Revival of the sustainable courtyard dwellings

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Midterm Review

Problem Statement:

Instead of following the popular trend of western living in the name of globalization, how can the built form of Kathmandu benefit from it while preserving the local culture?

Claim:

The built environment of the Kathmandu should embrace modern sustainable technology to meet its current and future needs while respecting the social and cultural patterns of the city.

Premises:

Modern sustainable technologies are capable of creating an impact in the Kathmandu world where resources are scarce.

Influence of Colonization in India in the past and globalization at present has enabled the transfer western ideas to the developing world.

The built environment of Kathmandu face the challenge to adapt to the modern world and is losing its 'sense of place,'It should be able to preserve its identity since response to shelter is closely affiliated with cultural, social, climatic and economic factors.

Conclusion:

Globalization has many pros and cons. It has made technology transfer possible which Kathmandu can use in it's built environment to meet it's current and future needs. Furthermore, the built environment should respect its long established cultural and social norms.

Project Justification:

It is important to have modern thinking in this global world, but people should be able to preserve their identity. There are great problems in the developing world that needs to be addressed at present and they cannot be solved by simple cultural imitation. Globalization could be used for the betterment of the society rather than just using it to fulfill the gross materialistic wants.

Inspiration

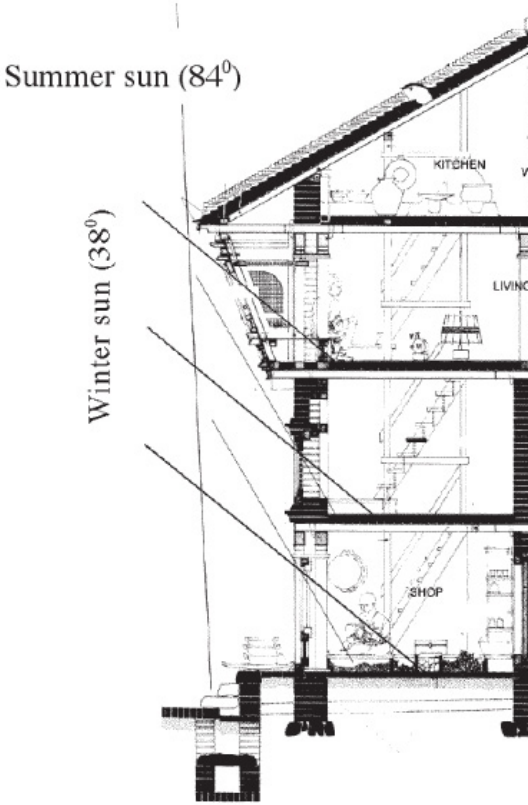
‘For thousands of years, human dwellings have developed in an incredibly rich diversity, reflecting man’s ability to respond to the environment-topography and climate and to create social norms and physical standards for his habitat. Until fairly recently, this habitat has always been in harmony with nature.

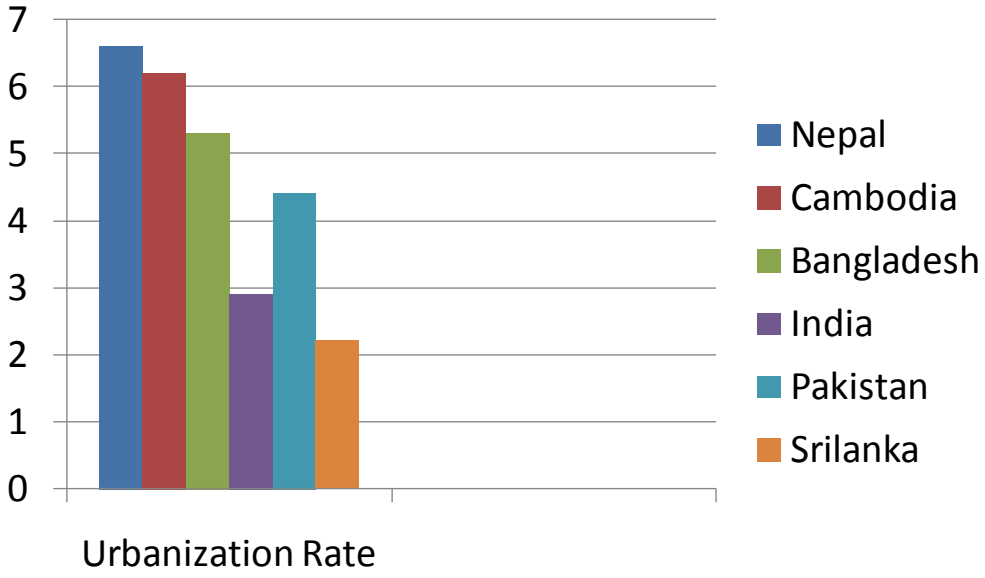
Our western world has become accustomed to a standard of living that is not only unsustainable in the long run, but lags behind previous achievements which are in danger of becoming forgotten. We have limited our choices to two equally unsatisfying and extreme dwelling alternatives: the highrise apartment blocks and the free standing single family house that have become the epitomes of contemporary American and European city. Both are extremely uneconomical in terms of infrastructure and maintenance. Nevertheless and almost incomprehensively, each alternative is being copied universally.

The Eastern world, a world that developed its own predominantly inward orientation as opposed to the purely outward orientation of its Western counterpart has been especially affected. Unfortunately, the societies for whom the typically introverted oriental urban houses were commonplace for several millennia are now abandoning this house type to adopt occidental schemes.’

Carl Pruscha

Vernacular Architecture





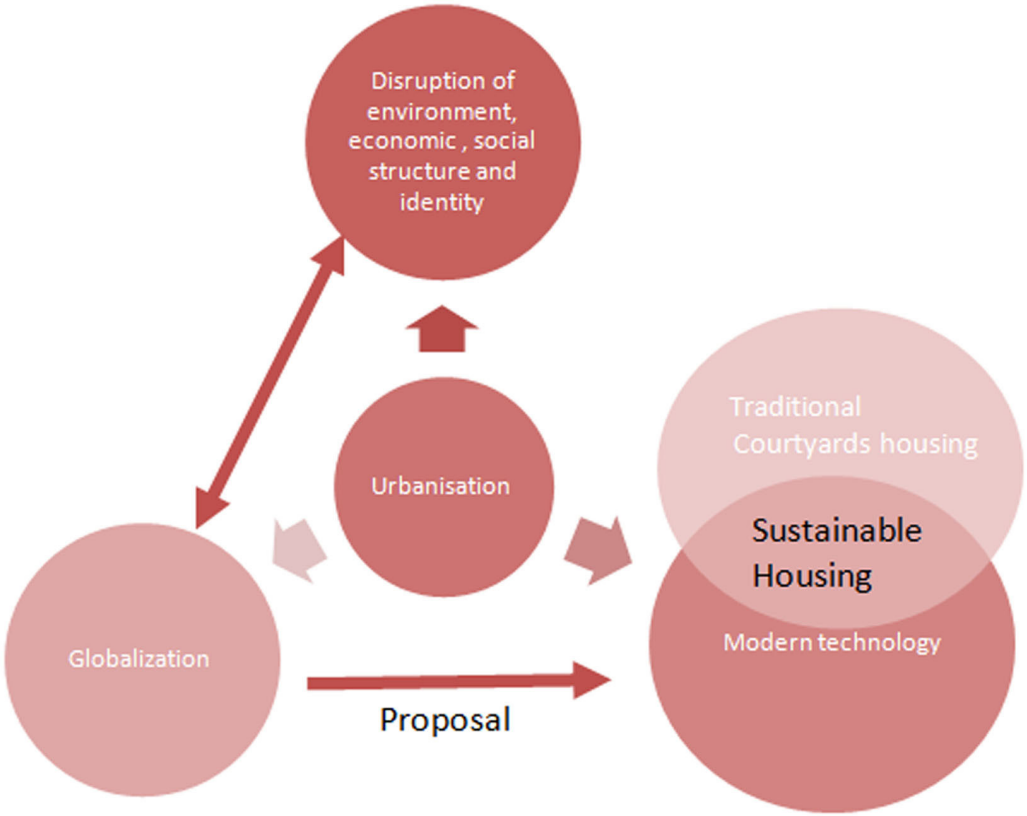
Modern developments started in the Nepal only after 1950s after the downfall of Rana Regime.

The rate of urbanization in Nepal was 6.6% per annum, which was the highest among the Asia Pacific region followed by Cambodia (6.2%), Bangladesh (5.3%), Pakistan(4.4%), India(2.9%) and Srilanka (2.2%)

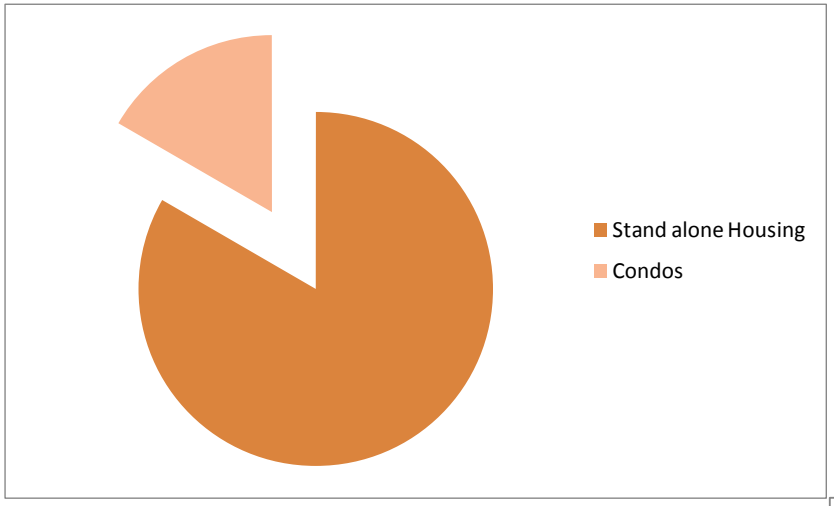
Population growth rate : 4.71% p yr one of the highest in the world today

consistent power, proper sanitation and clean drinking water supply hasn’t been proportional to rate of urbanization

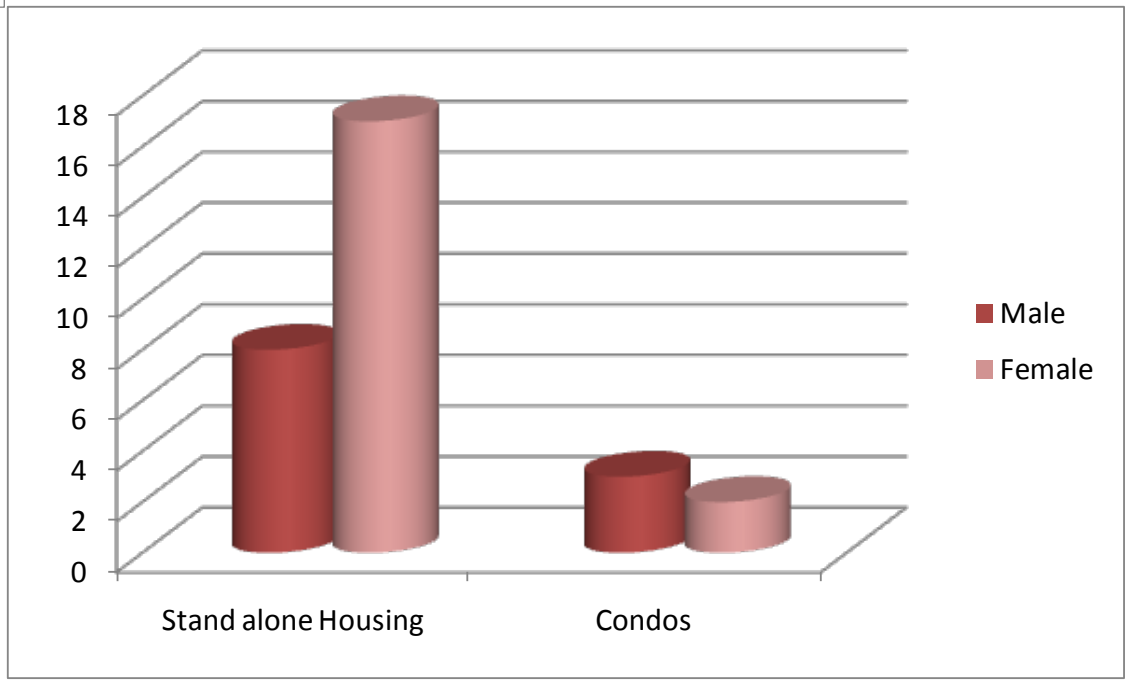
Proposal


Disruption of environment, economic , social structure and identity
Urbanisation
Globalization
Traditional Courtyards housing
Sustainable Housing
Modern technology
Proposal

Typology Determination

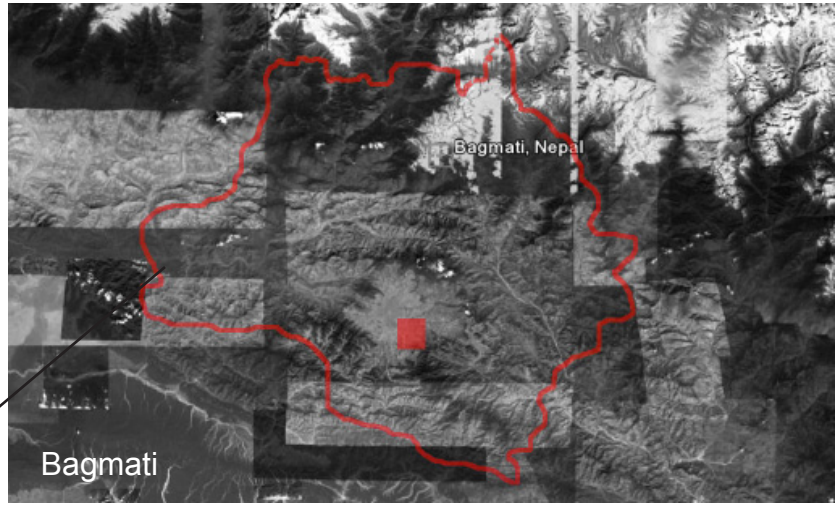


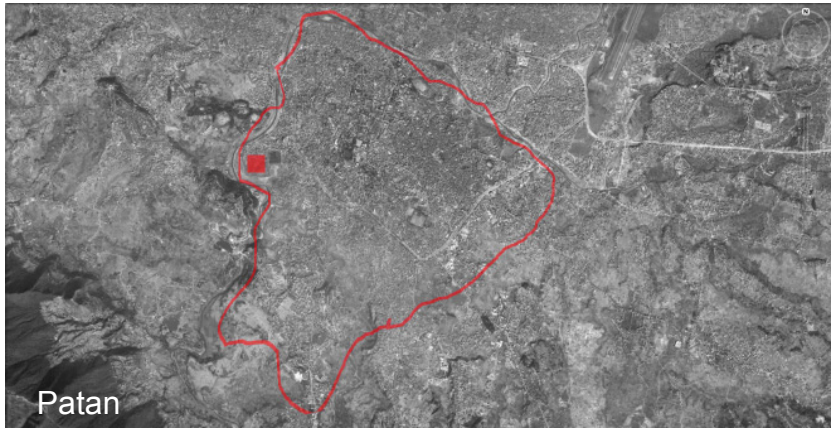
30 ppl total
19 female
11 male



Site

Kathmandu valley area 58.2 sq.miles
Population approx. 1million





Bridge
Busy traffic
Light traffic
Moderate Traffic
Dirt road
Temple
school

1. Southern view toward Modern Indian School

3. Chobar on the West

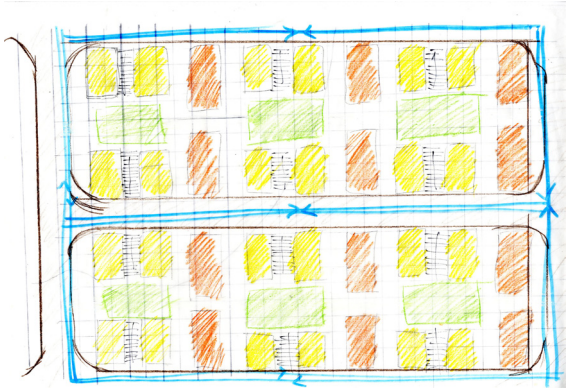
2. Built features on the East

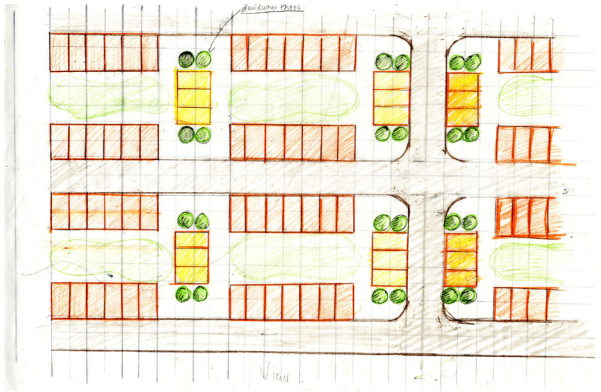
4. Panoramic View on the North

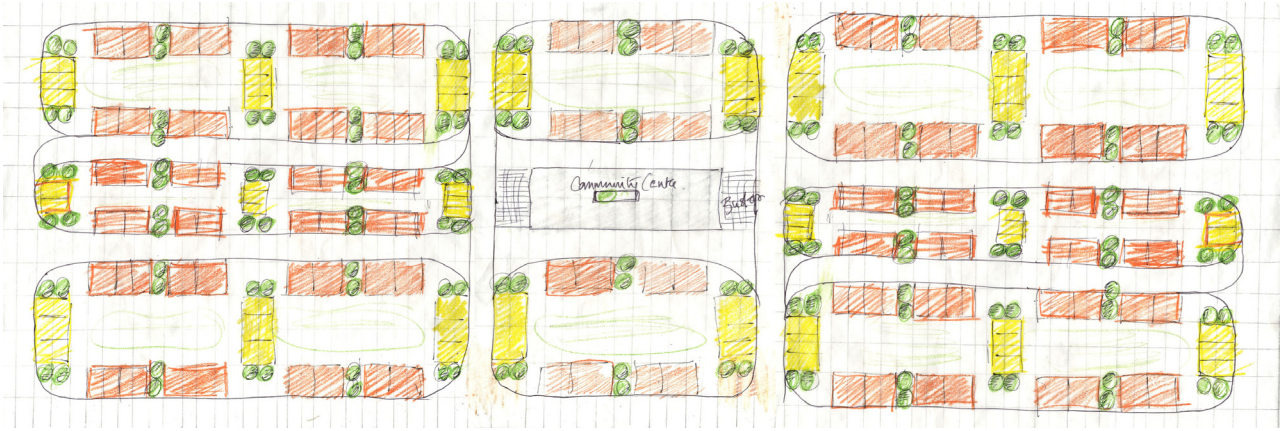
5. Sunrise Homes in the North Eastern view

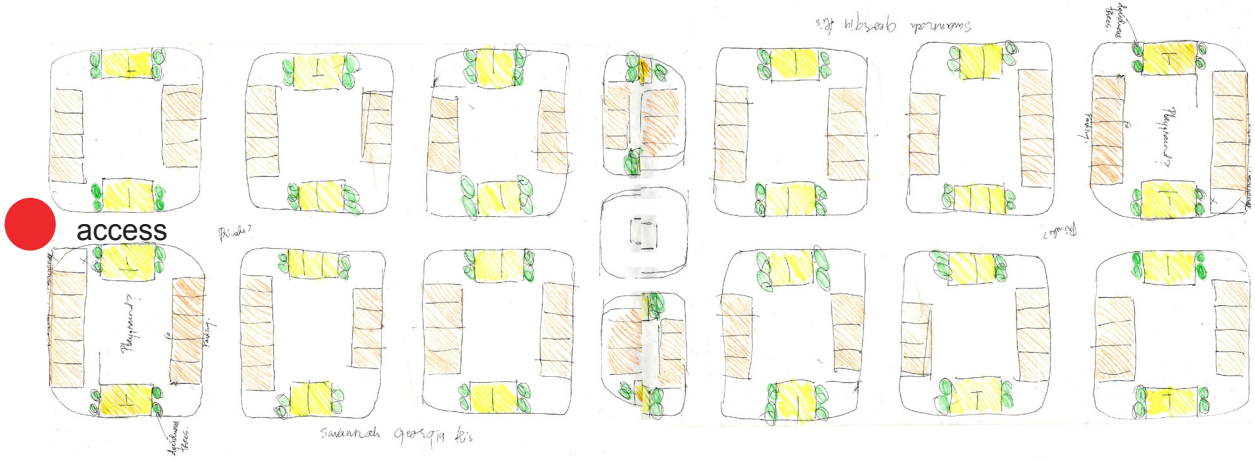
Concept

The concept of the thesis began with an exploration of the vernacular architecture section and developing the idea of forming a courtyard community gathering space within the larger courtyard housing.




Additional trees

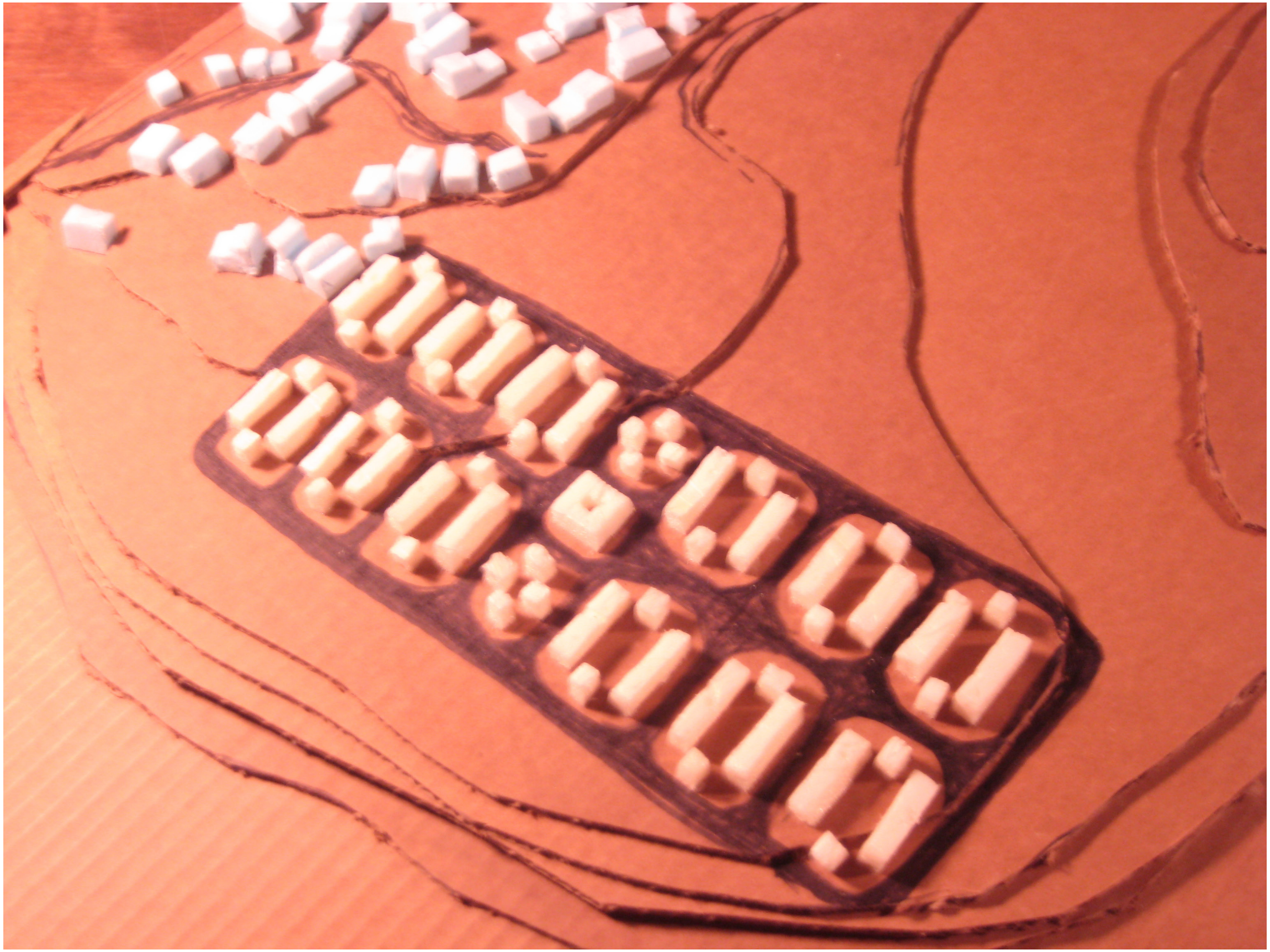

Community Center
Bus stop


access
Savannah georgia 1/2
Savannah georgia 1/2
Playground
Playground
Parking
Parking
Additional trees
Additional trees

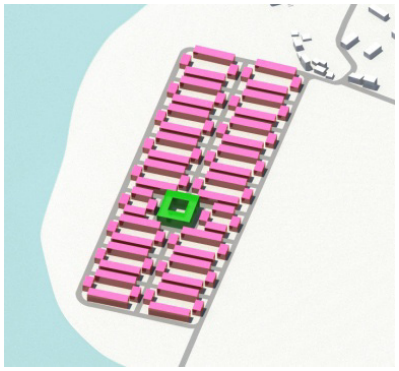
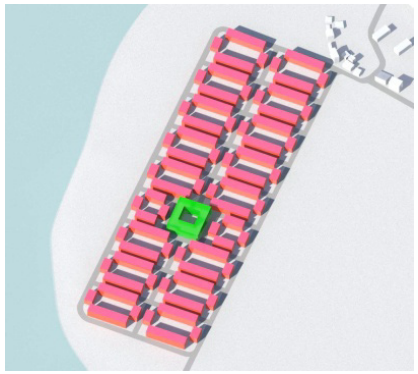
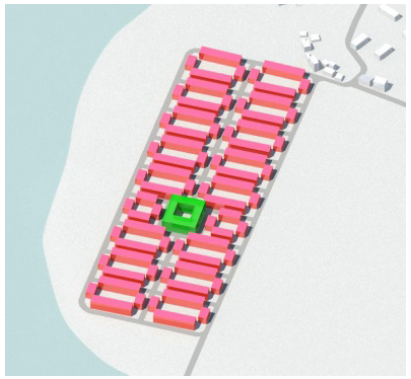
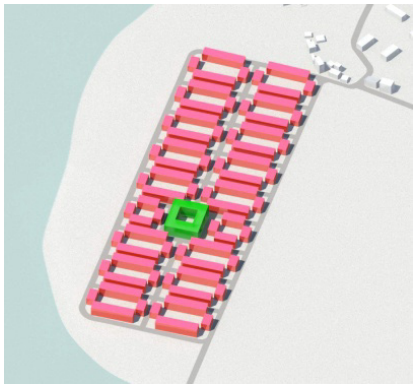
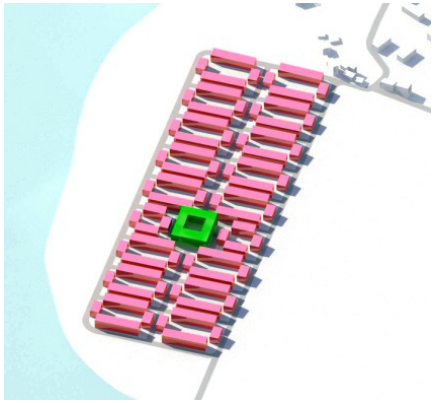
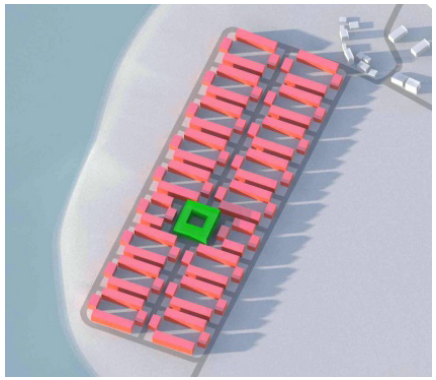
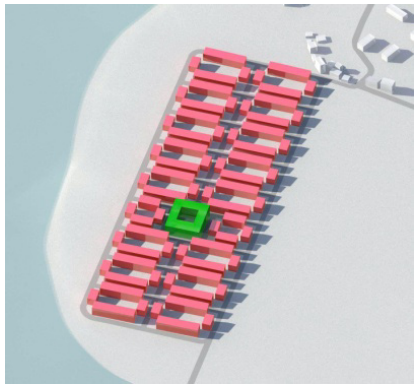
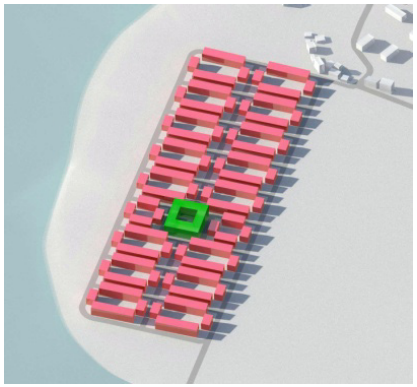
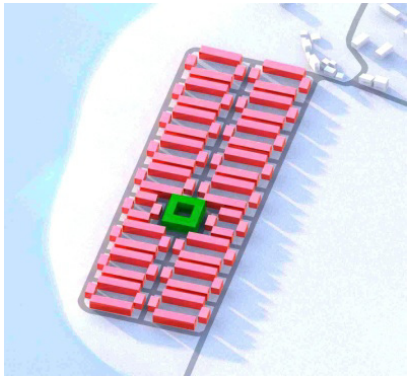
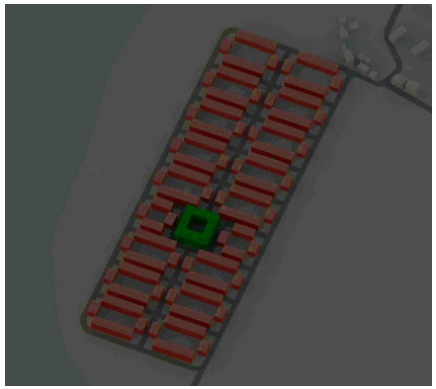
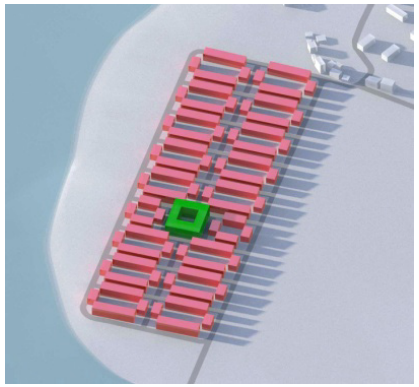
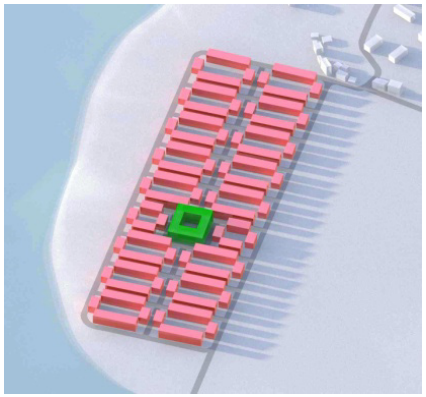
27° 43' 0" N =latitude
Mean Tilt angle- 26.9

Month	Sun Altitude	Array Tilt	Array points to
Jan	43	47	S
Feb	52	38	S
Mar	63	27	S
Apr	75	15	S
May	83	7	S
Jun	86	4	S
Jul	83	7	S
Aug	75	15	S
Sep	63	27	S
Oct	51	39	S
Nov	43	47	S
Dec	40	50	S

http://www.alternate-energy.net/sun_insol_mps04.html



Solar Study

	Solar Solstice	Winter Solstice	Spring Equinox	Fall Equinox
12:00PM				
3:00 PM				
6:00 PM				

Appliances	Watts	Hrs used/day	Watt hrs/Day
	7X10	8	560
	75	6	600
	30	6	180
	200	3	600
	75	2	150
	1000	15mins	250
	750	1	750
	500	1	500
		Total Watt	3590W

Steps for sizing PV:

1.Energy used per day= 3590WH

2. Adjusted load to account for system losses
= (WH/day) X 1.5= 5385WH

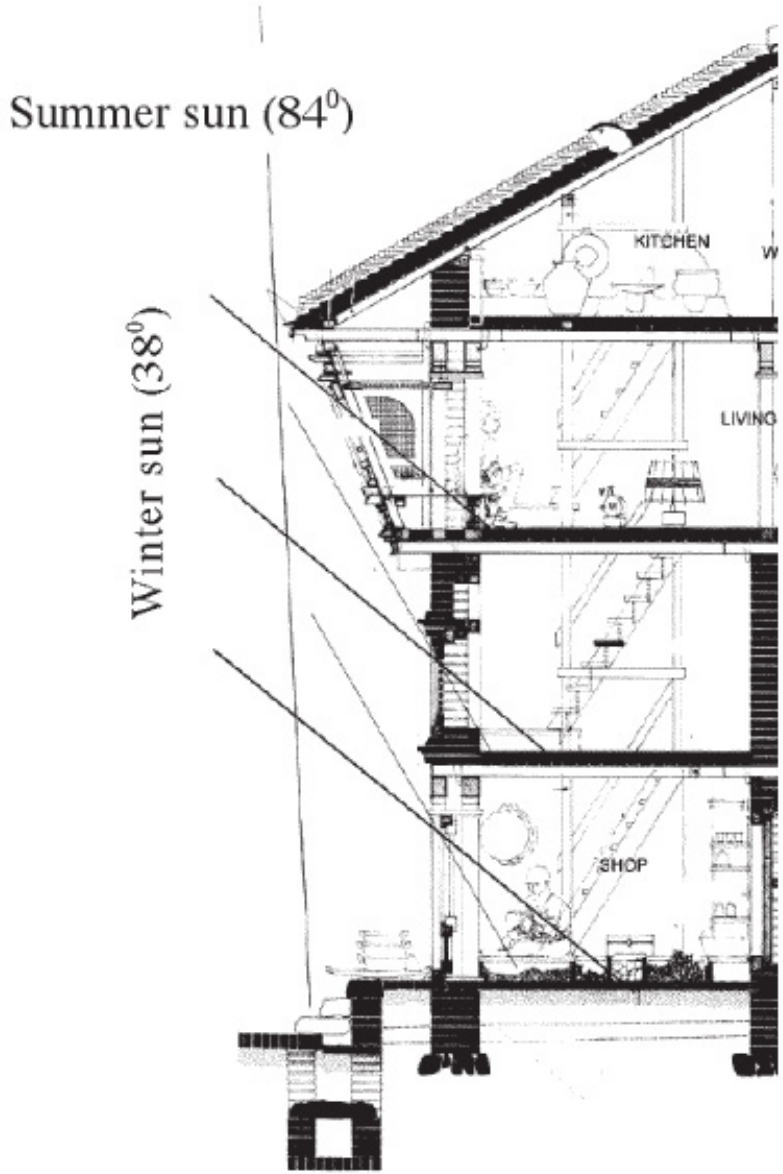
3. Number of sun hours= 6

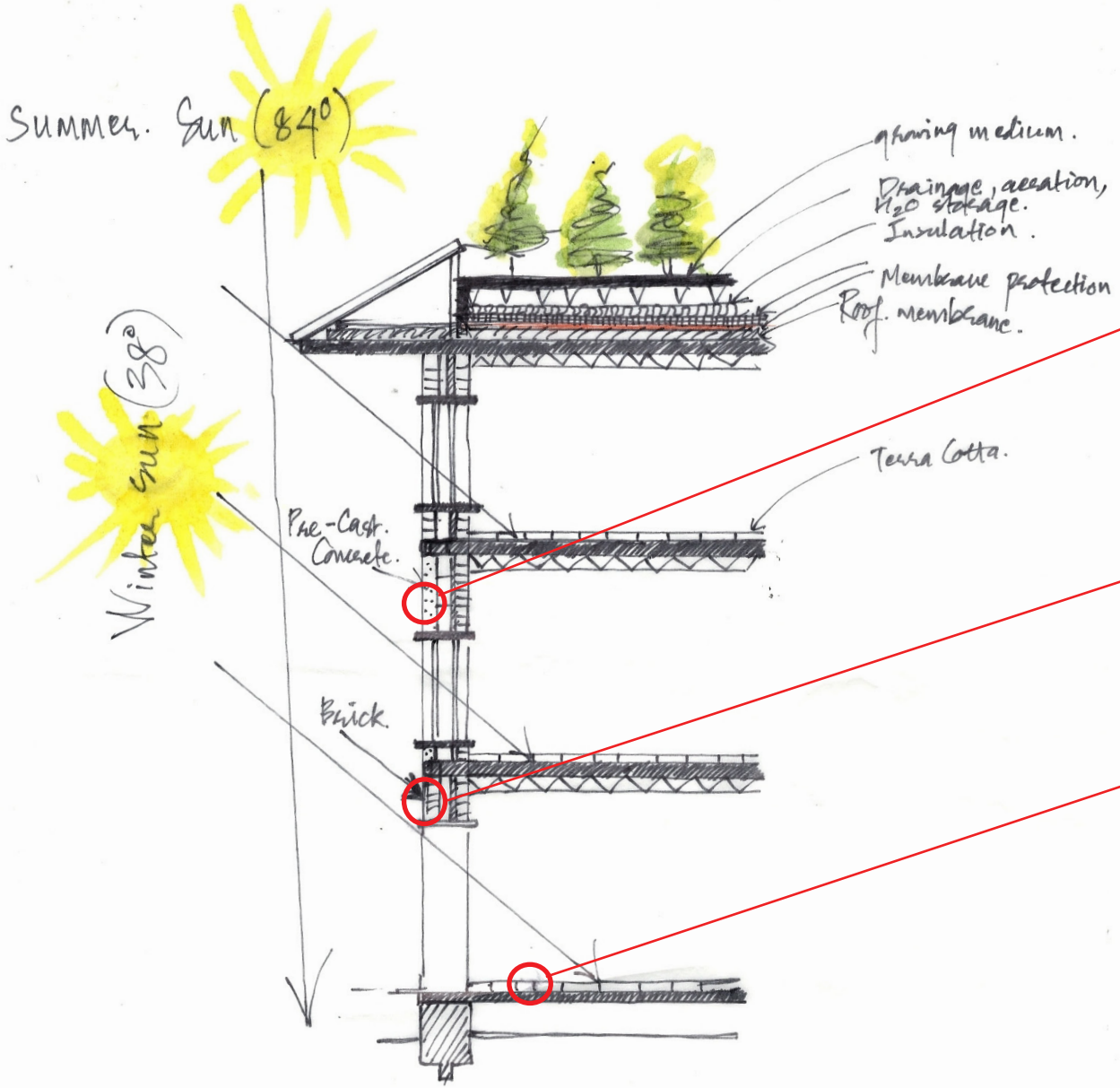
4. Required peak watts (Wp) = Adjusted load/ sun hours = 897.5 Wp

5.

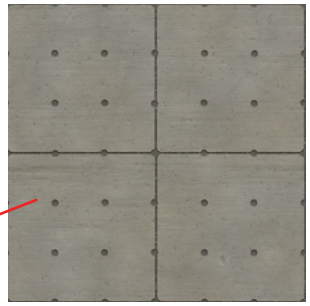
a.Divide Wp by 12 for single crystal silicon cells =74.79 sq.ft

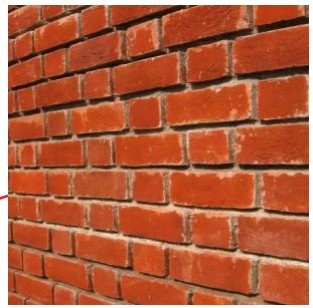
b.Divide Wp by 8 for amorphous silicon cells =112 sq. ft

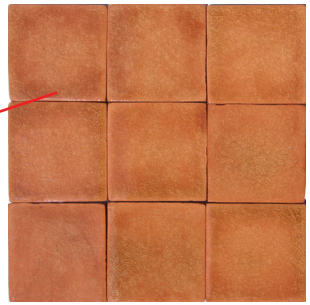

Summer sun (84⁰)
Winter sun (38⁰)
KITCHEN
LIVING
SHOP



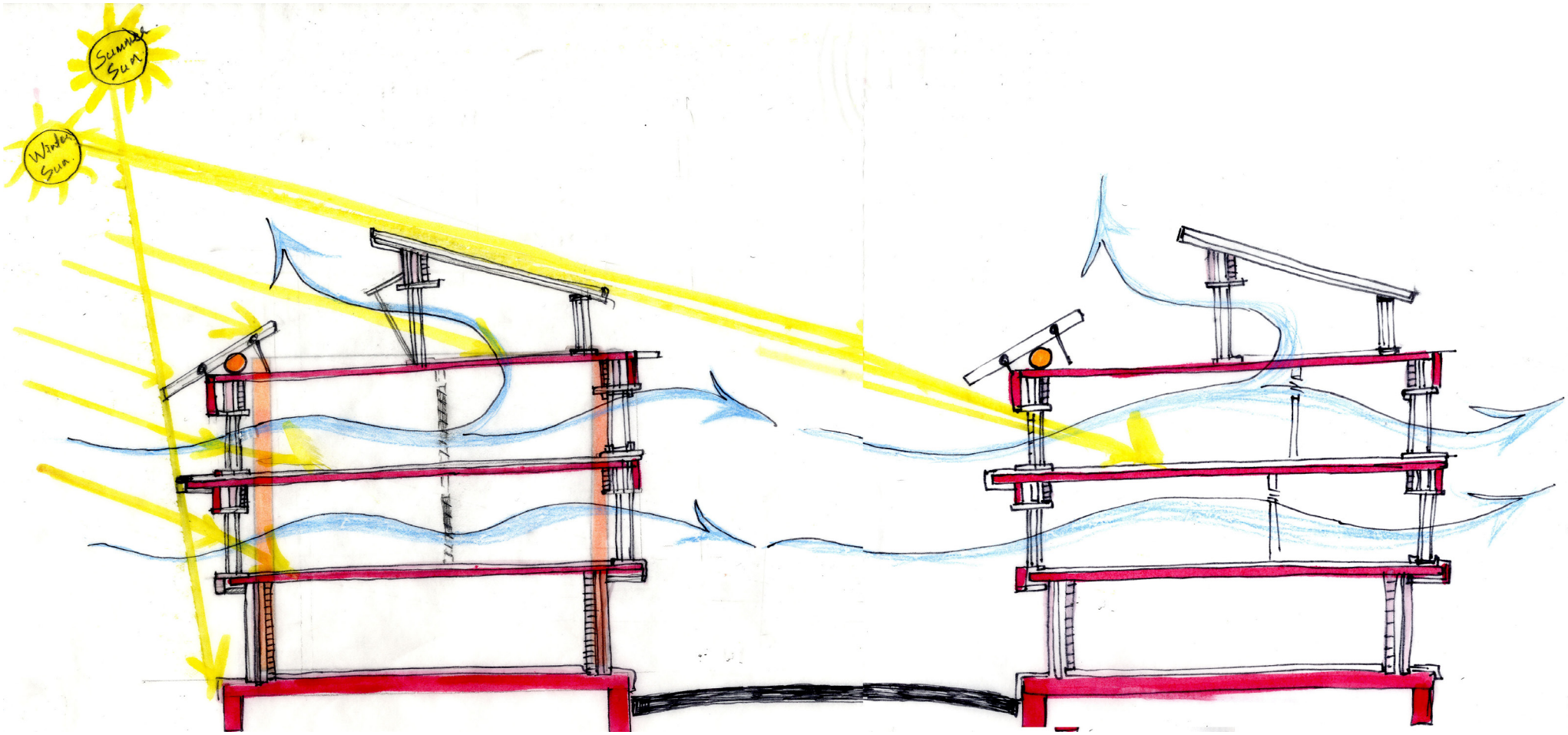
Local Materials



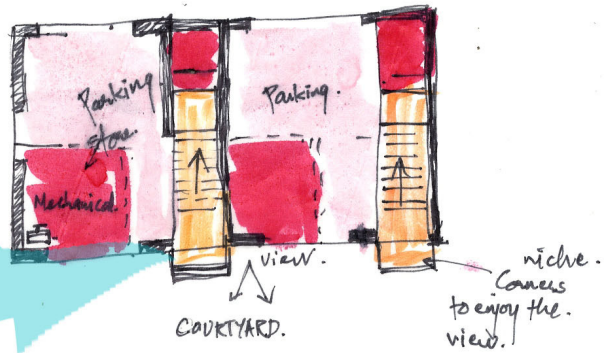




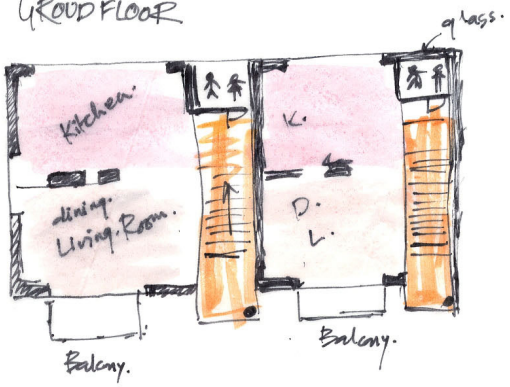
Passive design:



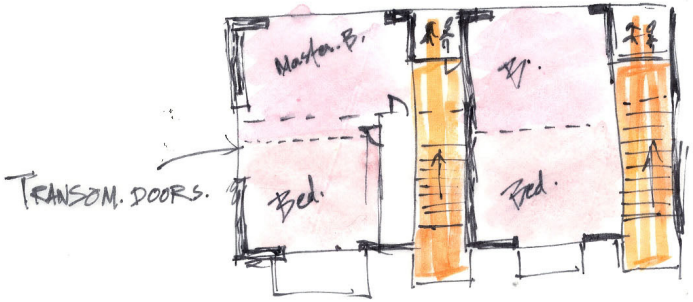
STREET VIEW



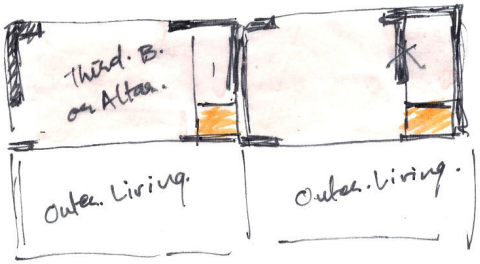
GROUD FLOOR



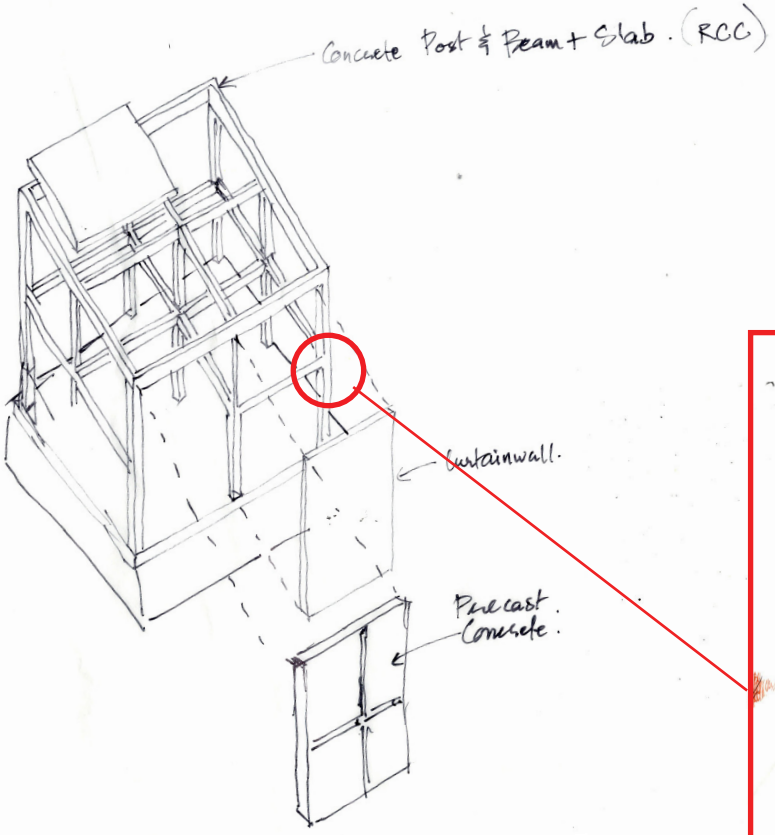
FIRST FLOOR.



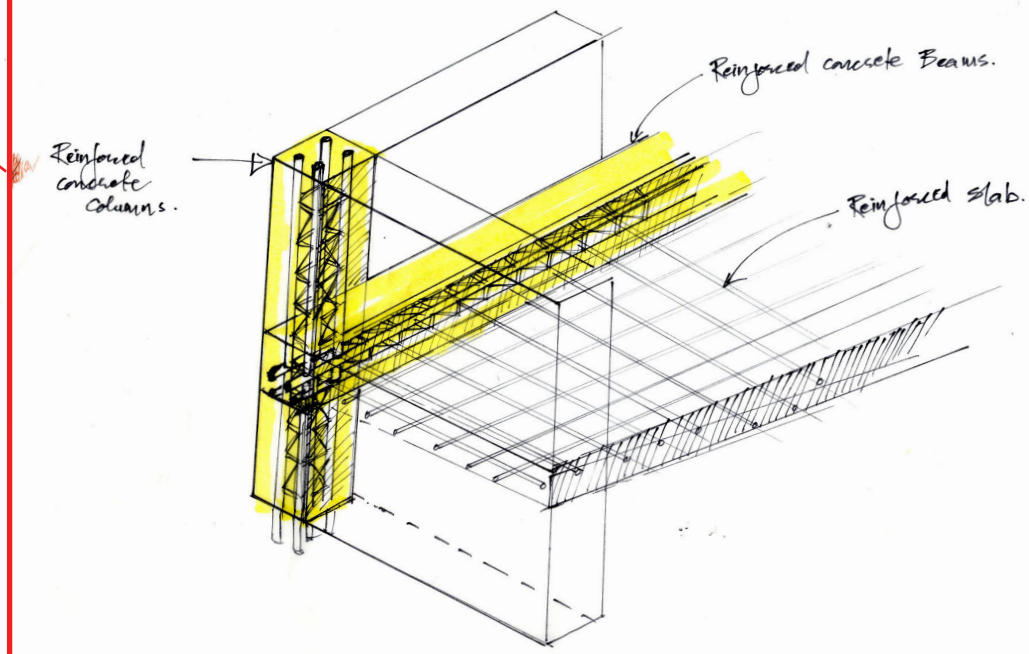
SECOND FLOOR.



THIRD

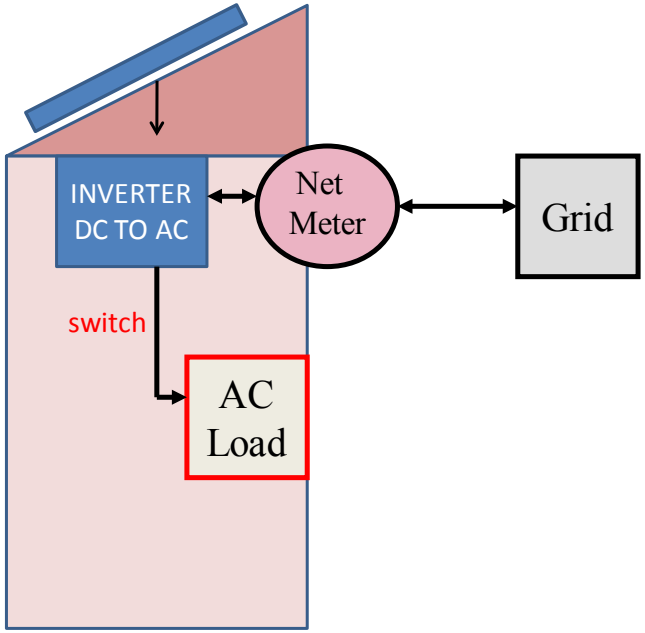


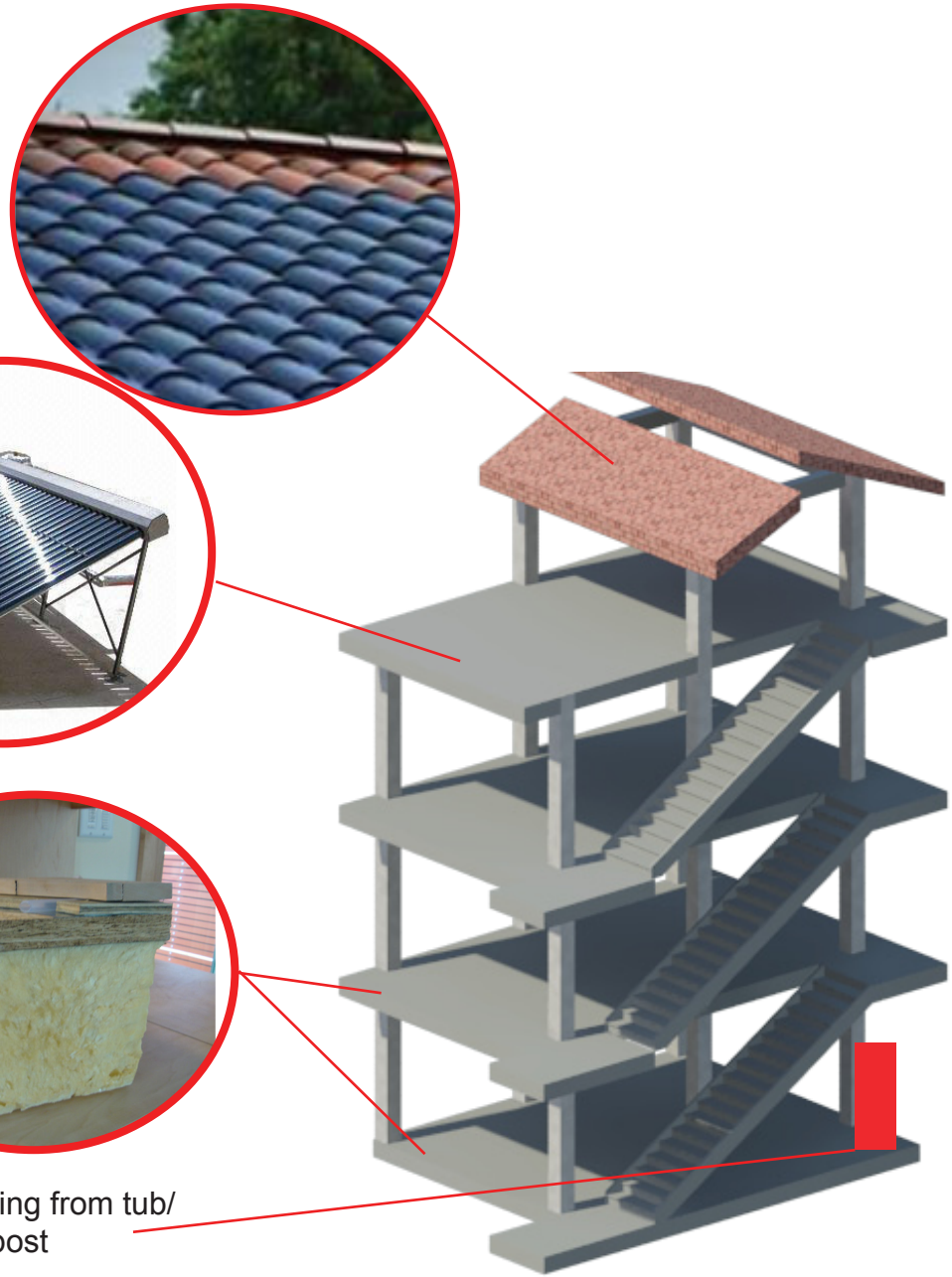
SEISMIC DESIGN: Reinforced Concrete colum, slabs & beams.



Sustainable strategies/Active systems

Rainwater Harvesting





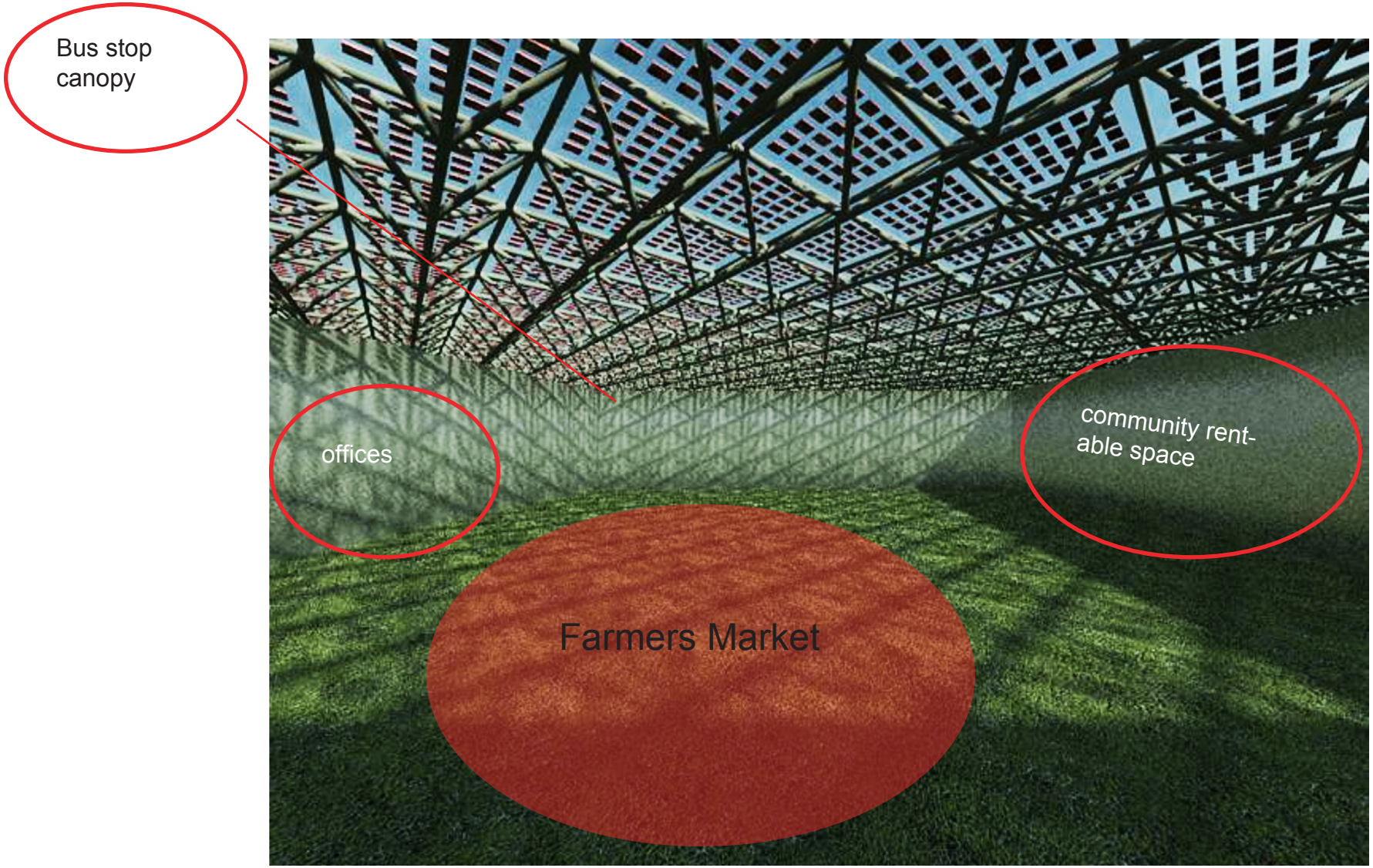
Grey water recycling from tub/
shower/sink/compost


Peach


Plum


persimmon

Community space



Bibliography

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civil homes. (n.d.). Retrieved from http://www.civilhomes.com/index.php?link=phase&phase=IV&home-type=apartments

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Special thanks to Dr. Doug Schulz