







# **WORKSHOP ON OPEN BUILDING IMPLEMENTATION**

## **'Theory and Practice in Adaptable Housing Design'**

National Taiwan University of Science and Technology

Department of Architecture / July 2007

Visiting Professor Stephen Kendall, PhD, Ball State University, USA



## TABLE OF CONTENTS

● Preface: Kung-Jen Tu, PhD	004
● Chapter 1: Introduction to the Workshop	
The Goals of the Workshop	005
The Content of the Workshop: Research and Design Exercises	006
● Chapter 2: The Research Reports	
Introduction	007
The Ten Reports	008
● Chapter 3: The Design Exercises	
Introduction	028
Exercise one	029
Exercise Two	050
Exercise Three	071
Exercise Four	092
● Chapter 4: Appendix	
Student participants	127



## PREFACE

National Taiwan University of Science and Technology (NTUST) has won the Top-University Grant given by The Ministry of Education and has been striving to achieve the goal of 'NTUST internationalization' by establishing partnership or exchange programs (faculty and students) with foreign universities worldwide. In order to advance the educational and research capacity of NTUST in the field of 'Open Building' (OB), I contacted Professor Stephen Kendall in the Department of Architecture, Ball State University last summer, and invited him to visit NTUST this summer to teach a course and pursue research collaboration in OB.

As the current Joint Coordinator of CIB W104 Open Building Working Commission, Professor Kendall has great knowledge in OB and is a representative figure in the field. He has witnessed the research development in the OB field and visited many implemented OB projects in the world. I am glad that Professor Kendall has agreed to visit NTUST in the month of July, 2007 and share his knowledge in OB with us. After numerous discussions between he and I, an intense summer course 'Theory and Practice in Adaptable Housing Design' with nine sessions was planned. As a coordinator of this course, I felt relieved to know that more twenty-five students have finally registered for this summer course.

This summer course is the first course in the Department of Architecture of NTUST that's taught in English and by an American Professor. It is pioneering and meaningful. Many of our students may not have a chance to study in the US or other foreign countries in the future. I was hoping that this summer course has provided them with special and memorable learning experience. The students may have been overwhelmed by the unfamiliar English language and may not fully understand the materials taught, which I think is normal and alright. Fortunately, Professor Kendall was sensitive enough to adjust the course scheme according to students' levels, and his 'learn by designing' teaching method should have been refreshing and enlightening. I greatly appreciate the effort he has put forth in teaching this course.

Now the summer course has come to an end, I hope the students have learned something and can begin to appreciate some, if not all, of the essence and meaning of OB. This final report of the summer course consists of all students' hard works and great achievements, which is something to be cherished. Hopefully it does not only mark the end of this summer course, but also signifies the beginning of the internationalization of NTUST.

Kung-Jen Tu  
NTUST, July 2007







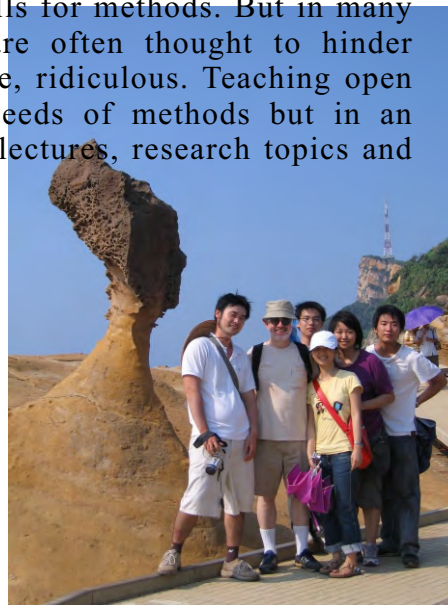
## CHAPTER 1: Introduction to the Workshop

### The Goals of the Workshop

This Open Building Workshop was designed for graduate students in architecture at NTUST. It was offered in nine four-hour sessions during the month of July 2007. The goal was to teach students fundamental principles of open building implementation, by way of a series of lectures, research undertakings and design exercises. Some of the students were already familiar with open building, having been introduced to the subject by faculty at NTUST. Given the compressed schedule of the short course, expectations of student outcomes were modest. Nevertheless, a broad series of research questions were given, and four cumulative and increasingly complex design exercises were organized, each of them aiming to cultivate the design skills, attitudes and methods that are a prerequisite to the architects' role in open building implementation.

One of the assumptions in developing the Workshop was that developments toward open building in Taiwan were already nascent. Two international workshops had taken place in Taiwan in 1995 and 1998. Open Building research was ongoing, and prototype projects had been built by faculty at NTUST. Furthermore, informal observations of housing in Taipei clearly showed evidence of a strong private sector of homeowners and an industry meeting their demands. This was most clear in the lively facades of residential buildings of all kinds. House interiors were following this pattern of inhabitants taking initiative.

Teaching architecture students how to work with OB principles presents a particular kind of challenge, because of the culture of design we have inherited and that is still dominant. This is magnified when a language barrier exists. Architects tend to think in terms of discrete building projects, with the tacit assumption being that each project is basically unique and an appropriate subject for creative invention. While this is valid in one way, it is also very clear that firms specializing, in, for example, schools, quickly grasp the fact that every school design shares certain principles. This calls for methods. But in many architectural curricula, explicit methods of designing are often thought to hinder creativity and imagination, a proposition that is, of course, ridiculous. Teaching open building means facing these beliefs, and planting the seeds of methods but in an unthreatening way. This was one goal of the selection of lectures, research topics and design exercises.





## The Content of the Workshop: Lectures, Research and Design Exercises

### Outline of the nine workshop sessions: ☐lanting seeds☐

#### Week One: Monday July 2

Introduction to the Workshop on Open Building

**Discuss course expectations, exercises, research topics**

**First Lecture:** Introduction to Open Building

**Select teams for the research work and design exercises**

#### Thursday July 5

Review Research Topics

**Second Lecture:** OB Conversion Processes

**Technical Review:** Separating territories, MEP (mechanical, electrical and plumbing) systems and issues of installation pathways

**First Exercise:** Setting and exploring constraints of a space in a conversion project

#### Week Two: Monday July 9

Presentation and Discussion of **First Exercise**

Principles of an Infill Industry

**Third Lecture:** HOMEWORKS

**Introduce Second Exercise:** Infill a townhouse

#### Thursday July 12

Finish work on **Second Exercise**

**Assign Third Exercise**

#### Week Three: Monday July 16

**Work on Third Exercise in class**

**(Agree on Final Report Format and delegation of tasks)**

**Hand in rough draft of the research work**

#### Thursday July 19

Review and discuss results of the Third Exercise

**Assign Fourth Exercise, Step One**

#### Week Four: Monday July 23

Review and discuss Fourth Exercise Part One

**Assign Fourth Exercise, Step Two (start work in class)**

#### Thursday July 26

Review and discuss Part Two of the Fourth Exercise

#### Week Five: Monday July 30

Review and summarize Research and Exercises

### The Research Topics

1. Identify property developers who do open building now.
2. Identify construction businesses in Taiwan already operating or almost already doing so - in providing infill services.
3. Document regulations and permitting processes that might constrain residential open building implementation.
4. Are there legal barriers to OB implementation?
5. Identify financing tools or products suited to an OB process.
6. Identify internet sites that already offer something like Infill or that would be supportive of OB implementation.
7. Identify specific infill technical products available in the Taiwan market (or importable).
8. Identify base building technical systems used in Taiwan
9. Identify façade strategies suitable in Taipei

### The Exercises

Exercise One: **Exploring constraints in existing buildings**

Exercise Two: **Infill a townhouse**

Exercise Three: **Infill Capacity Analysis**

Exercise Four: **Developing and using Façade Kits of Parts**

### Final Workshop Report

The results of the research studies and the exercises will be finally presented on A3 size paper, horizontally oriented with a common format.





## Chapter 2: The Research Reports

The research topics reflect a view of open building as being far more than the invention of technical solutions. While architects like to focus on the design and technical issues, and should, a number of other vital areas of understanding lie in the path of open building implementation. Familiarity with these other issues is therefore important for architects and others - interested in moving open building beyond rhetoric.

### The Research Topics

While this list is not exhaustive, it is nonetheless a research agenda that, with more time and resources, would constitute a major portion of a report on developments toward open building in Taiwan. Each topic is developed in more detail here.

1. Identify property developers who operate in an open building way currently.  
The assumption here is that many property developers already do something like open building. If we include office building and shopping center developers, this is certainly true. Taipei 101 is an open building. Designed by a famous architectural firm, it offers empty floors for use by a variety of changing tenants, who hire their own architects and contractors to design and fill-in their tenant space. All shopping centers behave the same way, with specialized companies providing fit-out services to each individual tenant. The question was, what about residential development companies. Do they show tendencies in this direction as well and if so, how do they operate?
2. Identify construction businesses in Taipei/Taiwan already operating or almost already doing so - in providing infill services.  
Here, the assumption was that construction companies either had specialized divisions providing fit-out services or special-function companies provided this service in the market for office and commercial space. The question was, what companies do now or almost operate in this way in the residential market.
3. Document regulations and permitting processes that might constrain residential open building.  
Because an open building process lies in both the public sphere and the private domain, the regulatory environment is important to understand. Regulations are designed to protect the public health, safety and welfare. They are founded on experience, standards and professional judgment. The question here was what existing regulations and permitting processes related to residential buildings would inhibit the full implementation of open building in Taiwan, or in any given municipality.
4. Are there legal barriers to OB implementation?  
While public regulations at various levels of government may constrain open building and may need adjustment, there are also potential legal barriers. For example, in Japan, legal experts argue about whether an infill level can be distinguished legally from a base building. In condominium law as it is practiced in the US, however, this distinction seems not to present legal difficulties, even when a dispute arises about whether a window in a condominium project belongs to the inhabitant to the association of owners (such a case was brought to court in recent years). The question here is the situation in Taiwanese law.
5. Identify financing tools or products suited to an OB process.  
With 80% of households in Taiwan owning their dwelling units, financing does not seem to be an impediment to the evolution of a distinct infill industry. Loans available to families buying units in condominium projects are readily available, based on a precise description of the property in question. These loans are offered at competitive interest rates and can be traded or changed in the market.
6. Identify internet sites that already offer something like Infill or that would be supportive of OB implementation.  
The internet is increasingly the vehicle for buying and selling products and services, world-wide. The question here is to what extent product and service providers in Taiwan already operate in the Internet environment, and whether this medium is suited for the promotion open building services as it is in Finland and the Netherlands.
7. Identify specific infill technical products available in the Taiwan market (or importable).  
Infill systems are best when they are locally available. This makes sense for replacement or service. It is also highly desirable that infill products are available from a variety of service / product providers. Competition helps push prices down and provides consumers with choice. The question here is the availability of such products in the Taiwanese market, or from the international market at reasonable prices and reliability of supply.
8. Identify base building technical systems used in Taiwan  
Reasonably well-constructed base buildings are being built in Taiwan using ordinary building systems. As our studies have shown, sophisticated base building technologies may not be needed at first in open building implementation. Later, as the practice becomes familiar, companies will invent better ways to build base buildings. The question here is an accounting of conventional ways of constructing base buildings.
9. Identify facade strategies suitable in Taipei

Apartment facades in Taiwan give evidence of the strength of individual initiative and its acceptance in Taiwan. Even if the apparently disorganized changes to apartment or townhouse facades represent "illegal" activity, this seems to be an irrepressible phenomenon. The question here is how the manipulation of the facade of large buildings takes place as part of "infill", and whether architects can work with this reality either as designers of base buildings or working for manufacturing companies making facade elements.



# 8 CHAPTER TWO \_ RESEARCH REPORT \_ TEAM 1

## IDENTIFY PROPERTY DEVELOPER WHO ALMOST DO OB NOW AND GET EXAMPLES OF CHOICES AVAILABLE TO TENANTS AND RULES THEY MUST FOLLOW

### SUMMERY

Our research is divided into two parts. First is a review of extant laws. Second we will compare several cases (original layout and after changing their infill), and find out the different in base building and infill between original case and changing one. Then we may conjecture the rules that user should observe in design

### RULES FROM AN APARTMENT HOUSE ADMINISTRATION

If occupants want to set up windows for protection. (Ex:fig.~3)

There are some rules they must follow:

1. Material: door and window must be made of aluminum.

2. The place you can install:

(1). The store in the apartment building can install anti-burglar windows in back and side of windows of store.

(2). The occupants can set up the anti-burglar door in the place where there is a steel door. steel door(fig.4)

(3). Above second floor (including 2F) occupants can installed an anti-burglar windows in the gallery outside of the kitchen. But they can't install on front/sides of house or in front of French windows..

For store in house(townhouse) within:

Only anti-burglar doors and windows which are in the hallway can be installed in ground floor, other floors can't. Only back of house's hallway can install burglar windows in ground floor, other floors can't. Can set up the window for natural light on the middle of roof.

3. Rules for installation \_For apartment house:

(1) The anti-burglar doors and windows which were installed in ground floor, must follow the original window/door size, you can't let the anti-burglar doors and windows be protrude the original one.

(2) Above second floor (including 2F) installed window in the gallery which outside of kitchen. The color of window's frame must be white and follow the wall (can't protrude beyond the outside wall)

(3) If occupants wants to increase the stack's (pipes for gas from kitchen) length of a kitchen. Stack should follow the outside wall.



The rule by Apartment house administration follows the rule made by government. We compare rules from two communities (100Lretime Town & colorful city young). They all look similar. One community makes more rules on facade

Community name	location	Household	House' age
100 Lretime Town	Taoyuan	2369	10 years
colorfulcityyoung	Taipei	About 300	4 years

Fig.1~3 anti-burglar doors and windows

### WORKSHOP ON OPEN BUILDING IMPLEMENTATION

National Taiwan University of Science and Technology

Department of Architecture / July 2007

Visiting Professor Stephen Kendall, PhD, Ball State University, USA

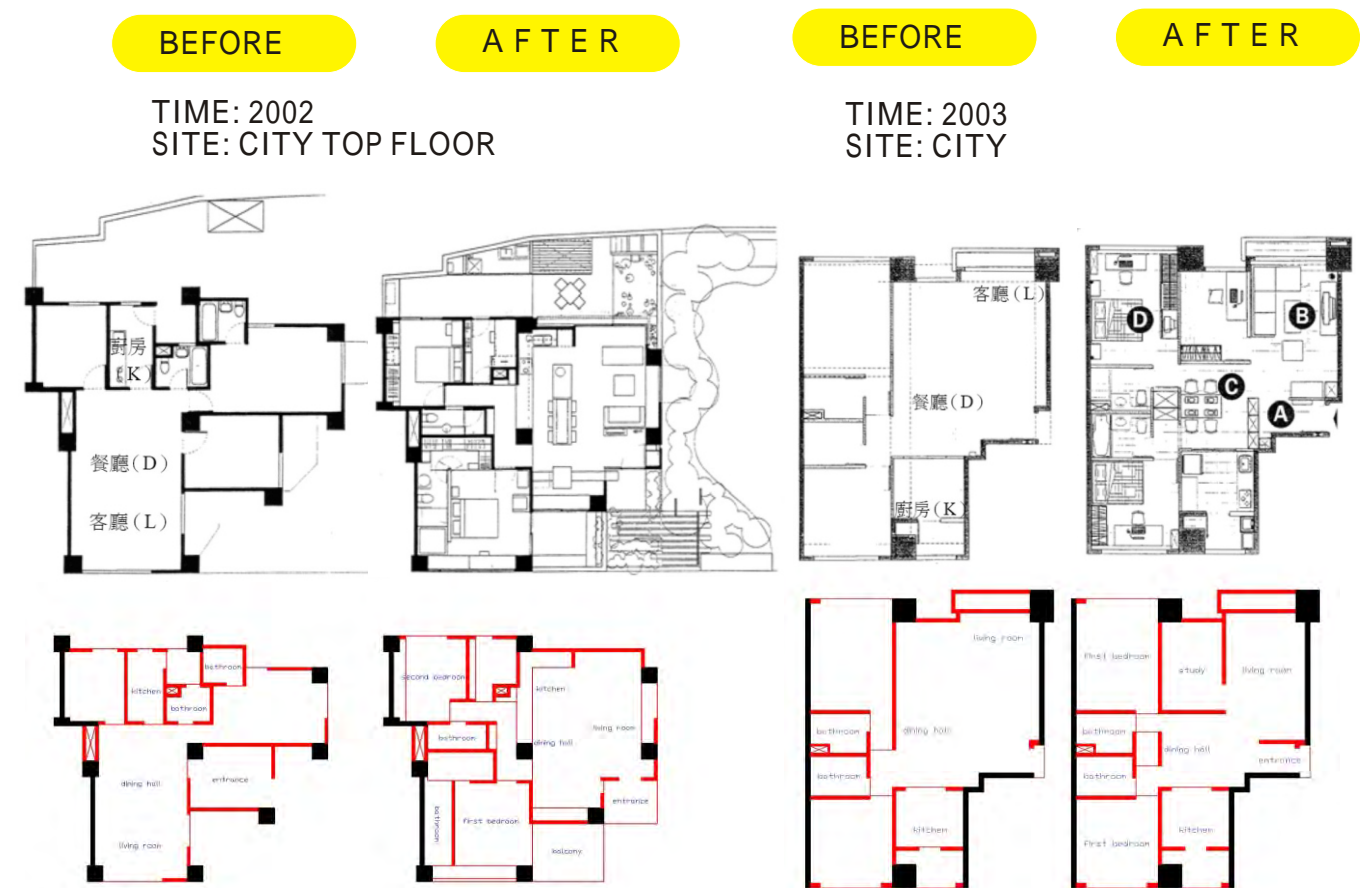
During decorating

When people plan house decoration: should indeed know the structure, water electricity, fire-fighting system, monitor control system and so on. After finishing the plan, they should give the whole plan to the apartment house administration. After the apartment house administration checks that plan is safe to public and not against the building's view. Then it is permit to decorate

In order to keep quiet: If there are requirement to break the ceiling, floor or something that will make big noise in the project. You only can do it at the between (10am~12pm, 14:00~16:30).

Occupants can't put the trash and building materials in the public place.

Can't put anything hanging signboard or not good looking things on the wall which make the view of building become bad



The living room and dining room were changed .It's They changed the original living room trend to use furniture or special cupboard to separate and dining hall which were combined space. It makes dinning hall become individual, and and separated kitchen, turned to also increase the character of space.The columns, individual space each one beams, the wall which deliver force to ground, and some outside wall were considered base building.

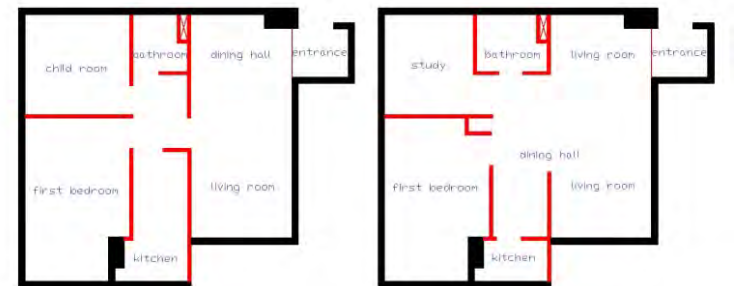
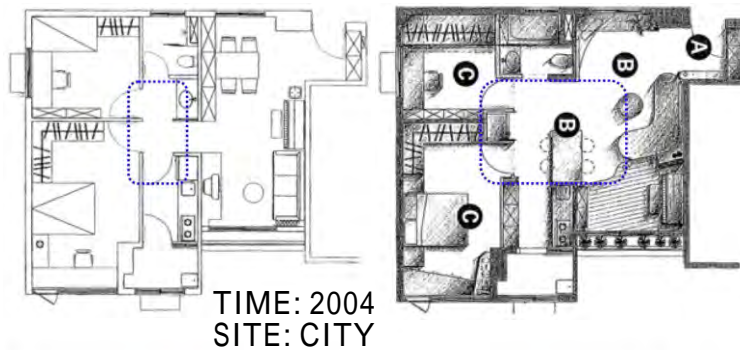
### REFERENCES

1. [Http://www.mytour.com.tw/colorfulcityyoung/rule\\_index.htm](http://www.mytour.com.tw/colorfulcityyoung/rule_index.htm)
2. [Http://www.tmm.org.tw](http://www.tmm.org.tw)
3. [Http://100.netown.tw](http://100.netown.tw)
4. Rules to community occupants in Liretime Town, Lungtan, Taoyuan.
5. Y, L.N. (2005). Research of the three-decade changes of indoor space of the condo-type apartment in Taiwan based on the published project cases by Interior Design Magazine in Taiwan

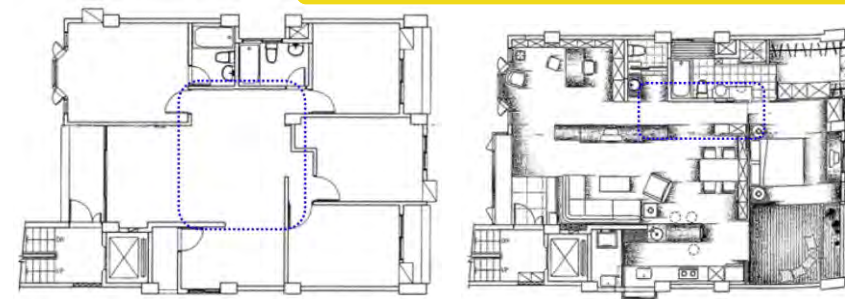
Compare with two communities



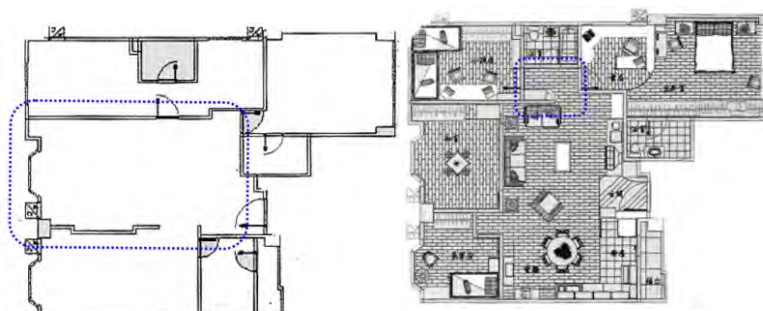
In order to increase the space functional and make it useful, we usually combine the dinner hall and path in a small apartment. In this case, we found out the columns, beams, and walls outside were considered as base building. The secondary design was changed infill in the most part. The service space was set around the channel. The gas from the kitchen go out directly without going back channel



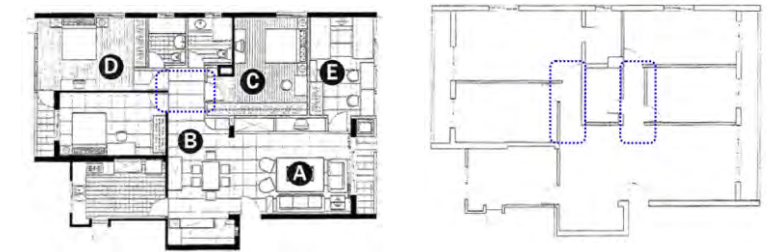
This case also was combined the dinner hall and path. Use living room and dining hall to switch the path. The columns, beams, and walls outside were considered as base building. There independent channel in bathroom and kitchen. It makes the spaces character more clear, and make multi-use of space. Because the bathroom and kitchen can design in any place which just near channel



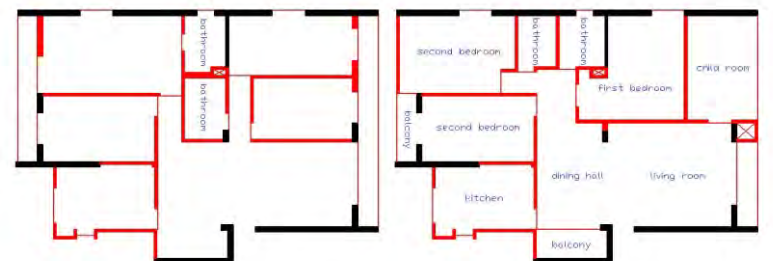
The columns, beams, stair, and some outside wall were considered as base building. Because there is a few people in the house. They decrease the public place, the path of new-add bad room, in order to increase the connection of each room



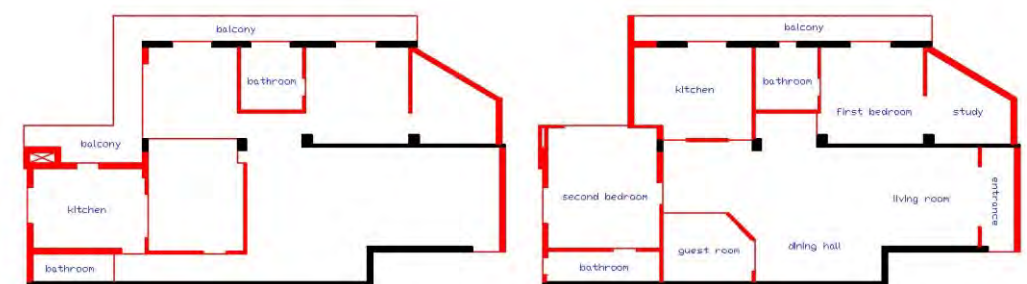
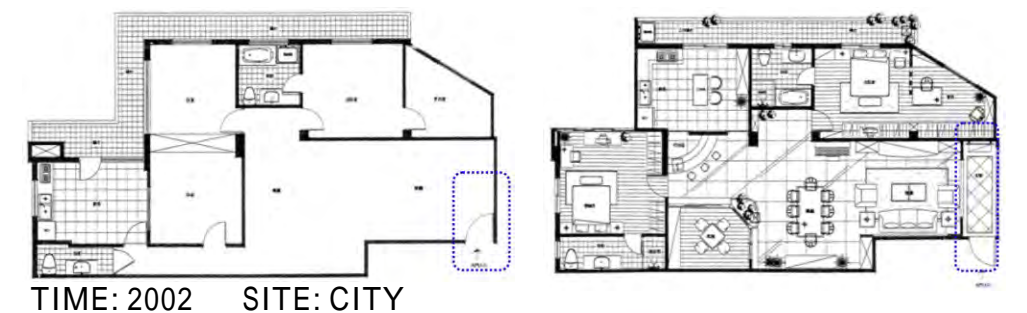
When there are more people living in the house together. It needs more privacy. Using public space to protect each room. The columns, beams, and some outside wall were considered as base building



TIME: 1980 SITE: CITY



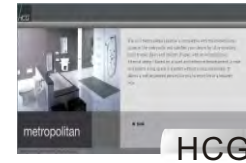
Decreasing the path, and change the bathroom's location (from vertical to horizontal). It added the length of pipe. The columns, beams, the wall which deliver force to ground, and some outside wall were considered as base building



It increased the quality in living room and entrance when was changed the entrance. It's illegal to make balcony become room (outside become inside), but it happen all the time. They changed the individual wall and make public space bigger. They change the original channel position. That may make harder to arrange the pipes



## EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT



HCG



B&amp;Q



Famwood



Greenhouse

## Construction business in Taiwan/Taipei

**A**pproaching a modern and various-style world, we hope to hold a new customized way to match what we really want. Besides, steady and perpetual living way is facing challenges; we wish to have changeable houses to respond different requirements of different period of our lives. Opening Building offers us new concept and feasible method to achieve our goals. There is a research as follows, which not only describes this new concept, but also discuss the Taiwan construction business situation about this aspect. We desire to examine new business and industry strategies for converting existing buildings. Plus, we will assume a possible way for companies to approach Open Building principals.

For Taiwan construction business model, we usually separate house building into several parts, such as shell (constructors / stair / walls /...), interior (equipments / decoration / furniture /...). Most business thrive because of fashion trends and unique design ability. On the contrary, the companies insist of improving technology skills lose their market because the society lack of correct building concept, particularly in decoration. In short, we will take a look in Taiwan construction business and then analysis them.

## Topic

**O**ur goals are leading readers to understand the Taiwan construction environment, and then offer an analysis of their advantages and disadvantages. Of course we will simulate a possible way for companies to satisfy various customs requirements at the end of research.

## 4 Kings of existing business

1. Contractors specializing in interior decoration / renovation work
2. Kitchen and bath showrooms and their installers
3. Companies fitting out stores in shopping centers
4. Companies doing custom high-end condominium interiors

## Classifying all products and making a complete infill

**I**n order to follow Open Building principals, we must list and evaluate some companies first (next page). So, we separated infill into several parts and classified them following the Taiwan customs.

## Examine the Taiwan construction environment

**F**or Taiwan construction situation, we still stay in the traditional way to distribute our products. Therefore, it is hard to take unified control of infill. On the other hand, several companies probably have difficulties in technology or finance. So, there is no one factory qualified depend on open building hopes. After our research, we will show the problems about what kind of barriers they should overcome in order to become ideal companies.

We selected 3 local companies have powerful effect in this aspect, including *B&Q*, *HCG* and *Green House*. Their international view not only helps Taiwan to accept new building ideas, but also lead us to follow the developed countries. Plus, we intend to see through a local company, *Famwood*. In Taiwan, these companies have some characteristics in common, we want to introduce the service process. First of all is offering a showroom for customers to see their products. And then, free to survey customers' houses. Thirdly, showing 3D design proposals. Forthly, free to transport a kit of infill, which are chosen by buyers. Finally, installation is one of free available service with more than one year guarantee.

## Conclusion

**A**fter our visiting, we discovered several barriers for these companies. First of all, two companies, HCG and B&Q, want not to become a complete infill companies. They said their location is supplying the products for customers. If they try to complete with the plumbers, the plumbers will refuse to buy their items and result in losing their market. Second, they lacks the integrity concept, like B&Q. Although he offers the most things, the customers still need to find the other department to design their houses. Thirdly, Famwood and Greenhouse have the same problem. The problem is they offer total design service, but have a weak connection with large suppliers. The three reason I mentioned above are the most difficult things to overcome.

Therefore, we suggest the supplier companies to integrate their design department or set up a data center to gather what the customers want, and then pack them together. It will easily to achieve our goal - offering a complete kit of infill. The second revolution is cooperating with design professional designers. Enlarging or reorganizing companies will cost too much money. In conclusion, cooperation could be the best way.

## HCG

**H**CG has been a manufacture of toilet and kitchen equipment for over seventy years. Since 1931, their principals and values have made them become the leader of Taiwan toilet equipment producers. Its capitalization reaches to 4 thousand million NT dollars. Their industry belief is like their name; H - Hi-tech and Harmony C - Compact?Creativity ?and Creative Chinese Culture G - Gratification and Global Values. HCG includes three types subsidiary companies. The first one is Hao Ghan Company, which offers toilet and kitchen facilities products. The second is Hao Long Limited company that aims to make Cerabo Ceramic Board in various art styles. The last one is Hao Si To Company, which puts focus on art design.

## B&amp;Q

**I**t is an import company from U.K, which was set up in 1969 in South Cap Town. Offering many applying functions things and DIY homework utilities. Of course, it is a chain of shopping malls, which is owned by the one of 500 biggest companies around world, British Kingfisher Plc.

In order to successfully stand in Taiwan market, the company cooperates with Taiwan Tu-li limited industry. Each of them holds half part of investment. They combined their name to call their new business mode. On January 27<sup>th</sup>, 1996, it became the largest shopping mall for house keeping. As a Home Improvement Center, carrying out the latest concept and offering the fashion products as European are necessary. Until now, B&Q has extended their physical stores to 21 in Taiwan and held a abstract one on the Internet.

## Famwood

**L**ike what CEO of Famwood furniture company said, houses are like underwear, comfortable and fitting are the most important points. Therefore, he has spend approaching two years to build up a fitting house with sunshine, fresh air, water recycling and woody materials. Handling with nature is his top issue. The experimental building was named Famwood No.1. The houses not only considerate to overcome the professional problems, but also take care about its cost.




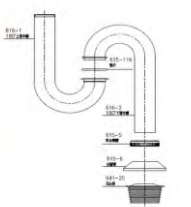



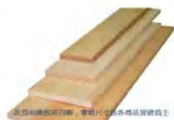

































## Green House

**F**orm an O.A. manufacture to a system supplier, Green house has had struggled since July, 1986. Now, everything is worth because it became a chain of business form 1994. Plus, Green House offers extra furniture.



Basic Element Groups

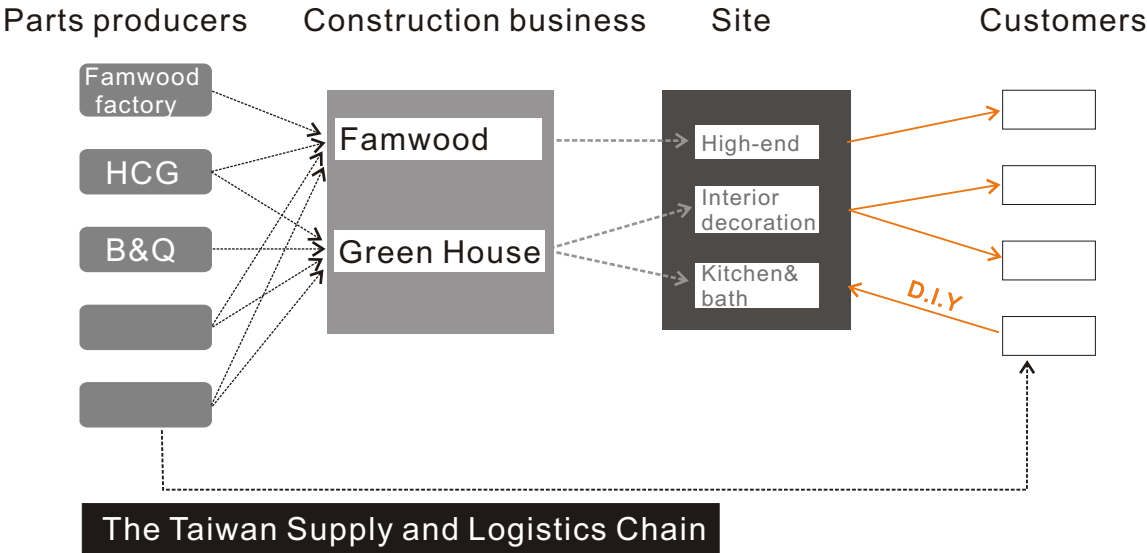
Ps. These products are practically produced by the companies listed at the left row.

Groups Companies	Interior walls windows	door	Wall	Stair	Cabinets	Fixture and Equipment	Mechanical	Plumbing	Electrical and Signal	Finishes Floor finishes	Ceiling	Furniture	Lighting
和成HCG													
B&Q													
紅屋傢俱 Famwood													
綠的傢俱 Green House													

Process	Companies	HCG	B&Q	Famwood	Green House
1. Offering a show room for customers to look at their products					
2. Free to survey customers' houses					
3. Showing 3D design proposals					
4. Free to transport a kit of infill chosen by buyers					

Depicts comprehensive covering service

Depicts partial covering service



</

## ABSBRACT

- 1.The department or bureau of the government that might relates to OB in Taiwan.
- 2.The regulations of the architecture that might be concerned in OB in Taiwan
- 3.The introduction of the process of the building built in Taiwan.
- 4.Comparing the essential of OB with the regulation of government t in Taiwan and figure out the legal way of OB in Taiwan.

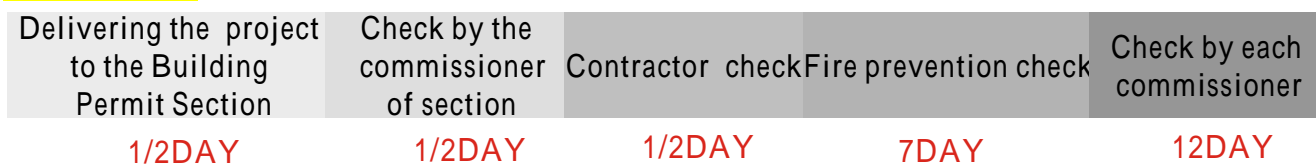
## PART1 DEPARTMENT OF ARCHITECTURE MANAGEMENT

Building Permit Section  
Construction Section  
Building User Section  
Apartment Management Section  
Illegal Building Control Section  
Illegal building Inspection Section  
Building Administration Section

## PART2 MAINLY REGULATIONS RELATIVE TO THE OB

Urban Planning Law  
Land Used Zoning  
Building Law

## PART3 THE PROCEDURE OF ALTER THE USING PURPOSE



## ON CAPACITY

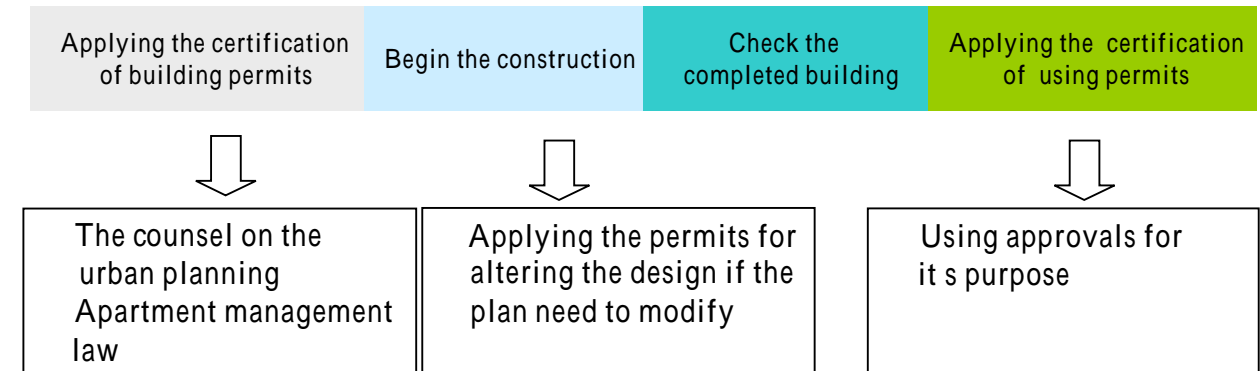
## ON IT PURPOSE



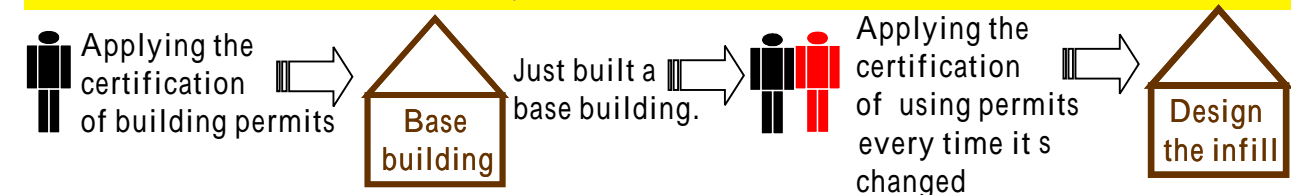
## DISCUSSION

Are floor plans needed for developers to get certificates of occupancy?  
Once a base building is built, are separate building permits needed for each infill?  
How do or would the public utilities control approvals, given the separation of base building and infill

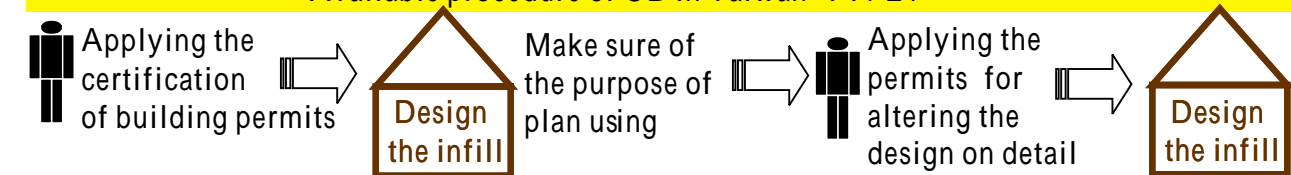
## PART4 THE BUILDING PROCEDURE ARCHTECTURE DEVELOPER



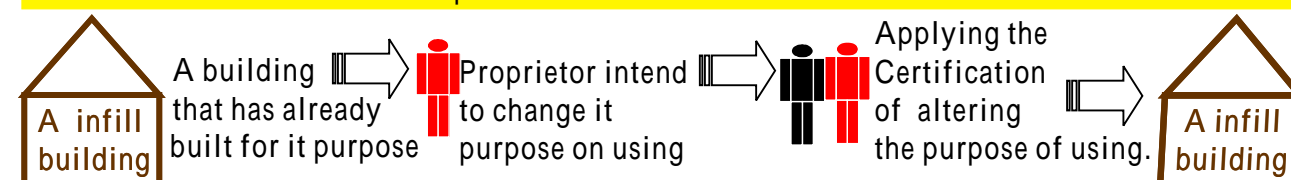
## Not available procedure of OB in Taiwan



## Available procedure of OB in Taiwan TYPE1

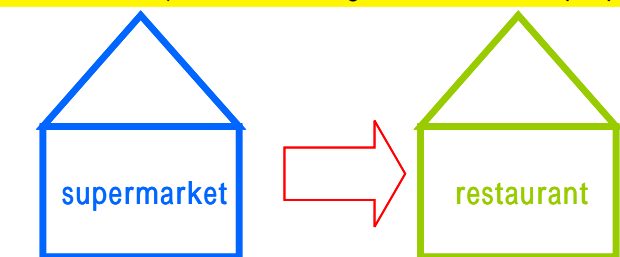
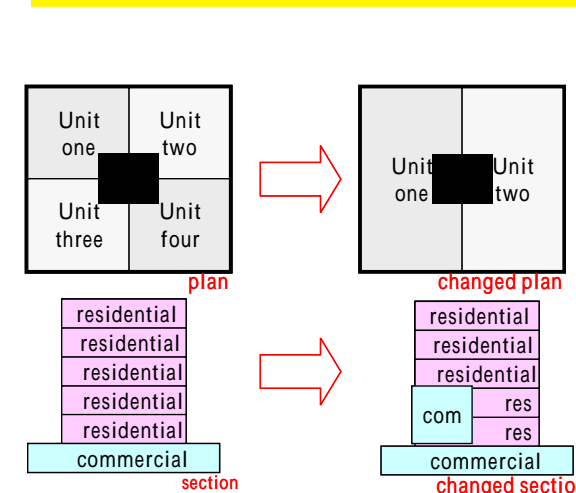


## Available procedure of OB in Taiwan TYPE2



TYPE1 ( During the procedure of construction)

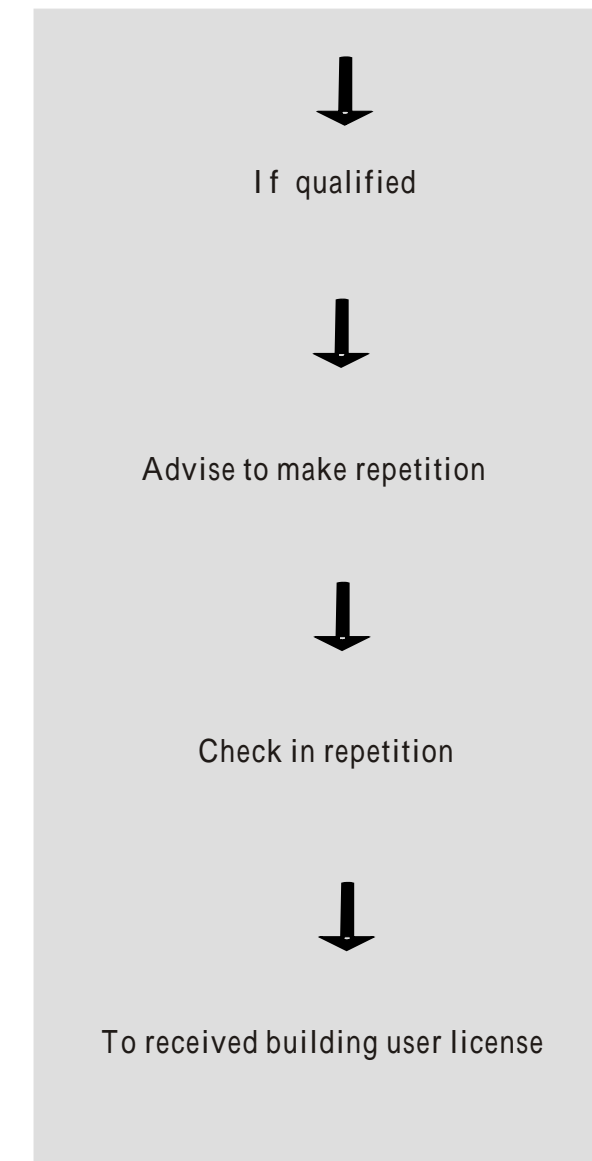
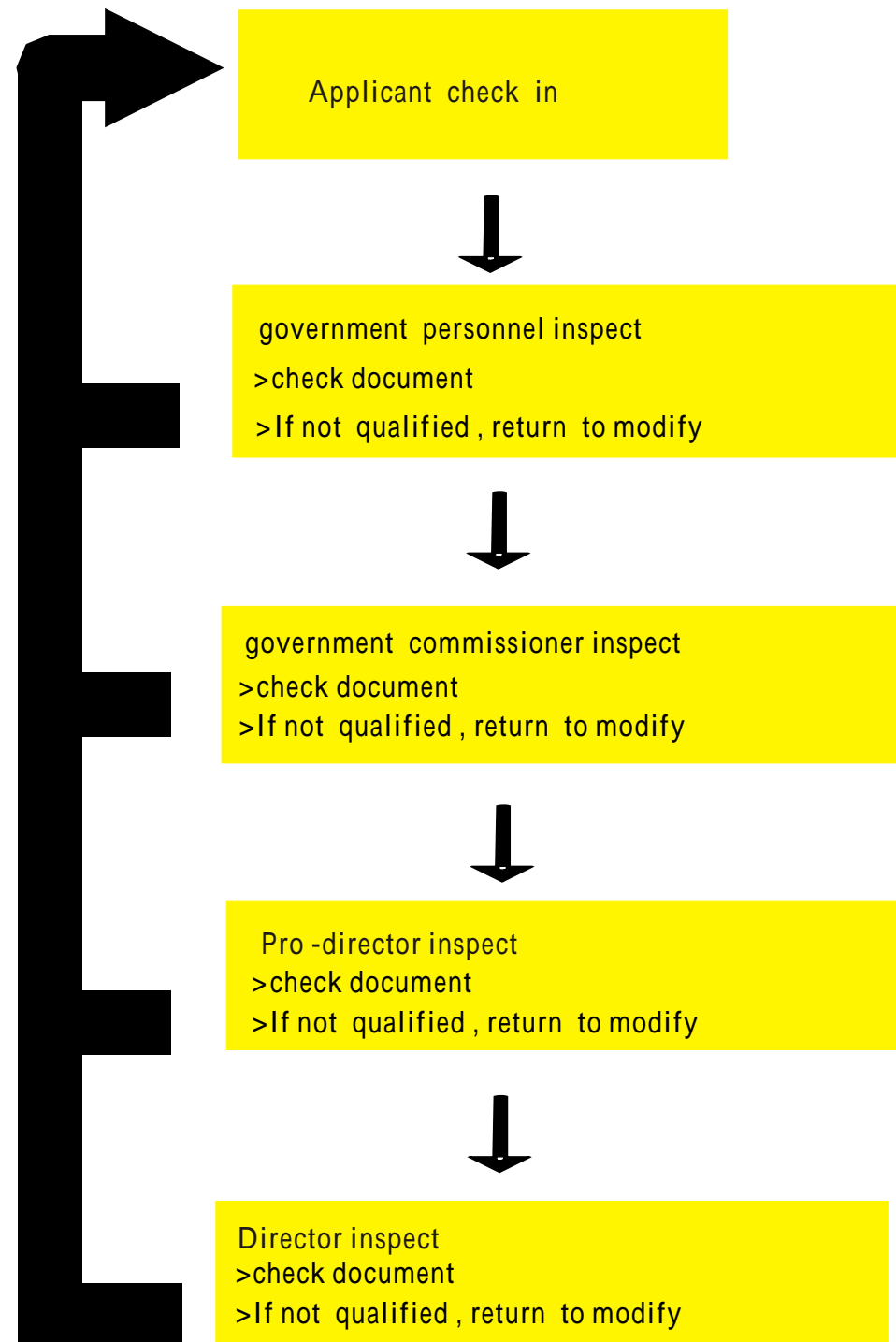
TYPE2(Public building is used on some purpose)



On this kind of situation. There are some detail which will be concerned and need to be permitted.

- 1.Structure safety.
- 2.Equipment correctly.
- 3.Interior fixing design.
- 4.Other details should follow its regulations.

## BUILDING USER LICENCE CIRCLE





## Are there legal barriers to OB implementation?

### Index

A. The law in Taiwan, manage the treaty to the apartment mansion

B. Some principles of OB

C. The building or community in Taiwan are operated

### talking about Taiwan...

In Taiwan, a lot of people are to live inside the apartment building , especially, people in the urban life, pass in and out the apartment building on ordinary days.

In the modern house type,because the people lives inside a limited 3D space range, such space range, probably many are what everybody must use together, for example the entrance hall passed in and out on the first floor, the lift, or the top

Taiwan house barred window stands in great numbers, does not know someone believes, once there are community households in Taiwan to installed the barred window,and is existed by the thing that court's Judgement is removed.



### A :The law in Taiwan, manage the treaty to the apartment mansion

#### Principle:

Safeguard for the management of strengthening the apartment mansion, promote the quality of inhabiting, specially make this regulations.

(This regulation stipulator, covered by other regulation of decree.)

#### Competent authority:

In the central authorities Ministry of Internal Affairs Municipality directly under the Central Government  
Government of municipality directly under the Central Government  
The county is a county government.

#### Define:

Apartment mansion: Is it have or is it go to to use to construct to point or license design pattern mark the clear boundary line in building, Must distinguish the buildings and bases of part.

- 1.Distinguish all: Index people distinguish one building and for exclusive part their, and some sharing should be weighed according to their to some extent partly on its.
- 2.Exclusive part: Refer to a part of the apartment mansion and use the independence that gets on, and the person who distinguishes all targets.
- 3.Share some: Refer to other parts beyond the exclusive part of apartment mansion and not belong to the exclusive annexe, and offer the common user.
- 4.Agree on the special-purpose part: The apartment mansion shares for distinguishing owner users specifically through agreeing on partly.
- 5.Agree on and share some: Refer to the exclusive part of apartment mansion and offer the common user through agreeing on.  
User and Discuss the item:

A: 1.Distinguish owner's meeting

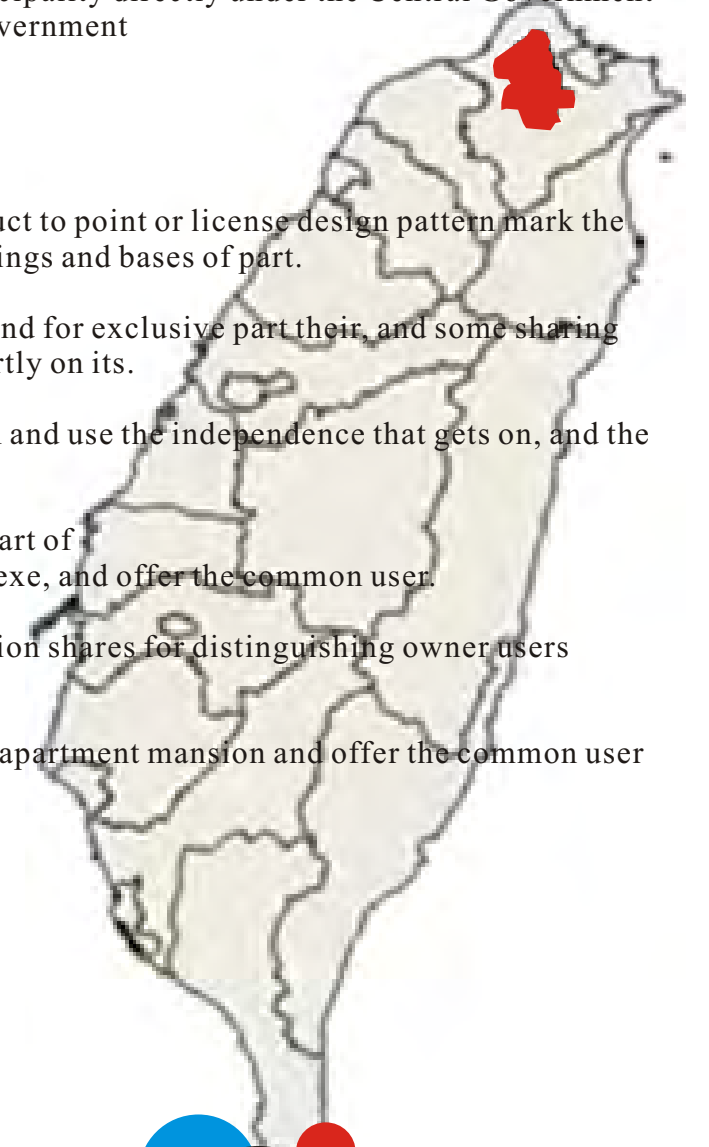
2.The stipulations

B: 1.Household

2.Board of trustee

3.Manage a director

4.Management service people



## B. Some principles of OB

What is OPEN BUILDING?

**Super said: Briefly, realize everybody's imagination of the family.**

**Liu said:**

**Not only the physics space stored only,  
and will distribute the life entity of the life breath.**

**Ying-Jun Hsieh architect said:**

**A principle for the changeable and unchangeable  
in construction and spatial layout to adapt to  
diverse needs.**

@What should and can an architect do when faced with hundreds of thousands of different needs for owners' housing designs?  
We cannot custom-make every single house, so naturally need to find a kind of rule for all purposes, including space, construction techniques and materials, to try and adapt to diverse needs. An approximate definition is to design the “prototype” of a building, which from the constructional point of view is an “open” construction method.

@In actual practice, apart from constructing the “prototype”, the most important thing is to simplify the methods of building so that non-professional workers and take part and also understand the technical principles, and adjust flexibly.

@“Open building” consists of two sides, the command of inner order and flexible development. The architect seeks to master the former, and let the user elaborate on the latter. Different from the thinking of architect as subject, the users or constructors participate in the creative process, and the two sides together present “order” and “diversity”.

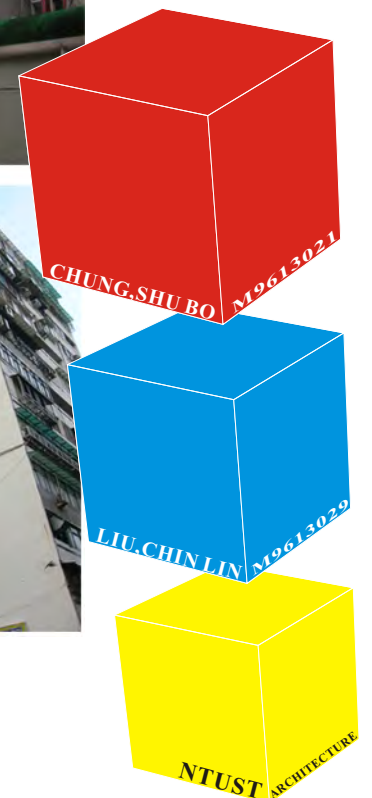
## C. The building or community in Taiwan are operated

The system of open building and structure was brought up when the modern architecture just began, however, OB system transgressed the so-called commercial logic, because OB will becoming meaningful under the support from aplenty social resources since it can't operate by single company, that's the reason that OB develops not quite smoothly so far.

The idea of OB is often abandoned during the process of industrialization of the building and commercial development, only compromising for a while once there's no alternative, in a narrow facing!

Each company has his own patent during the process of house industrialization, we can't connect and weld the node cause we use steel sheet for the light steel construction, unless under the condition that the factory controls.

There's so many nodes cause each package of the light steel construction bears is limited, plus each nodes has its own patent, therefore the system is ossified also expensive, it's so hard to form the open system! OB is killing in commercial logic, but we still attempt to break through it.



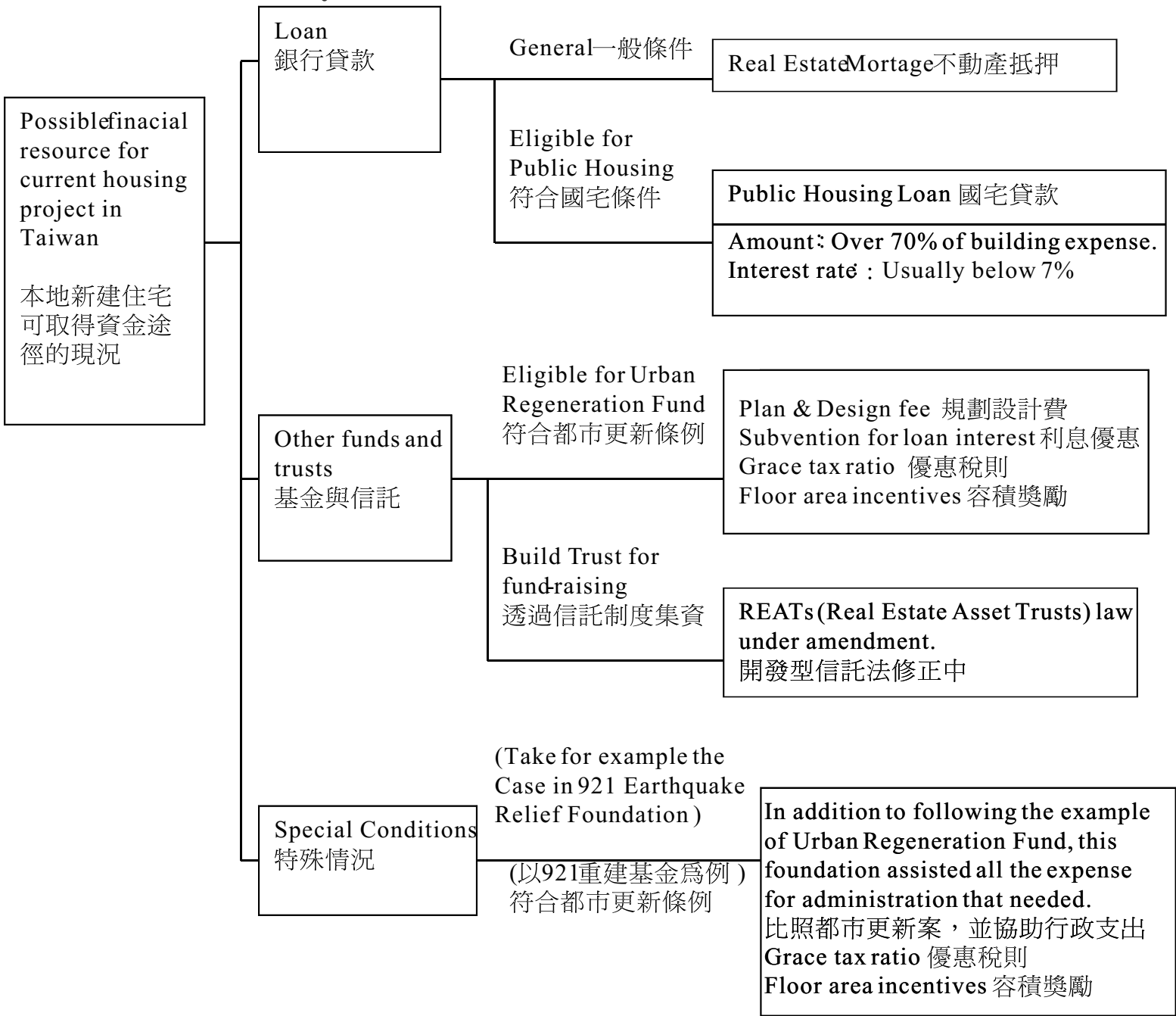


FINANCING TOOLS OR PRODUCTS SUITED TO AN OB PROCESS

5.0 Introduction-the financial tools available for housing projects in Taiwan

In search of the financial tools available for OB, it was our assumption in the very beginning that those tools useful for general housing project, are also possible tools for OB. Thus we started to find out where builders get the money they needed. We considered all kind of conditions that a building can be constructed, such as projects built by government or private developers, on virgin land or brown field sites. Also we reviewed all current regulations,to find out certain words in them that may need further interpretation or explanation, which can be applied on OB conditions.

5.1 Funds, the other way



In order to define whether the above tools are also possible solutions for OB, two questions for open building:

- 1.Does it make any difference for all the above tools if a project is planned to be built in an OB way?
2. Within those possible tools, anyone who can evaluate the In-fill and Base in OB separately, will be helpful for the builders.

Which are them and how do they evaluate?

5.2 Money from bank, the real estate loan

Previously review

The current applied methods for real estate evaluation

- Discounted Cash Flow (DCF)
- Income Capitalization (IC)
- Market Comparison (MC)
- Cost Approach (CA)
- Development Approach (DA)

Hypothesizes

1. As for the DCF, it considers the rental income, the capital replacement and the surplus value that are all possibly related to OB.
2. As for the MC, the OB product has better identity and suitability for the market.
3. As for the CA, the OB make the property share by two parties and the base building that can reduce the money expand and risk for both sides.

The elements for real-estate evaluation in current codes and regulations are:

- Building Location
- Building Construction
- Usage
- Individual Conditions
- Equipment

Hypothesizes

Possible difference in the later three elements with OB issues:

1. OB makes usage change available for higher capacity and value.
2. OB extends the traditional interpretation about “individual conditions” , such as the different base building case-by-case, the variable in-fill including its area and usage.
3. OB invited certain building equipment into construction, for example, attachable and extensional elevator, in-walled pipes and AC systems, recessed floor, etc, that redefine the word “equipment “.

### Introduction:

If the opening building concept is to be popularized smoothly in Taiwan, or even accept and liked by most of people, the key factors includes: property developers, construction businesses, regulation and processes, legal barriers, software and internet sites, infill technical products, base building technical systems, identify facade strategies, multi-skilled installation teams and financing tools. One of the critical factors is the availability of financing tools for building constructors and citizens. Both base building and infill need the funds.

This study aims to understand Taiwan domestic banking practices to determine if they can fund building constructors or general citizens implementing OB projects. Therefore, this study would focus on three directions thorough a series of interviews:

1. Identify financing tools or products suited to an open building.
2. What kinds of loans are available for households in condominiums?
3. Is it possible for a household to lease space and own their infill, and as a result deduct the interest on the infill loan from their income tax?

There are two parts in opening building construction. One is the “base building” ; the other is “infill” . The research direction of this study is whether the general citizens or building constructors can ask for a loan from a bank to finance the base building and infill. Depending on the content of the real-estate evaluation rules, announced by the Ministry of Interior on June 12, 2006, there are two factors that would affect the evaluation results, when we evaluate the buildings. One is location of the building; the other is land and floor area of the proposed building.

In addition to the above statements, there are some important items for reference to evaluate buildings:

1. Building construction system (reinforced concrete, steel and reinforced concrete, steel structure or timber structure)
2. Height of buildings
3. The stories (the ground story prices better than another story of same building)
4. Age for the building
5. The quality of public equipments and use life in building (new building or old building)

According to real estate evaluation rules Article 2, Article 19, Article 21, Article 24 status, etc., each “individual” factor will affect the real estate evaluation result. And according to real estate evaluation rules Article 67, the “construction materials and equipment” of buildings still can be sold in the market when the years of economic durable use are over. The total sale price of the building is an important item when evaluating the real estate. We must also think about the scrap value and depreciation of building.

There are some advantages in the opening building concept that should have an effect on financing:

1. Everyone can design their own house according to their preferences, so each dwelling of a condominium has its uniqueness.
2. When family members increase or decrease in number, or the use purpose changes, the dwelling layout and equipment can be changed without disturbing neighbors.
3. The infill can be reused.
4. Because of the multi-skilled installation teams, infill technical products and base building technical system, the constructing time is shorter. The constructor can sell the building more easily, the household can move in the building quickly. The management and interest cost of the constructor will be reduced.
5. When the household, constructor, and the architect plan, discuss, and design collaboratively, there is reduced conflict and increased decision flexibility for all plays.

According to these advantages, the Infill should match the article2, article19, article21 and article24. This means that the household can get a larger bank loan, and the rate of the loan can be decreased. The cost of Infill products can be deducted from income tax, in contrast to the model of renting. Therefore, it will decrease the householder's burden of income tax. Furthermore, the Infill products can be reused, by article67. Also, infill, public equipment, and installations are treated to Equipments of building so the infill should have scrap values. When the original householder sells the dwelling unit, they can raise the price of the building. In other words, when the real estate agent appraises the building, they should get the higher price.

Depending on the issues above, we get some conclusions after interviewing:

1. The base building without partition wall, bathroom, or the facade of building is illegal under current law in Taiwan.
2. Illegal buildings cannot get the building license.
3. No building license, no loan.
4. It needs to match the current law in Taiwan, when people apply to a loan on mortgage from bank. And meanwhile, they must own the land license of ownership of the building location.
5. It needs to match the current law in Taiwan, when people apply to a loan on house from bank. And meanwhile, they must own the land license of ownership of the building location.
6. Because of the owners' behaviors, styles, concepts and infill safety and beauty, the dwelling house is sale or rent to bank in evaluation process, the factors of quality style and quantity of infill are not important in building cost value. In other words, bankers concern the base building, location of building, land and floor area of building, building construction system, height of buildings, the stories, age for the building, the quality of public equipment and use life in building.
7. When people buy the open building they can get the bank loan only when they ask for the loan by infill or decoration. Bankers do not consider the quality, style and quantity of infill for the loan amount, only consider the debtor's repayment ability, such as profession, social position, job stability, bank account or other real estate.
8. Constructing new open building or rebuilding the old one to the open building, no matter ask for a loan from bank directly or in fund and trust to get bankroll, the process and method all need to match the current law in Taiwan and the statements above.
9. Promote open building concept in Taiwan, there is a long way to go, there are many difficult problems needing to make great efforts to overcome.



## FINANCING TOOLS OR PRODUCTS SUITED TO AN OB PROCESS

**5.3 The government's policy for public housing**

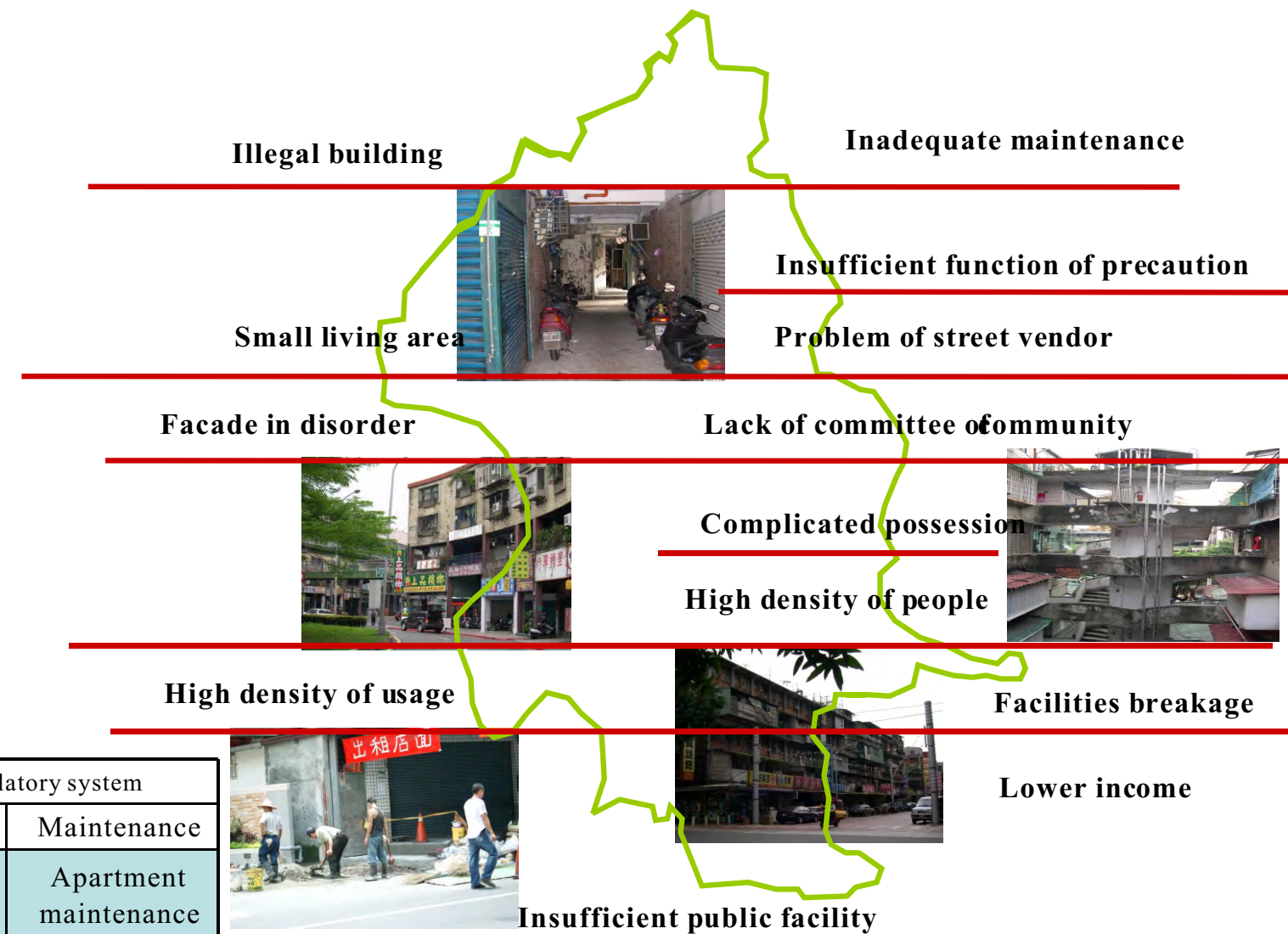
In Taiwan, open building related to “infill” does not have a distinct or Independent legal status from the building, Banks have been reluctant to support financing for investment in fill, because they do not have confidence to give developers the status of mortgage. Subjective images of bankers have tended to block the dissemination of the open building concept. At this moment, public authorities have to guarantee the infill owner's possessive right of infill entirely. Respecting this issues, this part of the research discusses the situation to give the “infill” a financially distinct status from the building “structure” and proposes an ideal regulation of apartment renovation under the scope of Taiwanese legal institutions.

**The principle of regulation of urban renovation**

There are a number of bad situations of urban phenomenon associated with living that need to be improved as quickly as possible (see in **Fig 1.**). Taipei City Government has much concern focused on these old apartments renovations. **Table 1** shows the current regulation based on urban renovation and condominium regulatory system in Taiwan. Incentive systems were also provided to people who participate in limited renovations. Urban renovations prescribe that any attachment to fixed property that owes fundamental function of the fixed property should be treated as combined property belonging to the fixed property, even in the case the attachment was bought or invested by different stakeholders from those related with fixed property. The principle of fixed property refers to this description and has been large a obstacle to the feasible operation of structure and infill buildings.

REGULATION	Based on urban renovation		Based on condominium regulatory system		
METHOD	Renovation	Maintenance	Renovation	Management	Maintenance
DEFINATION	Renovate and repair the infrastructures or public facilities.	Strengthen and improve the public facilities and building managements in renovate area.	Apartment renovation	Apartment management	Apartment maintenance
EXCECUTION	1. Renovation units Total area of renovation unit must be excess 1/10. 2. Developers or building owners To excess 2/3 number of possessive owners of buildings, total area of floor must be excess 3/4.		1. Renovation of agreement distinguished by owner's possessive right: Excess 2/3 possessive owners attendance, agreement with 3/4 number of possessive owners attendance.		
INCENTIVE	1. 1/2 fee can be exempted from the land tax during renovation. 2. 1/2 fee can be exempted from the land tax and house tax for two years after renovation. 3. Investors and developers engaged in the renovation can that can against the fee for Business profit.		None		

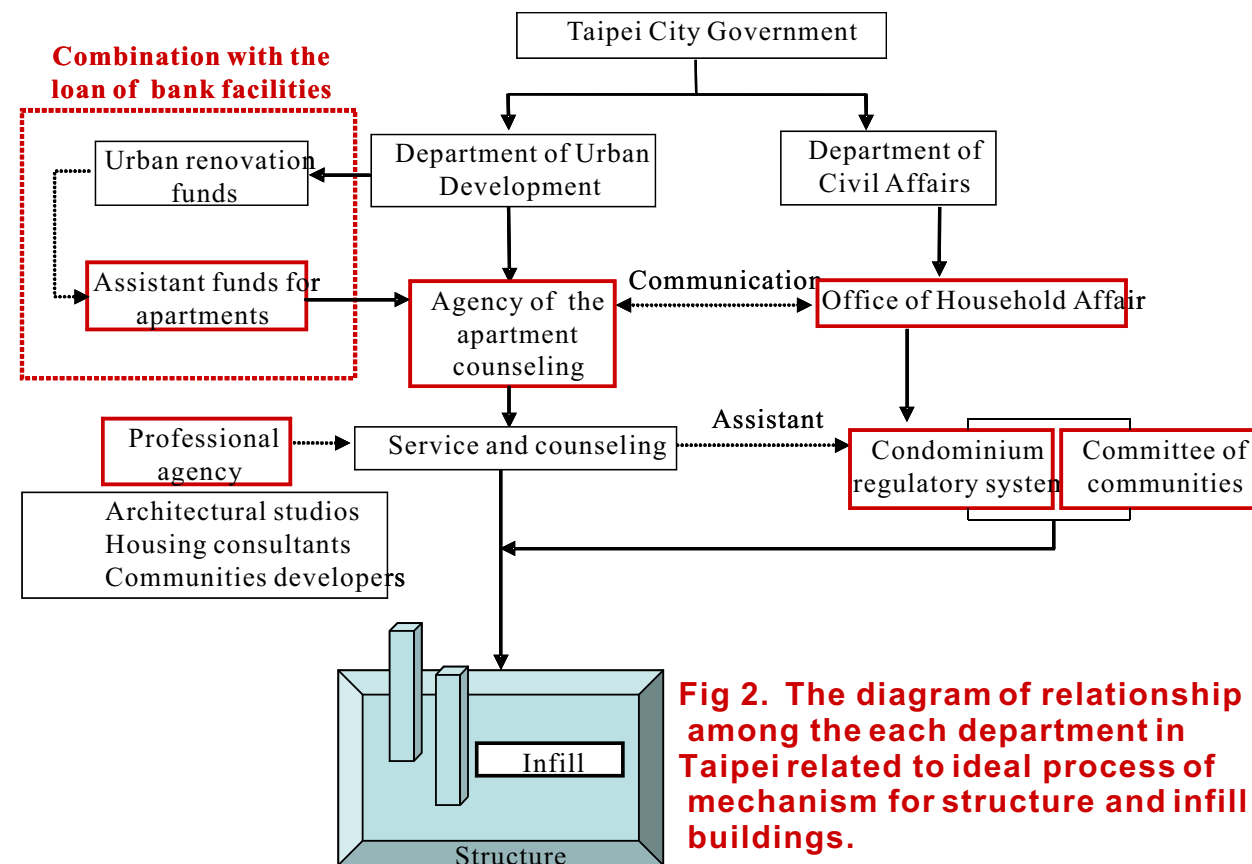
**Table 1. The regulation based on urban renovation and condominium regulatory system in Taiwan**



**Fig 1. The bad situation of essentiality for apartment renovation which are concerned by Taipei City government**

**The ideal support by the public authority**

Firstly, in order to satisfy open building as a feasible business, government (Taipei City Government) has to guarantee the infill owner's possessive right of infill entirely. Japanese regulation of Civil Law has been developed with the requirement for financial distinction between structure and infill in order to operate feasible business of OB. Figure 2 shows the diagram of relationship among the each department in Taipei related to ideal mechanism for structure and infill buildings. Even if the owner of structure may go bankrupt and the structure was bought or transferred to the creditor, it is required that the owner of infill can claim possessive right of infill against the creditor of the owner of structure. .



**Fig 2. The diagram of relationship among the each department in Taipei related to ideal process of mechanism for structure and infill buildings.**

Tool	Does it make difference if project be done in traditional way or OB ?	Do they afford additional loan for the infill?
General Real Estate Mortgage Loan	If both cases land and house ownership are mortgaged, no difference.	Individual condition will be considered, but the difference cannot be expected.
Public Housing Policies	Same as above.	Same as above.
Urban Regeneration Fund	The process of OB could be helpful for setting up cases, if there are multi-ownership.	Right now same as above, but the possible chance can be happened if the Regeneration Funds act like that of 921.
Real Estate Asset Trusts	New code under suspension. According to the market mechanism, it was believed that the location may be more important than variable usage.	Since the investor also owns the property, that can be sold or for rent. The infill can be an individual item in the Trusts, but its cost depends on its market.
Special Conditions Take Example the 921	The OB is a better way, but most of the difficulties remain the same.	In some cases banks would kindly increase the loan for furniture. The risk has been reduced with the financing collateral from the Funds.

### The Incentive system

Secondly, any of **incentives system** ideal regulation of apartment renovation will help the owners deal with all loan affairs easily and smoothly and should be distinguished financially in order to attract investment (see **table 2**).

METHOD	OBJECTS	CONTENTS
INCENTIVE SYSTEM	Compensation	Social disadvantaged minority (handicapped and advanced age people)
	Public Housing Loan	Lower income people
	Real Estate Mortgage	Who do not have enough guarantees or mortgages
	Floor area incentives	Exceed the amount of 2/3 social disadvantaged people live in condominium (handicapped and advanced age people)
	Land function expended	Strengthen and improve the public facilities in the renovate area.
	Simplify applied procedure	

**Table 2. The Incentives system were used derived from the ideal regulation of apartment renovation**

### Reference

1. Shunsuke Kawagishi et, "Potential of investment for open building based on demountable infill system", 2005 World Sustainable Building Conference, Tokyo, 27-29 September, 2005.

2. 游永慶, "A study on advancing rehabilitation and conservation of the apartment in Taipei", Master Dissertation, National Taiwan University of Science and Technology, 2004.

T.C. Yang 楊澤泉 Real Estate Securitization "不動產證券化", 2006年演講稿 [http://ac.nccu.edu.tw/~windy0206/%E6%94%BF%E5%A4%A795/%E6%88%BF%E6%8A%95/RES\\_2006.ppt](http://ac.nccu.edu.tw/~windy0206/%E6%94%BF%E5%A4%A795/%E6%88%BF%E6%8A%95/RES_2006.ppt), Cited in July 21, 2007

### Acknowledgement

Dr. Chih-Hong Huang, Chairman of Department of Architecture, National Taipei University of Science and Technology.

The completion of this research took several visits and calls. Thanks for those people with their professional comment and patient during our visit. Their names are as follow.

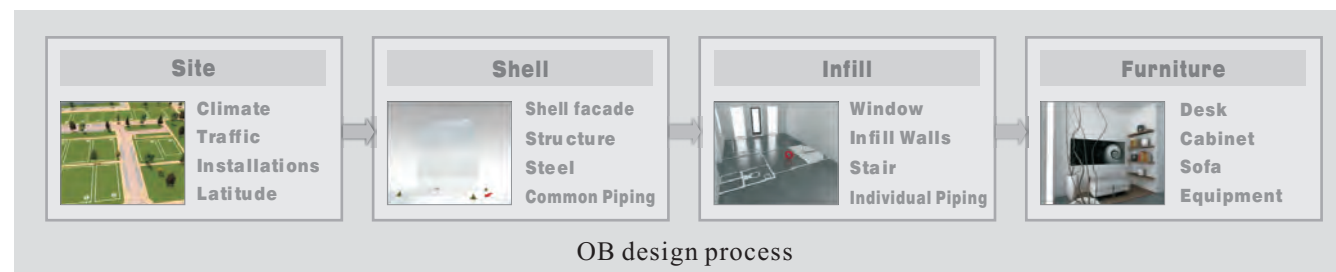
- Chun-kai Wang (王俊凱) of 921 Earthquake Relief Foundation.
- Special thanks for Ming-cheng Liao (廖明誠) for helping to make appointments



## THE INTERNET SITES OF THE OPEN BUILDING

## SUMMARY

This work is to find out the software and internet site which already offer some-thing like Infill or that would be supportive of OB implementation. Our achievement after searching website that and then recommend, is recom-mended offering intact procedure and explanation according with Open Building idea by websites of a Dutch company among them, understand that puts Open Building design process (Fig 1). In order into a procedure form after the service structure that this website offers, set about searching website that Taiwan or other countries are similar to this kind of service function.



When we already understood the procedure of the OPEN BUILDING, we try to search the similar company website in Taiwan or other country in order to find out something have been done and try to combine into our OB procedure that we understand. This procedure provides buyers to choose the site, floor plan, building construct, house direction and type of windows, material and color, we search the website that provides faultless procedure.

## THE SITE LOCATION WEBSITE

When buyer wants to order open buildings, the first step is to choose a site. So we search the websites that can show the information about the site that buyer like. These website offer us to choose the type of the site, such as City, suburb, village, mountain area, bordering on the seaffarent climate, geology and communications. That needs different system and material to cooperate.



## THE SHELL PRODUCTS WEBSITE

Then buyer must plan a pattern of the house, includes the scale and size. If the structure method can be known, the buyer can do more choices. The mass of building is decided the requirement of user, the OB system offers shells to support the infill. We try to order the standard to let design house by self from the internet easily and popularly. The following are that we find websites related to SHILL in the network.

The company purposes to support the products of OB systematic shell, the work includes the structures of the foundation, roof beam, and endure shake, guard against burglary and fireproof, etc. It includes shell work procedure that research and develop by oneself, among them include corre-sponding structure material and form.



This company offers the light-duty material to use and act as shell, the characteristic is to shorten time for a project, on-the-spot construction is simple, the workshop produces, reduces the waste material in the building site.



The products of this company are the foundation, the shock absorber, cage skeleton and light quality wall. The web offer four different kinds of choice of shell, every kind can raise the ability on structure, endure shake, fire prevention and waterproof. The buyer can choose according to economy or requirement.

This company offers integrative shaping shell frame, the structure can increase from side to side and overlap from top to bottom.



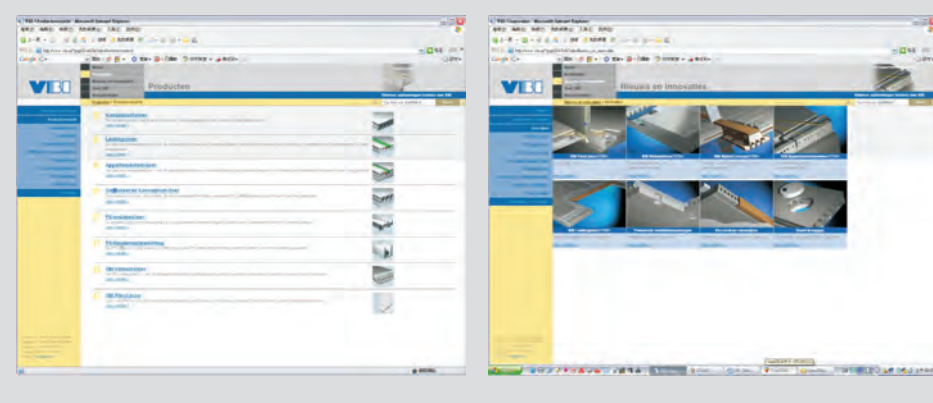


## THE INFILL PRODUCTS WEBSITE

The infill influence the quality of the space, the alterable part of a house includes wall or window, the characteristic provides the house using flexibly. This web offer several floor plans, and the model can convert 3d to view it. This function can show the vertical movement and service space, but there is still less variable of the floor plan, for example the interior partition present almost only one room.



Pipe need to cooperate structure system, belong to the part of the shelf body of the house system, must consider at the same time on the phase of house design .



Because different climate of every area, buyer has more choice on the house appearance, and can be researched and developed the produced materials.

Buyer can select the floor plan that the manufacturer sets up in advance, and look for the space suitable for him, then plan the house appearance. The house appearance presents modern fashion, European village, and Japanese type, the web support consumer to select architectural style what they like.

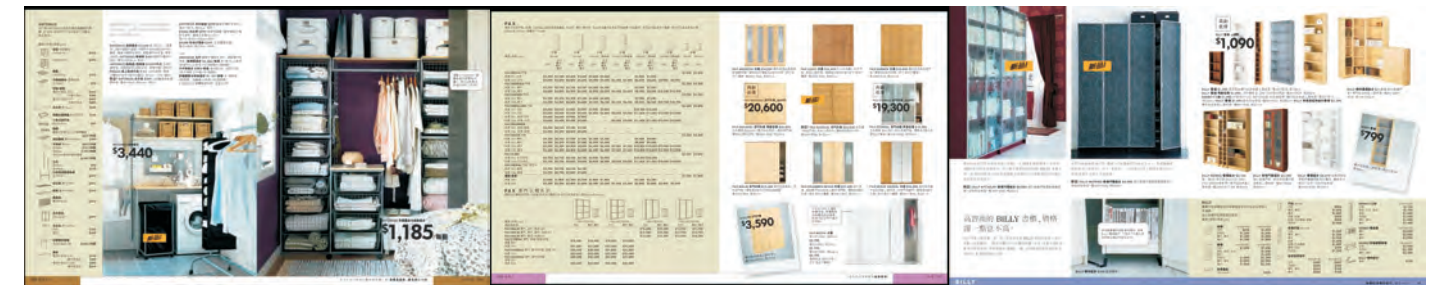


The buyer chose several kinds of packages from the web that appear finally in the process of purchase. We find the choice of the furniture is deficient form this procedure. If it joins purchase of furniture, the buyer can to know the prevision house overview.

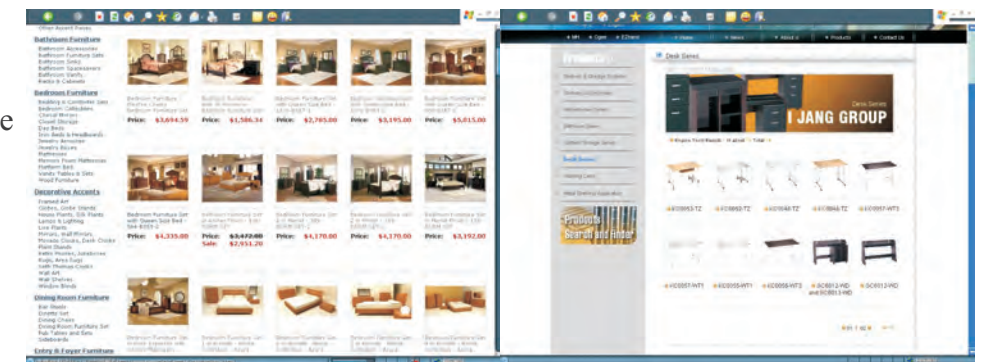


## THE FURNITURE PRODUCTS WEBSITE

We have looked for the furniture offered on website to browse through. We hope the buyer can image the furniture to furnish in the room. Products of the Company are furniture mainly, the products includes sofa, chair, wardrobe, and all kinds of furniture. Some of the furniture produces by factory. When the furniture is unnecessary, it will be take apart to the Company.



The products of the company are mainly furniture and the office furniture, you can choose the interesting furniture, and then throw it into the cart. The web will calculate out all the price finally, and send the furniture to your position.



## Conclusion

As the building can be ordered on websites and planed to detail of the building, large number of materials or components can be beforehand . Although the result is extensive and regular, but the website provides the mass customization for servicing guest. Then a guest buy a house as relax and fast as buying a computer.

## Website Reference

- 1.MISAWA, [Http://www.misawa.co.jp/madori/index.html](http://www.misawa.co.jp/madori/index.html)
- 2.d-roomchintai, [Http://www.d-roomchintai.net/?ad=top](http://www.d-roomchintai.net/?ad=top)
- 3.套房住宅, [Http://www.cis-life.com.tw/p111.html](http://www.cis-life.com.tw/p111.html)
- 4.日式鋼構屋, [Http://www.ncsuperhouse.com.tw/index.htm](http://www.ncsuperhouse.com.tw/index.htm)
- 5.Asahi Tostem, [Http://www.asahitostem.co.jp/](http://www.asahitostem.co.jp/)
- 6.Toyota Home, [Http://www.toyotahome.co.jp/](http://www.toyotahome.co.jp/)



## Identify Specific Infill Technical Products Available in the Taiwan Market

## Introduction

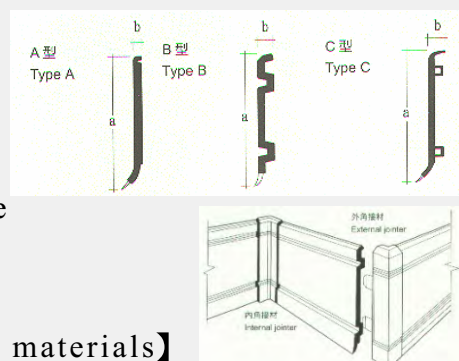
For open building, the building was divided into the base building and the infill. This research aim infill products investigate and combine available in Taiwan market. In the concept of the flexibility, that will be effective on the part of design and product.

For infill, can roughly divide all types into two big classes of hardware and software. It's called hardware not like the invariable part of the base building. It's not often to move site in the infill, for example, the interior walls, floor, etc.. Software can according user like, to a part of changeable, for example, the equipment, power line, etc..

## Products on the Taiwan Market

## Skirt board Products

In the space of Taiwan, designer is used to set up wall skirting in the connect place of wall and floor. The traditional wall skirting only has beautiful function. Now, many factories develop wall skirting easy to removing, and can set up power line in the wall skirting. The product not only simplifies the question of the power plan, but also can direct set up power line outlet on any wall place.



【TUNG KUNG building materials】

## Power Line Connect Products

The power line joint has another kind of type, it can install quickly and the iron is set up on the inside. The user will not touch the part of the iron, only need to install in the new joint. The new joint can connect the power line, cable, network line, etc., and set up in the both ends of the wall. No matter the interior walls how to change; the joint can easy to install. And the joint have a kind of transform joint, it can divide a power to a lot of outlets, or a lot of power to an outlet. The transform joint can use in the different types of plane.



【TAICHIN CO., LTD】

## Water Pipe Products

## Fast Joint of Drain Pipe

The Fast Joint use adhesive tape to connect drain pipe in the past, so unable to reach fully airtight of effect, sewage regular meeting seepage comes out. Use the fast joint of drain pipe connect water pipe end, can reach the result of the airtight separate, and prevent sewage seepage effectively.



【ANGEL ARGENT CO.,LTD.】

## Unit Toilet System

UT construction combines each pipe (ex. feed pipe, drain pipe, breather pipe) in the box. The box assemble, test in factory.



【TIEN KUANG ENTERPRISE CO.,LTD】

## UT character

Convenience: Only must reserve pipe shift

The Products Quality is Stable: Each products are strict product in the factory.

Seismic Capacity: Because UT is the independent box, it is link to do with hose, seismic not effect pipe.

Time Limit for a Project is Shorten: The pipeline has been already finished assembling in the factory. It can save traditional work time.

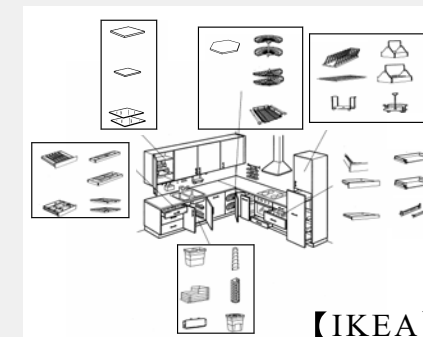
Convenient to Fix: UT system install on the floor, so can easy to fix.



【TWTOTO, LTD】

## System Cabinet Products

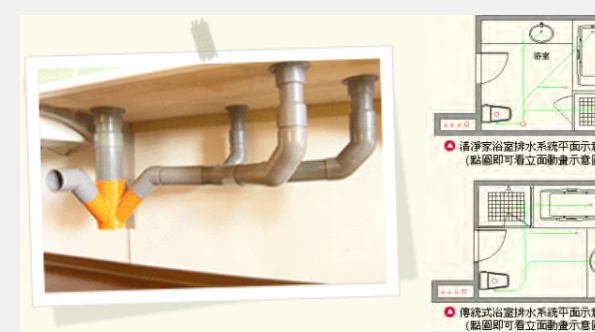
Every component of furniture (i.e. leaves, panels, fittings.) has various styles and they can be selected and changed. This design provides the flexible for users to decide the cupboard's function and surface.



【IKEA】

## Combine Trap

Every outlet of traditional trap install set trap, if single outlet not use for long time. It maybe dry and bring reek. Traditional trap is 135 degrees to retain water, apt to block. So use the comprehensive trap, converge all water in one trap inside, forming the single big water seal. If water pipe block, can open water seal cover to weed out matter. Comprehensive trap is 45 degrees more difficult to block.



【Cleaner Home, LTD】

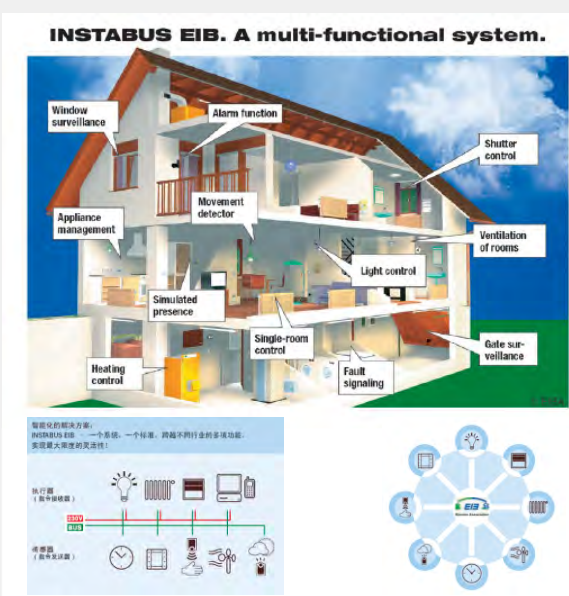


Smart Building System and HVAC Product

INSTABUS EIB

Switches, safety programmed, building management system and more the suitable program for all needs:

- Switches & accessories for private and commercial buildings
- INSTABUS EIB building management system
- Dimmer systems and transformers
- Shutter control system
- Radio system
- Movement detector system
- Smoke detector system
- Plugs & couplings, appliance connection boxes
- Internet Controller IC 1



【MERTEN】

Communication Module Series

Mounting industry standard communication devices in Wiremold Wire and Cable Management Systems has never been easier. The Wiremold Communication Module Series supports open system architecture by providing a variety of unloaded modules to accept devices from other manufacturers. These open system modules provide a flexible and aesthetically pleasing way to connect communication cabling at the point-of-use.

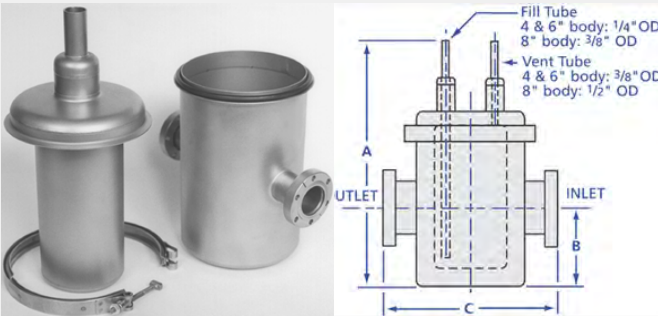


【WIREMOLD】

What Taiwan Market Lack?

In-line Trap

The dual-tube design allows the liquid nitrogen reservoir to be attached to an automatic fill tube, reducing the amount of service required by the system. These traps are available in in-line and right angle port configurations with 4.0, 6.0, and 8.0 inch OD bodies, .75 to 4.0 inch OD ports. The two-piece trap body and 304 stainless steel construction allow these traps to be easily cleaned.



【Nor-Cal Products, Inc.】

Conclusion

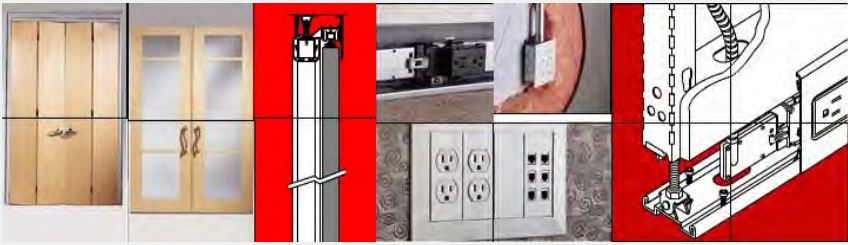
This research presents the infill products in Taiwan market, and products should be own for open building. For the concept of open building, try to combine the performance of each product. Though each product belongs to different companies, but the architect can use the products of each part. Even more to create the design of open building in the Taiwan, and can combine the advantage of each product. And provide the development of combine industry.

References

KI, Website: <http://www.ki.com/>  
TAICHIN CO., LTD, Website: <http://www.tccl.com.tw/>  
IKEA, Website: <http://www.ikea.com.tw/chi/main.html/>  
TIEN KUANG ENTERPRISE CO., LTD, Website: <http://www.tenco.com.tw/index.asp/>  
TWTOTO, LTD, Website: <http://www.twtoto.com.tw/home.asp/>  
Cleaner Home, LTD, Website: <http://www.cleanerhome.com.tw/index.htm/>  
KAI JAY ENTERPRISE CO., LTD, Website: <http://www.kaijay.com/>  
Nor-Cal Products, Inc, Website: <http://n-c.com/>  
WIREMOLD, Website: [http://wiremold.com/shared\\_content/pdf/ED1119.pdf](http://wiremold.com/shared_content/pdf/ED1119.pdf)  
MERTEN, Website: <http://www.merten.de/html/de/index.html>

SystemsWall Demountable Walls







Panels can be removed and replaced without disturbing adjacent areas. This multipurpose framework provides ready access for communication and data networks, easily changes doorways and features a variety of materials.



【KI】



BASE BUILDING TECHNICAL SYSTEM USE IN TAIWAN

Building types	Image	Stories	Structure & Construction							Base building types
			Reinforced Concrete				Steel Structure			
			Load-bearing wall	Column	Beam	Slab	Column	Beam	Slab	
Single detached House		1-4F	A		A	A				1
				A	A	A				2
Town House		2-4F	A		A	A				1
				A	A	A				2
							C	C	A	5
Low-rise Apartment		≤5F	A		A	A				1
				A	A	A				2
Mid-rise Apartment		6-10F	A		A	A				1
				A	A	A				2
Mid-high-rise Apartment		11-15F		B	B	A				3
				B	B	B				4
							C	C	A	5
							C	C	B	6
High-rise Apartment		≥ 15F		B	B	A				3
		(50M)		B	B	B				4
							C	C	A	5
							C	C	B	6

Introduction

Though the concept Open Building has been known for more than two decades, there are still few buildings with this concept being constructed in Taiwan. This could be the result of problems with the MEP system (Mechanical, Electricals, and Plumbing) installation and maintenance. In fact, the construction now applied in Taiwan could achieve open building easily with a slight change in composition. In this research we classify common residential buildings in Taiwan into 6 different types, and then we subdivide these 6 building types by structure and material. Furthermore we analyze their construction method and make a slight change to let them become a suitable base building for open building. By this research, we hope we can provide new thinking to construct buildings in new way but with the original construction method, and that could be one part of the promotion of open building in Taiwan.

Residential building types in Taiwan

There are many kinds of residential building types in Taiwan. We categorize them roughly into 6 types: single detached house, townhouse, low-rise apartment, mid-rise mansion, mid-high-rise mansion, and high-rise apartment. Each type can be constructed out of different or same materials. In order to avoid over extending the range of this research; we ignore other constructions such as bricks, masonry, and timber. **SS** (Steel Structure) and **RC** (Reinforced Construction) are the most popular construction in Taiwan, therefore, all the residential building types we defined can be constructed by these two construction methods. We can find 6 types of base building now used in Taiwan within these 2 constructions. Fig 01 shows how the 6 base building types in Taiwan could be defined by structure and construction.

New composition way with old construction

The base building types used now in Taiwan don't follow the concept open building. Though there is always a pipe shaft for vertical pipes, the horizontal plumbing always cause big problem and the position of the vertical shaft does not easily allow a variety of unit sizes or unit floor plans. The horizontal piping usually is put inside the concrete floor, and some pipes even need to pierce through columns or beams. This requires partial demolition of the floor to maintain or replace the piping. We can solve such problems easily by a slight change in composition of construction and smarter position of the vertical shaft. Fig 02 shows the details of these 6 base building types before and after the slight changes being made in the traditional construction.

Fig 01. Residential base building types

- A: On-site Cast
- B: Precast Concrete component
- C: Steel, Bolt / Weld



Conclusion

Though the contractors and developers in Taiwan don't build architecture within the concept open building and still build in a traditional way, it is very simply to achieve open building by modifying the construction. The modifications could be made with the same technical system, but they indeed help the base building become more flexible to the piping system. Flexible base building that variety of layouts could be generated, and the architecture could be more adaptive, economical, and sustainable. We expect the concept open building could be practice everywhere in Taiwan someday.

Base Building	Traditional Construction			New composition of original construction		
	Diagram	Details	Description	Diagram	Details	Description
Type 01: RC(w+b+s)			The beams, walls, and floors are poured on-site together. Horizontal piping must go through floor or beams into the lower dwelling unit.			By using upside-down beam/slab to locate horizontal piping in to avoid entanglement with other owner's space.
Type 02: RC (c+b+s)			The beams, columns, and floors are poured on-site together. Horizontal piping must go through floor or beam into the lower dwelling unit..			By using upside-down beam/slab to locate horizontal piping in to avoid entanglement with other owner's space.
Type 03: PC(c+b) +RC(s)			Precast columns and beams and the KT slab. Horizontal piping must go through floor or beams into the space of lower dwelling unit.			By using "L-shape" precast beam to lower the floor and to generate a space in which horizontal piping can be located without piercing through beams.
Type 04: PC(c+b+s)			Precast columns, beams, and hollow slab. Some horizontal piping go through beams into the space of the lower dwelling unit.			By using "L-shape" precast beam to lower the floor to generate a space in which horizontal piping can be located without piercing through beams.
Type 05: SS(c+b) +RC(s)			Steel columns, beams and KT slab. Horizontal piping go through floors or beams into the space of the lower dwelling unit.			Putting the KT slab on the lower flank of the beam to level down the floor to generate a space in which horizontal piping can be located without piercing through beams.
Type 06: SS(c+b) +PC(s)			Steel columns, beams and precast hollow slab. Some horizontal piping go through beams into the space of the lower dwelling unit.			Putting the precast hollow slab on the lower flank of the beam to level down the floor to generate a space in which horizontal piping can be located without piercing through beams.

Fig 02. Slight changes in composition of construction for 6 base building types. s= slab, w=load-bearing wall, b=beam



# CHAPTER TWO RESEARCH REPORT TEAM 9

## IDENTIFY FACADE STRATEGIES SUITABLE IN TAIPEI ASSUMING A RANGE OF SOLUTIONS



### 1. Introduction

About the plan of elevation of the building, there are a lot of factors must be considered. Such as the regulation, climate environment, beautiful...so on.

So under the view of the opening building, we probe the building elevation of Taipei, by four aspects:

- (1)Regulation.
- (2)Facade patterns.
- (3)Materials and Production.
- (4)Case Investigation.

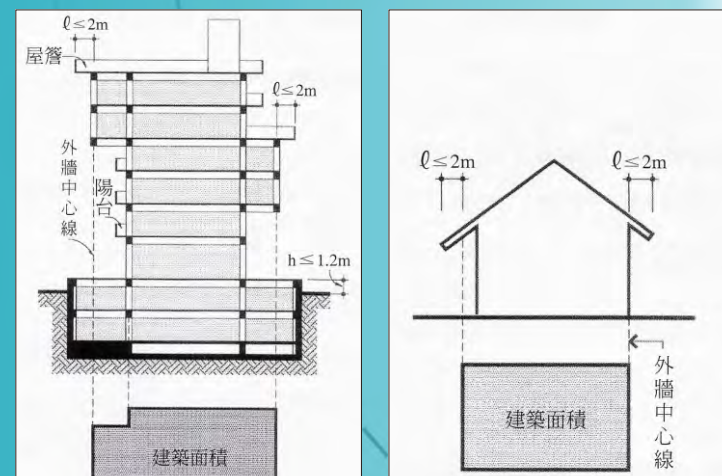
And by three kinds of housing building:

- (1)Apartment(high-rise, 10 floor and higher)
- (2)Apartment(low-rise, 10 floor and lower)
- (3)Townhouse(about 3~4 floor)

### 2. Regulation

#### (1)Building Area

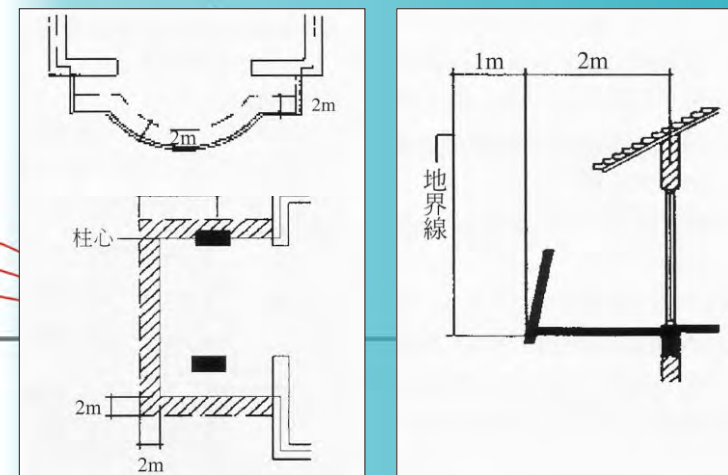
The projection line of the facade kits will be the "Build covering rate", that will influence the calaulate of the building area.



### 2. Regulation

#### (2)Balcony

If the depth of the Balcony exceed over 2m, the depth of the Balcony should deduct 2m when the building area will be calaulated.



### 2. Regulation

#### (3)Railings height :

- ~2F :  $\geq 1$  m
- 3F~ :  $\geq 1.1$  m
- 10F~ :  $\geq 1.2$  m

#### (4)Opening size

About natural light and adequately ventilated

#### (5)Shell energy stipulate

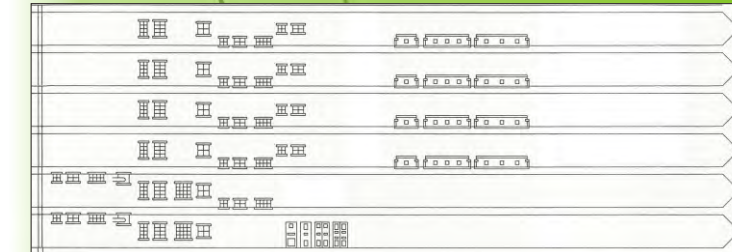
- Shell save energy
- Opening rate of the shell

### 3. Facade Patterns

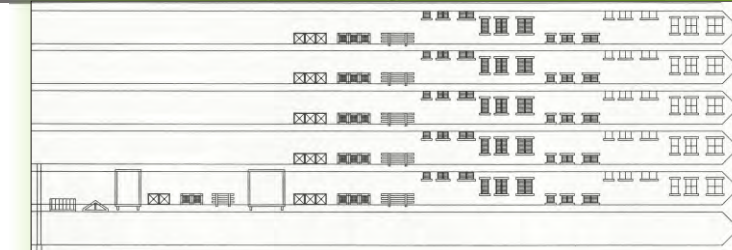
#### (1)Patten dimensions



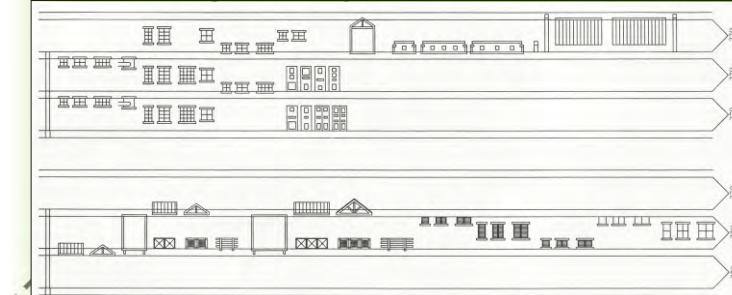
#### (2)Patten combination



Apartment first layer



Apartment second layer



Townhouse first and second layer

### 4.Materials and Production

#### (1)Base Building

Always use "Tile" in Taiwan.



#### (2)Infill

Always use "Aluminum" and "Stainless steel" in Taiwan







#### 4. Case Investigation

##### (1)Apartment(high-rise)



No added Facade



Unify Facade



Disorderly Facade

#### 4. Case Investigation

##### (2)Apartment(low-rise)



Disorderly Facade



Disorderly Facade



Disorderly Facade

#### 4. Case Investigation

##### (3)Townhouse



Disorderly Facade



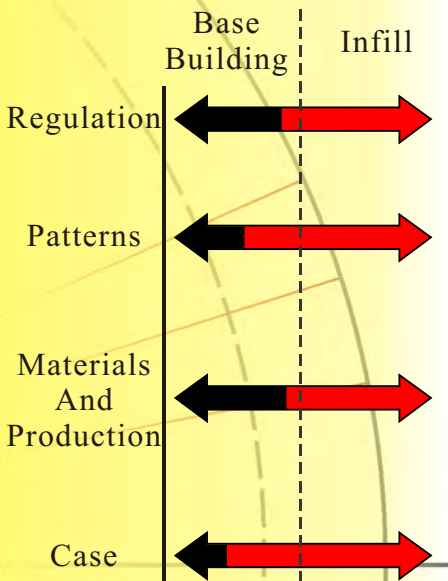
Disorderly Facade



Disorderly Facade

#### 5. Conclusion

About the facade factor, the opening building rate between "Base building" and "Infill".



#### 6. Reference

*Factory villa : the emergence of a type*, 2001.



Exercises in designing are similar to exercises in sports or music training. They are partial; they do not attempt to incorporate all aspects of a full design process, musical performance or a match. They “exercise certain muscles or plays”. In mastering the art of playing the violin, for example, exercises cultivate specific aspects of tone quality, bow technique or fingering. Similarly, design exercises are structured to develop particular design moves or operations. They depend on well-described constraints or limits. The selection of such constraints is the key aspect of a good exercise. When a series of design exercises are to be done, the progression of constraints is important.

In this workshop, I wanted students to get familiar and comfortable with just a few basic design moves at the heart of open building. Open building inherently concerns distribution of design. One party designs the base building while others design the infill. This means that, in open building if not more generally, all design acts are partial.

Another reason for understanding studio work as “exercises” is that, like in music education, exercises or practice routines are never mistaken for performances. Nor are exercises in composition confused with complete compositions ready for performance. The connection I am making between exercises and distributed design is that both are partial. Complete in themselves, both exercises in music and exercises in designing are nevertheless one part of the performance or, in the case of environmental design, part of a design process leading eventually to a built field.

Distributed design means that the “whole” whatever it is is partitioned, each part being the responsibility of an “agent”. Therefore, as in doing exercises, the essential idea of learning to work with distributed design is to work on parts. This has to come naturally to both teacher and student, and it has to happen with discipline and sensitivity. This takes time, but it pays off. It will be said that working on parts ignores the wholeness of reality, ignoring principles of integration. Some will say that work on an entry “place” can't be done unless the same person has designed the facade and the floor plan, at the same time. Someone will say that it is not a good idea for one person to design the building's “core and shell” while other people design the tenant fit-out later on. The argument is that wholeness will be sacrificed. These arguments are a trap and are part of an ideology of centralized control as the only way to get wholeness. They suggest that everything is seamlessly interdependent, which, in a metaphorical sense, is true. But practically speaking, without good task partitioning, every design move would require discussion and negotiation, since in any environment, control is distributed for the different parts and places over time. We would not want it otherwise, since a dictatorship of the environmental game would be a bad idea.

On the other hand, there is no argument that partitioning of a complex task can be achieved without shared values, assumptions, methods and processes. Without them, confusion and disjointed results are inevitable. This only begs the question of what is shared among designers and the public in the environment game. It is also important like in practicing a musical instrument to realize that just because you can do exercises well doesn't lead automatically to stunning performance, or an environmental design of excellence. But without exercising, achieving excellence will be more difficult, if not impossible.

## FIRST OB EXERCISE: JULY 5<sup>th</sup>:

### EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION

This exercise is designed to help you get started in doing “capacity analysis”. *Capacity analysis is a method to evaluate what INFILL is possible in a BASE BUILDING.* We will use one typical floor of an existing, historic 20 - story office building in Detroit, USA, as an example. It has actually been converted into an apartment building. (Unfortunately the developer did not use an open building approach, so there were many problems and the building is not “flexible”). It has a structure of concrete columns and slabs. The floor-to-floor dimension is about 4 meters. We will start the work in the class, but you can do more work on it over the weekend. I want each team to present its studies at the beginning of class on Monday July 9<sup>th</sup>.

#### WHAT I WANT YOU TO CONSIDER AND DO IN THIS EXERCISE

1. There are five units shown on the floor plan. I want teams to work on units # B, C, D. (I showed unit # A in my lecture as an example). Because there are “margins” between these units, teams working on adjacent units must agree on the size of their unit to begin with
2. All plumbing for a dwelling must remain inside the territorial boundaries of that space.
3. Assume Taiwanese life styles and conventions as much as possible (except for this exercise we will ignore the tradition of a floor drain in the bathroom).
4. Include air conditioning and a laundry facility in each dwelling unit.
5. For this exercise lets imagine the facade is entirely part of the base building.
6. Each team should develop at least three alternative INFILL layouts for their unit. For one of them, show installation pathways (for pipes, wires and air ducts) using dotted lines.
7. All drawings are by hand, using black for base building decisions and red for infill decisions.
8. Keep all study sketches and final “proposals” for inclusion in the final report.

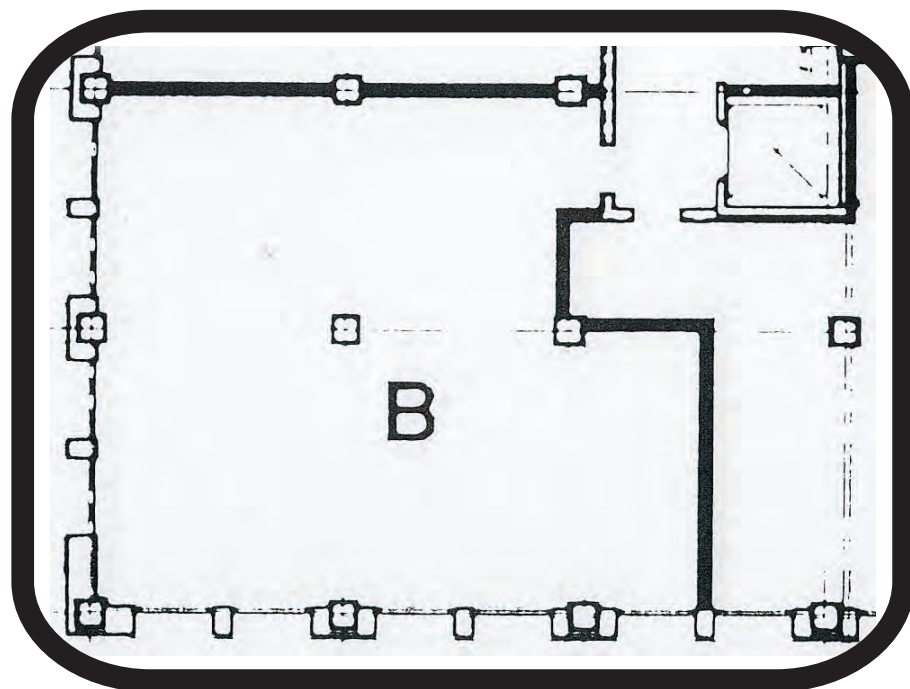
#### How to work

In the space given in the base building, make a reasonable floor plan. Locate the pipe shaft that will serve it. Overlay another piece of tracing paper and trace only the proposed base building including the newly positioned pipe shaft. Try to make another different floor plan. If you can't, try repositioning the pipe shaft to make a new floor plan possible. Again, trace only the new base building (with the repositioned pipe shaft). Then try to make another floor plan. Keep doing this until you find a pipe shaft location that enables a number of reasonable floor plans.

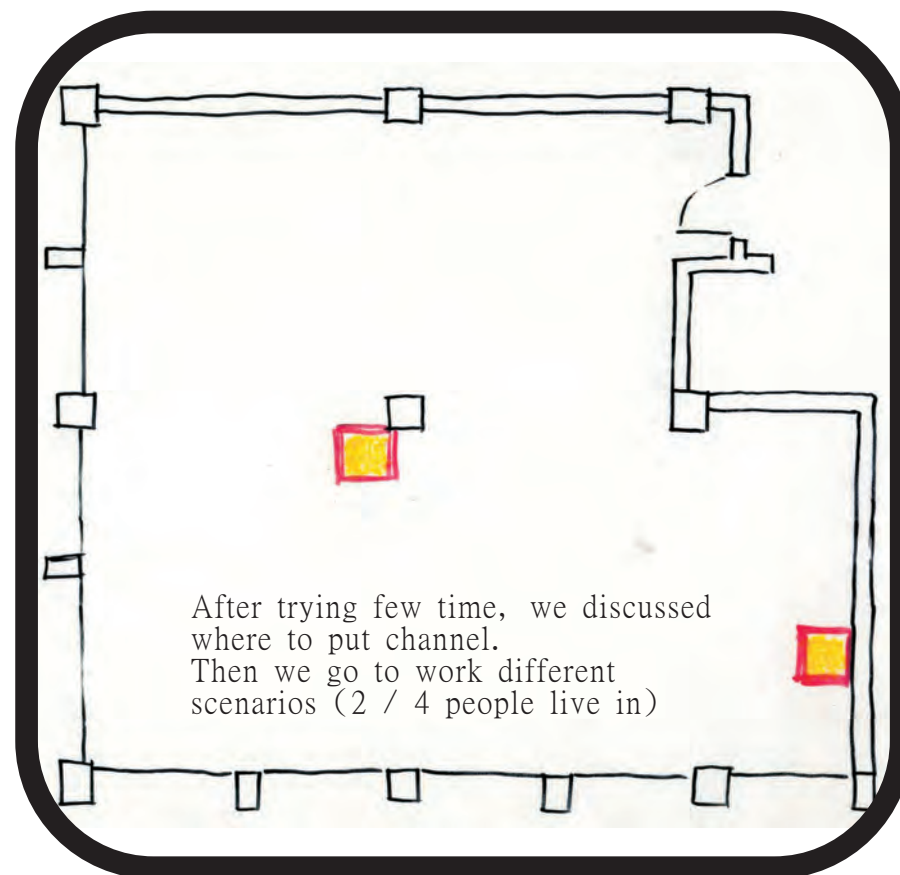


## EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT

This exercise is designed to help you get started in doing "capacity analysis". Capacity analysis is a method to evaluate what INFILL is possible in a BASE BUILDING.



We work on unit B



## FIND OUT

To find out where is the best channel's position after trying many ways.

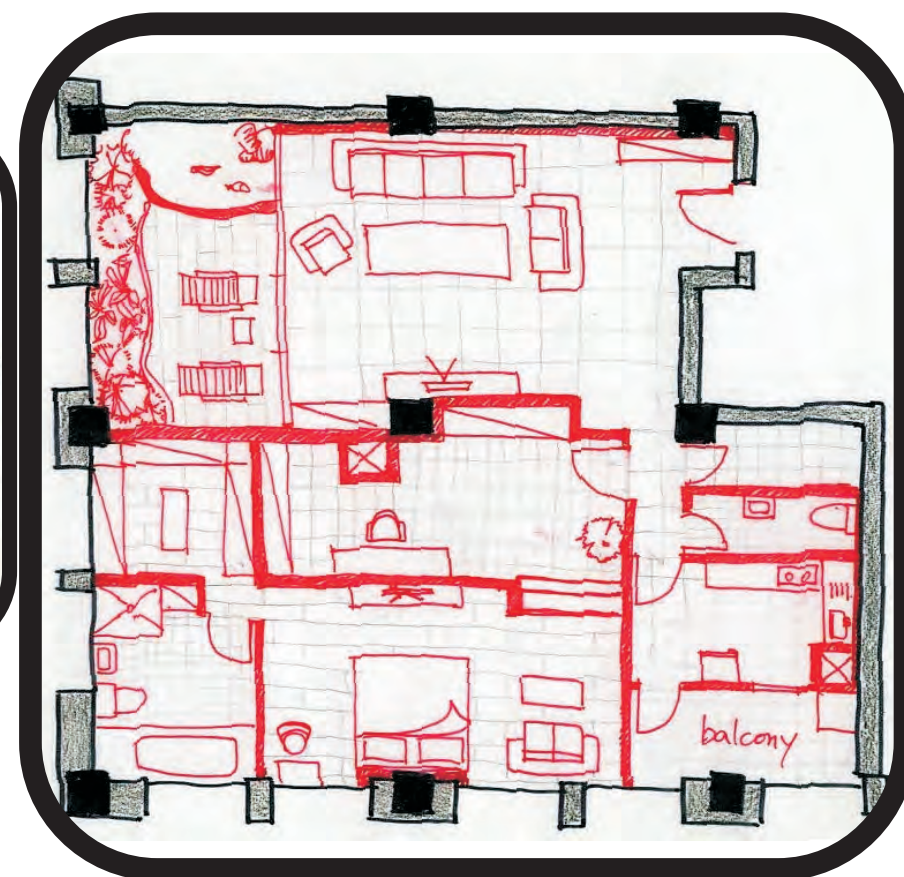
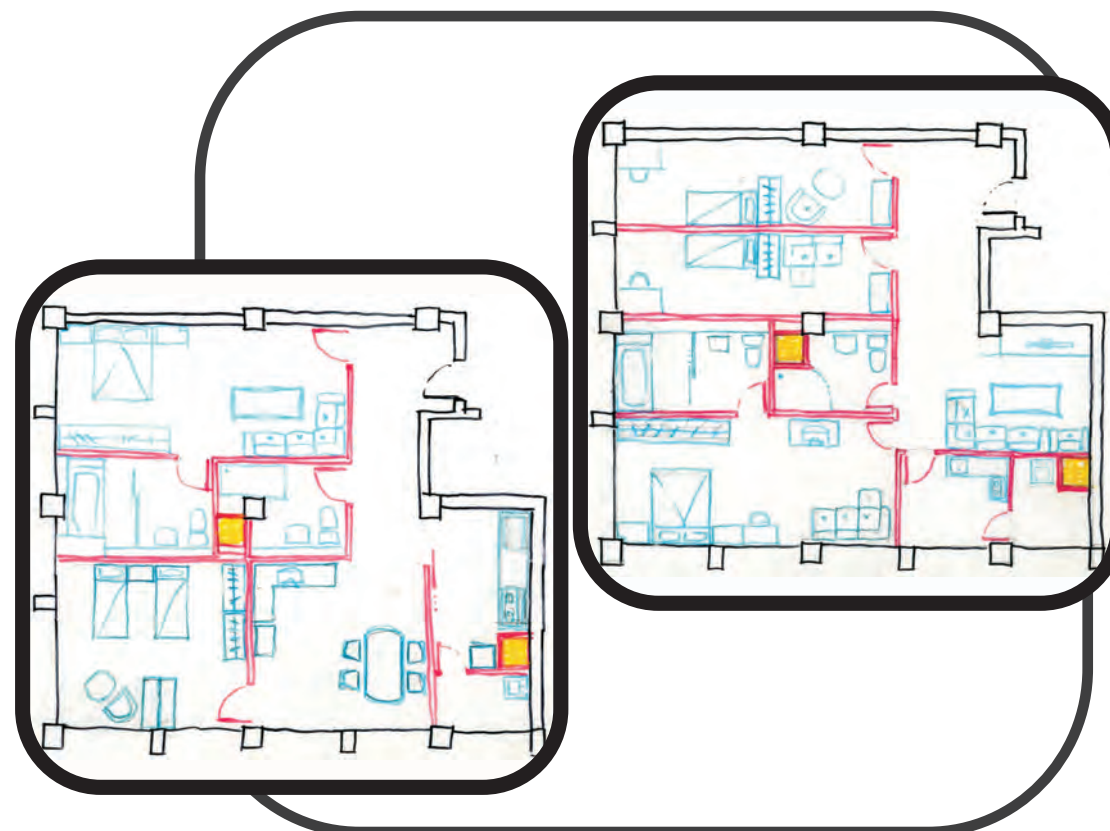
At beginning, we find there is no help for space's flexibility when we put two channels close or far away from each other.

It takes effect when channel put in the center to square plane.

It may divide the four parts or two parts of space.

Generally speaking no matter on the major axis or the stub axle, the way to put channel should separate different sizes.

The purpose is to create main space and secondary one.







## EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT

**W**e worked on the unit #B. Following the open building rules made by Dr. Kendall, we first defined how many pipe shafts we should have, and then decided where is the best location to place them. Of course, Dr. Kendall taught us how to judge which one is the better choice. Therefore, we used the method he told us to find out several appropriate and suitable places. Plus, when we designed and rearranged the housing, we still considerate the Taiwanese particular cultural background, such as Feng Shui.

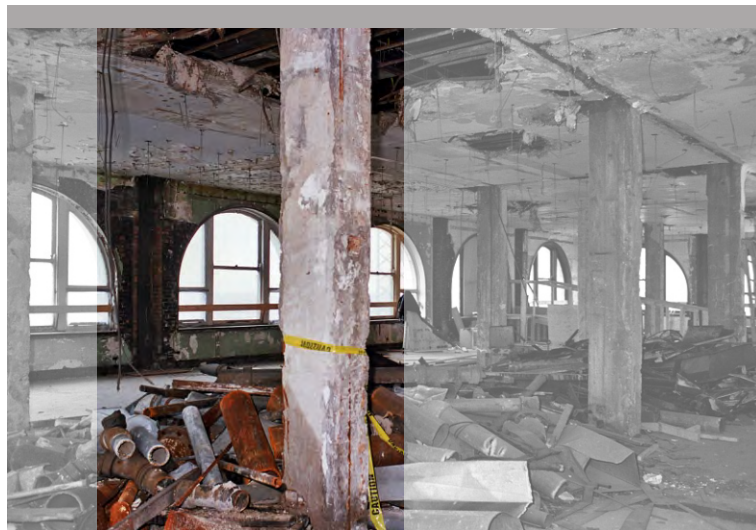


Figure 1 Two pics of the office bldg took by Dr. Kendall.

**O**riginally, the building is an office building. The purpose of our plan is aim to contain various functions in this bldg. Therefore, we think the OB would be the best solution. We hope not only to renovate it, but also install some concept and then offer the inhabitants different usage.

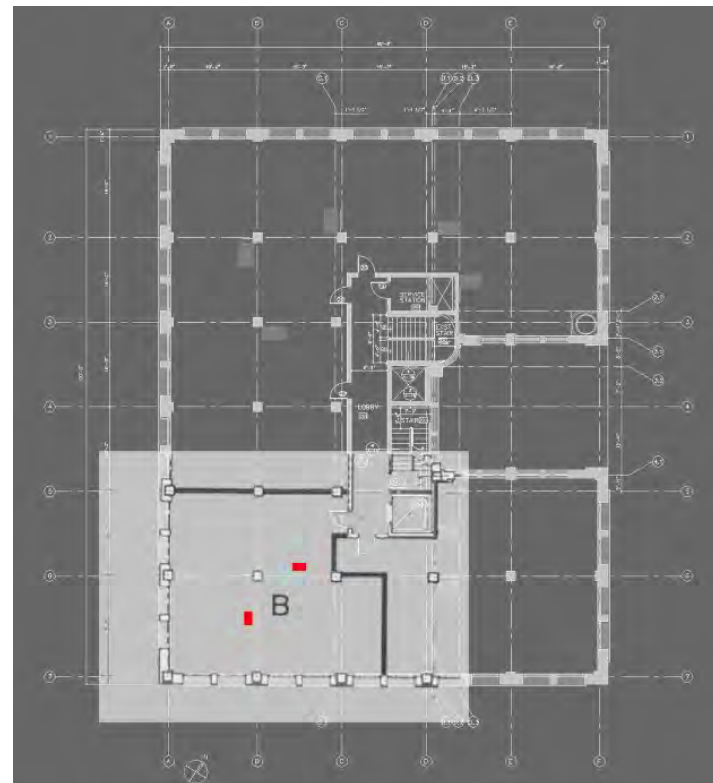


Figure 2 Red points are our two pipe shafts locations.

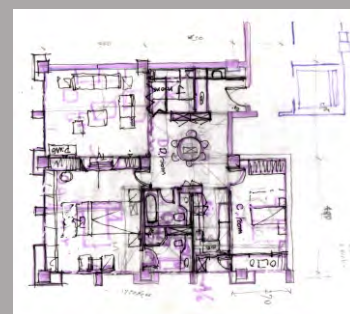


Figure 4 Overlap sketches.

**I**n the beginning of the exercise, our team member hypothesized the suitable house layouts. One designed for a small house, one for three partners

living together, and the other one designed for a core family with a house keeper. We started at different points, but at the same location. After that, we overlapped all of our works to find out where is the most opportunities to place our pipe shaft. And then, we used the new plan with two pipe shaft to develop other possibilities. If we discovered some unreasonable problems, we changed it again. After several rounds, we decided the pipe shafts location.

**A**fter several trial rounds, we believe the two pipe shaft location we defined would be the best solution. It allows enough possibilities for housing layouts.

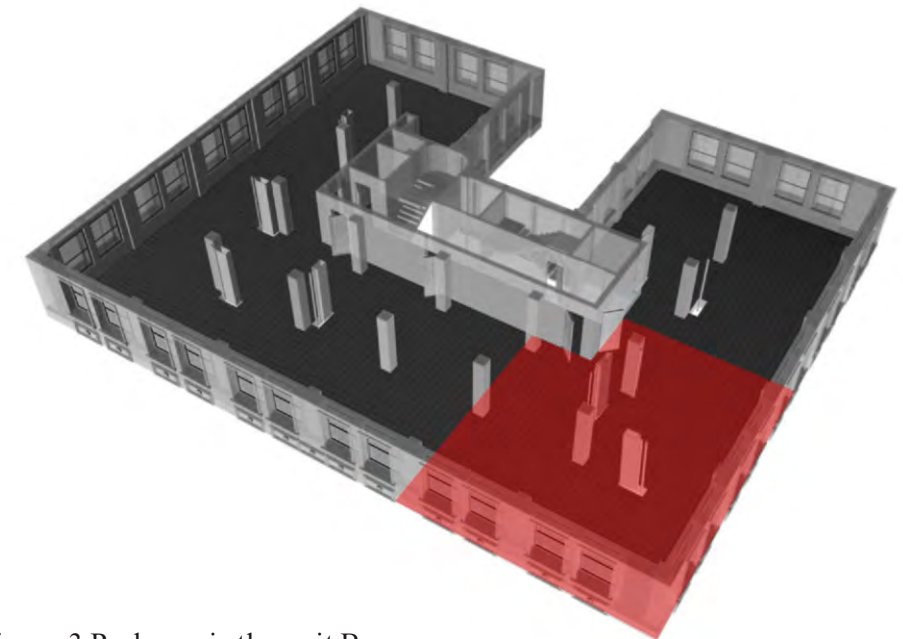


Figure 3 Red area is the unit B.

**D**uring the design process, there are two rules we should follow. First of all, the pipe shaft could not under the beams because its vertical ducts can NOT pass through the beams. Second, although we can put the pipe shaft beside the walls, we will lose the chance to place the kitchen or our restrooms. The later mistake could easily limit the housing flexibility. Therefore, we had better to avoid defending them.

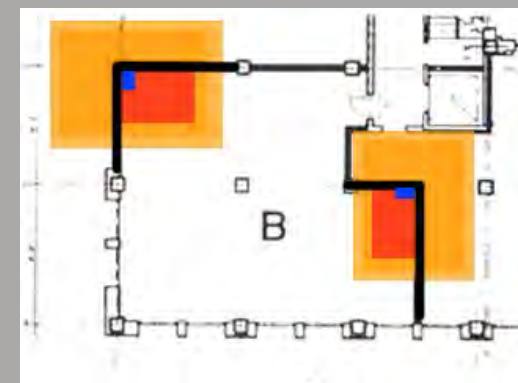


Figure 5 Red areas are suitable places to place the kitchen or restrooms.

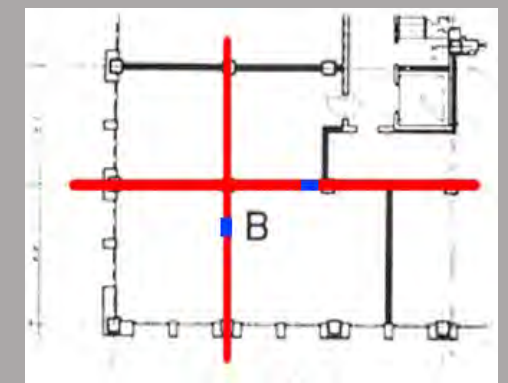


Figure 6 Prohibit to put pipe shafts under the beams.



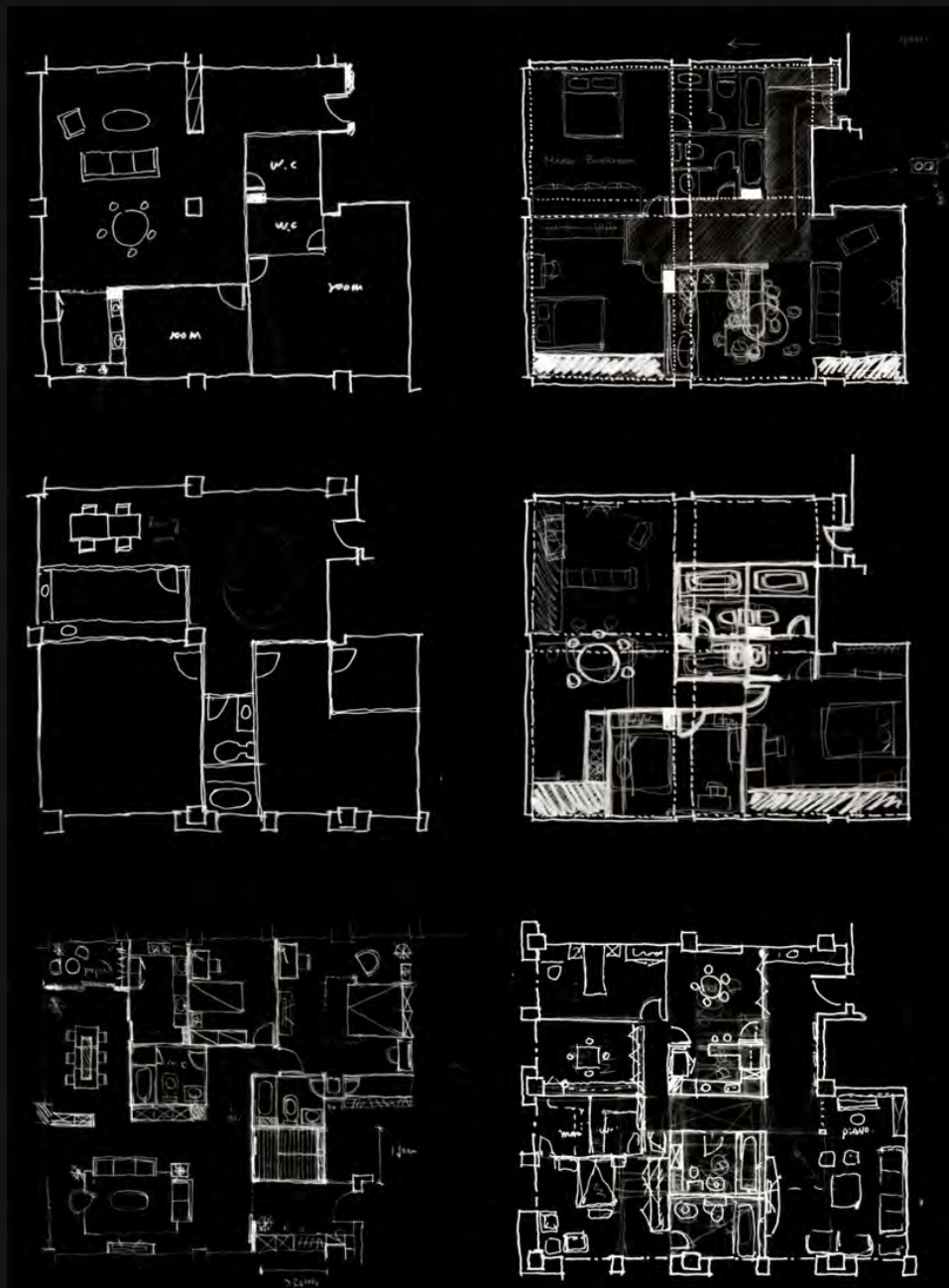


Figure 7 Sketches by KoYang Lin, GenHanLee & KuoPin Lin.

**A**pproaching the final process, we separately used our different methods to design this house. Obviously, the plan can easily meet our requirements. Otherwise, we stood on the buyers shoes, we hope these solutions not only respond to their needs right now, but also meet their unpredictable e future.

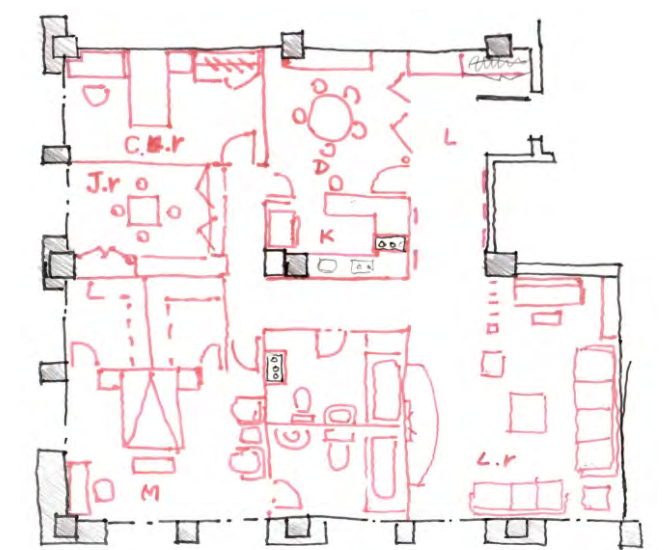
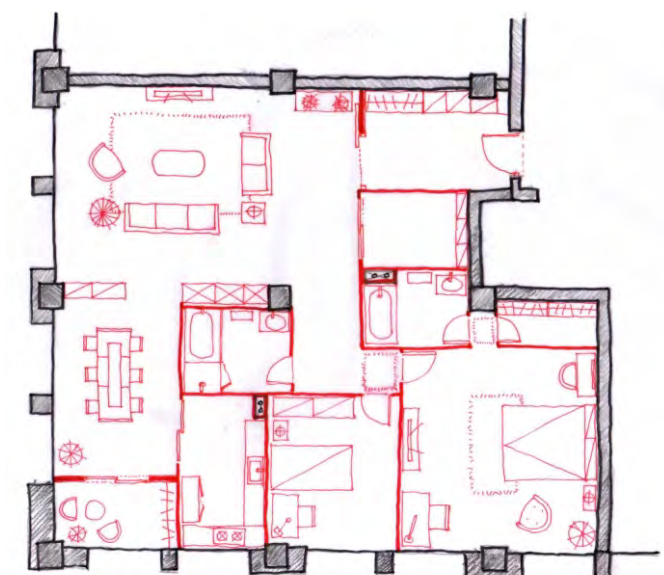
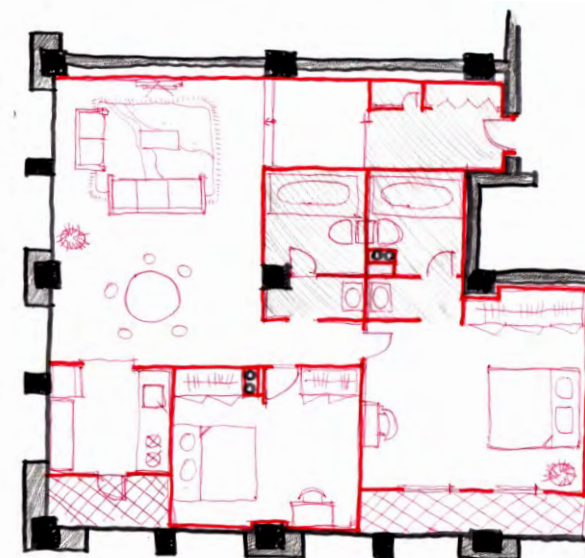
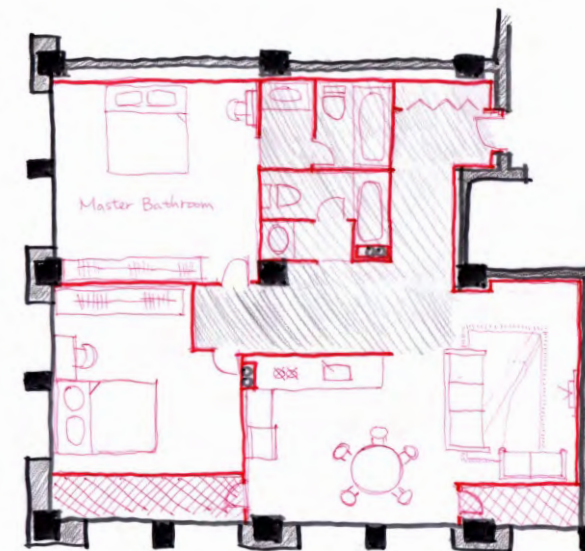
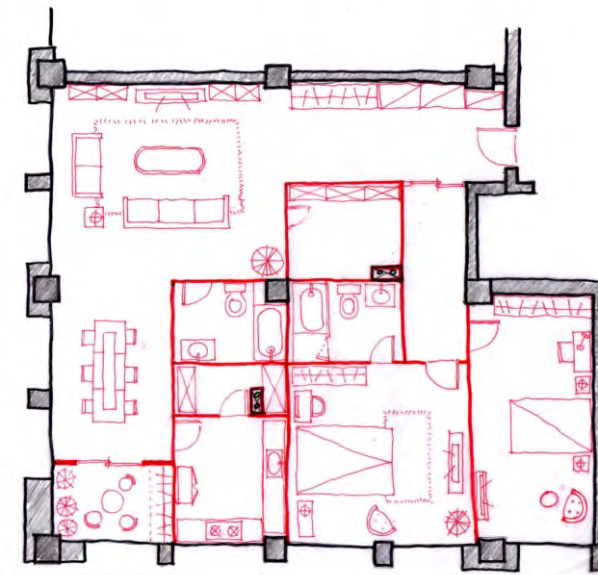


Figure 8 Five solutions.

**A**s you can see, we used the plan with the two pipe shaft we decided before to develop these five plans. If we placed the pipe shaft at an appropriate location, it will become easy to design useful and comfortable plans.



## INFILL A TOWNHOUSE

## SKETCH OF CAPACITY STUDY

Base Building TYPE 1



Pace Of Drain Line TYPE 1



Pace Of Electrical and Data TYPE 1



Base Building TYPE 2



Pace Of Drain Line TYPE 2

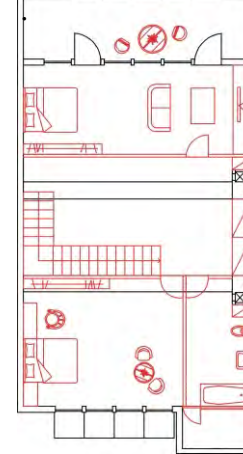


Pace Of Electrical and Data TYPE2

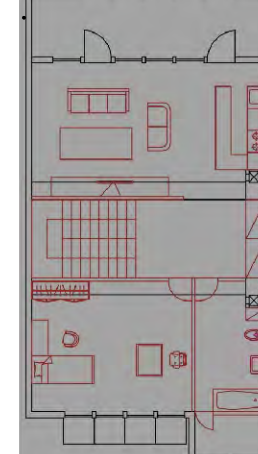


## PIPE SHAFT STUDY

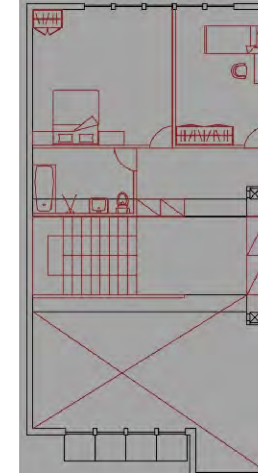
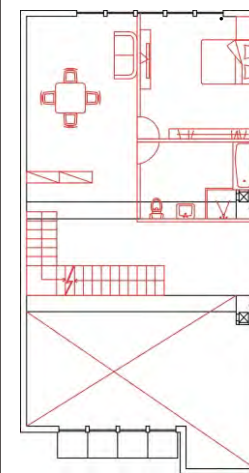
Modify Type 1



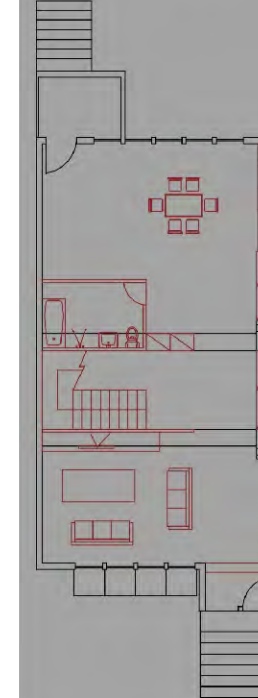
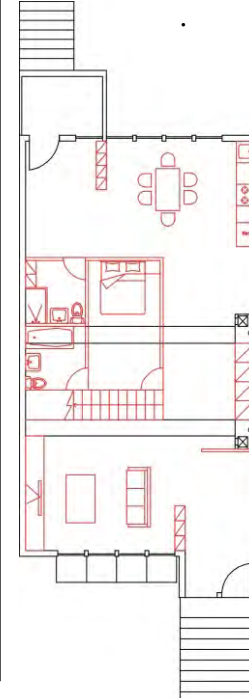
Modify Type 2



First floor



Second floor

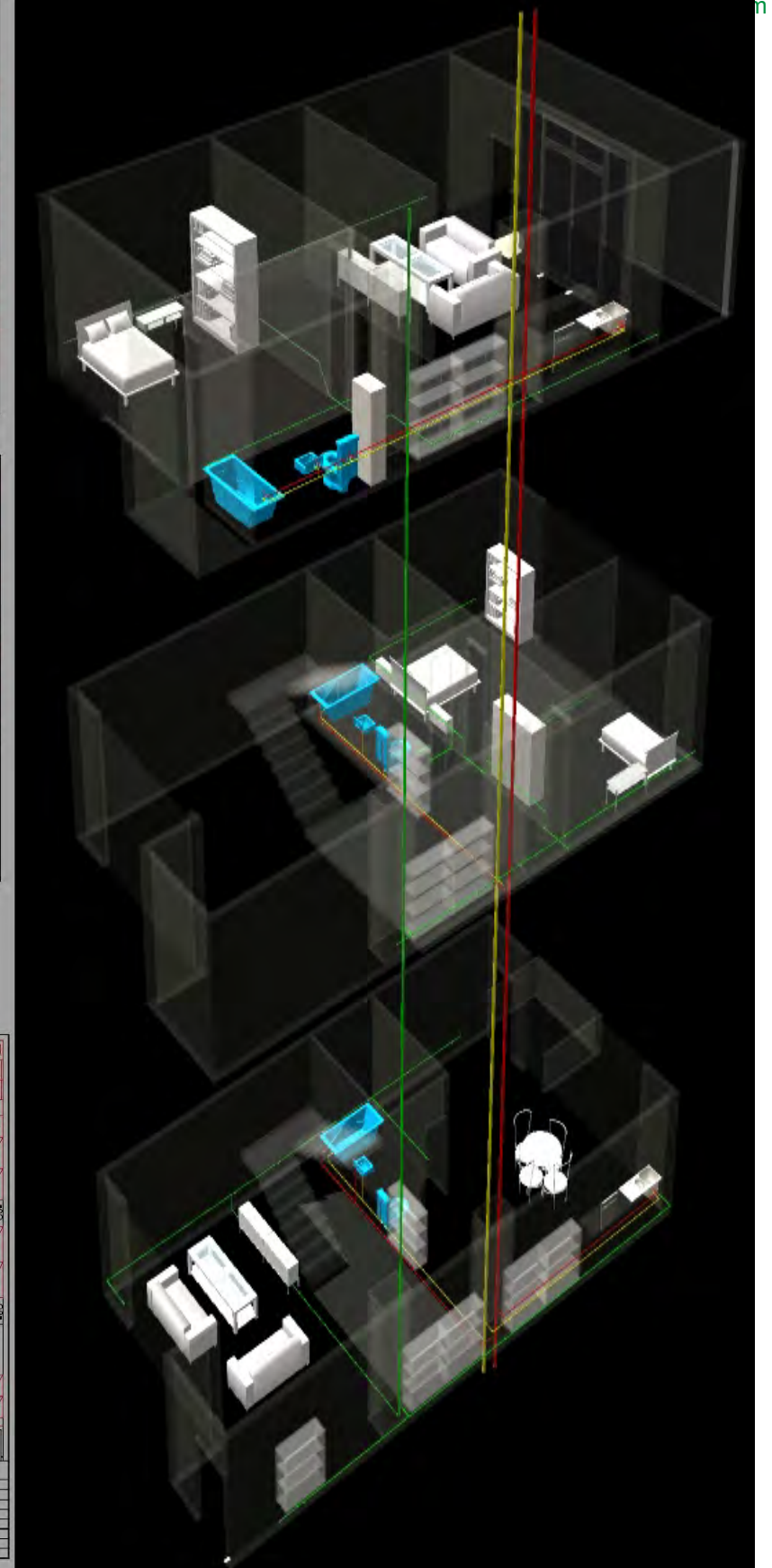


Third floor

Drain line

Supply line

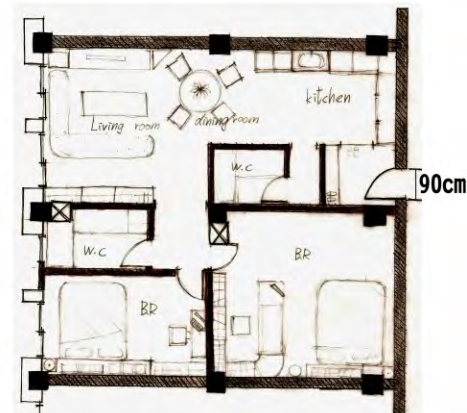
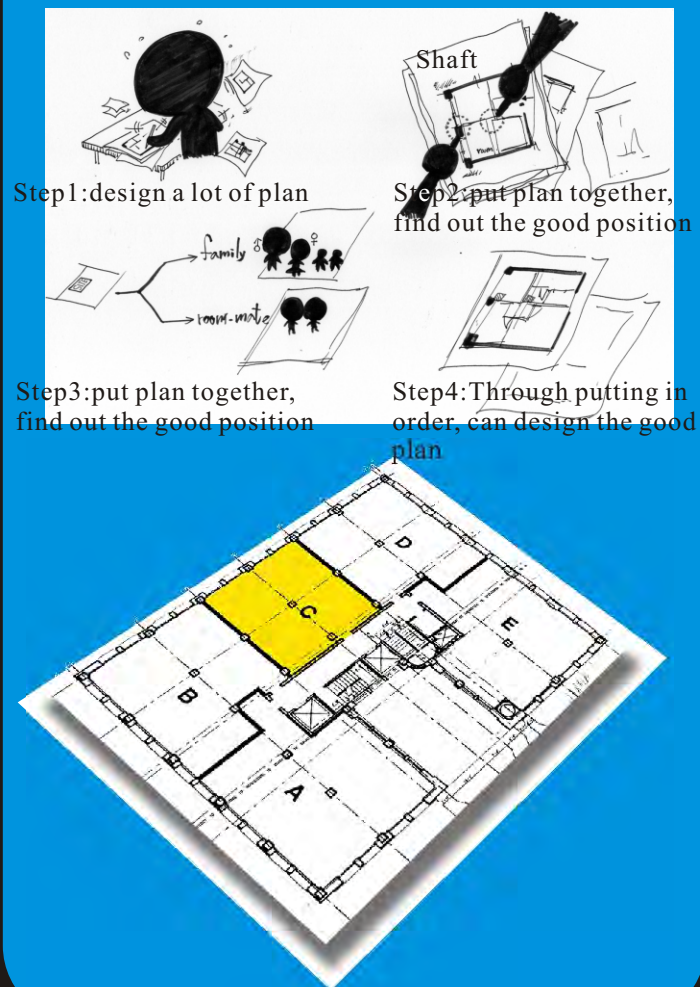
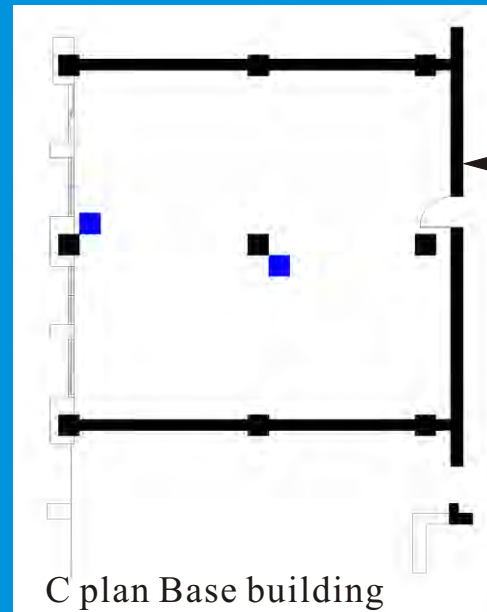
Electrical &amp; Data



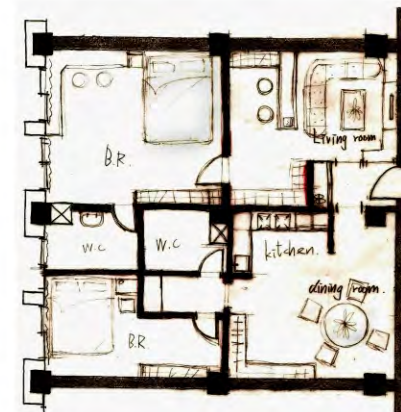




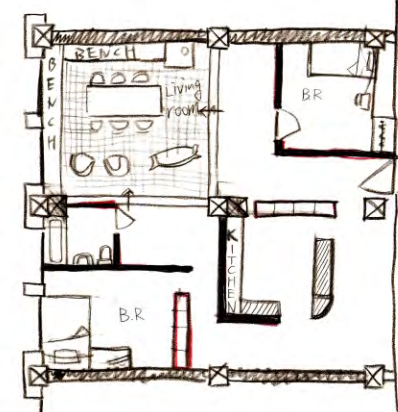
## EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT



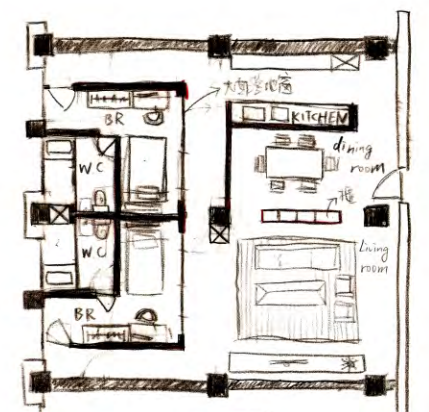
TYPE1  
Number:4  
Family



TYPE2  
Number:4  
Family



TYPE3  
Number:2  
Room-mate



TYPE4  
Number:2  
Room-mate

1. Setting-up of the image of the entry, linking the space sense of building the vision and extending in the kitchen in the sitting room.

2. Put the personal space in the place the daylighting, can offer the good vision

3. Link two bedrooms with an open space, become a key place

4. From the opening sitting room of the entry, with a buffer space, distinguish the public and personal space



Base building

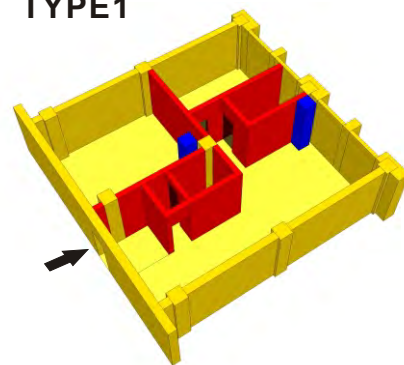


Shaft

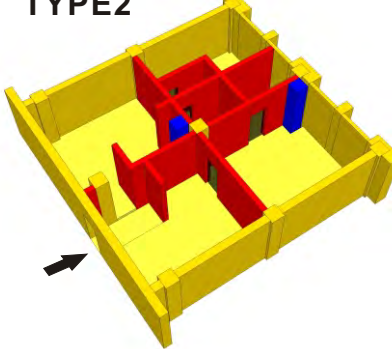


Infill

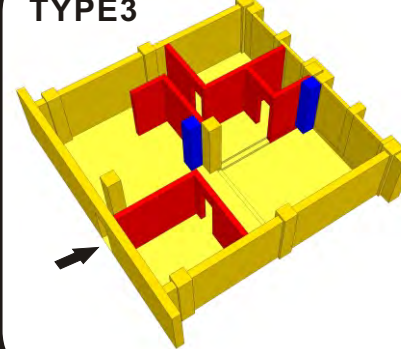
TYPE1



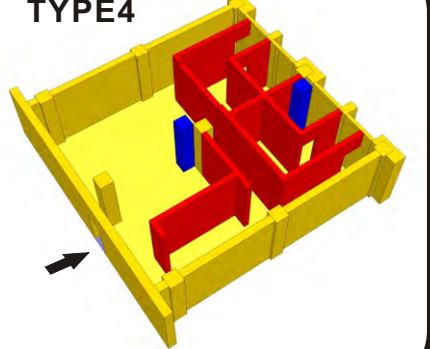
TYPE2



TYPE3

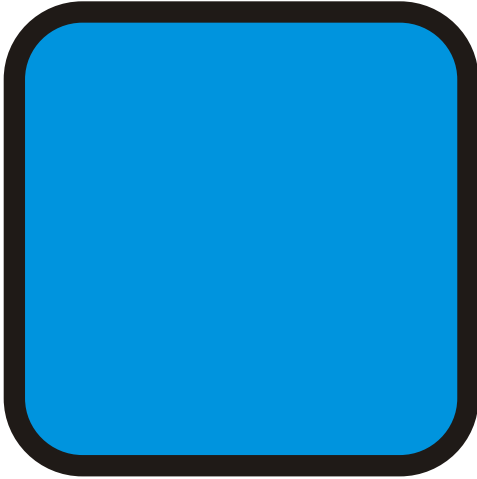
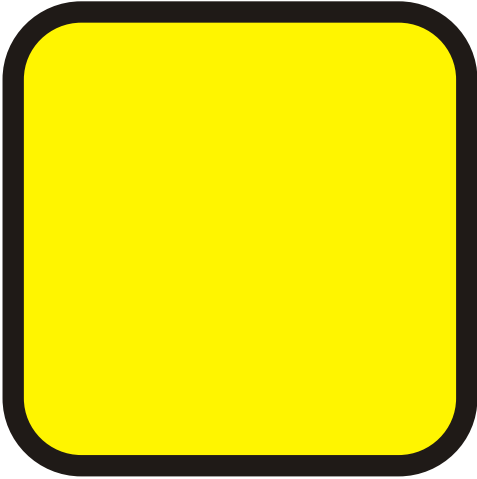
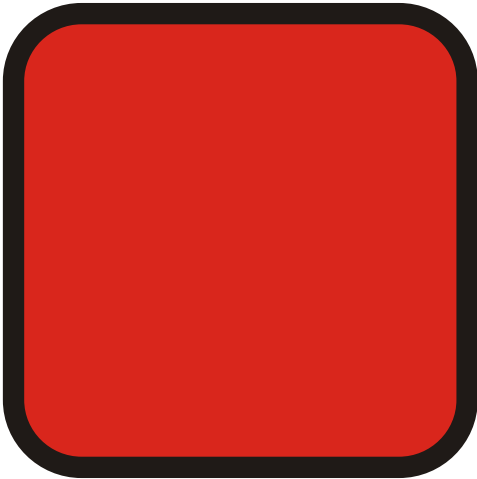
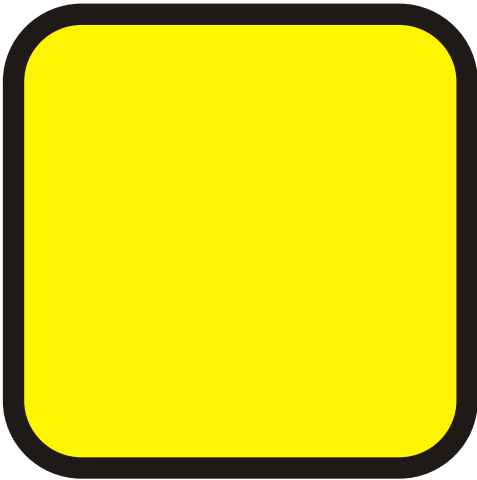


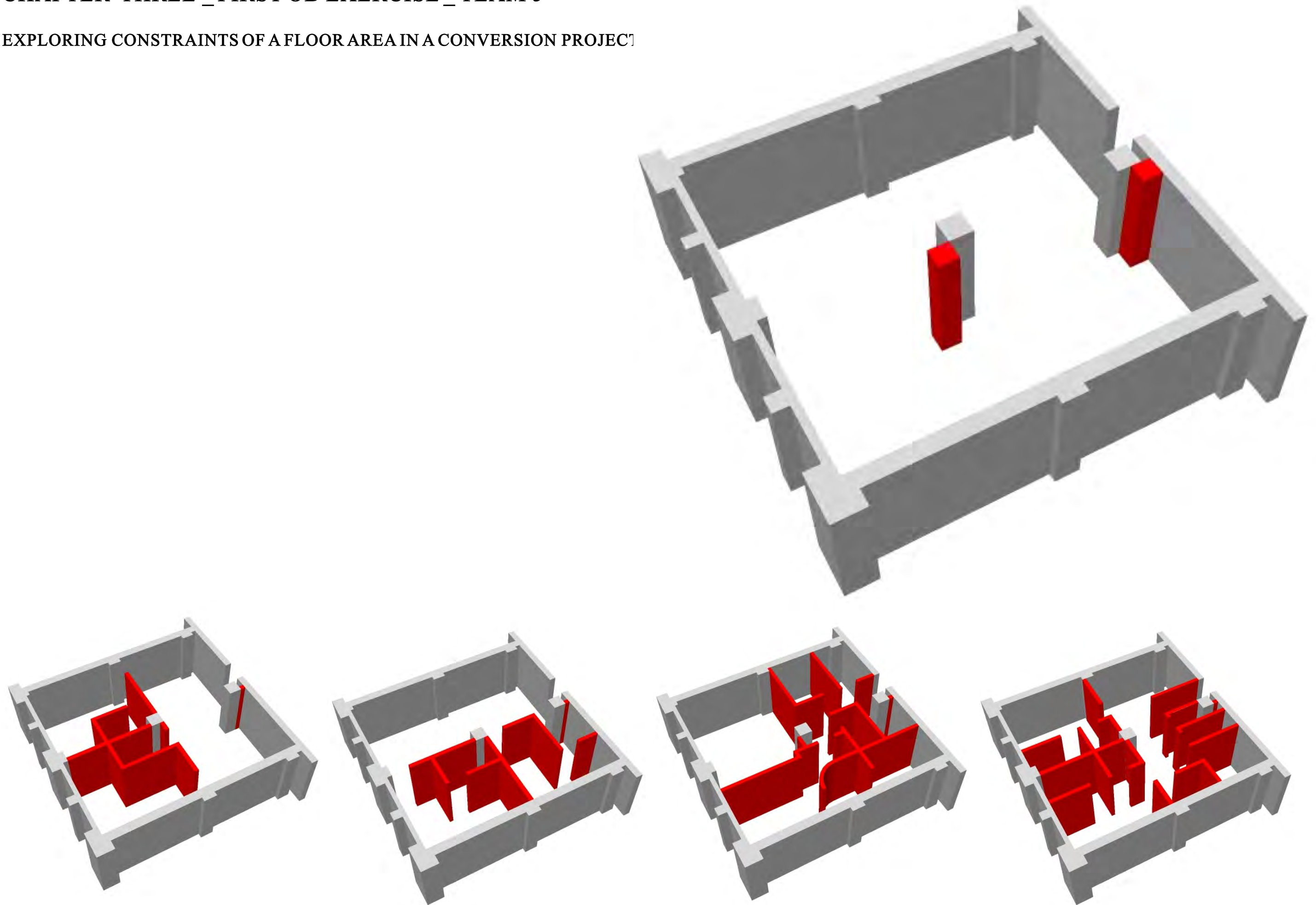
TYPE4





# Y&H STUDIO 1.0







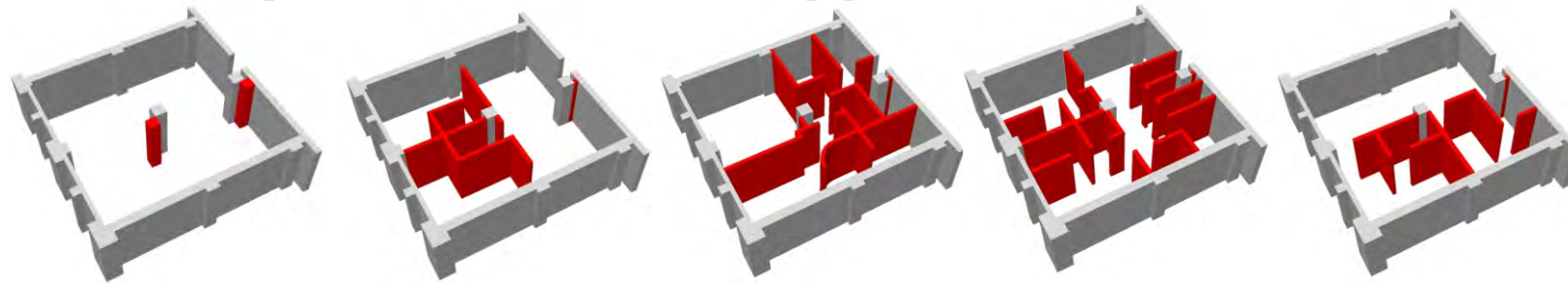


Mr. Big Shao Yuan Rian

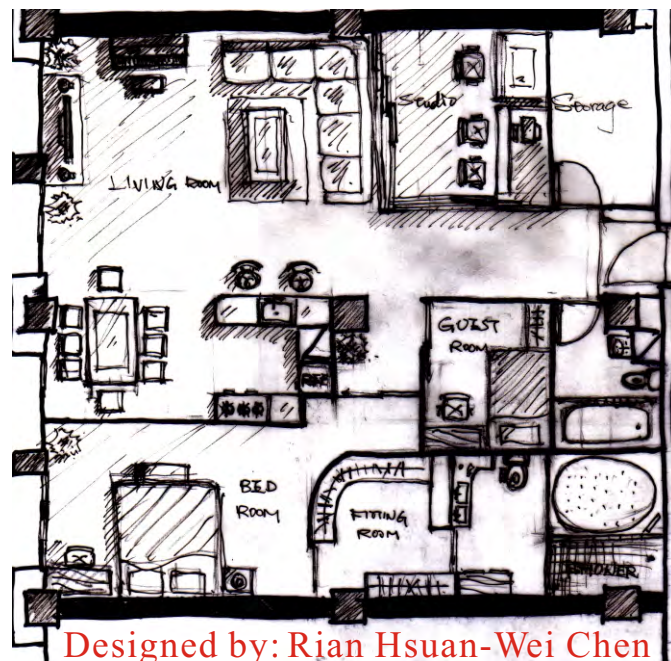
This exercise is designed to help you get started in doing “capacity analysis”. Capacity analysis is a method to evaluate what INFILL is a possible in BASE BUILDING.

We will use one typical of existing 20-story office building in Detroit, USA, as an example. It has actually been converted into an apartment building. (But unfortunately the developer did not use an open building approach, so there were many problems and the building is not “lexible”). It has a structure of concrete columns and slabs. The floor-to-floor dimension is meters.

**These two points are the locations of the pipe shafts**



**TYPE1**



**Designed by: Rian Hsuan-Wei Chen**

**Members:**  
A man and a woman,  
Designer Couple.

Conception: In this case, designing a household for a designer couple which has many friends, so I try to illustrate a bright and big living room, and make it connect with the studio. Whenever their friends or customers come, they could just talk without really serious atmosphere.

**TYPE2**

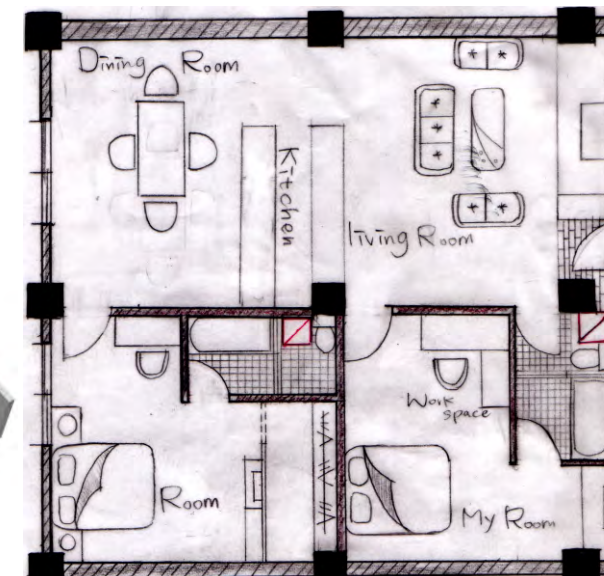


**Designed by: Shaou Yuan**

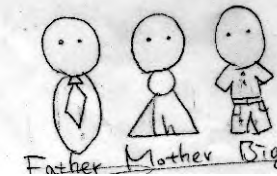
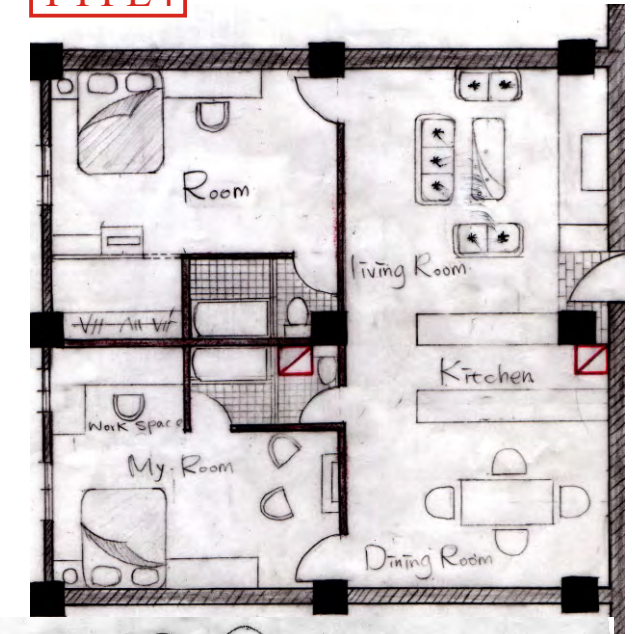
**Members:**  
A husband and wife and Baby

*husband. wife. baby*

**TYPE3**

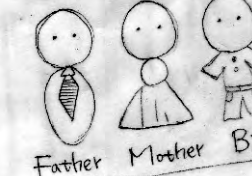


**TYPE4**



**Designed by: Mr. Big**

**Members:**  
My father and mother and meself.



**Designed by: Mr. Big**

**Members:**  
My father and mother and myself.

In this case, I tried to offer two choices for the spatial layout.  
Type one: Sunlight for both private and public space.  
Type two: Only for private use.

## WHAT I WANT YOU TO CONSIDER AND DO IN THIS EXERCISE

1. There are five units shown on the floor plan. I want teams to work on units # B, C, D. (I showed unit # A in my lecture as an example). Because there are “margins” between these units, teams working on adjacent units must agree on the size of their unit to begin with.
2. All plumbing for a dwelling must remain inside the territorial boundaries of that space.
3. Assume Taiwanese life styles and conventions as much as possible (except for this exercise we will ignore the tradition of a floor drain in the bathroom).
4. Include air conditioning and laundry facility in each dwelling unit.
5. For this exercise let's imagine the facade is entirely part of the base building.
6. Each team should develop at least three alternative INFILL layouts for their unit. For one of them, show installation pathways using dotted lines.
7. AA drawings are by hand, using black for base building decisions and red for infill decision.
8. Keep all study sketches and final “proposals” for inclusion in the final report.



## EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT

In this practice, our base plan is smaller than other ones, and only one side wall has opens (Figure one). This plan has nine columns, we decided establishes the pipe shaft between in the middle columns above (Figure two), and that may divide the space into about two areas.

We dispose the private space to A' zone which needs the natural lighting, may provide the service function by the middle pipeline area belt. Finally, we dispose the family member uses together space place to B' zone (Figure three).

This practice in view of each base proposed three kind of use functions, respectively are

- (1) the couple and two children family ,
- (2) the two man's dorm room,
- (3) the parent and one child .

The following introduced we operate three cases.

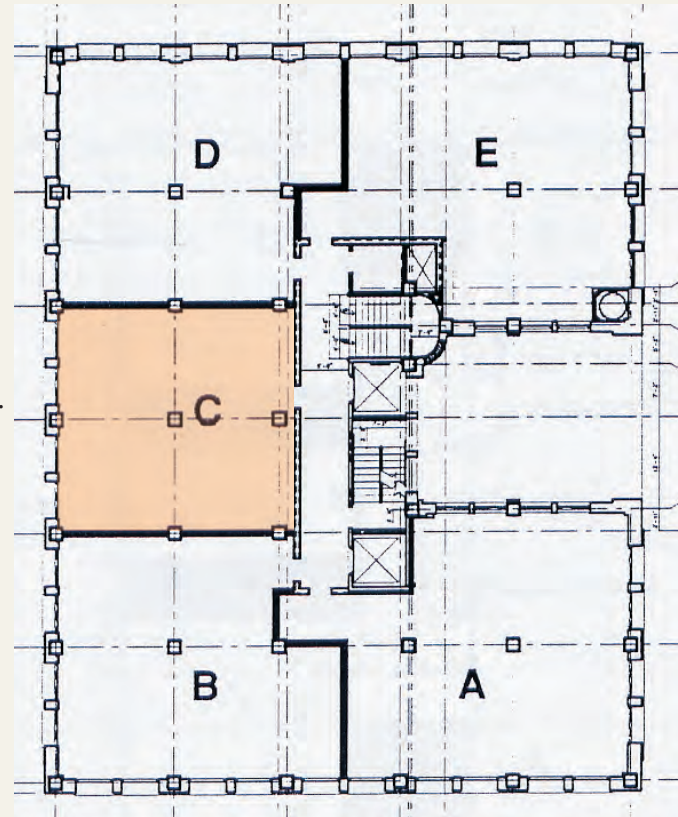
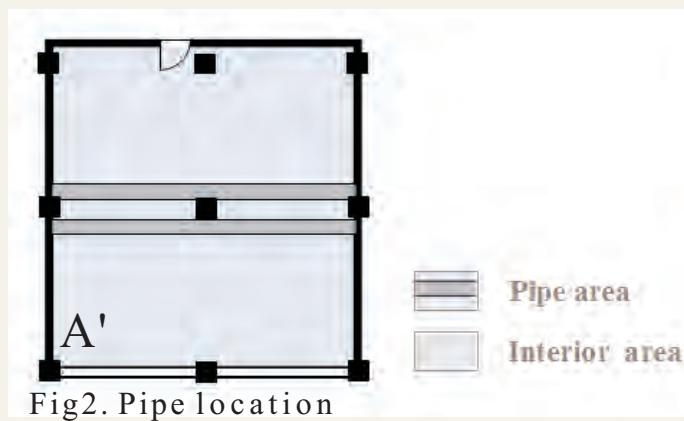


Fig1. Site location



(1) the couple and two children family

The function of the floor plan, it must be allotted sunlight to three rooms. This site is the minimal daylight area of this building, so how to allot sunlight to three rooms that will be the most attention to pay.

In the first program, the pipe shell set under the middle column. The pipes are unimpeded, but two rooms have no window. We consider at saving view for living room in the beginning, but we forget to give window for each room.

After discussing, we decide to put the pipe shells under the middle column, and set the toilet and kitchen near the pipe shell. This program lets every room has windows, but the living is small and no window comparatively.

The third scheme, we decide to change kitchen and the living room, then the yardstick of the living room has been enlarged. Each space needs to drain off water is near the pipe shell, and all rooms have window, we decide the third scheme to be a final result.

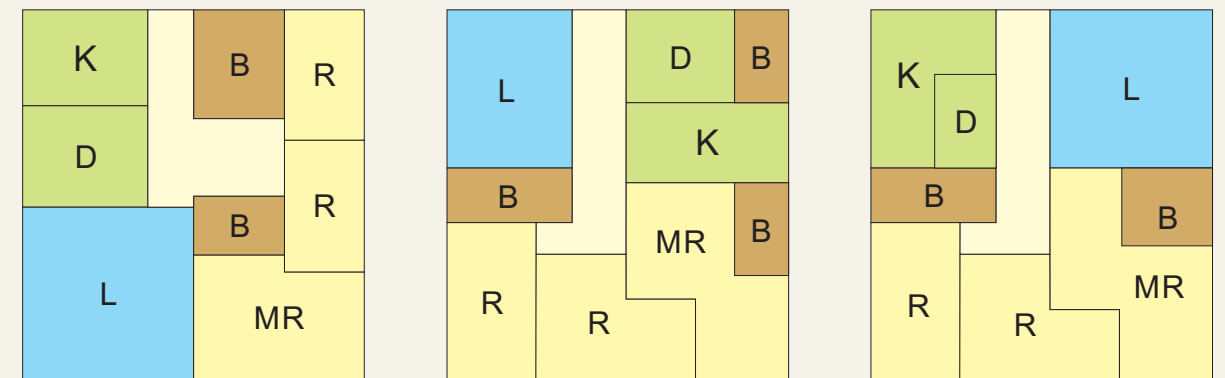


Fig4. The plan for a family



### (2) the two man's dorm room

As a result of this space only one side wall has the natural lighting, therefore must assign the bedroom and the public spatial natural lighting window in the function choice, therefore lets the room or the living room whether all can the natural lighting for operates this plan to change the most main topic.

At first considered leaves the natural lighting surface the public space, but the room then does not have the natural lighting space. In first plan (Fig.1), although the commission has the spacious bright public space, but the room position is a darkroom, but between the pipeline establishes right flank the left side middle pillar and the entrance nearby the column, although the pipeline moves towards reasonably, after but ponders the bedroom space natural lighting disposition the demand, disposition position between decision change pipeline. The second plan (Fig.2) mainly disposes in the attempt two pipelines between above about middle crosswise column, may satisfy the room natural lighting and have enough activity space demand.

The third plan (Fig.3), we decided also includes the living room to the natural lighting area, therefore attempts 2 bedroom spaces with 1 living room space disposition in the natural lighting zone, has the reasonable plan and the pipe shaft disposition, has had the plan which finally decides.

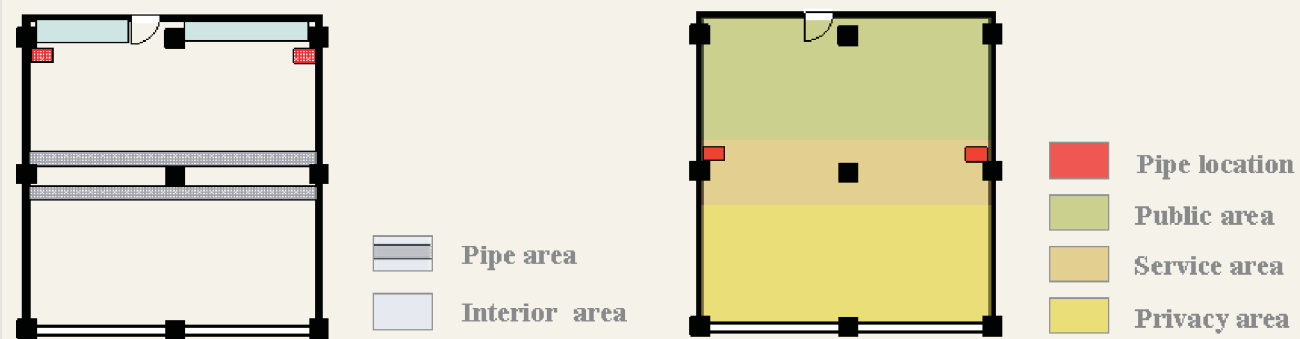


Fig5. Pipe location

Fig6. Space compartment

### (3) the two man's dorm room

Because only then faces the natural lighting surface, first differentiates the function three kinds: Needs the natural lighting, needs some the natural lighting, does not need the natural lighting at all, the space toward the natural lighting surface disposition which needs the natural lighting, for example like the living room and the bedroom, will then be dispose the dining room, the hall for worshipping Buddha, finally will be leaving the storeroom and the restroom disposition the natural lighting surface farthest position.

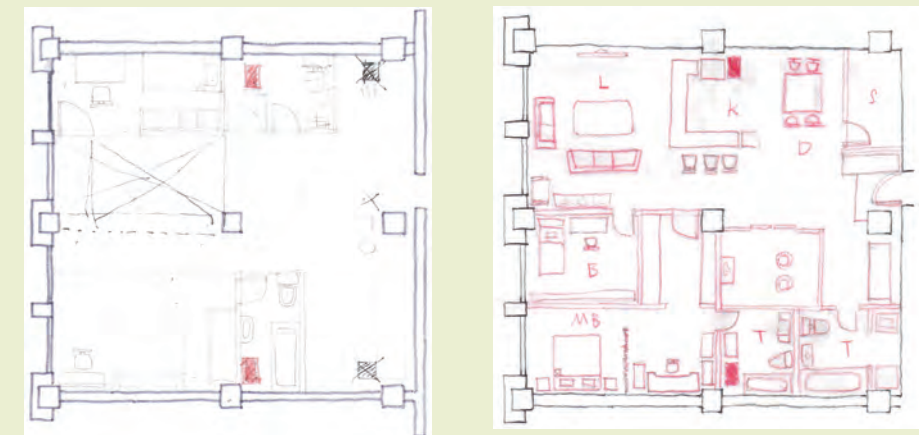


Fig7. The plan for a couple and one child family



Fig8. The plan for a dorm room

## EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT

## INTRODUCTION

This exercise is designed to help us get started in doing "capacity analysis".  
Capacity analysis is a method to evaluate what INFILL is possible in a BASE BUILDING.

We will use one typical floor of an existing 20-story office building in Detroit, USA, as an example. Trying to make it more flexible.

## PROCESS

- Step 1: Finding out the areas of pipe shaft.(pipe shafts can't go through the beams.)
- Step 2: Designing several layouts and deciding the locations of two pipe shafts.
- Step 3: Family types - a couple, a couple and two children, a couple and their parents.
- Step 4: Designing layouts of each family types.

Figure 1 : Pipe Shaft Location

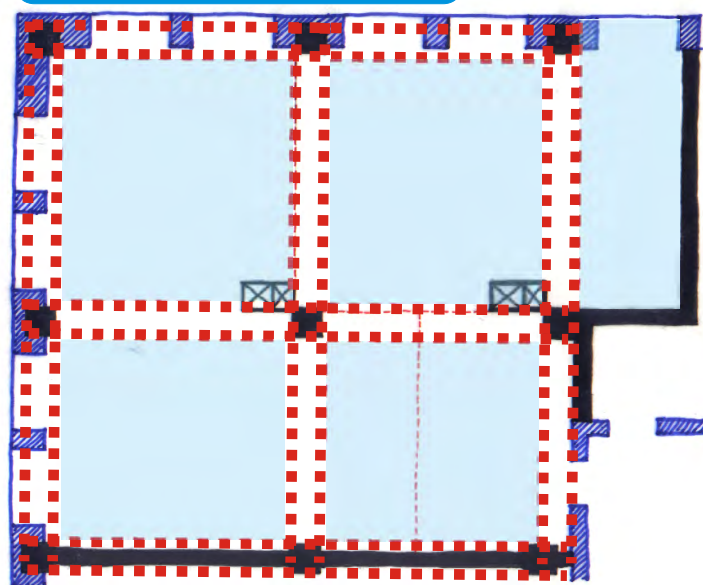
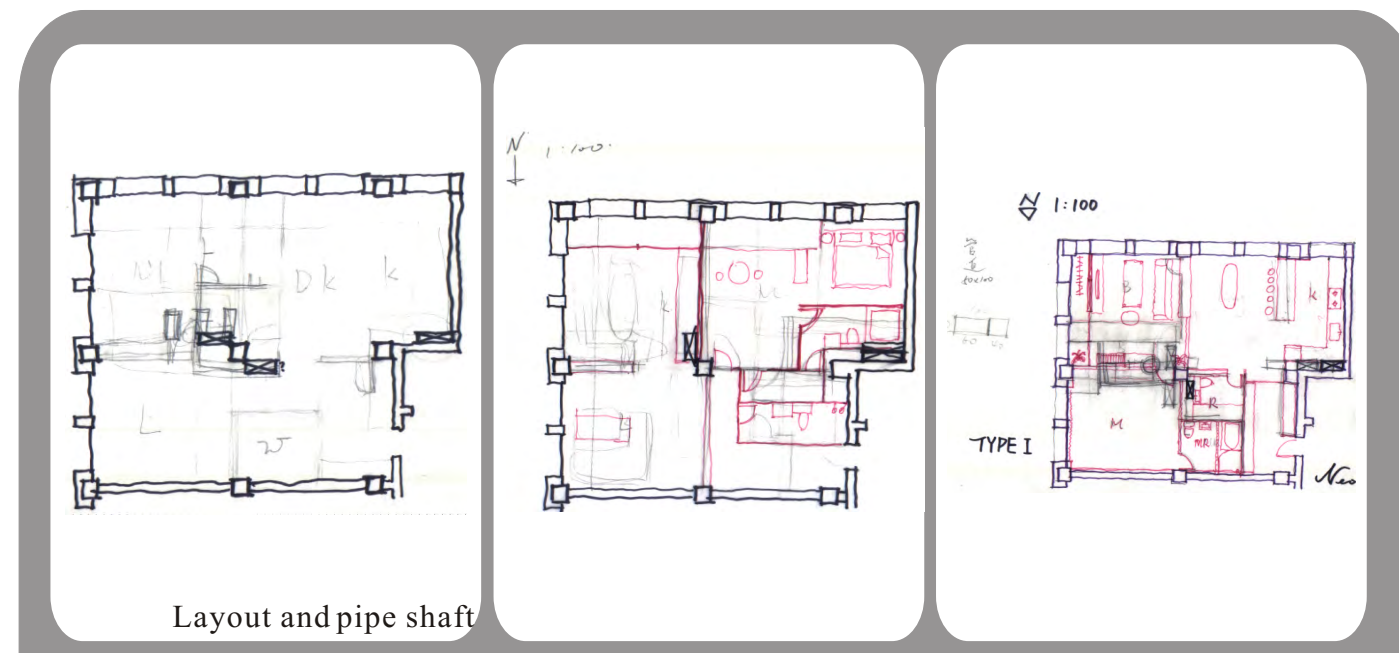
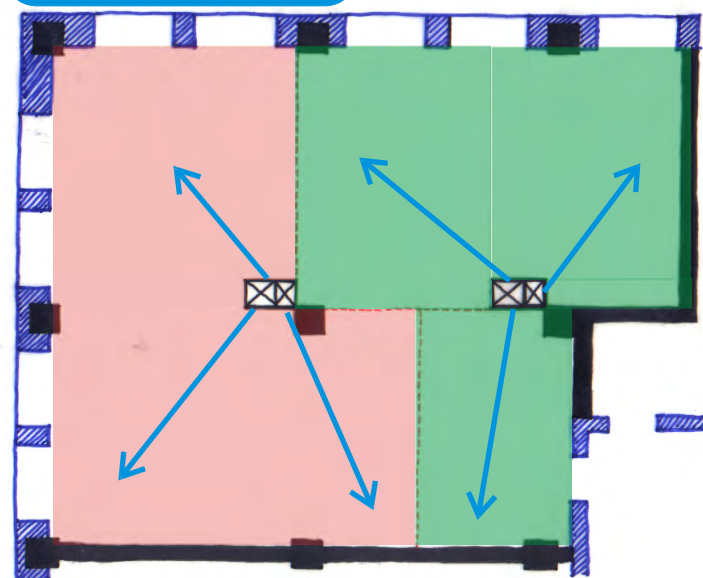
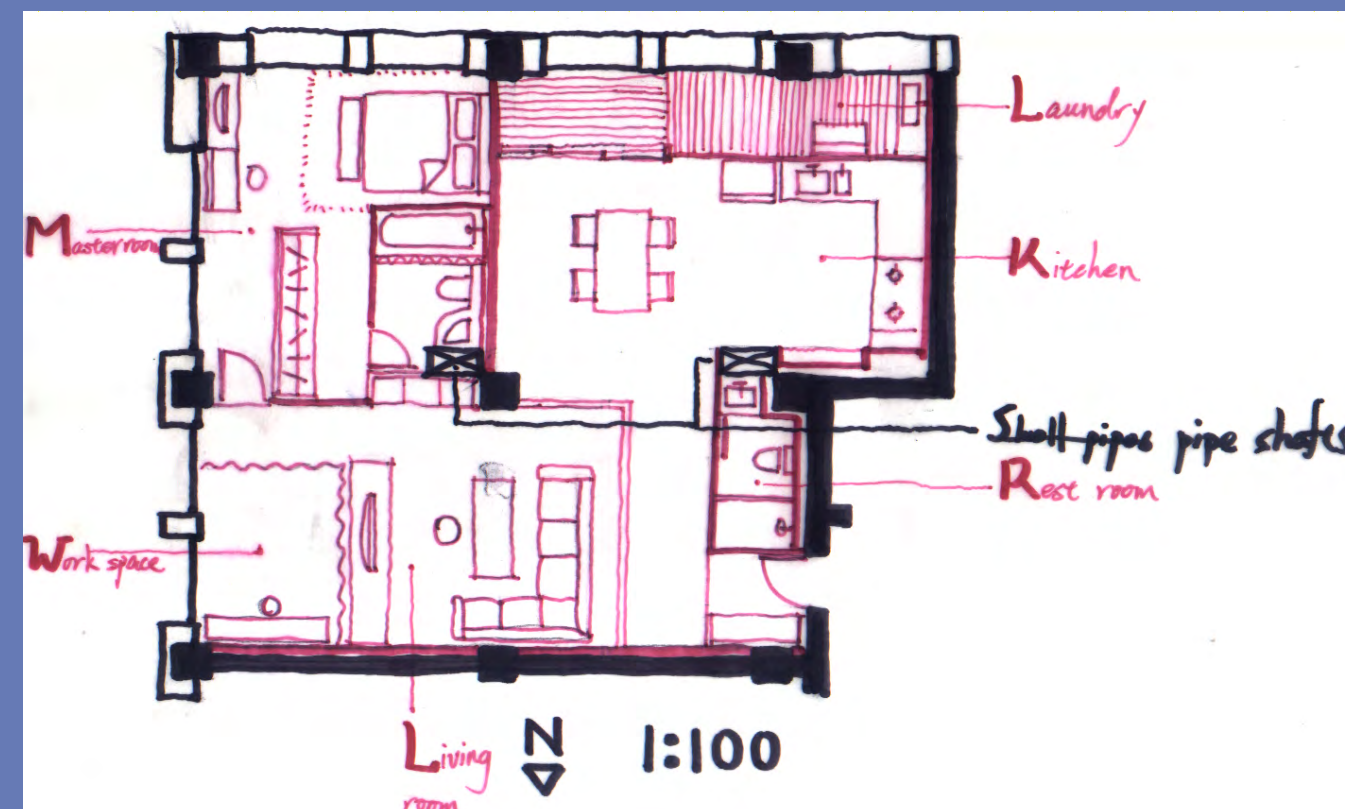


Figure 2 : Service Area



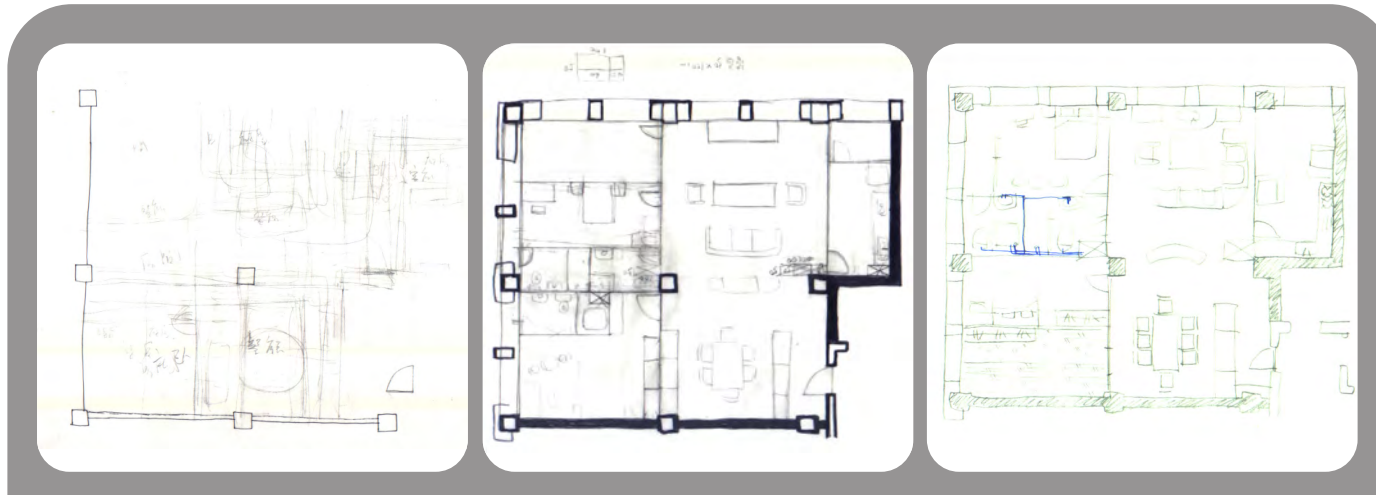
Layout and pipe shaft

## TYPE A

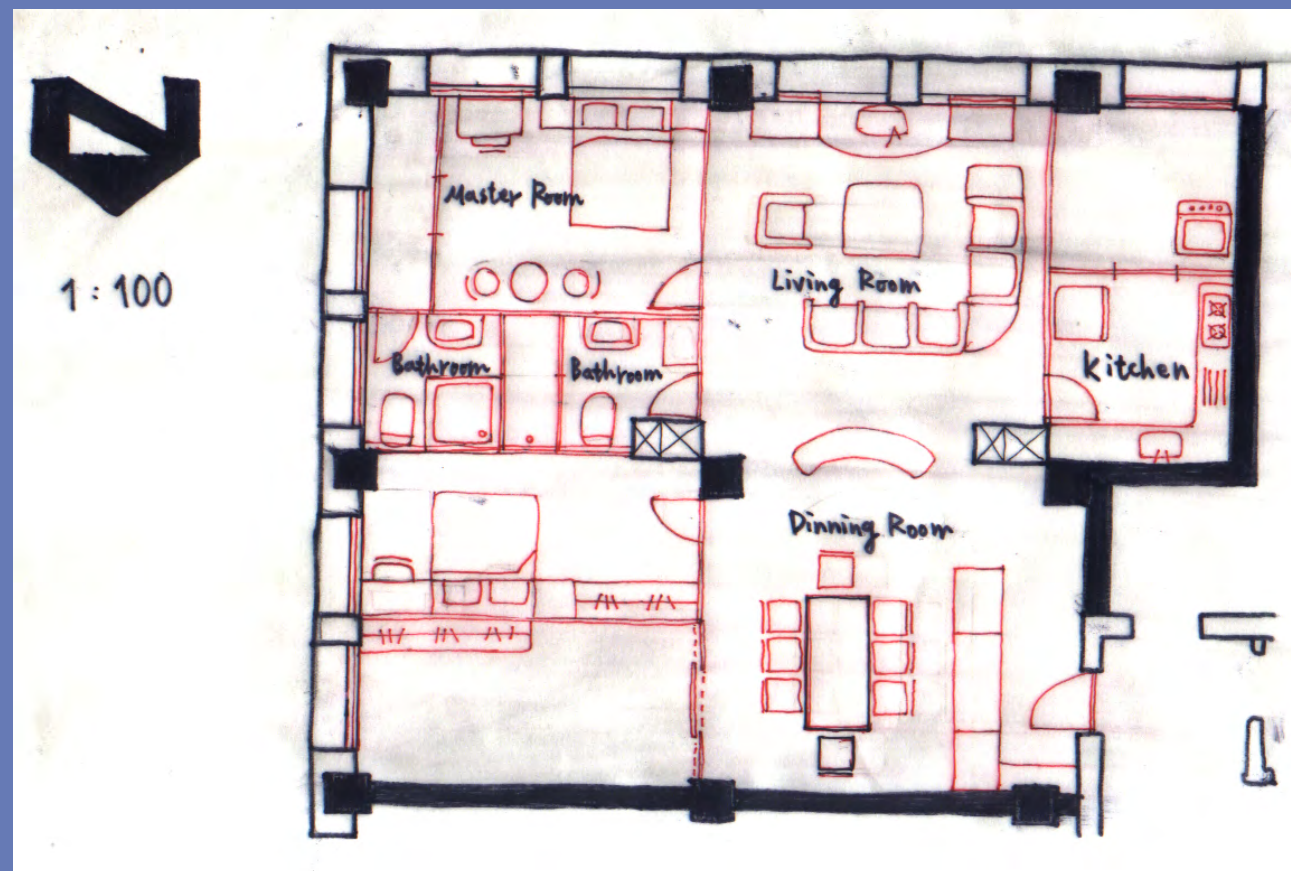




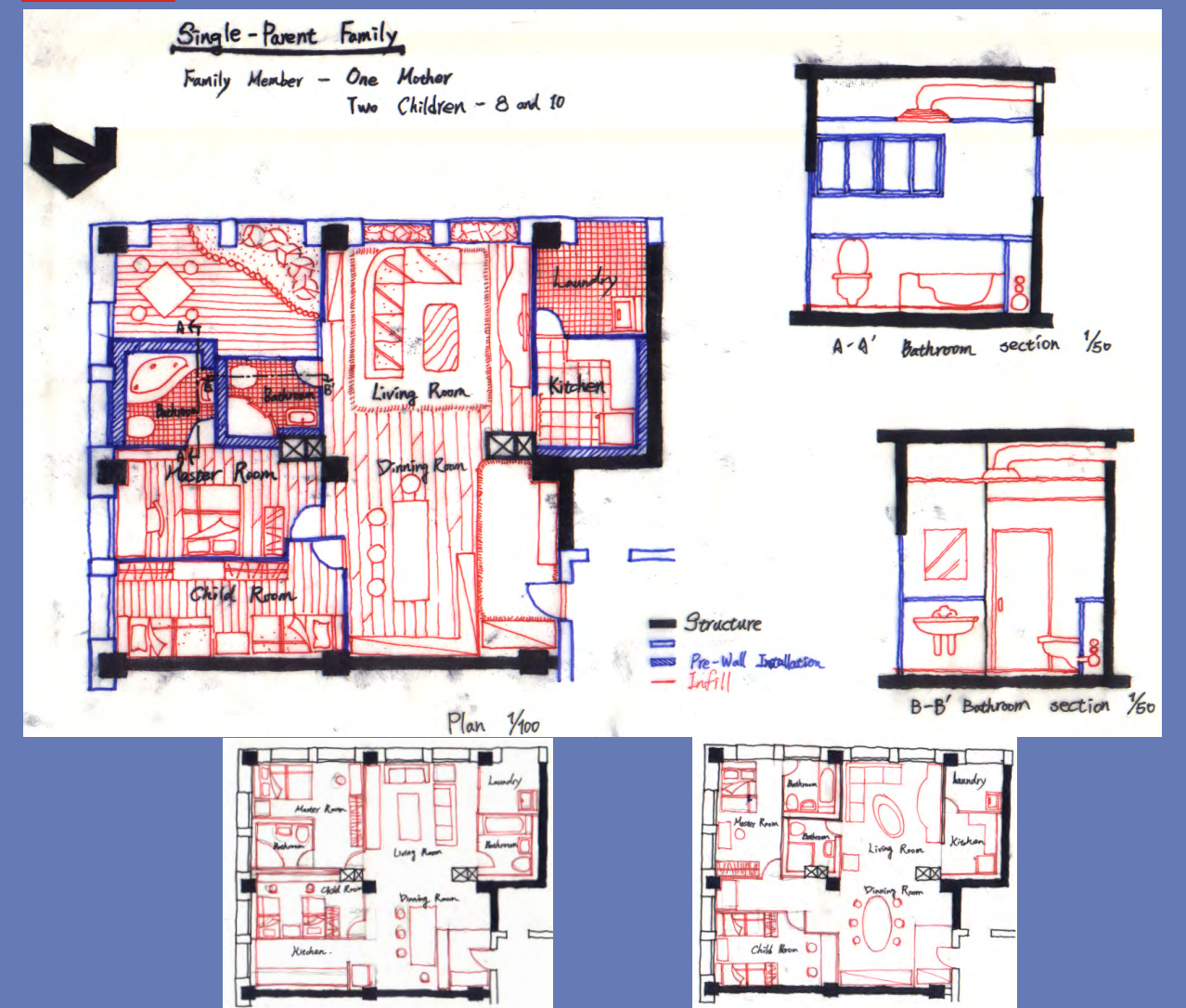
Shih-Min Cheng, Shao-Hung Lo, Chih-Kai Hsiao



TYPE B

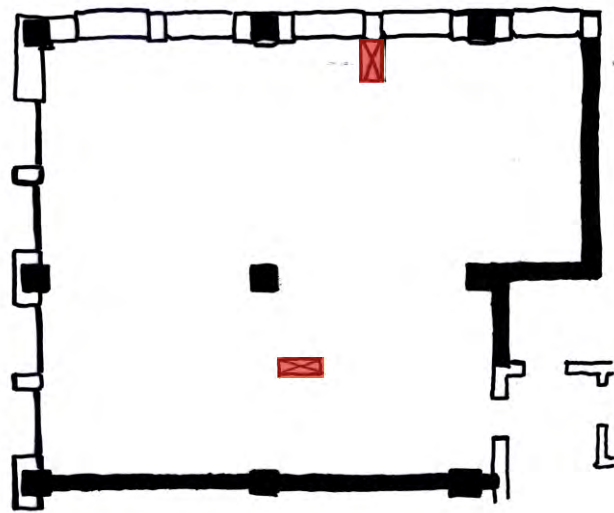


TYPE C





## Arrangement 01



- Bedroom
- Kitchen / Bath room
- Livingroom / Dining room
- Balcony
- Piping Shaft



Layout 01  
4 people Family with 2 bedrooms



Layout 02  
4 people Family with 3 bedrooms



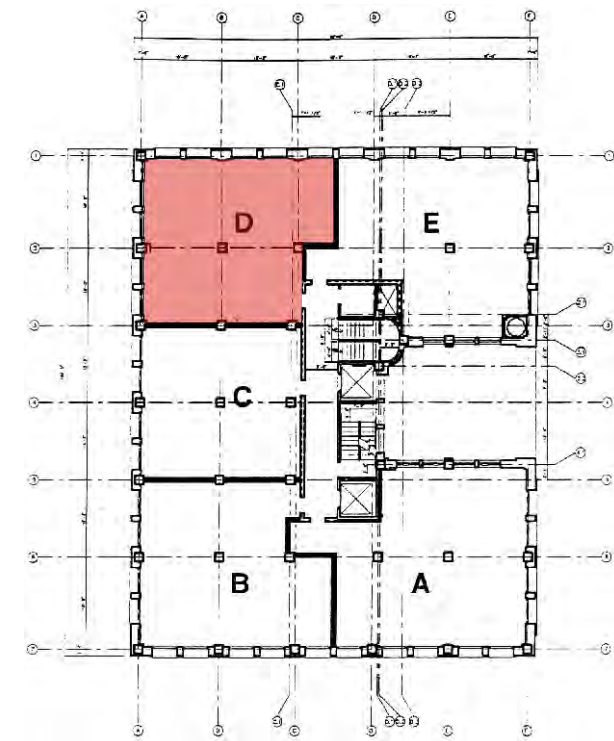
Layout 03  
5 people Family with 3 bedrooms



Layout 04  
4 people Family with studio

## Concept

The shape of this layout is almost a square. The area could be divided into 4 parts if there is a cross in the center of this plane. We want to try out whether the arrangement of placing pipe shafts on the same axis or placing them in different axes could make the building more flexible. So we place both pipe shafts along the Y axis in arrangement 01, and one on X axis and the other on Y axis in arrangement 02. Then we can find more than 4 different layouts for both arrangements.



The exercise is designed to do capacity analysis which is a method to evaluate what INFILL is possible in a BASE BUILDING. The floor above is an existing 20-floor office building in Detroit, USA, which has actually been converted into an apartment building. But the developer did not use an open building approach, so there were many problems and the building is not flexible. It has a structure of concrete columns and slabs. The floor-to-floor dimension is 4 meters.



## Comparison

In arrangement 01, the service space (wet zones) almost distribute over both top and bottom area of the plane, so the serviced space (dry zones) are divided into two almost equal parts. In arrangement 02, one pipe shaft is on the left side and the other is on the bottom side. The service space are concentrated in the corner and then divide the floor into two areas that the sizes vary very much. So the layouts would become less flexible than that of arrangement 01.

## Conclusion

The flexibility of a building depends on the location of pipe shaft very much. If we can deliberate about the location of pipe shaft in the first design phase, then we can make the building more flexible for conversion in the future.



Layout 01  
3 bedroom unit for family of 4



Layout 02  
2 bedroom unit for family of 3

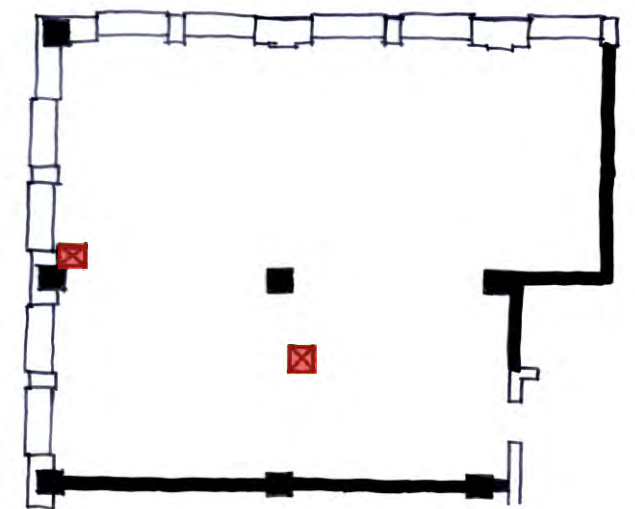


Layout 03  
2 bedroom unit for family of 4



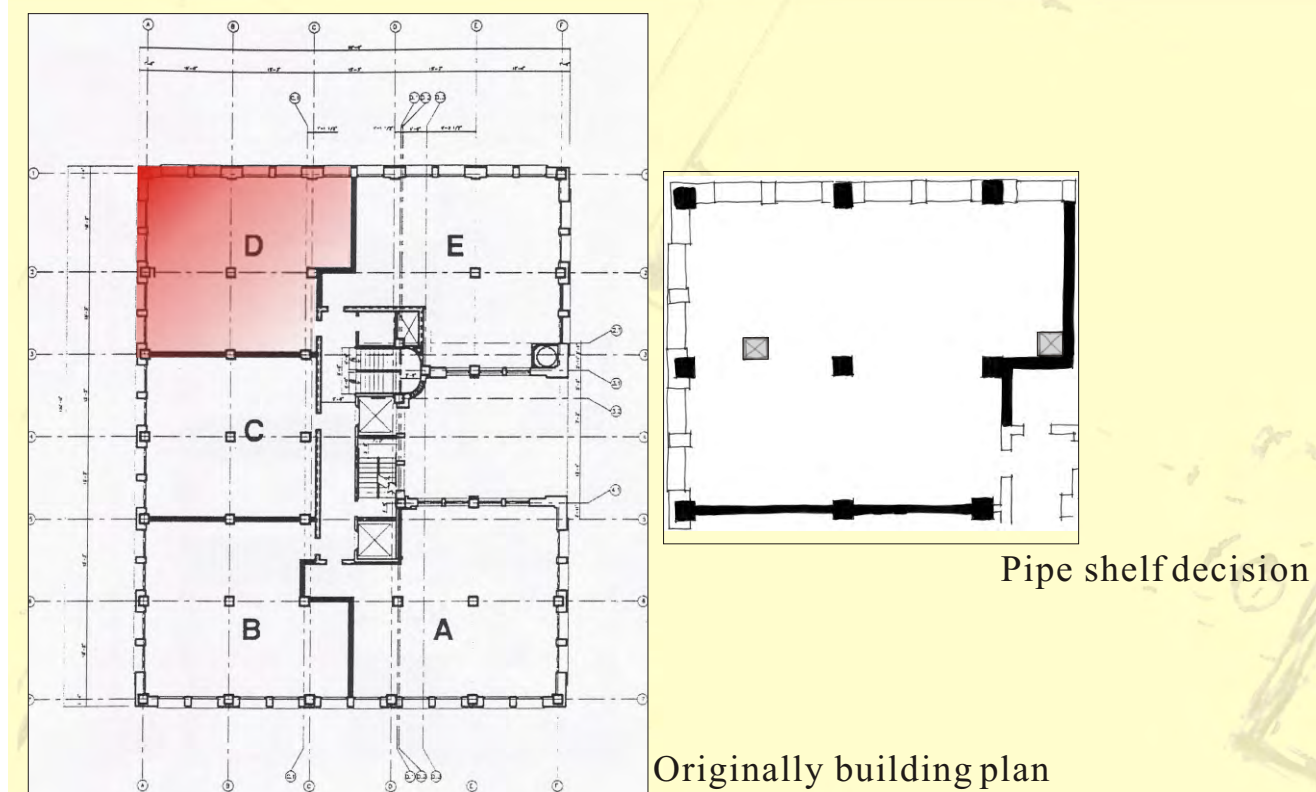
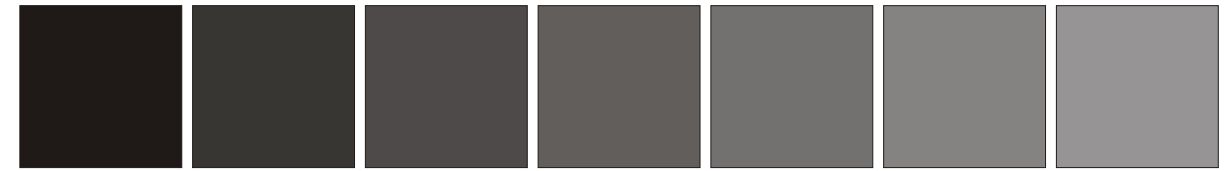
Layout 04  
3 bedroom unit for family of 4

## Arrangement 02



- Bedroom
- Kitchen / Bath room
- Livingroom / Dining room
- Balcony
- Piping Shaft





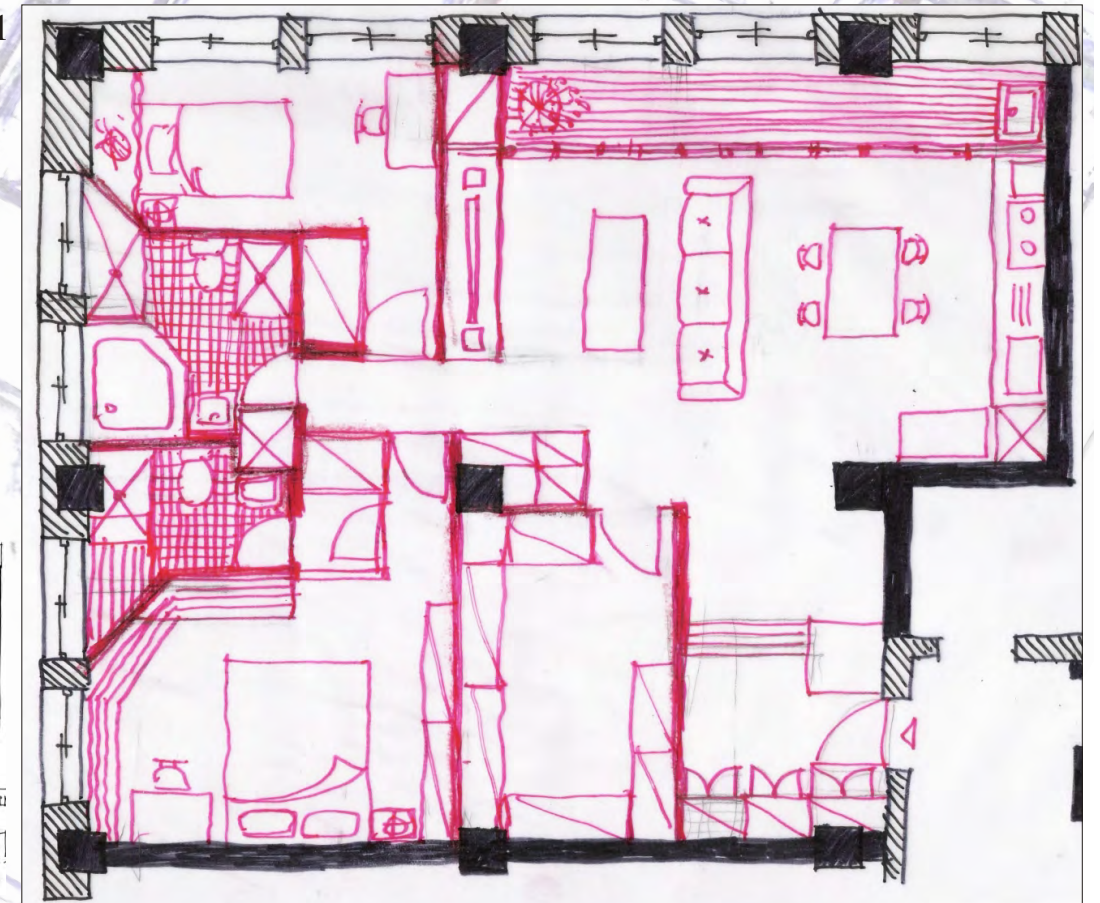
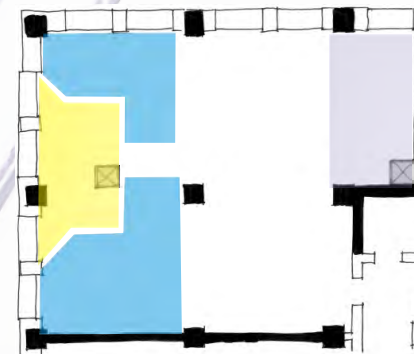
### Exploring Constrains of a Floor Area in a Conversion project

This exercise is designed to help in doing "capacity analysis". Capacity analysis is a method to evaluate what INFILL is possible in a BASE BUILDING.

Will use one typical floor of an existing 20-story office building in Detroit, USA, as an example. It has actually been converted into an apartment building. (But unfortunately the developer did not use an open building approach, so there were many problems and the building is not "flexible"). It has a structure of concrete columns and slabs. The floor-to-floor dimension is 4 meters.

Type 1

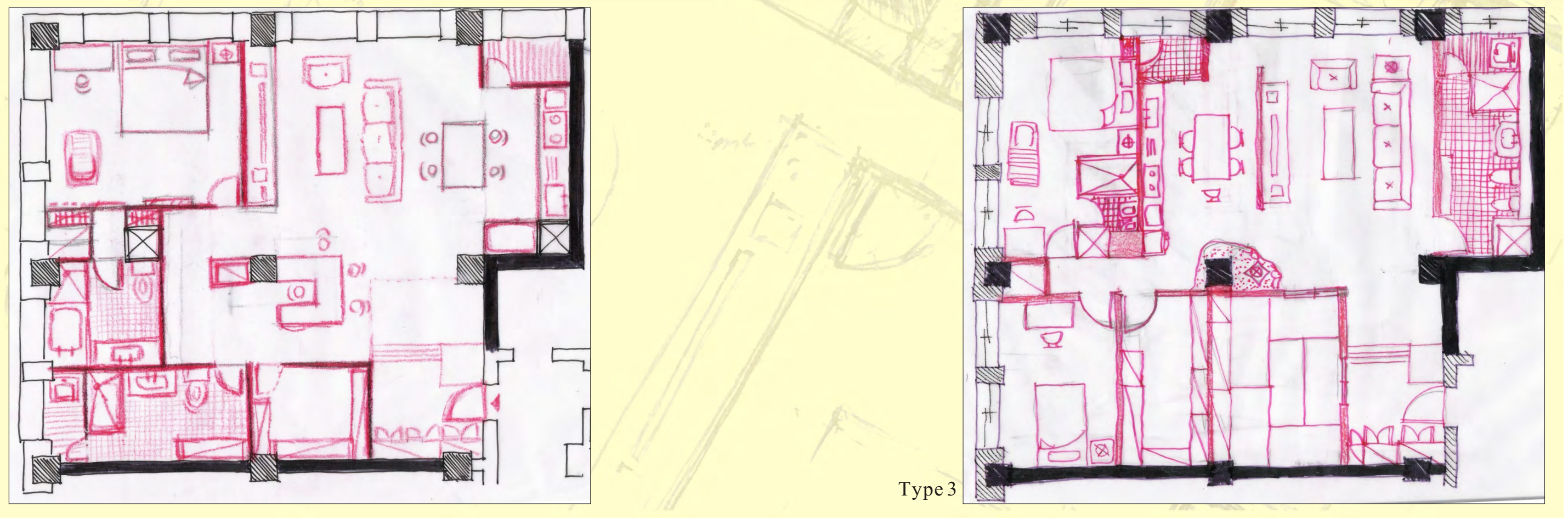
KITCHEN  
 BATHROOM  
 ROOM







Type 2



Type 3



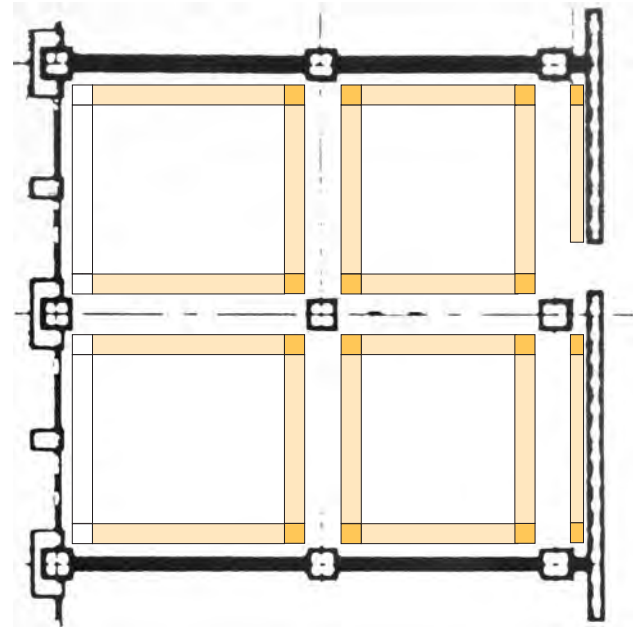
## EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT

## Description on Topic :

- Interior area: 60m<sup>2</sup>

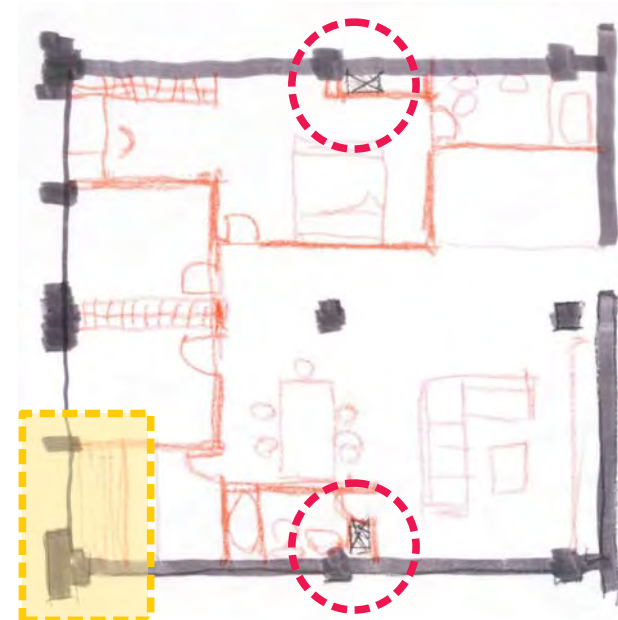
- Interfaces:

Natural light and air only come from one side of the unit.



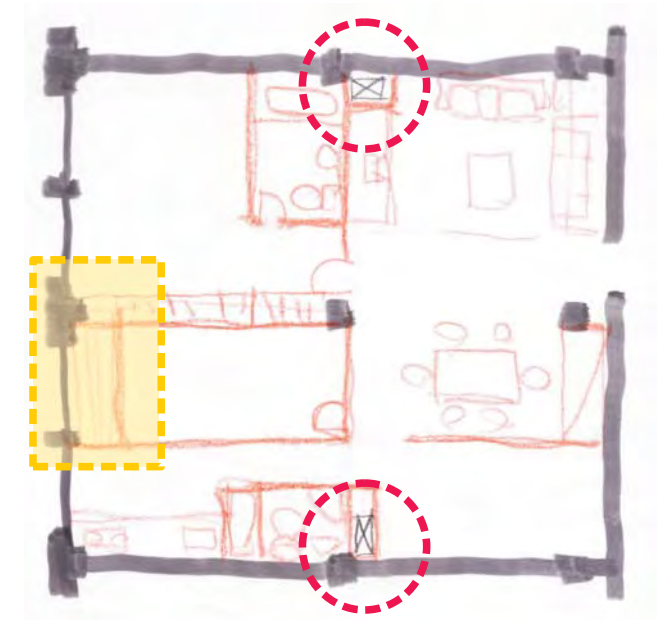
## Proposal One

3BR. with 2 toilets



## Proposal Two

2 BR. with 1.5 toilet



## Analysis of conditions:

- For health consideration, the location of pipe shaft should not block the façade which refer to limited nature.
- Priority set for room utilizing lights and fresh air:
  1. Bed room
  2. Kitchen
  3. Toilet
  4. Others

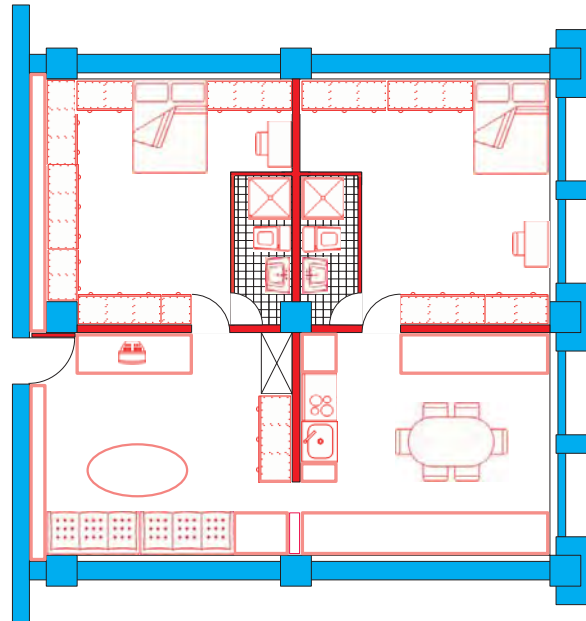
- Four bays of window each one for a room.
- One balcony available as a boundary space.
- With the room width strictly limited, better to have the furniture arranged along the depth, layout of closet should be carefully done.
- The column in the center of unit blocked out the circulation, more improvement to be needed.

- Dimension of rooms seemed comfortable.
- One additional storage.
- Both pipe shaft and center column can be unobvious.



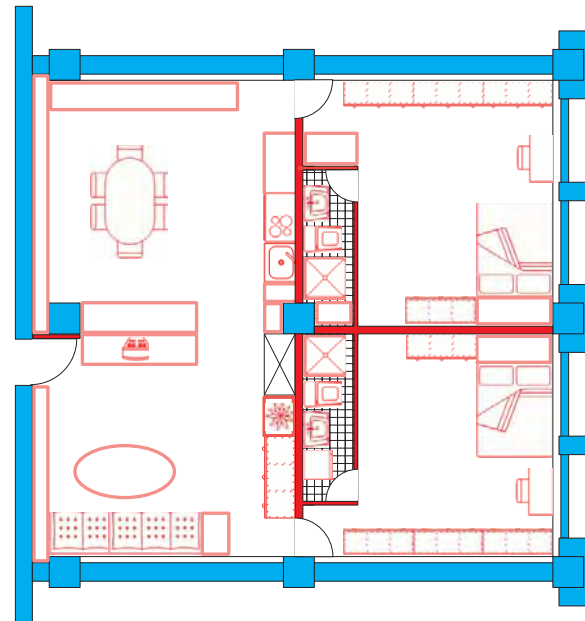
Proposal Three

2BR. With 2 toilets



Proposal Four

2 BR. with 2 toilet

**Design Concepts:**

1. Trying to set the pipe shaft location in the middle zone of the dwelling unit, the distance from the service point to each corner of the dwelling unit will be shorter.
2. People will get good life faculty; because of there are shorter distance from service point to each corner of dwelling unit.
3. The distance, walk to the service point, is decreased.
4. When pipe shaft location in the middle zone, the kitchen or the bathroom would be island style or against wall style.
5. Using sheet materials to decorate the space between column edge and wall surface, and set the electric pipes and water pipes between the wall and sheet materials, then the wires or pipes could not be seen.
6. Those are the shortest distance to get the user side, includes gray pipes, sewage pipes, gas pipes, electric pipes, water pipes, web wires and cable wires.
7. We thinking over the ambient light and ventilate in bedrooms or dining room.
8. Adults can watch the kids-rooms from kitchen, for knowing the kids situations.

## SECOND OB EXERCISE: JULY 9<sup>th</sup>: Infill a Townhouse

### EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT

#### SECOND OB EXERCISE: JULY 9<sup>th</sup>: Infill a Townhouse

This exercise is designed to continue your study of “capacity analysis”. *Capacity analysis is a method to evaluate what INFILL is possible in a BASE BUILDING.*

We will use a townhouse “SHELL” designed by my students at Ball State University as an example. It has pipe shafts already located, and some of the shells have “trenches” in the floor in which infill piping can go. Each shell has an opening in the floor where a variety of infill stairs can be placed to go with a floor plan. Assume the shell is being build in Taipei. We will start the work in the class, but you can do more work on it between classes and in the first part of class on July 12th.

#### WHAT I WANT YOU TO CONSIDER AND DO IN THIS EXERCISE

1. Follow “HOMEWORKS” principles.
2. I will offer two townhouse SHELLS; each team will select one to work with.
3. In this exercise, try to follow Taiwanese conventions of space use in townhouses, and Taiwanese regulations as much as possible. If that means adjusting the given SHELLS just a little, please do so.
4. Final work should include the following sketches:
  - a) Minimum of two complete INFILL layouts for the SHELL (floor plans, furnishings)
  - b) (If you adjust the SHELL, show the NEW SHELL as the basis for your exercise, and a small diagram showing what you changed from the given SHELL)
  - c) A diagram of the installation pathways for drain lines, on just one floor (show in a plan view; an axonometric view of the same is asked for but not required)



## INFILL A TOWNHOUSE

## SUMMARY

This is a townhouse (fig.1) which be used to study capacity analysis.  
We drawn by hand, and use different color to show base building (black) & infill (red).

In this exercise, we tried to follow Taiwanese conventions and regulations as much.  
For example, the top floor in this two drawing (fig. 2, fig. 3), were drawn a place for religion  
& memorial tablet.



Fig. 2 exercise

## ANALYSIS

When we are drawing two different spaces in the townhouse, to discover capacity analysis.

We have found something that may effect the way we design.

The space was separated two parts by trench and pipe shell.

We find out stair is better between the trench (in the blue zone).

Because it can get two more bigger spaces in a long and narrow space.

It can use trench to put pipe (cable, gas, water) from right to left side.

We drawn lines in green color, to check the service system can go the place we design.





## EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT

In this exercise, we were asked to work on a town house. It already has some existing limits. First, the developer had set up two fixed pipe shafts. The other is that the builder had already prepared a trench for the buyers. Therefore, the most challenge for us is to offer different use possibilities for this house owner. By operating this practice, we can learn the details about the infill ducts. Besides, we can know the clear definition of infill and base building.

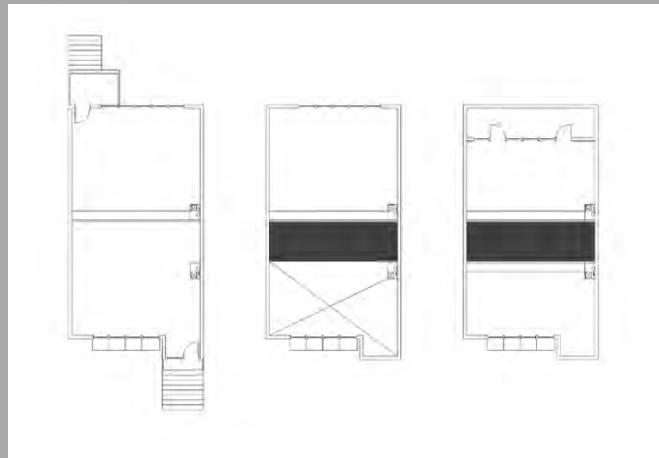


Figure 1 Three-story town house. Black areas are stair opening.

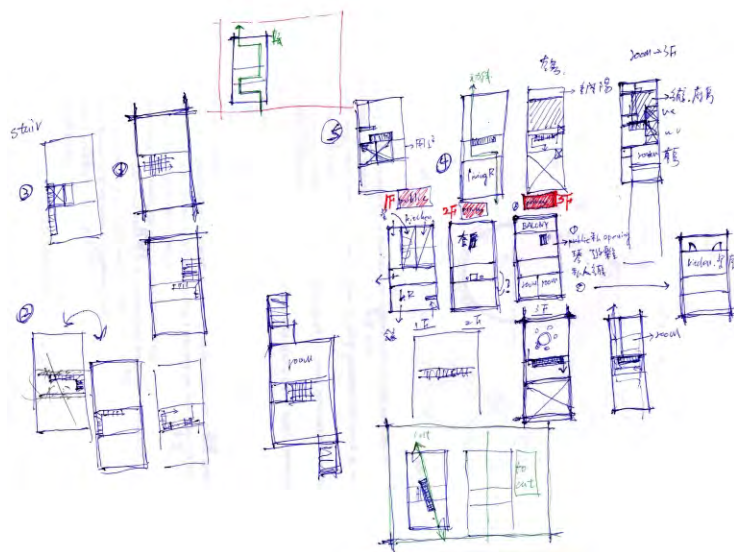


Figure 2 We tried to find out all possible ways to place all kinds of stairs.

Figure 3 Pathway details section drawn by Prof. Kendall.

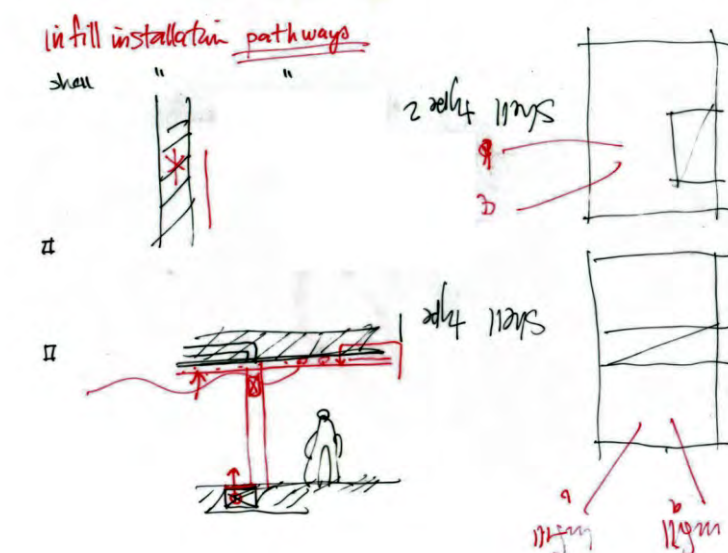
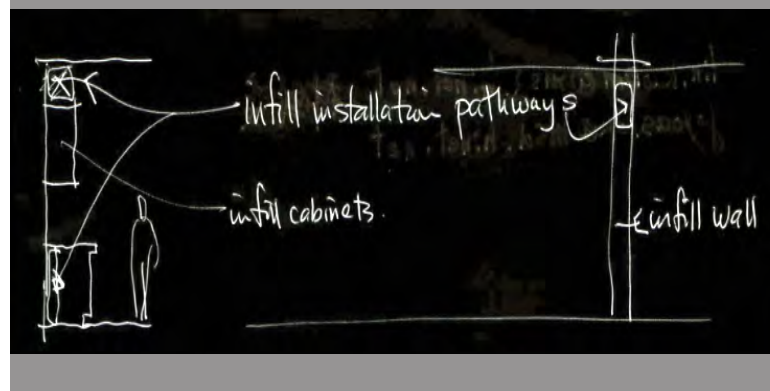


Figure 4 Pathway details section drawn by Prof. Kendall.

There is some important things we should notice. Firstly, like the last exercise, we should avoid the kitchen and bathroom too far from the trench placing. Secondly, the new stair we designed must be placed in the stair opening. Last but not least, when we considerate the new housing placement, we should think about the pathways of these equipment lines.

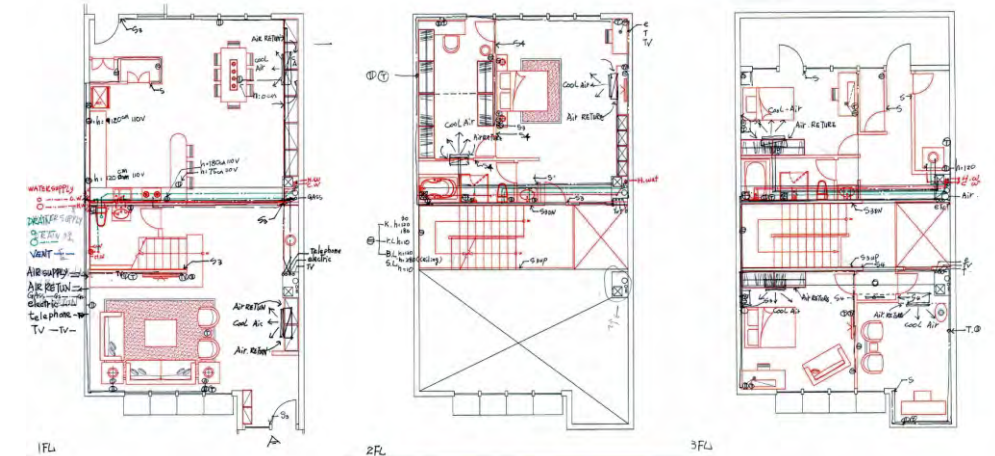


Figure 5 Evaluation and test our placement can easily hide all ducts.

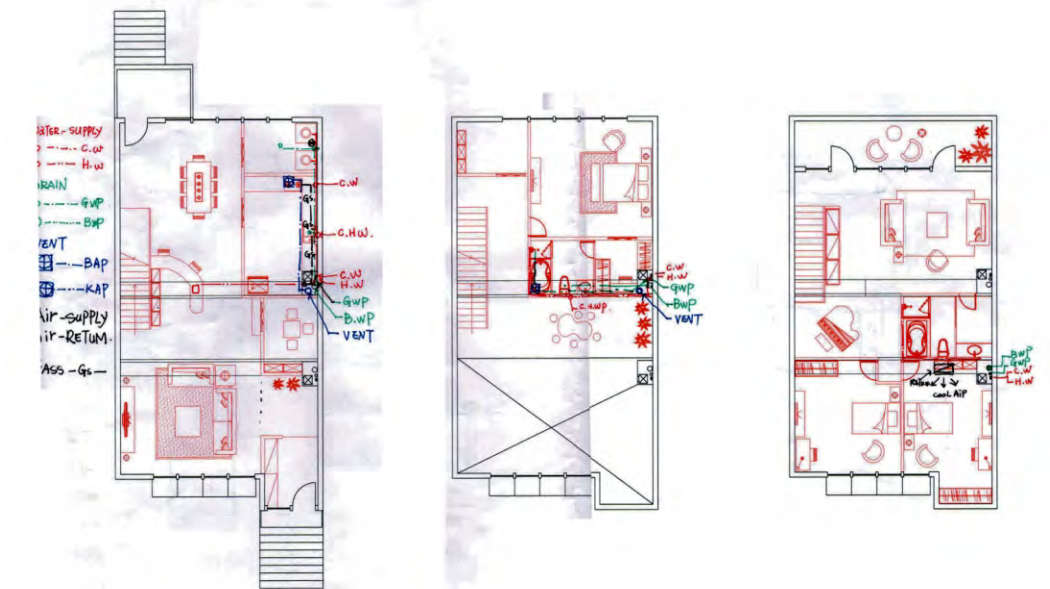


Figure 6 Evaluation and test our placement can easily hide all ducts.

From water supply to drainage, we checked all pipes one by one. Each color depicts each function. We deliberated two different plans which contains one living room, one kitchen, one laundry, one kitchen, a major bedroom, two rooms, and other necessary units. Although the function is very simple, these two designs perform slight flexibility. At the next page, you will see our results.



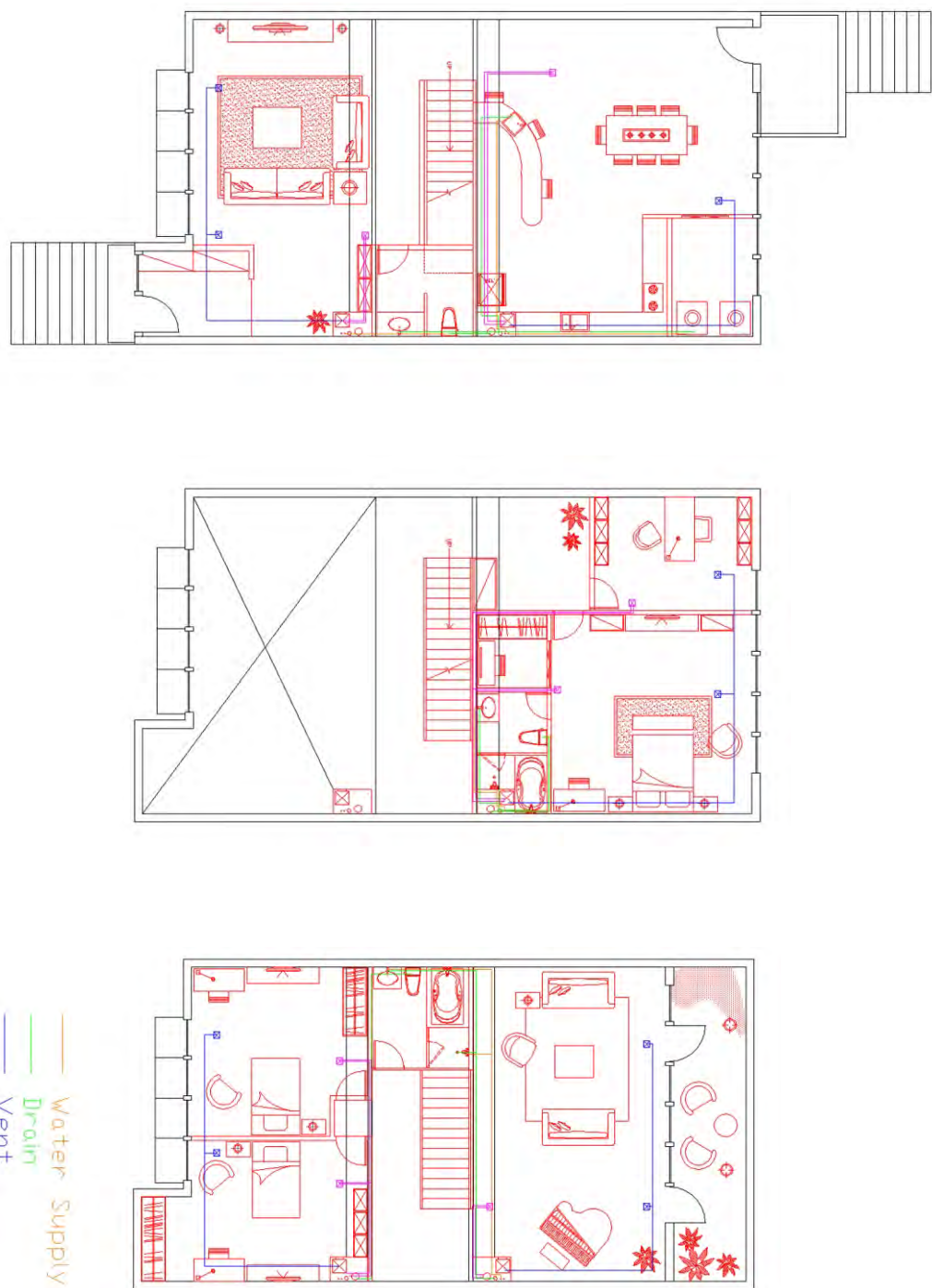


Figure 8 The second case was designed by GenHan Lee.

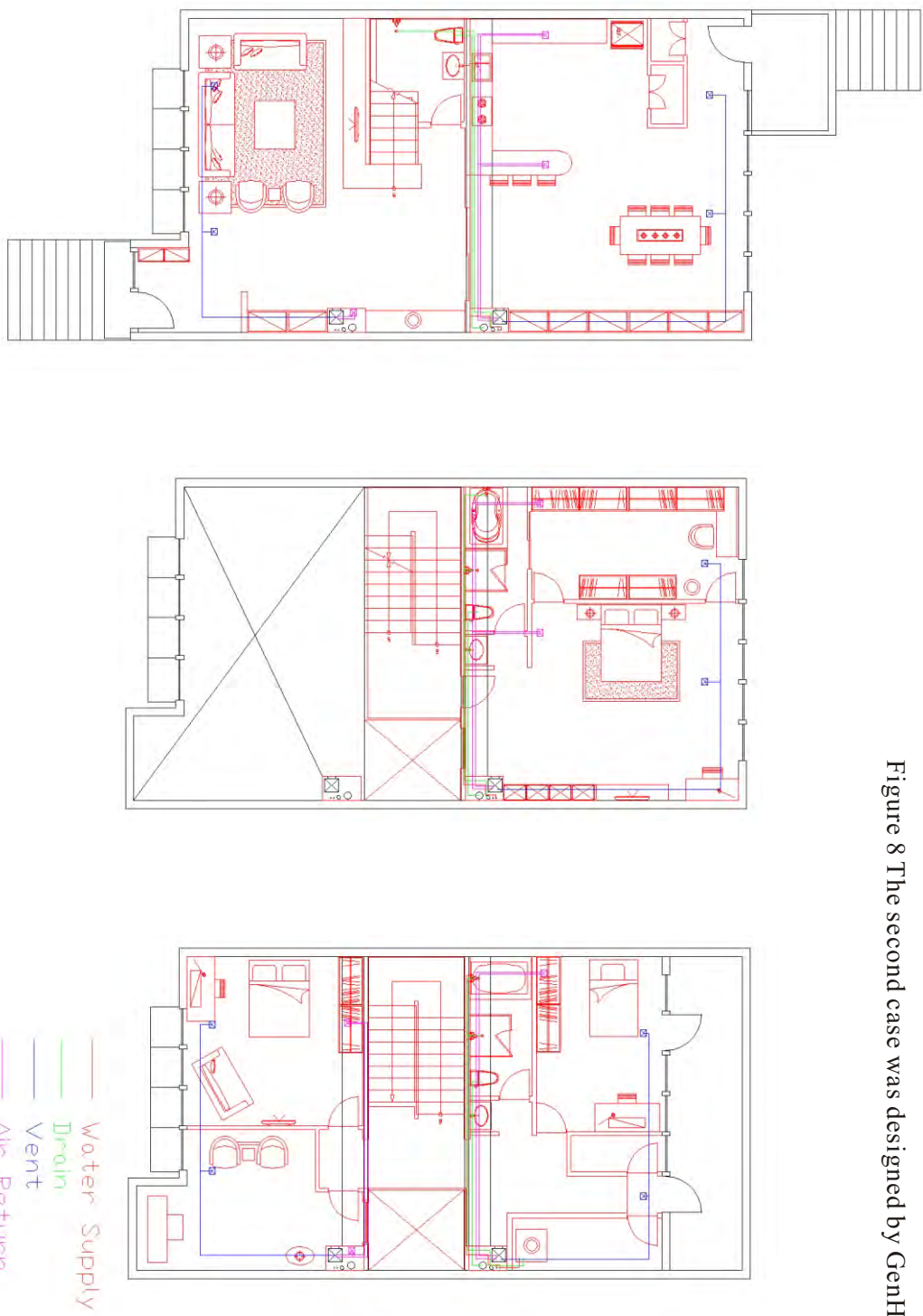


Figure 7 The first case was designed by KoYang Lin.

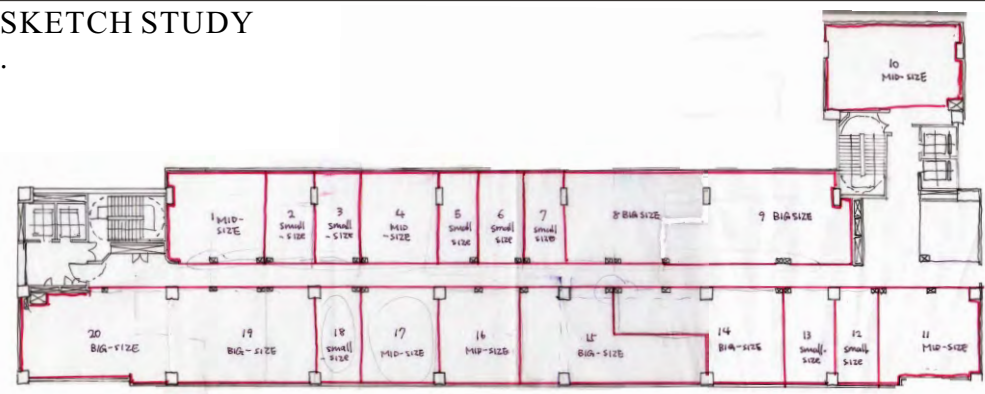
**We** tried to combine Taiwanese customary and particular usage in our plans. Take the KoYang Lin's case for example. In this case, we leave the top floor front space to put God statue. It is a normal situation for Chinese. Otherwise, we still create some interesting and intriguing volume. We used different stairs in order to enlarge the visual space sense. Moreover, we designed two kinds of stairs.

In conclusion, we did our best to keep attempt to follow the principals of open building. At the same time, we understood how to connect to the trench and used it in creative way.

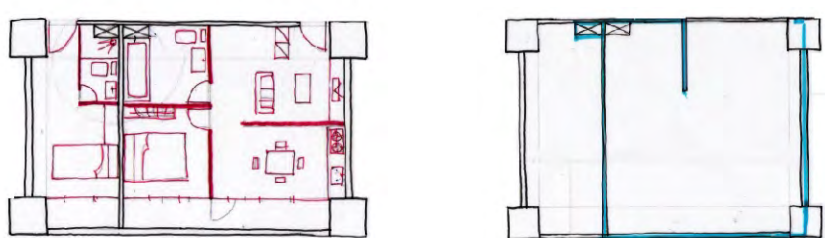


Transforming an existing base(rigid) building into A RESIDENTIAL OPEN BUILDING

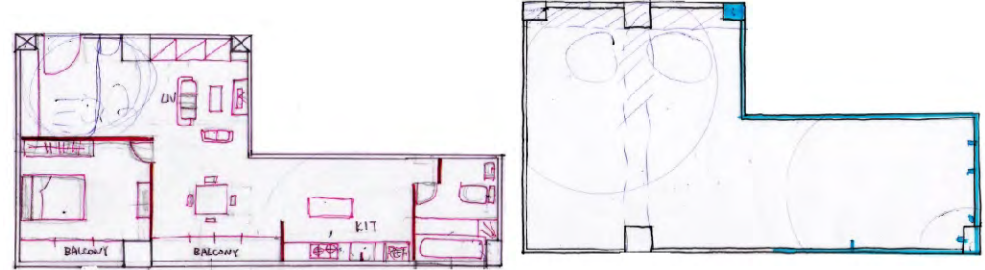
SKETCH STUDY



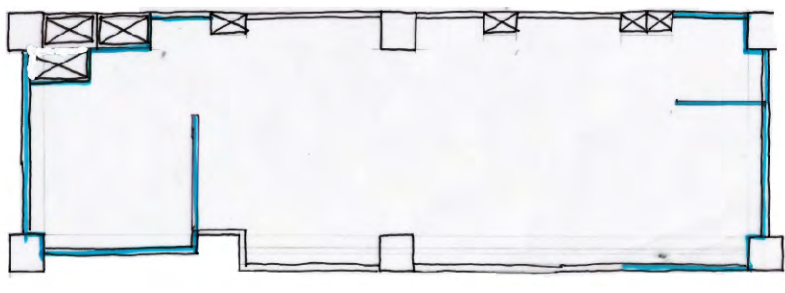
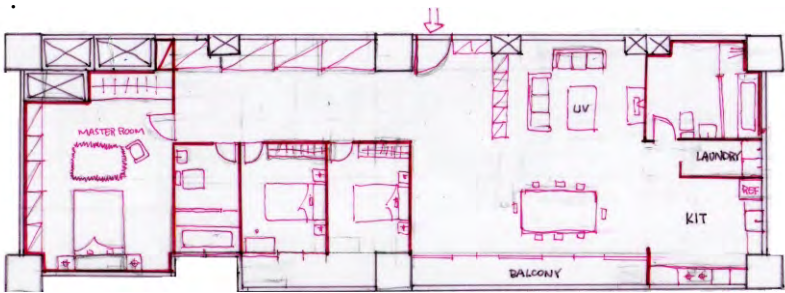
WHOLE PLAN



TYPE 1 PLAN



TYPE 2 PLAN



TYPE 2 PLAN

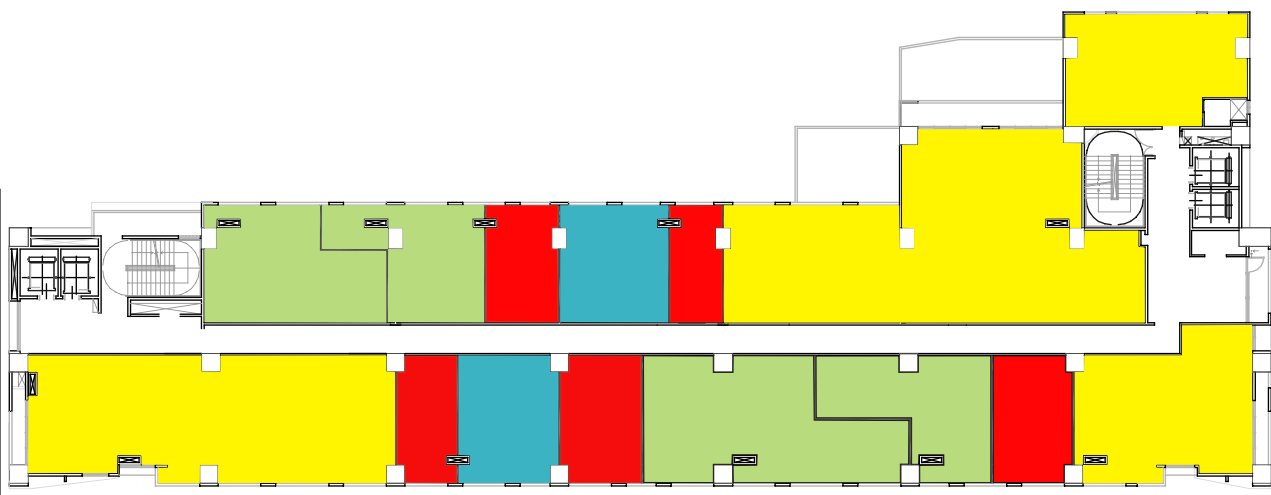
DESIGN PROCEDURE

Trying to separate the whole plan of residential into three type of area.

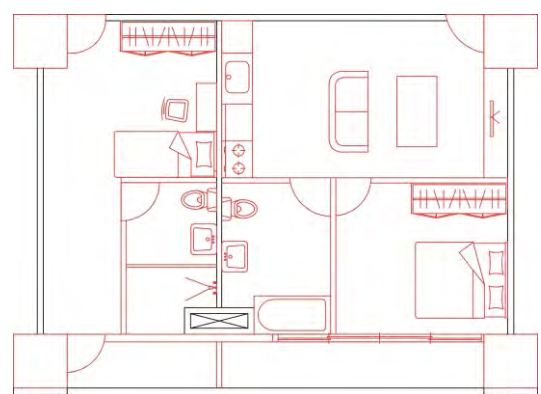
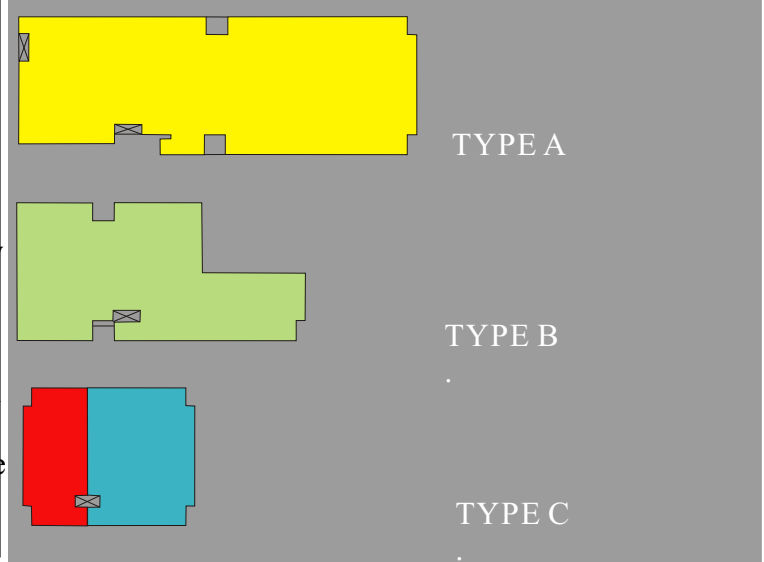
Type A is the biggest one in the whole units, it provides a big area for someone who is rich to live in.

Type B is the middle size unit. It provides the basic function of residence for a little family to live.

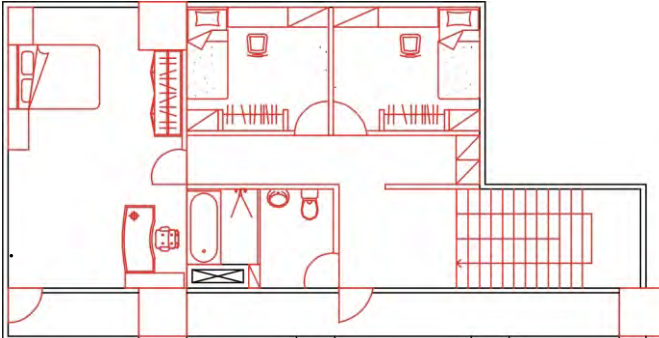
Type C is include a flatlet and a flatlet with a living room. Usually, this kind of the space are for students or single.



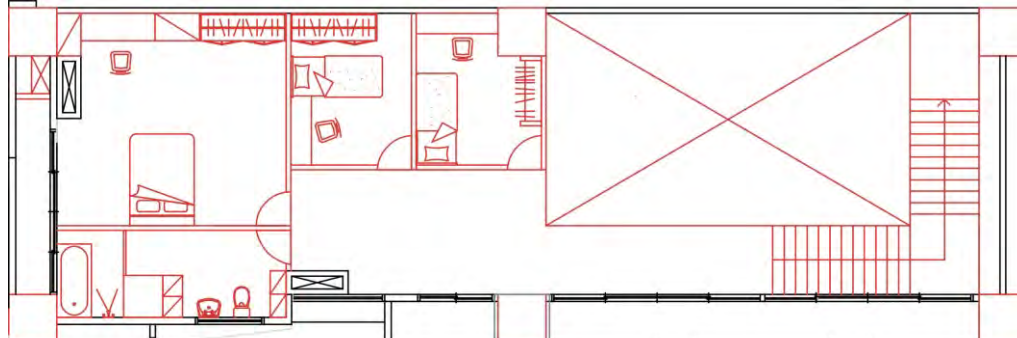
WHOLE PLAN



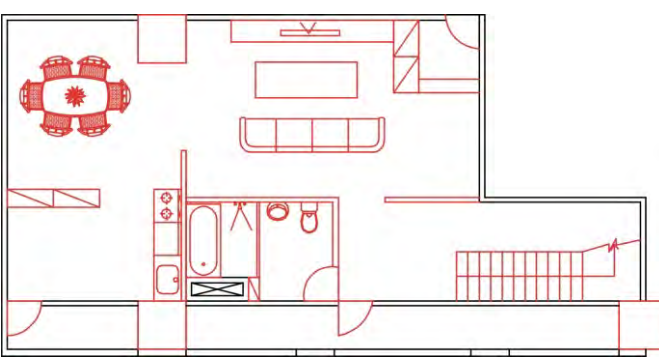
TYPE C PLAN



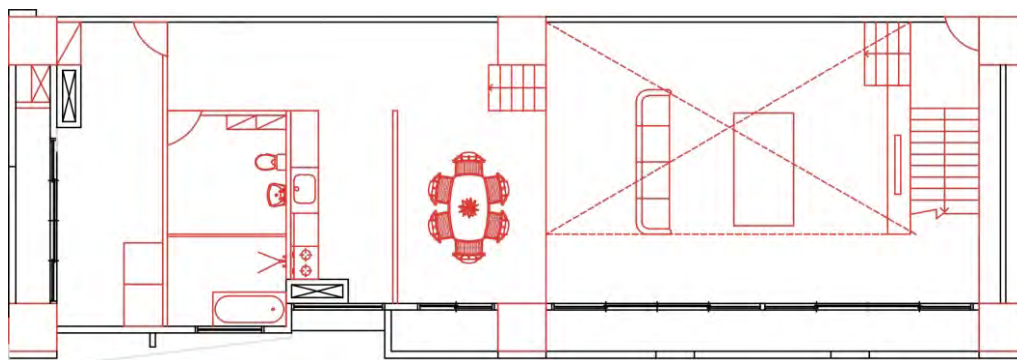
TYPE B PLAN SECOND FLOOR



TYPE A PLAN SECOND FLOOR



TYPE B PLAN FIRST FLOOR



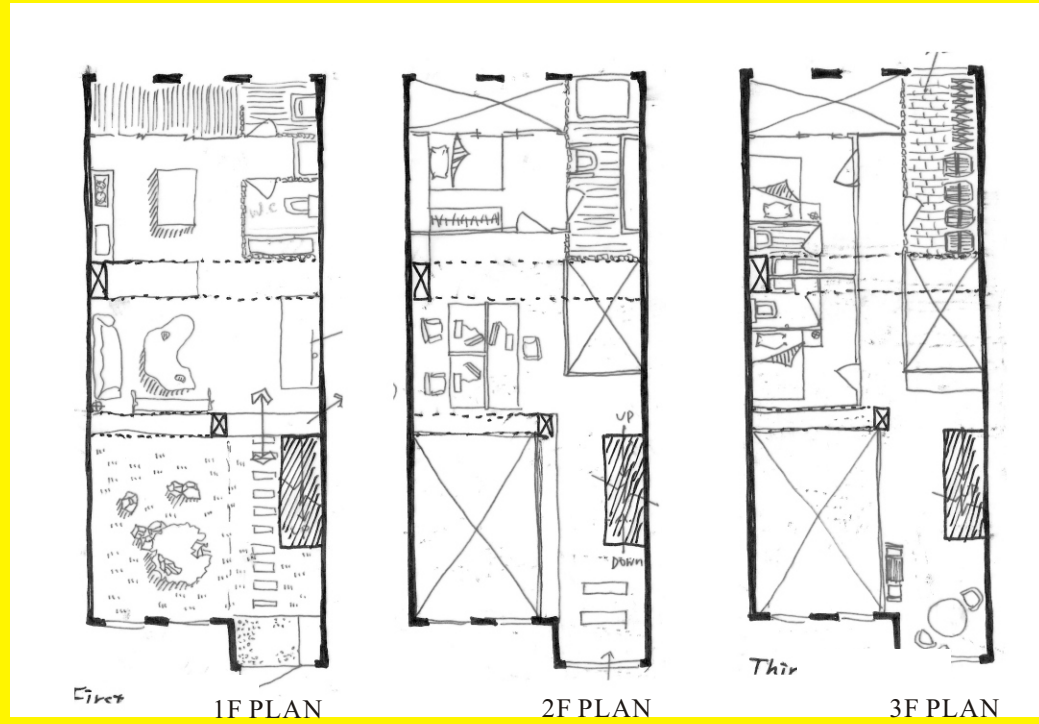
TYPE B PLAN FIRST FLOOR



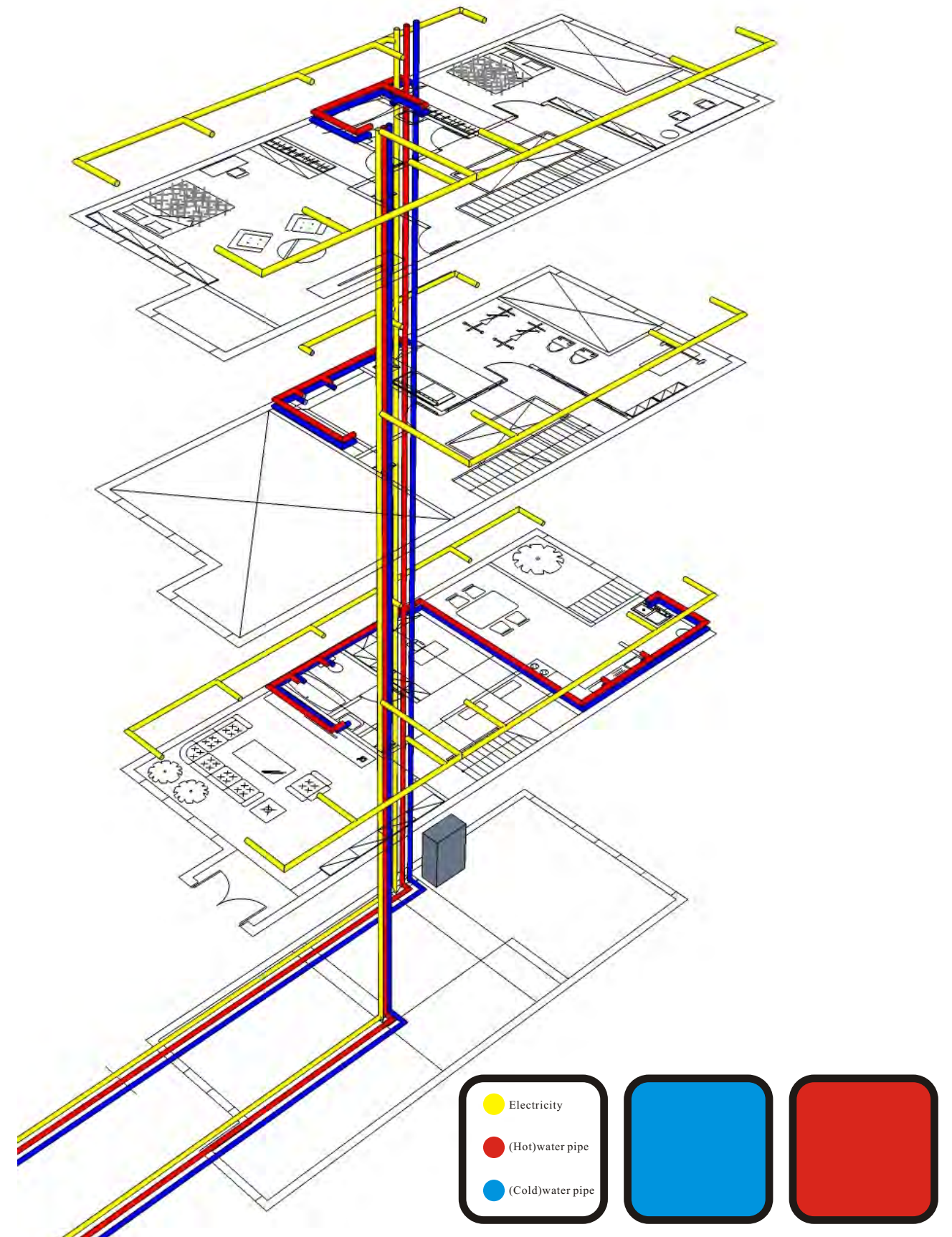
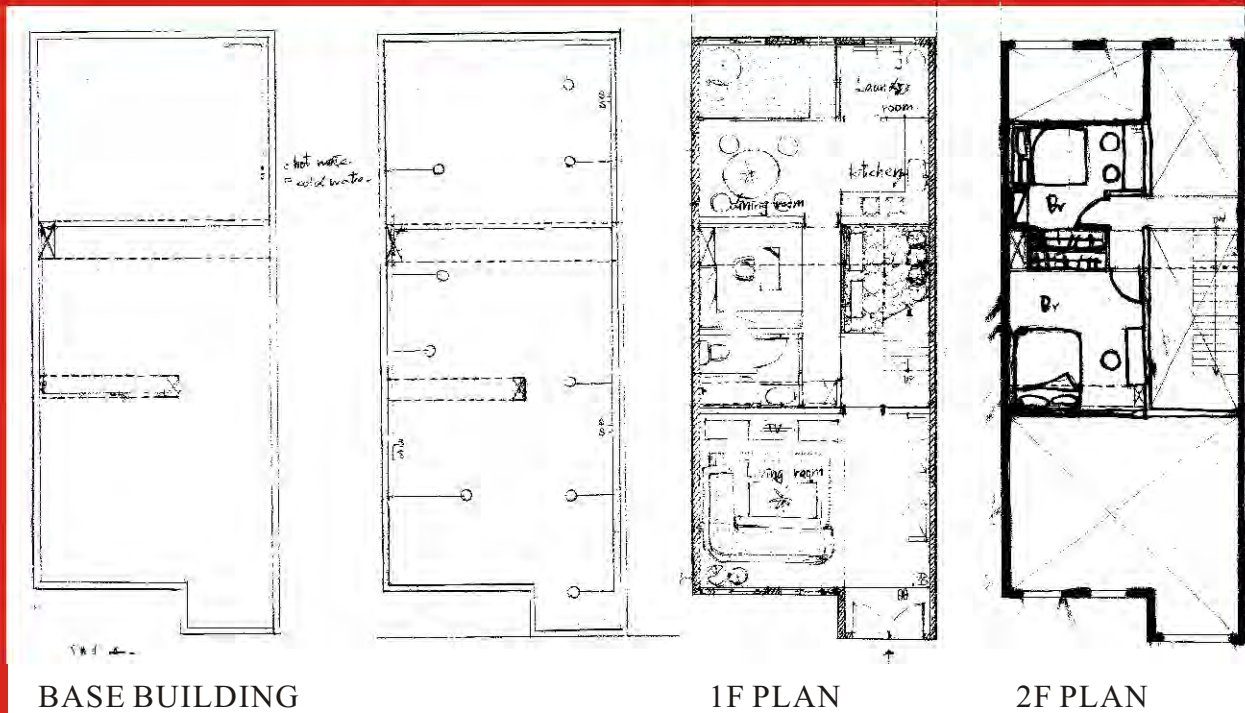


## INFILL A TOWNHOUSE

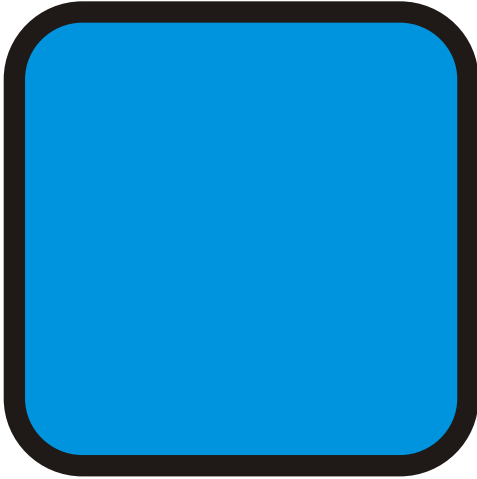
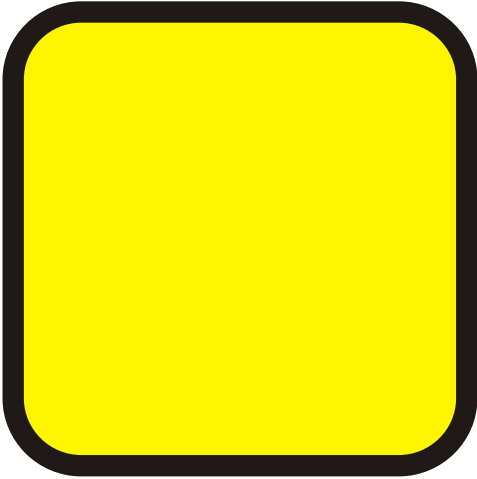
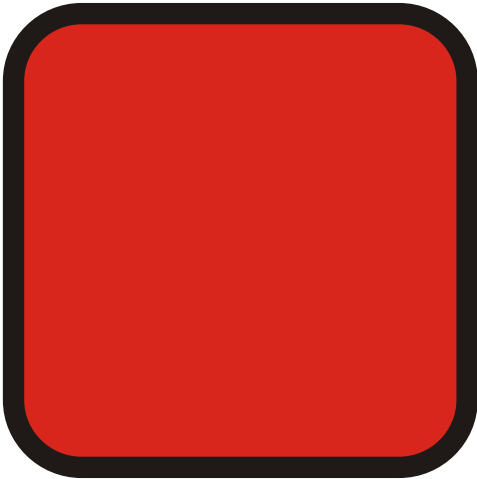
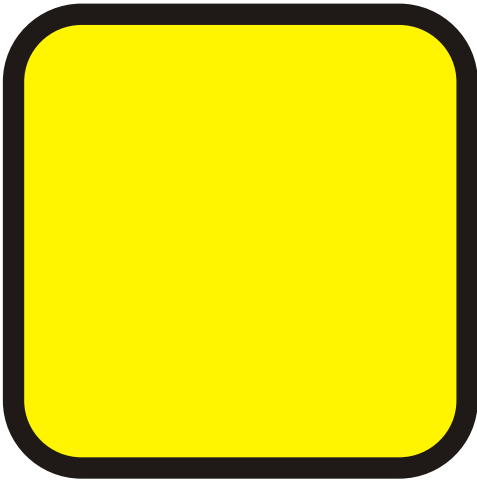
TYPE1



TYPE2

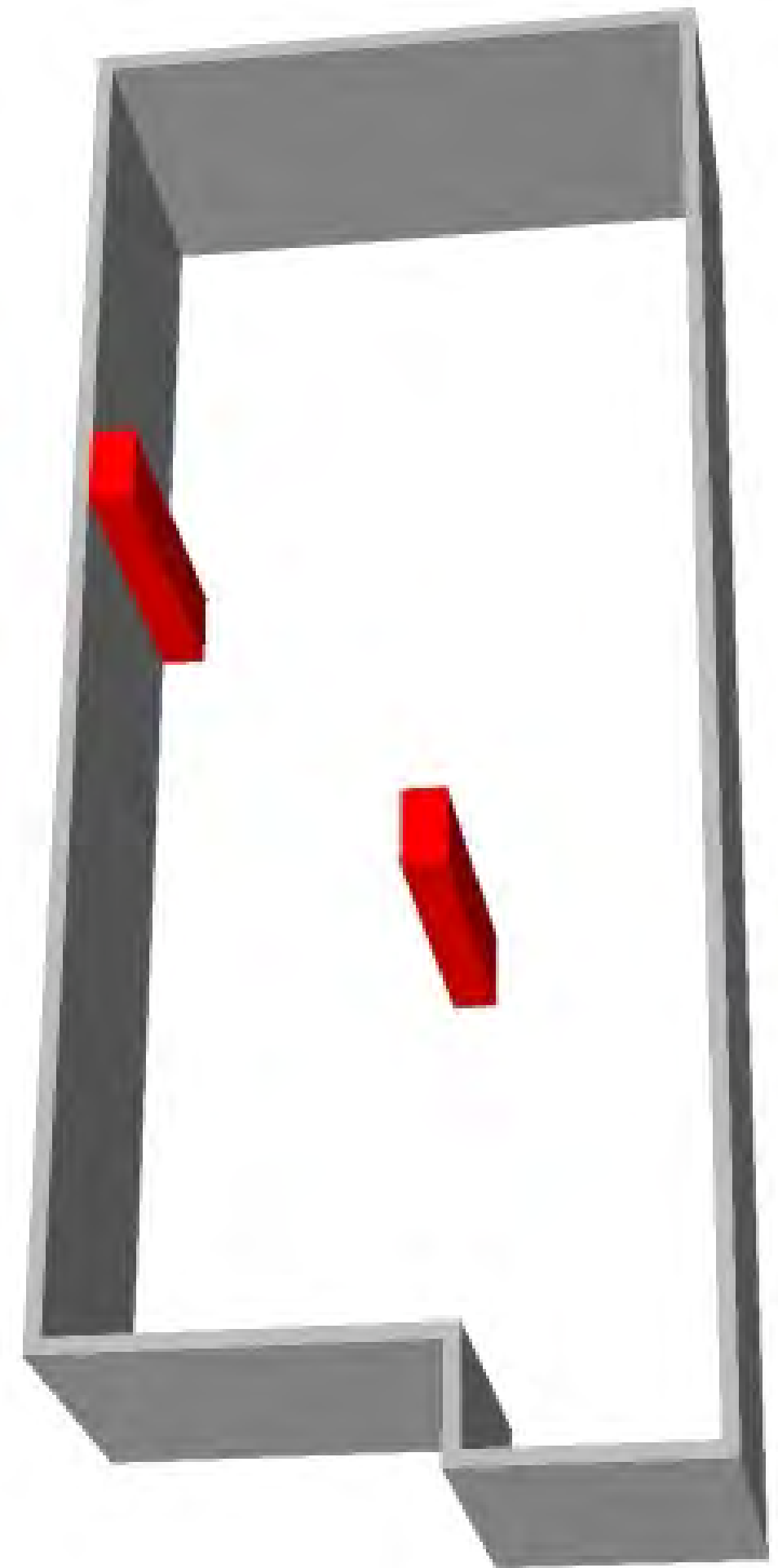
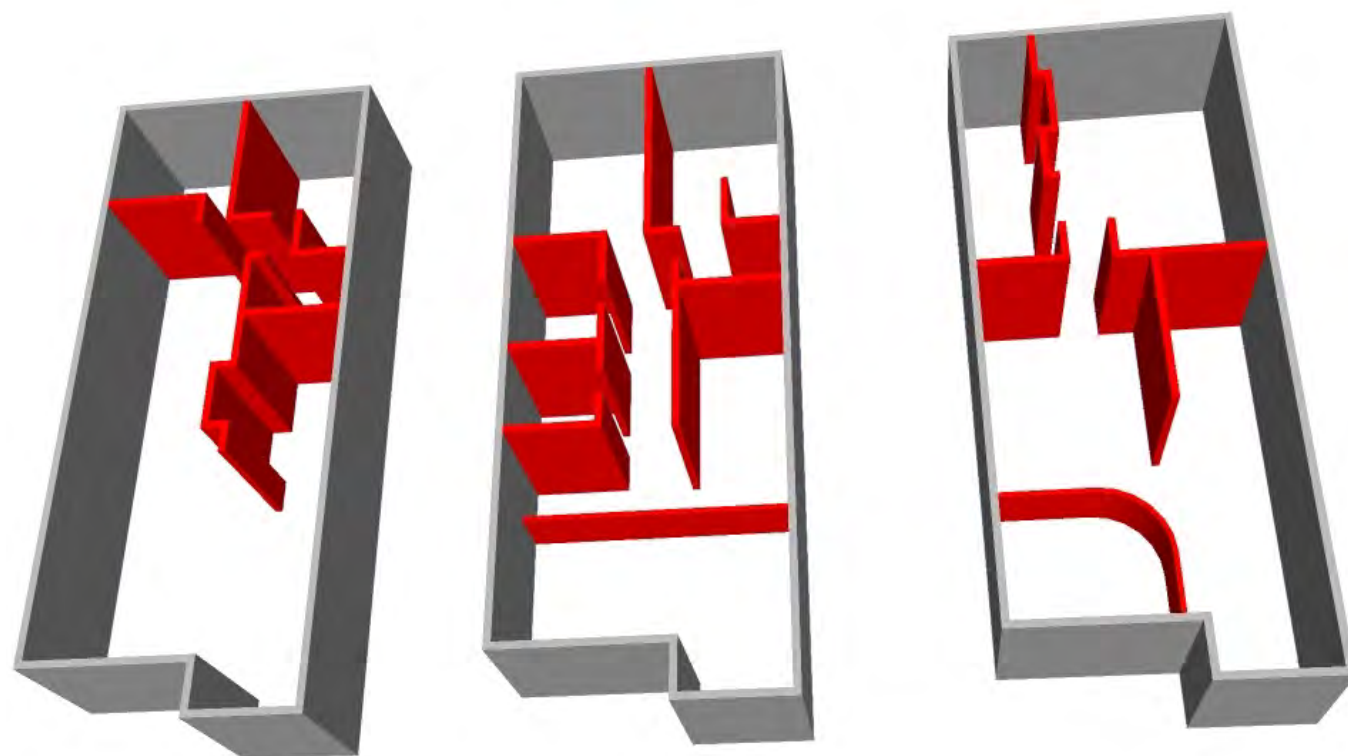


# Y&H STUDIO 2.0





## INFILL TOWNHOUSE





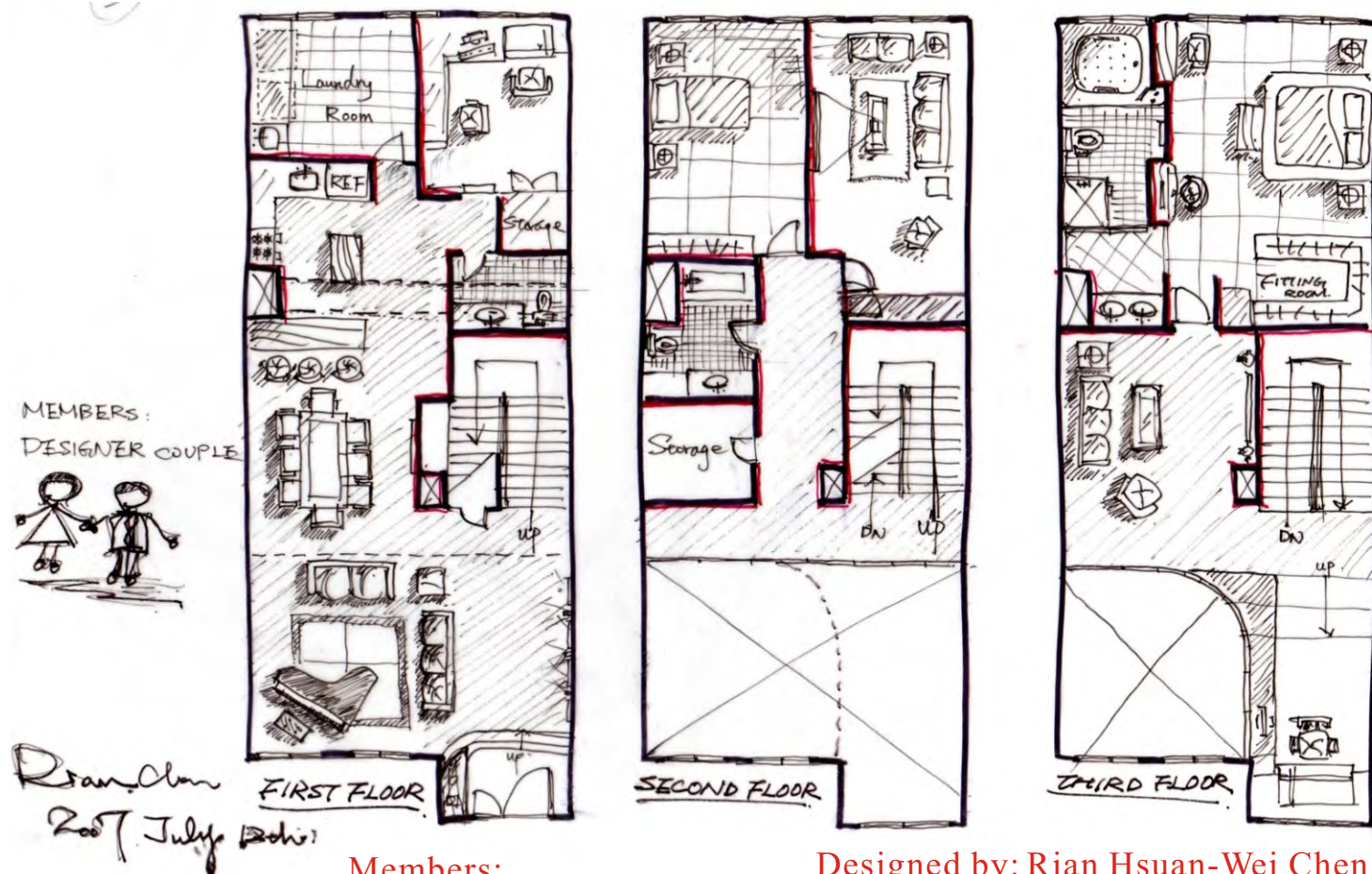


This exercise is designed continue your study of “apacity analysis” ? . Capacity analysis is a method to evaluate what INFILL is possible in a BASE BUILDING.

We will use a townhouse “HELL” designed by my students as an example. Please assume it is being build in Taipei !

WE will start the work in the class, but you can do more work on it between classes and in the first part of class on July 12<sup>th</sup>.

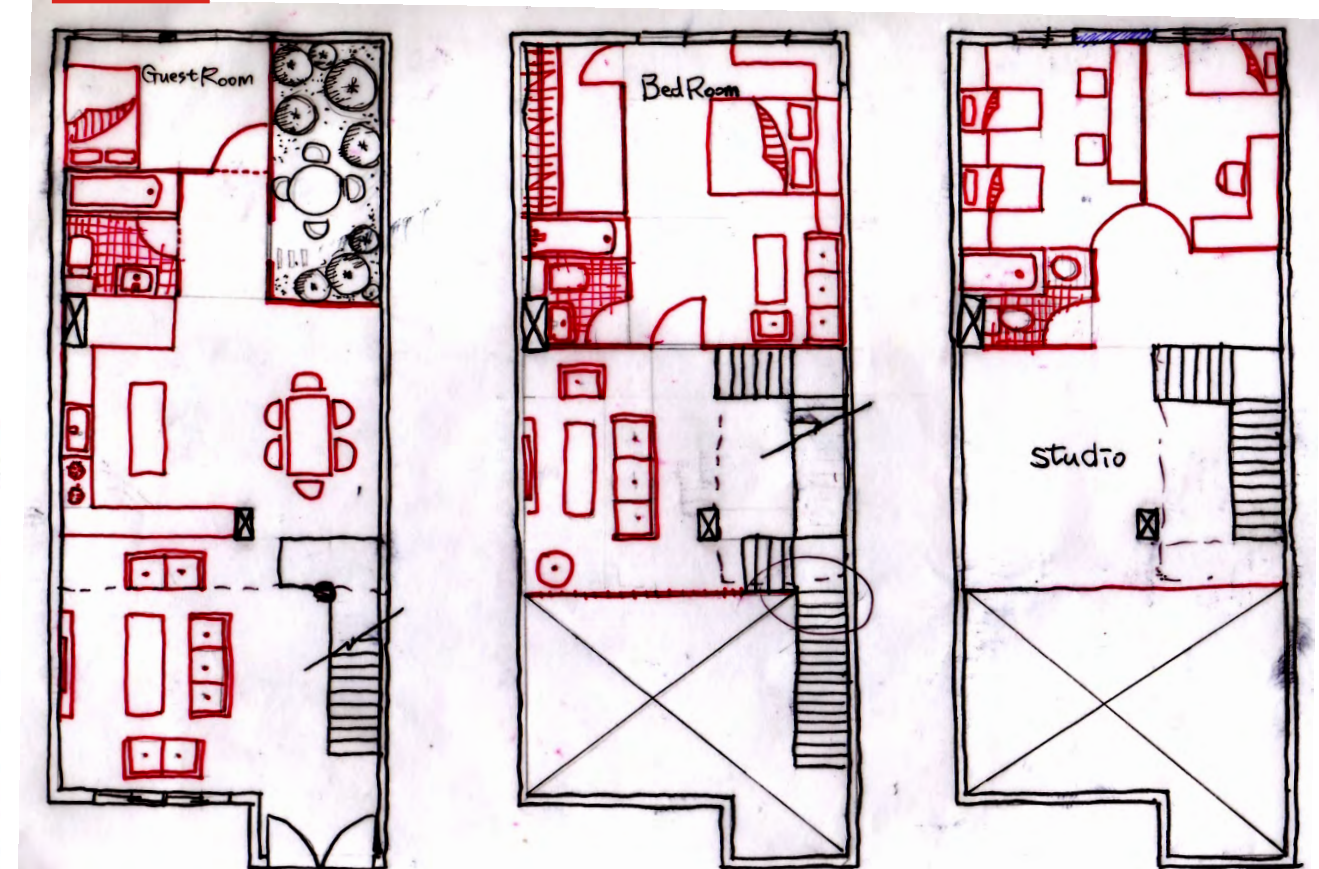
### TYPE1



Members: A man and a woman, Designer Couple.  
Designed by: Rian Hsuan-Wei Chen

Conception: In this town house with original base, I first figure out where comes the sunlight. And I want to make a bright lobby with an open upon it. When hostess plays piano, the whole house will full of musical sounds. Another idea about this house is the studio layout, I design several studios at different places, and each of them has their own facility.

### TYPE2



Members: My Father, mother, twin younger sister and myself.  
Designed by: Mr. Big and Shao Yuan

In this case, we designed this townhouse with the original base. First of all, there is an open upon the living room which is to the top floor, Main floor is public space for banquet or meeting friends; second floor bedrooms for parents and family members; third floor are children's playing room and master's studio. The general conception of this OB design is to make a small space as big as possible, and create warm, interesting atmosphere.

### WHAT I WANT YOU TO CONSIDER AND DO IN THIS EXERCISE

1. Follow “HOMEWORKS” principles.
2. I will offer two townhouse SHELLS ; each team will select one to work with.
3. In this exercise, try to follow Taiwanese conventions and regulations as much as possible. If that means adjusting the given SHELLS, please do so.
4. Final work should include the following sketches:
  - a) Minimum of two complete INFILL layouts for the SHELL (floor plans, furnishings) (If you adjust the SHELL, show the NEW SHELL as the basis for you exercise, and a small diagram showing what you changed from the given SHELL)
  - b) A diagram of installation pathways for drain lines, on just one floor (show in a plan view: an axonometric view of the same is asked for but not required)



## INFILL A TOWNHOUSE

This exercise is designed to continue your study of capacity analysis. Capacity analysis is a method to evaluate what INFILL is possible in a BASE BUILDING.

We will use a townhouse SHELL designed before as an example and assume it is being build in Taipei and try to follow Taiwanese conventions and regulations as much as possible.

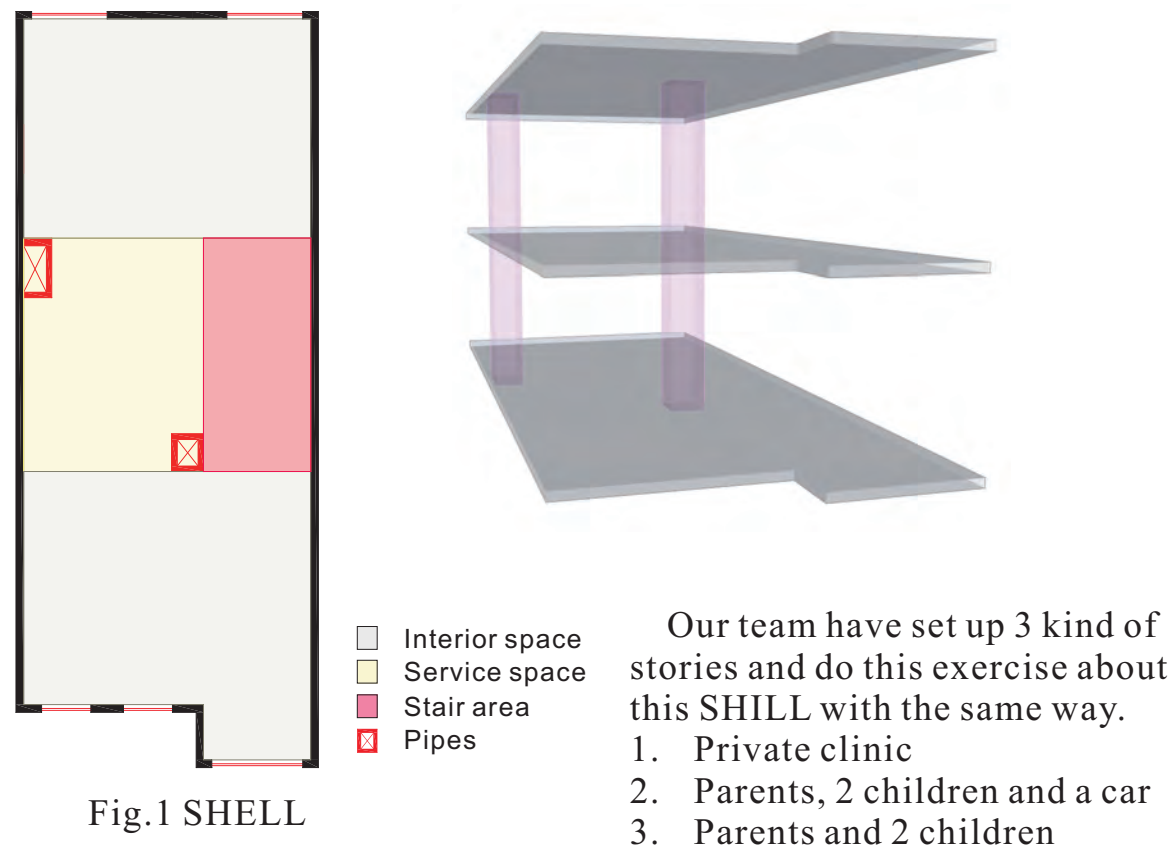


Fig.1 SHELL



In this practice, we have three plan spaces to be possible to use, therefore we coordinate make 1F are the commercial space, and others are two housing spaces, we attempt design the different plan to the plan and the pipe shaft which decides the position.

In this exercise we try to do different functions in this site. We set a dispensary in the first floor to make a family clinic, and set the restaurant in back of the house. There is a conversion of public and private from the family clinic, this scheme is interesting in the conversion. The first floor set for the public to use, there are larger space over the second floor. Let the function of those spaces to be open relatively, such as the living room. Some spaces have windows, and then put the bedroom in these space (Fig 2).



Fig 2. Three floor plan and pipes

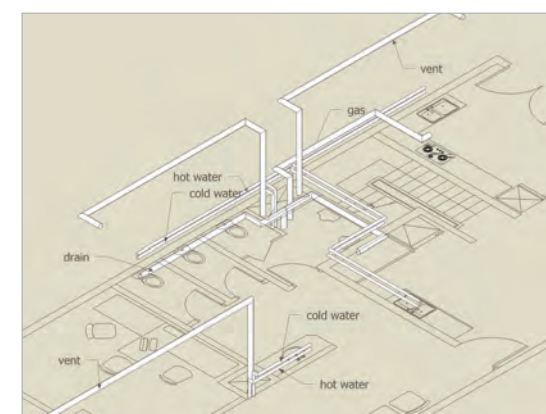


Fig 3. Pipe in the three-D diagram

We try to show the arrangement of every pipe in the three-D diagram (Fig 3). The diameter of the water pipe set 8 centimeters, drain pipe diameter sets 12 centimeters, and vent pipe diameter sets 6 centimeters. There is a trench between the pipe shell and another. It is easy to set each pipe. When set the pipe, no more than five turns as the principle, and limit the length in 10 meters.

This homework is mainly to practice planning the INFILL in the SHILL which support Open Building construction methods, include the relation that advances among the principles through one that is with pipeline, must observe the rationality of people to move.

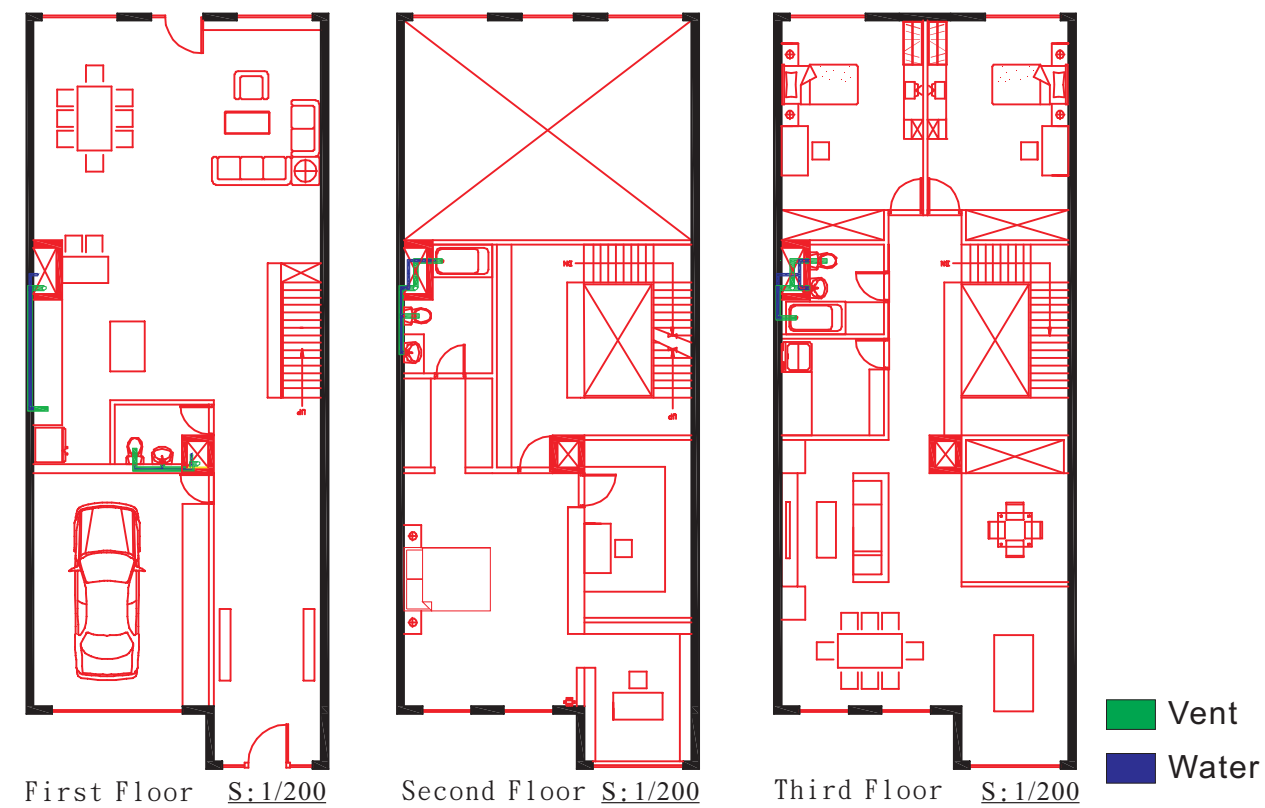


Fig 4. Three floor plan and pipes

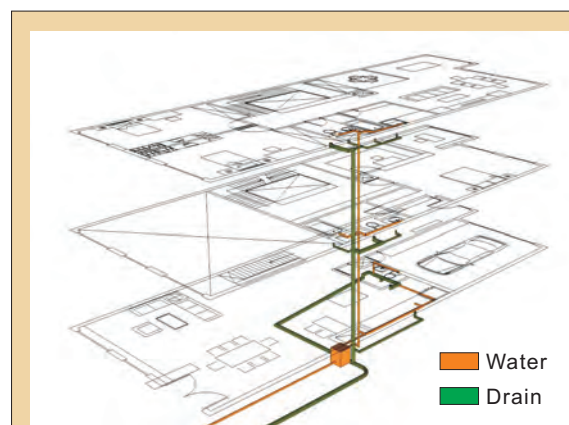


Fig 5. Pipes 3D diagram

I do this exercise by using the most common one at present of Taiwan the level pattern conduct of a signal house. The garage on the first floor, second floor with the master bedroom, the room of children and recreation room on the third floor.

Chen, Tsung-Yu

In slender townhouse plan, I cut the base three sections, then we dispose for the serves space and the skylight stair hall in among that section of base, 1f plan mainly for is near the street in a business area clothes shop and the working room, 2f plane for the parents room and the dining room and the living room, 3f plane are two child room, a guest room and the playroom.

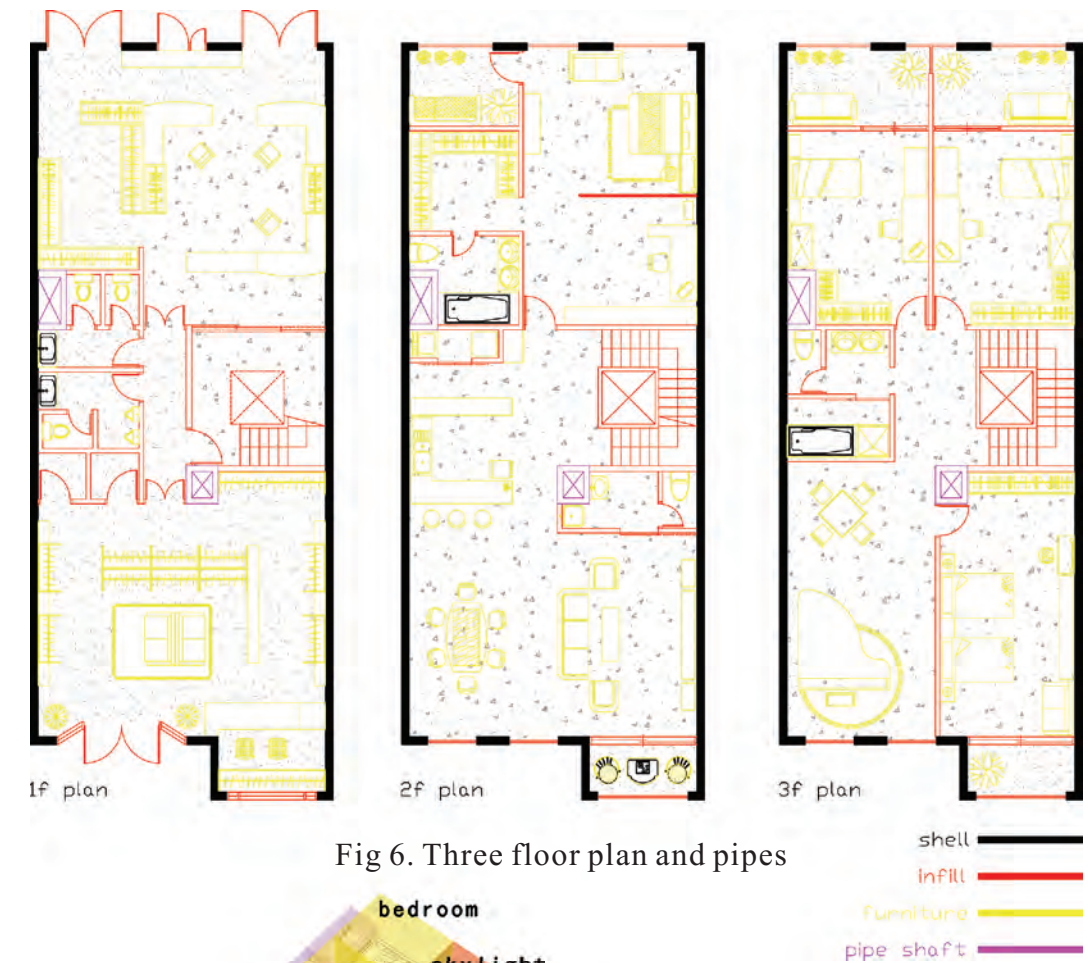


Fig 6. Three floor plan and pipes

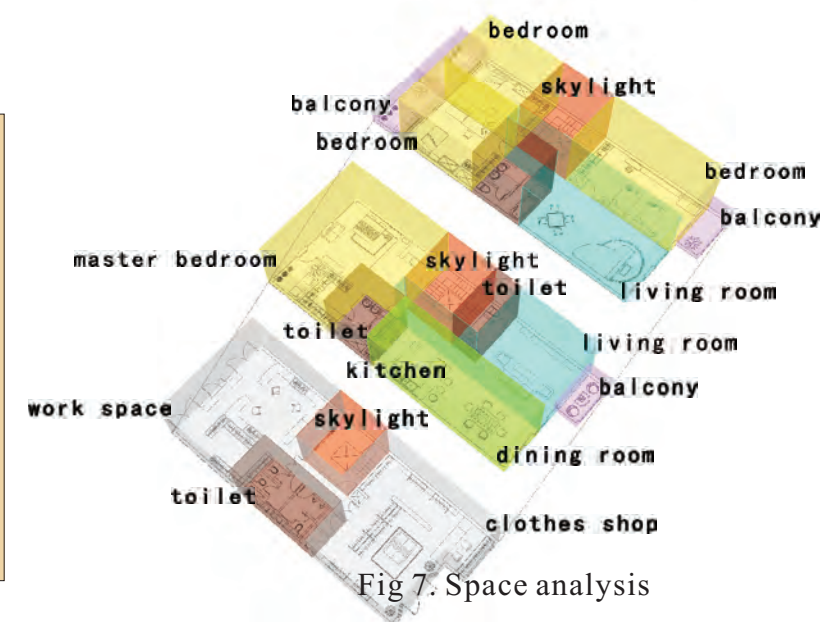


Fig 7. Space analysis

Ho, Wen-Chun



INFILL A TOWNHOUSE

INTRODUCTION

This exercise is designed to continue the study of capacity analysis.  
Capacity analysis is a method to evaluate what INFILL is possible in a BASE BUILDING.  
The SHELL has already been designed. We will assume it is being build in Taipei.

CONCEPT

We try to follow Taiwanese conventions and regulations as much as possible.  
Step 1: select a system- UT system.  
Step 2: make some layouts and discuss the religion space.

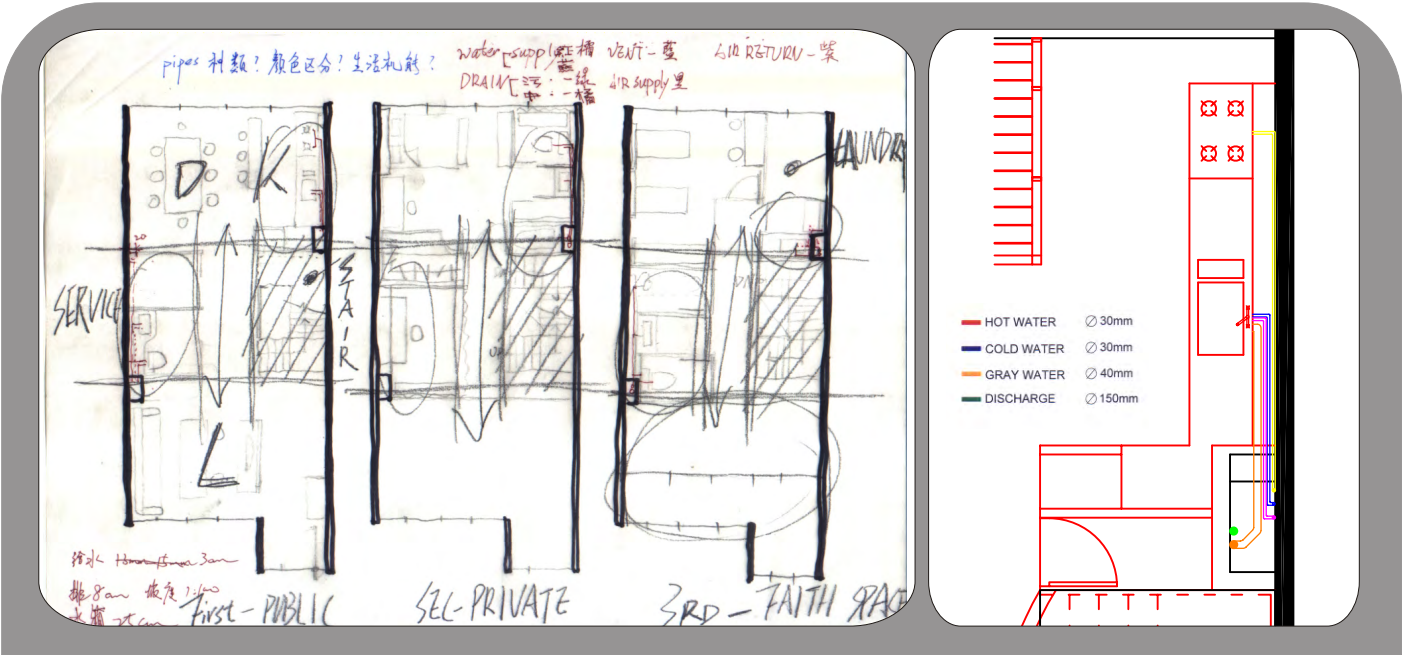
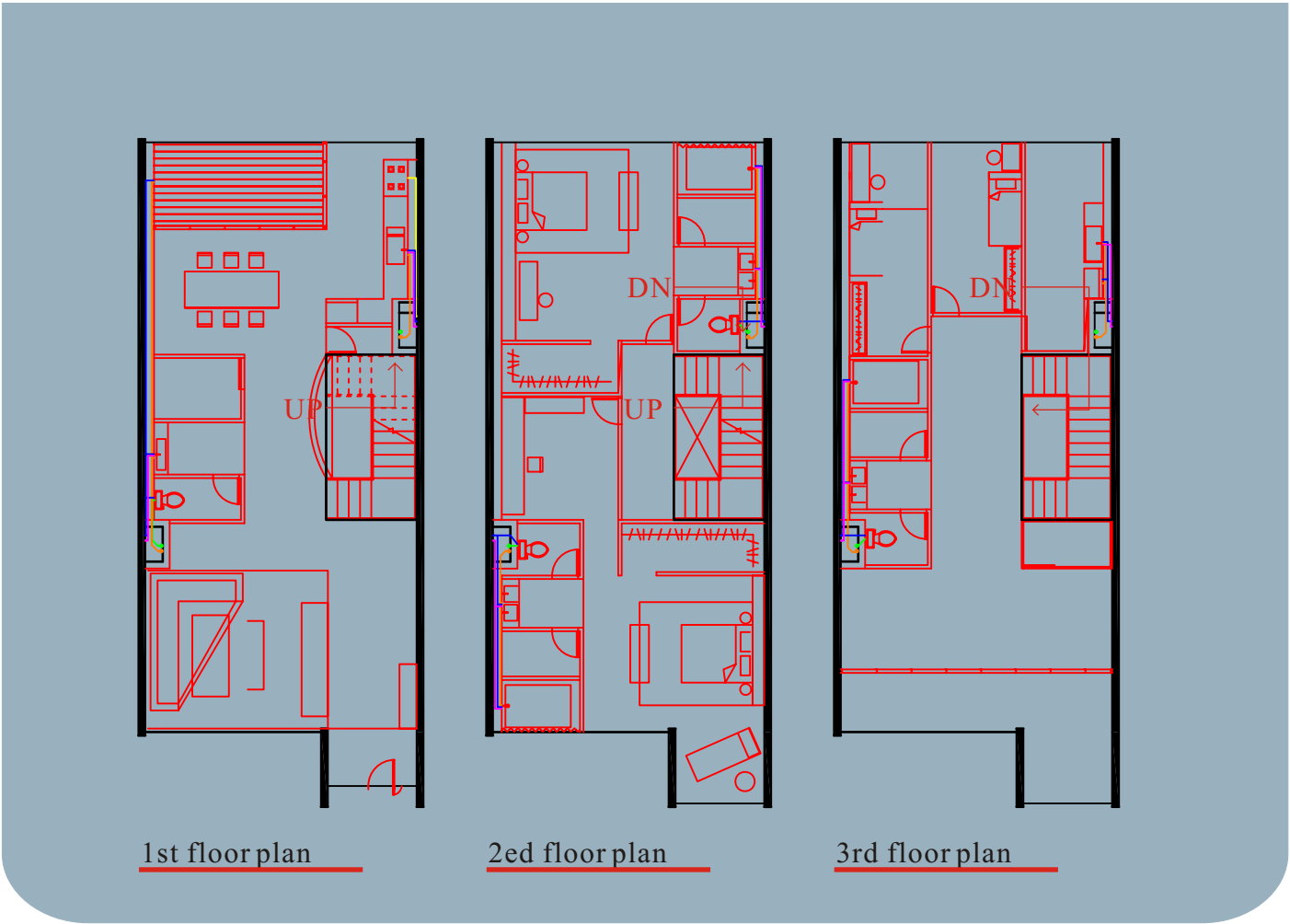


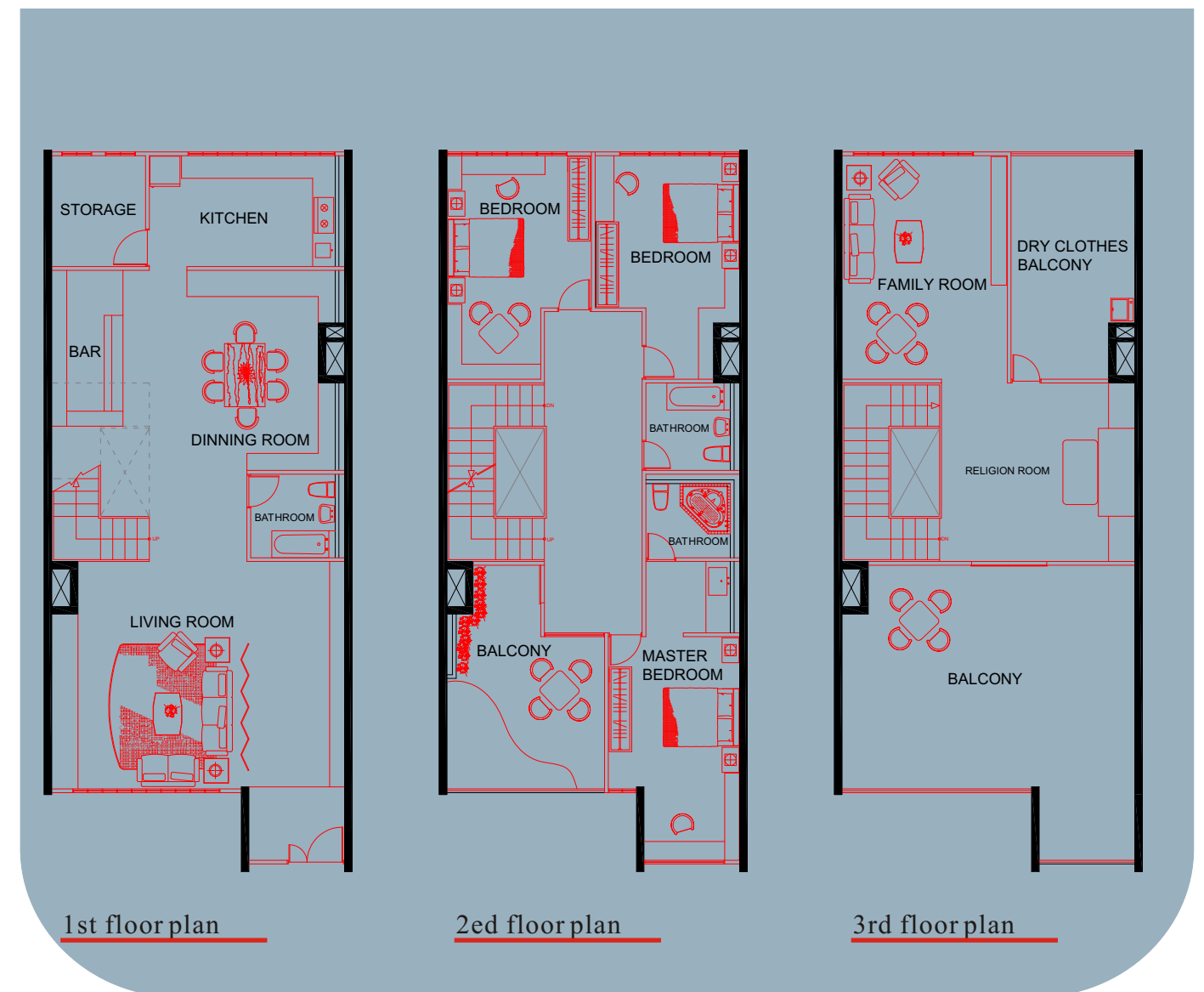
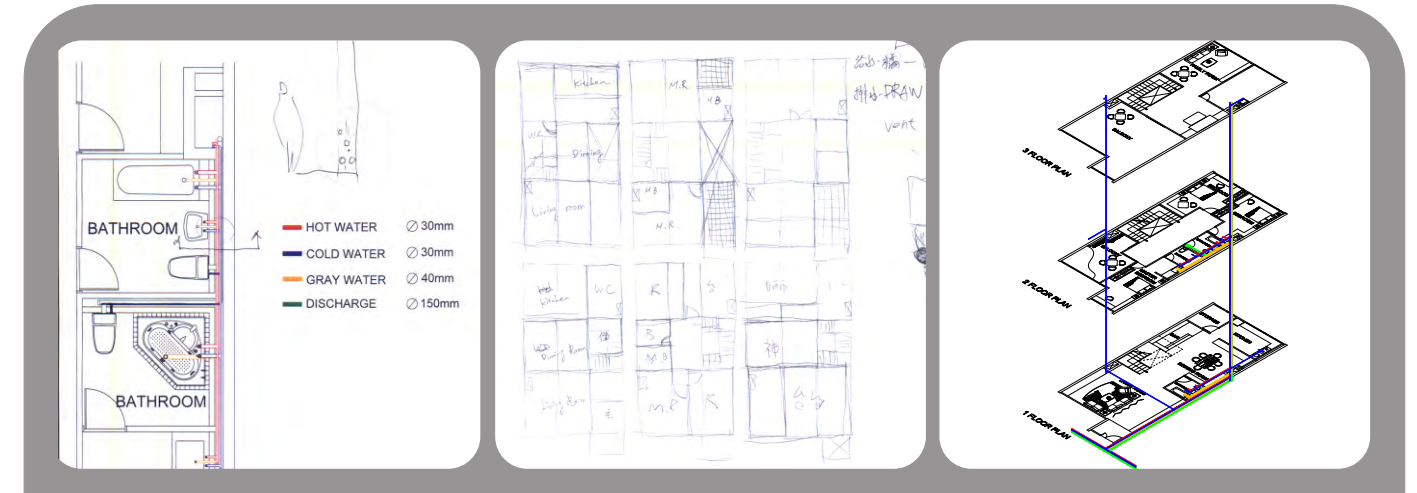
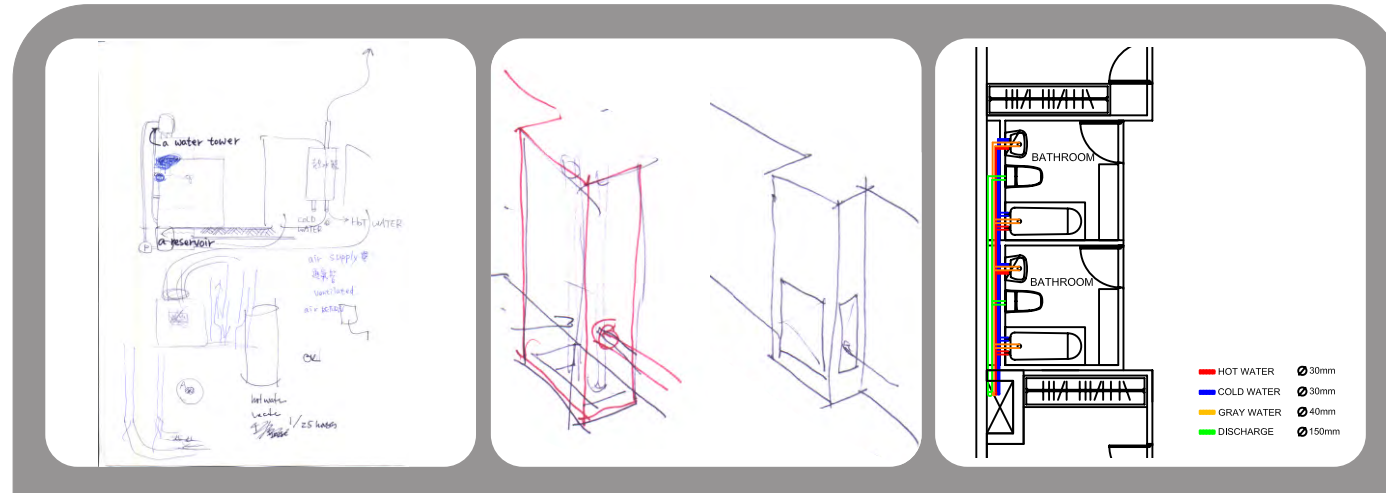
Figure : Unit Toilet



- 1. A top board
- 2. Askeleton
- 3. Pottery ironware
- 4. A front panel board
- 5. Pipe
- 6 Skirting board



Shih-Min Cheng, Shao-Hung Lo, Chih-Kai Hsiao



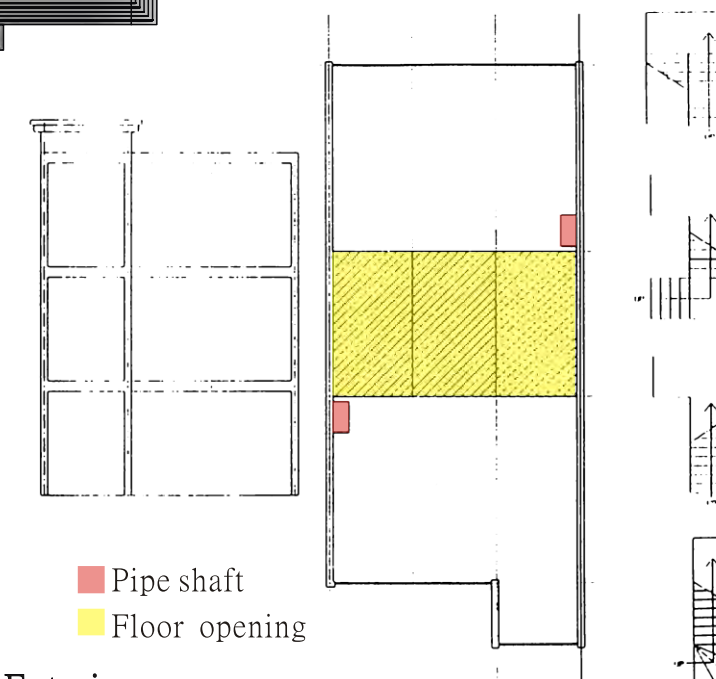


## INFILL A TOWNHOUSE

Design A



Shell / Base Building

**Exterior**

The exterior of the shell is a simple layout with six bays in which the panels are placed. Eleven foot floor to floor height provide plenty of room for deep floor cavities in which to place HVAC and other utilities.

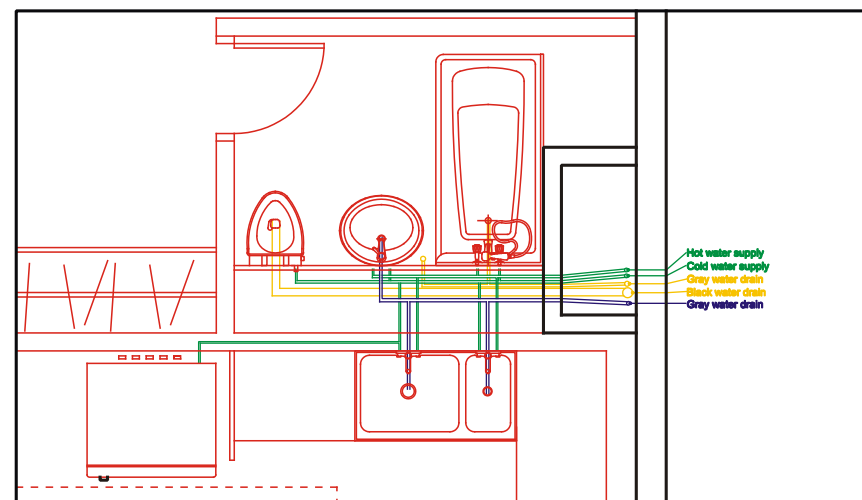
**Floor Plan**

The floor plate is divided into 3 bays both horizontally and vertically and has two mechanical chases in which all the HVAC, electrical, and data are run from floor to floor.

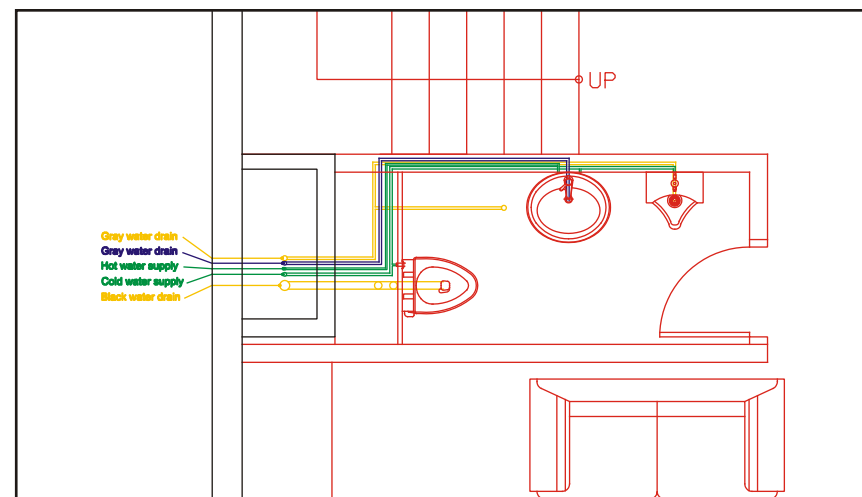
**Vertical Circulation**

With a constant size opening for the stairs there are a variety of options. Each of the four options can be placed in any of the three places.

- Upper piping zone
- Waterline zone
- Lower piping zone

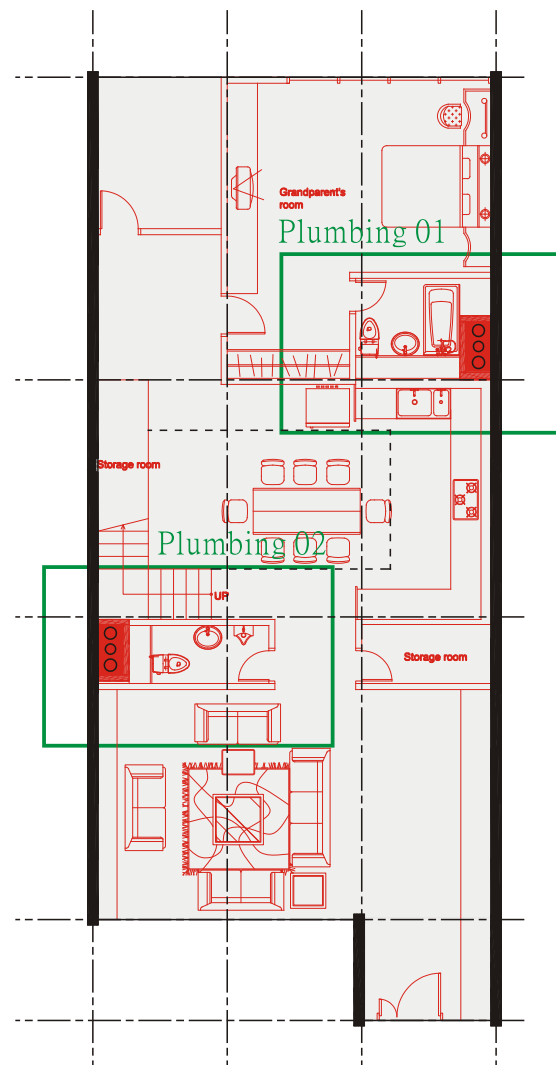


Plumbing A Detail  
Scale= 1:50

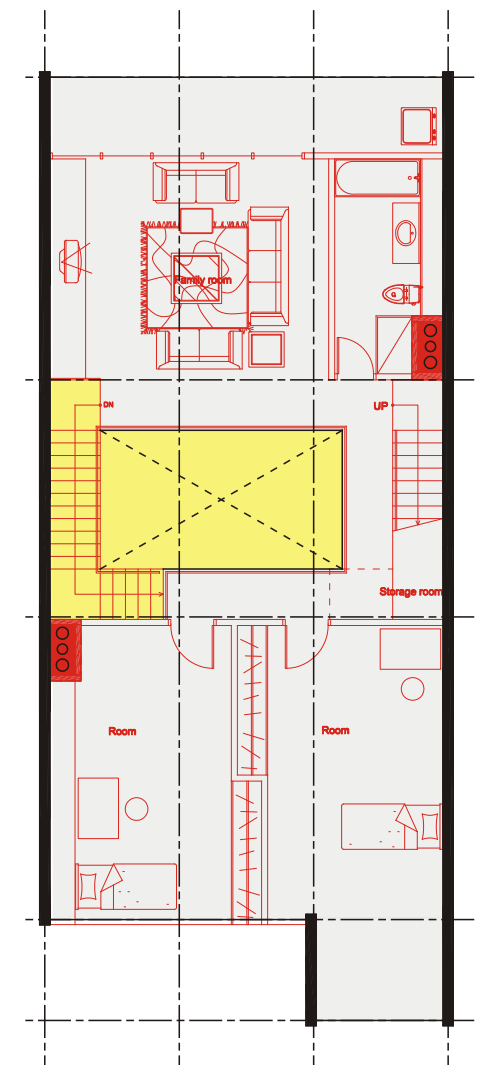


Plumbing B Detail  
Scale= 1:50

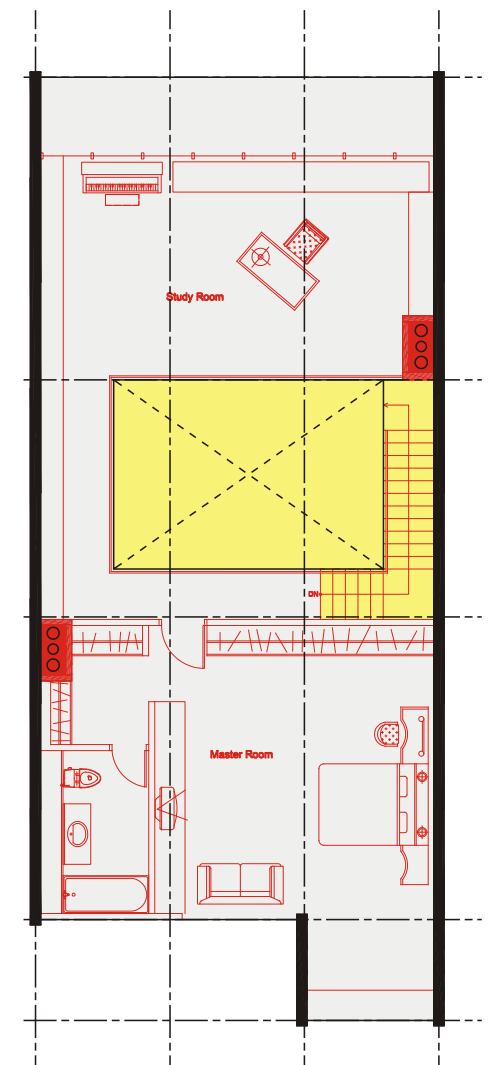
## Design B



1st floor plan  
Scale= 1:150



2nd floor plan  
Scale= 1:150



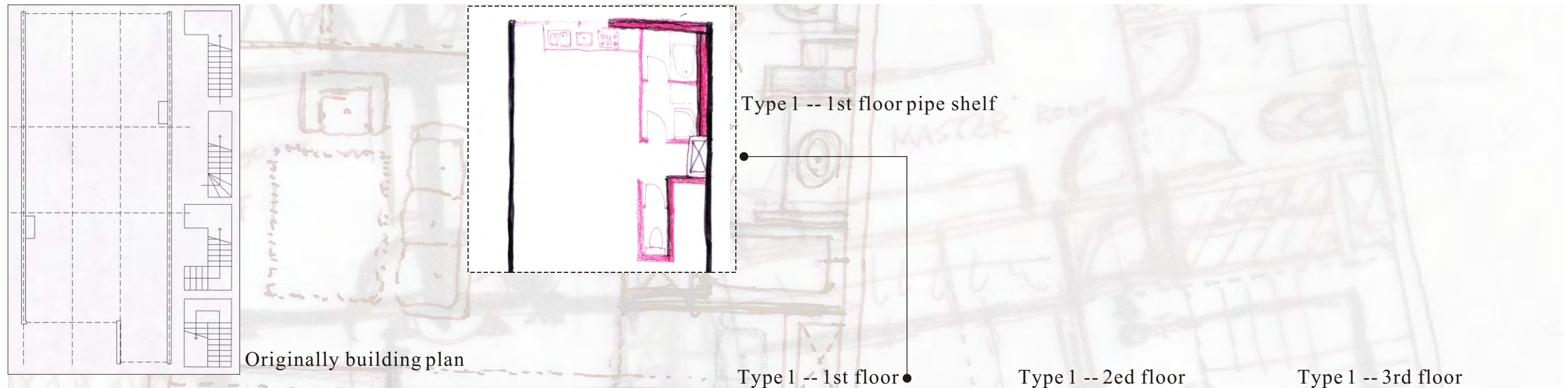
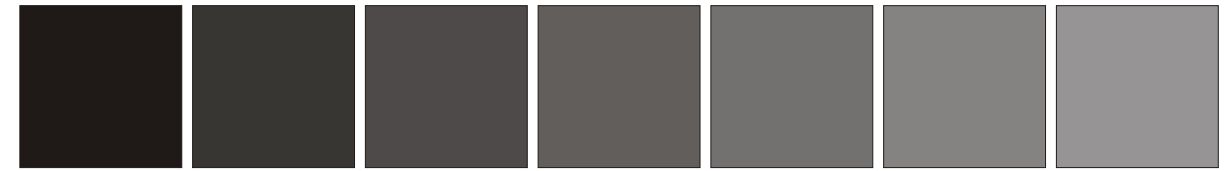
3rd floor plan  
Scale= 1:150

## Plumbing

We categorize piping into 3 zones by height: upper piping zone, waterline zone, and lower piping zone. The drain with higher height, such as drains of sinks in bathroom and kitchen, are located in upper piping zone. In the contrast, the drain with lower height are put in the lower piping zone, such as drains of bathtub, toilet, and urinal. The water supply includes hot and cold water pipes which are located in the waterline zone which with middle height. The drain in both upper and lower zones could be divided into black and gray water drains, if there is a water recycle system implement in the building that could reuse the gray water.



## INFILL ATOWNHOUSE

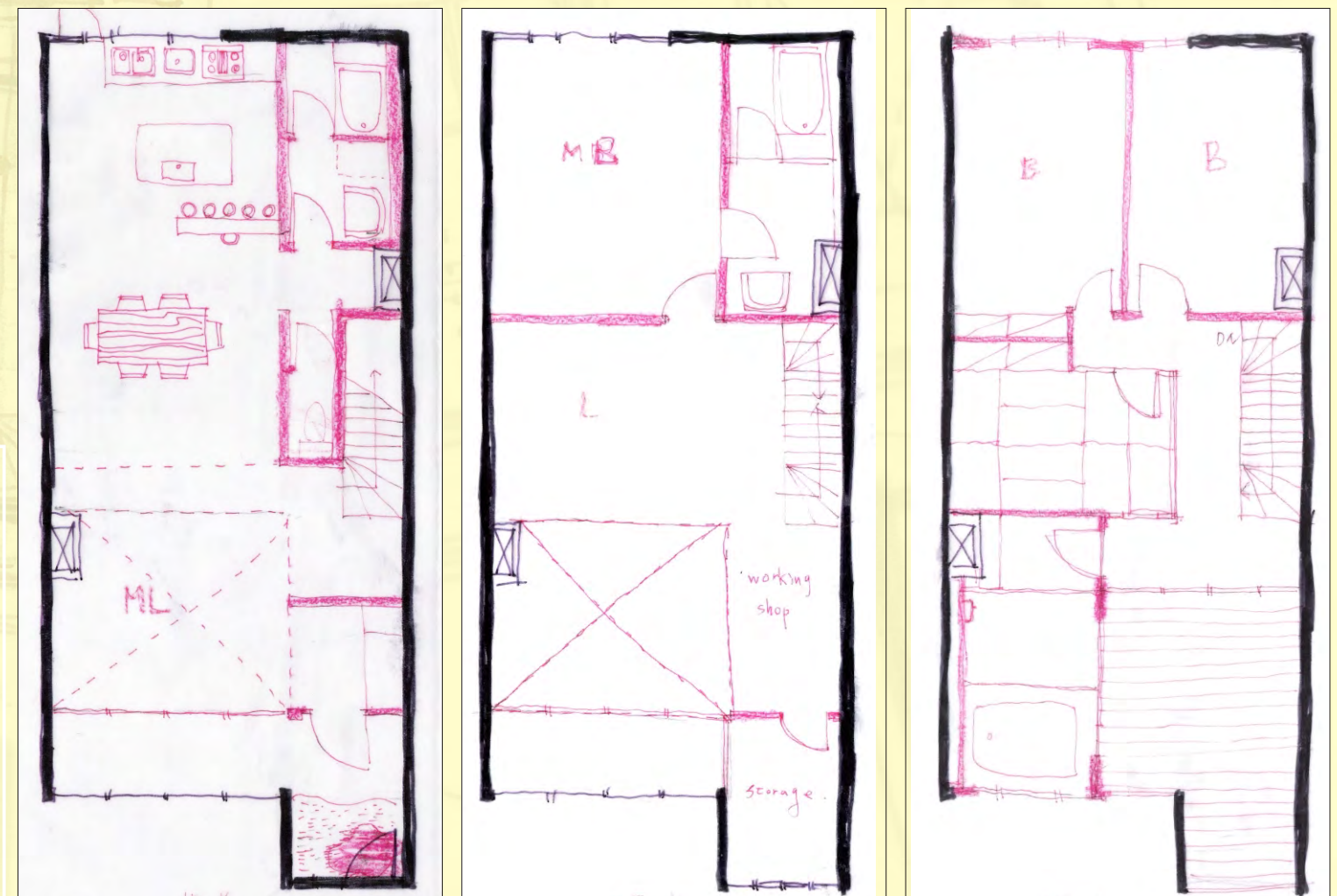


## Infill a Townhouse

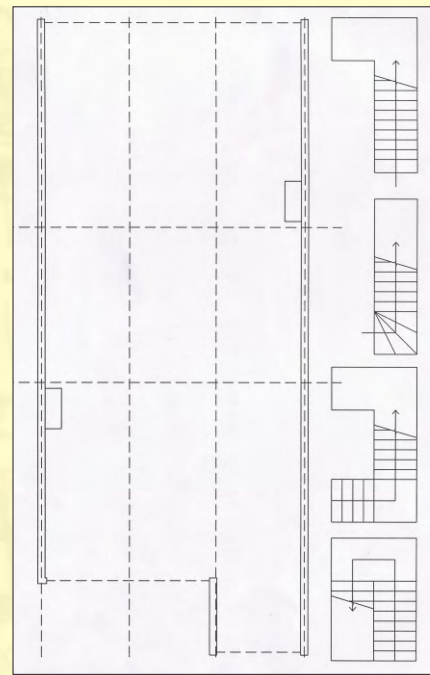
Study of "capacity analysis". Capacity analysis is a method to evaluate what INFILL is possible in a BASE BUILDING.

Use a townhouse "SHELL" designed by my students as an example. Please assume it is being build in Taipei!

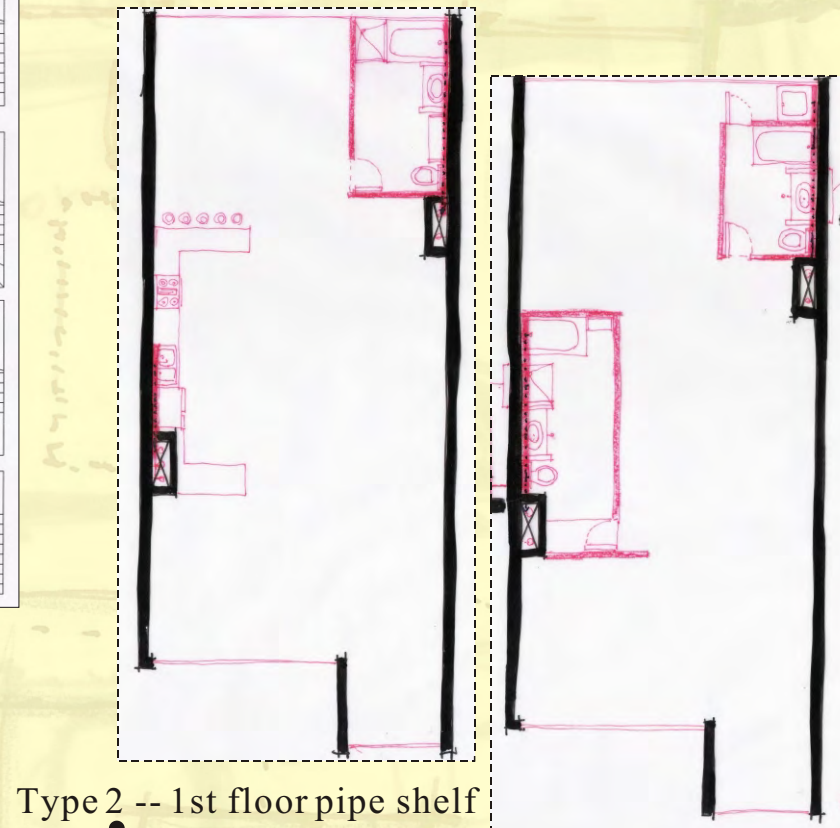
- KITCHEN
- BATHROOM
- ROOM







Originally building plan



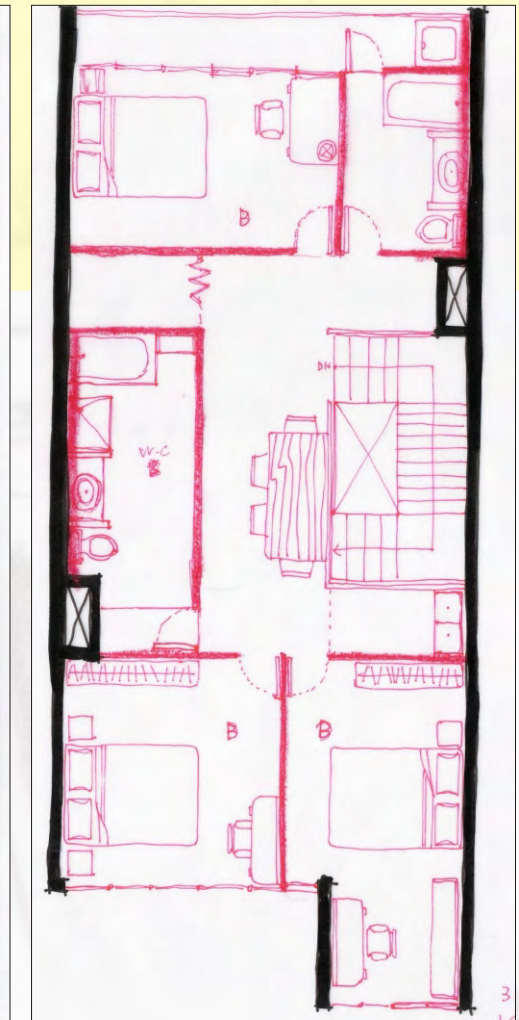
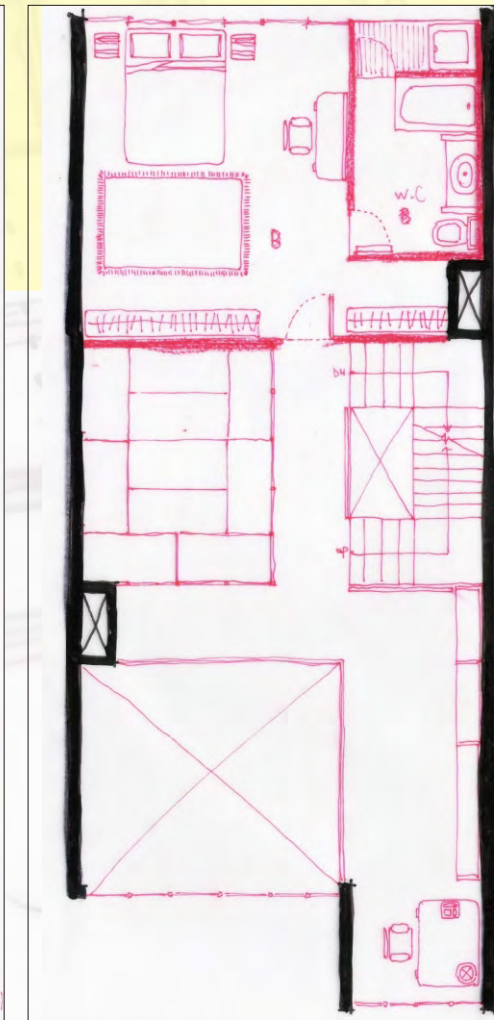
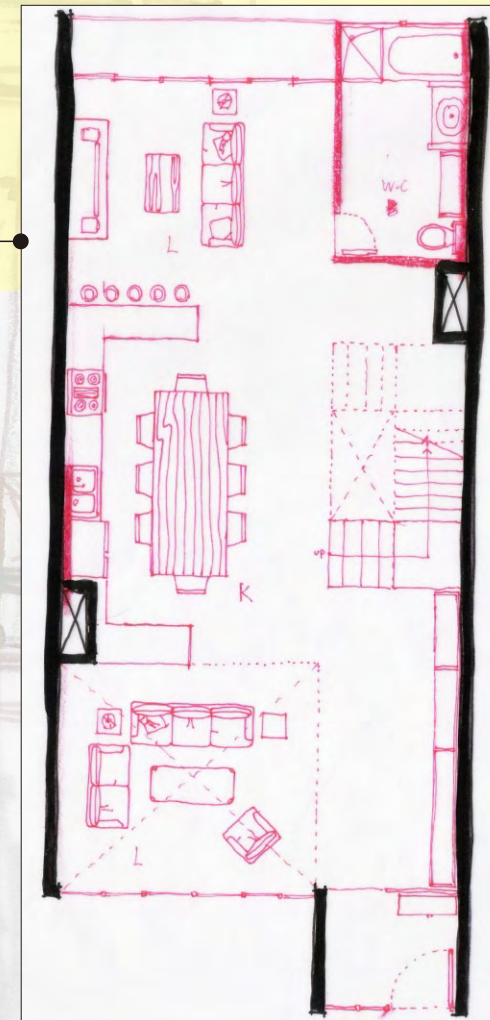
Type 2 -- 1st floor pipe shelf

Type 2 -- 3rd floor pipe shelf

Type 2 -- 1st floor

Type 2 -- 2ed floor

Type 2 -- 3rd floor



KITCHEN  
 BATHROOM  
 ROOM

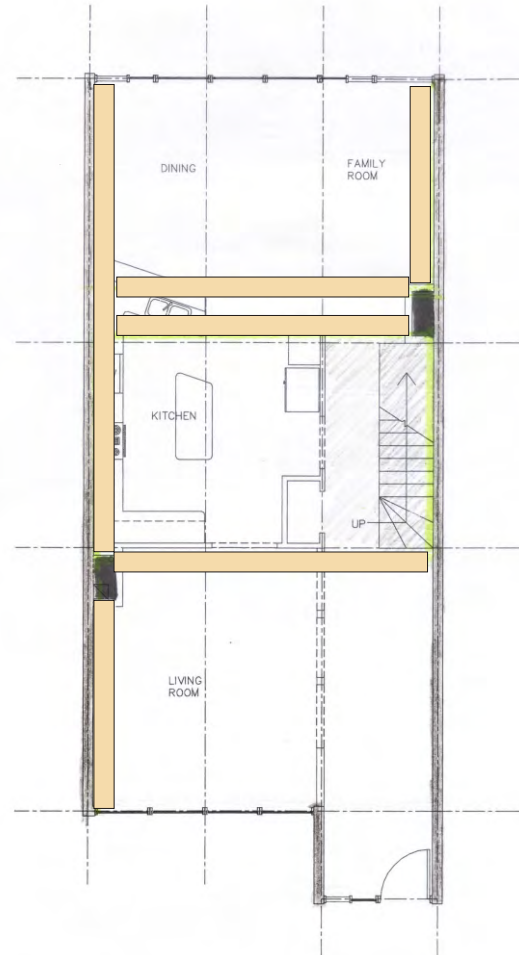




## INFILL TOWNHOUSE

## Work Discriptions

This building is a typical townhosue that also happened in Taiwan. Usually two to four floors. The dimention is large enough that two rooms can be easily arranged in the same facede. Considering the climat condition, this proposal wants to creat more shadows on the Facade, with balcony and terrace as more as possible.



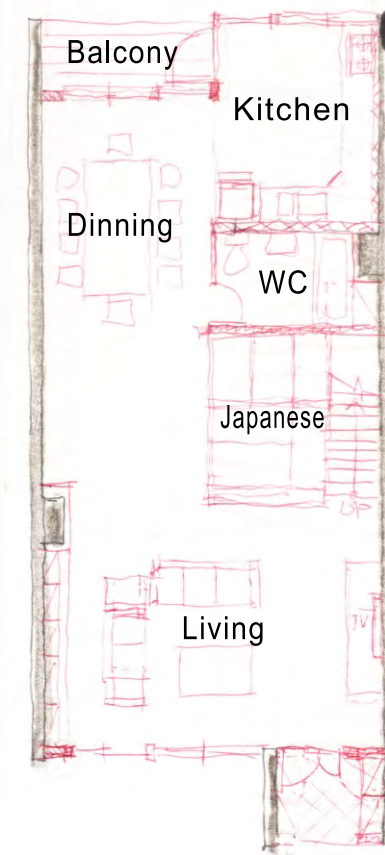
## Analysis

In the beginning the available ways for pipe system connecting to the shafts are marked up, as a restrain for layout of wet spaces such as kitchen, toilet, and planter in terrace.

## Proposal One

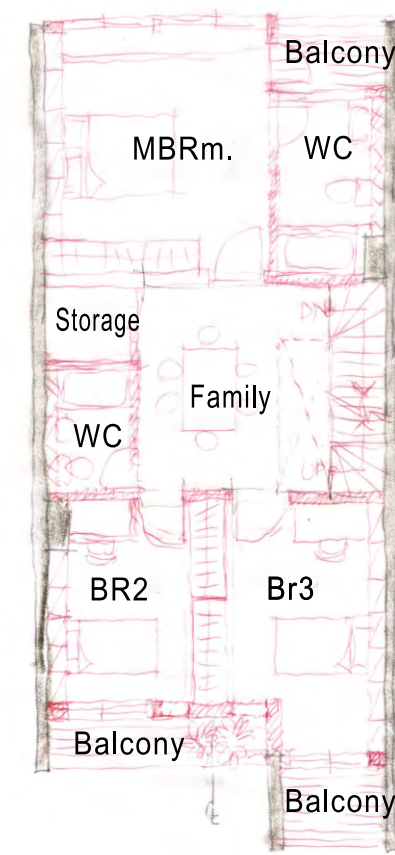
## 1st Floor Plan

Living, Dinning,  
Kitchen



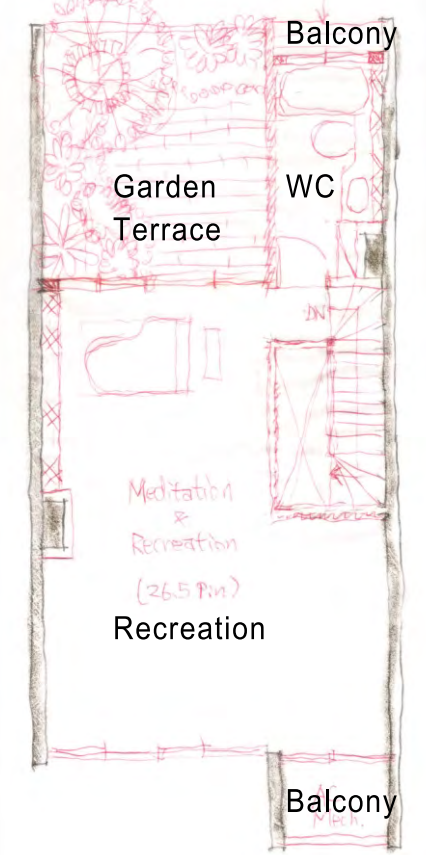
## 2nd Floor Plan

M BR, 2 SRm, 2Toilet  
Family, Storage



## 3rd Floor Plan

Recreation, Garden  
1 Toilet



As it used to be the spaces in 1st. Floor are public areas. It seems the floor area is too large for only those public usage, that developer in the market may want one bedroom to be arranged in. But considering only 8m width for each facede, and part of them have to reserve for kitchen, there have to be a dicission for space sharing the rest of natural light between dinning and bedroom. As a result we give up adding a bedroom, then add a spared room in Japanese style with retractable partitions.

Two bedrooms with 4m width for each with balcony sharing the front facede.

A shared closet is arranged as a dividing element between them.

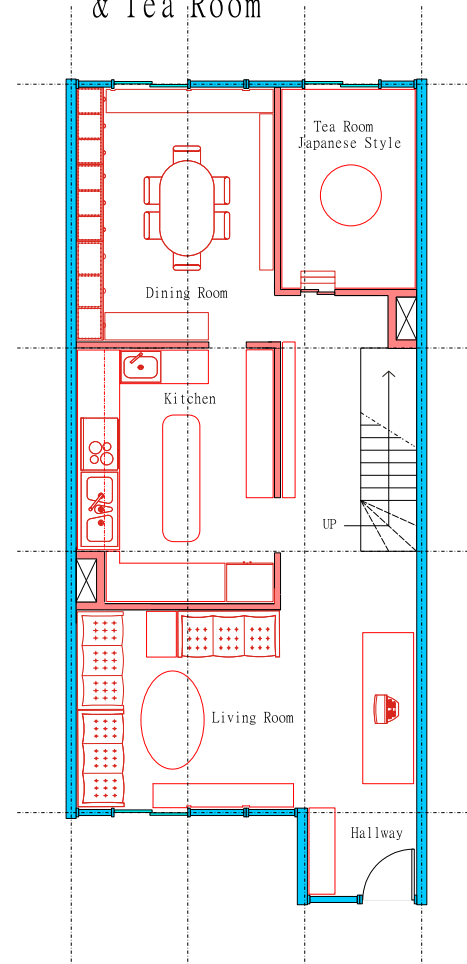
The master bedroom also have its own balcony, which let in air and light into its toilet, in which a wide-opened window is possible through the envelope by the balcony.

The 3rd. Floor is a recreation space for the family. The designer,s wish is to creat a free and transparent space in it, with garden terrace large enough for family party. A skylight is possible through design of the roof.

## Proposal Two

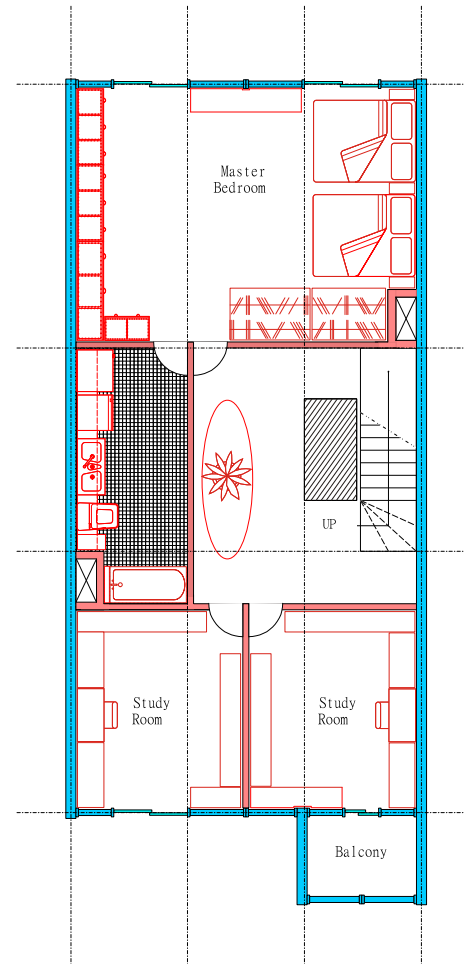
### 1st Floor Plan

Living, Dinning, Living,  
& Tea Room



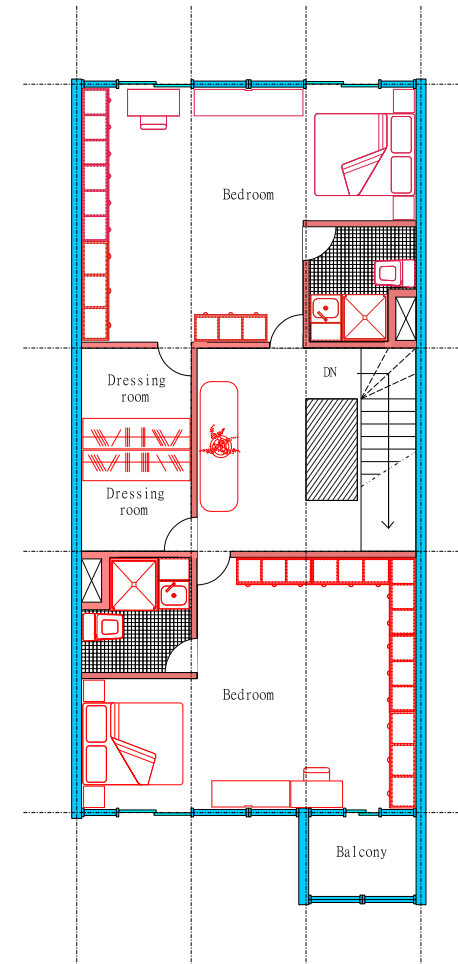
### 2nd Floor Plan

M BR, 2 SRm, 1 Toilet

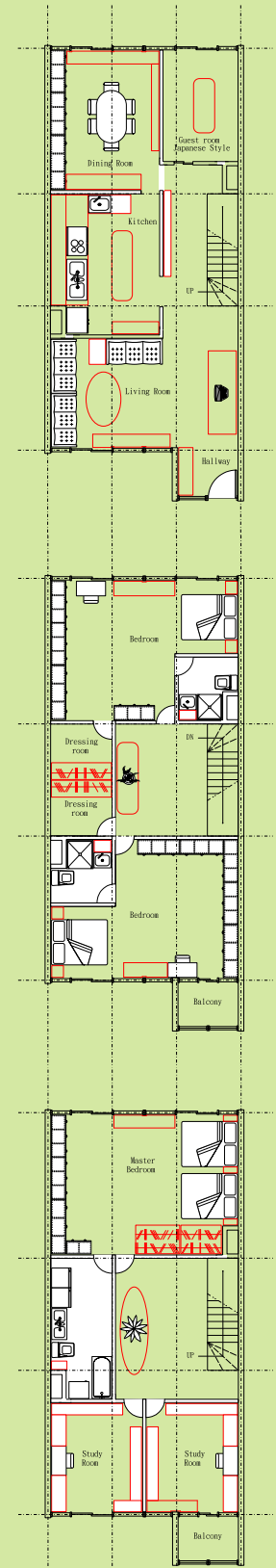


### 3rd Floor Plan

2 BR, 2 Toilets



## The Other Proposals



### Design Concepts:

1. The entrance for dining room and kitchen should be separated, to avoid disturbing.
2. The stairs zone should be thought about the ambient light, and be designed opening on the second floors and third floor.
3. To keep the balcony for shining the coverlet and clothing.
4. Thinking the ambient light and ventilate.
5. Using a lot of bookcases, large store boxes and large wardrobe to keep the rooms look like clean and neat.
6. If the couples work on college, then each other need own study room for research, to avoid disturbing each other.
7. Tea room, designing opening, is near to the pipe shaft location. If need, it can add a bathroom for visitors or families.
8. For convenience and privacy, the master bedroom is on the second floor.
9. The activity, children better than parent, the children room is on the third floor.
10. The simple feng-shui rules have been thought over.



## THIRD OB EXERCISE: JULY 12<sup>th</sup>

### TRANSFORMING AN EXISTING BASE(RIGID) BUILDING INTO A RESIDENTIAL OPEN BUILDING

## THIRD OB EXERCISE: JULY 12<sup>th</sup>

You have learned how to prepare one dwelling space in a conversion project to make it more open, by carefully positioning a pipe shaft. You have also worked with a townhouse to understand its typology in terms of open building principles.

In this exercise, five teams will work with one existing mixed use building in Taipei. Six teams will work with another mixed use building. The purpose is to learn now to adjust them, with as little change as possible, to increase their capacity for accommodating variety.

For the sake of the exercise, we are assuming that a developer has hired an architect, who designed the building you have to work with. After the design is finished, but before construction began, the developer learned about open building, and how this way of building could give her added decision flexibility and could allow her to compete more successfully in the market. So she asked her architect to redesign the building but to waste no time and to make as few changes as possible to save time and money. You are the architect! What would you do to adjust the building to make it more open?

### I want you to:

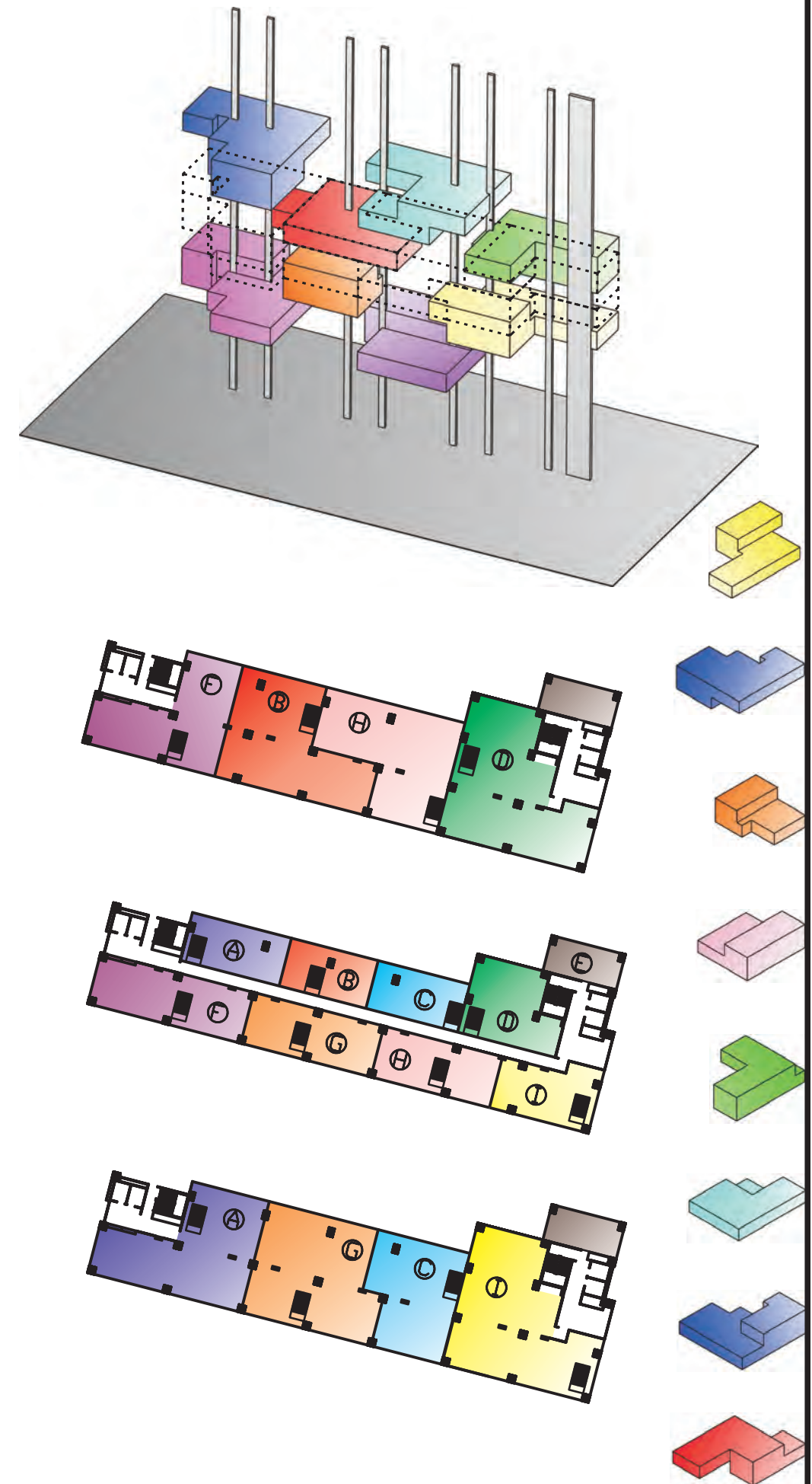
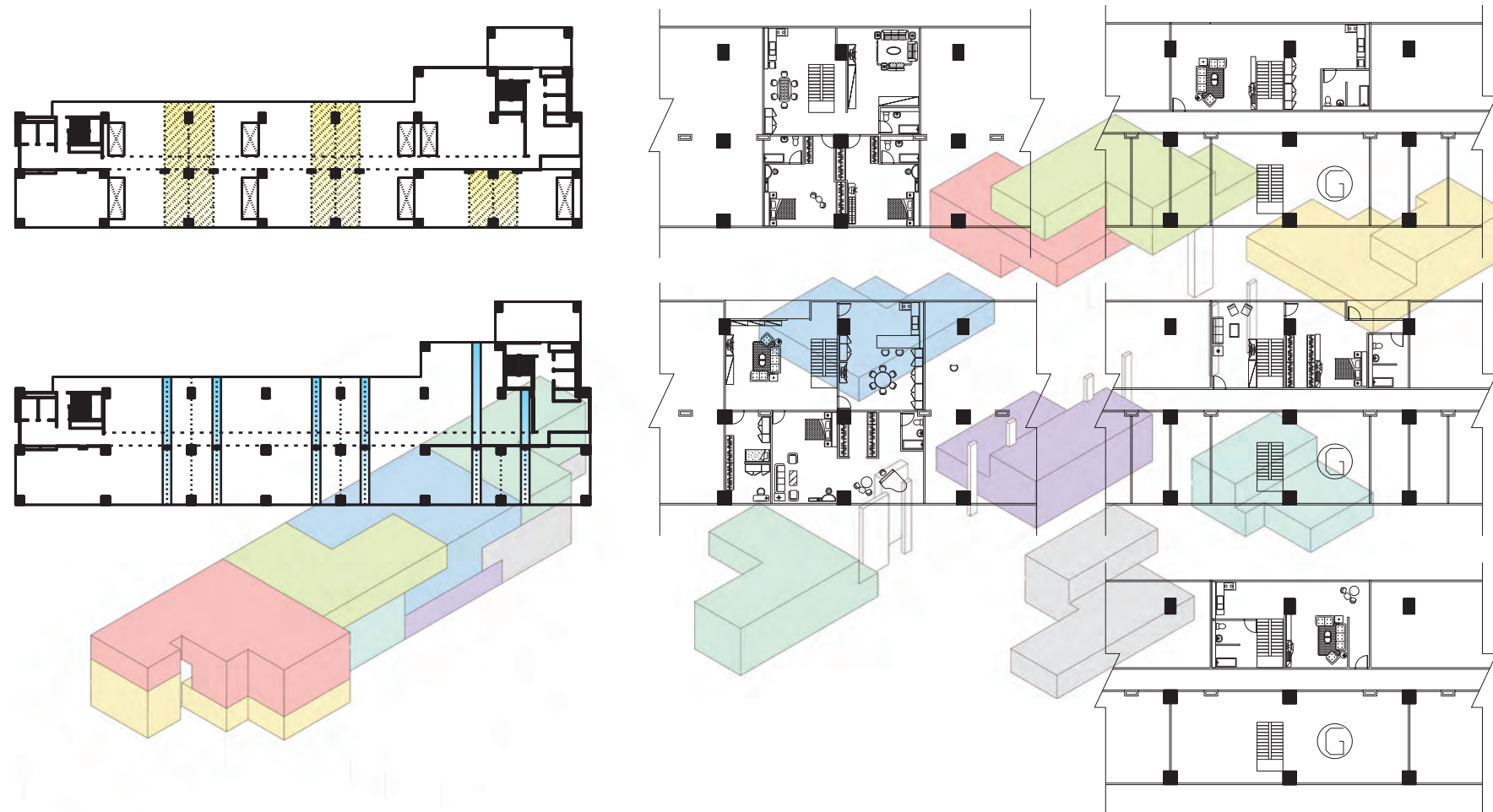
1. Use principles learned so far to transform this building's base building (which is designed for only one set of floor plans) into an OPEN BUILDING.
2. Follow Taiwanese standards for living.
3. Change AS LITTLE AS POSSIBLE to increase this building's capacity to accommodate individual family preferences. (I suggest that the vertical pipe shafts are perhaps the only things needing to be adjusted).
4. DO NOT CHANGE THE FAÇADE or STRUCTURE or FIRE ESCAPE SYSTEM.
5. Show ALTERNATIVE UNIT SIZES on a given floor level, and for several such units, SHOW ALTERNATIVE INFILL You may want to make some floors into duplex dwellings, for example, or create double-height spaces on a few floors to make special units.
6. Show one whole building axonometric drawing showing the new VERTICAL PIPE SHAFTS.

## Transforming an existing base(rigid) building into A RESIDENTIAL OPEN BUILDING

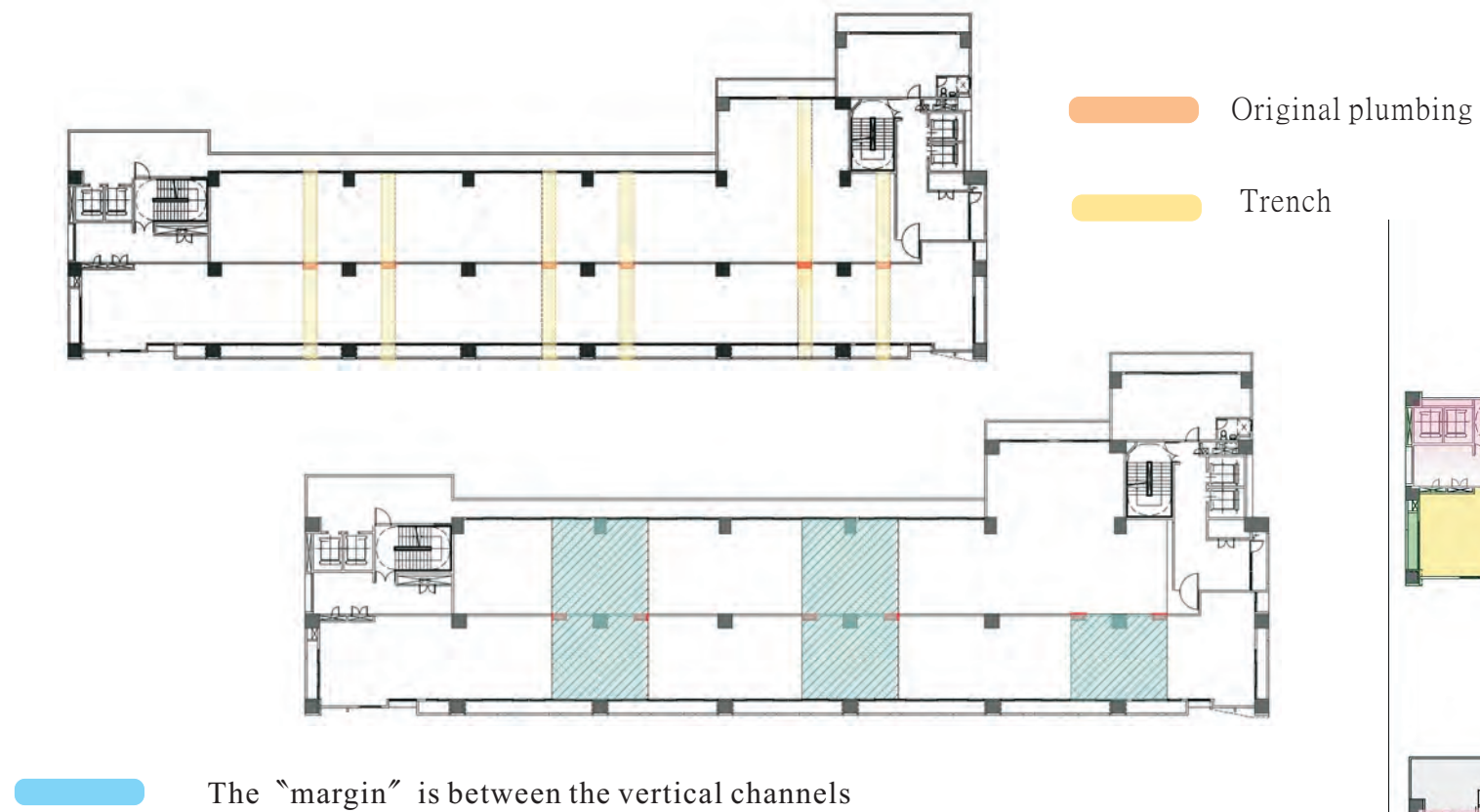
## Summary

The building is on the Gongguan MRT station. It combines rail system, store, office, and small room for single person.  
 We tried to change as little as possible to increase this building's capacity to accommodate individual family preferences.  
 Usually a long floor layout needs a long hall to connect each space, especially in a narrow and long space.

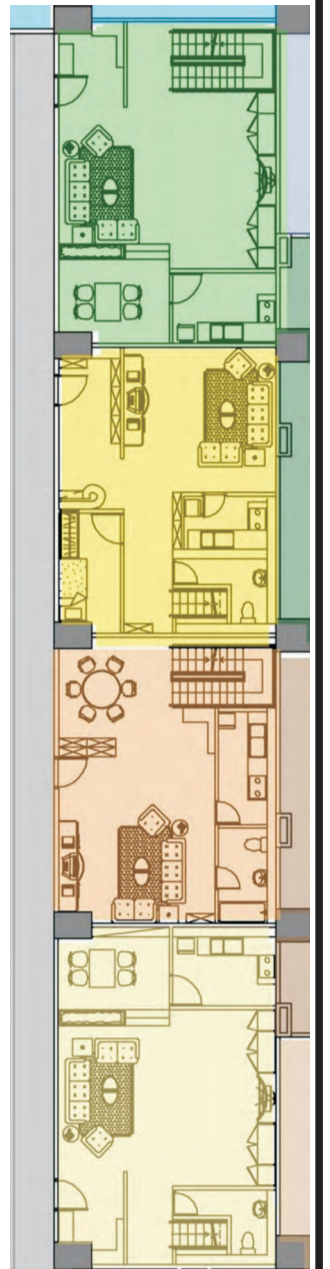
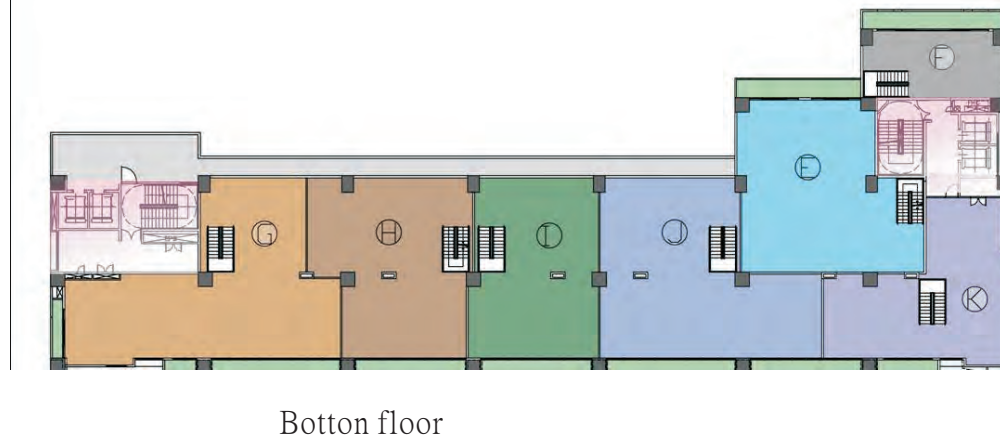
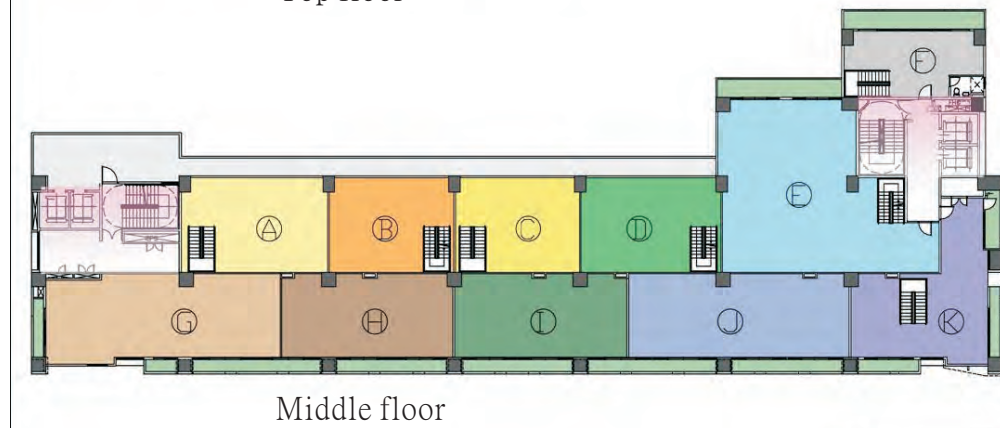
The narrow and long space makes the house too deep, and the width small.  
 In order to solve this problem, we combined three floors to one unit.  
 We used this concept to put the long hall in the middle floor, and occupants can get in their house in the middle floor, then they can go up or down to another floor.  
 It also can make every unit have two sides of windows at least.







We tried to change as little as possible to increase this building's capacity to accommodate individual family preferences. We didn't move the channels' position, it's better to try original one. The "margin" is between the vertical channels. In the margin area, we can put individual wall flexible. The purpose to let margin between channels is because the units near by can use the same channel. You can put individual in any place to fit different using in margin zone. In this exercise, we still use the three floors become one unit's concept. But we try to put the long hall in different way. We use the original layout's balconies become a long hall. The trench (horizon channel), can provide a place to pipes from side to another side. The plumbing (vertical channel) can service right away through floors.





## EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT

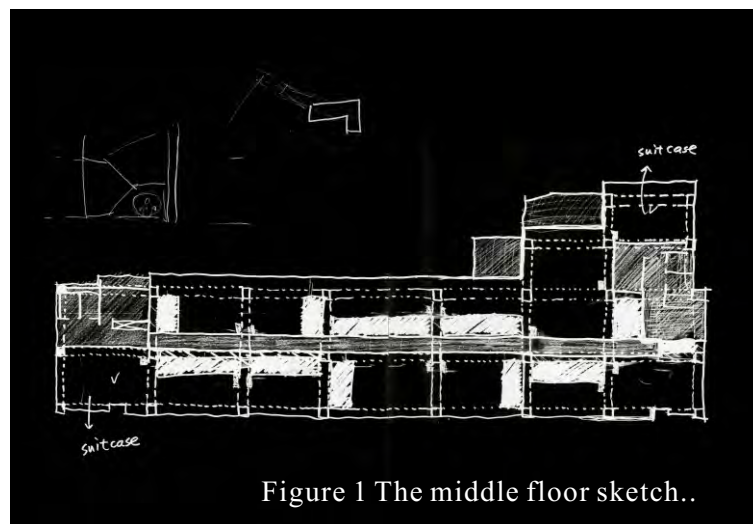


Figure 1 The middle floor sketch..

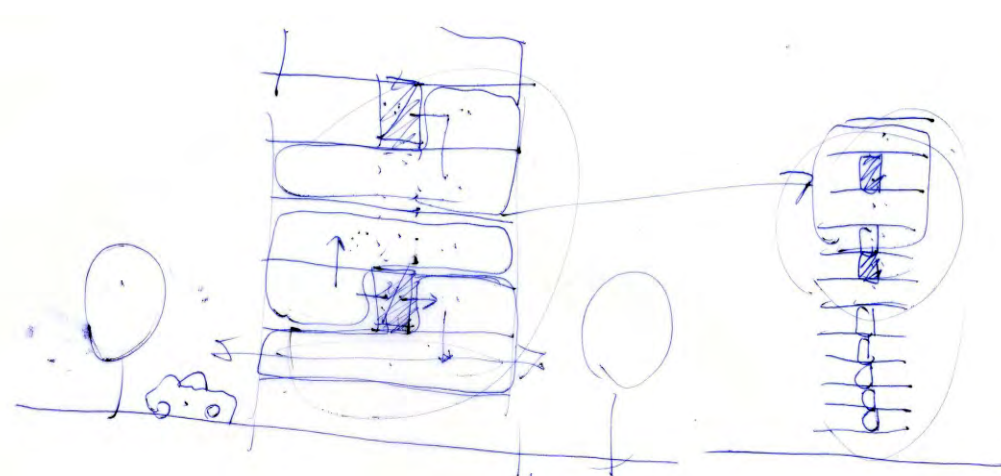


Figure 3 The sketch of building section drawn by Prof. Kendall.

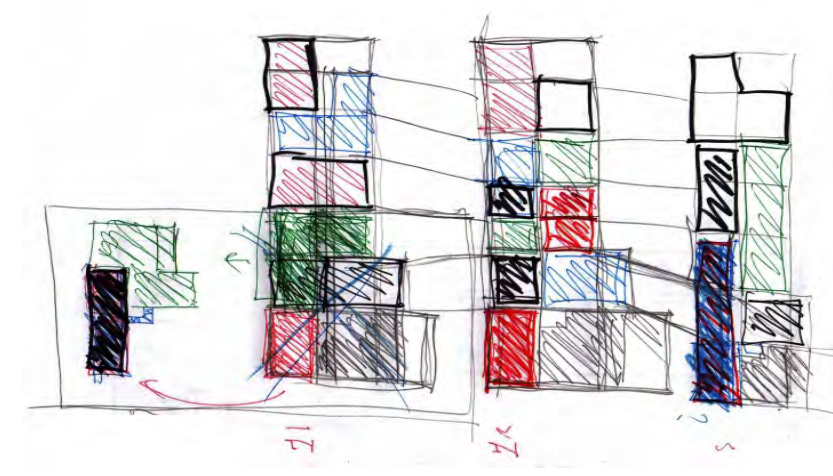


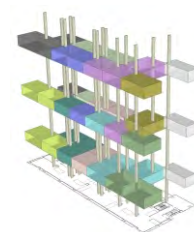
Figure 4 The sketch is describing the composition thinking.

**F**or renovating a new building, we should think differently. As an architect, we should think more to offer the owners special space experience, such as expending threshold. Our team was assigned to transform a building above MRT station into multifunction usage. Actually, this building originally was designed for offices, now we should design for housing. Reclassifying the space would be a good way. It not only can enlarge the space, but also can easily be changed to respond to the customers requirement. Under the situation, we developed three composition answers. They would be picked up by the developer. So finishing reclassifying the floors section, we rearranged the pipe shafts and stair openings. As usual, we will show two possible solutions at the end.

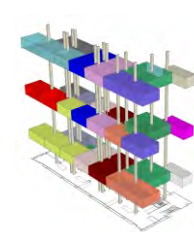


Figure 2 Pipe shafts and stair openings location.

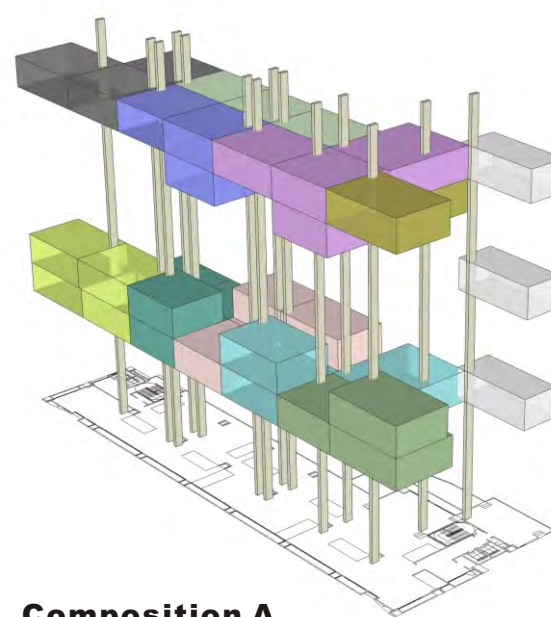
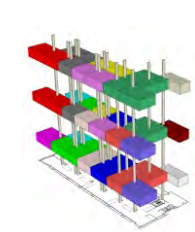
**W**e regarded three floors as one pile. People can upstairs or downstairs from the middle floor.



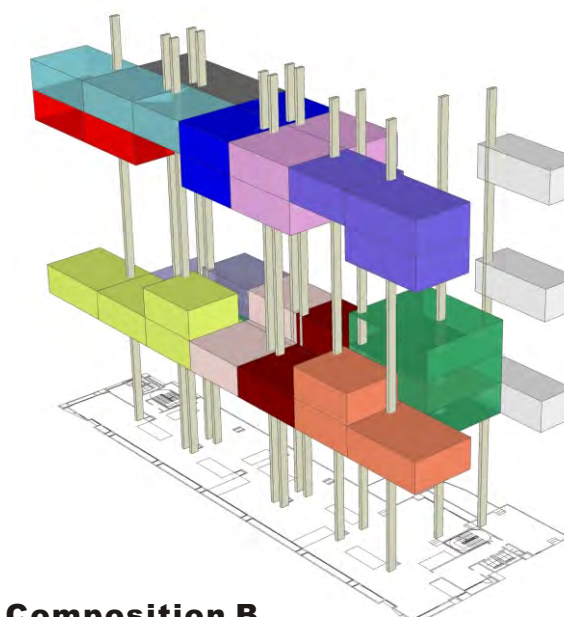
**F**ollowing OB principals, we struggled to avoid putting pipe shafts and stair openings under ALL beams.



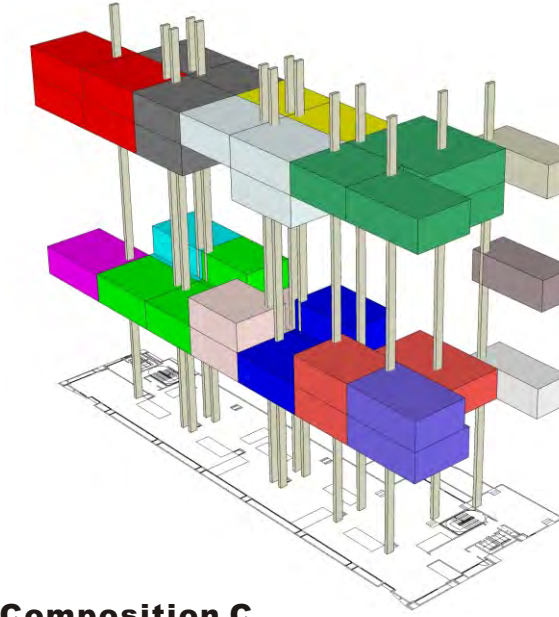
**T**he apartment which is in GRAY is A type. We used this prototype to deliberate our intention.



Composition A



Composition B



Composition C

Figure 5 The three different composition way distributed by KoYang Lin and GenHan Lee.



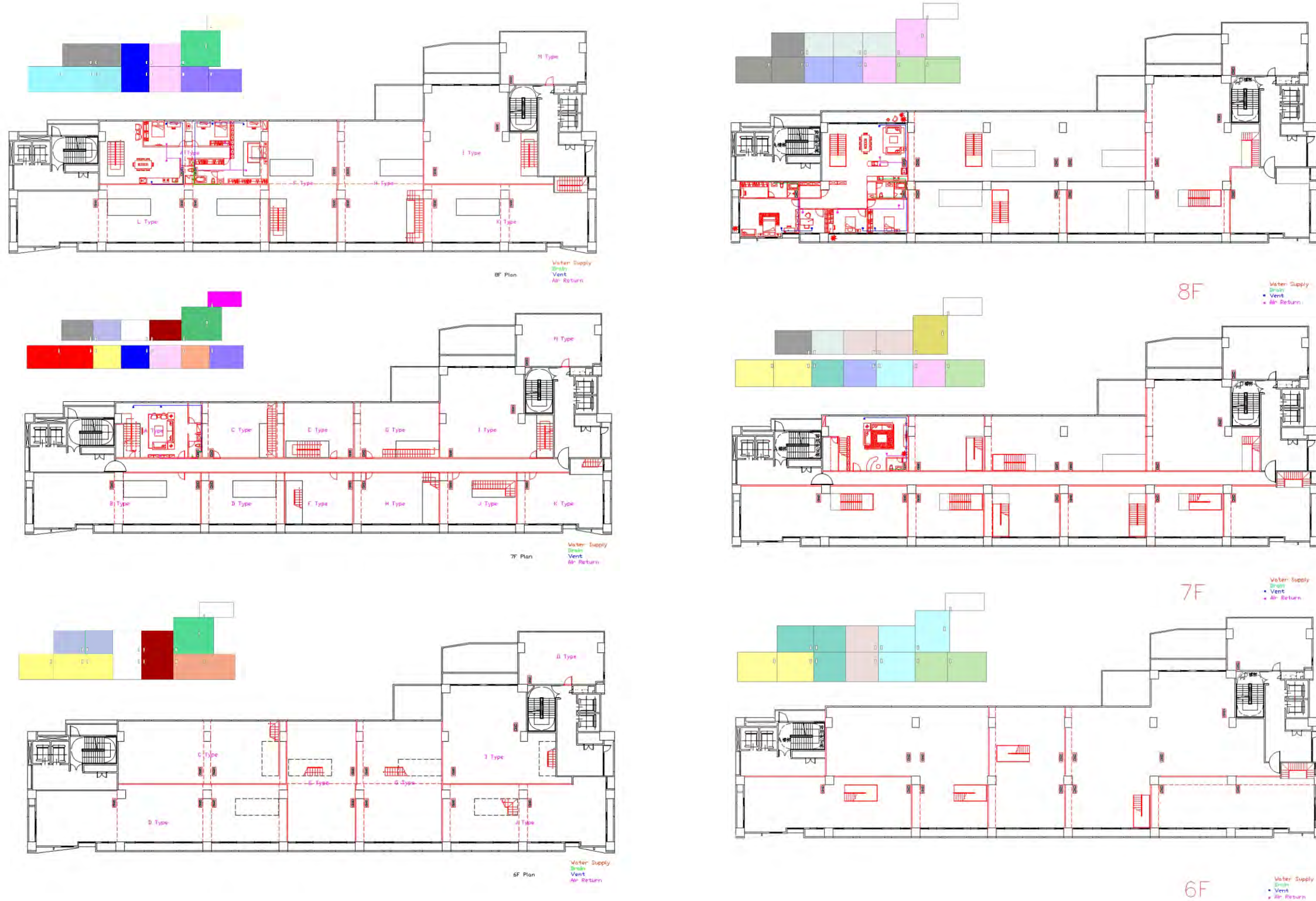


Figure 6 The left is composition #B designed by KoYang Lin, and the right is #A designed by GenHan Lee.

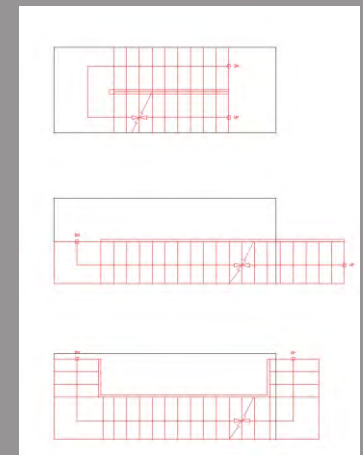
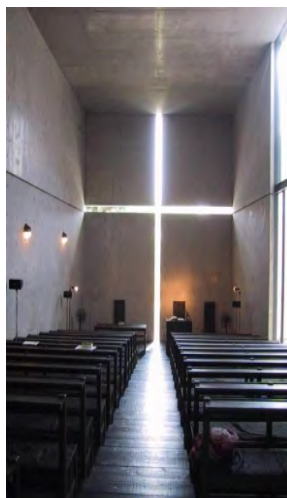
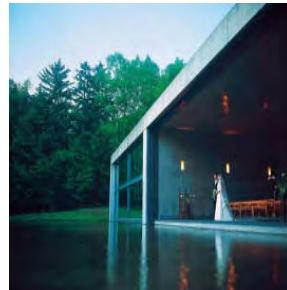


Figure 7 Three stair types.

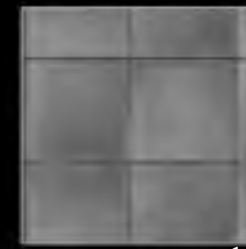
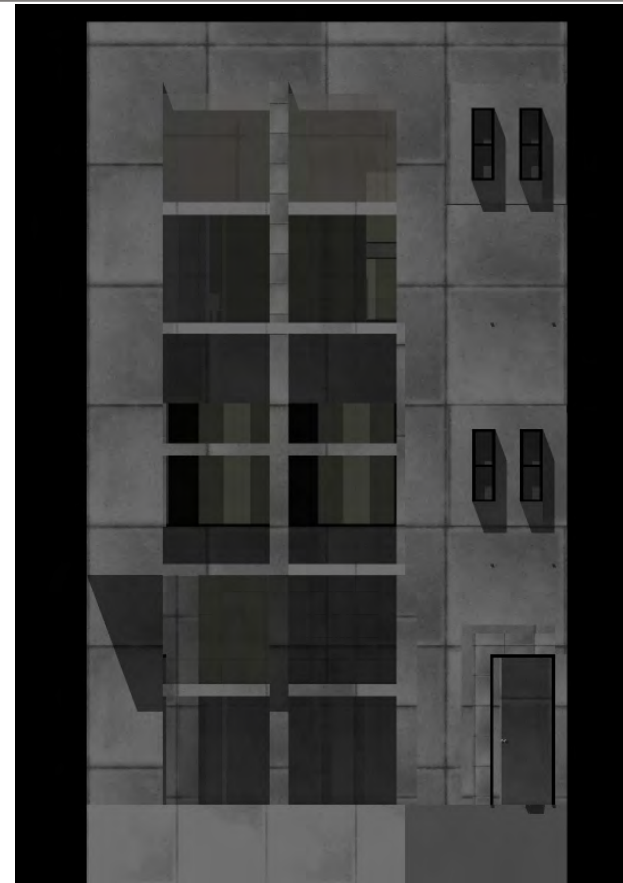
After setting up the pipe shaft location, we started to explore unit and plan variants. Finally, we made two different plans. At the same apartment - Type A, we tried to develop two dissimilar interior ideas. Like the exercise two, we decided which kind of stair we want to use. From the above Figure 7, we designed three different stair types that allow the buyers to decide which one they prefer. As the result, we presented these two plans.



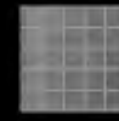
## FACADE KIT OF PARTS

TADAO ANDO  
imitateThree basic  
element  
of Andos design

- 1.cross
- 2.originally of its material(concrete wood)
- 3.the shape is clean and easy



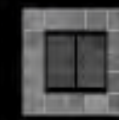
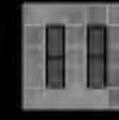
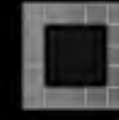
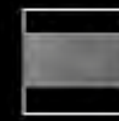
exposed form



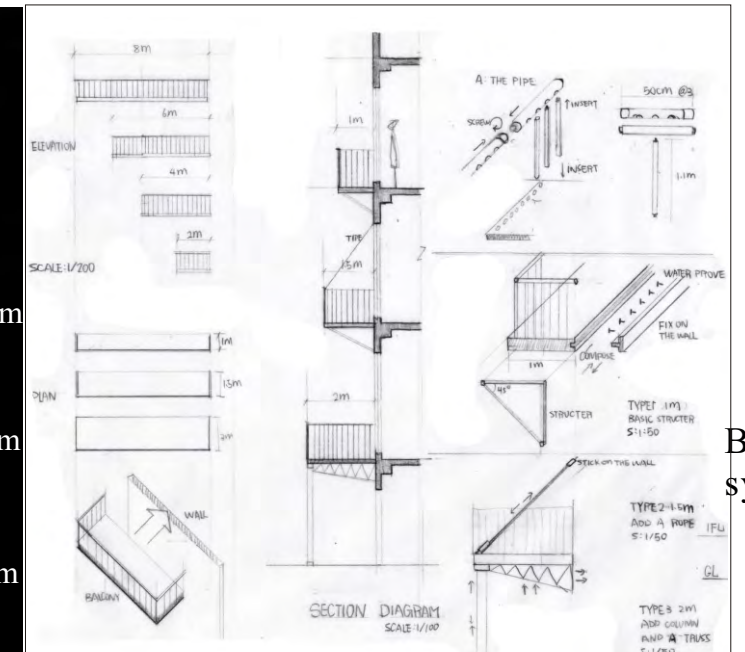
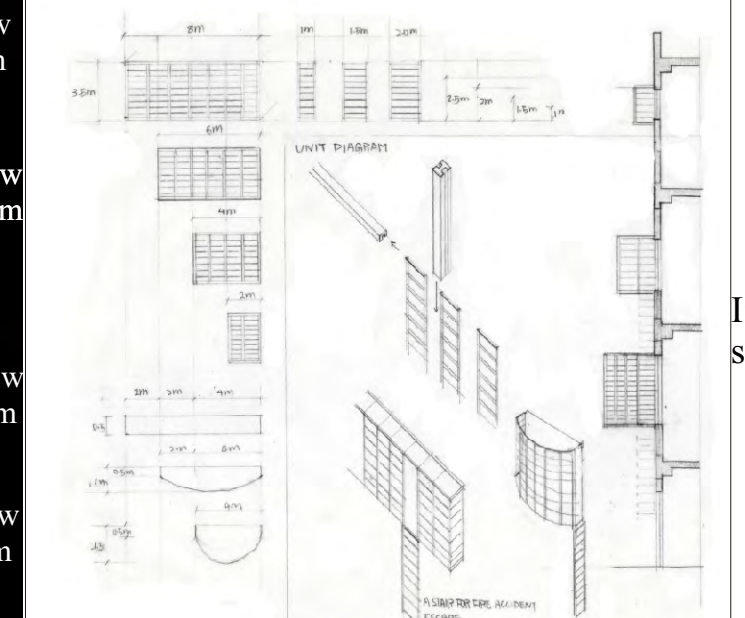
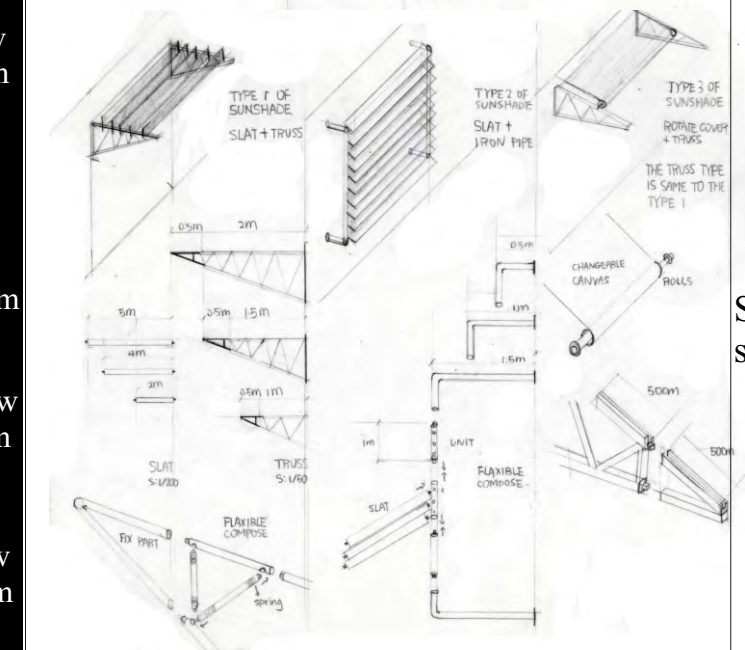
Unit 2m\*2m



Unit 2m\*2m

Window  
2m\*2mSlid window  
2m\*2mSlid window  
1m\*1mPull window  
1m\*1mFix window  
1m\*1m

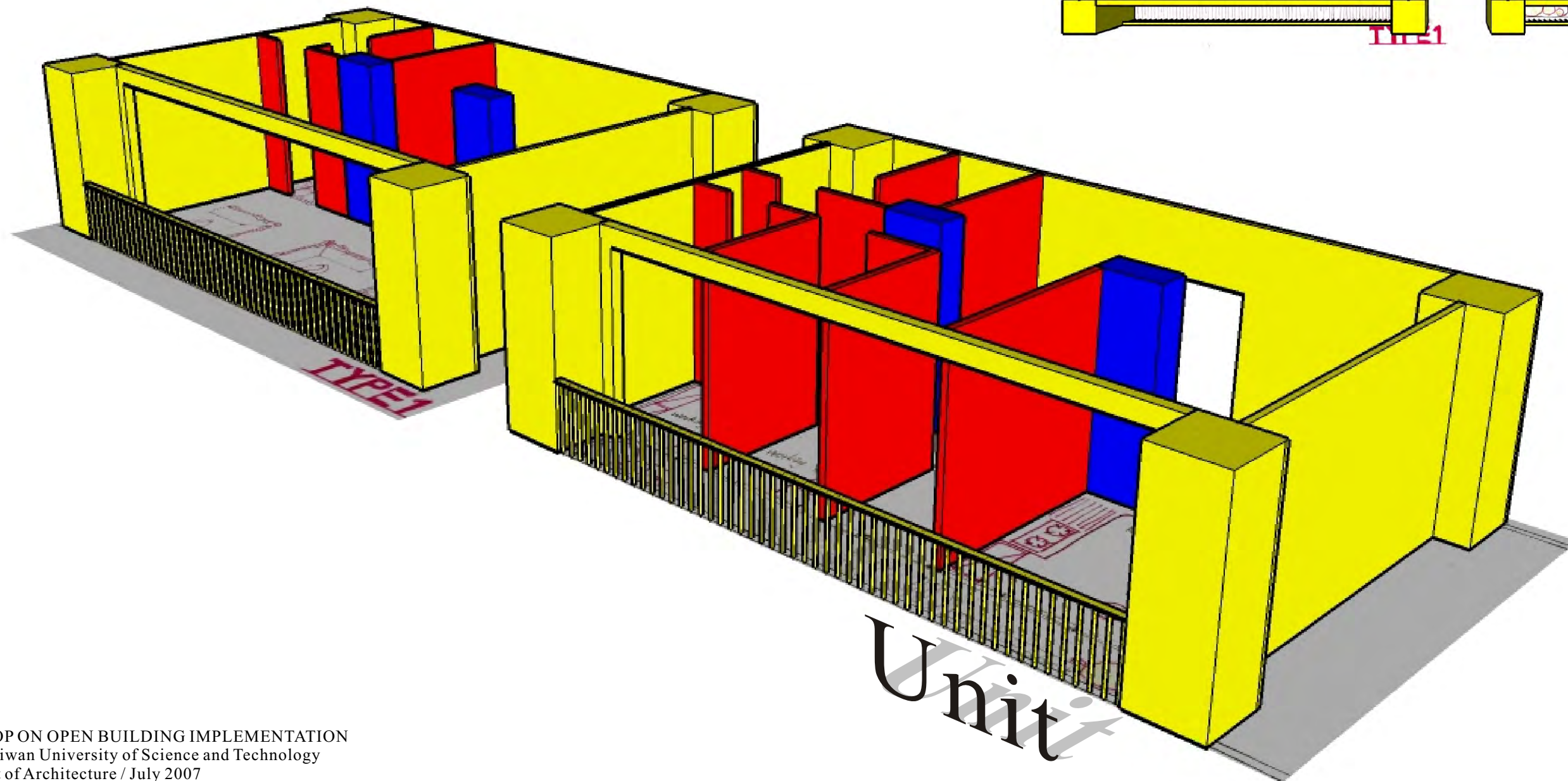
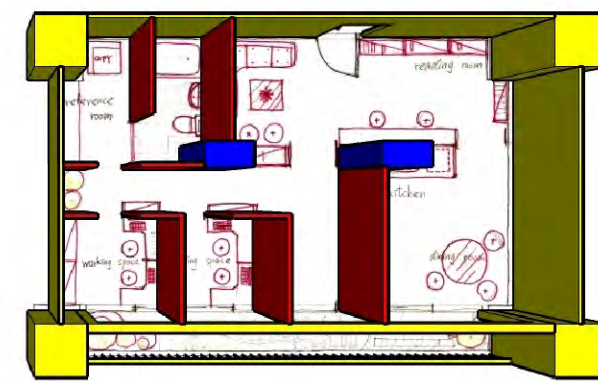
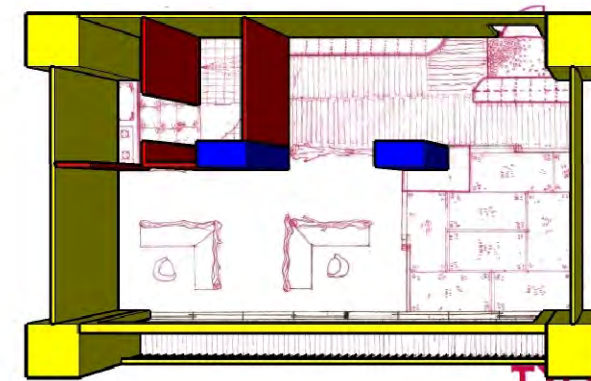
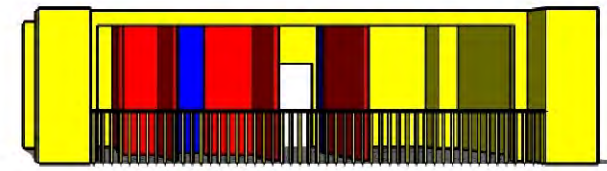
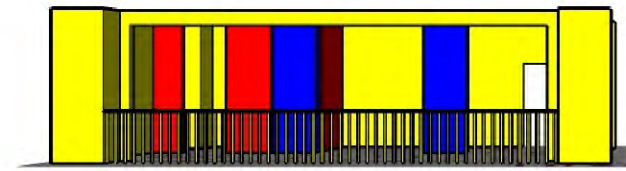
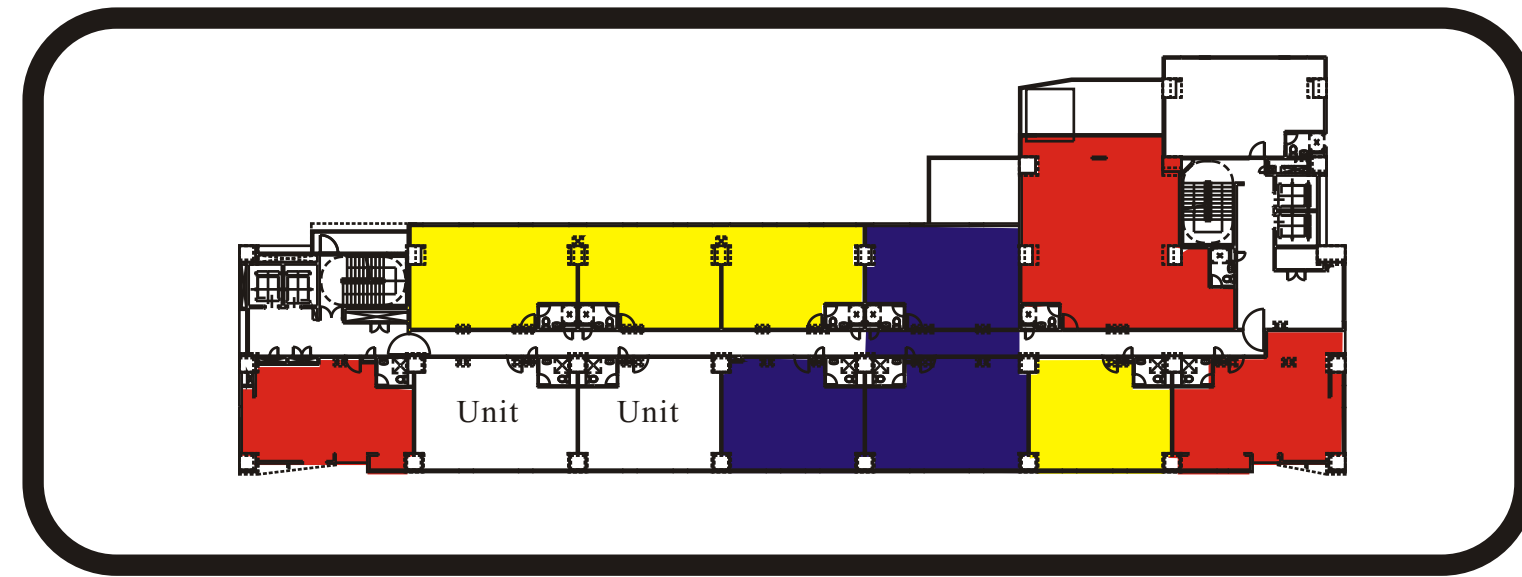
Unit 1m\*2m

Slid window  
1m\*2mFix window  
1m\*2mBalcony  
systemIron crating  
systemSunshade  
system





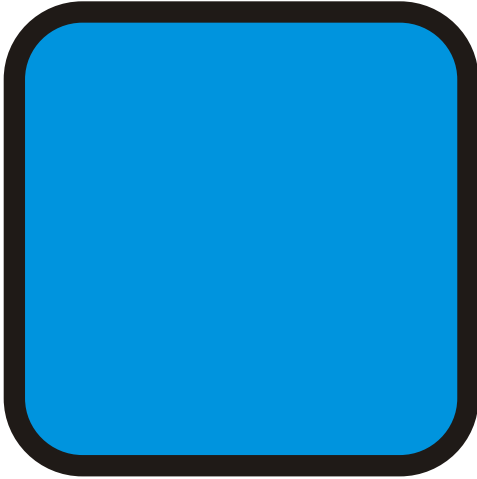
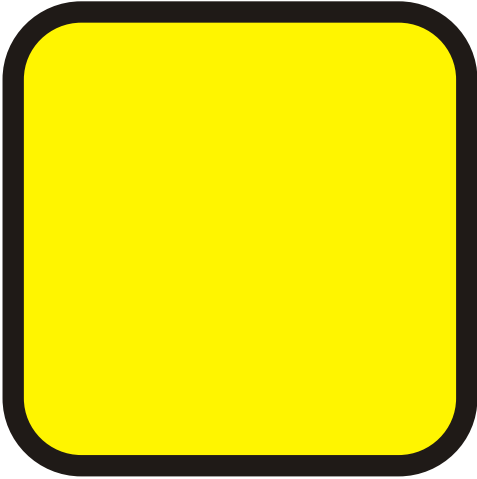
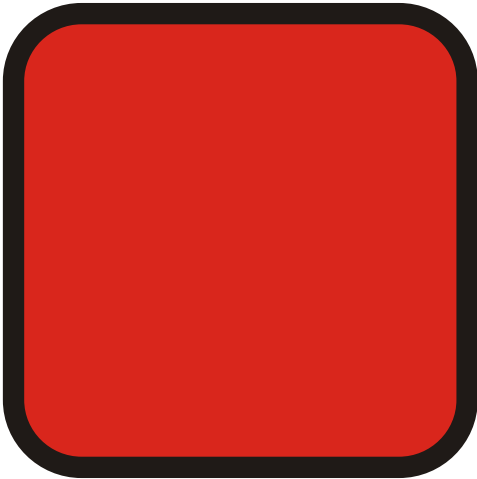
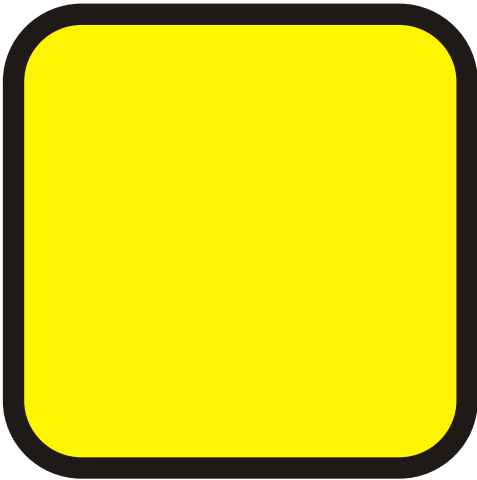
Transforming an existing base(rigid) building into A RESIDENTIAL OPEN BUILDING



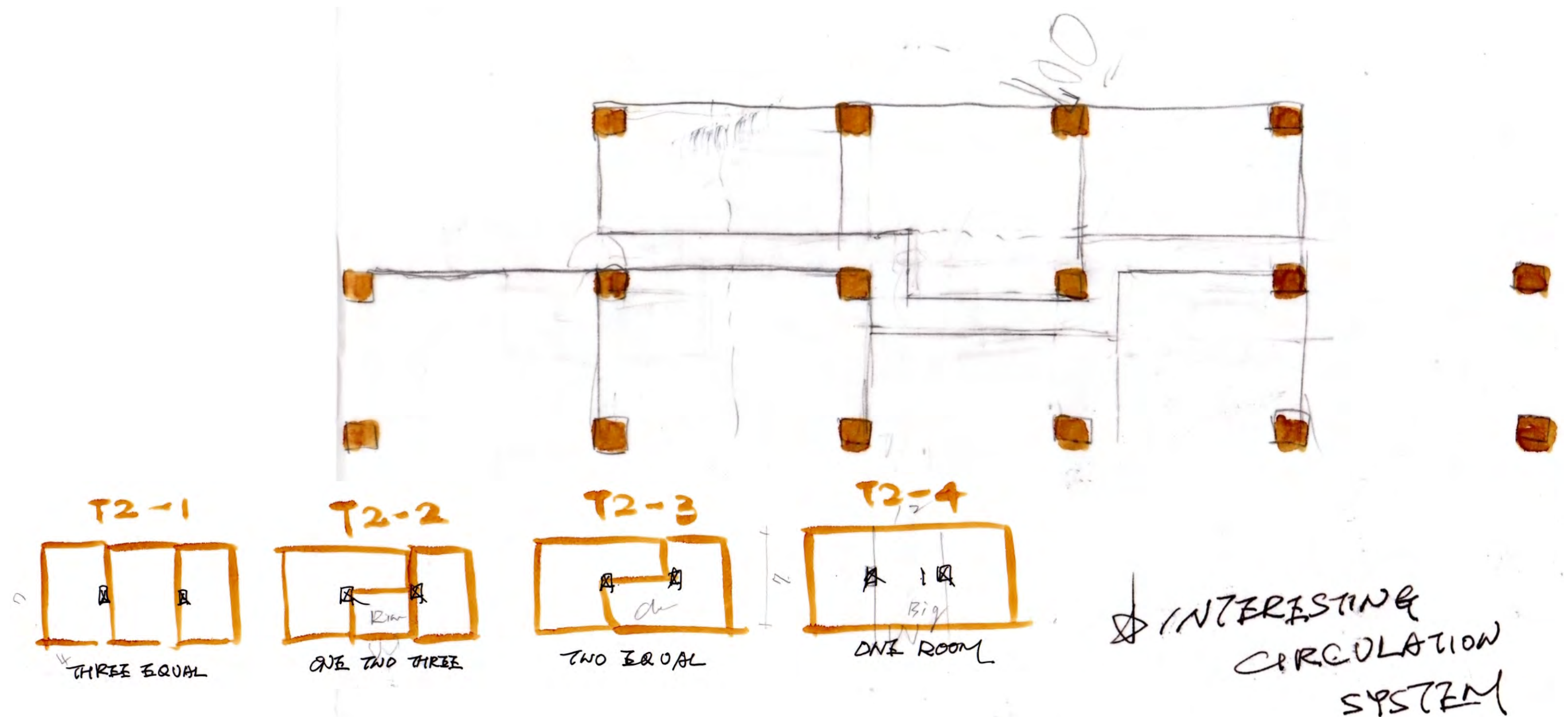
- Base building
- Infill
- Shaft



# Y&H STUDIO 3.0



Transforming an existing base(rigid) building into A RESIDENTIAL OPEN BUILDING



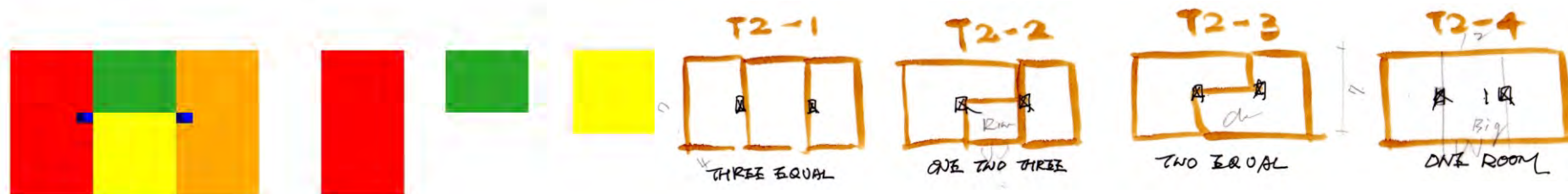
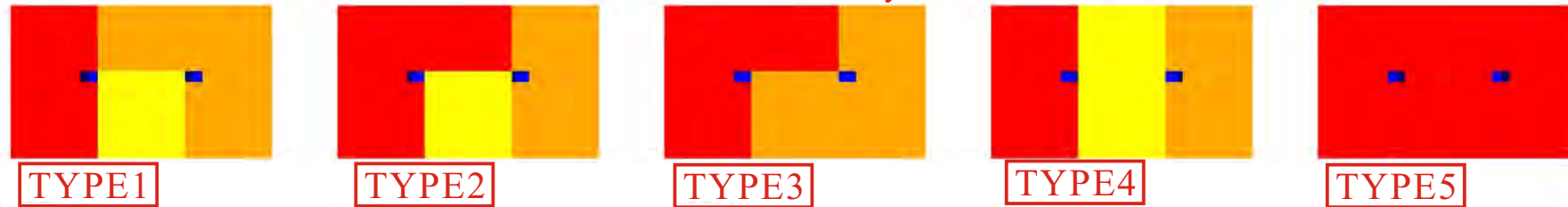


You have learned how to adjust one dwelling space in a CONVERSION PROJECT to make it more OPEN.

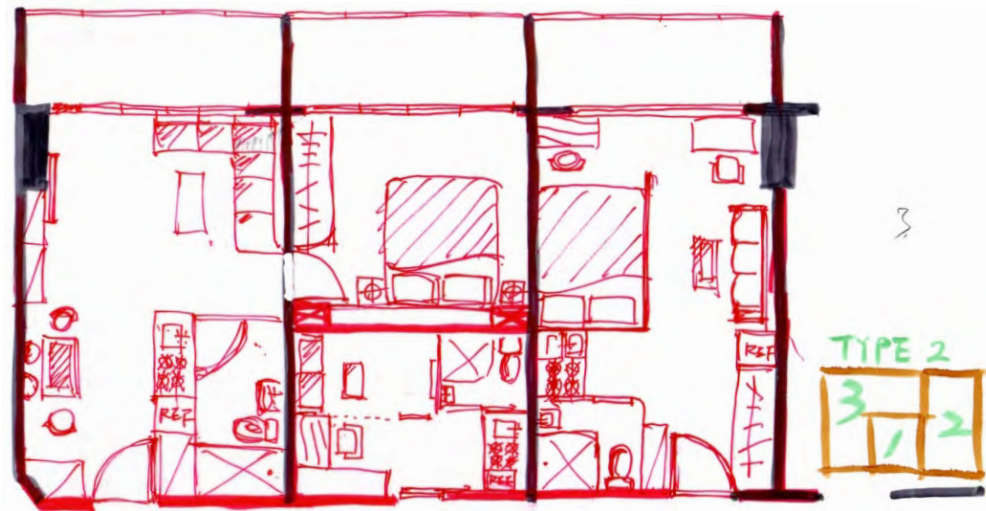
You have worked with a TOWNHOUSE to understand its typology in terms of OPEN BUILDING PRINCIPLES.

In the exercise, FIVE TEAMS will work one with another one. The purpose is to learn now to adjust team, to INCREASE CAPACITY FOR ACCOMMODATING VARIETY over TIME.

In this Taiwan residence, we redesign the original layout and make it as five dismantle units, and then we use these five units to assemble different kinds of layout.



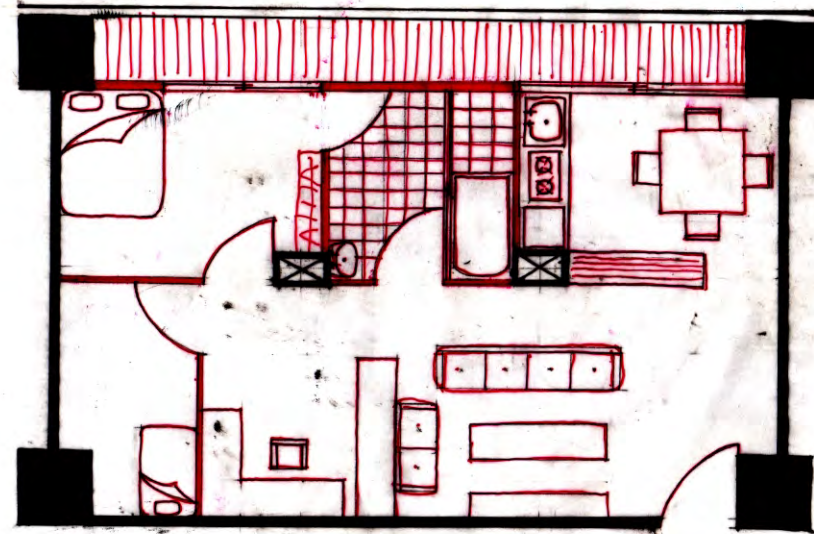
TYPE1 + TYPE2 + TYPE4



Designed by: Rian Hsuan-Wei Chen

Conception: This case is a new building in Taiwan, but it's not an open building which we are talking about now. So, what we do is to use the construction as a base and rearrange the unit for people are going to move in. And design the applicable infill for them. With this base building, we designed couples layout, each of them could fit customers' need.

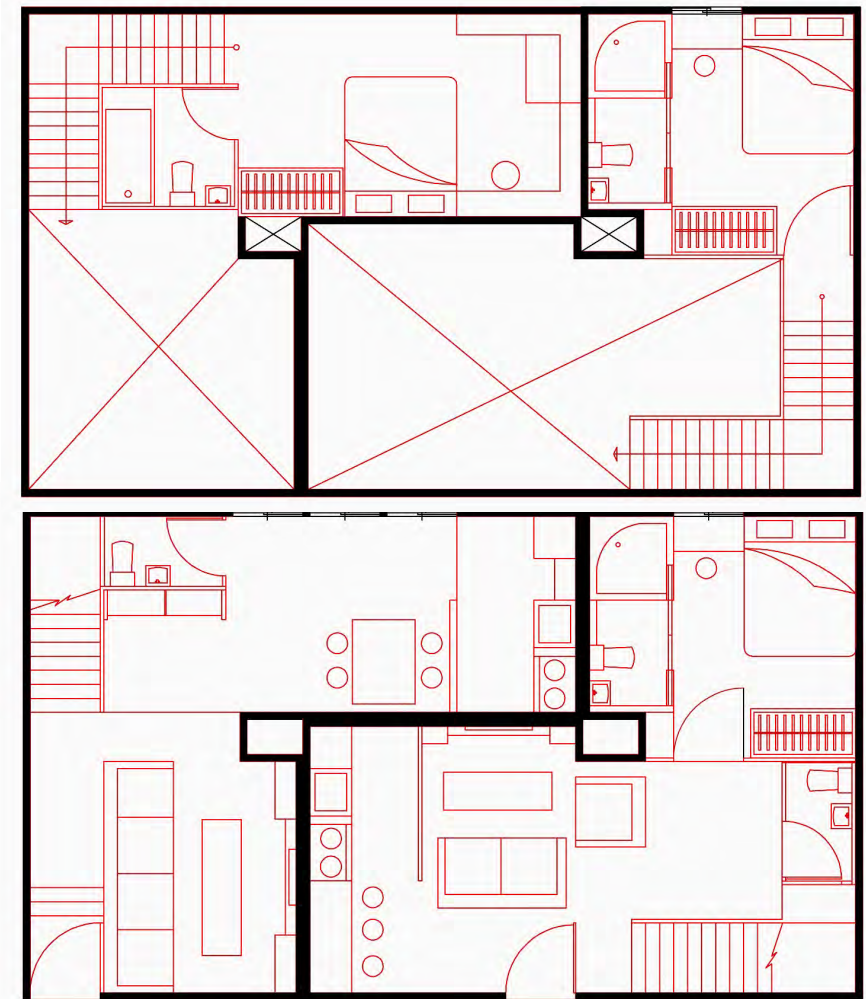
TYPE5



Designed by: Mr. Big

In this case, we try to make a Taiwan new residence as an open building. My idea is not setting any fixed walls to make space more flexible.

TYPE3



Designed by: Shaou Yuan

WHAT I WANT YOU TO CONSIDER AND DO IN THIS EXERCISE

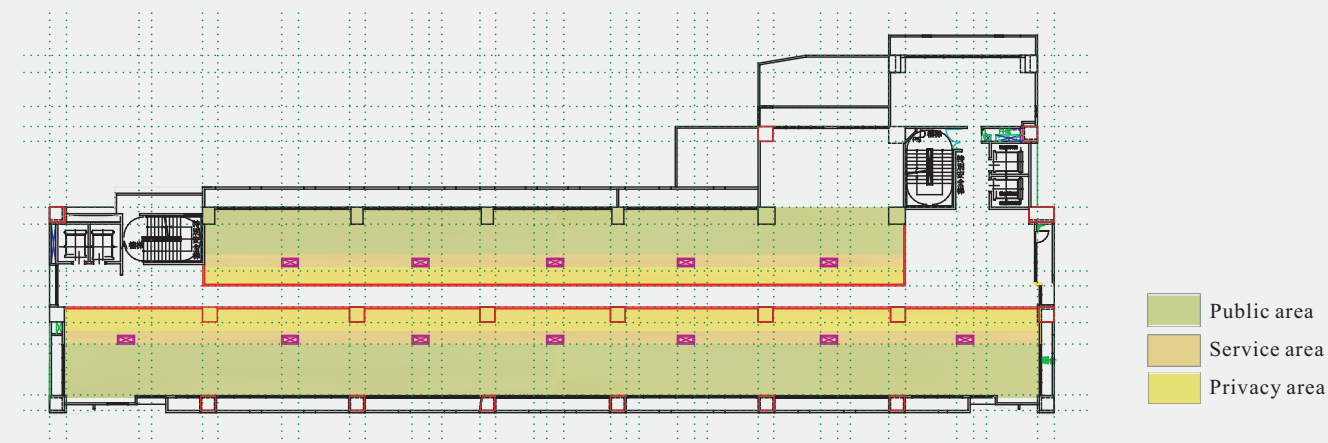
- 1 Use principle learned so far to transform this building's base building ( which is designed for only one set of floor plans) into an OPEN BUILDING.
2. Change AS LITTLE AS POSSIBLE to increase this building's capacity to accommodate individual family preferences. ( I suggest that vertical pipe shafts are perhaps the only things needing to be adjusted).
3. DO NOT CHANGE THE FACADE or STRUCTURE or FIRE ESCAPE SYSTEM.
4. Show ALTERNATIVE UNIT SIZES and for each unit SHOW ALTERNATIVE INFILL, on two or three typical floors. (you may want to make some floors into duplex dwellings, for example, or create double height spaces on a few floors to make special units.)
- 5 Show one whole building on axonometric drawing showing the new VERTICAL PIPE SHAFTS.



## Transforming an existing base(rigid) building into A RESIDENTIAL OPEN BUILDING

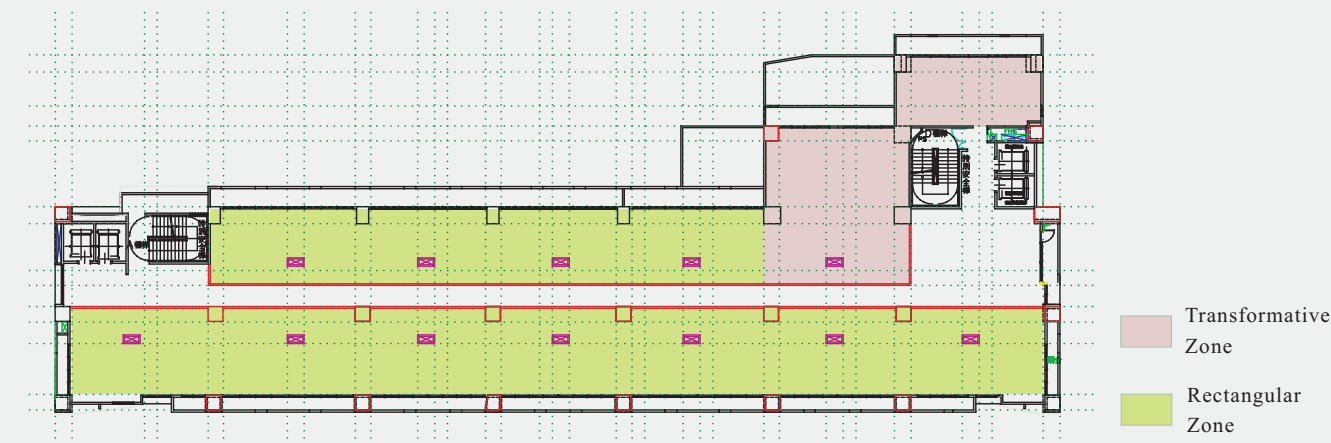
## THE PIPE SHELL LOCATION

In this exercise, we get the narrow and long site. The original space used for offices, and link the two elevators by a 160 centimeter width path. Each office contains a block between two pillars. We regard the OPENING BUILDING as the main concept, reconfigure the inside compartment, and decide positions to put the pipe shell. The pipe shells are horizontal and offset from the path, and set each pipe shell between two pillars. When put the pipe shell, we let the space becomes big and small ones as a principle. The facing window spaces are bigger, and these spaces are more or less three meters five widths, we want to put the living room or bedroom in. The distance between pipe shell and path is about two meters. We set the service space such as the kitchen or the lavatory.



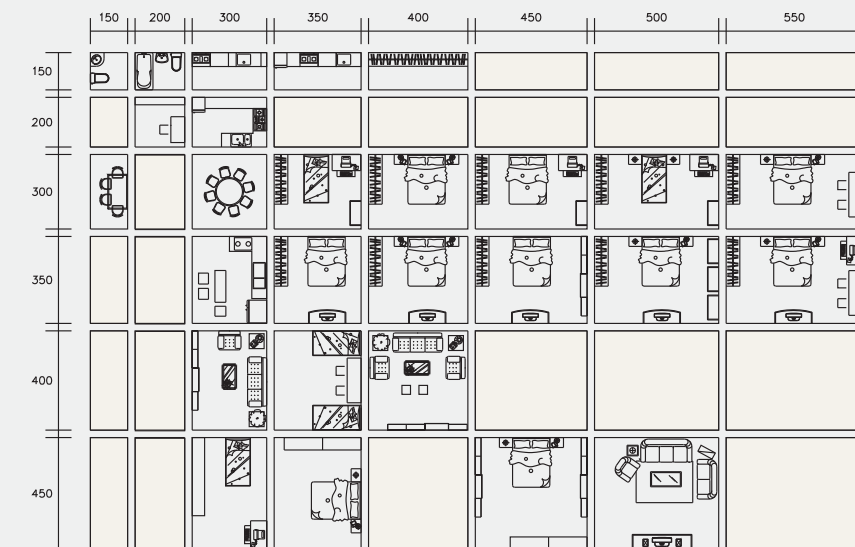
## THE FLOOR ZONE

The narrow and long block on this site can be divided into two types of plan. One kind of types is a rectangular block and unanimous in width. The rectangular width areas are 5.5 meters and 7.5 meters, we set several kits of family units and combinations in different width. Another kind of floor plan types that are more transformative, we should make slight adjustment to every floor plan.



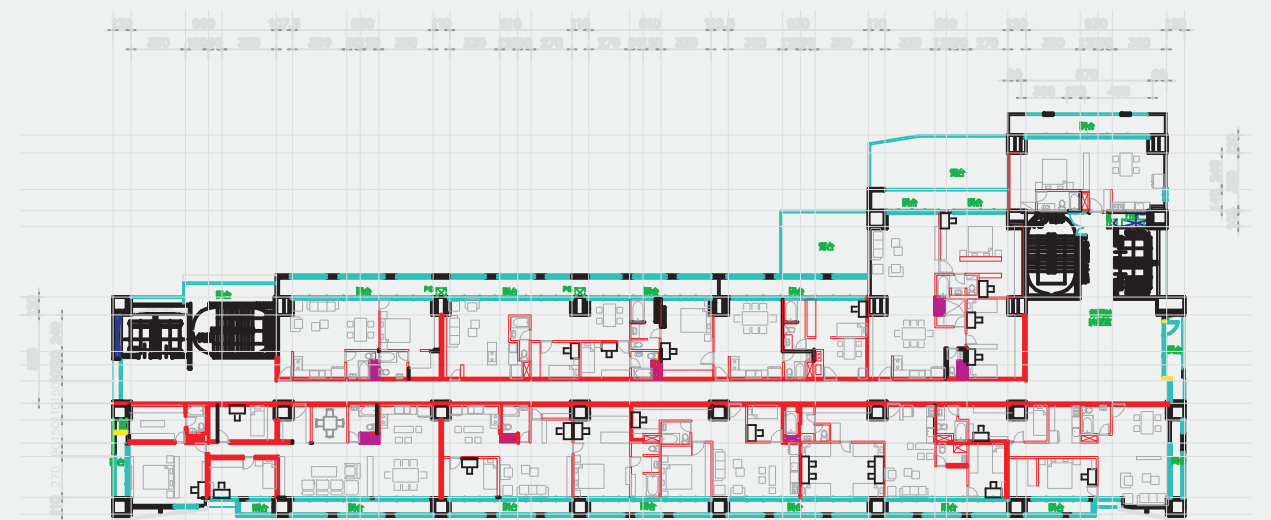
## KIT OF THE FURNITURE

We decide 150cm and 200cm that are the basic dimensional components that are the minimum size of living space. In the basic dimension of space that can set toilet or kitchen in. We generate the series of pattern to make different functions demand in the house. Such as the living we set it in four meters widths and five meter long space. Then we use the kit of furniture to set up all the floor plan.



## DESIGN SCHEME I

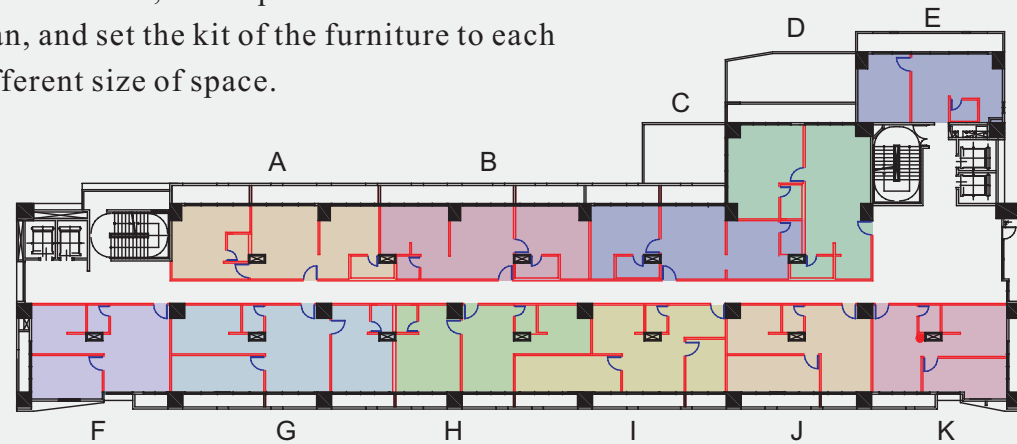
Our main operation mode of this exercise divides the plan into different use areas and brings according to some space measurement that have frequently first, set up pipe space in taking in service space district set up, is it have a person who change level type most to produce by this.



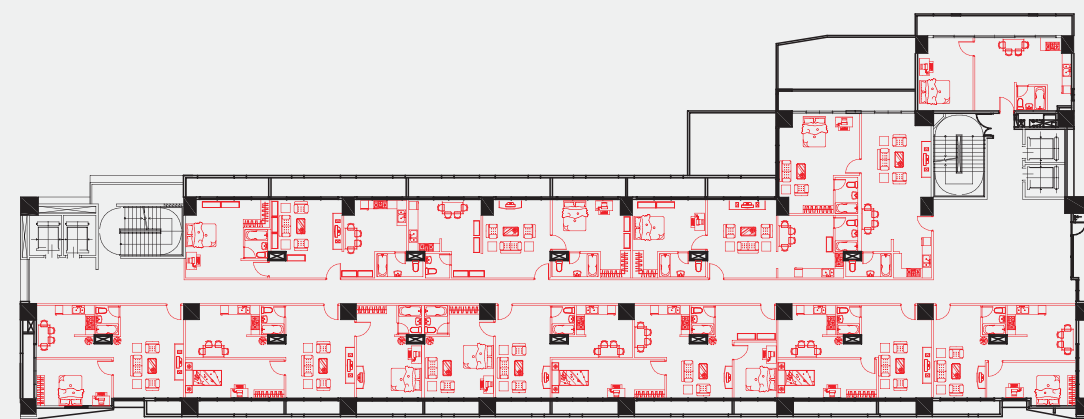


## DESIGN SCHEME II

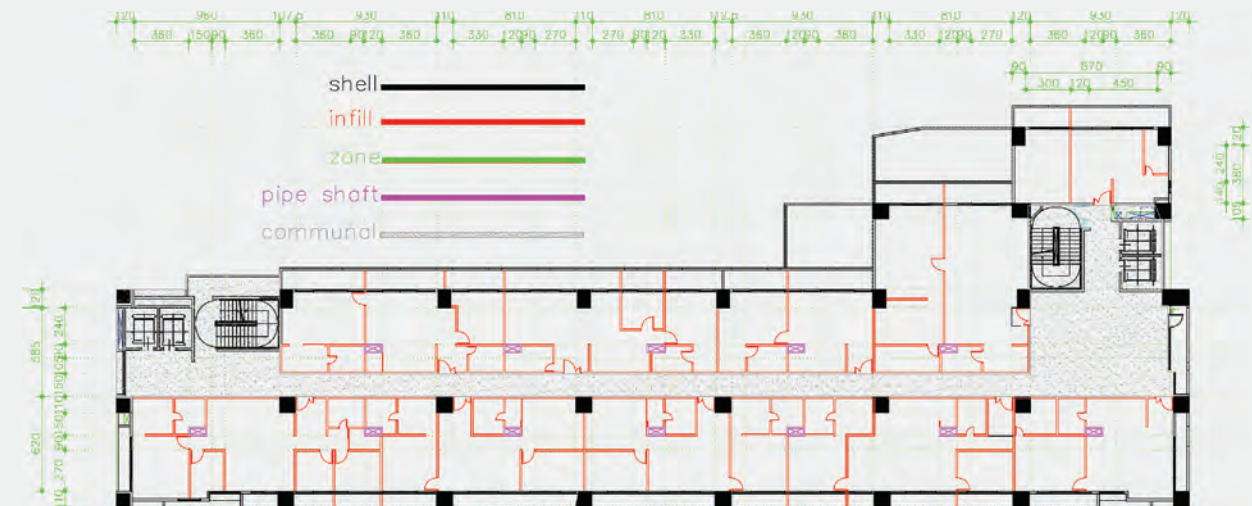
In the scheme, we dispose 11 families in a floor plan, and set the kit of the furniture to each different size of space.



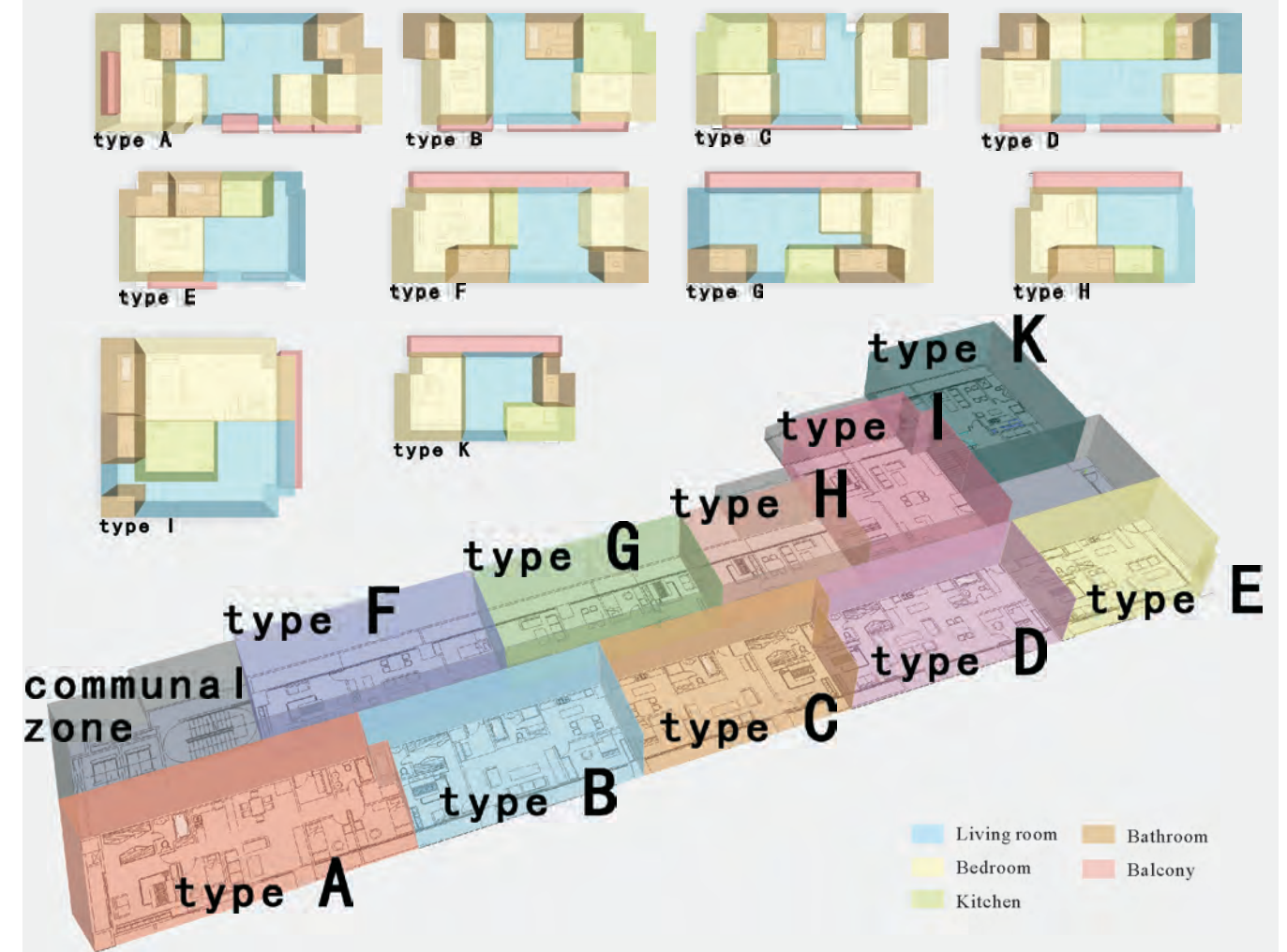
### FLOOR UNIT



## DESIGN SCHEME III



### FLOOR UNIT





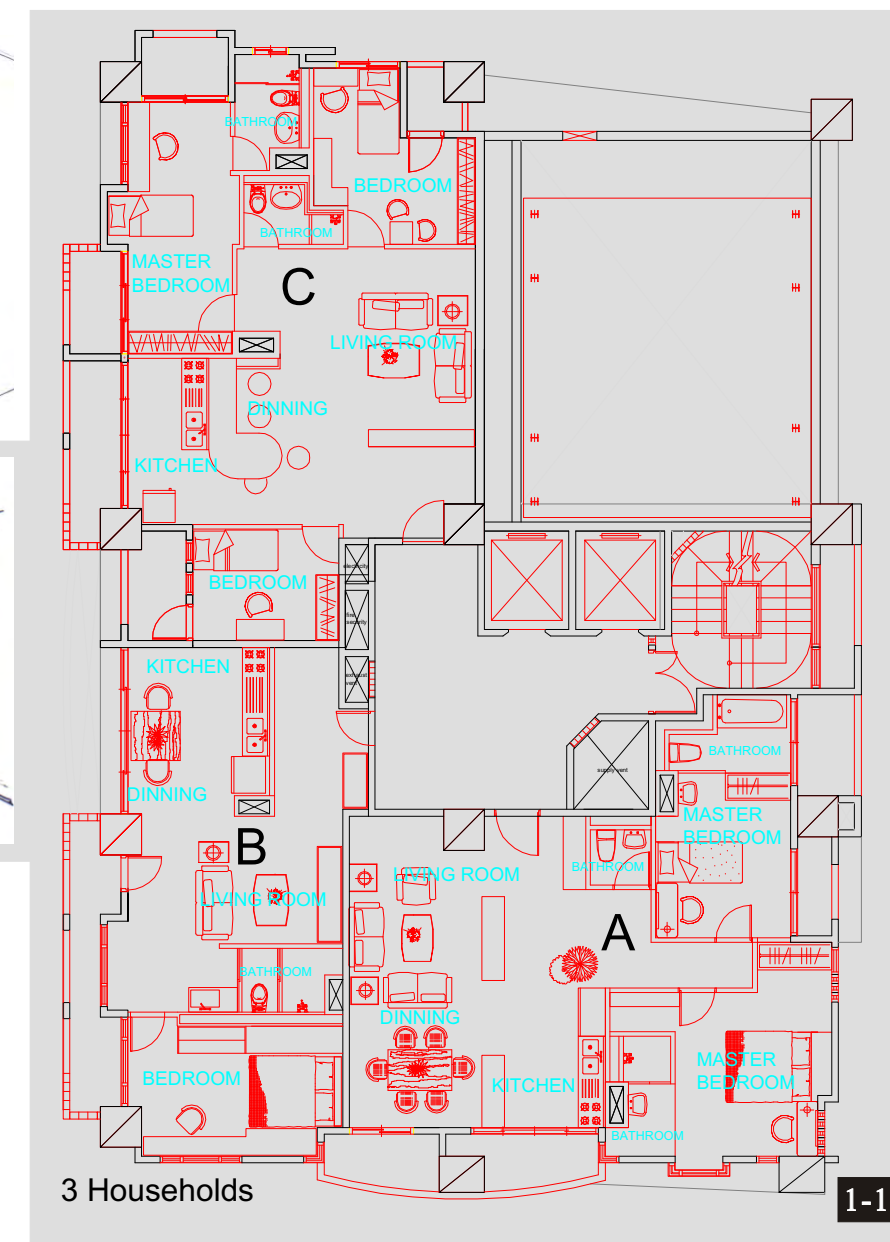
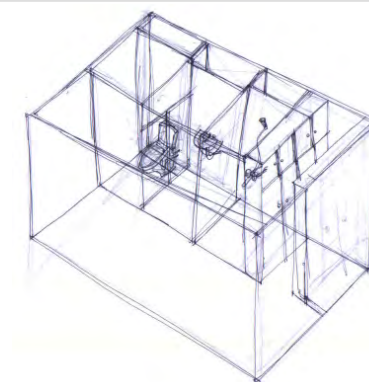
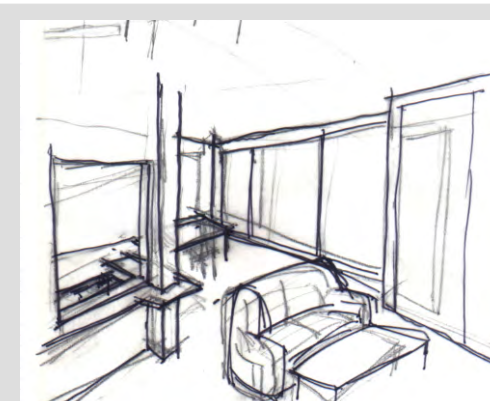
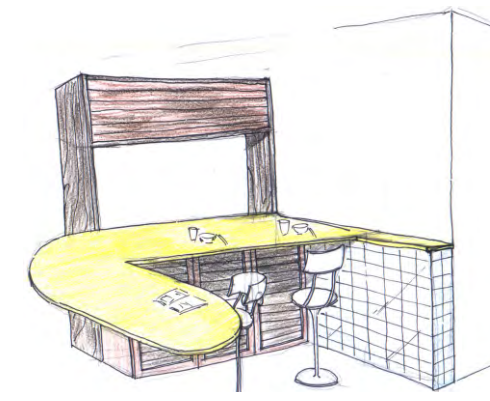
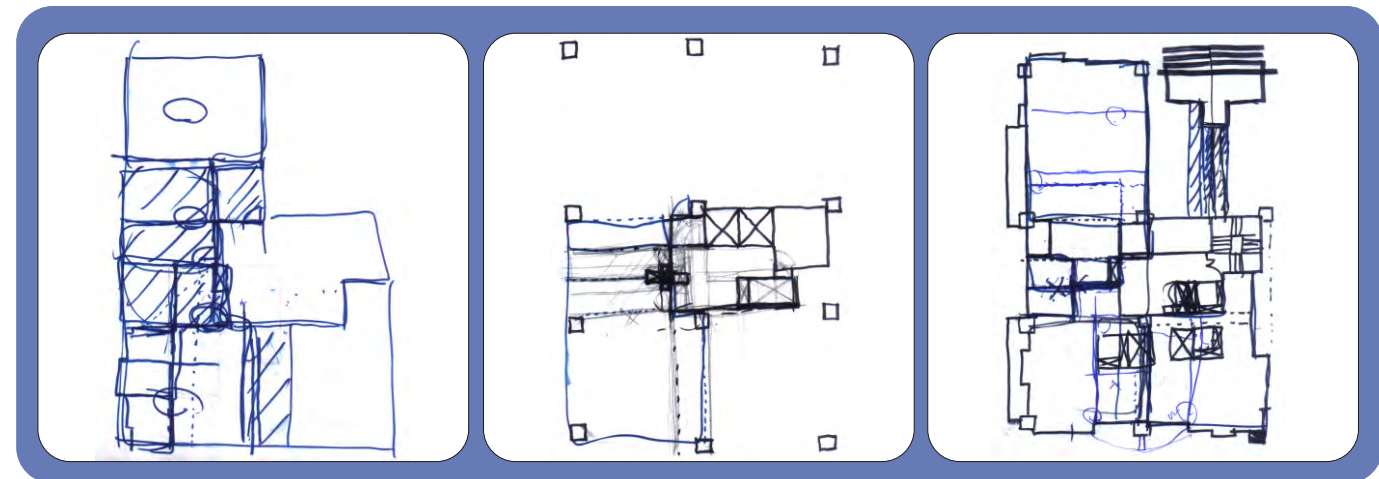
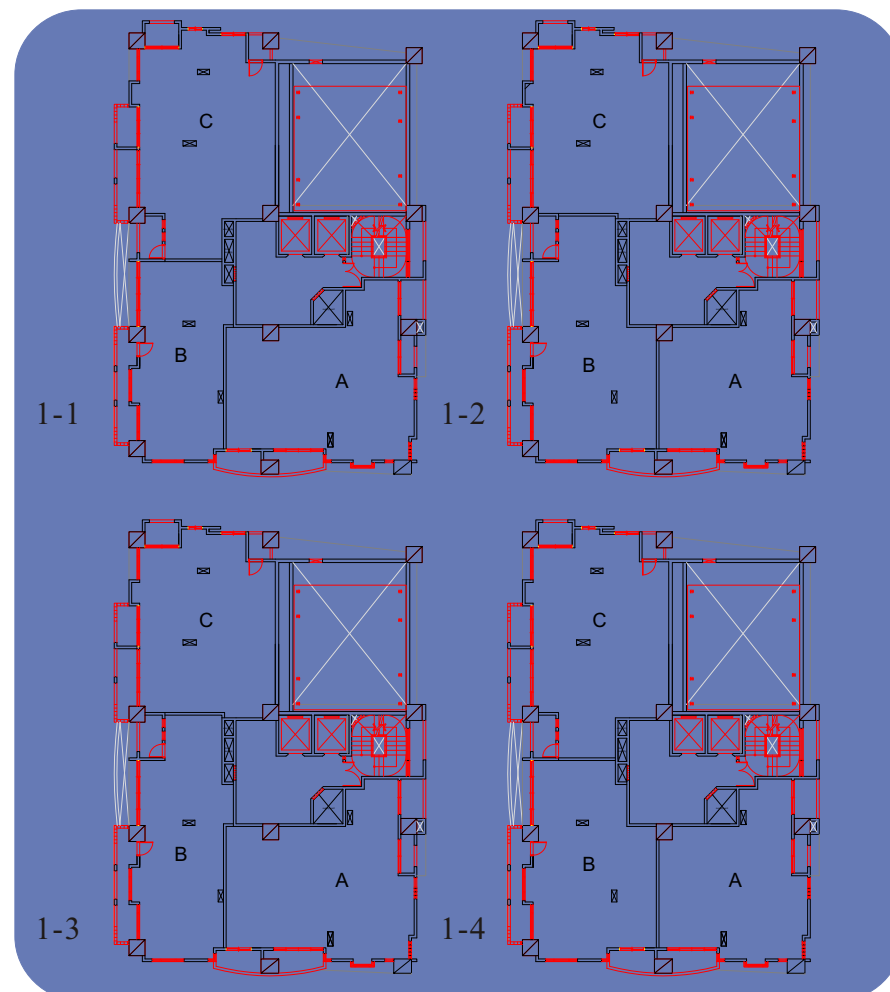
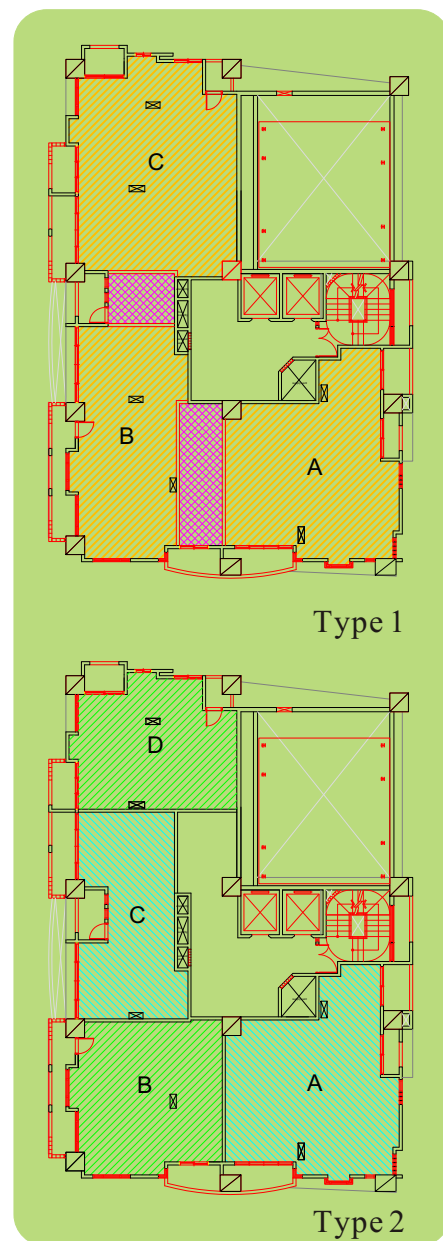
## Transforming an existing base(rigid) building into A RESIDENTIAL OPEN BUILDING

## INTRODUCTION

In this exercise, we will work one EXISTING MIXED USE BUILDING in Taipei.  
The purpose is to learn how to adjust them, to INCREASE THEIR CAPACITY FOR  
ACCOMMODATING VARIETY over TIME.

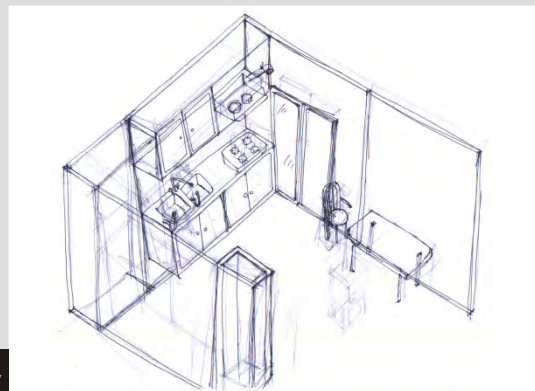
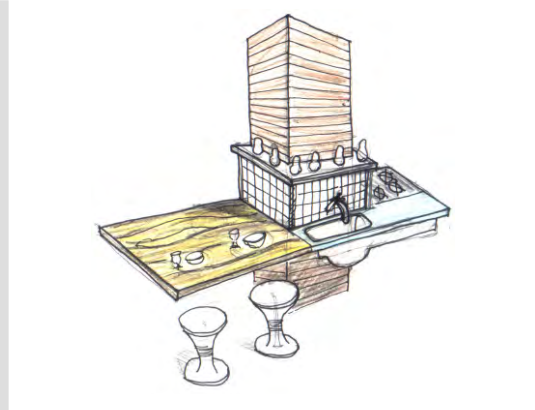
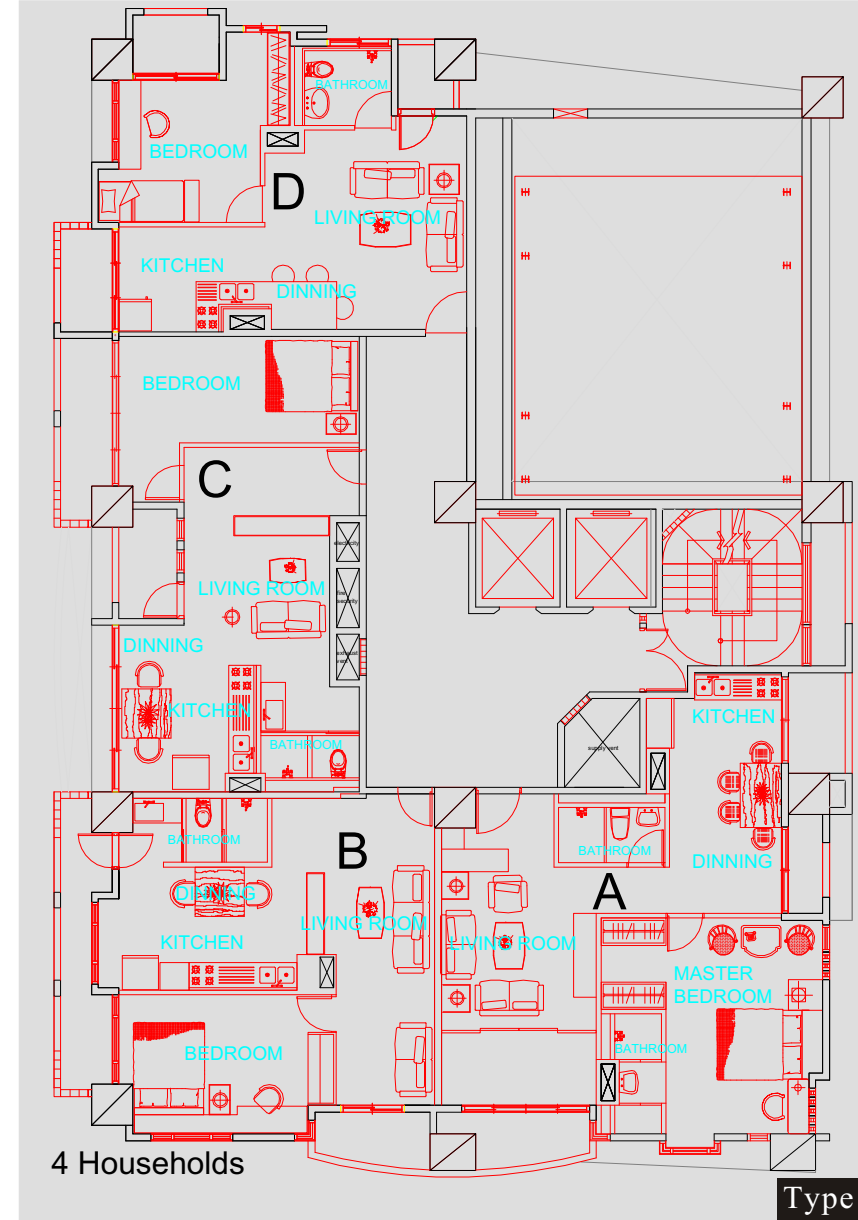
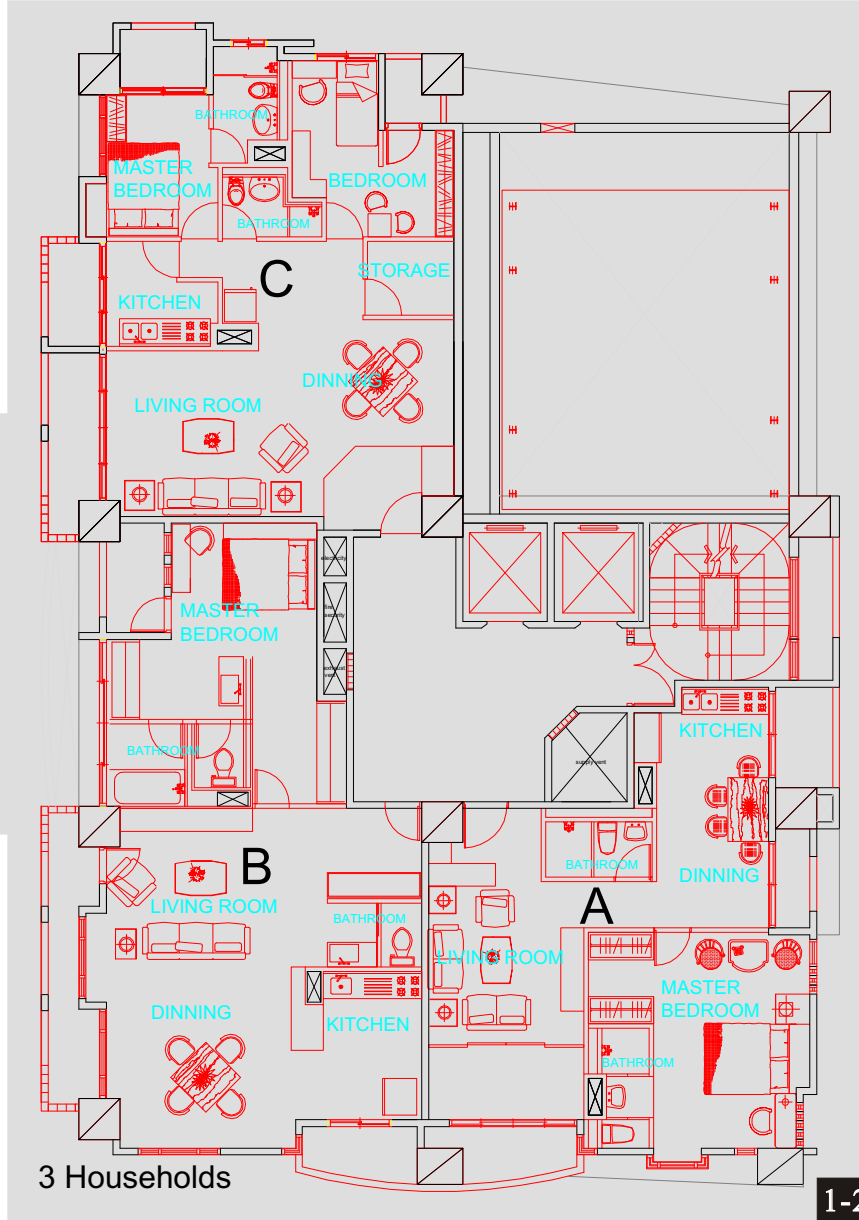
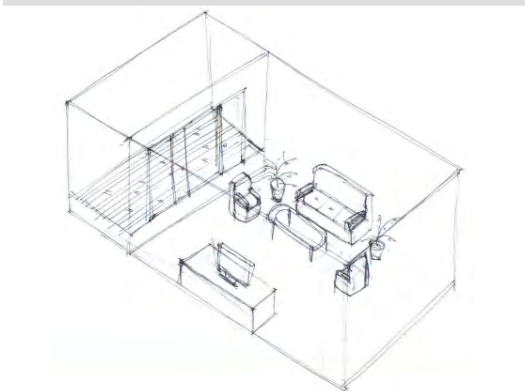
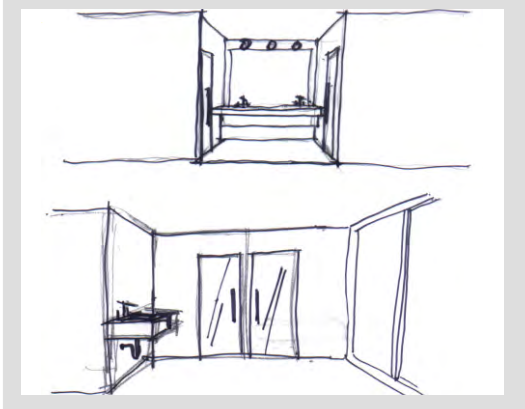
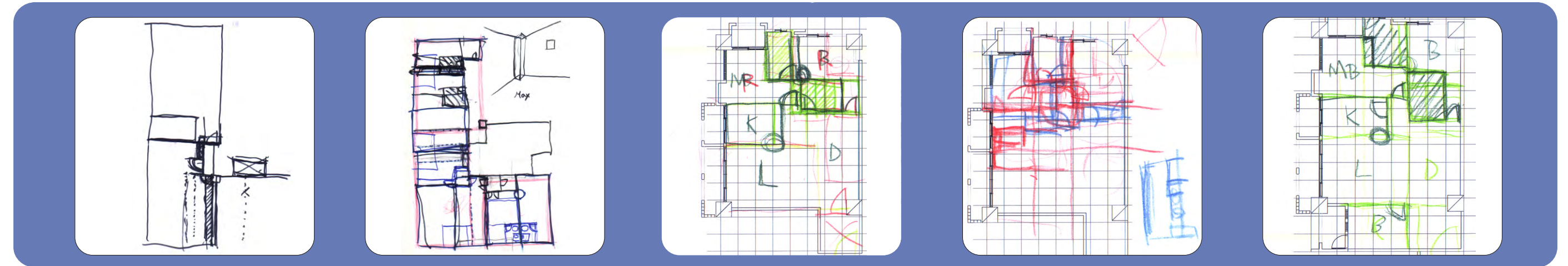
## CONCEPT

- Step 1: Integrate service cores. Making a complete public space.  
Step 2: Deciding the number of space which we want to divide.  
Step 3: Deciding the position of partitions and margins.  
(according to the facade and structure.)  
Step 4: Making layouts.





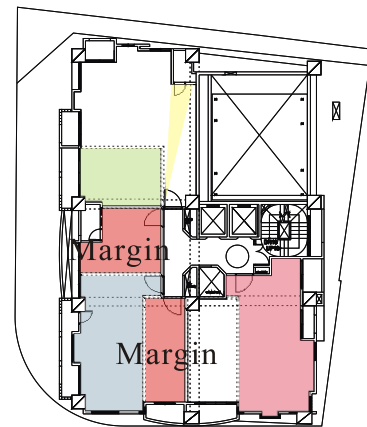
Shih-Min Cheng, Shao-Hung Lo, Chih-Kai Hsiao



## Transforming an existing base(rigid) building into A RESIDENTIAL OPEN BUILDING

**Topic**

This exercise is designed to transform an existing mixed use base building into a Residential Open Building. Change as little as possible to increase this building's capacity to accommodate individual family preferences. The façade, structure, and fire escape system can not be changed.



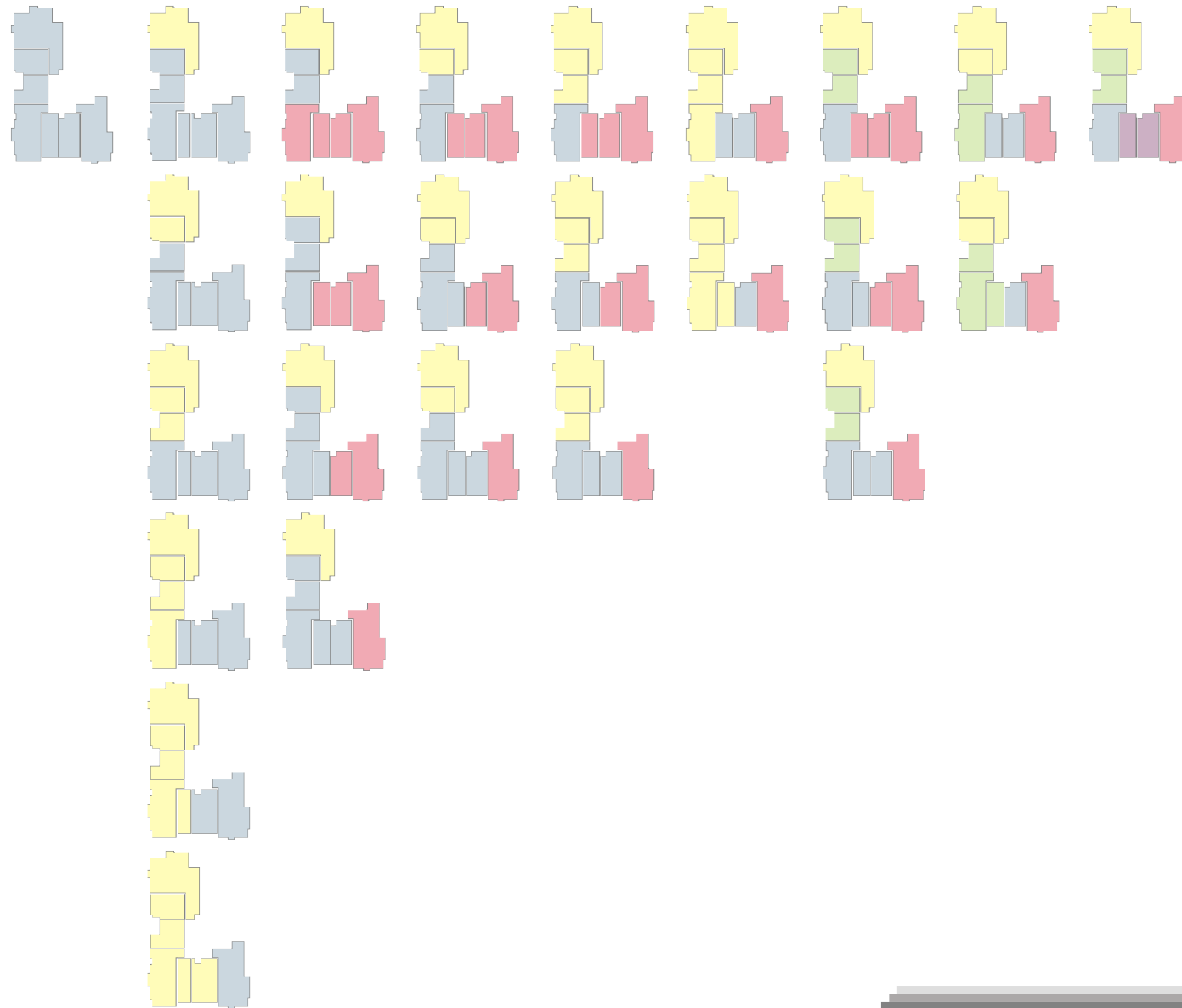
1Unit

2Units

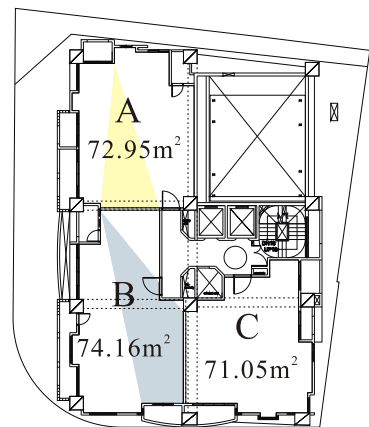
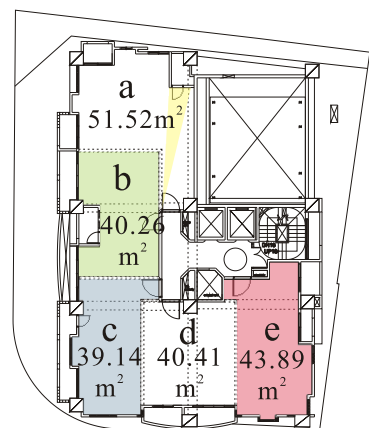
3Units

4Units

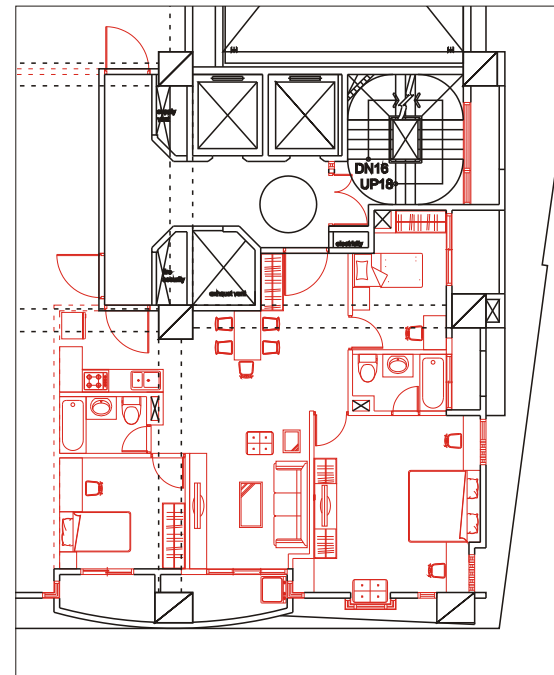
5Units



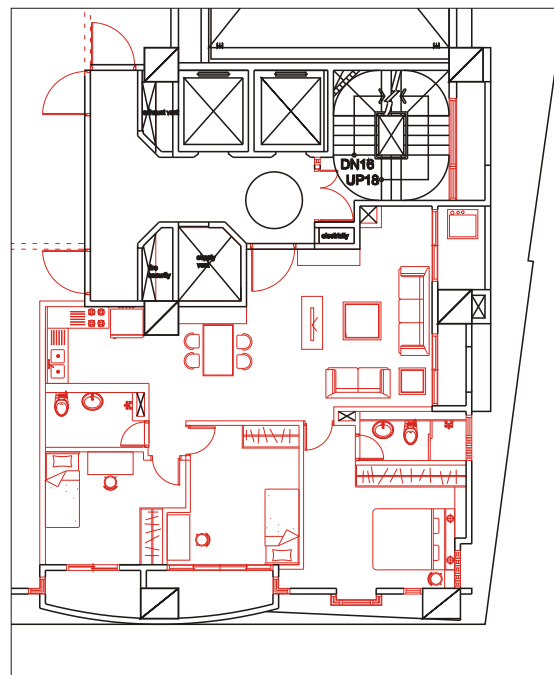
The floor is divided into 7 segments which with different measure of area can generate at least 25 different floor plans in accordance with different permutations. The area of each unit is flexible that there is a flexible margin between every two adjacent dwelling units, so up to 20 alternative units could be found. The square measure of single unit ranges from 39.14 m<sup>2</sup> (1 bedroom) to 220.16m<sup>2</sup> (whole floor). Because of its outstanding capacity of accommodating individual family preference, the arrangement of the whole floor is perfectly flexible. It demonstrates that if the designers (architects) can deliberate about the floor plan to enlarge its capacity, the difficulty of refurbishing or rearranging it will become much easier. Actually the problem base building caused is much minor than that of bad design in initial stage. The designer always plays a very important role in open building.

**3Units Type****5Units Type**

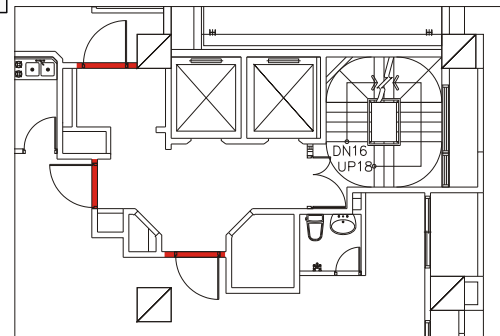




**Alternative Design 01**  
Scale:1/200

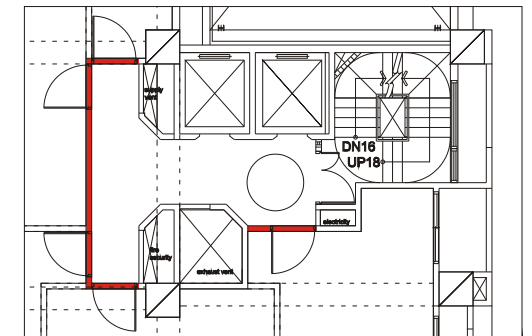


**Alternative Design 02**  
Scale:1/200

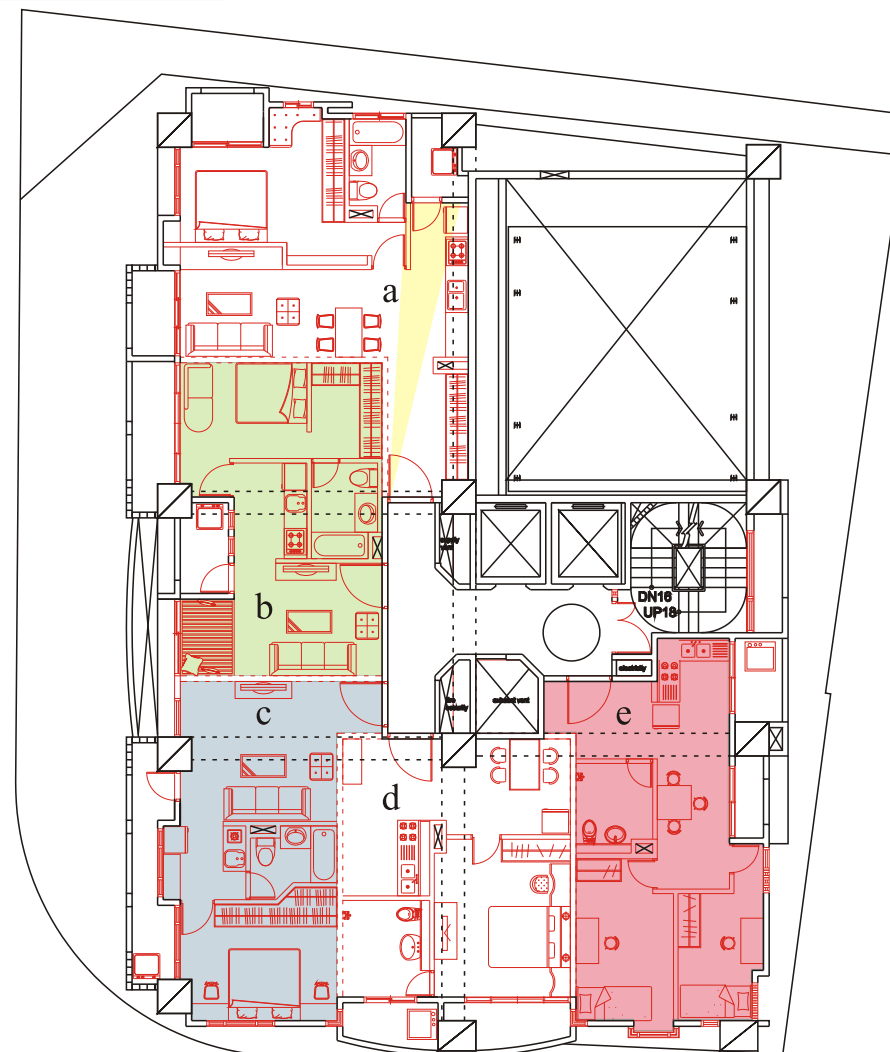


**Original Core Plan - Scale:1/200**

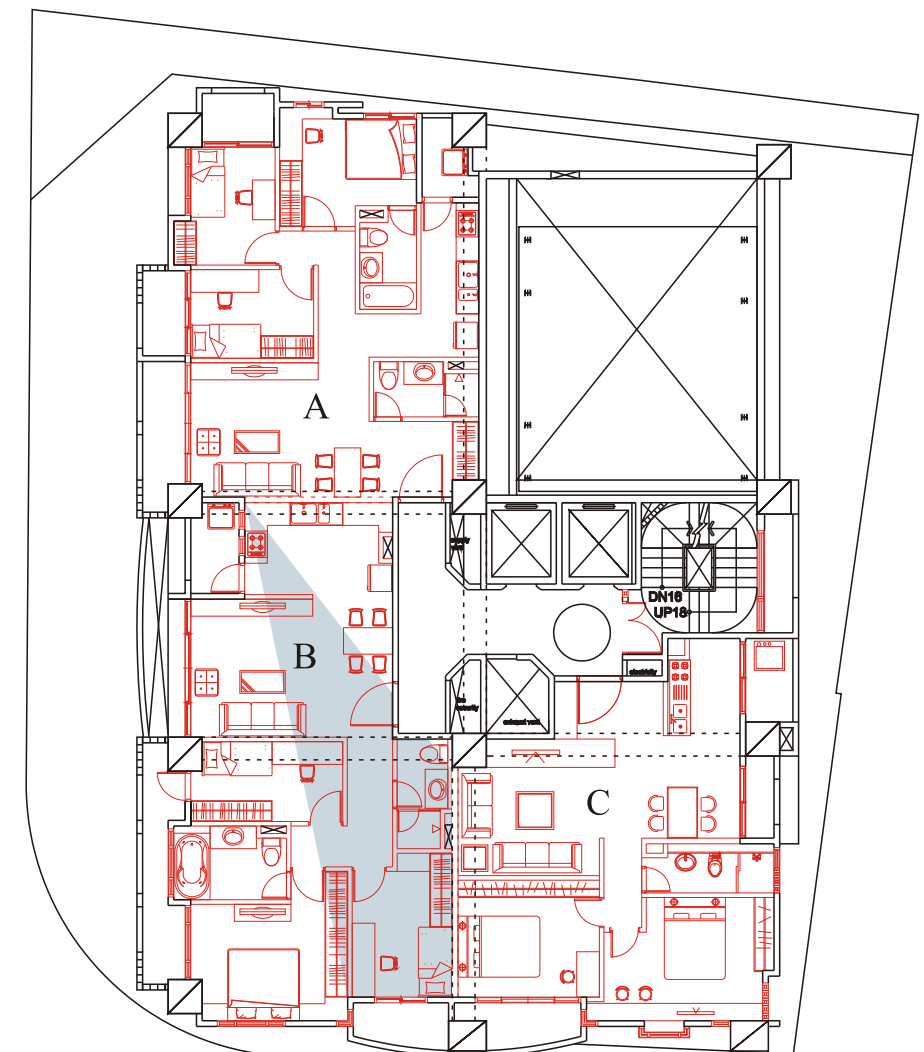
The redesigned of core creates more number and possibility of entrance location to each unit.



**Redesigned Core Plan - Scale:1/200**



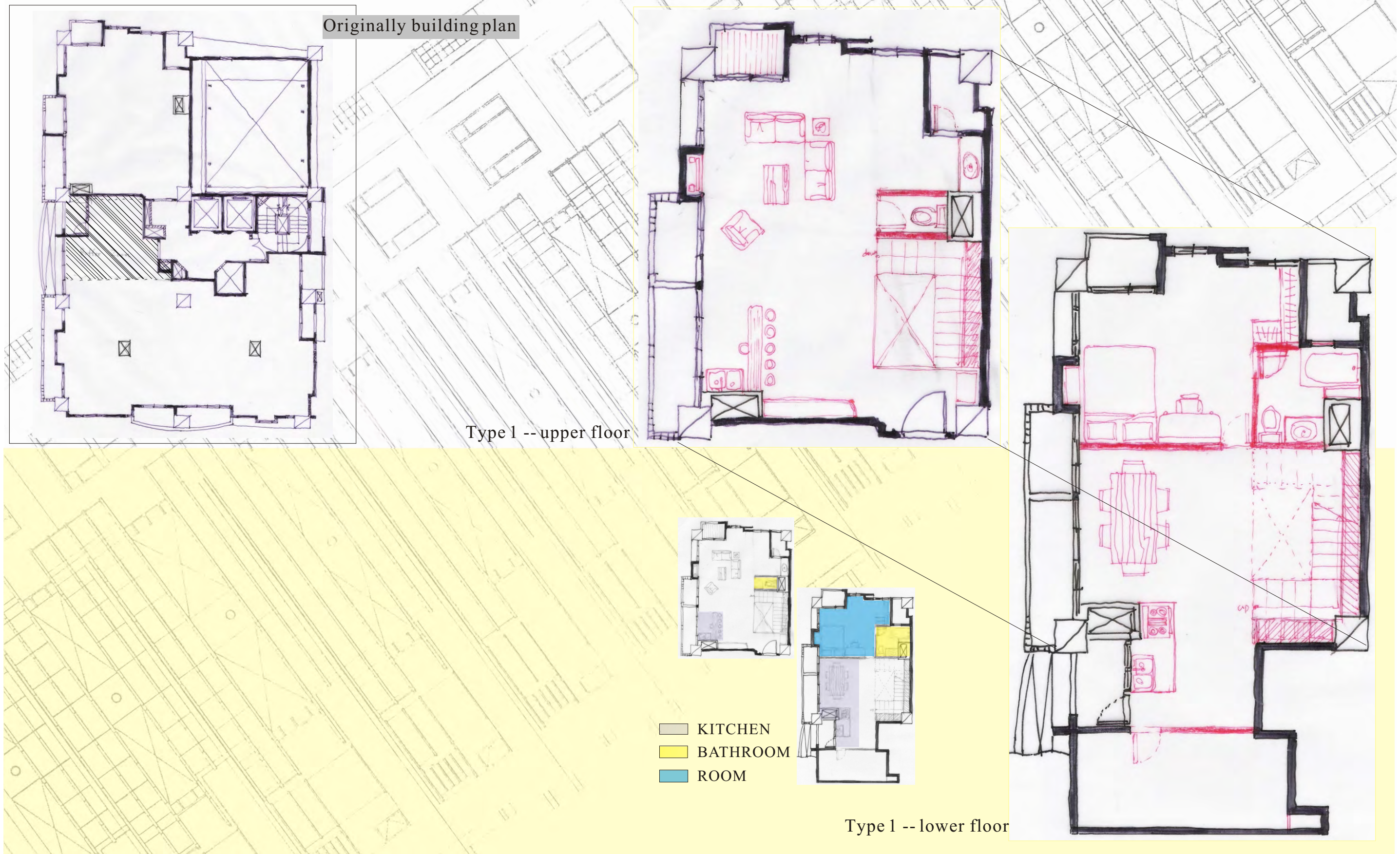
**Prototype Design for 5-Unit Scale:1/200**



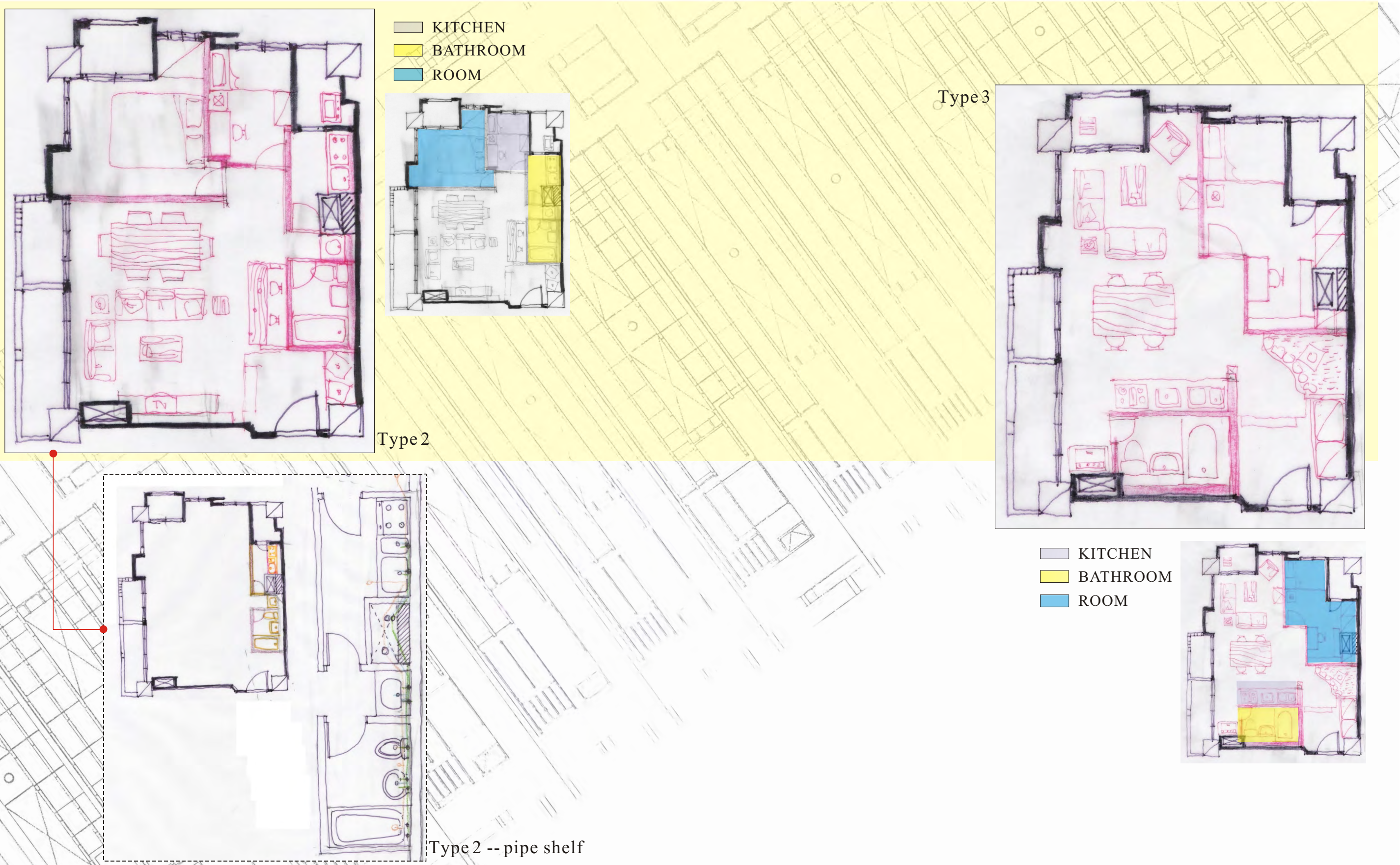
**Prototype Design for 3-Unit Scale:1/200**



Transforming an existing base(rigid) building into A RESIDENTIAL OPEN BUILDING









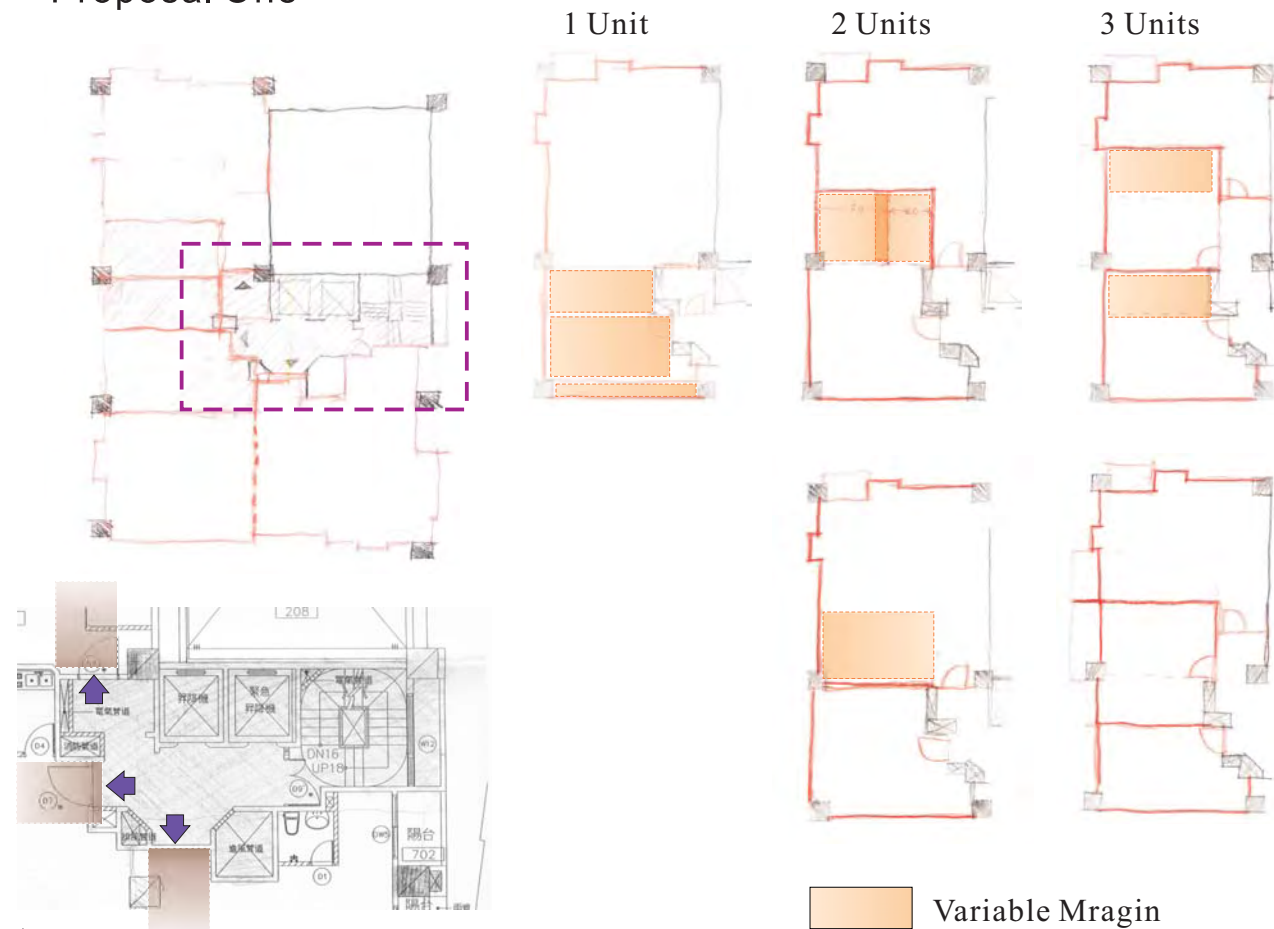
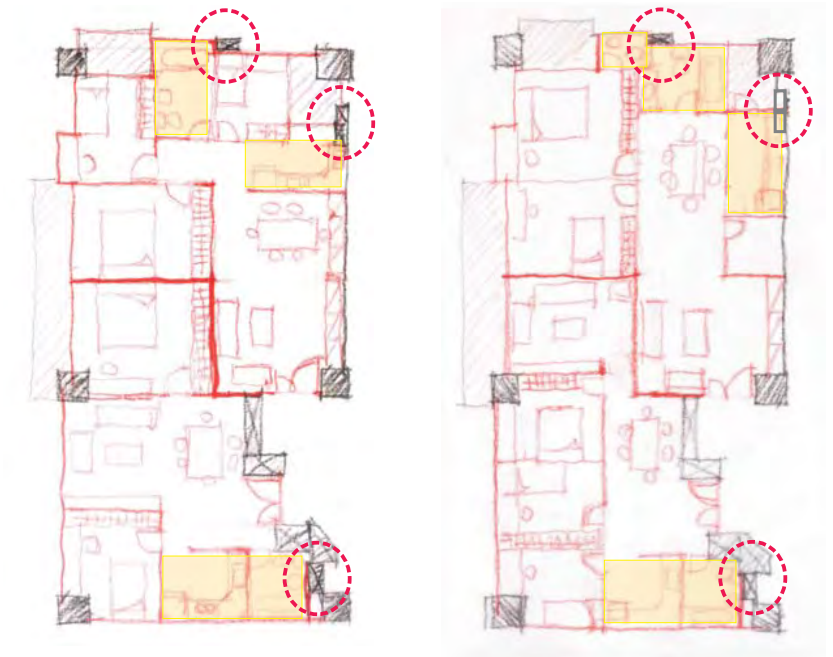
## Transforming an existing base(rigid) building into A RESIDENTIAL OPEN BUILDING

## Work Discriptions

The building is already in use right now. For this reason we do this practice with the idea that the works for reconstruction should be reduced as les as possible. Thus the fey shafts in the core area functioned as integral performance such as electricity, communication, fire control, as well the elevators and staircase, are kept without change.

Consequently we found the possibility of variable are reduced a little, in comparison with the worked results of other teams. From this point of view the existing may not be a best design solution, as for a pre-saled product.

## Proposal One

Floor Plan:  
Shaft & Wet Area

## Analysis

- In the beginning the core area are been studied, as the most important condition of restrain for OB development. Only three exits are available, thus if for adding more units, the only way is to extent the corridor.
- The potantial for adding new units will be restrict by the "L" shape of floor plan, because only with two of four directions the natural light are available with the facades: the lower one horizontal and the left one vertical. As for the upper one horizontal facade any intention to have more than one unit sharing it will cause a longer corridor for adding exit, which is not economical.

## Units Development

- In searching for possibility of the number and type of units in floor plan, we focus on the facade vertical on the left refering to its longest length, which means best probobility.
- We found tree is the largest number for units in this area, with area 30m<sup>2</sup> more for each.
- One thing interesting that there exist a certain margin, which means variable buffer zoon between two units, and the margin for one unit and two units plan remain consistence. But the margin for three units plan are in totally defferent locations. This could be a trouble in design that we have to varified.

## Discussion on Margin

The relation between layout of shafts, which should be the same for every floors, and the variable margin, which can be different in any floors, is the issue we want to concentrat with. Here are three ways supposed for them:

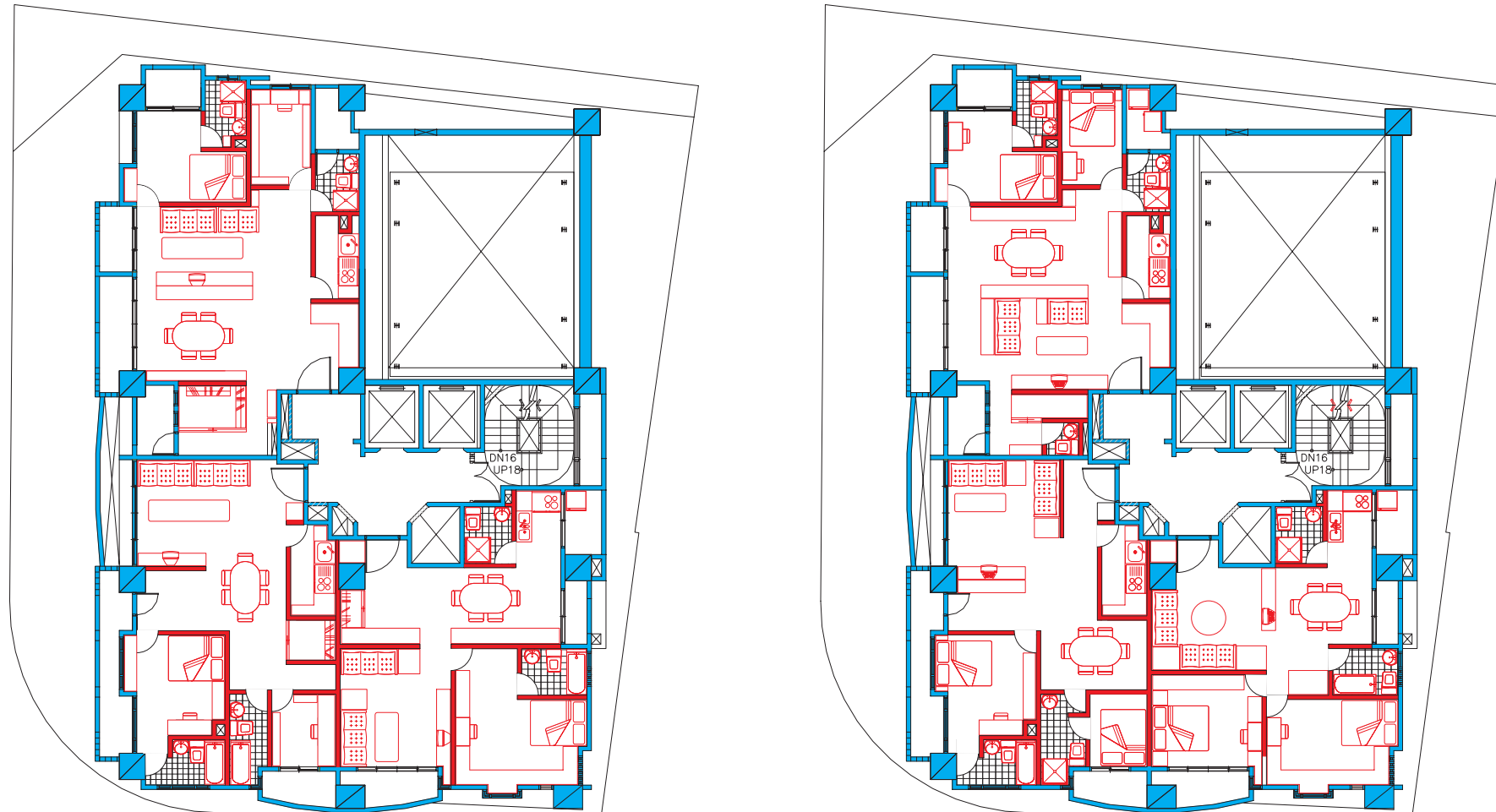
- The shafts are arranged within certain rules, for example along the eadge of the margin.
- No shaft inside or near the margin.
- Shafts are freely workable anywhere in the margin.

In our study with the two-units plan, it can be easily done that no shafts are located inside or near the margin.

More proposal were needed because with the three units plan the unit in the center are just the area of the entire margin, that it is necesssary to have at lease one shaft.



## Proposal Two



1. The original design is two large units; we redesign it from two units to three units by open building concepts.
2. We are not changed the original pipe shaft location.
3. There are two bathrooms in each unit; one of them is opening d esign for visitors using.
4. Right diagram: two bedrooms, one kitchen, one dining room, for small family.
5. Left diagram: one bedroom, one kitchen, one dining room and one study room, for couples but no kids
6. Thinking the ambient light and ventilate, there are windows set in the dining room, living room and bedrooms.
7. The entrances of the three units are set in three different directions, to avoid disturbing each other when everyone gets into or out the entrance.
8. The pipe shaft location is set on outdoors; the first reason for thinking the distance from the pipe shaft location to bathroom can be as shorter as possible, the second reason for avoiding digging the opening in each inside floor, the third reason for building, fixing and checking conveniently
9. The walking path should be convenience.

## FOURTH OB EXERCISE: JULY 19<sup>th</sup>

### FAÇADE KIT OF PARTS

## FOURTH OB EXERCISE: JULY 19<sup>th</sup>

In this final exercise, the purpose is to explore the design and use of façade “kits of parts”. Facades, whether they are entirely base building or partly infill, can be seen as a composition of elements that together make an entire building façade. These elements are walls, windows, doors, balconies, decorative features, and so on. Façade elements are often made off-site. The façade elements are themselves made of many individual parts. Some of these parts were made for use in any building (like glass, bricks and tiles, concrete panels, steel shapes, window systems). Many of these parts are further manipulated to make the façade elements. The production of façade elements is therefore a series of steps, involving many parties and many parts. A major distinction in the kinds of parts is whether they are made for a specific assembly (custom or site dependant) or are made to go in any assembly (stock or site independent).

Your team's task is to design a kit of façade elements for the townhouse your team worked on before. Imagine you are a consultant to a façade element manufacturer, who wants your advice on developing a new catalogue of façade elements. To do so, your team needs to decide:

1. Is the façade you are thinking of entirely a base building decision or is part of it decided as infill? Whichever answer you give will lead you down a different design and technical path.
2. Is the kit of parts for just one townhouse, or for a particular grouping, or for use in any townhouse in a certain region?
3. What are the “rules” for arranging the elements? Are there certain adjacency rules, or can any part go anywhere?

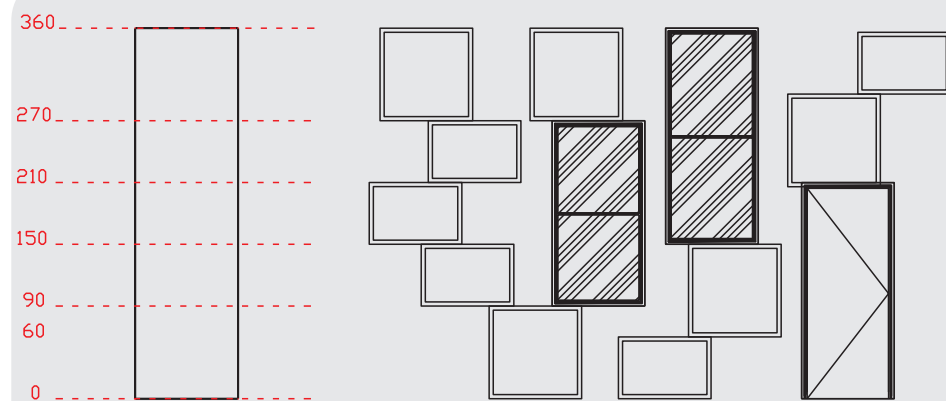
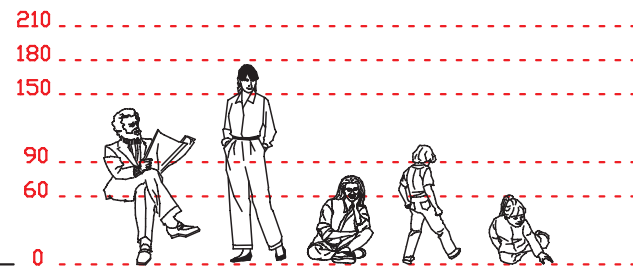
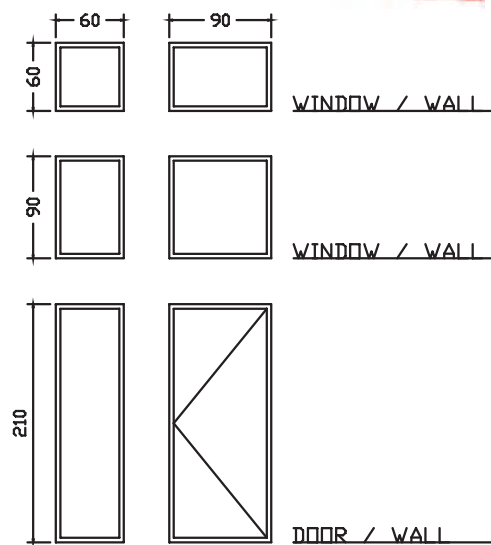
#### What to show in your drawings:

- a. The elements of the façade kit, clearly distinguishing between base building and infill elements. Note materials, colors, and basic interface details.
- b. Rules for composition; that means making clear what the constraints are that a user of the kit must follow.
- c. A “fictional” composition using the kit (to illustrate the idea)

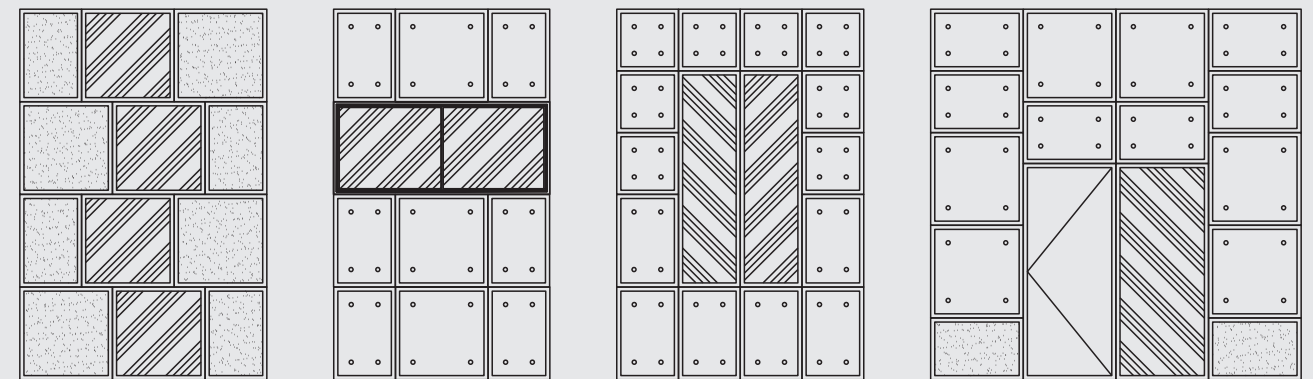
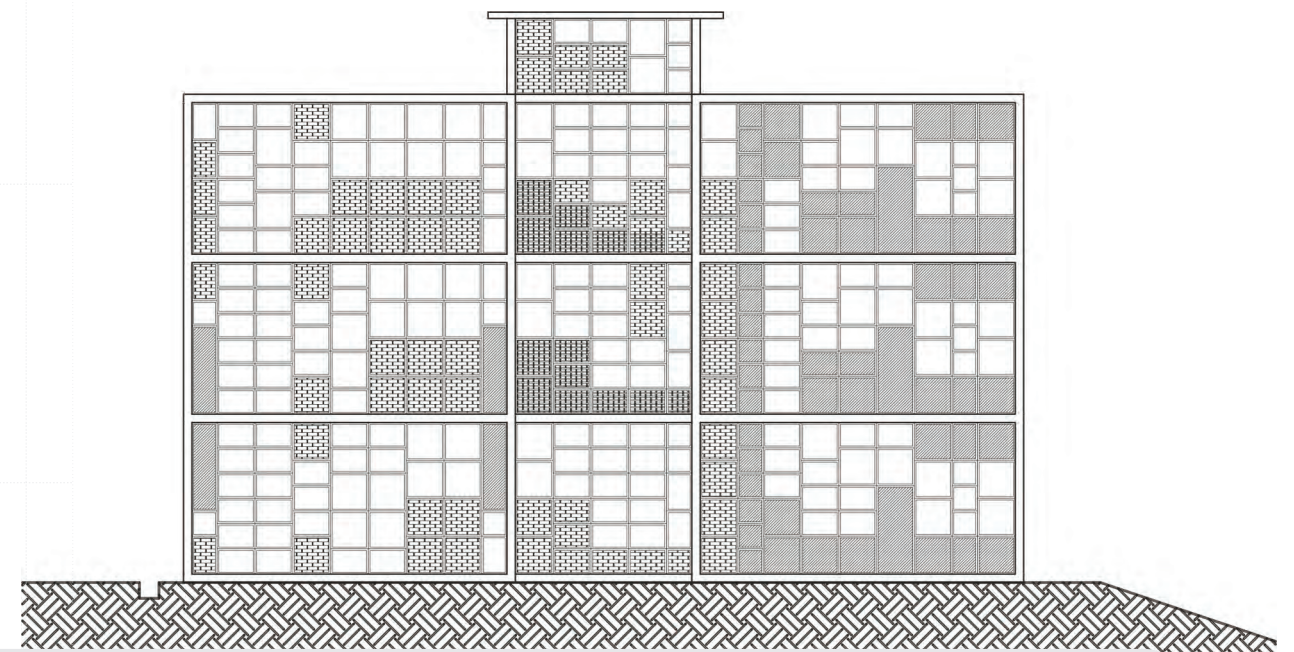
In the last class, each team is to use any façade element from the class, and to design two adjacent townhouse facades. In doing so, find inspiration from an architect you admire, whose work includes any kind of residential architecture. Name the architect, and show the elements you've selected (your own or some from other teams' kits of parts) for use in the two facades you design.



## FACADE KIT OF PARTS



module type



simulation

## Summary

In this exercise, the purpose is to explore the design and use of facade "kits of parts". Facades, whether they are entirely base building or partly infill, can be seen as a composition of elements that together make an entire building facade.

These elements are walls, windows, doors, balconies, decorative features, and so on.

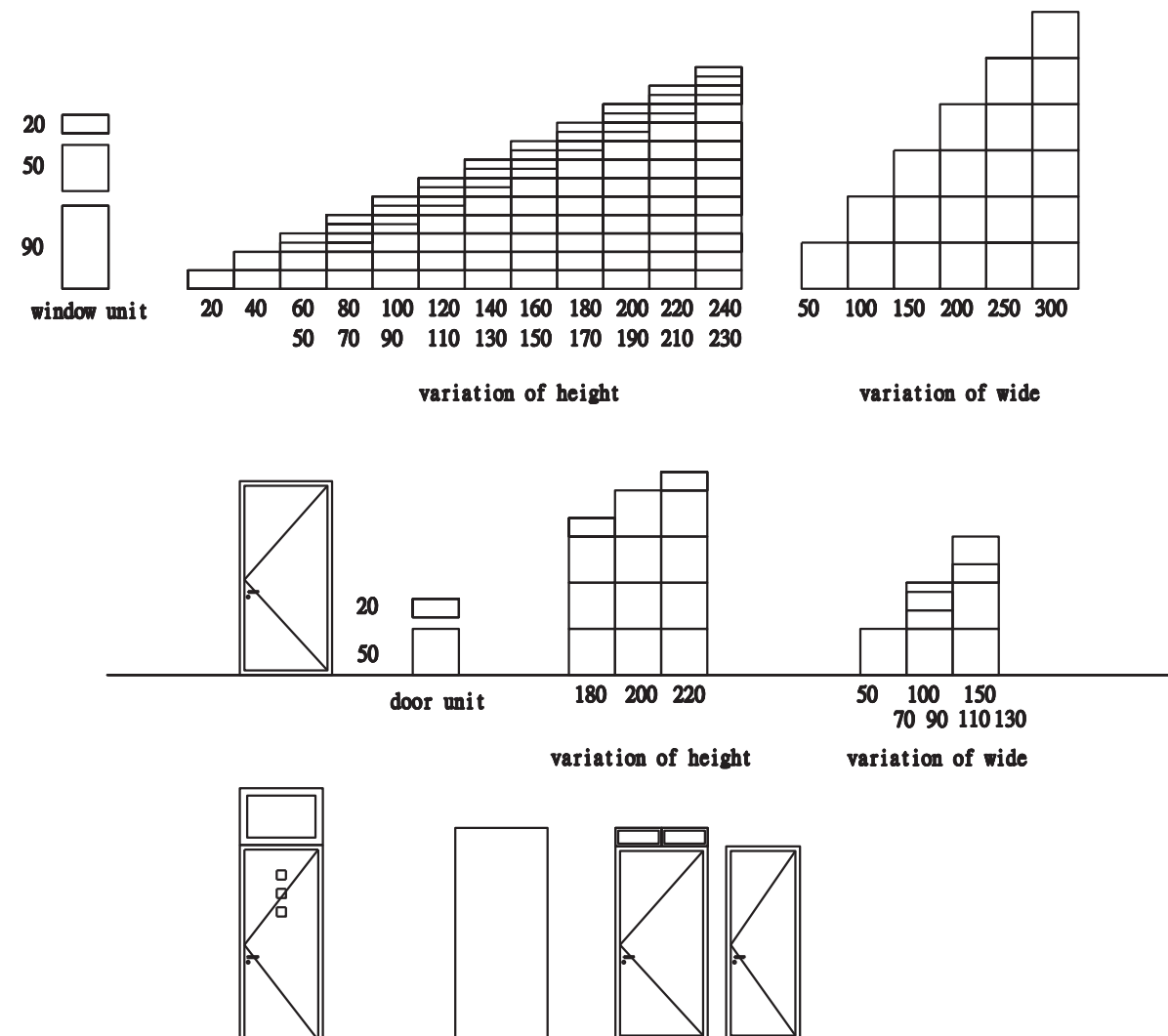
Finding the scale of facade modular from human scale.

90cm could be a safe altitude for 3.6 meter.

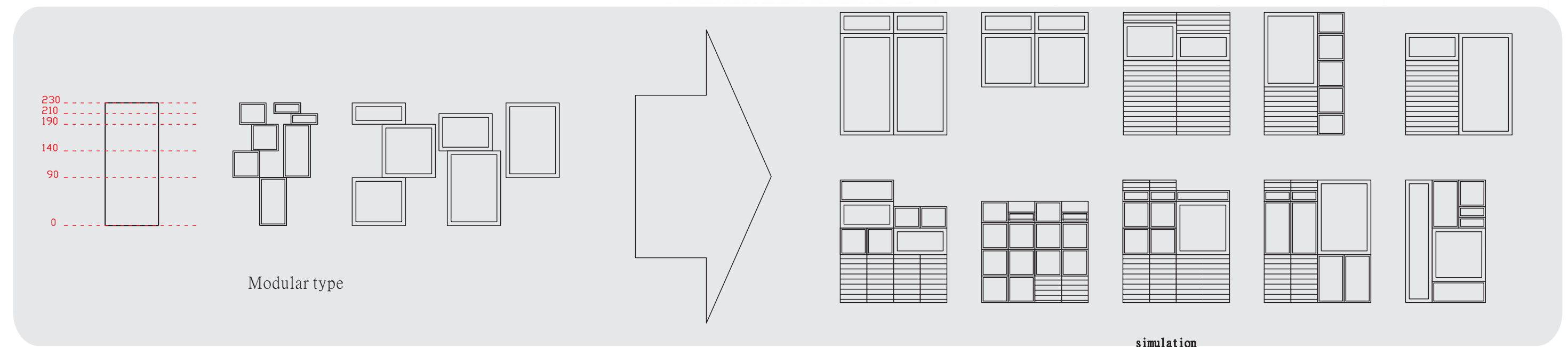
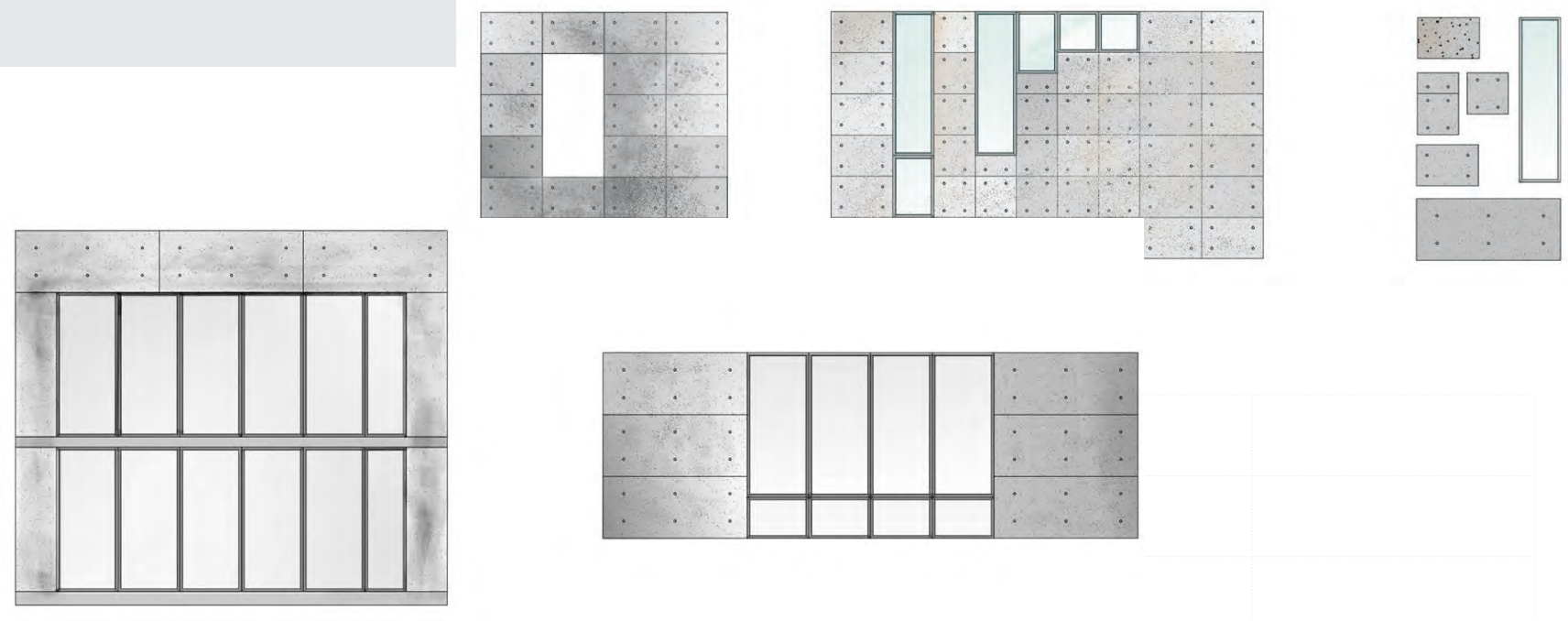
The window is 1.2 meter high. 60cm is safe to children, and they won't drop in this altitude.

From above, can make sure to use 90cm and 60cm for the modular is O. K.

90cm and 60 cm can fit in any facade scale when it's size are  $90n+30$ ,  $90n+60$  or  $90n$ .

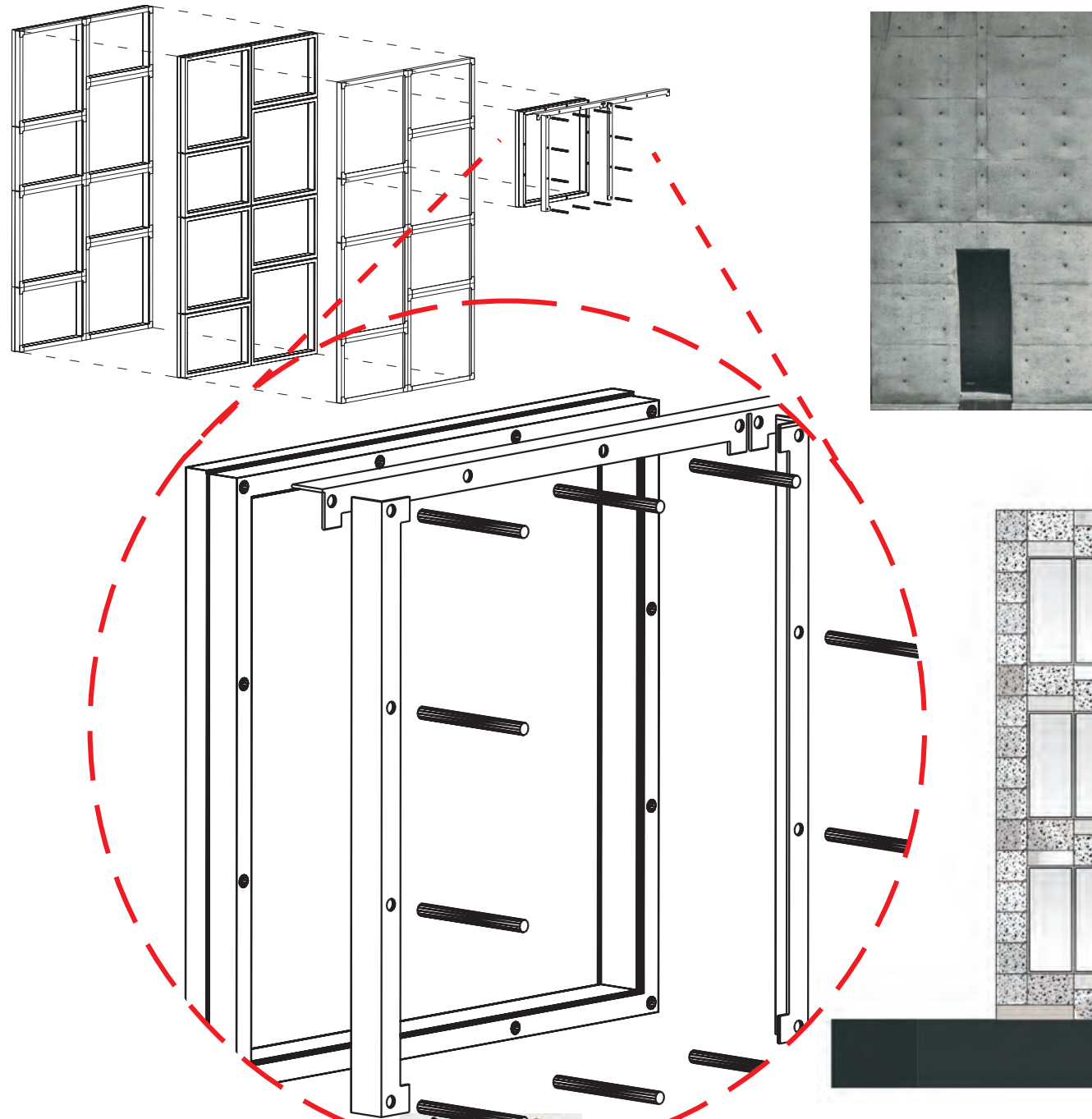


In this exercise, we are trying to imitate the architecture, Tadao Ando.  
 From his work, we can find out some material that Tadao Ando like to use.  
 For example: concrete, vertical & horizon elements.  
 After taking off the formwork, it's all done without any painting.  
 We tried to use frame and infill to think what might Tadao Ando want.  
 Select material, infill 90cm and 60cm modular, then combine them to become a facade.  
 The frame is fixed, we can put different materials, colors, interface details to create different feelings facade, like the drawing below.



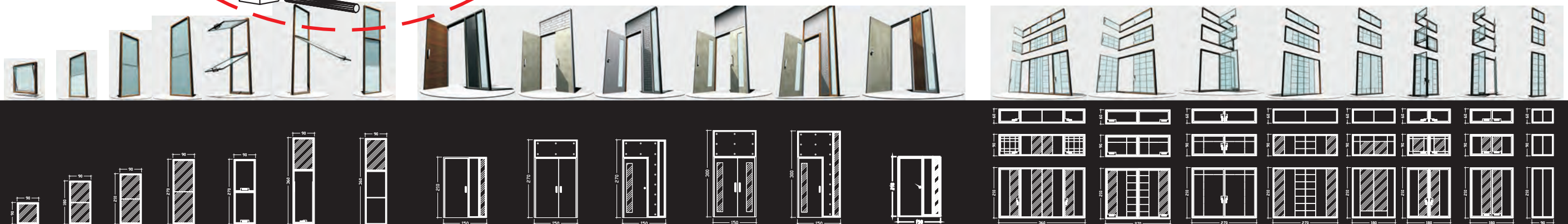


## FACADE KIT OF PARTS



## Summary

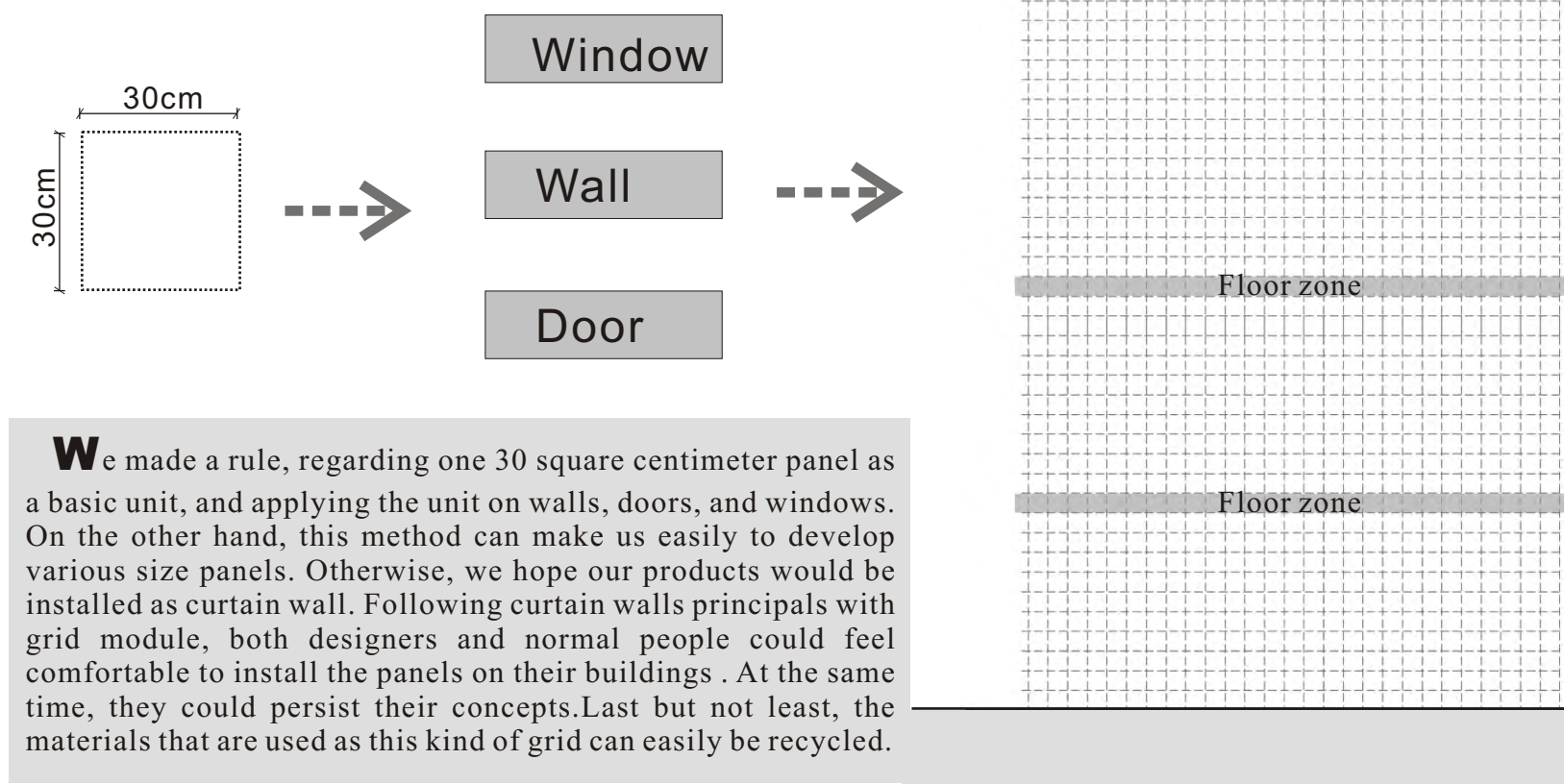
During exercise 4.2, we added more modular unit from 6 to 20. The purpose is to use the modular unit as much as possible in the building. Another way we did is to refer to "Team 8's frame structure". We added L shape steel component in 90cm and 60cm modular units. It can decrease the way unit pass force with unit, and can decrease the original modular section.



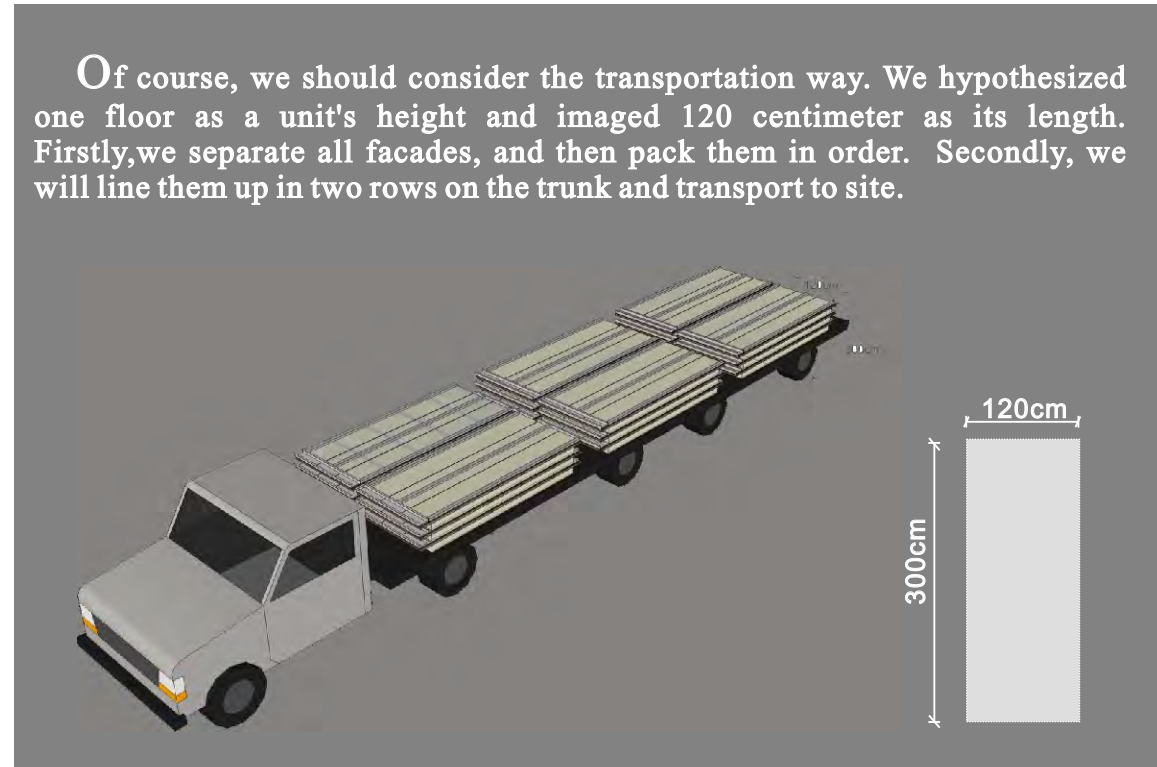




EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT



**W**e made a rule, regarding one 30 square centimeter panel as a basic unit, and applying the unit on walls, doors, and windows. On the other hand, this method can make us easily to develop various size panels. Otherwise, we hope our products would be installed as curtain wall. Following curtain walls principals with grid module, both designers and normal people could feel comfortable to install the panels on their buildings . At the same time, they could persist their concepts.Last but not least, the materials that are used as this kind of grid can easily be recycled.

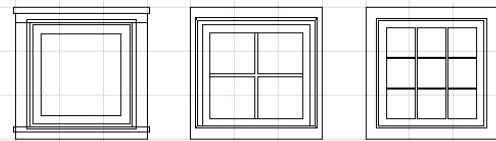


**O**f course, we should consider the transportation way. We hypothesized one floor as a unit's height and imaged 120 centimeter as its length. Firstly,we separate all facades, and then pack them in order. Secondly, we will line them up in two rows on the trunk and transport to site.

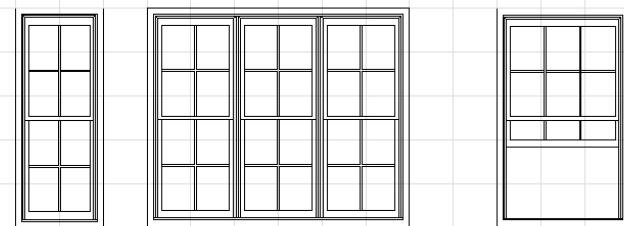
### Wall

	Fiber-cement sheets, perforated	
	Wood	
	Stone	
	Brick	
	Concrete	
<div>Aluminium</div> <div>Lead</div> <div>Bronze</div> <div>Weathering steel</div>	Metal	
	Polycarbonate corrugated sheets with UV-resistant coating	
	Solar energy board	

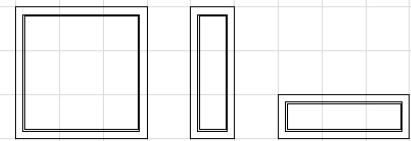
## Window



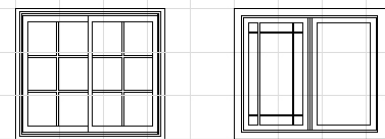
Top-hung window



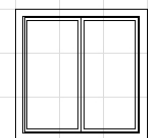
Vertical sliding window



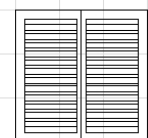
Fixed window



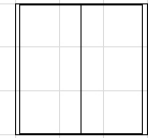
Horizontal-pivot window



Side-hung window



Venetian blind

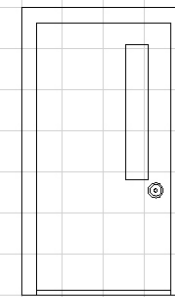


Plywood shutter

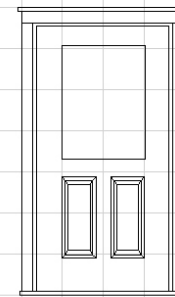


Plywood shutter

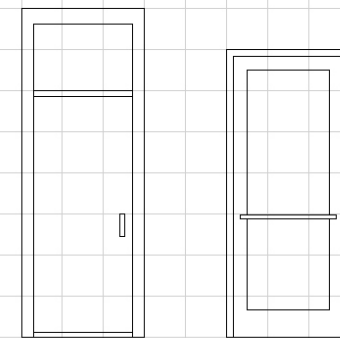
## Door



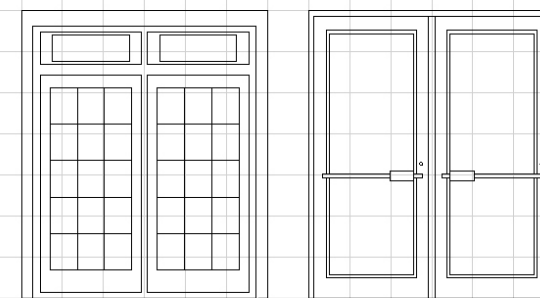
Singal door



Singal door



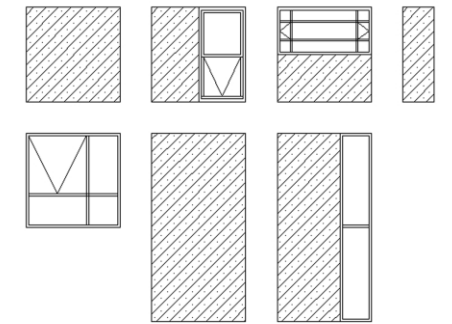
Singal door



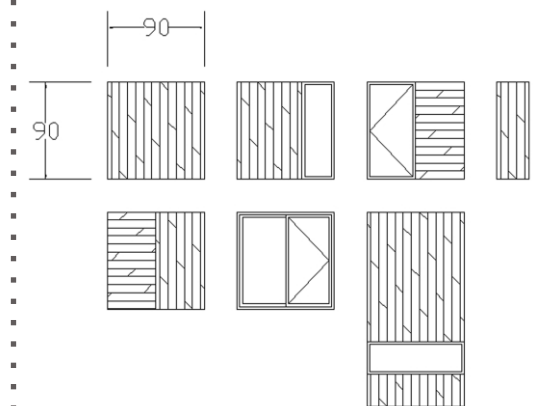
French door



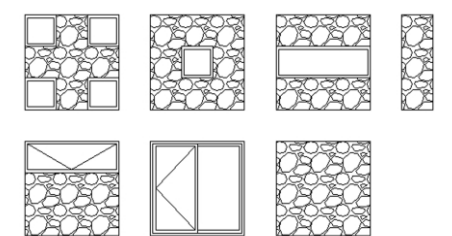
## Various complexity items



Concrete



Wood



Stone



# EXPLORING CONSTRAINTS OF A FLOOR AREA IN A CONVERSION PROJECT

**M**eeting Dr. Kendall's demand, we should pick the materials from the products designed by ourselves. Otherwise, each of us will stimulate a world wide famous architect to design the town house. In the past, we already know that facade has more opportunities to replace or change. So we will design the facade with our crafts. In our group, Ko Yang Lin will offer one solution related to the famous American Architect Institution, Morphosis. The other guy, Gen Han Lee, will offer his work involved in Glenn Murcutt.

I tired to use the materials which Murcutt prefers and stimulated applying them in his simple aura to compose the townhouse facade. Giant window opening, elegant way to use Venetian blind, wood, and hanging roof are his works characteristics. He not only is good at using the Low-tech materials like all above things to respond to the climate situation, but also can use them to present his concept, particular in high quality facade.



Figure 3 material resources

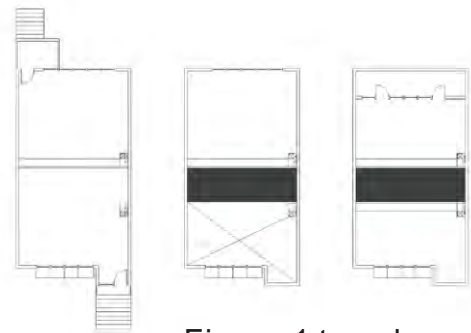


Figure 1 townhouse plans



Figure 2 Murcutt Design



Figure 4 front facade

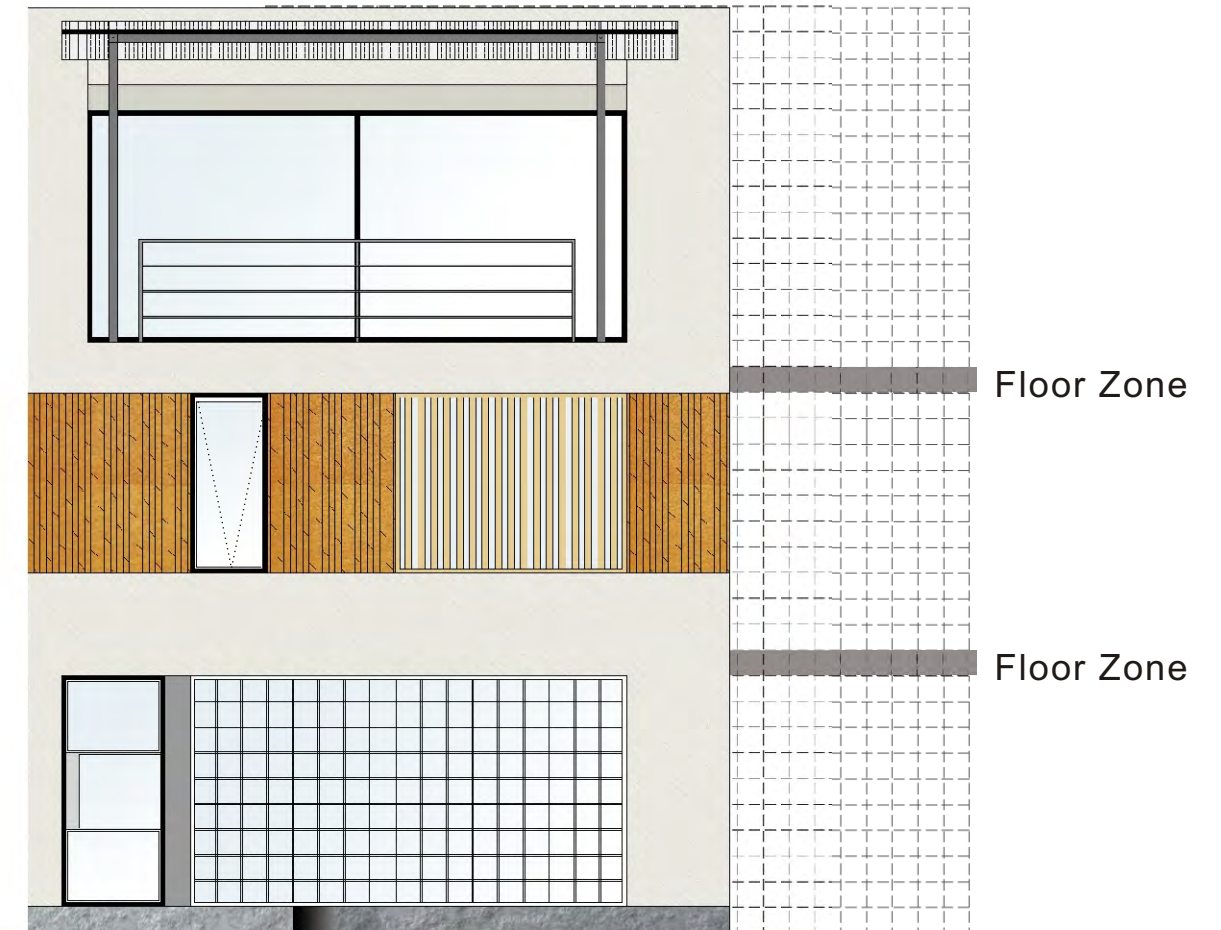


Figure 5 back facade

Reference Architect \_ GLENN MURCUTT  
Designer \_ GenHan Lee



We tried to think on these famous Architect feet, even though they have no experience to design any townhouses. Ko Yang Lin hypothesis Morphosis mind and compose different materials in one facade. KuoPin Lin tried to think the same as the most popular Japanese architect Tadao Ando.

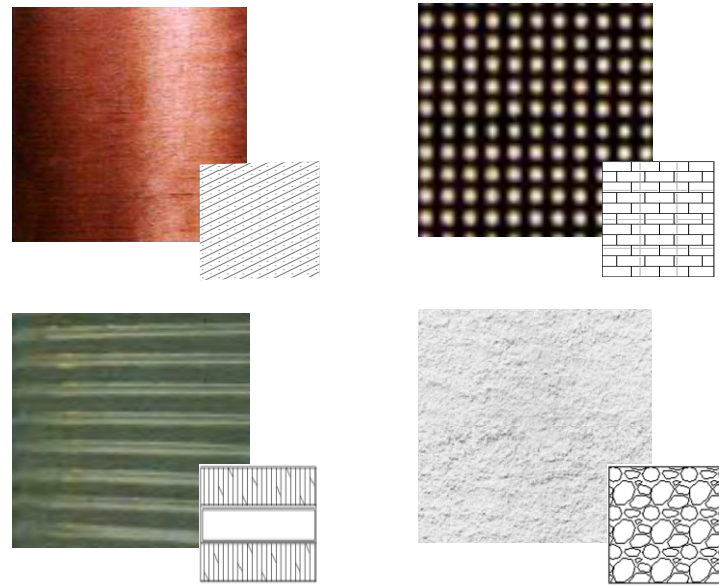
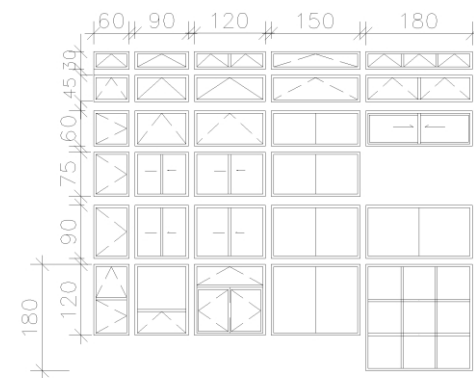
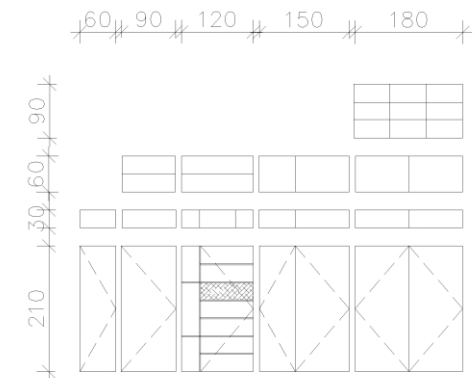


Figure 7 material resources



Window size



Door size

Figure 9 material resources

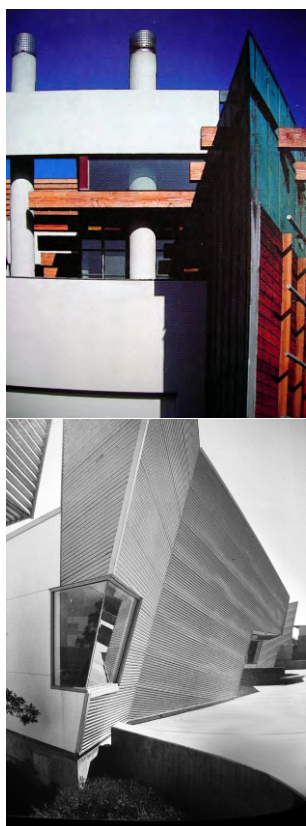


Figure 6 Morphosis

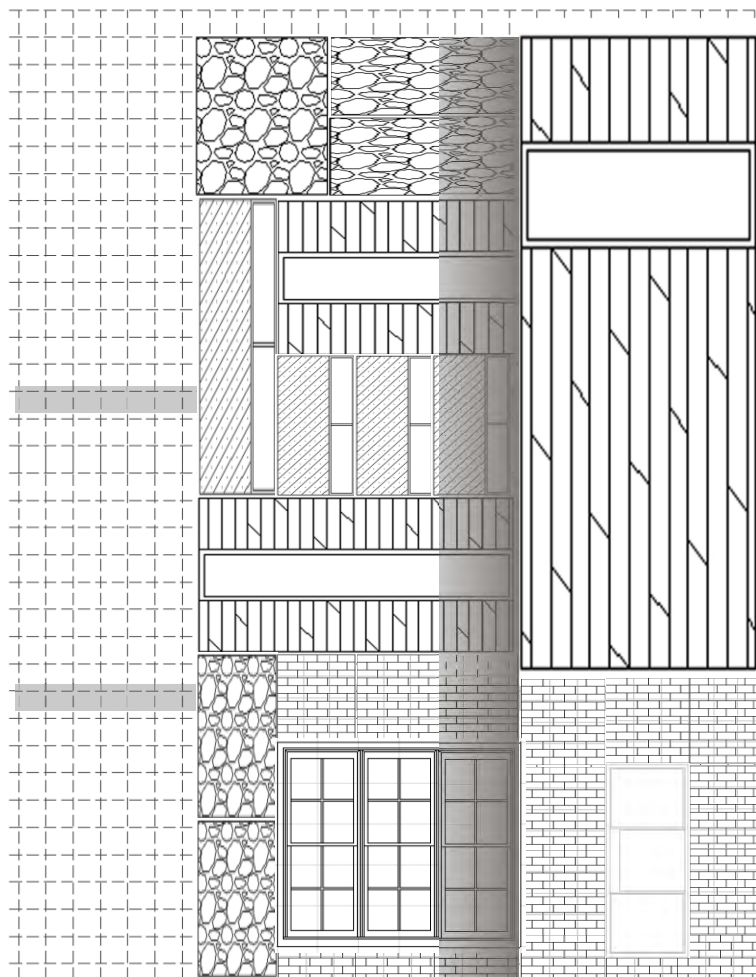


Figure 8 front facade



Figure 10 front facade

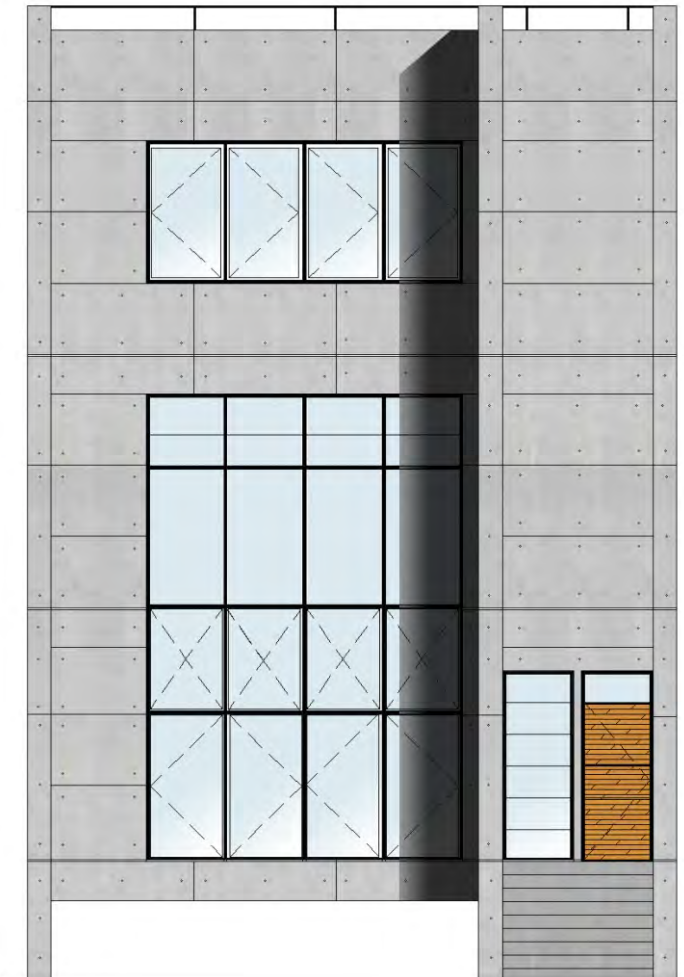


Figure 11 backt facade

Reference Architect \_ MORPHOSIS  
Designer \_ Ko Yang Lin

Reference Architect \_ TADAO ANDO  
Designer \_ KuoPin Lin



## FACADE KIT OF PARTS

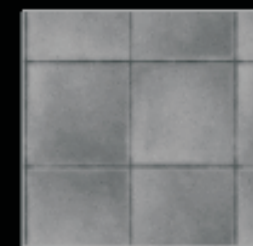


TADAO ANDO  
imitate

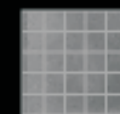


Three basic element  
of Andos design

- 1.cross
- 2.oringinally of its material(concreat wood)
- 3.the shape is clean and easy



exposed form



Unit 2m\*2m



Unit 2m\*2m



Window  
2m\*2m



Slid window  
2m\*2m



Slid window  
1m\*1m



Pull window  
1m\*1m



Fix window  
1m\*1m



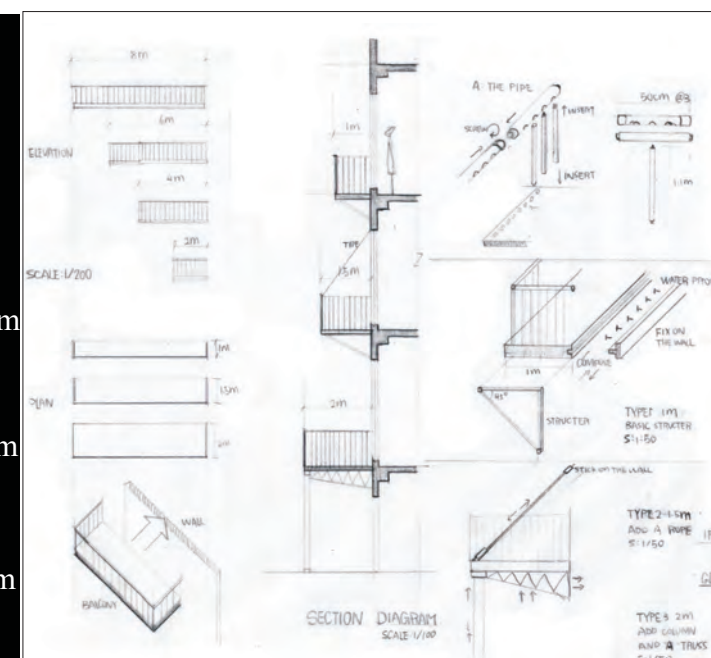
Unit 1m\*2m



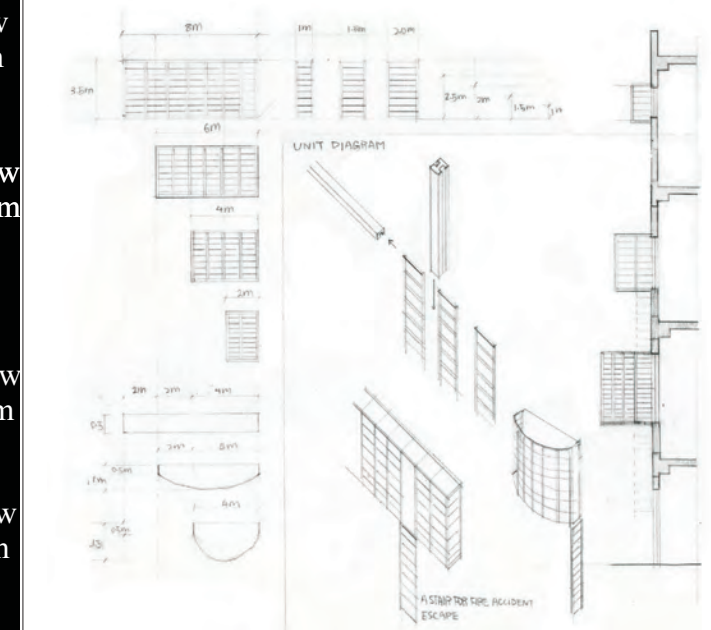
Slid window  
1m\*2m



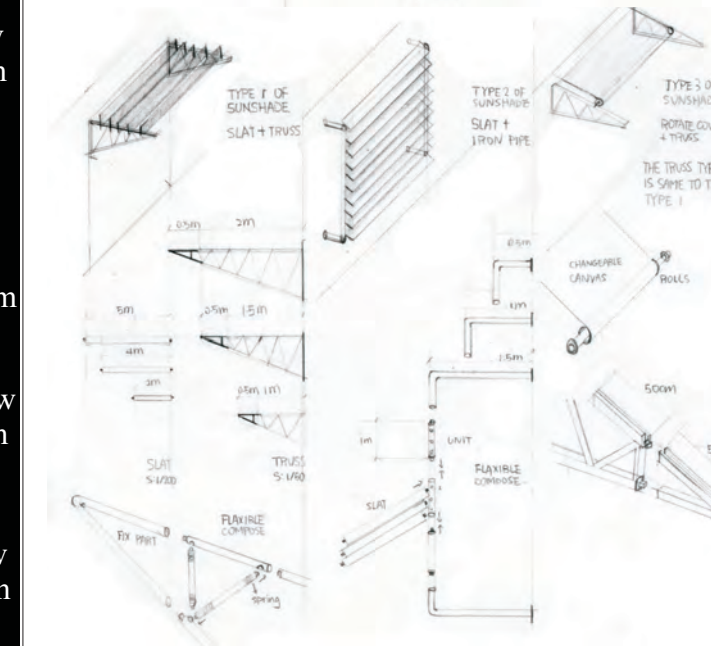
Fix window  
1m\*2m



Balcony  
system



Iron crating  
system



Sunshade  
system





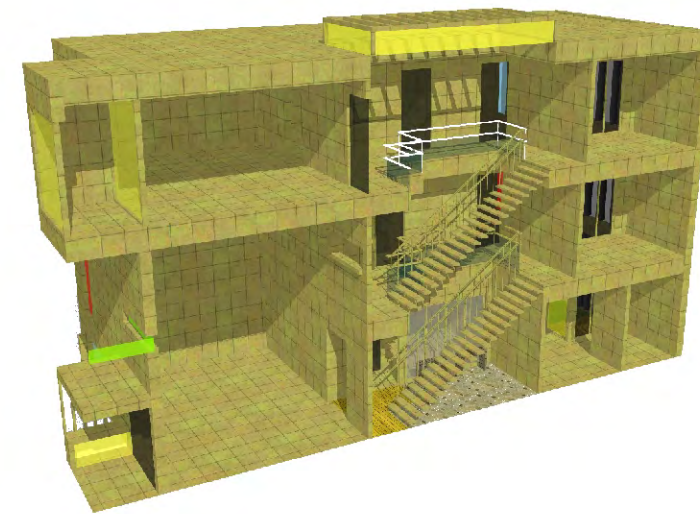
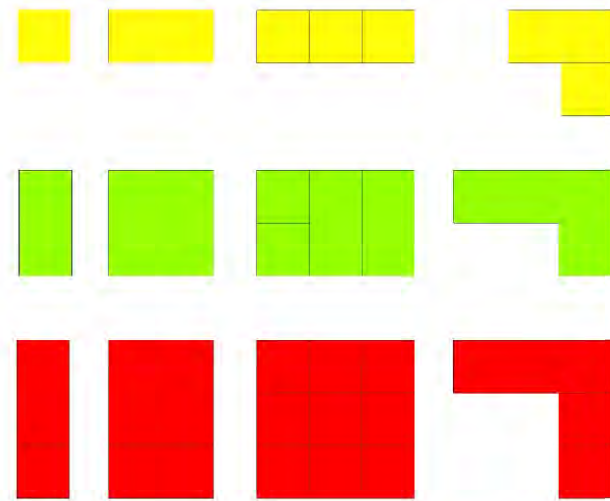
FACADE KIT OF PARTS



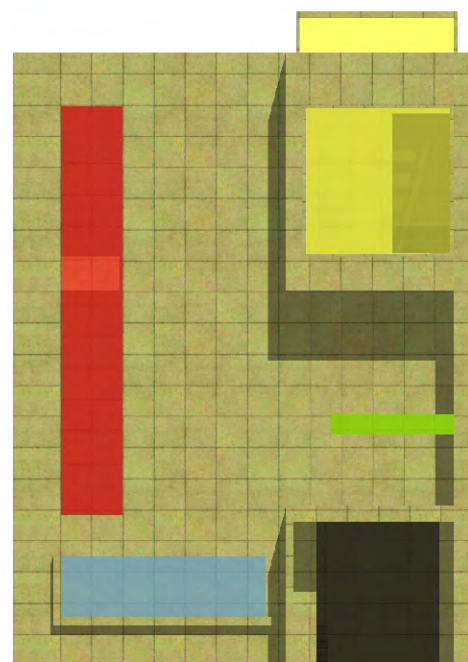
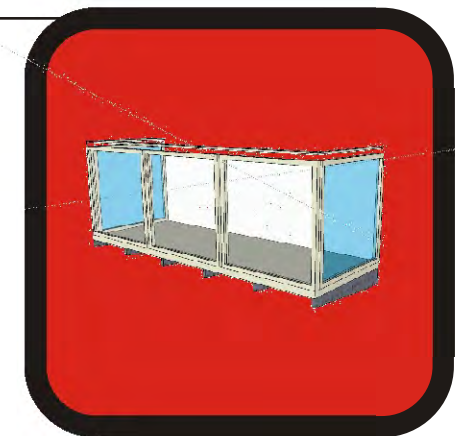
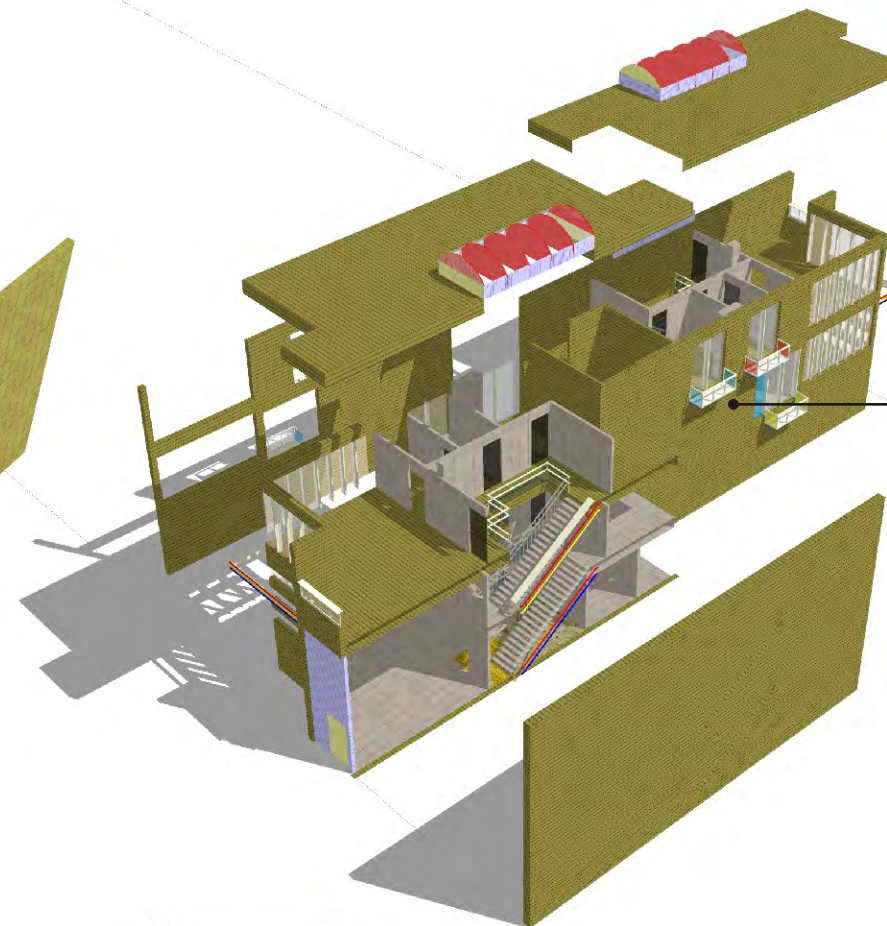
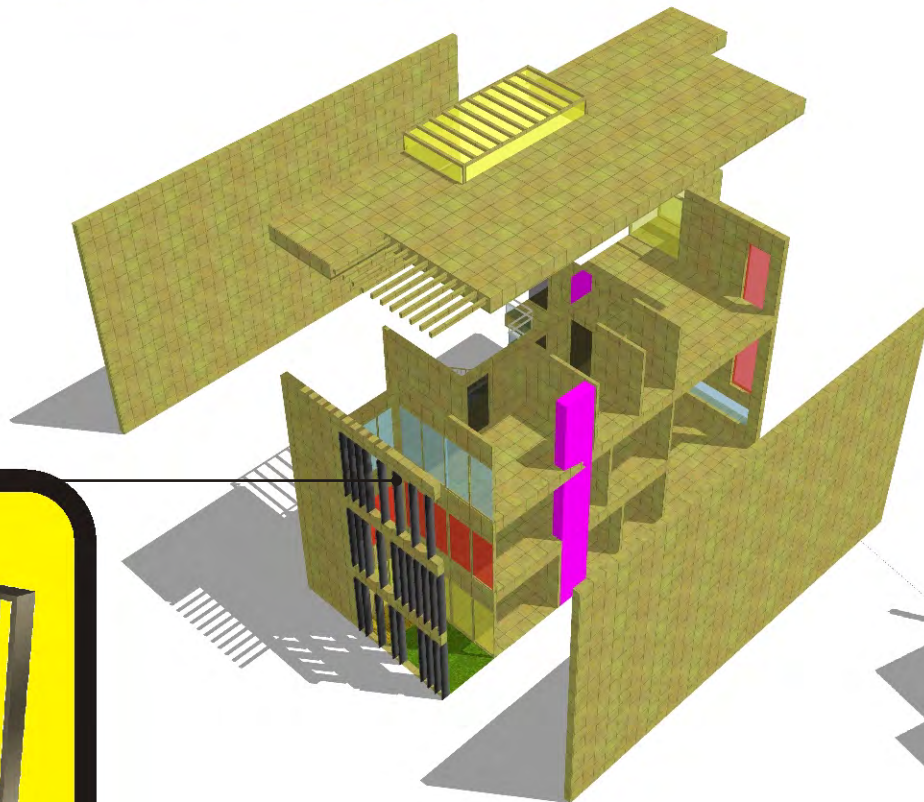
Reference Architect: Ralph Erskine







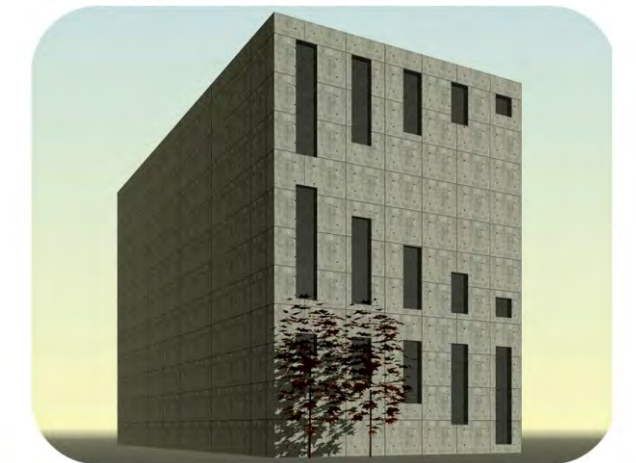
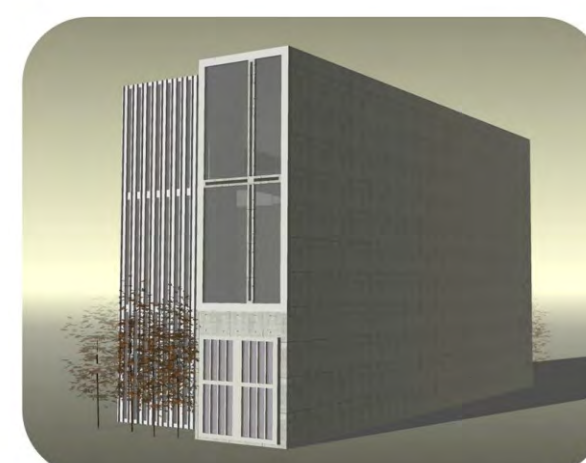
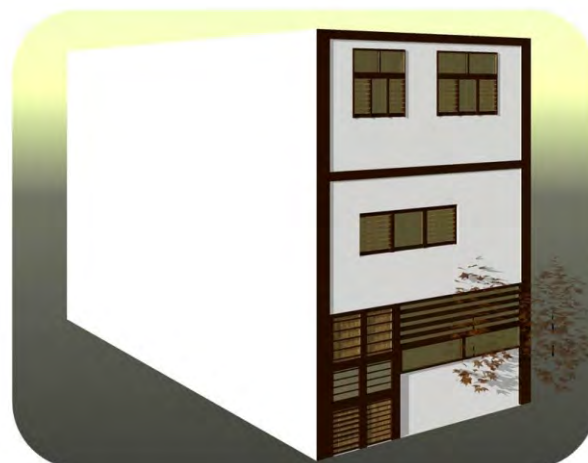
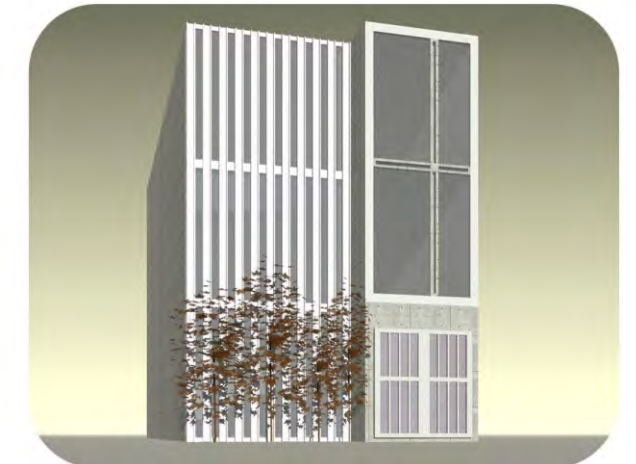
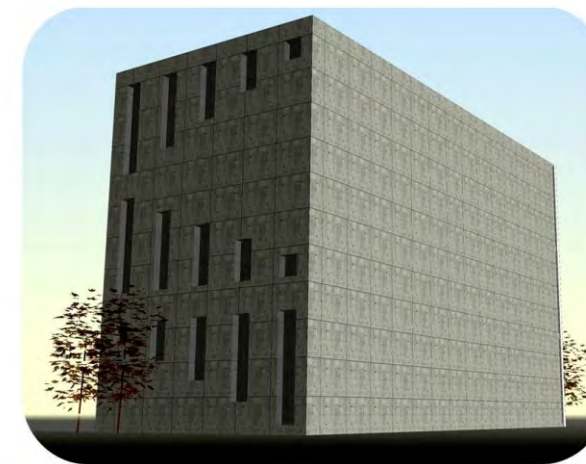
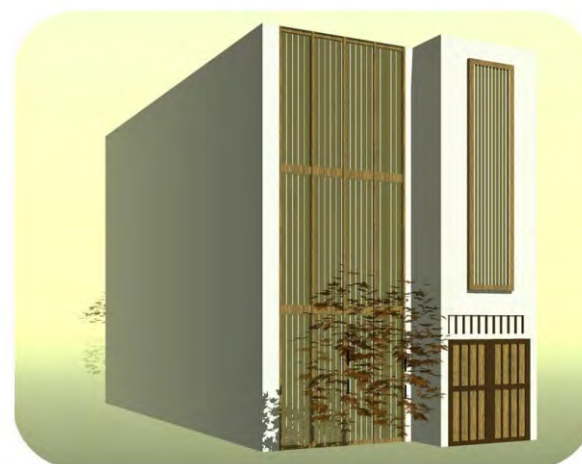
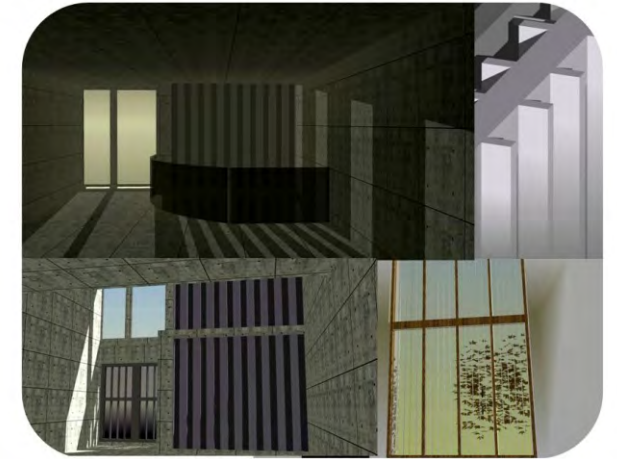
We attempt to create an environment where the occupants can benefit from the advantages of a tightly knit community while allowing a feeling of ownership through a relaxed composition.



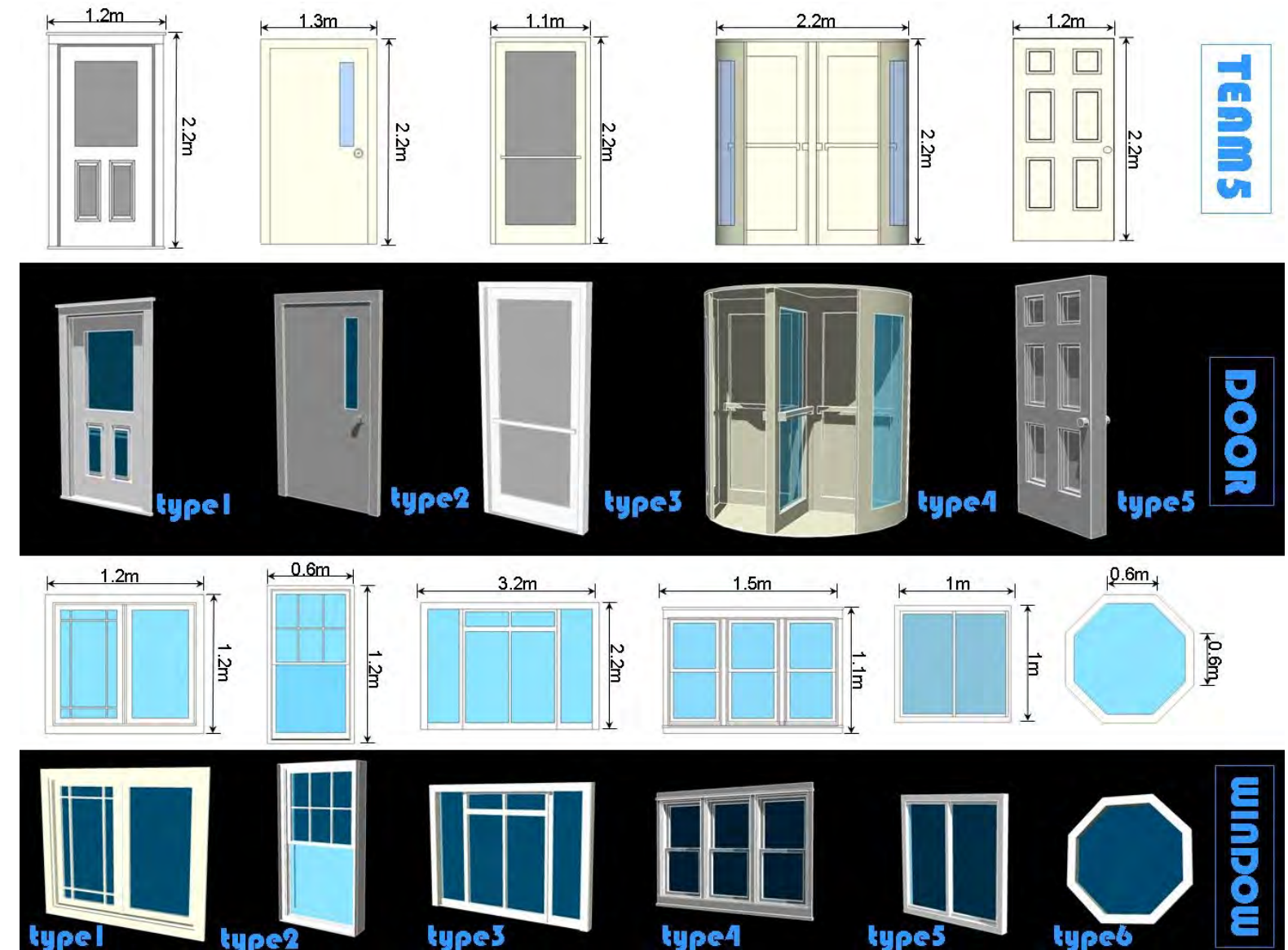
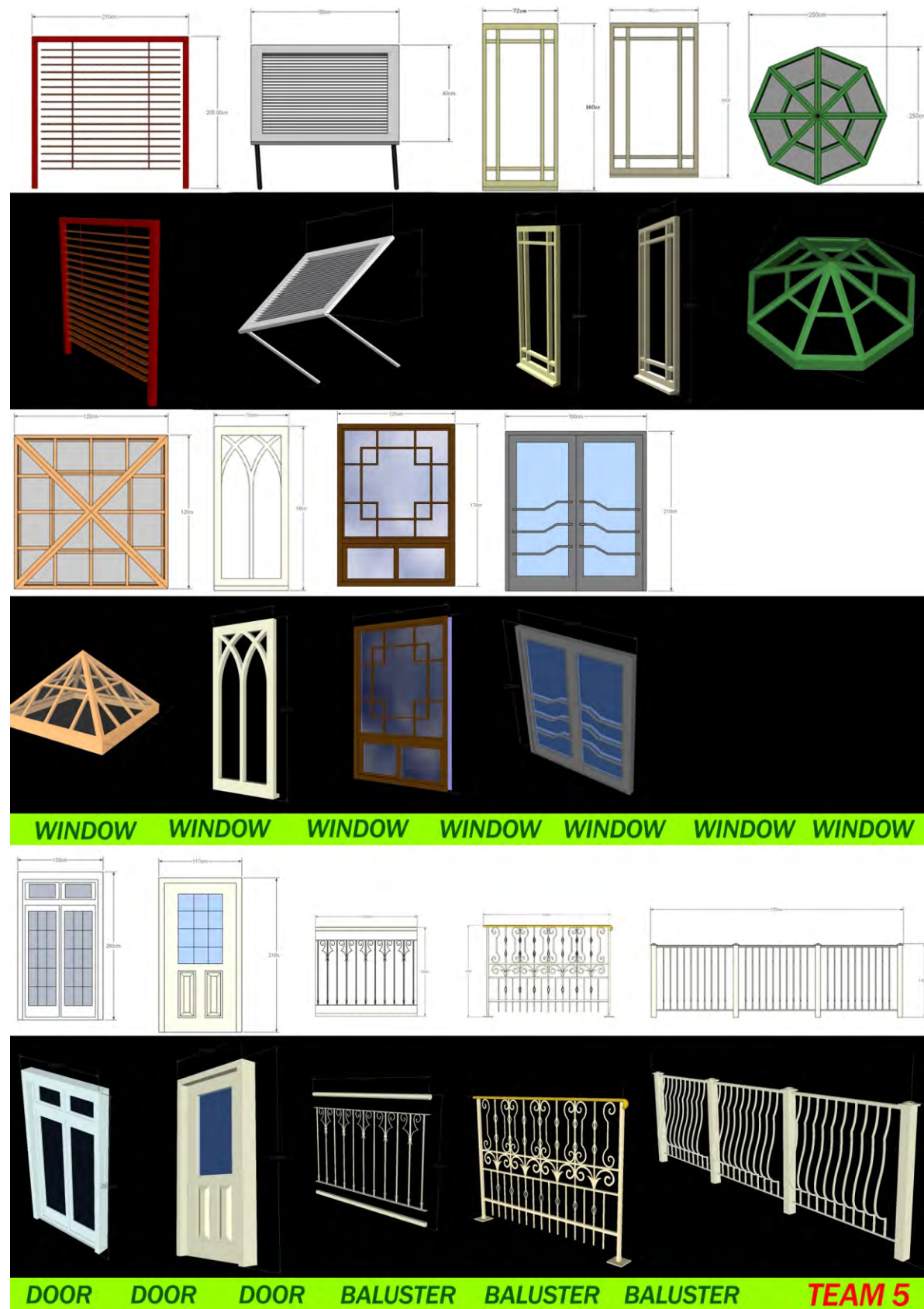
**EN STUDIO** presented

WORKSHOP ON OPEN BUILDING IMPLEMENTATION  
National Taiwan University of Science and Technology  
Department of Architecture / July 2007  
Visiting Professor Stephen Kendall, PhD, Ball State University, USA



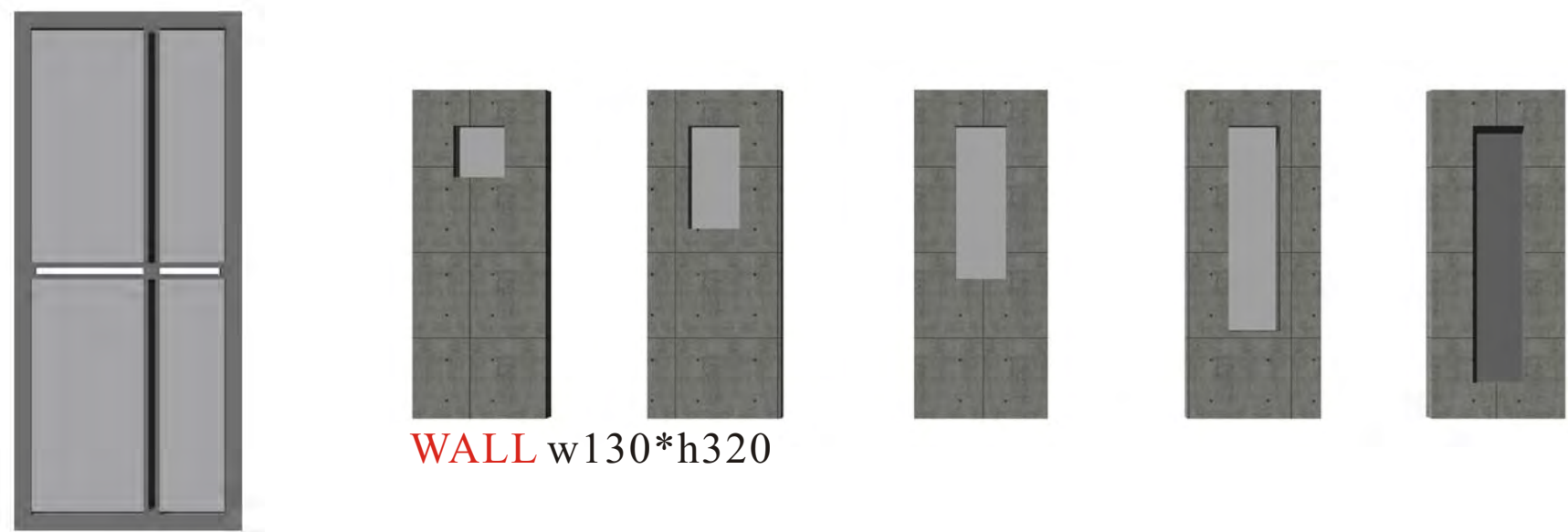








FACADE KIT OF PARTS



WALL w130\*h320

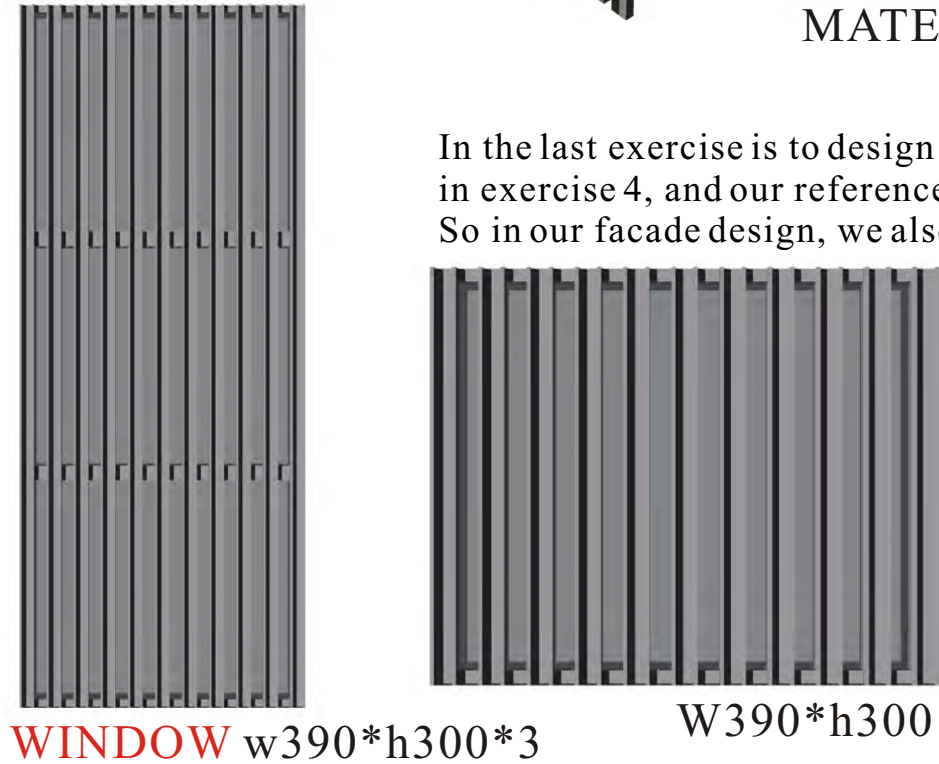
WINDOW w280\*h640



DOOR w280\*h320

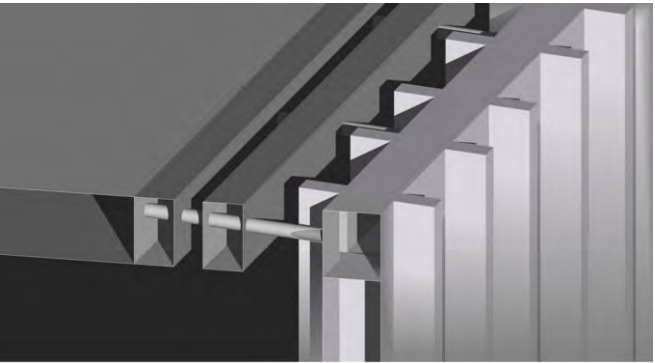
MATERIALS

In the last exercise is to design the facade for the townhouse we did before in exercise 4, and our reference architect is Ando Tadao. The style of this Japanese architect is to make people believe “less is more” . So in our facade design, we also try to illustrate this idea, simple but elegant; understated but powerful.

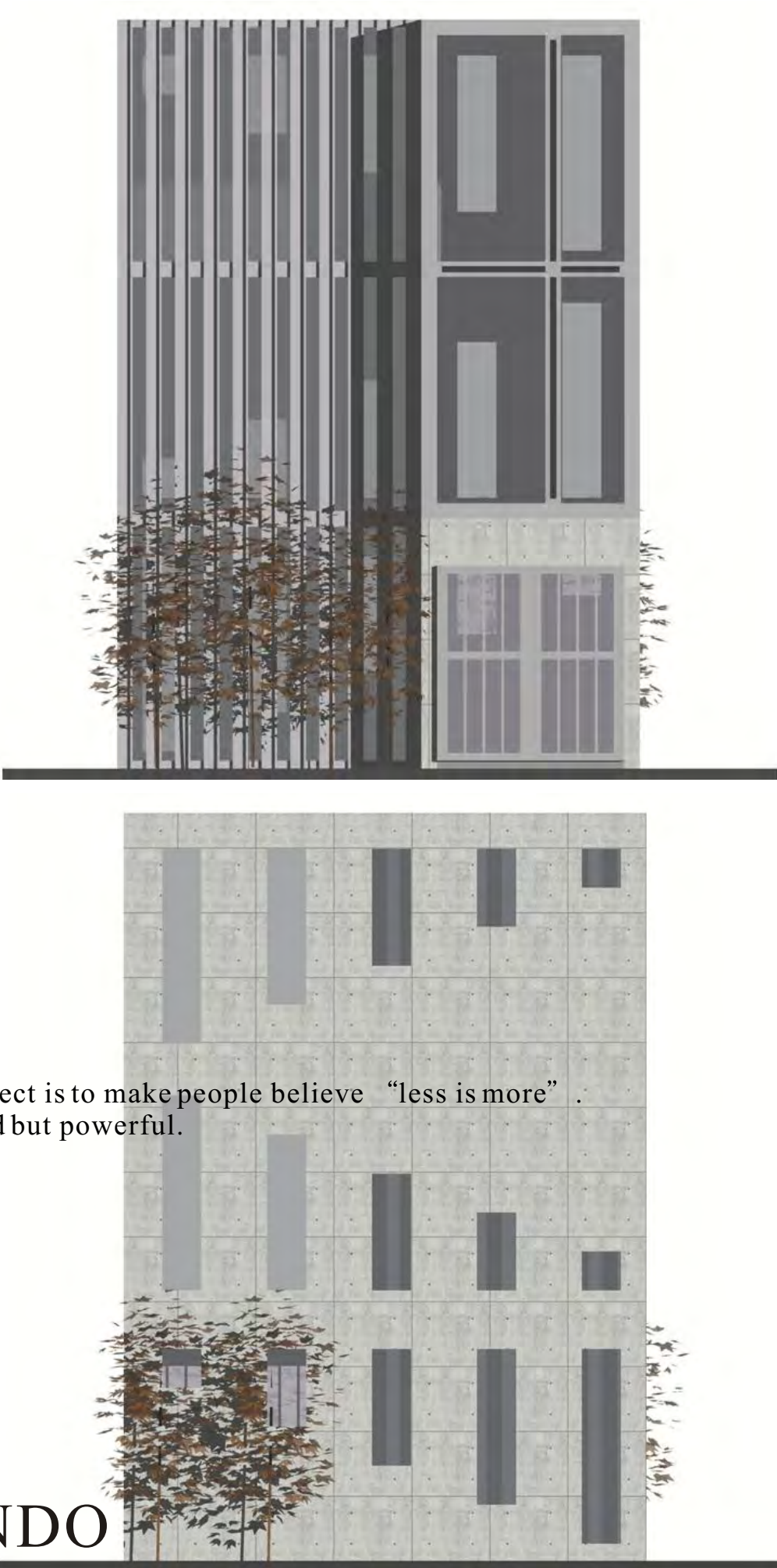


WINDOW w390\*h300\*3

W390\*h300



TADAO ANDO



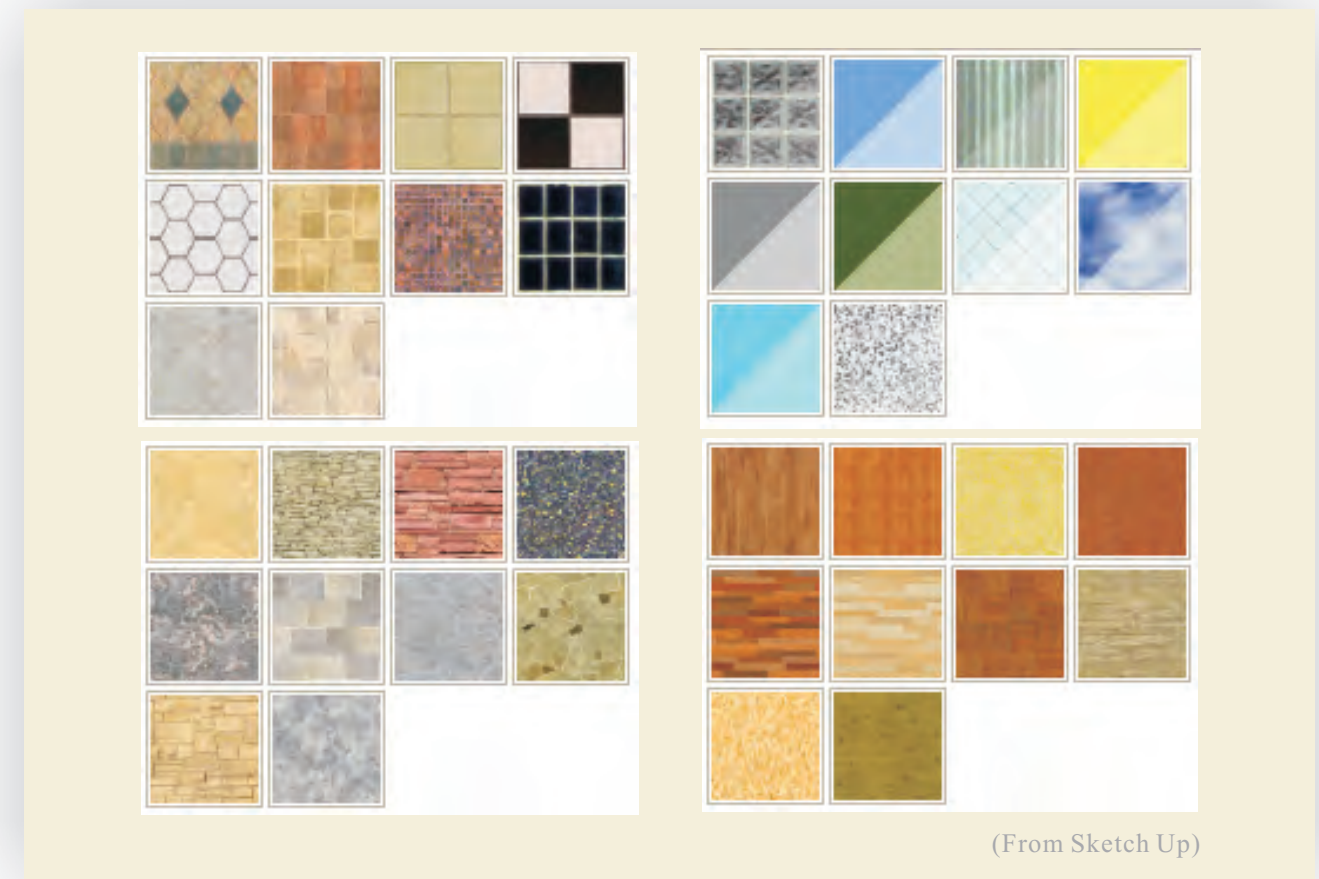




## FACADE KIT OF PARTS

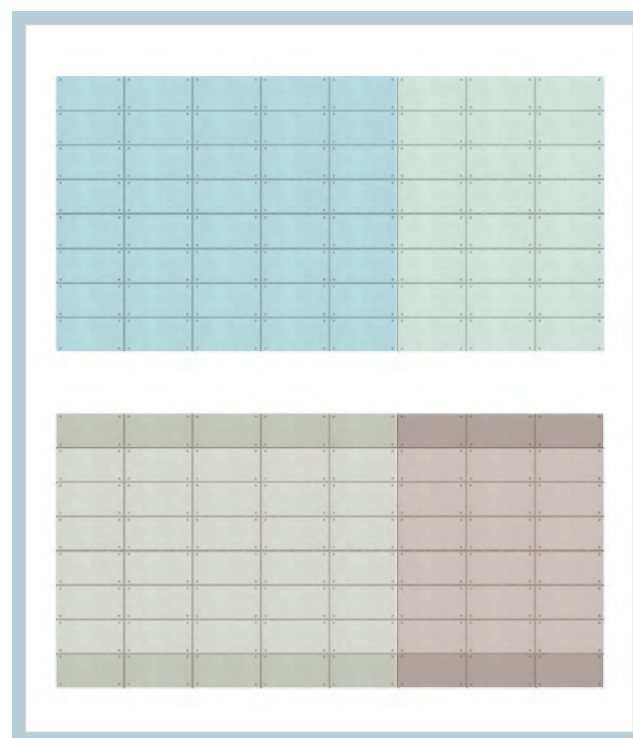


Door



(From Sketch Up)

Material



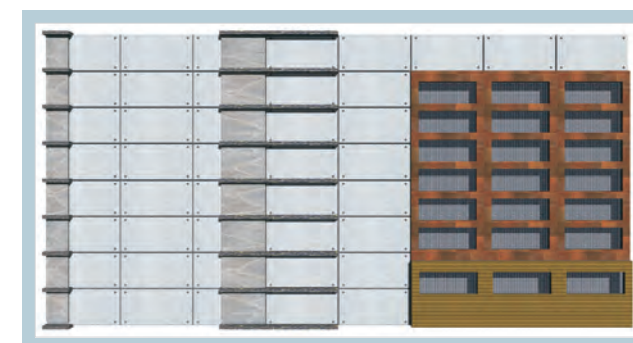
Facade divide



Window



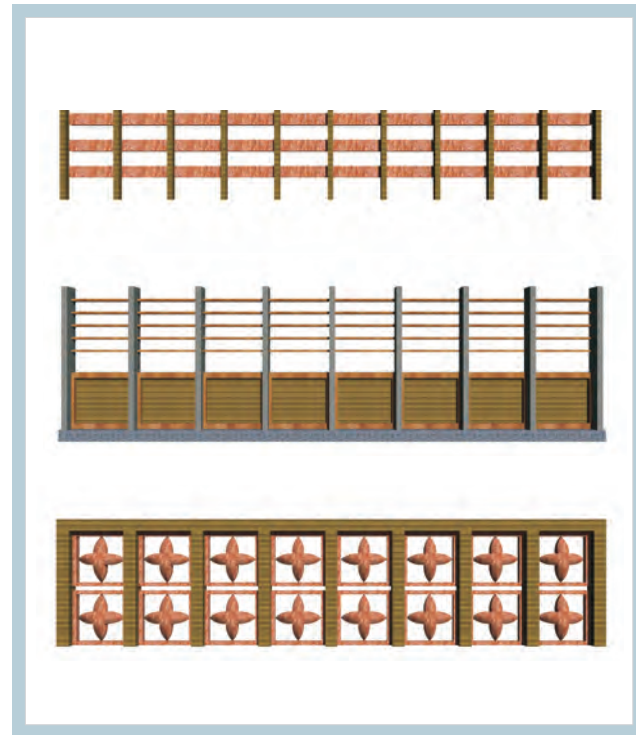
Wall



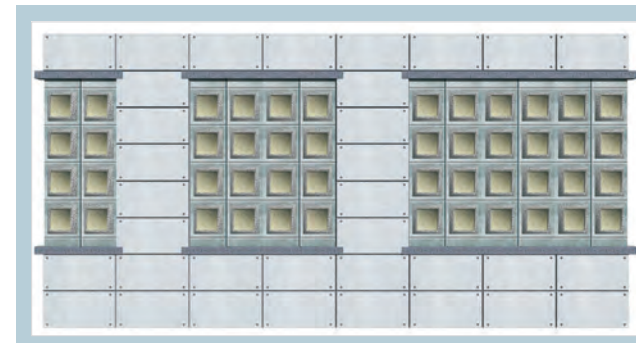
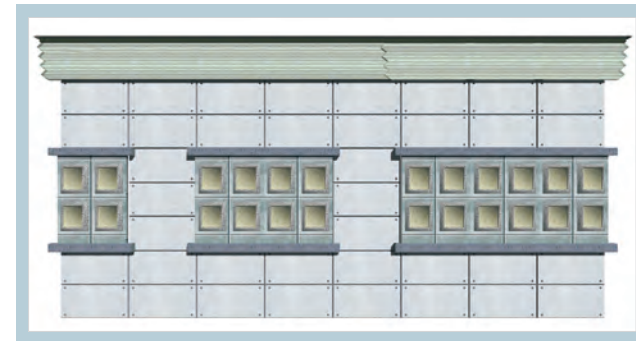
Window



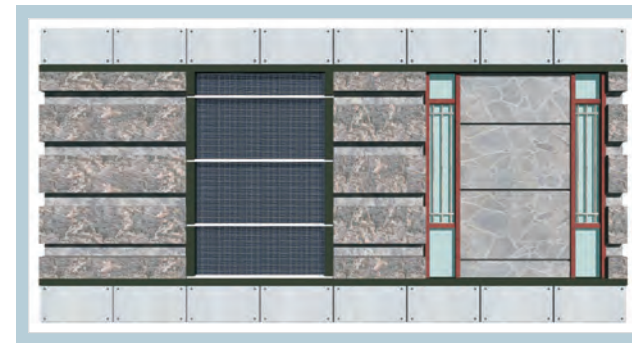
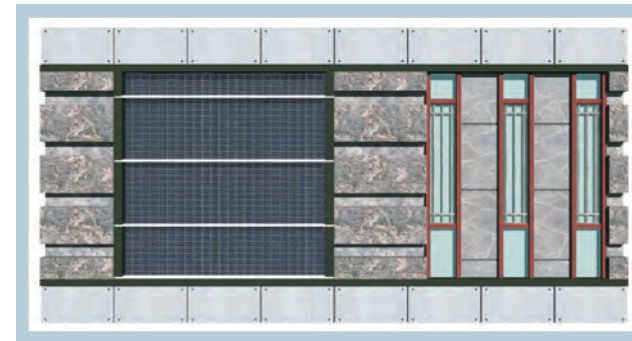




Balcony



Window



Wall



Wall

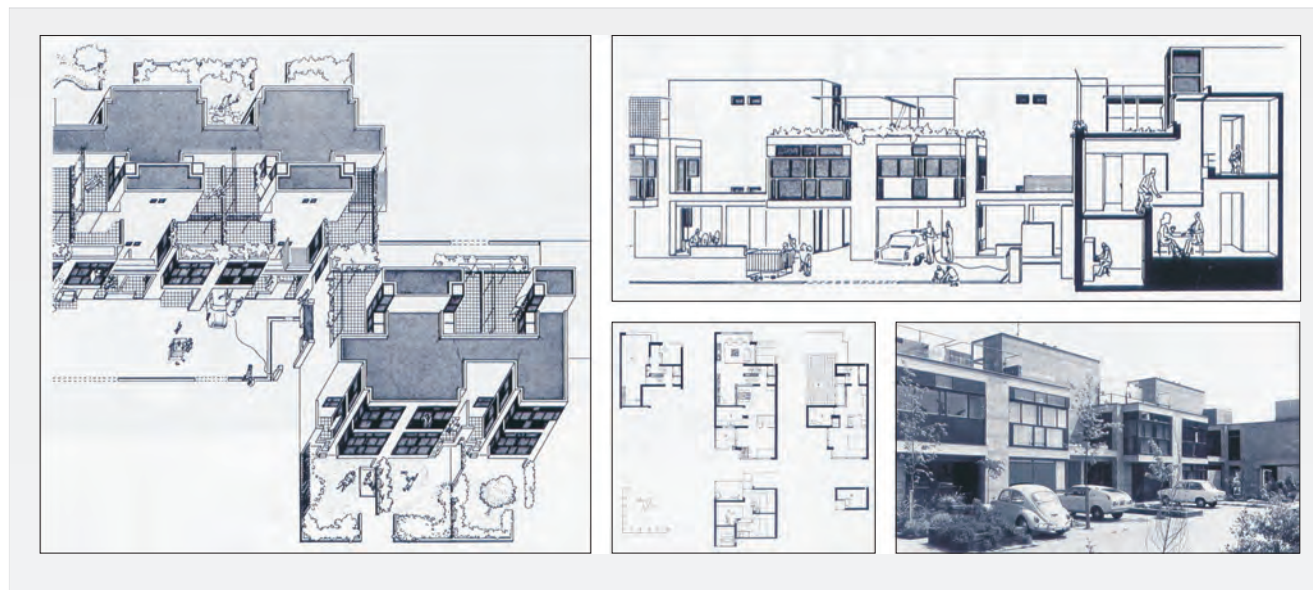




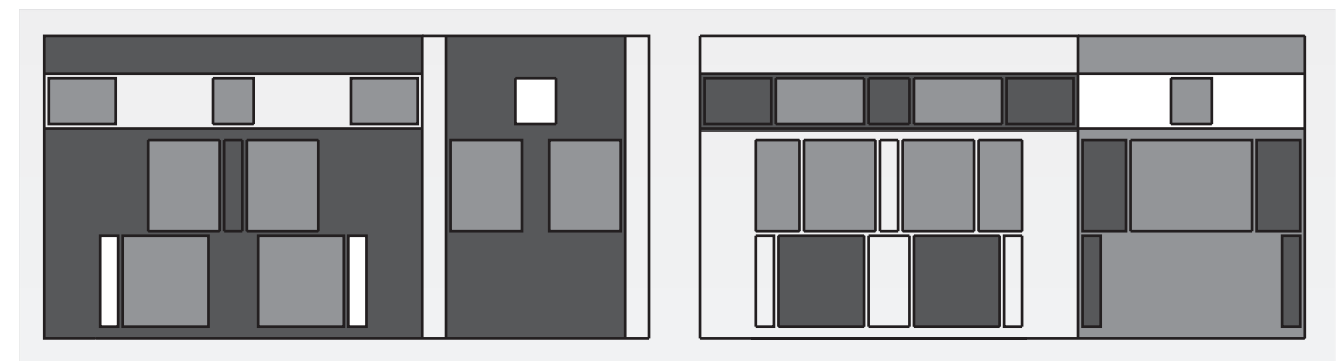
## FACADE KIT OF PARTS

Diagoon dwellings (1969-1971) - Herman Hertzberger

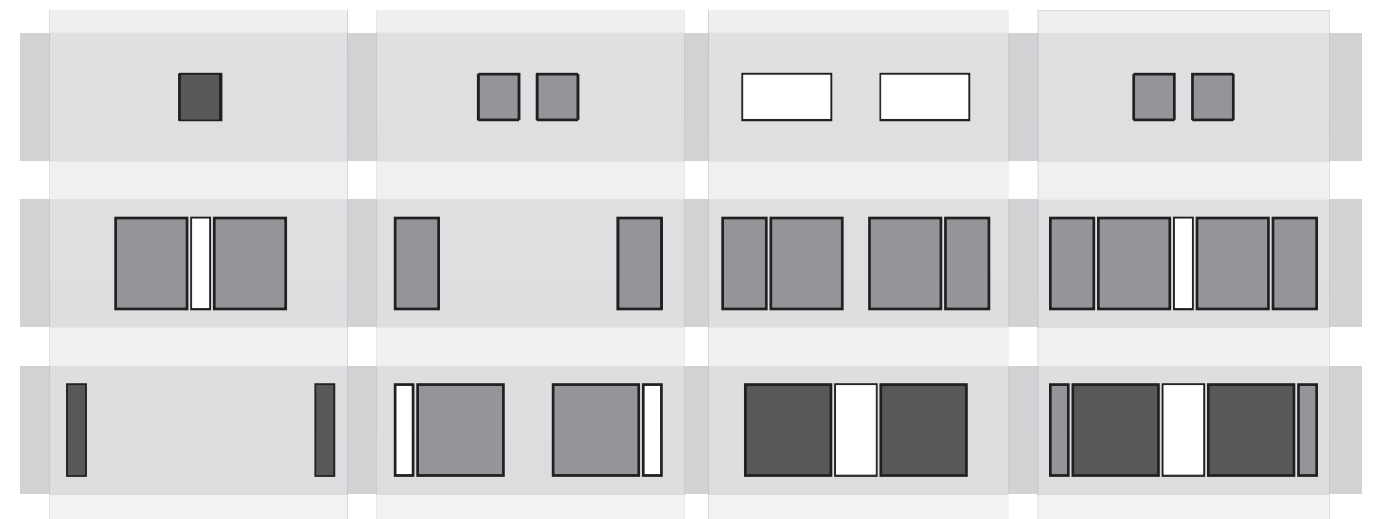
Commissioned by the Experimental Housing Foundation, Hertzberger designed a staggered row of eight dwellings as prototypes in which the future inhabitants could determine the floor plan themselves. (Wim J van Heuvel)



## THE FACADE FROM THE CASE STUDY

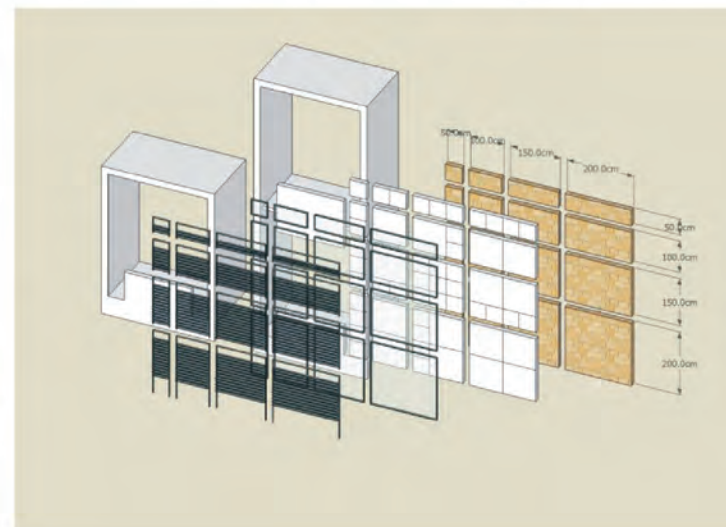


## WINDOW SYSTEM

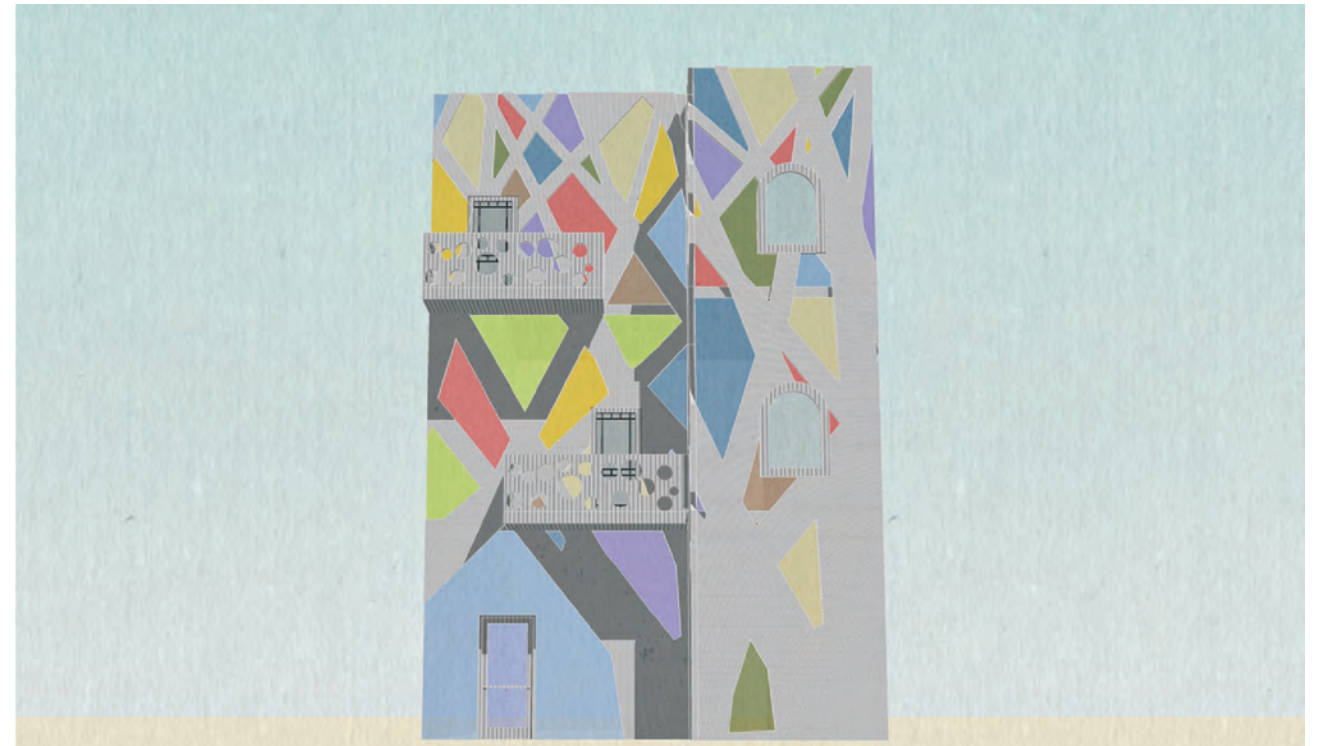
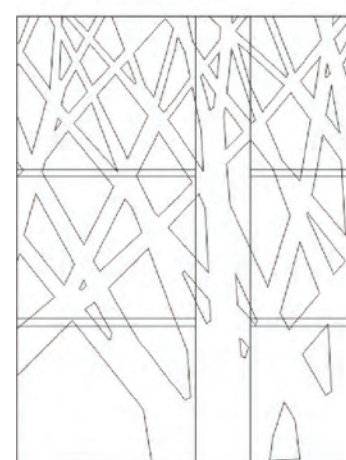
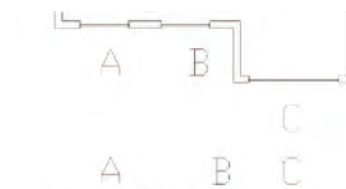




# Richard Meier Architecture Styl



# TOD'S OMOTESANDO BUILDING - TOYO ITO



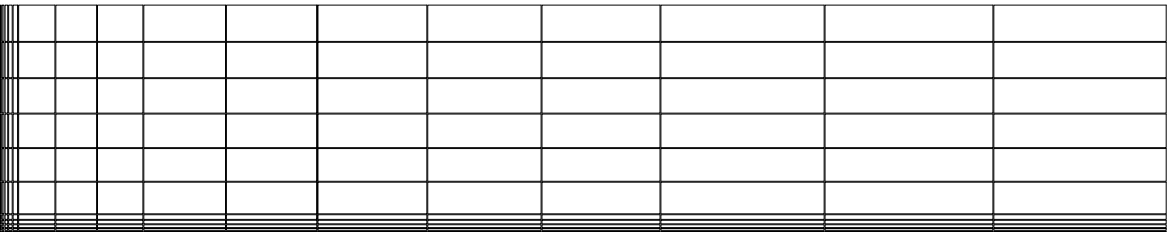
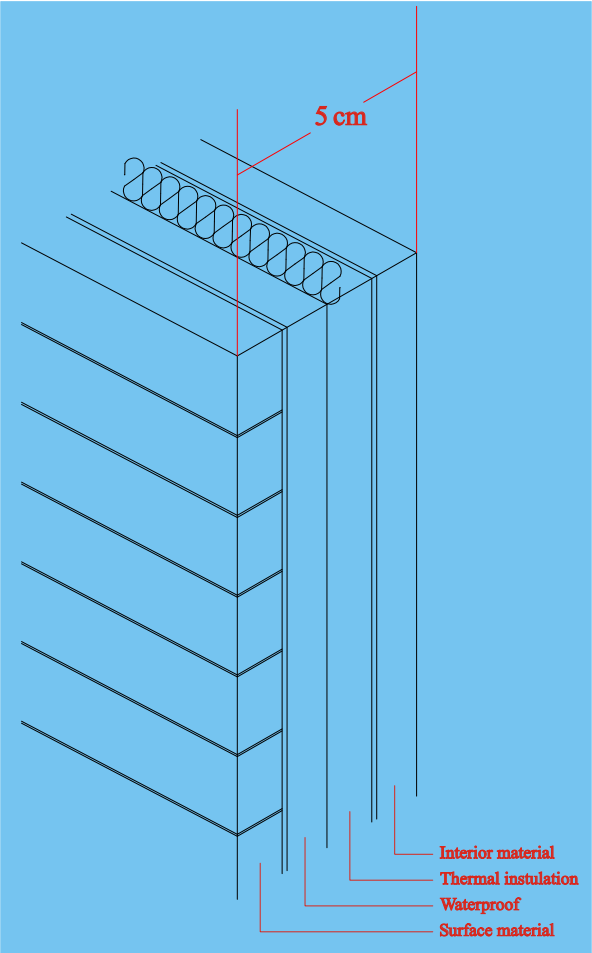


FACADE KIT OF PARTS

INTRODUCTION

In this exercise, the purpose is to explore the design and use of facade "kits of parts". Facades, whether they are entirely base building or partly infill, can be seen as a composition of elements that together make an entire building facade. These elements are walls, windows, doors, balconies, decorative features, and so on. Facade elements are often made off-site. The facade elements are themselves made of many individual parts. Some of these parts were made for use in any building (like glass, bricks and tiles, concrete panels, steel shapes, window systems). Many of these parts are further manipulated to make the faade elements. A major distinction in the kinds of parts is whether they are made for a specific assembly or are made to go in any assembly.

CONCEPT



Rules

- 1. The frame width is 10 cm, it is installed on the edge of wall and floor. The frame has 5 cm adjustment space.
- 2. Facade kit of parts setting authority often use dimensions in Taiwan (ex. 300 cm, 500 cm, etc.). So, we setting facade kit width have 1~5 cm, 35~40 cm, and 90~100 cm, Height have 1~5 cm, 40~50 cm, 90~100 cm, 120~130 cm, and 180~190cm.

FACADE KIT

Frame Kit

Window Kit

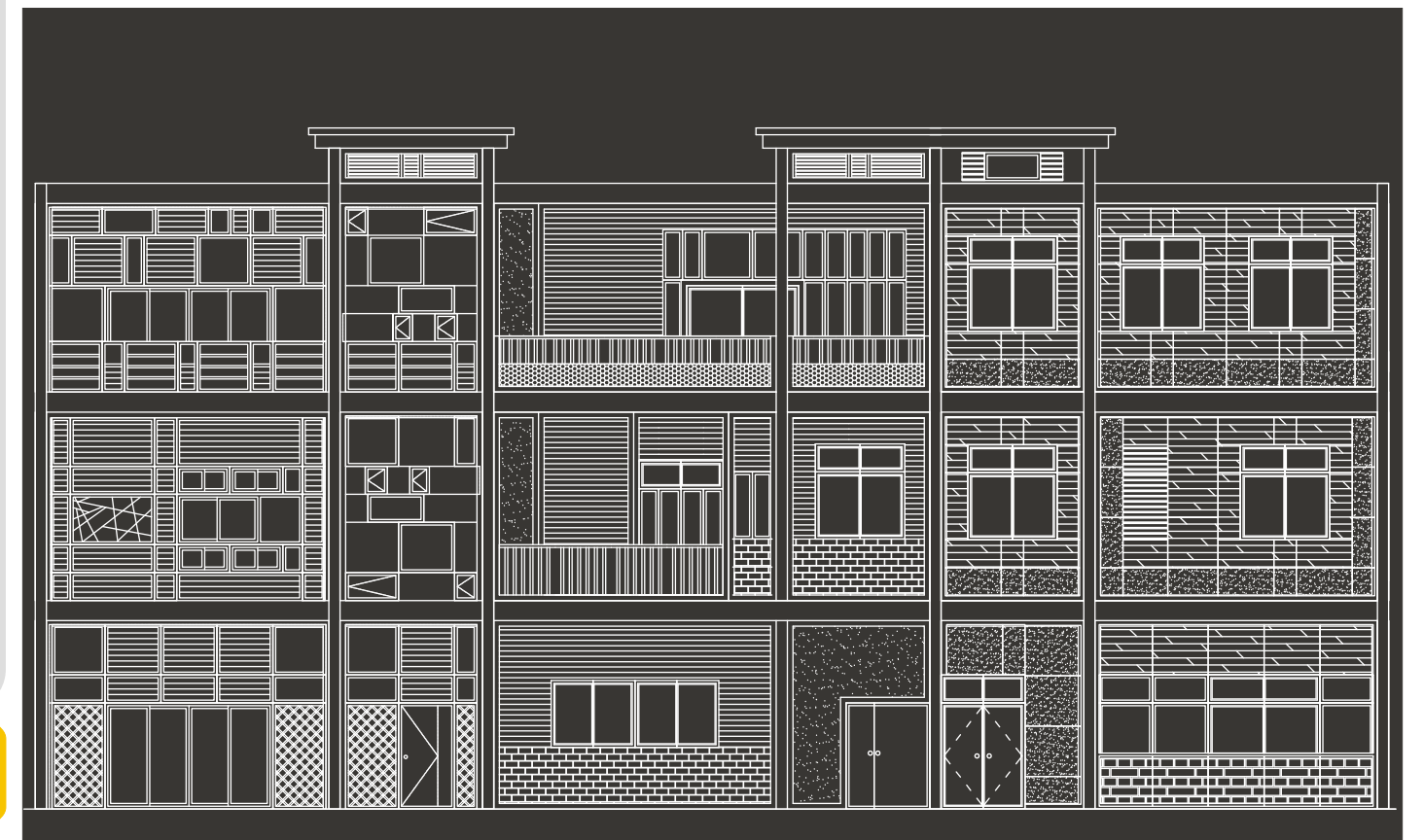
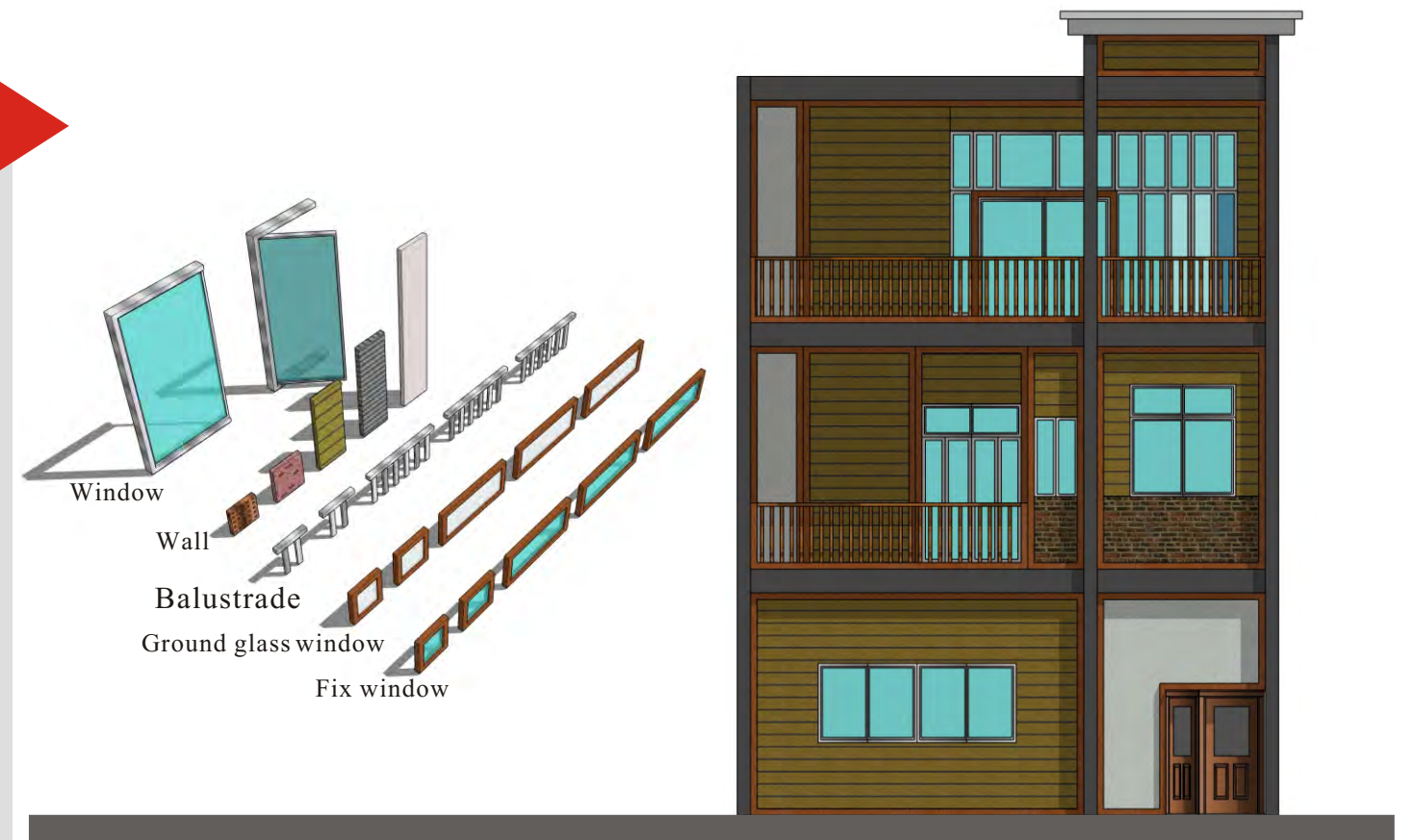
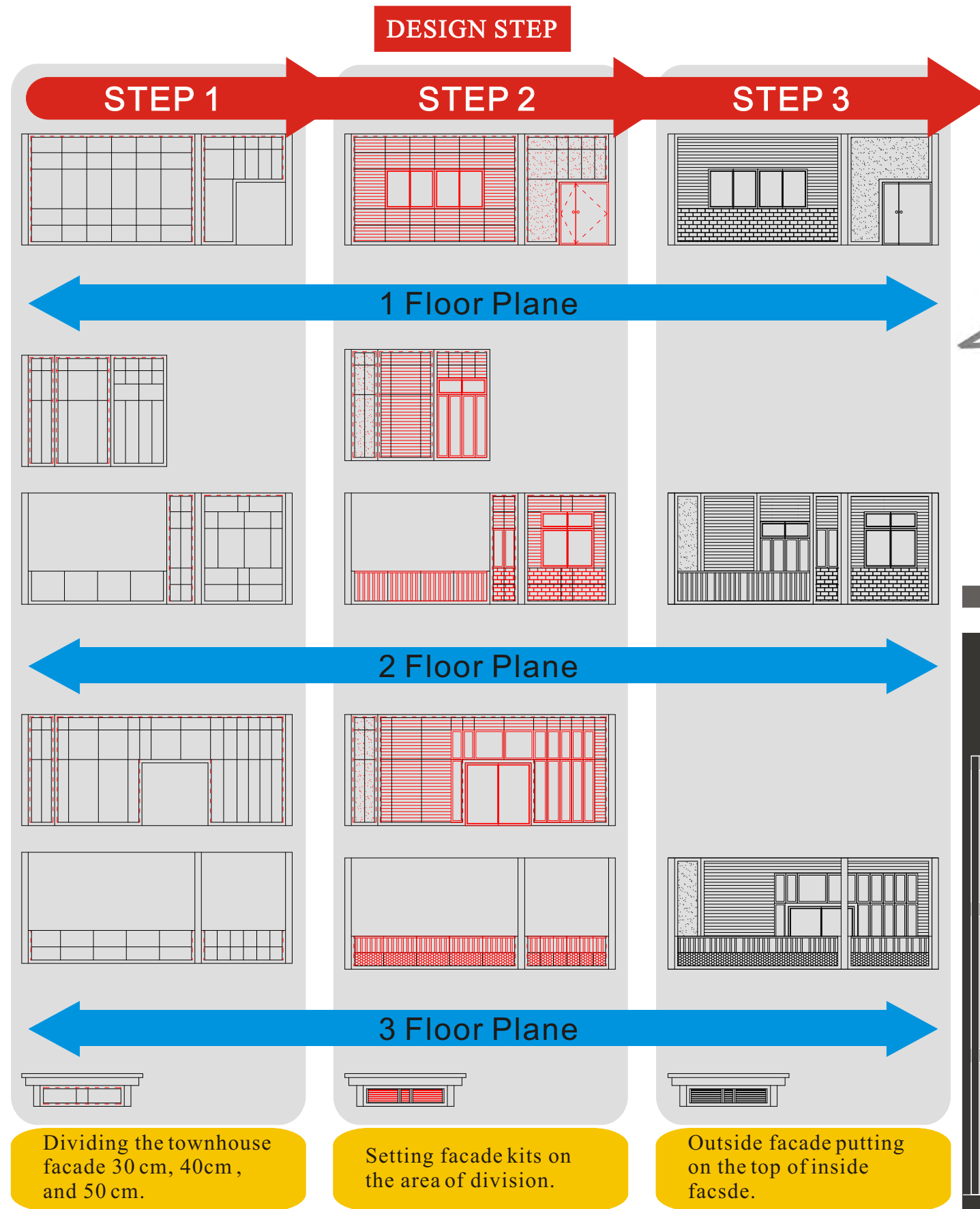
Door Kit

Fix Window Kit

Wall Kit

Balustrade Kit

Unit: cm



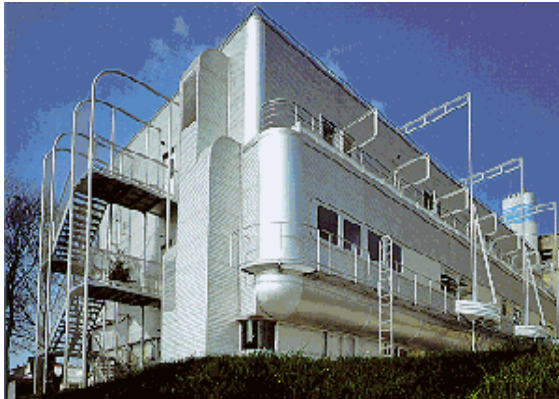
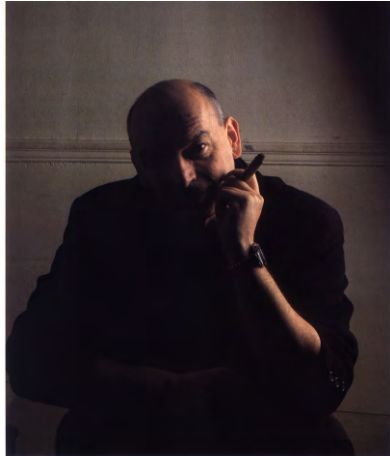


INTRODUCTION

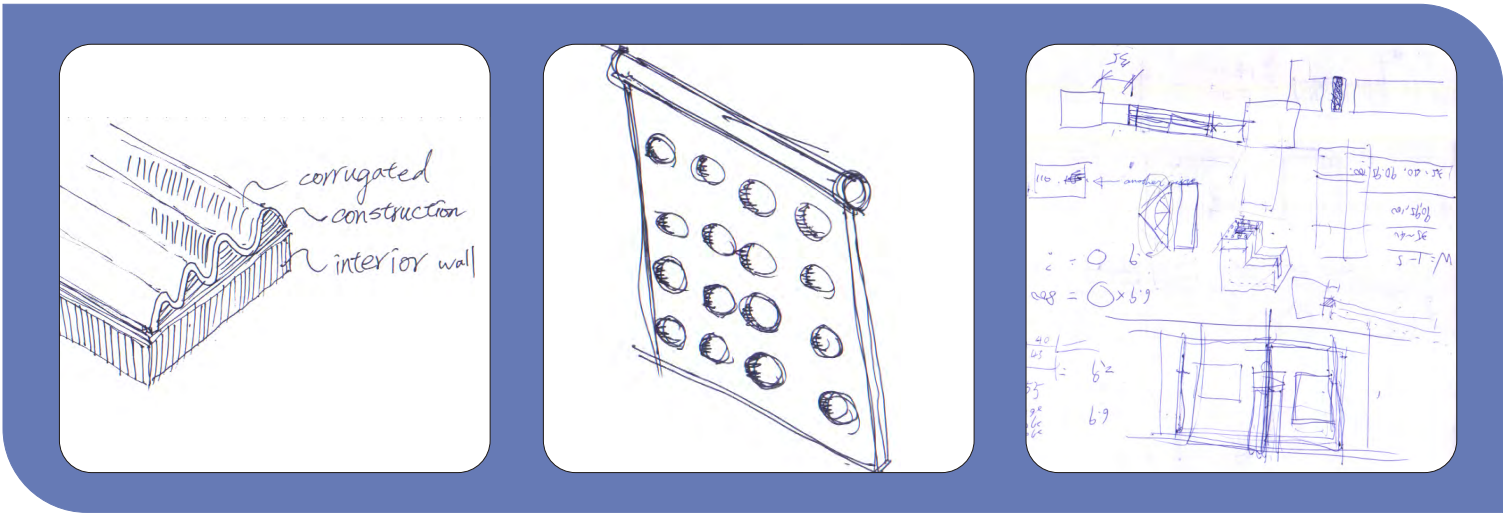
This exercise is use facade kits of Team 1~10, we chose size and material of team 2 and team 7. Because the townhouse width has 260 cm and 270 cm. So, in the exercise, we use 30 cm, 40cm, and 50 cm to divide facade. And use metal material create a style of mechanical.

CONCEPT

Reference Architect: Jean nouvel

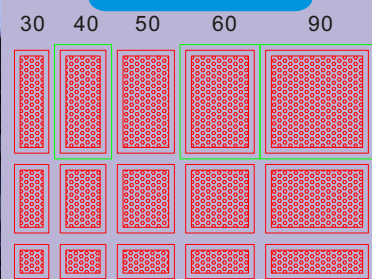


- ◆ Material
  - Metal
  - Glass
- ◆ Colour
  - Gray
  - Black
  - Transparent
- ◆ Feature
  - Small division
  - Mechanical

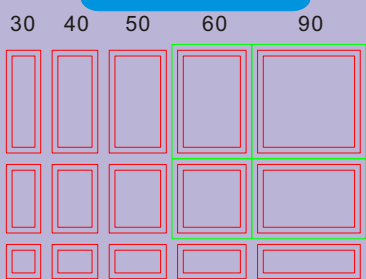


FACADE KIT

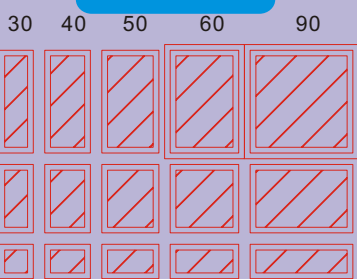
Balustrade Kit



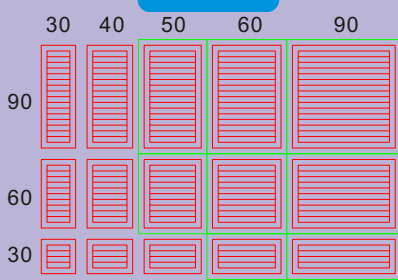
Fix Window Kit



Window Kit



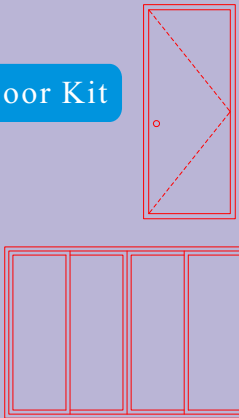
Wall Kit



Frame Kit

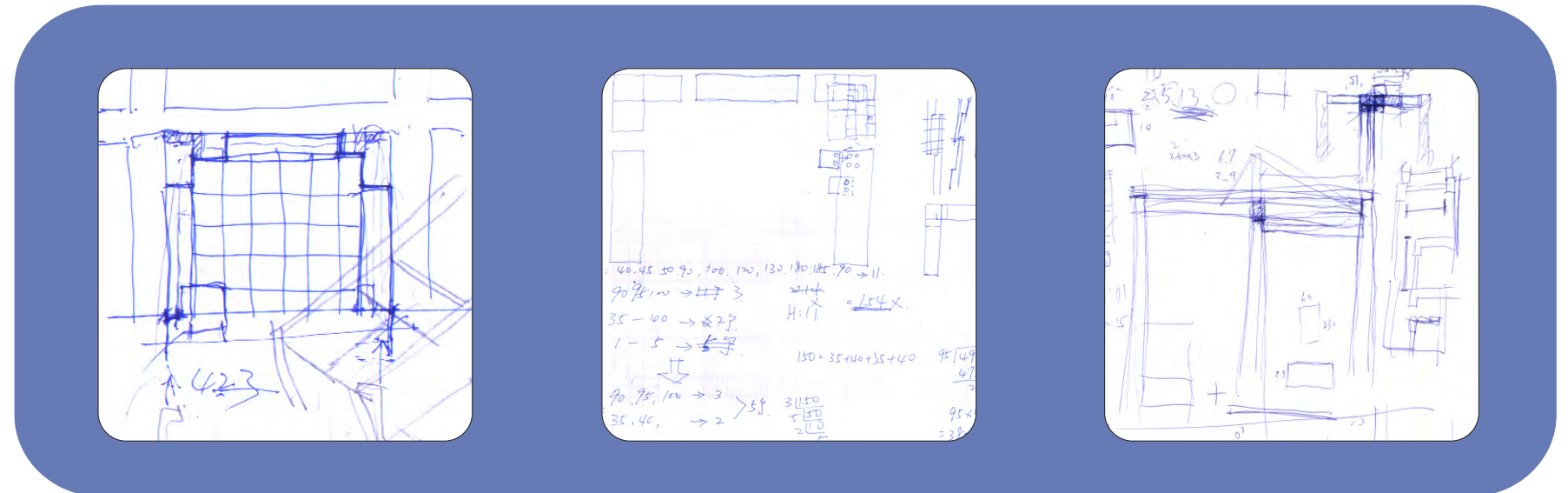


Door Kit



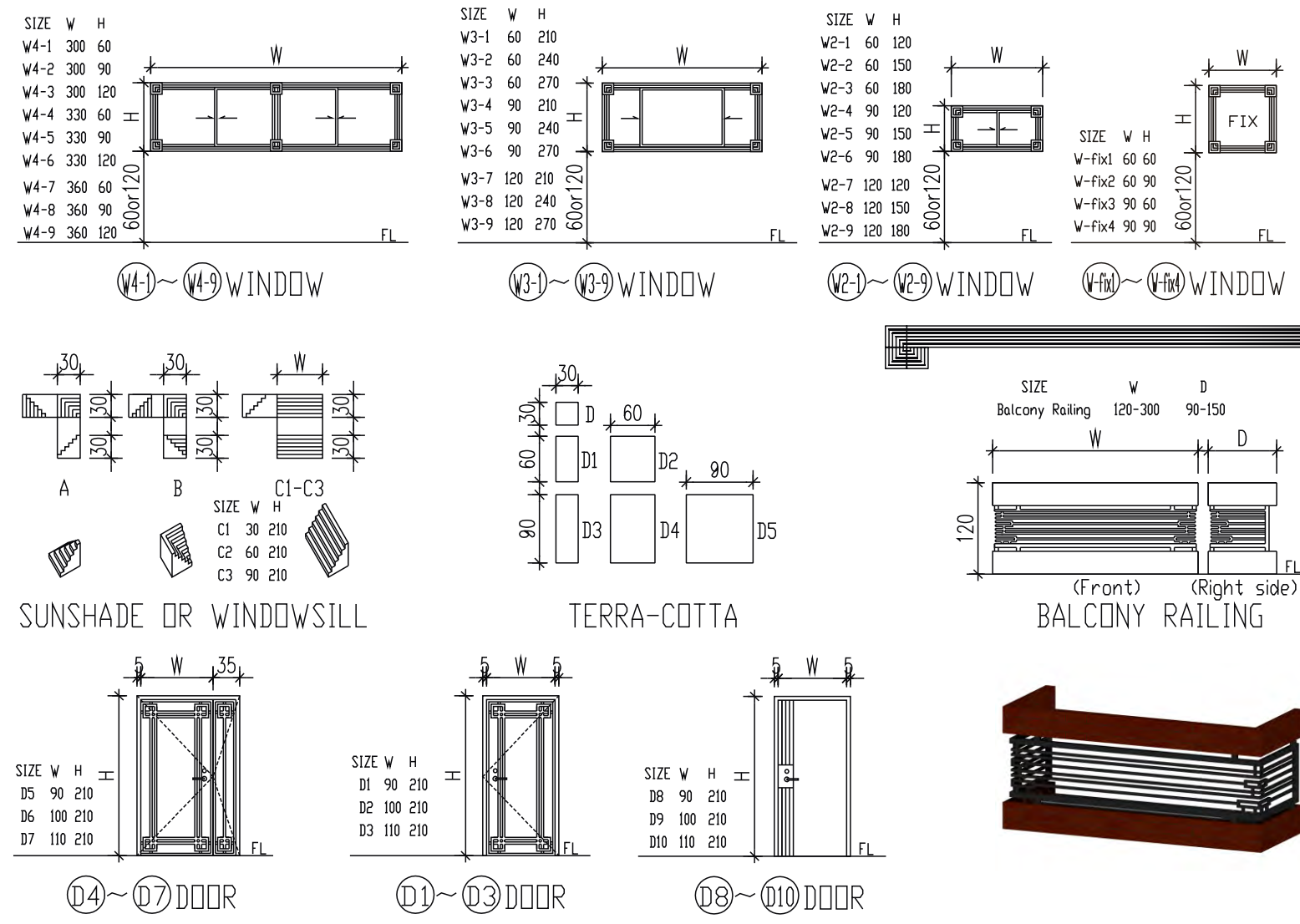


Shih-Min Cheng, Shao-Hung Lo, Chih-Kai Hsiao





FACADE KIT OF PARTS



Hierarchy

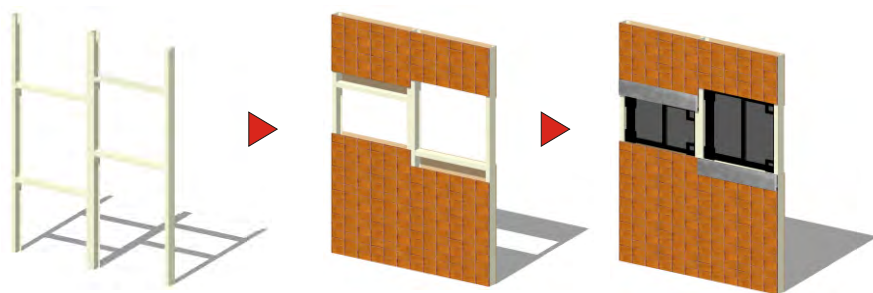
There are three major parts of the facade: lattice, windows, and fill-in wall. Three of them are defined as infill. The windows and fill-in wall can replace each other just depends on the situation. Occupants can decide the size, style, material, and location where they want to have an opening on their facade.



Construction

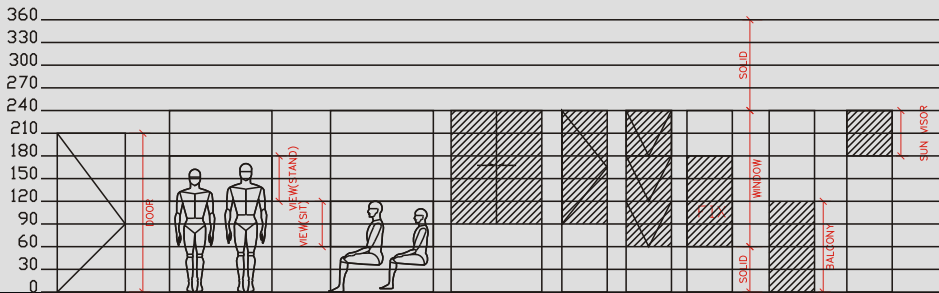
The lattice is made of light-weight steel; the window frame is made of aluminum extrusion; and the panel of in-fill wall is made of terra-cotta. There are 4 steps to complete the facade:

1. Occupants decide which facade they want and then decide the location of the opening.
2. Erect the light-weight steel of lattice in two directions, vertical and horizontal, to form the place where the windows and fill-in wall can be put in.
3. Install the fill-in wall.
4. Install the windows.



Rules

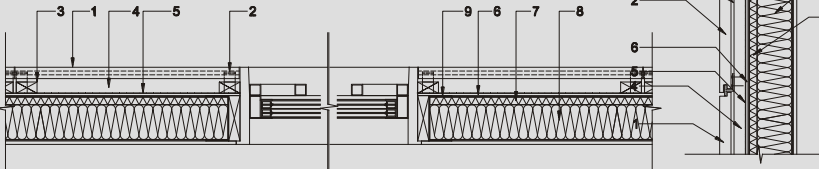
- There are 3 rules for this kit.
1. The color of terra-cotta is free, such as red, black, white, etc. The window frame color is black.
  2. The black steel panel must be adjacent to either up or under side of the windows in order to let the facade keep its order (horizontal line).
  3. There must be at least 30 cm between the vertically adjacent windows because of the space of deformation support.



Body Scale

Vertical section & Horizontal section Scale = 1:20

1. Terra-cotta panel, t=3cm
2. Steel hanger, t=0.4cm
3. Lumber, 2"x4"
4. Air
5. Water barrier
6. Wood panel, t=0.6cm
7. Thermal insulation, 2cm
8. Acoustics insulation, 10cm
9. Light-weight steel channel, t=0.15cm
10. Sheathing, t=0.15cm
11. Steel panel, H=15cm, t=0.2cm



Concept Image



Concept

The kit we designed derived from the pattern of traditional Chinese window and characters. The facades of Taiwanese buildings nowadays are almost western style. We want to install the feature of vertical and horizontal lines of Chinese characters in the modern facade design in order to evoke the new experience of vision.

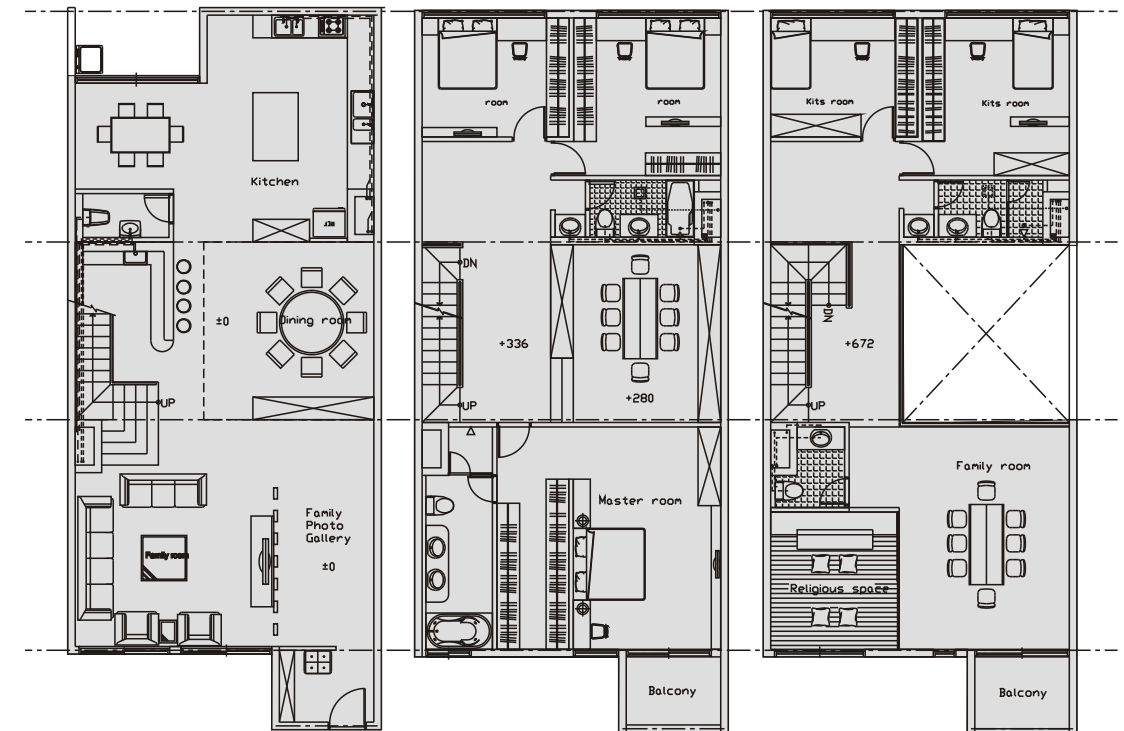


### Reference architect-Carlo scarpa

Scarpa was born in Venice, all his works during his whole life are influenced by the splendid and delicate style of Venice. He believes that the detail of joints can embody the panorama of architecture, and that with detail he can express his own style at the same time.

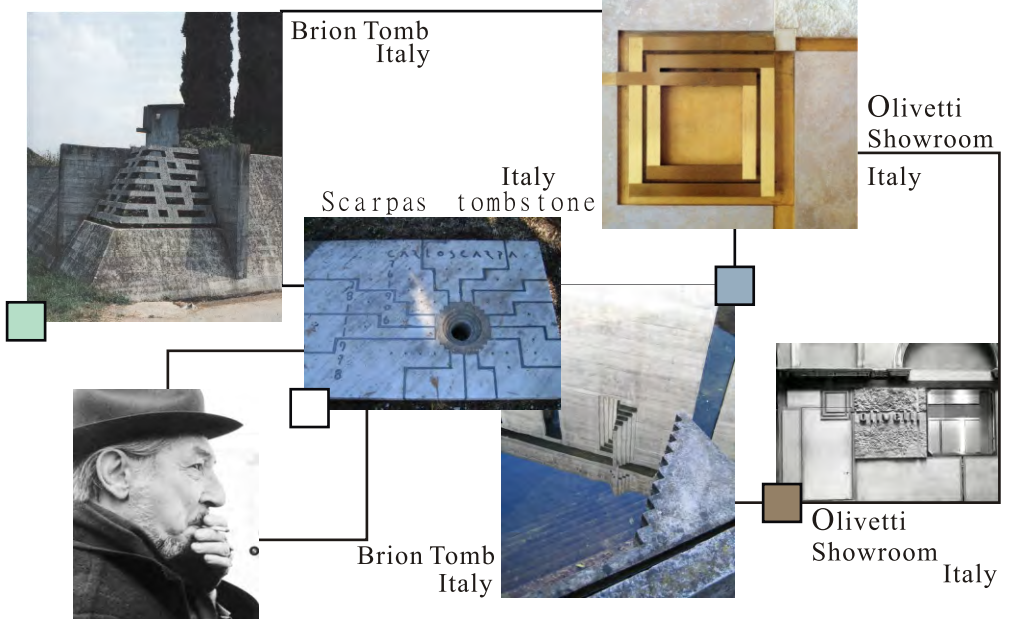
### Design concept

We create components of facade by extracting characteristic elements from many Scapa's famous works. The totemic theme of facade and the indented effect of windows and windowsills provide the variation of light and shadow on facade with sophisticated and delicate quality.



Town House Plan- scale: 1/200

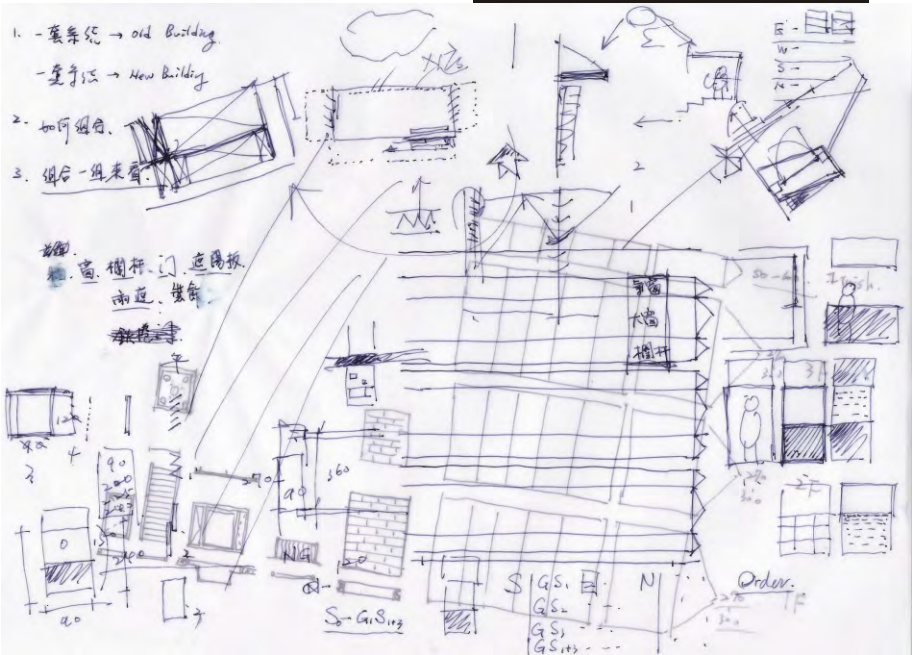
### Scarpa Element



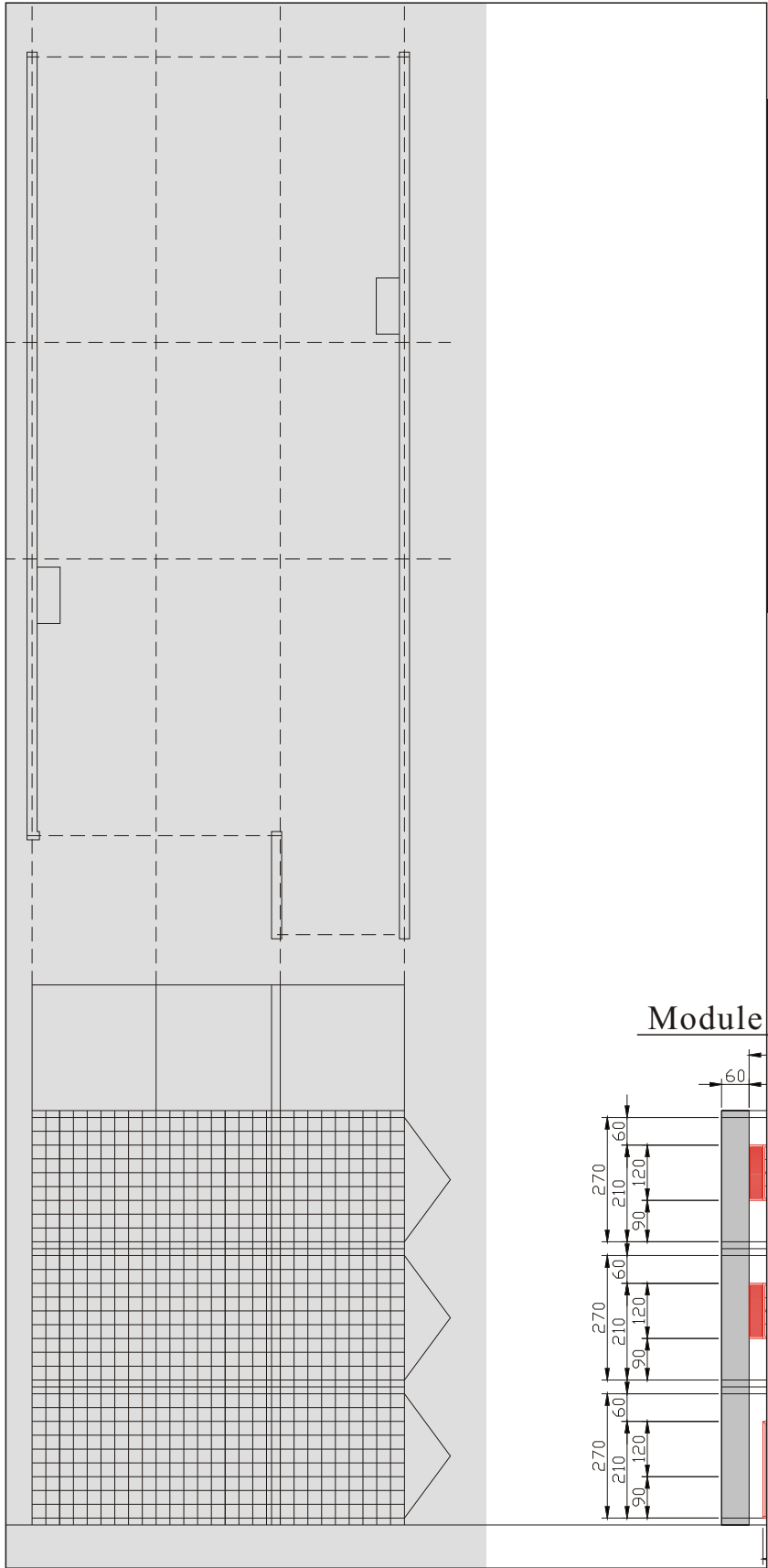
Front Elevation- scale: 1/50



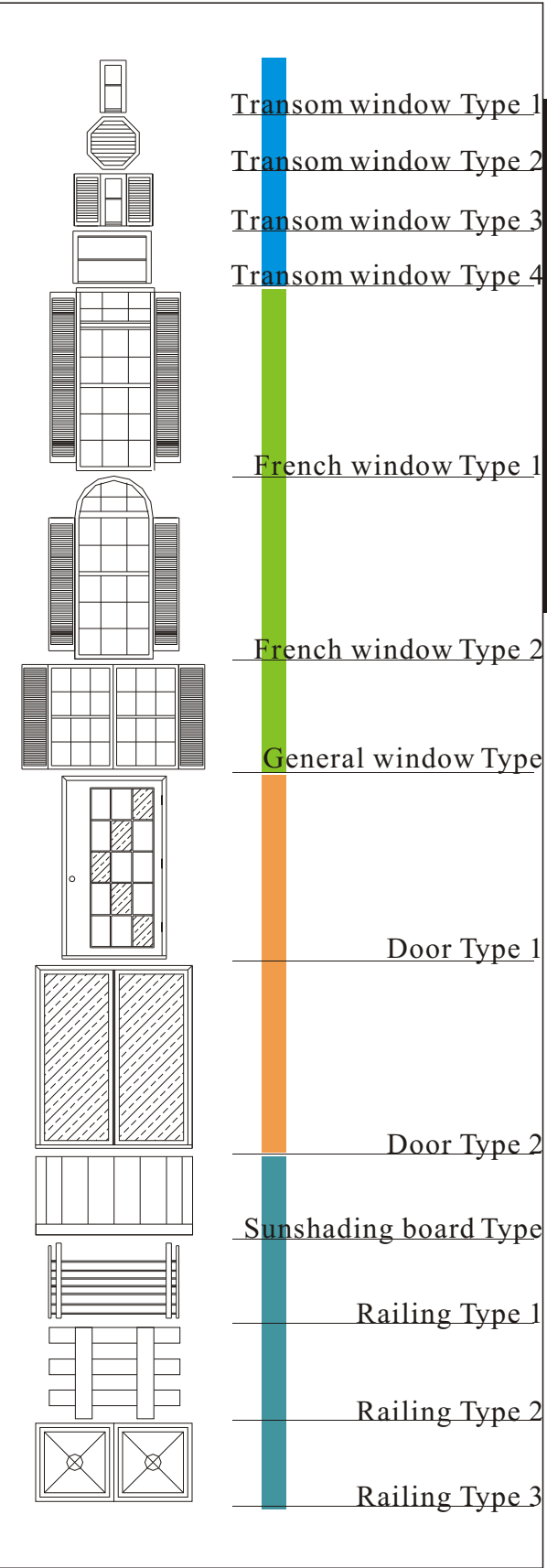
FACADE KIT OF PARTS

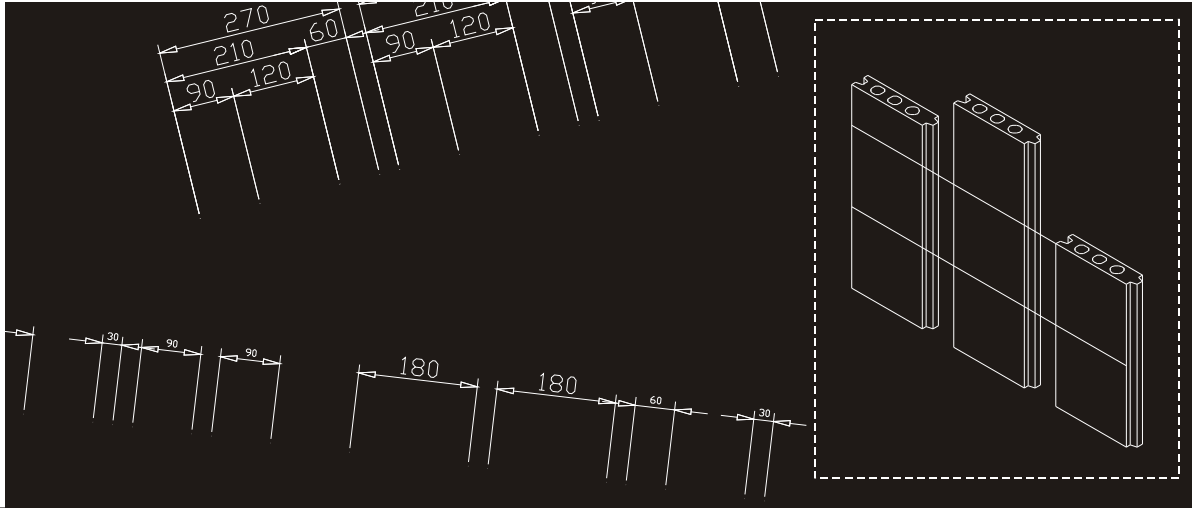
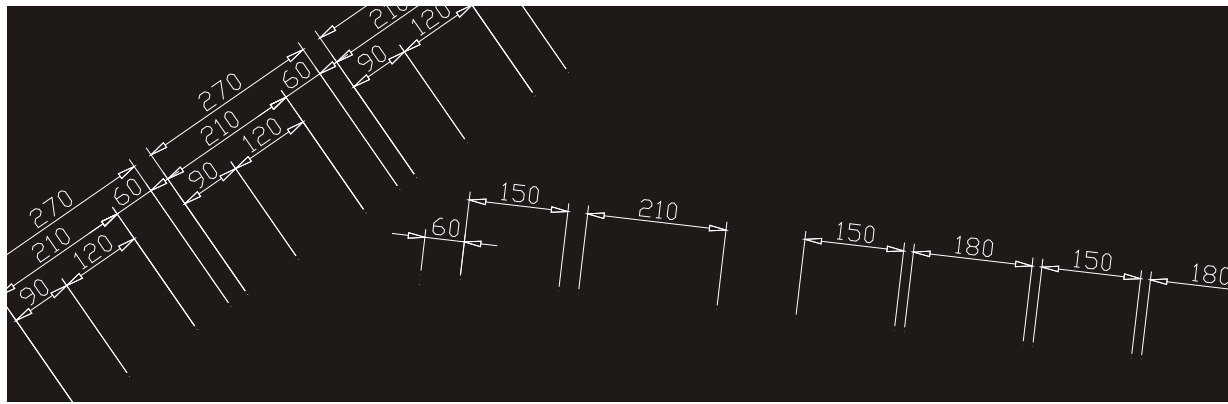


Concept



Module dimensions



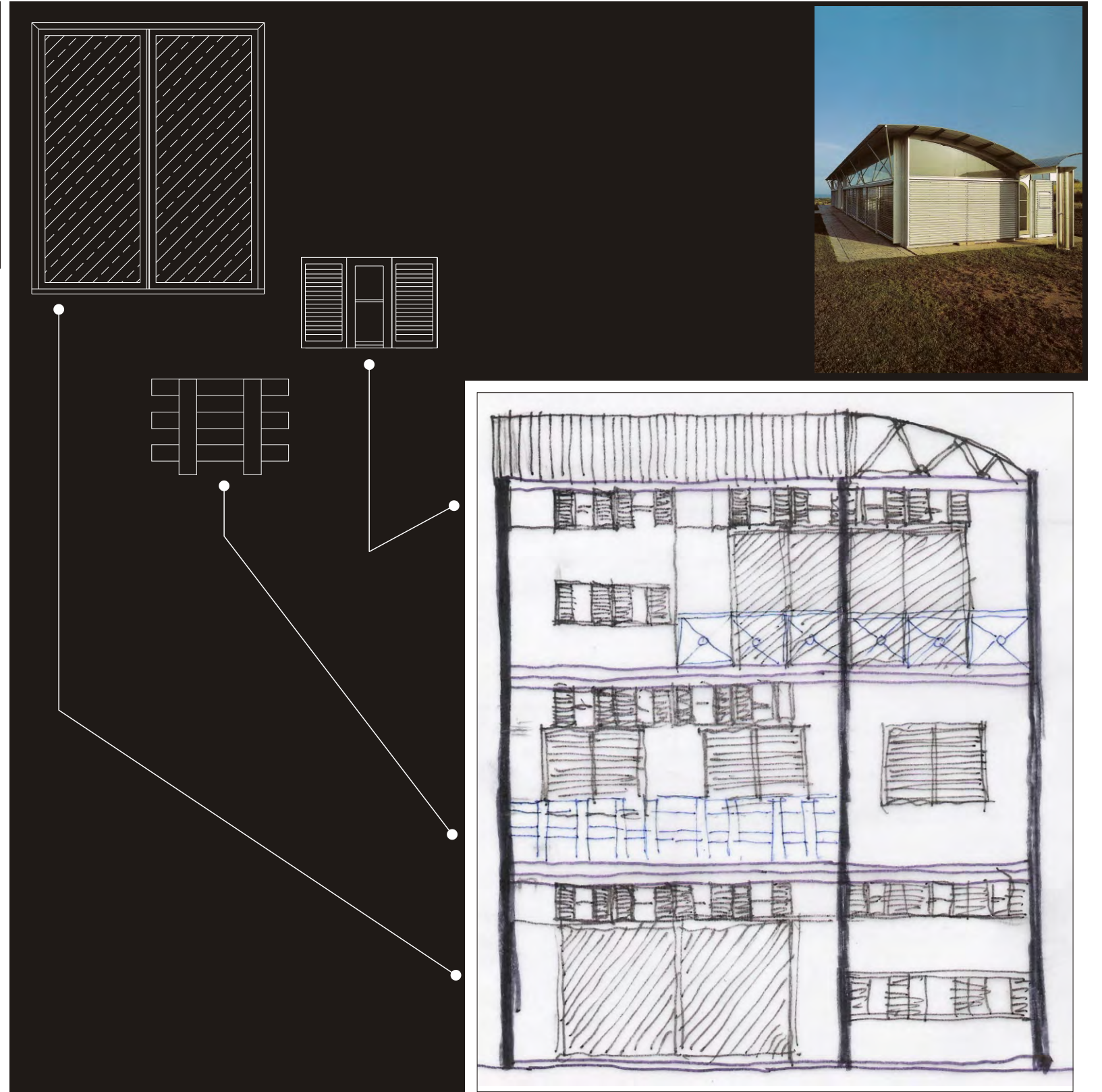
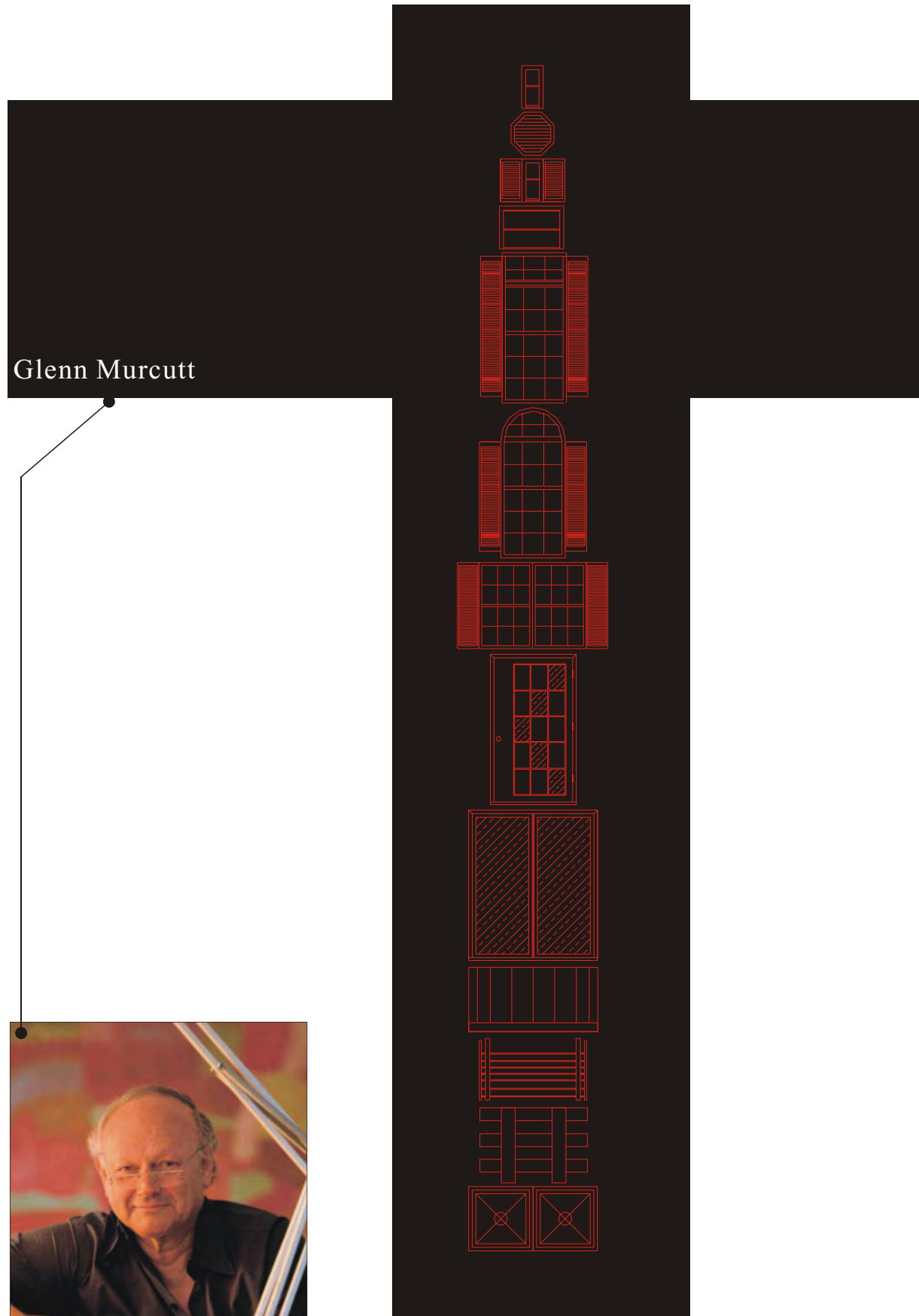


Combination

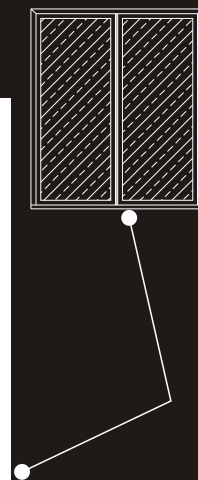
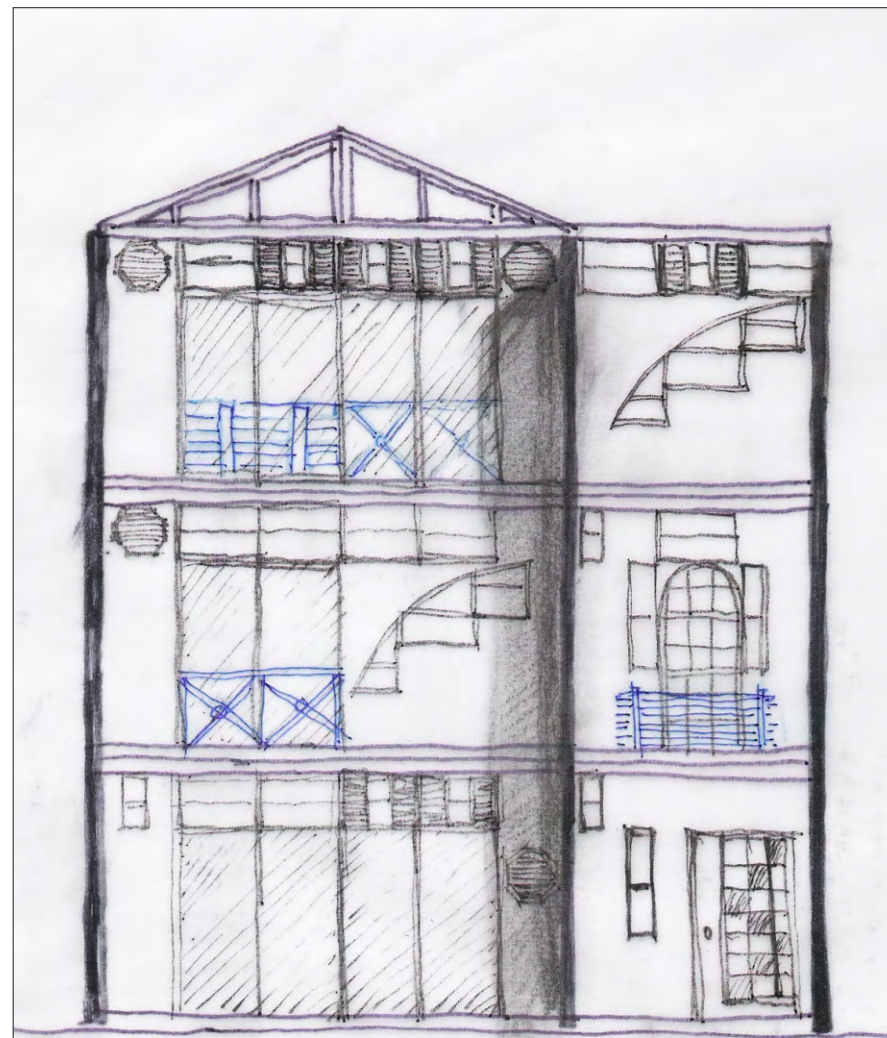
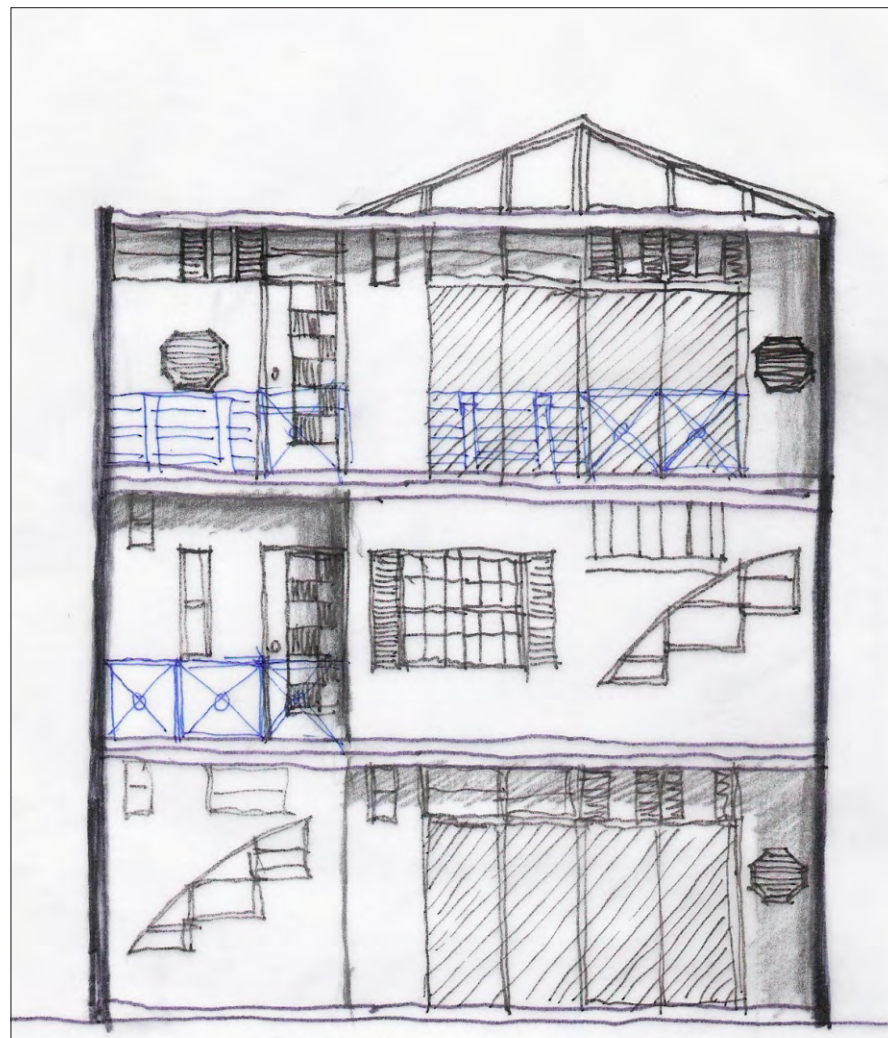
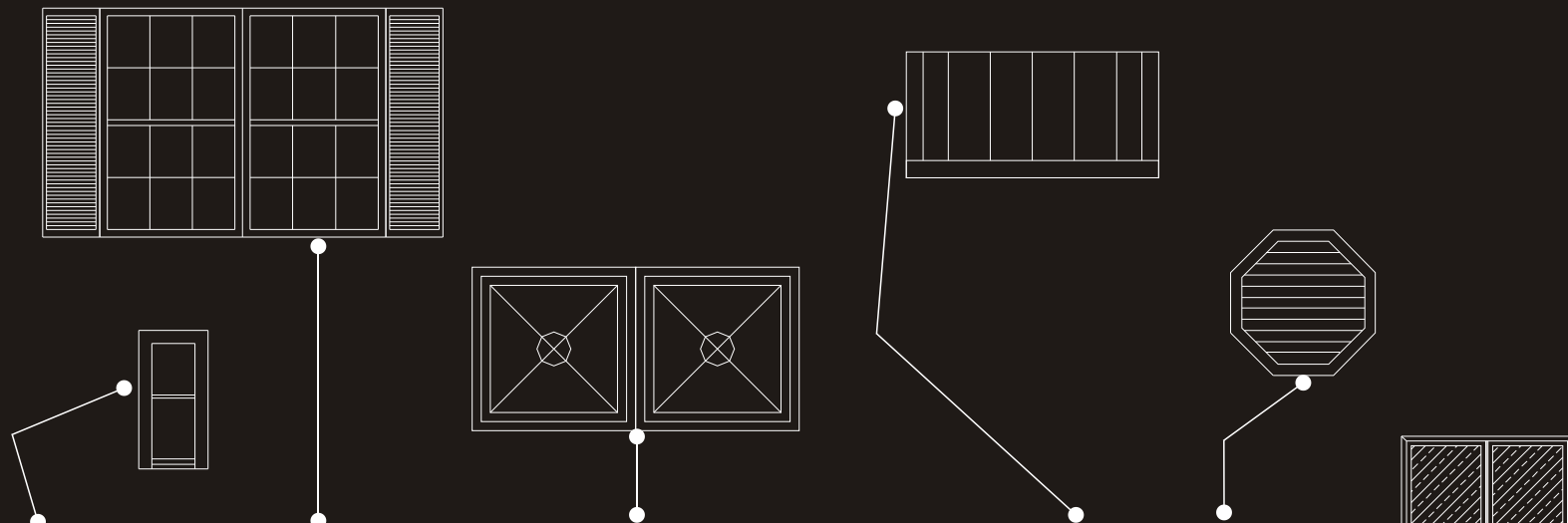




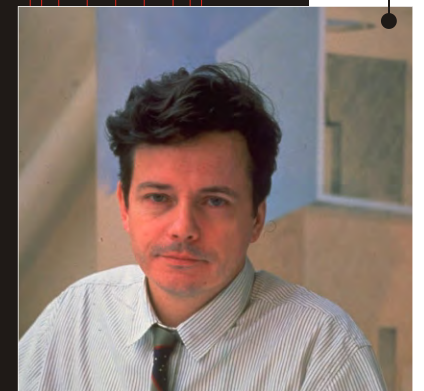
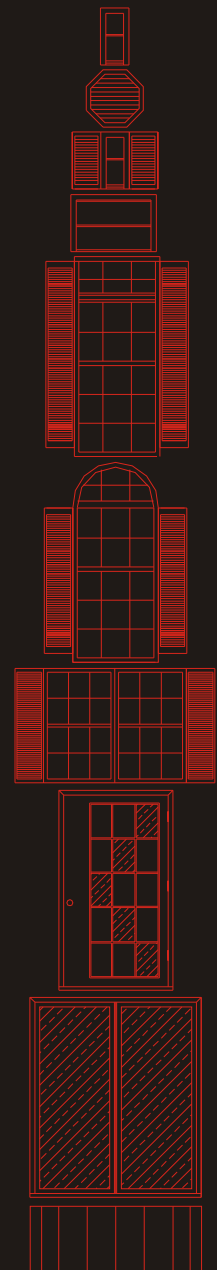
## FACADE KIT OF PARTS







Christian de Portzamparc





FACADE KIT OF PARTS

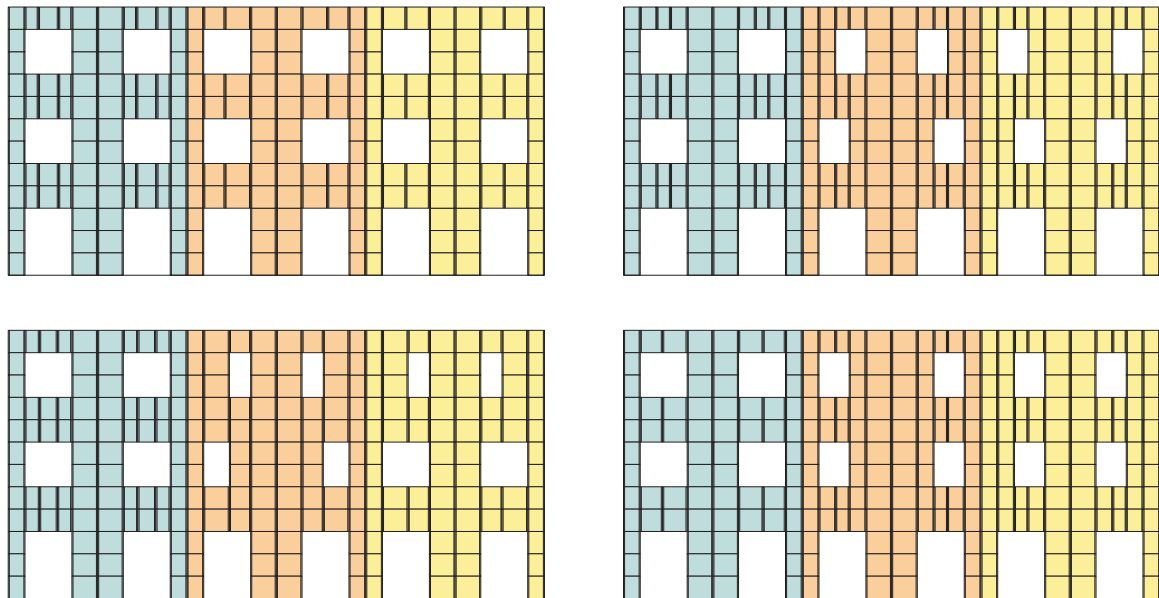
Work Discriptions

With the different working background, designers were doing their pratice seperately.

The first one utilize the system of curtain wall, to develop modulized panels with a menu for architects..

The second was trying to design a panel system with decision process for endser as well the architects..

Study with Curtain Wall

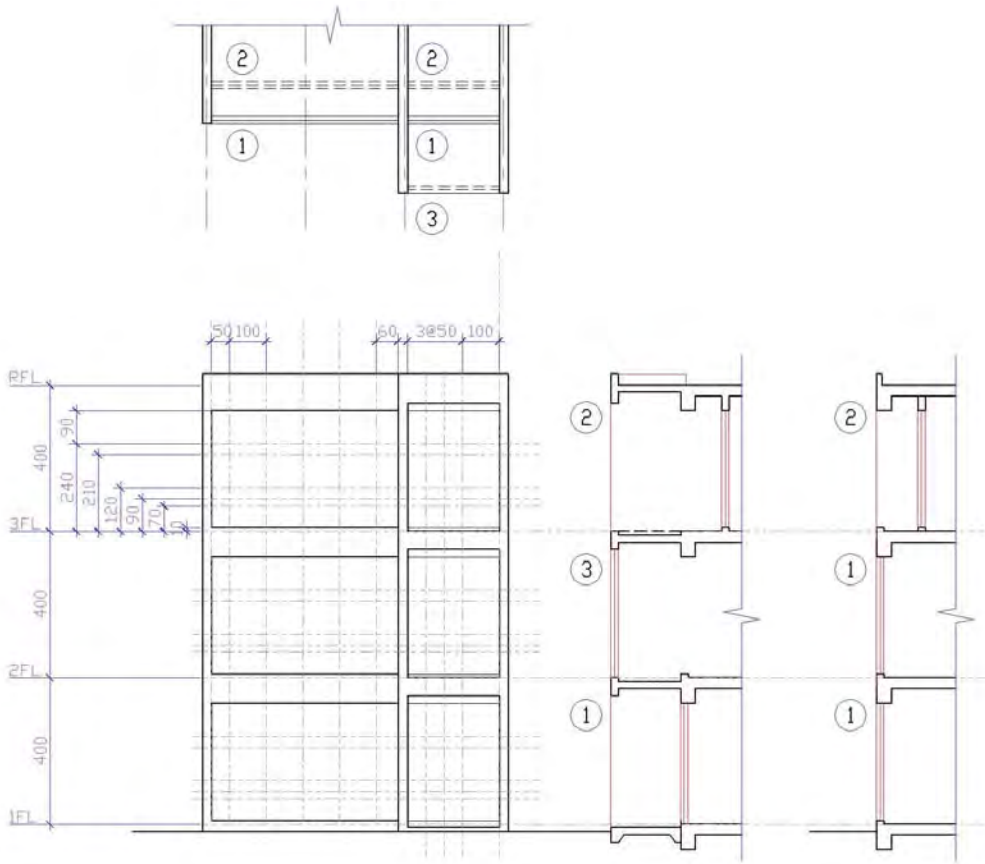


unit: cm		Example:									
Type	width	Sample	Piece-1	Piece-2	Piece-3	Piece-4	Piece-5	half-Span	One-Span		
1	115	1	115	105	105	75	0	400	800		
2	110	2	115	75	75	75	60	400	800		
3	105	3	110	110	110	70	0	400	800		
4	100	4	105	80	75	75	65	400	800		
5	95	5	100	115	110	75	0	400	800		
6	90	6	95	115	95	95	0	400	800		
7	85	7	90	115	115	80	0	400	800		
8	80	8	85	115	115	85	0	400	800		
9	75	9	80	90	90	80	60	400	800		
10	70	10	75	115	70	70	70	400	800		
11	65	11	70	115	85	65	65	400	800		
12	60	12	65	115	80	75	65	400	800		
		13	60	115	90	75	60	400	800		

In order to create many kinds of facade forms, and make the possess function fit in the concept of open building. We set some limiting factors as bellow:

- 1.The kit of parts is for a particular grouping.
- 2.We design curtain wall for those townhouse. (for example: aluminum curtain wall, stone curtain wall, etcetera)
- 3.The facade width of building is eight meters.
- 4.The facade height of building is four meters.
- 5.We distribute the facde of each building into two units. In other word, each span of facde of one unit is four meters width.
- 6.Each element height is one meter.
- 7.Three are twelve types of element width. (such as: 115cm, 110cm, 105cm, 100cm, 95cm, 90cm, 85cm, 80cm, 75cm, 70cm, 65cm, 60cm)
- 8.According to customers order, the product company can change windows size and doors size. That is, either window or door is custom-made.

A Proposed Panel System



It was the designer's intension to built up certain working process for OB facade.

- Horizontal ruler lines as functional level divisions for the windows, railing, and additional, the ceiling height 210~240cm, or a possibility for small mezzaning.
- Vertival ruler lines were modified through dimensional common denominator within two part of the facade, 50cm.
- Remodify a vertical dimension refering closet between two rooms in Exercise2, 60cm.
- Three possible layer for the facade interface in the smaller part, and two for the larger part.

## Panels Developed



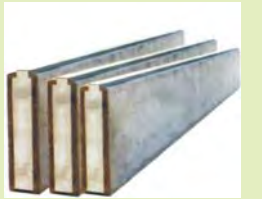
### Users Decision Process

A considering an easier interface for end users, which means the process for decision making:

- Build up floor plan.
- Put into wall elements with suitable width for the function.
- Check the space left between wall panels in the facade
- Pick the window elements grouped by width, with suitable form that meets their usage.

### Description of Elements

- Dry wall panel, precasted or precomposed panel.
- Window frame, Aluminum, which is very common and have great compatibility with different insertional material, such as glass and Aluminum panel.
- Glass, in addition to clear glass, screen printed glass are used with light needed but private space.
- Window panel, composited with insulation material.
- Railing, printed Aluminum with vertical elements preventing climbing.
- Retractable sun screen, fabric or made of bamboo.



Patterns for Reference





FACADE KIT OF PARTS

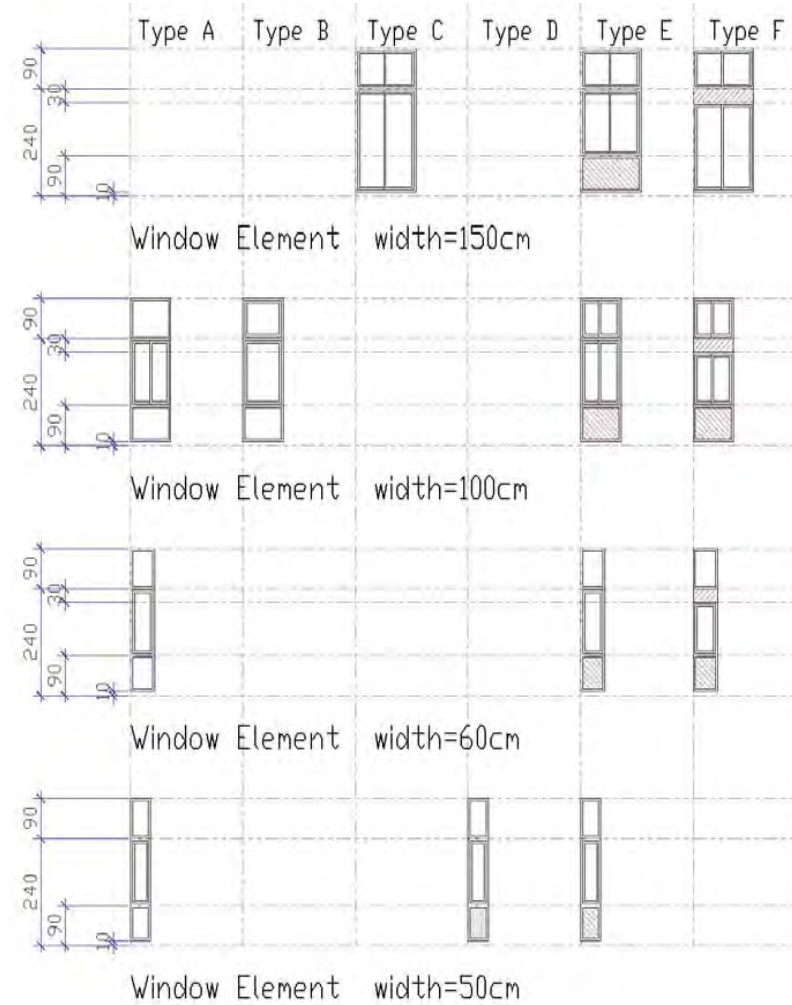
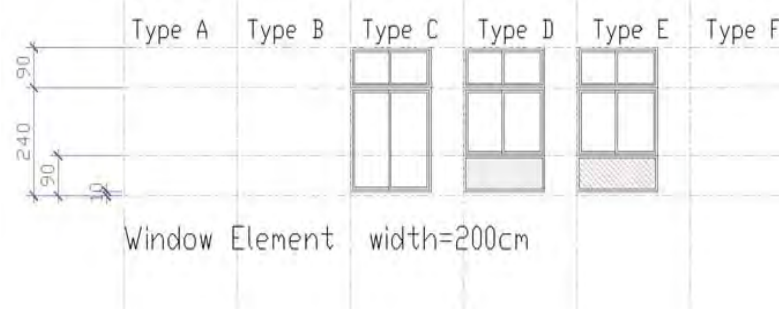
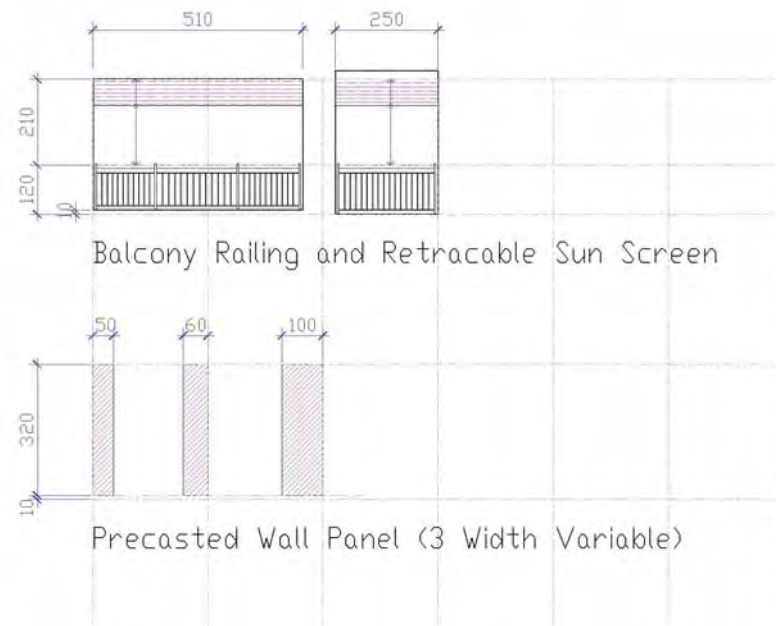
Demonstration of Elevation



The design of this demonstrat facade referenced the design of the Hillside Terrace Projct in Tokyo, by Fumihiko Maki.



### Selected Panels



The elements developed in last exercise were not all used in this exercise. The descriptions and reasons:

- Sliding windows with printed glass parapet is not necessary, for those types of window are used with walls toward balcony, that can be replaced by either glass parapet to let in lights, or panel parapet for private and crash protecting.
- Windows with untransparant higher parts were also deleted, for ceiling fixed in 240cm high is not necessary, except the mezzanin that need windows.



## Student participants



Team1: Carrie Andy



Team2: Kuo-Bin Allen Joshua



Team3: Starli Ming



Team4: Super Liu



Team5: Shau-yuan Rian Big



Team6: Jon Wish Eric



Team7: Neo Hung Benson



Team8: Hardy Sonia



Team9: Pippe Yves



Team11: Alen Wei Bang-Lee



Student participants

team	name	pronunciation	English name	e-mail
1	林坤緯	Lin, Kun-Wei	Andy	M9513104@mail.ntust.edu.tw
	潘信如	Pan, Hsin-Ju	Carrie	M9513110@mail.ntust.edu.tw
2	林國濱	Lin, Kuo-Bin	Kuo-Bin	M9513217@mail.ntust.edu.tw
	李根漢	Li, Gen-Han	Allen	M9513217@mail.ntust.edu.tw
	林可揚	Lin, Ko-Yang	Joshua	M9513213@mail.ntust.edu.tw
3	林佳莉	Lin, Jia-Li	Starli	M9613011@mail.ntust.edu.tw
	巫明章	Wu, Ming-Chang	Ming	M9613025@mail.ntust.edu.tw
4	張書淳	Chang, Shu-Bo	Super	M9613021@mail.ntust.edu.tw
	劉勁麟	Liu, Chin-Lin	Liu	M9613029@mail.ntust.edu.tw
5	趙永豐	Chu, Yung-Fong	Big	M9613027@mail.ntust.edu.tw
	楊紹遠	Yang, Shau-Yuan	Sing	M9613013@mail.ntust.edu.tw
	陳軒偉	Chen, Hsuan-Wei	Rian	window202000@hotmail.com.tw
6	林孟申	Lin, Meng-Shen	Eric	M9513224@mail.ntust.edu.tw
	陳宗佑	Chen, Chong-Yu	Jon	jon720810@yahoo.com.tw
	何文群	Ho, Wen-Chun	Wish	fenixchch@yahoo.com.tw
7	鄭世民	Cheng, Shih-Min	Neo	M9513223@mail.ntust.edu.tw
	羅少宏	Lo, Shao-Hung	Hung	M9513222@mail.ntust.edu.tw
	蕭志凱	Hsiao, Chin-Kai	Benson	M9513208@mail.ntust.edu.tw
8	黃韻珊	Huang, Yun-Shan	Sonia	sonia.hun@msa.hinet.net
	鄔豪中	Wu, Hau-Jong	Hardy	M9513214@mail.ntust.edu.tw
9	王永成	Wang, Hung-Chang	Pippe	M9513112@mail.ntust.edu.tw
	張有一	Chang, Yu-I	Yves	M9513106@mail.ntust.edu.tw
10	周積鈺	Chou, Chi-Yu	Chi-Yu	M9413110@mail.ntust.edu.tw
	陳思聿	Chen, Suu-Yu	Your	M9413105@mail.ntust.edu.tw
11	陳以侖	Chen, Yi-Run	Alen	p162@ms3.hinet.net
	張邦立	Chang, Bang-Lee	Bang-Lee	banglee@mail.ntust.edu.tw
	林 葳	Lin, Wei	Wei	D9313001@mail.ntust.edu.tw