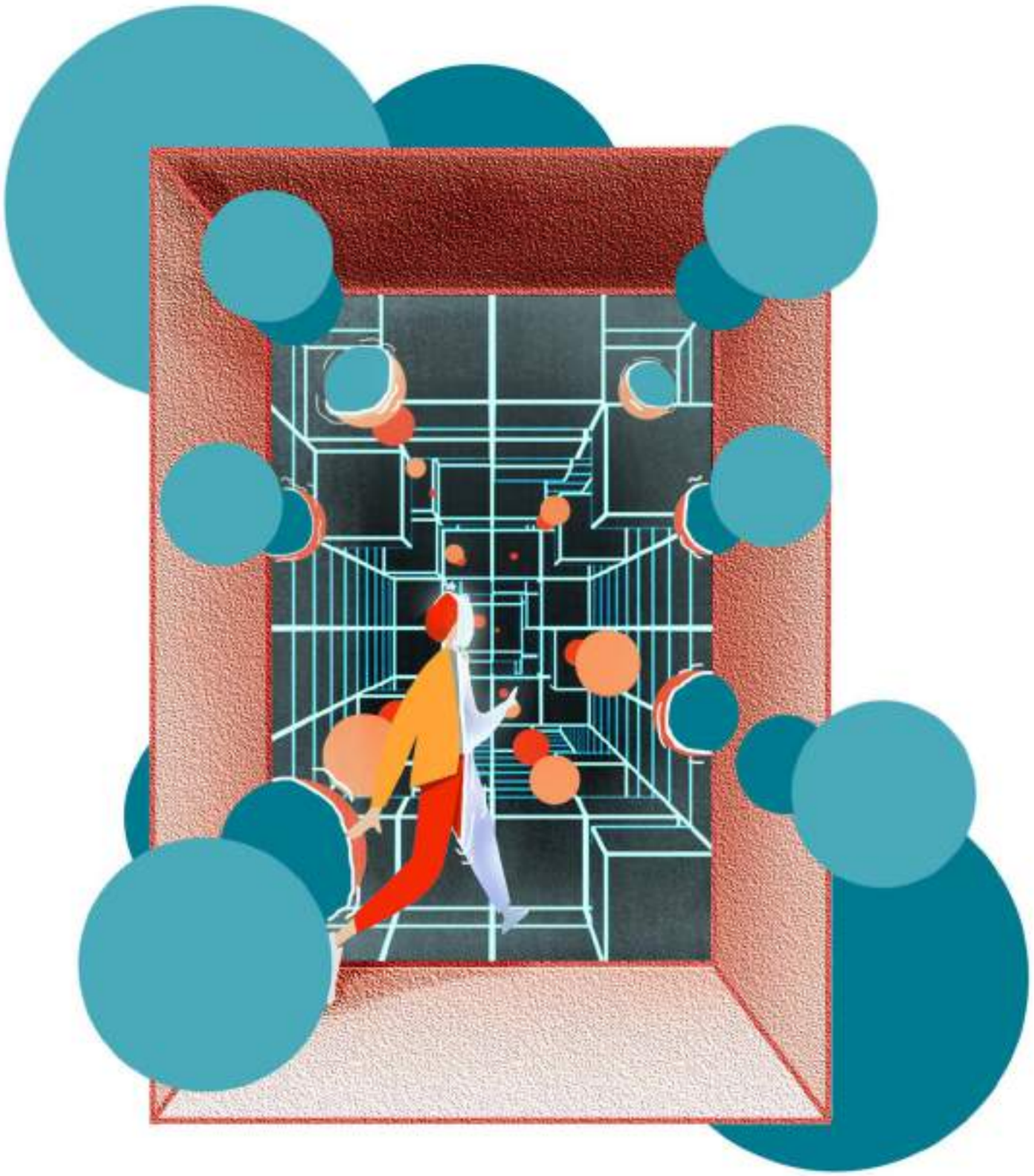
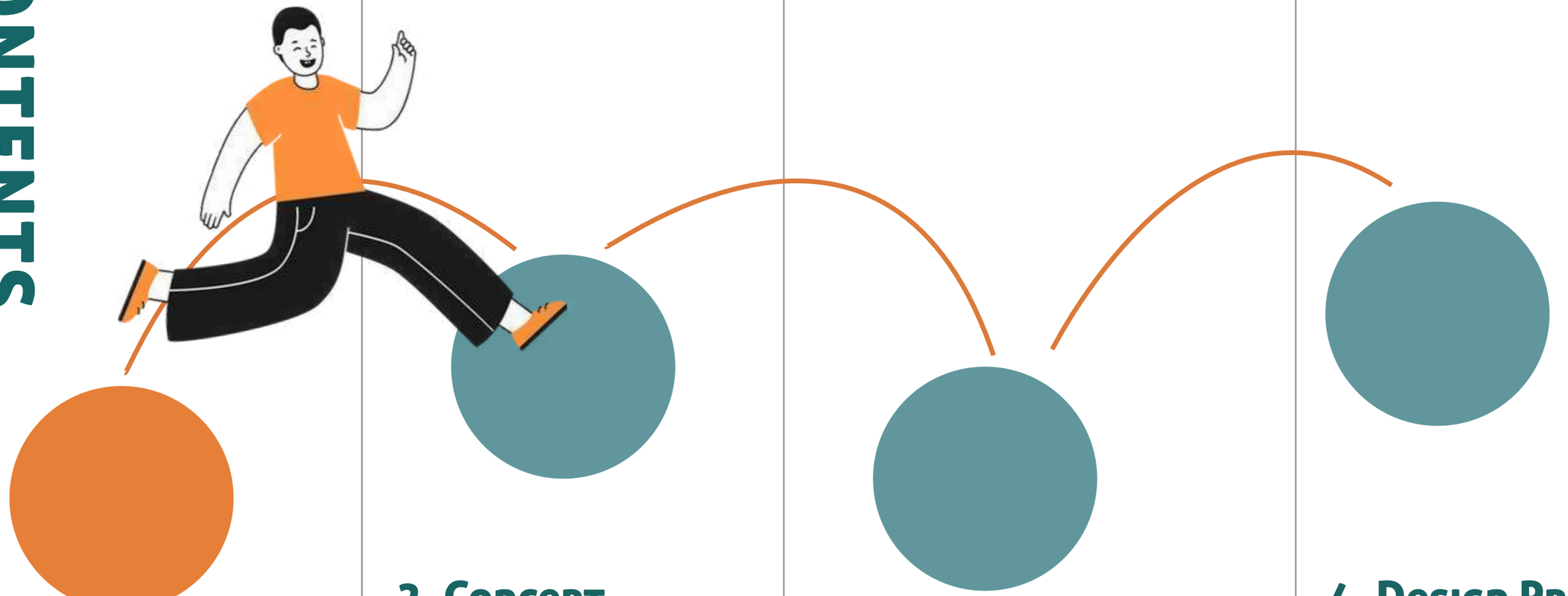


INTERACTIVE KEEPLAND

INTERACTIVEING FITNESS SPACE WITH ONLINE FITNESS SERVICE

FRANK (HUIXIN) REN

CONTENTS



1. Analysis

1.1 Site analysis
1.2 Brand Analysis

2. Concept

Interactive Keepland connecting physical gym space with online fitness service

3.Design Development

3.1 Precedents
3.2 Zoning
3.3 Initial sketch plans

4. Design Proposal

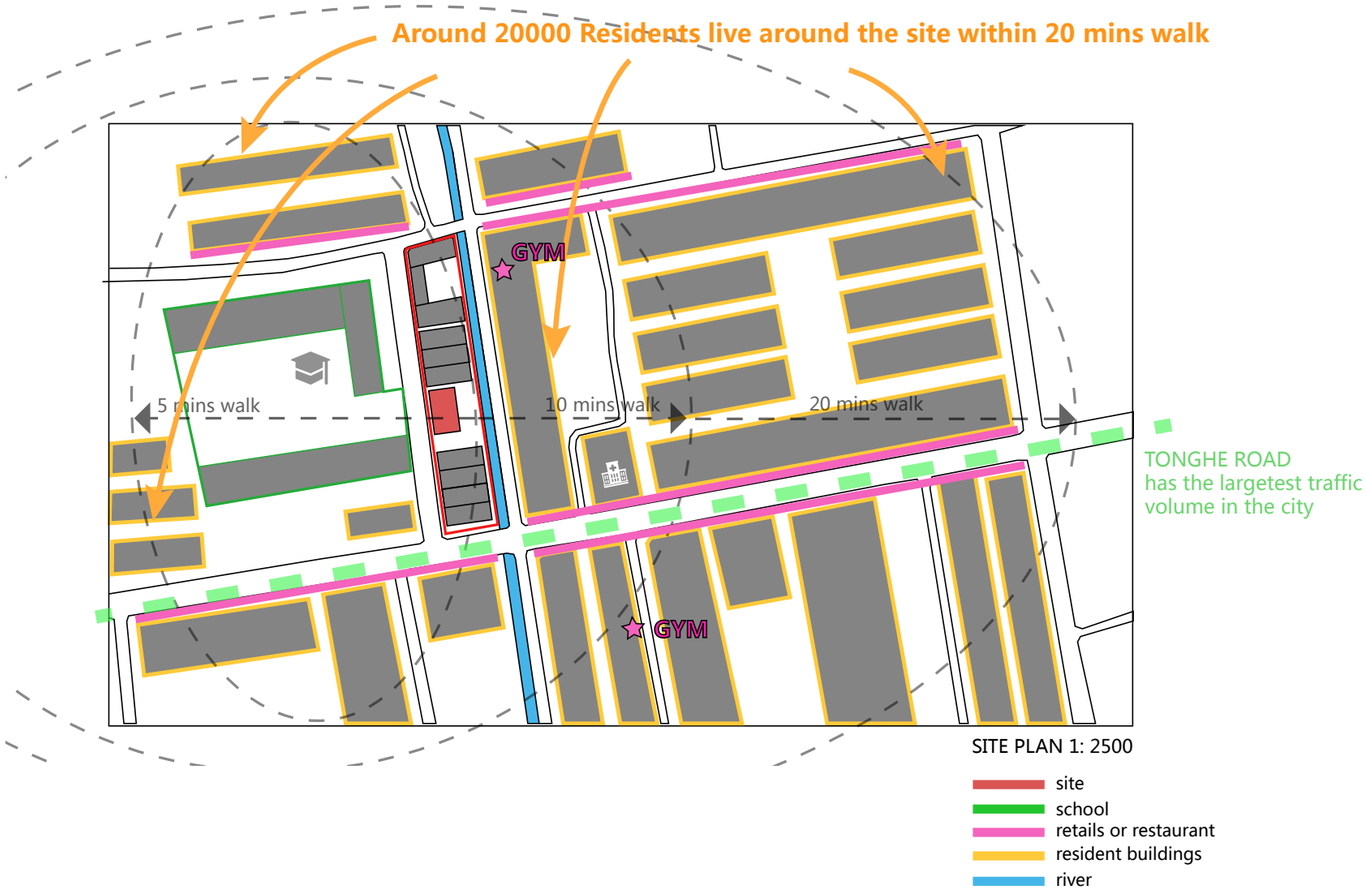
3.1Rendering
3.2 Plans and sections
3.3 Details


SITE ANALYSIS
ANALYSIS
STRUCTURAL MODEL
ANALYSIS
CLIENTS analysis

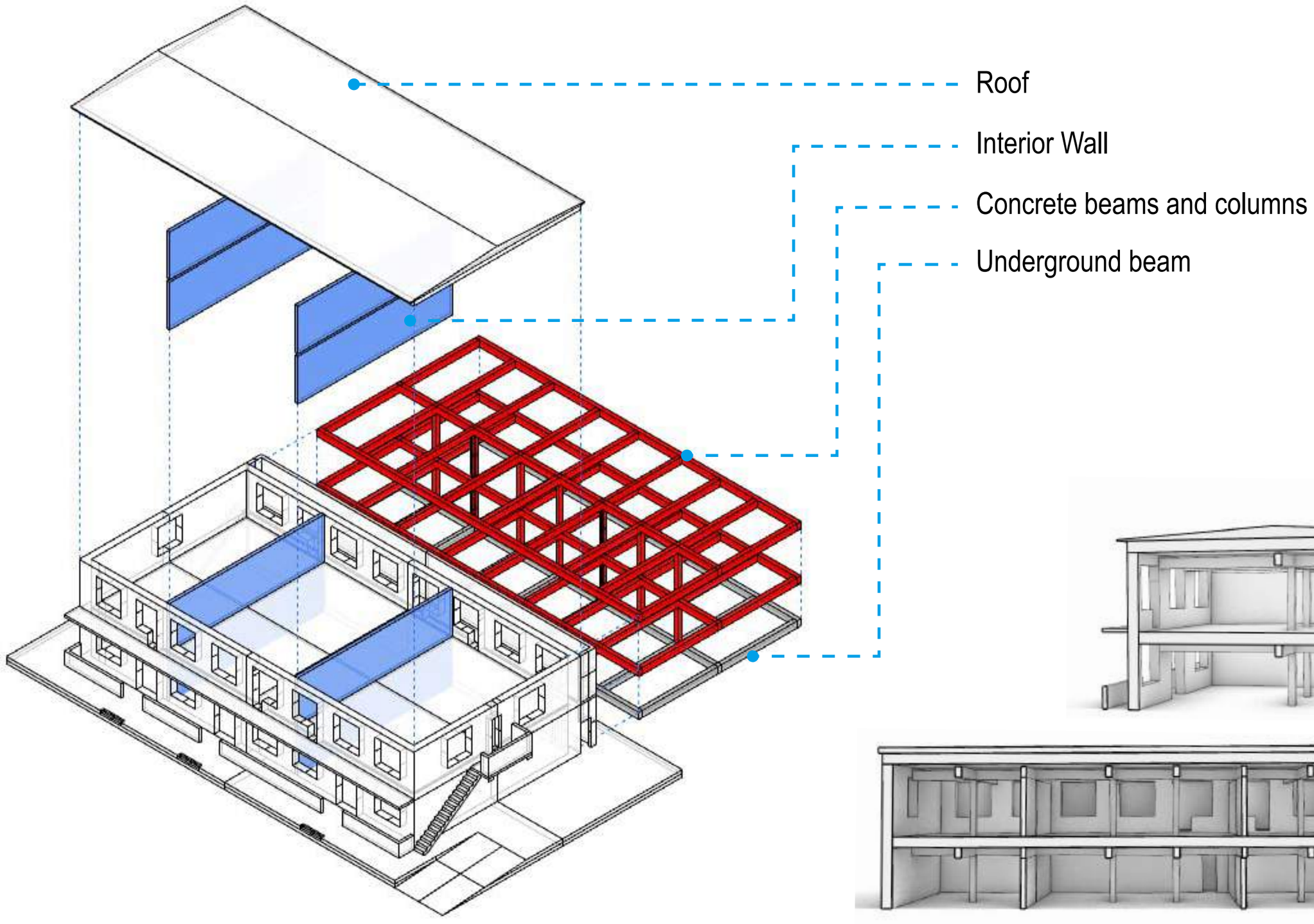
SITE ANALYSIS

It is a 2-floor building located at Tongjiang road, Nehe, China. It is facing a school and surounded by residential high rise building.

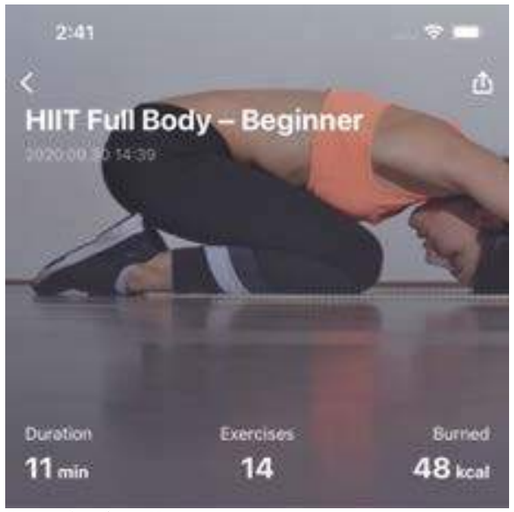
The building is representative of the old local construction methods before 1980. A facade made of small colorful tiles, worn iron window frames, doors and stairs, make this building look very special and colorful



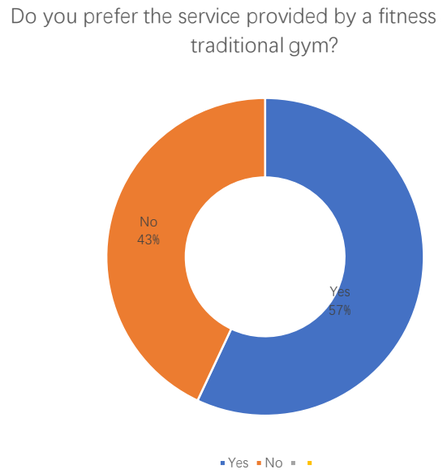
STRUCTURAL MODEL OF EXISTING BUILDING



CLIENTS ANALYSIS



Screenshot from Keep



Selected questionnair research

Selected questionnair research

	Advantages of Keep compared with a traditional gym	Disadvantages of Keep compared with a traditional gym
1	It makes it easier to start a fitness regimen	Inaccurate user data collection
2	It offers low-cost scientific fitness guidance	Lack of atmosphere
3	Interesting fitness courses	Risk of injury
4	Online community	Lack of content suitable for higher-level trainers
5	Rich fitness library	
6	Health monitoring	

Summary of interview content

This project offer a physical training space for online fitness app named Keep. The service of the app includes an e-store for fitness-related products (including exercise equipment) and online fitness courses. Users are provided with training schemes and tutorial videos after filling in an information request form and stating their goals.

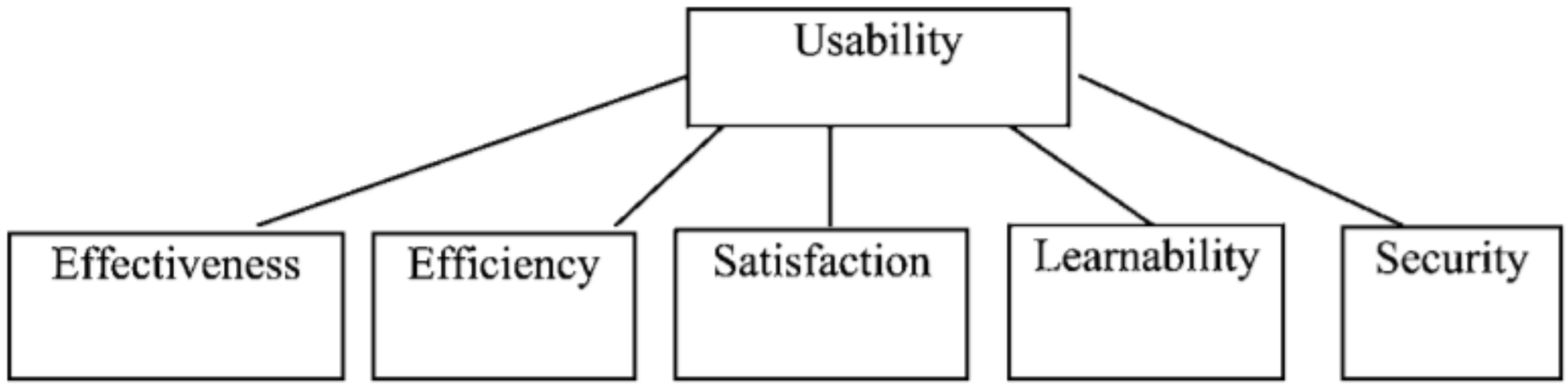
According to the interiview survey, only providing online fitness services cannot fully meet the needs of users. To provide comprehensive fitness services, the two types of provision could be combined.


FROM RESEARCH TO CONCEPT
CONCEPT
FROM RESEARCH TO CONCEPT

SPACE, ONLINE SERVICE AND HUMAN COMPUTER INTERACTION

“As computing becomes embedded in our homes, our streets and our buildings, the demands to understand the role of space and architecture are becoming critical to HCI. At the same time, architecture is becoming far more engaged with the digital experience” (Dalton et al. 2016: 2). To generate a methodology for the interaction between humans and computers using space as the carrier, we must first understand human computer interaction. As there is currently no systematic solution for the design of interactive spaces, we can apply the existing HCI method.

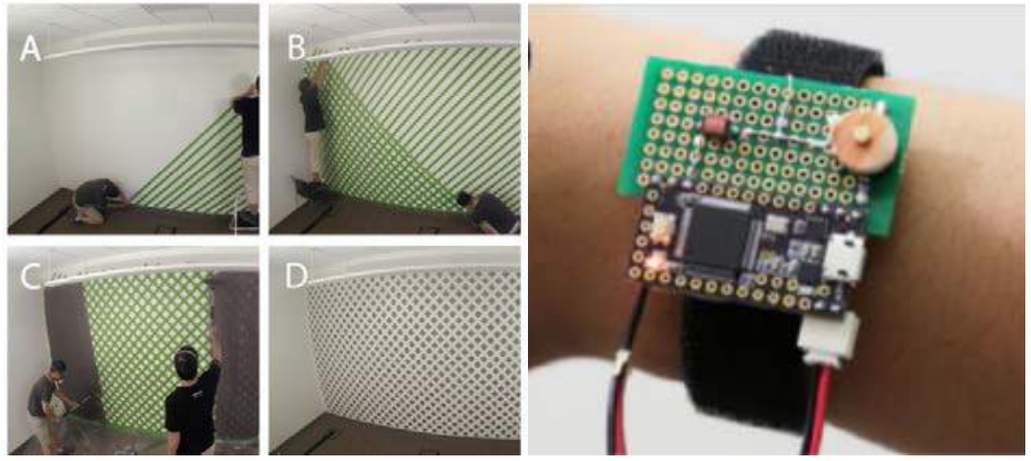
To evaluate the interactive process involved in a project, the first step is to consider software usability. Abran et al. (2003) conclude that software usability is a basic determinant of productivity and of the acceptance of software applications. They have analysed ISO usability evaluation models, such as ISO 9126 and 9241-11, and propose their integration into an enhanced model.



Enhanced usability model (Abran et al. 2003).

AUGMENTED REALITY

Augmented Reality (AR) was defined as a real-time direct or indirect view of a physical, real-world environment that has been enhanced/augmented by adding virtual computer-generated information to it (Carmigniani and Furht 2011). Morton Heilig (1992), a cinematographer, was the first to propose AR. In his essay "The Cinema of the Future," he mentions an AR device called Sensorama.



Wall++ (Yang Zhang et al. 2018)

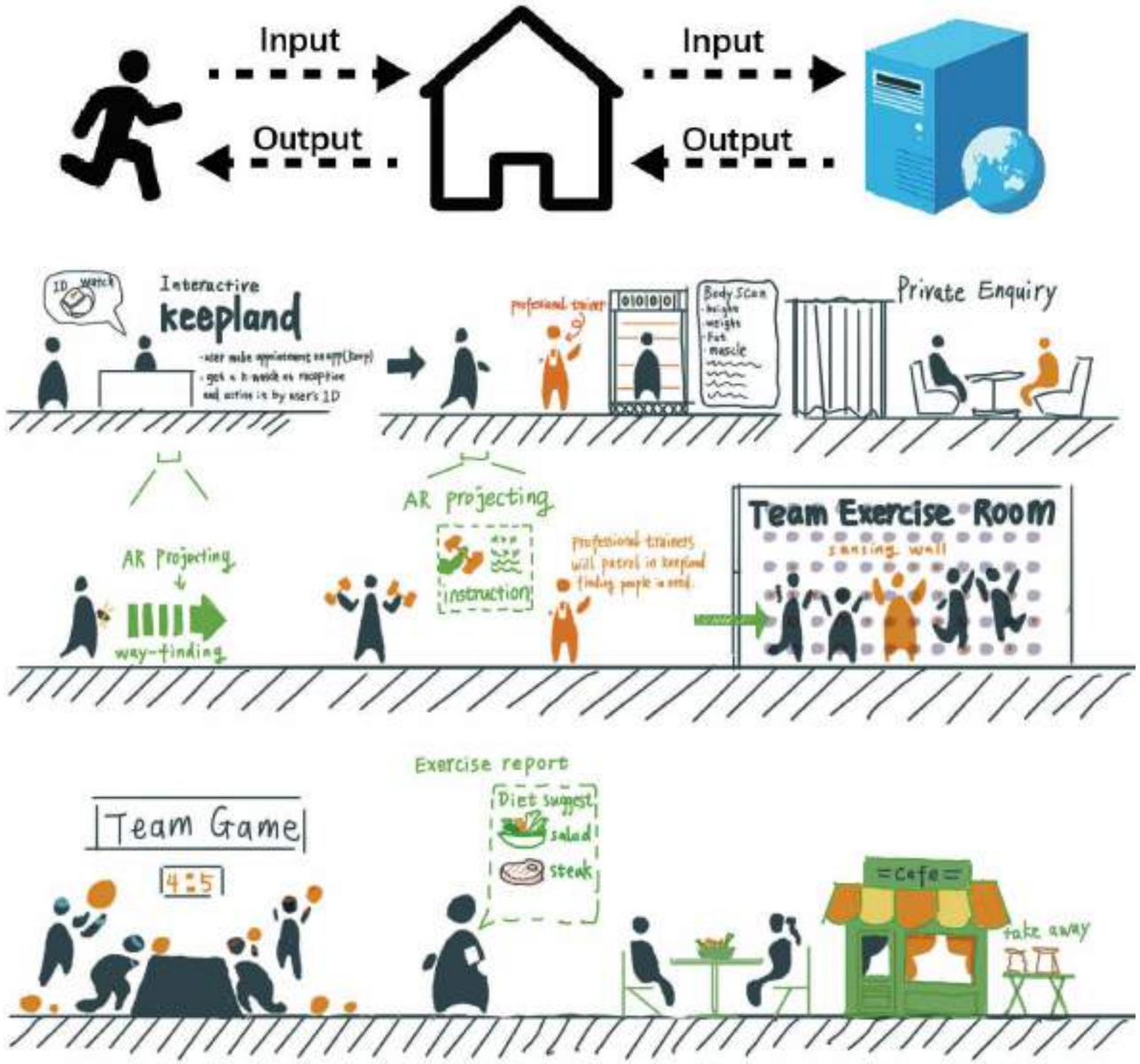
The Universe of Water Particles in the Tank (TeamLab 2019)

The Wall++(Yang Zhang et al. 2018) is a room-scale interactive sensing system. It can collect the location information of visitors like the AI-based camera technology applied by The Universe of Water, but it collects the position information in another way.

This system monitors the touch and movement of visitors and estimates the body position using large electrodes that are painted onto a wall with conductive paint. It can also detect which appliances are operating and where they are located by capturing airborne electromagnetic noise. The most exciting function is the identification of the user ID and location through a wristband. They claim that this is a very low-cost sensing system, and their experimental works only cost 22 dollars per square meter. They said that if there is an opportunity for mass production and large-scale use, the cost will be further reduced. This price is similar to that of a mid-level wall finish. Compared with expensive pressure sensors, wall++ is easier to be accepted by the clients.

In 2019, Teamlab presented an immersive interactive exhibition called The Universe of Water Particles in the Tank at the Oil Tank Art Center in Shanghai. Walking into the space, visitors felt as if they were stepping into a magical world. They could observe that the animation projected on the wall and ground was following their movement. The water flowed around their feet, and clusters of flowers bloomed around them. They were both connected with and immersed in a virtual world (Teamlab 2019). This work is a brilliant representation of the application of the technologies of Interactive projecting.

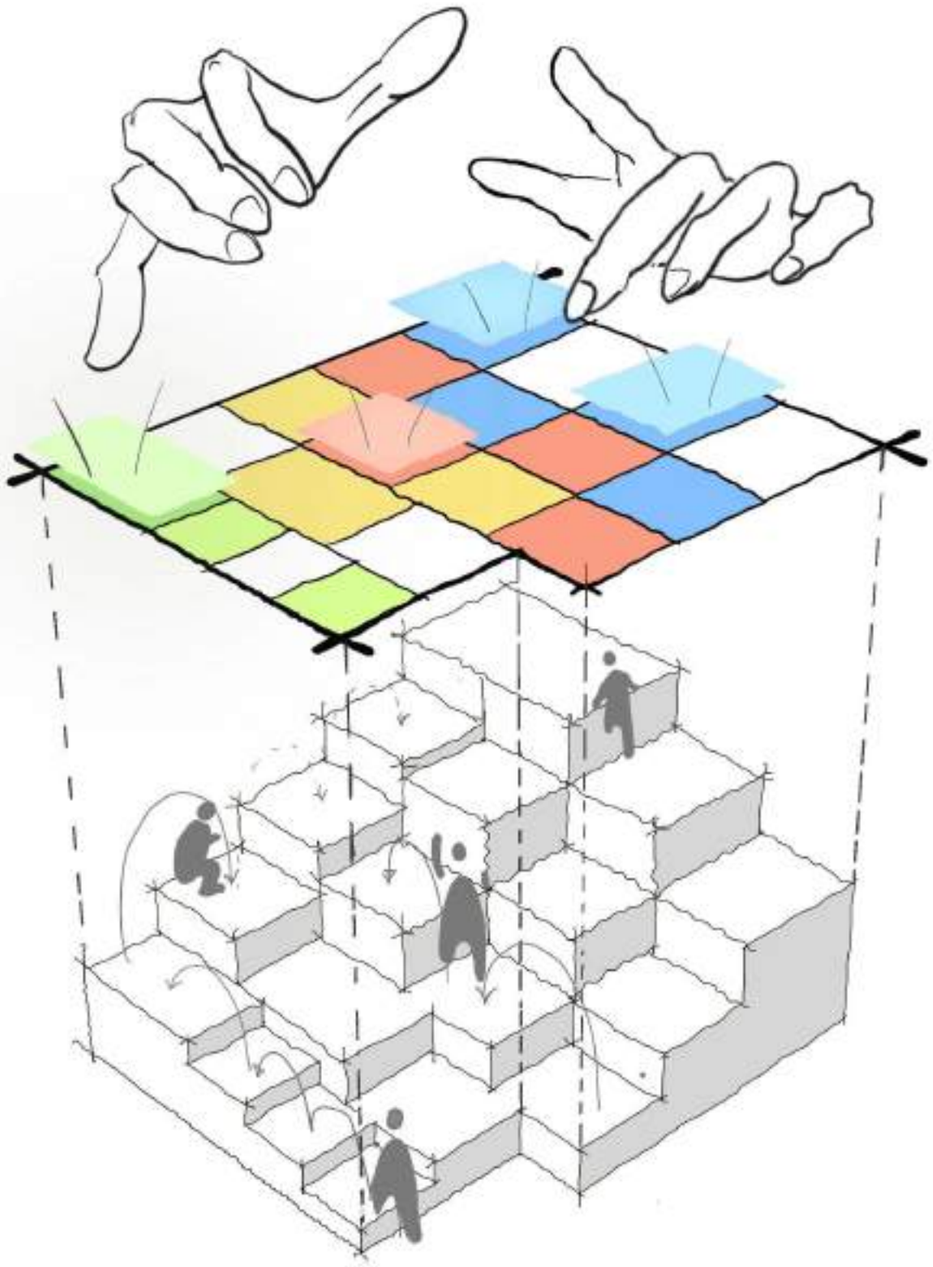
CONCEPT

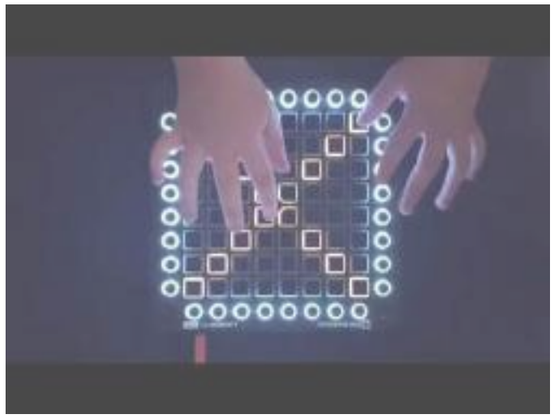


Based on the sensing system and AR , the Interactive Keepland offer a hybrid fitness service that combines online services and gym services.

When users get into the interactive keepland they get a smart watch for computer to recognize their ID and monitoring their moves and heart rates. Then facilities such as body scanning machine help to build a data model of users and updates it. Project mapping can do things like way-finding and intercative fitness games. The salad bar could suggest food to users by analysis how much calories they burn.

CONCEPT OF THE INTERACTIVE FITNESS INSTALLATION





DJ PAD*JUMPING BOX is an interactive fitness installtion. The user can follow the instructions of the projection on it to jump on the jumping box, and at the same time, when stepping on the jumping box, the sensor will be triggered to play musical instrument sounds, such as drums and electric guitar sounds.

Besides Users can select different programs or tracks through the Keep app, and managers can also design different programs and activities to link with the installaion.


DESIGN DEVELOPMENT
site analysis
clients analysis
DESIGN DEVELOPMENT
structural model

PRECEDENTS

Harvard University's ArtLab by Barkow Leibinger


Asphalt Green Gym by Asphalt Green


International Furniture Fair pavilion by Álvaro Siza

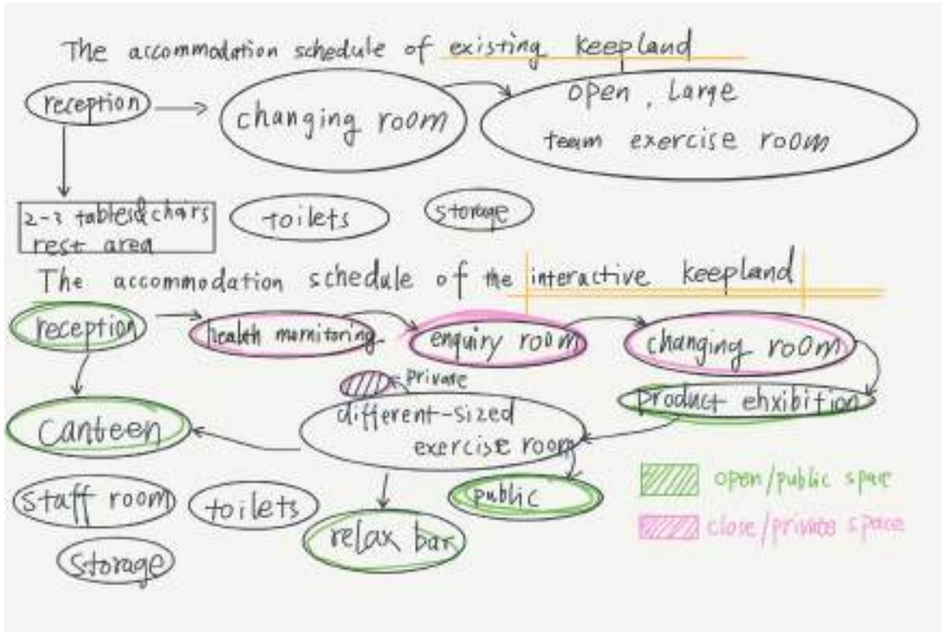

Design Faculty in Munich by Staab Architekten


São Paulo apartment renovation
by Pascali Semerdjian Arquitetos

On the left side are six selected precedents which inspire me a lot in developing the interactive keepland.

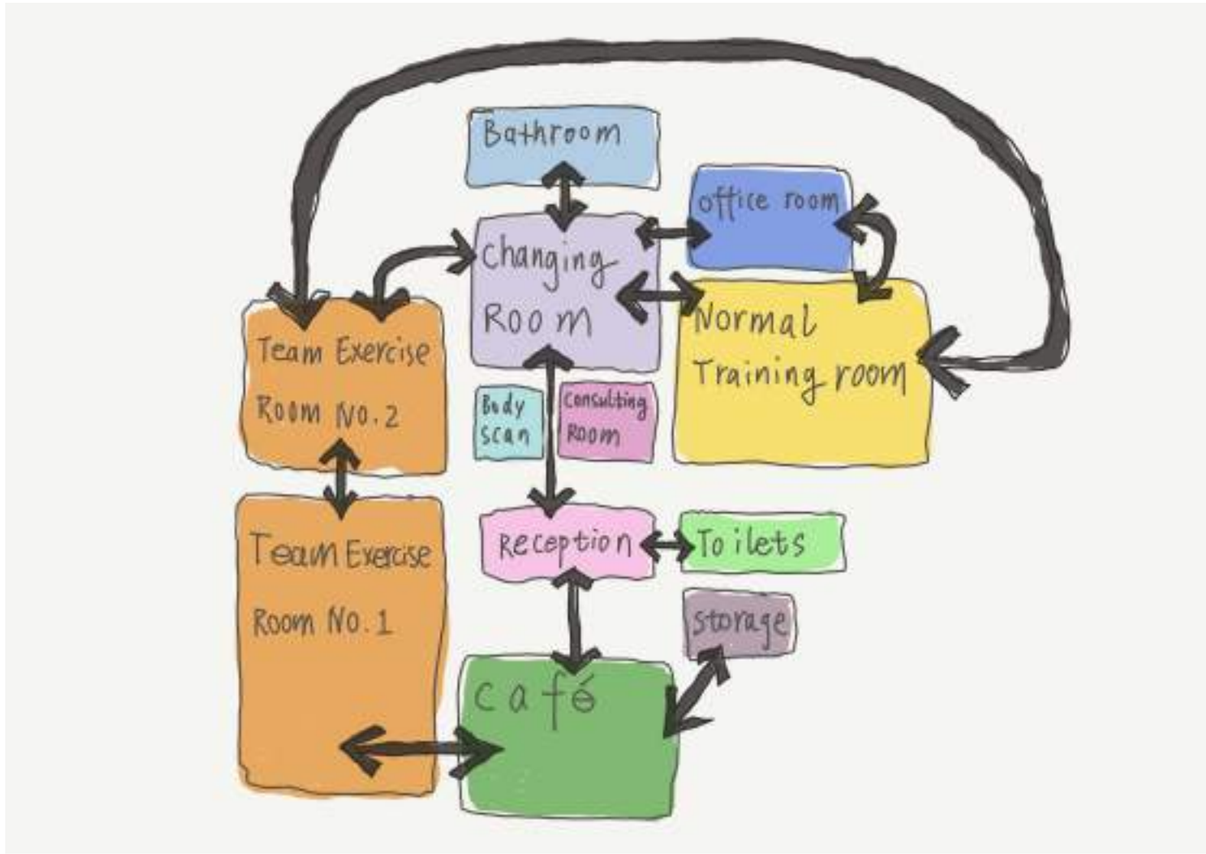
I learned from the Art lab to use polycarbonate sheets as partitions that are bright and translucent. Design Faculty's brushed aluminium sheet and the aluminium foil used in the Furniture Fair pavilion could create a sci-fi atmosphere. There is a big shelf covering concrete columns in São Paulo apartment renovation project and this solution to hide columns is applied to my project as well. The design of the interaction between users and spaces in the gym refers to the Asphalt Green Gym.

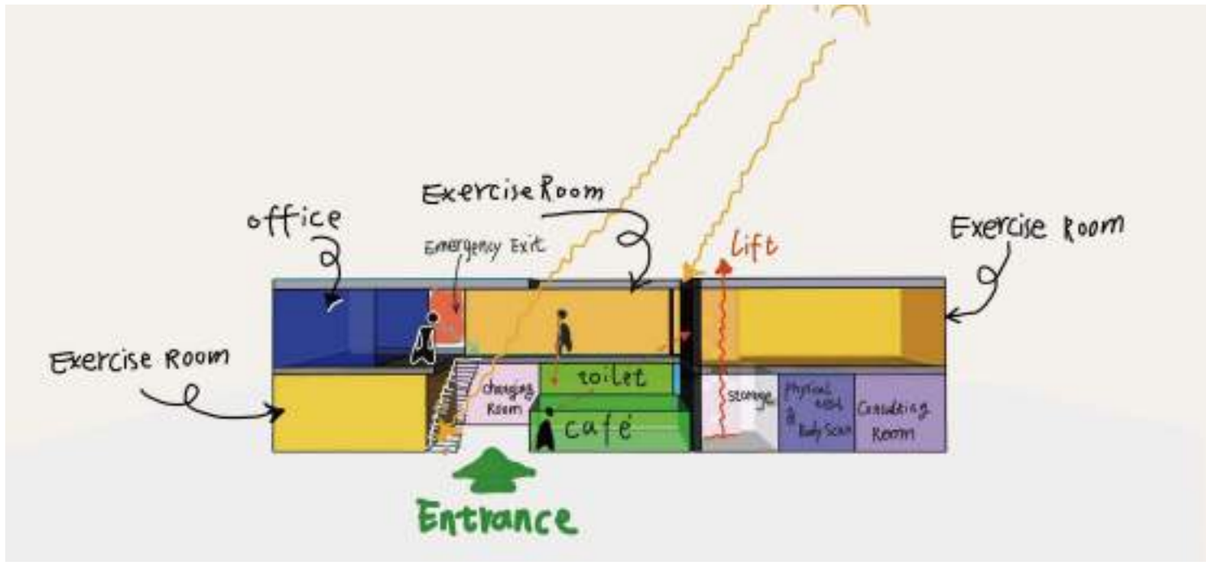
ZONING



SCHEDULE OF ACCOMMODATION

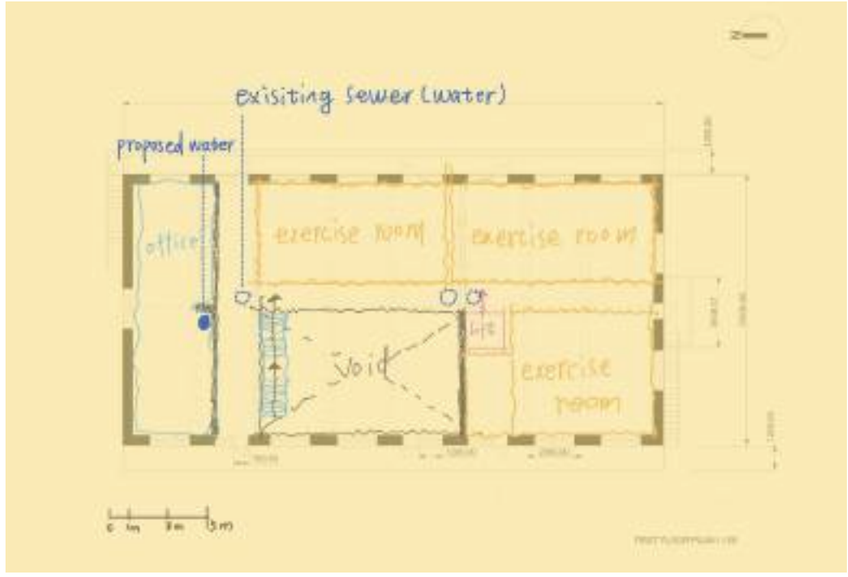
Room Type or Function	Approximate Size in m2	Public/ Private
Reception	30m^2	public
Body scan room	18m^2	private
Consulting room	20m^2	private
Team exercise & Public events room 1	45m^2	public
Team exercise & Public events room 2	45m^2	public
Salad bar	30m^2	public
Training facilities area	90m^2	public
Changing rooms	35*2= 80m^2	private
Shower room	15*2= 40m^2	private
Toilets	40m^2	private
Staff Room	60m^2	Private
Storage	20m^2	Private





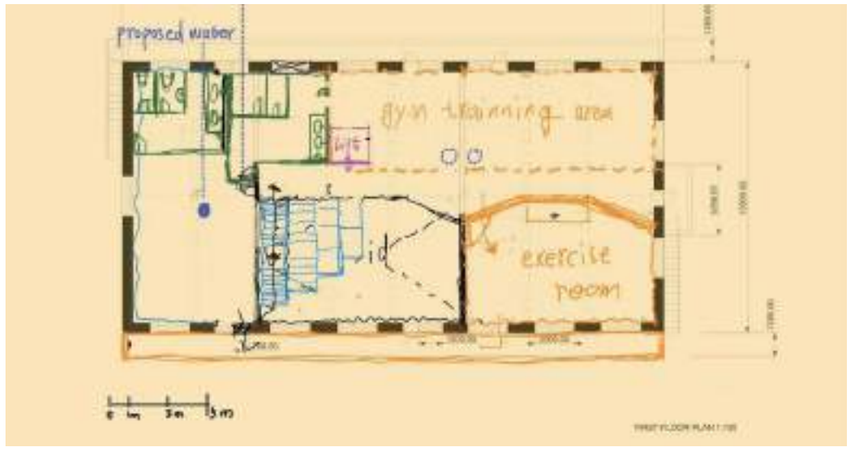
INITIAL SKETCHS PLANS

SKETCH NO.1



This sketch puts the functions planned in the early brief into the building as reasonably as possible. This initial draft has some problems, such as the elevator being placed in a remote corner, and the storage room is too far away from the cafe

SKETCH NO.2

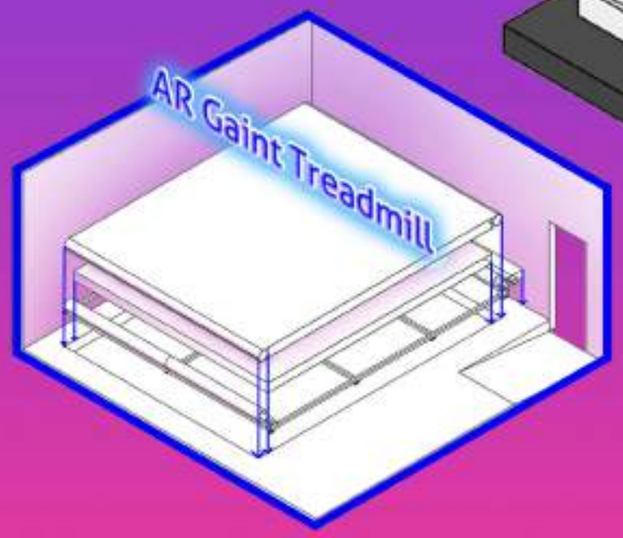


In the new sketch, the designer further refined the sketch after solving the problem of elevator and storage in the previous sketch layout. The designer also placed the jump box combination in, and further distinguished male and female toilets and staff toilets

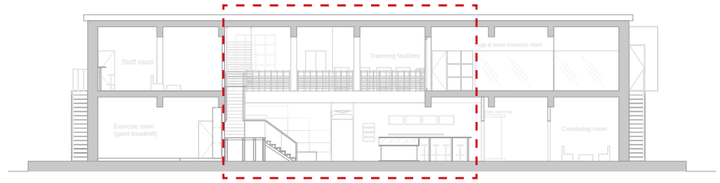

DESIGN PROPOSAL
RENDERING
PLANS AND SECTIONS
DETAIL DESIGN
DESIGN PROPOSAL

DESIGN PROPOSAL

The space design foucus on adapting gym space with online serivice. Designer arranges functions like interactive jumping box, AR gaint treadmill and AR aid trainning area. Besides, the atmosphere is desinged to be futuristic, sci-fi feeling.



RENDER SECTION

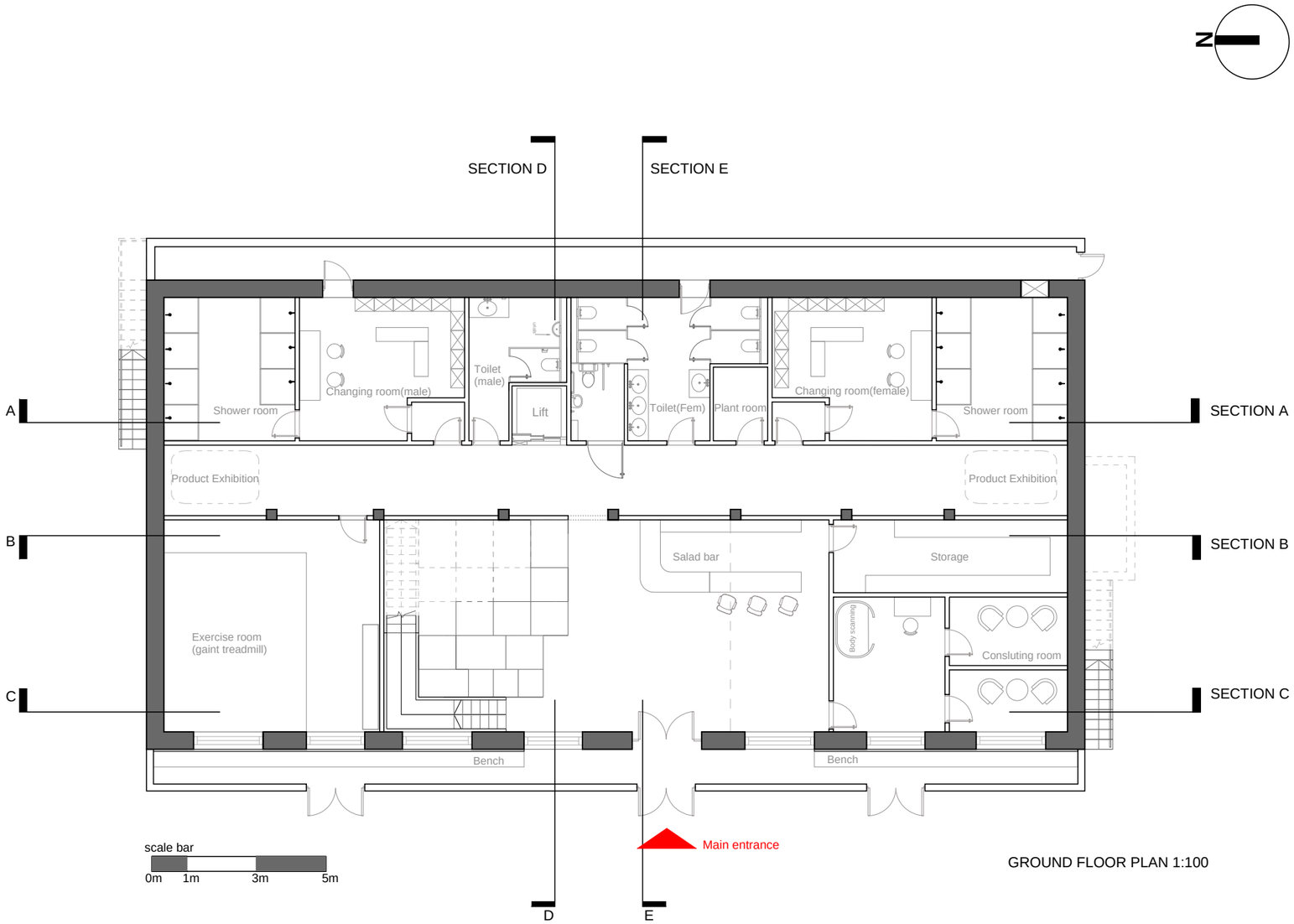


CLUB MODE

DAY MODE

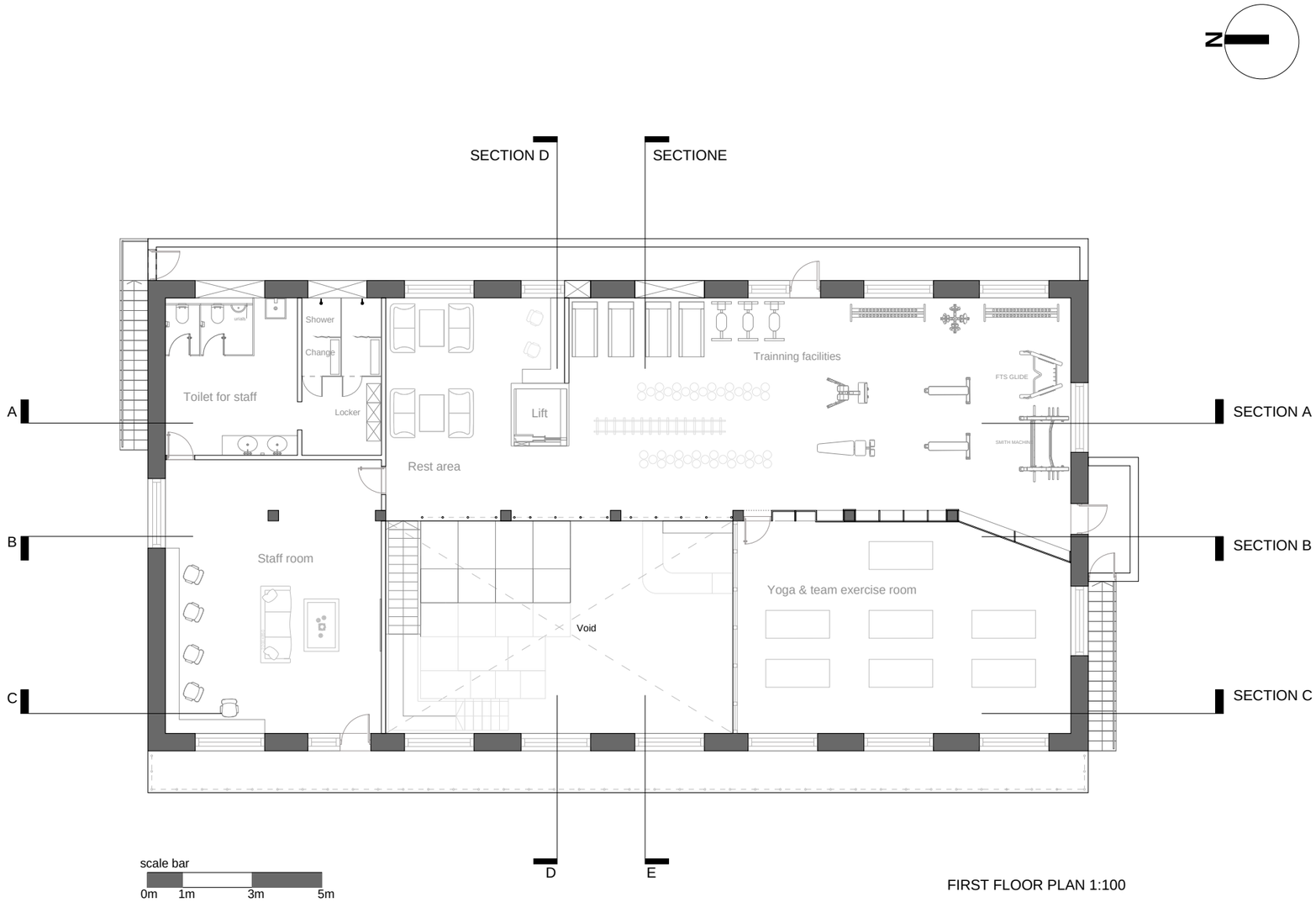
TRAINING AREA-FIRST FLOOR

PROPOSED GROUND FLOOR PLAN



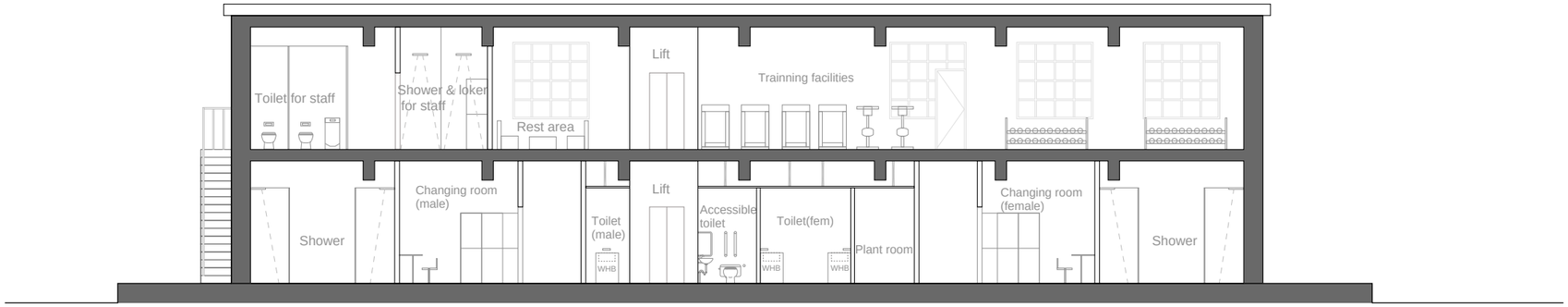
GROUND FLOOR PLAN 1:100

PROPOSED FIRST FLOOR PLAN



FIRST FLOOR PLAN 1:100

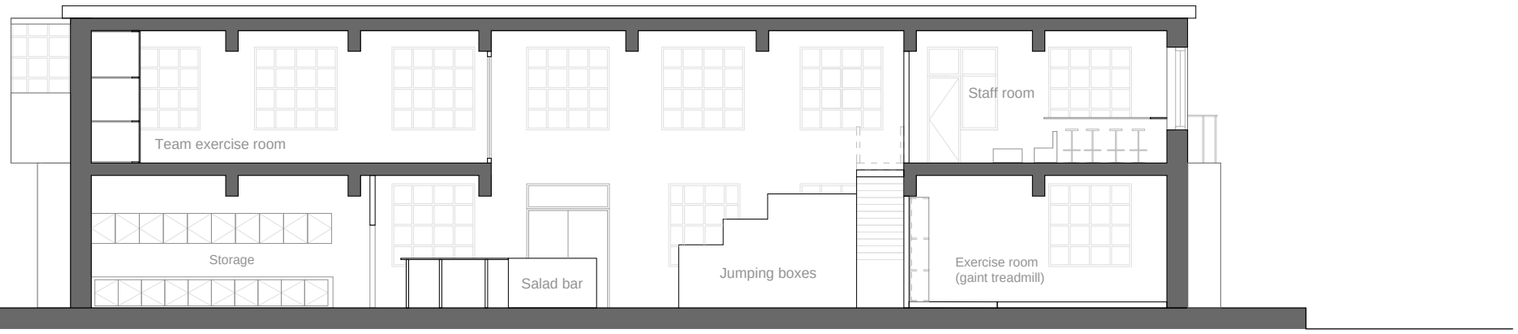
PROPOSED SECTION A, B AND C



scale bar

0m 1m 3m 5m

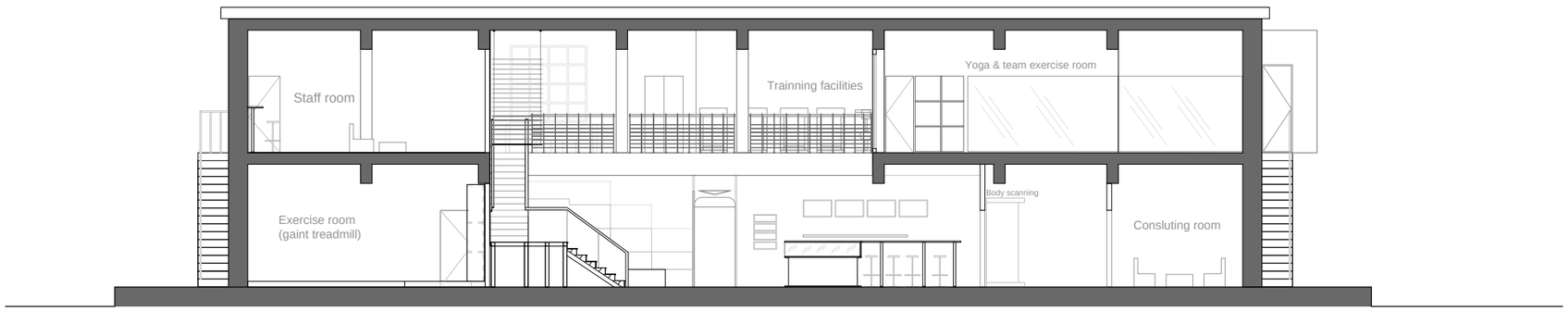
SECTION A 1:100



scale bar

0m 1m 3m 5m

SECTION B 1:100



scale bar

0m 1m 3m 5m

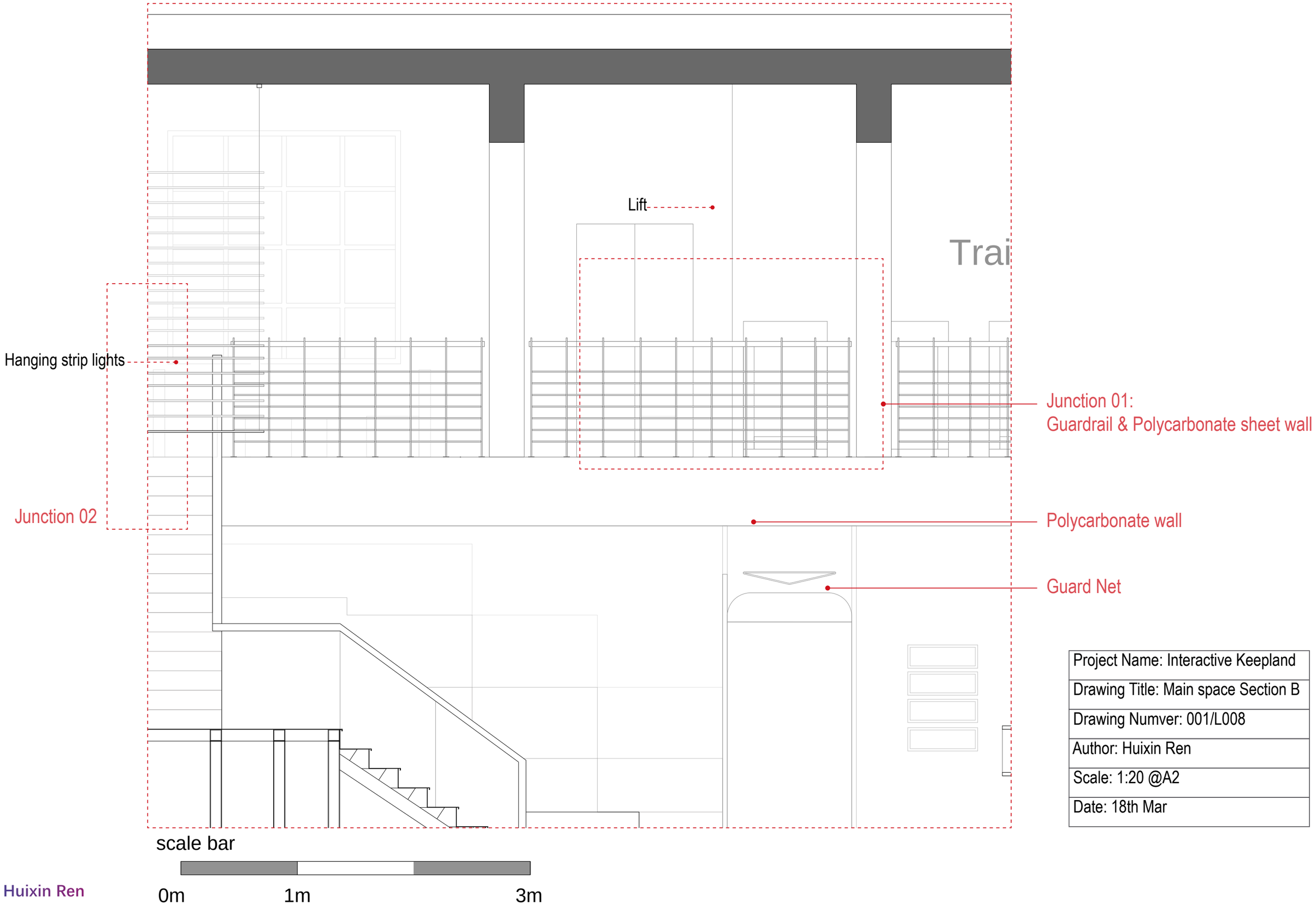
SECTION C 1:100

PROPOSED SECTION D AND E

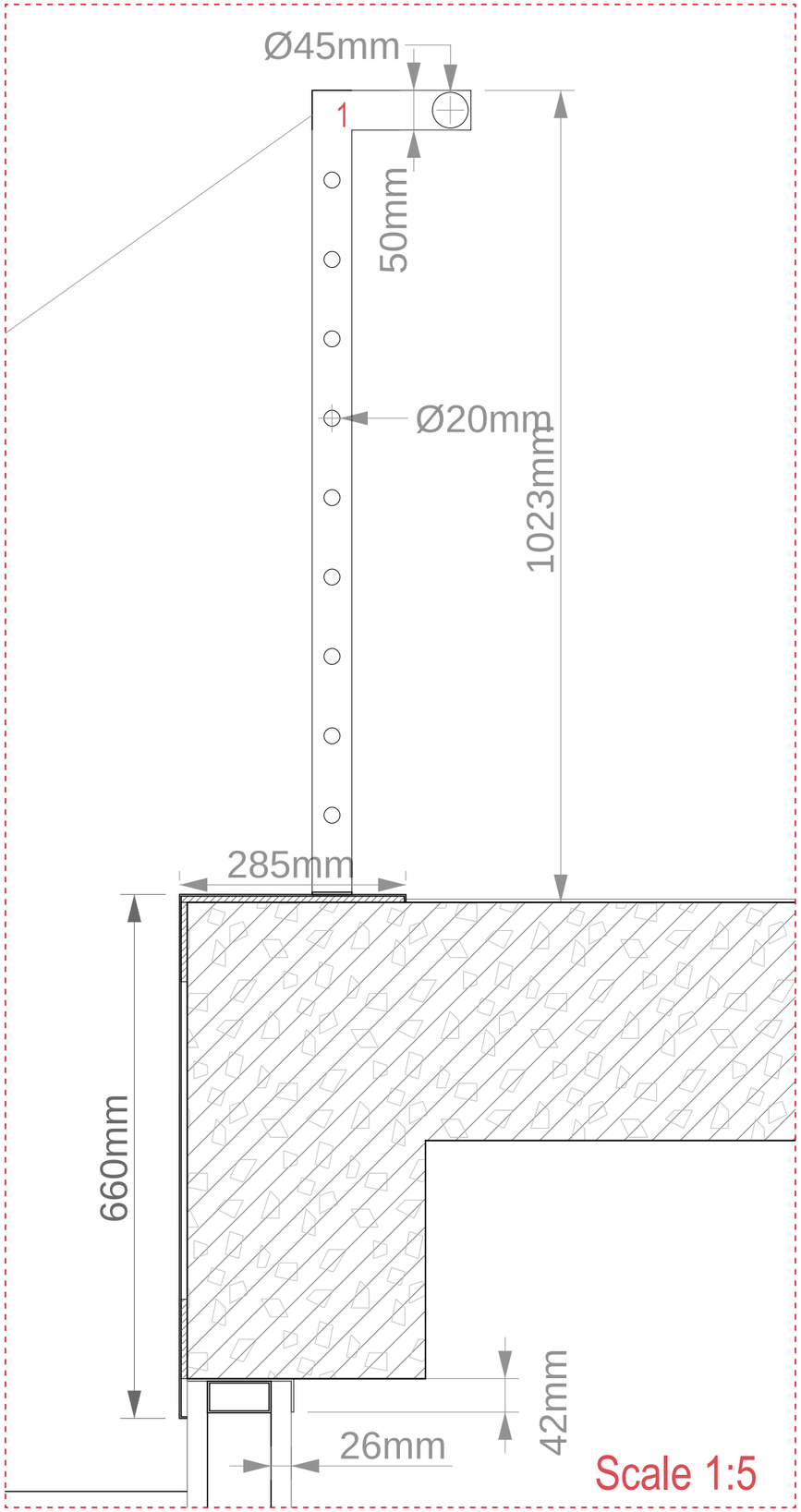
SECTION D 1:100

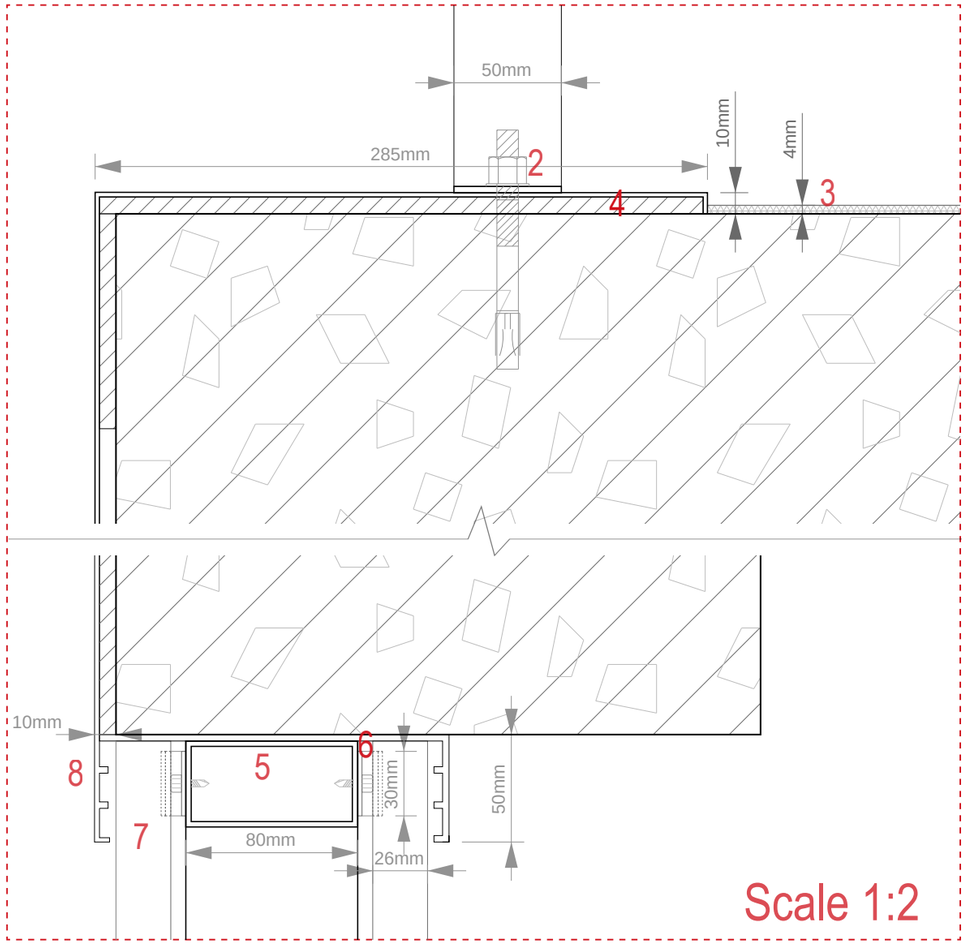
SECTION E 1:100

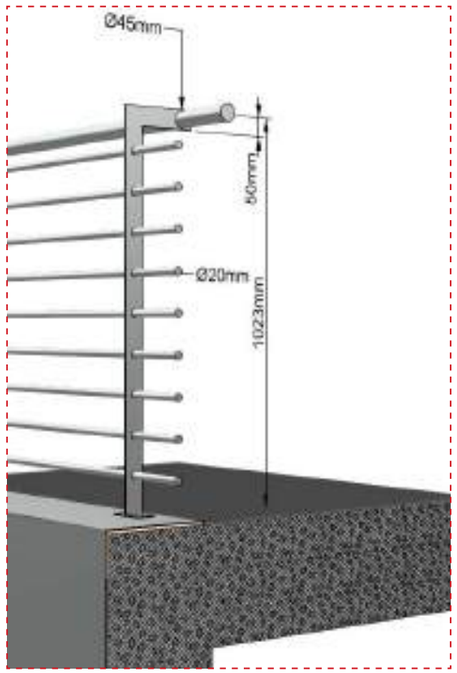
MAIN SPACE DETAIL STUDY

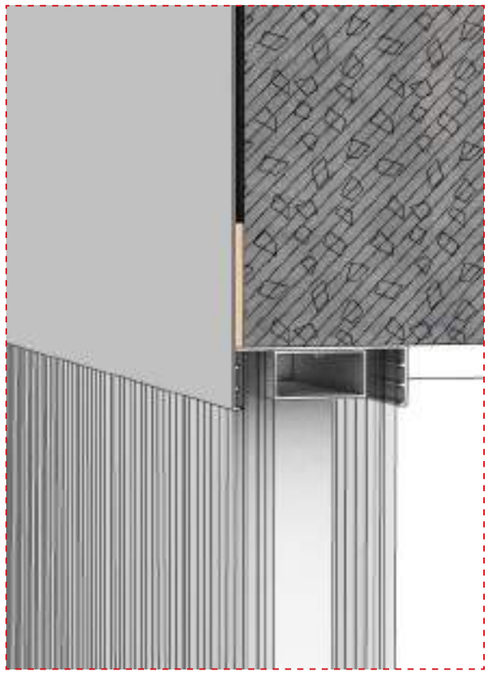


Project Name: Interactive Keepland
Drawing Title: Main space Section B
Drawing Numver: 001/L008
Author: Huixin Ren
Scale: 1:20 @A2
Date: 18th Mar









1. Guardrail
 50mm width matte steel sheet
 45mm caped steel pipe
 20mm caped steel pipe

2. 10mm Expansion bolts fix the guardrail to the floor

3. 4mm Nora rubber floor

5. Floor edging
 10mm raising up floor edging to make the floor edging a little bit higher than the rubber floor.
 7.5mm wood bar underneath the 2.5mm matte steel sheet.

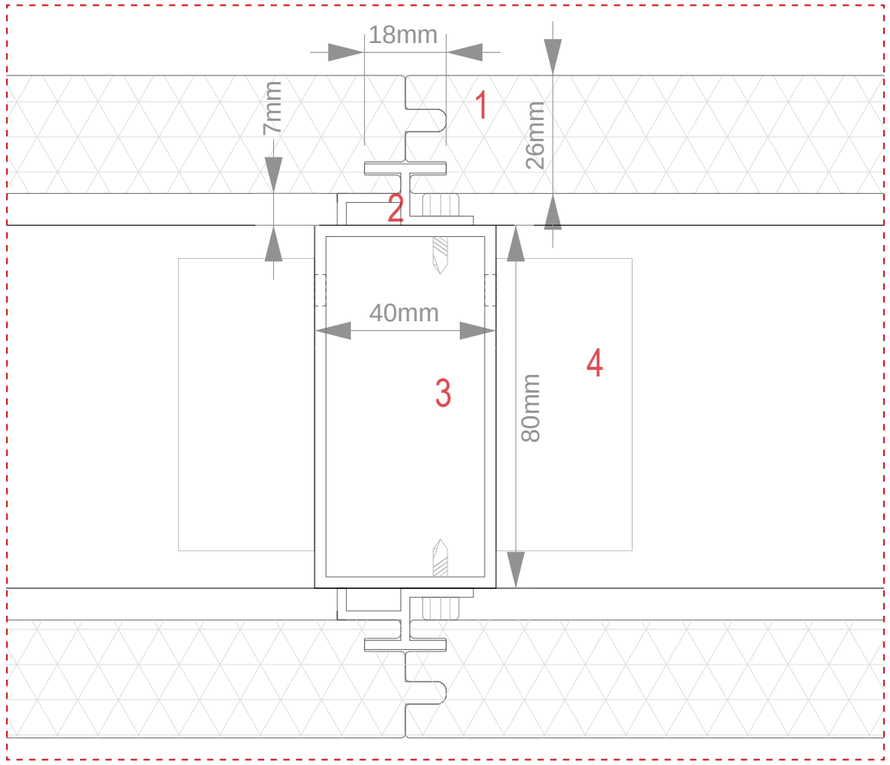
5. 40mm*80mm HRS as studs of polycarbonate sheet wall

6. T- lock
 locking the polycarbonate sheet to the studs

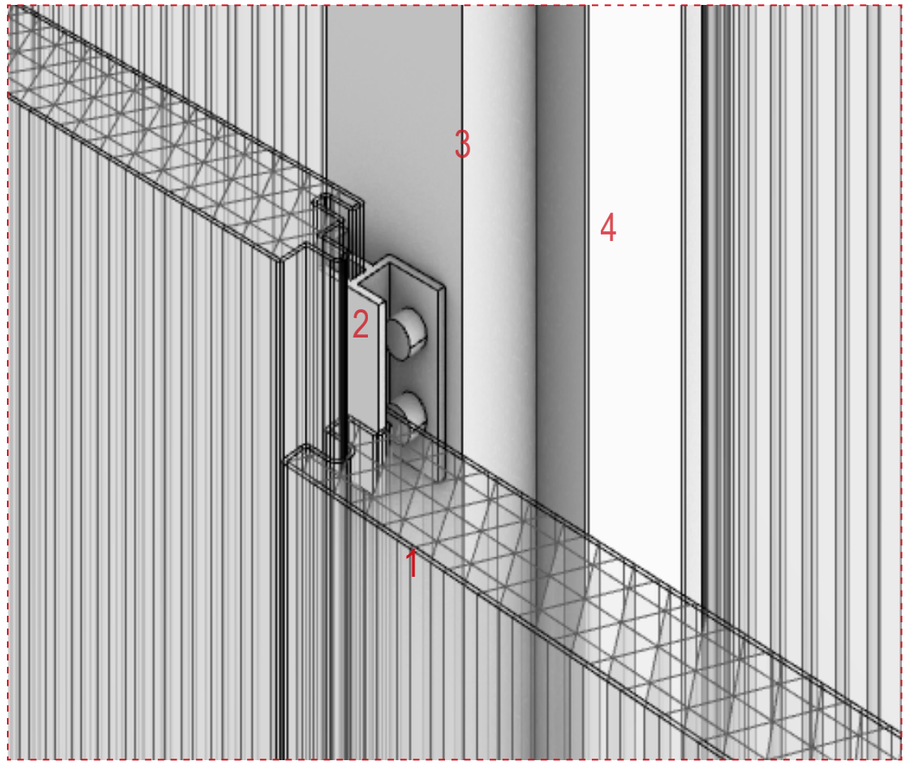
7. 26mm polycarbonate sheet

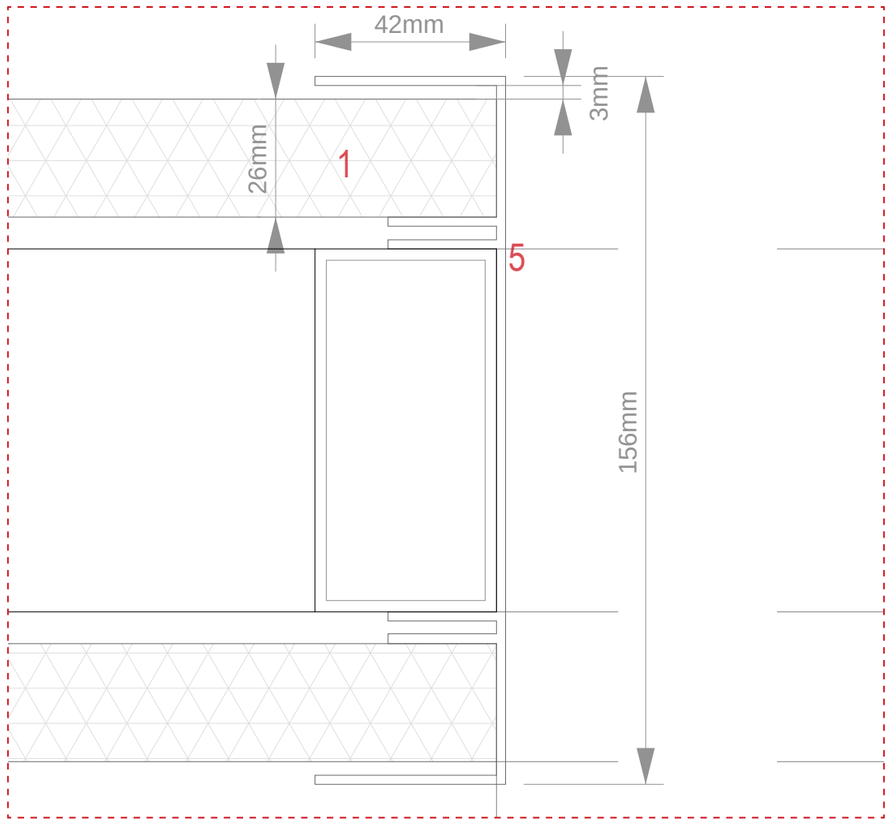
8. Wall ending
 shaped 2.5mm matte steel sheet (leave 3mm distance between the ending and the polycarbonate sheet, because the polycarbonate sheet may expansion or shrink with the temperature)

Project Name: Interactive Keepland
Drawing Title: Junction 01
Drawing Numver: 001/A003(24)
Author: Huixin Ren
Scale: 1:2 @A2
Date: 18th Mar

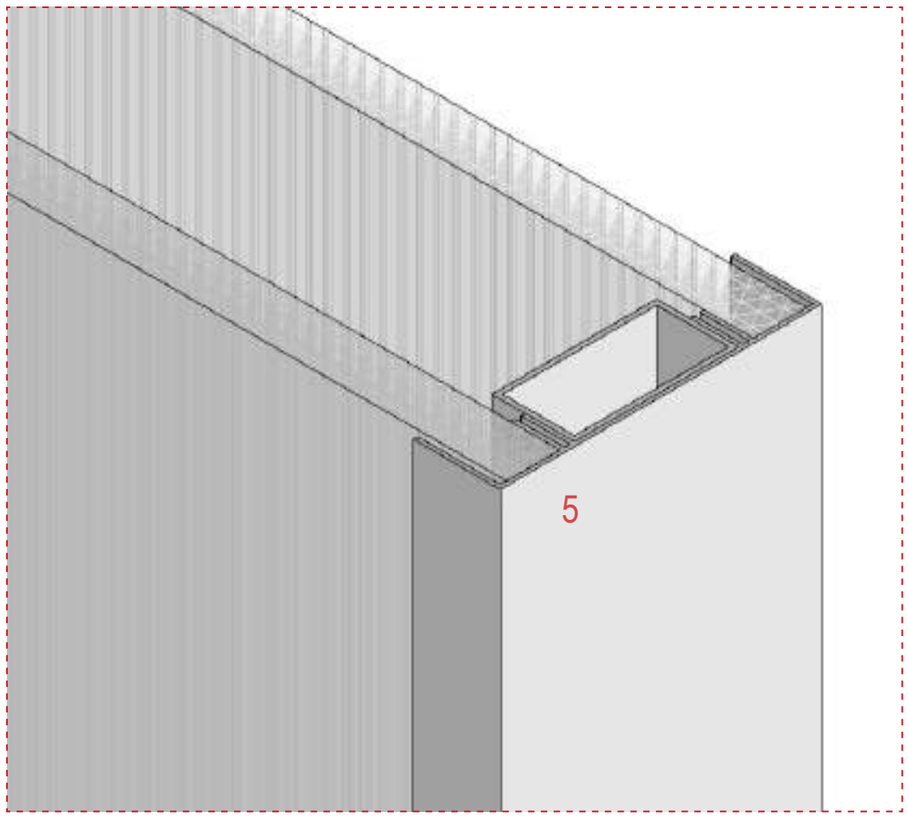


Scale 1:1





Scale 1:1



1. 26mm Polycarbonate sheet

2. T-lock

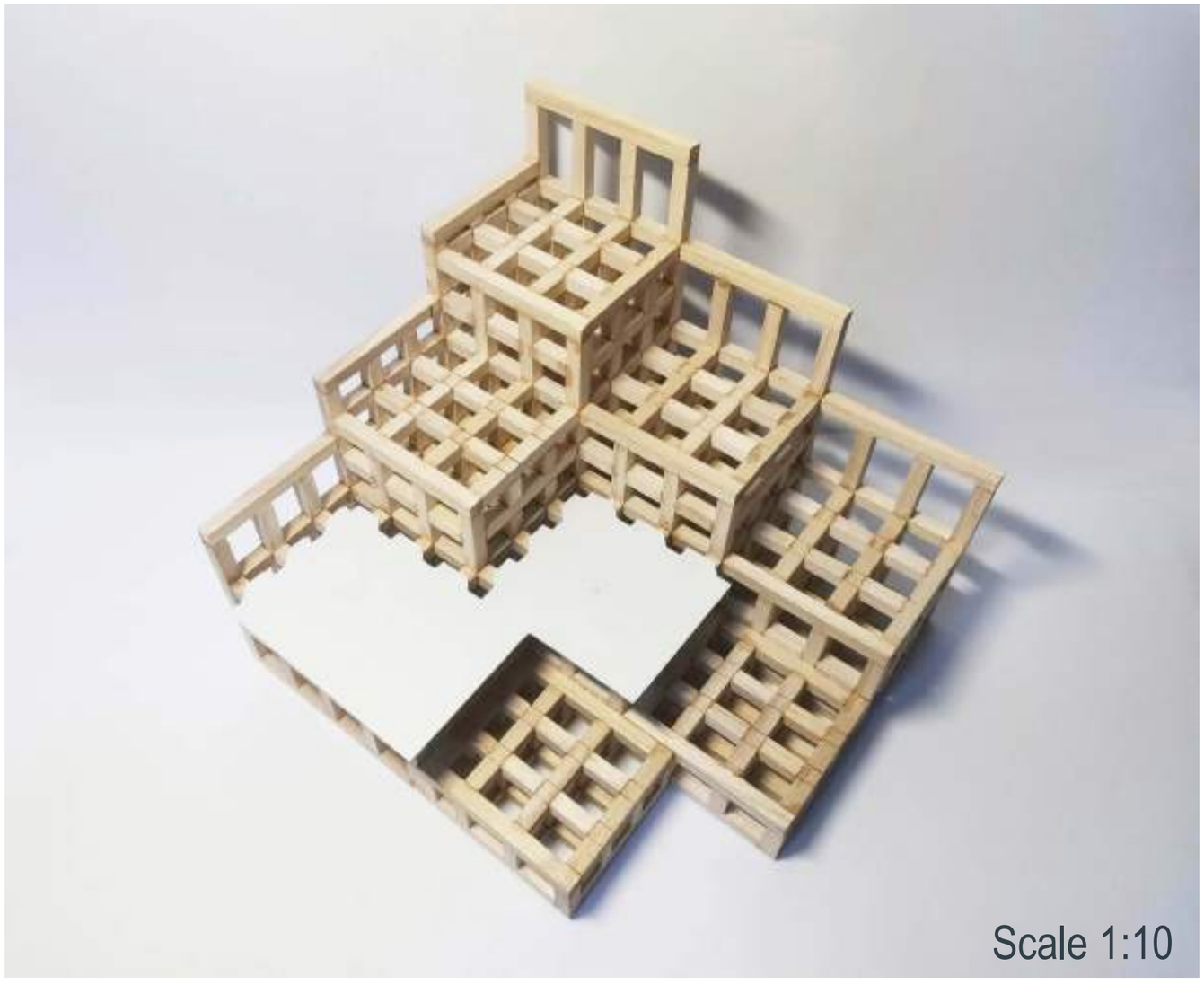
3. Wall studs
   40mm*80mm steel HRS

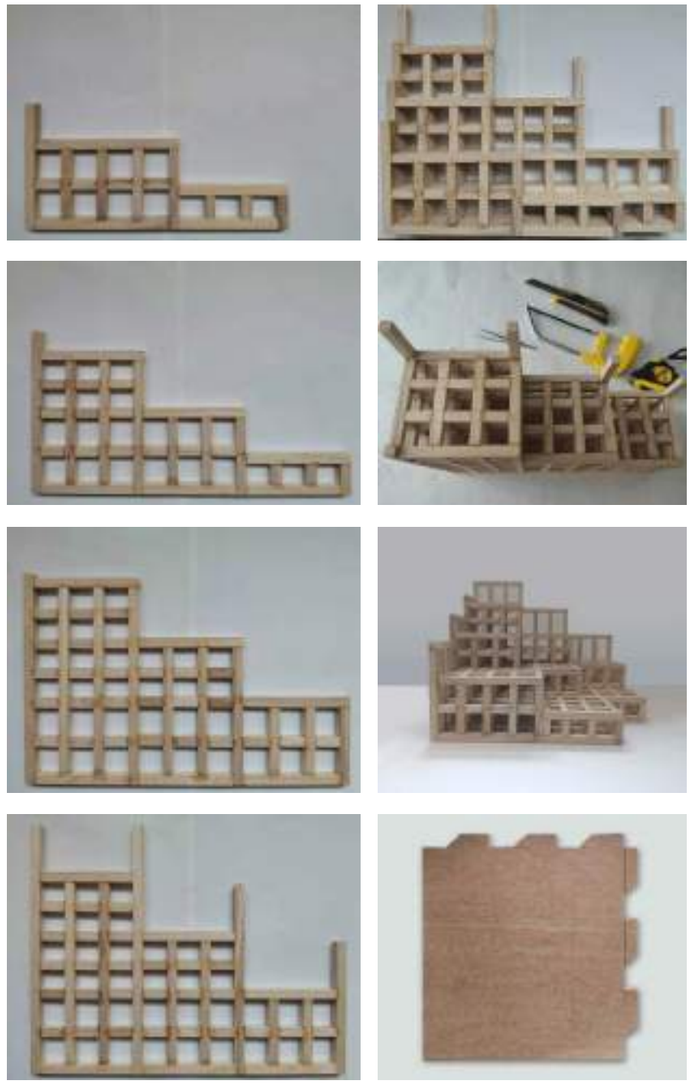
4. Light panel

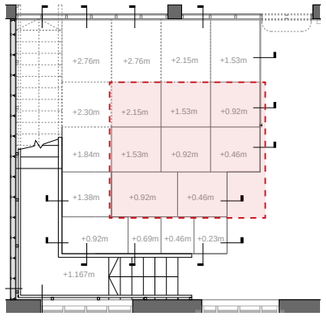
5. Wall edging
   2.5mm Aluminum alloy edging fixing to the stud by Liquid nail.

Project Name: Interactive Keepland
Drawing Title: Polycarbonate T-lock& Wall edging
Drawing Numver: 001/A006(24)
Author: Huixin Ren
Scale: 1:2 @A2
Date: 18th Mar

PHYSICAL MODEL STUDY (PART OF THE DJ PAD JUMPING BOX)



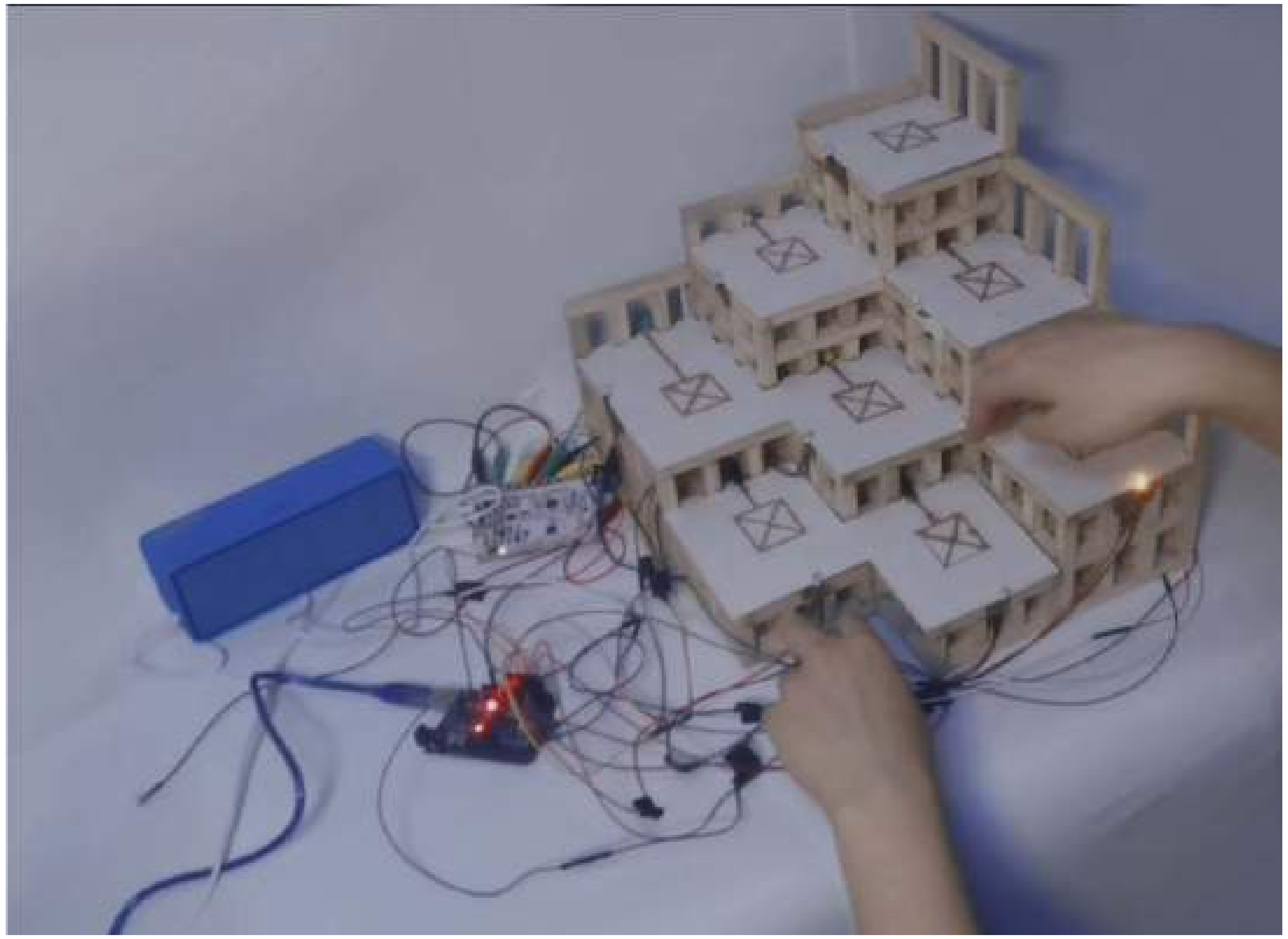




To better understand how to design the supporting structure of the jumping box, I built a 1:10 partial model with 10mm*10mm wooden strips. I have tried different construction methods to find the strongest structure with the least number of wooden slats. In the process of building the model, I gradually optimized my drawings, and discovered and gradually solved the problems that existed in my early design. It is worth mentioning that in order to ensure that the plywood board placed on the beam can completely touch each beam below it, the board needs to cut several gaps in the corresponding column. And to make the installation more convenient, it is necessary to cut the protruding part with a 45-degree bevel.

INTERACTIVE JUMPING BOX PROTOTYPING

Click the vedio link to see how it works: https://vimeo.com/538778001



Material: Ardunio UNO board; Duinopeak Touchtouch board; Speaker; LED with 220 ohm resistor*8; Conductive paint;

I made a simple version of the sensing and interactive system through learning programming and circuit design. In this prototype, I transform music rhythm information to signal of flashing of LED lights , and then the participants jumped to the corresponding jumping box according to light signal. The sensor circuit on the surface of the jumping box sends a signal to the data board after sensing the human contact, and the data board sends a command to the speaker to play the specified sound after receiving the signal.

The purpose of the following Ardunio program is to make the lights flash according to the rhythm of the music score so as to guide the participants to follow the instructions of the lights to step on the corresponding box.

```
void setup() {
pinMode(2,OUTPUT);//LED Light on Drum kit No.1
pinMode(3,OUTPUT);//LED Light on Drum kit No.2
pinMode(4,OUTPUT);//LED Light on Synthesizer sound C
pinMode(5,OUTPUT);//LED Light on Synthesizer sound E
pinMode(6,OUTPUT);//LED Light on Synthesizer sound A
pinMode(7,OUTPUT);//LED Light on Synthesizer sound G
pinMode(8,OUTPUT);//LED Light on Synthesizer sound B
pinMode(9,OUTPUT);//LED Light on Synthesizer sound A-
digitalWrite(2,HIGH);//LED Light on Drum kit No.1
delay(1000);
digitalWrite(2,LOW);
delay(1000);
digitalWrite(3,HIGH);//LED Light on Drum kit No.2
delay(1000);
digitalWrite(3,LOW);
delay(1000);
digitalWrite(2,HIGH);//LED Light on Drum kit No.1
delay(1000);
digitalWrite(2,LOW);
delay(1000);
digitalWrite(3,HIGH);//LED Light on Drum kit No.2
delay(1000);
digitalWrite(3,LOW);
delay(1000);
digitalWrite(2,HIGH);//LED Light on Drum kit No.1
delay(1000);
digitalWrite(2,LOW);
delay(1000);
digitalWrite(3,HIGH);//LED Light on Drum kit No.2
delay(1000);
digitalWrite(3,LOW);
delay(1000);
digitalWrite(2,HIGH);//LED Light on Drum kit No.1
delay(1000);
digitalWrite(2,LOW);
delay(1000);
digitalWrite(3,HIGH);//LED Light on Drum kit No.2
delay(1000);
digitalWrite(3,LOW);
delay(1000);
}

void loop() {
digitalWrite(2,HIGH);//TURN THE LED Light ON FOR THE Drum kit No.1
digitalWrite(4,HIGH);//TURN THE LED Light on FOR THE Synthesizer sound C
delay(1000);
digitalWrite(2,LOW);//TURN THE LED OFF ON THE DRUM KIT NO.1
digitalWrite(4,LOW);//TURN THE LED OFF on THE Synthesizer sound C
delay(1000);
digitalWrite(3,HIGH);//LED Light on Drum kit No.2
delay(1000);
digitalWrite(3,LOW);//TURN THE LED FOR DRUM KIT NO.2 OFF
delay(1000);
digitalWrite(2,HIGH);//TURN THE LED Light ON FOR THE Drum kit No.1
digitalWrite(4,HIGH);//TURN THE LED Light on FOR THE Synthesizer sound C
delay(1000);
digitalWrite(2,LOW);//TURN THE LED OFF ON THE DRUM KIT NO.1
digitalWrite(4,LOW);//TURN THE LED OFF on THE Synthesizer sound C
delay(1000);
digitalWrite(3,HIGH);//LED Light on Drum kit No.2
digitalWrite(5,HIGH);//TURN THE LED Light on FOR THE Synthesizer sound E
delay(1000);
digitalWrite(3,LOW);
digitalWrite(5,LOW);//TURN THE LED Light on FOR THE Synthesizer sound E
delay(1000);
digitalWrite(2,HIGH);//TURN THE LED Light ON FOR THE Drum kit No.1
digitalWrite(6,HIGH);//TURN THE LED Light on FOR THE Synthesizer sound A
delay(1000);
digitalWrite(2,LOW);//TURN THE LED OFF ON THE DRUM KIT NO.1
digitalWrite(6,LOW);//TURN THE LED OFF on THE Synthesizer sound C
delay(1000);
digitalWrite(3,HIGH);//LED Light on Drum kit No.2
delay(1000);
digitalWrite(3,LOW);
delay(1000);
digitalWrite(2,HIGH);//TURN THE LED Light ON FOR THE Drum kit No.1
digitalWrite(6,HIGH);//TURN THE LED Light on FOR THE Synthesizer sound A
delay(1000);
digitalWrite(2,LOW);//TURN THE LED OFF ON THE DRUM KIT NO.1
digitalWrite(6,LOW);//TURN THE LED OFF on THE Synthesizer sound C
delay(1000);
digitalWrite(3,HIGH);//LED Light on Drum kit No.2
digitalWrite(7,HIGH);//TURN THE LED Light on FOR THE Synthesizer sound G
delay(1000);
```

```
delay(1000);
digitalWrite(3,LOW);
digitalWrite(7,LOW);
delay(1000);
digitalWrite(2,HIGH);
digitalWrite(5,HIGH);
delay(1000);
digitalWrite(2,LOW);
digitalWrite(5,LOW);
delay(1000);
digitalWrite(3,HIGH);
delay(1000);
digitalWrite(3,LOW);
delay(1000);
digitalWrite(2,HIGH);
digitalWrite(5,HIGH);
delay(1000);
digitalWrite(2,LOW);
digitalWrite(5,LOW);
delay(1000);
digitalWrite(3,HIGH);
digitalWrite(7,HIGH);
delay(1000);
digitalWrite(3,LOW);
digitalWrite(7,LOW);
delay(1000);
digitalWrite(2,HIGH);
digitalWrite(8,HIGH);
delay(1000);
digitalWrite(2,LOW);
digitalWrite(8,LOW);
delay(1000);
digitalWrite(3,HIGH);
delay(1000);
digitalWrite(3,LOW);
delay(1000);
digitalWrite(2,HIGH);
digitalWrite(8,HIGH);
delay(1000);
digitalWrite(2,LOW);
digitalWrite(8,LOW);
delay(1000);
digitalWrite(3,HIGH);
digitalWrite(9,HIGH);
delay(1000);
digitalWrite(3,LOW);
digitalWrite(9,LOW);
delay(1000);
digitalWrite(2,HIGH);
delay(1000);
digitalWrite(2,LOW);
delay(1000);
digitalWrite(3,HIGH);
delay(1000);
digitalWrite(3,LOW);
delay(1000);
}
```

THANKS FOR WATCHING