.E-CO-HOUSING.

CASE STUDY:

A LOW-RISE APARTMENT FOR NEW HABITATION IN CHIANG MAI

SIRINPAT KUTTIKUL

MASTER THESIS AT
CHALMERS ARCHITECTURAL SCHOOL
MASTER PROGRAM IN ARCHITECTURE: 2012

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BY

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EXAMINER

MORTEN LUND

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.Abstract.

In an aspect of apartments, The Ecological Housing Projects are currently used anywhere. However, the idea to relate the benefits of habitants with social relationship has not grabbed enough attention yet. So, E-Co-Housing is a theme regarding cooperation, communication and community inside the project. This theme can be applied to many places, depending on there the project is mainly located.

This Thesis has a case study in Chiang Mai, northern city and second capital of Thailand, which is facing significant challenges in order to meet project housing demand. Planning legalization and rising land cost have contributed to the difficulty of delivering an effective range of housing choices. Most of the projects in Chiang Mai are more related to the profitable purpose than quality of life of residents.

Thesis aim is to propose the balancing ideas of living qualities from local architecture – Lanna Architecture; Northern Thai Vernacular Style – to contemporary styles. In addition, it aims to solve the housing problems from which mainly focus on commercial purpose in order to become beneficial for customers in term of self-suffiency and flexibility.

In order to facilitate the transformation of architectural form into the combination between local to contemporary style, the following topics are examined: main features and spatial qualities of Lanna Architecture, social activities, social organization, climate adaptation, sustainable technologies and planning legalization. In process, first mainly focusing in vernacular architecture by investigating life and tectonic structure,

which found in the space organization and technical in climate adaptation. These factors are developed with second part; social living, site planning and regulations.

An apartment low-rise for new habitation in Chiang Mai is a new home, new community in the future, an upgradeable housing solution which is emphasize on social life, inhabitant living qualities and environmental awareness.

.Acknowledgement.

On behalf of the Sievert Larsson Scholarship holder 2010, I would like to first and foremost express my profound gratitude to Mr. Sievert Larsson, for his encouragement to the Thai students. So, I can continually study in master program aboard here in Sweden. This scholarship fund within Friends of Chalmers; Chalmers Technology University.

Secondly, I am heartily grateful to the advisors team in MSS; Matter Space Structure Studio - Mrs. Anna Nilsson, Mr. Fredrik Olson and Mr. Claes Johansson – and my examiner, Mr. Morten Lund, for their continuous support, motivation, patience, enthusiasm and supervision throughout the research. Their guidance enabled me to complete this master thesis successfully. I could not have imagined having a better supervisors and mentors.

I sincerely grateful to Ph.D. Rawiwan Oranratmanee ,for suggest an idea of the housing in Thailand, especially in Northern region, Chiang Mai, Thailand. My sincerely thank you to Mr. Purin La-Teja for his encouragement, motivation and supervision during my experimental design stage. Sometimes I might got stuck and depressed. However, in shortly discussion with people who has experiences, I had got many ideas and my project could constantly proceed.

Finally, I owe my deepest gratitude to my parents Mr. Kangtapong and Mrs. Sarunrat Kuttikul and my uncle, Mr. Mongkol and Mr. Pracha kuttikul, for their love and support throughout my life. I would like to thank you my sister and Ms. Thanchita Pankong who always gives me the moral encouragement. Without them, my master thesis would not have been possible.

Sirinpat Kuttikul

Introduction and Intention

Chapter 01

.Introduction and Intention.

_The Theme: E-Co-Housing

During finding out a Master Thesis topic, I am interested in Residential issues and Sustainable thinking especially Ecological Housing. When coming into the topic, however, I found many directions in Ecological Housing depending on what we are interested; saving energy or materials and etc., I personally focus on social agenda in how people living harmoniously in between natural environment and architecture.

By this idea in the apartment aspect, the circulation designs are mostly crystal clear in between public and private. Moreover, these circulations in comparison of single family house and neighbors nearby are totally different. It is not only put the green area into buildings but also the possibility to access and meeting from surrounding nearby.

I mainly focus on the social benefit of the habitants in architecture. From Ecological housing to E-Co-Housing; the architectural works in regarding cooperation, communication and community inside the project. The E-Co-Housing is a theme which could be applied to many places, depending on there the project is mainly located.

.E-Co-Housing.

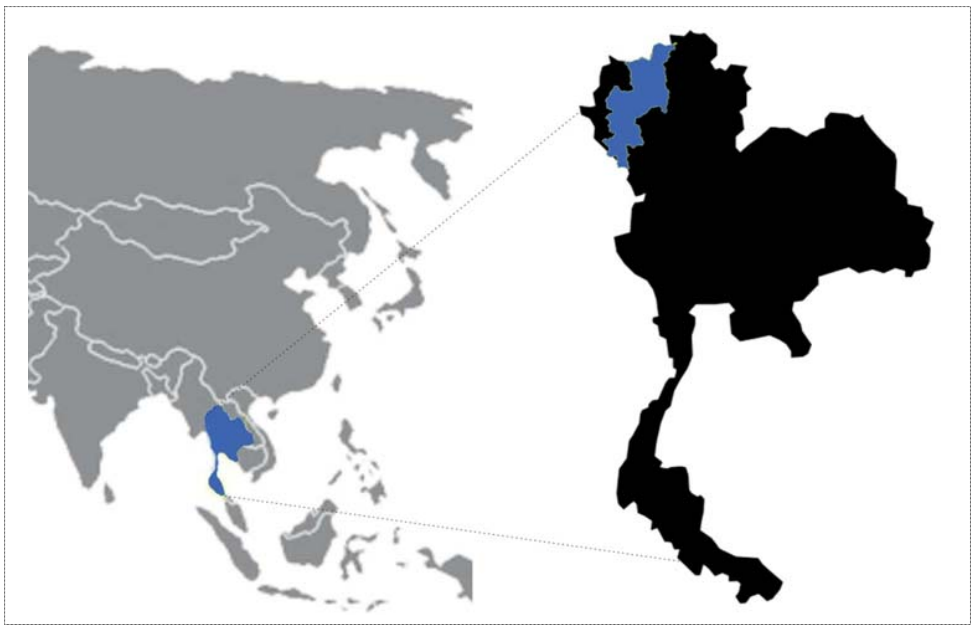
+ ECOLOGICAL THINKING + ECOSYSTEM + ECONOMICS
+ COOPERATION + COLLECTIVISIM + COMMUNITY + COMMUNICATION
+ HOME + HOUSING THEORY + CULTURAL HOLOSTIC

T01| Table shows the meaning in E-Co-Housing Theme

_A Case Study: Chiang Mai, Thailand

In meaning of the Theme, there is inevitably involved in culture and sense of the place. In order to manipulate to architecture, designers should clearly understand “THE SITE” (Case Study); local culture, the site existing and surrounding. Therefore, I personally want to apply the theme in Thailand; my home country. Moreover, in northern region there is the highest statistic of expanding cities particularly Chiang Mai; Thailand second capital.

There is crucial issue in Urban Planning and Architectural style in Chiang Mai. Because of Chiang Mai is the northern touristic city, lots of apartments and hotels were constructed to the place. These have been effecting to the city scenery and local architecture.

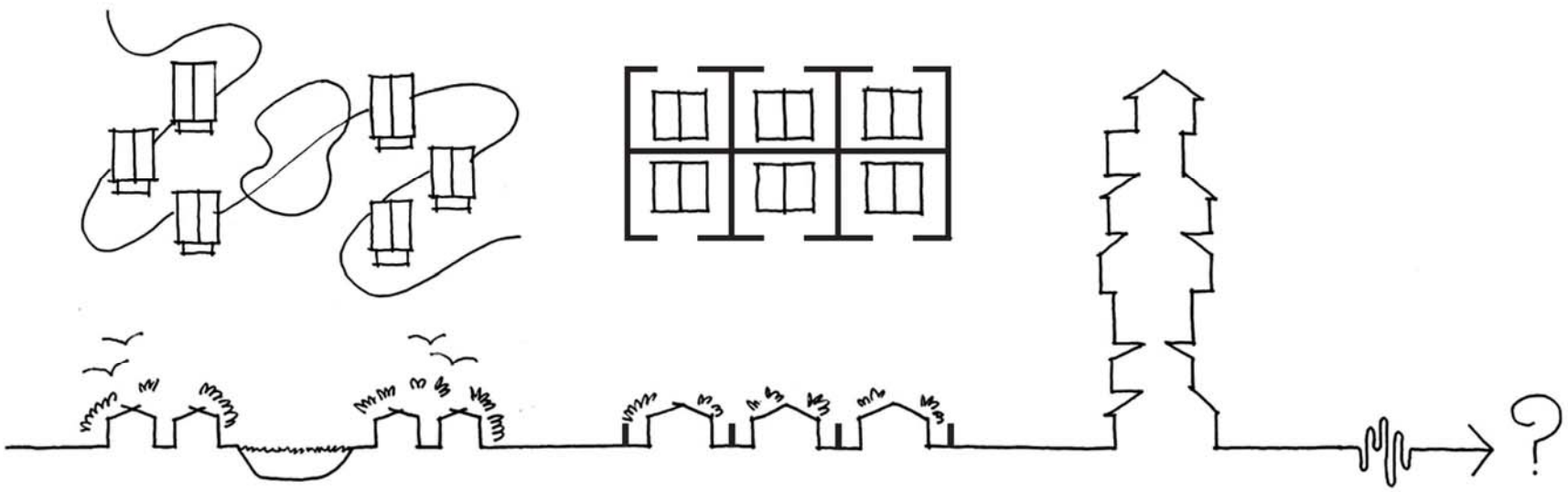


P01| Picture shows where the Chiang Mai is located in Thailand.

_Issue

"HOME" there is many senses of feeling including lots of memories and experiences when we talk about. In the other ways, Home is objective as the living space and is the architecture. In my opinion, Home is not only the place but "**Home is the Life**", warmth and very personal space for the residents.

However, when the time changes the housing styles and life styles has also already changed. In Thailand, The second capital which has been in the situation is Chiang Mai. In the past, in Thai culture we were living in the big community, either in LANNA Architecture (Northern Thai Architectural Style) has big common space for everyone in the community. Specifically, in the house area also has the space for neighbors and family. It is **the collective culture**; there isn't clearly boundary from house to house, we lived as the generosity. People can walk through the common space of each house. In 30 years ago, when many families expanded, original housing style had developed to specific areas; new community of fence to fence, block by block. However, there had some area which people could see the neighbors nearby. Nowadays, the housing is expanding in vertical. The living style is wall to wall, a personal space is the area inside the apartment only. People live as individually, the social culture change to **Individualism**. Living in the space as wall to wall, this is the proper living quality in the apartment?



PAST
Living as Collectivism

30 YEARS AGO

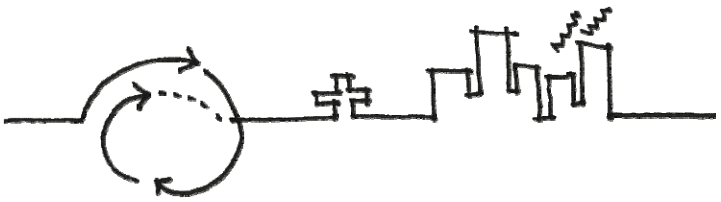
PRESENT
Living as Individualism

FUTURE

Is it possible for the architectural designs to provide residents the better living quality and the environmental awareness?

_Aim

Propose the better of living quality and solve the housing problem in Chiang Mai, Thailand by using architecture which reflects sustainable principle idea and promote local E-Co-living styles; holistic idea of E-Co-Housing which regarding **living quality, domesticity and sustainability.**

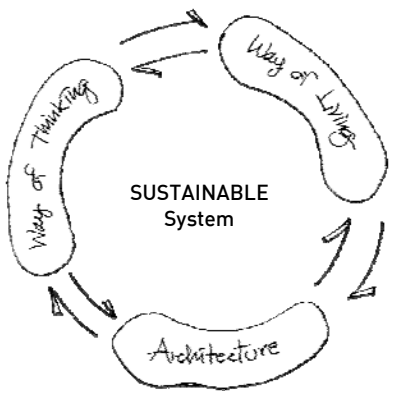


SUPPORTIVE
E-Co-Living Style

SOLVING
Housing Problems

_Hypothesis

Architecture has continually involved with Human being, Culture and Ways of living. So, **if architecture has affected to the way of living, the architectonic and spatial housing designs could help in the reflection of new habitation eco-living styles**; more connection, more generosity.



_Objectives

- Objectives of Doing Master Thesis

1. Studying and design architecture for Thai people in concerning to Thai traditional living, Culture and Thai history which promote E-Co-Living styles.
2. Studying and design housing which is not only sustainability but also encourage the ways of living in ecology awareness.
3. Studying and knowing how to apply local materials and tectonics to the contemporary architecture.

- Objectives of the Project

1. For having an E-Co-Housing simple guideline which could be one of the other choices for the future sustainable housing in Thailand.
2. For solving housing problem in Chiang Mai, Thailand from demanding to sufficiency
3. For having the architecture regarding Thai people and Thai living styles by applying spatial areas and materials.
4. For showing the future living possibility could be successful in convenient and sustainable.

_Outcome

Personal goal with my master thesis is to change the perception of the living place, the way of living and to solving Chiang Mai housing issues; Architecture of Future Living – Sufficient, comfortable and sustainable- is a better choice for merging space, including way of thinking and living at once from Housing to Living styles.

It is not only the house but it is our home. A low-rise apartment is a proper case to start, by using the spatial design conform to Thai living. The architectonic outlook is mixed international but still Thai style; materiality, space and landscape design.

_Keywords

E-Co-Housing, E-Co-Living, Sustainable Living, A Low-Rise Apartment, Chiang Mai Housing

- **E-Co-Housing** : The architectural work which is more focusing not only the ecological issues but also in the social agendas; living quality of residents, local culture and community on location**.**
- **E-Co-Living** : The Living Style in which people perceive self-sufficiency. Living harmoniously with the nature and the culture of their own.
- **Individualism** : The habit or principle of being independent and self-reliant, a social theory favouring freedom of action for individuals over collective or state control.*
- **Collectivism** : The practice or principle of giving a group priority over each individual in it.*

* Oxford Dictionary Online : http://oxforddictionaries.com/definition/english

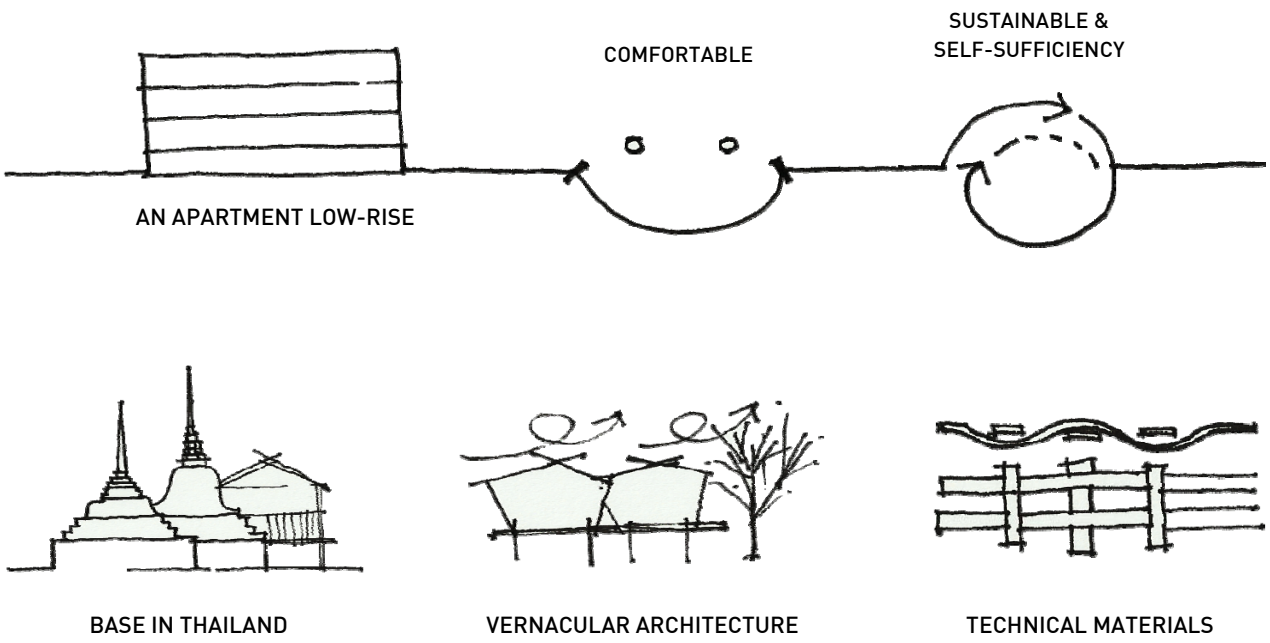
_ Criteria

- Objectives of the Project

A project should merge with the city skyline. In Chiang Mai, there is controlling of the building height. So, I concern to design as an apartment low-rise with the comfortable and sustainable ideas.

- Objectives of Finding Information

The criteria of the Information are base in Thailand specifically in Chiang Mai. Intensively studying in vernacular architecture which is called Lanna Architecture (Northern Thai Style) and technical materials. Seeing how local material can be applied to the project.



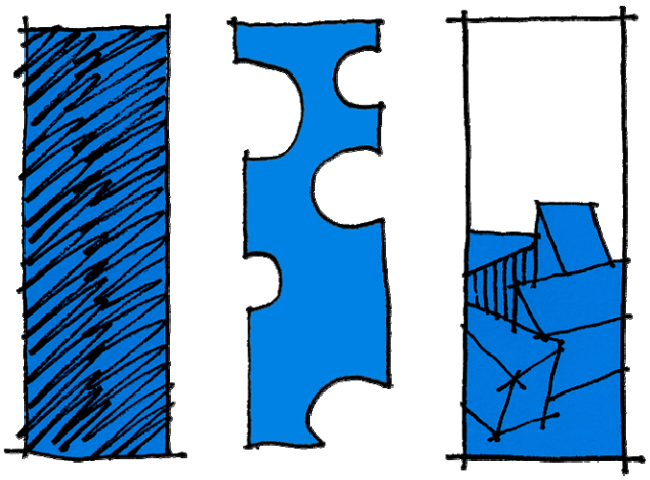
- Objectives of the Research

  - Studying Chiang Mai geography seeing how the landscape look like, also the micro climate which affect to architecture.
  - Studying the culture, history of Thai and Thai architecture in relate to the ecology system, seeing how I can properly develop space to functions.
  - Studying example of sustainable housing in terms of the systematic management; building space and materials.

_ Research Methodology

- Collecting Data Phase

- Studying the data base of Chiang Mai geography both in landscape and micro climate to understand the living culture; why and how.
- Studying the culture, history of Thai and Thai architecture in relate to the ecology system, seeing how people live in the past and how I can develop the proper functions for present.
- Studying the Methodology in Original Thai Architecture for understanding in the meaning of space; in relate to the nature. The Thai traditional wisdoms can develop to the design frame in my project.
- Studying in the ways of living in terms of sustainable in the past, seeing the positive and negative points.



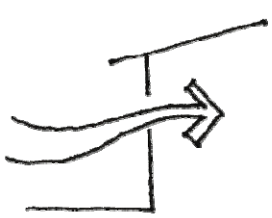
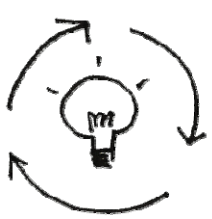
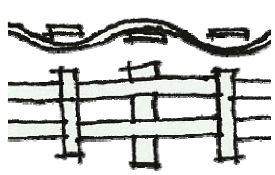
- Evaluation and Analysing Data Phase

- Analyzing all the collecting data; seeing how they relate to each other in the holistic view.
- Dividing the distinctive and interesting topics for specific analyze. Comparing the similar topics and extract the outstanding points which are important for design.
- Making the conclusion of all data and analysis result for setting the design frame, having an image of the site. Which area will be my location for the E-Co- Housing?

- Planning and Design Phase

- Build up the conceptual design from the conclusion of analysis result and making the diagram for comprehension.
- Finding the location for the design project; site analysis
- Studying the lay-out of building plan and form of building, this should be merge with all analysis result
- Making the preliminary design to the design stage; with tutor and supervisor.
- Design development; keep the feedback to final production
- Making final production and preparing for the final presentation

_ Case Study for Design Project

+ Case Study in Architecture	+ Case Study in Sustainability	+ Case Study in Materials
How does it look in architectonic? : Space, Composition and Void Techniques **How does it conduct the circulation?** : Flowing direction, Lighting and Ventilation 	**What a main system is applied to the building and how?** : Recycological Thinking, Water Recycle and Relationship between Comfort Level and Performance Ability 	**What kind of materials are used and how?** : Apply Techniques and Price **Which parts of building are using these materials?** **:** Façade, Corridor or Interior 

_ Stockholders

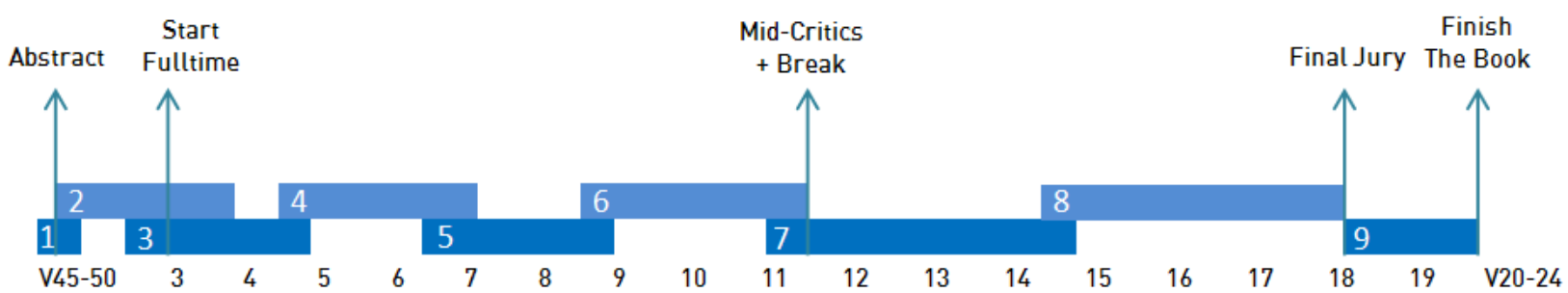
+ Personal	+ Main User	+ Outside
Me : What do I have (knowledge) and what do I have to investigate more? **My family and friends** : Energy, Motivation and Local opinion and ideas from close relationships	**Inhabitants** : What is a home in their minds? : What do they need? What kinds of space do they like? Making the interview of people for extracting the core ideas. **Workers** : What is the good working atmosphere in their minds?	**Investors** : What are they think with E-Co- housing? , It is worth to invest? : How can I find the compromise way from users and investors **Environmentalists** : In terms of sustainability what do they think about my project? : What do I need to focus or added to the project?

+ The Knowledge banks		
Chalmers (with my tutors) : Feedback, Motivation, Credibility and Connection **The fellowship** : The students who have done project before and have similar or interesting topics. What could they give me? Experience, Advice, Motivation and Connection	**Architects and Urbanist** : What are they thinking in terms of practical project in the future? : Is my project will help to manage the urban planning? Guidance, Feedback, Energy, Motivation and Connection	**Government** : Is government has a policy for future housing? What are the ideas? **Municipality** : What are the main problems that they want to solve with housing? What do they think about Eco-Housing? I will collect all data to see the core requirements and develop to the project.

_ Schedule

Timetable is a key which lead to final production. My commitment is to finish the Master Thesis on time without stress.

1: Formulating the project >> **Abstract**
2: Exploring >> **Inspiration, Research, Methodology, Inspiration, Participation**
3: Programming >> **Requirements and Conceptual for Design**
4: Concept development >> **From Statements to Approach**
5: Preliminary Design >> **First Draft**; get feedback and develop more
6: Design Project >> **Design building**; planning for final production
7: Project development >> **Design Develop** to final design
8: Visualizations >> **Final Production and Models**
9: Improvement and Report >> **Making The Book**



Week		Process
V 45 -52 (from 2011)		**ABSTRACT AND RESEARCH** First draft of Abstract Chiang Mai: History, Culture and Architecture Lanna Architecture: Form, Space, Elements and Materials Eco-Issues: Eco-friends, Eco- logical construction and Eco-responsibility
V 1-2		**PREPARING** Finish project plans , paper for registration Dummy of the booklet; Font, Colors "Feeling of Presentation" Present former researching
11-JAN-2012		PRESETNT PROPOSAL
V 3-4	(2 weeks)	**PROGRAMMING** Function and area requirements in the building Site analysis; site-ecosystem and facilities, micro- climate Draft master plan and perform concept Workshop; elements and materials (model) Dummy poster
V 5-10	(6 weeks)	**PROJECT: Preliminary and Design Phase** Sketch models and Drawings Planning of units, details and section Presenting a "finish" example for the mid-critics Site model in 1:500
V 11		MID-CRITIQUE
V 12	(1 weeks)	**PROJECT: Development and Conclusion** Recheck comments from mid-critics Designs develop: plan, section, facade
V 13-18	(6 weeks)	**PROJECT: Producing and Visualizations** (WARP-UP) Drawing facade, section, plans and details Building Mode 1:100, Facade model 1:50, 1:25 Rendering: Perspective and Interiors Preparing final poster and oral presentation
V 19		FINAL-SEMINAR
V 20	(1 weeks)	**FINAL RECHECK** Recheck comments from final seminar Preparing oral presentation for public presentation
V 21		FINAL PRESENTATION
V 22-25	(4 weeks)	**FINISH THE BOOKLET**

Chapter 02

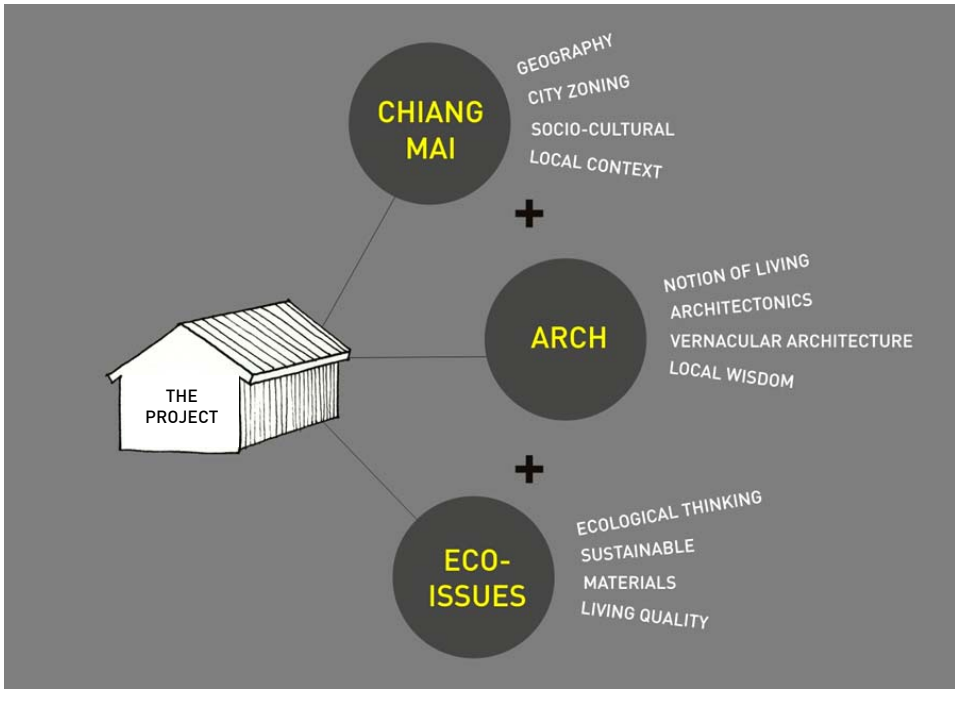
Exploration and Clarification

.Exploration and Clarification.

_The Exploration

I strongly believe in order to design something and to make it looks exceptional; the products should have a sense or a root of the local culture. In Master Thesis, E-Co-Housing has a case study in Chiang Mai. I would rather apply both local in architecture and the cultural living to the building. It isn't the outlook but also the way of living in the space inside the apartment.

The exploration has three main topics; Chiang Mai, Vernacular Architecture and Eco-Issues. In these three topics are properly merged into the project. In Chiang Mai, you will know the shortly information also the figure ground of the city. Vernacular Architecture, in Chiang Mai there is local architectural style called "Lanna Architecture". You will get to know, how does is looks in Lanna architecture? Including the main features and the way how I transformed to the project. As well as, the ecological Issues are the crucial investigation for sustainable ideas in terms of applying to architectural design.



P02| Diagram shows three topics which relate and including in the project

_Chiang Mai, Thailand

Chiang Mai is a case study on my master thesis. It is second capital and also a northern trade center of Thailand. Lately, there is a crucial issue about urban expanding regard to residential density and preserving local architecture.

The city of Chiang Mai was capital of the **Lanna Kingdom**[1] after its founding in 1296 by **King Mengrai**[2] the Great; the first king of the Mengrai dynasty. It was established same time as the Sukhothai Kingdom establishment. From then, Chiang Mai province was not only became the capital and cultural core of the Lanna Kingdom, it is also the centre of Buddhism in northern Thailand till present days.

The urban planning was influenced from Sukhothai Kingdom. There is an old wall in rectangle shape, surrounded by canals. In the moat; area inside the wall, there are lots of temples which still remain ever since city was founded. So, nowadays, Chiang Mai is the only one city in Thailand can fully call as; Living Ancient City.

Because other provinces in Thailand, even they have an old city but the area is an abandoned town. A capital district is **Mueang Chiang Mai** which is the same area in the moat including area both side of Mae Ping River[3]. In common understanding, when people are talking about Chiang Mai, they always mean a capital district.

A city is surrounded by mountains because it's located in Chiang Mai-Lamphun Basin. So, wherever you are in Chiang Mai, you always see the mountains. This makes Chiang Mai is the most enchanted province in the northern region.

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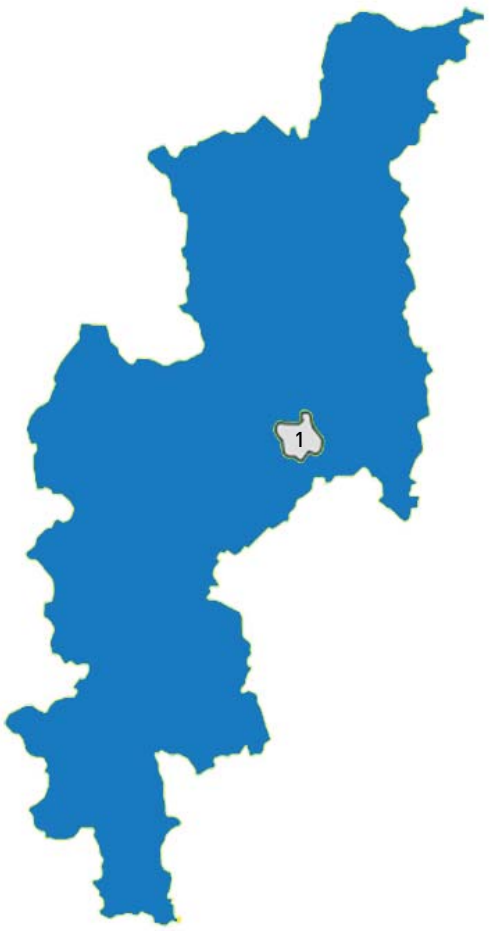
1 **Lanna Kingdom**: was a kingdom centered in present-day northern Thailand from the 13th to 18th centuries.

2 **King Mengrai (1238–1317):** also known as Mengrai was the 25th King of Ngoen Yang (r.1261-1296) and the first King of Chiang Mai (r.1296-1317), capital of the Lanna Kingdom (1296–1558).

3 **Mae Ping River:** is one of the two main contributories of Chao Phraya River. It originates at Doi Tuay, in Chiang Dao district, and is also a main river in Chiang Mai province.



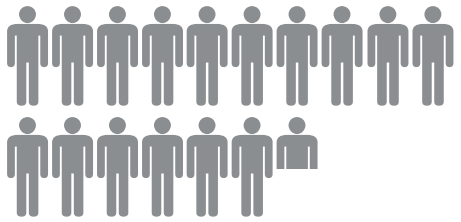
CITY NAME

CHIANG MAI

AREA: 20,107.057 km2

DENSITY: 81.19 people/km2

POPULATION:



1,640,479 people

THE ONLY ONE CITY IN THAILAND WHICH IS CALLED

LIVING ANCIENT CITY

DISTRICT NAME

1. Mueang Chiang Mai
2. Chom Thong
3. Mae Chaem
4. Chiang Dao
5. Doi Saket
6. Mae Taeng
7. Mae Rim
8. Samoeng
9. Fang
10. Mae Ai
11. Phrao
12. San Pa Tong
13. San Kamphaeng
14. San Sai
15. Hang Dong
16. Hot
17. Doi Tao
18. Omkoi
19. Saraphi
20. Wiang Haeng
21. Chai Prakan
22. Mae Wang
23. Mae On
24. Doi Lo
25. Galyani Vadhana

CITY WAS BORN

B.E. 1839

A.D. 1296

IN 2013 THE CITY WILL BE

717 YEARS OLD

AVERAGE TEMPERATURE (°C)

29°

LOWEST TEMPERATURE (°C)

15° IN THE TOWN
0°C ON TOP OF MOUNTAIN

HIGHEST TEMPERATURE (°C)

36°

THE SEASONS

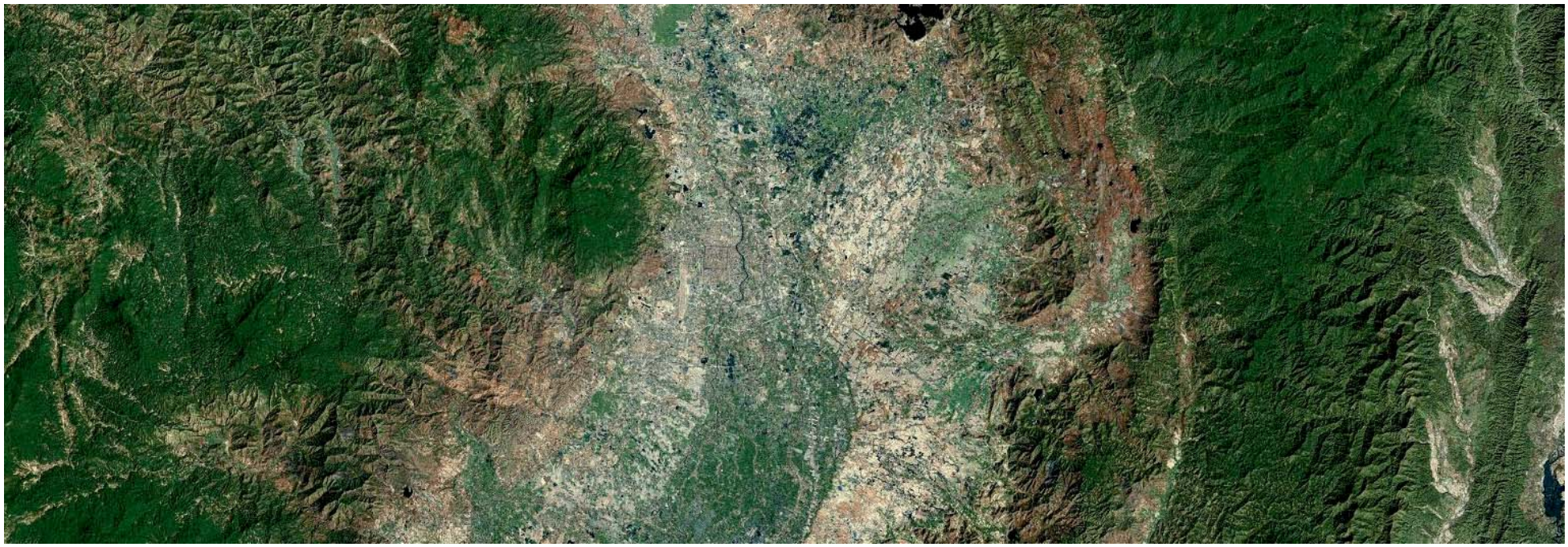
3 SUMMER
RAINY
WINTER

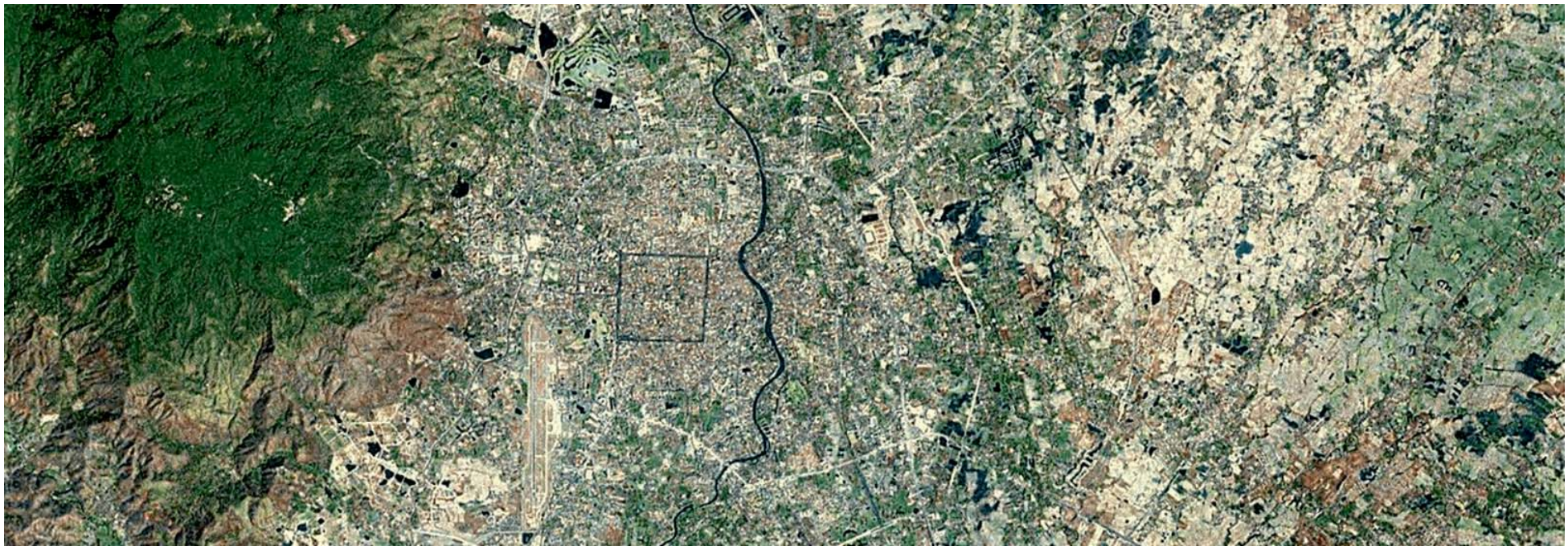
THE DISTRICTS IN CITY

25

CAPITAL
DISTRICT NAME IS
MUEANG
CHIANG MAI

SATELLITE MAPS





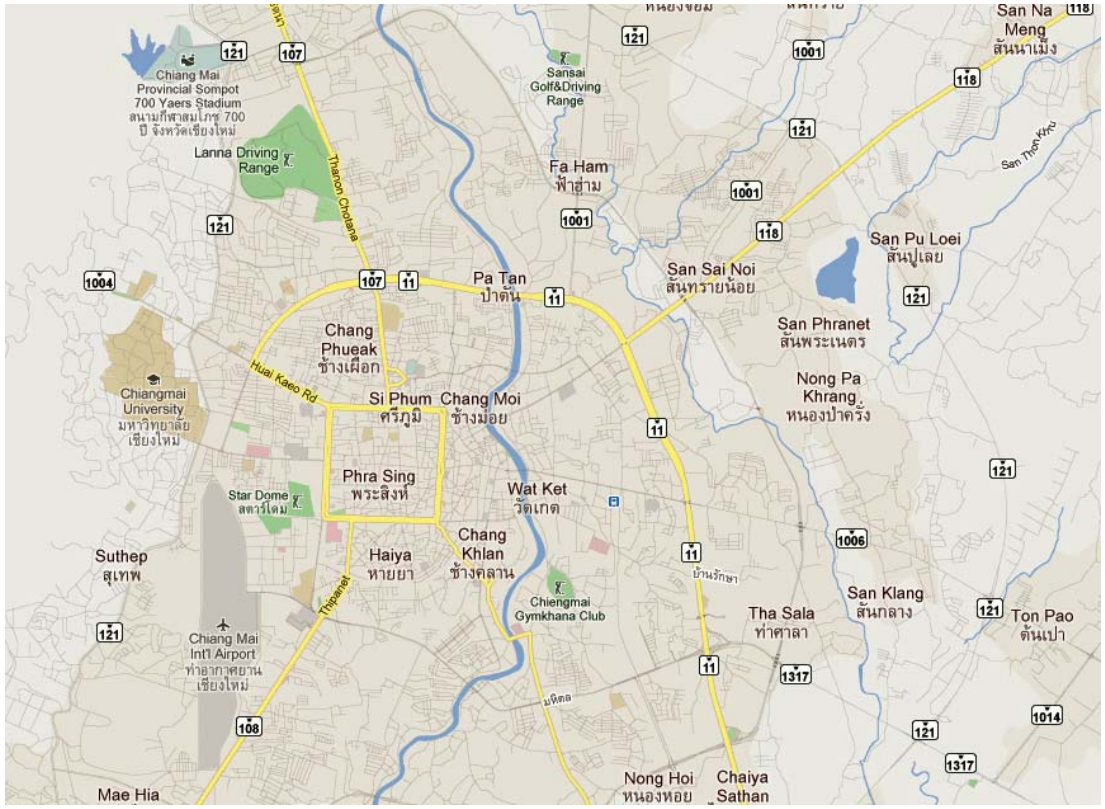
ABOVE

A map shows Chiang Mai – Lamphun Basin or Mae Ping River Basin, where Chiang Mai province is located. In the province, 70% of the area is the mountains only 30% is the area for livelihood and agriculture.

BOTTOM

A capital district: "Mueang Chiang Mai" there is the city old wall in the middle, surrounded by the canals. A main river is Mae Ping River which is the Forest Industry delivery path to Bangkok in 59 years ago (from 2012)

Pictures from www.bing.com/maps/ChiangMai Thailand



CAPITAL DISTRICT NAME

MUEANG CHIANG MAI

AREA: 152.400 km2

DENSITY: 1,768.11 people/km2

POPULATION:

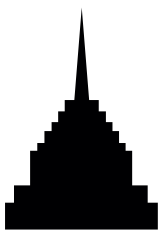
369,460 people

CONSIDERED TO

ONE OF THE MOST SCENIC CITY IN THE COUNTRY

due to its mountain ranges, valleys, flora and fauna.

RELIGIOUS BUILDINGS IN CITY



BRAHMA 3
MOSQUE 13
CHURCH 356

TEMPLE 471

PUBLIC TRANSPORTATION IN CITY

70% RED BUS
20% TUK TUK
10% RICKSHAW

VISITORS IN 2010

2,770,142 PEOPLE

4,343,090 IN 2009
5,313,352 IN 2008

CULTURAL ATTRACTIONS IN CITY

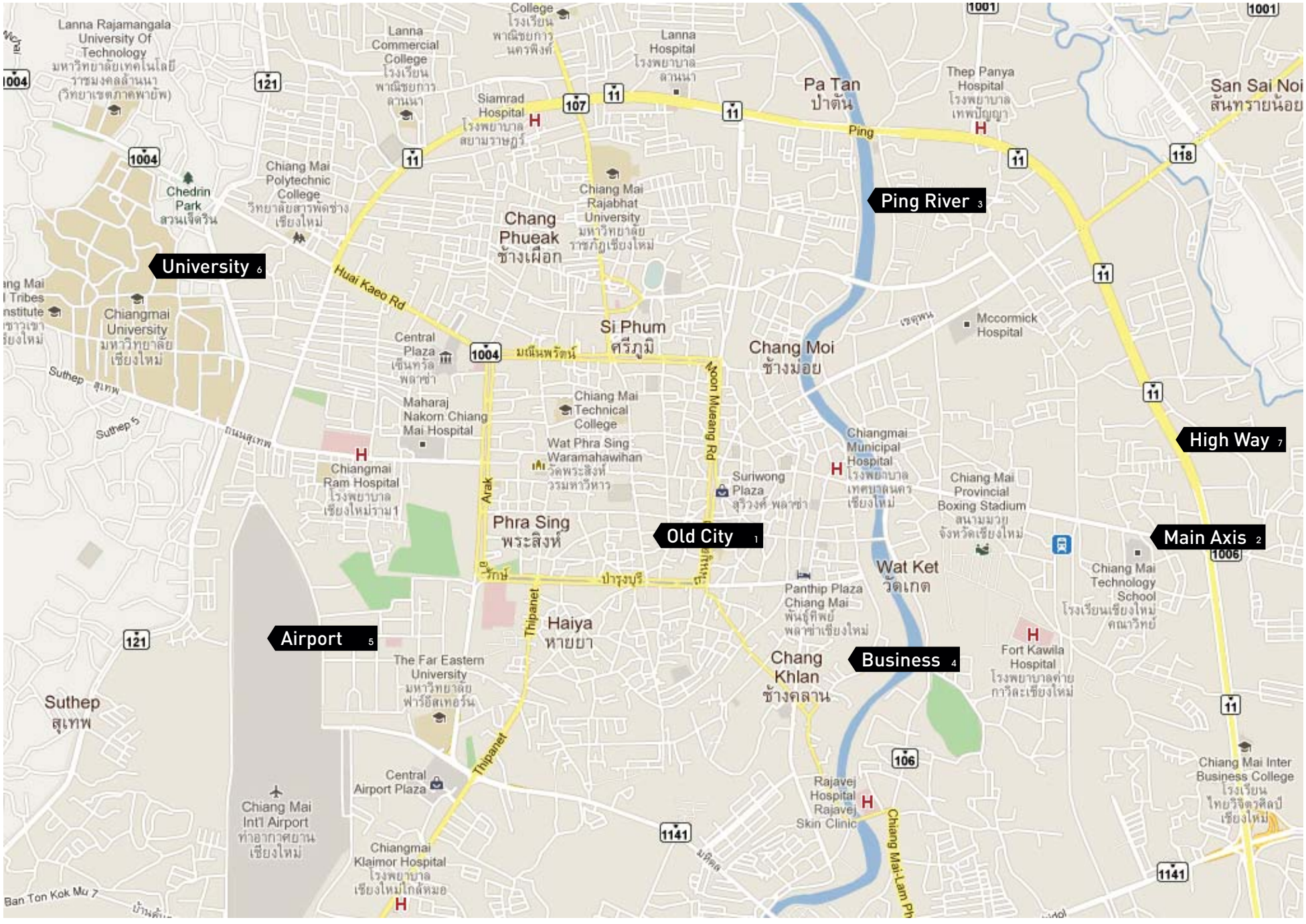
WALKING STREET
EVERY SUNDAY

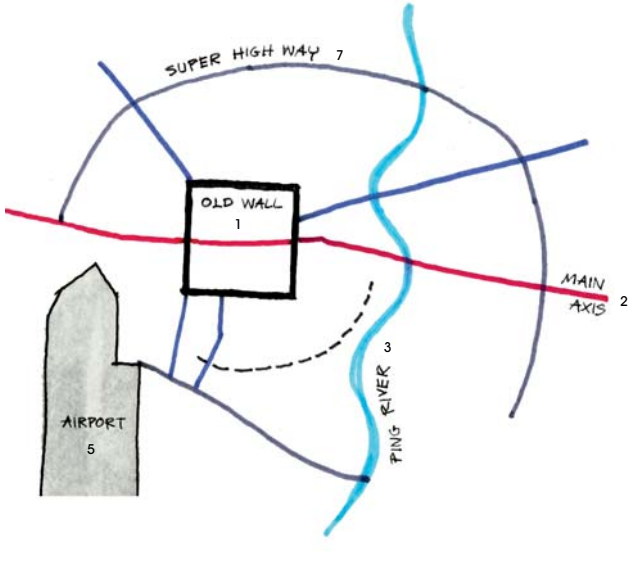
THAI NEW YEAR	IN APRIL
SONG KRAN FESTIVAL	IN MID-APRIL
VEGETARIAN FESTIVAL	IN JULY
LANTERN FESTIVAL	IN NOVEMBER

LOCAL ARCHITECTURE

LANNA ARCHITECTURE

IN THE CITY





THE OLD CITY

Area inside the wall is Chiang Mai city area from 700 years ago, where the city was a capital of Lanna Kingdom (1296–1558) by King Mangrai (r.1296-1317).
In order to preserve the cultural and local architectural style, there is illegal to build any design constructions higher than 9 meters.

PING RIVER

It is Chiang Mai main river where was the economy base for import and export goods. Both side of the river was the markets, wood and tobacco factories.
Today, Ping River is the green scenery attraction place for the tourists.

MAIN AXIS

Tapae Road is the main axis start from the northeast near Ping River, which is directly to Tapae Gate.
In the past, Tapae road is the main economy path way from outside into the centre. During the cultural festival, most of the parades are always happened on this road toward Tapae Gate.

BUSINESS CENTER

Chang Khlan Road is the main business center in present day. Most of the high rise buildings, Banking are located in this area.

Pictures from http://maps.google.com

IN CITY DAY TIME

TAPAE ROAD

A main axis toward in the old city, there are lots of temples and boutique shops both side of the street.
Main public transportation in Chiang Mai is Red Bus.

WAT PHRATHAT DOI SUTHEP

Generally, in the old city there are 471 temples.
However, the most famous one is Wat Doi Suthep.
"Doi Suthep" is mountain's name where a temple is located.
The impressive views of Chiang Mai can be seen and
it a sacred place to many Thai people.

TAPAE GATE

The multipurpose area for exhibitions and
cultural ceremonies, most of the time has been using as
local market every Sunday evening. Behind the gate is
the old city, there are many tuk tuk service for tourists.

THE OLD WALL

There is moat outside along the old wall.
In the past was the protection area from the enemy.
Today is the green belt along the old city.

IN CITY NIGHT TIME

TAPAE GATE

By night, Tapae gate and the square are outdoor entertainment area. It provides the shows all year round. During the summer(Mar-May) is the Songkran Festival and the cold season(Oct-Feb), is the Beer Festival at the square.

SUNDAY WALKING STREET

On Sunday evening, all streets inside the old city will be closed for people. There are lots of cultural entertainments and local markets from people who live in outskirts. It is also the tourist attraction place.

FIREWORKS

It is happened all year round. However, there are two festivals which are the biggest fireworks. Thai New year eve, in the midnight we celebrate fireworks in the temples and Loy krathong or Yi peng on November. The fireworks on Yi peng festival will be located along Ping River.

KONMING LANTERN

Chiang Mai is the cultural city "Konming Lantern" always use during sacred ceremonies. People lid the lanterns in Thai new year on April and Yi Peng festival on November.

SKYLINE

DAY TIME

Even Chiang Mai is Thailand second capital; however, it doesn't mean a city will grow without direction. There are laws to control the buildings and keep the city green as much as possible. On sunny day, the mountains are clearly to be seen from other side of the city. This is the charming of Chiang Mai and so attractive to the tourists.

NIGHT TIME

There are some high-rise buildings in the old city and the area nearby were allowed to build long time ago. So atmosphere by night it looks obviously opposite from daylight. It is because you will see lighting and architectural surrounding instead of beautiful green area.

“ The charming of Chiang Mai is wherever you are,
you can see the mountains.
In order to keep the city skyline,
My building height should not higher than twenty meters.”

OVERVIEW
IN CHIANG MAI

+ BIG CITY BUT NOT SAME AS BANGKOK
+ COZY & BE WITH THE NATURE
+ NATURE & CULTURE

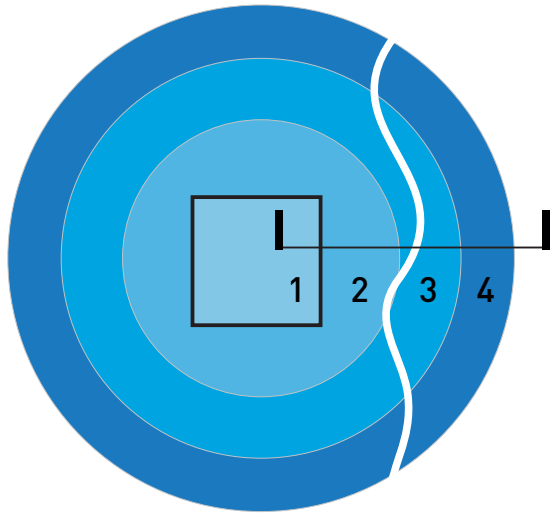
ZONING
IN SELECTED

IN CAPITAL DISTRICT

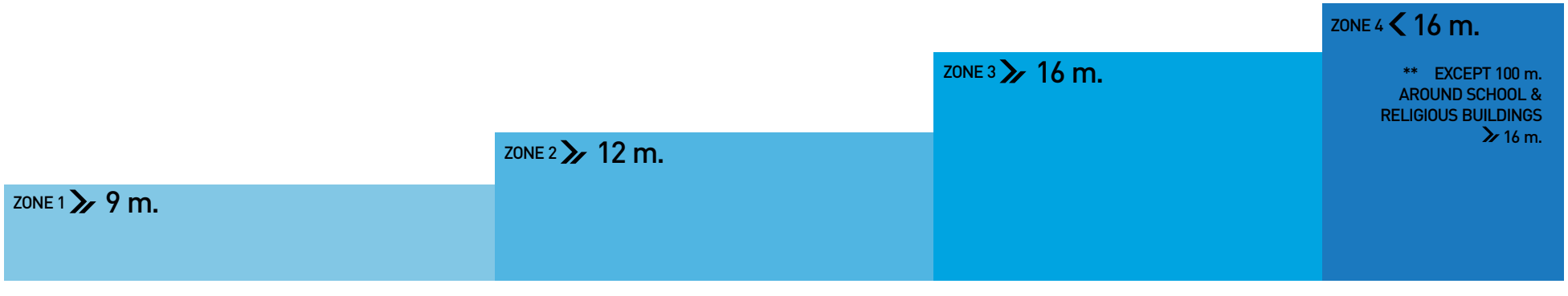
ZONE 3 ≫ 16 m.

** ANY DESIGN CONSTRUCTION IN AREA OVER 100 m. AROUND SCHOOL & RELIGIOUS BUILDINGS

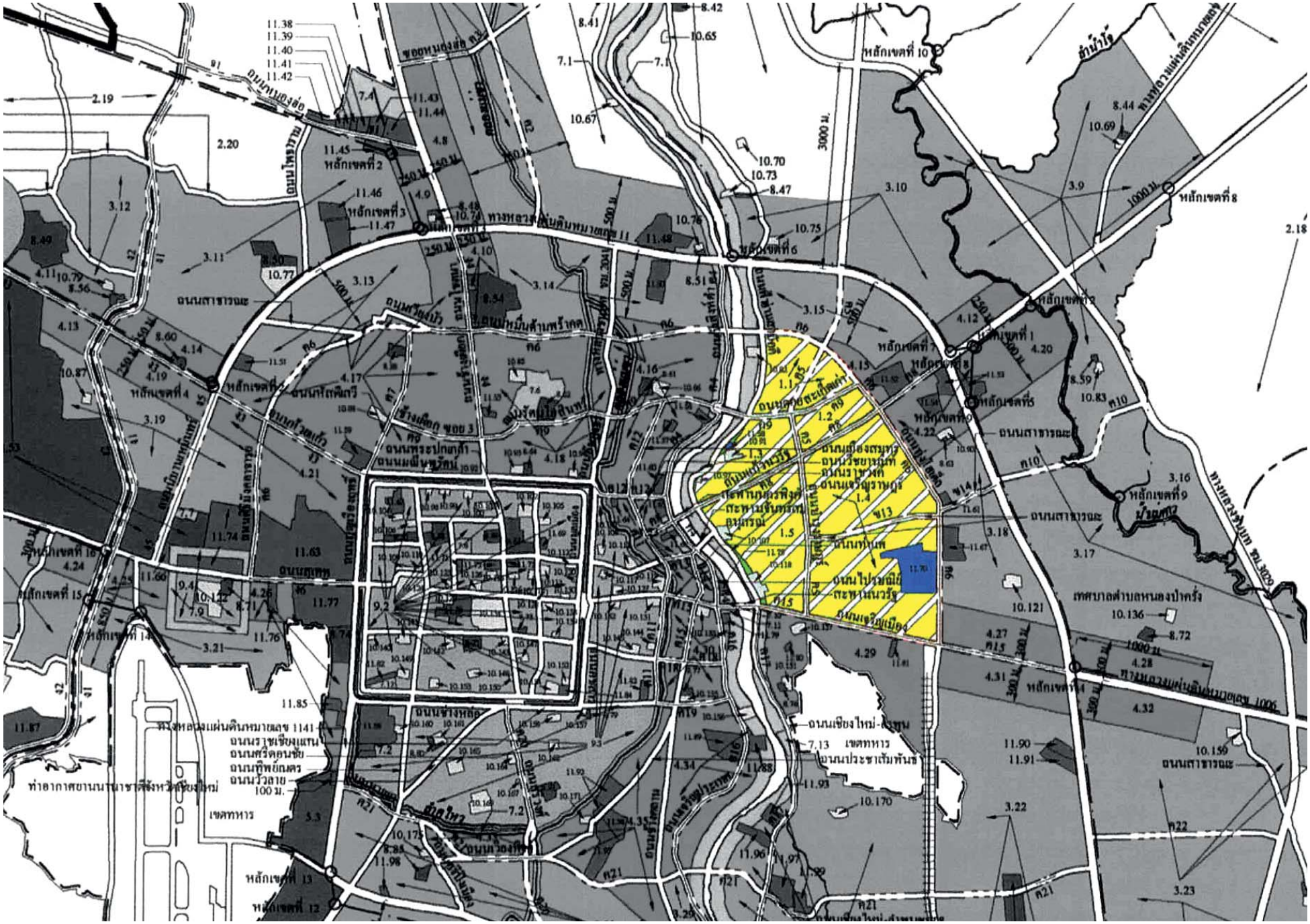
COULD < 16 m. BUT ≫ 20 m.

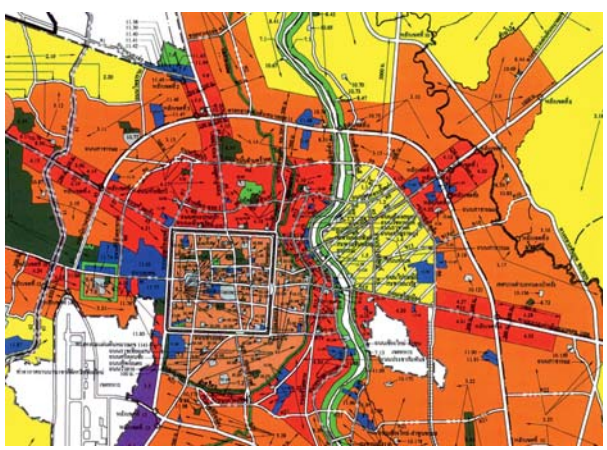


THE BUILDING HEIGHT
ZONING DIAGRAM



SELECTED AREA IN ZONE 3





LAND USED IN CHIANG MAI

There are 11 types of land using, divided by colors. Yellow, Orange and Red show habitation density from low, medium and high respectively.

Blue is government properties. Light Green shows green open space for environmental quality control, which belong to both side of Ping River.
My selected location is in Yellow with White Line.

YELLOW WITH WHITE LINE

It is also residential area however has density quality controlling. Any kinds of hotel and entertainment buildings are illegal to construct. Most buildings are houses, low-rise apartments and elementary schools.

" It's calm and peaceful also is located not far from the center, I want my project in this area. "

Pictures from: CHIANG MAI MUNICIPALITY
http://www.cmcity.go.th/aboutus/map.php

_Thai Architecture

The architectural criterion on master thesis is mainly focused on Thai traditional house. Thailand is located in Southeast-Asia; tropical country with highly humidity. According an agricultural society, most of Thai houses are made from timber construction; hard wood and bamboo. However, eighty percent of construction is hard wood structure. It is widely used as an accommodation from ordinary people to the Royal family[4]. Other twenty percent is temporary structure by bamboo; a simple shed for farmers resting during the day.

The vernacular styles divide follow the four cultural regions; the North (Lanna), Central Thailand, the North-East (Isaan), and the South. In Northern region once belonged to Lanna Kingdom. When the region completely merged with Siam (an old Thailand's name), all northern style always call as "Lanna" including architectural style as "**Lanna Architecture**". Nowadays, Lanna region means eight provinces in northern Thai; Chiang Mai, Chiang Rai, Lamphun, Lampang, Phayao, Phrae, Nan and Mae Hong Son[5].

4 **Dr. Pinyo Suwankiri**: *Thai Architecture,* www.thai-architecture.com

5 **Lanna Region**: Saratsawadee Ongsakul, A Study of Ancient Settlement in Lanna. Bangkok: Amarin Printing, 1998, P.25

_Lanna Architecture

In general, the Thai traditional houses are properly adapted to its environment; ecological thinking and functions. Because of high temperature and heavy rain, windows and walls in combination with semi-outdoor terrace provide the ventilation ideas. Also, the open high-pitched roof facilitates air circulation and drainage when it's raining. Tectonic joints are distinguishingly unique by interpenetrating joints, no nails applied.

Regarding former chapter, one of my objectives is to have an architectural design for Thai people and Thai living style. In the meantime, Chiang Mai is my case study, studying from local architecture is the best way in order to develop to contemporary architecture. In **Lanna house** (Northern Thai vernacular house), I study in four main topics as following; Form, Space, Elements and Materials. On site, as I see, one house can explain in many topics in concerning to quality of the house. Deliberately, there are four qualities in classification.

- **Ecological Quality**: The architecture in understanding of the ecological context of a given design problems and design solutions that are consistent with the natural context.

- **Socio-Cultural Quality:** The functional design in understanding of cultural living context and people in the area, the design solutions which are compatible and promote domesticity.

- **Spatial Quality:** The space in understanding of Architectural language in cultural context and be able to develop into contemporary function, the sequence of spatial design that appropriate for living.

- **Tectonic Quality:** The architectonic in understanding of local materials and the outstanding simple structures by local wisdom.

FORM

SPACE

ELEMENTS

MATERIALS

LANNA ARCHITECTURE

AT THE MUSEUM

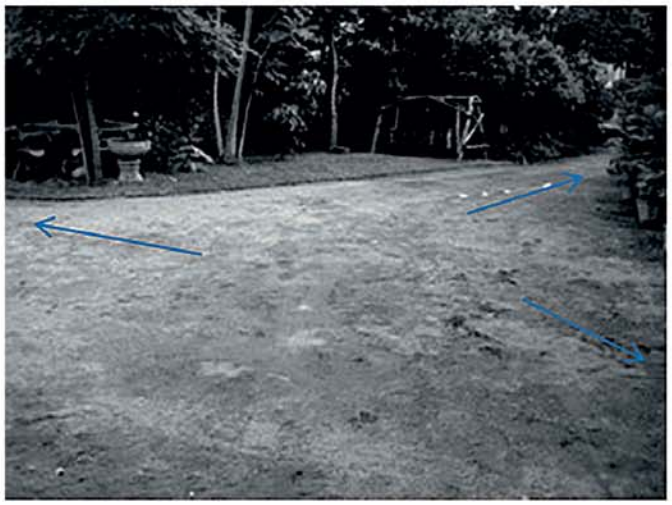
I went to Lanna Traditional Houses Museum in Chiang Mai for more information about Lanna Architecture. At the place, there are many single houses from many places. Some of them came directly from the owners themselves.

On researching work in Lanna Architecture, Deliberately, there are four qualities in classification; Ecological quality, Socio-Cultural quality, Spatial quality and Tectonic quality.

Picture by Kantapong Kuttikul
Area: Lanna Traditional Houses Museum, Chiang Mai

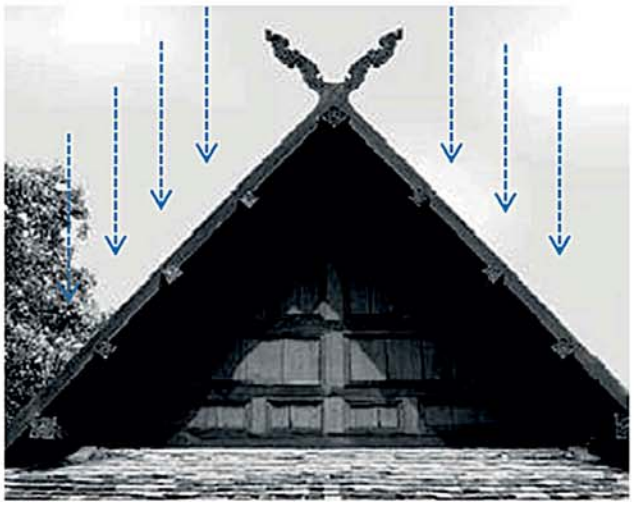
MAIN FEATURES

PATIO
SOCIO-CULTURAL QUALITY



+ Multipurpose Area for Public Activities
+ Spatial Quality

ROOF
TECTONIC QUALITY



+ High Roof, Angle 45° - 55°
+ For draining the rain

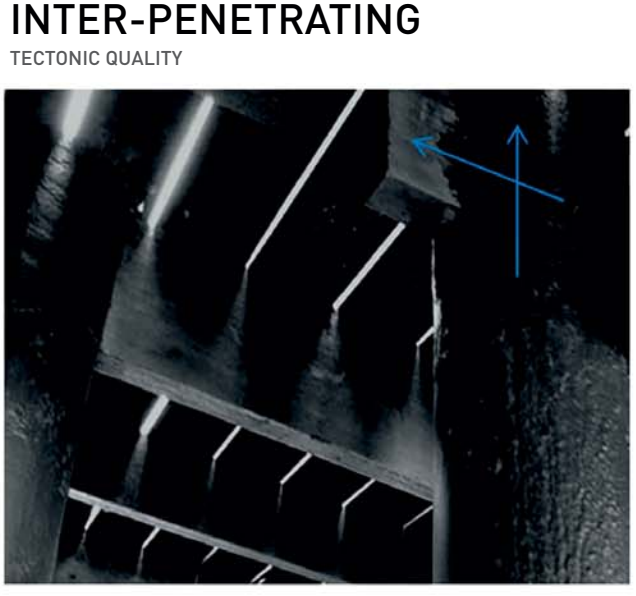
WALL
ECOLOGICAL QUALITY

+ 2 Types; Solid & Breathable Wall
+ Some parts be able to sliding

PILLARS
SOCIO-CULTURAL AND ECOLIGICAL QUALITY

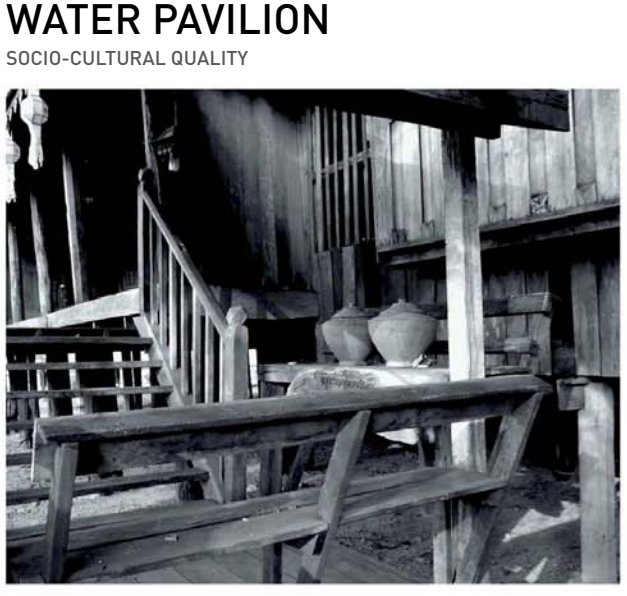
+ Perpendicular
+ Spatial Quality

STRUCTURE
INTER-PENETRATING
TECTONIC QUALITY



+ No nails
+ Unique Wood Joint Technique

WATER PAVILION
SOCIO-CULTURAL QUALITY



+ Generosity and Kindness
+ Free Drinking Water

SIX MAIN FEATURES OF LANNA HOUSE

The six main features make Lanna house looks exceptional from the other regions; The Central, the North-East and The South.

The most distinguishing mark is the roof.
On top of the gable, there is a carved wooden cross called "Kalae". It is made to scare crows away.
So, another Lanna house's name is "Kalae House".
Nonetheless, Most of traditional Thai house, in general, they are always similar.

On location and Web Site:
- Lanna Traditional Houses Museum, Chiang Mai
- 100 Years old House, Mae Ping River
- http://th.wikipedia.org/wiki/thai northern house

_Main Features

Generally, Thai vernacular houses are always similar in basic construction. In Northern region some features, however, are exceptionally outstanding. Many other books mostly are always mentioning the specific details in Lanna Architecture. However, all those marks have not classified as a group or clearly pin-points yet. My intention is to make it become more comprehensible by given the main features as following.

- **PATIO**

In front of the house, there is wildly opened area called "Kuang". It is can either be softscape or hardscape; a multipurpose area for community and family activities. Long ago as a agricultural society, it is the place for agricultural products drying. For example; foods like rice, corn, peppers and fish. Meanwhile, it is also be the meeting place for neighbors. The qualities of space are

- ✓ Spatial Quality
- ✓ Socio-Cultural Quality.

- **ROOF**

A roof is one of the most distinguishing mark. On top of the gable, there is a carved wooden cross called "Kalae"[6]. It is made to scare crows away. So, another Lanna house's name is "Kalae House". The open high-pitched roof; in angle as 45-55 degree, simplifies drainage when it's raining as well as facilitates air circulation. Moreover, wide overhanging eaves give shading to the house in the afternoon. Thai people always enjoy the sun, however, we celebrate the shady much more. The qualities of space are

- ✓ Tectonic Quality
- ✓ Ecological Quality

- **WALL**

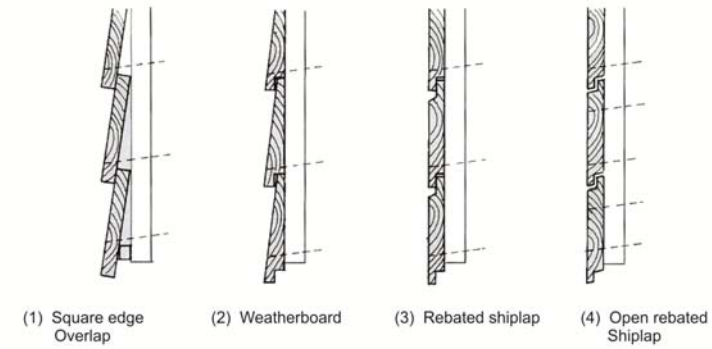
Unspecifically, the wooden cladding patterns of both horizontal and vertical paneling, the patterns are depend on the house owners. There are four types of each from the pictures. Pattern two and three are broadly used as exterior horizontal also as in vertical paneling.

However, the breathable walls are a special notice of Lanna House. Ventilated walls can be also beneficial during the heating period (in Summer 29–35 °C) because during daytime, they allow the heat gains through conduction and convection heat transfer. This is the answer why living in Thai traditional house is always cool? A breathable wall called "Fha-lap-nang"[7] or "Fha-lai". The qualities of space are

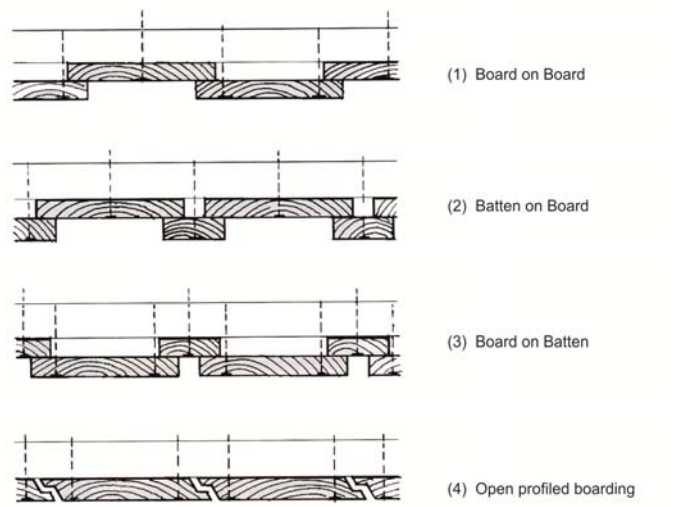
- ✓ Tectonic Quality
- ✓ Ecological Quality

Type of Wooden Cladding

1. Exterior Horizontal Paneling



2. Exterior Vertical Paneling



Fha-Lap-Nang or Fha-Lai[8] :
a breathable wall in Lanna Architecture

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6 **See visualization of Kalae house :** http://art-culture.cmu.ac.th/node/265, The Center for the Promotion of Arts and Culture, Chiang Mai University

7 **Fha-Lap-Nang**: Hand-Out, Lanna Traditional houses museum ,Chiang Mai; page 8

8 **Fha-Lai**: Picture of Fha-Lai http://mintarch26.blogspot.se/2011/07/4.html

- **PILLARS**

The perpendicular pillars are commonly structure in Lanna house. The method of raising a platform on poles is common to all parts of the country. It offers protection from dirt, hostile wildlife, thieves, and most importantly from the monsoon floods which affect all of Thailand.

Nonetheless, the inclined stilts structure is commonly used in central region because are in the most flooding area. In functionally, shady under the house is the women working area such as textile weaving and crafting, and also a playground for children. The qualities of space are

- ✓ Socio-Cultural Quality
- ✓ Ecological Quality

- **INTERPENETRATING STRUCTURE**

The architectonic joints are distinguishingly unique by interpenetrating structures, no nails applied. There are three generally characteristics of the pole raising[9] on main foundation in Kalae house. These local wisdoms are continually applied till present days. The qualities of space are

- ✓ Tectonic Quality
- ✓ Ecological Quality

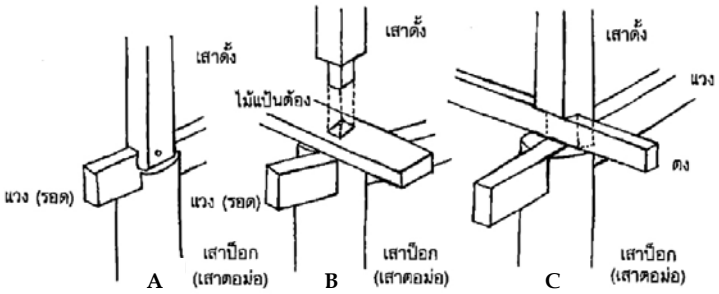


Fig.3 Three Characteristics of The Pole Raising

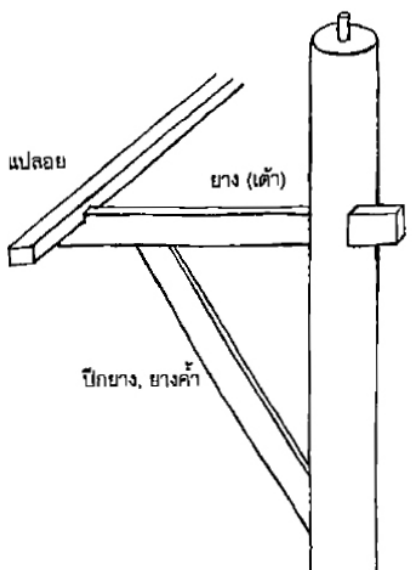


Fig.4 Interpenetrating eave structure
(Source: Kalae House, Professor Dr.Chaleaw Piyachon; p.22, 28)

- **WATER PAVILION**

Hospitality and generosity are profoundly culture in the Lanna Community. Terracotta jars are always near by the house. It contains drinking water also for the guests and people who walk passed by. Water pavilions or "Han-Num" [10], some of them are located in the house next to outdoor terrace. The qualities of space are

- ✓ Socio-Cultural Quality
- ✓ Spatial Quality

Fig.5 Water Pavilion or Han-Num

Fig.6 Water Pavilion or Han-Num
(Source: http://www.chiangmaithailand.net/lanna_house/lanna_house.html)

9 **Professor Dr.Chaleaw Piyachon**: Kalae House, Amarin Printing, Bangkok; p, 22-28

10 **Han-Num**: Hand-Out, Lanna Traditional houses museum ,Chiang Mai; page 10

_Spatial Organization in Lanna House

Getting to know the architecture by living with them is the best way in studying architecture, I strongly believe. In this case, the other dimensions can be seen from living in Lanna house. Many aspects layering, one space could be explained several contents. The house is not only built for living but also shows the local wisdoms, Lanna philosophies and culture as well as the understanding of ecological system. The contents are as the following.

- The Hierarchy and the Sequence
- The Notion of Living
- The Ecological Thinking

_1. The Hierarchy and the Sequence

As living in collectivism culture, the house is always opened to the guests and neighbors, no fences as the clearly house border. At the meantime, unsurprisingly, the residents can also feel secure by "Stilts"; the method of raising a platform on poles; (see main features). Nonetheless, these are minor parts.

A main part is the house has many levels, in level differentiations explain the hierarchies; how close you are with the owners. The gradient of public to private spaces reflects function sequences.

- **On Ground:** Area under the pillars

The most public area, even though you barely know the house owner or only are acquaintance, this space is always welcome for everybody. As mentioned in the main features, it is multipurpose area for house meeting activities, playground for the children and parking for bicycle and motorcycle.

- **First Step:** Outdoor terrace with water pavilion

Welcome guests area, some house near water pavilion has a step to sit on. According in Buddhism culture, the porch is also properly space for religious ceremony. On Thai New Year "Songkran Festival", is traditionally a time to visit and pay respects to elders, including family members. So, during that time, on veranda will fully with many people.

- **Second Step:** Semi-Outdoor terrace; called "Toen"[11]

Semi-Private space for family members and close friends, the step is lifted up in order to make hierarchical space and heat ventilation. In the afternoon, second step serves as eating, working and resting area as well as a sitting place for the guests. Toen is always shady all the afternoon, besides at night, is the sleeping area for brothers of the owner. For daughter, Toen is privately working area by using "Fha-Lai"; the sliding walls or partitions which can slide in order to open and close.

Because of spatial flexibility, Toen can be occupied by many functions. It is the most important space, it can be called as the heart of the house.

- **The Body:** The bedrooms

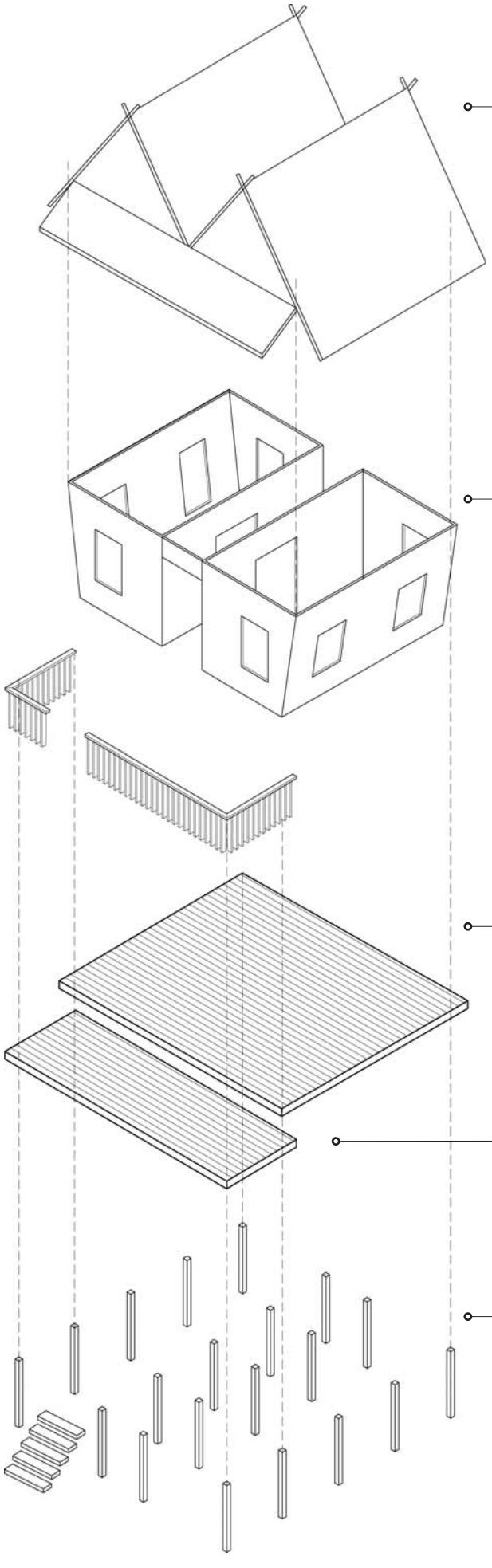
Generally, because of the walls are outstretched to support the roof, the bedrooms size in Kalae House is quite bigger than others. Inside the room is purposely divided for sleeping and clothing. Mostly, the hierarchical of space are separated by the level differentiations. However, there is a notable decorative lintel above the sleeping door; called "Hum-Yon"[12], which also represents the most privacy area. Likewise, in Lanna perception, Hum-Yon is a sacred lintel to protect the residents from evil.

Fig.7 Kalae House
(Source: Lanna Traditional House Museum, http://art-culture.cmu.ac.th/)

11 **Toen**: The second step, semi-outdoor terrace, Hand-Out, Lanna Traditional houses museum ,Chiang Mai; page 12

12 **Hum-Yon**: The holy wooden lintel, Hand-Out, Lanna Traditional houses museum ,Chiang Mai; page 13

THE HIERARCHY



THE ROOF

On top of the gable,
there is a carved wooden cross called "Kalae".
So, another Lanna house's name is "Kalae House".
The open high-pitched roof;
in angle as 45-55 degree, simplifies drainage
when it's raining as well as
facilitates air circulation.

THE BODY

Two bedrooms is divided by a main corridor.
The interior looks ample, because of
the outstretched walls. Above the sleeping door,
there is wooden lintel called "Hum-Yon".
In Lanna perception, it is a sacred lintel
to protect the residents from evil.

MOST PRIVATE

Family Members

SECOND STEP

Semi-Private space for family members
and close friends, called "Toen"
The most important space,
it can be called as the heart of the house

Close Friends
Family Members

FIRST STEP

Outdoor terrace; a porch with water pavilion
, welcome guest area.

Acquaintances
Close Friends
Family Members

MOST PUBLIC

ON GROUND

Area under the house is continually
linkage to the Patio, obviously, there is clearly no
house's border. It is the most public space
where everybody is always welcome.

Everybody

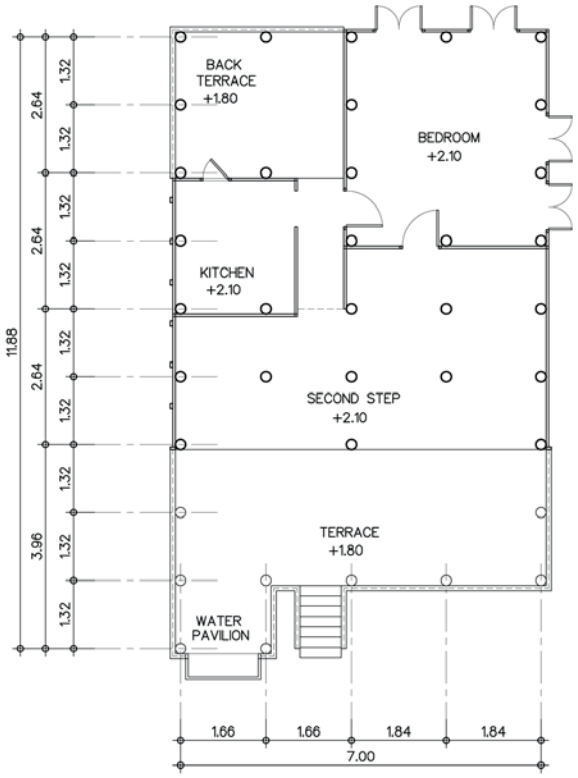
On location and Web Site:
- Lanna Traditional Houses Museum, Chiang Mai
- http://th.wikipedia.org/wiki/thai northern house
- http://www.chiangmai-thailand.net/lanna_house.htm

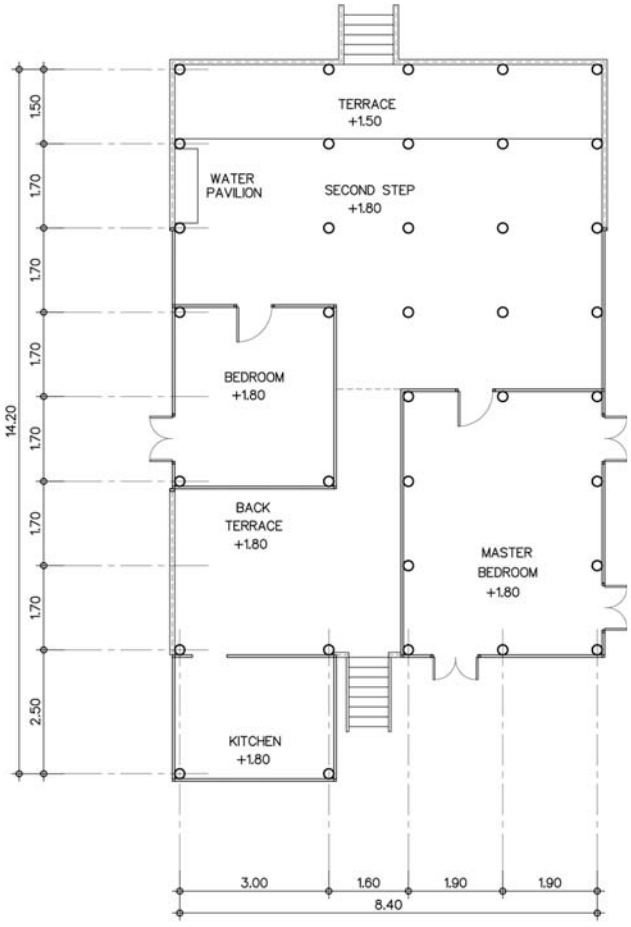
THE SEQUENCE

Simple planning in circulation and function, the houses' main entrance are always only facing
with the North or the South, In order to collect the wind both in cool and summer season.
How much in the functions planning have influenced to the living style? These two houses will be analyzed as following.

HOUSE 1: Mrs. Pad Photathi, 83 Soi 3, Chiang-Hod Rd., Jomtong, Chiang Mai

HOUSE 2: Mr. Cheun Boontoukeaw, 21 Moe 1, Baan Nongtu, Pa Shang, Lamphun





HOUSE 1

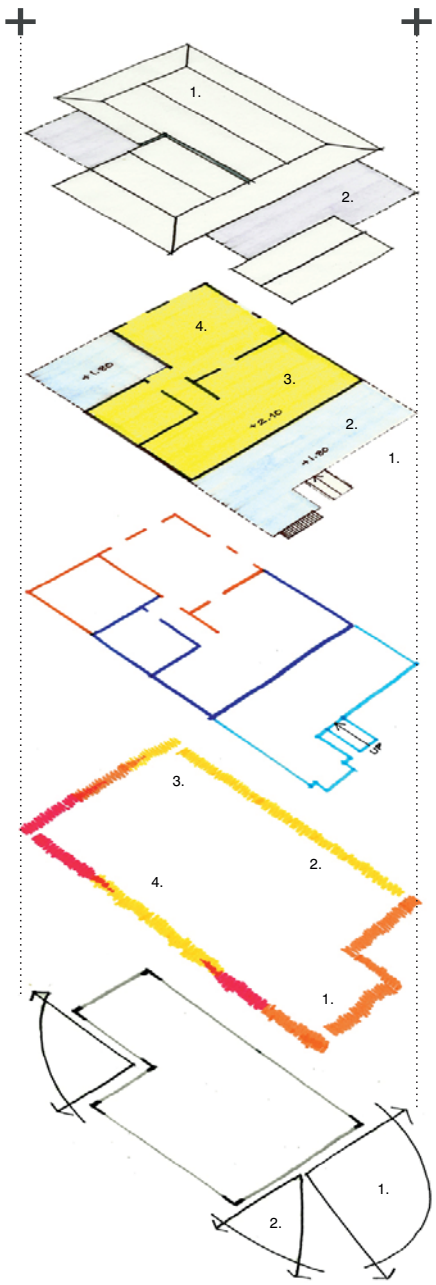
Mrs. Pad's Kalae house in seventy-six years old, was originally moved to The Lanna Traditional Houses Museum.
The entrance faces to the South, main terrace near water pavilion is always dry.
Nonetheless, "Toen", a second step is obviously shady by the long eaves from the roof.

HOUSE 2

Mr. Cheun's Kalae House, the entrance faces to the North, the main terrace and second step are always shady during the afternoon. Because of the area is bigger than Mrs.Pad's house, there are two bedrooms and widely opened terrace back of the house.

On location and Books:
- Lanna Traditional Houses Museum, Chiang Mai
- Professor Dr.Chaleaw Piyachon: Kalae House, Amarin Printing, Bangkok; p. 58-59, 65-66

HOUSE 1: ANALYSIS PLAN & SEQUENCES



OUTDOOR AREA

1. Roof
2. First step (Main Terrace)
3. Back Terrace

LEVEL DIFFERENTIATION

1. Patio and On Ground
2. First step (Main Terrace)
3. Second step (Toen)
4. The Body (Bedroom)
5. Back Terrace

GRADIENT OF PRIVACY

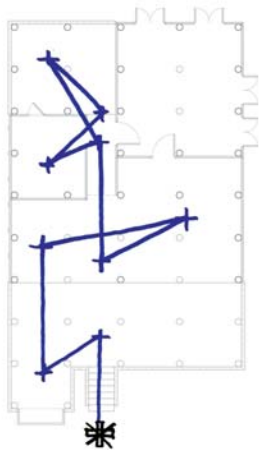
- Public Space
- Semi-Public Space
- Private Space

DAYTIME HEATING

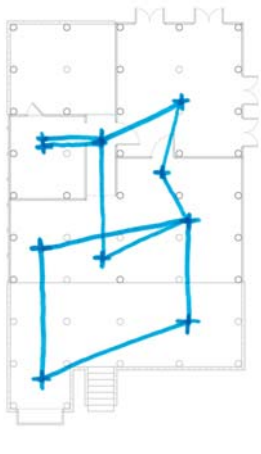
1. SW: Main entrance & Water Pavilion
2. SE: Second Step (Toen)
3. NE: Bedroom
4. NW: Kitchen
5. NW: Back terrace

VIEW POINTS

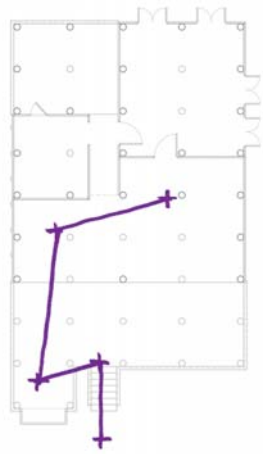
1. SE: Best View Point
2. SW: Good View Point
3. NW: Good View Point



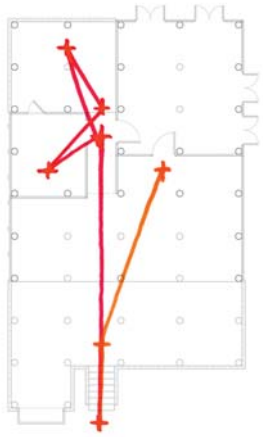
OWNER SEQUENCE
Coming back from outside



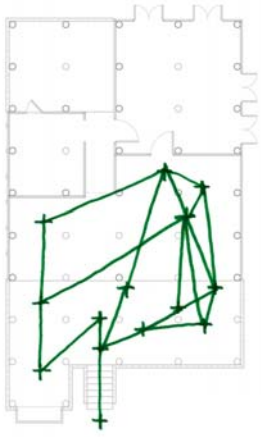
OWNER SEQUENCE
In the morning



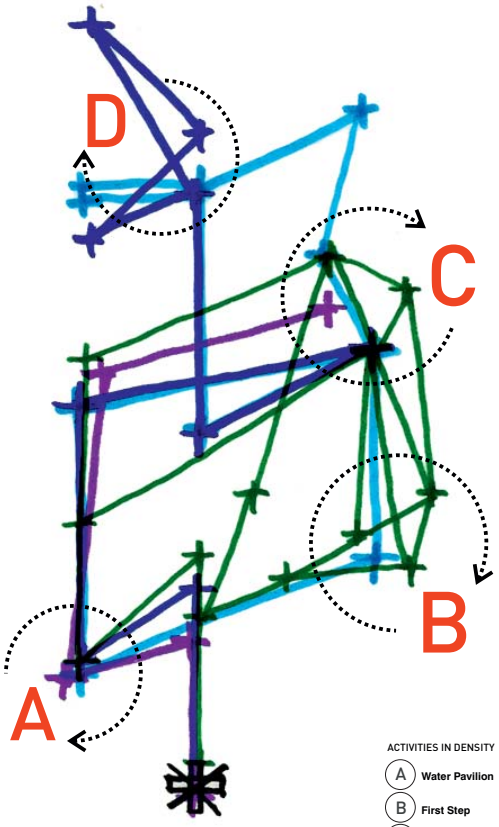
OWNER SEQUENCE
Before going out



OWNER SEQUENCE
Shot Cut when coming back
Shot Cut before going out



GUEST SEQUENCE
Visiting the house



INTERPENETRATION
All Sequences in The House

ACTIVITIES IN DENSITY
A Water Pavilion
B First Step
C Second Step
D Kitchen

PLANNING ANALYSIS

During afternoon, at the main terrace, the temperature is extremely high; (30-35 degrees) because it is outdoor area. At the meantime, on the second step where is the main relaxing area of the house, is always shady by the open high-pitched roof. Second Step continually connects to the back terrace near the kitchen. Look closely, the central circulation of the house is on the second step, where the other functions are connected nearby. Planning direction, because of main entrance face to the South, so a bedroom is at the Northeast, where the owner can see sunrise in the morning.

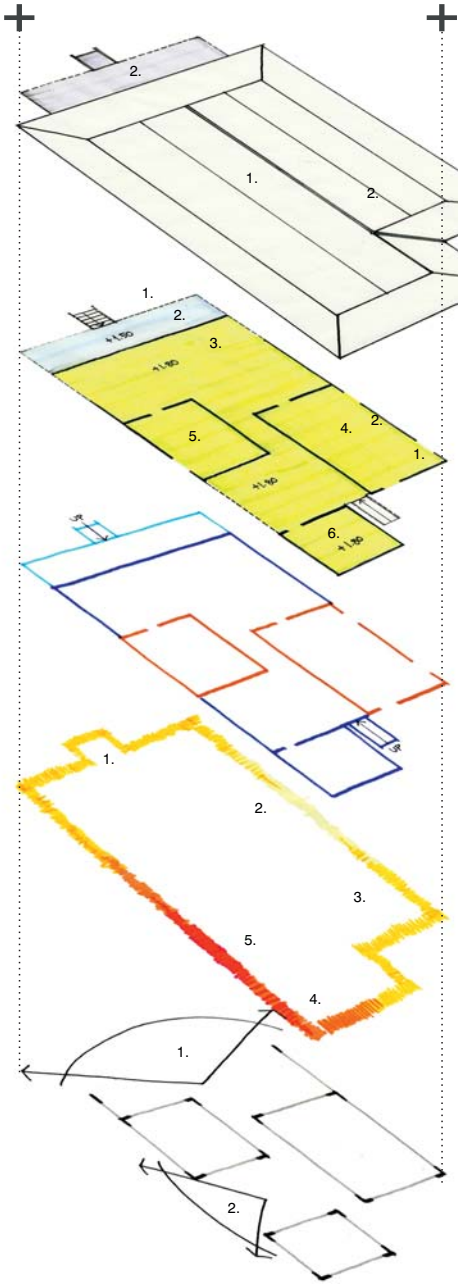
According, the kitchen needs sunlight and good ventilation.
At the Northwest, it is also proper direction for cooking. In the past, a toilet was separately from the house, people usually took a shower before got up into the living area.

SEQUENCING ACTIVITIES

The positioning of the functions are extensively convincing to the living style.
Diagrams show the movement in different activities.
As I mentioned about heart of the house is the Second step, from the final diagram, the area is the most occupy. Following by the area near water pavilion, which is also shady in the afternoon for acquaintances.

n conclusion, the flexible planning by opened plan is properly convenience for the owners. Because they can choose to go directly to the place, without passing through the other functions.

HOUSE 2: ANALYSIS PLAN & SEQUENCES



OUTDOOR AREA

1. Roof
2. First step (Main Terrace)

LEVEL DIFFERENTIATION

1. Patio and On Ground
2. First step (Main Terrace)
3. Second step (Toen)
4. The Body (Master Bedroom)
5. The Body (Bedroom)
6. Back Terrace

GRADIENT OF PRIVACY

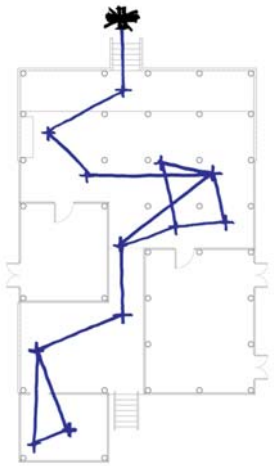
- Public space
- Semi-Public space
- Private space

DAYTIME HEATING

1. N: Main entrance & Outdoor terrace
2. NE: Second Step (Toen)
3. SE: Master Bedroom
4. SW: Kitchen
5. SW: Back Terrace

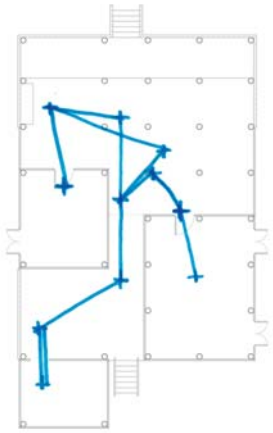
VIEW POINTS

1. N: Best View Point
2. SE: Good View Point



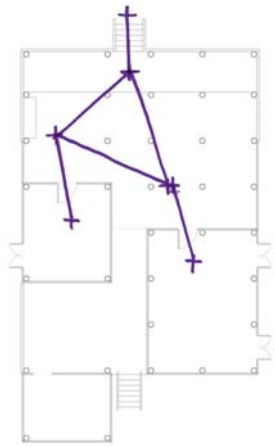
OWNER SEQUENCE

- Coming back from outside



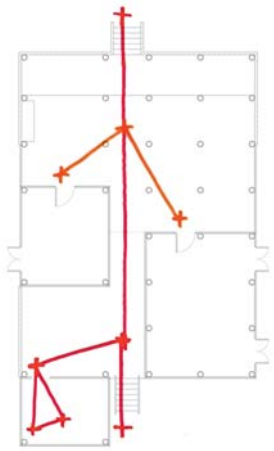
OWNER SEQUENCE

- In the morning



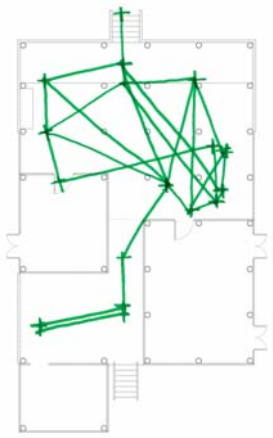
OWNER SEQUENCE

- Before going out



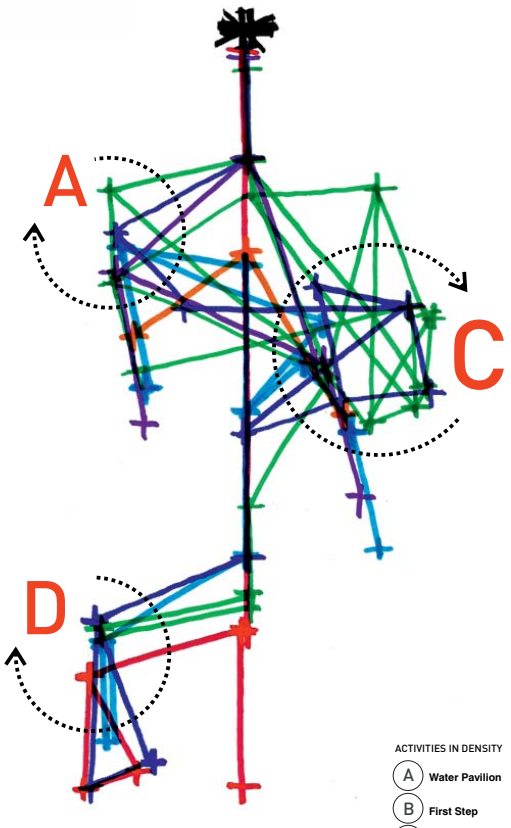
OWNER SEQUENCE

- Shot Cut when coming back
- Shot Cut before going out



GUEST SEQUENCE

- Visiting the house



INTERPENETRATION

All Sequences in The House

ACTIVITIES IN DENSITY

- A Water Pavilion
- B First Step
- C Second Step
- D Kitchen

PLANNING ANALYSIS

The housing area is bigger than Mrs. Pad's house. There are two entrances, the most interesting is the main entrance faces to the North, while the main circulation continuously to the sub-entrance; back of the house.
Two bedrooms are connected nearby corridor. On the plan, the back terrace has very much area almost the same as the second step in the front, because the owner is big family.

Planning direction, according second step face to the Northeast, the area is always shady all day. In the meantime, at the Southwest is a kitchen, where is also ventilation flow and sunlight.

SEQUENCING ACTIVITIES

The positioning of the functions have influenced to the movement of activities inside. Diagrams show the movement in different activities. The most occupied area is "Toen" Second step. Following by the water pavilion area, which is always shady in the afternoon for acquaintances. In conclusion, no matter where the entrance is located, the bedrooms are mostly sited on the East. Same as the kitchen is mostly located at the West. The opened plan is practical and flexible for living.
I will apply and develop this planning to my project.

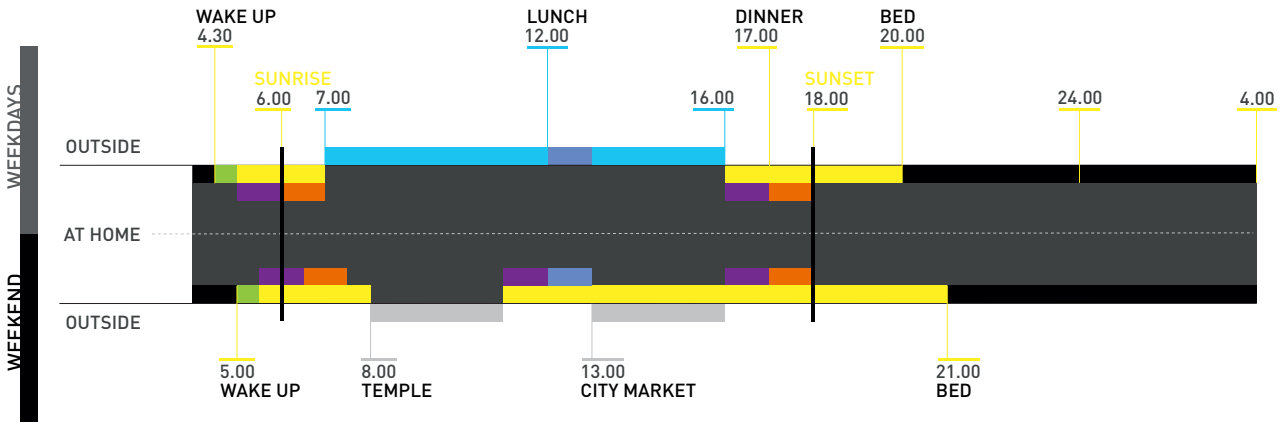
THE NOTION OF LIVING





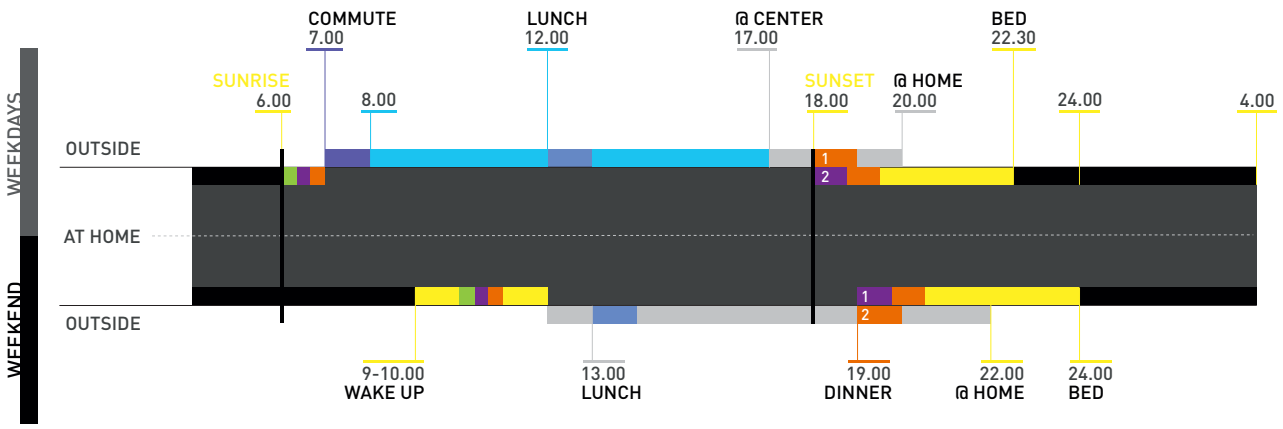

LANNA HOUSE

IN THE PAST



CHIANG MAI

THAILAND, PRESENT DAY



PAST

AGRICULTURAL COMMUNITY **70%** TIME SPENDING IN HOUSE

TODAY

INDIVIDUAL COMMUNITY **70%** TIME SPENDING OUTSIDE

NOTION OF LIVING

General image of Thai people, we have simply lifestyle. Long ago, in agricultural society, we lived as Collectivism. People were always help each other and very generous as you can see when, water pavilion is mentioned in Lanna culture. The differences of steps in the house are not only the function divided but also they represent as furniture; the chairs for visitors. It is simple one space can interpret as many functions.

People always backed home early and spent evening with the family. Comparing to Individualism as today, people always spend outside during the day longer.

" I want to design the space and place which can compromise time spending both inside and outside of the house. "

_3. The Ecological Thinking

In aspect of Ecological Thinking of Lanna House, I simply separate as **Ecology + Living Space**. Eco issues are crucial topic and also harmoniously permeate in vernacular architecture. It's difficult to separate and describe as the new single topic. In a sense, ecological design is really the place unfolding through the hearts and minds of its inhabitants. It embraces the realization that needs can be met in the potentialities of the landscape and the skills already present in community.

- **SITE:** The Local Context

Bringing sustainability home is about growing a culture of sustainability that is suited to the particularities of place. Ecological design begins with the intimate knowledge of a particular place. Therefore, it is small-scale and really direct, responsive to both local conditions and local people[13]. If we are sensitive to the nuances of place, we can inhibit without destroying.

- ✓ The solution grow from place (unique cultural and physical characteristics)
- ✓ The interweaving between Human and Natural Designs (Ecology, Materials and Human character)
- ✓ Site of the project: proper with urban planning

- **ARCHITECTURE:** Form of design

Minimizes environmentally destructive impacts by integrating itself with living processes

- ✓ Exterior (façade and opening) proper with micro-climatic
- ✓ Interior (Spatial Architecture) living space suite with the living culture
- ✓ Apply Materials

- **MATERIALS:** Local and Restorative materials

Material Concerning the materials choice can come from a combination of desires to investigate local primary materials requiring little energy for manufacture, to seek out regional expertise and to find a low-maintenance solution.

- ✓ Natural materials: wood, bamboo, terracotta Tiles, cane works and clay
- ✓ Restorative materials: recycle and reuse




However, in terms of Eco-criteria, there are also three mains topics in Lanna House; Eco-friendly, Eco-Logical Construction and Eco-Responsibility.

- **Eco-Friendly**

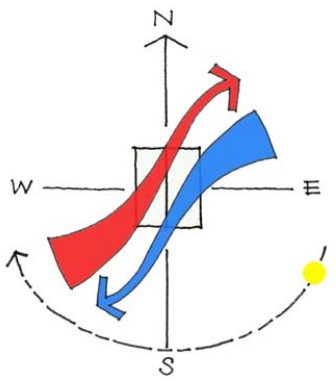
- ***Site-planning***: Micro-climate; Master Planning
- ***Natural Materials***: wood, bamboo, terracotta Tiles, cane works and clay
- ***The Self-ventilated System:*** air can flow though the house

- **Eco-Logical Construction**[14]

- ***Low Construction Costs***: Using local materials and the design with practical structures
- ***Easy Maintenance***: Accessibility to maintenance. Structure of Lanna house is obviously simple and crystal clear by steps divided. In order to develop to the project, service system in my apartment should be clearly accessible.
- ***Healthy Natural Environment*****:** It is always been in the house by greenery around the house and neighbor nearby.
- ***Healthy Living Environment*****:** Quality Indoor in ventilation and shading area
- ***Low Operating Costs*****:** additional in order to apply to low-rise apartment. In traditional house is unnecessary to operating costs because it made from local materials.

- **Eco-Responsibility**

- ***Socio-Cultural*****:** In general image is quality of the community; both the residents feel familiar to the neighbours and awareness to natural environment.



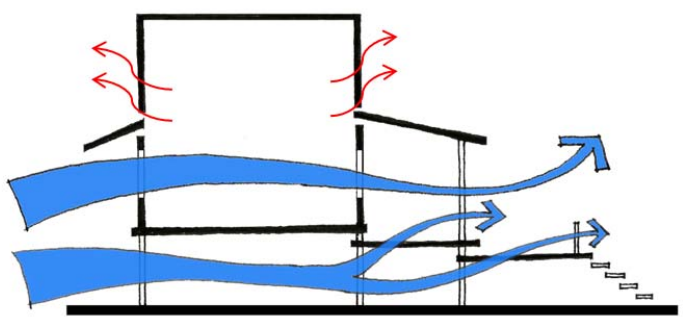


Fig.8 Wind flowing direction during Summer and cool season and Housing Ventilation

Fig9 Natural Materials; bamboo, cane, wood and terracotta Tiles

13 **Ecological Design**: Ryn, Sim Van der and Cowan, Stuart.: United State of America: Island Press, 2007; page 77

14 **Eco-Logical Construction:** H.R. Preisig, W. Dubach, U. Kasser and K. Viriden: Zurich: Werd Verlag, 2001

_Characteristics of Conventional and Ecological Design

Ecological design is a way of integrating human purpose with natural's own flows, cycles and patterns. It begins with the richest possible understanding of the ecological context of a given design problem and develop solutions that are consistent with cultural context[15]. I strongly agree with the ideas of comprehension on our culture and general context before design practice.

The better way before practice is to understand our own system in majority and minority "To look at things as synthesis of the whole and not fragmentation"[16] However, the understanding in what are the differences between Conventional and Ecological Design, is so important. This table will clearly describe the differences as following.

15 **Ecological Design**: Ryn, Sim Van der and Cowan, Stuart.: United State of America: Island Press, 2007; page 41-43

16 **BALKRISHNA DOSHI**, "A Flow in India", A+U, No. 445, 2007

ISSUE	CONVENTIONAL DESIGN	ECOLOGICAL DESIGN
Energy Source	Usually nonrenewable and destructive, relying on fossil fuels or nuclear power; the design consumers natural capital	Whenever feasible, renewable: solar, wind, small-scale hydro, or biomass; the design lives of solar income
Materials Use	High-Quality materials are used clumsily, and resulting toxic and low-quality materials are discarded in soil, air, and water	Restorative materials cycles in which wastes for one process becomes food for the next; designed-in reuse, recycling, flexibility, ease of repair and durability
Pollution	Copious and Endemic	Minimized; scale and composition of wastes conform to the ability of ecosystems to absorb them
Toxic Substances	Common and destructive, ranging from pesticides to paints	Used extremely sparingly in very special circumstances
Ecological Accounting	Limited to compliance with mandatory requirements like environmental-impact reports	Sophisticated and built in; covers a wide range of ecological impacts over the entire lifecycle of the project, from extraction of materials to final recycling of components
Ecological and Economics Design Criteria	Perceived as in opposition; short-run view Economics, custom, and convenience	Perceive as compatible; long-run view Human and ecosystem health, ecological economics.
Sensitivity to Ecological Context	Standard templates are replicated all over the planet with litter regard to culture or place; skyscrapers look the same from New York to Cairo	Responds to bioregion: the design is integrated with local soils, vegetation, materials, culture, climate, topography; the solution grow from the place
Sensitivity to Cultural Context	Tends to build a homogeneous global culture; destroys local commons	Respects and nurtures traditional knowledge of place and local materials and technologies; fosters commons
Biological, Cultural, and Economics Diversity	Employ standardized designs with high energy and materials throughput, thereby eroding biological, cultural, and economics diversity	Maintain biodiversity and the locally adapted cultures and economics that support it
Knowledge Base	Narrow disciplinary focus	Integrates multiple design disciplines and wide range of sciences; comprehensive

Spatial Scale	Tends to work at one scale at a time	Integrates design across multiple scales, reflecting the influence of larger scales on smaller scales
Whole System	Divides systems along boundaries that do not reflect the underlying natural processes	Works with whole systems; produces designs that provide the greatest possible degree of internal integrity and coherence
Role of Nature	Design must be imposed on nature to provide control and predictability and meet narrowly defined human needs	Includes nature as a partner: whenever possible, substitutes nature's own design intelligence for heavy reliance on materials and energy
Underlying Metaphors Level of Participation	Machine, Product, part Reliance on jargon and experts who are unwilling to communicate with public limits community involvement in critical design decisions	Cell, Organism, Ecosystem a commitment to clear discussion and debate; everyone is empowered to join the design process
Types of Learning	Nature and Technology are hidden; the design does not teach us over time	Nature and technology are made visible ; the design draws us closer to the systems that ultimately sustain us
Response to Sustainability	Views culture and nature as inimical, tries to slow the rate at which things are worse by implementing mild conservation efforts without questioning underlying assumptions	Views culture and nature as potentially symbiotic; moves beyond triage to a search for practices that actively regenerate human and ecosystem health

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Chapter 03

Concept and Program

.Concept and Program.

_The Retrospective of Lanna Architecture

Chiang Mai was a capital of Lanna Kingdom (1296-1558), the concentration of Lanna culture has existed extensively anywhere. In order to design a project; a low-rise apartment, the understanding of local context, architecture and way of living are crucial keys. Generally, the contemporary architectural designs in Chiang Mai, some of them are well-practiced example in how understandable of Lanna culture and architecture. On the other hand, attaching the "Kalae" on top of the gable roof is not properly direction of Lanna characteristic expression.

Besides, facade of traditional house and tectonic quality should be emphasis. The local wisdom of building skins in vernacular house is significantly valuable, both in terms of ecological thinking and construction designs. On my analysis; the gradient of privacy, the hierarchy and the sequence, notion of living as well as the eco-issues, all these should be applied to architecture.

I understand if I put all details into my project, the final production will not further from the original. So, my design aspect is about analysis and synthesis to find the final result, the imitation or mimicry hasn't closely to my intention in this case. I would rather emphasize in social agenda; the spatial organizations in architecture, more than only have the outstanding building in shape.

_A Concept

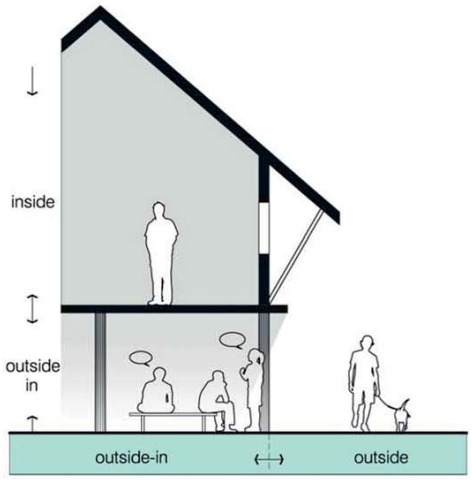
The hierarchical classification of space and the sequencing from outside to inside are noticeable. I would love to keep as the main idea of my design. Nonetheless, these keywords in lists should be applied to the project. I can see the differences of living style in between common single apartment and lanna house. Everything changes everyday, the housing is expanding in vertical. The living style is wall to wall, a personal space is the area inside the apartment. People live as individually, the social culture change to Individualism. My question is how will the housing be if I could provide the better community and better living quality together?

In the next pages are the concept diagram and the transformation process to architecture.

Fig.10 Listing of Keywords in order to apply to project

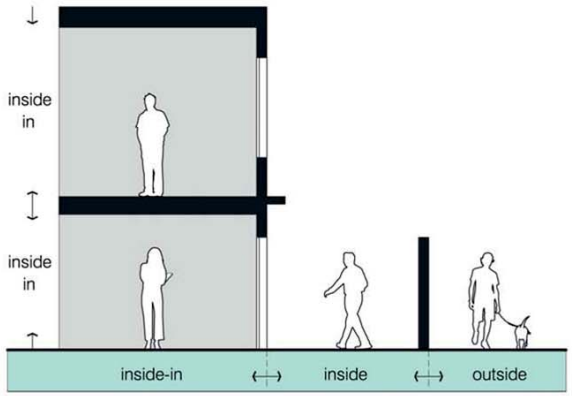
OUTSIDE - IN & INSIDE - OUT

OUTSIDE » OUTSIDE - IN » INSIDE » INSIDE - IN » INSIDE - OUT



LANNA LIVING UNIT

+



COMMON APARTMENT UNIT

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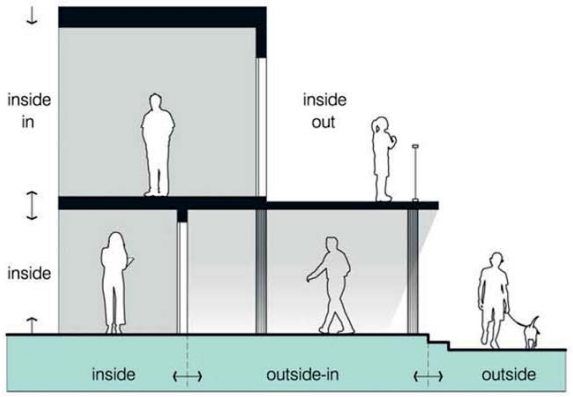


E - CO - HOUSING UNIT

PAST

AGRICULTURAL COMMUNITY

70% TIME SPENDING IN HOUSE

TODAY

INDIVIDUAL COMMUNITY

70% TIME SPENDING OUTSIDE

FUTURE

E-CO-HOUSING

55-60% TIME SPENDING IN HOUSE

CONCEPT

Outside-In and Inside-Out
It is the sequencing idea of occupied space.
In traditional lanna house, even you are at the first step, you already are in the house but have the feeling of outdoor. It's called **OUTSIDE-IN**. Which this moment is hardly found as living in the apartments. On the other hand, when living in the apartments circulations mostly are closed. Which called as **INSIDE-IN**; the residents have to walk through other functions to the areas they want.

Nonetheless, they both are outstanding. In Lanna unit the sequence is always in between; **SE-MI,** and being outdoors. In apartment unit in Thailand, the sequence is always deeper **INSIDE-IN**. Finally, they were consistently integrated to the new sequence.

E-CO-HOUSING

Long ago Thai people living as collectivism but nowadays we are almost livings as individually. The habitations are partly influence of the living style. The integration of vernacular and forthcoming architecture could create new space and new sequence.

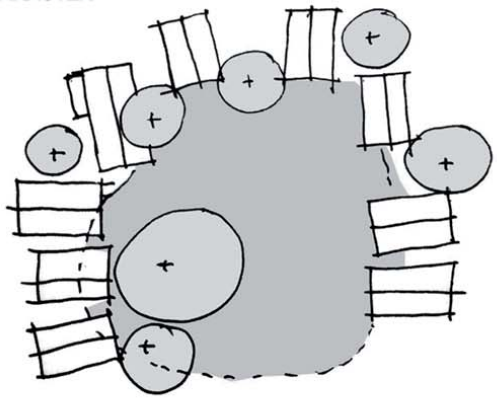
The project which is in the combination of Ecological thinking, Cooperating, Communication and housing solutions, will lead to E-Co-Housing.

An apartment low-rise for new habitation in Chiang Mai is a new home, new community in the future, an upgradeable housing solution which is emphasize on social life, inhabitant living qualities and environmental awareness.

TRANSFORMATION TO ARCHITECTURE

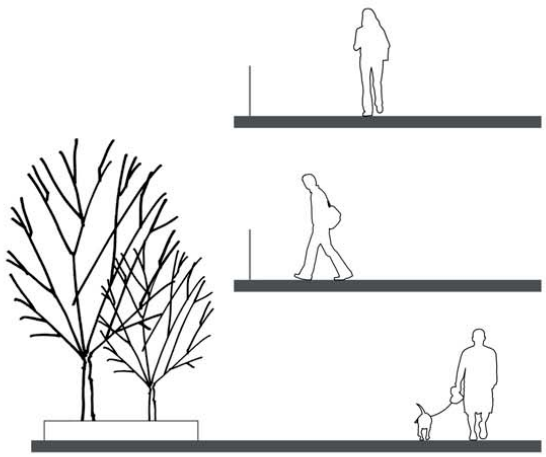
PATIO

_CHARACTER



_USAGE

PATIO is common area in front of the house. It's also the public space for community activities. I design as the common area and vertical patio for the linkage in the vertical.



_QUALITY

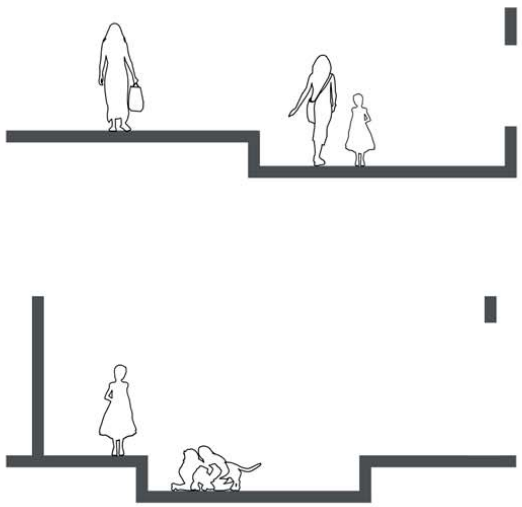
SOCIO-CULTURAL QUALITY
ECOLOGICAL QUALITY

SECOND STEP

_CHARACTER

_USAGE

SECOND STEP is the semi-private terrace for a guest and neighbours. I apply to the main terrace for everyone in the building and also step in the units.

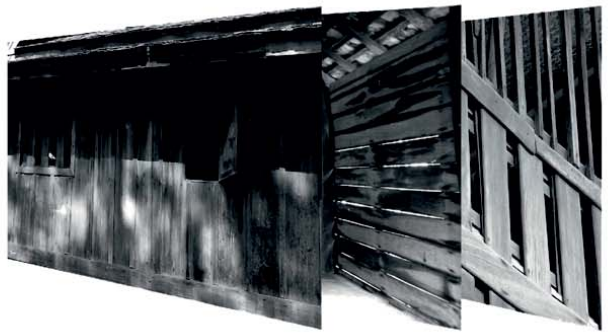


_QUALITY

SOCIO-CULTURAL QUALITY
ECOLOGICAL QUALITY

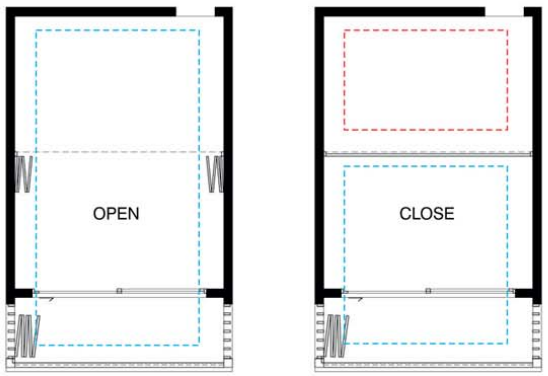
WALL

_CHARACTER



_USAGE

WALL is another building skin which be able to breathable and protecting people inside. I apply to my project and some areas the wall also can moveable.



_QUALITY

ECOLOGICAL QUALITY
SOCIO-CULTURAL QUALITY
TECTONIC QUALITY

MODIFICATIONS

PATIO

As big open space, on ground floor I provide green area in the middle; a public common area, for neighbors nearby and the tenants. In each floor, also has vertical patio, connect to the corridor. The sequence is **OUTSIDE-IN**

SECOND STEP

Welcome guest area and living space, as it is in Lanna house. I applied the second step both in common space and in the apartment units. On ground floor, it is linkage to the green courtyard, where people can sit on and relax during the day. In the units, the floor is pushed up or pushed down, the function is mostly the same as in traditional house.

BUILDING SKIN

The tectonic wooden cladding is employed as the façade. Many types in vertical and horizontal are chosen to show the façade variety of the project. The possibility of flexible space In the unit is one of the qualities indoors, which the resident deserved. I applied the breathable wall to the folded wall, it does also make the area widen and let the ventilation flow.

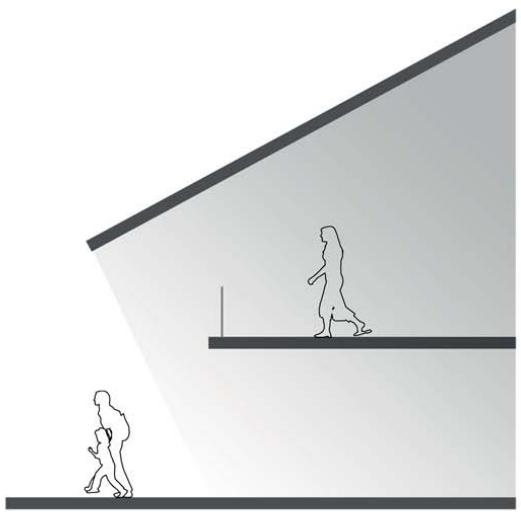
TRANSFORMATION TO ARCHITECTURE

ROOF

_CHARACTER

_USAGE

ROOF is the main parts to giving the shady to the terrace. A style is always long cantilever to protect the strong sunlight. I combine roof with the vertical patio, which makes common space very shady during the day.

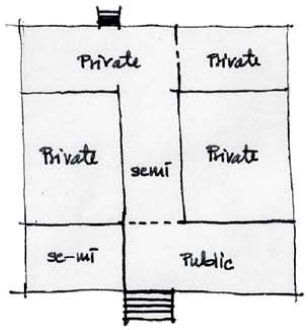


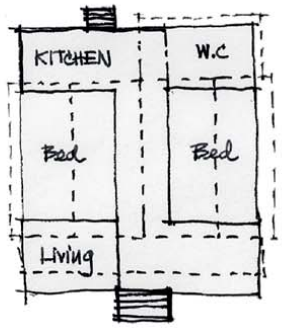
_QUALITY

ECOLOGICAL QUALITY
TECTONIC QUALITY
SOCIO-CULTURAL QUALITY

CIRCULATION

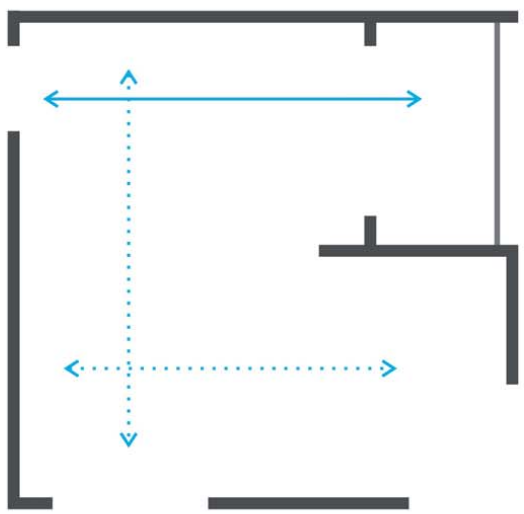
_CHARACTER





_USAGE

The planning is open plan by the main circulation is always in the middle. The residents can easily walk to other function. I apply this idea to design planning in the units and also main circulation in the building.



_QUALITY

SOCIO-CULTURAL QUALITY
ECOLOGICAL QUALITY

MODIFICATIONS

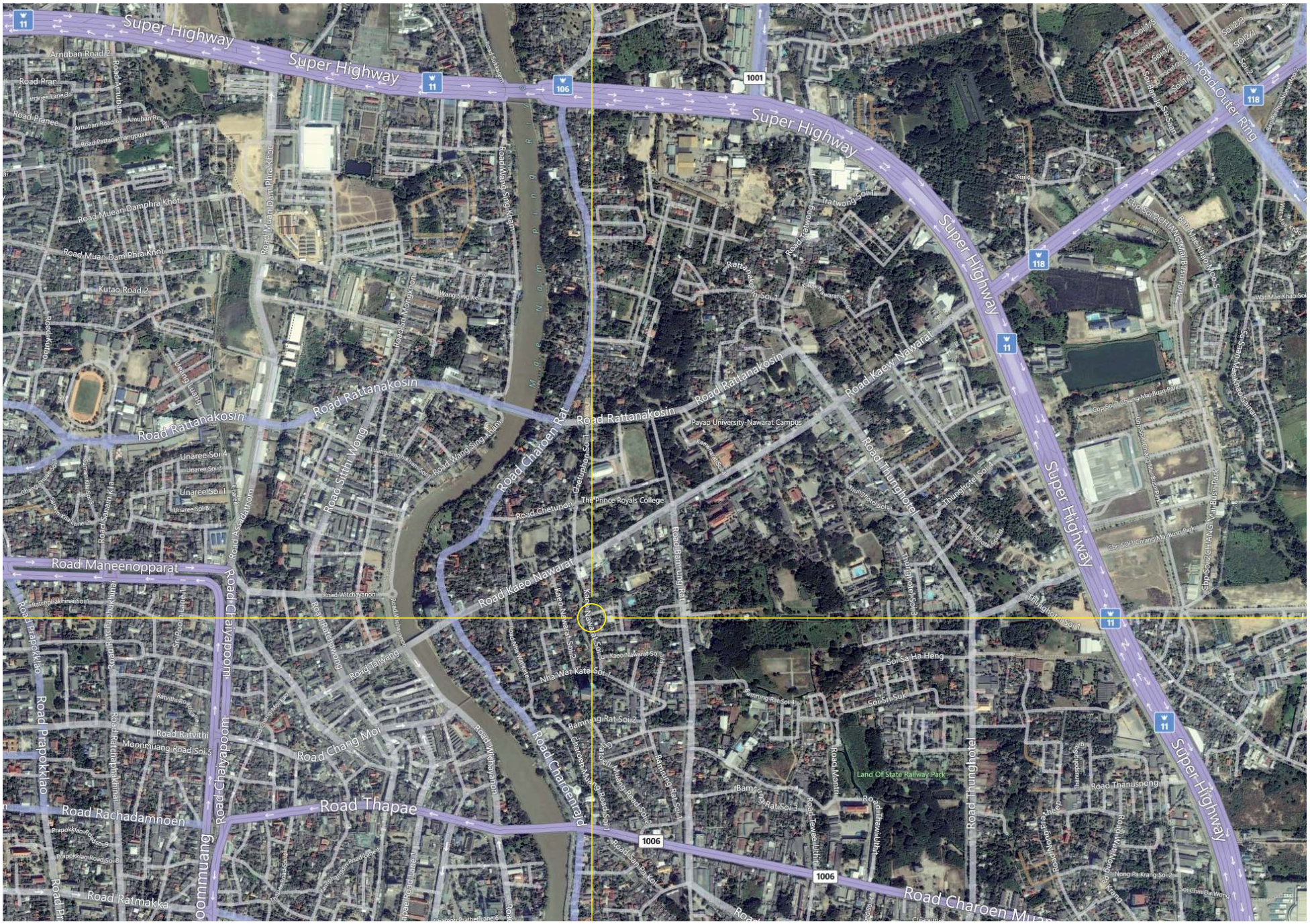
CANTILEVER & ROOF

Thailand as in the tropical climate, the flat slap roof is improperly suitable for draining and protecting sunlight. So, the main roof I design as the open high-pitched for flowed natural ventilation, giving shading and draining. The cantilevers are the unit terrace, which variable in each floor.

CORRIDOR & CIRCULATION

The transformation is done from the majority to minority. From outside, the corridors are merged to the units. There are wooden partition makes the area more privacy before come into the room. In the units, planning as opened plan is flexible for family activities.
When folded wall integrate with the unit circulation, residents can decide their own space whether close or open it.

ON LOCATION



TO THE OLD CITY

1.40 KM.

SUNDAY WALLING STREET

TO UNIVERSITY ZONE

4.20 KM.

CHIANG MAI UNIVERSITY

TO SHOPPING ZONE

3.10 KM.

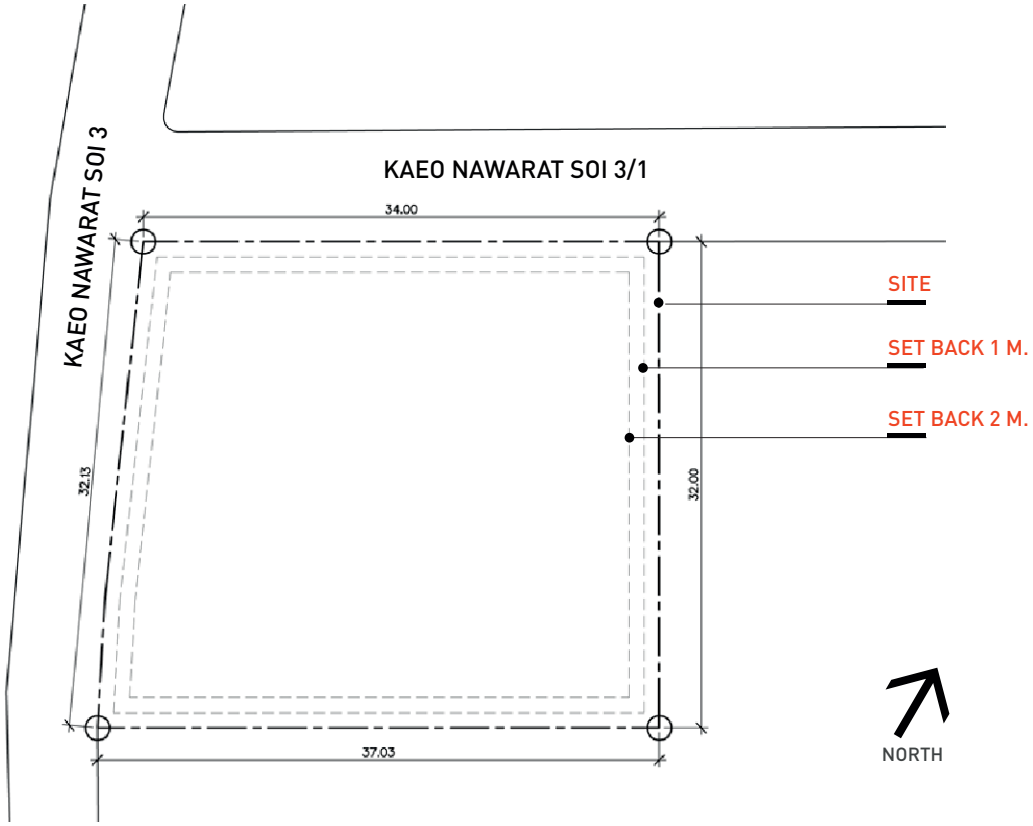
ROBINSON
CENTRAL
CARREFOUR

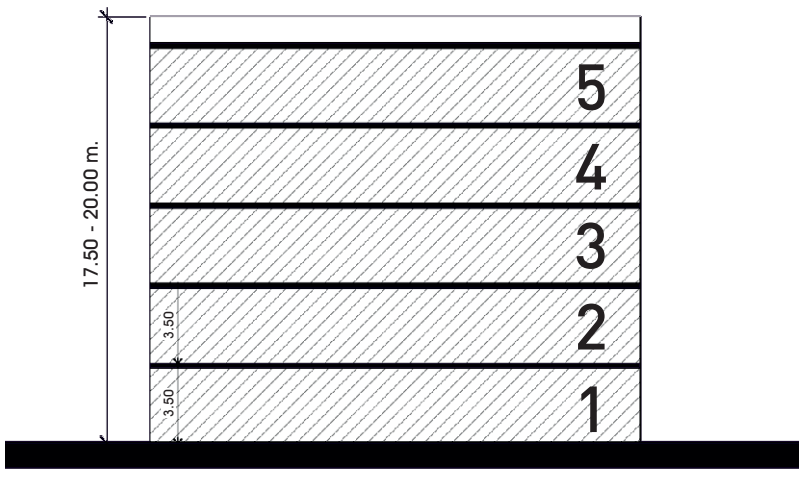
THE HEIGHT CONTROL

From chapter 2, the location is in Zone 3 of the city. There is the height control not over than 16 meters. However, Any design construction in area over 100 meters rounded from school and religious buildings could higher than 16 meters but lower or equal to 20 meters.

Pictures from:
http://www.bing.com/maps/thailand/chiangmaimap.php

ON LOCATION





PLANNING LEGALIZATION

The Architectural Regulations from Chiang Mai Municipality, on this site at Zone 3.There are the building height controls, minimum of green space on site and set back from the site. As I mentioned in chapter two, in order to keep city skyline, my building does not exceed 20 meters in height.

SITE AREA

1141.58 SQ.M.

PERIMETER 135.16 M.

HEIGHT CONTROL

20.00 M.

EVEN OR LOWER

OPEN & GREEN SPACE

30% OF SITE REGULATION

342.47 SQ.M.

SET BACK WITH OPENING WALL

1.00 METER OF THE EDGE

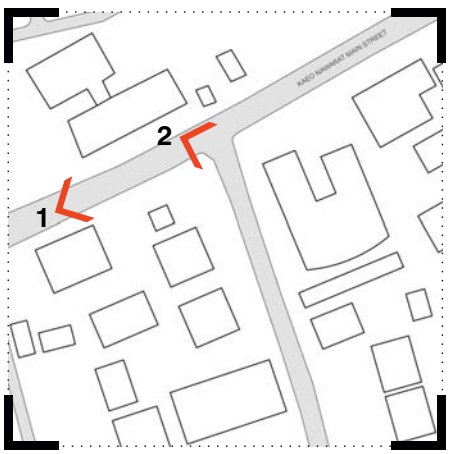
0.5 FOR SOLID WALL

TYPE OF ROOM

55-65, 66-85 84-100 SQ.M.

THREE TYPES OF UNITS

SITE ATMOSPHERE: ZONE A



VIEW 1

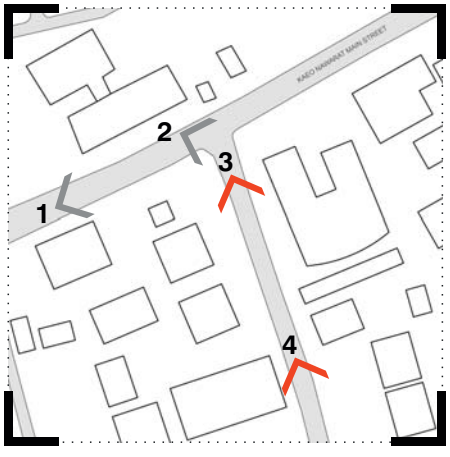
General traffic during the day on
Kaeo Narawat Main Street,
there are many trees both side of the street. On the left,
behind the green fence is Prince Royal College,
the largest high school in Chiang Mai.

VIEW 2

In front of Kaeo Narawat soi 3, at the left conner is
Yamaha music school, next to is Honda and
IZUZU car service. On Kaeo Narawat Main Street,
there are many crossroads. So everyday,
in the morning and in the evening,
there is always traffic conjestion.

Pictures from www.bing.com/maps/ChiangMai Thailand
**At the angle is the position of viewer

SITE ATMOSPHERE: ZONE A



VIEW 3

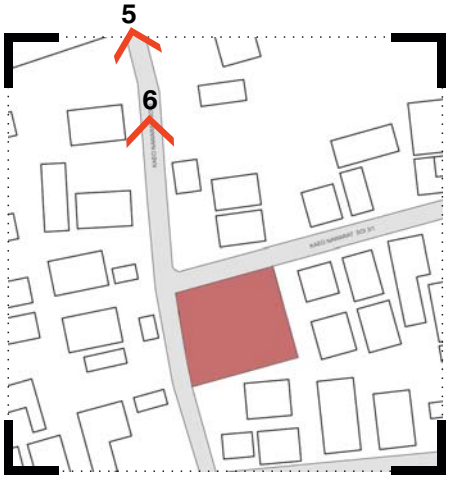
Kaeo Narawat soi 3, it's quite long sub-street.
Moreover, it's in the education area, the common t
ransportation is minibus. Normally, minibus in
Chiang Mai has the color as red, called "Red Bus".
Nowadays, there is private company conducts
their own buses, the color has already changed to yellow.

VIEW 4

As you can see, both side along Soi 3 is lots of trees
and quite peaceful. On the right side,
it is the office renting and the apartment at 10 storied.
According to the laws, this building is now allow to
construct in present days, because is illegal.
However, the owner got the permission before
the laws had changed.

Pictures from www.bing.com/maps/ChiangMai Thailand
**At the angle is the position of viewer

SITE ATMOSPHERE: ZONE B



VIEW 5

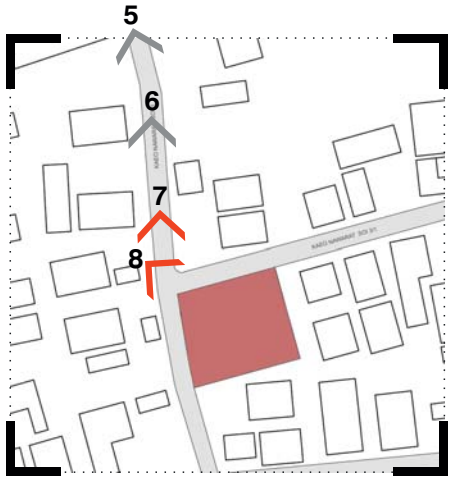
Along way to the construction site, mostly are single family house. Some of them are one or two storied. On the right, Komon; mathematic tutoring place for children who want to improve in calculation skill.

VIEW 6

The atmosphere is very peaceful and safe for the residents. Moreover, it's still green in comparing to the area in the city center.

Pictures from www.bing.com/maps/ChiangMai Thailand
**At the angle is the position of viewer

SITE ATMOSPHERE: ZONE B



VIEW 7

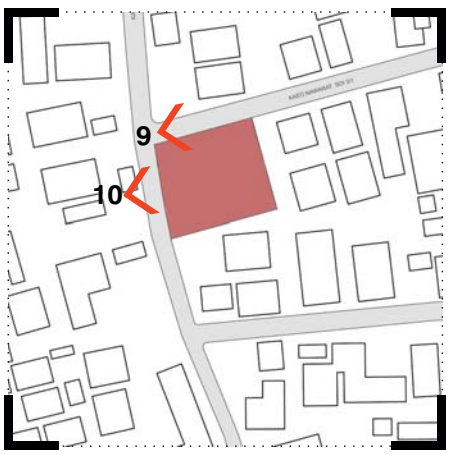
From here, you see my site's project from the corner.
There are all single family houses around the site.
At the end of the street is the condominium,
which is unsuitably constructed high-rise building.

VIEW 8

Zooming closely to the area, the site is at the corner.
Two side of the area are next to the street,
which makes the profitable of site.

Pictures from www.bing.com/maps/ChiangMai Thailand
**At the angle is the position of viewer

SITE ATMOSPHERE: ZONE C



VIEW 9

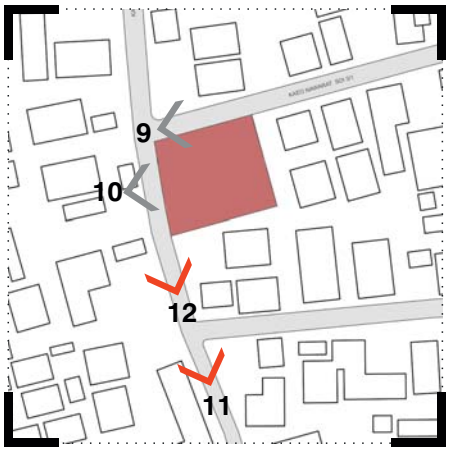
Picture shows Kaeo Narawat soi 3/1, the area is so respect to the ground; no other buildings higher than 4th floors. It's very convincing to make the building as the low-rise. I don't want to make the building which totally conflict to the context.

VIEW 10

In front of the site, these are the telephone booth and electricity pole. I really don't want to get rid of it but all these would be managed properly to the design.

Pictures from www.bing.com/maps/ChiangMai Thailand
**At the angle is the position of viewer

SITE ATMOSPHERE: ZONE C



VIEW 11

The view from the south of the street, people also
can come to visit by this way. On the left,
it is noodle buffet house, very popular in Chiang Mai.
There is Kaeo Narawat soi 3/2 on the right.

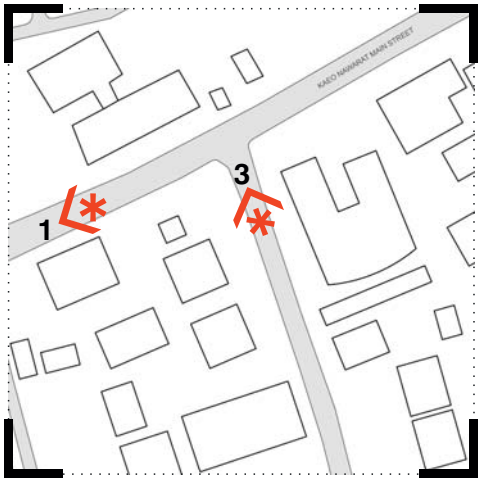
VIEW 12

Same view from the south but closer,
the accessibility to the site is convenience.
It is because people can come from the north;
Main Street, and the south.
The streets are connected to each other.

Pictures from www.bing.com/maps/ChiangMai Thailand
**At the angle is the position of viewer

IN CONCLUSION OF SITE SURROUNDING

ZONE A

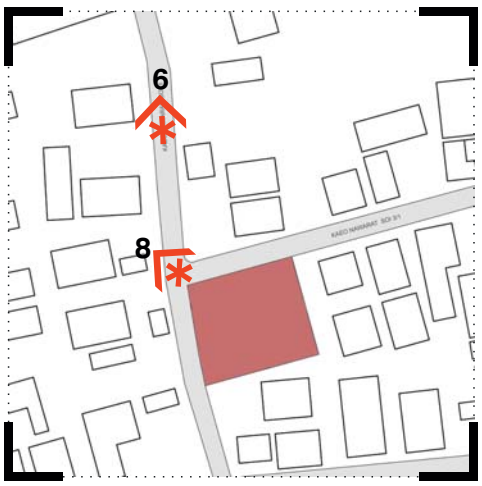


ZONE A: At The Beginning

Along the Main street; **Kaeo Nawarat** is green by the bushes and big trees. The traffic congestion is always on the rush hour; morning and evening.

In front of the Sub-street, **Kaeo Nawarat Soi 3**, is Minibus station, for students and parents. Main function on the street is schools and tutoring places.

ZONE B

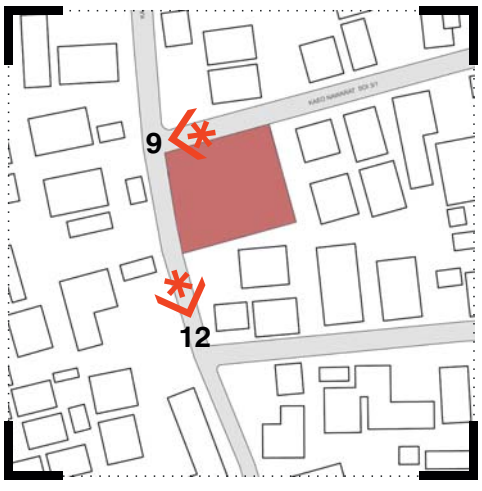


ZONE B: In Between

There are many single family houses on both side, along the way to the located site. The feeling peaceful and save are common environmental neighborhood nearby. From the site to Minibus station take 15 mins by walk.

However, in Chiang Mai some of people, usually transport by bicycle. Especially, in this area people, use bicycle for nearly transportation.

ZONE C

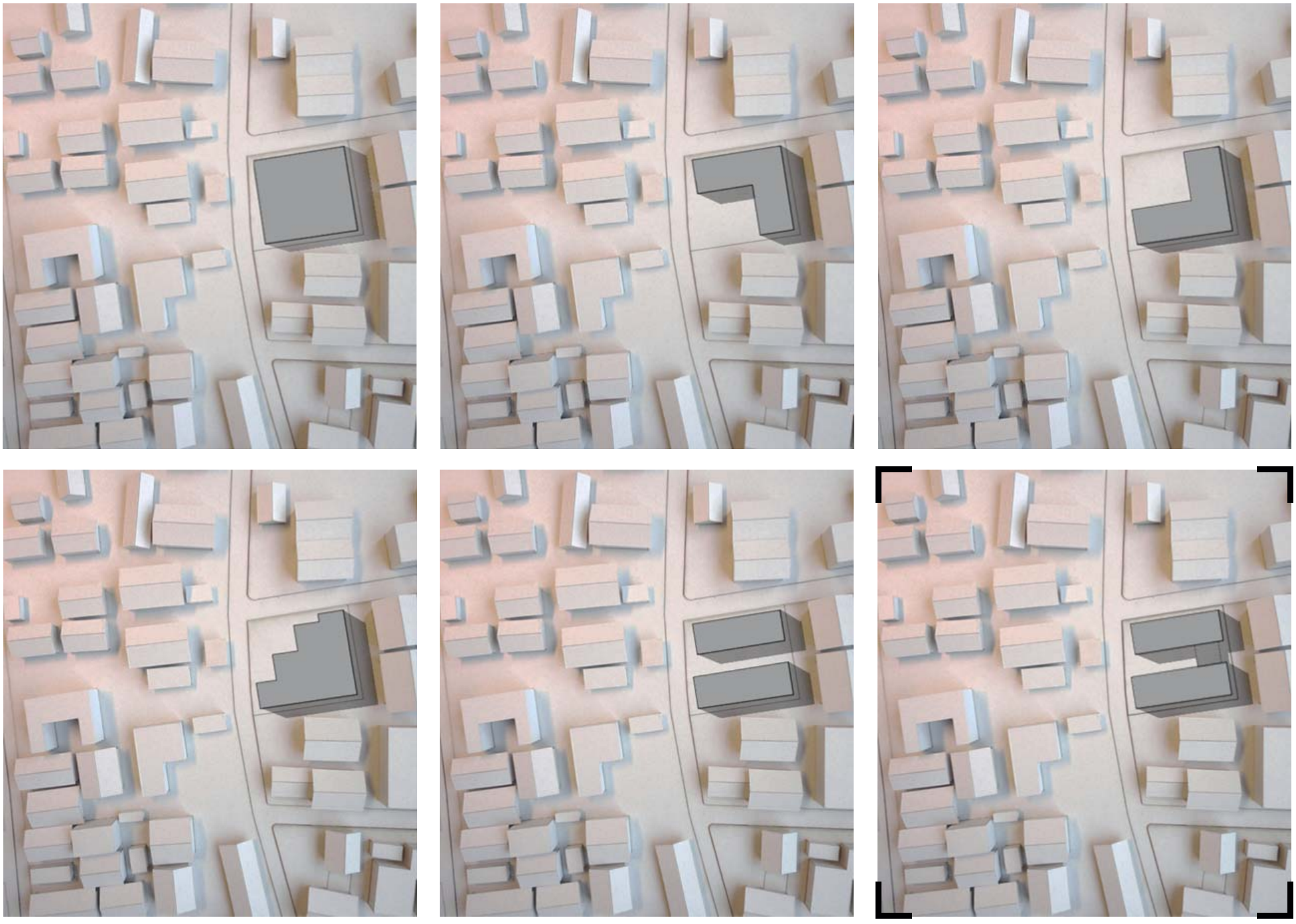


ZONE C: To The Site

Kaeo Nawarat Soi 3/1, is the sub-street next to the site. There is clearly comfortable for making as the main entrance to the project.

At the same time, The main street also next to the site at the East. I design as the green open space for neighbors and the residents.

BUILDING CONFIGURATION



STUDY OF BUILDING CONFIGURATION

During the site analysis, I did the lay-out model to see site surrounding on scale 1: 500. Then, I study the building with the program that I had before. The first three, if the make the form in L shape, The building will opened to the main street. However, the space are not enough for the units.

After that, I changed to reduce the form by zig-zag. Obviously, that didn't work out. Finally, I divided the building as two towers and made the linkage point to connect them to each other.

Pictures show six models of study in building configuration

Chapter 04

Workshop and Preliminary Design

. Workshop and Preliminary Design .

_The Workshops

When I assigned to new design projects, normally, I intuitively see what design directions I will proceed. However, in some projects although I have much information but I do not know where to begin with. According to the main schedule from Chalmers master thesis, I obviously don't have much time. In order to finish the project on time, everything should be well-managed. Threee workshops were sat up for purpose as following.

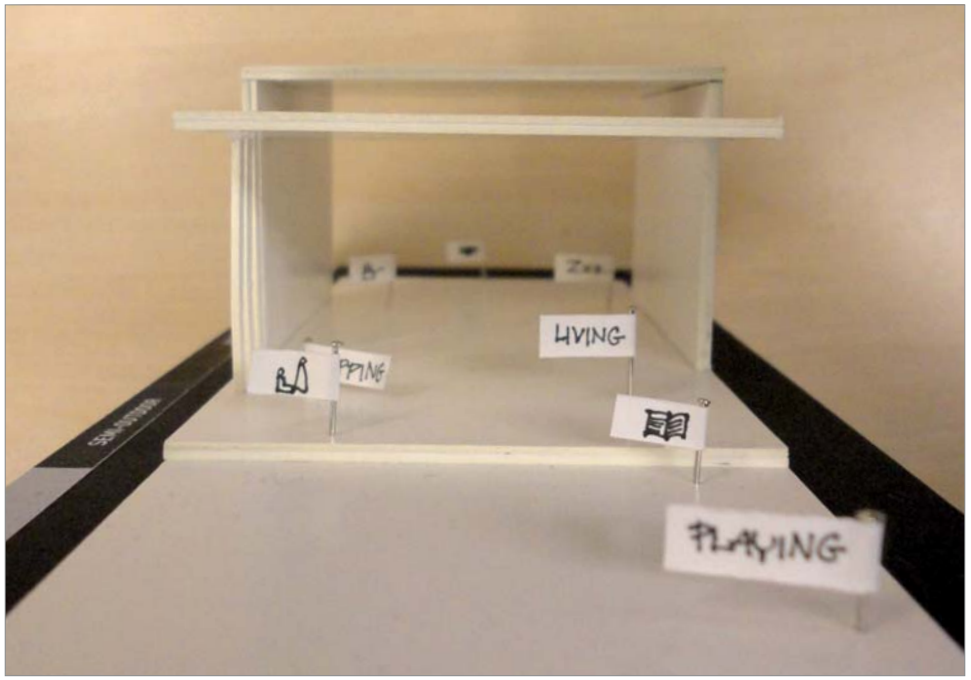
- Form finding
- Concept interpretation
- Functions connection

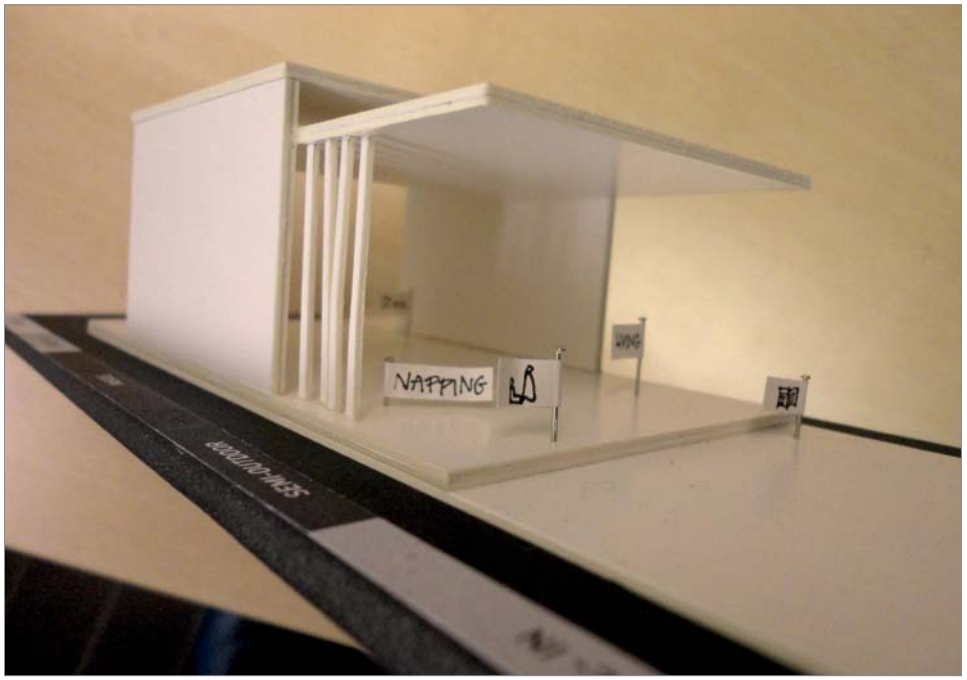
Fig.11 Three workshops will be proceeding

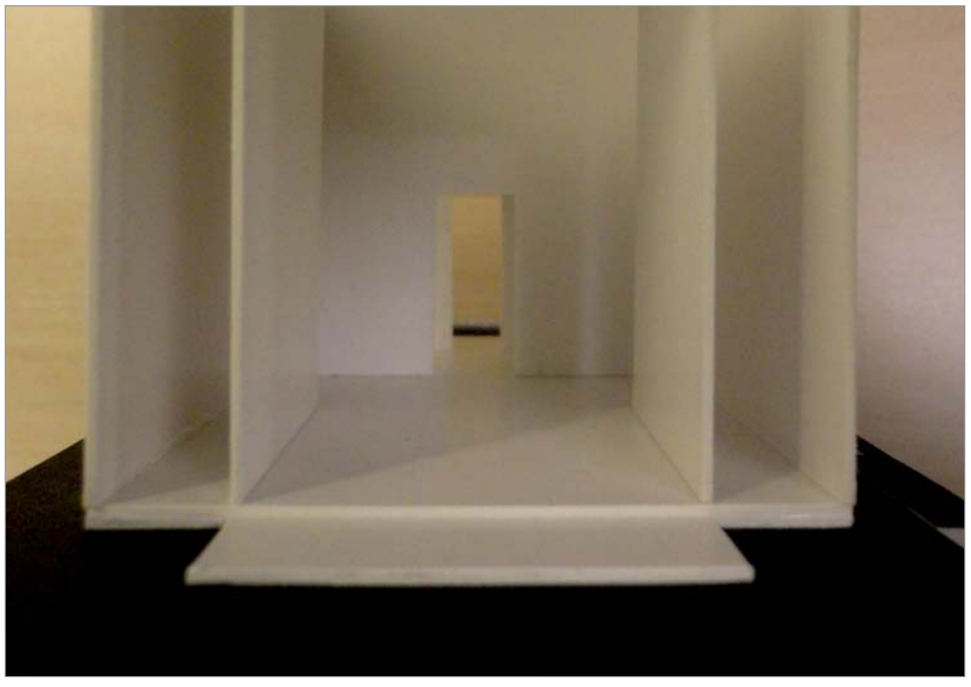
_The Preliminary Design

Actually, during the workshops some decisions on design had already been made. However, on preliminary stage is firstly integrating everything that I did experimental before. Some sketching and modeling will be coming up next.

WORKSHOP 1: Cutting Model







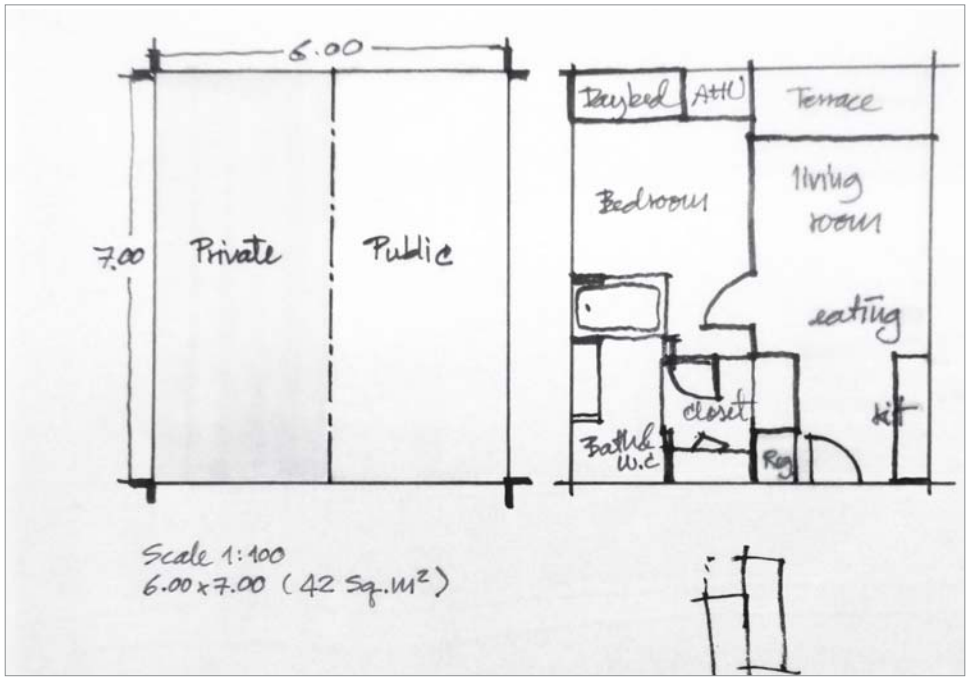
CONCEPTUAL MODEL COMPARING TWO UNITS BETWEEN LANNA & COMMON APARTMENT

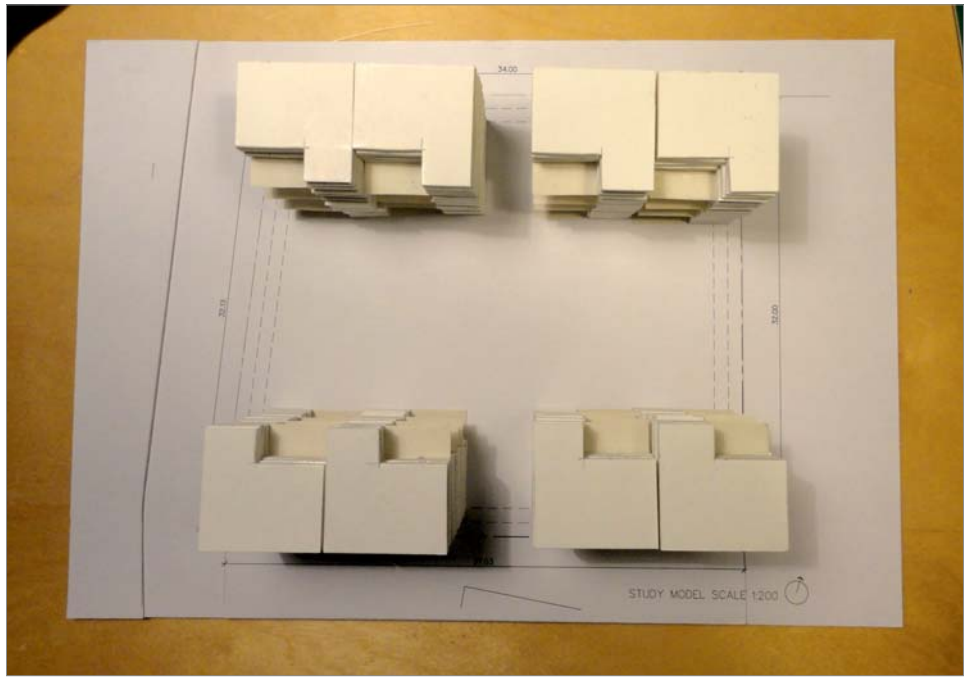
The idea of living in Lanna Unit and Common Apartment unit are already translated to the models.I want to see how it will be in the model, if I interpret follow the sequences.

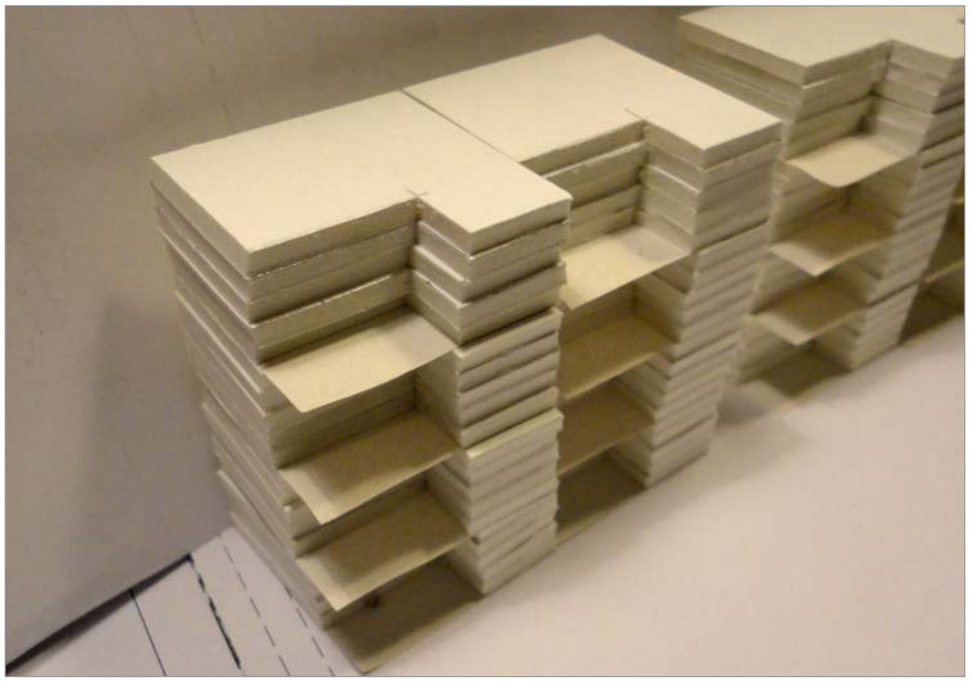
PIC 1and 2: Living in Lanna Unit
The planning as opened plan is more flexible to the residents. when they are living inside the unit. One space can occupy by many activities.

PIC 3and 4: Living in Commom Apartment Unit
The planning is formal to the function. However, at the same time, it looks to complicated by walking crossed circulation. The sequences are always INSIDE-IN and IN Deeper.

WORKSHOP 1: Connection Module Study, Option 1





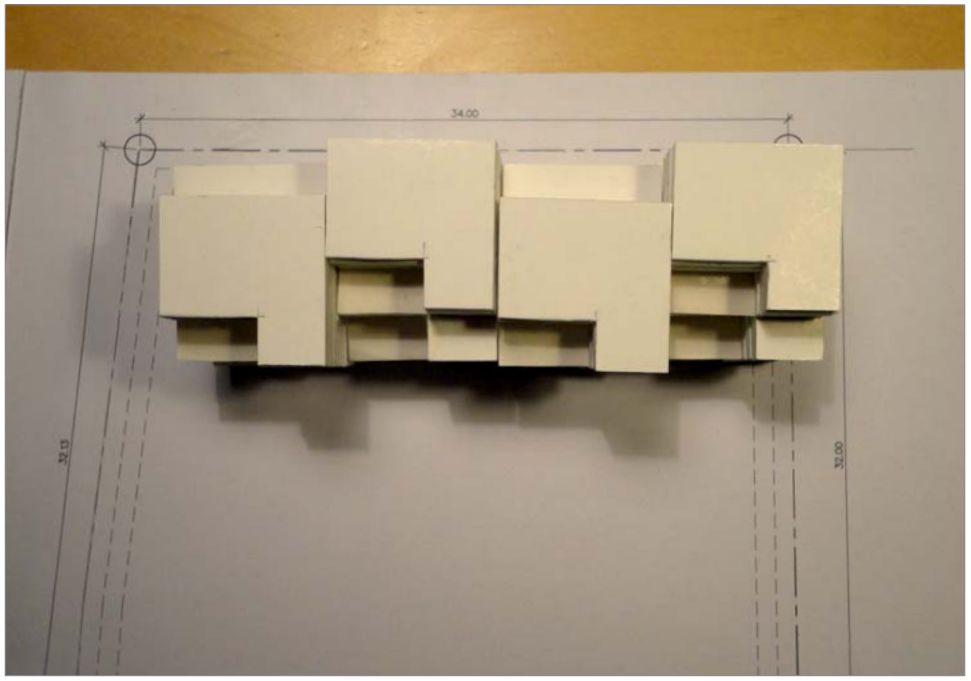


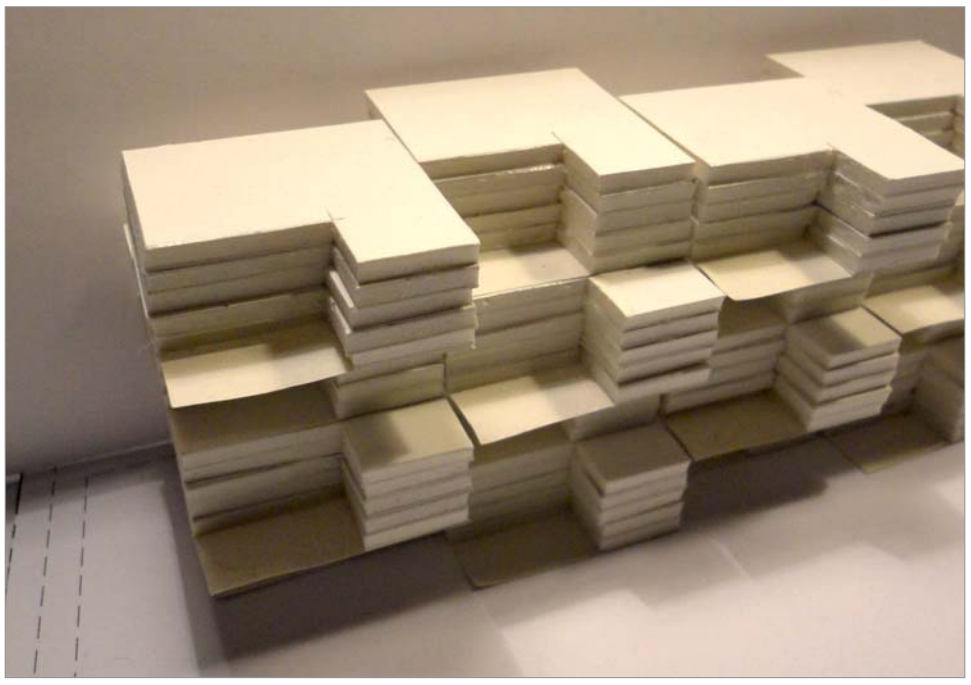
FORM FINDING
FROM ONE PERFECTLY UNIT
STUDYING HOW CONNECT WILL THEY BE

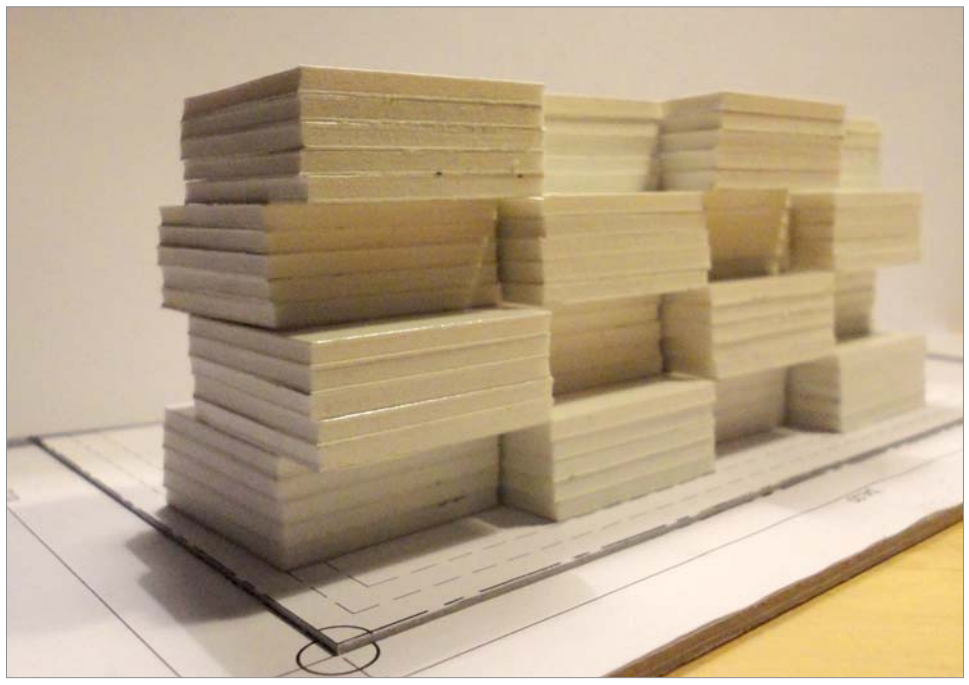
I imagine, what if I have a perfectly unit and studying from model.
My unit has 42.00 sq.m, in square shape. After site configuration,
we also know that divided building in two towers are better.
So, I experimental how does it looks, when the units connect together.

PIC 2 - 4: Connection Module Study (Option 1)
The buildings are separated to 2 buildings in each side.
In order to detect the ventilation both two season; Cool and Summer,
this option is better. However, the modules are connected in
the simply way by overlay.

WORKSHOP 1: Connection Module Study, Option 2





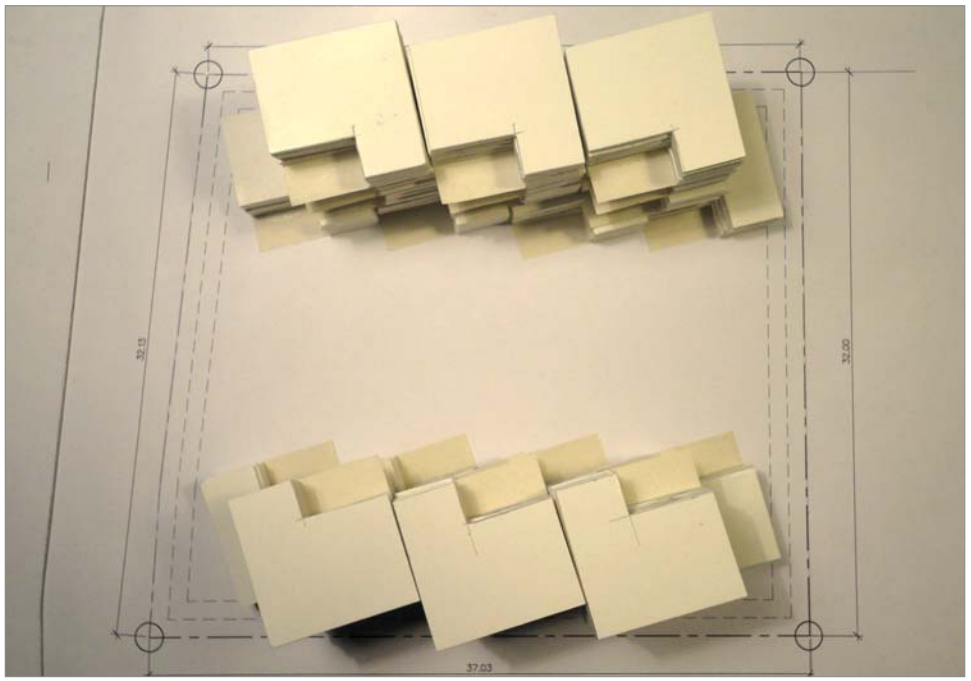


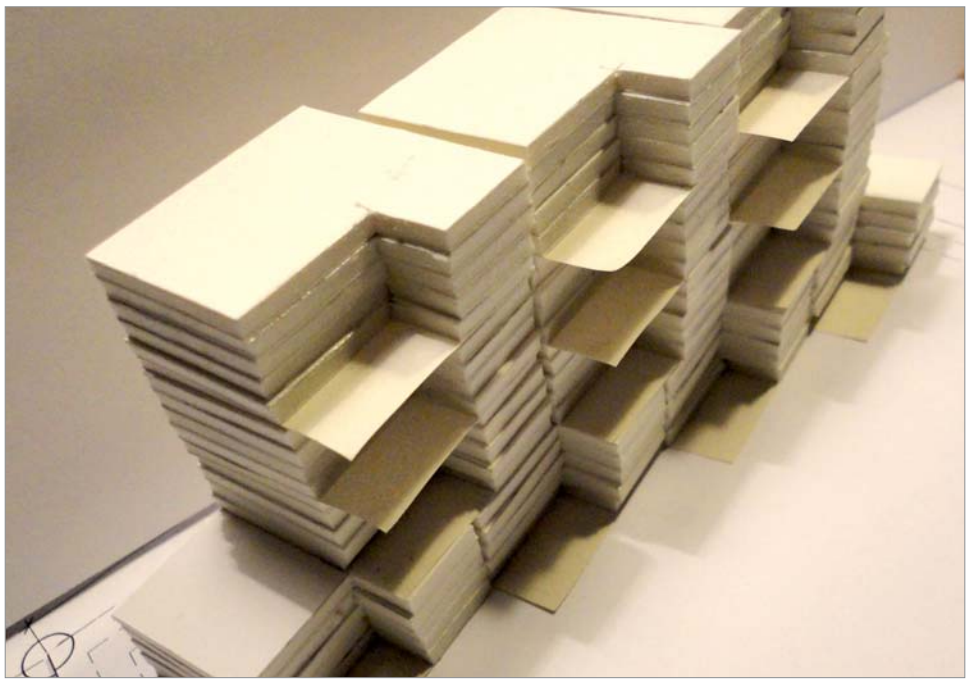
CONNECTION STUDY

PIC 1 - 4: Connection Module Study (Option 2)
The modules are connected by staking each other.
I put the main core beside of the building.
In this option, each terrace will shady by the units above.

I think, option two is the simple connection and makes the facade looks outstanding at the same time.

WORKSHOP 1: Connection Module Study, Option 3





CONNECTION STUDY

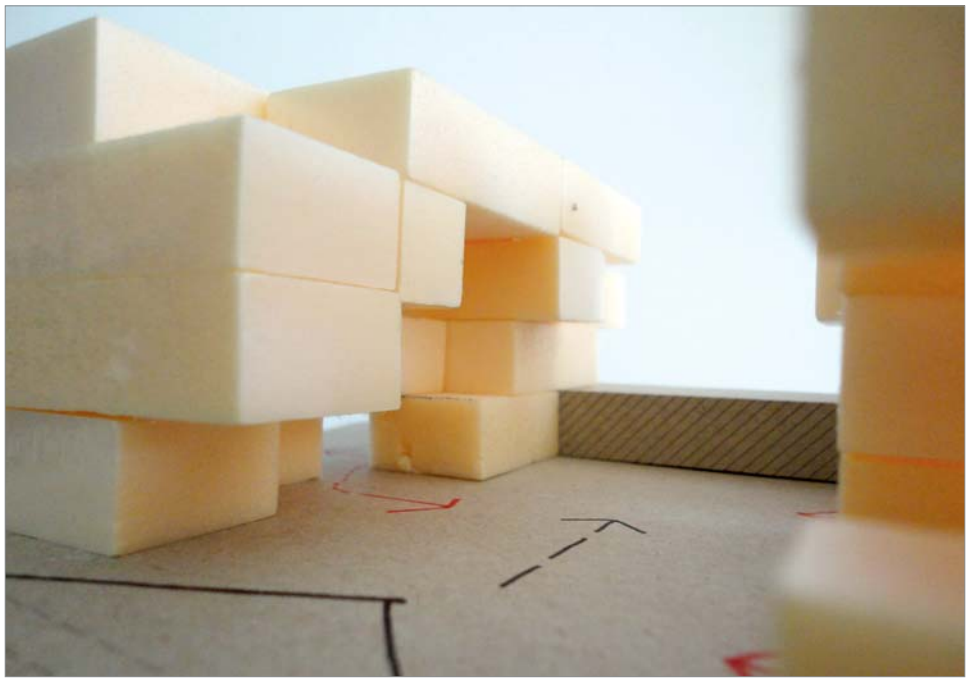
PIC 1 - 4: Connection Module Study (Option 3)
The modules are staking to each other, the main core is beside of the building. In this option, each terrace will shady by the units above. However, the building has bigger area on the podium.

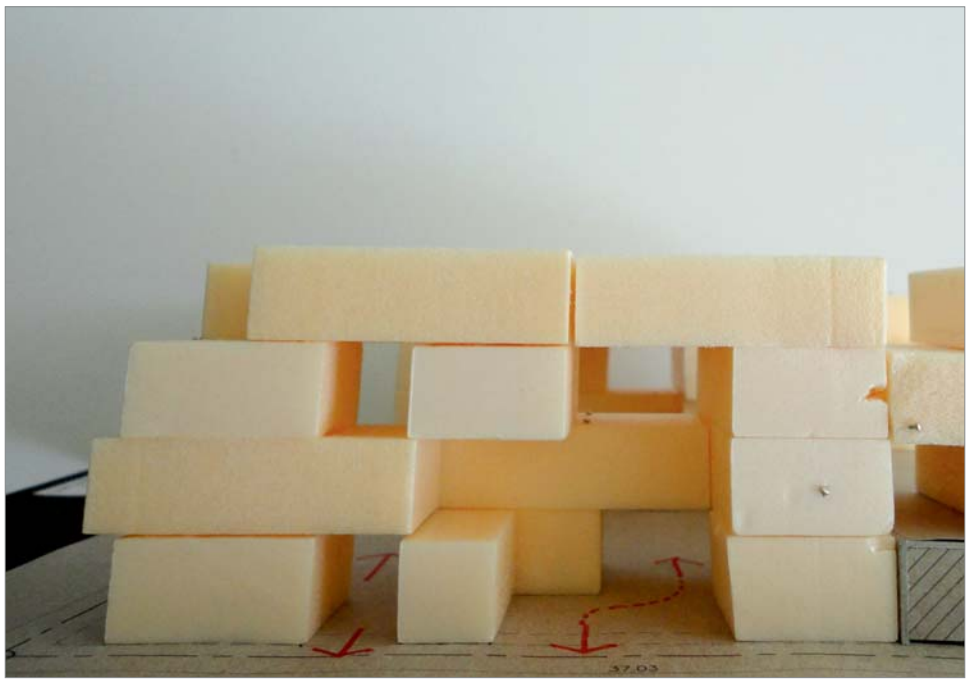
Three options are almost the same, the differences are the way they join together. On the other hand, the units will be one in the same, no options to choose.

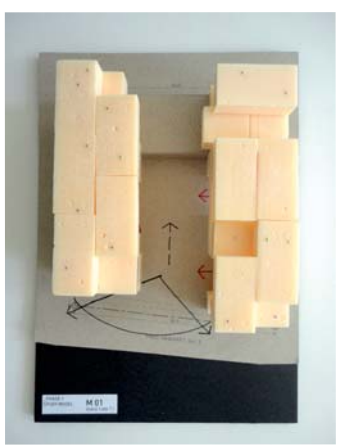
IN CONCLUSION FROM ALL 3 OPTIONS

2 DAYS STUDYING
I took two days in forming the plan and study the connections. However, when looked back at the unit. It's opened-plan but wasn't specific for people who live in Chiang Mai.

Moreover, I did experimental in a very short time. So there will have any other connection techniques more, if I step back.
I also think to add the variety of the unit options and find other ways of the unit connections.







45.00
Sq.m.

50.00
Sq.m.

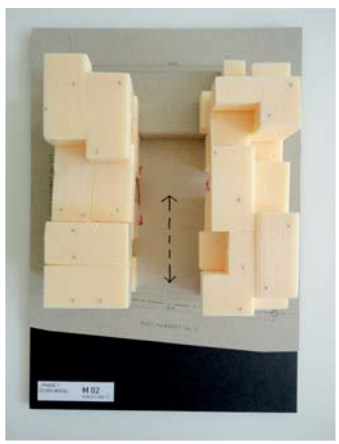
55.00
Sq.m.

FORM FINDING
FROM THREE UNITS AREA
STUDYING HOW CONNECT WILL THEY BE

I set the other way of experimental. Because earlier I very much concerned about functions inside the unit, which wasn't the right moment to think. I stepped back and reconsidered on the space of units. Three types of the area; 45, 50, 55 sq.m.

PIC 1 - 4: Model 01
Forgot the idea of function and more focusing on how the modules connects, this is the main key in the first workshop. The foam were cut to the scale 1:200 in three differences square meters.
During combined the modules, I applied the micro-climate to the building. So, there are the open space and shading area by the connections.

WORKSHOP 1.2: Form Finding, M 02



45.00
Sq.m.

50.00
Sq.m.

55.00
Sq.m.

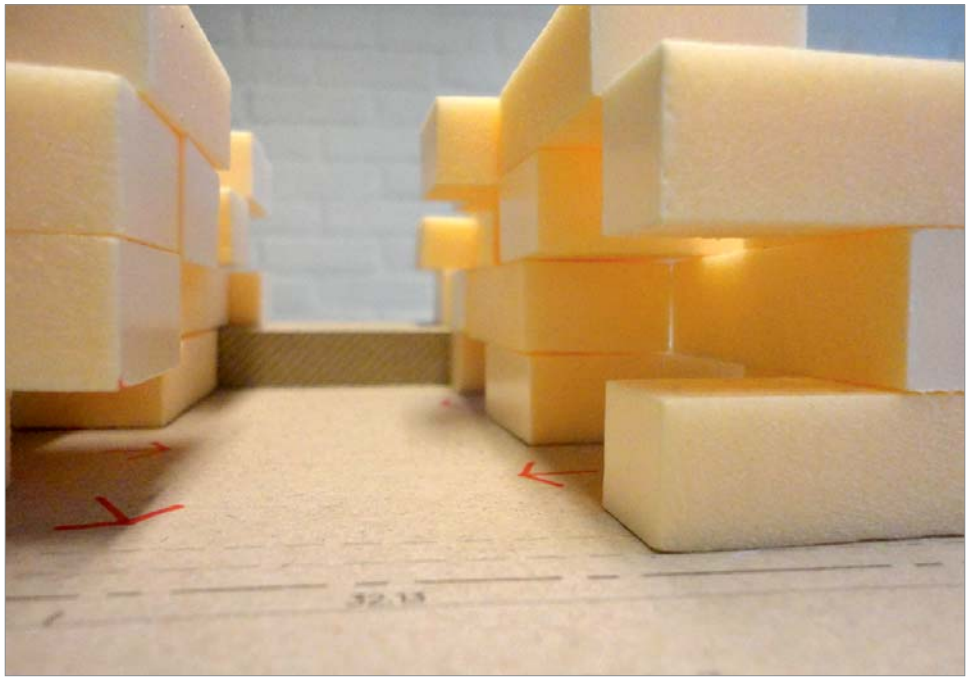
CONNECTION STUDY

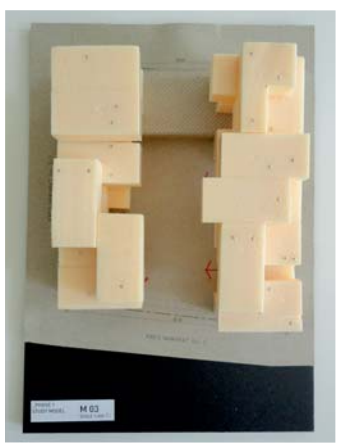
PIC 1 - 4: Model 02
The procedure same as the model 01, added the micro-climate to the building. Seeing the open well as the ventilation flow, and the area under the shading could be develop to vertical patio or private terrace. At the back of building, the modules stack to each other more than the first one.

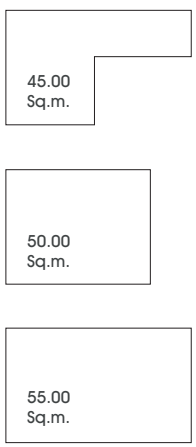
WorkshoP II

_ Form Developing _
_ Combining Units & Unit types _
_ Main Circulation _

WORKSHOP 2: Form Finding, M 03



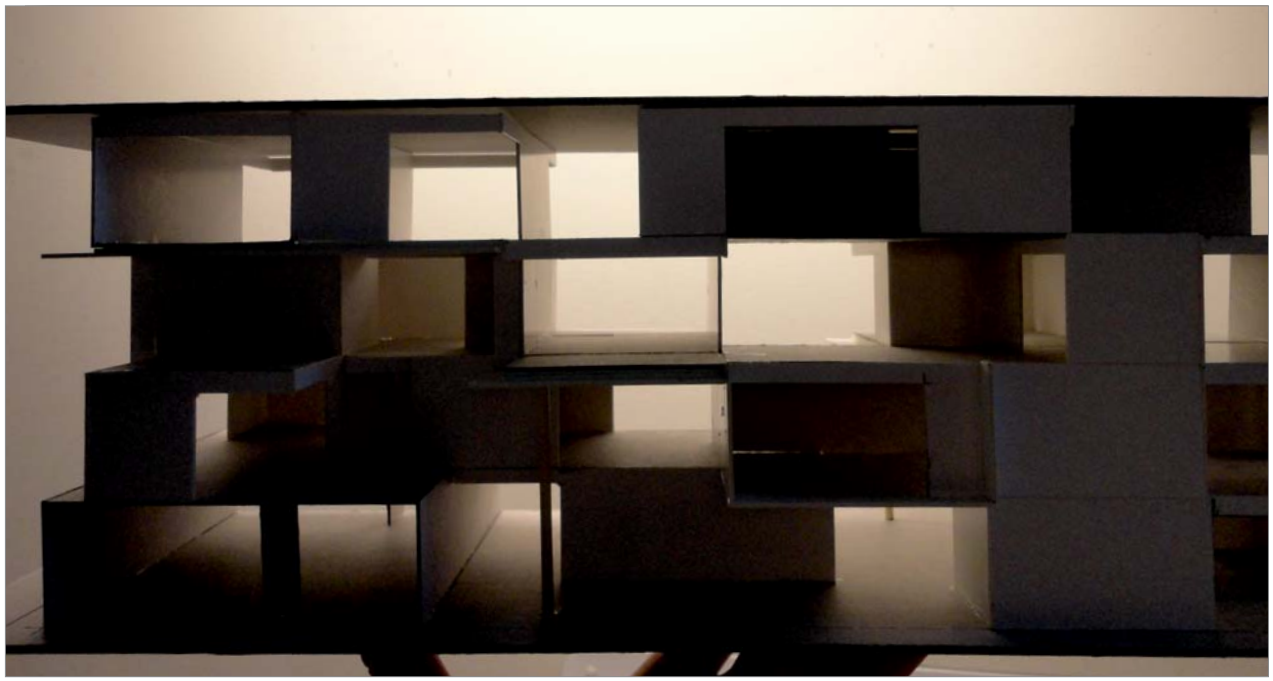




CONNECTION STUDY
DEVELOPING BY 01 + 02

PIC 1 - 4: Model 03
It is the integration of model 01 and 02, when I did the model, it wasn't for enjoying but also thinking. I could see the capability of the space, when models were extrudes and expelled.
The opening space, can be the private terrace for units or vertical patio.

WORKSHOP 2: Model 03 on 1:100



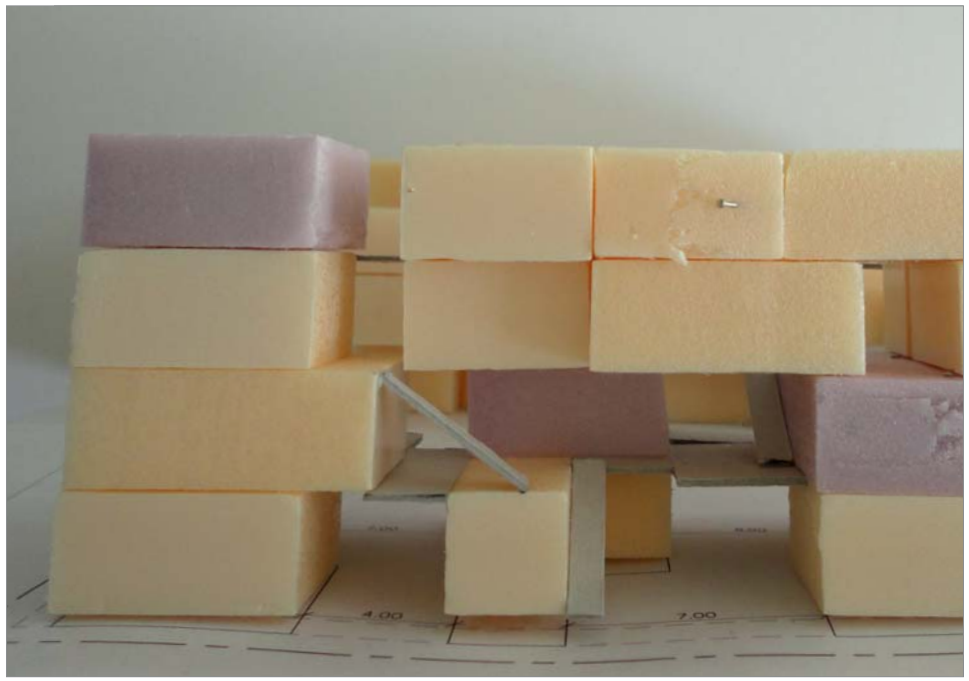
FORM DEVELOPMENT OF MODEL 03 ON SCALE 1:100

After enjoying with the foam, it's time to move on.
I choose left side of the model 03 to develop on scale 1:100
imagine how it would be if the boxes transform to windows and walls.

PIC 1and 2: Solid and Void
I lid up a model, by put the light in the back and see the result.
if the opening perfectly overlay, the light can come in to the building.
However, if the void slightly overlay, the light will inderctly come through.

PIC 3and 4: Pillars and Plains
I combine the idea of vernacular house to the building.
The Pillars lift up the units and the level differences of plains,
created the steps.

WORKSHOP 2: Adding Building System: Model 04



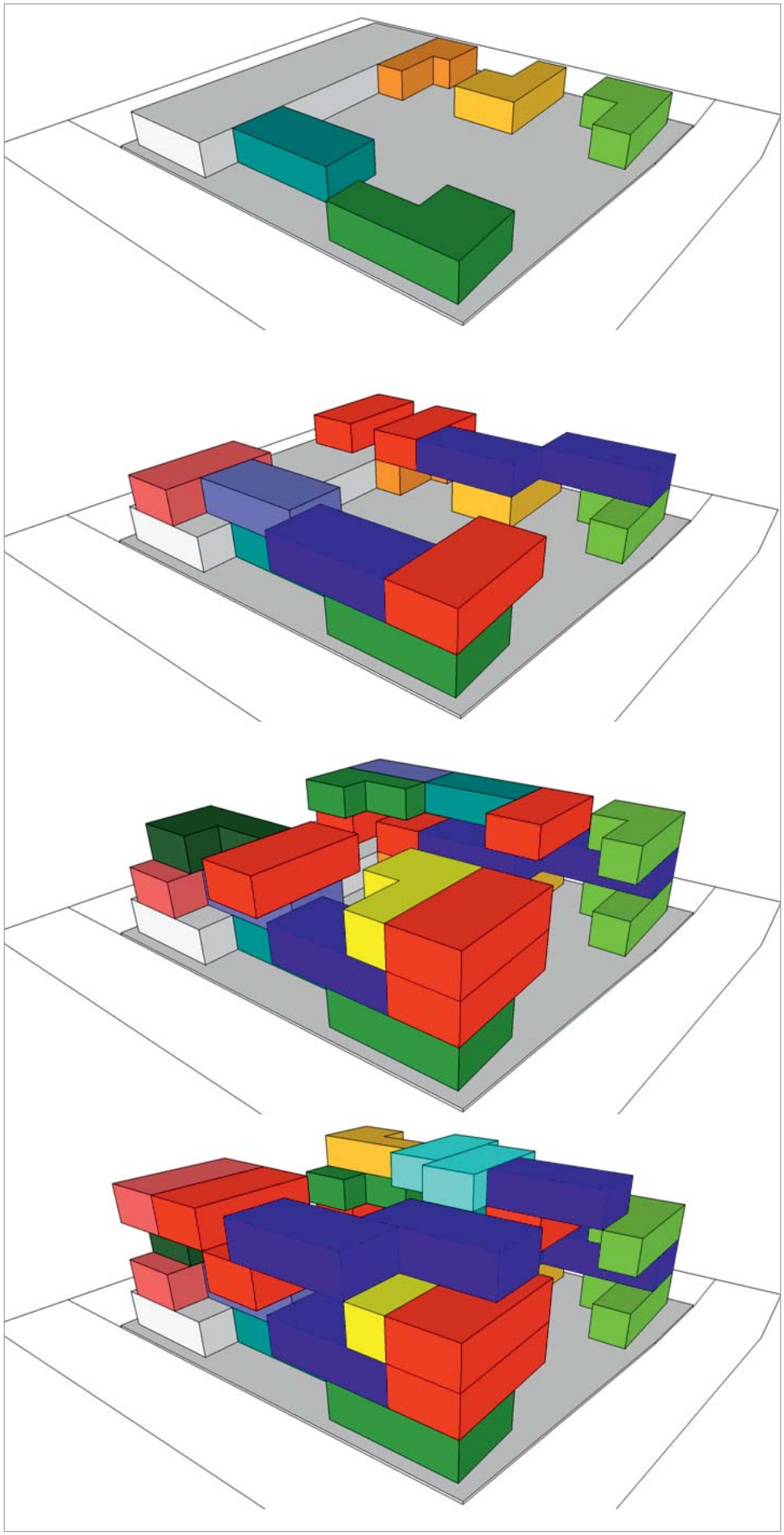
MAIN CORE AND CIRCULATION ADDED TO THE MODEL 04

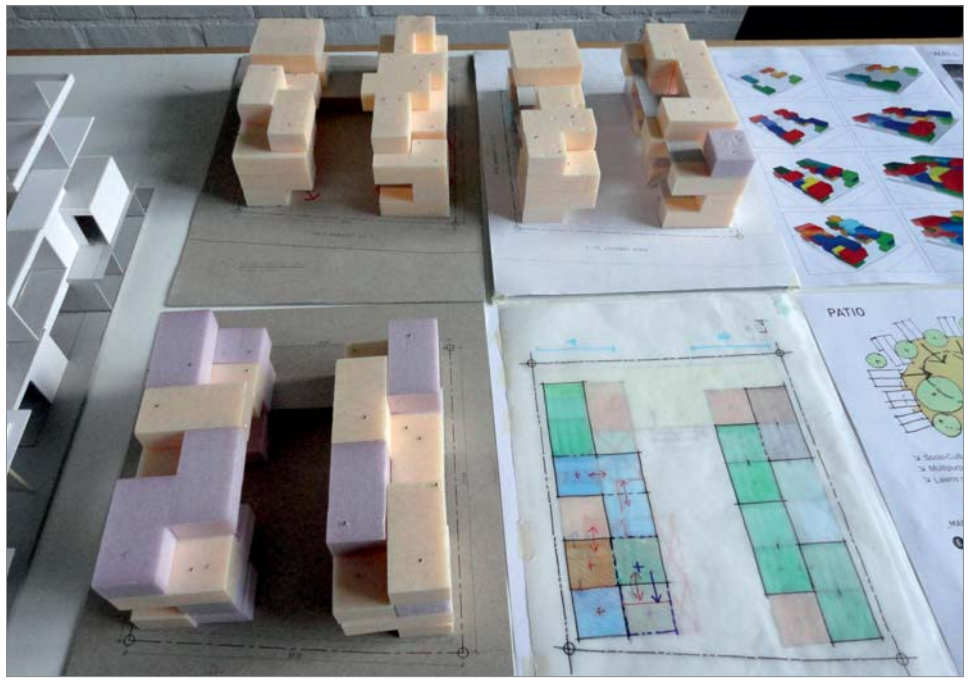
Adding the complexity to the building
I had learnt from the first workshop, if I concern on the building system too much; Main core and Unit types, the system will form the building. Then, after I stepped back, so many options I had.

On the second workshop, the theme is the added complexity into the form that I studied before. You can see from the pictures, gray papers represent of the core and corridors.

I have an idea as the community in the past, that the houses were freely located. So, the circulation, I have many stairs in different directions.

WORKSHOP 2: Adding Building System: Model 04





FACADE STUDY AND UNIT TYPES

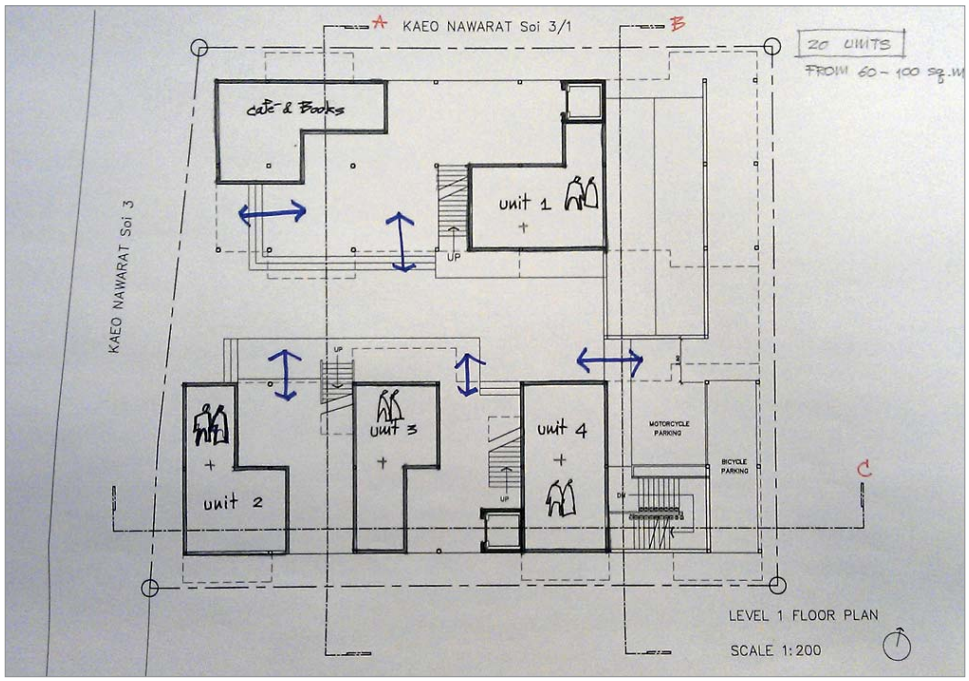
The traditional cladding techniques, I study the materials languages for the building skin of my project. I have the idea of mixing the traditional and modern applied together.

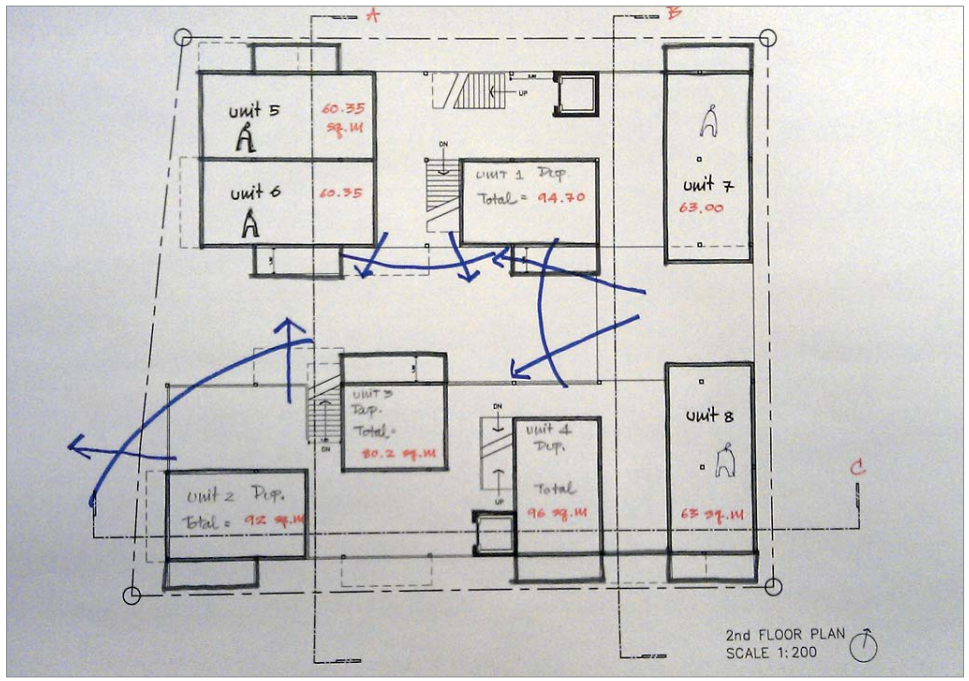
At the mean time, I am still struggling with the main core and circulations. I did many schemes. The units types, at first version the area there are three; 45 50 and 55 sq.m., but the colors are different. Because of the doors are in different positions.

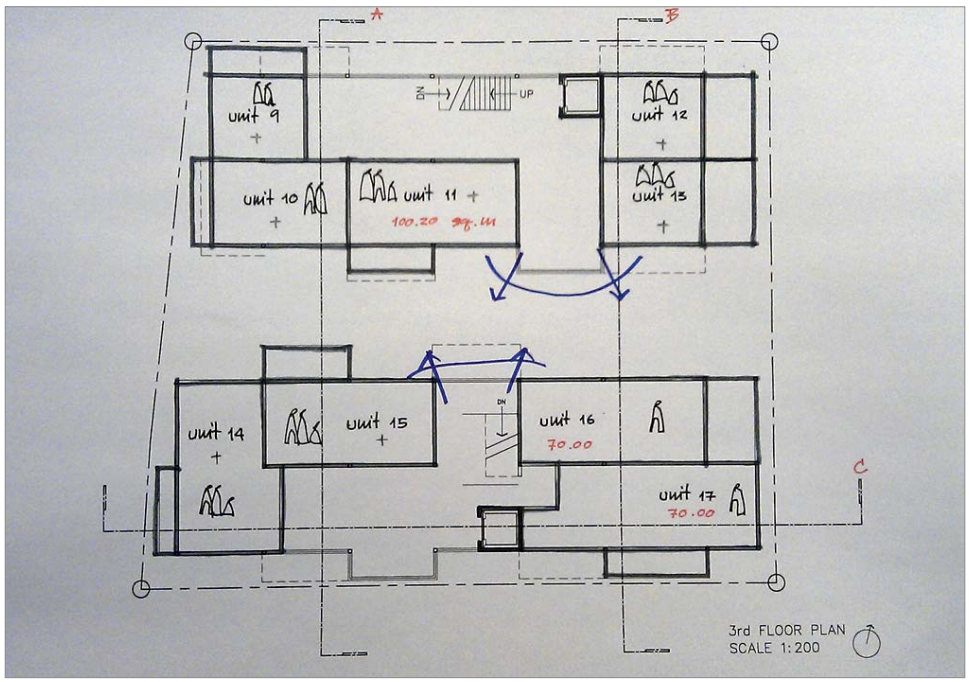
WorkshoP III

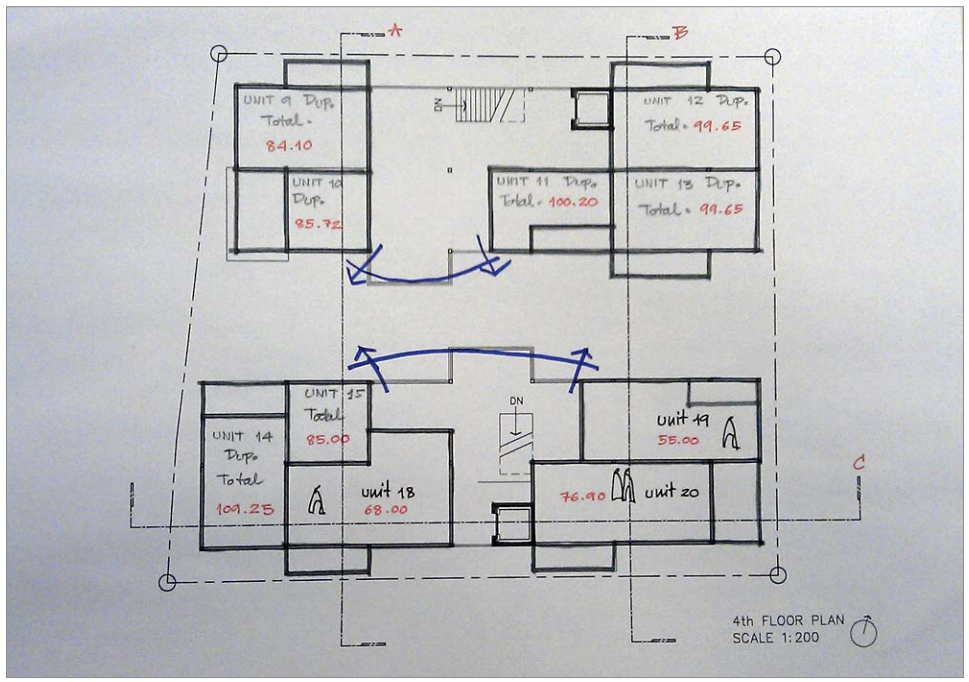
_ First Draft before Preliminary Design _

WORKSHOP 3: FIRST DRAFT





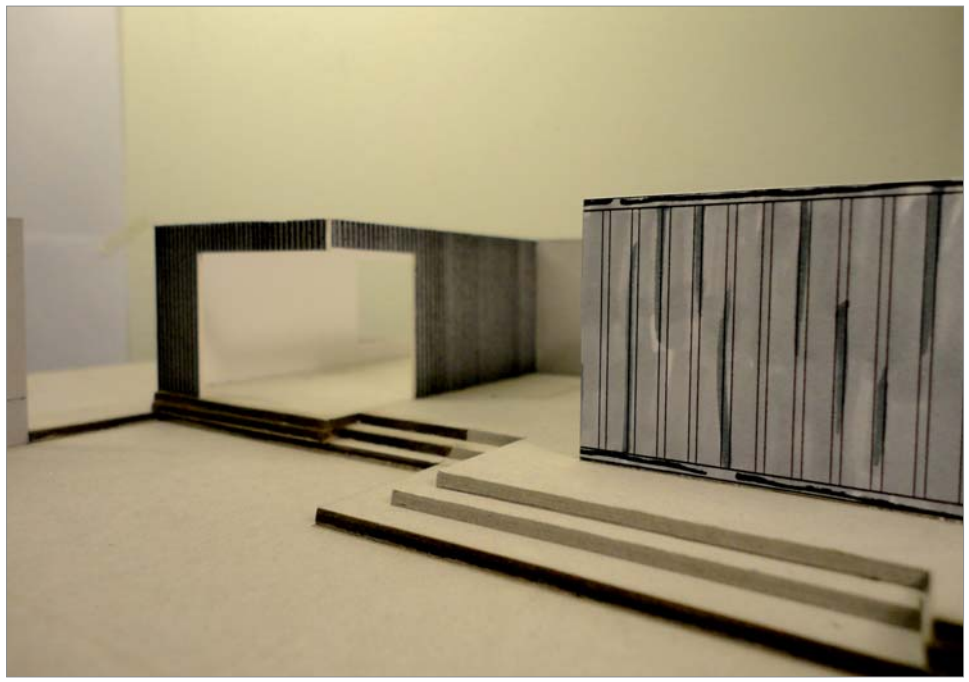




FIRST DRAFT IN PLAN
BEFORE PRELIMINARY DESIGN

Actually, on 3rd workshop it is the conclusion of unit studies and the building system. On the plan, you see the blue arrow lines. They are the point view from each floor.

WORKSHOP 3: Start with The Models



STUDY MODEL ON
SCALE 1:100

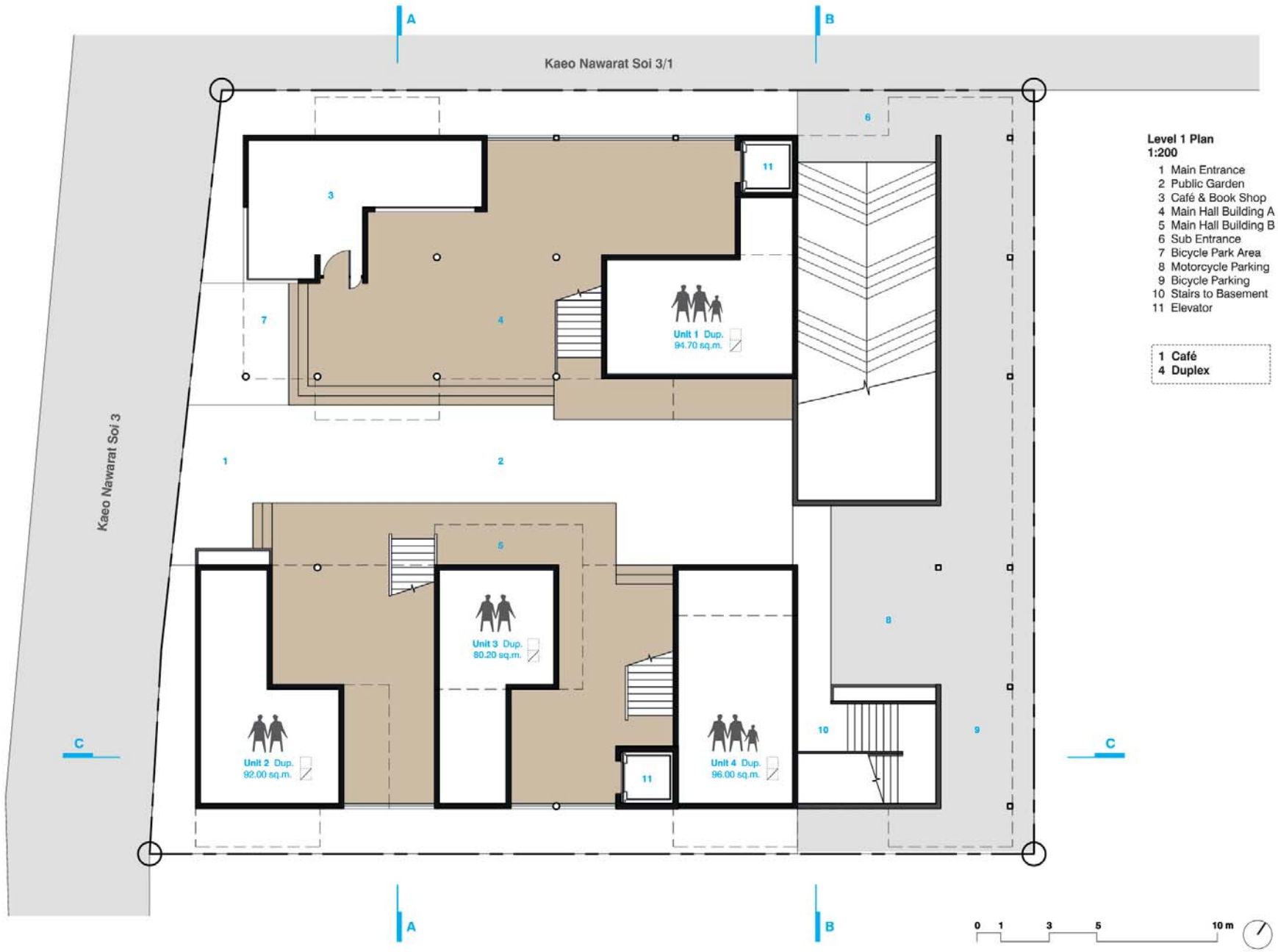
When we did the models on computer, sometimes we too much into the details. Because on the computes we can zoom in as deep as we can. So, I made decision to do a model in 1:100.

It is because the scale is properly suit for the final model.
If I cut before, I will know the problems before final production.

PreliminarY DesigN

_ Plans _
_ Sections _
_ Model _

PRELIMINARY DESIGN: Plans

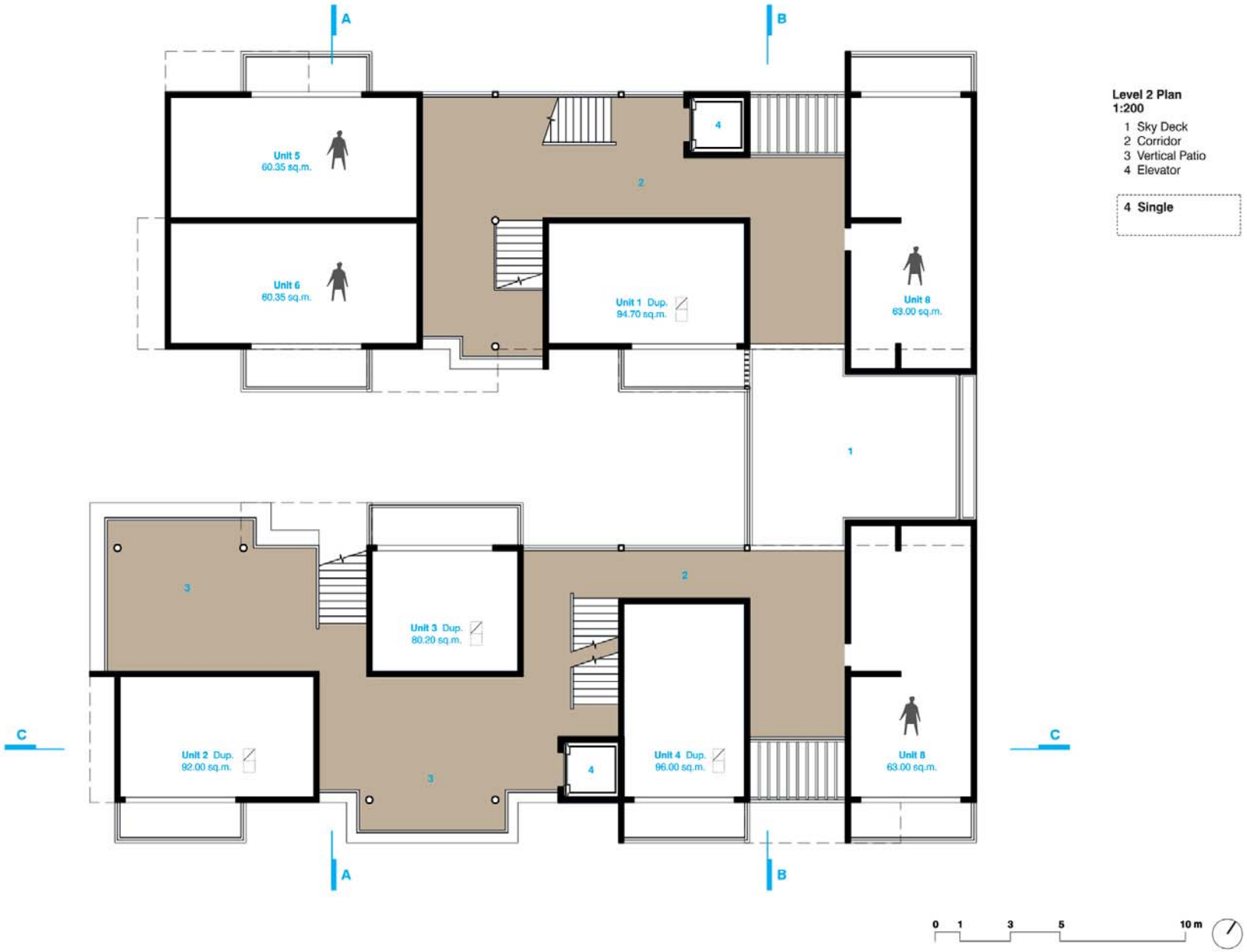


THE UNITS

Unit 1: 94.70 Sq.m.
Unit 2: 92.00 Sq.m.
Unit 3: 80.20 Sq.m.
Unit 4: 96.00 Sq.m.

Patio on the ground floor is quite big, because it is common area for the residents and the neighbors nearby. I make a café for invite the people outside come to the project.

PRELIMINARY DESIGN: Plans



Level 2 Plan
1:200

1 Sky Deck
2 Corridor
3 Vertical Patio
4 Elevator

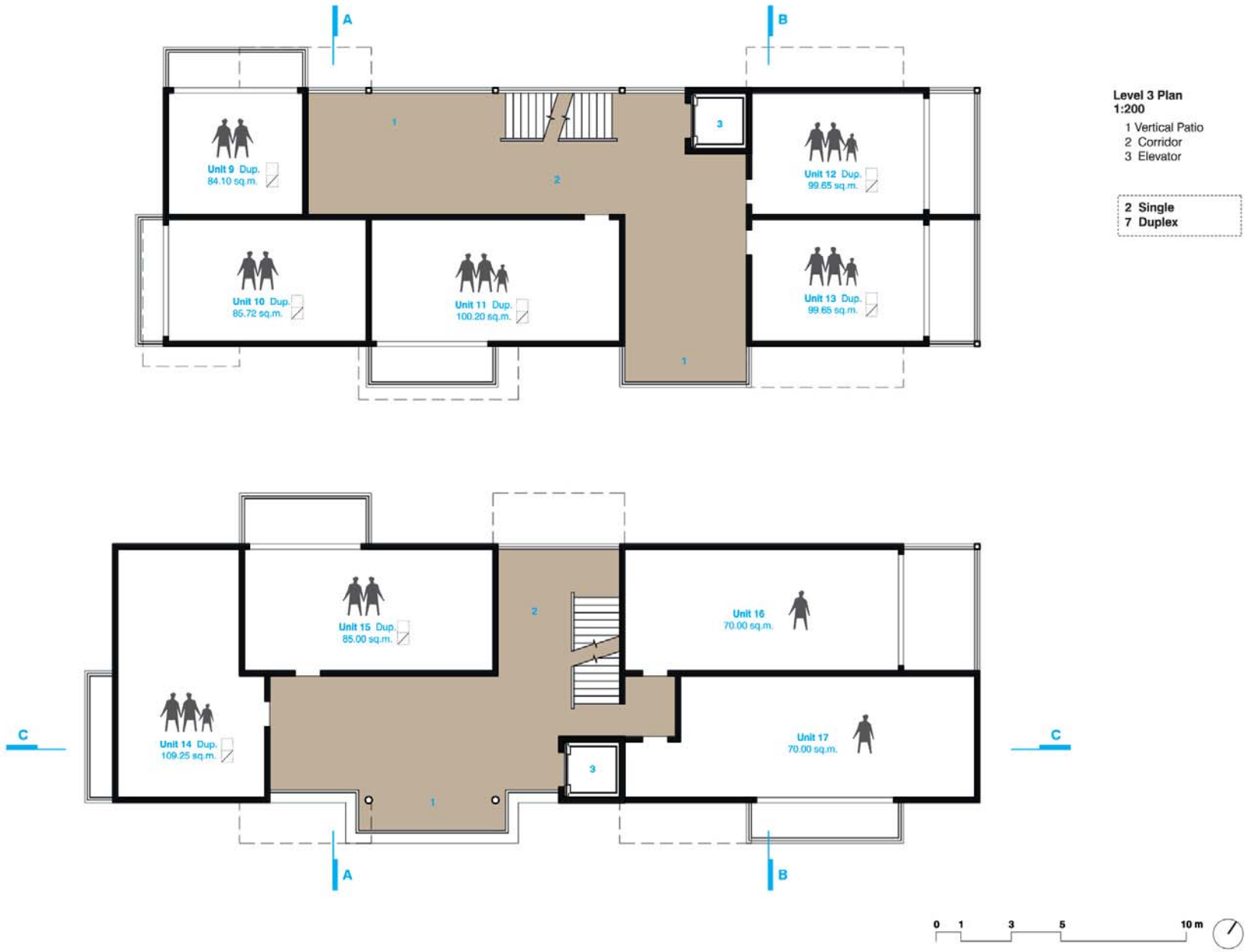
4 Single

THE UNITS

Unit 5: 60.35 Sq.m.
Unit 6: 60.35 Sq.m.
Unit 7: 63.00 Sq.m.
Unit 8: 63.00 Sq.m.

On second floor, two buildings are connected by green deck.
At the same time, I also provide the vertical patio for the residents
There are all shady in the afternoon.

PRELIMINARY DESIGN: Plans



Level 3 Plan
1:200

1 Vertical Patio
2 Corridor
3 Elevator

2 Single
7 Duplex

THE UNITS

Unit 9: 84.10 Sq.m.
Unit 10: 85.72 Sq.m.
Unit 11: 100.20 Sq.m.
Unit 12: 99.65 Sq.m.
Unit 13: 99.65 Sq.m.
Unit 14: 109.25 Sq.m.
Unit 15: 85.00 Sq.m.
Unit 16: 70.00 Sq.m.
Unit 17: 70.00 Sq.m.

On the third floor the corridor is smaller than the first and second floor.

PRELIMINARY DESIGN: Plans

Level 4 Plan
1:200

1 Vertical Patio
2 Corridor
3 Elevator

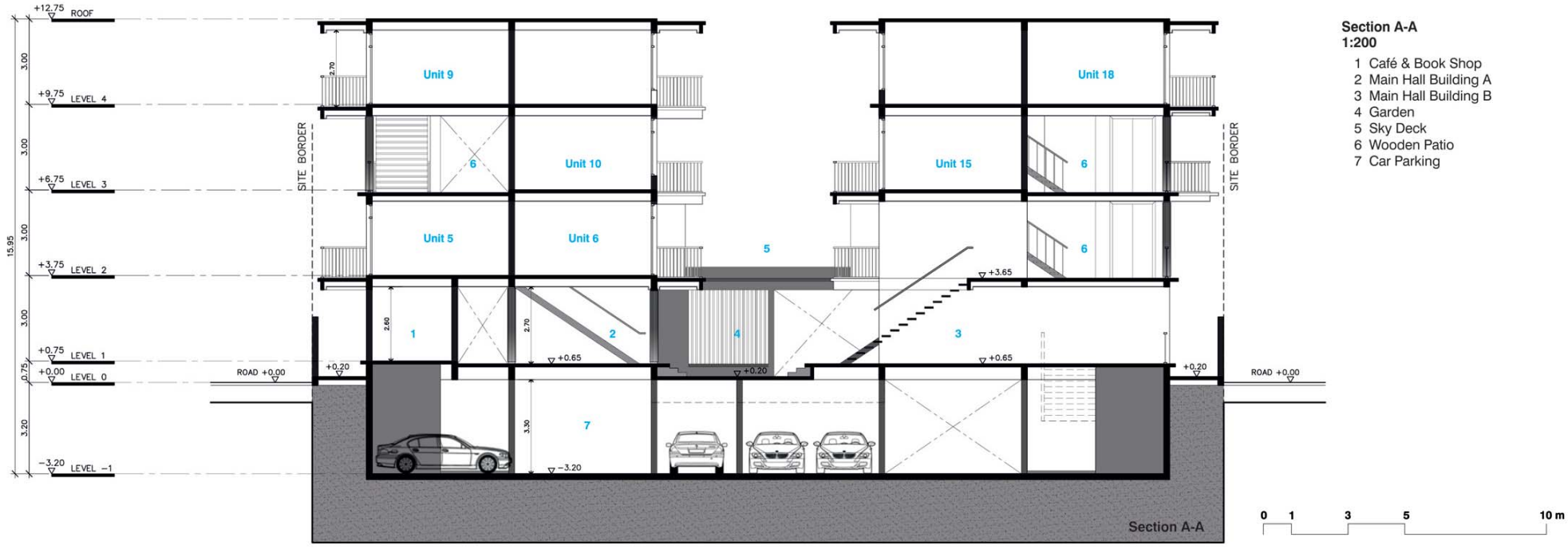
3 Single

THE UNITS

Unit 18: 68.00 Sq.m.
Unit 19: 55.00 Sq.m.
Unit 20: 76.90 Sq.m.

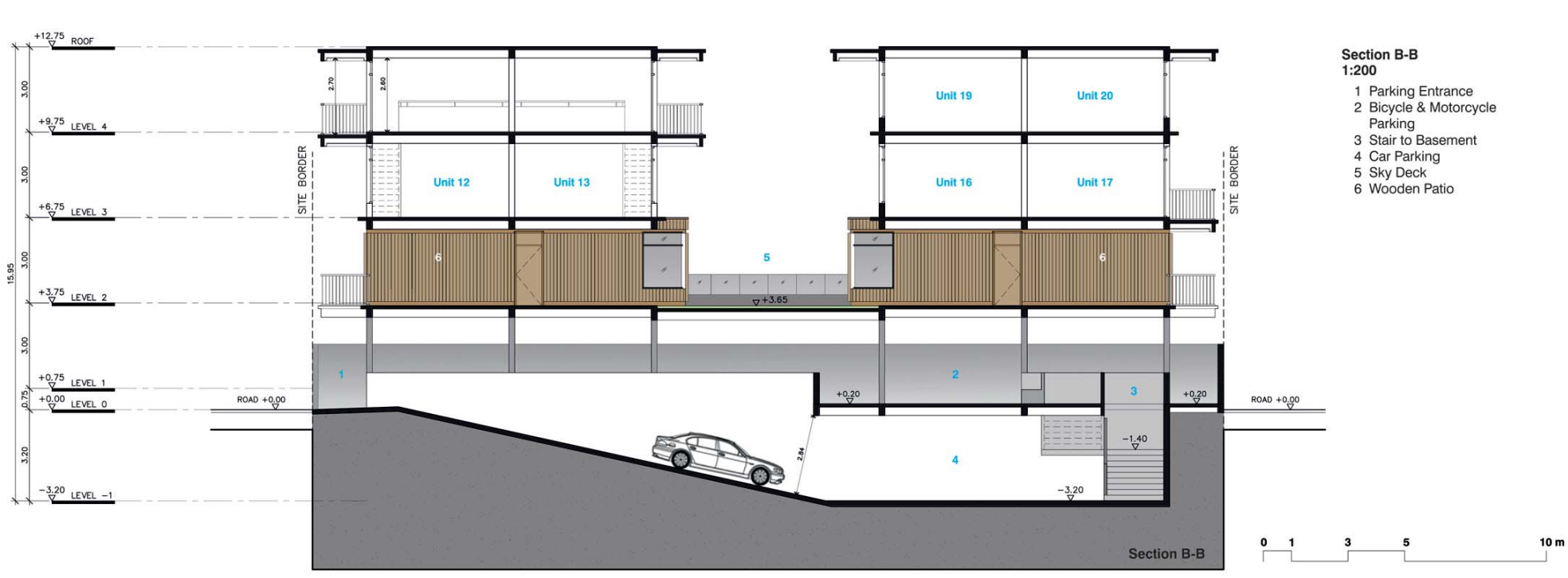
On fourth floor, **Building A** hasn't got any new rooms, because all rooms are duplex from third floor. However, at **Building B** has three units.

PRELIMINARY DESIGN: Section AA and BB



Section A-A
1:200

1 Café & Book Shop
2 Main Hall Building A
3 Main Hall Building B
4 Garden
5 Sky Deck
6 Wooden Patio
7 Car Parking



Section B-B
1:200

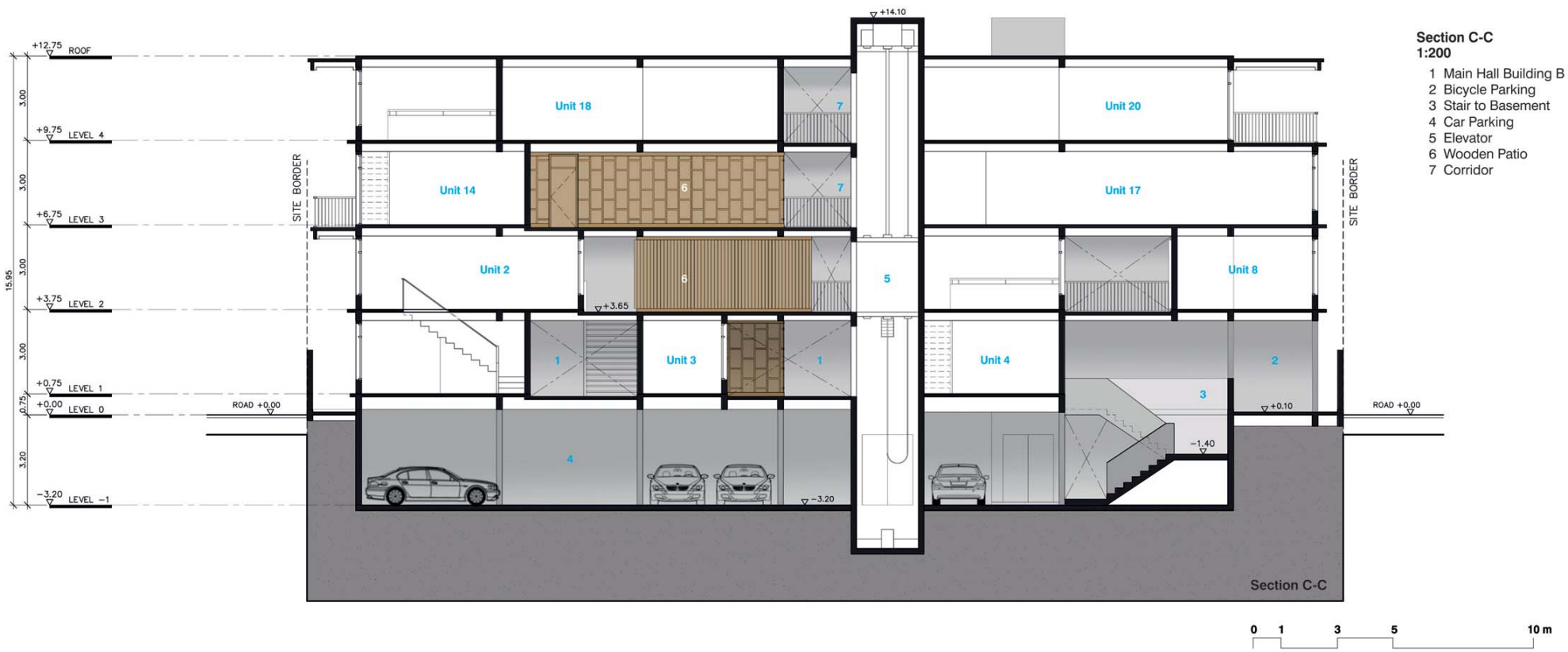
1 Parking Entrance
2 Bicycle & Motorcycle Parking
3 Stair to Basement
4 Car Parking
5 Sky Deck
6 Wooden Patio

THE SECTIONS

Section AA: Shows the green area and the patio connect to the second floors

Section BB: Shows the green deck on second floor and car parking in the underground.

PRELIMINARY DESIGN: Section CC and Model



Section C-C
1:200

1 Main Hall Building B
2 Bicycle Parking
3 Stair to Basement
4 Car Parking
5 Elevator
6 Wooden Patio
7 Corridor

THE MODEL

All windows in this model, they are made up to see the atmosphere and the proportion of the windows. I also studied on facade patterns, by giving in differences and directions.

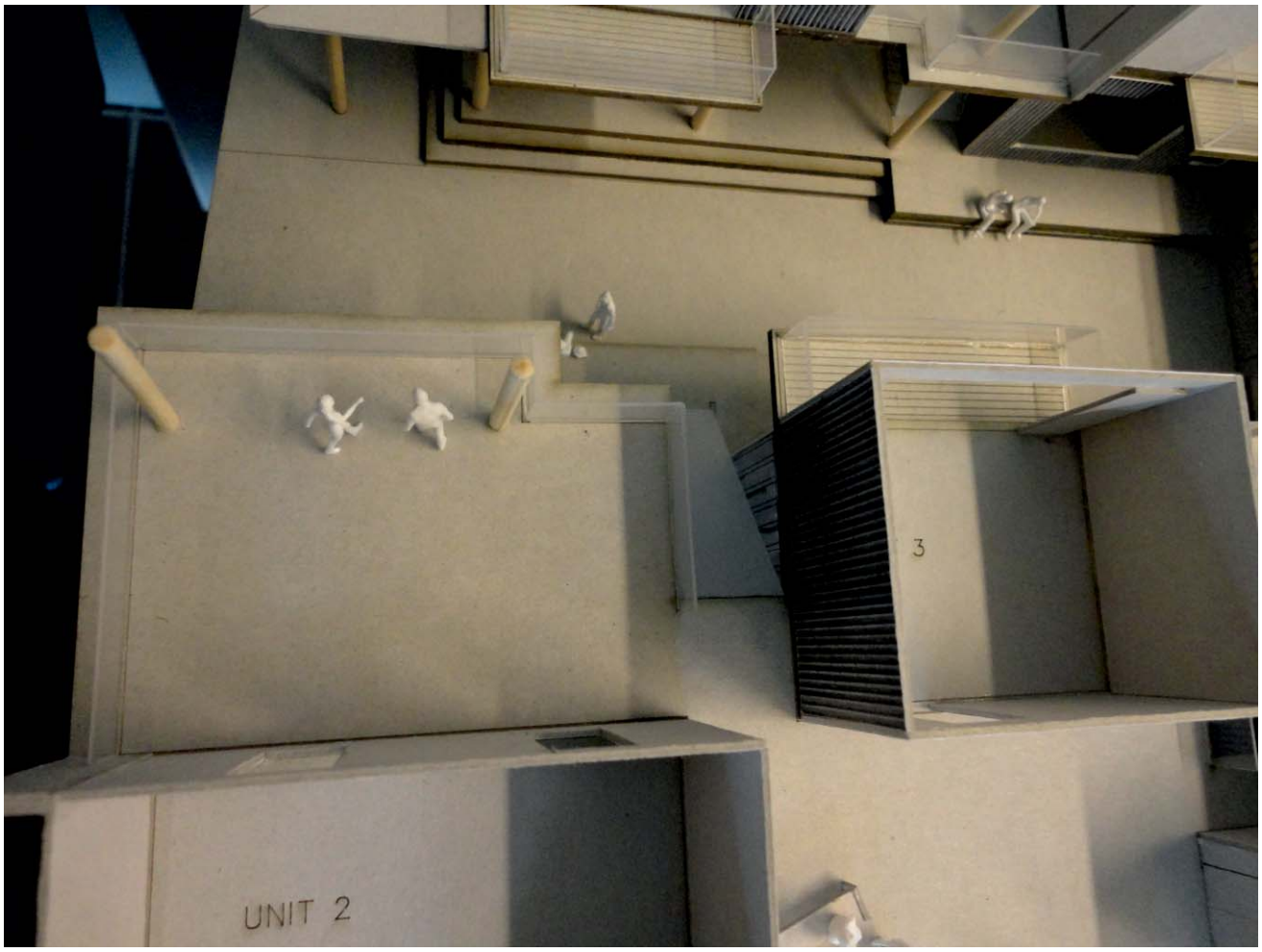
Process and Design Development

Chapter 05

DesigN DevelopmenT

_ Integration _
_ Interpretation _
_ Interpenetration _

LEARNING FROM MODEL

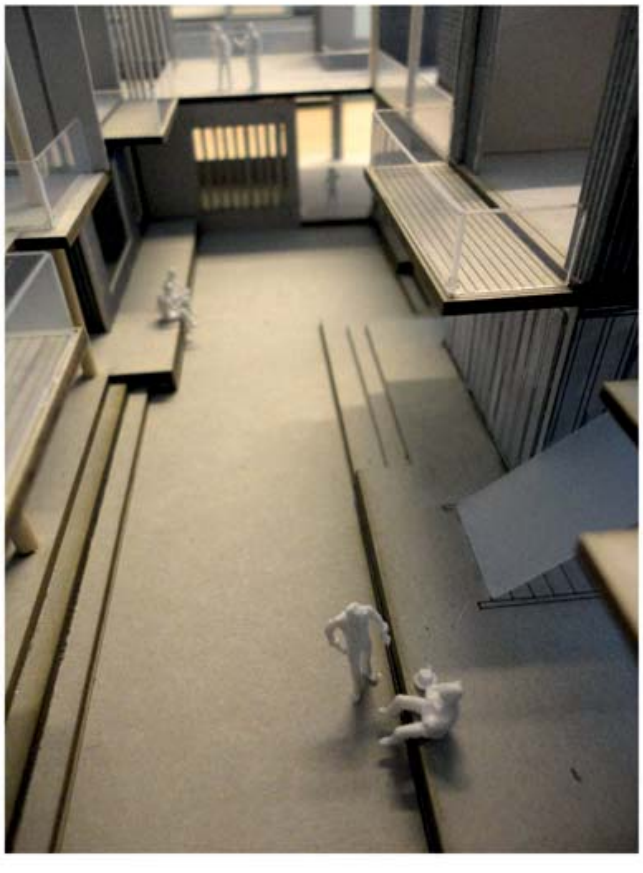


THE PROCESS DEVELOP FROM MODEL

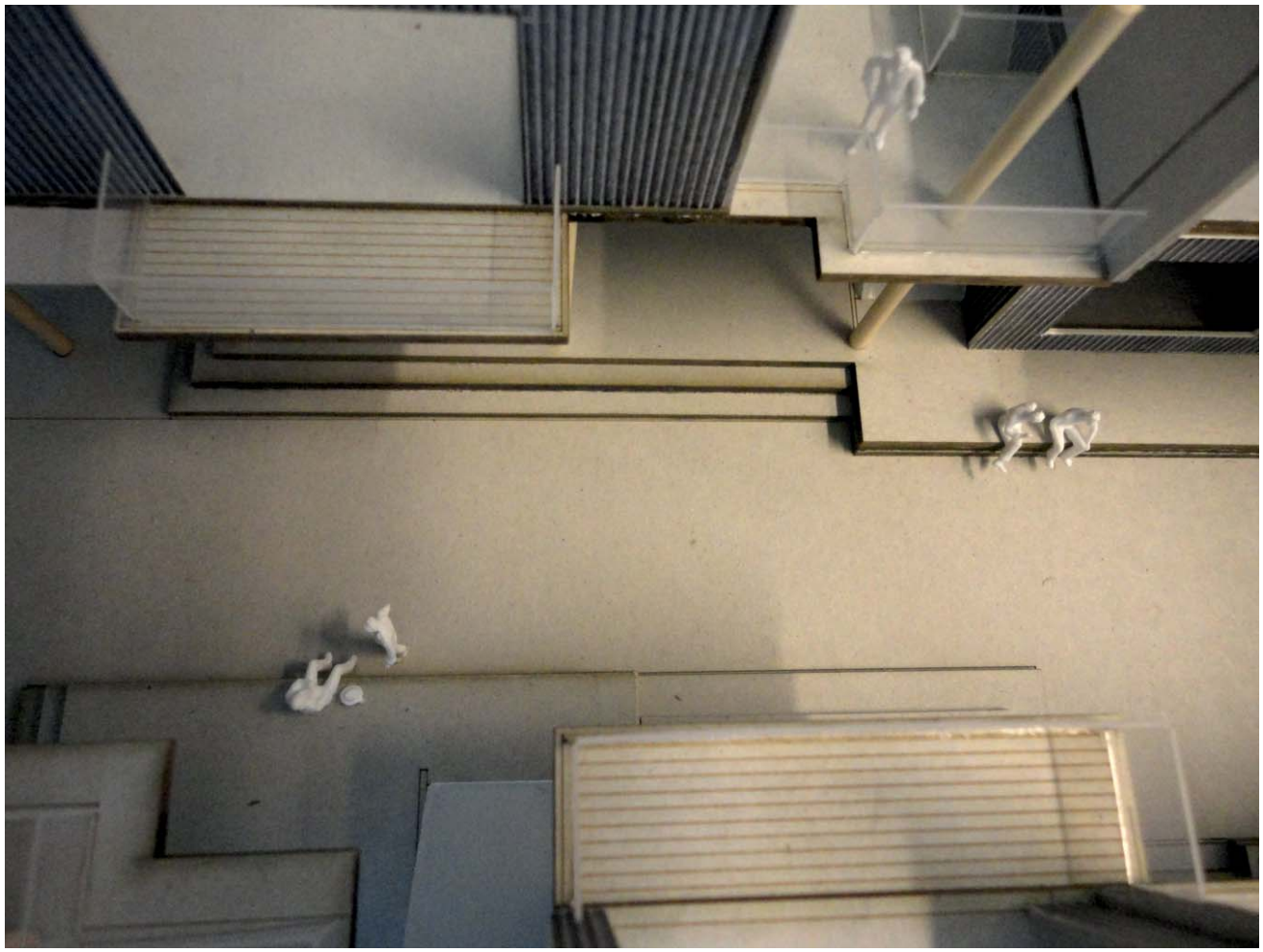
The process from Prelim-Design is continually merged to Design Development. During did the model, I laser cut only floor plans. Wall in the elevation I manually did by hand.

From the plan on prelim design, Main entrance to each unit is done, however, I did not know the function and which area I should make the windows.

Nonetheless, after the model had finished, I could see the real space of my project. Everything became clearer, I know which parts of the building, have to solve.



LEARNING FROM MODEL

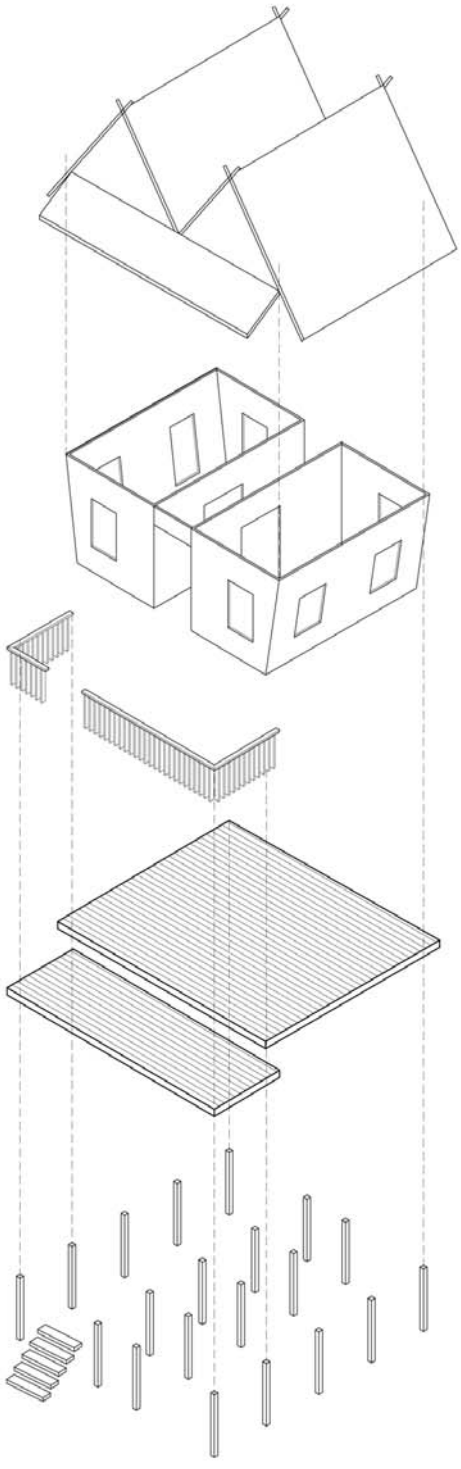


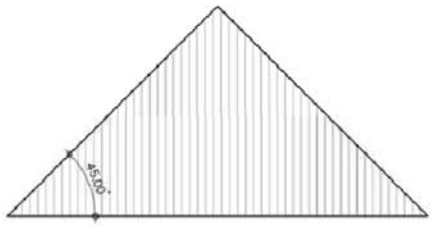
THE MISUNDERSTOOD FROM MODEL

As I mentioned earlier, this model is for study, it is not the final model. Generally images, from people who interested in my project. They thought this was the final model and it looked like a construction model.

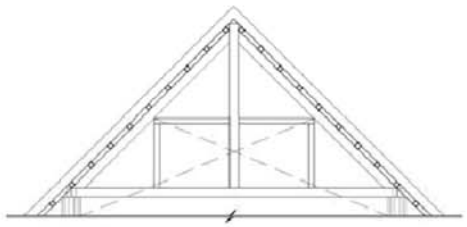
Normally when people cut model by hand, it commonly perceive the paper thickness as part of the model.
It doesn't mean on the facade will see the beam as it is in this model. For me, I obviously wondered why they questioned me in this way. At the end, the model will be treated in a nicely way.

INTEGRATION & INTERPRETATION

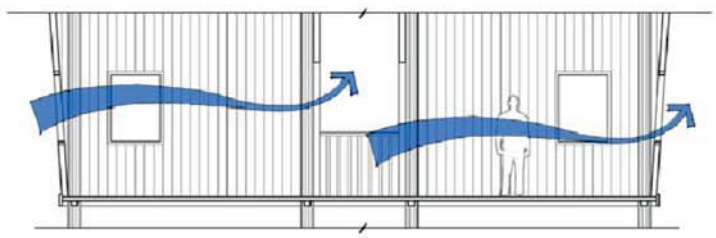




01 | Solid Mass as Triangle; High Roof, Angle 45-55 degree



02 | Roof Section shows interior structure and no Ceiling inside



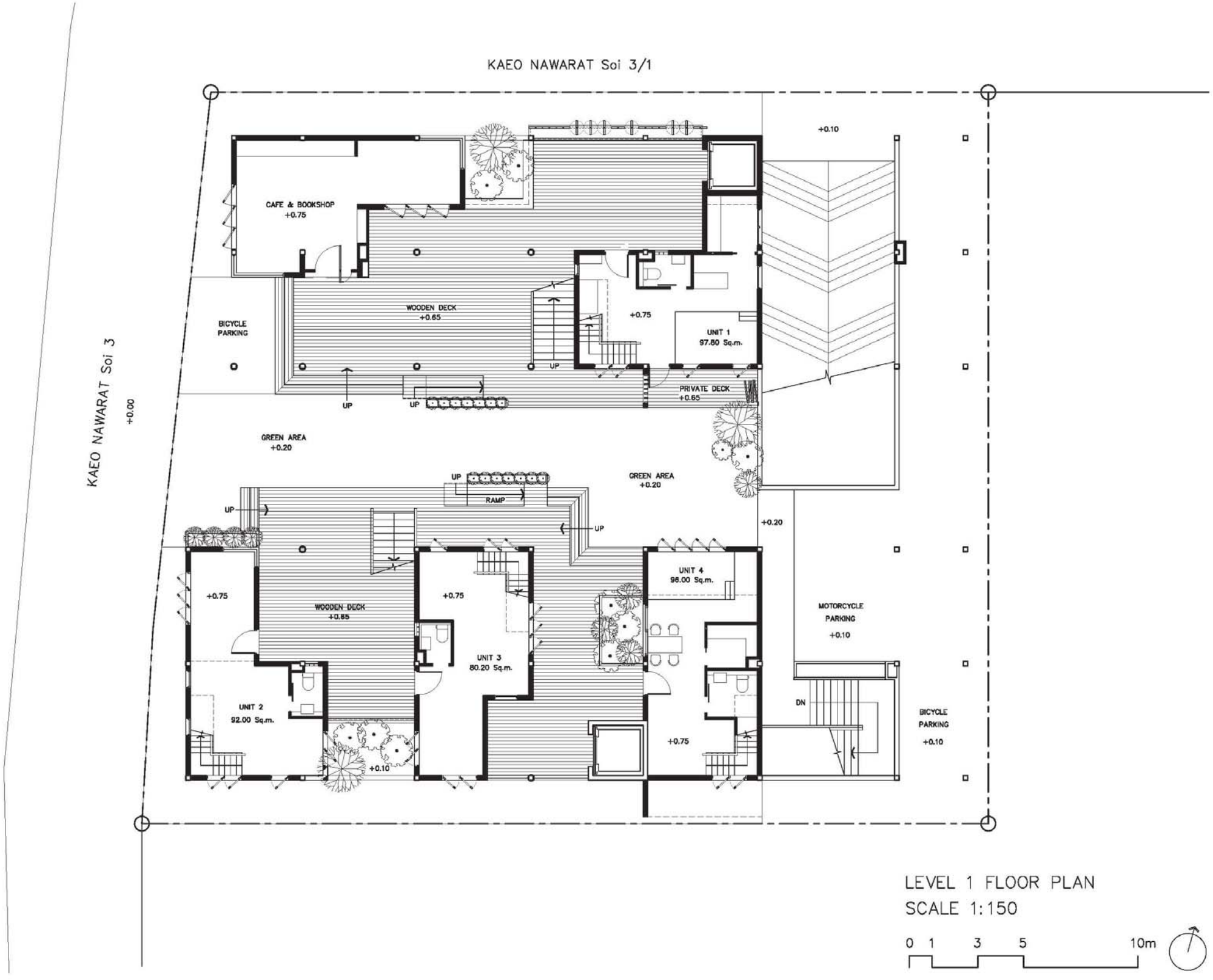
03 | Section shows the openings and windows, which proper for house ventilation.

THE ESSENCE OF INTEGRATION & INTERPRETATION

Depth in the design enjoyment, sometimes we might forget the main idea on translation to the architectural space. I don't want something lost in translation.

In order to design the function inside the units, I want to have a spatial architectural suit with people who live in Chiang Mai.

FLOOR PLAN DEVELOPMENT



GROUND FLOOR PLAN
MATERIALS AND FUNCTIONS ADDED

The steps on the patio are part of wooden deck, people can either sit on or lay down take a rest under shady on weekend. There are the bicycle parking both side of the project. Because in small community people usually transport by cycling.

FLOOR PLAN DEVELOPMENT

Level 2 Plan
1:150

1 Sky Deck
2 Corridor
3 Vertical Patio
4 Elevator

0 1 3 5 10 m

FLOOR PLAN DEVELOPMENT

Level 3 Plan
1:150

1 Private Deck
2 Vertical Patio
3 Elevator

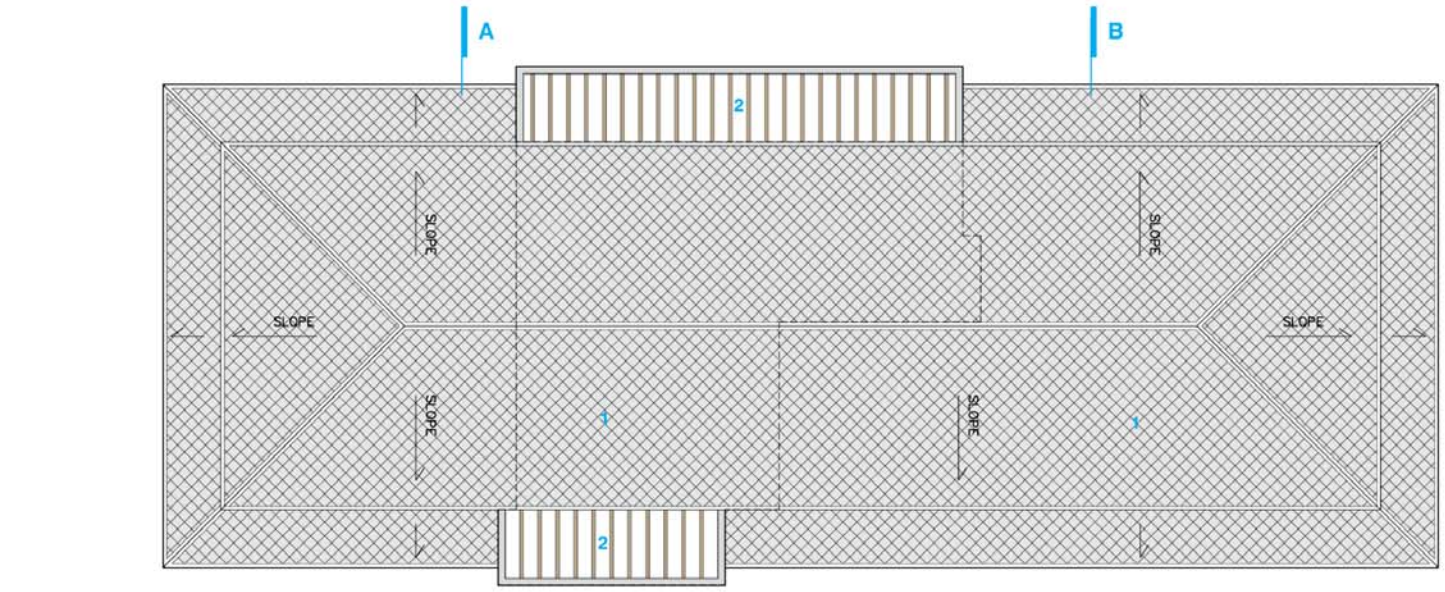
FLOOR PLAN DEVELOPMENT

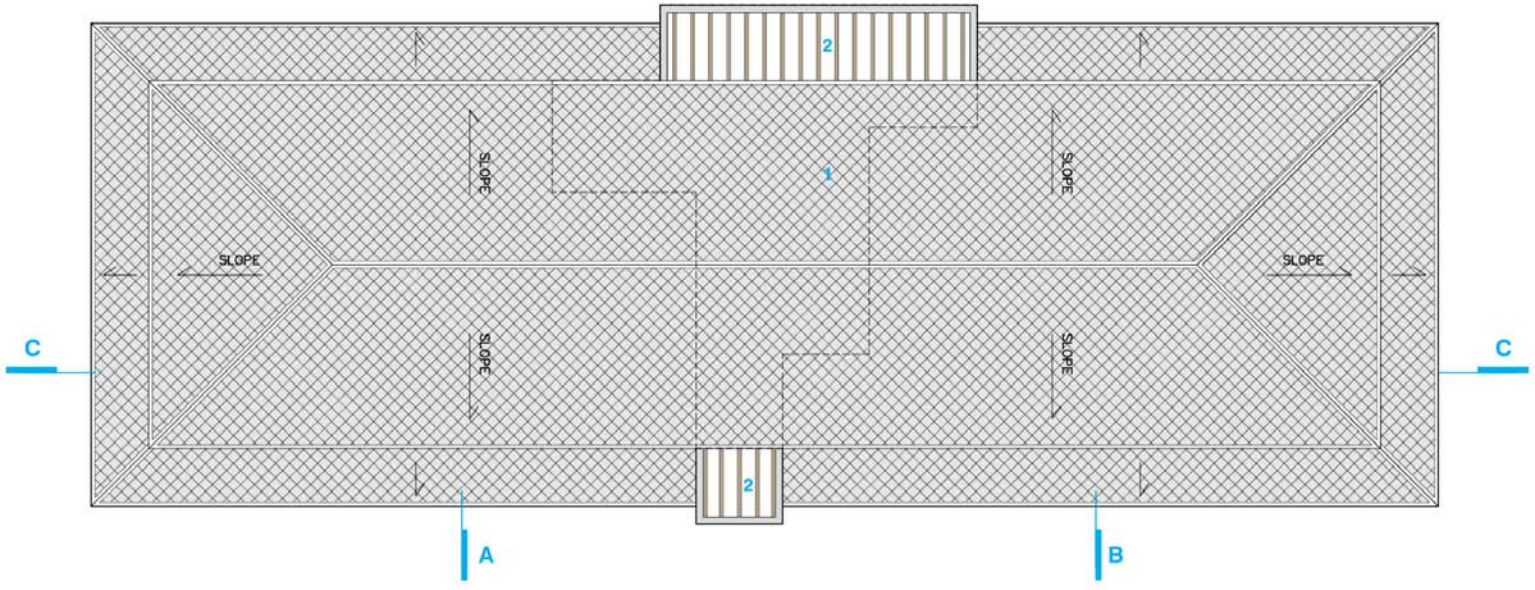
Level 4 Plan
1:150

1 Private Deck
2 Vertical Patio
3 Elevator

0 1 3 5 10 m

FLOOR PLAN DEVELOPMENT



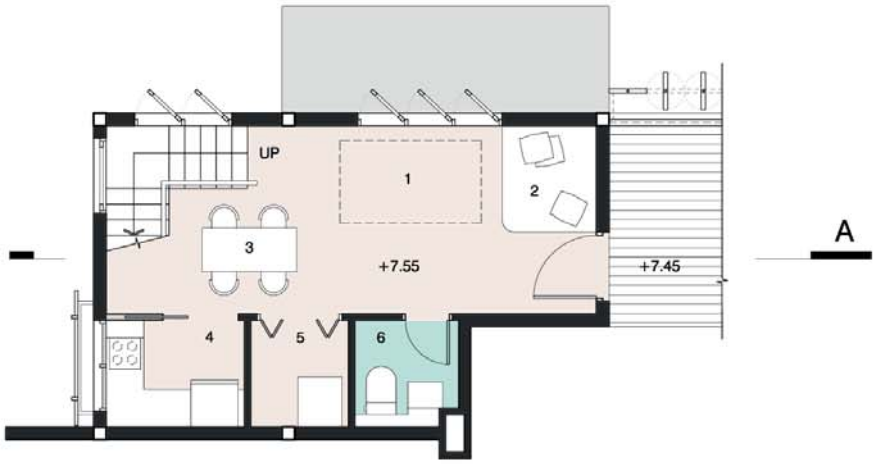


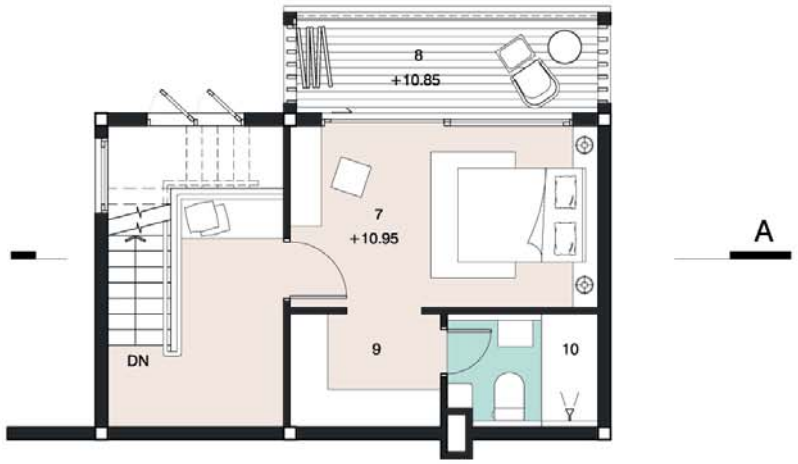
Roof Plan
1:150

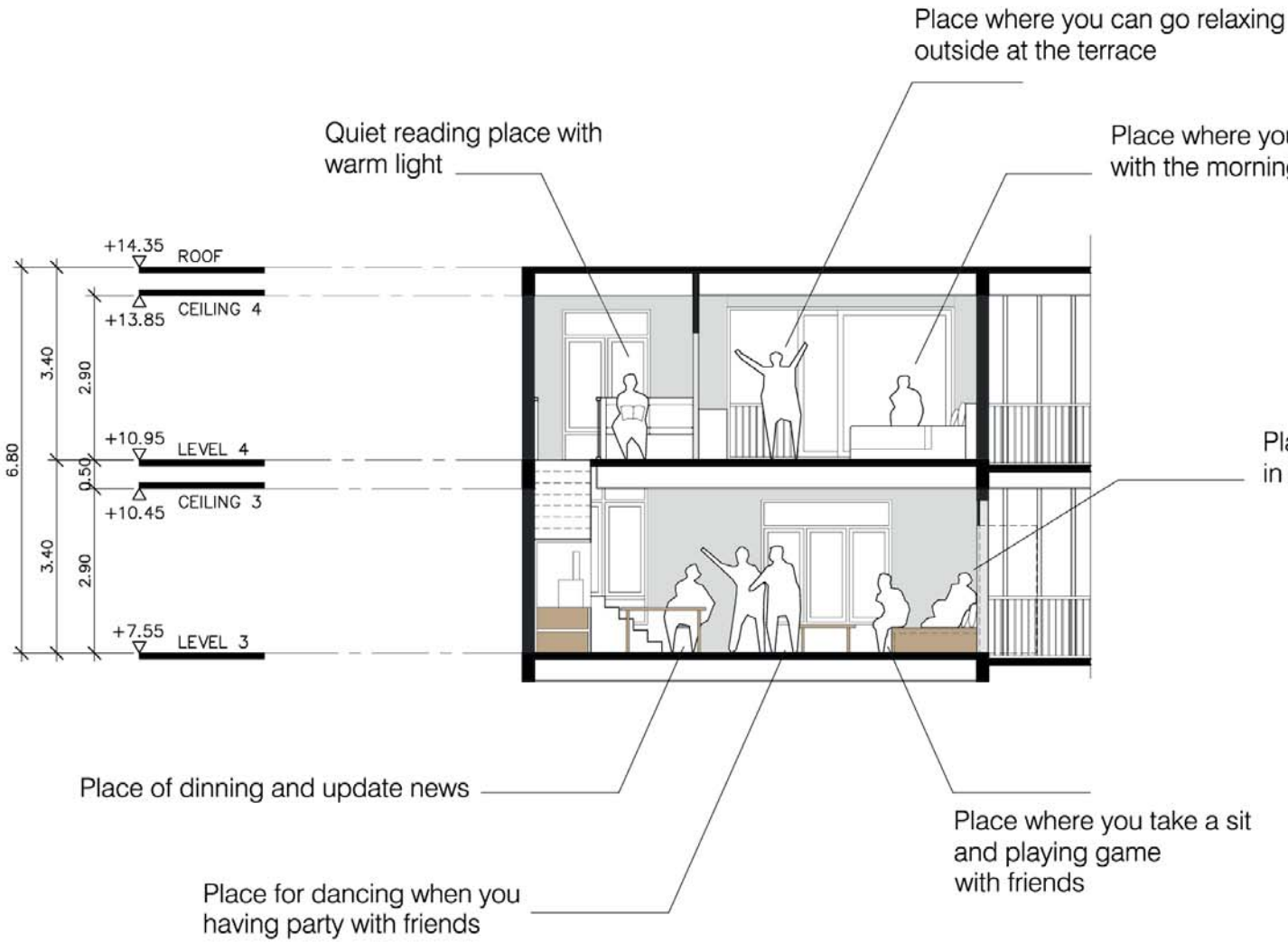
1 Kite Tiles
2 Louver

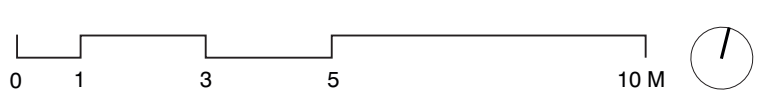
0 1 3 5 10 m

UNIT DETAILS







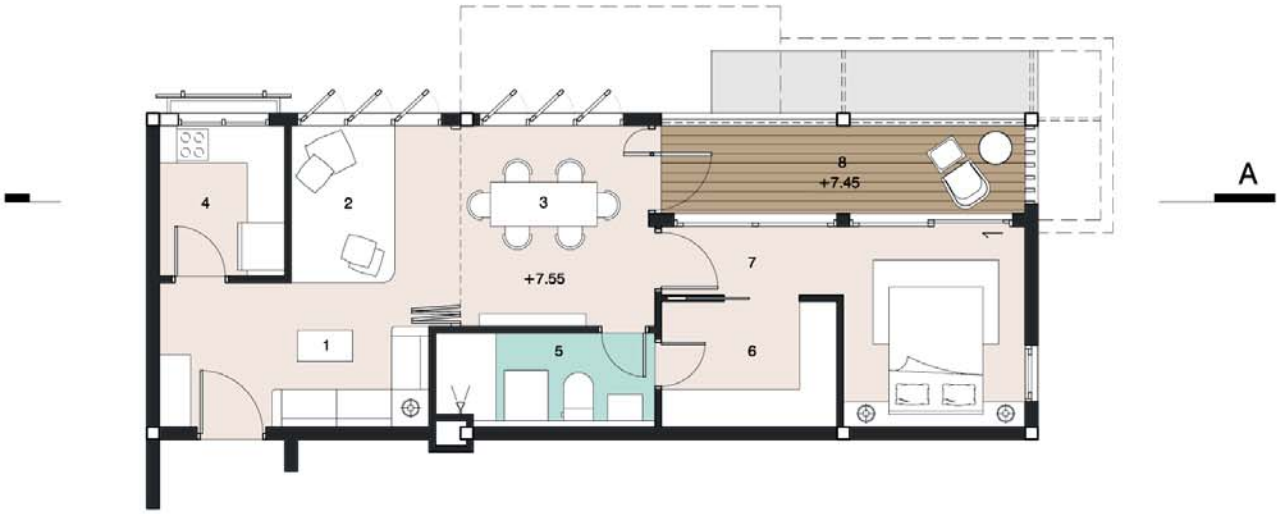


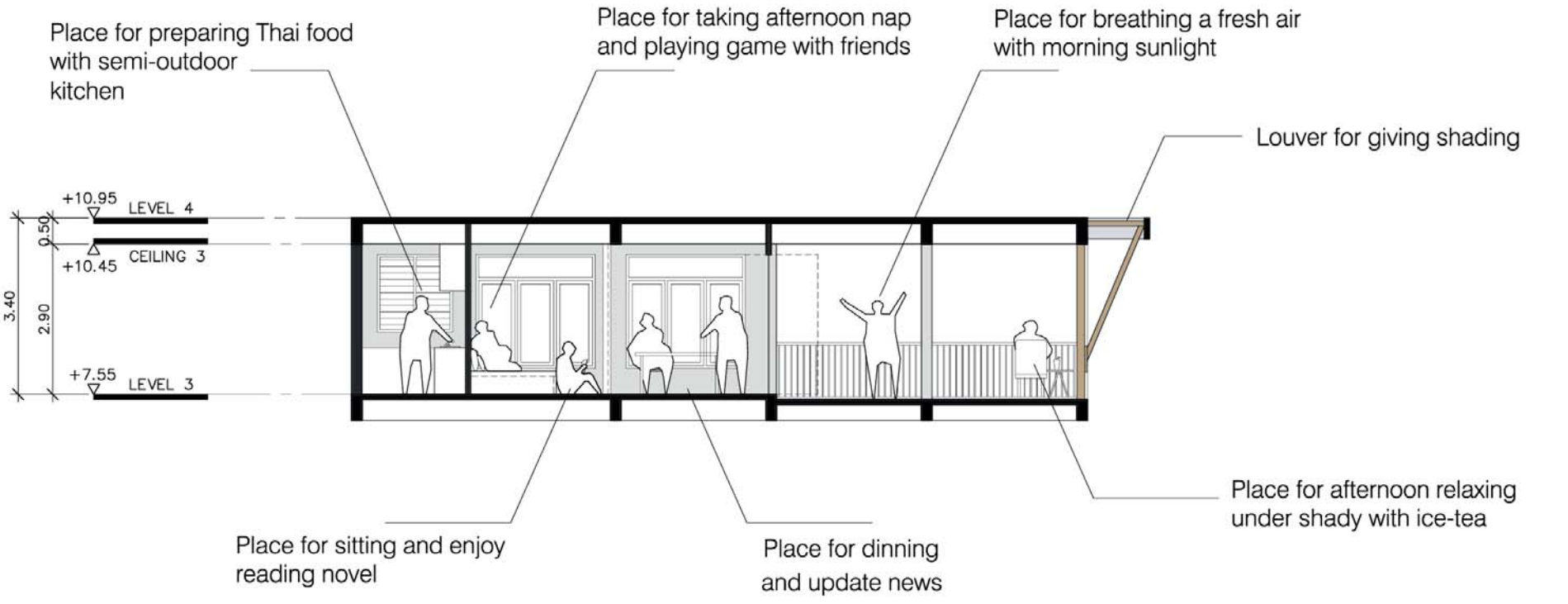
UNIT 9 79.09 sq.m.

1:100

1 Living
2 Leisure Area
3 Dinning
4 Kitchen
5 Laundry
6 w.c.
7 Bedroom
8 Terrace
9 Walk-in Closet
10 Shower Room

UNIT DETAILS





UNIT 16 66.24 sq.m.

1:100

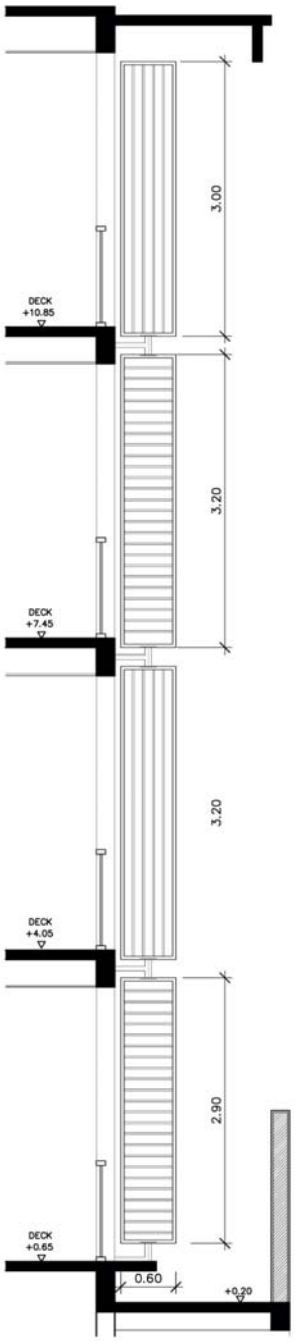
1 Living
2 Leisure Area
3 Dinning
4 Kitchen
5 W.C & Laundry
6 Walk-in Closet
7 Bedroom
8 Terrace

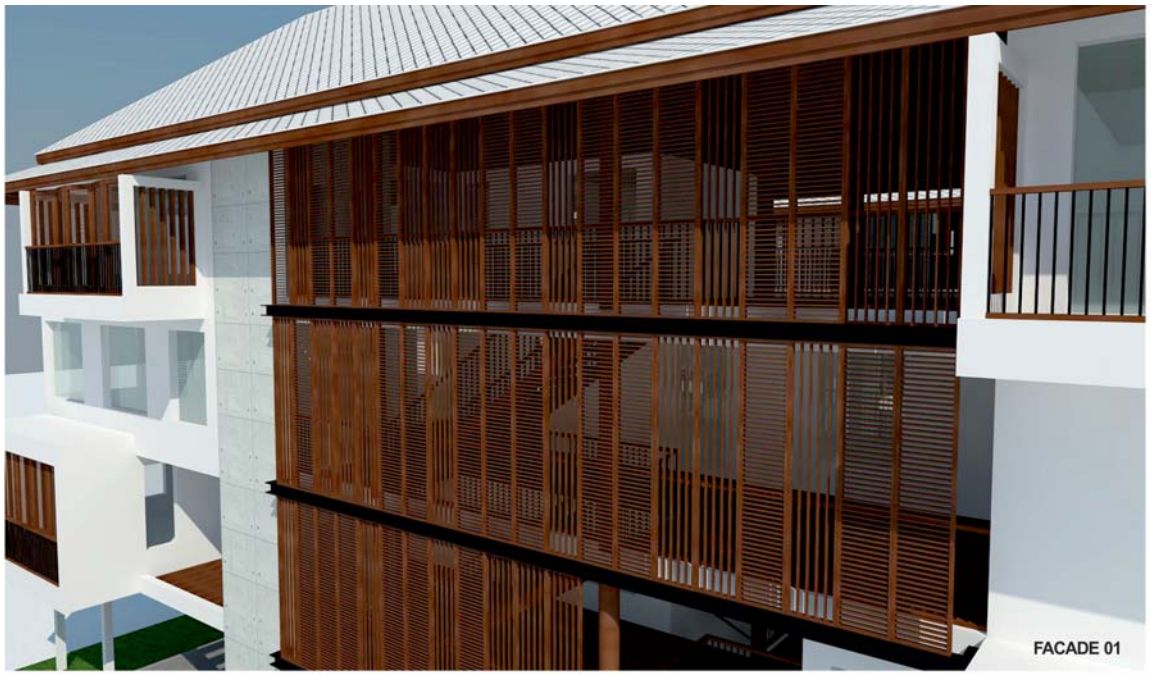
0 1 3 5 10 M

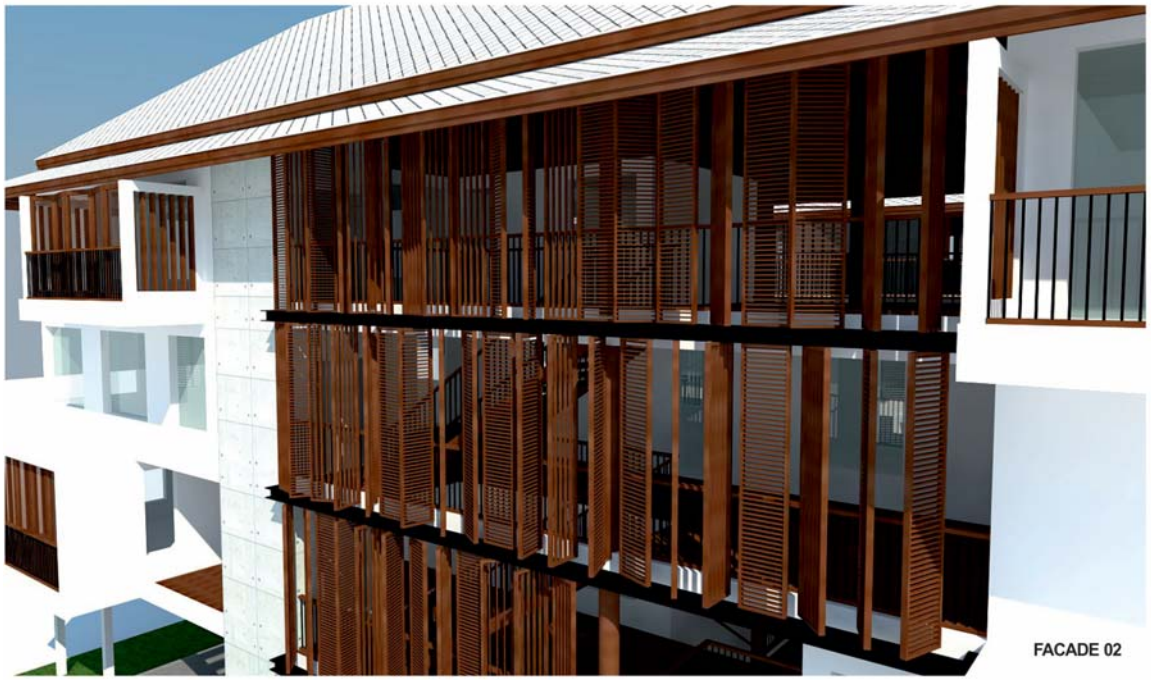
OPENED-PLANNING FLEXIBILITY AND ACCESSIBILITY

Planning inside the unit, I provide the flexibility to expand or change the function. Unit 9 is a duplex, second floor in the bedroom with terrace, which can close and open for ventilation. Unit 16 has folded wall. The owner can close when the space are not use for saving electricity.

FACADE DETAILS







VENTILATING FACADE
WIND FLOWING AND GIVE SHADING

The Northwest of the building is next to the street. In order to keep privacy I provide the facade. The facade can de opened by the residents, themselves. People can play and have fun with the swing.

In the afternoon, when you stay outside in the patio, the wind is flowing but you don't like the sun. So you can close it and have the ventilate and the same time.

THE BUILDING FROM OUTSIDE

PERSPECTIVE 01

PERSPECTIVE 02

PERSPECTIVE 03

EXTERIOR VISUALIZATION
FACADE AND TERRACE

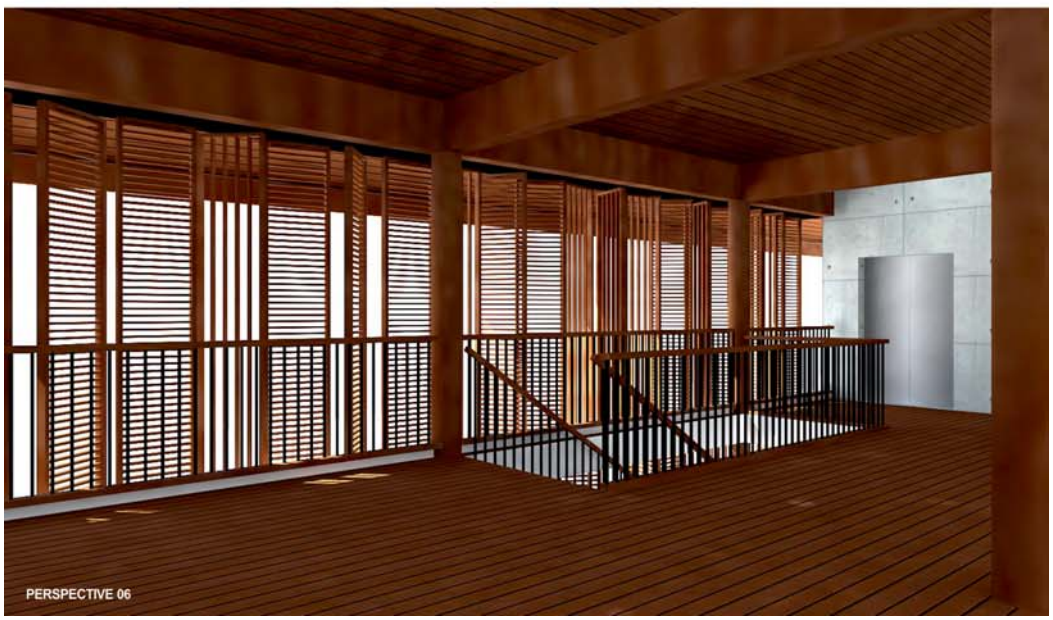
These are the sketch up 3D. I made to see when the wooden attach to the structure. From cutting model in 1:100, many patterns were designed to the walls. I will merge them later for final production.

However, the propose for the 3D this time is for holistic studying and recheck all of my translations in the architecture. The building will use in the mix of materials; concrete, wooden cladding, and wooden floor.

THE BUILDING FROM INSIDE-OUT


PERSPECTIVE 04


PERSPECTIVE 05


PERSPECTIVE 06

INSIDE-OUT VISUALIZATION
ATMOSPHERE AND UNIT CONNECTIONS

The sketch up 3D represent view inside the project but outside the rooms, I called **INSIDE-OUT**.

Perspective 04: the view from the café on the ground floor, the vertical patio on second floor connect to the ground by the stairs.

Perspective 05: the view from patio on second floor, looking the building in the opposite.

Perspective 05: the view from 4th floor, in the Northwest side see the facade, which can swing.

The Final Production

Chapter 06

FINAL FLOOR PLANS

Level 01 Plan
1:200

1 Wooden Deck
2 Private Deck
3 Bicycle Parking
4 Motorcycle Parking
5 Green Area
6 Elevator

GROUND FLOOR

On ground floor, the unit level start from +0.75. The planning, I design as the opened-plan because I want the neighbor nearby feel familiar to the new buildings, new community.

DUPLEX UNIT

Unit 1: 99.00 Sq.m. Unit 2: 92.00 Sq.m.
Unit 3: 80.20 Sq.m. Unit 4: 102.00 Sq.m.

0 1 5 10 20 M

FINAL FLOOR PLANS

Level 02 Plan
1:200

1 Sky Deck
2 Corridor
3 Vertical Patio
4 Elevator

SECOND FLOOR
VERTICAL PATIO AND GREEN DECK

Second floor is the level after the ground. The connection between people from outside and the residents still have. I design as open corridor. Each unit has there own area in front of the room. The wooden partitions make people more privacy among the public space. Wooden deck, it is a common space for children play in the eyes of parents.

DUPLEX UNIT

Unit 1: 99.00 Sq.m.
Unit 2: 92.00 Sq.m.
Unit 3: 80.20 Sq.m.
Unit 4: 102.00 Sq.m.

SINGLE UNIT

Unit 5: 55.00 Sq.m.
Unit 6: 55.00 Sq.m.
Unit 7: 63.00 Sq.m.
Unit 8: 63.00 Sq.m.

0 1 5 10 20 M

FINAL FLOOR PLANS

Level 03 Plan
1:200

1 Private Deck
2 Vertical Patio
3 Elevator

THIRD FLOOR
VERTICAL PATIO AND THE GRADIENT OF PRIVACY

The corridor on third floor is smaller than if compare with the first two level; ground and second floor. Generally living in the apartments, when come inside the room everything is closed connection from outside. I want the feeling same as when you live in a house. So, some parts of the walls I provide the windows with wooden louver. You can see and also have the privacy.

DUPLEX UNIT

Unit 9: 79.09 Sq.m.
Unit 10: 89.06 Sq.m.
Unit 11: 100.20 Sq.m.
Unit 12: 99.65 Sq.m.
Unit 13: 99.65 Sq.m.
Unit 14: 109.25 Sq.m.
Unit 15: 85.00 Sq.m.

SINGLE UNIT

Unit 16: 70.00 Sq.m.
Unit 17: 70.00 Sq.m.

0 1 5 10 20 M

FINAL FLOOR PLANS

Level 04 Plan
1:200

1 Private Deck
2 Vertical Patio
3 Elevator

FOURTH FLOOR

On the top floor, there is very privacy and quite. However, the residents from the other level can come the use the space. I think it is the quite space for reading during the afternoon tea on the weekend.

In total the building has 20 units, it is a small community and co-connected to each other.

DUPLEX UNIT

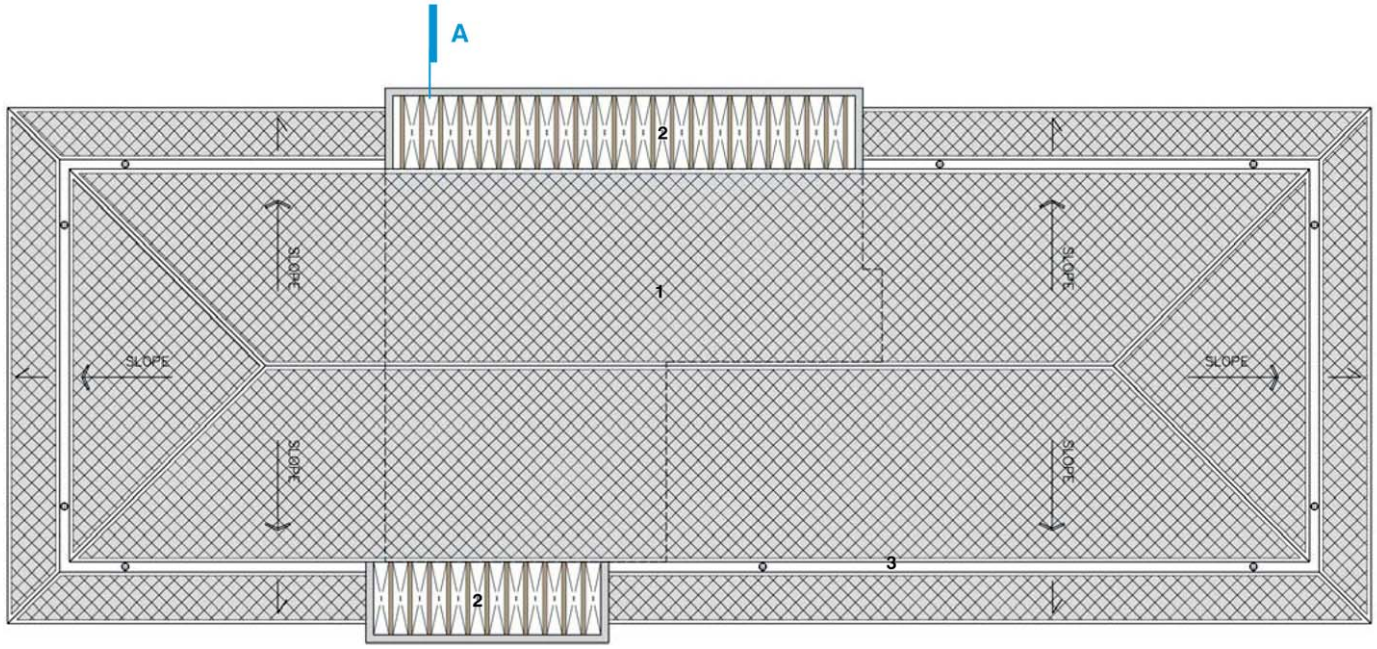
Unit 9: 79.09 Sq.m.
Unit 10: 89.06 Sq.m.
Unit 11: 100.20 Sq.m.
Unit 12: 99.65 Sq.m.
Unit 13: 99.65 Sq.m.
Unit 14: 109.25 Sq.m.
Unit 15: 85.00 Sq.m.

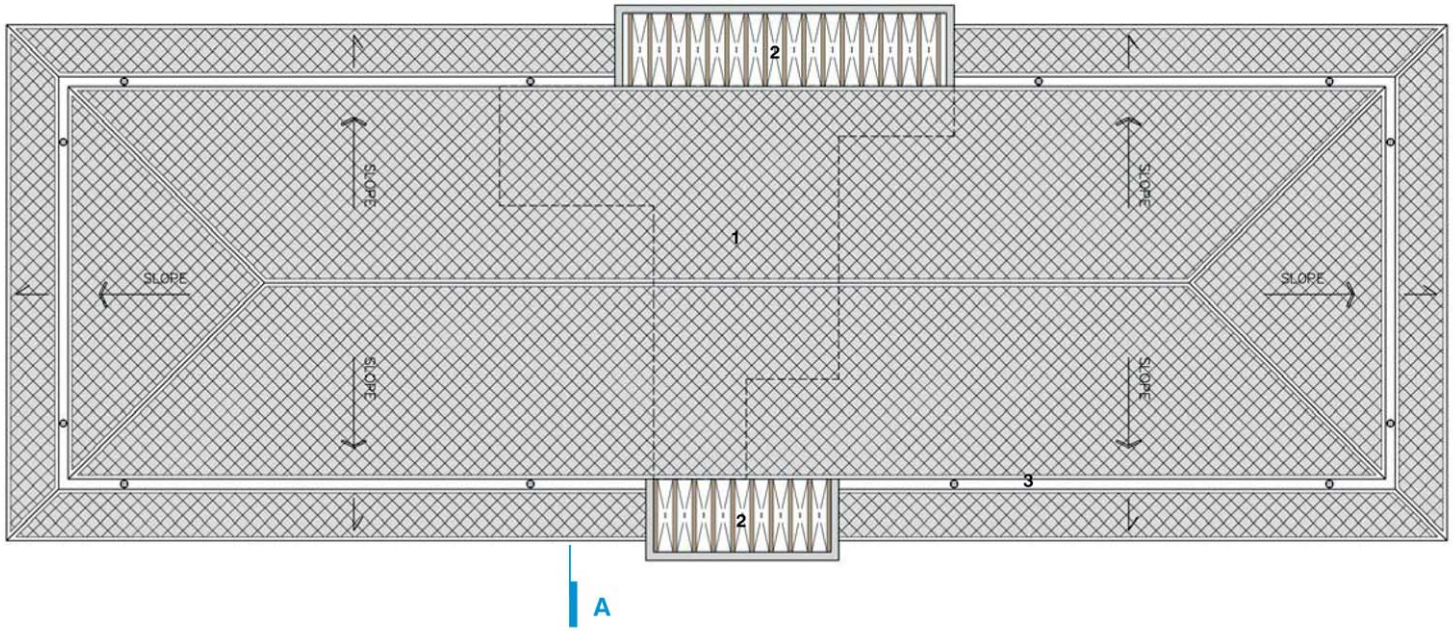
SINGLE UNIT

Unit 18: 68.00 Sq.m.
Unit 19: 70.30 Sq.m.
Unit 20: 79.00 Sq.m.

0 1 5 10 20 M

FINAL ROOF PLAN





Level Roof Plan
1:200

1 Kite Tiles
2 Louver
3 Gutter

ROOF

The roof, I chose the tiles which has the similarity of the traditional from Lanna house. The gutters are prepared for rainy season.
The wooden louvers give the heat detection from the sun but allow the light come into the corridor.

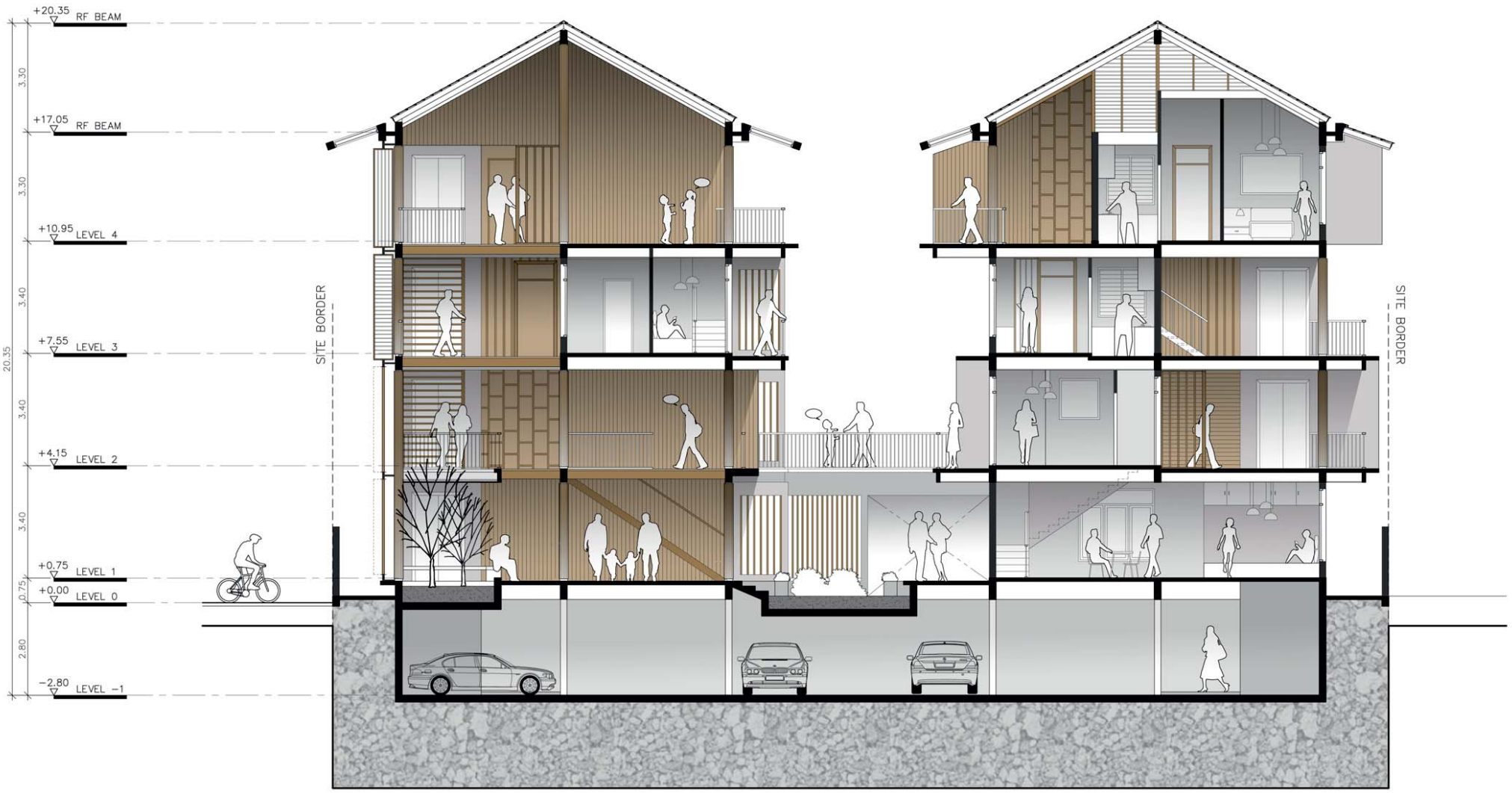
ELEVATION 01 AND 02

ELEVATION 03 AND 04

ELEVATION 03

ELEVATION 04

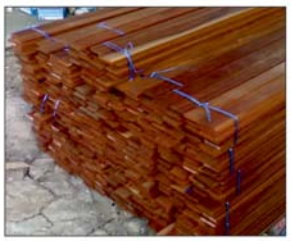
SECTION AA



Timber Materials

Teak

Color: Light Brown to Dark
Using: Furniture, Parquet, Door and Windows



Red Wood

Color: Dark Orange to Red
Using: Exterior cladding, Louver, Parquet, Ceiling

Siamese Sal (Teng)

Color: Light Brown
Using: For Construction, Terrace, Outdoor Area

** Cheap and proper for color painting

SECTION AA

Section shows the activities INSIDE-OUT and OUTSIDE-IN
The space are more close to each other, however people still feel the privacy at the same time.

0 2.5 5 10 20 M

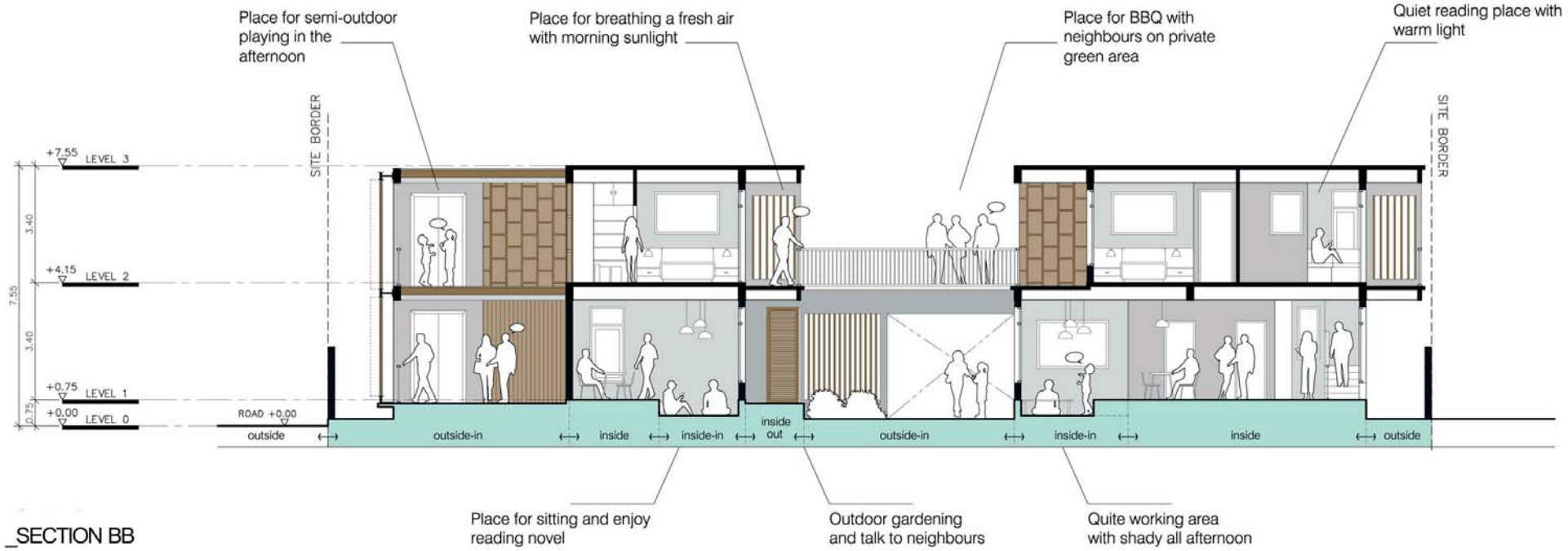
UNIT PLAN: 1 & 4

UNIT 01 99.00 sq.m.
UNIT 04 102.00 sq.m.

1 Living
2 Leisure Area
3 Working Area
4 Dinning
5 Kitchen
6 w.c.
7 Shower
8 Master Bedroom
9 Bedroom 1
10 Closet
11 Private Deck
12 Pavement

_LEVEL 02 + 4.05

_LEVEL 01 + 0.75



_SECTION BB

0 2.5 5 10 20

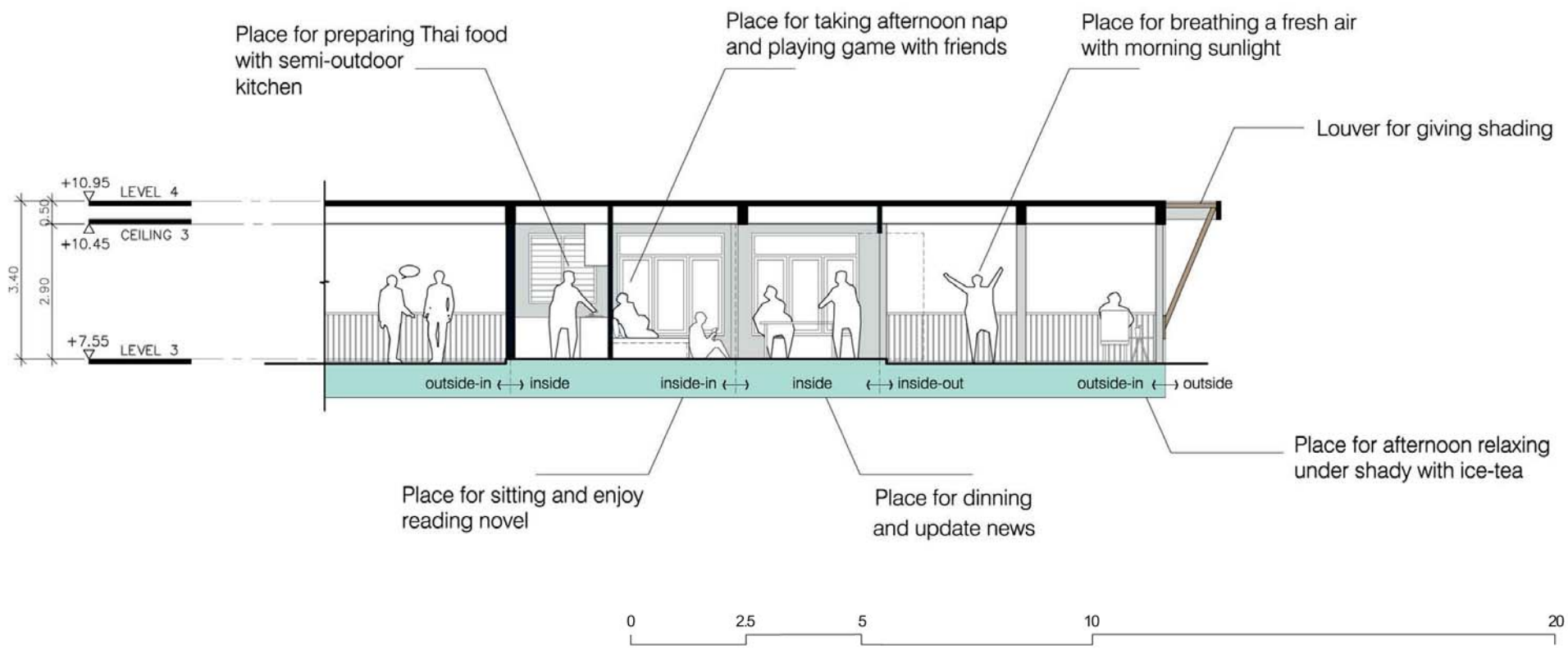
UNIT PLAN: Unit 16

UNIT 16 **66.24 sq.m.**

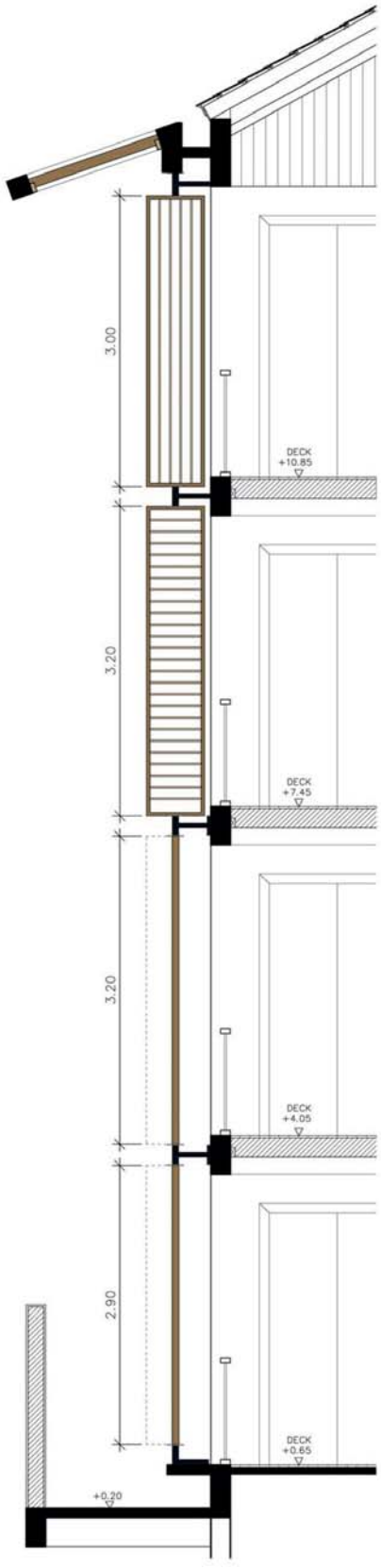
1 Working Area
2 Leisure Area
3 Dinning
4 Kitchen
5 W.C & Laundry
6 Closet
7 Bedroom
8 Terrace

_LEVEL 03 + 7.55

_SECTION CC

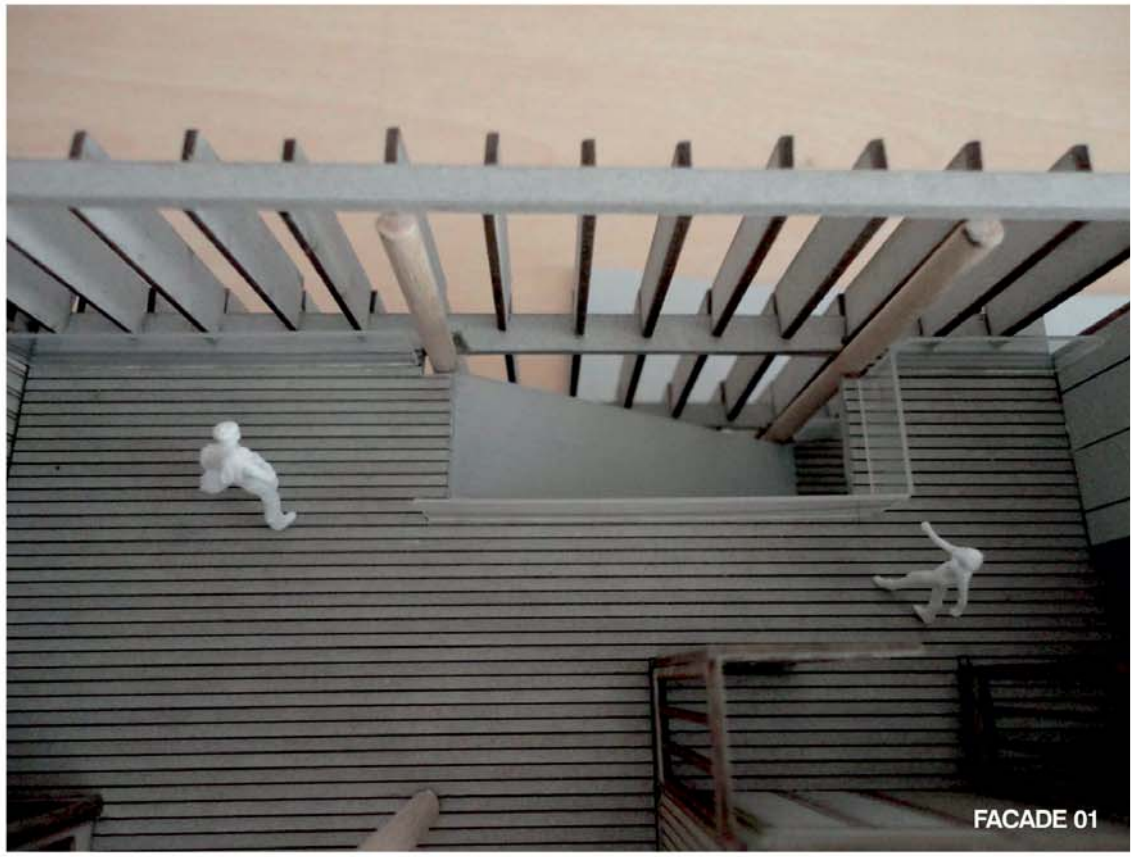


FINAL FACADE DETAILS



_DETAIL 01

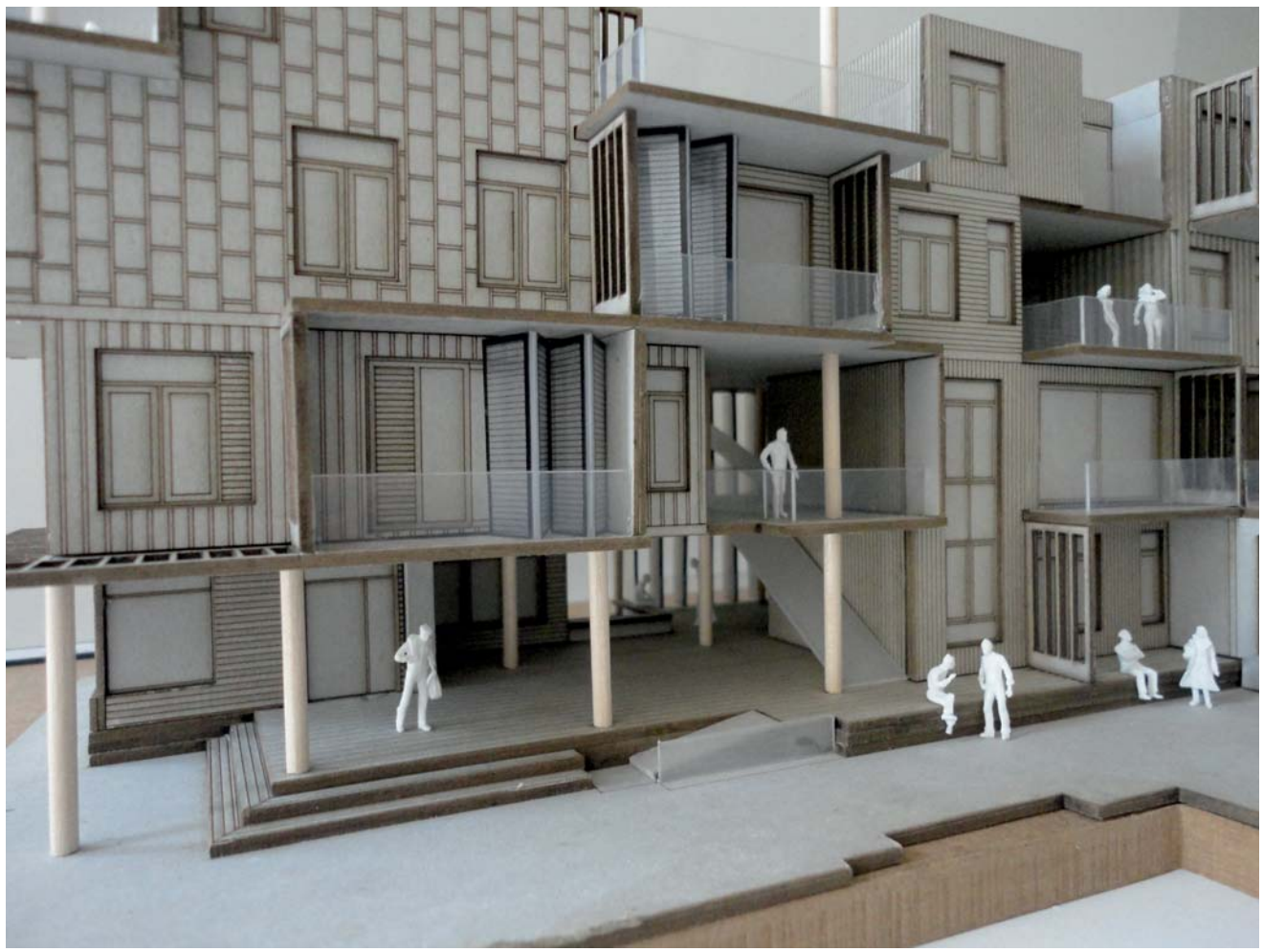
0 1 2 3 5 M



FACADE 01

FACADE 02

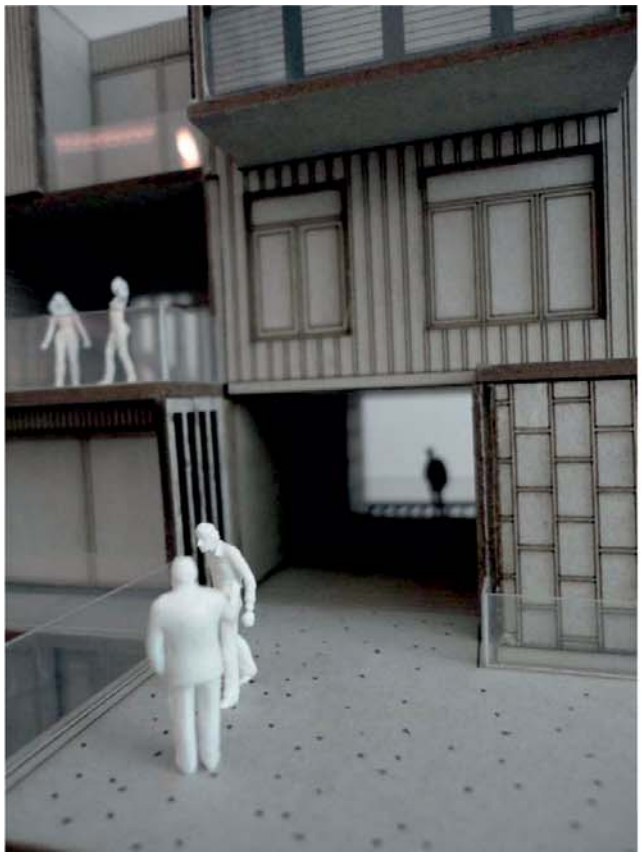
FINAL MODEL



THE SECTION MODEL

Final model was divided two side, in order to see the atmosphere in the middle of the courtyard.
The picture shows patterns of wooden cladding; in vertical and the horizontal. I also took the traditional patterns merge with the contemporary style.

The steps on the ground represent as the furniture. People can sit and lay down. On the second floor, green deck is the linkage between two building, and also the relaxing space for everyone.



FINAL MODEL

THE VARIETY AND FLEXIBILITY

The most challenging in the project is the unit varieties. The room is stacking each other, lead to the shady area and the open space. In this project, The most I like is the flexibility; there are always overlay and share the place together. It is the co-operate, co-community, co- housing.

PERSPECTIVES 01-02

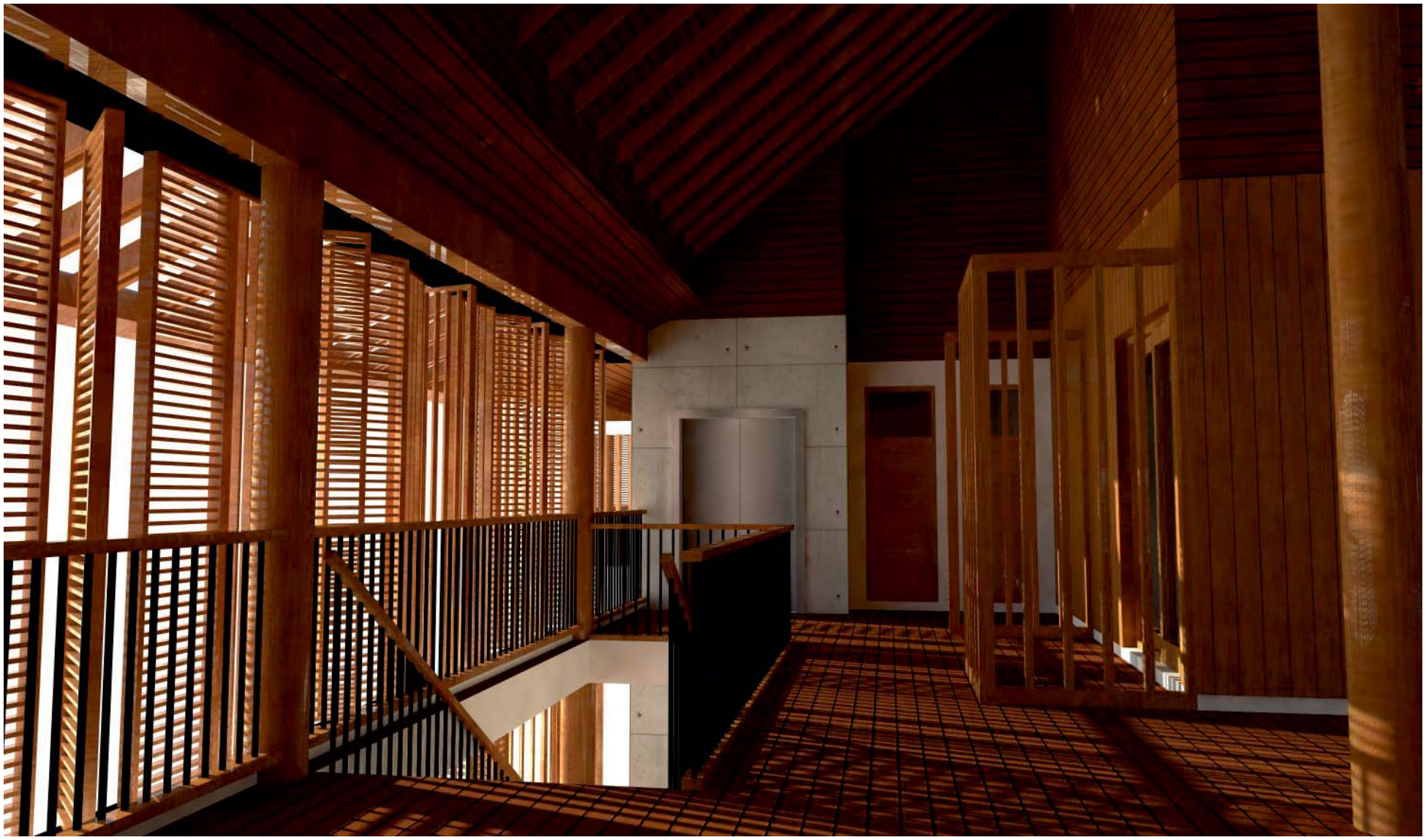
PERSPECTIVES

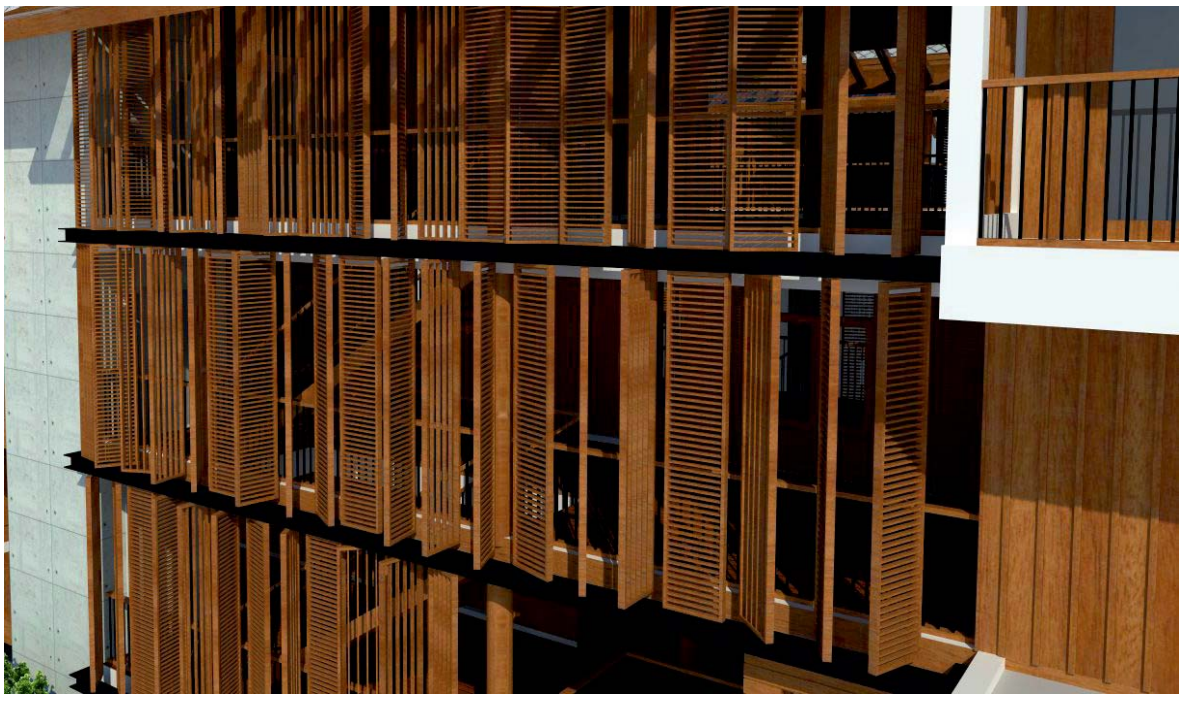
01 In front of the café on the ground floor
02 The Southwest is the main entrance from Kaeo Nawarat Main Street

PERSPECTIVES 03-04

PERSPECTIVES

03 View from the third floor at the terrace
04 View from the top of the green area, see the green deck on second floor





PERSPECTIVES

05 View from the top floor see the open high-pithed structure
06 The Northwest facade in the afternoon

PERSPECTIVES 07-08

PERSPECTIVES

07 View in front of the project, see the courtyard
08 View from the back of the building, see the sky deck and the terrace on the third floor

AT THE EXHIBITION

MASTER THESIS EXHIBITION
24-26 MAY 2012

AT THE EXHIBITION

MASTER THESIS EXHIBITION
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