = 0.7925 kw

Seating room (6 person)

Sensible heat gain = 70 w

Latent heat gain = 44 w

$$\text{Total sensible heat gain} = \frac{6*70}{1000} = 0.42 \text{ kw}$$

$$\text{Total latent heat gain} = \frac{6*44}{1000} = 0.267 \text{ kw}$$

Total heat gain = 0.42 + 0.267 = 0.687 kw

Master bed room (2 person)

Sensible heat gain = 70 w

Latent heat gain = 30 w

$$\text{Total sensible heat gain} = \frac{2*70}{1000} = 0.14 \text{ kw}$$

$$\text{Total sensible heat gain} = \frac{2*30}{1000} = 0.2 \text{ kw}$$

Total heat gain = 0.14 + 0.2 = 0.34 kw

Corridor (2 person)

Sensible heat gain = 71.5 w

Latent heat gain = 71.5 w

$$\text{Total sensible heat gain} = \frac{2*71.5}{1000} = 0.143 \text{ kw}$$

$$\text{Total latent heat gain} = \frac{2*71.5}{1000} = 0.143 \text{ kw}$$

Total heat gain = 0.143 + 0.143 = 0.286 kw

Bed room (3person)

Sensible heat gain = 60 w

Latent heat gain = 30 w

$$\text{Total sensible heat gain} = \frac{3*60}{1000} = 0.18 \text{ kw}$$

$$\text{Total latent heat gain} = \frac{3*30}{1000} = 0.09 \text{ kw}$$

Total heat gain = 0.42 + 0.267 = 0.27 kw

Bath (1 person)

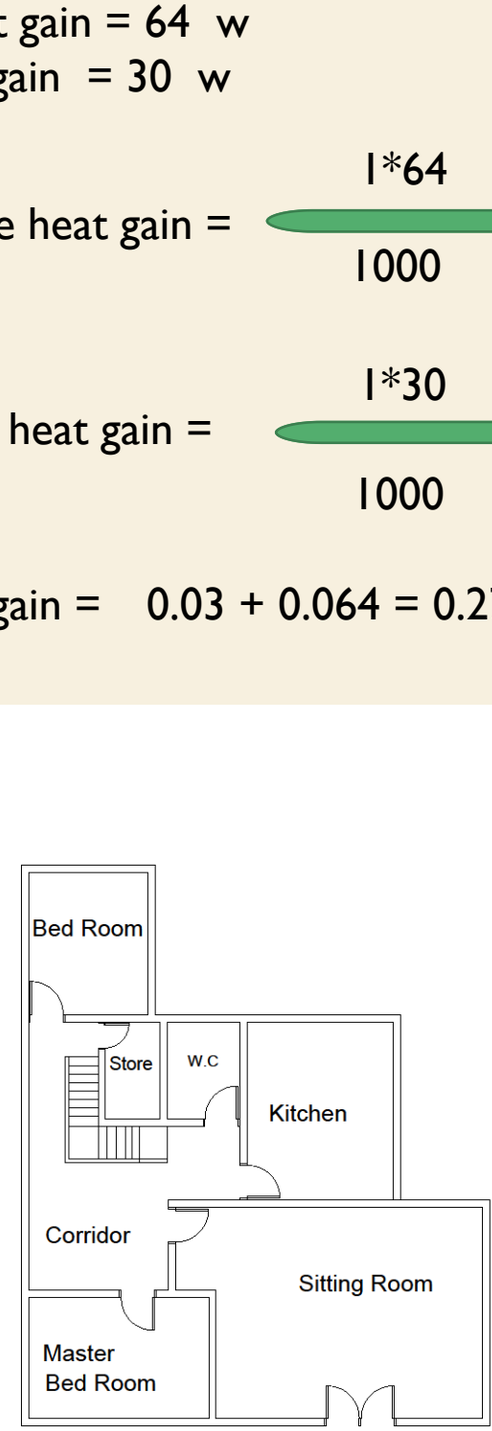
Sensible heat gain = 64 w

Latent heat gain = 30 w

$$\text{Total sensible heat gain} = \frac{1*64}{1000} = 0.064 \text{ kw}$$

$$\text{Total latent heat gain} = \frac{1*30}{1000} = 0.03 \text{ kw}$$

Total heat gain = 0.03 + 0.064 = 0.27 kw



Total heat gain of the house = 2.6895

The heat gain calc. by ventilation

$$\text{Air Changes / hr} = \frac{\text{CFM} * 60\ \text{MIN}}{\text{VOLUME OF ROOM}}$$

$$\text{KITCHEN} = \frac{300 * 60}{4*5*3} = 300$$

$$\text{SITTING ROOM} = \frac{300 * 60}{8.4 * 5.5 * 3} = 129.8$$

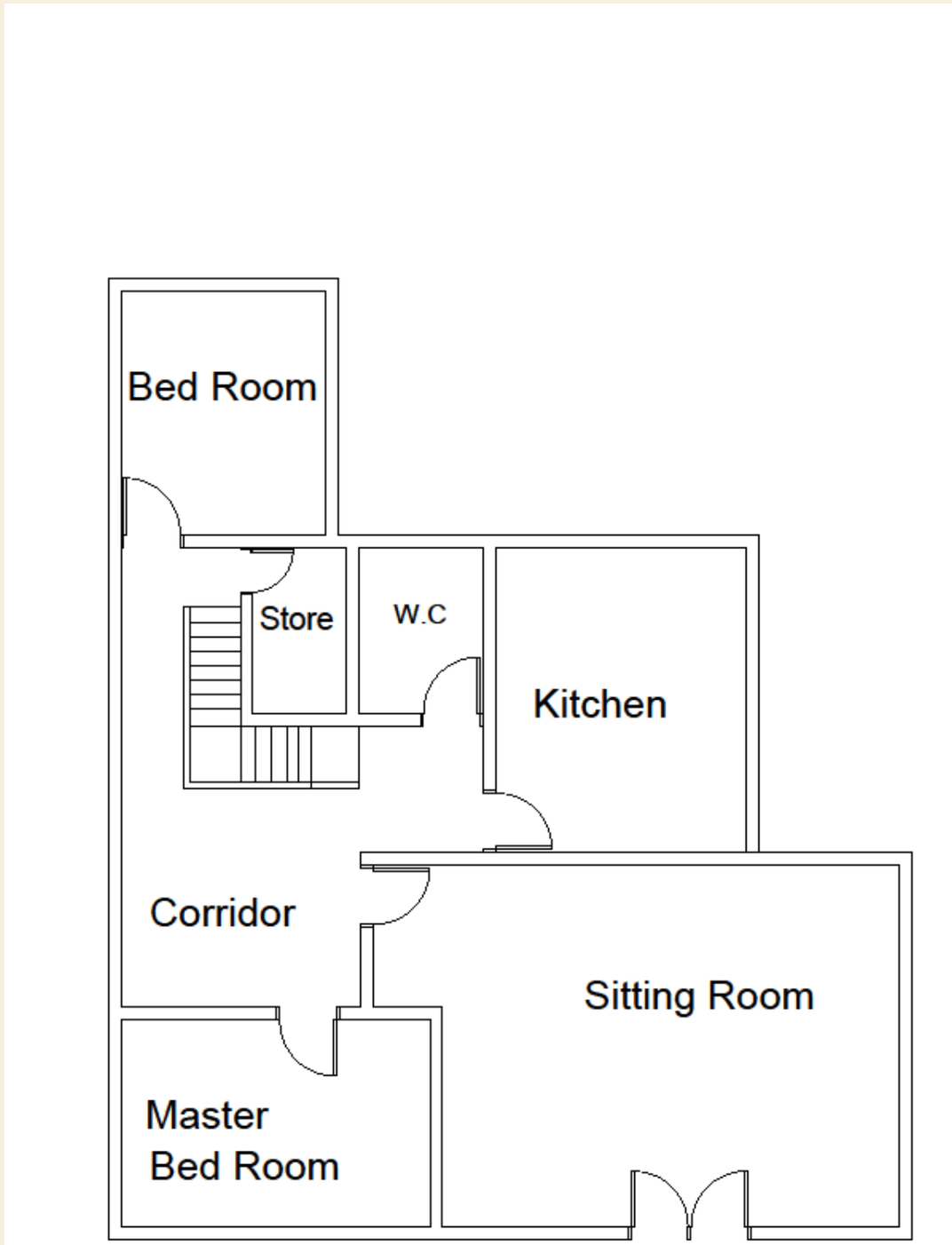
$$\text{STORE} = \frac{300 * 60}{1.5*2.5*3} = 1600$$

$$\text{MASTER BED ROOM} = \frac{300 * 60}{5*3.5*3} = 342.8$$

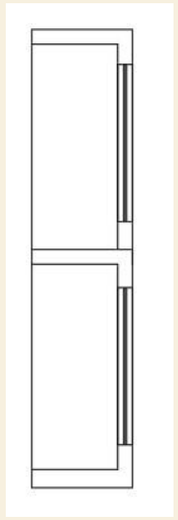
$$\text{CORRIDOR} = \frac{300 * 60}{4*7*3} = 214.3$$

$$\text{BED ROOM} = \frac{300 * 60}{3.2*3.8*3} = 493$$

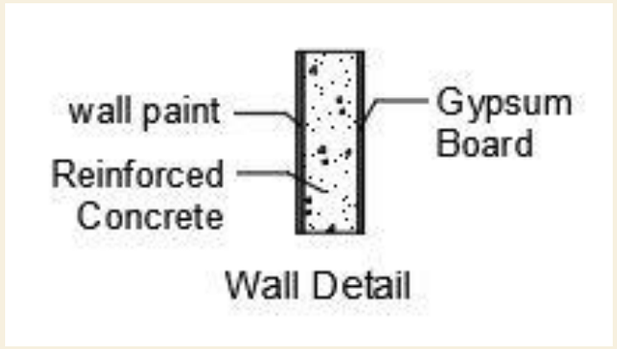
$$\text{Bath} = \frac{300 * 60}{2*2.5*3} = 1200$$



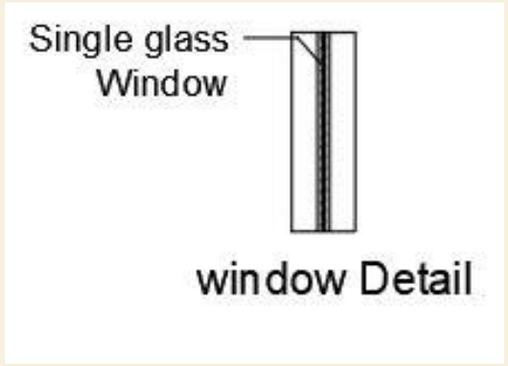
Main Problem:



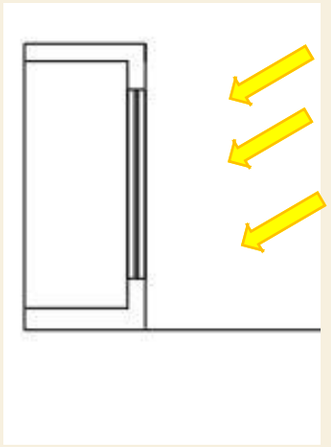
There isn't any
Shading Devise
For window



There isn't any
Insulations
For wall

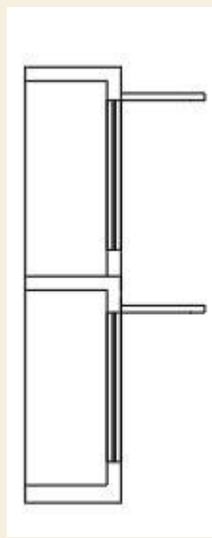


The window is
Single glass

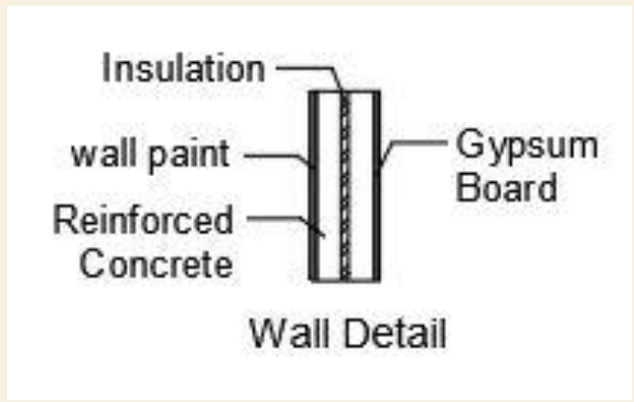


There isn't enough
Trees surrounding the
building

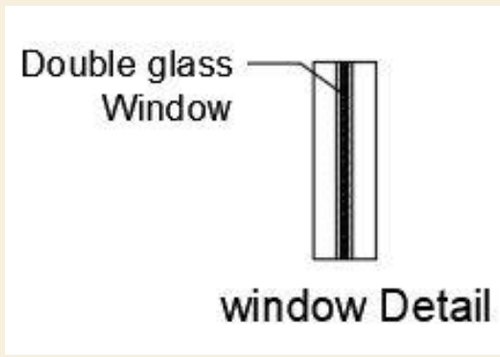
Suggest Solution:



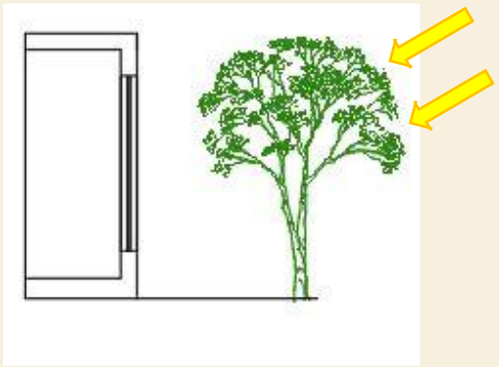
We must provide
Shading devise to
Protect from sun



We must provide
Insulation to
Protect from hot
and cold



We must use
Double glass
Window to protect
From hot, cold and
dust.



We must use more
Trees near the window
To protect from sun and
wind