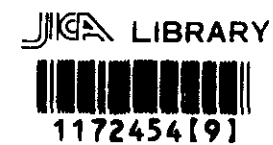


**THE URBAN DESIGN MODEL STUDY
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN**

**Vol. 2
MODEL DESIGN DRAWING**



MARCH 2003

SOCIAL DEVELOPMENT STUDY DEPARTMENT

JAPAN INTERNATIONAL COOPERATION AGENCY

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Vol. II MODEL DESIGN REPORT

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INTRODUCTION

This is a drawing report on the Urban Design Model Study for the Development of the City of Astana in the Republic of Kazakhstan prepared in accordance with the Scope of Work (S/W) concluded on September 4, 2002, between three organizations of Capital Development Corporation (CDC) and Department of Architecture and urban Planning of Astana Municipality (DOA), the Republic of Kazakhstan and the Japan International Cooperation Agency (JICA).

In this study, the model design of four facilities as shown below was carried out.

The locations of each facilities were decided according to the discussion between JICA Study Team (JST) and local relative organizations like DOA and Astanagenplan.

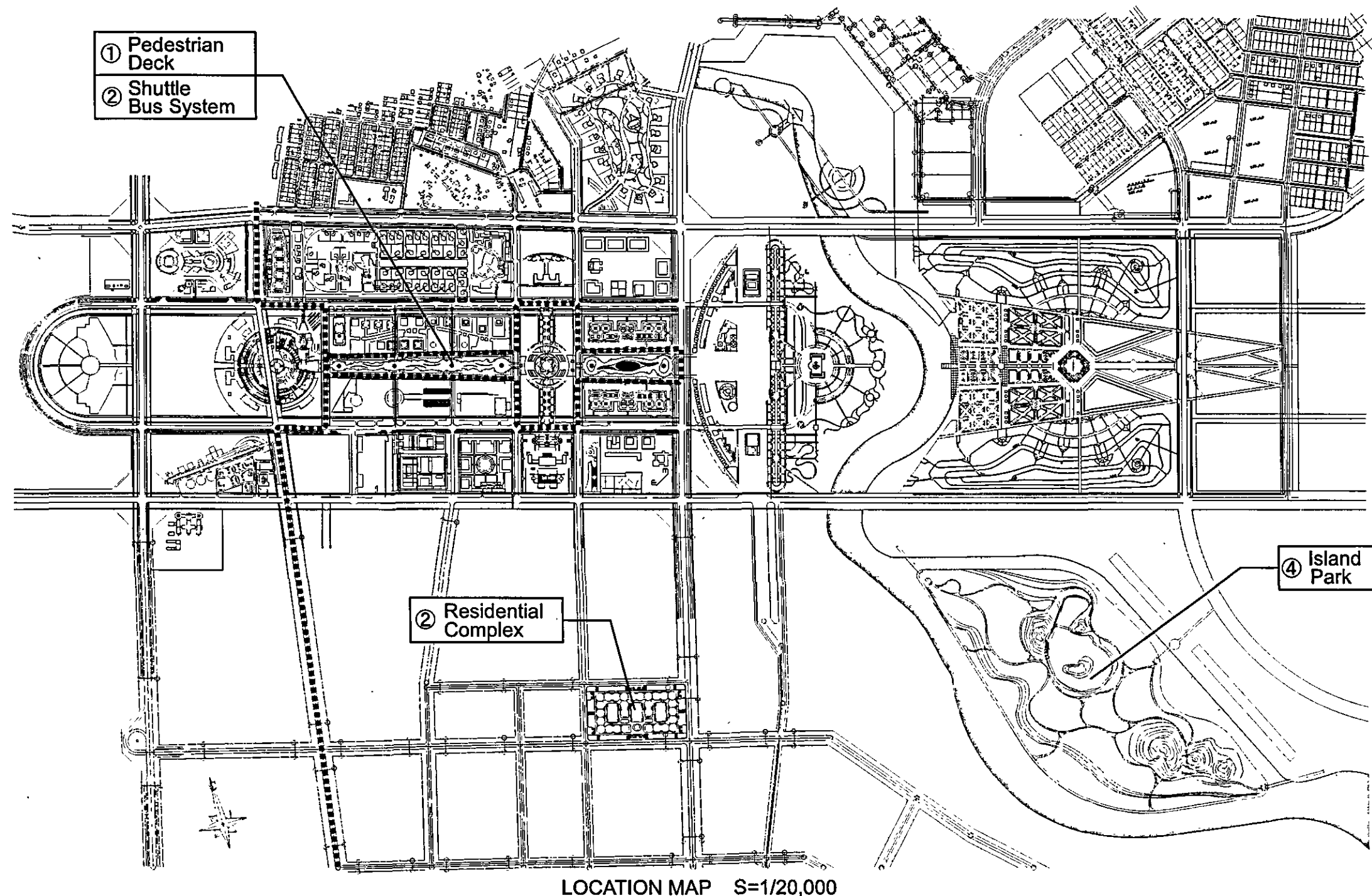
- ① Covered pedestrian decks connecting buildings and parking systems within the Government City which is located in the central part of the government city.
- ② A linear citizen's park in Government City together with a special lane for electrical-operated shuttle bus system located in and around the covered pedestrian decks,
- ③ A residential complex (one block) with a patio type of closed inner space as a countermeasure for the severe weather conditions of Astana of which the target area is selected in the southern part of the Government City, and
- ④ Landscaping along the Ishim river of which the target area is selected in the southern part of the presidential facilities along the Ishim river.

According to the model Astanagenplan made, the linear citizen's park of ② became clear to be a three-story building. So, this linear citizen's park was decided to be designed with the covered pedestrian deck of ①.

Regarding the landscaping along the Ishim river of ④, it's design became clear to have been finished already.

So it was decided to design a park in the artificial river island in the Ishim River in the southern part of the presidential facilities instead of it.

This drawing report is composed with two chapters. First one includes the conceptual sketch Dr. KUROKAWA made and second one includes the model design drawings of each facility.



CHAPTER 1 BASIC CONCEPT

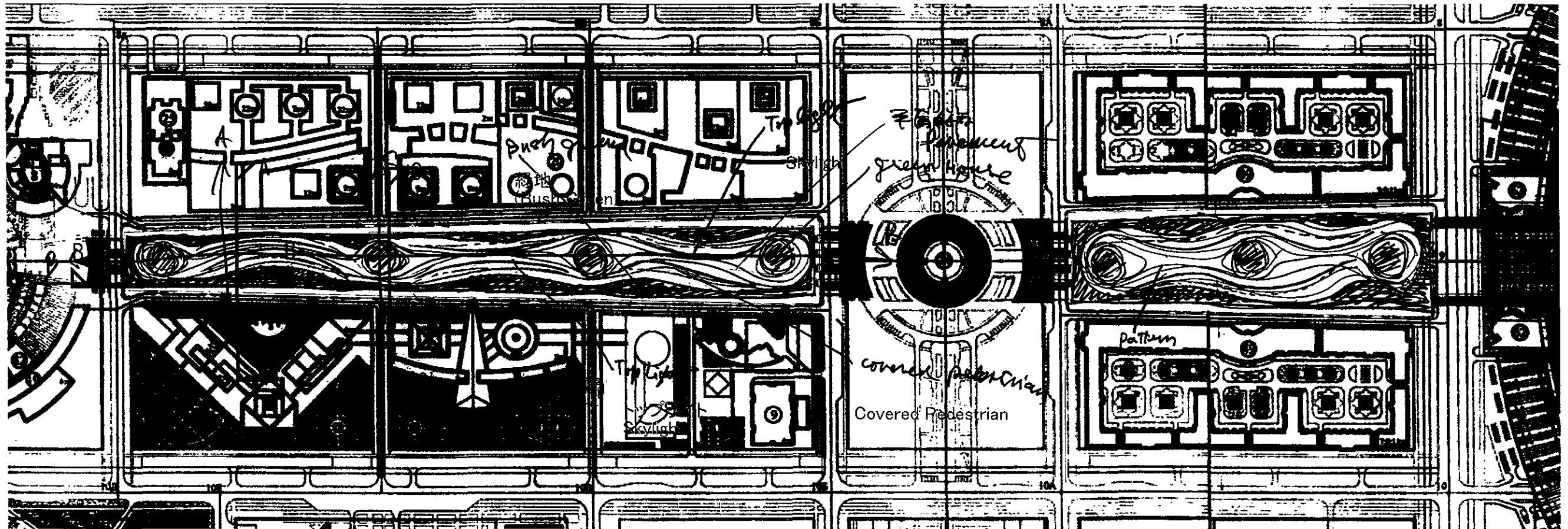
1-1 BASIC CONCEPT OF PEDESTRIAN DECK

<JICA MASTER PLAN (August, 2001)>

- (1) Pedestrian paths with green area and parks should be designed in the Government City so that inhabitants and visitors can be relaxed and enjoy the city amenity.
- (2) Considering severe winter climate, inner pedestrian decks and the bridges between the pedestrian deck and the surrounding buildings should be designed.
- (3) Car parking is supposed to be open air type. But in future, it should be covered with a pedestrian deck.

<Design summary>

According to the investigation, the linear citizen's park of Government City became clear to have been designed as three-story building already. According to the model Astanagenplan made, the ground floor is used as car parking, second floor is used as pedestrian path, and third floor is used as open air pedestrian deck. It is good to build the facility like this from the beginning. So it is decided to combine this linear citizen's park with the pedestrian deck in this study.

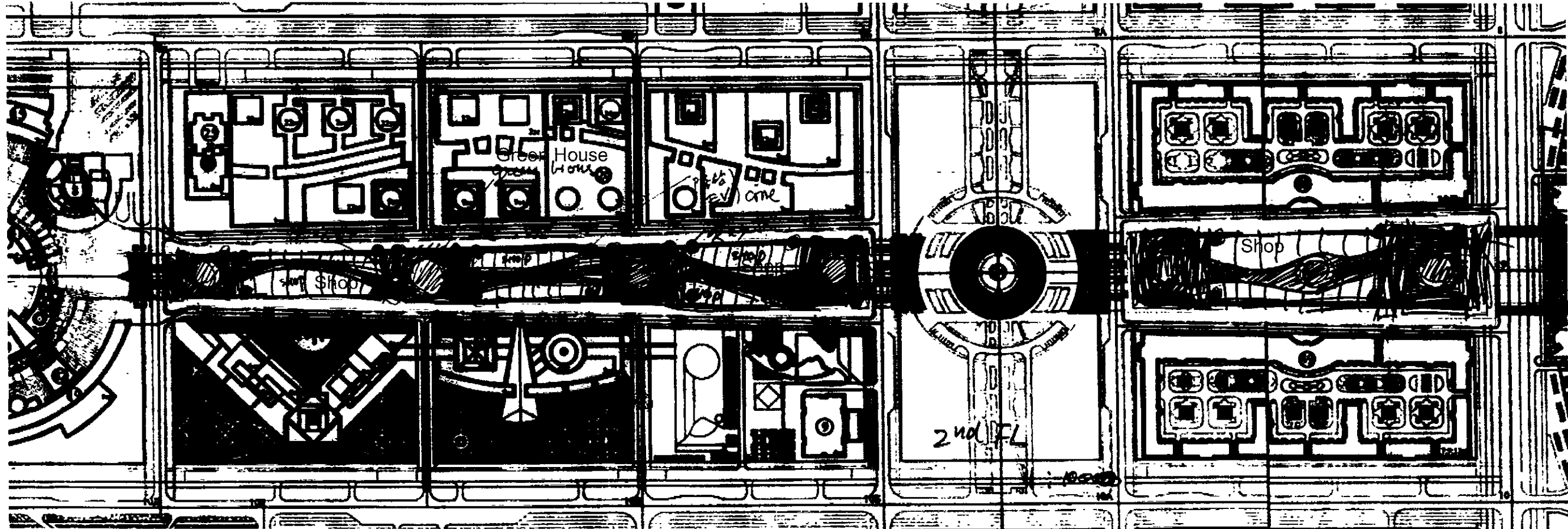


<Basic concept>

- (1) Continuous green axis
Gently curved green areas locate on the top of the pedestrian deck continuously.
- (2) Effective use of sun light.
A Cone-shaped glass atrium which reach until ground floor and a slit top light on the pedestrian deck
- (3) The countermeasure to winter cold
Inner pedestrian deck and bridge
- (4) The unification of the bus stop with the pedestrian deck
The bus stop should be designed so that visitors can ride shuttle bus directly from pedestrian deck without going outside.
- (5) Simple traffic
To make simple traffic according to make lateral and vertical traffic concentrate around the green house

<ROOF>

Cone-shaped glass atriums are located considering the location of the surrounding roads on the pedestrian deck at 7 parts. This cone-shaped glass atrium is called as "green house", and there are high trees planted in the green house. Visitors can enjoy green in it throughout the year. Around the green house, there is gently curved pedestrian path and green area.

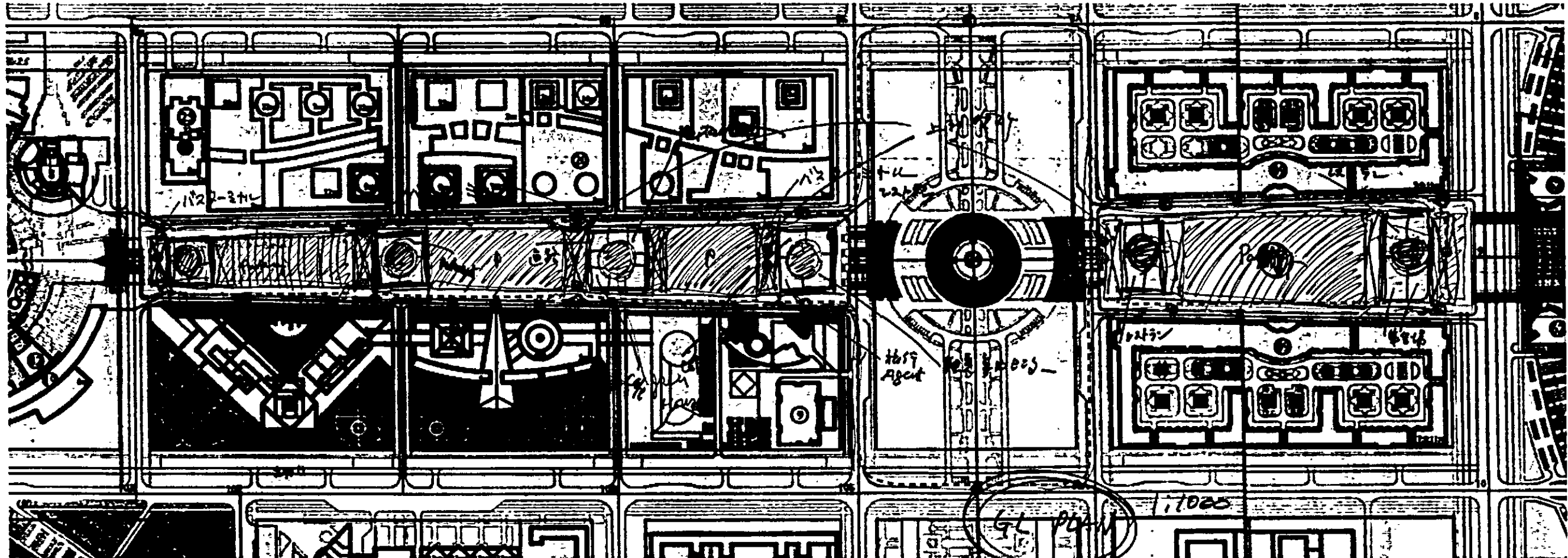


● Stair, Corridor

<Second floor>

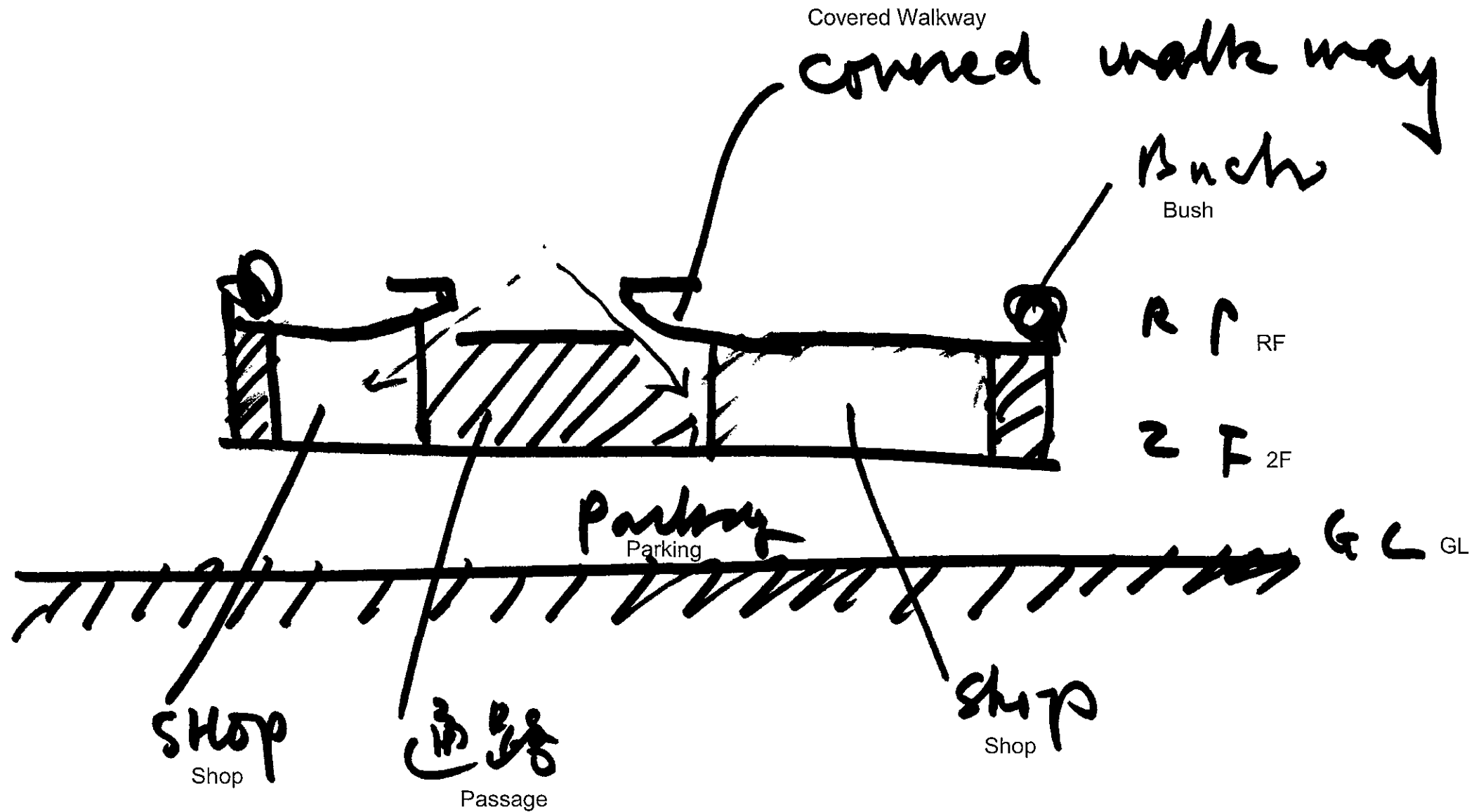
The area around the green house is defined as traffic intersection. Lateral traffic like a bus stop and access bridge from surrounding buildings and Vertical traffic like a stair case and elevators are concentrated to this area.

Visitors can enjoy to eat and drink around the green house seeing the green in the green house. Green houses are connected by winding corridors. Shops and restaurants are located around the corridor.



<Ground floor>

Shuttle bus stops are located next to the traffic intersection, green house . There are cafes and restaurants around the green house, and visitors can enjoy green waiting shuttle bus. Car parking is located between green houses so that visitor can easily access to the traffic intersection.



Sectional concept of Pedestrian deck

There are three stories in the pedestrian deck as shown below.

<Ground Floor>

Ground floor is mainly used as car parking. Because car parking is interior, people can get on and off the car comfortably. The 2nd floor and the roof are for walkers, and the ground floor is for cars, so that the traffic of car and walker is perfectly separated.

Stair case and elevator are located at regular intervals.

<2nd Floor>

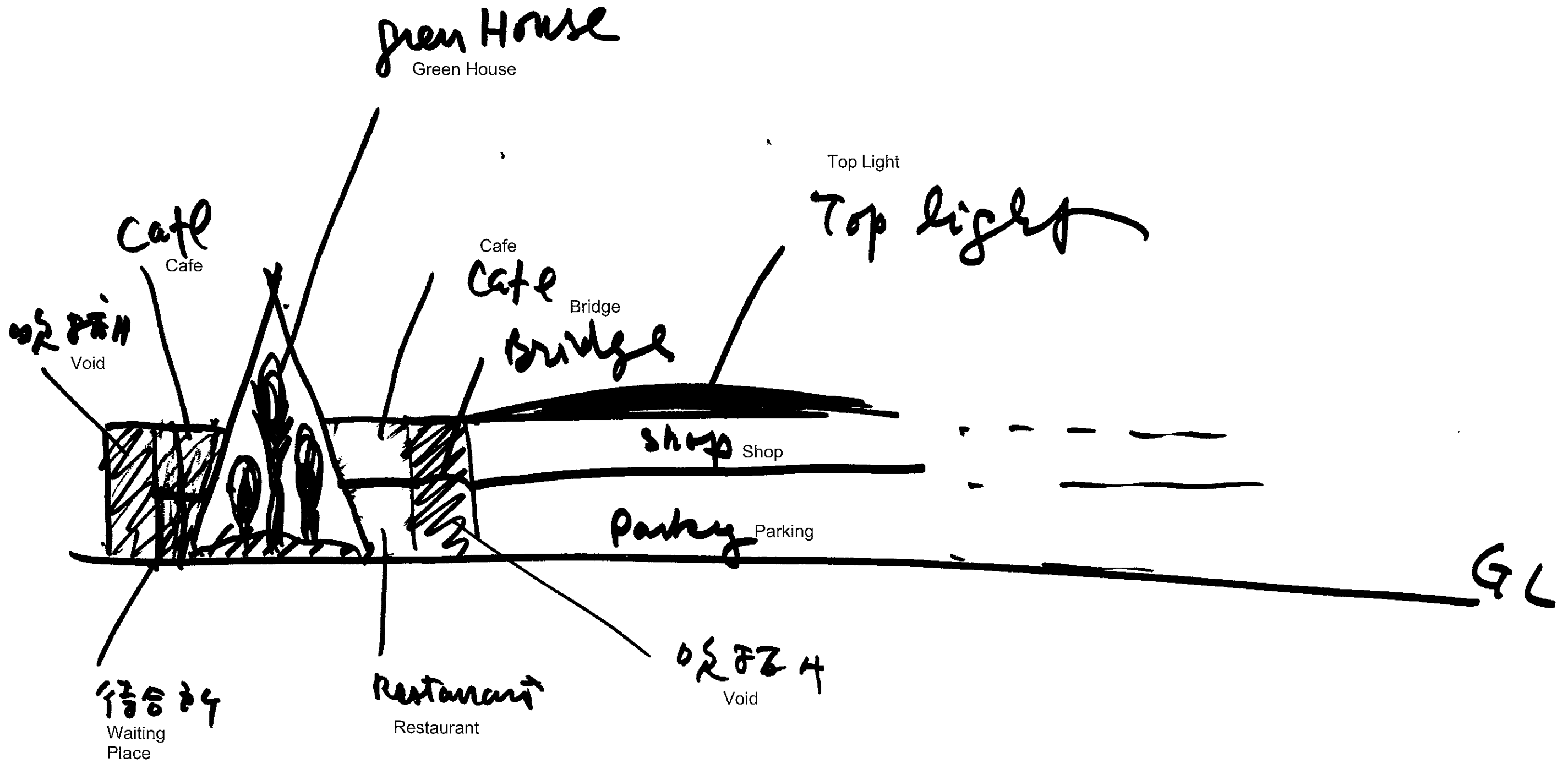
2nd floor is defined as inner pedestrian space. There is central aisle on the center of the floor, and shops and restaurants are located around the aisle.

Visitors can enjoy shopping in the comfortable temperature during cold winter. There are winding slit-shaped skylight on the roof of the aisle, and natural lighting and ventilation are possible from them.

Visitors can easily access to the car parking of the ground floor and the roof garden using elevator.

<ROOF>

Roof is defined as outside pedestrian space. Pedestrian deck spread like a winding river being surrounded by green area. Visitors can enjoy walking in fresh air seeing green from spring until autumn.



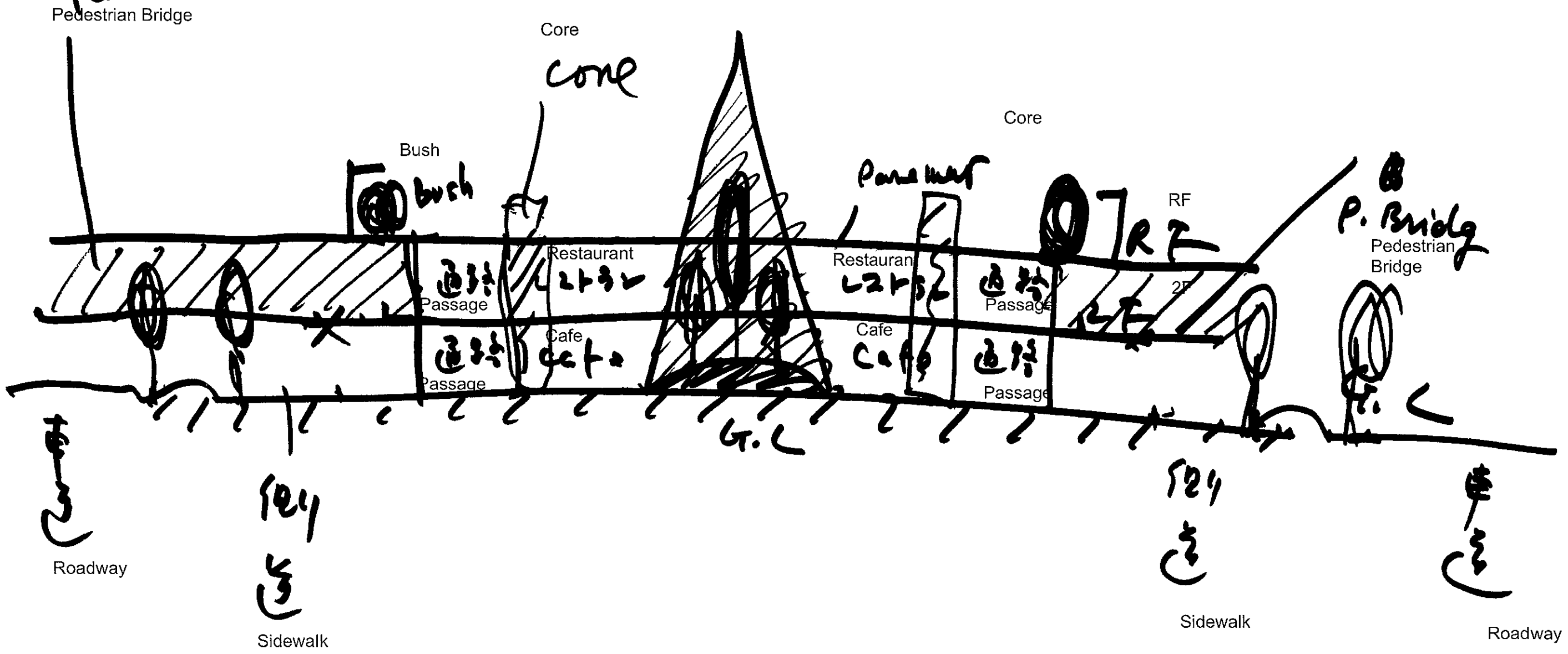
<Green house>

There are several cone-shaped glass atrium called green house in the pedestrian deck. There are high trees planted in the green house, and visitors can enjoy the interior green throughout the year.

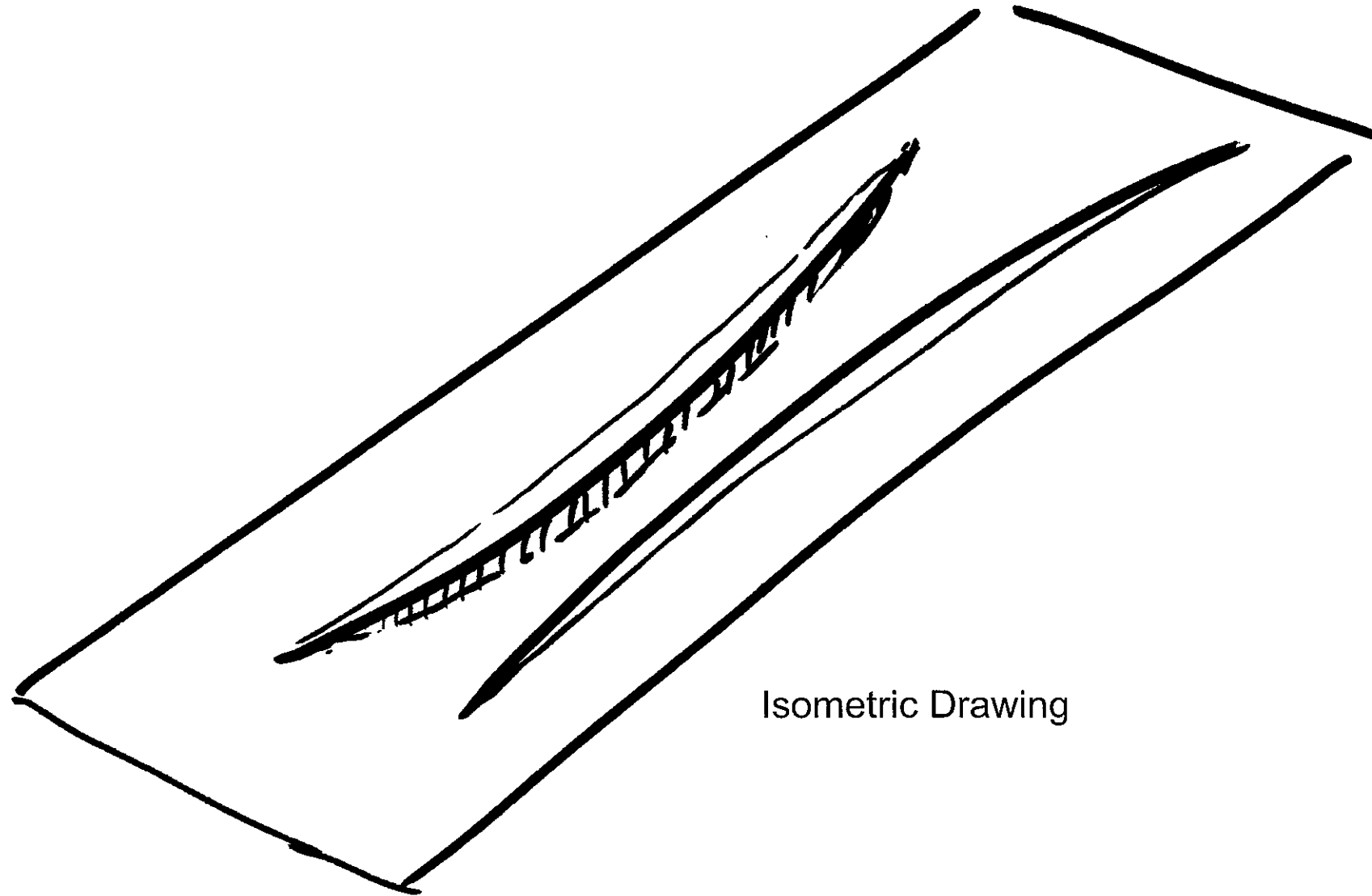
There are cafes and restaurants around the greenhouse so that people can enjoy eating and drinking seeing the green in the green house.

There is voids between shop and green house.

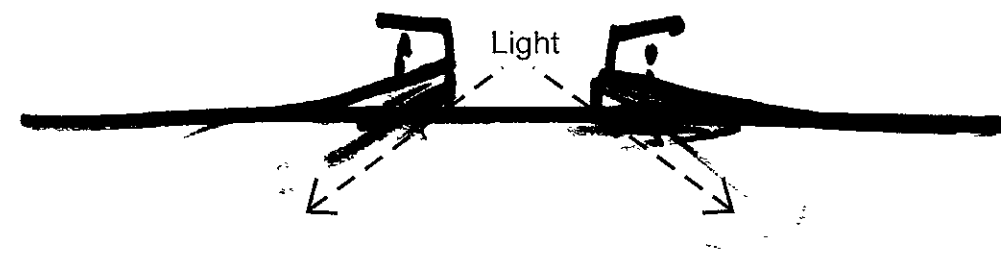
Pedestrian Bridge



<Pedestrian bridge>
 One of the important concepts of this pedestrian deck is the separation of the traffic of car and walker. That is, the ground floor is for cars, and 2nd floor and roof are for pedestrian.
 There are pedestrian bridges between the pedestrian deck and surrounding buildings on the 2nd floor so that people can access another building safely and freely not affected by cars.
 There is outside pedestrian deck surrounded by green area on which people can walk around. Elevators and stair cases are located at regular intervals.



Isometric Drawing

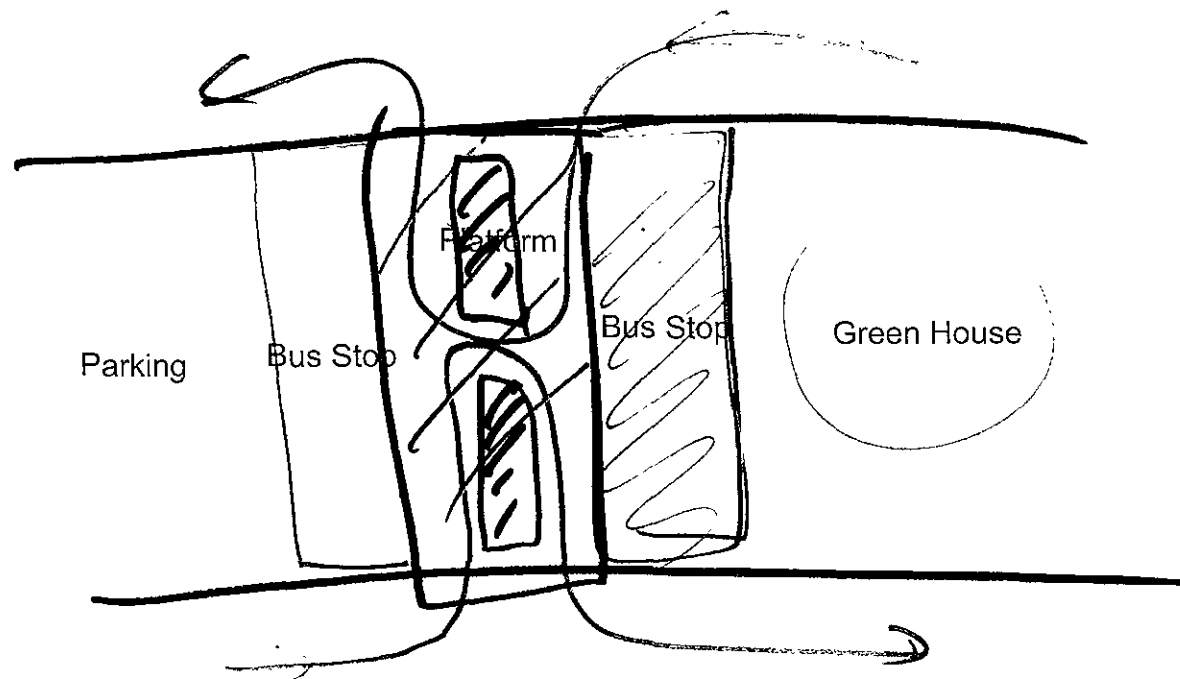
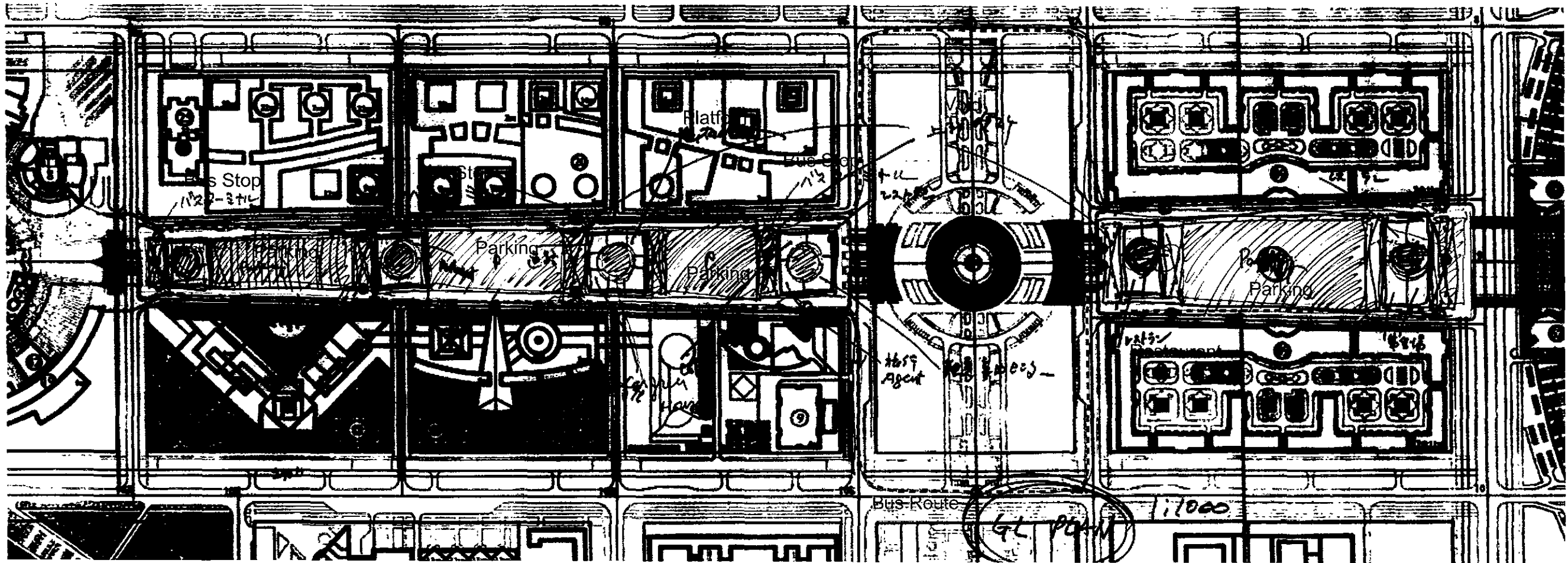


Section

<Slit-shaped skylight>

There are winding slit-shaped skylight on the roof of the pedestrian deck. Natural lighting and ventilation are possible from these skylights, and they give the landscape of the pedestrian deck beautiful variation.

1-2 BASIC CONCEPT OF SHUTTLE BUS SYSTEM



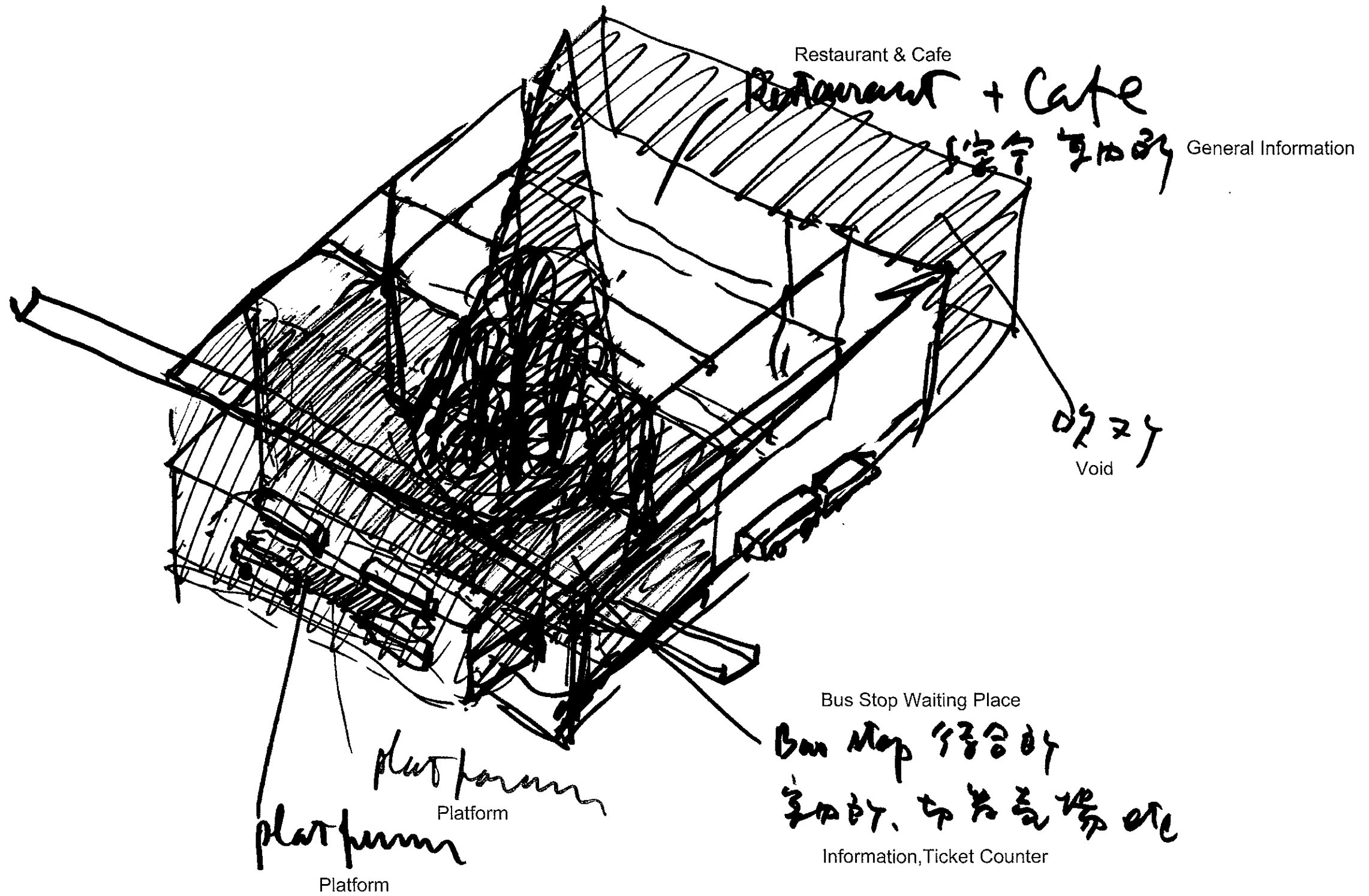
PLAN of Bus Stop

Many people from domestic and overseas area will visit Government City in future. Because total length of central core of the Government City exceeds 1.5km, shuttle bus system is designed around the core.

The bus stop which is located west-end of the pedestrian deck is used as the bus stop for city bus leading to old city in addition to the bus stop for shuttle bus system. Each bus stop is located at intervals of 200 to 350m along the pedestrian deck.

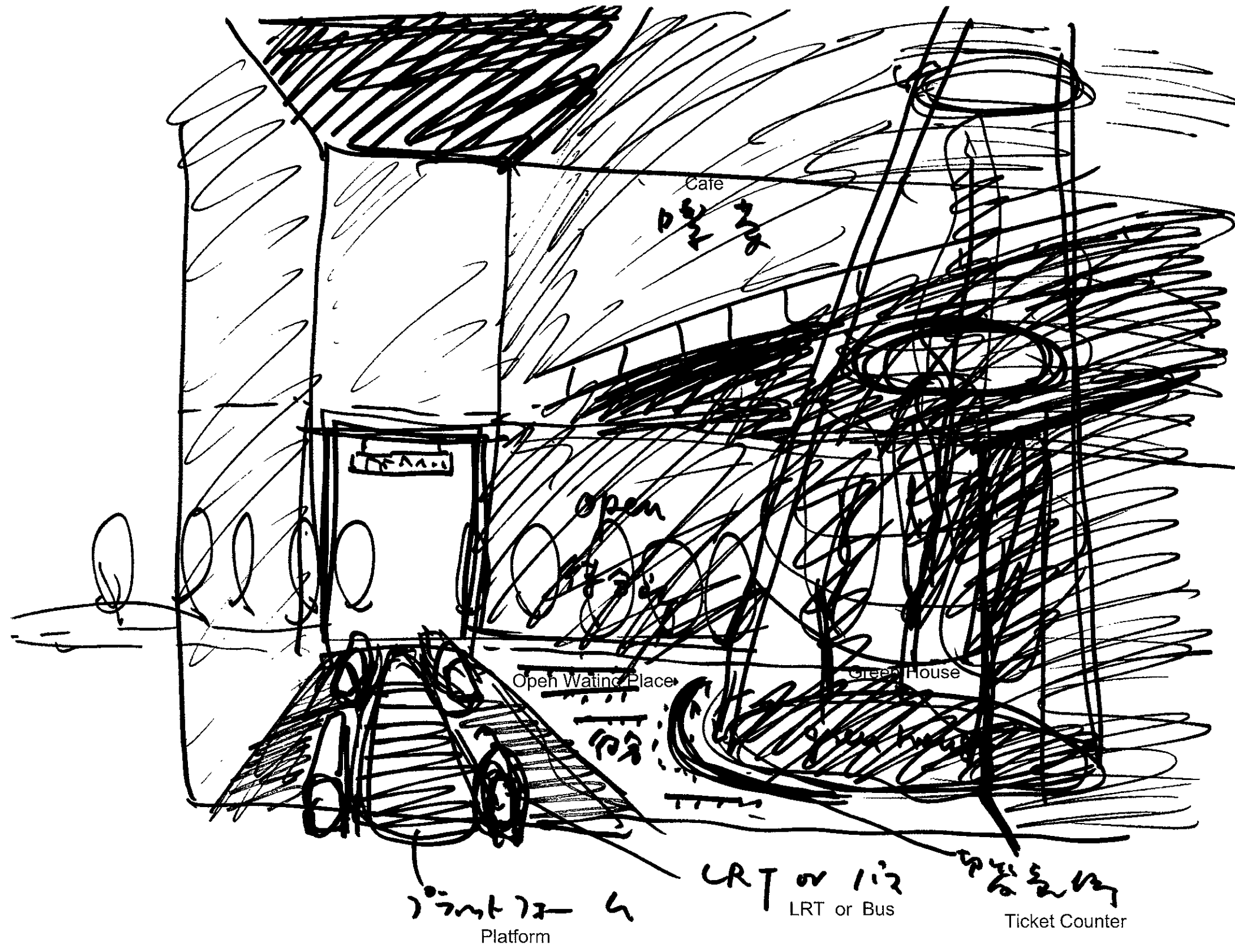
Bus stop is connected to the pedestrian deck building directly so that people can easily get on and off the shuttle bus not going outside.

Low-emission bus should be adopted to the shuttle bus system, and barrier-free should be applied with the bus stop.



<Relation between Green house and platform>

Bus stop is located next to the greenhouse. The area around the green house is divided by glass walls on the center of the green house. One side is inside, and there are cafe and restaurant in it. Another side is outside, and there is the waiting space for shuttle bus. Visitors can access bus stop using elevator from 2nd floor. Bus stop is located in the atrium, and visitors can see the green in the green house and enjoy eating and drinking waiting the bus to arrive.



Low-emission bus

Low-emission bus as shown below should be used in the shuttle bus system.

(1) TVR system (Nancy, France)

Dual mode system

- hybrid powered electric bus with one guide rail & rubber tires.
- It runs with diesel engine in suburban area.



(2) Hybrid powered bus (Japan)

A bus powered with electricity of battery and diesel engine.

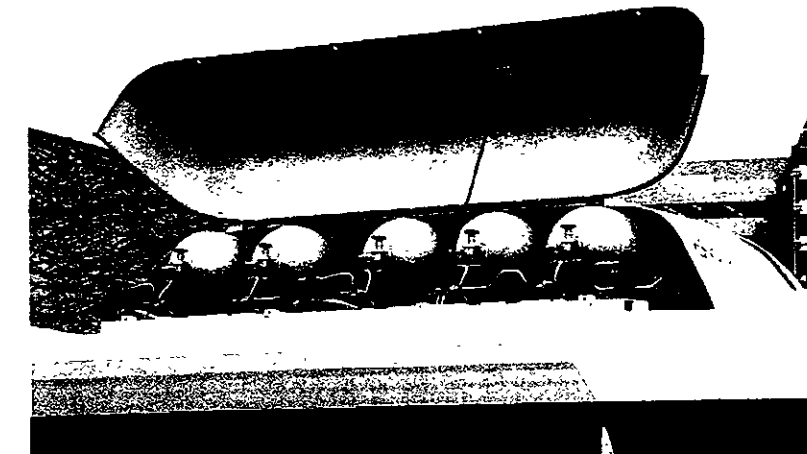


Nissan diesel (product)

B. Natural gas bus

CNG bus (Tokyo Japan)

-Bus powered by CNG (Compressed Natural Gas) engine



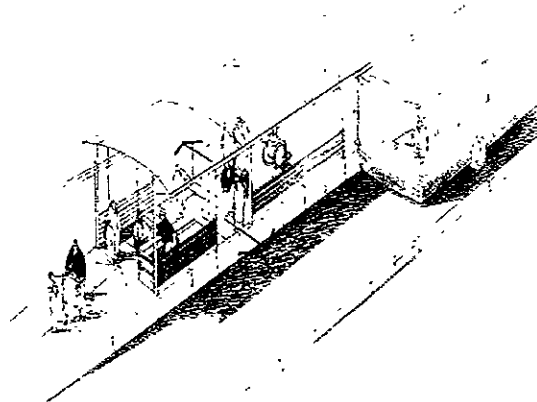
Barrier-free

Barrier-free is important matter in the shuttle bus system.

A. Non level difference bus stop design



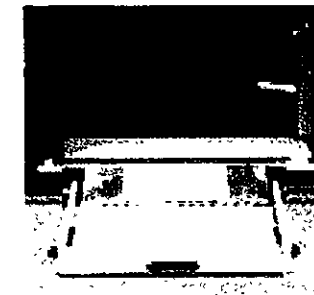
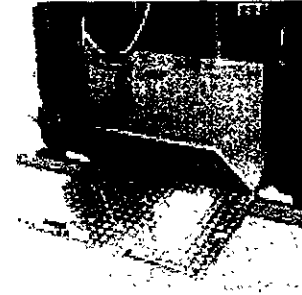
Elevated bus stop (London, UK)



High leveled bus stop with shelter (Critiva, Brazil)



B. Barrier-free design for disabled person



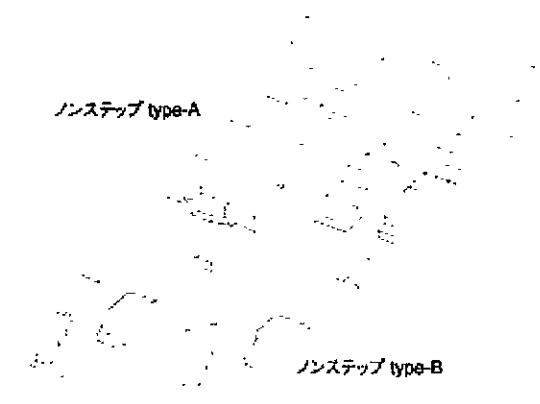
Non level difference system



Notsc(UK)

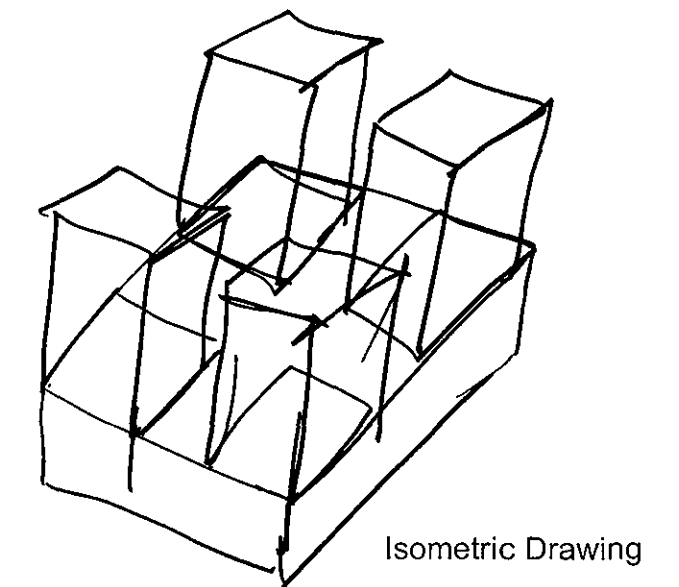
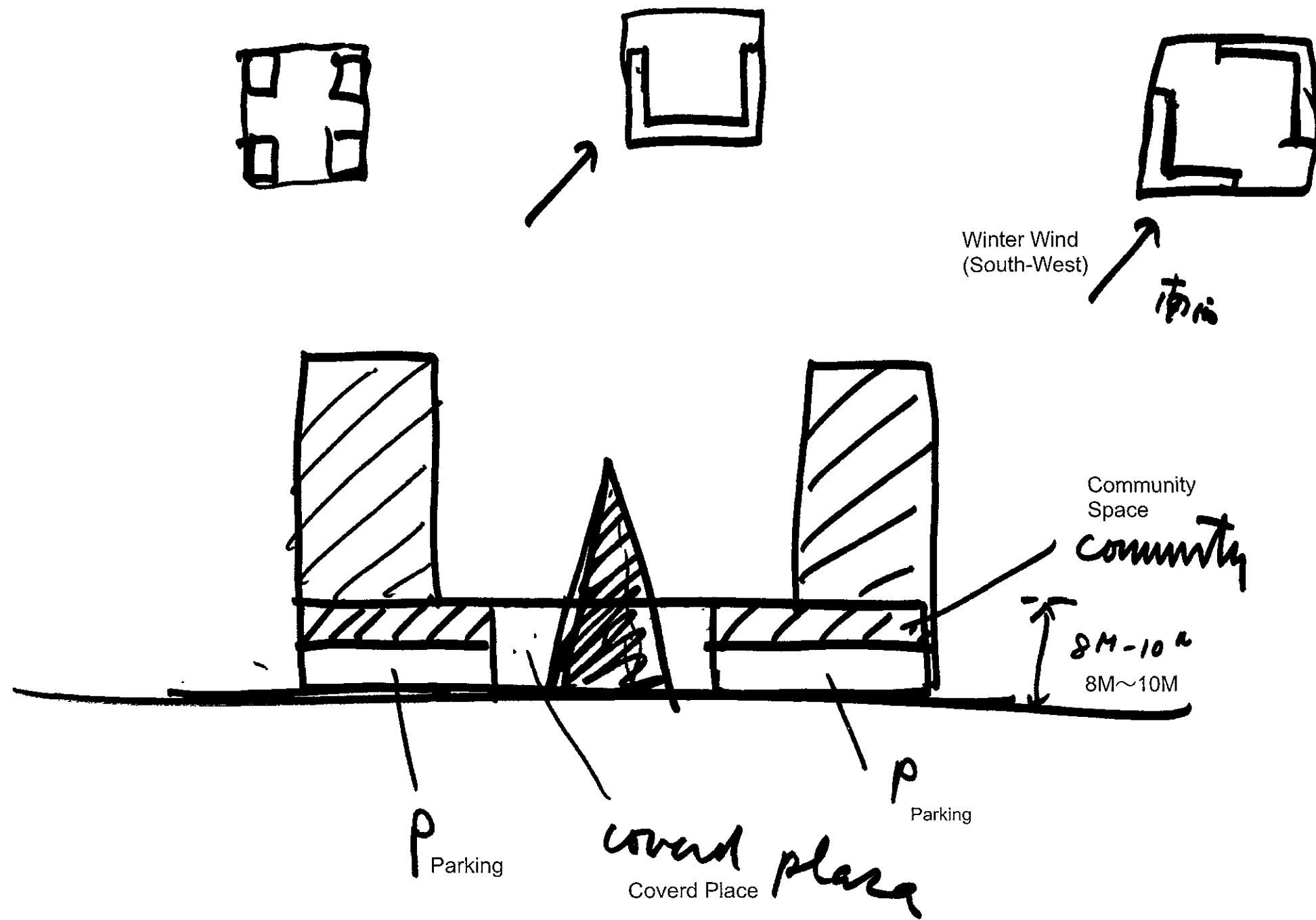


Practical use examination
(ministry of Land, Infrastructure & Transport, Japan)



Flat floor system

1-3 BASIC CONCEPT OF RESIDENTIAL COMPLEX



Isometric Drawing

1. Inner Patio

Astana is the area that strong wind blow throughout the year. Especially, strong south-west wind blow in winter, so the countermeasure against strong wind is important matter. To protect that strong wind and make comfortable residential environment, I propose the inner patio surrounded by residential towers. There is green house in which there are high trees planted on the center of inner patio.

2. The summary of each floor

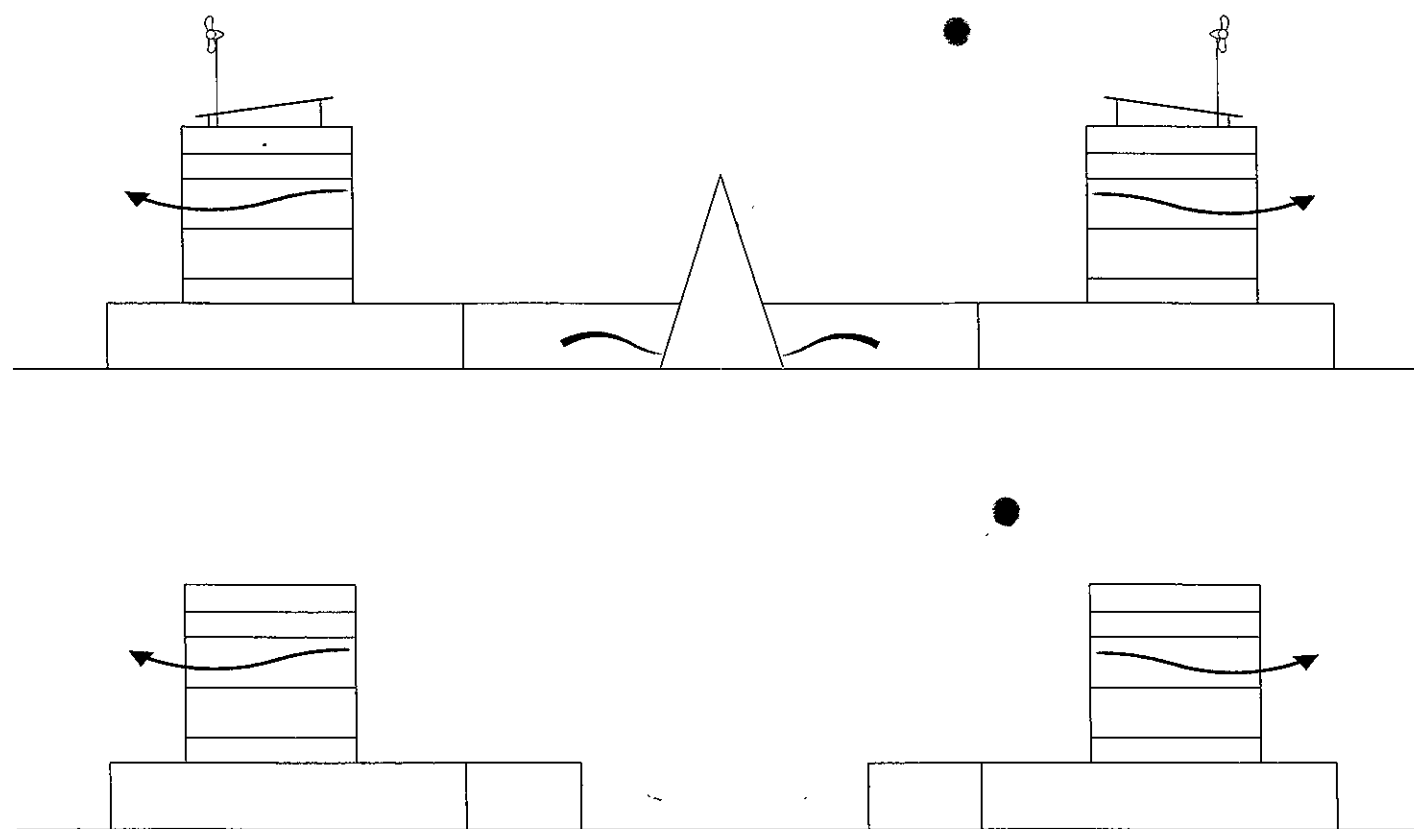
- Ground floor
Ground floor is used as car parking mainly. There is atrium surrounding the green house on the center of the residential complex.
- 2nd floor
2nd floor is used as community space for resident, and there are hall, lobby, meeting room, administration, kiosk, post etc. in this floor.
- Residential floor
The stories above 3rd floor are residential floor. Residential towers are located around the patio.

3. The position of the residential tower

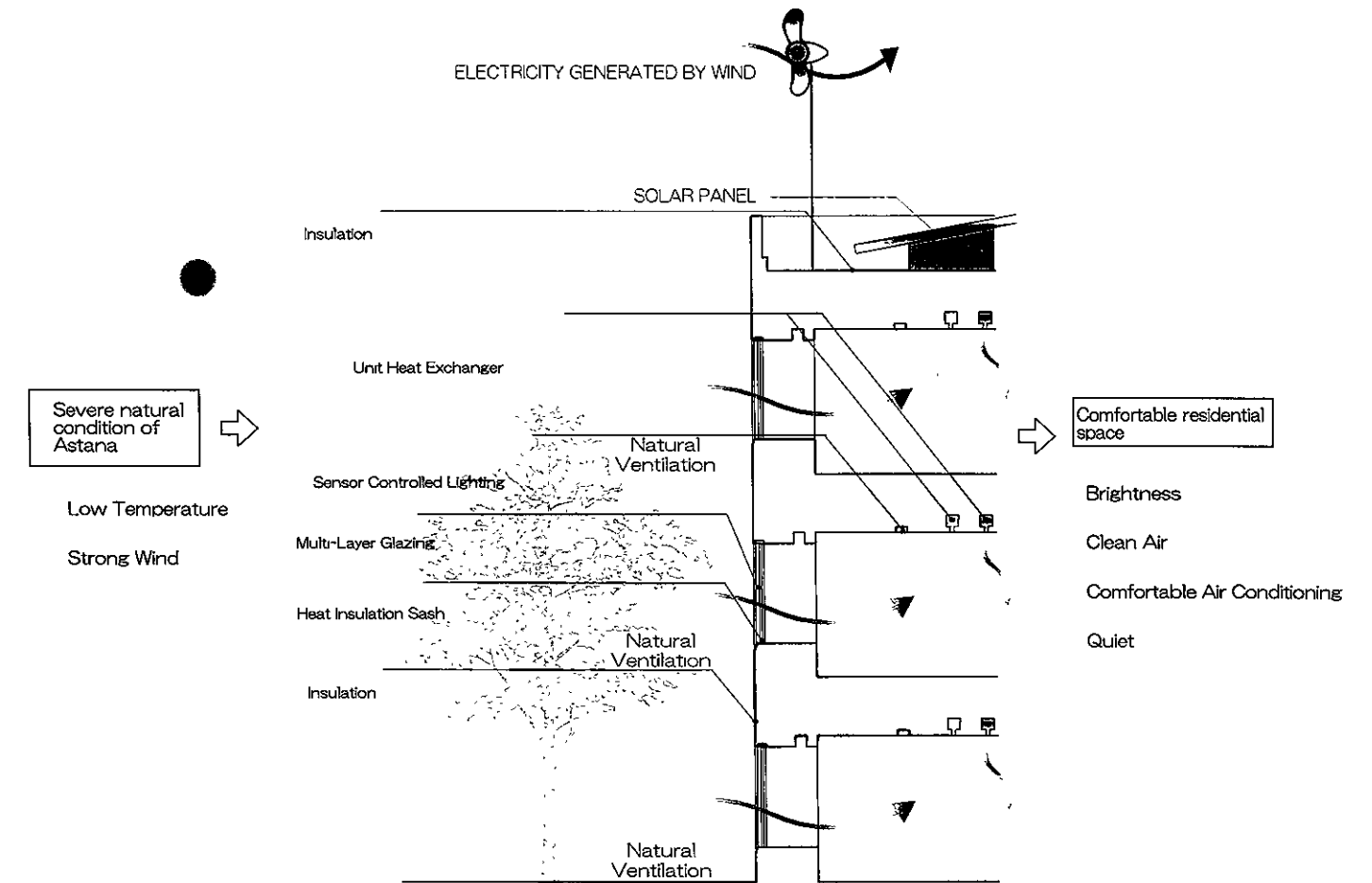
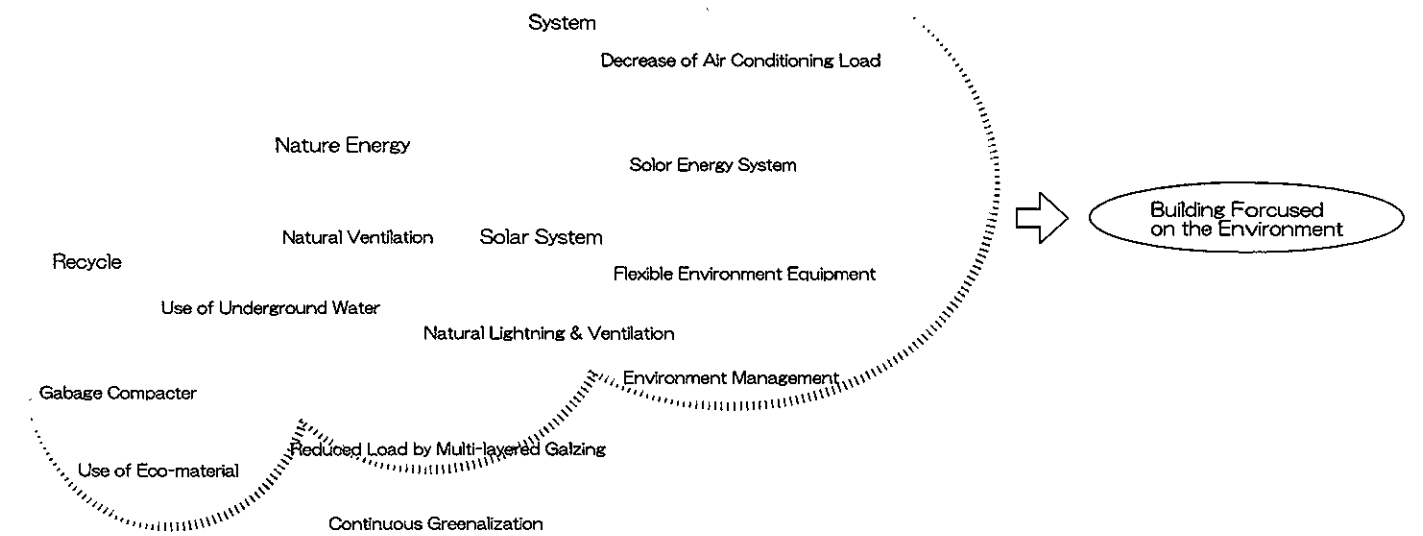
The residential tower should be located around the patio in order to block strong wind of Astana. The open side of the residential tower differs according to the direction of each building and the situation of surrounding roads. As a result, variety of landscape will be generated.

Implementation of an Environmentally Friendly 'Eco-System'

Eco-sensitive technologies, in particular a solar power system, will be implemented in the building's design. The solar panel roof is rendered in an emblematic design appealing to the environmentally conscious. The materials and equipment that will be used for the building keep in mind energy efficiency and zero-emission production.

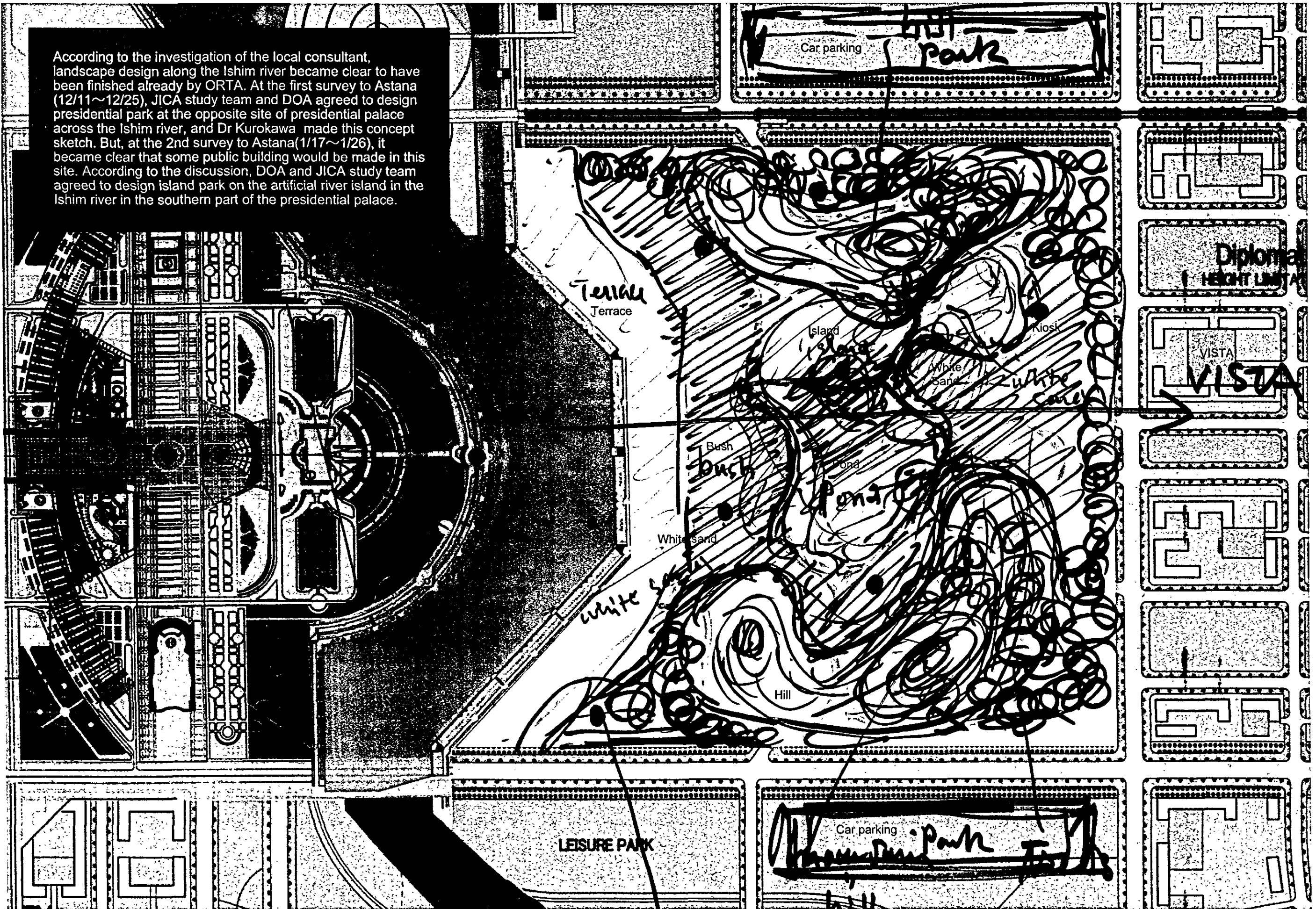


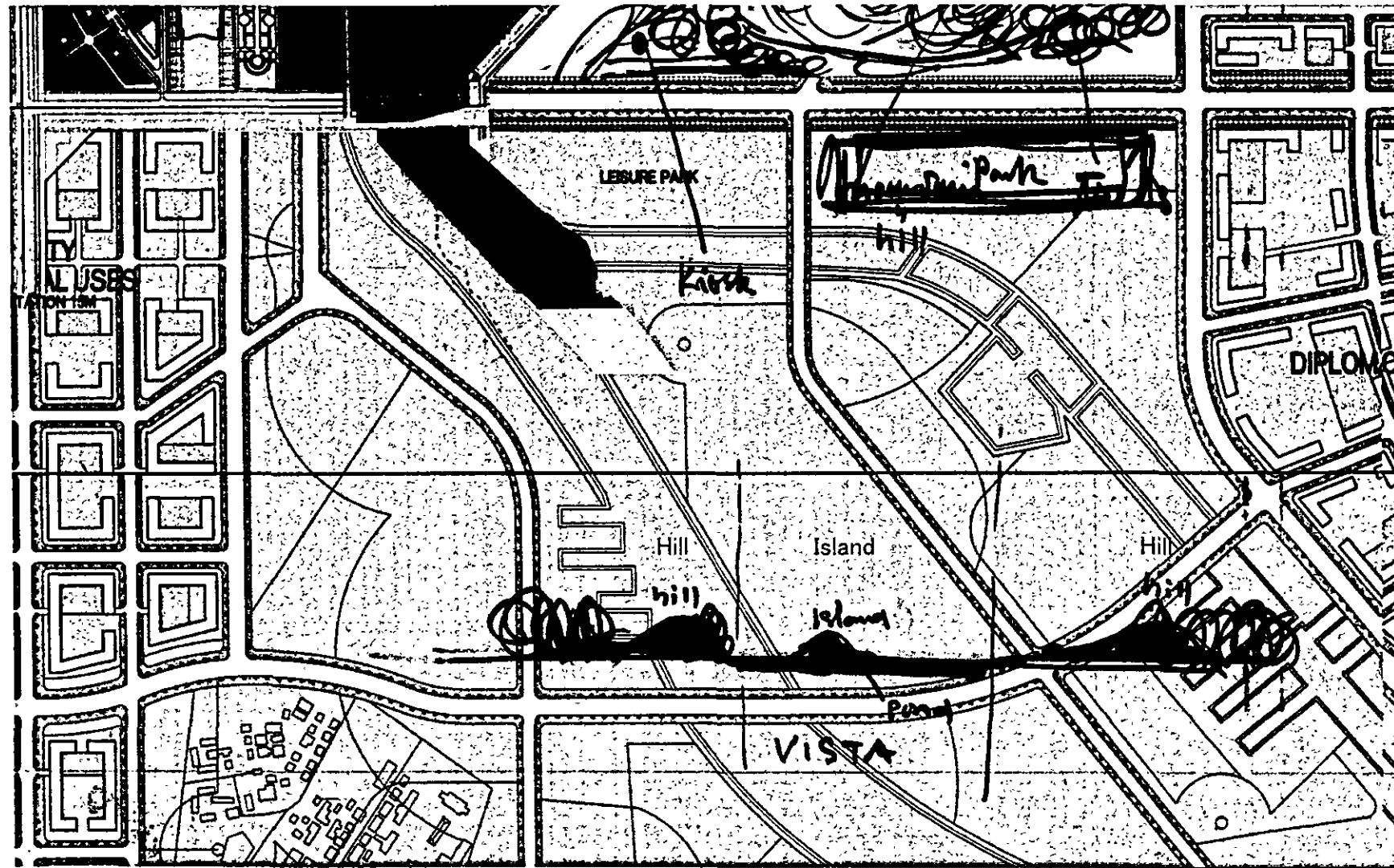
Eco System Flow



1-4 BASIC CONCEPT OF LANDSCAPE ALONG THE ISHIM RIVER

According to the investigation of the local consultant, landscape design along the Ishim river became clear to have been finished already by ORTA. At the first survey to Astana (12/11~12/25), JICA study team and DOA agreed to design presidential park at the opposite site of presidential palace across the Ishim river, and Dr Kurokawa made this concept sketch. But, at the 2nd survey to Astana (1/17~1/26), it became clear that some public building would be made in this site. According to the discussion, DOA and JICA study team agreed to design island park on the artificial river island in the Ishim river in the southern part of the presidential palace.





Because these two concept sketch were made during 1st and 2nd survey to Astana, these sketch don't fit to the final site of the park. So only concept of the park is explained in this sentence.

The main concept of the park is to express typical natural elements like mountain, plain, forest, river etc. at the park in all. It is the intention to incorporate natural features found across the Republic of Kazakhstan, from the Tien Shan Mountains to the Balkhash lake, to the Forest and Steppe lands, in a miniature scale.

This park is intended to be a place of recreation and relaxation for whole citizens of Astata city in which visitors can come in touch with nature as the park of organic image in contrast to the orderly divided Government City.

There are restaurants, kiosks, toilets etc at the suitable place. These facilities should be innovative design using newest material like glass and aluminum considering the traditional shape of Japan and Kazakhstan.

CHAPTER 2 MODEL DESIGN

2-1 MODEL DESIGN OF PEDESTRIAN DECK

Outline of Pedestrian Deck

Regarding the pedestrian deck, it became clear that there is the scheme made by Astanagenplan and regarding west building of the pedestrian deck, pile driving has been already finished. According to the discussion between DOA and JICA study team, the design of the pedestrian deck was decided to be done using the grid span of the Astanagenplan's plan, and the piles already driven were decided to be used maximum.

The pedestrian deck is located on the main axis and represents one of the basic element of the center composition, combining the adjacent building up into one united complex. The pedestrian deck includes eastern and western parts, located on both sides of "Astana-Baiterek" tower and consists of three levels.

There is parking with a pedestrian corridor in the center of the ground floor.

The 2nd floor represents a passage (shopping mall) with a central void gallery and halls on both sides of it. The halls can be used as show rooms, shops or for some other purposes, intended for cultural and consumer services.

The 3rd floor represents pedestrian street with a good view of new center and gives an opportunity to enjoy walking on fresh air. On this level, along the perimeter it is proposed to arrange lawns with flowerbeds and decorative trees in combination with architectural forms (lamps, benches, decorative sculptural compositions etc.).

In order to provide with good growth and maintenance of greenery, it is proposed to the following ideas:

- (1) special chute for ground 60 cm. deep;
- (2) planting of Canadian type of decorative trees with horizontal root structure;
- (3) insulation and damp course of chutes for ground;
- (4) system of boiler irrigation and system of excessive moisture drainage.

For snow handling purposes from upper level, it is supposed to have special manholes, through which snow is thrown down to damp trucks.

In the eastern part of the pedestrian deck, it is proposed to organize spacious covered area for the unique color musical fountains-theatre. On both longitudinal sides of the fountain, it is proposed to put seating for audience and arrange cafes and restaurants.

Along the whole pedestrian deck, it is offered to have six "Green houses" in the form of transparent conic domes, which run through the pedestrian deck from top to bottom. The location of "Green houses" is dictated by the urban planning situation.

"Green house" looks like high atrium with artificial garden inside. Around the green house, it is planned to have cafes and restaurants. "Green house" is defined an a traffic intersection, that is all vertical and lateral traffic like stairs, elevators, access bridges and bus stops are concentrated around it.

On the 2nd floor, the pedestrian deck is connected with adjacent building up by means of overpasses-galleries, which are situated above roadway. Overpasses-galleries can be mounted in any place if it is necessary to connect some building, located along the pedestrian deck.

Undoubted advantages of the pedestrian deck are as follows:

- (1) maximum efficient use of city land, the cost of which will increase in the course of building up the central area;
- (2) the provision of composition and functional unity of central trestle, which is ongoing built over by facilities, different in their volume and architectural style;
- (3) creation of comfort for visitors and people working in the center, moving in the covered area of the pedestrian deck and overpasses-galleries at any time and weather;
- (4) maximum provision with cultural and consumer services, leisure and trade facilities in the central zone, where mostly business and governmental buildings are under construction;
- (5) three, different in their functions, floors of the pedestrian deck satisfy ultimately various needs and expectations of people (walks, rest, entertainment, food and shopping).

<Specification figures of the pedestrian deck>

General square – 290,000 m²

Number of parking places - 400

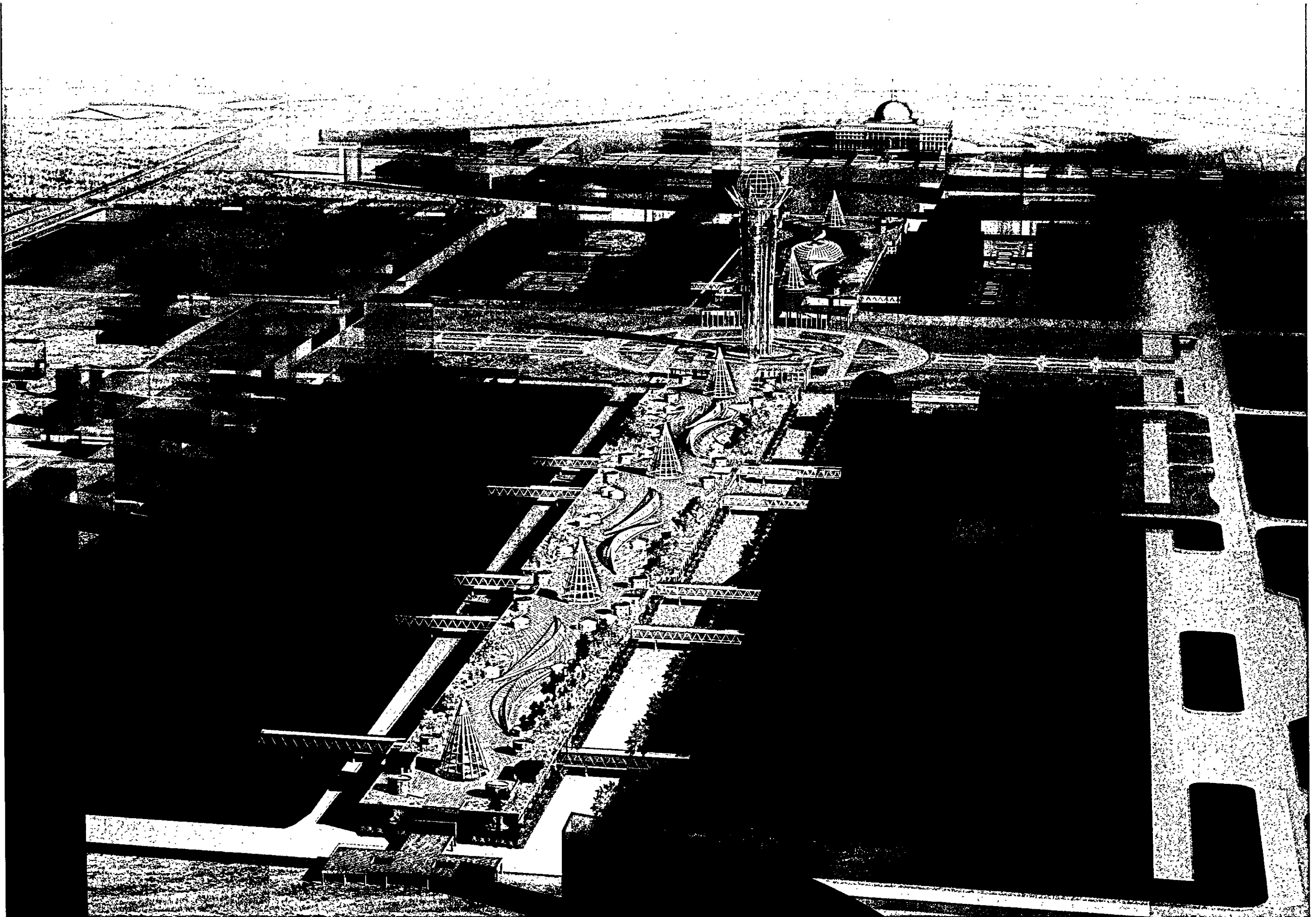
General square of quarters – 80,000 m²

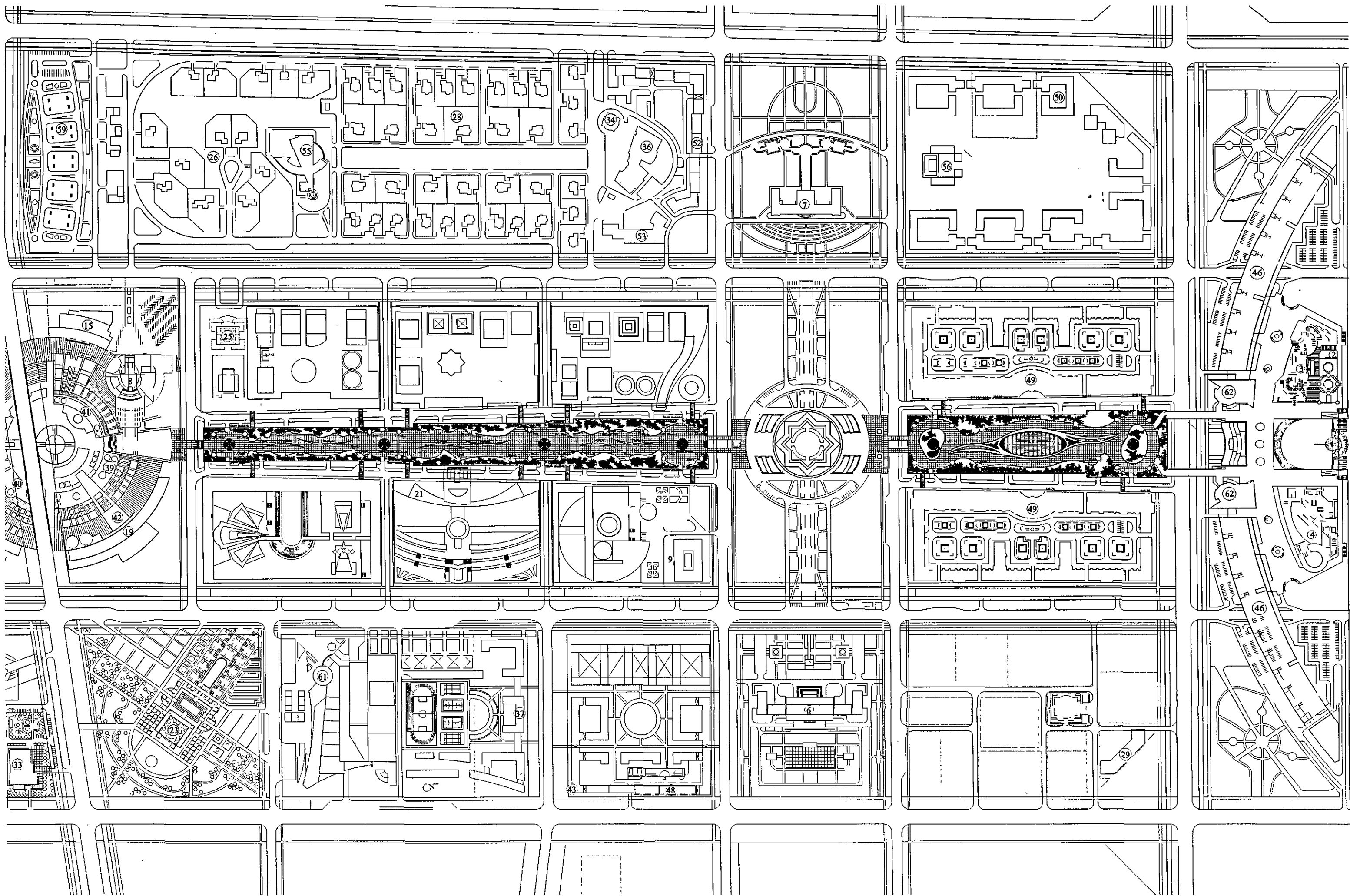
Including:

Public spaces – 65,162 m²

Corridors and galleries – 5,315 m²

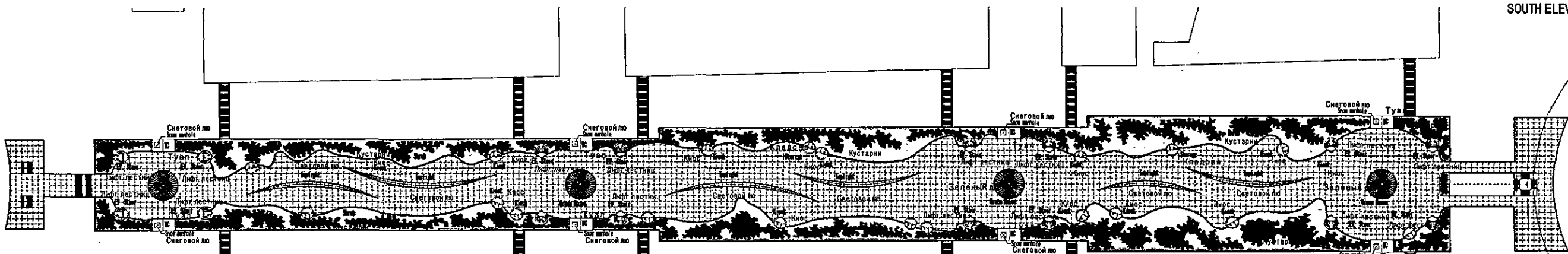
Technical spaces – 9,523 m²



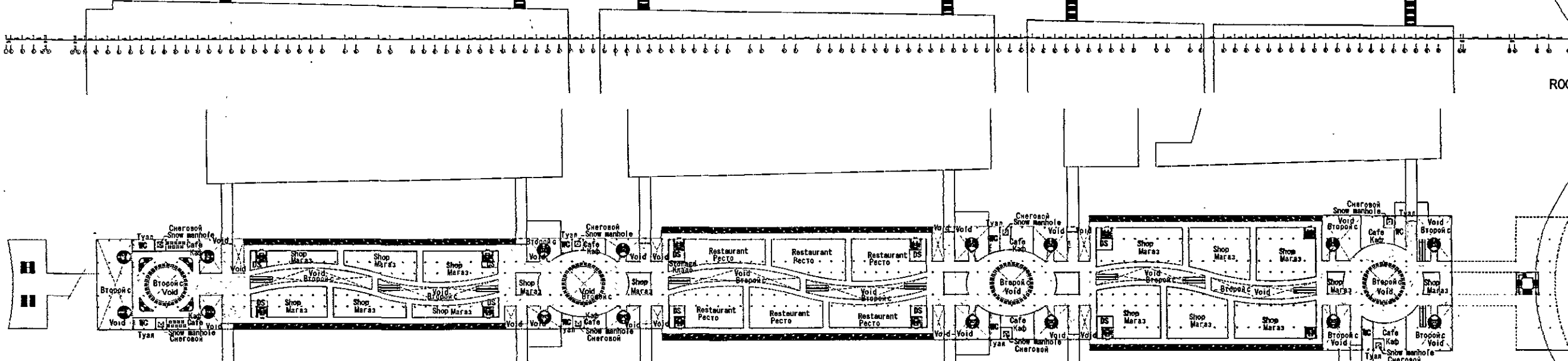




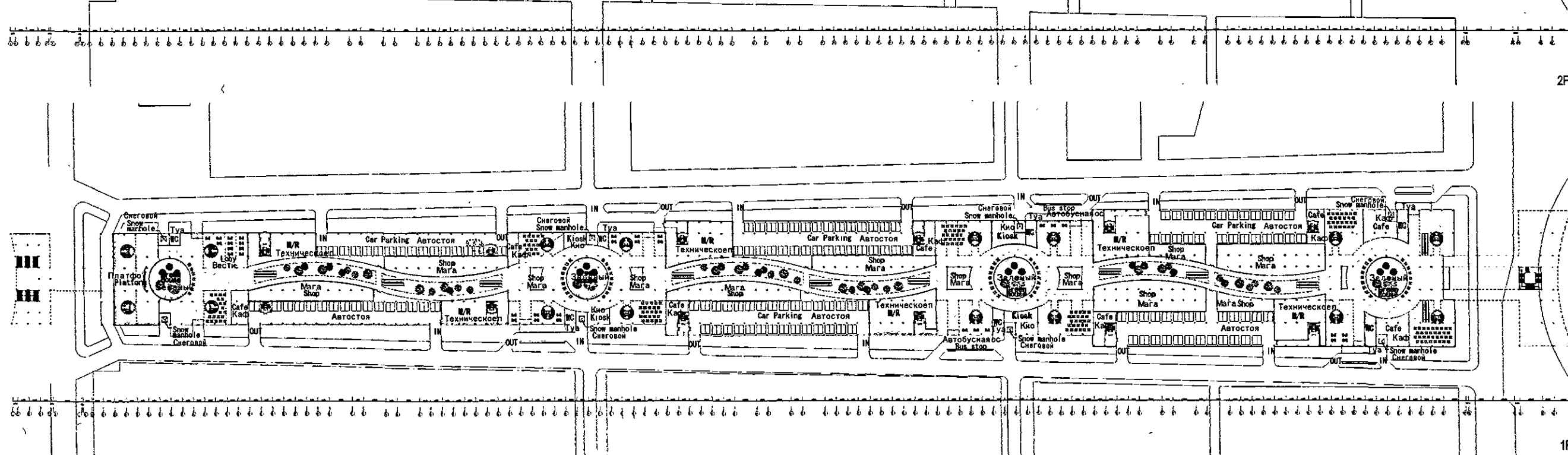
SOUTH ELEVATION(BUILDING-1)



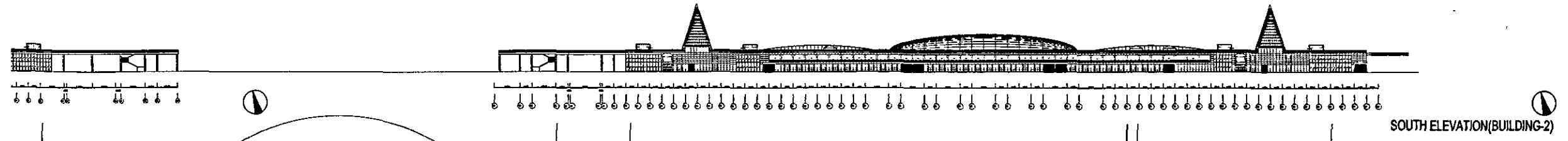
ROOF PLAN(BUILDING-1)



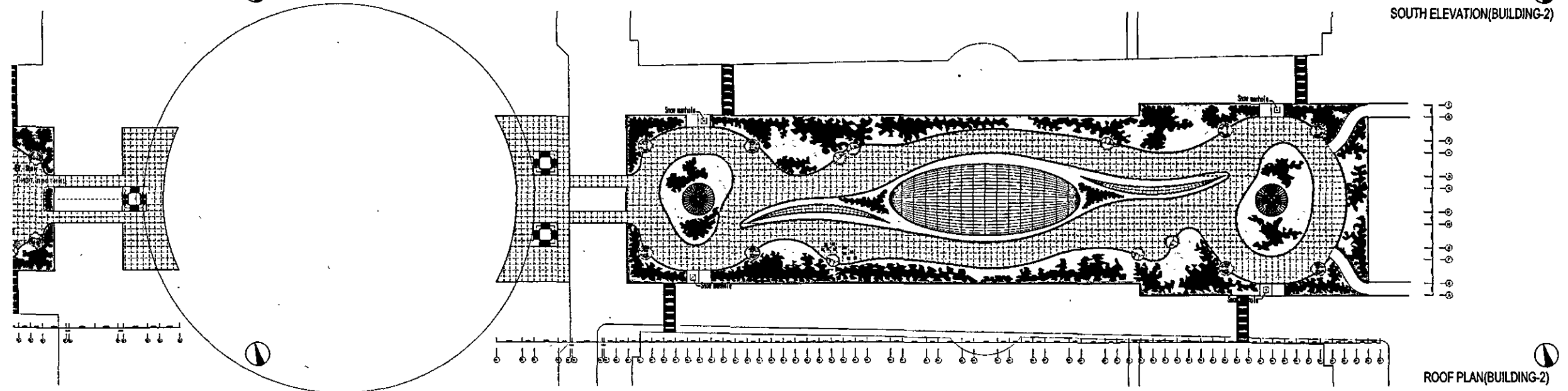
2F PLAN(BUILDING-1)



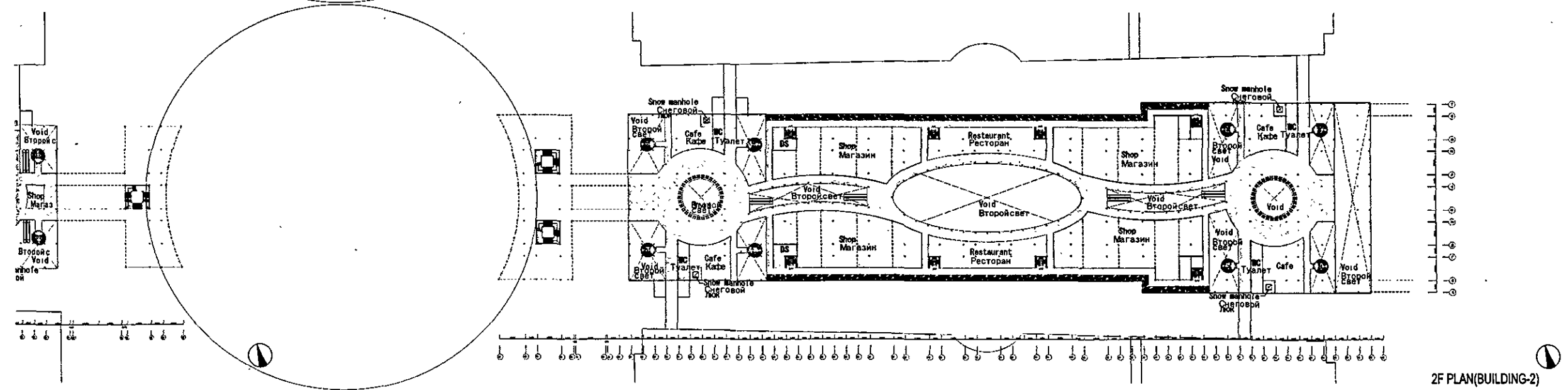
1F PLAN(BUILDING-1)



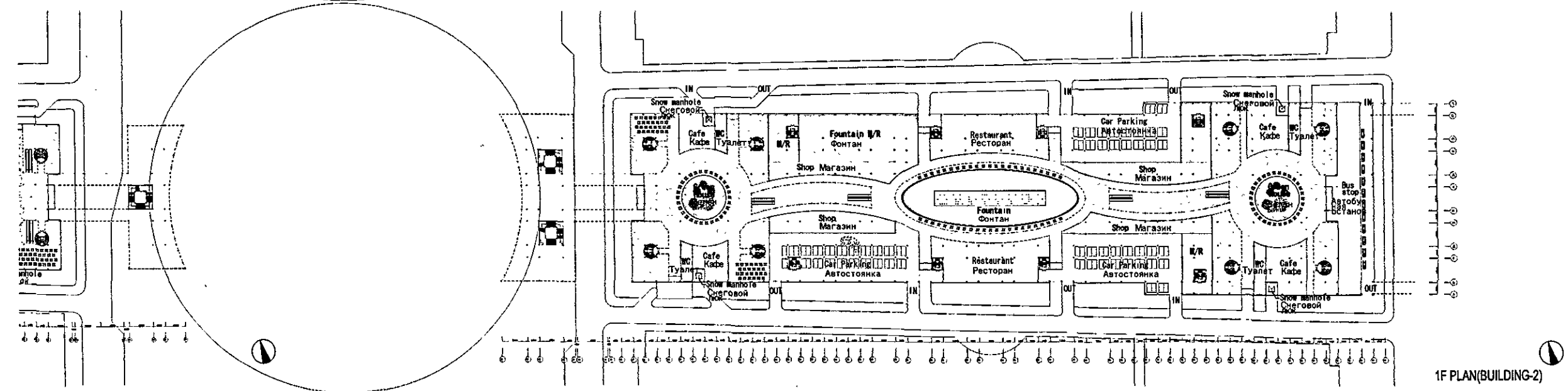
SOUTH ELEVATION(BUILDING-2)



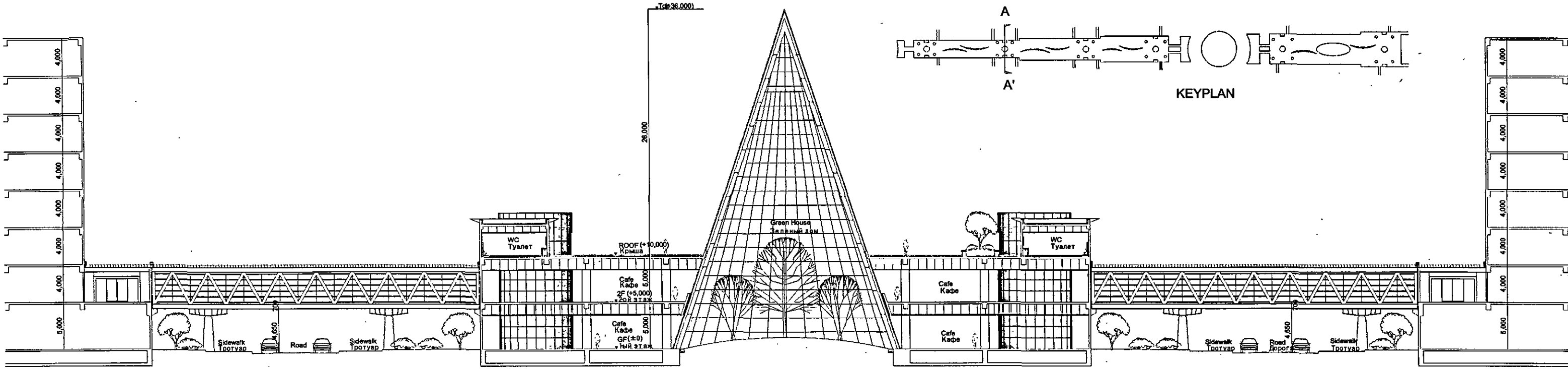
ROOF PLAN(BUILDING-2)



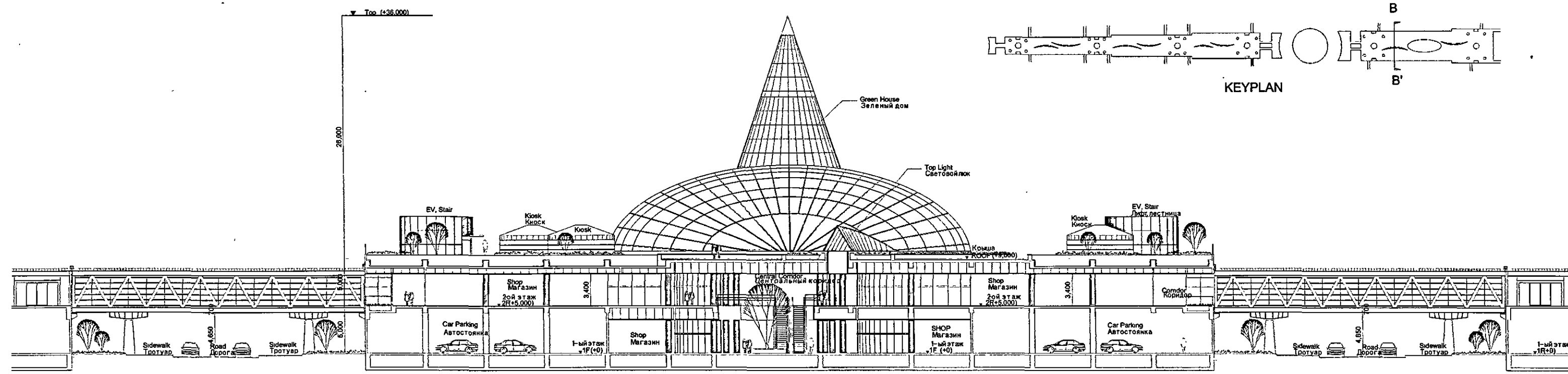
2F PLAN(BUILDING-2)



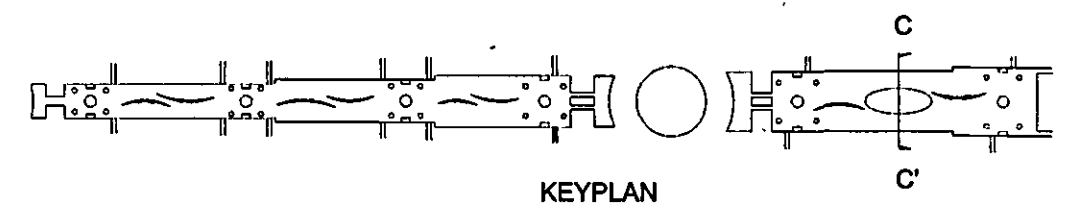
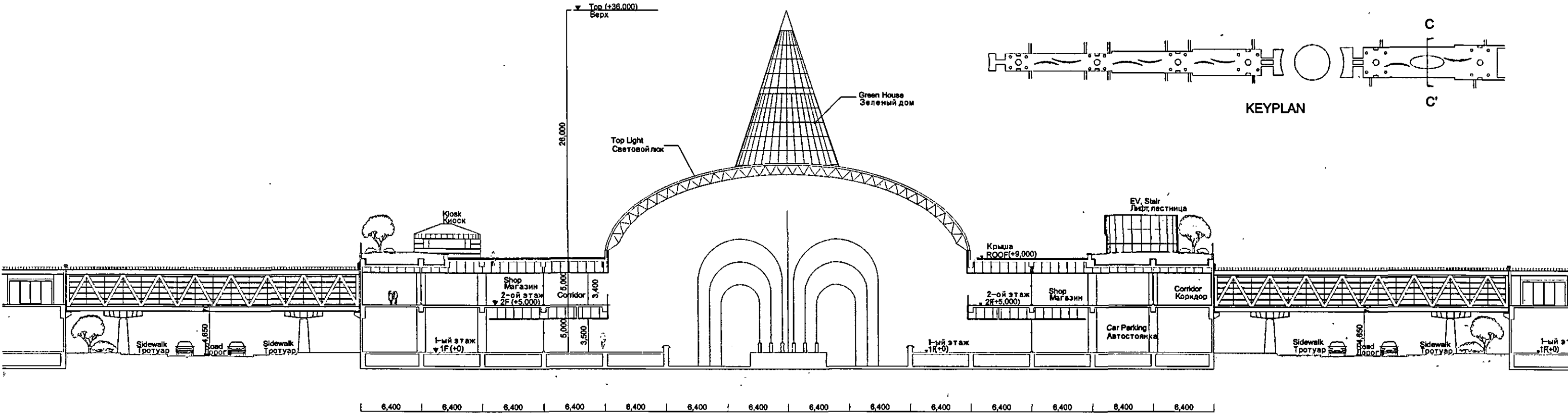
1F PLAN(BUILDING-2)



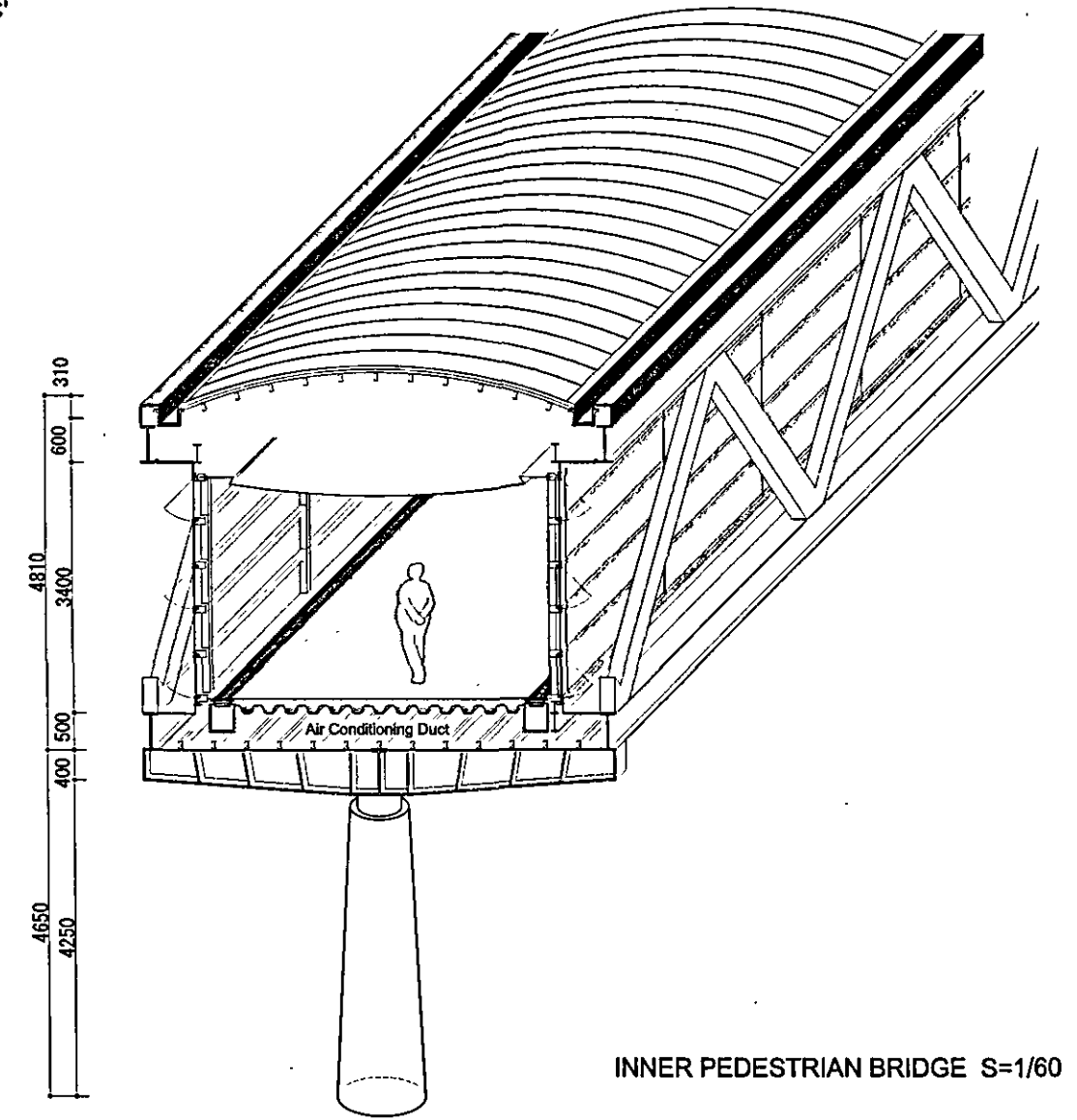
SECTION A-A'



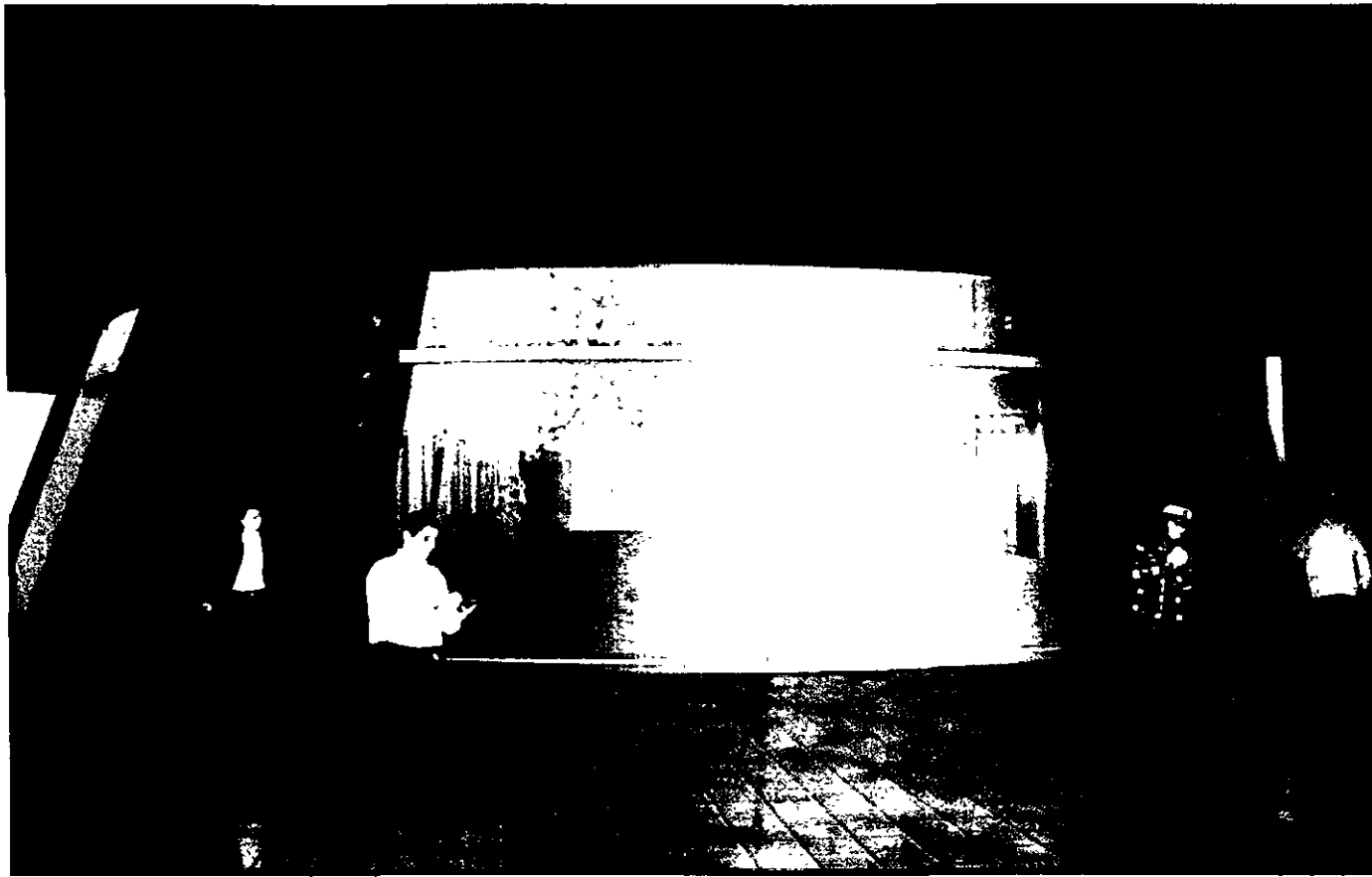
SECTION B-B'



SECTION C-C'



INNER PEDESTRIAN BRIDGE S=1/60



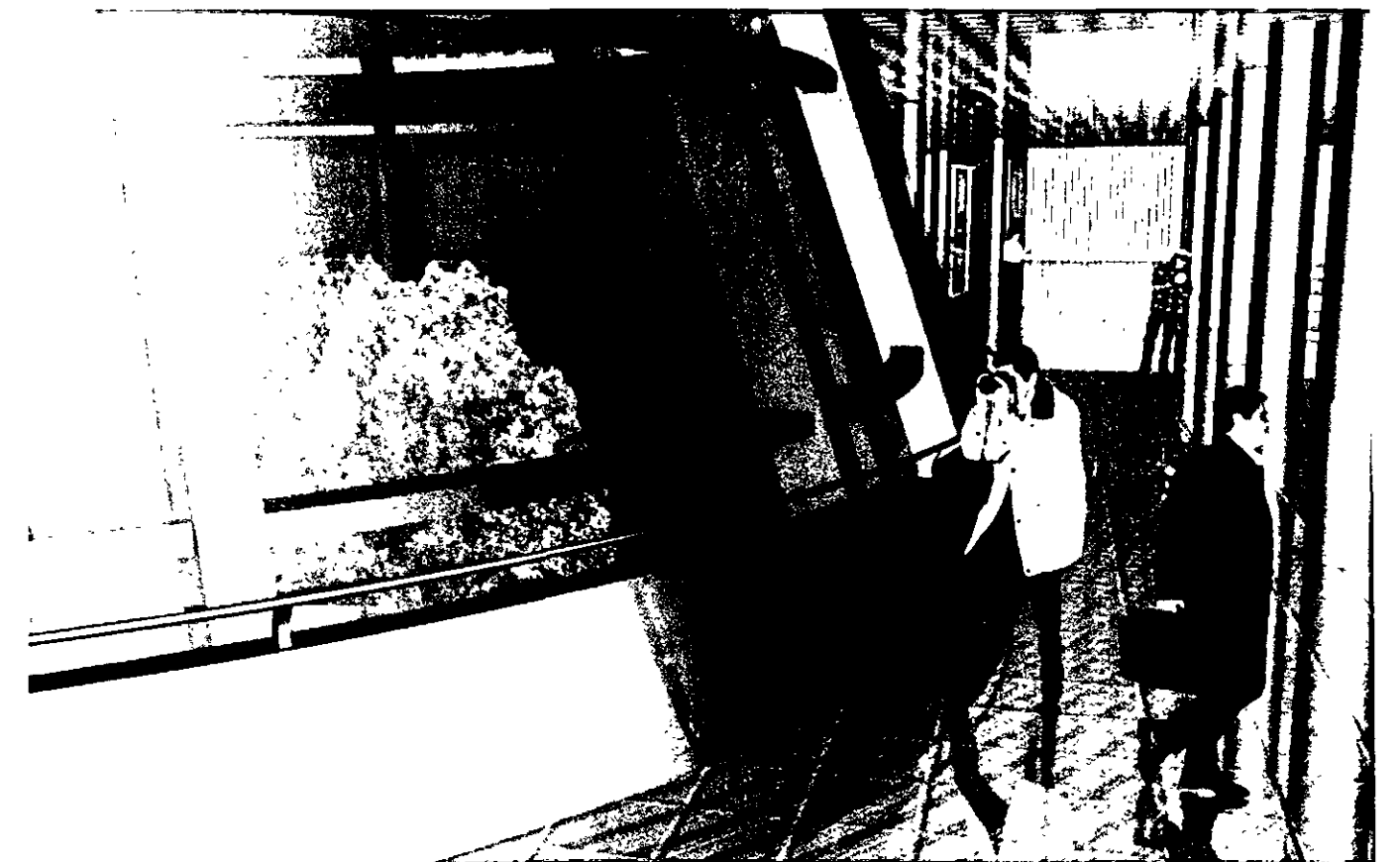
1F Bus Stop



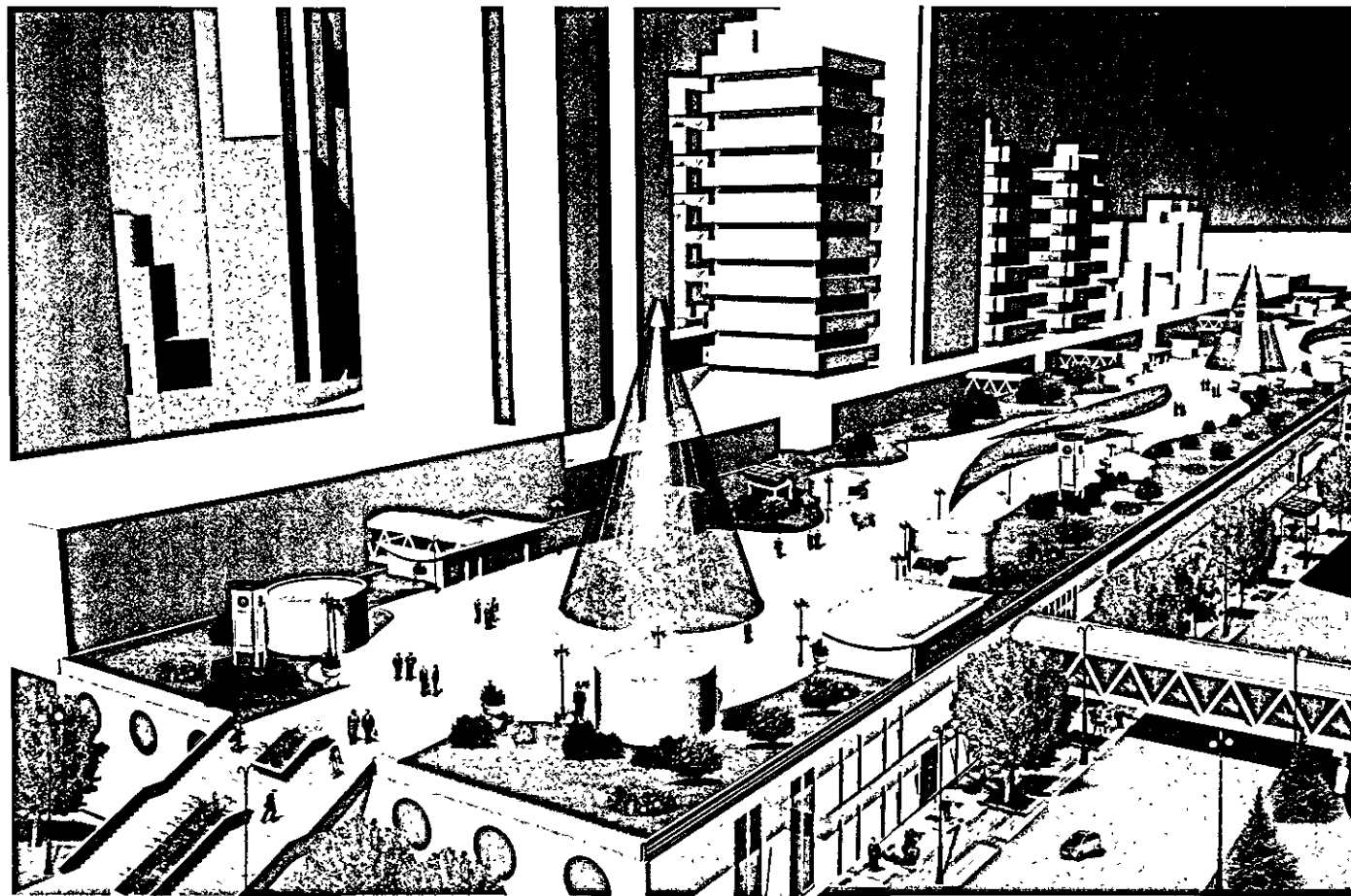
2F Shopping Mall



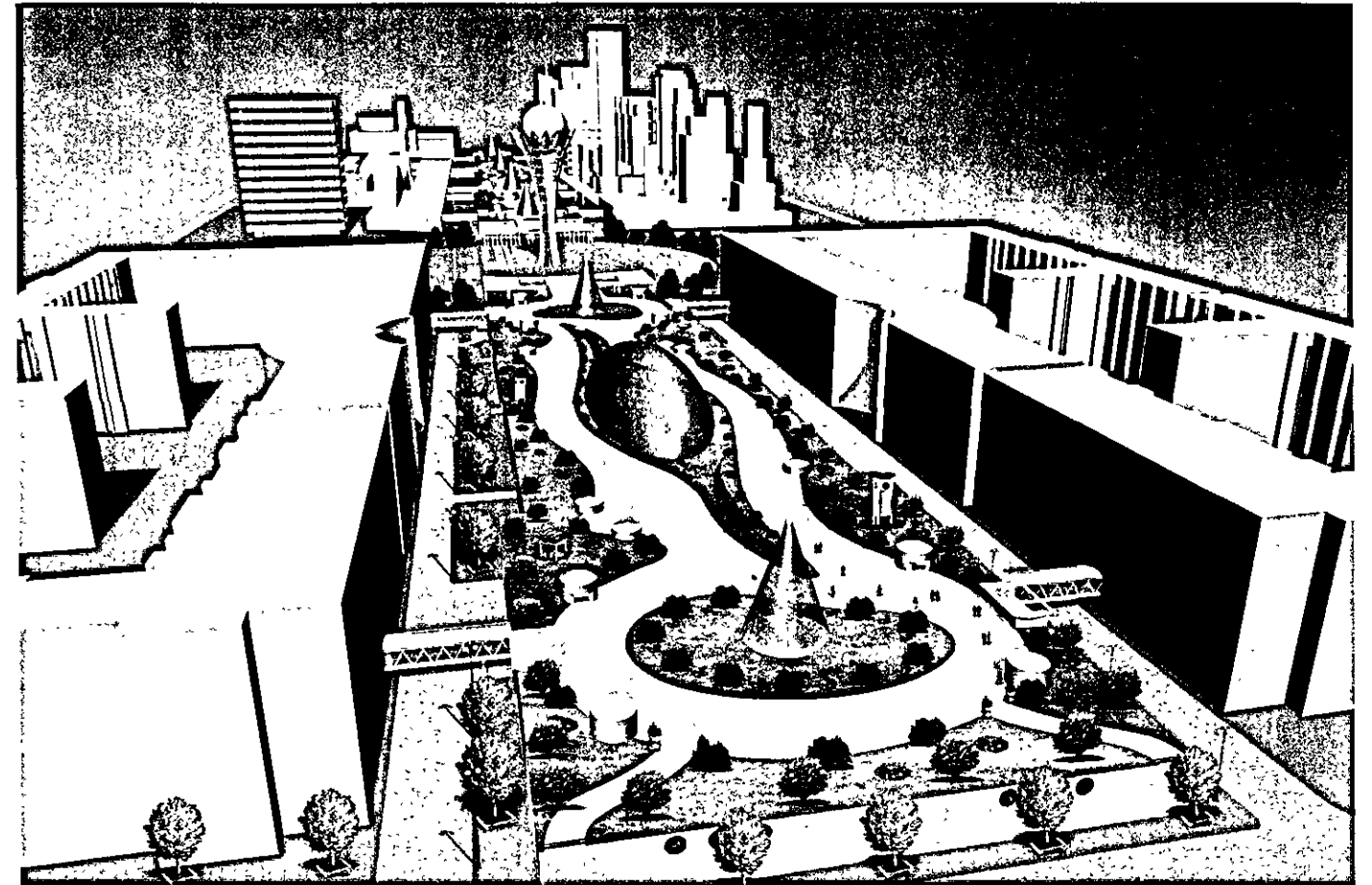
2F Shopping Mall



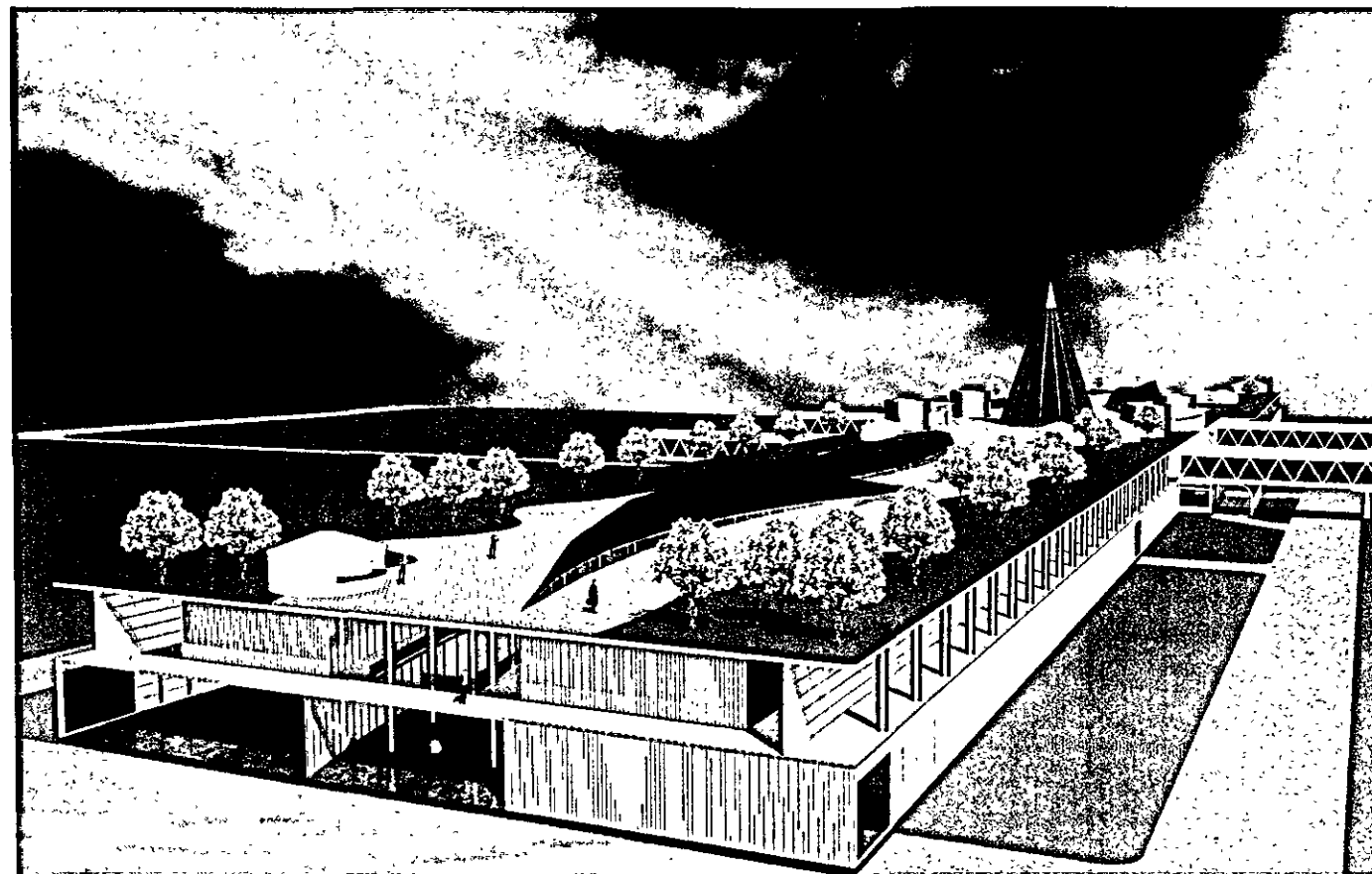
2F Green House



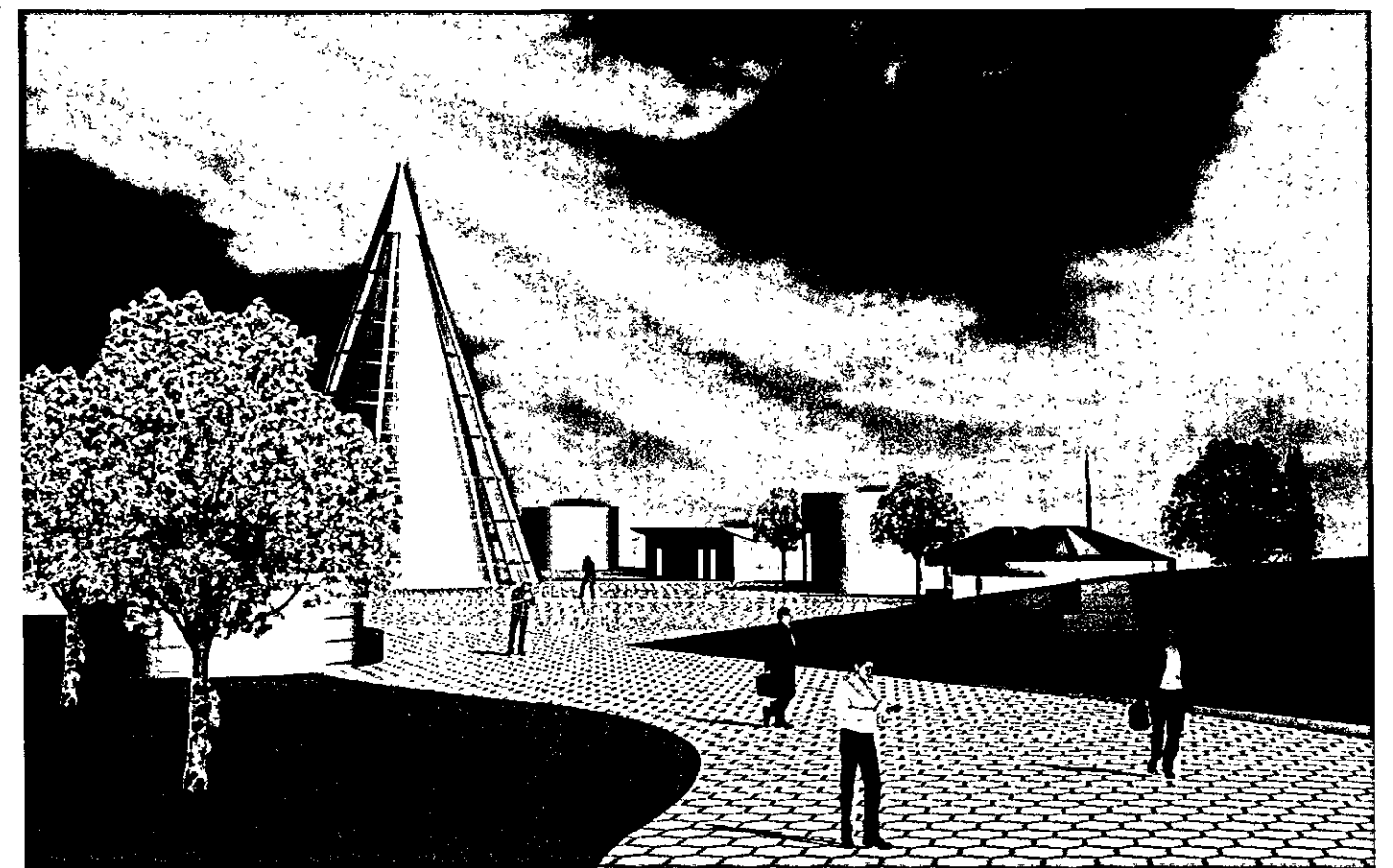
Overview perspective of west pedestrian deck



Overview perspective of east pedestrian deck



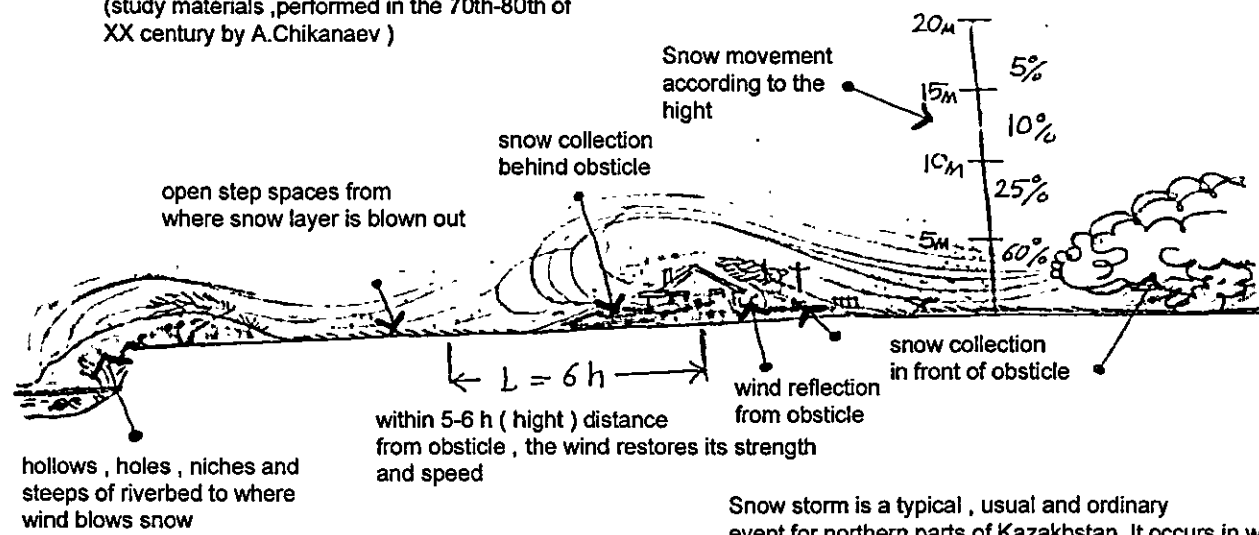
Section perspective of west pedestrian deck



Roof deck of west pedestrian deck

Mechanism of snow drifts and snow movements in the steps of the Northern Kazakhstan (study materials, performed in the 70th-80th of XX century by A.Chikanaev)

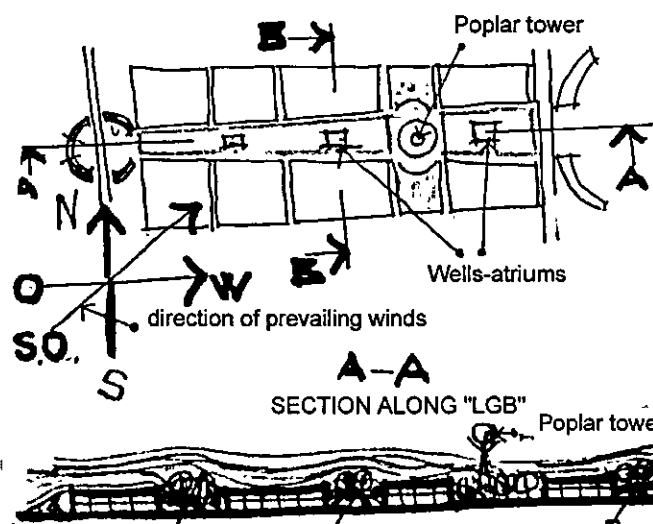
А.В.Ор. А.Ч.ИКАНАЕВ



Snow storm is a typical, usual and ordinary event for northern parts of Kazakhstan. It occurs in winter period. Duration-2-4 days. Frequency- 3-7 times per winter. It is accompanied by storming wind up to 25-30 m/s (more than 100 km/h) and heavy snow falling. Snowstorm is a basic factor of forming of snow movement and snowdrifts.

Thickness of snow layer in steps in the Northern Kazakhstan varies from 20 to 40 sm. However, snowstorms allocate all that snow layer by blowing it from vast areas to towns, villages, forests and hollows.

Analysis of urban development solution of so called "linear green boulevard" (LGB) designed by Astanagenplan from the point of view of snowdrifts and snowmovement.



The along axis of "LGB" does not coincide with the direction of prevailing winter winds (South - West). However from the western direction, along which the "LGB" is designed, the wind is also intensive. That's why, measures which prevent from snowdrifts and snowmovement should be taken into consideration while making urban development decision.

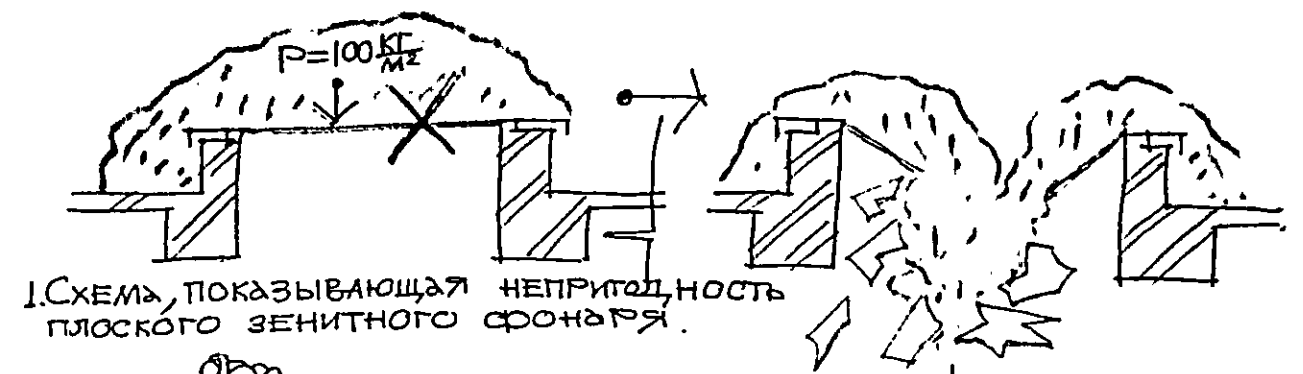
Roofs of pavilions are intended for pedestrian walks. Due to great greenery expenses, basically it is supposed to have grass lawn and flowerbeds as well as decorating by small architectural means, devices. The absence of obstacles, which stop snow movement, along the "LGB" axis will promote the blowing of snow from roofs into well-atriums and further down.

From wide (up to 76 m), open to winds, flat surface, the snow will be blown down. People on roofs will feel as though they are in aerodynamic tube. It is up for extreme fans to walk along the roofs of "LGB" during snowstorm.

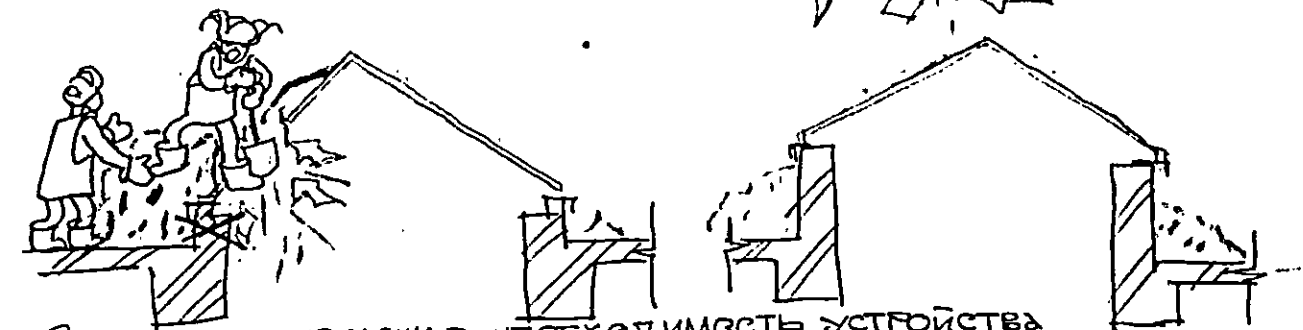
open atriums -designed facilities for snow collection, blown from roofs

CROSS SECTION "LGB"

B-B



1. СХЕМА, ПОКАЗЫВАЮЩАЯ НЕПРИГОДНОСТЬ ПЛОСКОГО ЗЕНИТНОГО ФОНАРЯ.



2. СХЕМА, ПОКАЗЫВАЮЩАЯ НЕОБХОДИМОСТЬ УСТРОЙСТВА ВЫСОКИХ (НЕ МЕНЕЕ 80см) ВОРТИКОВ ЗЕНИТНЫХ ФОНАРЕЙ.



3. СХЕМА, ОБОСНОВЫВАЮЩАЯ НЕОБХОДИМОСТЬ УСТРОЙСТВА НА КРОВЛЕ СПЕЦИАЛЬНЫХ ПОМЕЩЕНИИ ДЛЯ СТОЯНКИ ТЕХНИКИ, ХРАНЕНИЯ ИНВЕНТАРЯ И ВЫВОЗА СНЕГА.



4. СХЕМА, ОБОСНОВЫВАЮЩАЯ ВОЗМОЖНОСТЬ И ЦЕЛЕСООБРАЗНОСТЬ УСТРОЙСТВА ПОЛУЗАТЛУБЛЕННОГО ГАРАЖА И ДВУСВЕТНОГО ПРОХОДА - КОРИДОРА

А.В.Ор. А.Ч.ИКАНАЕВ