

Onsen & Thermal Baths

Learning from Japan to regenerate a thermal site in Italy

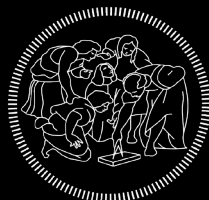
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Simonetta Lucia Pagliolico

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Master Degree Course
in Architecture Construction City

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Learning from Japan to regenerate a thermal site in Italy

Master Degree Thesis
A.Y. 2019/2020

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*We lead our lives like water flowing down a hill,
going more or less in one direction until we splash into something
that forces us to find a new course.*

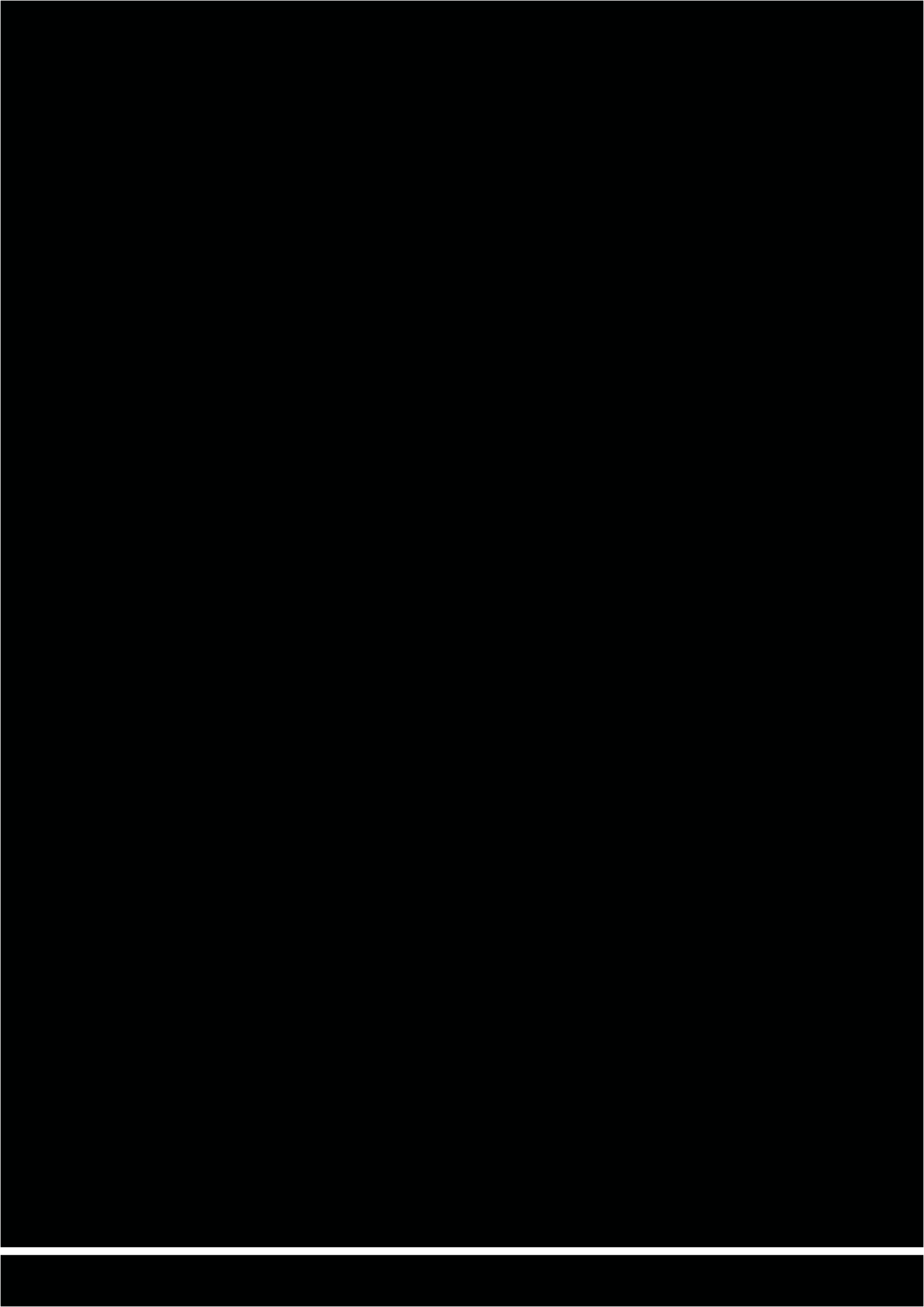
A. Golden, *Memoirs of a Geisha*

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Abstract

Abstract



The exploitation of hot water for religious, relaxation and medical purposes, represents an eradicated tradition in Japan. Favoured by its geology and location, the nation counts thousands of springs and bathing facilities, accessed, on a daily basis, by multitudes of natives and tourists. Among the available typologies, onsen represent the most interesting establishments. Their fascination, in fact, transcends the attractiveness of relaxation: the process of bathing, imposing a rigorous etiquette, along with architectural choices and the attention to the natural environment, consist in a unique combination. Despite a strong centenary tradition, the onsen sector, after the bursting of the Economic Bubble in the 90s, has undergone a phase of crisis, mostly due to: the advent of private home baths, the reduction in payed company recreational trips and the decrease of overnight staying. In this perspective, the joint efforts of local population and Tourism Bureau have produced several measures of intervention, which have generally proven to be successful for the revitalization of more conservative and secluded onsen towns. Italian public baths, similarly, have had a long and complex history, which has culminated, after the reduction of State's subsidies, in a radical loss of popularity. However, differently from Japan, the recovery of the sector has interested only major compounds and has left smaller realities in a state of inexorable dissolution.

On the base of these reflections, this thesis initially explored the regeneration processes followed in several Japanese onsen municipalities, in order to understand the various methodologies and try to draw some guidelines for their replicability. The most common measures appeared to be: valorization of existing heritage, enhancement and preservation of natural landscape, networking among facilities and improvement of connections. Moreover, the tendency of asking famous architects to design or renovate onsen facilities, used as a driving force for the regeneration of entire communities, also appeared to be successful. In this perspective, the regeneration of Itomachi in Saijo, Ehime Prefecture, seems to partially embody this strategy. The author of this thesis had the opportunity to collaborate on the design concept of the Onsen&Gym compound, which was briefly presented to summarise some of the principles learnt in Japan. The research work was further advanced by exploring the bathing sector in Italy, through the analysis of some successful compounds. The latter appeared to have preserved their appeal by combining the usage of hot waters for medical purposes, with its employment for beauty, relaxation and fitness ones, by stressing on the idea of comprehensive thermal parks. Thus, the outcome was the selection of the dismissed Thermal Baths of Bacedasco, extremely well known during the 60s for its Park of Fons, as a case study. The concept for this regeneration project was to consider water as the driving force for the development of the compound as a series of scattered prefabricated wooden blocks. The aim was to create a sort of community, within which patients and visitors can interact and equally benefit from being immersed in water and nature. To render the solution flexible to further developments and to minimize the impact on the landscape, a prefabrication and modular strategy, along with a study on wooden based building products were carried out.

The final output demonstrates how the intercultural exchange of ideas can lead to more diversified, yet context conscious solutions to eradicated problems. Moreover, it provides an additional model for the regeneration of more secluded thermal complexes in Italy.

Thesis Journey

Thesis Journey

Kengo Kuma Laboratory, The University of Tokyo



Phase 1

After being accepted at the University of Tokyo for an Half-Yearly Exchange Programme, during the first semester of the second year of Masters' in Architecture Construction City (Politecnico di Torino, A.Y. 2018-2019), I started getting in touch with the Kengo Kuma Laboratory by taking part in a Design Studio and several lectures organized by it. As the Lab provided its students with the opportunity of collaborating on projects of Kengo Kuma and Associates (KKAA), I applied to become its member and to develop part of my thesis project there. After becoming a member of the team, I was offered the chance to work on the development of several projects, among which the design concept for the Onsen+Gym complex of the Ito Project, in Saijo, Ehime Prefecture, Japan, which became the starting point for this thesis work. As a matter of fact, as with Architect Takumi Saikawa and the fellow student Sarah Wellesley I started researching the onsen typology for the sake of the design project, with periodical meetings with Professor Kengo Kuma; under the guidance and support of Professor Toshiki Hirano, I decided to study the measures of intervention undertaken to revive thermal towns in Japan, as a phase of crisis has characterized them in recent years, due to a divergence between available structures and customer needs. Despite the fact that the project temporarily came to an halt after I came back to Italy, the research and design developed during my permanence at the Kuma Lab were condensed to become the first section (*Part 1*) of this Masters' Thesis.

Alta Scuola Politecnica, Politecnico di Torino - Politecnico di Milano



Phase 2 & Phase 3

During the first year of Masters' I applied to become a member of the XIV Cycle of Alta Scuola Politecnica (ASP), joint venture between Politecnico di Torino and Politecnico di Milano. As I was selected to become a member of it, the prescribed educational path consisted in: four frontal courses (in the form of intensive weeks of work), each followed by the redaction of a paper; one online course; several seminars; a final project (lasting slightly more than one year). If these activities were compulsory to complete the ASP path, in order to obtain the double degree from the partner university students were required to have a Co-relator from the latter. In this perspective, I asked Professor Simonetta Lucia Pagliolico to become my Relator and Professor Pierre Alain Croset to become my Co-Relator from Politecnico di Milano.

Under their supervision, I transferred the research topic developed in Japan to the Italian context and thus: first, searched for a case study and selected Thermal Park of Bacedasco, Municipality of Castell'Arcquato, Province of Piacenza, Italy; then, investigated the documentation available at GPR Studio, under the supervision of the Engineer Ermanno Rastelli and thus the one stored by the States' Archive of Piacenza; having processed the historical documents, I started approaching the design phase, along with a study on materials and a more general discourse on the thermal sector in Italy. In this perspective, I divided the knowledge on the field and its current status and the project, respectively into *Part 2* and *Part 3* of this book. Although the ASP Programme initially asked its students to graduate until December 2019, I was granted the opportunity to extend my research period until April 2020, due to the demanding thesis work.

Introduction

Introduction

The exploitation of hot water for religious, relaxation and medical purposes, represents an eradicated tradition in Japan. Favoured by its geology and location, the nation counts thousands of springs and bathing facilities, accessed, on a daily basis, by multitudes of natives and tourists. Among the available typologies, onsen represent the most interesting establishments. Their fascination, in fact, transcends the attractiveness of relaxation: the process of bathing, imposing a rigorous etiquette, along with architectural choices and the attention to the natural environment, consist in a unique combination. Despite a strong centenary tradition, the onsen sector, after the bursting of the Economic Bubble in the 90s, has undergone a phase of crisis, mostly due to: the advent of private home baths, the reduction in payed company recreational trips and the decrease of overnight staying. In this perspective, the joint efforts of local population and Tourism Bureau have produced several measures of intervention, which have generally proven to be successful for the revitalization of more conservative and secluded onsen towns. Italian public baths, similarly, have had a long and complex history, which has culminated, after the reduction of State's subsidies, in a radical loss of popularity. However, differently from Japan, the recovery of the sector has interested only major compounds and has left smaller realities in a state of inexorable dissolution.

On the base of these reflections, this thesis initially explored the regeneration processes followed in several Japanese onsen municipalities, in order to understand the various methodologies and try to draw some guidelines for their replicability. The most common measures appeared to be: valorization of existing heritage, enhancement and preservation of natural landscape, networking among facilities and improvement of connections. Moreover, the tendency of asking famous architects to design or renovate onsen facilities, used as a driving force for the regeneration of entire communities, also appeared to be successful. In this perspective, the regeneration of Itomachi in Saijo, Ehime Prefecture, seems to partially embody this strategy. The author of this thesis had the opportunity to collaborate on the design concept of the Onsen&Gym compound, which was briefly presented to summarise some of the principles learnt in Japan. The research work was further advanced by exploring the bathing sector in Italy, through the analysis of some successful compounds. The latter appeared to have preserved their appeal by combining the usage of hot waters for medical purposes, with its employment for beauty, relaxation and fitness ones, by stressing on the idea of comprehensive thermal parks. Thus, the outcome was the selection of the dismissed Thermal Baths of Bacedasco, extremely well known during the 60s for its Park of Fons, as a case study. The concept for this regeneration project was to consider water as the driving force for the development of the compound as a series of scattered prefabricated wooden blocks. The aim was to create a sort of community, within which patients and visitors can interact and equally benefit from being immersed in water and nature. To render the solution flexible to further developments and to minimize the impact on the landscape, a prefabrication and modular strategy, along with a study on wooden based building products were carried out.

The final output demonstrates how the intercultural exchange of ideas can lead to more diversified, yet context conscious solutions to eradicated problems. Moreover, it provides an additional model for the regeneration of more secluded thermal complexes in Italy.

Onsen, in Japan



Img. 1 - Onsen. Accessed online at: www.cultura.it/gli-onsen-le-stazioni-termali-giapponesi.

Terme, in Italy



Img. 2 - Terme di Saturnia Golf Club&SPA. Accessed online at: www.termedisaturnia.it/it/hotel/hotel-con-spa-toscana

Part 1

Onsen & Onsen Towns in Japan

Part 1

Onsen & Onsen Towns in Japan

Understanding Onsen & Onsen Towns

Understanding Onsen & Onsen Towns

Img. 1- Bathing at an Onsen



Bathing Facilities in Japan

Overview

Considering the relevance of hot water, for bathing purposes, in Japan, it is important to begin the discourse on the regeneration process of facilities by mentioning the major typologies of establishments and their characteristics. If on the one hand it appears to have become common practice to address all of them with the name *onsen*, researching the literal translation of each specific term proves it wrong in nature.

Following an increasing ordering scale, on the base of age, there are:

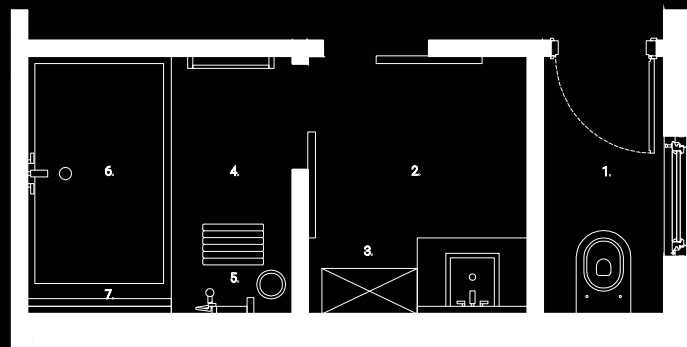
Ofuro: 湯風呂 - sum of honorific *o* and *bath*, consists in a private wooden tub;

Sento: 銭湯 - officially *coin* plus hot water, are provided with hot water by the municipal sewage system and are accessible upon payment of a minimum, fixed, fee;

Onsen: 温泉 - literally *hot* followed by *source*, are the only category to be supplied with thermal water and thus their accessibility results more expensive.

The usual layout of private houses' bathrooms is composed by:

- a small cubicle for the toilet, usually equipped with a technologically advanced seat's cover, which provides various functions, like: water spray, air spray, self-cleansening system and noise covering music;
 - a separate room for sink and thub, which is divided in: a space for the former, with shelves for clothes; a communicating one for ofuro and adjacent shower.
- | | |
|----------------------------|-----------------------------|
| 1. Toilet Cubicle | 5. Pavement Shower with Tap |
| 2. Changing room with sink | 6. Ofuro |
| 3. Shelves for Clothes | 7. Bathtub Cover |
| 4. Washing Room | 11. Toilet |



Img. 2 - Private House Bathroom Layout

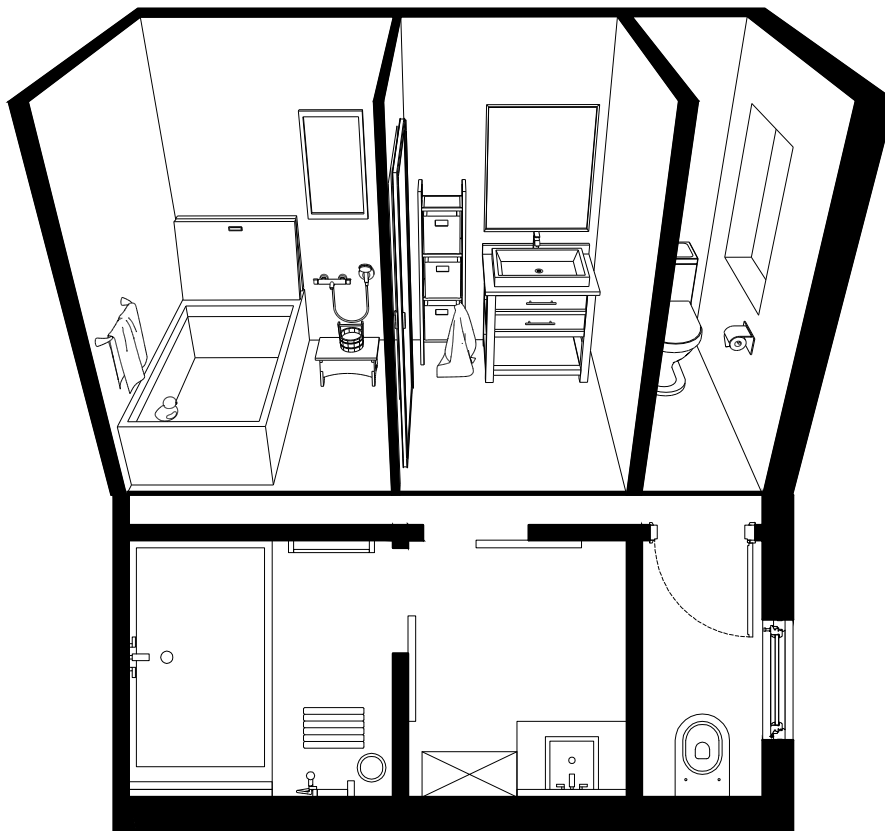
Ofuro (お風呂), Honorific “o” + Bath

Identified since the middle of the 20th Century as the home private bath, it consists in a 60cm deep tub for soaking up to the neck and relax for up to 45 minutes.

Usually made of wood (mostly cedar and cypress), for the minerals it contains, it is filled in tap water at 38-42° C and used for consequent baths by all the family members.

This is possible as no soap or dirt are supposed to enter the ofuro: Japanese houses not only have toilets in separate rooms from those reserved to cleanliness, but also present a walk-in shower next to the tub, for washing the body thoroughly before entering it.

Moreover, water can be reheated and once released, conveyed to washing machines or gardens, making maximum use of it. (1)(2)(3)

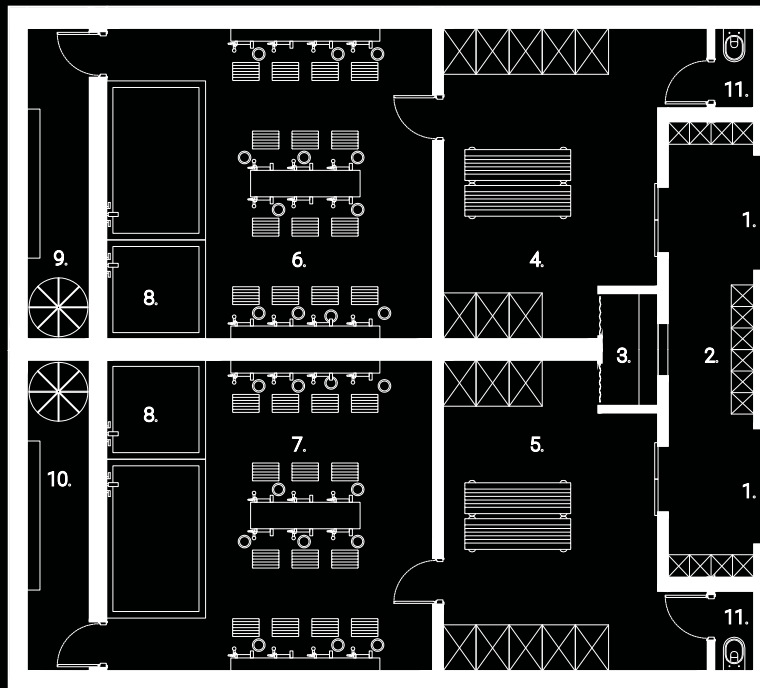


Img. 3 - Private House Bathroom Axonometric and Plan View

Their usual layout, presenting a separation of men and women compartments, is composed by:

- an entrance space, where shoes are left in apposite lockers, the entrance fee is payed to the host and opposite sexes move apart. It usually presents vending machines for drinks and couches;
- two changing and lockers rooms, with toilets, equipped with scales, dryers and massage tools;
- one bath area, with a central barrier for visual separation and faucets on the sides for cleaning thoroughly before entering the various baths.

- | | |
|--------------------------|-------------------------|
| 1. Entrance | 7. Women's Washing Area |
| 2. Shoes' Lockers | 8. Water Tubs |
| 3. Ticket Booth | 9. Boiler Room 1 |
| 4. Men's Changing Room | 10. Boiler Room 2 |
| 5. Women's Changing Room | 11. Toilet |
| 6. Men's Washing Area | |

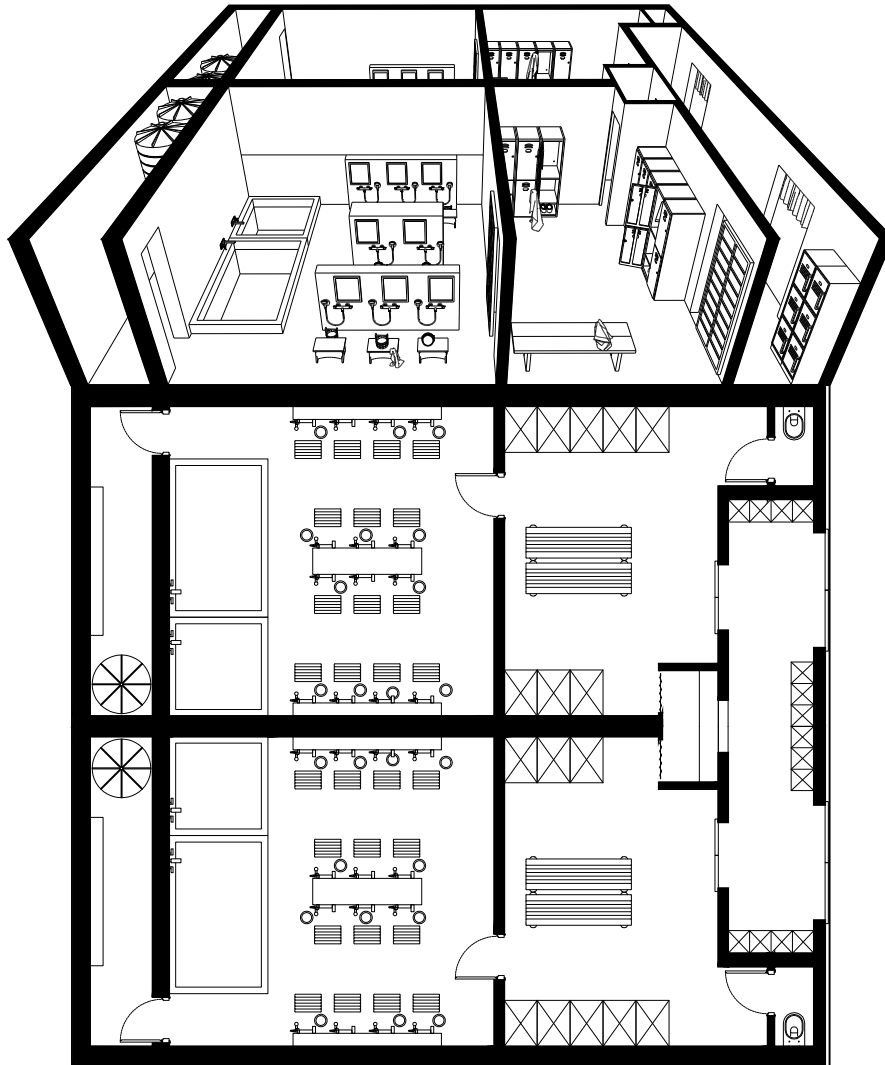


Img. 4 - Sento Layout

Sento (銭湯), Coin + Hot Water

Consisting in communal baths supplied with tap water, they represent urban neighbourhood establishments for daily hygiene and community gathering.

Reaching the peak of extension in the post-war era, due to population boom, lack of private facilities and extreme affordability, they have been drastically diminishing, but still hold an important role in the Japanese society. With prices set at Municipal level, they are usually accessible for less than 4€.



Img. 5 - Sento Axonometric and Plan View

Historical Evolution

Despite controversies on the actual first appearance of these compounds, it can be said that they found their origins in collective baths at temples, which expressed the need for affordable physical cleansing facilities and only later, around the end of the 16th Century, became to be associated with collectivism and social interaction as well.

Sixteenth Century

Authors seem to agree on the opening of the first privately owned public bath in Edo (present Tokyo), in proximity of the Edobashi Bridge, as having taken place in 1591. This event is considered as the foundation stone for the spread of these facilities in the rising Capital, as well as in the rest of the Country's urban areas.

Edo Period (1603-1868)

This Era represented the major phase for the development of sento as daily washing facilities, due to the diffused lack of indoor plumbing and the fear of fires sprouting from private fireplaces in a predominantly wooden city.

Initially, they diffused as mixed steam baths (Furoya), deeply dark spaces, allowing to soak only the bottom part of the body and accessible through low entrances, aimed at preserving the water's heat.

Subsequently, immersion baths started sprouting, presenting more elaborated systems of heating. Towards the end of the Period, certain bath houses, started providing scrubbing services, with often overlapped with prostitution and licentious behaviour. This led to the erection of bath houses on two levels, the one on the ground for bathing and the upper one for relaxing, drinking and socializing, which became sorts of men clubs. In all of its forms, sento bathing was characterized by nudity, associated with social inclusiveness and truthfulness.

Img. 6 - *Bathhouse Women*, Torii Kiyonaga (1752–1815).



Meiji Period (1868-1912)

As a phase of profound historical and cultural changes, during this time span several were the modifications that characterized sento: considered as immoral by Western mentality, mixed bathing was ended by introducing partitions at the core of the main bath; changing, washing and bathing areas were identified; fire sources were moved to separate rooms; regulations on hygiene and equipment were enforced.

Taisho Period (1912-1926)

This time span witnessed more innovations in terms of materials and layout: wood was substituted by ceramic tiles; faucets started appearing as individual washing pods; boilers allowed the extension and improvement of baths.

Showa Period (1926-1989)

The Era was characterized by swinging in numbers of sento: if the period prior to the war was characterized by the prosperity of these facilities, bombings and abandonment caused a profound shrinking of the sector; which had fully recovered by the end of the 60s, before unavoidably declining with the spread of private baths.

Heisei Period (1989-2019)

If in 1868 Tokyo alone hosted 2 687 facilities, by 2008, around 3 000 were left at Country level. This crisis has seen attempts by some sento owners to modernize their facilities, by: rendering the exteriors more appealing, transforming the entrance into a lobby space and providing more typologies of baths, while keeping prices low, thanks to Governmental supports and stressing on their cultural value.

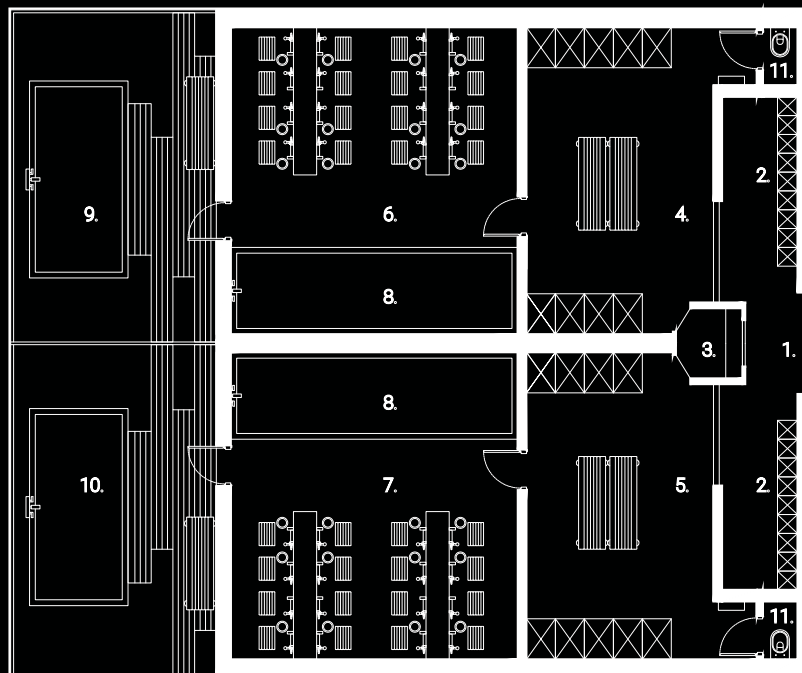
(4)(5)(6)(7)(8)

Img. 7 - Yakuza bath house- 1946.



Presenting a similar organization of spaces to that of sento, the main difference consists in the search for deeper connections with the surrounding natural environment. In this perspective, an additional component are outdoor baths, rotenburo.

- | | |
|--------------------------|-------------------------|
| 1. Entrance | 7. Women's Washing Area |
| 2. Shoes' Lockers | 8. Water Tubs |
| 3. Ticket Booth | 9. Men's Rotenburo |
| 4. Men's Changing Room | 10. Women's Rotenburo |
| 5. Women's Changing Room | 11. Toilet |
| 6. Men's Washing Area | |

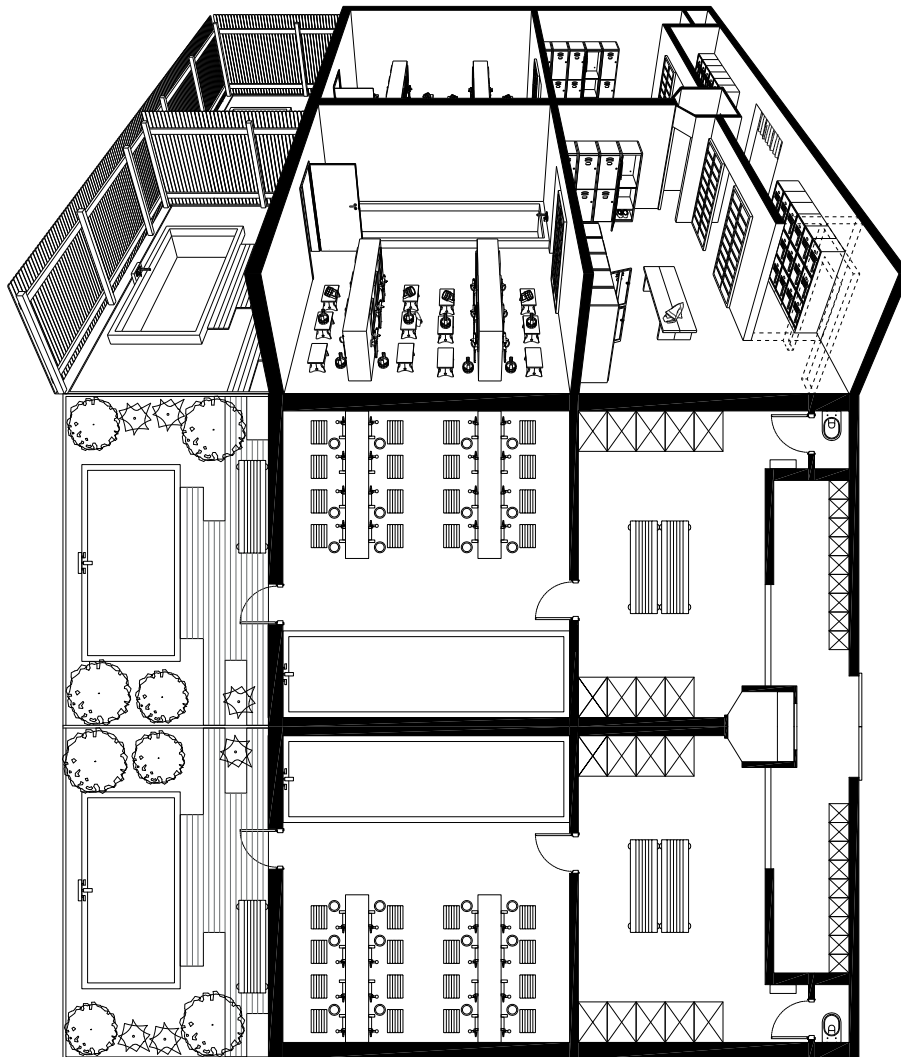


Img. 8 - Onsen Layout

Onsen (温泉), Hot + Source

As communal baths supplied with spring water, they share some features with sento, but present crucial differences as:

- the usage of thermal water, associated with therapeutic properties, which is regulated by the Hot Spring Law, prescribing a set of criteria that have to be matched;
- the location, in proximity of a spring, prescribing a deep relation with the natural environment; the aim, set to relaxation and well-being, rather than an affordable daily activity;
- the price, autonomously set by owners.



Img. 9 - Onsen Axonometric and Plan View

Historical Evolution

The history of onsen differs from that of the previous two typologies as, from its very first developments, it was linked with religious and therapeutic implications, rather than mere practical ones.

6thCentury

If the mythology surrounding the formation of hot springs was at the base of the strong ties between thermal waters and curative properties, the concept of purification via water found its roots in Shintoist rituals. Moreover, with the diffusion of Buddhist proselytism, communal bathing, foreign to the Japanese culture, was introduced to clean body and soul by pouring water boiled in cauldrons into small wooden tubs.

Nara Period (710-794)

During this phase, they also assumed a political role, as “charity baths” were introduced to display the Empress (Kômyô) benevolence towards the population: during these occasions, in fact, the prime woman gave baths to citizens personally.

Kamakura Period (1192-1333)

Later on, charity baths became to be considered as gestures of reverence towards deceased ancestors: relatives were offering baths to any member of society, in order to honour the death. An alternative declination of these baths was also provided by temple patrons, which, by making offers, aimed at consenting low income citizens to benefit of hot water, while obtaining eternal redemption for themselves.

In this plurality of shades, thus, charity baths covered a primary role in diffusing a bathing culture.

Muromachi Period (1338-1573)

In the form of devotional baths they assumed the role of combining a cleansing practice with spiritual submission, by having worshippers pray the Buddha from within thermal waters. It is, thus, even more explicit how the Buddhist ideology supported the diffusion of the onsen as a curative practice.

Azuchi-Momoyama Period (1573-1603)

Curative aspects of spring water became the driving force for the success of bathing: following the religious idea of bathing as cure for any illness, a high level of specificity started surrounding different locations.

Edo Period (1603-1868)

The circulation of books on therapeutic benefits of waters, associated with accurate accounting of springs peculiarities, officially rendered bathing a mass phenomenon. This Era was characterized by a division of facilities according to social status:
- Zatto, destined to common people; - Tonosamayu: reserved to higher ranks; - Kagiya: exclusively accessible to shogunate, governors and lords. If the latter had more frequent opportunities to enjoy waters, commoners visited the springs on special yearly occasions for seasonal cures of illnesses and fatigue.
This Era also saw the clear delineation of different types of baths, depending on specific water properties.

Meiji Period (1868-1912)

The diffusion of the boring technology, specific drilling methodology, supported a radical increase in the number of onsen, as well as the evolution of thorough scientific researches on springs.

Showa Period (1926-1989)

The subsequent output was the official scientific recognition of onsen properties by means of medicine and analytic chemistry.

Heisei Period (1989-2019)

It was eventually demonstrated how the therapeutic value of hot springs depends on their geography, rather than the legitimization of religious institutions or those of wealthy individuals. It is in fact the temperature or the mineral composition of water, characteristic of each place, which result in different curative properties. However, the present tendency for visiting hot springs has gradually shifted to refreshment and relaxation, rather than staying bounded to religious or medical purposes. (9)(10)(11)(12)(13)(14)(15)

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Images for “Bathing Typologies in Japan”

Img. 1 - Bathing at an Onsen. Accessed on April 19th 2019, at: www.kiniseko.com/news/uncovering-the-japanese-onsen-tradition#

Img. 2 - Private House Bathroom Layout. Produced from the rielaboration of the image accessed on April 19th 2019, from: M. Bandolin, 2018. Onsen - Japanese bathing culture in the contemporary city, Part II: Japanese bathing culture - Ofuro, p. 210.

Img. 3 - Private House Bathroom Axonometric and Plan View. Produced from the rielaboration of the image accessed on April 19th 2019, from: M. Bandolin, 2018. Onsen - Japanese bathing culture in the contemporary city, Part II: Japanese bathing culture - Ofuro, p. 210.

Img. 4 - Sento Layout. Produced from the rielaboration of the image accessed on April 19th 2019, from: M. Bandolin, 2018. Onsen - Japanese bathing culture in the contemporary city, Part II: Japanese bathing culture - Sento, p. 208.

Img. 5 - Sento Axonometric and Plan View. Produced from the rielaboration of the image accessed on April 19th 2019, from: M. Bandolin, 2018. Onsen - Japanese bathing culture in the contemporary city, Part II: Japanese bathing culture - Sento, p. 208.

Img. 6 - Onna yu (“Bathhouse Women”) by Torii Kiyonaga (1752–1815). Accessed on April 19th 2019, at: www.messynessychic.com/2018/12/06/a-beginners-guide-to-the-bath-houses-of-japan/.

Img. 7 - *Yakuza bath house in 1946*. Accessed on April 19th 2019, at: www.messynessychic.com/2018/12/06/a-beginners-guide-to-the-bath-houses-of-japan/

Img. 8 - Onsen Layout. Produced from the rielaboration of the image accessed on April 19th 2019, from: M. Bandolin, 2018. Onsen - Japanese bathing culture in the contemporary city, Part II: Japanese bathing culture - Onsen, p. 212.

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Img. 1- Dogo Onsen



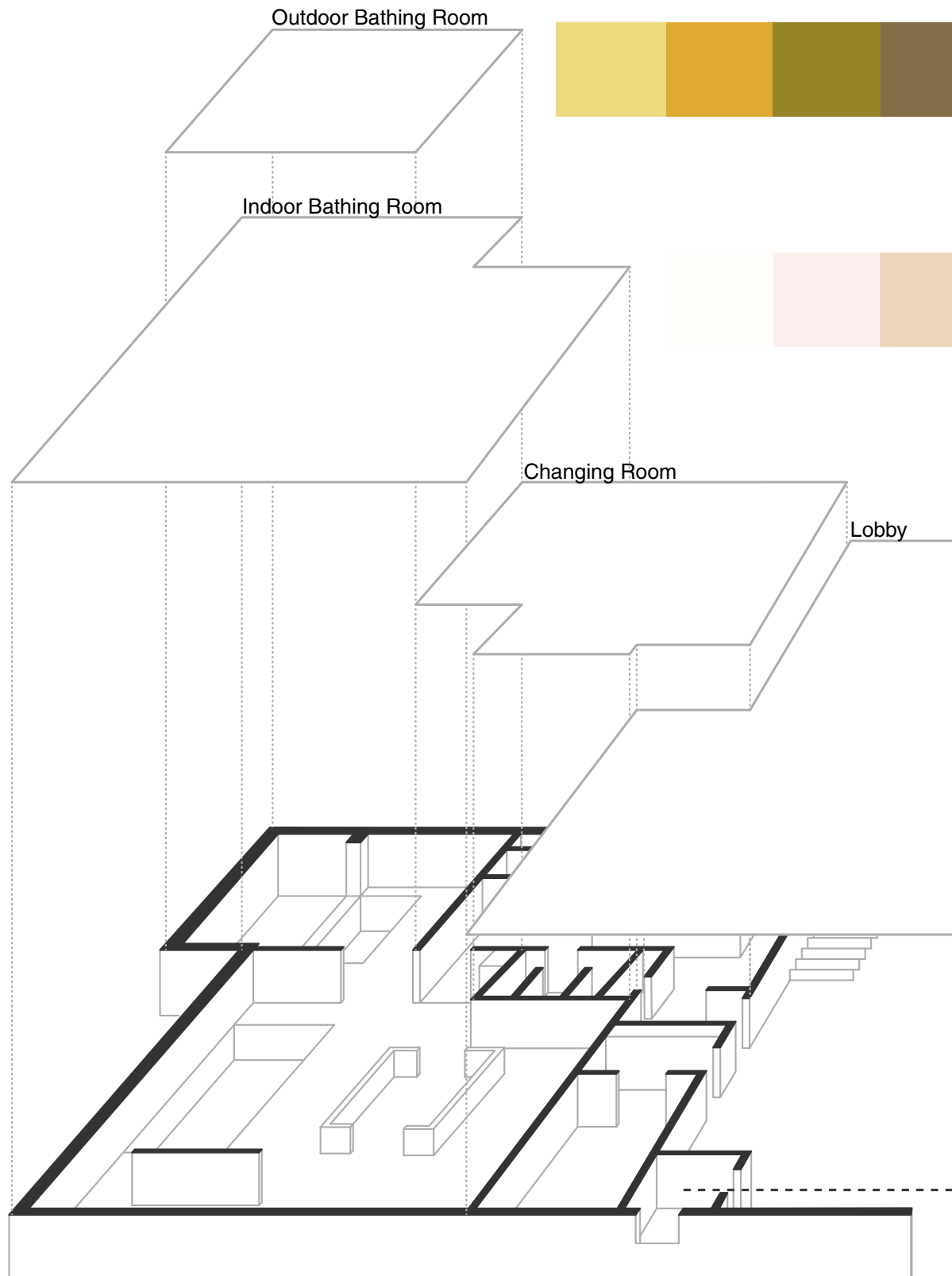
More about Onsen

Overview

Deciding to focus on the onsen typology, it appeared interesting to deepen the understanding on the relation between architecture, natural environment, materials and colours.

As a matter of fact, one of the crucial aspects of onsen is their location, mostly, in uncontaminated natural environments. The erection of these complexes does not usually have excessive impact on the existing ecosystems thanks to the choice of sustainable building materials and to policies of careful management.

Wood, bamboo and stone have been used as preferred materials for centuries and still retain a leading role within the hot spring compartment.

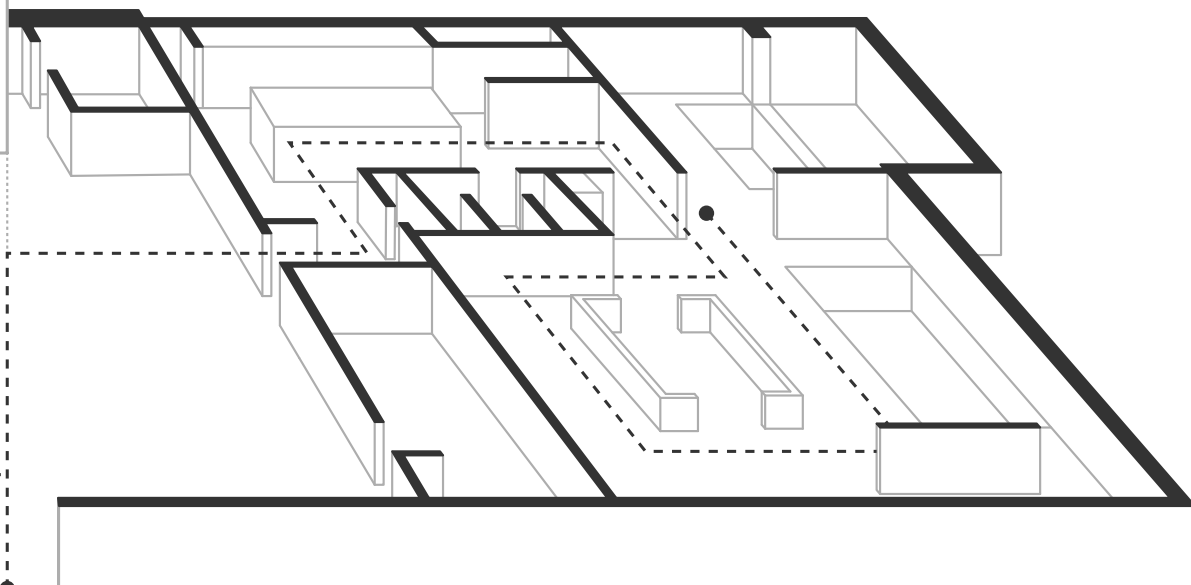
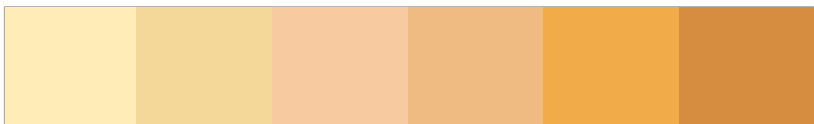




Layout, Movement & Colours



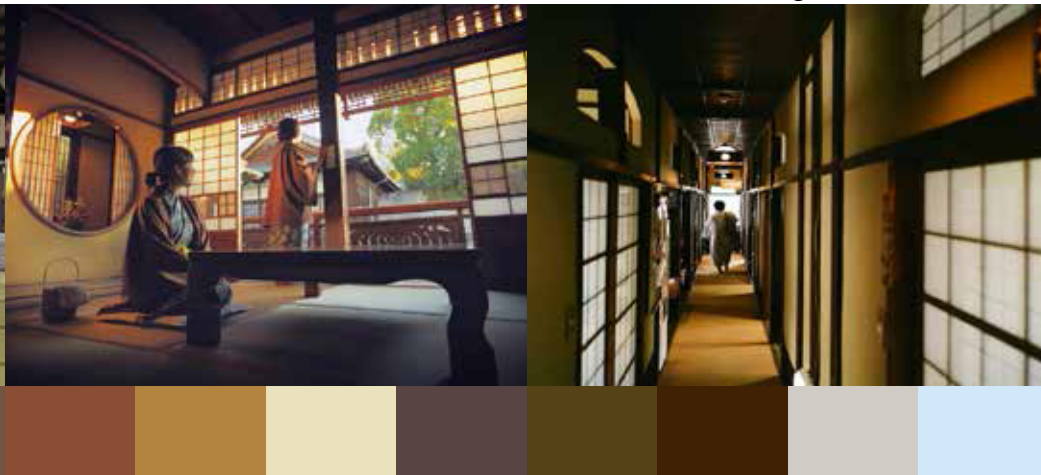
The Example
of Dogo Onsen



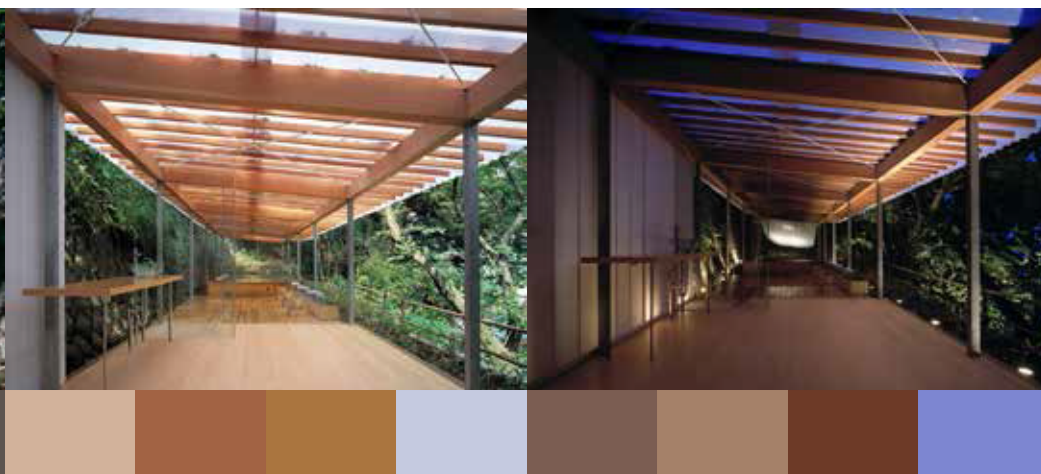
Img. 2 -Axonometric drawing of the Dogo Annex Complex.



Dogo Onsen Honkan



Horai Onsen



Oedo Onsen Monogatari



Img. 3 - Experience, Materials and Colours. Accessed online from:
M. Bandolin, 2018. Onsen - Japanese bathing culture in the contemporary city, Part II:
Japanese bathing culture - Onsen, p. 26.

The Hot Spring Act

Criteria Defining an Onsen as such

From a legal standpoint, the recognition of an onsen as such depends on certain parameters listed by the Hot Spring Act (Act No. 125 of 1948) First enacted at the end of the 40s, it has been revised several times through the years.

1948

According to Chapter 1 – Article 2:

“The term “hot spring” as used in this Act shall mean hot water, mineral water, water vapor and other gases (excluding natural gas composed mainly of hydrocarbons) produced from the ground, which is defined as having a temperature or substance listed in the appended table”.

Which means that, to be an onsen, a facility has to be supplied with water that either gushes at a certain amount of heat or contains at least one of the prescribed minerals.

The minimum level of temperature is set at: 25° Celsius.

The chemical requirements are listed in the adjacent page. (1)

1979

To uniform to the international classification of onsen, the existing nomenclature, based on water's properties, was substituted with one referring to mineral content.

1982

Due to difficulties in diffusing the healing power of the fluid, caused by the highly technical level of the names, it was decided to select more immediate ones for divulgation purposes.

2014

Ten new classes were introduced to describe spring qualities, namely: Simple spring, Carbon Dioxide spring, Chloride spring, Hydrogen Carbonate spring, Sulphate spring, Iron-containing spring, Iodine-containing spring, Sulphur spring, Acid spring and Radioactive spring. (2)(3)

Chemical Substance	Content (in 1 kg)
Dissolved substances (excluding gaseous ones)	Total volume of more than 1,000 mg
Free carbonic acid (CO_2)	Over 250mg
Lithium ion (Li^+)	Over 1mg
Strontium ion (Sr^{2+})	Over 10mg
Barium ion (Ba^{2+})	Over 5mg
Ferro or ferri ions ($\text{Fe}^{2+}, \text{Fe}^{3+}$)	Over 10mg
First manganese ion (Mn^{2+})	Over 10mg
Hydrogen ion (H^+)	Over 1mg
Bromide ion (Br^-)	Over 5mg
Iodide ion (I^-)	Over 1mg
Fluoride ion (F^-)	Over 2mg
Hydrocitrate ion (HAsO_4^{2-})	Over 1.3mg
Metaphosphate (HAsO_2)	Over 1mg
Total sulfur (S) [corresponding to HS^- + $\text{S}_2\text{O}_3^{2-}$ + H_2S]	Over 1mg
Metaboric acid (HBO_2)	Over 5mg
Metasilicic acid (H_2SiO_3)	Over 50mg
Bicarbonate soda (NaHCO_3)	Over 340mg
Radon (Rn)	20 (ten billionths of a Curie* or more)
Radium salt (as Ra)	1/100 million mg or more

【 * Unit of radioactivity, 1 Curie is 37 giga-becquerels 】

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Images for “More about Onsen”

Img. 1 - Dogo Onsen Annex. Accessed online, at: www.dogo.jp/en/asuka.php.

Img. 3 - Experience, Materials and Colours. Accessed online from:
M. Bandolin, 2018. Onsen - Japanese bathing culture in the contemporary city, Part II:
Japanese bathing culture - Onsen, p. 26.

References & Case Study

References & Case Study



Arima Onsen (有馬温泉), Kobe Prefecture

One of The Three

Located in the Kita Ward of Kobe (Hyogo Prefecture), Arima Onsen is one of the oldest and most popular hot spring towns of Japan.

Considered as one of the best three onsen towns in the Country, the village's uniqueness derives from two main factors:

- its thermal waters, as Arima presents Kinsen and two types of Ginsen, respectively golden and silver hot springs, which contain seven of the nine natural components that consent to certify by law the curative effects of onsen. Kinsen waters, rich in iron and salt, obtain the characteristic bronze tonality by getting into contact with air and are particularly suited to treat neuralgia and arthritis.

The Kinsen waters, on the other hand, carbonic and radioactive, are mostly beneficial to circulation, metabolism, immune system and fatigue;

- its location, differently from most of the Japanese springs, far from volcanoes. Arima's springs, in fact, originated from deposited seawater, emerging from a depth of 60km, due to tectonic movements, as it is located on the Arima-Takatsuki tectonic line.

Presenting one major commercial road, the Yumotozaka, Arima hosts two public baths, the Kin no Yu, famous for its golden water and the Gin no Yu, characterized by "silver water", several municipal footbaths (ashiyu) and a multitude of private ryokans. (1)(2)

Destructions and Reconstructions

Documented to trace back to the 7th Century, Arima Onsen became known thanks to various Emperor's and elite member's frequentation. However, it owes its popularity to the efforts of Ninsai, a high monk from Yoshino, who, after Centuries of decay due to natural catastrophe, in 1911 erected a series of twelve Touji Inns, devoted to the guardians of the Buddha. Moreover, having been part of the circulation zone for foreigners after the opening of Kobe Port in 1868, the area started becoming the stage for the development of westernized hotels and vacation lodgings. It is in this perspective that, after the 1923 Kanto Earthquake, the area was reconstructed in an eclectic style.

With the end of WWII a phase of great rise for the town started and brought to the erection of mass-tourism complexes. The epilogue of this period of prosperity, however, came at the end of the 20th Century with the Kobe Earthquake (1991) and the effects of the economic crisis, which had the number of visitors decrease of almost 100 000 people (From 1 920 000 in 1991, to 1 020 000 visitors 1995). (3)



Community Brand Enhancement & Revitalization: Kanai Hironobu's Initiative


In this perspective, the case study of Arima resulted of interest because of the prompt local initiative to contrast the decaying trend and especially for the contribution of a local charismatic figure, Mr. Kanai Hironobu, who led the path for the town's re-birth.

The revitalization process was based on several cardinal points:

- opposition of the failing trend of large-scale inns, often prioritizing quantity over quality, by reducing the number of rooms, to favour comfort and attention to details, while preserving the Japanese historical wooden structure and adapting facilities to Western standards;
- increasing attention to the needs of Japanese and foreign tourists, by considering transportations to Arima, delayed check-in times, employment of English-fluent or foreign staff, provision of diversified attractive poles;
- cooperation at municipal level;
- attention to environment and recycling.

Img. 1- Private House Bathrooms Axonometry and Plan View





Tocen Goshoboh, literally Imperial Palace Temple Lodge, consists in one of the most prominent inns of Arima Onsen. Said to trace back to the 12th Century, in the form of a temple lodging (suffix “bo”), it is considered to have been given the title of “Imperial Palace” (“Gosho”) after the visit of a Samurai Lord in the 14th Century and it has been hosting prominent figures throughout its entire life.

Owned by Mr. Hironobu since the 1980s, it underwent radical renovations that contrasted the mass-travel trends and preserved a traditional Japanese appearance, while blending it with an overall Westernization of the guest rooms, reduced to twenty, to improve the users’ experience. This Eclectic blending found its origin in the influence of foreign residents after the Meiji Restoration and has been the distinctive trait of the inn ever since. (4)(5)

However, after the 1991 Kobe Earthquake, the facility, along with all the other business of Arima faced a critical phase of decay. It is in this respect that Kanai’s initiatives were particularly relevant.

Concerning Tocen Goshoboh

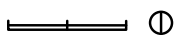
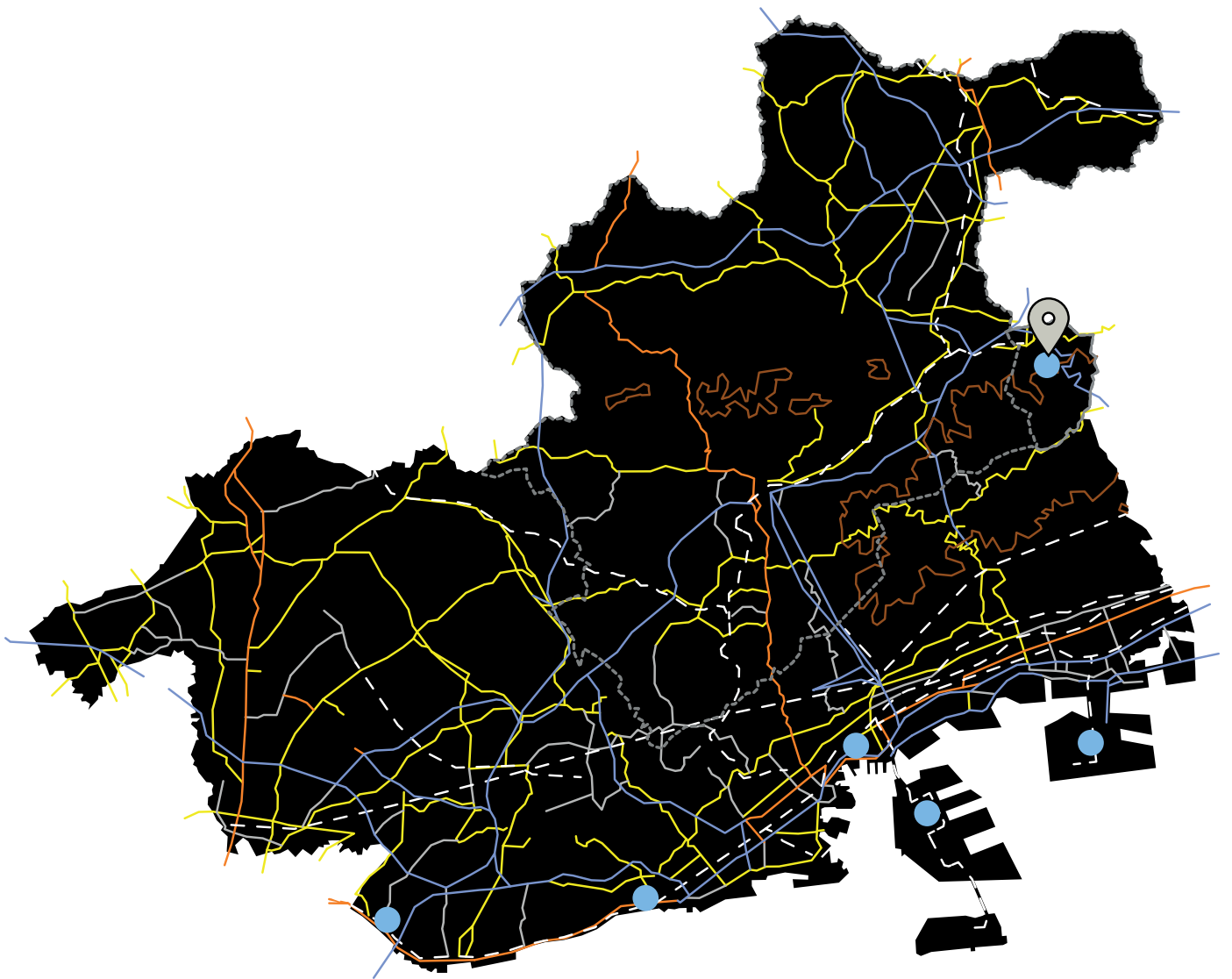
- the introduction of diverse staying plans, adapted to festivals and different customers’ needs, providing alternatives to the traditional Japanese etiquette of Onsen Ryokan full stay combination (room, spa and meals). One of these solutions was the flexible “stay only” formula, which, excluding meals from the package, consented to reduce prices of overnight staying, meanwhile encouraging visitors to enjoy other local dining facilities, to revive Arima’s commercial street;
- the promotion of recycling and composting, consented the facility to provide fertilizers for the fields of the Green Dad Agriculture Corporation, resulting in local high-quality products, while obtaining biodiesel from the cooking oil discharges of the inn.

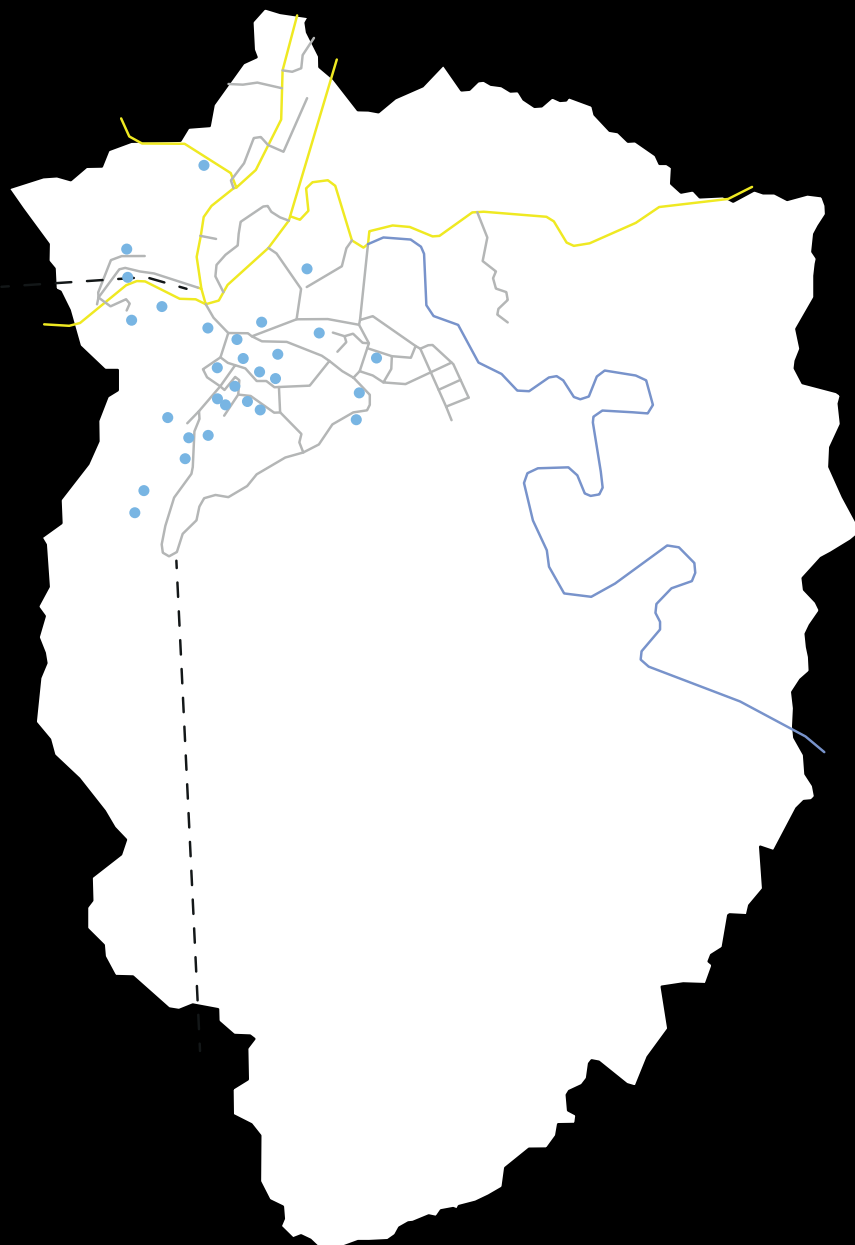


Img. 1- Private House Bathrooms Axonometry and Plan View

Regarding the Entire Community

- the establishment of the Arima-Cho Revitalization Committee, promoting the re-vitalization of the two local public baths, by encouraging the diffusion of hot spring bath and lunch one-day coupons; thus, having a positive impact also on local shops;
- the foundation of the Arima Hot Springs Tourism Association, which encouraged: the on-site and digital diffusion of information, through the Arima Onsen Tourism Information Centre, the set-up of signs and the launching of the “Visit Arima Onsen” website (2016), offering information on the local hot springs, surrounding touristic attractions, events and making it possible to reserve local accommodations;
- the cooperation with international hot springs towns, for the diffusion of ideas on resilience;
- the creation of a community branding image, by adopting two of the Enbound Inc.’s “Onsen Musume” or “Hot Spring Girls” characters, invented to promote tourism, hot spring and anime industry during and after the 2020 Tokyo Olympic Games;
- the cooperation for the creation of the Arima 8 Assistant Shopping (1999), joint-stock company, which gathered 400 000 yen to re-open local dining facilities and generate employment;
- the support to the Arima Onsen Ryokan Cooperative Society, responsible for the institution of the “Arima Loop Bus” service (2001), aimed at reducing car traffic;
- the revival of the town’s craftsmanship, by founding, in cooperation with NPOs and other mecenate, the Arima Toy Museum (2003) and the Gallery Retiro d’Oro (1997), incrementing the Town’s appeal, by inviting artists and crafters to exhibit their pieces of art. (6)(7)(8)(9)





Achievements

The efforts taken by the local population have shown a rapid recovery in popularity, which resulted in a rise to 1 310 000 visitors in 2002.

On the other hand, in 2007, it was taken as one of the exemplar case studies for the stimulation of tourism and overnight staying, by the Japan Tourism Agency for the redaction of White Paper on Tourism.

Eventually, according to the “32nd Japan’s Hot 100”, ranking system based on the votes of tourism sector employees, in 2018, Arima Onsen has been ranked as the 6th Japanese Onsen Town, thanks to its two typologies of water and its long-standing history.

It can be thus said that Arima onsen has fully reclaimed a leading position within the thermal tourism industry. Further developments are however expected in the years to come, as continuous actions of renovation and commercialization are taking place, as the Onsen Musume Characters adoption seems to testify. (10)

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Beppu Onsen (別府温泉), Oita Prefecture

A unique amount of thermal water

Located on the North-East portion of Kyushu Island, in the Oita Prefecture, Beppu stands on a alluvial fan bordered by Yufu and Tsurumi Mountains on one side and the sea on the other. (1) Its uniqueness derives from the 2 849 springs present on its 125.1 km² territory, which have granted it a world record, from which sprout 1 142 328.32 barrels of water per day, making it second only to the Yellowstone National Park and first in Japan. (2) As springs seem to gather predominantly around specific poles, there exist eight zones, namely Hamawaki, Beppu, Kankaiji, Horita, Myoban, Kannawa, Shibaseki and Kamegawa, identified with the name Beppu Hatto (Eight Major Hot Spring Areas of Beppu), each unique unto itself. Of the eleven typologies of hot springs recognized by the Hot Spring Law, Beppu hosts 10, greatly differing in terms of water content due to their scattered ubication. (3)

The Seven Hells

The City's popularity is also consecrated by the seven Jigoku, literally Hell, fuming gas expulsions, bubbling muds and steaming hot water, which reach such elevated temperatures to be only admirable.

The act of visiting of all of them in one time is called Jigoku-meguri, Hell Tour and goes through (4):

- Oniishibozu-Jigoku: resembling the bold head of Buddhist Monk, from which comes its name, is the gray boiling thermal mud; (5)
- Umi-Jigoku: nicknamed the King of Hells or Sea Hell, it is characterized by cobalt blue waters at 98° C; (6)
- Kamado-Jigoku: is known as Cooking Pot Hell, due to a myth recounting the employment of its 90° C fumaroles to cook rice offerings; (7)
- Shiraike-Jigoku: the White Pond Hell presents a temperature of 95° C and in its surroundings tropical fishes are hosted; (8)
- Oniyama-Jigoku: deriving its name from the district it stands in, it is also called Crocodile Hell, as it is home to around 100 of these animals; its waters present a temperature of 98° C; (9)
- Tatsumaki-Jigoku: is a geyser, whose sprouting, happening at shorter intervals than others worldwide, is so strong to require top vertical protection; it is recognized as natural monument by the Municipality; (10)
- Chinoike-Jigoku: translated as Bloody Hell Pond, it presents a reddish tonality and a temperature of 78° C. Its muds are used to make products for skin diseases and are sold in the area. (11)(12)

Rieses & Falls in Popularity

With records dating back to the 8th Century, in the Kamakura Period Beppu became the setting for sanatoriums for the treatment of wounded samurai and in the Edo Period it was fully recognized as a successful spring area.

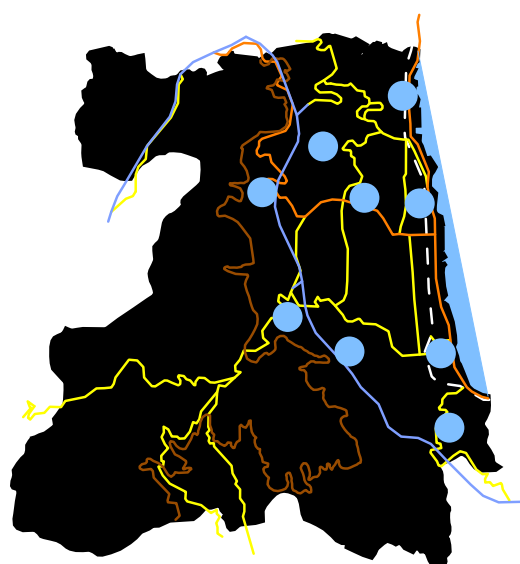
At the end of the 1880s, with the introduction of the Kazusa-bori technique, consisting in the creation of wells by means of an iron pipe, a scaffolding and one bamboo spring, to make the underground water gush naturally, the basis for the City to reach its primate in pits number had officially been laid. (13)(14) With the advent of the 20th Century, the drilling had produced around a thousand wells. After a phase of deceleration in between the 20s and the 40s, however, the 60s and 70s, were the theatre of the greatest boom, resulting in more than 2 300 shafts. These actions, highly supported by the Government, were combined with diffused infrastructural projects, along with renovations of existing touristic attractions and the erection of disproportioned staying facilities. If the initial results were excellent, they did not last long due to the end of the economic boom and Beppu saw a decline in popularity, which regained relative stability exclusively in the 90s. In the meanwhile, the sector experienced changes in touristic trends as: the increase of daily visits, the proportional decrease of overnight stays and the critical reduction in group travels, as school and company trips. All these phenomena provoked: a general crisis of the hotel industry, due to the inability of adapting to market changes; a fall back in major tourists destinations' attractiveness, due to the inability of keeping up with modern styles; a widespread crisis of the thermal sector, product of an overabundant offer for an ever-shrinking demand; but also a crisis of the downtown area, as staying facilities started providing all sorts of comforts and activities, to attract more clients. (15)

Despite continuous swings in tourism flow, also provoked by national socio-political factors, it has to be noted that Beppu still represents one of the major onsen towns.



Img. 1- Private House Bathrooms Axonometry and Plan View





References for “Beppu Onsen”

(1)



Ikaho Onsen (伊香保温泉), Gunma Prefecture

The City around 365 Steps

Standing on the slopes of Mount Haruna, Ikaho Onsen, belonging to the Municipality of Shibukawa, is the second hot spring centre in Gunma Prefecture after Kusatsu.

Peculiar to this location is its spatial development around a majestic stone staircase: built around four hundred years ago and initially presenting 315 steps, which became 365 only in 2010, in fact, it is flanked by game arcades, restaurants, souvenir shops and it is interspersed by foot baths or fountains. With two public baths, Ishidan no Yu and Ikaho Rotemburo, but also a multitude of ryokans, the town presents two typologies of hot springs: Kogane no Yu, golden water, characterized by an elevated quantity of oxidized iron and thus beneficial for open wounds; Shirogane no Yu, silver water, discovered only in recent times and mostly used to relieve fatigue. Moreover, Ikaho is considered as the mother land of manju, buns steamed in thermal waters and usually filled in red beans paste. (1)(2)(3)(4)(5)

Various Phases of Planning ended in crisis

With legends having its origins date back to the Nara Period (710-794 AD), Ikaho is considered as the first example of onsen town resort whose spatial development was planned, to exploit the sloping topography to the fullest. As a matter of fact, it was first, moved from its originary location, Yumoto, to the present one and thus, in 1576, provided with the 315 steps staircase, which became the main axis, on the sides of which the village evolved for a second time.

The peak of popularity was reached during the Edo Period (1603-1868), with several personalities of the time visiting and it had such an echo to render necessary the merging of the main village with the neighbouring ones of Yunakako and Mizusawa (1889), to form the town of Ikaho. As the post-war years consisted in another great phase of expansion, the necessity to control development became evident: a new spring town was planned, on the eastern portion, in addition to the old town one and was envisioned to host investments from privates.

However, the result was a disproportionate erection of large-scale ryokans, which required the introduction of the Oiikaho Plan, entrusting ryokan management permissions by lottery.

Another relevant consequence was the progressive suburban relocation, which brought uncontrolled expansion and variegated townscape image.

With the bursting of the economic bubble, in the 90s, progressive decline in visitor rates and consequent abandonment of facilities became unavoidable, resulting in deterioration of buildings, roads and overall urban environment.

The situation, in recent years, was worsened by water shortages. (6)(7)



The Creation of a New Image: Landscape Study and Collective Action

What is interesting about the Ikaho case study are not the results that have been obtained, as the long-term plans implemented are supposed to officially deliver their first outcomes by 2025, but the thorough analysis undergone to understand the major criticalities and strengths, along with possible solutions, in order to produce an overall change of image.

Major Criticalities

Considering the condition of this Onsen Town, the greatest problems appeared to be:

- a still limited number of day trips and overnight stays, product of a sectorial crisis and water shortages, as compared to the town's glorious past;
- general lack of adaptation to market changes: with the merging of the town to Shibukawa City (2006) and the consequent increase in citizens, the existing facilities resulted inadequate for their needs, being mostly destined to host tourists;
- necessity to re-acquire reliability as a whole, due to the poor supply of water characterizing some ryokans (2004);
- negative image of the major tourists attractions (as the 365 stone steps), caused by insufficient works of maintenance and a diffused decline of surrounding commercial activities;
- missing cohesion between the hot spring core and the ryokan development area, combined with absent onsen town atmosphere;
- limited sense of hospitality, both in terms of infrastructures, such as tourists signs, benches and parking lots, as well as operators' attitude.

Img. 1- Private House Bathrooms Axonometry and Plan View



**Target Image**

In this perspective, through the joint efforts of Municipality, the Shibukawa Ikaho Onsen Association and several other public, as well as private entities, a target image was formulated, stressing on the following aspects:

- Ikaho as a reliable Hot Spring Town, offering two typologies of water, several up to date inns and a cohesive space, in harmony with the natural environment;
- Ikaho as an Onsen Town for detaching from the frenetic life of cities, through natural sceneries and a peaceful habitat;
- Ikaho as a lively Thermal Centre, proposing modern events and activities, while promoting and cherishing its historical background. (8)

Img. 1- Private House Bathrooms Axonometry and Plan View

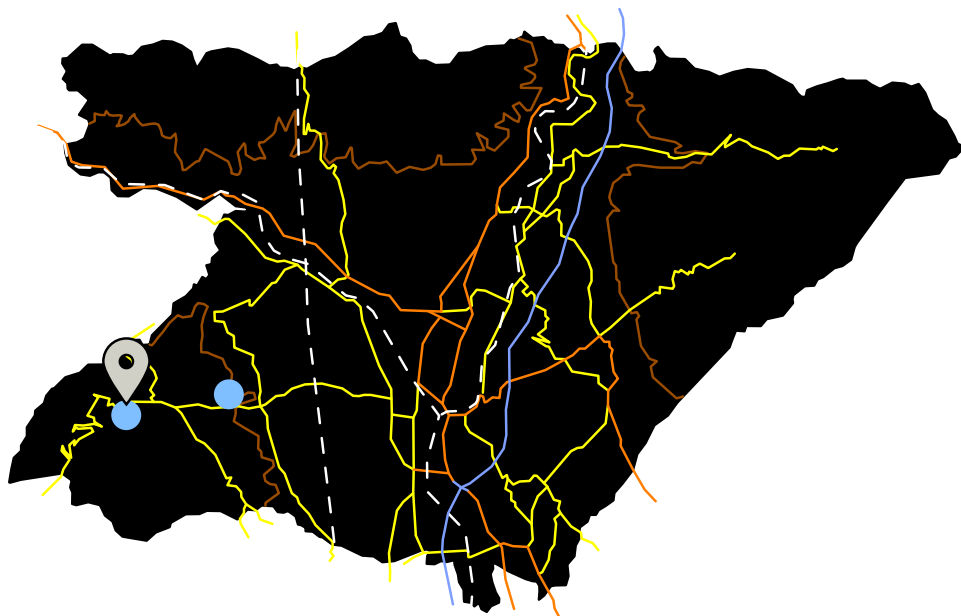


Measures Needed for Renewal

Considering the creation of a fresh scenery, the needed measures resulted:

a) To compensate with major weaknesses of the onsen area, as simplicity of visitability:

- Improvement of parking spaces, public transportation and roads;
- Diffused and frequent actions of cleaning, maintenance and management of public facilities;
- Renovation of signs boards;



b) To ensure safety:

- Formulation and diffusion of tourists information;
- Revision of crossings and intersections;

c) To rebuild the atmosphere characteristic of an Onsen Town:

- Insurance of sufficient supply of thermal water;
- Enhancement of the town's hot spring culture and valorisation of public bathing;
- Creation of harmony between water, landscape and surrounding environment;
- Provision of itineraries and complementary programmes;

d) To monitor nature:

- Maintenance of green spaces;
- Reorganization of the watersides;

e) Promotion of uniqueness and attractiveness:

- Design of street furniture;
- Establishment of landscape regulations on private and public architectures, as the promotion of Japanese style for the central area and of Taisho Roman for the more recent development;
- Study of views on the landscape;
- Renovation of major pedestrian paths;
- Sensibilization towards hospitality.

Set as a crucial component for the successful application of these actions, the cooperation between public and private sector prescribed specific roles for the various entities:

- Residents were asked promote cleanliness and respect the proposed norms on uniformity of the built environment;
- Business managers were encouraged to support the creation of a new image by aiming at cooperation, rather than competition;
- The Administration was required to facilitate interaction among the various responsible and provide economic support.

On the other hand, the Ikaho Onsen Tourism Association, composed by representatives of the above mentioned, set itself for the encouragement of regional cooperation and the promotion of events, organizing, among the other activities, several festivals every year.

(9)(10)(11)

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Kusatsu Onsen (草津温泉), Gunma Prefecture

The Second in Japan

Located in the Gunma Prefecture, while being easily accessible from Tokyo, Kusatsu is one of the three major hot spring towns in the Country. Its popularity mostly originates from the amount of spring water discharged naturally, with a daily peak of 230 000 barrels (1), rivalled only by Beppu Hot Spring. Sprouting from Mount Shirane, an active volcano, the fluid presents high acidity (pH 2.1) and includes a variety of six components, namely sulphur, iron, alum, aluminium sulphate, chloride and arsenic, conferring it a yellowish tonality and making it particularly suited to healing arthritis, diabetes, fatigue and blood pressure. Moreover, the City is the setting for two unique bathing methodologies, dating back to the Edo Period: the yumomi, water beating, warm-up action, consisting in the stirring of the fluid with wooden planks, to lower its temperature and the jikanyu, timed bathing, process of pouring several buckets of hot water onto oneself before soaking into the bath, up to the neck, for three minutes. Kusatsu's main attraction is the Yubatake, hot water field, representing the Town's largest spring, lined with wooden sluices, aimed at thermally moderating and purifying the spring waters before distribution. It is surrounded by a foot bath and by the Netsu-no-yu, a facility hosting live reproductions of the timed bathing technique. Around its main commercial road, Sai-no-Kawara, the City presents six municipal facilities and hundreds of private ones. (2) (3) (4)

A Worldwide Famous Locality

Although the first documented evidences of the existence of Kusatsu date back to the 12th Century, it is believed of having been originated earlier as a prosperous onsen town. During the Edo Period, it reached outstanding levels of popularity thanks to its role as samurai's preferred location for healing.

However, it was only in the 19th Century that the City became known worldwide for its waters' therapeutic properties and the quality of its environment, through the studies of Dr. Erwin von Baelz.

These events have turned it into one of the most characteristic thermal towns of Japan. (5) (6) (7)

Yet, in its recent history, due to heavy eruptions on the Motoshirane Peak, dating January 23rd 2018, the Town has experienced massive cancelling of bookings (5 499, corresponding to 20275 visitors), which resulted in the loss of 280 million yen of expected revenues.

Despite re-assurances on the renewed stabilization and the efforts being made to increase the Locality's safety, visitors seem to be too afraid to return. (8)



Aiming at Greater Value for Tourists

This case study was selected because of the several levels of intervention that have been considered, in the last decades, both to enhance existing local resources and to rise the rates of tourism.

Among them, the most beneficial have resulted to be:

- Punctual architectural interventions in the Yubatake District: restoration, in traditional style, of the former Gozanoyu Bathhouse; transformation of the Yuji Hiroba into a multi-purpose gathering space, suitable also for events; renovation of Atsunoyu and its entertaining role;
- Kusatsu Yubatake Illumination, first held from 2008 to 2016 during winter time, consisted in the design of lighting effects around the Town's main attraction. Thirty lamps, in Japanese style, used to be set, so as to enhance the beauty of the open space by means of LEDs. Since 2018, a new initiative, called Yubatake Tree and Illumination, similar in nature to the previous one, started to be organized on the Toji Plaza. (9) (10)

Img. 1- Private House Bathrooms Axonometry and Plan View



- Redaction of district townscape development agreements, regulating over: the preservation of a traditional Japanese appearance, of greenery, of existing landscape assets, as well as the necessity to employ materials with natural appearance and uniform colours; (11)
- Development of the hot spring branding strategy by means of the “spring quality principle”, which consists in taking care of the water sources and in educating all residents to live in symbiosis with tourists from all over the world, without discriminations;
- Promotion of a multitude of events for the valorisation of seasonal environmental phenomena, as to entertain domestic and foreign visitors throughout the year;
- Provision of touristic information not only on the town’s facilities, but also on neighbouring centres, to encourage regional exploration. (12)

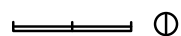


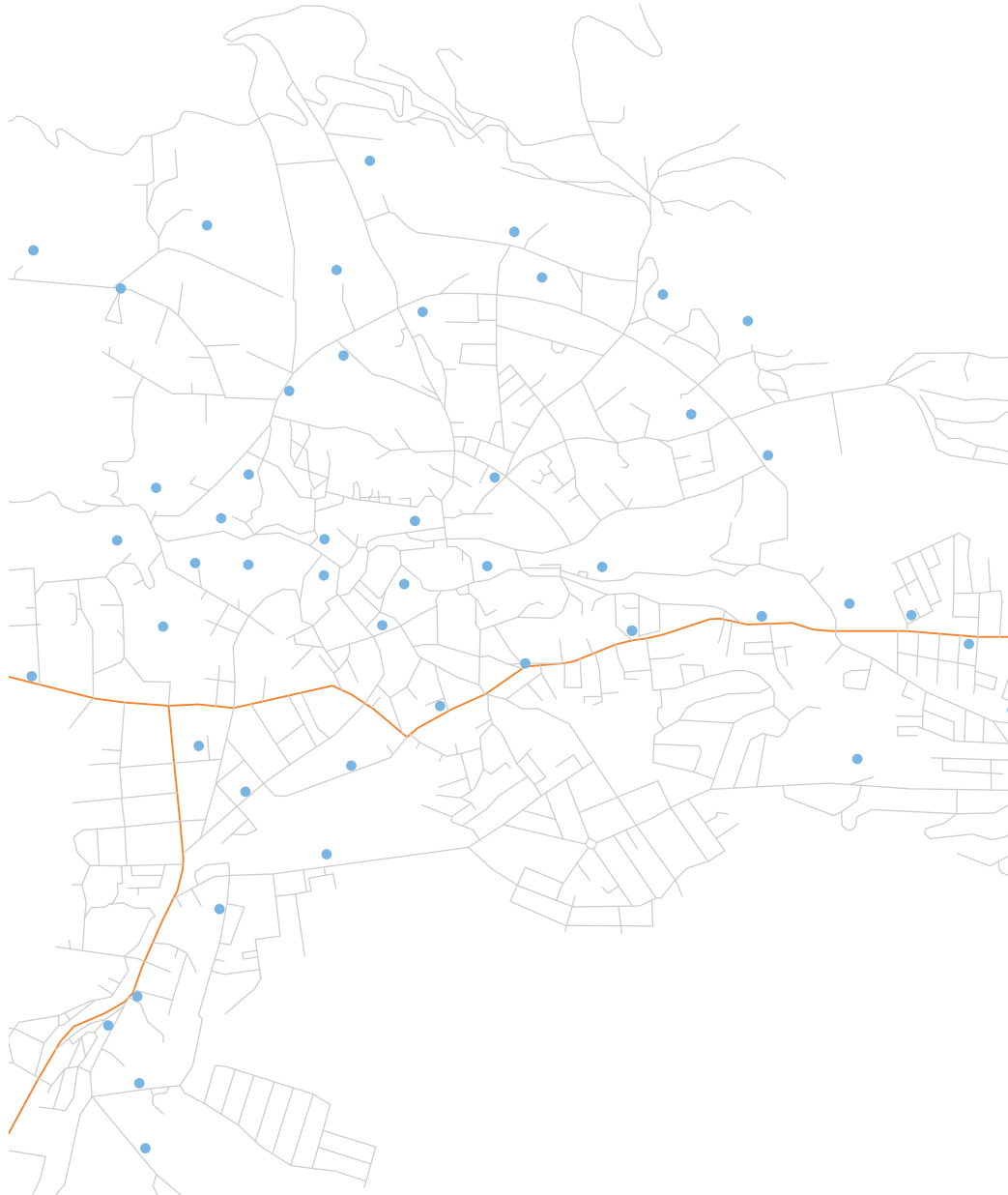
Recognitions of Quality

According to the 100 Best Hot Springs in Japan's ranking system, executed by professionals of the sector, Kusatsu Onsen has been holding the title of best Hot Spring Town in the last sixteen years. Moreover, it was selected for the addition to the Onsen Hall of Fame (Information accessed at: www.kusatsu-onsen.ne.jp/guide/en).

Img. 1- Private House Bathrooms Axonometry and Plan View







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Saijo (西条市), Ehime Prefecture

The “Capital of Water”

Saijo, located in the Ehime Prefecture, is the product of the unification, in 2004, of the municipalities of Old Saijo, Toyo, Komatsu, and Tanbara.

The Older eastern portion of the City used to be called the “Capital of Water”, due to the extensive amount of water spurting from a 20 to 50 m shallow aquifer, through the uchinuki, artesian wells. The latter are based on the usage of a 15 to 30 m long metal pipe, combined with a compressor air hammer, to reach the reservoir and drive up the water; while, at ground level, a hollow bamboo piece allows the fluid to gush out. Emerging from around 2000 of these establishments, this cold water is used by both private residents, industries and tourists, as it has become particularly well known as one of Japan’s 100 best water sources.

The quality of this primary good is certified by the fact that local residents enjoy it without any need for disinfection practices.

(1)(2)(3)(4)

Groundwater Flow

In order to fully understand how uchinuki work, the scheme following this text represents the cross section of a shallow aquifer.

The latter consists in an underground strata of water bearing rocks, located at a reduced distance from the ground, which are sandwiched between two layers of less porous ones, responsible for the confinement of a certain level of pressure. Thanks to this intrinsic force, the simple insertion of the pipe described in the previous paragraph allows water to gush naturally, without the need of pumps; thus, the name artesian well. (5)

Img. 1- Private House Bathrooms Axonometry and Plan View



Envisioned Water Shortages

This water reservoir has not only been crucial for the survival of the population, but also as foundation for a reclamation project (400 years old) and for the water desalination of fields. Thus, having the aquifer been extensively exploited, the local population has started to be afraid of the remaining level of the resource and of its level of pollution. Since the 50s several tests have been conducted on the source and around 2010 scientific projects have been established to understand the effective underground flow.

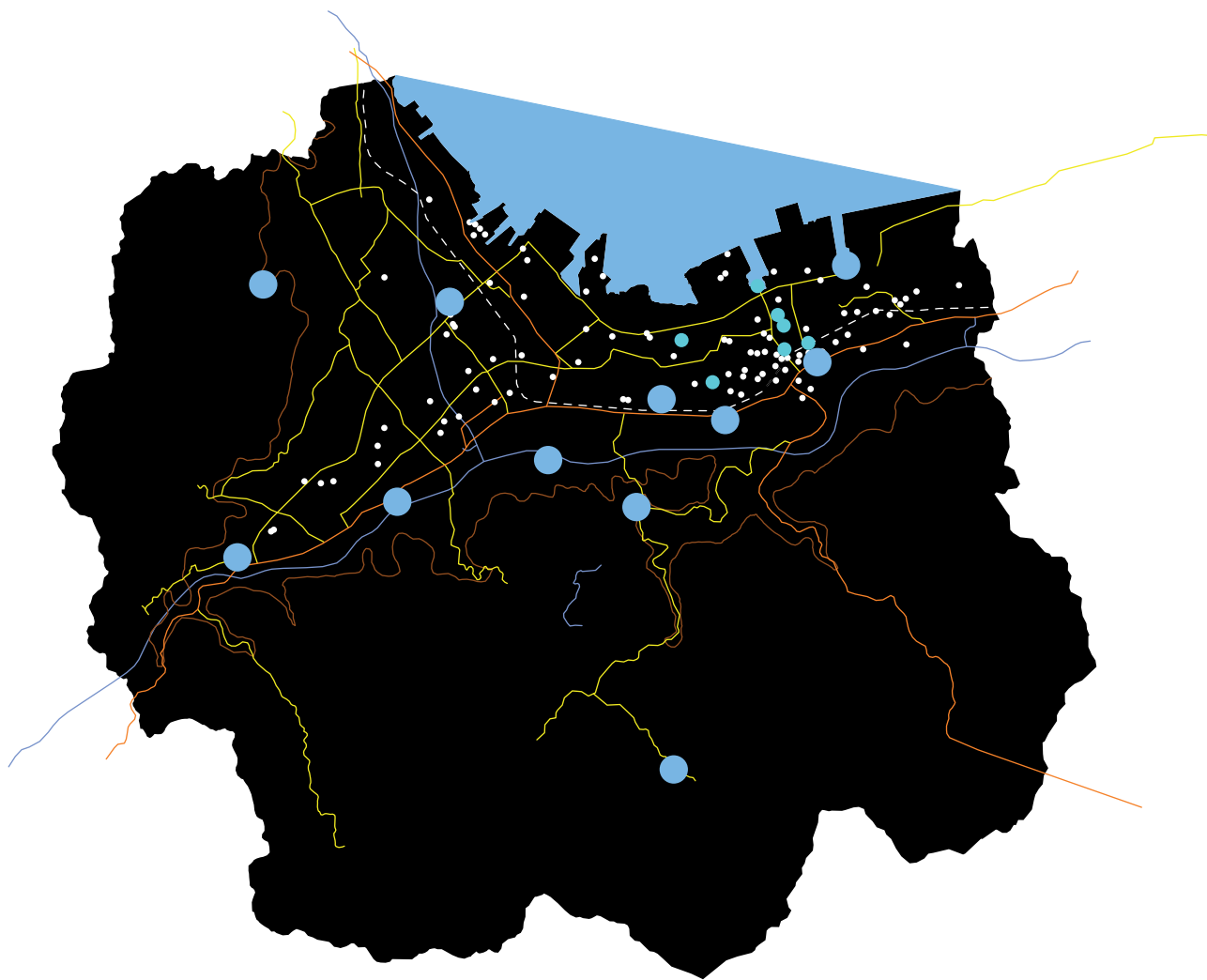
The Municipality has ever since tried to encourage local development on the base on the water reserves and has tried to safeguard them by establishing a number of policies, among which:

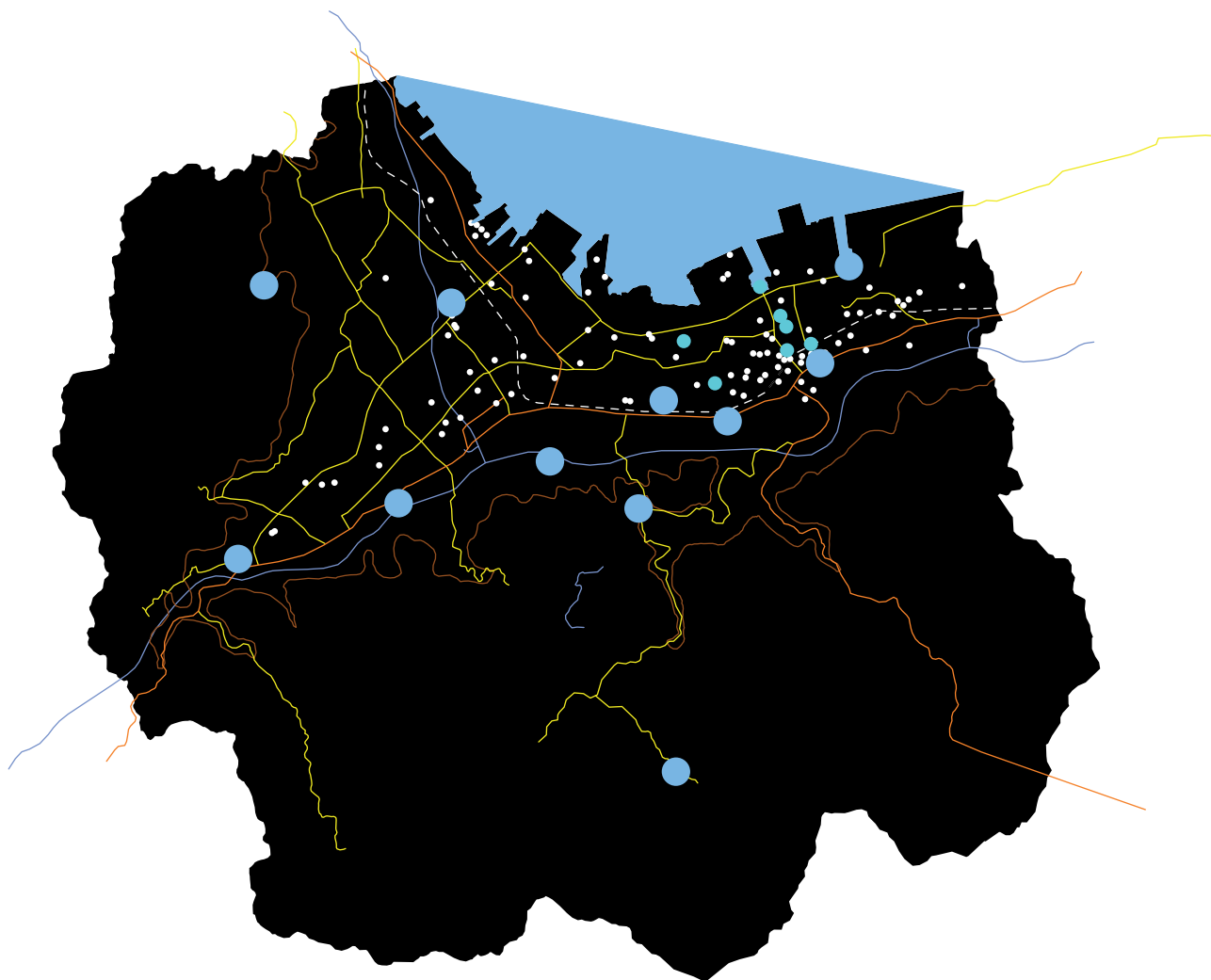
- local utilization of the water and prohibition to sell it;
- inaccessibility of groundwater collection areas to Companies that do not primarily rely on it;
- establishment of water stations to compensate shortages of agricultural water.

The guiding principle relies on the idea of “full citizens ownership”, rather than on that of “sharing”, which implies interaction and obligations among residents. This concept is quite unique to Japan, as, in general, groundwater is considered as a land dependant property and thus, as a private good. It is in this perspective that scientific studies are crucial, as they are necessary for making the population understand the importance of jointly preserving natural resources in a sustainable manner. (6)

Img. 1- Private House Bathrooms Axonometry and Plan View







Aquatopia and Aqua Route to Revive the Sector

From an architectural perspective, water in Saijo is mostly accessible through:

- Uchinuki, which, mostly privatized, are still present, in limited numbers, as public drinking fountains;
- Onsen, both private and municipal, usually providing accommodation as well. It has to be noted that, of the twelve detected establishments, two resulted closed at the time of examination (April 2019).

Through several measures of recognition of the City's water quality, projects have been implemented to preserve the public fruition of this high-quality fluid. If the Ministry of Environment's recognition as one of Japan's 100 Famous Waters, in 1985, consisted in the starting point for the rise in popularity of the City; the Ministry of Land, Infrastructure, Transport and Tourism's selection as the 19th Water Town (Aquatopia), in 1995, represented the major input for the recognition and beginning of actual projects at municipal level. (7)

Img. 1- Private House Bathrooms Axonometry and Plan View



Aquatopia (Water+Utopia)

Literally represents the aim of transforming Saijo and the other selected cities into ideal city of water, thus Centres re-establishing a harmony between daily life, water and nature. In this perspective, it is divided in five water zones:

- the *Spring Water Zone*, ideal starting point in proximity of the station, which is characterized by the Kannon Water Fountain, the Aquatopia Water Fountain (a mountain like triangular fountain, representing the symbol of the project) and a wooden uchinuki; (8)
- the *Running Water Zone*, characterized by streaming water flanked with a stone walking path, enriched with flower trees, which make it the ideal habitat for firefly. From this fact, the monument it presents is called Firefly Fountain; (9)
- the *Yusui Zone*, representing the widest one and the most suitable to admire the communion between water and agricultural fields; (10)
- the *Scenic Water Zone* (Jingshui Zone), leading towards the main road, is a paved walkway flanking the water basin; (11)
- the *Quiet Water Zone* (Shizume Zone), peculiar for its protection of the water of the remains of the historical moat, from the contamination with salty one. This portion is the site for more springs and museums. (12)

Img. 1- Private House Bathrooms Axonometry and Plan View



Aqua Route

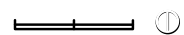
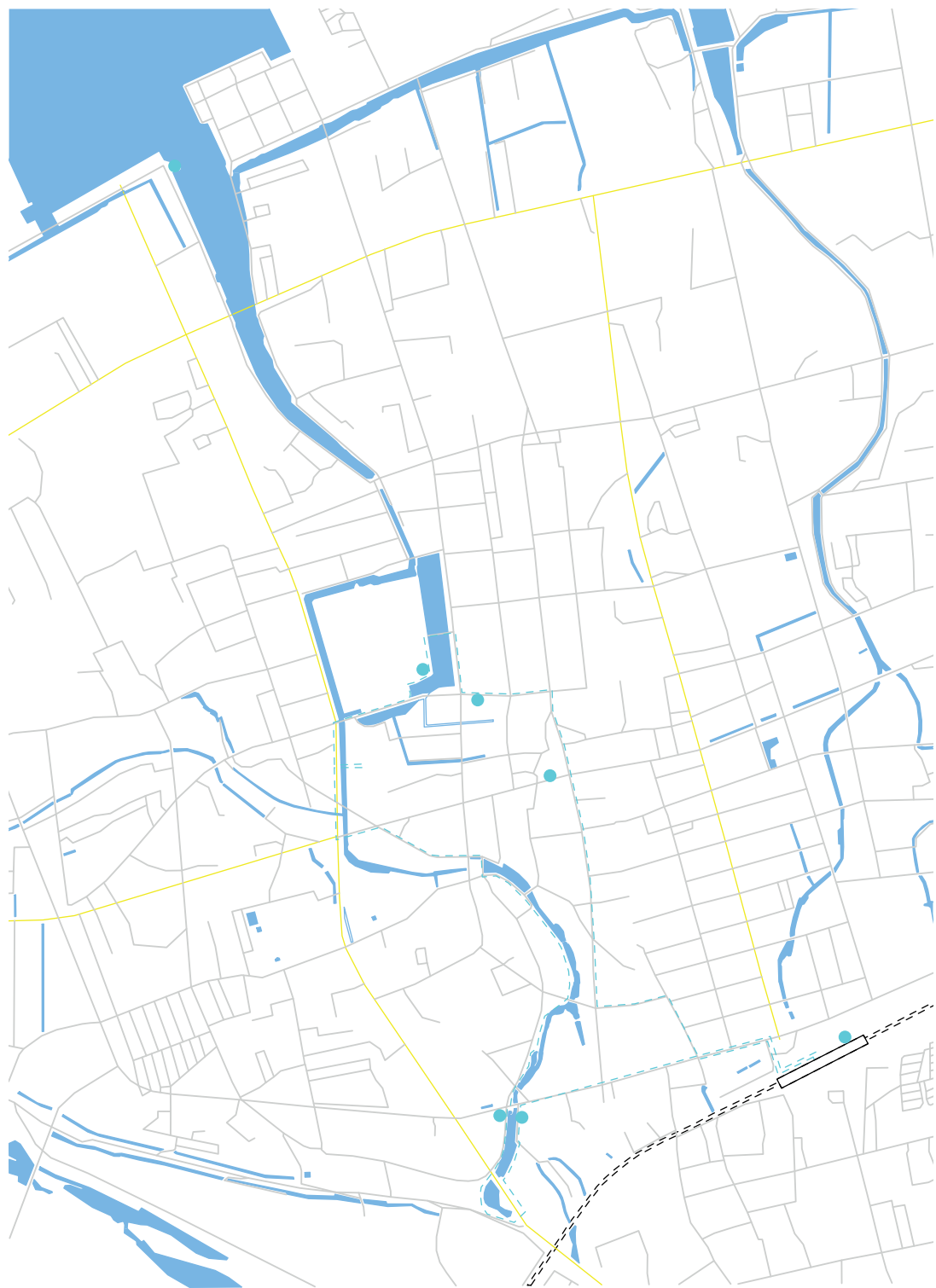
To facilitate the circulation around the different attractive poles in this portion of the City, the Aqua Route (Shin Shikoku Michi) was officialised by the Ministry in 2002. This 7km infrastructural project consists in a raised wooden and stone walking route, which beginning from an ideal starting point in proximity of the Iyo-Saijo Railway Station leads around thirteen stops, aiming at the discovery of scattered uchinuki and at the appreciation of the beautiful landscape. The furthest attraction point is represented by the Kobosui, fresh-water spring, located at the extremity of Saijo Harbour and surrounded by a little shrine. (13)(14)(15)

The Saijo Sightseeing Association organizes tours around it (Saijo Uchinuki Famous Water Tours), thus strongly contributing to its appreciation by all kinds of tourists. (16)

A new uchinuki was inaugurated in 2017, along this path, demonstrating how the trend towards improvement has yet to come to an alt. (17)

Img. 1- Private House Bathrooms Axonometry and Plan View





The Destructive Force of Typhoons

In its recent history (Summer to Autumn 2004) Saijo has been under the action of 6 typhoons (n. 4, 6, 10, 11, 21 and 23), of which the devastating action of number 21 (September 2004) hit records of concentrated rain and caused avalanches of rocks, earth and driftwood in the mountainous area, resulting in overflowing and flooding of houses in the plain area, with an overall loss of 14 human lives.

As a consequence of these saddening events, community disaster education and mountain watching were proposed, in the form of associations for both adults and children, to promote awareness and thus risk reduction. (18)(19)

However, the progressive abandonment of the City, also on the base of the envisioned water shortages, mentioned before, has been an evident phenomena.

in this perspective, the Itomachi Project, located in proximity of the Aqua Route and assigned to Kengo Kuma & Associates, which will be introduced briefly in the following section, represents an interesting strategy for the repopulation of abandoned areas as a consequence of natural disasters.

Img. 1- Private House Bathrooms Axonometry and Plan View



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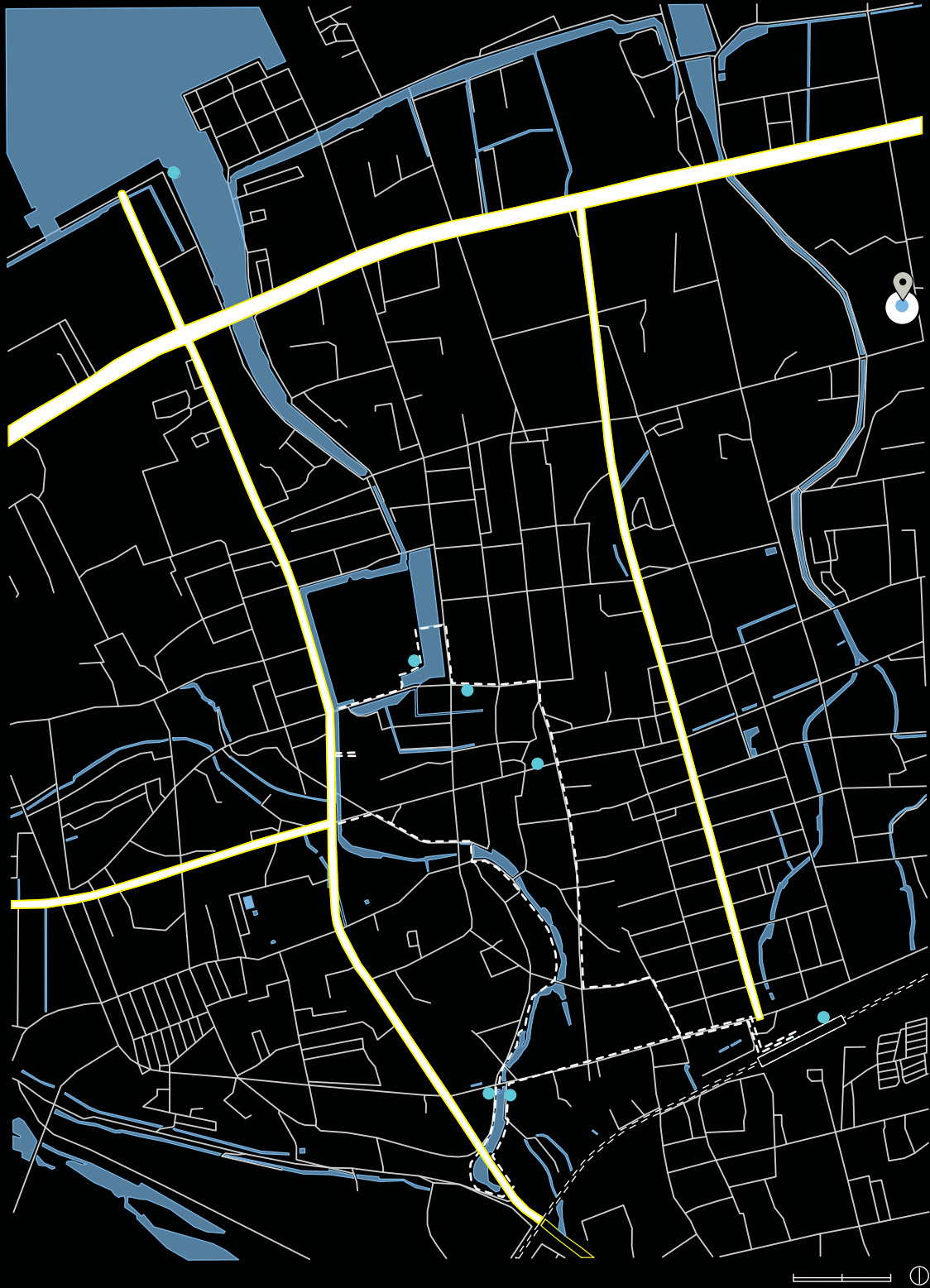
Images for “Saijo”

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The Project in Synthesis

The Project in Synthesis

Img. 2 - Operating Thermal Towns, indicated by period of erection.



Img. 2 - Operating Thermal Towns, indicated by period of erection.



Ito Project, A Urban Regeneration Strategy Relying on Environment, Technology & Architecture www.ito-pj.town

Framework

Saijo represents the typical contemporary Onsen Town, which, experiencing a great population decrease, over the decades has become extensively less lively and attractive towards tourists. Moreover, the environmental treats mentioned earlier, greatly contributed to worsening the City's condition.

The client, in this perspective, being born and living in Saijo, approached Kengo Kuma & Associates with the request of designing a new Ito District, not far from the Aqua Route, aiming at the re-population of the core of the City and the rebirth of a sense of community.

Functional requirements prescribed the necessity to design: residential, educational and leisure facilities. Moreover, great stress was posed on sustainability, environment and technological advancement.

In this perspective, the concept, developed by Members of the Kengo Kuma Laboratory, was centred around the keywords: energy, technology, green infrastructure, water, food and architecture.

Img. 3 - Operating Thermal Towns, indicated by period of erection.



Masterplan Components:

- 1 Shinto Shrine
- 2 Co-working Space
- 3 Food Processing Complex+School+Dormitories
- 4 Marche
- 5 Pond
- 6 Multi-Purpose Hall
- 7 Residential Area
- 8 Hotel
- 9 Health Centre: Onsen&Gym



Concept & Masterplan

In this perspective, the concept, developed by Members of the Kengo Kuma Laboratory, was centred around the keywords: energy, technology, green infrastructure, water, food and architecture.

The masterplan that was thus designed involved:

- a residential area, whose nine typologies of units were designed by emerging architects through an open competition, which received more than 300 entries, focused on the design of easy to live in and pleasurable to go home to detached houses (Link to the Competition: www.japan-architect.co.jp/saijo);
- a marchet, focused on water (cold products), fire (hot products) and brewing;
- a pond;
- a multi-purpose hall;
- a hotel;
- a health centre, composed by an onsen and a gym, to stress on the relevance of wellness in daily life and water in the city;
- moreover, still in phase of definition: a Shinto Shrine, a co-working space, a food processing complex, with annex school and dormitories.

Health Centre: Onsen&Gym

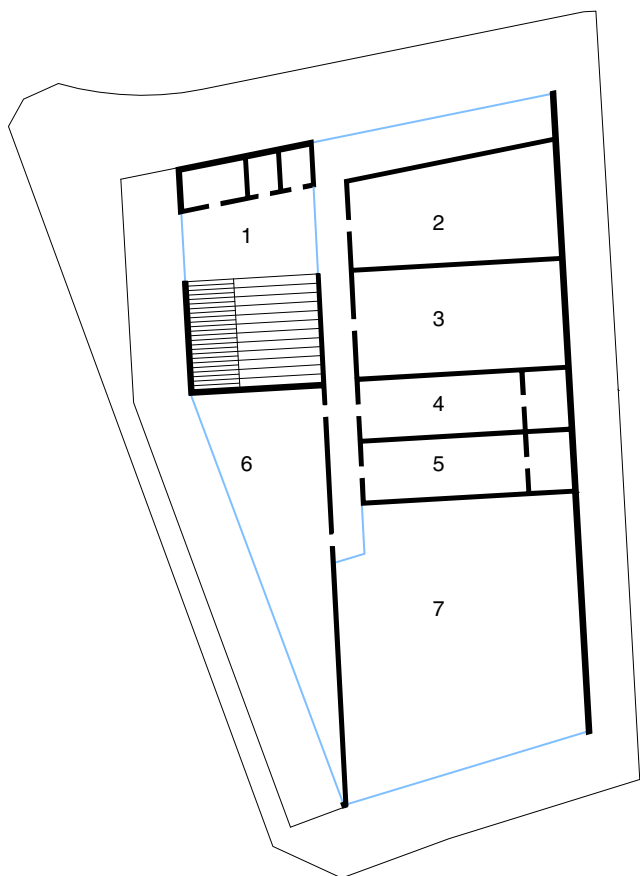
When the author joined the Kengo Kuma Laboratory in April 2019, the Masterplan had already been developed. However members were offered the possibility to join the Design Concept Phase of the Health Centre, whose functional requirements were the development of an onsen and a gym, each with an extension of approximately 1000 m².

As I decided to take part in this experience, I became a member of the design team lead by Architect Takumi Saikawa and composed by two students, Sarah Wellesley and myself. From the beginning of May to the beginning of September weekly meetings were held with the architect to check on the advancement of the design process and periodical ones with Architect Kengo Kuma to receive approval.

The project was supposed to reach the level of detail of finishing and lighting, coming to an end by December. However, it came to an alt at the beginning of October, with the completion of major volumetric and architectural choices. The schemes that follow are drawings made by the author herself and aimed at showing the form generation process as a design exercise.

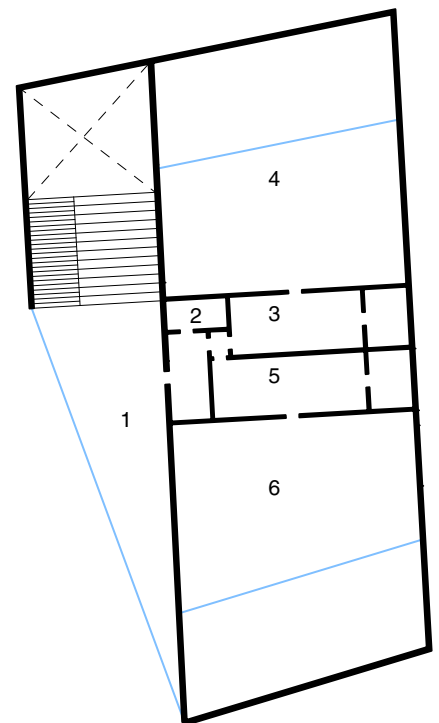
The project is envisioned to restart in the months to come.

Img. 4 - Week 1 Design for Onsen&Gym.



Ground Floor - Gym

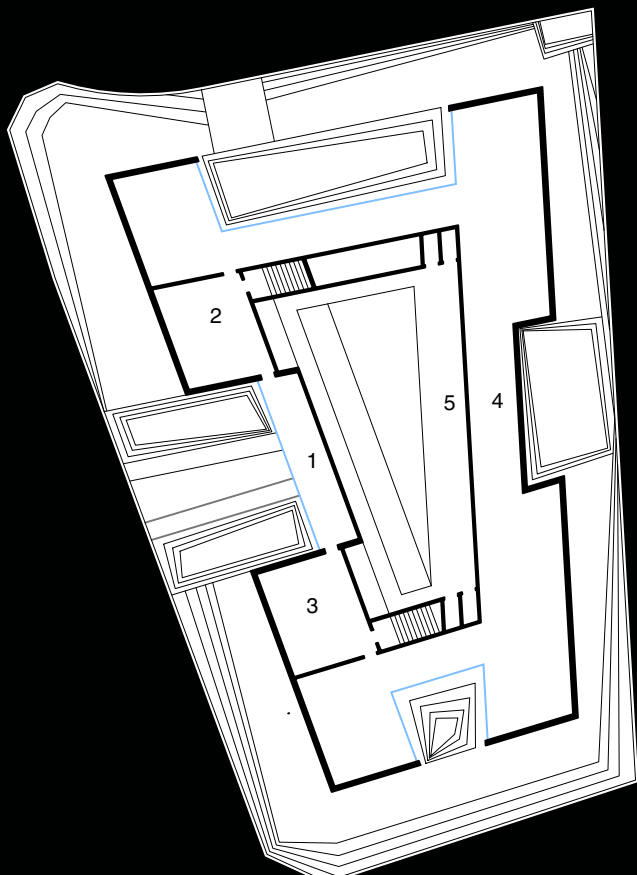
- 1 Lobby, with info point and toilets
- 2 Exercise Room A
- 3 Exercise Room B
- 4 Women Changing Room with Toilets
- 5 Men Changing Room with Toilets
- 6 Office
- 7 Gym



First Floor - Onsen

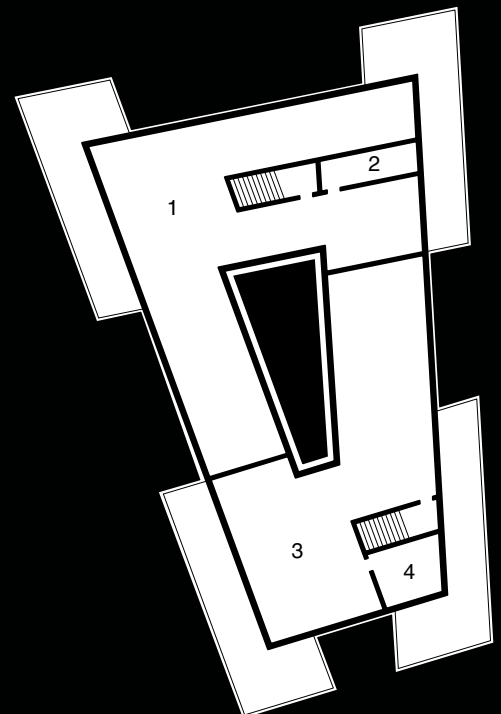
- 1 Terrace
2 Ticket Office
3 Women Changing Room with Toilets
4 Women Indoor and Outdoor Onsen
5 Men Changing Room with Toilets
6 Men Indoor and Outdoor Onsen

Img. 5 - Week 3 Design for Onsen&Gym.



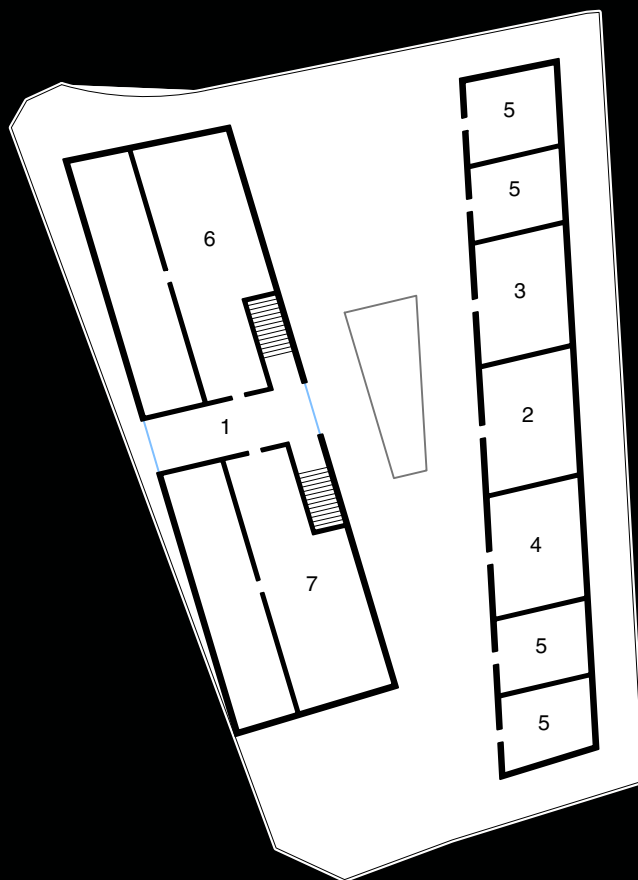
Ground Floor - Gym+Pool

- 1 Lobby, with info point
- 2 Women Changing Room
- 3 Men Changing Room
- 4 Gym
- 5 Pool with Toilets



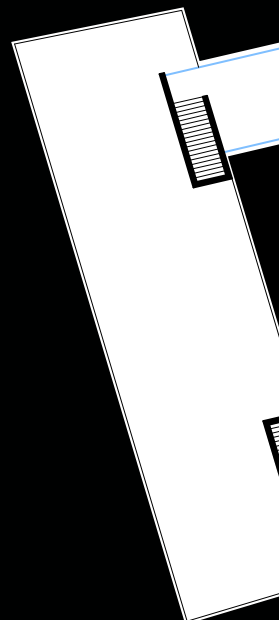
First Floor - Onsen

- 1 Women Onsen
- 2 Women Toilets
- 3 Men Onsen
- 4 Men Toilets



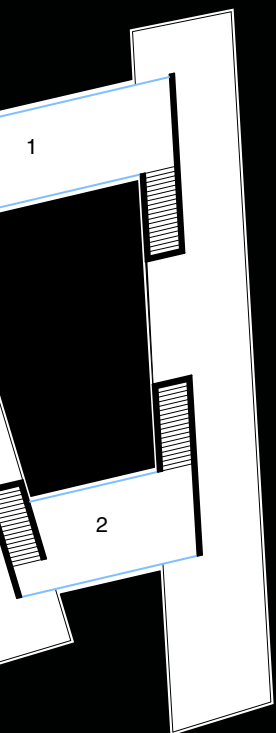
Ground Floor - Onsen

- 1 Lobby
- 2 Office
- 3 Women Changing Room
- 4 Men Changing Room
- 5 Treatment Room
- 6 Women Indoor and Outdoor Onsen
- 7 Men Indoor and Outdoor Onsen

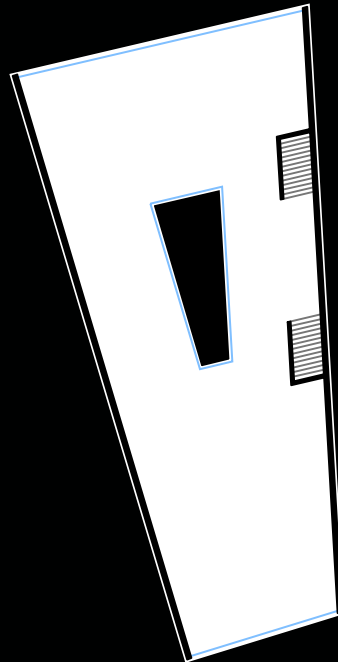


- 1 Women Relax Area
- 2 Men Relax Area

Img. 6 - Week 3 Design for Onsen&Gym.

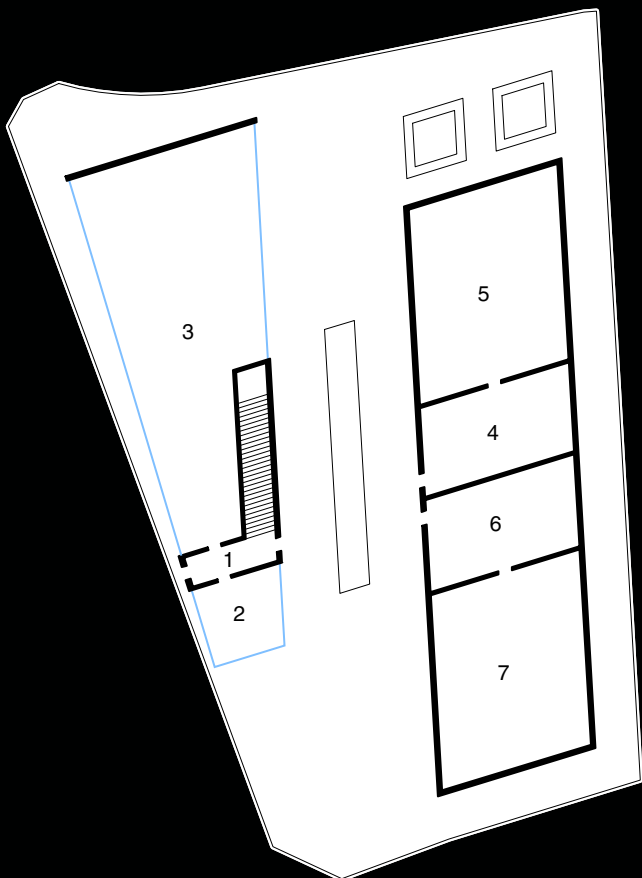


First Floor - Relax Areas

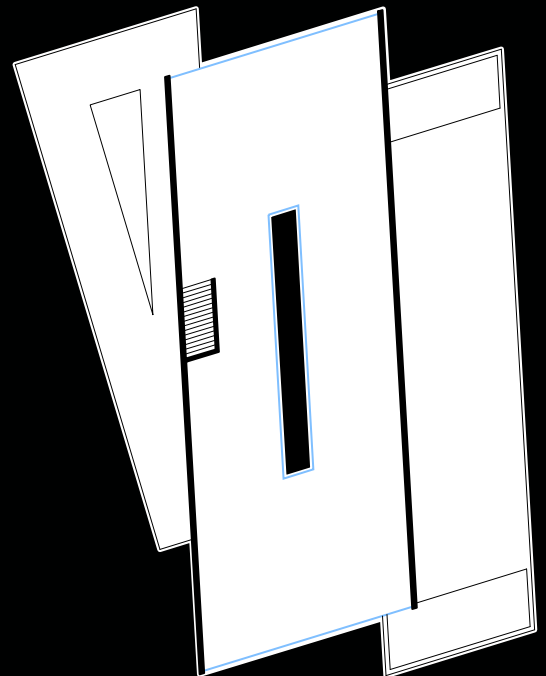


Second Floor - Gym

Img. 7 - Week 5 Design for Onsen&Gym.



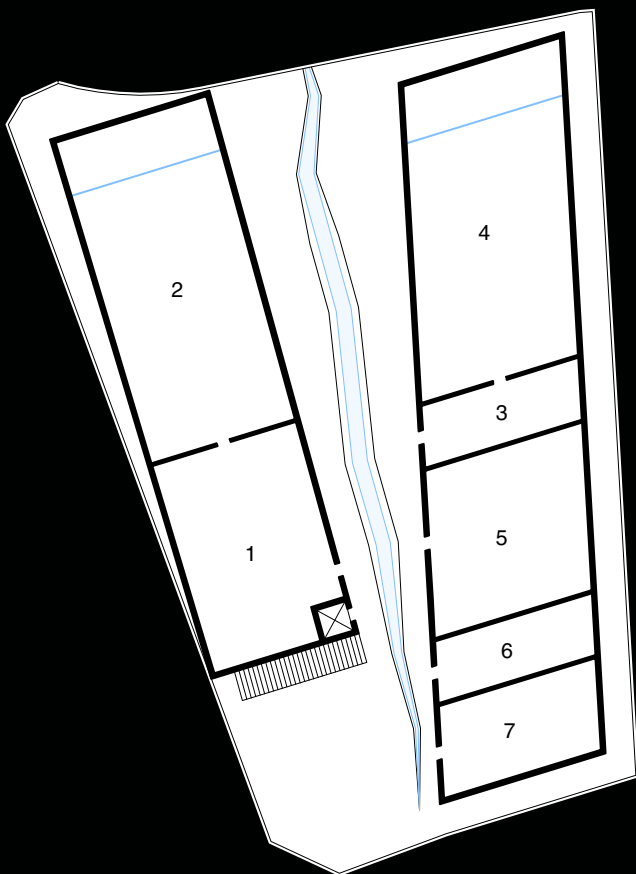
Ground Floor - Onsen



First Floor - Gym

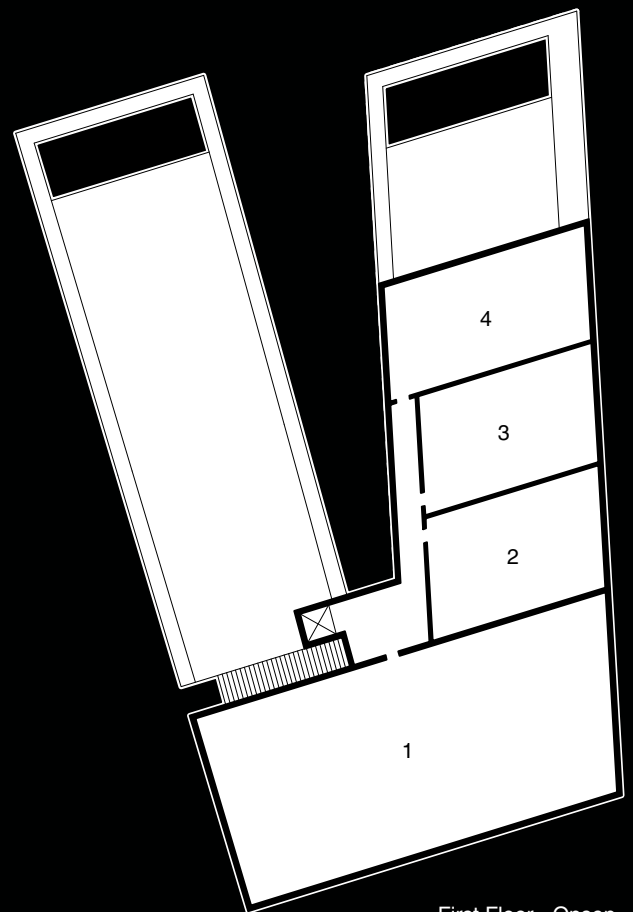
- 1 Lobby
- 2 Office
- 3 Café
- 4 Women Changing Room with Toilets
- 4 Women Indoor and Outdoor Onsen
- 6 Men Changing Room with Toilets
- 7 Men Indoor and Outdoor Onsen

Img. 8 - Week 7 Design for Onsen&Gym.



Ground Floor - Onsen

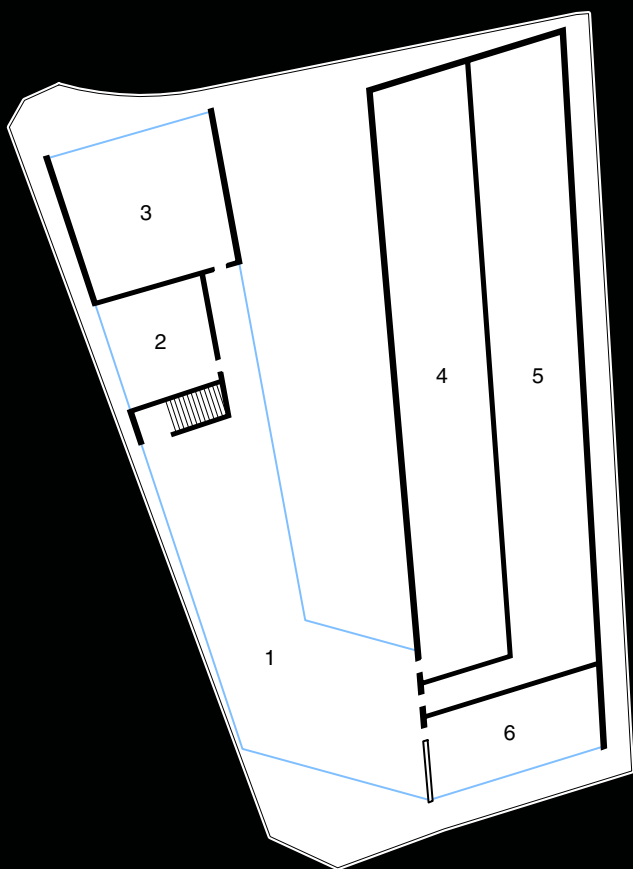
- 1 Women Changing Room
- 2 Women Indoor and Outdoor Onsen
- 3 Men Changing Room
- 4 Men Indoor and Outdoor Onsen
- 5 Cafè
- 6 Toilets
- 7 Office



First Floor - Onsen

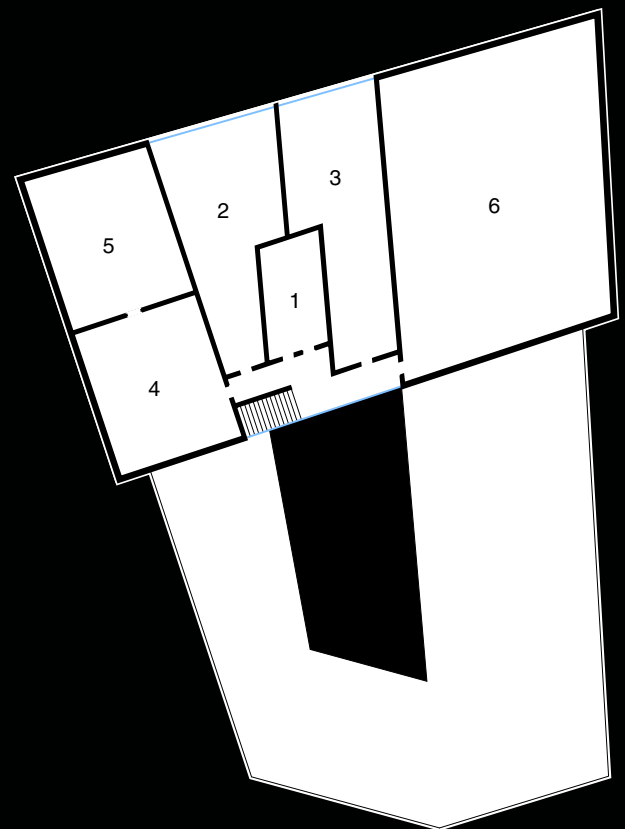
- 1 Gym
- 2 Women Changing Room with Toilets
- 3 Men Changing Room with Toilets
- 4 Practice Room A

Img. 9 - Week 8 Design for Onsen&Gym.



Ground Floor - Onsen

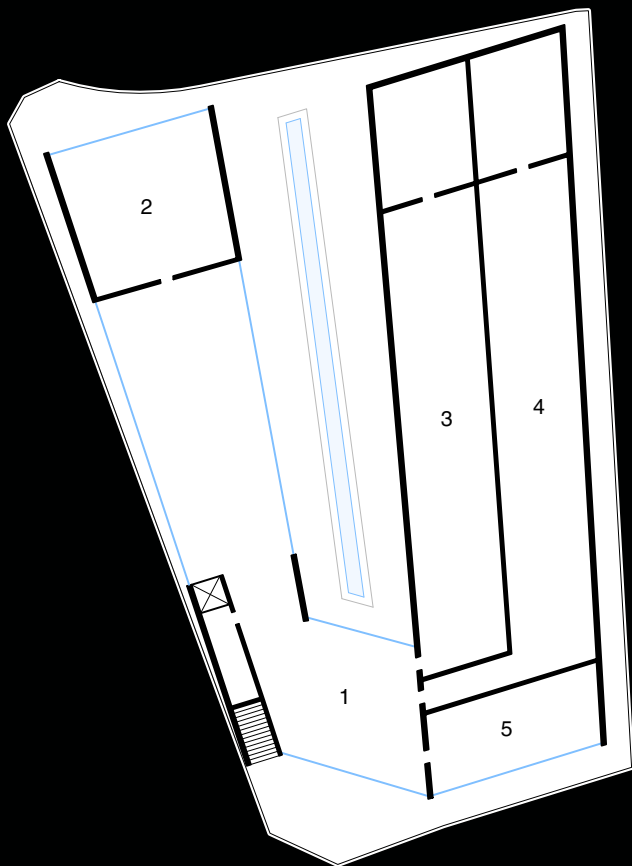
- 1 Lobby
- 2 Office
- 3 Café
- 4 Women Changing Room and Onsen
- 5 Men Changing Room and Onsen
- 6 Machines Room



First Floor - Gym

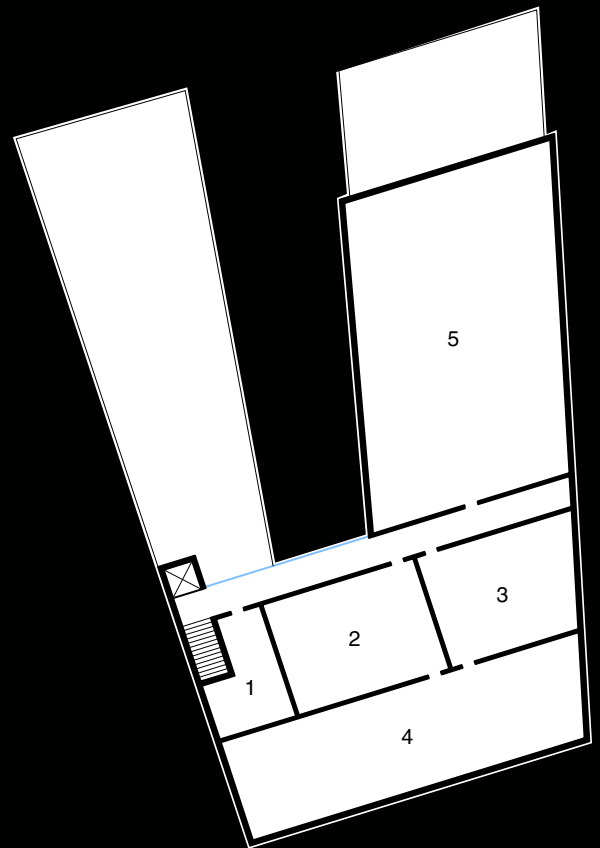
- 1 Toilets
- 2 Women Changing Room
- 3 Men Changing Room
- 4 Practice Room A
- 5 Practice Room 5
- 6 Gym

Img. 10 - Week 9 Design for Onsen&Gym.



Ground Floor - Onsen

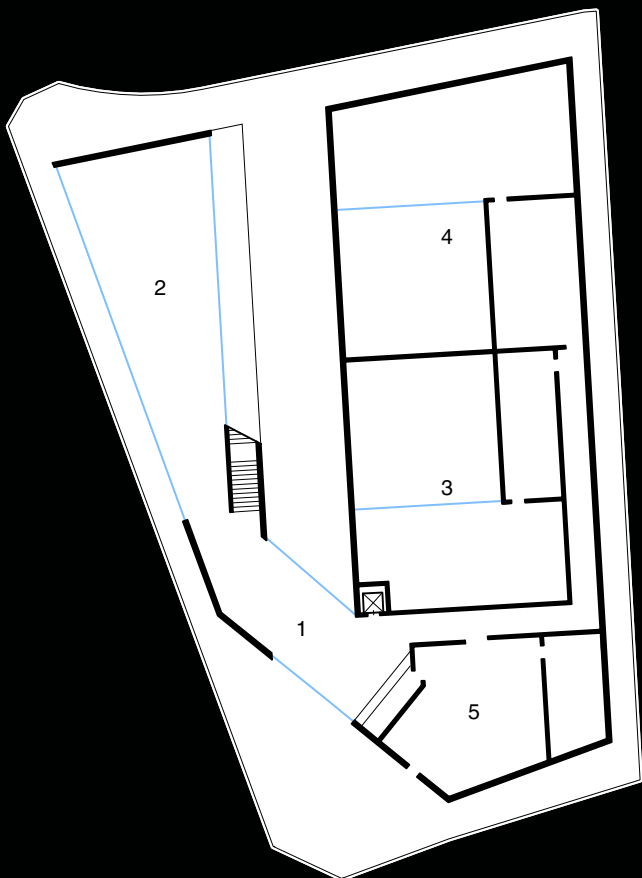
- 1 Lobby and Cafè
- 2 Office
- 3 Women Changing Room and Onsen
- 4 Men Changing Room and Onsen
- 5 Practice Room



First Floor - Gym

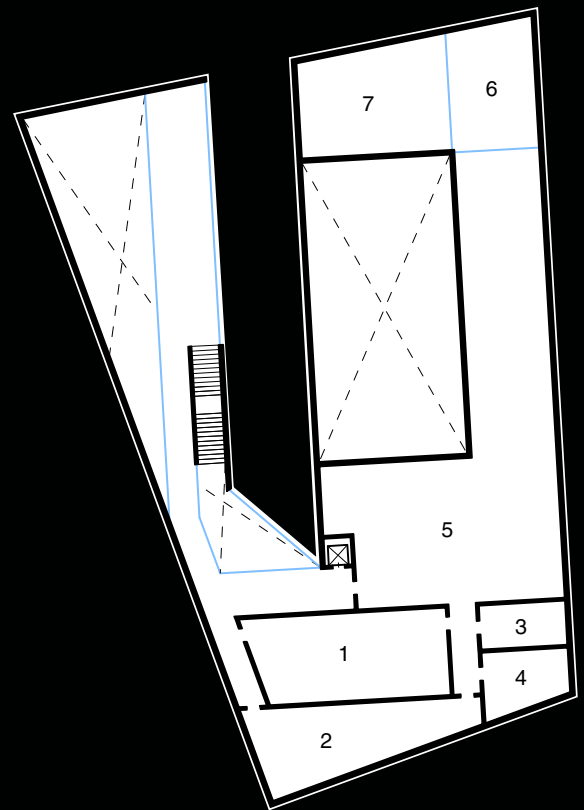
- 1 Toilets
- 2 Women Changing Room
- 3 Men Changing Room
- 4 Practice Room A
- 5 Gym

Img. 11 - Week 11 Design for Onsen&Gym.



Ground Floor - Onsen

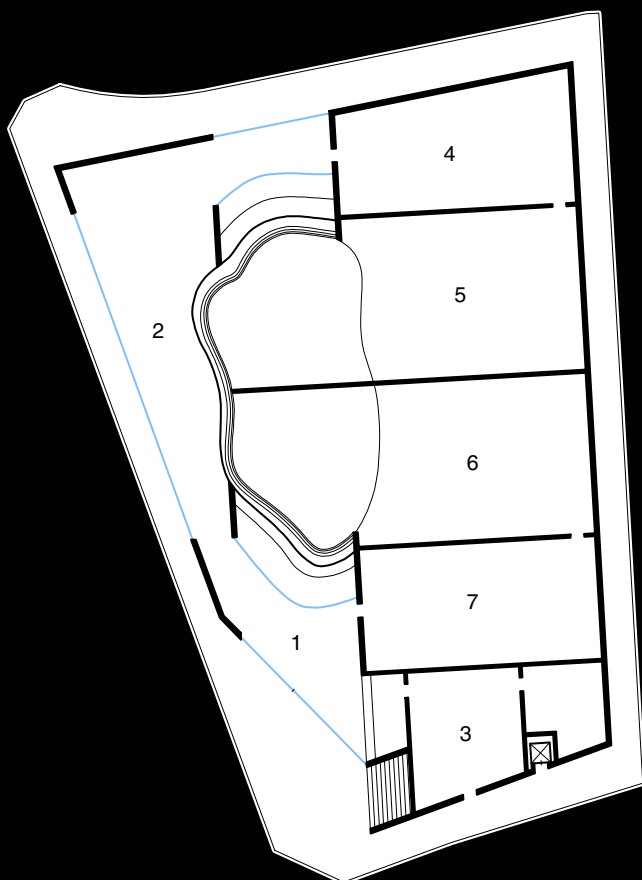
- 1 Lobby
- 2 Cafè
- 3 Office with Toilet
- 4 Women Changing Room
- 5 Women Indoor and Outdoor Onsen
- 6 Men Changing Room
- 7 Men Indoor and Outdoor Onsen



First Floor - Gym

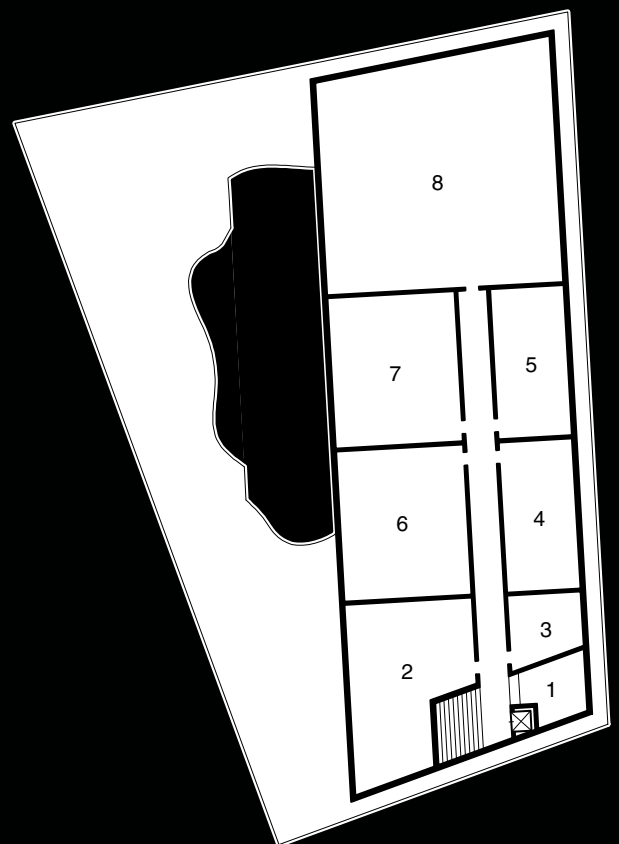
- 1 Women Changing Room
- 2 Men Changing Room
- 3 Women Toilets
- 4 Men Toilets
- 5 Gym
- 6 Practice Room A
- 7 Practice Room B

Img. 12 - Week 13 Design for Onsen&Gym.



Ground Floor - Onsen

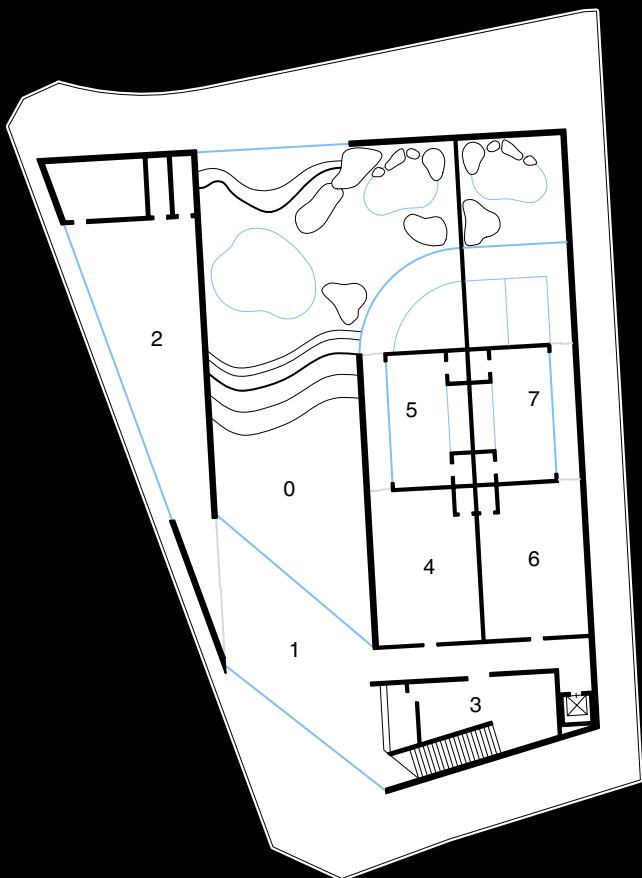
- 1 Lobby
- 2 Cafè
- 3 Office with Toilet
- 4 Women Changing Room
- 5 Women Indoor and Outdoor Onsen
- 6 Men Changing Room and Onsen
- 7 Men Indoor and Outdoor Onsen



First Floor - Gym

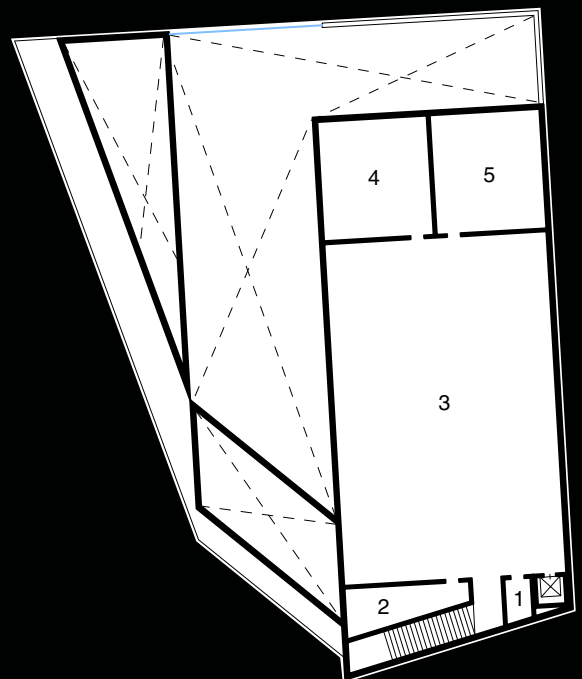
- 1 Office
- 2 Machines Room
- 3 Relax Room
- 4 Women Changing Room
- 5 Men Changing Room
- 6 Practice Room A
- 7 Practice Room A
- 8 Gym

Img. 13 - Week 15 Design for Onsen&Gym.



Ground Floor - Onsen

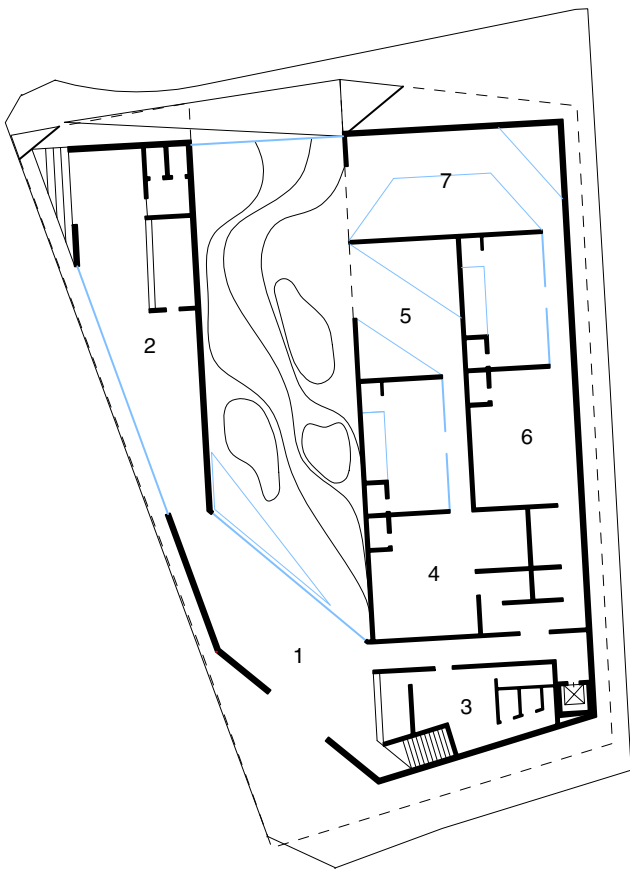
- 0 Internal Garden
- 1 Lobby
- 2 Café with Kitchen and Toilets
- 3 Office
- 4 Women Changing Room
- 5 Women Indoor and Outdoor Onsen
- 6 Men Changing Room
- 7 Men Indoor and Outdoor Onsen



First Floor - Gym

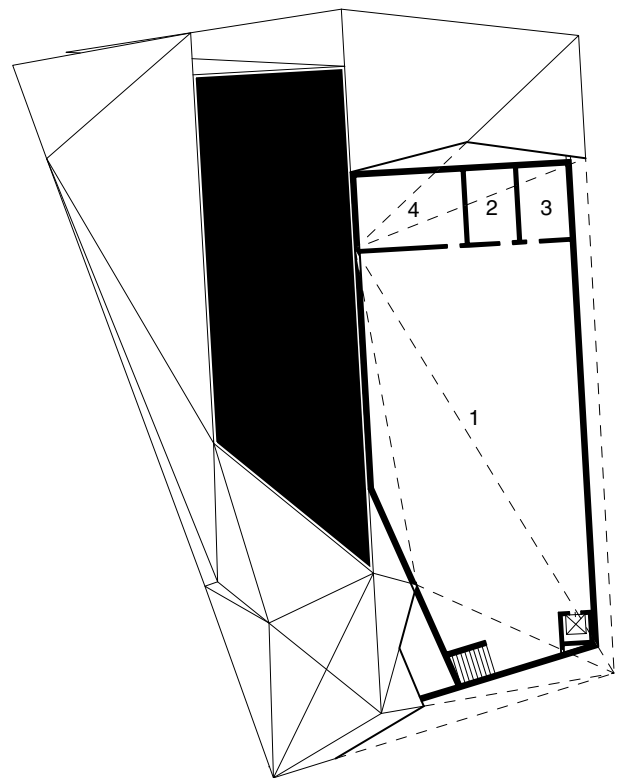
- 1 Office
- 2 Machines Room
- 3 Gym
- 4 Practice Room A
- 5 Practice Room 5

Img. 14 - Week 16 Design for Onsen&Gym.



Ground Floor - Onsen

- 1 Lobby
- 2 Cafè with Kitchen and Toilets
- 3 Office with Kitchen, Changing Rooms and Toilets
- 4 Women Changing Room
- 5 Women Indoor and Outdoor Onsen
- 6 Men Changing Room and Onsen
- 7 Men Indoor and Outdoor Onsen



First Floor - Gym

- 1 Gym
- 2 Women Changing Room
- 3 Men Changing Room
- 4 Practice Room A

Part 2

Exploring the Italian Scenario

Part 2

Exploring the Italian Scenario

Understanding Thermal Baths & Thermal Towns

Understanding Thermal Baths & Thermal Towns



Bathing Facilities in Italy

Overview

Addressing the topic of regeneration of the thermal sector in Italy, a premise has to be made on the existing structures which currently exploit waters for medical, wellness and relaxation purposes. This is necessary as, in the last two decades, the field has undergone deep transformations and some typologies have emerged and prevailed over the conventional one.

Trying to get to simplify the matter to the roots, there are:

SPA: *Salus Per Aquam* – not necessarily employing thermal waters, these structures focus on the usage of the fluid for wellness, as well as relaxation, purposes, through a multitude of baths, treatments and sensorial experiences.

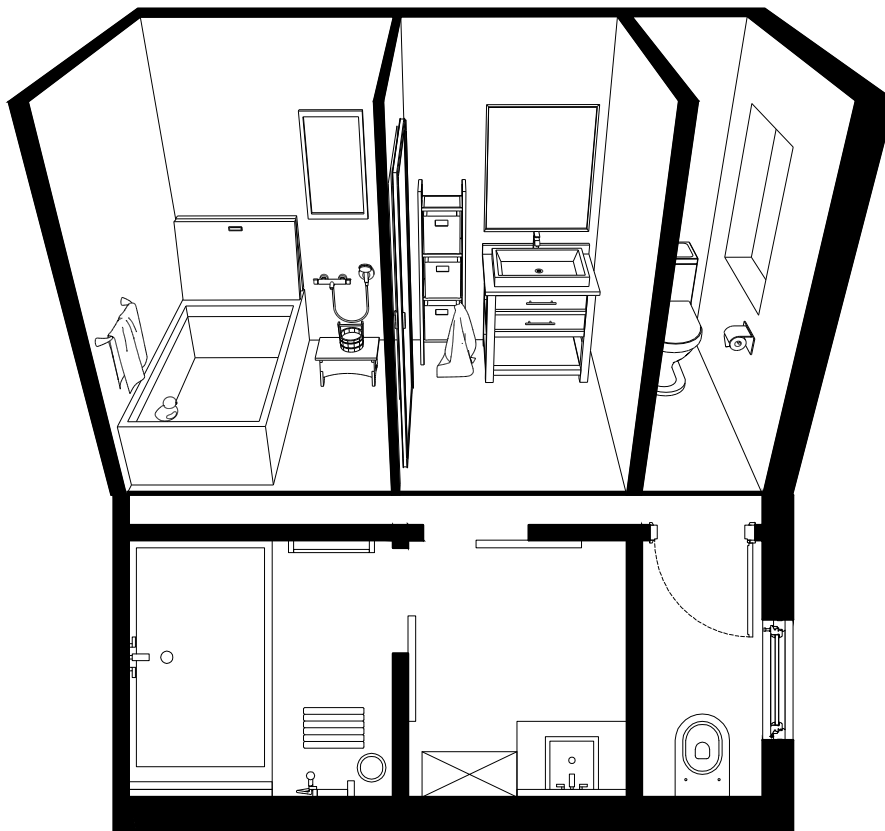
Thermal Baths: *Complessi Termali* – facilities supplied with thermal waters, which are employed, for medical purposes, mostly for bathing, drinking, inhalation and mud therapy.(1)

SPA, Salus per Aquam

Despite controversies on the origins of the term, the concept behind these typologies is that of using water as a tool to maintain or to re-establish physical and mental wellness.

The most diffused hydrotherapeutic treatments of a SPA are:

- *Hydromassage*, practised inside baths supplied with both hot and cold water gushing at variable levels of pressure, to ease muscular tension and stimulate blood circulation;
- *Emotional Showers*, aimed at the stimulation of the sense, whose experience is enriched through light, colours and perfumes;
- *Hammam* and *Finnish Sauna*, employing wet and dry vapour to encourage perspiration and circulation;
- *Kneipp Path*, consisting in a series of baths alternatively filled in hot and cold water, through which clients walk to stimulate legs and feet's wellness. (2)



Thermal Baths,

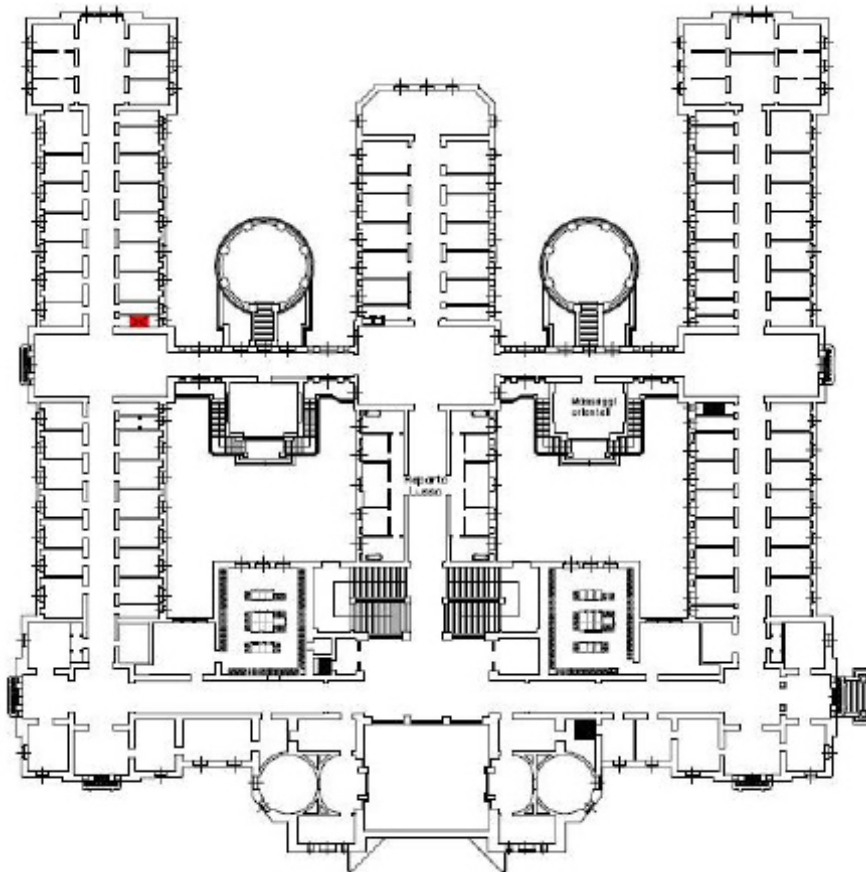
Complessi Termali

Similarly to SPAs, they are centres focused on the usage of water for treatments, however two are the main differences:

- the water employed is thermal water, gushing from the underground, whose mineralogic content is regulated by law;
- the purpose of the treatments is merely medical.

Their layout has undergone serious variations through the Centuries; however, the major thermal techniques of exploitation of the fluid have resisted these changes. They are:

- *Balneotherapy*, consisting in bathing in thermal waters, individually or collectively. These treatments mostly target the skin diseases and affections of the circulatory apparatus;
- *Hydropinic Therapy*, prescribing the drinking of mineral waters in certain quantities at specific times of the day. It is particularly beneficial for gastric and urinal apparatus;
- *Inhalation Therapy*, employing aerosol or nebulizers to reduce the particles of water and render them more beneficial for, mostly, the respiratory apparatus;
- *Mud Therapy*, revolving around mud baths or treatments, targeting rheumatic affections. (3)(4)



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www.blogunisalute.it/cure-termali-trattamenti-patologie.

Images for “Bathing Facilities”

Img. 1

Img. 2

Img.3



More About Thermal Baths, In Italy

Overview

Currently the active thermal complexes in Italy are 323, a quite exiguous number as compared to the amount of wellness centres, which in all of their declinations go beyond the 2.400 facilities.

This number results even more striking if compared with the same one from nine years ago, 378 structures, as it shows that in less than ten years the facilities that have been closed are more than 50. (1)(2)

In this perspective, the joint efforts of the Government, a series of Associations and privates have been crucial for the sector.

Federterme, the Italian Federation of Thermal Industries and of Curative Mineral Waters (Federazione Italiana delle Industrie Termali e delle Acque Minerali Curative), which groups together the majority of the remaining facilities, has proven to have played a leading role for the promotion of thermal baths, through: the redaction of periodic relations (Rapporti Federterme); the proposition of amendments to the existing national laws; the promotion of events, as seminars and periodic meetings of its members. (3)

Recent History

If the thermal sector is deeply eradicated in the history of the Peninsula due to the conformation of its territory and to the presence of conspicuous reservoirs of thermal waters, what is mostly interesting for this thesis is its evolution from the beginning of the 20th Century onwards.

End of the 19th Century – Beginning of the First World War:

Ludic Thermalism

This time span has come to be considered as the most flourishing for thermal baths. In fact, this phase witnessed the shift in their frequentation from predominantly therapeutic reasons to ludic ones. Bathing became fashionable among the élite of the period. This, resulted in the erection of thermal towns, identified through the Liberty Style and in the development of the first form of modern tourism.

First World War – 1960s: Social Thermalism

These forty years saw a shift back to the concept of bathing for healing purposes. However, accessibility was widened through the introduction of additional holidays for treatments, financed by the National Sanitary System. This period is, thus, considered as the Social Phase of thermalism.

Mid 1970s – 1980s: Assisted Thermalism

Due to the increasing association between baths and illnesses, these ten years were the theatre for the plantation of the germ for the subsequent crisis of the sector. As a matter of fact, it became evident how the scientific research behind the medical benefits of bathing was still poor; moreover, its fast evolution into a mass phenomena resulted in an excessive Governmental expenditure and in a general loss of appeal, which did not produce an adequate adaptation to the shifting needs of costumers towards wellness, rather than just health.

1990s: Thermalism Different from Wellness

The response of the Sanitary System, was thus a restrictive one: cures started to be provided only upon the presentation of certified tickets, additional payed periods of leave were abolished and accessibility to cures became much more selective. With the actual development of wellness centres, focused on preservation and prevention, more than on curing, the thermal sector was officially in full crisis status: its facilities out of style and its costumers above age level.

2000s: Thermal Wellness

Eventually, an adaptation to market needs started to take place and thermal baths evolved into centres for overall health, legitimized by scientific studies and modernized in architectural style, treatments and products.

Present: Wellness as Medicine

More relevance has been given to clients, their own experiences and their capability to decide for themselves which path to follow, according to their individual needs.

The target has thus shifted towards the usage of water as medicine for relaxation and aesthetic purposes.

Thus, the most successful centres are the ones that have managed to create a balance between wellness, beauty, food, health and sports, stressing predominantly on the first three. (4)(5)(6)

If the number of tourists has been documented to have risen again, after the shrinks caused by the economic crisis in 2012, overnight staying do not exceed the three days and high level of competitiveness are posed by both wellness facilities in Italy and other structures in Eastern Europe. (7)

Thermal Laws

1919 - 2017

The regulation of the thermal sector, first considered by the Italian Government at the beginning of the 20th Century, has undergone several modifications over the last one hundred years.

1916

Despite not being specifically focused on the topic, the Law L. 16 luglio 1916, n. 947 - “Disposizioni varie sulla sanità pubblica” – Capo IV (Law July 16th 1916, n. 947 – “Various dispositions on public sanitation” – Point IV) consists in the first mentioning of mineral waters and thermal complexes, stating that, for the usage of waters and the opening of baths, a Governmental authorization is required.

1919

With the emission of the Royal Decree R.D. 28 settembre 1919, n. 1924 – “Regolamento per l'esecuzione del Capo IV della L. 16 luglio 1916, n. 947, contenente disposizioni sulle acque minerali e gli stabilimenti termali, idroterapici e di cure fisiche e affini” (Royal Decree September 28th 1919, n. 1924 – “Regulation for the execution of Point IV of Law July 16th 1916, n. 947, containing dispositions on mineral waters and thermal, hydrotherapeutic complexes and for physical and similar treatments”, a formal definition for the above mentioned was officially given and thus the first actual legal base for the development of the sector was set.

1978

The Law L. 23 dicembre 1978, n. 833 – “Istituzione del servizio sanitario nazionale” (Law December 23rd 1978, n. 833 – “Institution of the National Sanitary Service”), on the other hand, posed thermal treatments as under the State's Sanitary Service and prescribed the specific properties for thermal waters to be recognized as such.

2000

The regulation promulgated in this year, L. 24 ottobre 2000, n. 323 – “Riordino del settore termale” (Law October 24th 2000, n. 323 – “Reordering of the thermal sector”) was, however, one of the most important, as it prescribed a solid operational regulatory framework for the thermal sector and its various aspects, crucial for the promotion of measures of requalification for it. Moreover, the norm formally linked it with the agenda for the development of tourism.

2011

Through the Legislative Decree D.L. 8 ottobre 2011, n. 176 – “Attuazione della direttiva 2009/54/CE, sull'utilizzazione e la commercializzazione delle acque minerali naturali” (Legislative Decree October 8th 2011, n. 176 – “Actuation of the 2009/54/CE directive, on the use and commercialization of natural mineral waters”), thermal waters or mineral natural waters are defined, along with the process for their recognition, which consists in: four microbiological analysis; four chemical and chemical-physical analysis; four clinical analysis; four pharmacological analysis. The latter have to be completed within a year and have to demonstrate that the mineral properties have remained constant over this period of time. (8)(9)

2017

Eventually, the Amici del Termalismo (Friends of Thermalism) Parliamentary Group, proposed a framework of law, which was welcomed, for the regeneration of the sector in the time span 2017-2019. The latter was based on several propositions, among which:

- the setting of a Fund to test local deals between sanitary and thermal structures;
- the commercialization of abandoned structures, through the promotion of privatization;
- the establishment of a National day of Thermal Baths;
- the institution of financing for the actuation of the above mentioned.

(10)(11)

Despite the richness of regulations and propositions, the sector still appears slow in embracing them.

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Images for “More About Thermal Baths”

Img. 1

Img. 2

Img. 3



Focus on Thermal Towns

Overview

According to the 2018 Report of Federterme, the municipalities hosting thermal complexes are 154, of which 62 are actual thermal towns, mostly of limited geographic extension. (1)

Of these, 46 are the settlements belonging to the Associazione Nazionale Comuni Termali (A.N.CO.T – National Association of Thermal Municipalities), which was founded in 1989 at Salsomaggiore Terme, by the latter and the Towns of Abano Terme, Bagno di Romagna, Castellammare di Stabia, Castrocaro Terme, Chianciano Terme, Godiasco Salice Terme, Ischia, Montecatini Terme, Montechiarugolo, Montegrotto Terme e Tivoli.

This Group of representatives has several aims:

- valorisation of the sector and the related touristic impact through the organization of events;
- support of Governmental actions in the development of policies;
- implementation of scientific research;
- safeguard and enhancement of the environment;
- collaboration with national and international agencies for the support of thermal tourism;
- coordination among Other Associations (as Federterme), Governmental Institutions and its members. (2)



Img. 2 - Operating Thermal Towns, indicated by period of erection.

Ephemeral Entities

The necessity to Follow Market Trends

Considering that, apart from historically routed centres, the evolution of thermal towns has been a phenomena mostly characteristic of the beginning of the last Century, it is quite striking to think about thermal towns as such a small entity.

In this perspective, the study conducted by the *Associazione Geografi Italiani* (*Italian Association of Geographers*), within the project “Dai luoghi termali ai sistemi locali di turismo integrato” (“From thermal destinations to local systems of integrated tourism”), is quite interesting as, by analysing the entire range of municipalities hosting thermal complexes, it produced several maps focused on them. By grouping towns according to ranges of years of erection, they were further divided according to their success or failure. The outcome was the definition of three classes of typologies of thermal-touristic towns:

- destinations presenting integrated structures: centres that have kept themselves at the pace of costumer needs and have merged traditional thermal treatments with those related to wellness and beauty;
- localities with just thermal structures: mostly declined or in phase of dissolution, due to limited attention to market trends;
- municipalities characterized just by wellness centres: of most recent formation.

From these considerations, the conclusion is that, for thermal baths and thermal towns to be successful: first, the focus has to be centred on costumers needs and satisfaction, as the market is so volatile that it is quite simple to fall behind; second, the orientation towards curative wellness has to predominate. (3)

In these respects, the case studies considered in the following section are: a small thermal park with great relevance in between the 60s and the 80s , which has fallen into dissolution due to the inability of shifting its sanitary orientation; three really successful centres, which have reached success by combining the usage of water for wellness, beauty and medical purposes in different ways.



Img. 3 - Forerunner Localities, divided by stage of development.



Img. 4 - Class II Localities, divided by stage of development.



Img. 5 - Class II Localities, divided by stage of development.



Img. 6 - Class III Localities, divided by stage of development.



Img. 7 - Class IV Localities, divided by stage of development.



Img. 8 - Class V Localities, divided by stage of development.

References for “Focus on Thermal Towns”

- (1) Il Messaggero.it, 2019. *Federterme: “In tre anni si possono creare 15.000 posti di lavoro”*, Economia - News. Translated from Italian and accessed online on January 13th 2020, at: www.ilmessaggero.it/economia/news/terme_lavoro-4845529.html.
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Images or “Focus on Thermal Towns”

Img. 1

Img. 2 - Operating Thermal Towns, indicated by period of erection. Produced from the rielaboration of the image accessed on January 13th 2020, from: G. Rocca, 2009. *La recente evoluzione del fenomeno salutistico e l'avanzamento degli studi geografici in materia*. Geotema 39 – Dal turismo termale al turismo della salute: i poli e i sistemi locali di qualità, 39, p. 11. Translated from Italian and accessed online on January 13th 2020, at: www.ageiweb.it/geotema/wp-content/uploads/2019/01/GEOTEMA_39.pdf.

Img. 3- Forerunner Localities, divided by stage of development. Produced from the rielaboration of the image accessed on January 13th 2020, from: G. Rocca, 2009. *La recente evoluzione del fenomeno salutistico e l'avanzamento degli studi geografici in materia*. Geotema 39 – Dal turismo termale al turismo della salute: i poli e i sistemi locali di qualità, 39, p. 12. Translated from Italian and accessed online on January 13th 2020, at: www.ageiweb.it/geotema/wp-content/uploads/2019/01/GEOTEMA_39.pdf.

Img. 4 - Forerunner Localities, divided by stage of development. Produced from the rielaboration of the image accessed on January 13th 2020, from: G. Rocca, 2009. *La recente evoluzione del fenomeno salutistico e l'avanzamento degli studi geografici in materia*. Geotema 39 – Dal turismo termale al turismo della salute: i poli e i sistemi locali di qualità, 39, p. 13. Translated from Italian and accessed online on January 13th 2020, at: www.ageiweb.it/geotema/wp-content/uploads/2019/01/GEOTEMA_39.pdf.

Img. 5 - Class II Localities, divided by stage of development. Produced from the rielaboration of the image accessed on January 13th 2020, from: G. Rocca, 2009. *La recente evoluzione del fenomeno salutistico e l'avanzamento degli studi geografici in materia*. Geotema 39 – Dal turismo termale al turismo della salute: i poli e i sistemi locali di qualità, 39, p. 14. Translated from Italian and accessed online on January 13th 2020, at: www.ageiweb.it/geotema/wp-content/uploads/2019/01/GEOTEMA_39.pdf.

Img. 6 - Class III Localities, divided by stage of development. Produced from the rielaboration of the image accessed on January 13th 2020, from: G. Rocca, 2009. *La recente evoluzione del fenomeno salutistico e l'avanzamento degli studi geografici in materia*. Geotema 39 – Dal turismo termale al turismo della salute: i poli e i sistemi locali di qualità, 39, p. 15. Translated from Italian and accessed online on January 13th 2020, at: www.ageiweb.it/geotema/wp-content/uploads/2019/01/GEOTEMA_39.pdf.

Img. 7 - Class IV Localities, divided by stage of development. Produced from the rielaboration of the image accessed on January 13th 2020, from: G. Rocca, 2009. *La recente evoluzione del fenomeno salutistico e l'avanzamento degli studi geografici in materia*. Geotema 39 – Dal turismo termale al turismo della salute: i poli e i sistemi locali di qualità, 39, p. 16. Translated from Italian and accessed online on January 13th 2020, at: www.ageiweb.it/geotema/wp-content/uploads/2019/01/GEOTEMA_39.pdf.

Img. 8 - Class V Localities, divided by stage of development. Produced from the rielaboration of the image accessed on January 13th 2020, from: G. Rocca, 2009. *La recente evoluzione del fenomeno salutistico e l'avanzamento degli studi geografici in materia*. Geotema 39 – Dal turismo termale al turismo della salute: i poli e i sistemi locali di qualità, 39, p. 17. Translated from Italian and accessed online on January 13th 2020, at: www.ageiweb.it/geotema/wp-content/uploads/2019/01/GEOTEMA_39.pdf.

References & Case Study

References & Case Study



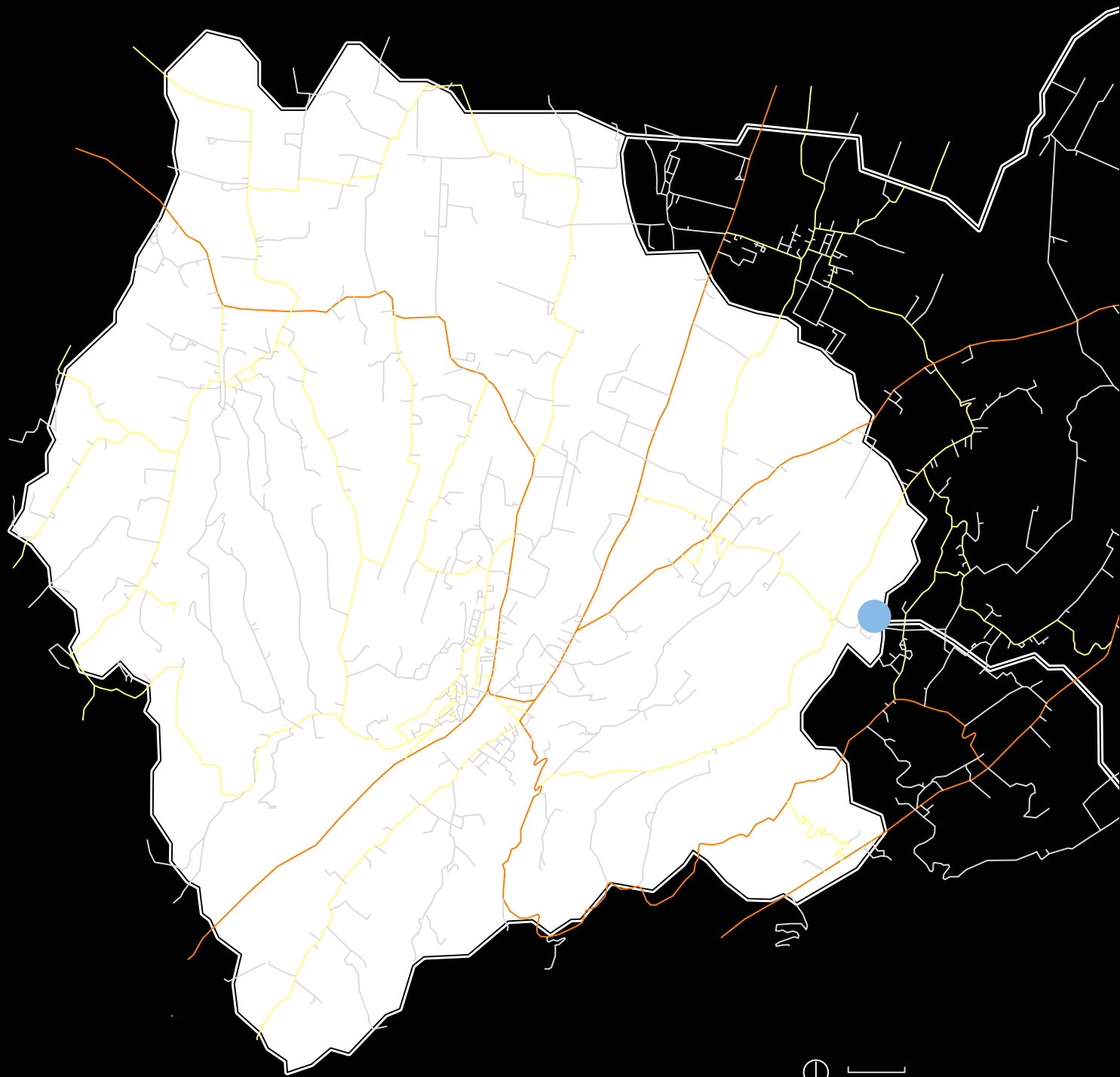
Bacedasco, Emilia-Romagna

Town of Baths

Located in Province of Piacenza, approximately 20km from Salsomaggiore Terme, the Complex of Terme di Bacedasco has been for decades a lively touristic centre, which currently verts in a state of dissolution. (1)

Elements of distinction of this thermal area are:

- its ubication, in proximity of the widest chestnut grove of the Emilian Alps, Bosco di Santa Franca, which encouraged developers to build in wood and in respect of the local environment, quite an innovative practice for the 1960s;
- the name, which deriving from the Celtic language of the Pre-Romanic colonizers, appears to mean "Town of Baths", particularly fitting, as the site presents ten springs and fourteen mud baths, while neighbouring two rivers, Acqua Puzza and Santa Franca. (2)(3)



Salso-Bromo-Iodic Waters & Their Curative Properties

Img. 1- Private House Bathrooms Axonometry and Plan View



The compound is certified to supply mineral waters, predominantly of sulphurous nature, but also containing sodium chloride, bromine and iodine. (4) (5)

In the field of internal medicine, the fluid can be beneficial for the treatment of gastrointestinal, rheumatic and pulmonary diseases; meanwhile, it can also be employed for gynaecological, urological, oropharyngeal and dermatological pathologies. (6)

More in depth, the sulphurous waters of Bacedasco can be employed for:

- Hydropinic Therapy, consisting in the ingestion of water;
- Balneotherapy, implying the bathing in the mineral springs;
- Inhalation Therapy, primarily targeting the treatment of pulmonary symptoms;
- Mud Therapy, external application of thermal muds. (7)

Fons & Their Curative Properties

Img. 1- Private House Bathrooms Axonometry and Plan View



Considering the various water sources available on site, there are:

- Alberoniana: detoxing waters contained in a pit reaching 9m depth; it is suitable for liver and skin disease;
- Aucia;
- Amussia: diuretic, detoxifying and slimming waters;
- Baragines;
- Fedelina: with a pit reaching 33 m of depth, it was used for mouth and teeth problems;
- Ipergea: tonic action;
- Ipogea: tonic action;
- Kerneriana: deriving its name from the first scientist in charge of studying Bacedasco's waters, Professor Korner, it can be employed for the oral, respiratory and the female reproductive systems;
- Piazzale Nuova: with a pit reaching 30 m of depth, it was used as detoxifying agent and product for skin complications;
- Piazzale: with a pit reaching 30 m of depth, it can heal diseases of the digestive system, along with those of skin and gallbladder;
- Pliocenica: with a pit reaching 16 m of depth, it supplies diuretic waters, also suitable to cure kidney and genital apparatus diseases;
- S. Lorenzo: sprouting at 13.4°C, it has a digestive and detoxicating action;
- Fonti del fango: for arthro-rheumatic and skin diseases;
- S. Cristina. (8)

Rise & Fall of Parco delle Fonti

Despite the exploitation of the hydrological resources is documented to date back to the Pre-Romanic Period, the first legally recognized authority for the controlled usage of the waters was established, under the name of “Società Balneare di Bacedasco” (“Balnear Society of Bacedasco”), in 1883.

The curative properties were formally recognized in between 1884 and 1887, through scientific studies conducted by Professor Guglielmo Körner and consequently praised as being among the best in Europe at the 1900 Paris Exposition.

It was only in the 1952, however, that the Thermal Complex came into existence as a curative hub, through the efforts and studies of the Terme di Bacedasco S.p.A., company structured by a group of local doctors.

The compound, flourished in the 60s, presented a medical pavilion, designed with modular units to consent subsequent enlargements.

It was immersed in an “Health Park”, renamed Parco delle Fonti (Springs’ Park), characterized by a multitude of water sources and walking paths, while presenting: a restaurant, a bar, a playground and a small lake, with adjacent grotto hosting the Gee Springs. A series of dacie, entirely made in wood to respect the surrounding biodiversity of the natural setting, formed the Villaggio Egeo, residential compound, located Northern of the treatments’ pavilion.

In between 1965 and 1969, with the movement of the entrance to the Northern portion of the plot, a Decauville Railway Line was erected to drive visitors to the southern facilities.



Once reached the apex of development, plans were made to transform the neighbouring Wood of Santa Franca into a Zoological Park, but the Baths were closed shortly after due to a diffused sectorial crisis arising from a reduction in financing and the general predominance of patients assisted by the National Sanitary System (Sistema Sanitario Nazionale – S.S.N.).

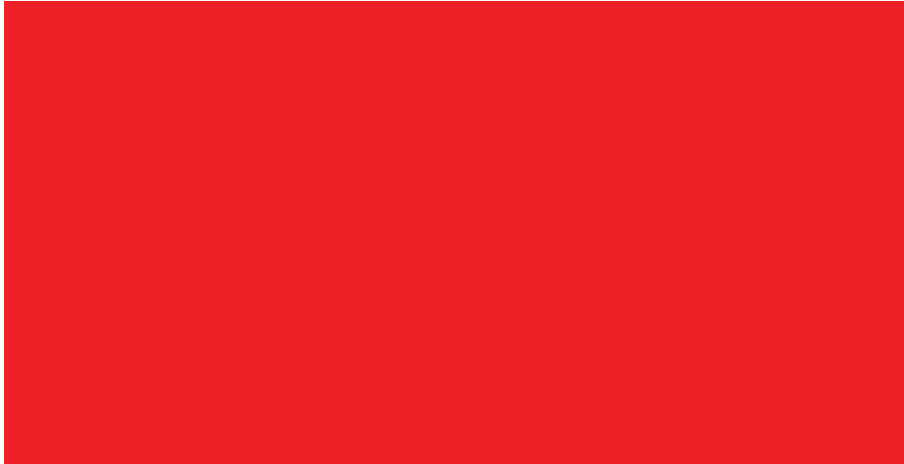
At the end of the 1980s, the Northern portion of the district had been transformed into a Golf Club and an attempt to re-open the Southern region was made, by building a new SPA Resort, of much greater ecological impact and forty semi-detached villas in front of it, while realizing an open air dance floor, particularly suitable for summer gigs. Nevertheless, also this chapter of the area was destined to have a short life span.

Following decades of abandonment and vandalism, in 2017 the remains of the old thermal complex were acquired by a private entrepreneur. The new owner seemed to have first planned works of maintenance of the park and the water sources, thus, envisioned the demolition of the remaining constructions and eventually planned the re-establishment of the bar and the playground. However, despite initial cleanings from waste and advancement of weeds, no further news has been made available and the area seems to have fallen back into a state of abandonment. According to Municipal guidelines, the re-development of the site has to be envisioned ex-novo, by demolishing the ruins of the precedent constructions. (9)(10)(11)(12)(13)(14)(15)

Img. 1- Private House Bathrooms Axonometry and Plan View



Img. 1- Private House Bathrooms Axonometry and Plan View



Advanced Contructive Choices

Several building choices were made during the first decades of development, which could be still considered as avant-gardist nowadays, namely:

- the medical pavilion, initially composed of eight hexagonal units, was conceived with a modular design, envisioning subsequent enlargements;
- all the toilet facilities, located at lower altitudes, as compared to mineral water springs, in order to avoid the usage of pumping systems for their exploitation;
- constructions with higher ecological impact, were erected further from the springs;
- the New Entrance was built furthest from the springs, in order to preserve the park as a pedestrian area.
- the sewing system was realized with stoneware pipes, reaching septic tanks, located far from the medical area. (16)

Img. 1- Private House Bathrooms Axonometry and Plan View



Prescribed Design Possibilities

Examining the General Urban Development Plan (Piano Regolatore Generale), the following developments of the district are noted as possible:

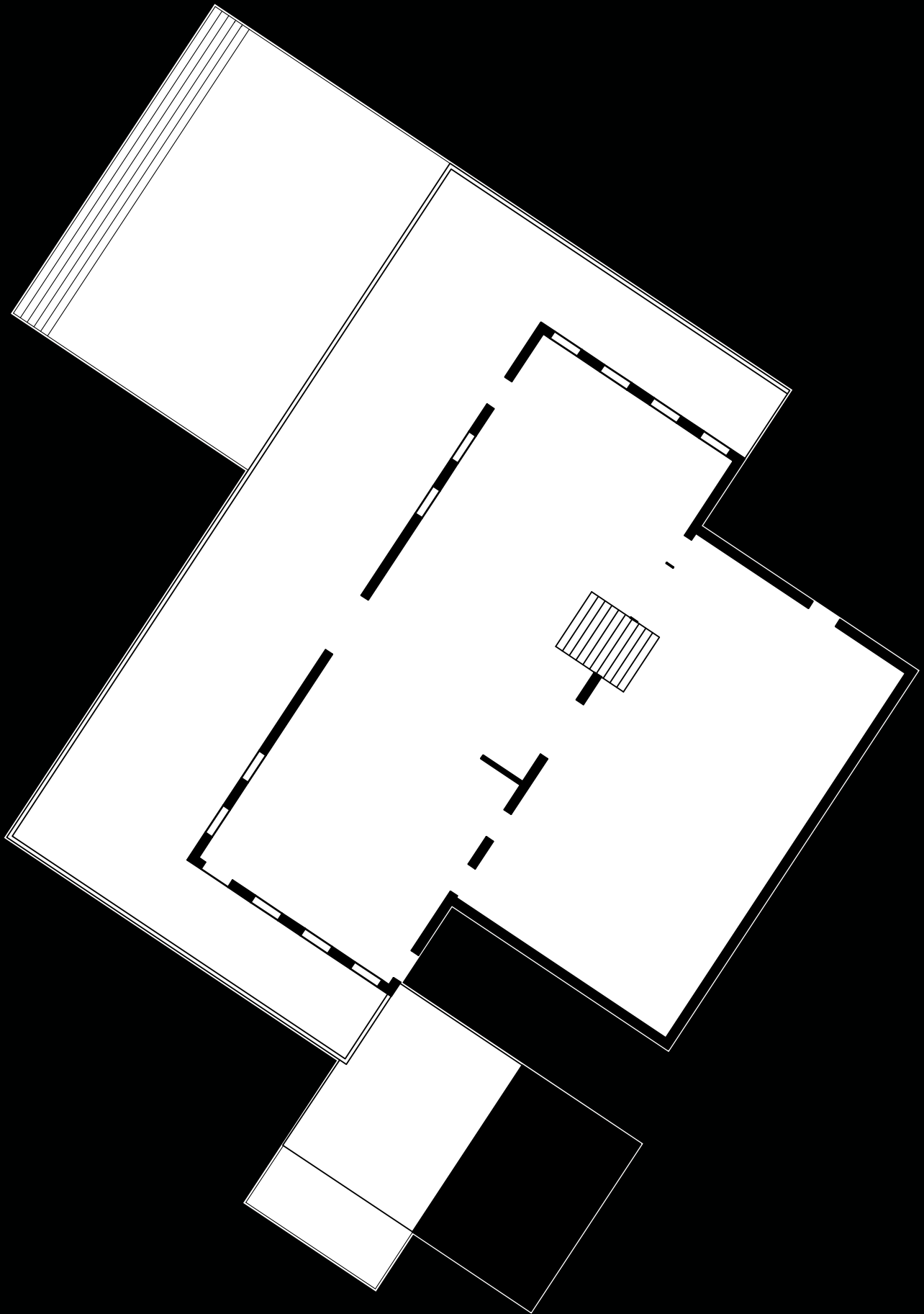
- Touristic zone of hotel receptiveness - 95 000 m²;
- Residential tourist zone – 50 000 m²;
- Commercial tourist zone, consenting the erection of bars, restaurants, shops, galleries and recreational spaces – 5 000 m²;
- Sports tourist zone, consenting the erection of tennis courts, pools, gardens and multifunctional fields;
- Thermal zone – 15 000 m²;

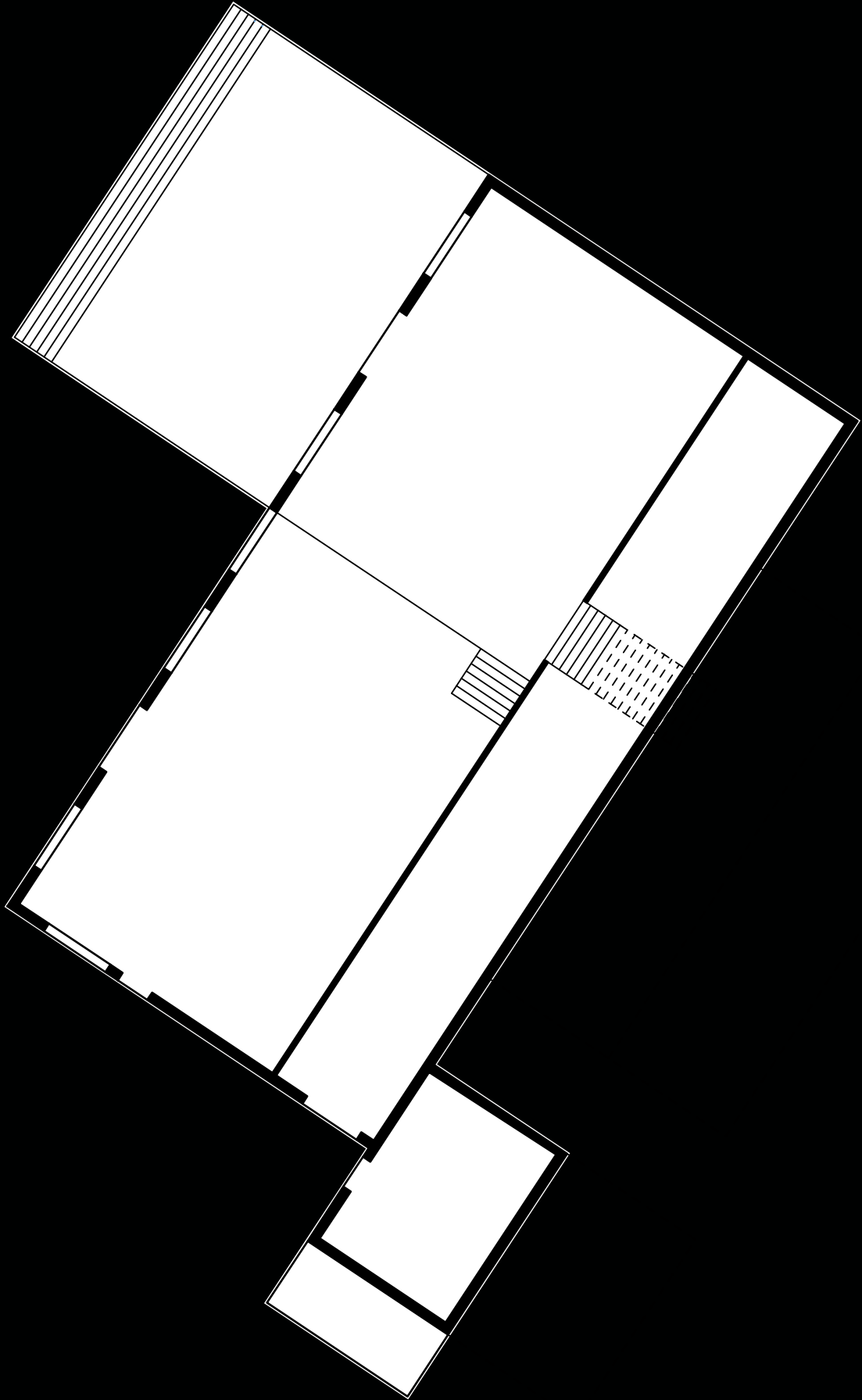
Considering the Commercial Report produced by Eng. Ermanno Rastelli in 1993 (as documented by a study completed in 1981, accessed at the State Archive of Piacenza - Archivio di Stato di Piacenza, Terme di Bacedasco, Serie 12, Busta 63, on October 16th 2019).

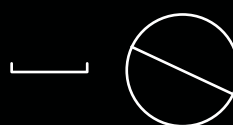
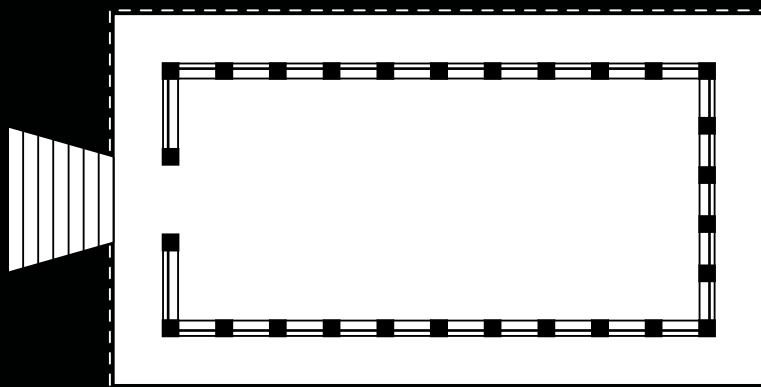
- Bottling of mid-mineral table water, producing 16 000 bottles/hour, corresponding to 24 000 000 bottles/year.
- Cosmetic line of healing and beauty products containing sulphurous water and muds of the Thermal Baths of Bacedasco;
- New Thermal Pavilion (SPA Resort – Realized & still standing);
- Golf Court with 18 holes, supplementary to the existing 18 ones;
- Conference hall;
- Sports facilities;
- Sports centres for A and B Football League teams' retreats;
- Race horses' breeding – Racecourse;
- Hotel developments (additional to the existing);
- Clinic – Nursing home;
- Heliport;
- Discotheque. (17)

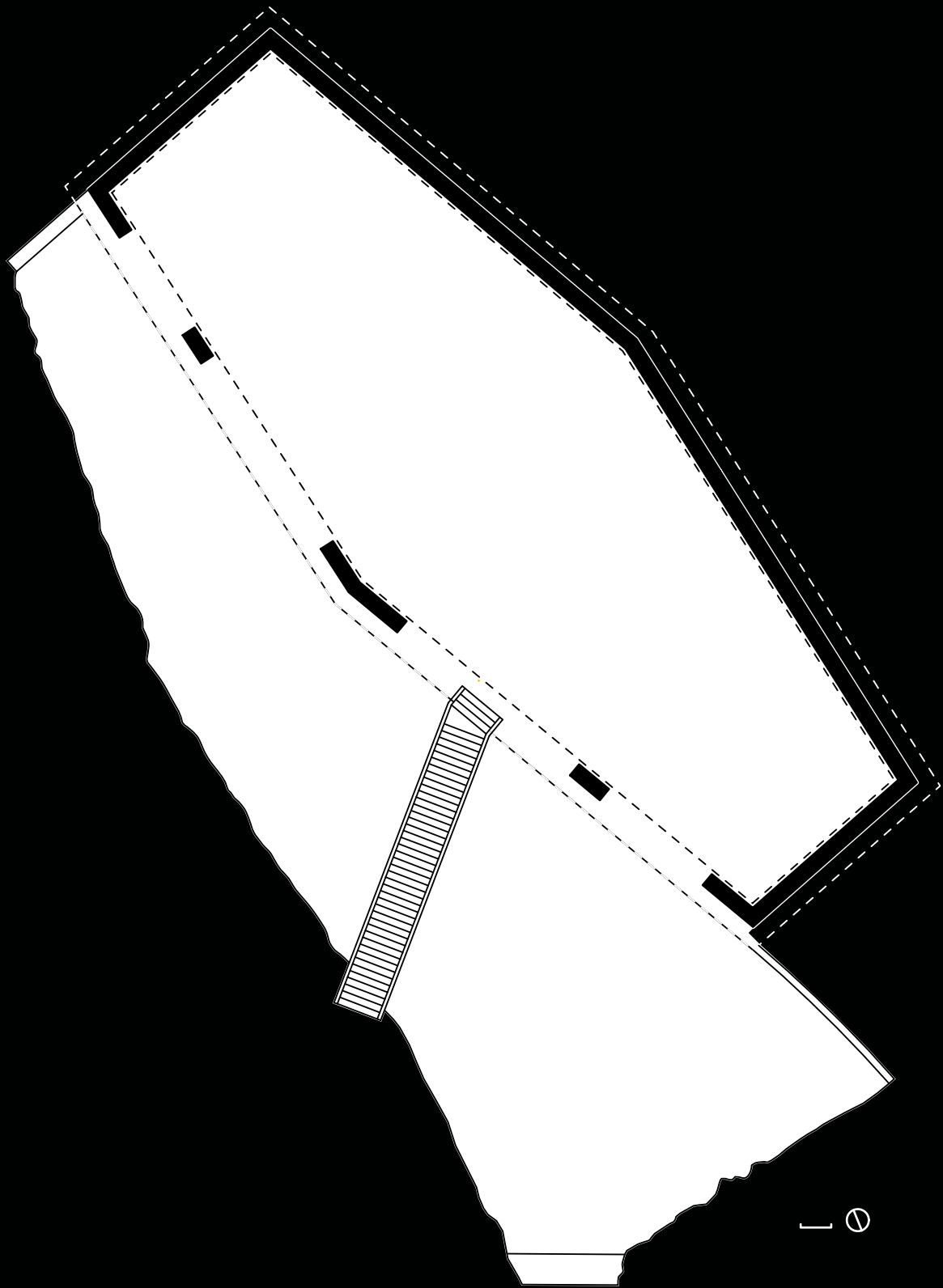
Img. 1- Private House Bathrooms Axonometry and Plan View

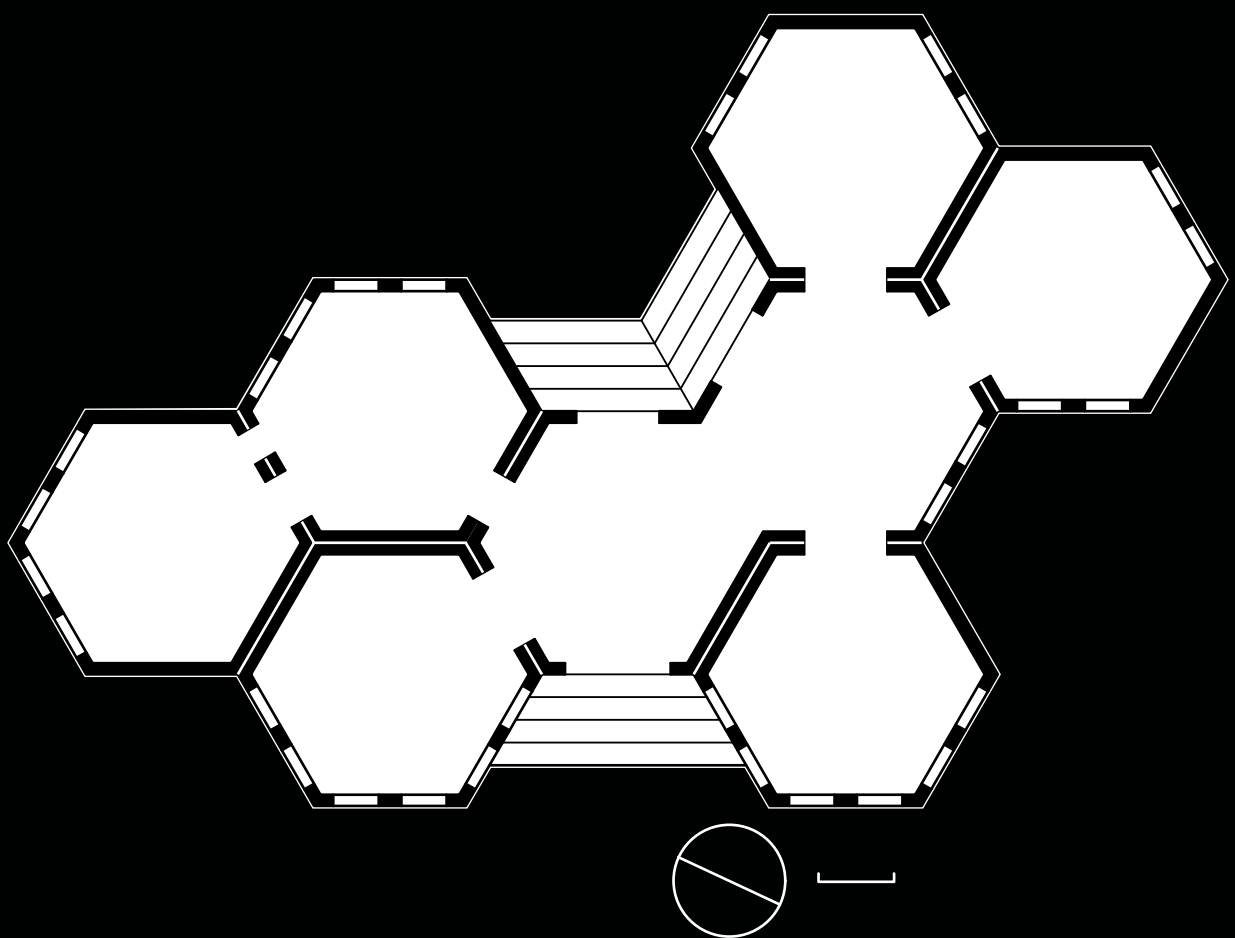












Legnami Pasotti S.A.

Avant-Garde and Sustainability

Considering the first phases of implementation, a primary role was played by the *Legnami Pasotti S.A.*, which was in charge of designing the thermal complex, its extension and subsequently the units for the *Villaggio Egeo*.

The company born at the end of the 19th Century in Brescia. Lombardy, acquired great relevance in the first half of the 20th Century by specializing in the production of wood for prefabricated dismountable structures and building components (doors, windows, floors and beams), which were commercialized both in Italy and abroad, especially in the Colonies.

By the end of the 40s, as documented by several advertising posters, the success had been such that the Pasotti Association presented three compounds: its main headquarters in Brescia and two secondary establishments in Rome and in Durazzo, Albania.

Among their major registered products, the *System for the construction of curvy or strict wooden plywood beams and joints for plywood beams* (*Sistema per la costruzione di travi in legno compensato curve o rettilinee, e giunti per travi di legno compensato*), was extremely successful and was employed for the erection of large span structures, as factories and temporary pavilions for Governmental Exhibitions in the 30s.

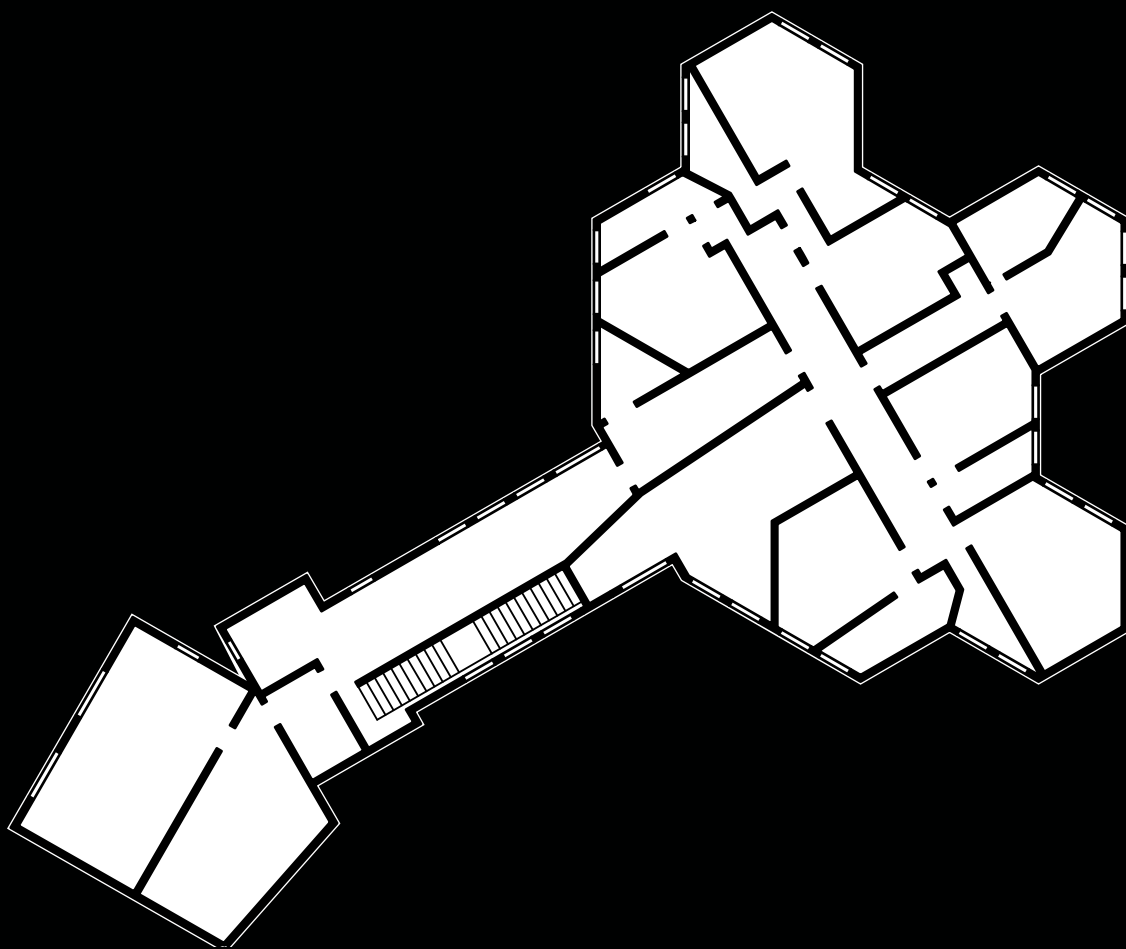
Regarding prefabricates structures, the innovative character results even more evident, as publications mentioned concepts as:

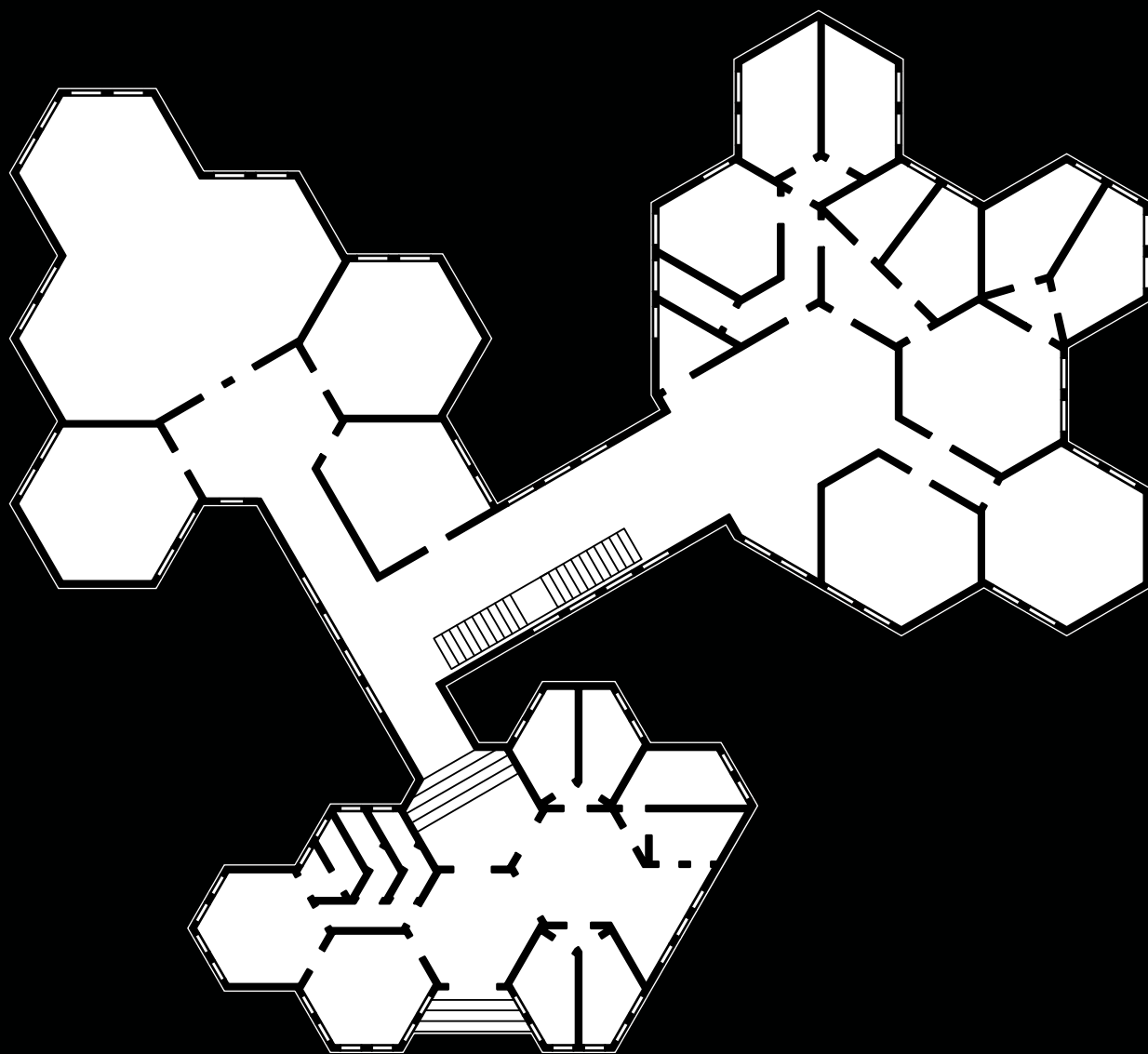
- the employment of a limited number of mass-produced components;
- the importance of simple and fast transportability, construction and extension;
- the load bearing function exercised by plywood wall boards (composed of a double layer of wood separated by a highly insulating one) and solid floor planks;
- the attention to durability, through the employment of weather and pests resisting finishing.

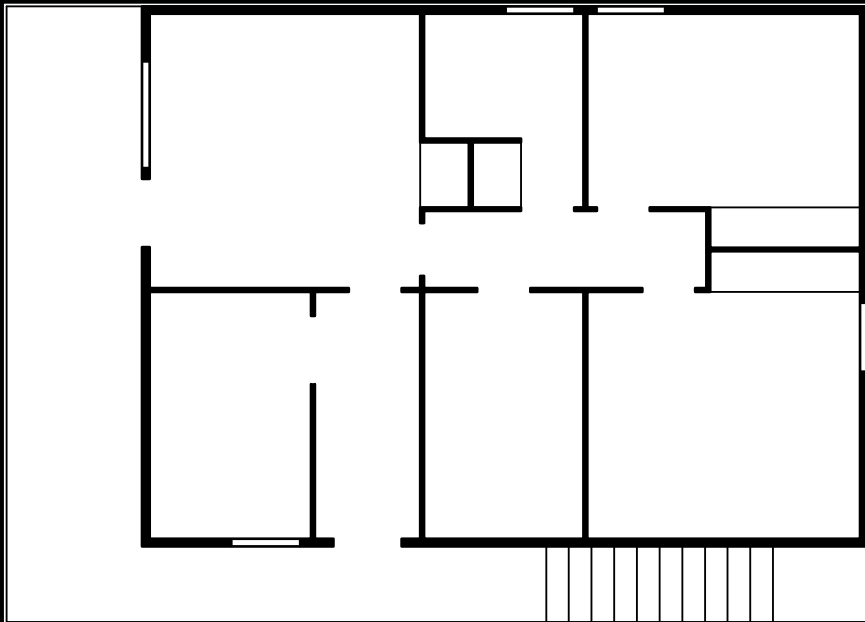
The solutions proposed by Pasotti were employed for the temporary housing adopted in Messina after the 1908 earthquake, as prototypes for colonial houses in Oriental Africa, for schools (as the *Prefabricated Middle School of Romiti*, from the 60s) and several residential units, as documented by the case study of Bacedasco, as well as the *Sistema P63*, recognized with prestigious prizes. (18)(19)(20)(21)(22)(23)

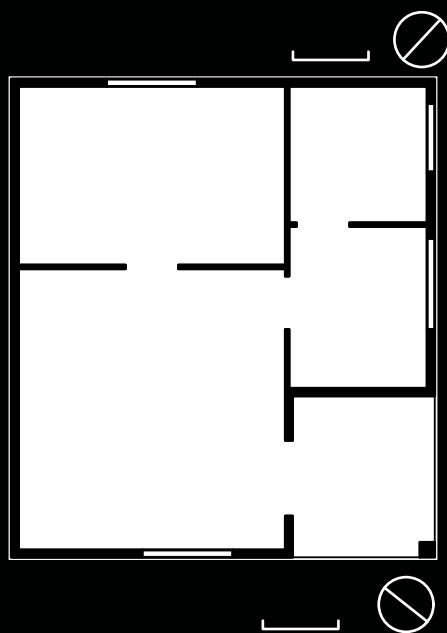
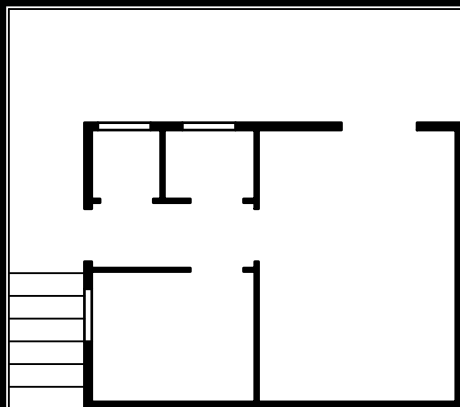
Img. 1- Private House Bathrooms Axonometry and Plan View

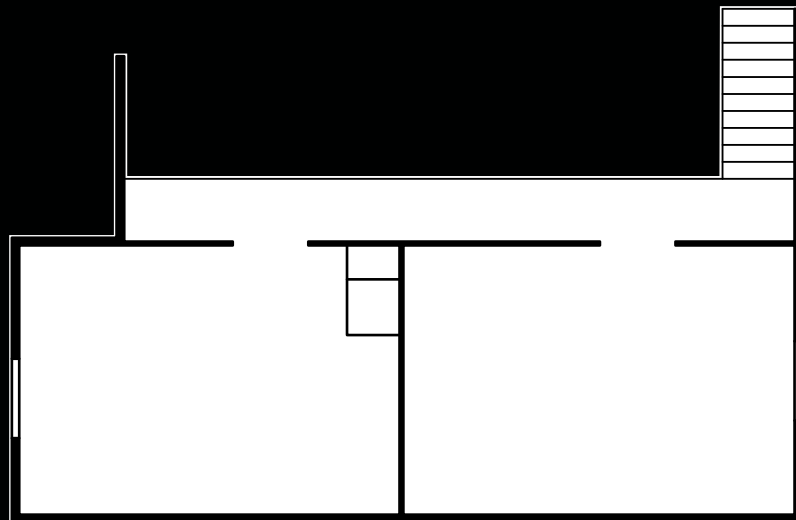
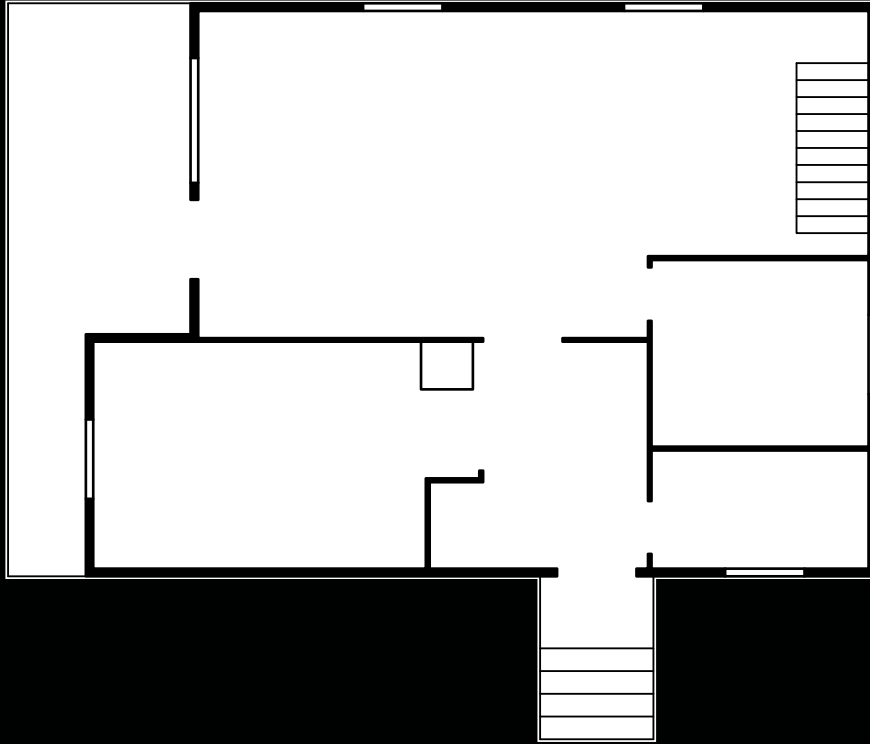


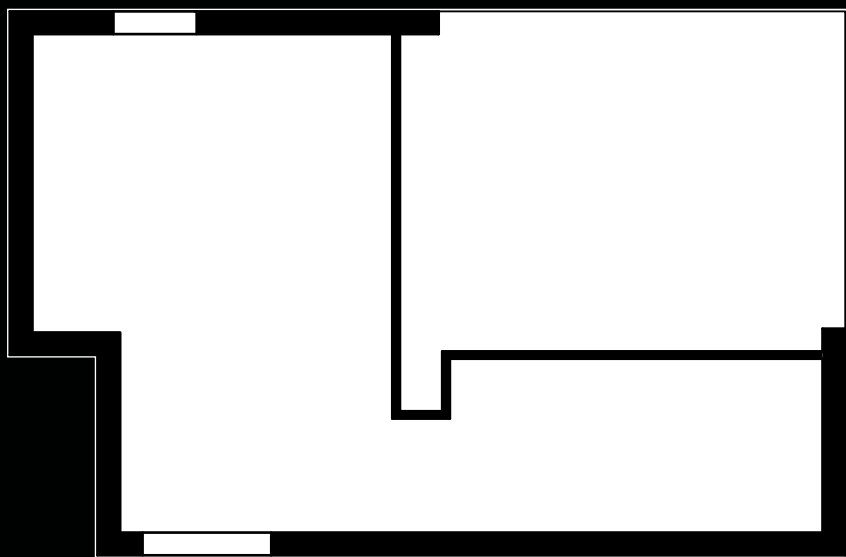
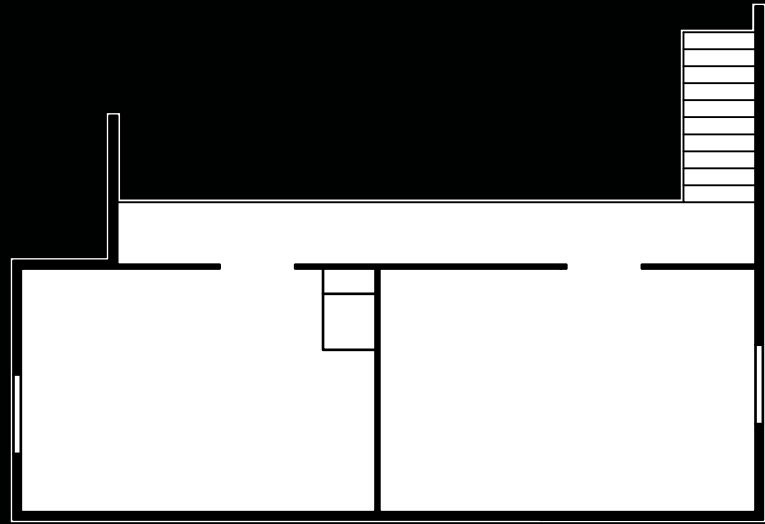
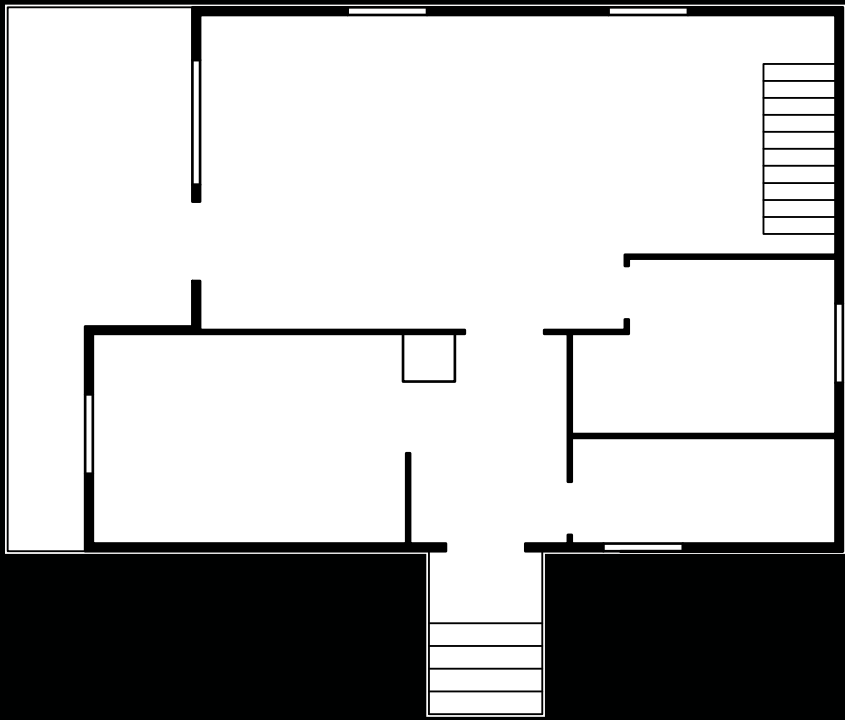




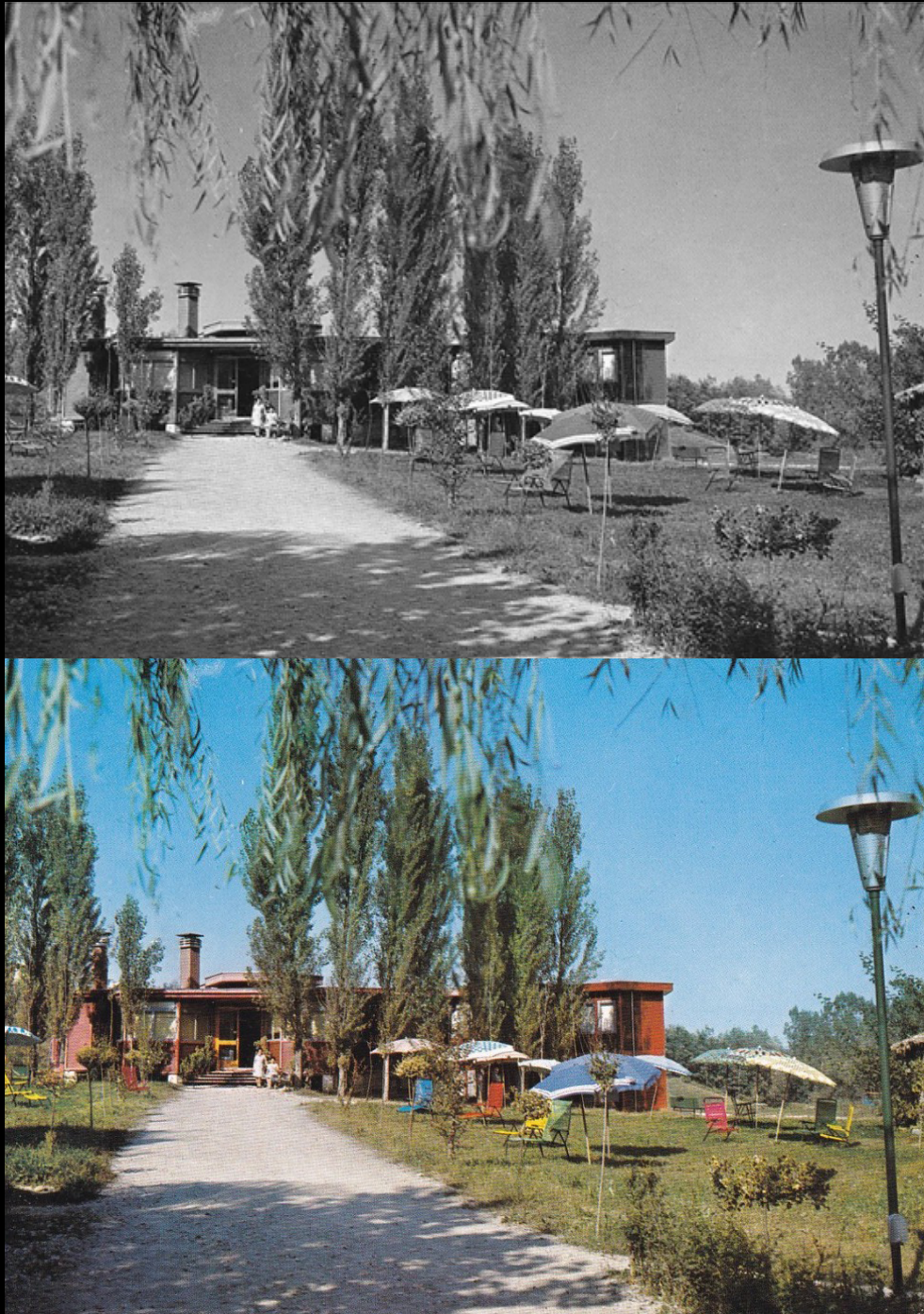








Img. 1- Private House Bathrooms Axonometry and Plan View



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Img. 1- Private House Bathrooms Axonometry and Plan View



Img. 1- Private House Bathrooms Axonometry and Plan View



Img. 1- Private House Bathrooms Axonometry and Plan View



Img. 1- Private House Bathrooms Axonometry and Plan View



Img. 1- Private House Bathrooms Axonometry and Plan View



Img. 1- Private House Bathrooms Axonometry and Plan View



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Images for “Bacedasco”:

- Img. 1
- Img. 2
- Img. 3
- Img. 4
- Img. 5



Chianciano Terme, Tuscany

Healing Through Water & Nature

The Municipality of Chianciano Terme, hosting archaeological remains which document the appreciation of the curative properties of its waters by Etruscans and Romans, represents an Italian example of thermal town. What is interesting about the compound of Chianciano Thermal Baths is that the various facilities it hosts are complementary, rather than competing, with one another, by employing the underground resource in different ways:

- the Acquasanta (Holy Water) and Fucoli Park are renowned for hydropinic treatments, as a consequence of the presence of the former's homonyms water sources. This green lung has become the setting for lively cultural activities and concerts, owing to the dancing area. Moreover, located within the Garden, the Terme Sensoriali Chianciano (Chianciano Sensory Baths), combine thermal experience and Naturopatia, aiming at the re-alignment of the psycho-physical-emotional status of patients. This goal is achieved by using water and additional elements to stimulate the senses in different ways. Some of the services are: Aroma-music Therapy, Cromotherapy, Emotional Shower, Melmarium and Hydropinic Therapy;

Img. 1- Private House Bathrooms Axonometry and Plan View



- the Terme di Chianciano Theia (Chianciano Theia Thermal Pools), using the waters gushing from the Silene Fons, mostly provide Balneotherapy. They do so by presenting three external and four internal baths, for an extension of more than 500 m² of pools. Additionally, the Health Centre supplies one sauna, one turkish and a rasul bath, emotional and cold showers;
- the Terme Sillene are mostly engaged with recovery treatments of muscular and skeletal systems, by virtue of a team of doctors and physiotherapists following the patients. (1)(2)(3)(4)(5)

The water typologies in this town are four, each with its own healing properties:

- Acqua Fucoli, bicarbonate-sulphurous-calcic cold thermal water (16.5°C), is mostly beneficial for intestinal natural regularity and osteoporosis;
- Acqua Santissima, spouting at a temperature of 24°C, predominantly acts on the respiratory apparatus;
- Acqua Sillene, characterized by an elevated content of carbon dioxide, it is usually put into service for balneotherapy and muds preparation;
- Acqua Santa, springing at 33°C, providing depurative and detoxifying actions, can be either drunk directly from the fons within the Park or from bottles distributed all over Italy in the number of six, for eighteen. (6)(7)

Overall, it can be stated that the experience of Terme di Chianciano is exemplar for its treatment of waters as mostly aimed for medical purposes.

Solutions which could be suitable to Bacedasco are:

- the successful combination of thermal park and bathing facilities, achieved by highlighting the relevance of nature and internal harmony in the healing process;
- the development of the bottling brand as an extension of the cures in loco;
- the strategy of creating a sort of network among the existing facilities, supported by diversified applications of the waters, which could be applied at larger scales.

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Parchi Termali di Ischia, Campania

Thermal Parks

Another interesting case study, researching the park and water sources typology, are the Thermal Parks of Ischia, deriving their name from being, mostly, open air baths, designed to merge into the natural landscape. There is at least one in every municipality of the Island, in proximity of thermal springs, making them a primary attraction to visitors.

The most well known are:

- Giardini Poseidon;
- Parco Idrotermale Negombo;
- Parco Termale Castiglione;
- Giardini Termali Tropical;
- Terme di Cavascuro;
- Fonte delle Ninfe Nitrodi;
- Parco Balneare Marino 'O Vagnitiello. (1)(2)

Parco Idrotermale Negombo - Lacco Ameno, Baia di San Montano

This Park, characterized by hyperthermal (above 40°C) salso-alkaline waters, rich in sodium chloride, consists in the most exotic of Ischia, as, thanks to its founder, the Duke Luigi Silvestro Camerini (1947), it is currently home to a multitude of rare and foreign plants.

It not only presents several types of grotto, pools and peculiar baths with water at different temperatures; what makes it unique is the blending of landscape, nature and bathing facilities, carefully studied by the Landscape Architect Ermanno Casasco after the opening of the garden to the public. This harmony was obtained by incrementing the number of Mediterranean vegetal species and by recovering local architectural elements and materials.

Overall, the experience results further enriched by the presence of contemporary art works along the walking paths and an arena for 1700 people, which contribute to increase the parallelism between baths and leisure or pleasure. (3)(4)(5)



In Bacedasco, the design of greenery and the attention to local materials are practices that have been applied during the first phases of implementation, in the 60s and 70s; however, the integration with art pieces and the stress on thermal parks as spaces for relaxation, could be interesting aspects to develop.

The facilities characterizing the compound are:

- Thermal Treatments' Facilities: 2 outside grottos; 3 outdoor baths; 8 outdoor pools; 1 hammam;
- Private beach;
- Health Centre;
- Restaurants and bars: 3 restaurants; 3 bars;
- Hotel: 4 stars; 16 rooms; 5 villas.

Img. 1- Private House Bathrooms Axonometry and Plan View



Giardini Poseidon - Forio, Baia di Citara

This thermal garden, alimented by salt-bromine-iodine and salt-alkaline-sulphate waters, is the widest of the island. Its uniqueness also derives from the 500 m² health and wellness centre, which combines physiotherapy, massages and inhaling with aesthetic and holistic ones, as the Rhythmical matrix therapy aimed at stimulating the organism. Additionally, it provides in water personal training support. (6)(7)(8)

The comprehensiveness of the health centre is a strategy that could be beneficial also for Bacedasco.

Available facilities are:

- Thermal Treatments' Facilities: 3 outdoor baths; 9 outdoor pools; 2 indoor pools; 1 indoor bath; 1 hammam;
- Private beach;
- Health and wellness centre;
- Restaurants and bars: 2 restaurants; 1 bar;

Img. 1- Private House Bathrooms Axonometry and Plan View



References for “Parchi Termali di Ischia”

- (1) A. Di Iorio and C. Ryll, 2012. *Ischia, l'isola verde nel Golfo di Napoli - Parchi Termali*. Accessed online on October 10th 2019, at: www.pithecusa.com/Terre/parchi_termali.htm.
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- (5) Le Acque del Negombo. Accessed online on October 10th 2019, at: www.negombo.it/le-acque.
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Saturnia, Tuscany

Natural Spa & Golf Resort

Considering an Italian facility relying on sulphurous waters, gushing at 37.5° C directly from the crater located underneath it, the Saturnia Compound appears as the best known and most successful one. (1) With its history tracing back to the Etruscan Period, this case study is relevant to this research for the present luxurious multi-award configuration and management of the resort. (2)

Composed by thermal park, SPA & Beauty Clinic, club, hotel, dining facilities, shops and golf courts, this institution has created a perfect synergy between thermal treatments for health and for beauty. If the curative properties of the waters are exploited to provide conventional treatments as balneotherapy, hydromineral, mud and inhalation therapies, as well as innovative massage and therapeutic techniques, the facility is also a field of practice for aesthetic medicine, consisting in the usage of tripolar radiofrequency, hyaluronic acid and botulin, among the others.

Img. 1- Private House Bathrooms Axonometry and Plan View



Moreover, the Clinic, recognized as the Best Medical Spa by the Italian Spa Awards, produces and sells beauty products of excellent quality, while hosting a famous hair saloon, Frank Giacone. (3)(4)(5)(6)

The presence of the Club consents to provide members and requesting guests with a more exclusive experiences, comprising the access to springs, fitness, solarium and separated relaxation areas, in addition to the park's pools and baths. (7)

On the other hand, different dining options, namely restaurant, bistrot, lounge bar and picnic service, along with the availability of tennis and golf courts, make physical exercise and nutrition two other crucial components of the users' experience. (8)(9)

It can thus be said that Saturnia represents an extension of the concept of thermal park, by proposing a package of excellence, focused not only on health, but more on beauty, relax, sports and food.

Img. 1- Private House Bathrooms Axonometry and Plan View



Making a parallel with Bacedasco, it is quite striking to notice how several facilities and services were already envisioned or designed for the latter and did not bring to a long-lasting success.

In this perspective, providing a more unique and luxurious experience, as well as enhancing the relax and beauty components could be applicable ingredients to achieve success.

Facilities available for fruition are:

- Thermal Treatments' Facilities: outside grottos; 4 outdoor baths; 5 outdoor pools; 1 hamam; 1 sauna;
- SPA & Beauty Clinic: 54 treatment rooms; 1 indoor pool, 2 outdoor baths, 1 outdoor pool, 1 sauna;
- Shops: 1 beauty and crafts; 1 food and wine; 1 art and jewellery;
- Restaurants and bars: 2 restaurants; 1 bar; 1 Picnic Service;
- Hotel: 5 stars; 130 rooms;
- Golf Club: 18 holes;
- Tennis Courts.

References for “Saturnia”

- (1) Terme di Saturnia. *Terme di Saturnia SPA and Gold Resort – A unique spring of beauty*. Accessed online on October 10th 2019, at: www.termedisaturnia.it/en.
- (2) Terme di Saturnia. *The history of the thermal baths of Saturnia between myth and legend*. Accessed online on October 10th 2019, at: www.termedisaturnia.it/en/hot-springs/benefits-of-the-water/history.
- (3) Terme di Saturnia. *SPA & Beauty Clinic – Thermal spa regeneration*. Accessed online on October 10th 2019, at: www.termedisaturnia.it/en/spa/beauty-clinic.
- (4) Terme di Saturnia. *Aesthetic Medicine - Avant-garde aesthetic*. Accessed online on October 11th 2019, at: www.termedisaturnia.it/en/spa/aesthetic-medicine.
- (5) S. Viganò, 2019. *Terme di Saturnia: 100 di bellezza e benessere*, Vogue Online – Beauty. Accessed online on October 11th 2019, at: www.vogue.it/bellezza/article/terme-di-saturnia-trattamenti-acqua-termale-benefici-novita-100-anni.
- (6) Terme di Saturnia. *Hair Stylist – Healthy hair*. Accessed online on October 11th 2019, at: www.termedisaturnia.it/en/spa/hair-stylist.
- (7) Terme di Saturnia. *Thermal Park – Thermal water and nature*. Accessed online on October 10th 2019, at: www.termedisaturnia.it/en/hot-springs/thermal-park.
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Part 3

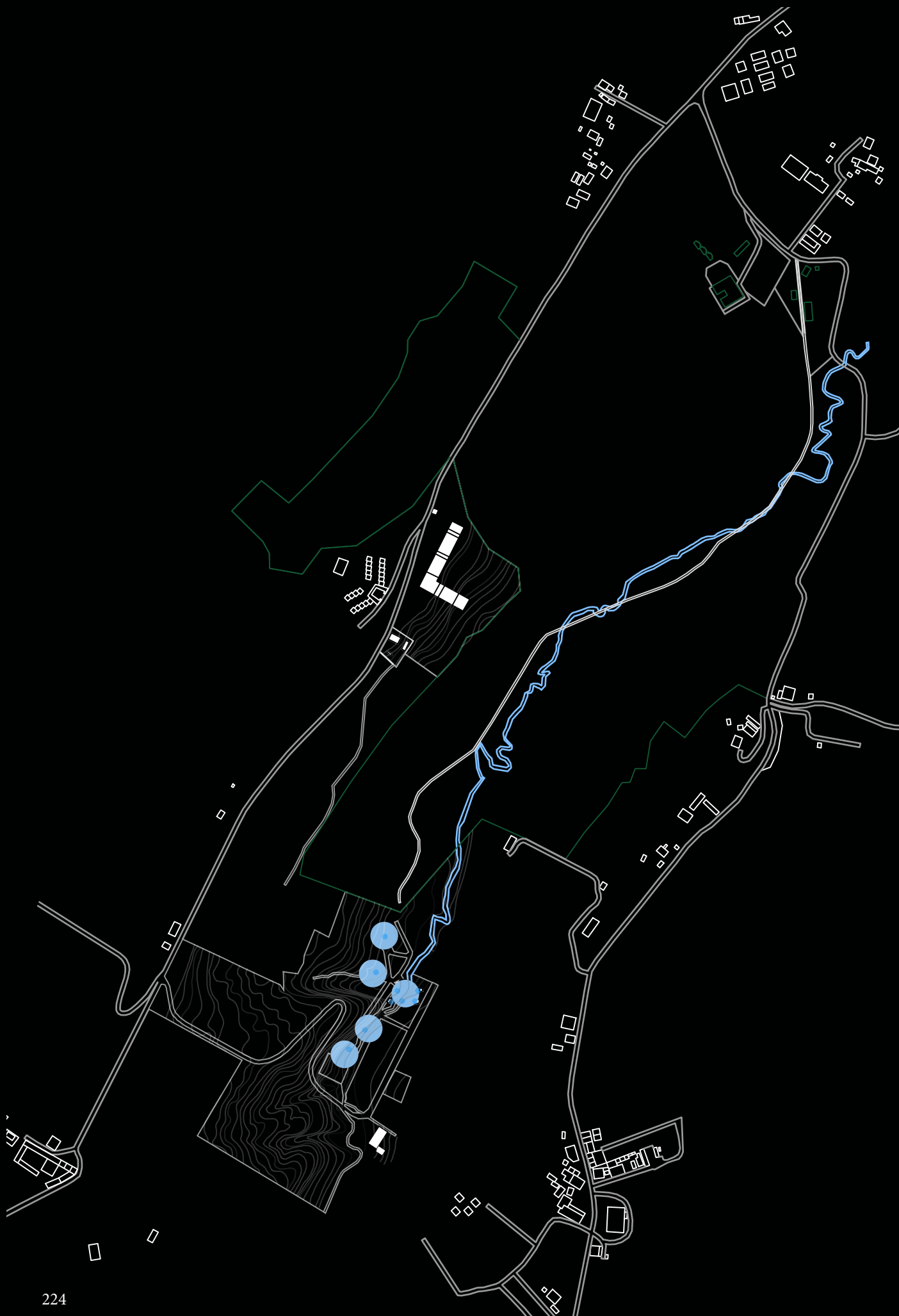
Design Process
for the Regeneration of the
Thermal Park of Bacedasco

Part 3

Design Process
for the Regeneration of the
Thermal Park of Bacedasco

Territorial Approach

Territorial Approach





Approaching Bacedasco, A Large Scale Perspective

Remains of Parco delle Fonti

Considering the two portions that remained available as part of the property, this thesis project was focused only on the one surrounding the springs.

As it was introduced in the previous section, the Thermal Park of Bacedasco, after decades of inactivity, is in a state of dissolution. If the access road is covered in weeds and most of the initial constructions have disappeared, however, the walking path designed around the springs has remained quite clearly delineated.

Moreover, during the interaction of the author with Eng. Ermanno Rastelli, currently in charge of the Project, it was mentioned how, it is quite normal that only a couple of sources still discharge water, as sulphur tends to accumulate in the pipes and block the flow, if not cleaned annually.

In this perspective, the formulation of the design concept started with the decision of preserving the remains of Parco delle Fonti, while aiming at re-interpreting their relation with the Acqua Puzza River and the new thermal complex.

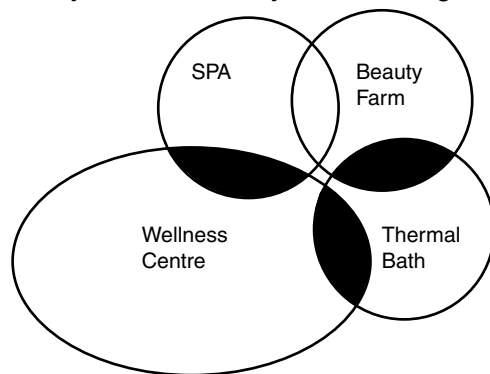
The Revival of the Area Through More Than Medical Treatments Strategy and Target

As it has become evident, through experience and history, that medical treatments are not enough for the survival, or in this case revival, of small-scale thermal complexes. It thus appears evident that Bacedasco would need a more comprehensive strategy.

However, several are the factors that favour the site in this perspective:

- interest of private investors and Municipality;
- existing neighbouring golf club;
- presence of quality muds, employable to start a cosmetic line;
- availability of a sufficient water reservoir and space to implement bottling;
- proximity with famous thermal towns;
- local population attachment.

The Terme di Bacedasco Compound could thus become an elite centre for health, wellness and beauty, as it is located at the bottom of a quite valley, surrounded by a flourishing landscape.



The Bocconi Model

Considering the target, both patients and visitors could be considered, as the edificable land is prescribed to be available for hotel, residences, restaurants and shops. As the area is limited and bound by the existing structure of the Park, spaces for treatments should be prioritized.

In these regards, rooms quipped with kitchen, comfortable livingroom and private bath could be provided, so as to favour the staying of a limited, but sufficient amount of both targeted classes of clients.

Moreover services as restaurant, bar and shops should also be available, so as to encourage daily customers and local population alike.

The Community Around the River

Philosophy of the Project

To move on with the elaboration of a concept for the project, several historical plans, accessed through the State Archive of Piacenza and the documents available at GPR Studio, were analysed in order to understand the actual path followed by the river, as only a portion of it was visible during site visits. It was interesting to discover that the route connecting the springs run exactly on top of the water source.

In light of this information, the idea that emerged was that of enhancing the concept of water being central to the thermal complex, by suggesting the uncovering of the river and its transformation into the main pedestrian axis, by flanking it with raised paths.

Thinking about the medical pavilion and its ruinous condition, it was decided to study the area as if it had been already demolished.

For its design several factors were taken into consideration:

- the sectorial trends, suggesting an enlargement of perspective from mere health treatments;
- the past ruinous projects implemented in the area;
- the attention to the environment played in the earliest stages of development, still characterizing the main structure;
- the communitarian role embodied by this complex and the survived attachment to it;
- the lesson learned from studying the Japanese approach to onsen and their close relation with nature.

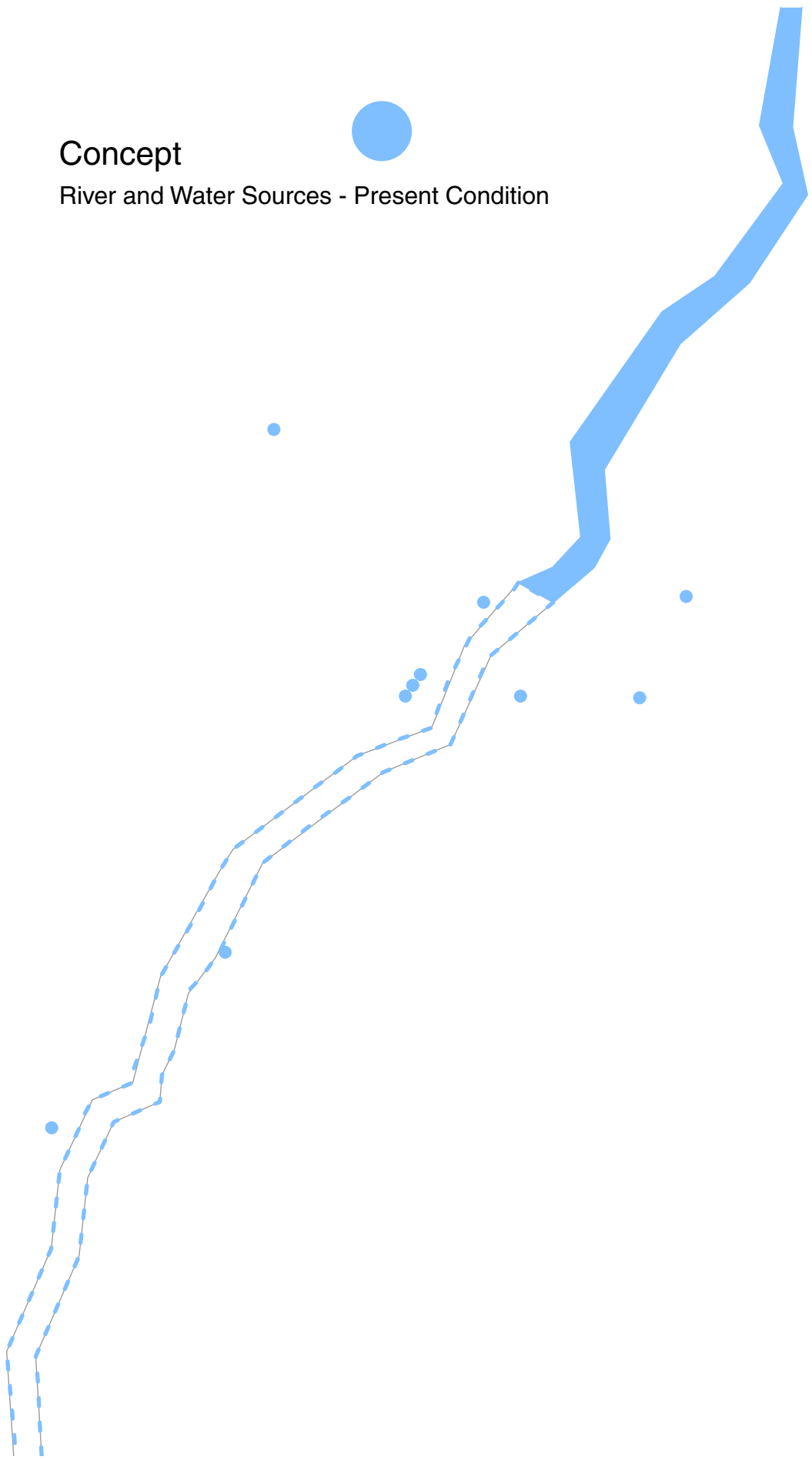
In this perspective, the most efficient strategy seemed that of favouring a diffused solution, rather than re-proposing a centralized one.

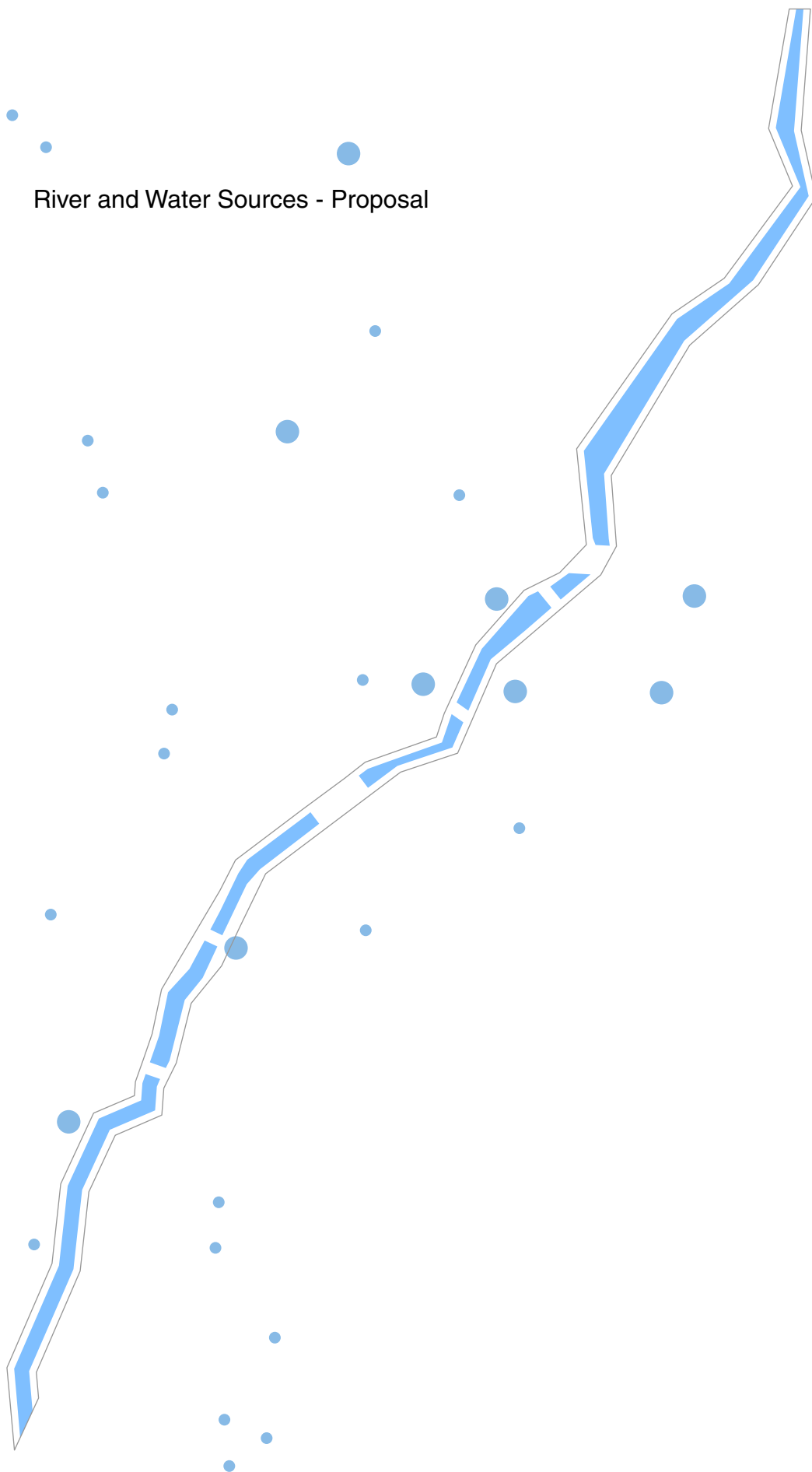
Moreover, by considering the existing water sources as nodes to pass by to reach small units disseminated around the plot, their importance seems automatically to rise, without the need for further action, if not minor restoration and maintenance.

The concept that resulted from the previous reasoning was that of considering the capability of water of permeating as the ratio essendi of a diffused thermal complex, composed by several blocks, immersed in nature and connected by raised gangways sprouting from the proximities of the existing fons. Connectivity becomes a primary aspect as it consents patients and visitors to meet, interact and coexist, thus favouring the creation of a sense of community, rather than that of segregation, characteristic of centres that provide both medical and wellness facilities.

Concept

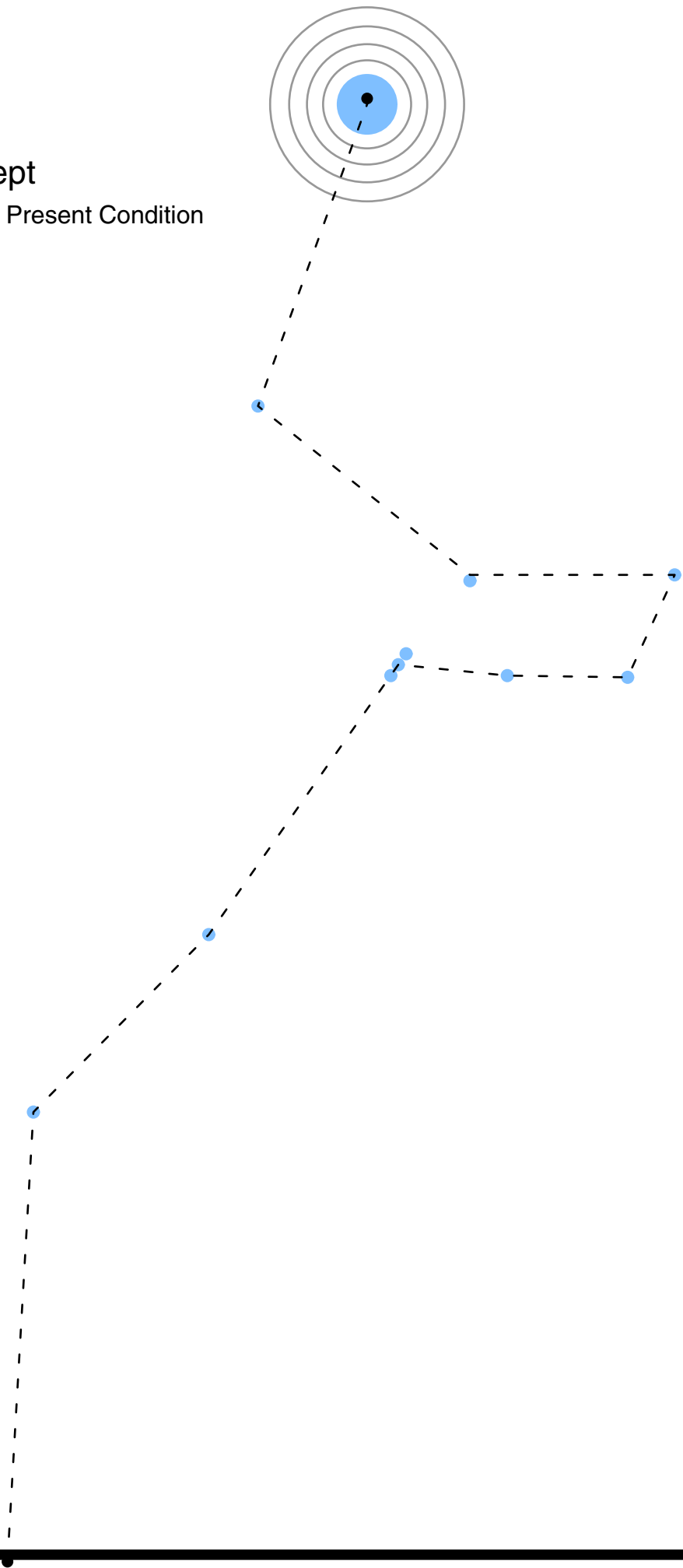
River and Water Sources - Present Condition



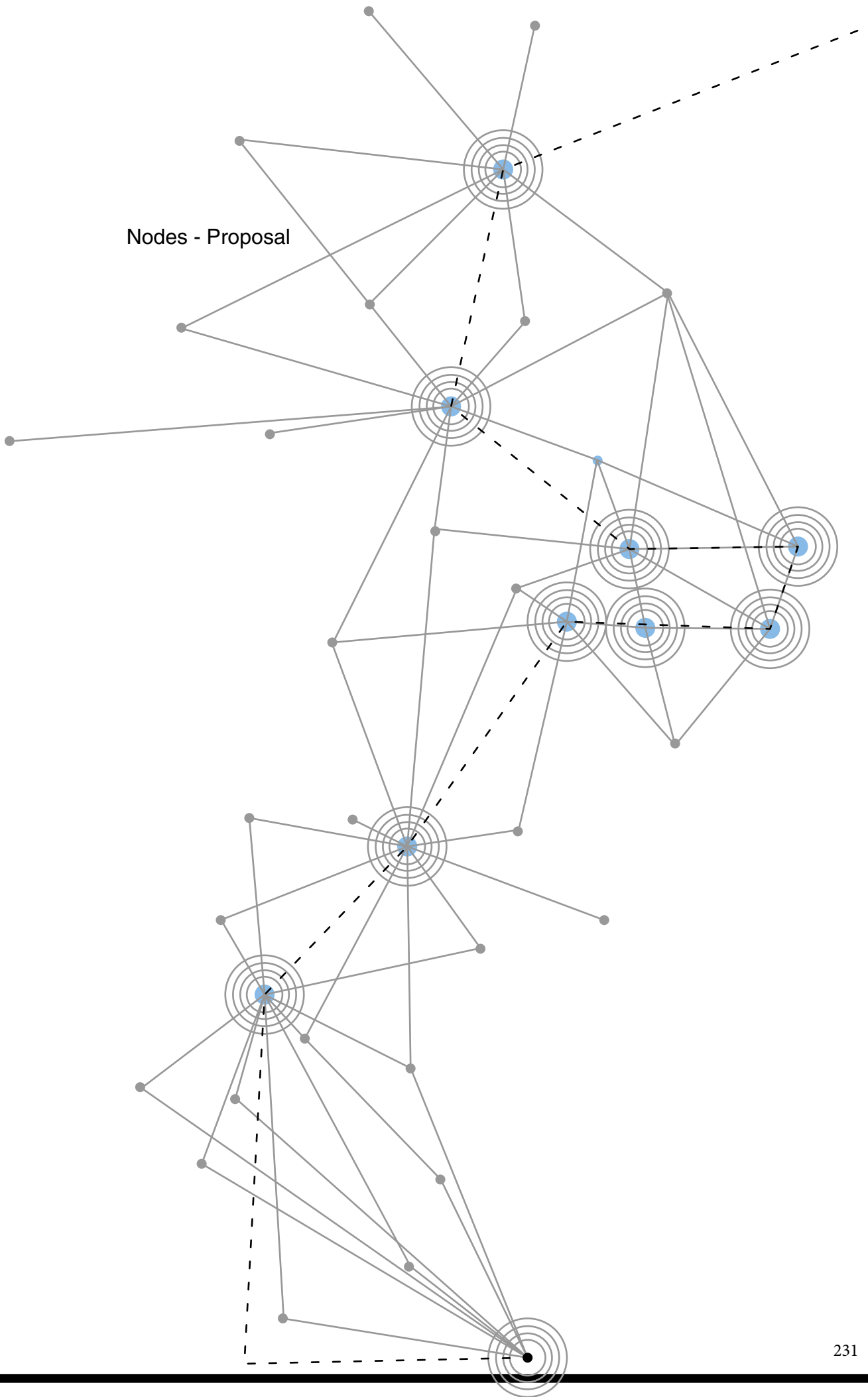


Concept

Nodes - Present Condition

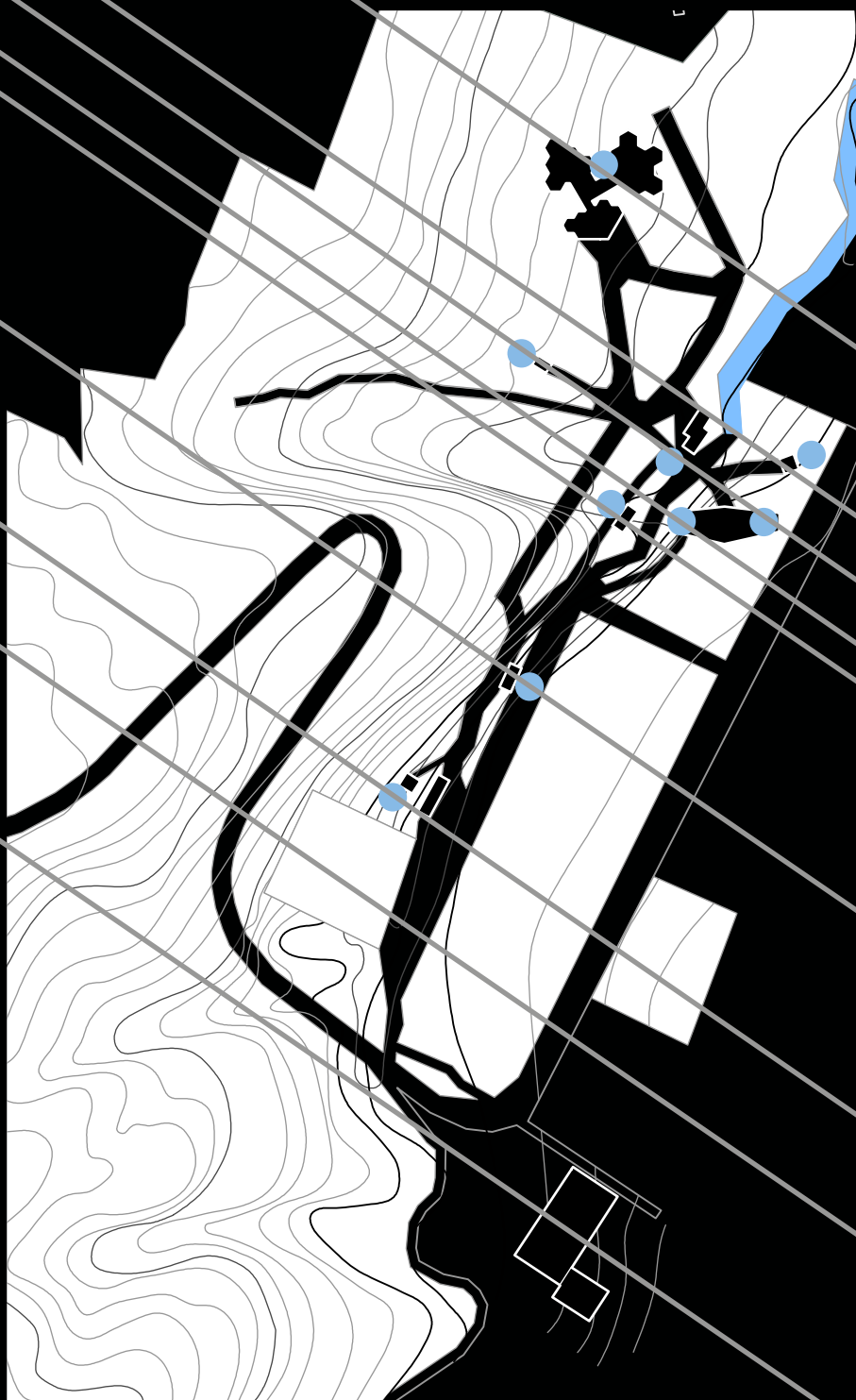


Nodes - Proposal



Territorial Approach

Masterplan of the Present Condition

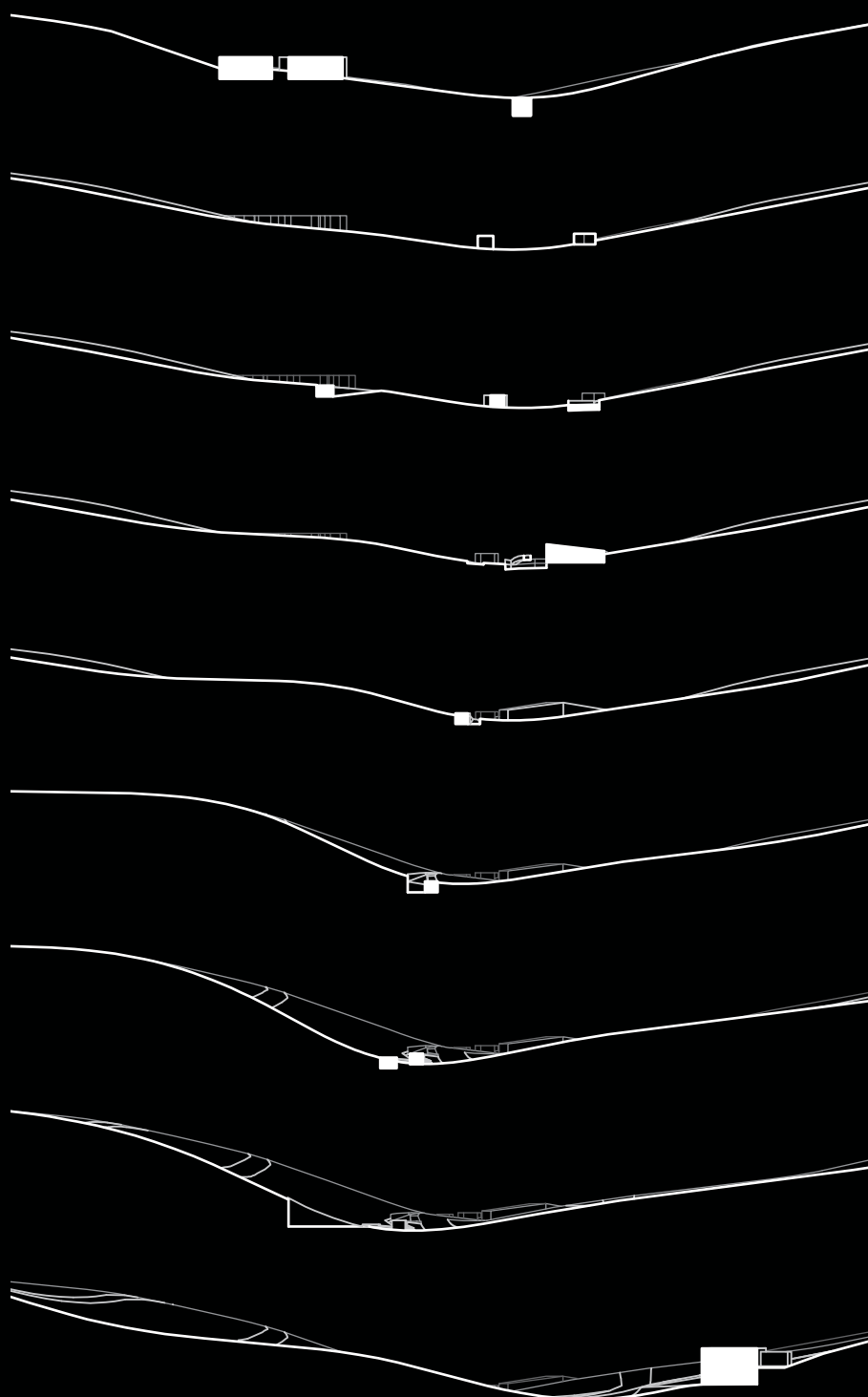


Masterplan of the Proposal

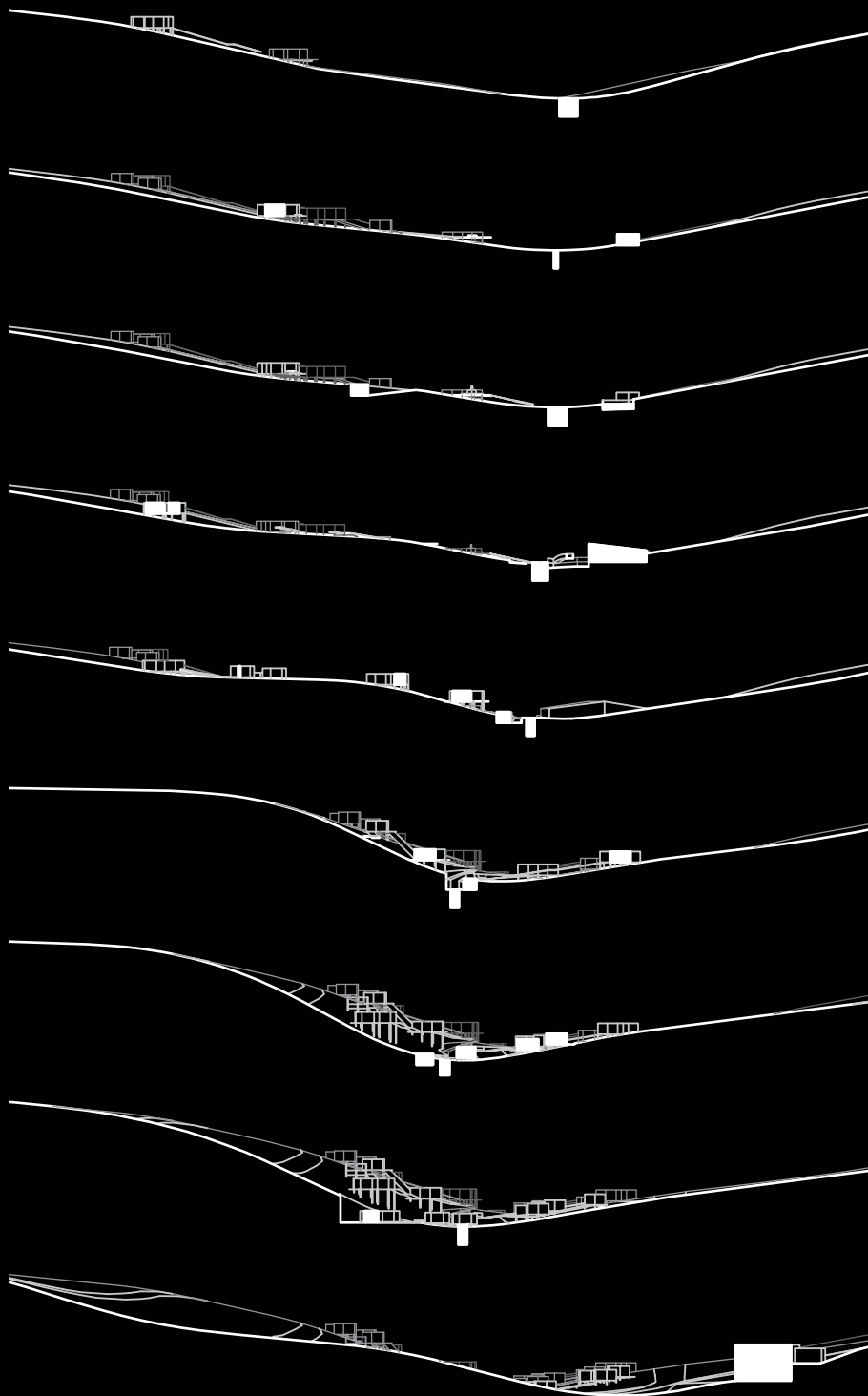


Territorial Approach

Territorial Sections of the Present Condition



Territorial Sections of the Proposal



Prefabrication & Modularity



Hexagonal Ready-Made Units, Constructive Strategy

Concept

Approaching the design of the individual units, the prerogatives were:

- the choice of a geometrical shape which could consent maximum livability of interiors and exposition to the natural environment;
 - the attention to choosing a layout which could be easily expanded or reduced, according to the evolving needs of the complex;
 - the need for fast and inexpensive production and building strategies.
- In this perspective the concepts of prefabrication and modularity became cardinal.

Moreover, considering the historical background of the site and the solutions introduced by *Legnami Pasotti S.A.* for the Medical Pavilion, the hexagon was selected as basic geometric figure for the essential layout of the modules.

Thus, from one to five components layouts were designed, in order to provide comfortable architectures for all ranges of proposed services. A prefabrication strategy was then formulated and adapted to each typology of solution.

Strategy

Taking the dimensions of the Pasotti Hexagons as a reference, the basic shape has an external side dimension of 3.3m (internal side – 3.1m) and a floor area of 25m².

From this assumption, the assemblage of more units was conceived as the sum of the standard ones and thus, each preserves its lower structural components.

To understand the structure of prefabricated wooden hexagonal modules, several existing solutions were researched and two particular ones were selected as references:

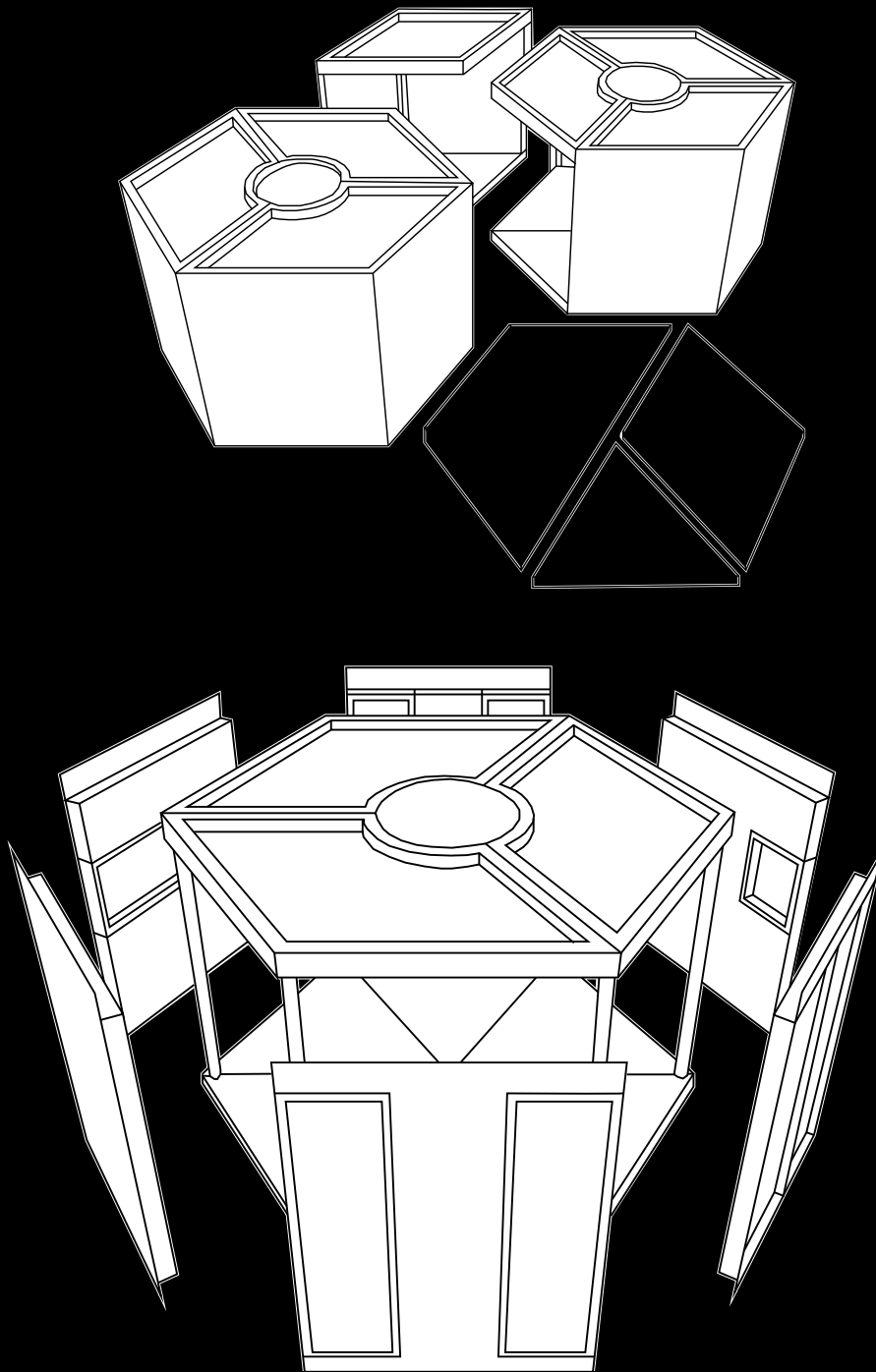
- the *Hivehaus*, by Barry Jackson, is a hexagonal modular living space which is extremely customizable and adaptable. Each 9.3 m² unit (with 2m sides) is considered as function specific and thus a house would be composed by a series of them. The prefabrication strategy, based on the usage of a six pieces deck and three pieces roof, connected through small columns and enclosed by prefabricated panels, permits to construct a three units house in a couple of hours, with the support of two to three operators. Moreover, a circular skylight consents the increment of

natural sunlight intake. (1)(2)

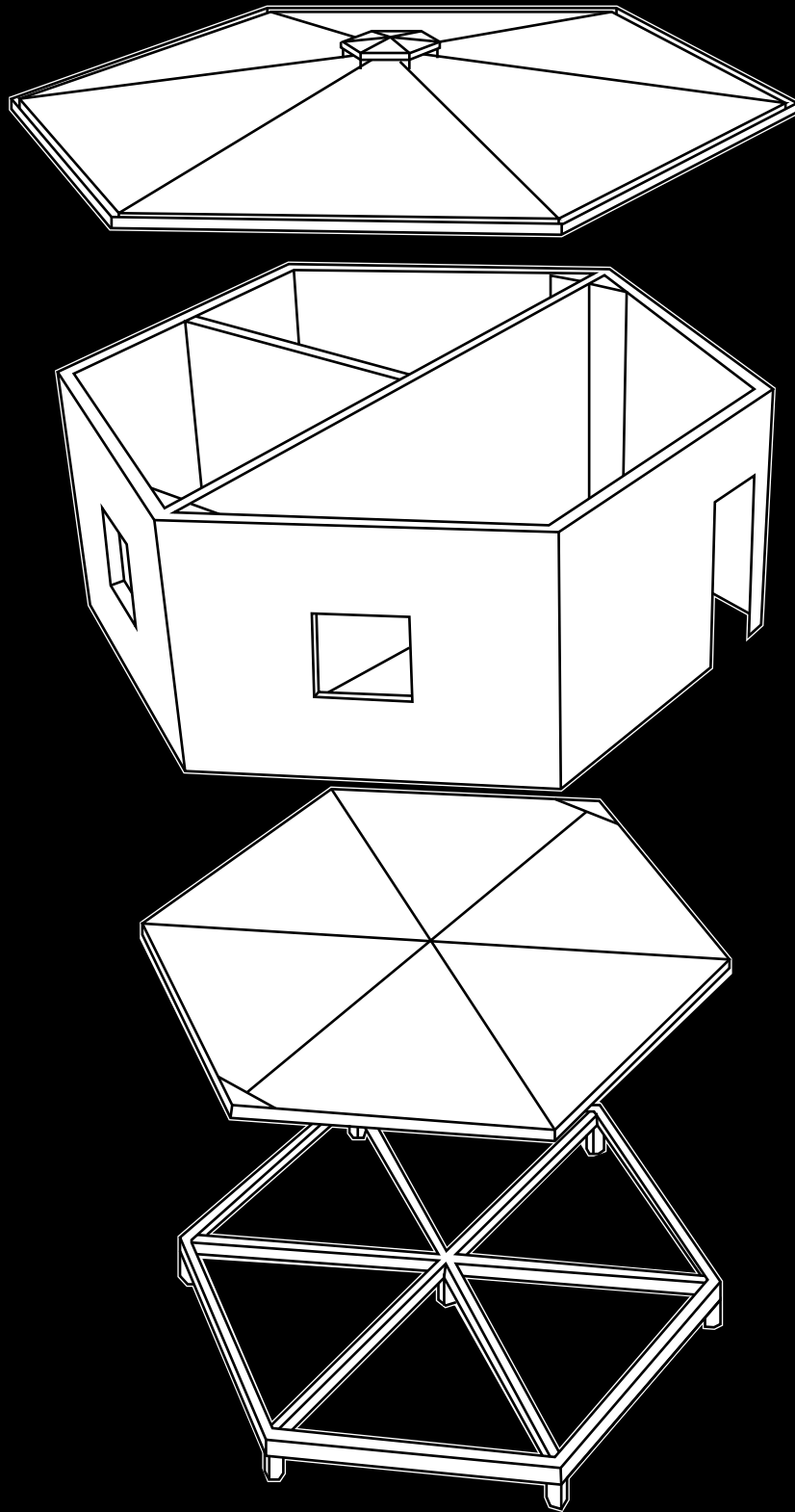
- the *Hex House*, by Architects for Society, conceived with a hexagonal base shape, is a model for prefabricated emergency shelters.

Presenting a minimum area of 40m², it is designed as an extensible twenty years life-span unit, which presents living room, kitchen, two bedrooms, bathroom and an entrance porch within one cell, separated by internal movable walls, to consent freedom of personalization of interiors. Standardized 3 by 4m Structural Insulated Panels are employed to simplify production, transportation and assembly. (3)

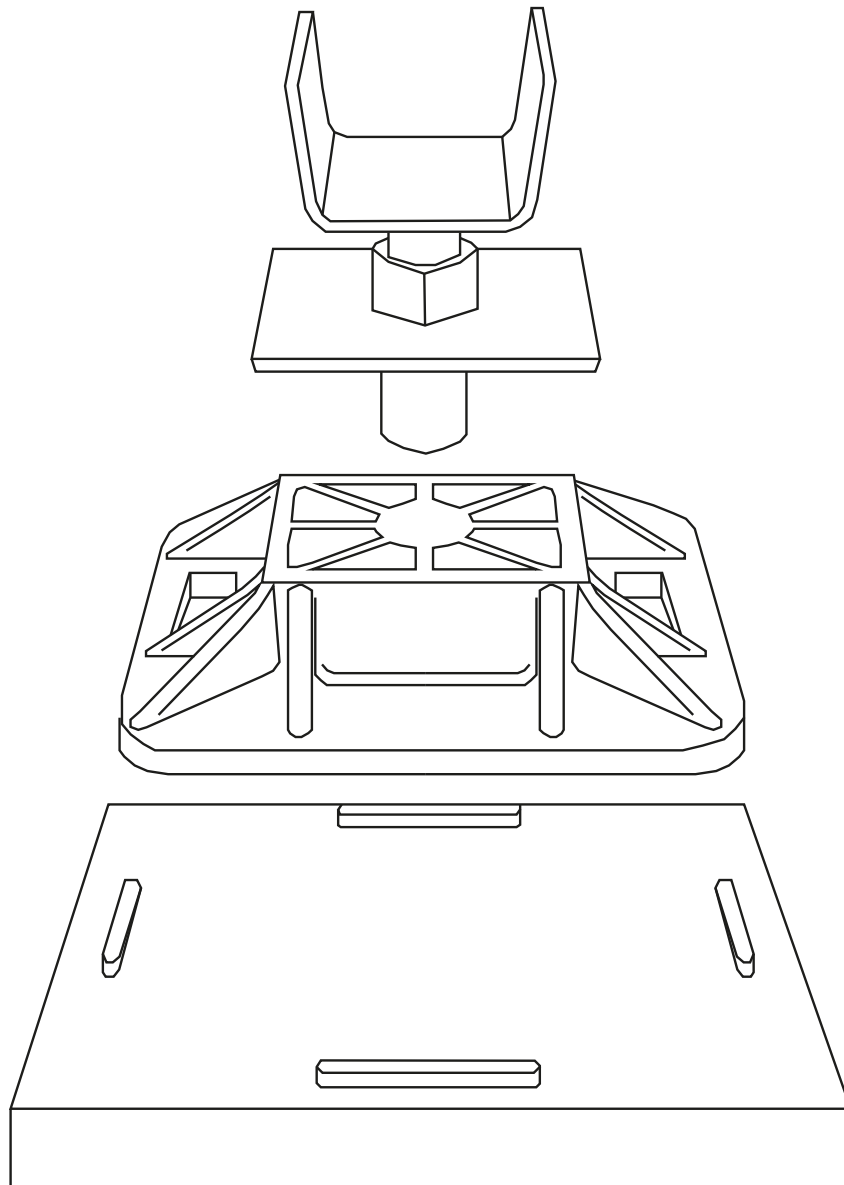
Having taken inspiration from these projects, it was decided to utilize a structure more similar to the *Hivehaus*, thus, with a six pieces decking, a partitioned roof, prefabricated wall panels and columns. However, this structure was partially modified: a central pier was added, under the base, at the centre, as for the *Hex House*; the columns were enlarged, so as to match the base structure and the roof was conceived as a hexagonal prismic crown, so as to allow the opening of skylights in different shapes.



Img. 2 & 3 - Hivehaus Assembly & Construction Diagrams



Img. 4 - Hex House Construction Diagram

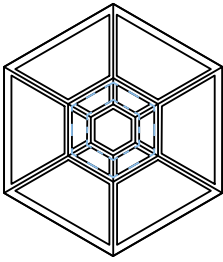
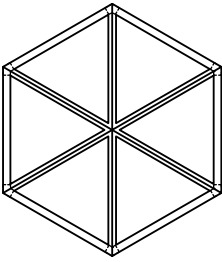
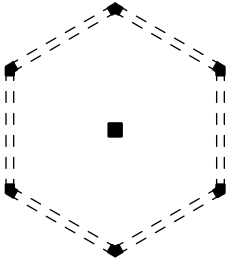
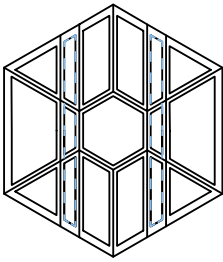
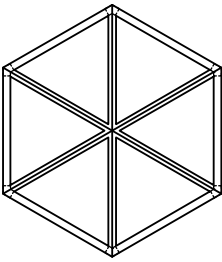
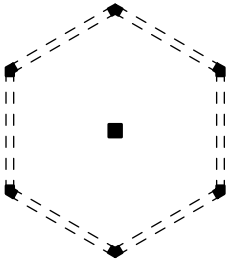
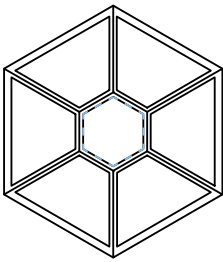
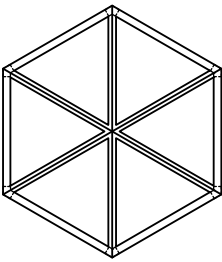
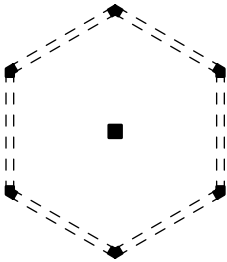
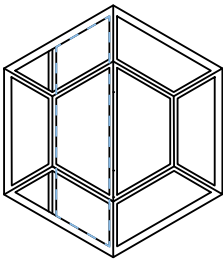
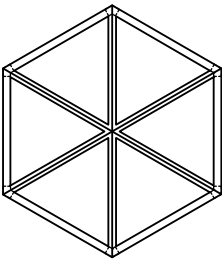
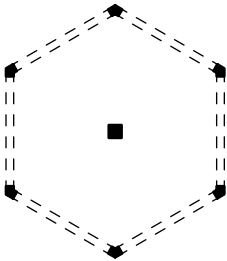
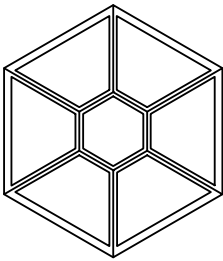
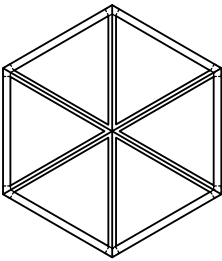
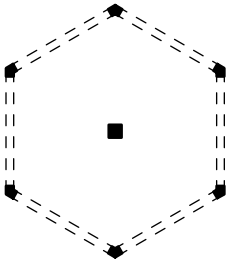


Img. 5 - Adapter, Support Block & Incremental Packers of Jackpad Portable Foundations

For the foundations, due to the great differences in steepness characterising the site, more research was carried on. In this perspective, the Jackpad Portable Foundations, made of a steel adapter and recycled plastic support block and incremental packers, seemed particularly suitable and were adapted to the peculiar shape of the base columns. (4)

Thus, each unit is raised from the ground from a minimum of 20cm on the shortest side and an adapted height from the others.

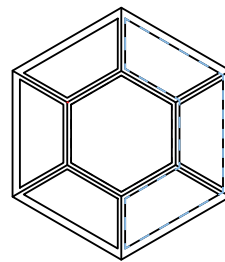
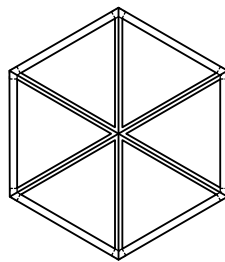
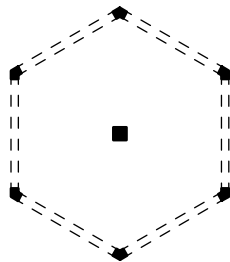
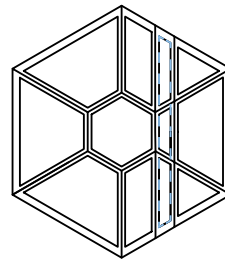
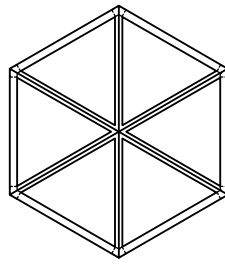
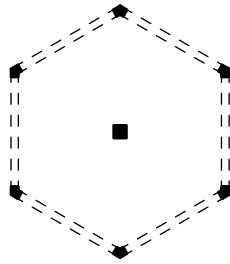
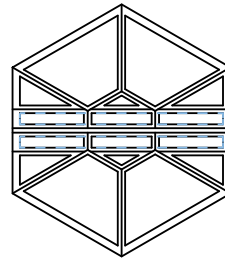
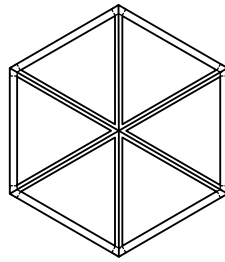
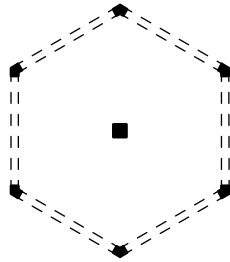
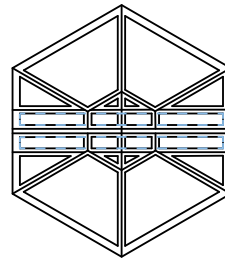
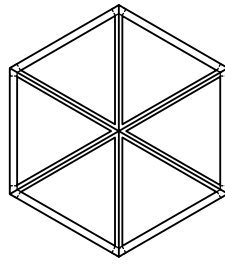
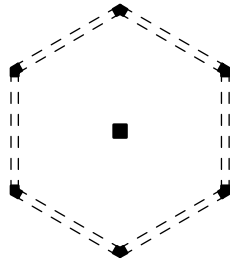
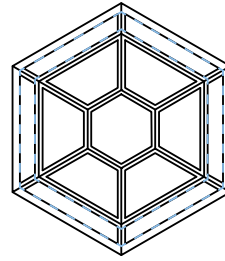
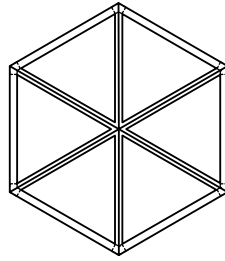
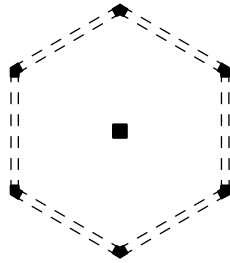
One Unit Modules



Elevation Structures

Base Structures

Roof Structures



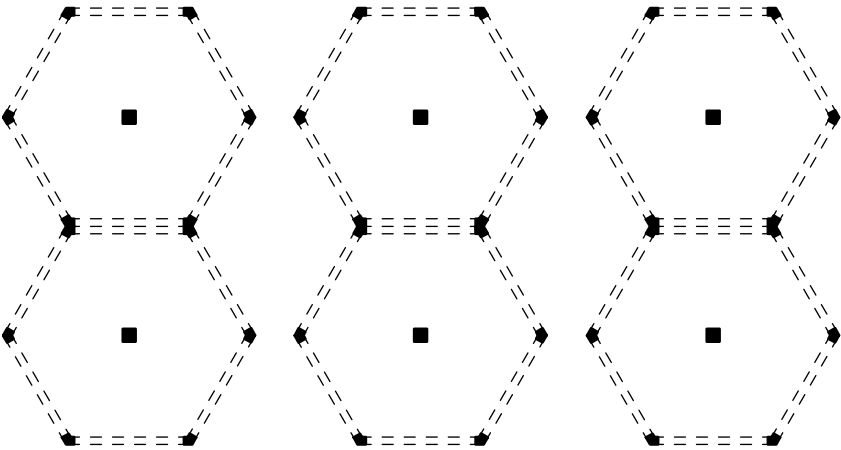
Elevation Structures

Base Structures

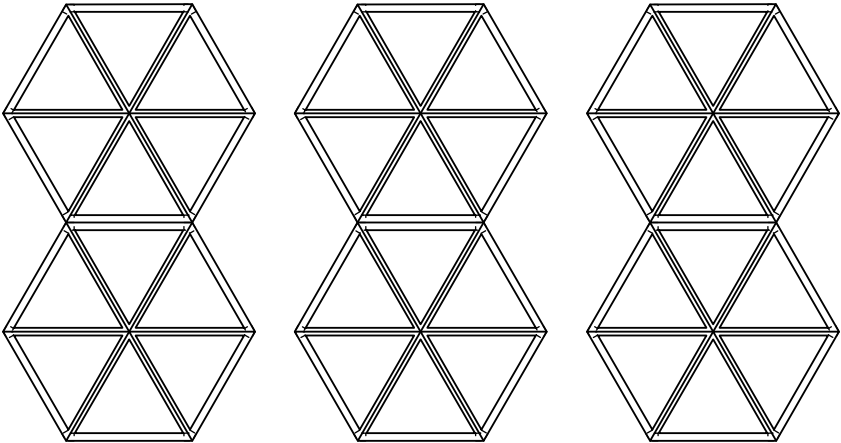
Roof Structures

Two Units Modules

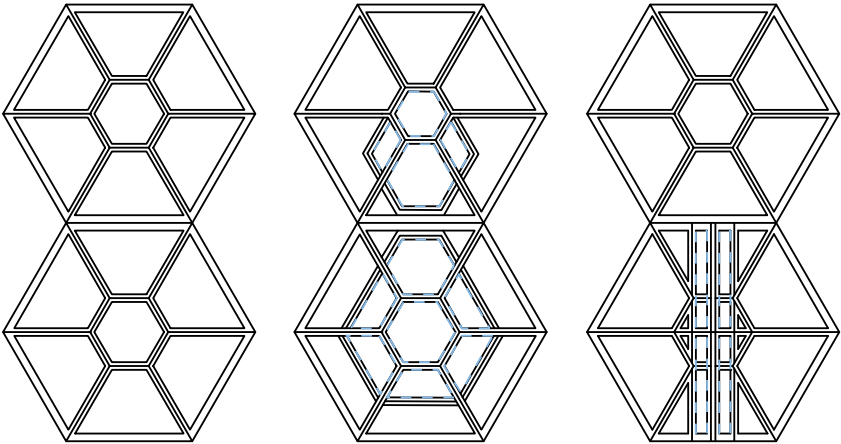
Elevation Structures



Base Structures

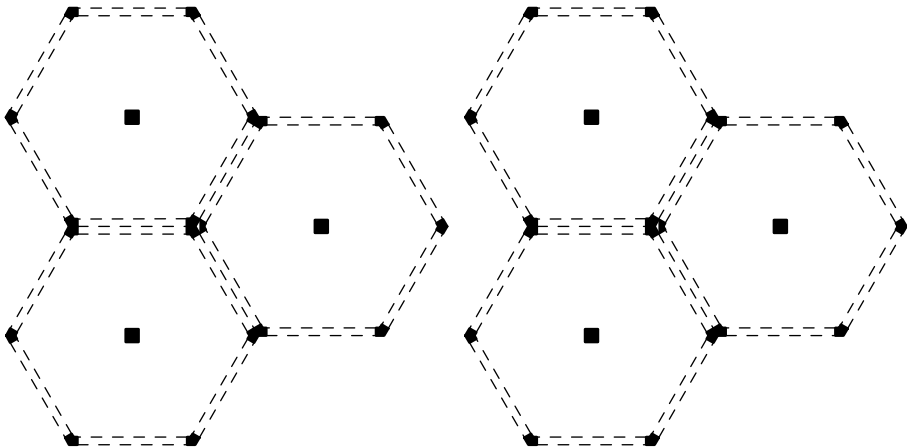


Roof Structures

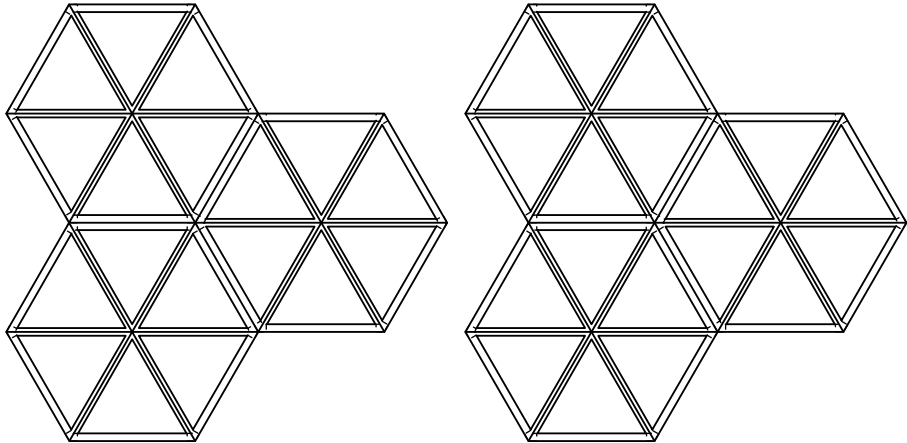


Three Units Modules

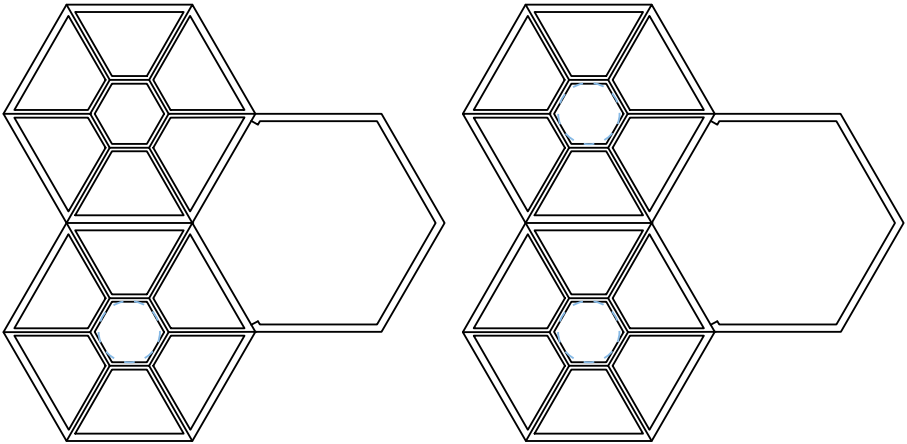
Elevation Structures



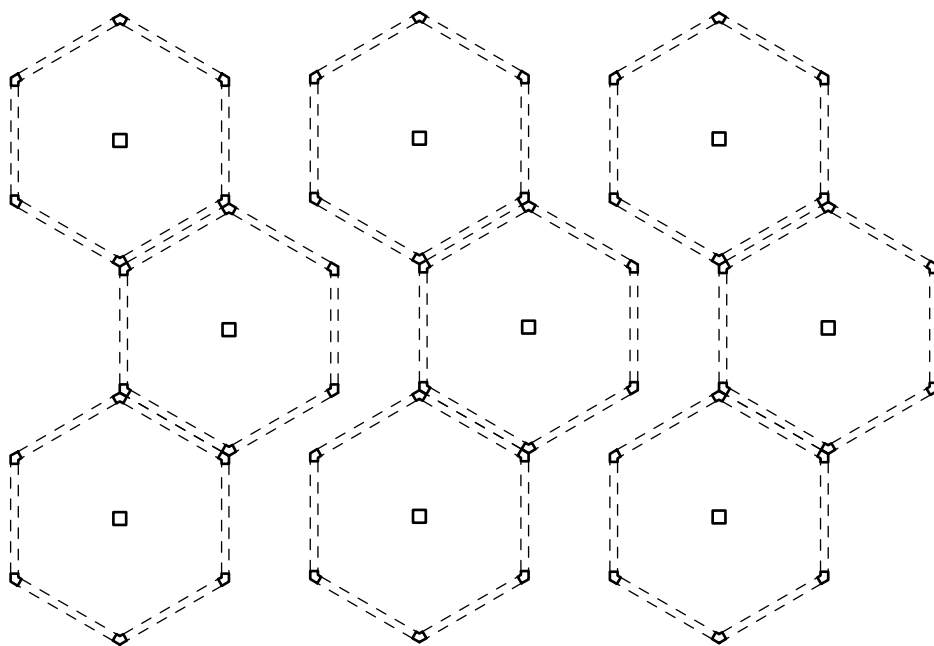
Base Structures



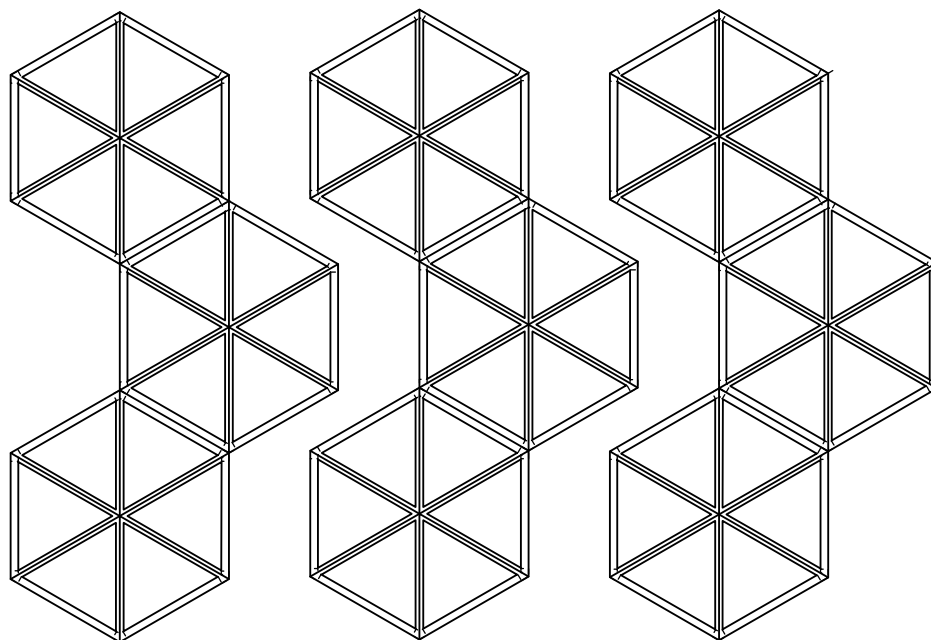
Roof Structures



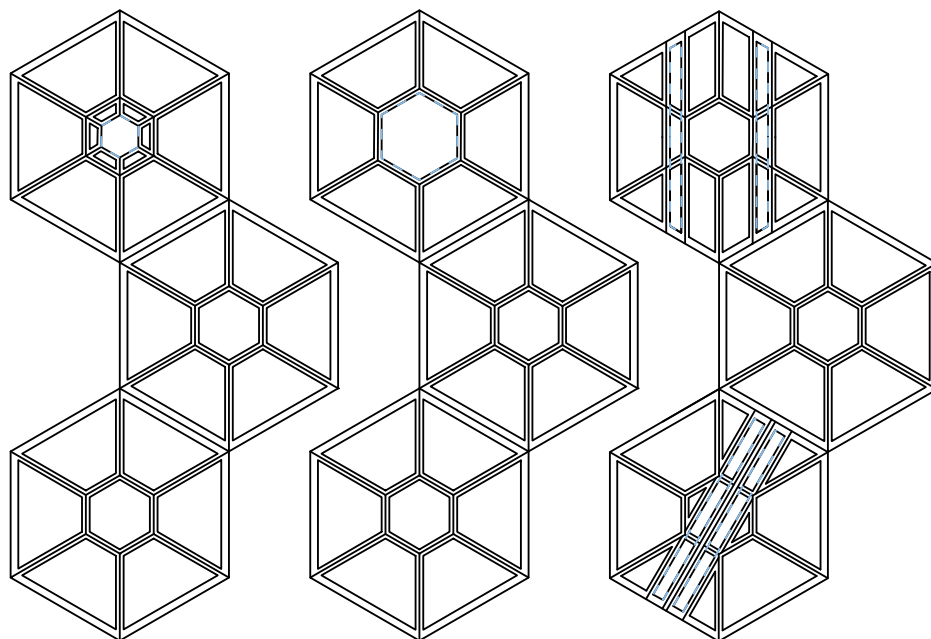
Elevation Structures



Base Structures

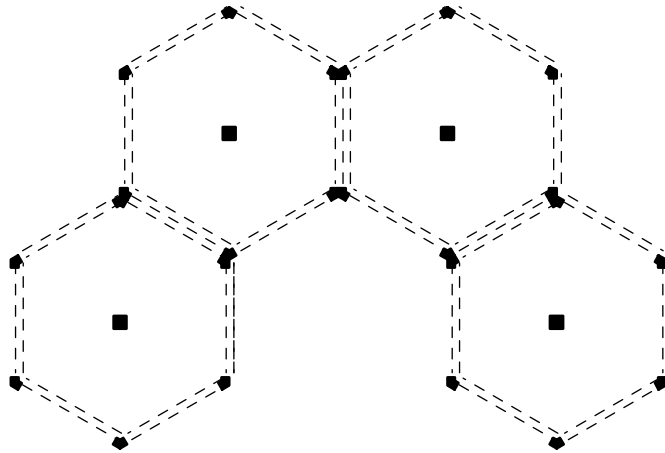


Roof Structures

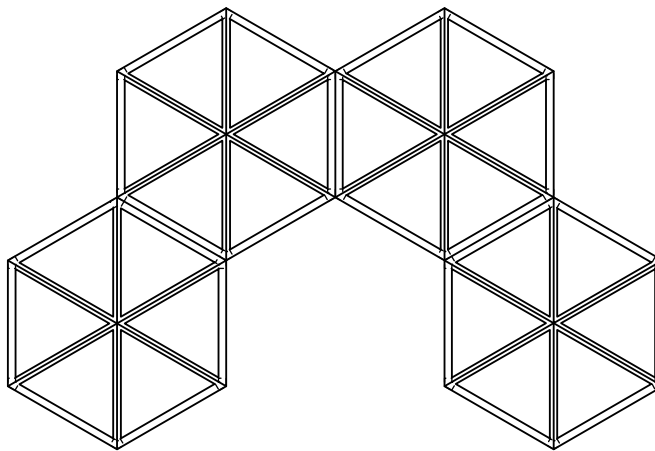


Four Units Module

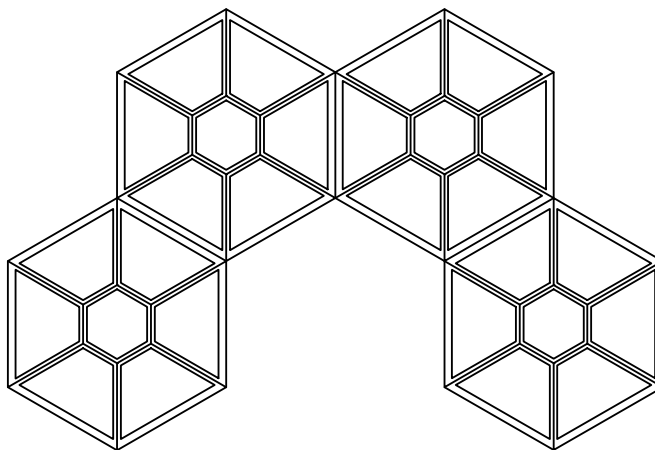
Elevation Structure



Base Structure

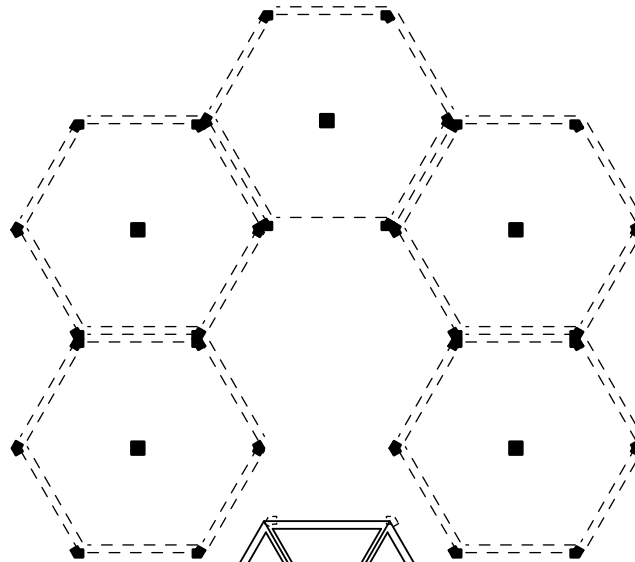


Roof Structure

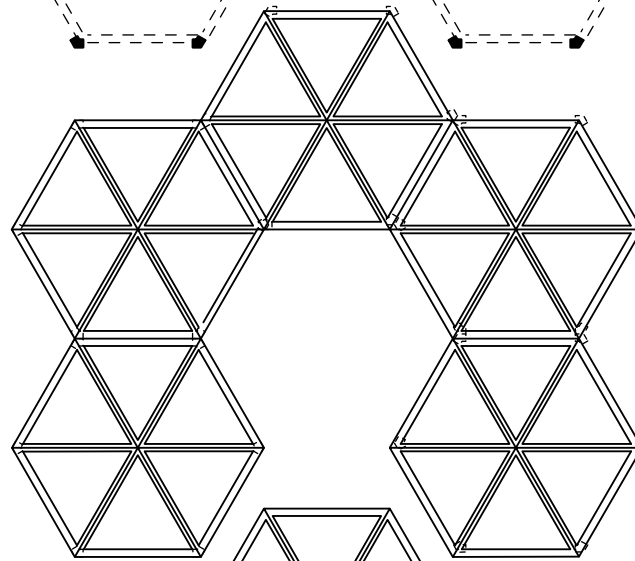


Five Units Module

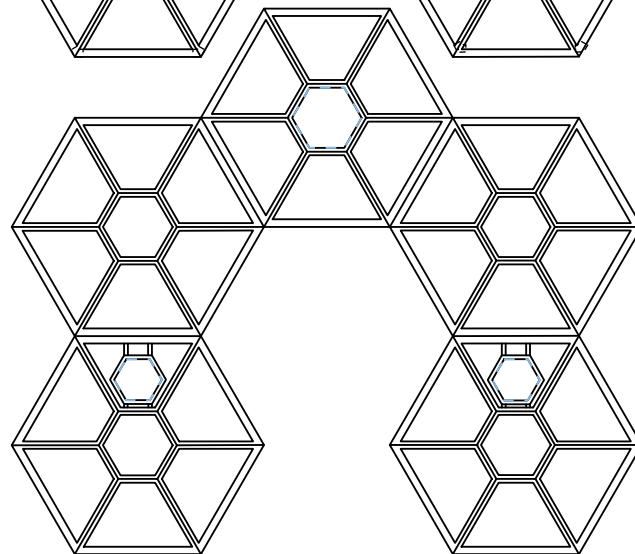
Elevation Structures



Base Structures



Roof Structures



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Images for “Prefabrication & Modularity”

Img. 2&3 - Hivehaus Assembly & Construction Diagrams. Produced from the rielaboration of the image accessed on December 22nd 2019, at: www.static.dezeen.com/uploads/2016/04/hex-house-architects-for-society-deployable-shelter-housing-refugee-crisis-architecture-news-explored-structural-axonometric_dezeen_6.gif.

Img. 4 – Hex House Construction Diagram: Produced from the rielaboration of the image accessed on December 22nd 2019, at: www.archinew.altervista.org/2016/04/14/architects-for-society-designs-low-cost-hexagonal-shelters-for-refugees/?__cf_chl_jschl_tk__=2cb25057de8b3d19797f81d5533bc18fb341e7b0-1581862510-0-ATx3FbQMz6rXAdoDO4bmG_6q1S97H4avekCOkCUtnQQsjm4br2Jf-QRy9B5Lj6WFP8i0nrpme7K4N1FwZvOzpRI53Lp-j1SptCQ9KzOE5sgr2YSzvUtNjnbDH-qRY6L7Fd5NDKJAX7iiR6uVN_Mwg1GbD651qcEPQLjTiQ4GHBo9u1ZYUr1XhTRRfCeP39Pn-Zxs2z3awlVx4c_N341cJqKu4zA5noSIYUb9FeFO0LSTyNdT9q5ufZboy-C51rSeieZg0eH7u-Vf1imwkjBiWb2QBE8wbS-SkbF3In3l_1o7PaFnsb-cB2G9aZr0pMw3iJoeuFJEwV1tUfd-m3FwPwDMmQGQnCvBdNkR3PBnbAZcLMWs3dnkcKgQvW_bvLiKaKfHeg.

Img. 5 - Adapter, Support Block & Incremental Packers of Jackpad Portable Foundations. Produced from the rielaboration of the image accessed on December 22nd 2019, at: www.jackpad.co.uk/the-system.

Behind the Choice of Wood as Building Material

Behind the Choice of Wood as Building Material



Why Poplar Plyood Panels?

Research Process
for Making a Conscious Choice

Background Reasoning

The choice of wood as building material resulted sufficiently straightforward for three main reasons:

- it refers to the first phase of edification, characterized by highly sustainable, prefabricated, wooden constructions;
- it is a way to interpret the Japanese ecological and anti-seismic building strategy;
- it consents to exploit the strengths of the material, in terms of: attention to the environment, affordability and limited time of assembly.

However, more reasoning and research were necessary for the choice of building products and timber typologies. In this perspective, regulatory frameworks were also considered.

Wood Based Building Products

Increasing attention, within the architecture field, to environmental pollution, energy savings and the usage of renewable materials, on top of the competitiveness of other building materials, has led to the conception of a multitude of technologically advanced wooden products.

The main distinction among the available products lies in the usage of chemicals:

- Solid wood, which is obtained from heartwood or duramen, the central wood of the tree characterized by elevated degrees of stiffness and durability, is lumber obtained without the need for additional materials, such as adhesives. It is usually sold in boards or laths; (1)
- Engineered wood, is a composite material consisting of timber combined with adhesives, resins or other chemicals to increase the natural strengths of wood as building material. (2)

Within this second category, various products exist, which differ in composition, dimensions and orientation of timber parts.

The most successful in terms of either diffusion or grade of innovation, within the world of prefabrication, are:

- Plywood, made by veneer lumber – in odd number, perpendicularly glued and hot pressed - is mostly used for interior walls and stiffening. In Italy, the most diffused typologies come from: fir, birch and poplar. (3)
- Cross Laminated Timber (CLT), is composed by boards, lamellas, extracted from the outer section of the trunk, which are layered perpendicularly, in odd numbers, to form panels. It differs from plywood due to the employment of thicker sections of wood and it requires at least five layers to provide structural stability; these facts consent its panels to cover wider spans. It is usually adopted for load bearing functions. (4)
- Laminated Veneer Lumber (LVL), mostly used for structural purposes, is produced by the superimposition of thin solid wood layers, which are glued and pressed together. Although produced in the same way as plywood. It can be obtained from a variety of species, as red fir, pine and poplar. (5)(6)
- Oriented Strand Board (OSB), obtained by gluing and applying pressure to oriented wood chips, presents an overall satisfactory performance structurally and in terms of internal comfort. It is mostly composed of waste from the coniferous family and in Italy it is one of the most diffused products. (7)

- Laminated Strand Lumber (LSL), results from the parallel orientation of strands obtained from the discharged materials from trees with a short growth rate, as poplar. It is mostly employed for the realization of linear elements. (8)(9)

In one storey, suspended, pre-fabricated units of limited dimensions plywood appears to be a diffused choice. Sandwich Plywood panels, in fact, do not only provide structural stability, but also thermal and acoustic insulation, making them the perfect solution for huts and cabins. Some reference projects in this perspective are:

- Jyubako (2016), trailer house, designed by Kengo Kuma in collaboration with Snow Peak; which is a hinoki, Japanese cypress, prefabricated plywood box, whose development has resulted in the design of the Small Hut (2018). This second project consists in an extendible prefabricated cypress plywood house, which granted the Office the G-Mark Good Design Award 2018 and perfectly combines functionality with visual internal comfort. (10)(11)

- Muji Hut (2017), prefabricated mobile micro-housing, from the Nippon home décor brand Muji. This typology has vertical partitions and ceiling entirely made of wood: internally it is employed hinoki plywood; the core consists of structural plywood; exteriors present burnt hardwood cladding for greater durability. However, it is rendered more stable by equipping it with reinforced concrete raft foundation and mortar floor. (12)(13)

Typologies of Wood

In Italy, the production of plywood highly relies on intensive plantations of poplars. These trees, as a matter of fact, have a fast growth rate: in around ten years, they can reach the minimum shaft height of six meters, which is sufficient for the manufacturing of panels.

The cultivation of poplars is realized on farmlands, thus minimizing the impact on woods, with reduced quantities of pesticides and positive effects on the soil's fertility. (14)

This being said, poplar plywood appears as an ideal solution for the sandwich panels of the considered case study.

Img. 1- Private House Bathrooms Axonometry and Plan View



Laws on Formaldehyde

To glue together the various laminae composing plywood, the resin mostly employed is the highly reactive and inexpensive urea-formaldehyde. The greatest limit of the adoption of this adhesive is the emission of formaldehyde (HCHO), toxic to the human body. If this chemical is released from three major sources, namely untreated wood, structural degradation of panels during service life and adhesives (residual free to react HCHO), the latter represents the major cause of indoor pollution (15).

Since the end of the 70s, after the recording of illness related to visual and respiratory system, concerns in regards of the strict relation between formaldehyde emissions from wood-based products and indoor air quality started emerging. As a matter of fact, testing methodologies and related regulations were developed across the world, with Japan, USA and Europe in the front run. Yet, in the first decade of the 21st Century, more advanced studies have proved the carcinogenic effect of HCHO on humans, leading to the establishment of Occupational Exposure Limits (OELs) with the WHO suggesting the threshold of interior concentration of 0.1mg/m^3 (0.08ppm) over 30 minutes, but also rendering evident the necessity for more restrictive standards. Disparities in consented values and testing methodologies are still a major limit to the uniformization process across the world. Overall, the most constricting ones in terms of consented values of emission are:

- The amended Japanese Building Standard Law (BSL), controlling the release of various chemicals from building materials, presents the Japanese Industrial Standards classification (JIS A1460:2015 - Desiccator Test) of the latter into four classes of discharge of HCHO:
 - Type I: boards whose usage is prohibited for interiors (emissions greater than $0.12\text{ mg/m}^2/\text{hr}$);
 - F^{**}: employability depending on tight room area restrictions (emissions comprised between 0.12 and $0.02\text{ mg/m}^2/\text{hr}$);
 - F^{***}: adoption subjected to less stringent area limitations (emissions comprised between 0.02 and $0.005\text{ mg/m}^2/\text{hr}$);
 - F^{****}: presenting no limitation of operability (emissions lower than $0.005\text{ mg/m}^2/\text{hr}$, proximate to untreated wood).

The Japanese limits are the most limiting ones of the globe. Such reduced levels have been mostly obtained by either diminishing the ratio between formaldehyde and urea (UF resins) or by trying to develop alternative adhesives. (16)

- The American Airborne Toxic Control measure of 2007, by the Air Resources Board of California (CARB), which proposed the reduction of emissions from wood composites (particleboard, MDF and hardwood plywood (HWPW)) in two phases. The limit values of this product-specific regulation for HWPW are (ASTM E13333 - Surface Emissions):
 - Phase 1: setting a limited stringency of 0.08 ppm (lower than F*** - 0.07 ppm);
 - Phase 2: imposing a more profound threshold of 0.05 ppm (roughly equivalent to F**** - 0.04 ppm). (17)

On the other hand, the European harmonized Standard (EN 13986:2005), dividing the release limits from particleboards, fibreboards and plywood into two classes, with specific values for each, represents a less constricting one. Considering plywood (EN 717-2 - Gas Analysis Method) the categories are:

- E2: boards which are not allowed for interiors (emissions comprised between 8 and 3.5 mg/m²/hr -);
 - E1: board allowed for interiors (emissions lower or equal to 3.5 mg/m²/hr – 0.14 ppm).
- Encouraged by the efforts of IKEA, an additional class, E1+, is currently being considered for the revision of the current law and it prescribes that wood-based panels should presents emissions lower than half of those imposed by the E1 band. (18)(19)

Regarding Italy, indoor emissions have been set, through the Ministerial Decree of 10 October 2008, to be lower than 0.1 ppm, thus products exceeding this limit cannot be neither produced nor commercialized. (20)

In this perspective, although the Italian tendency seems in favour of the stringency of emissions, more work seems to be done to match the Japanese F****.

Img. 1 - Private House Bathrooms Axonometry and Plan View



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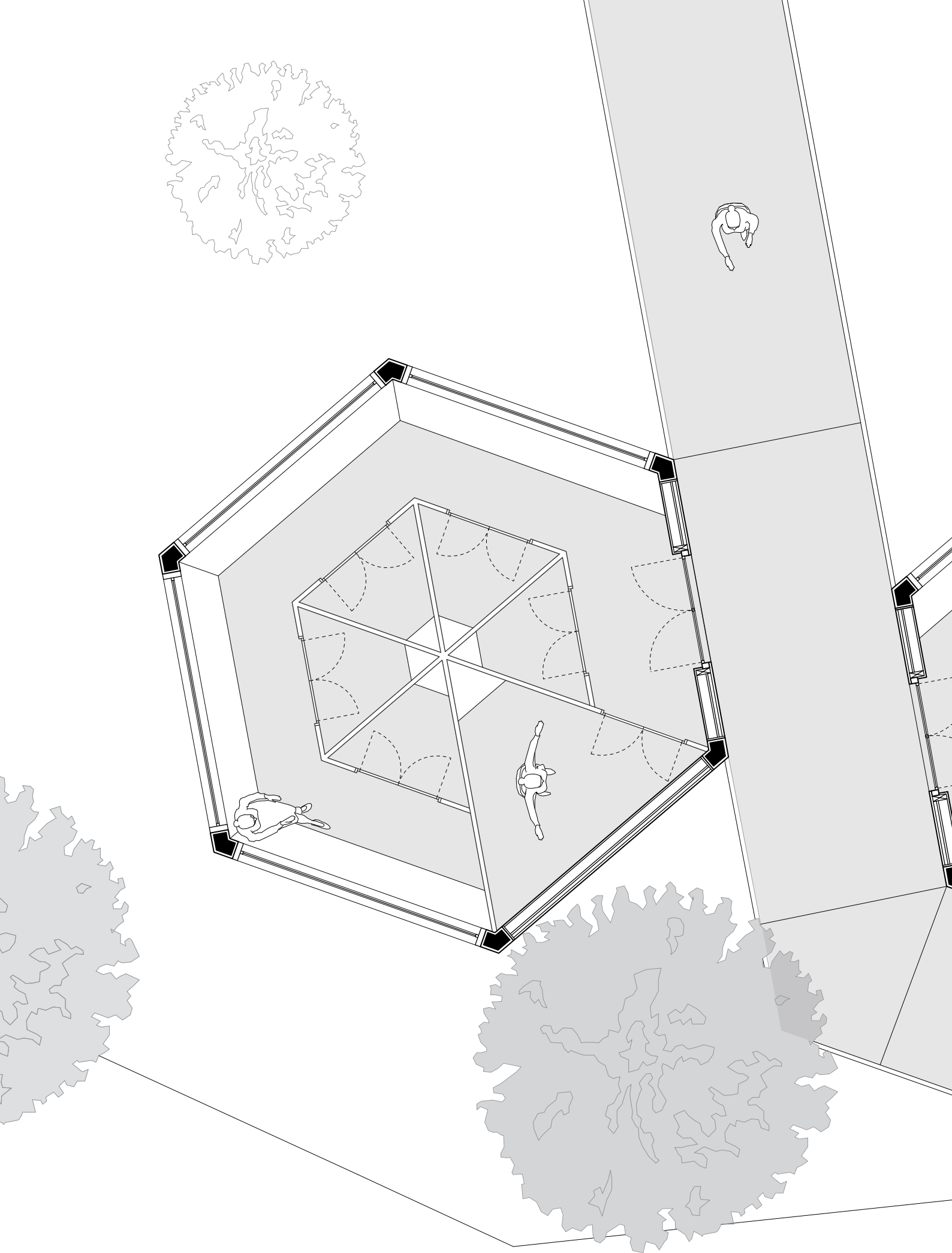
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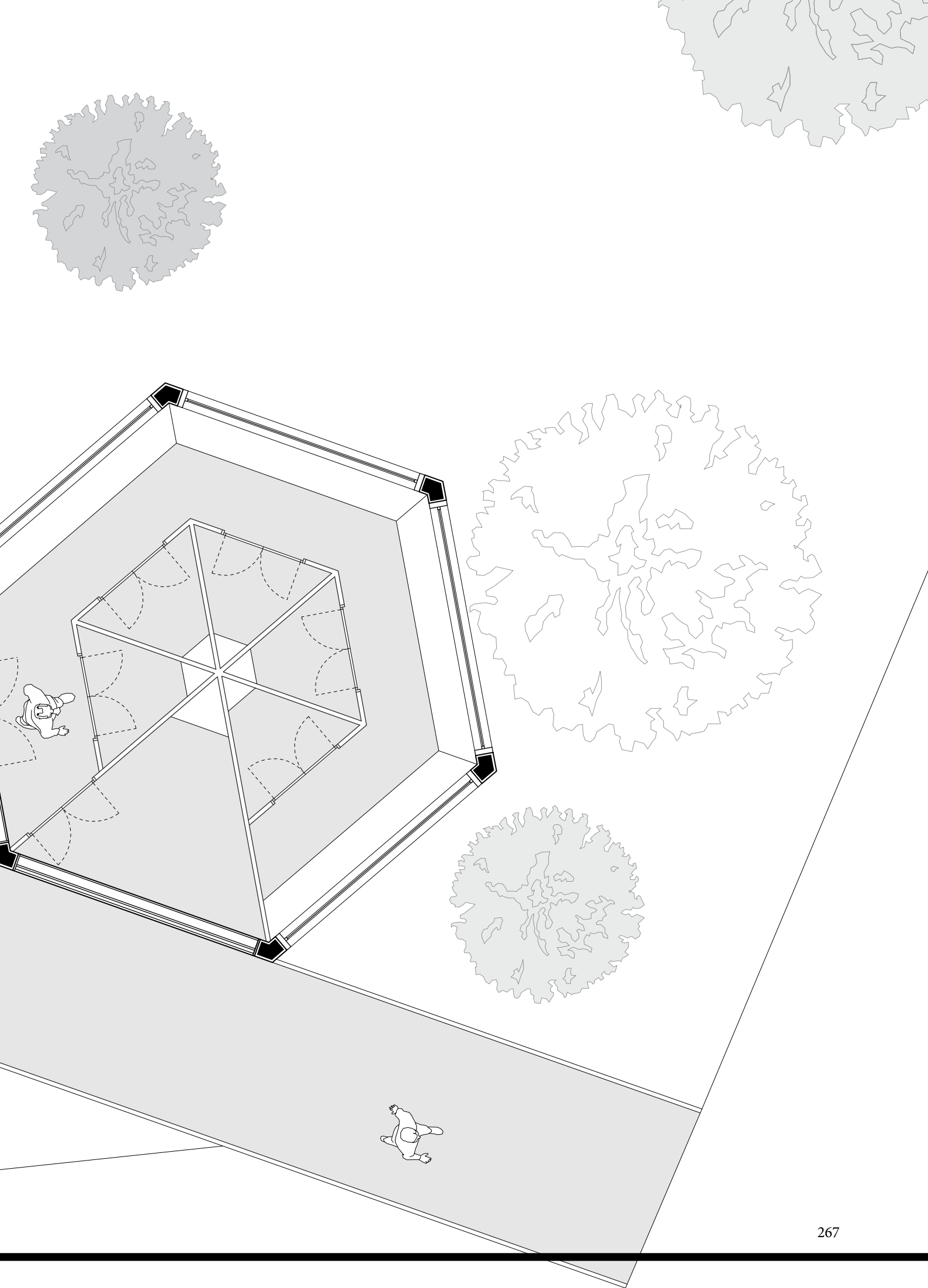
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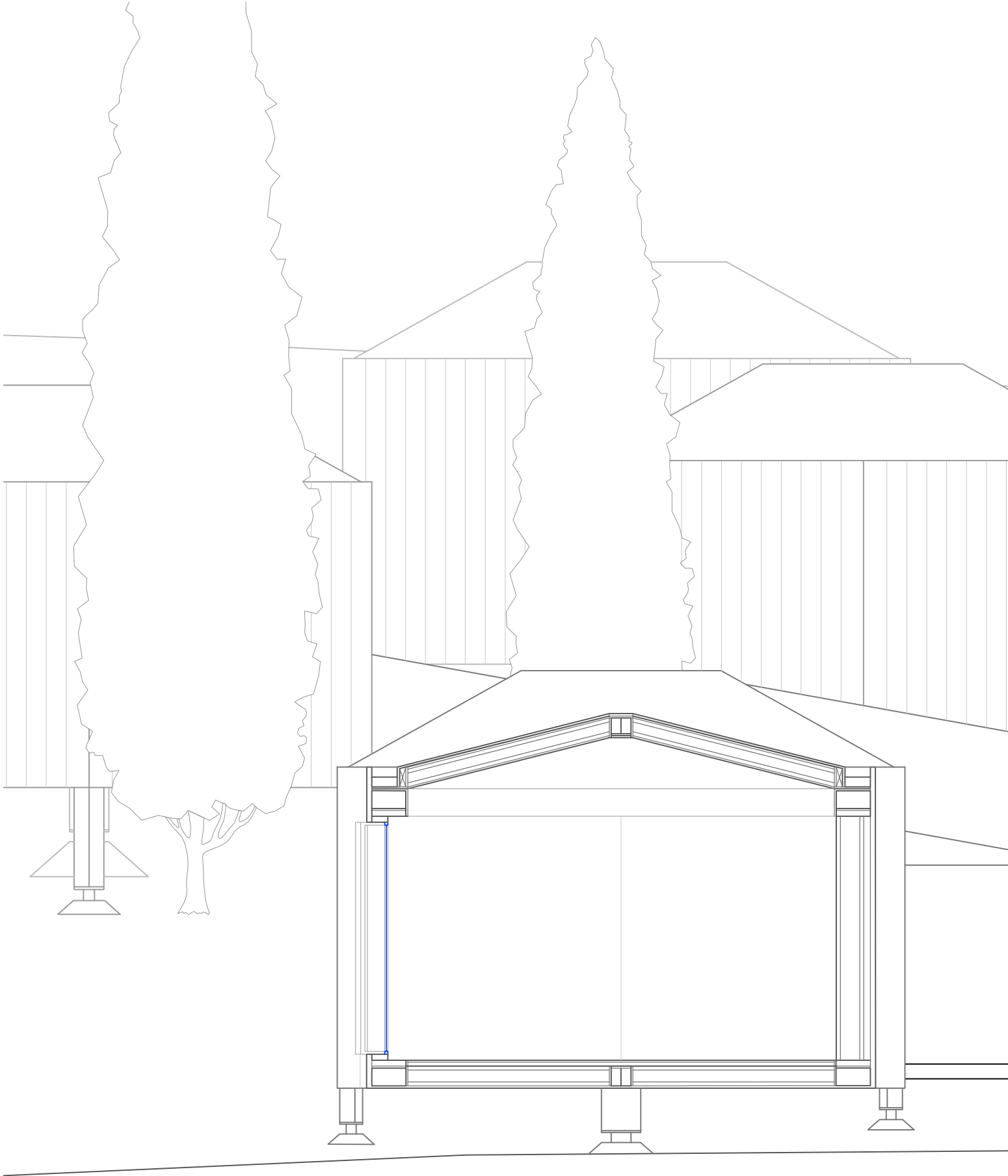
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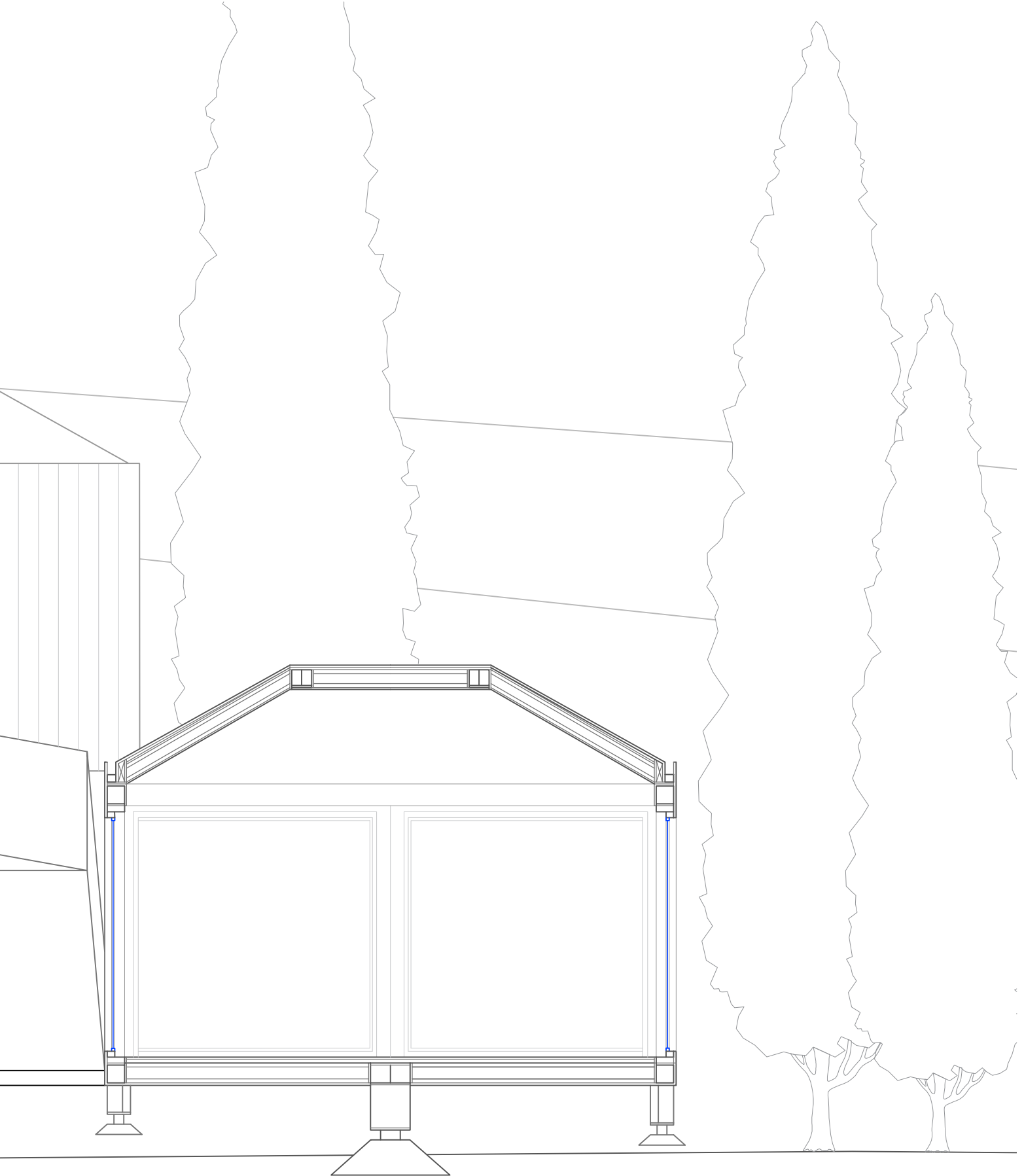
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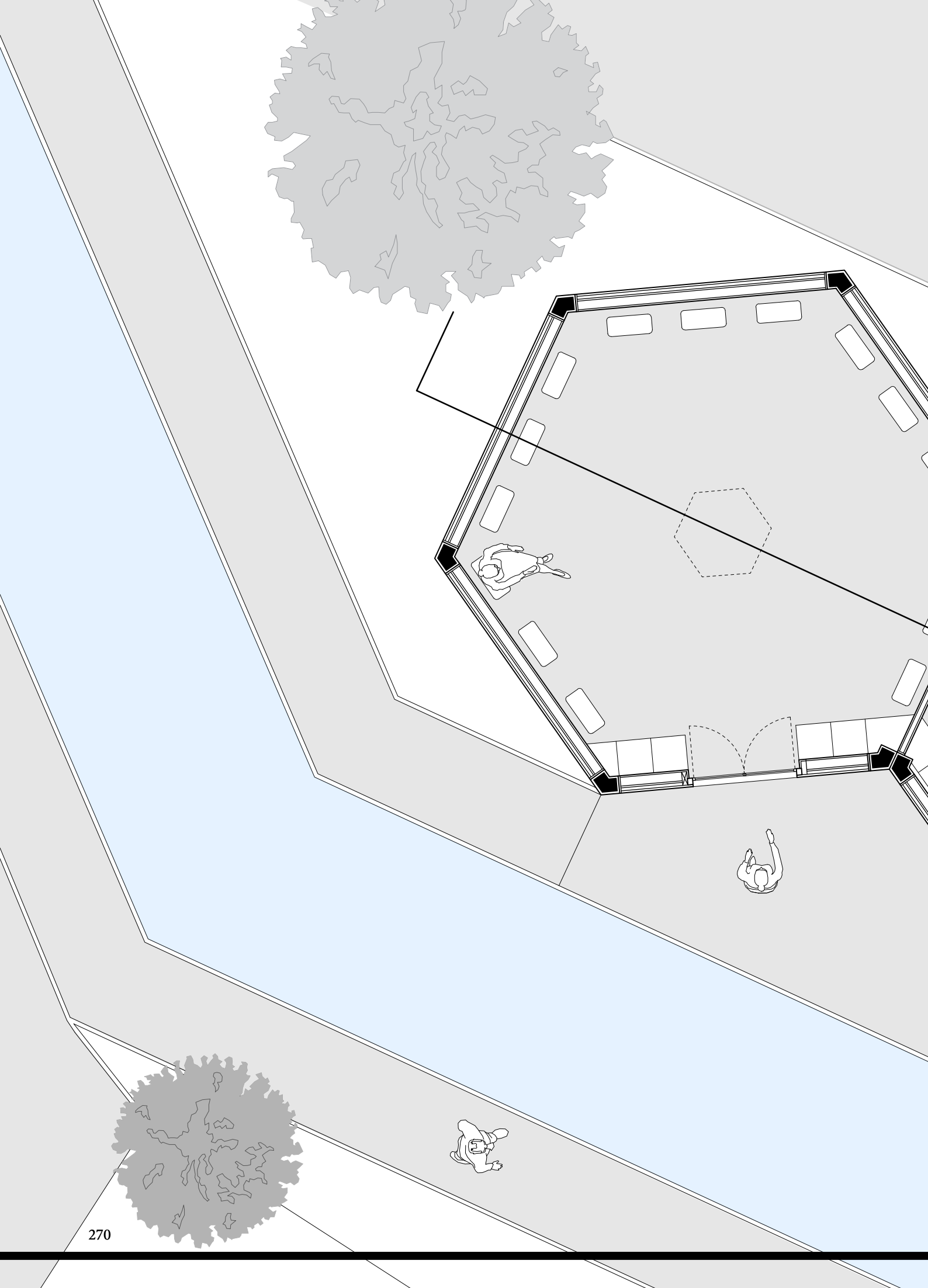
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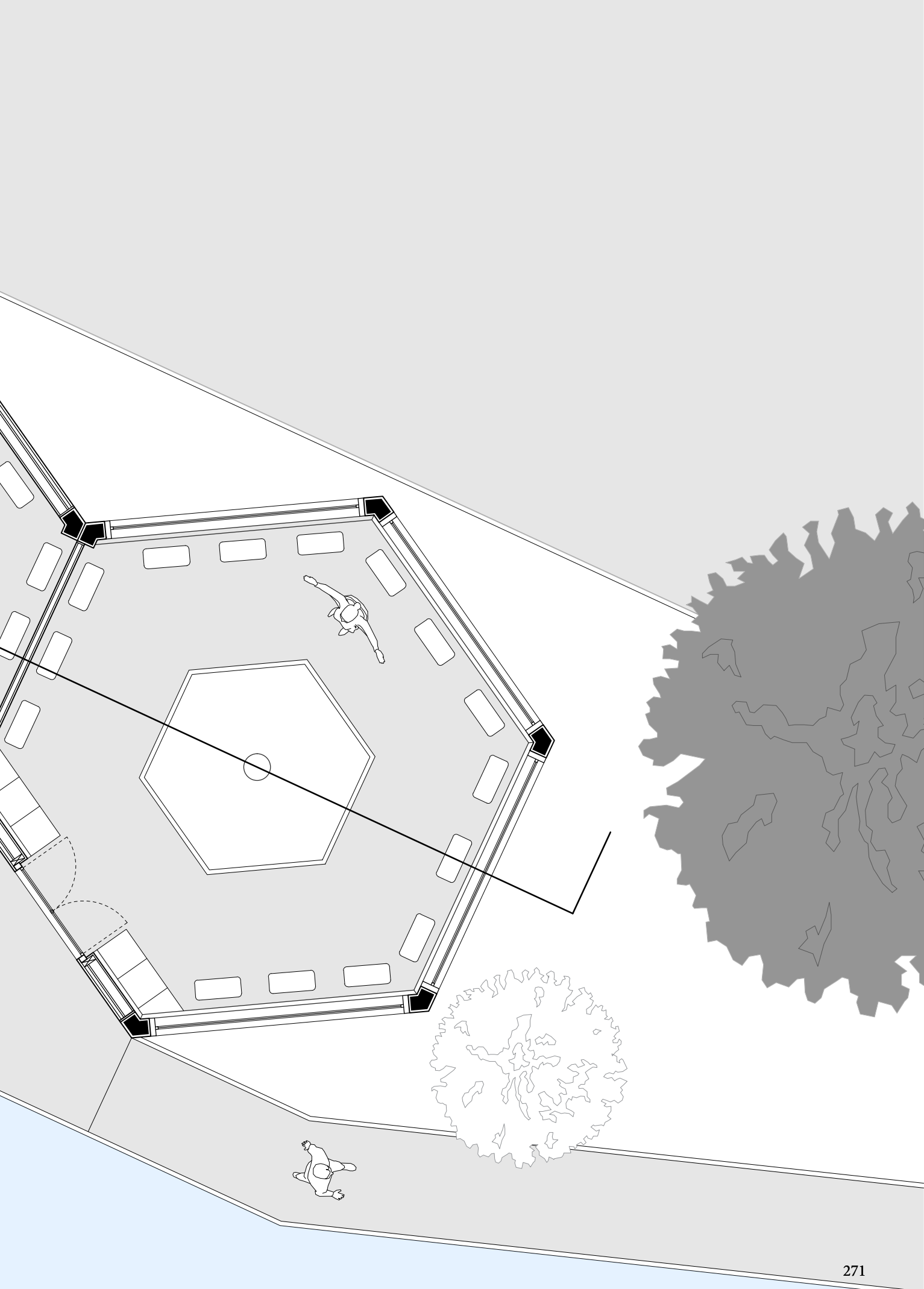


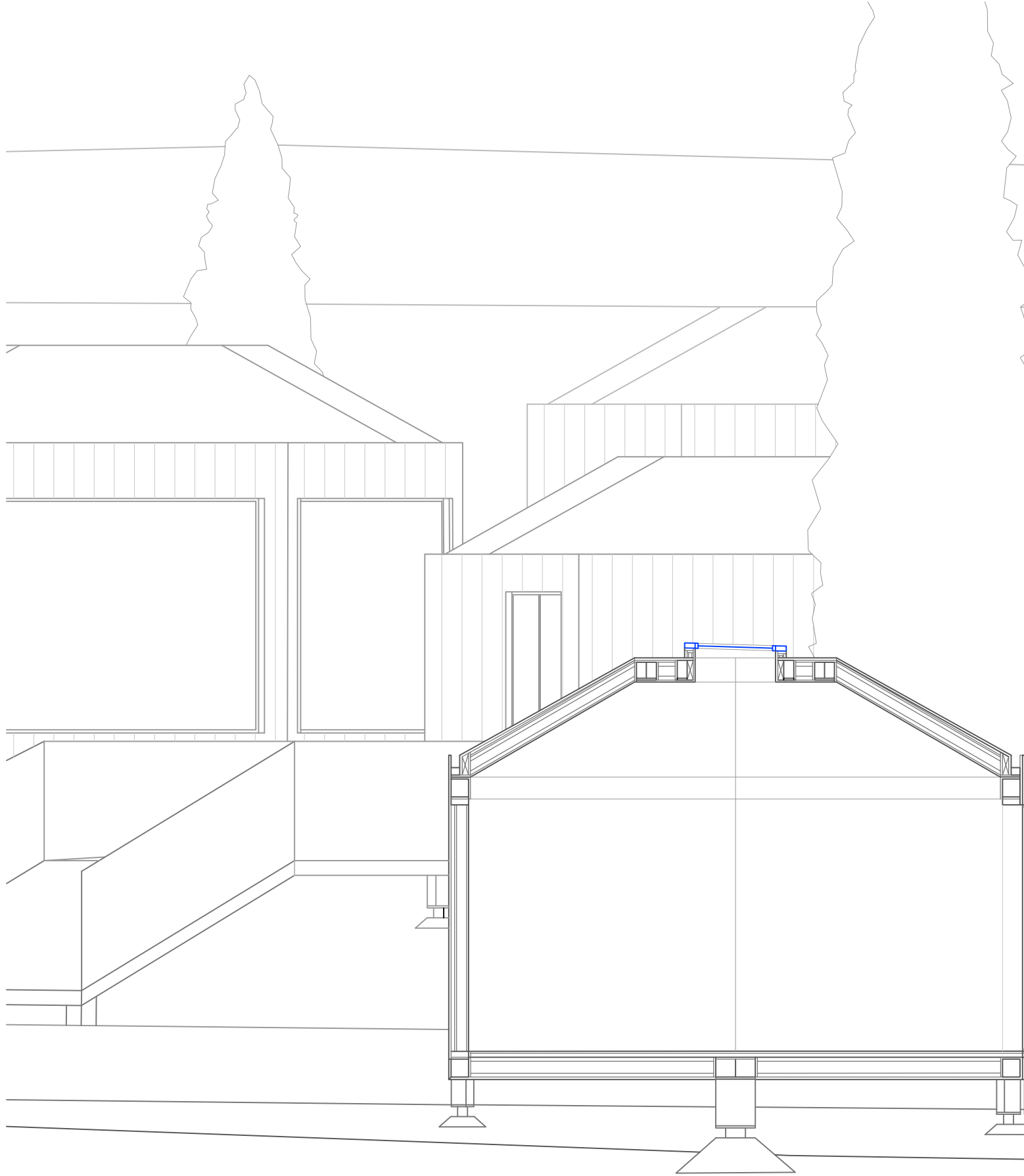


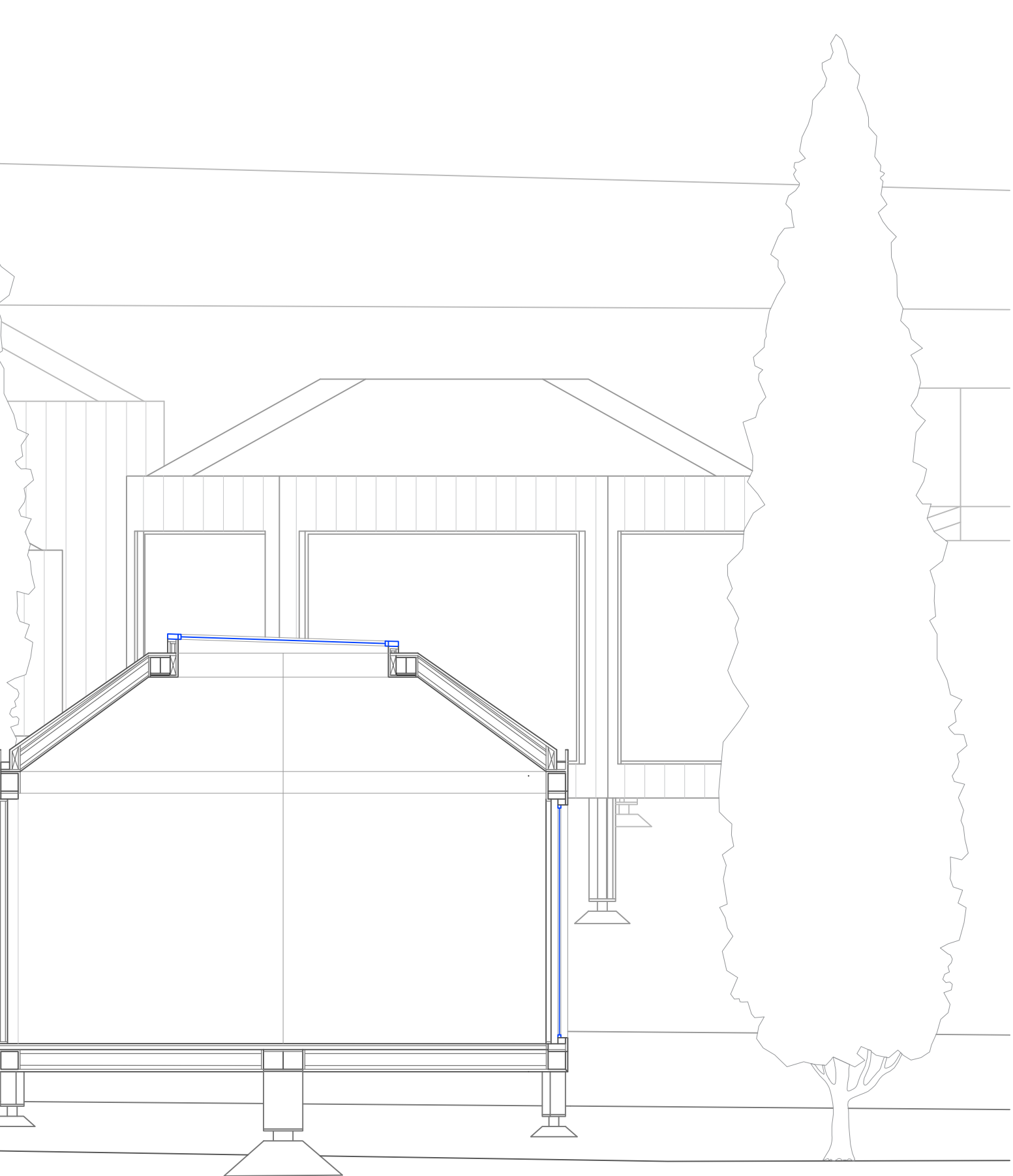


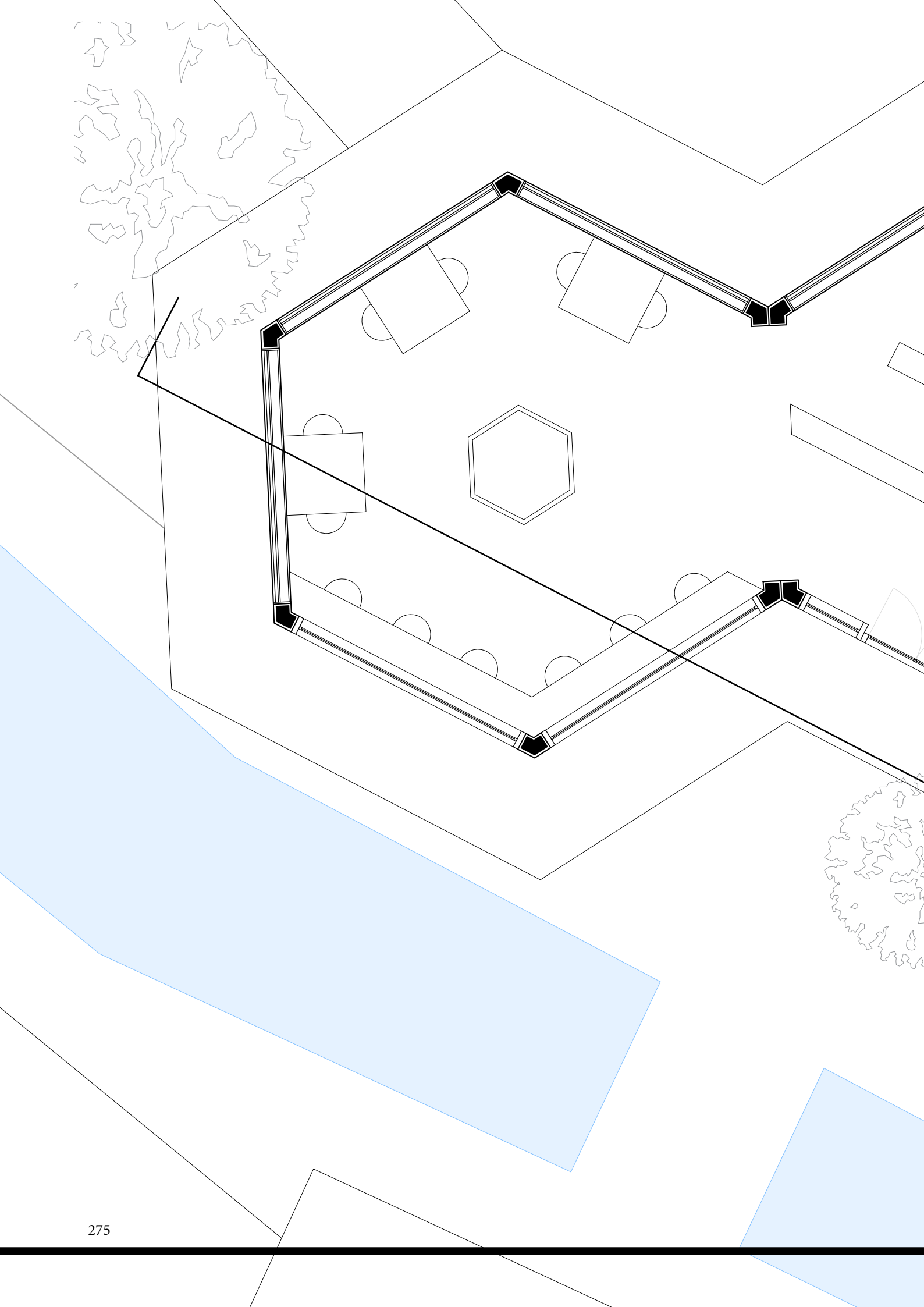


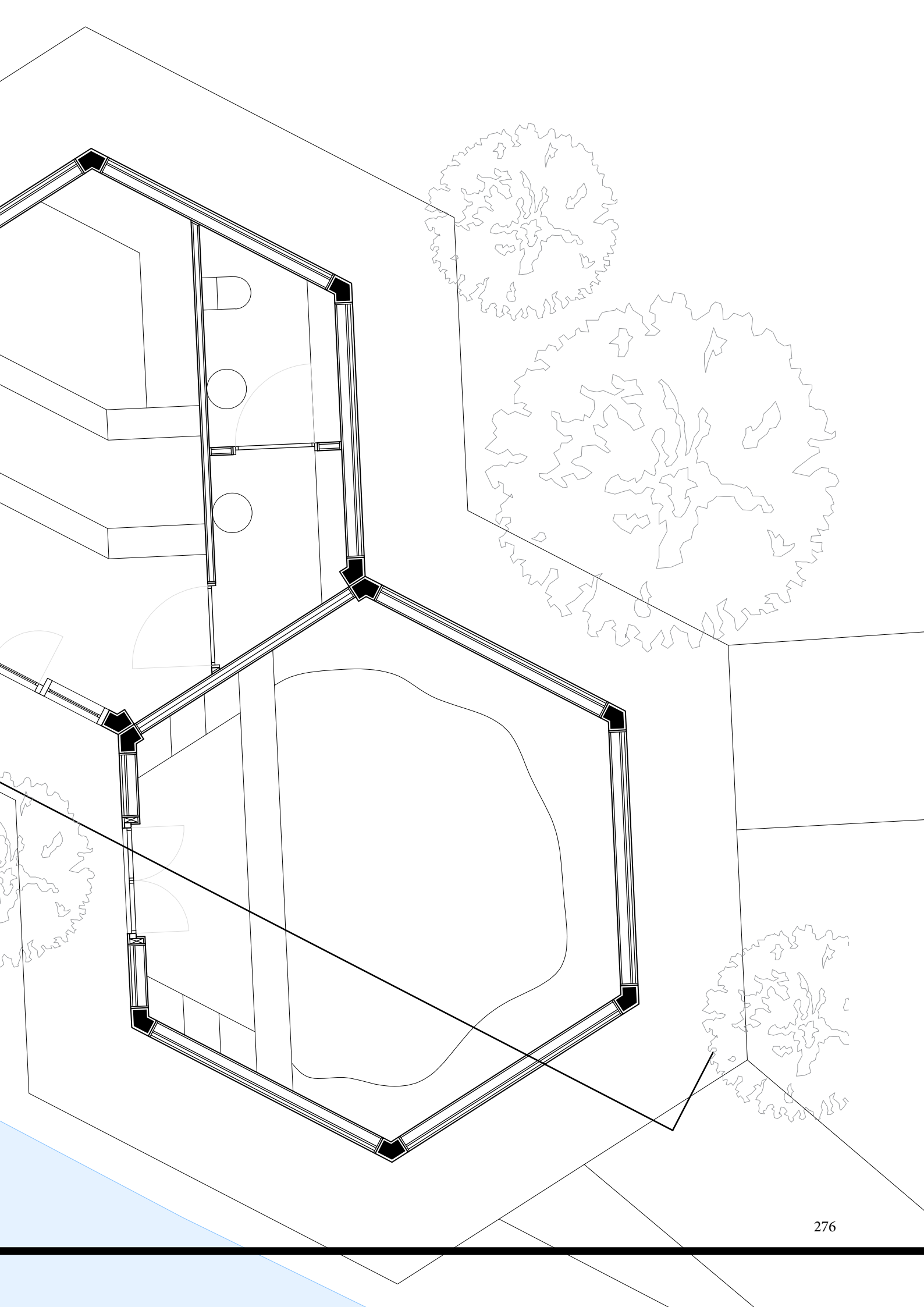




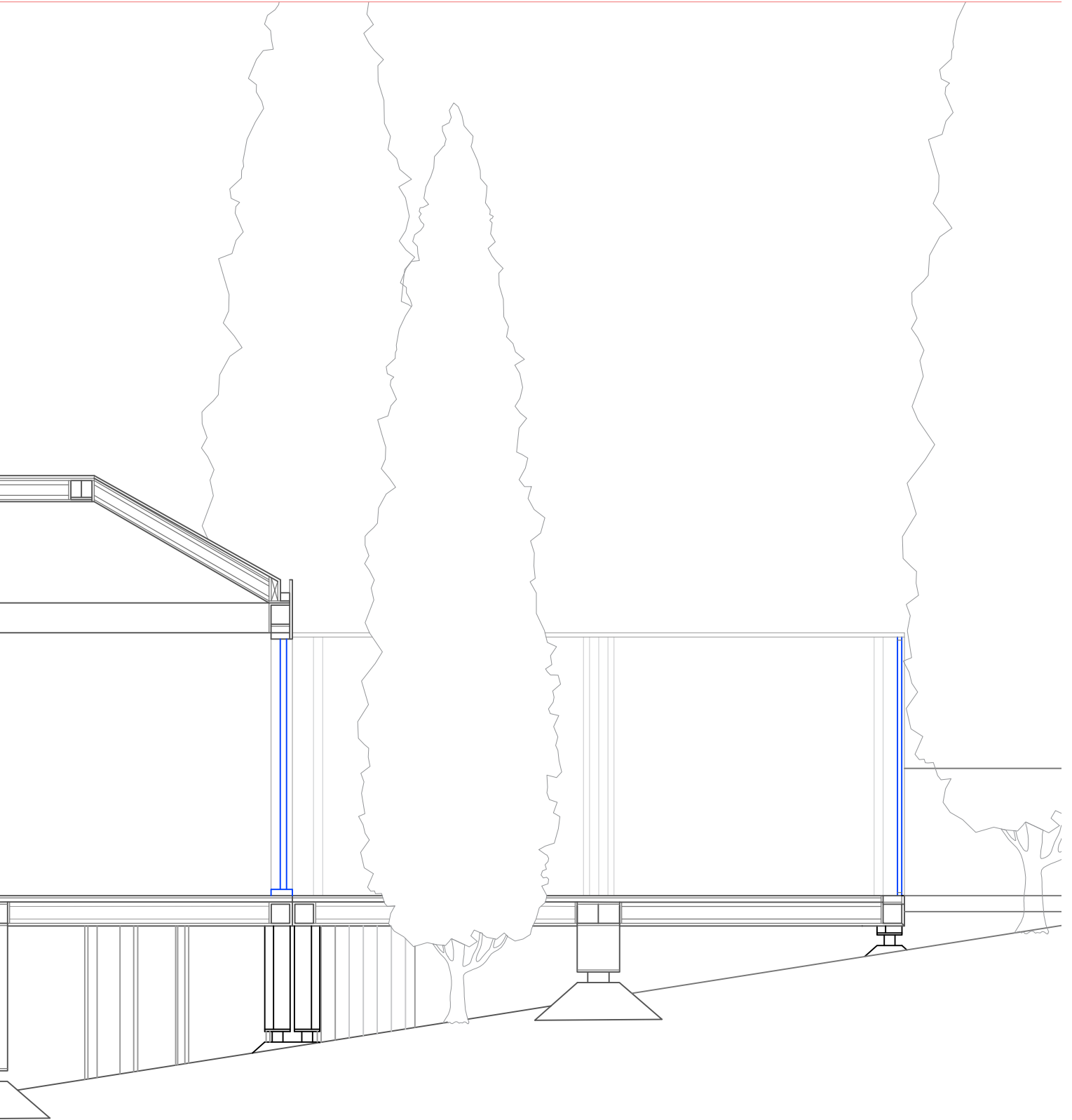


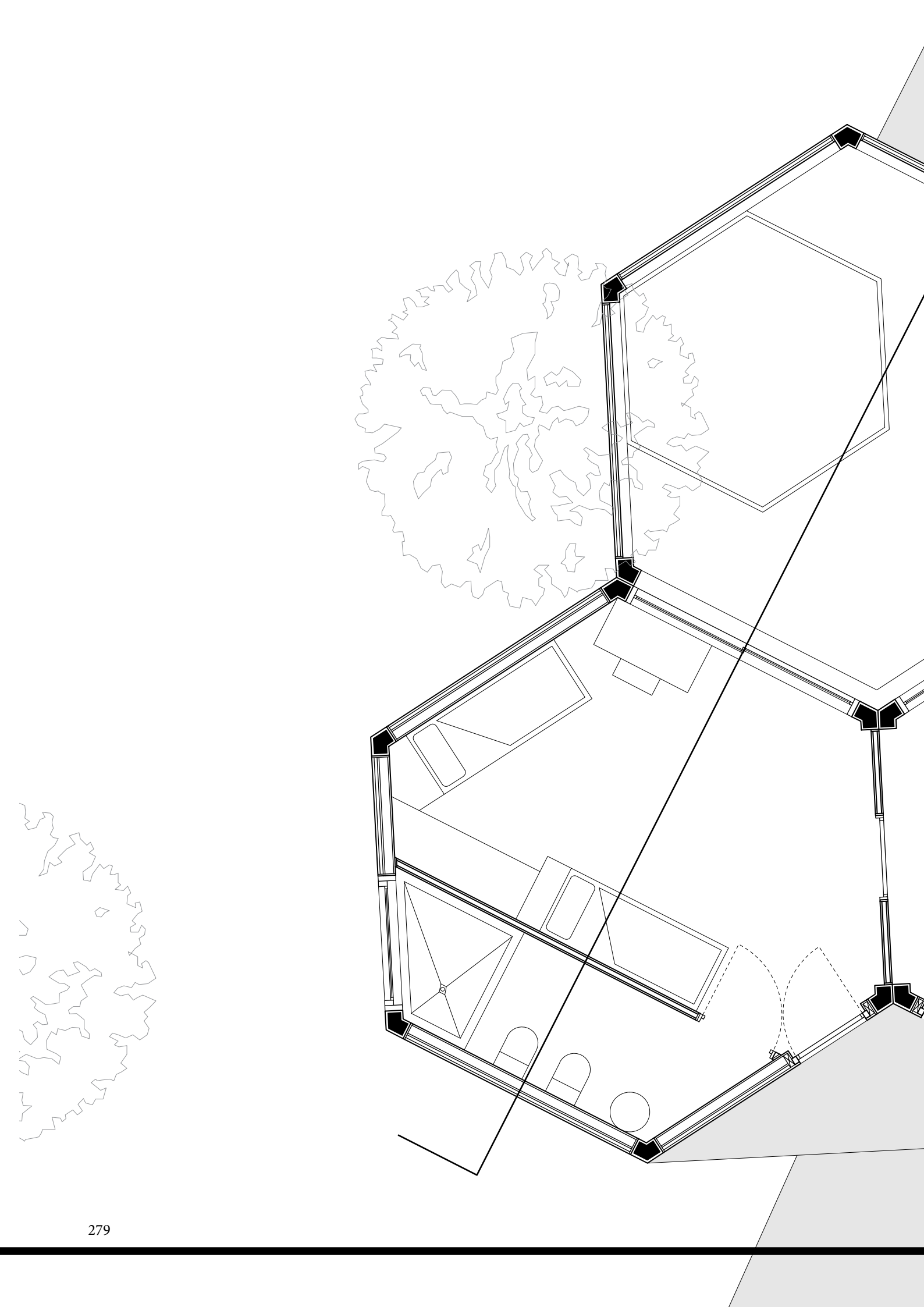


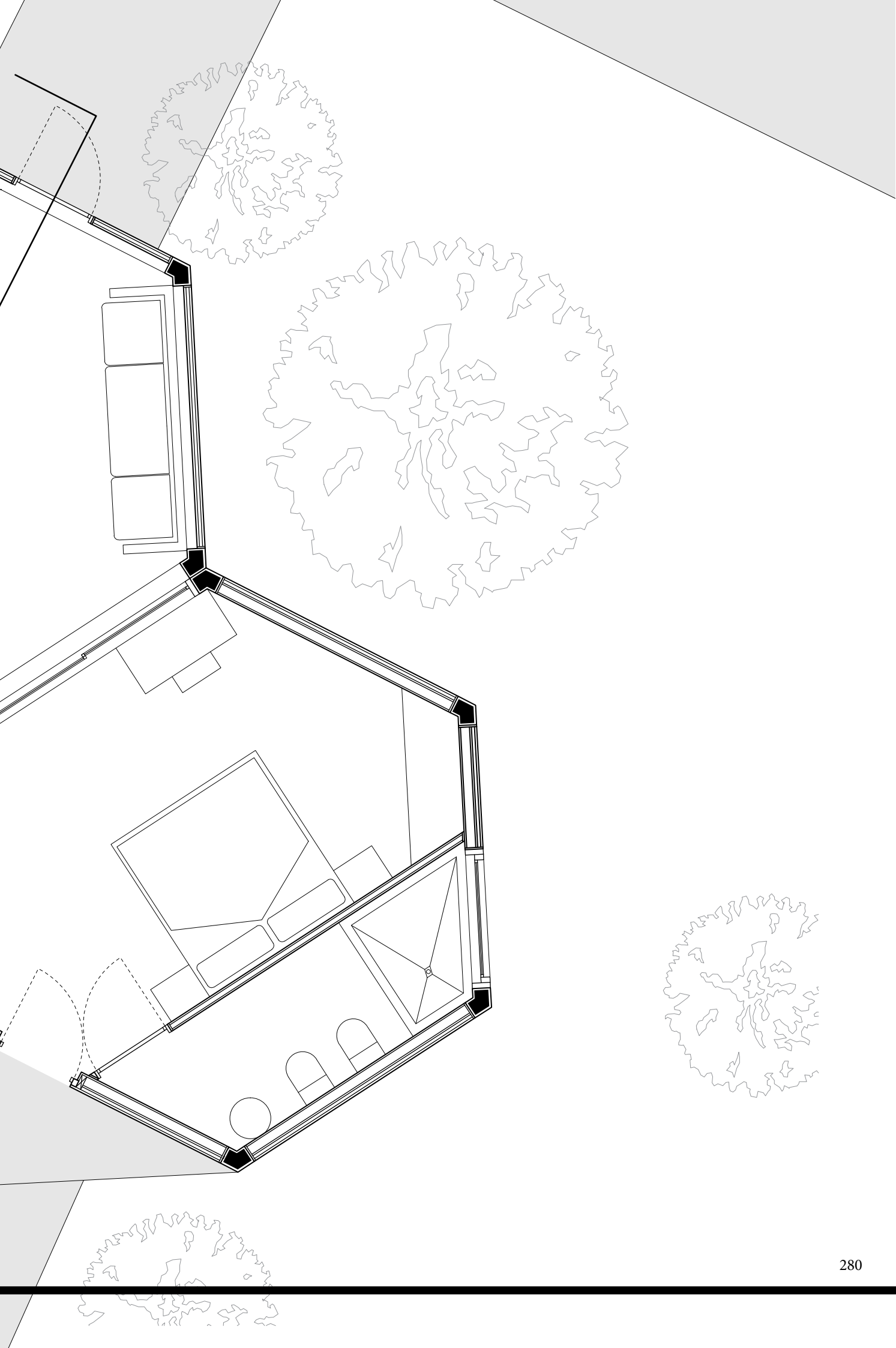


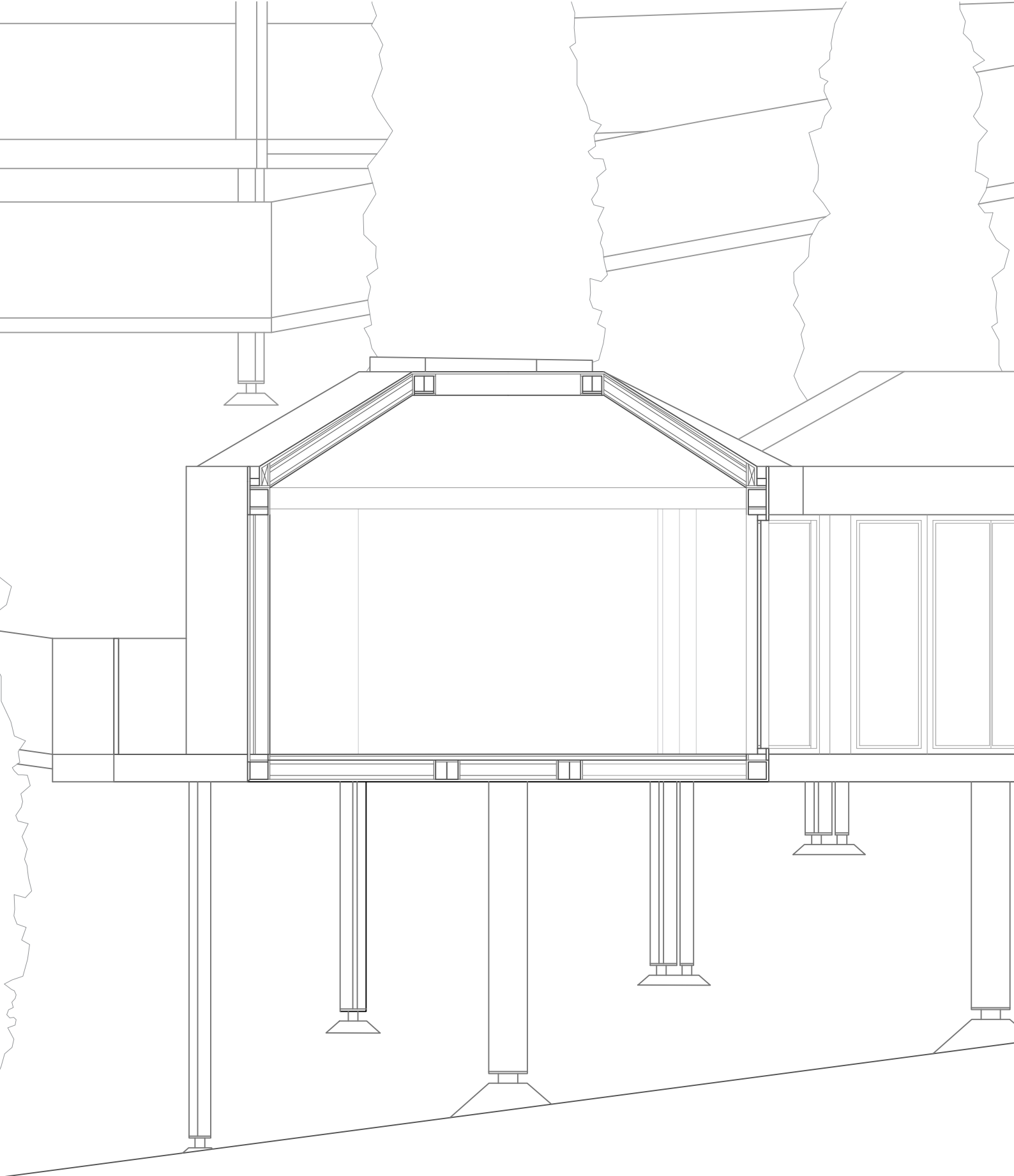


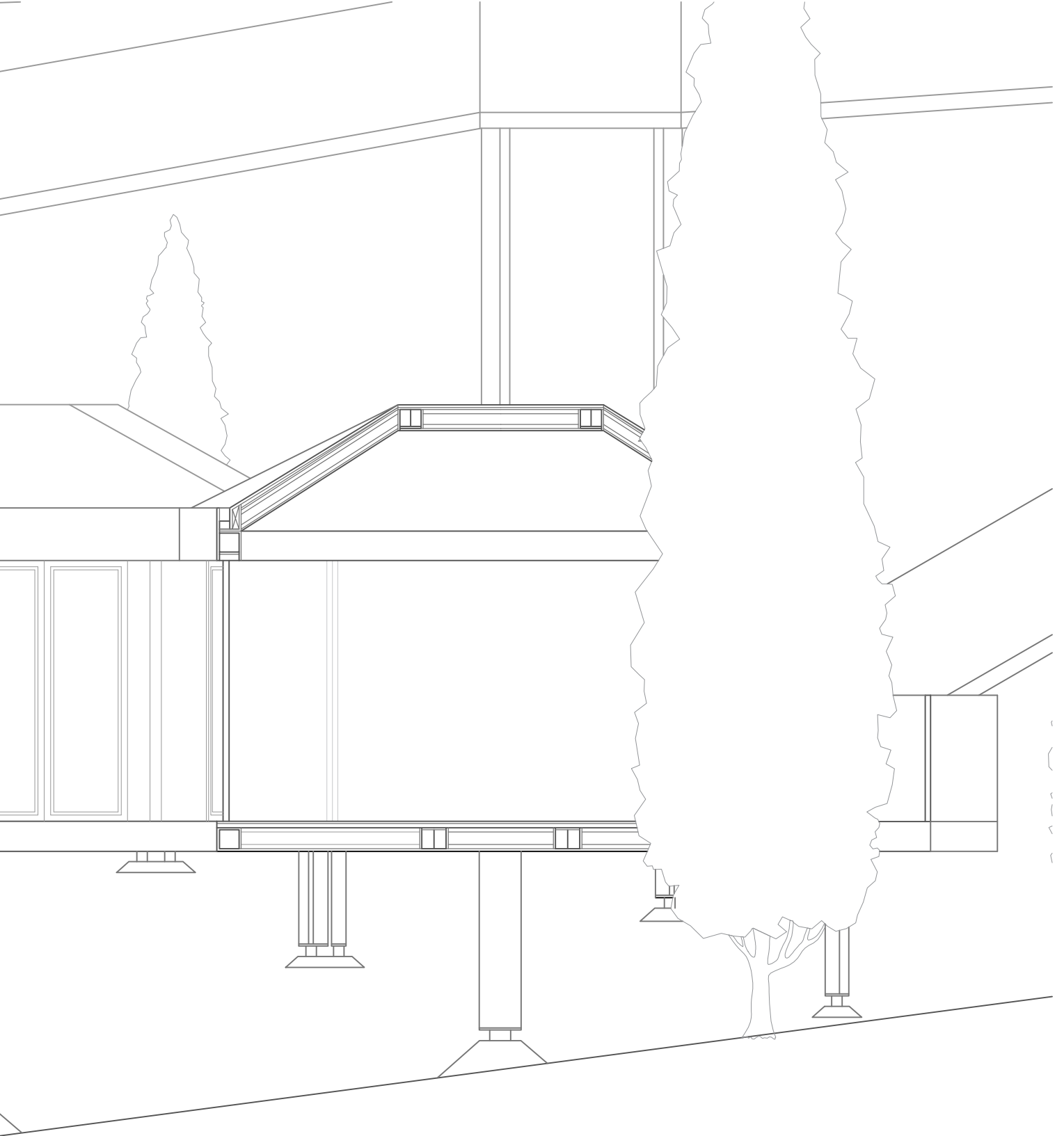


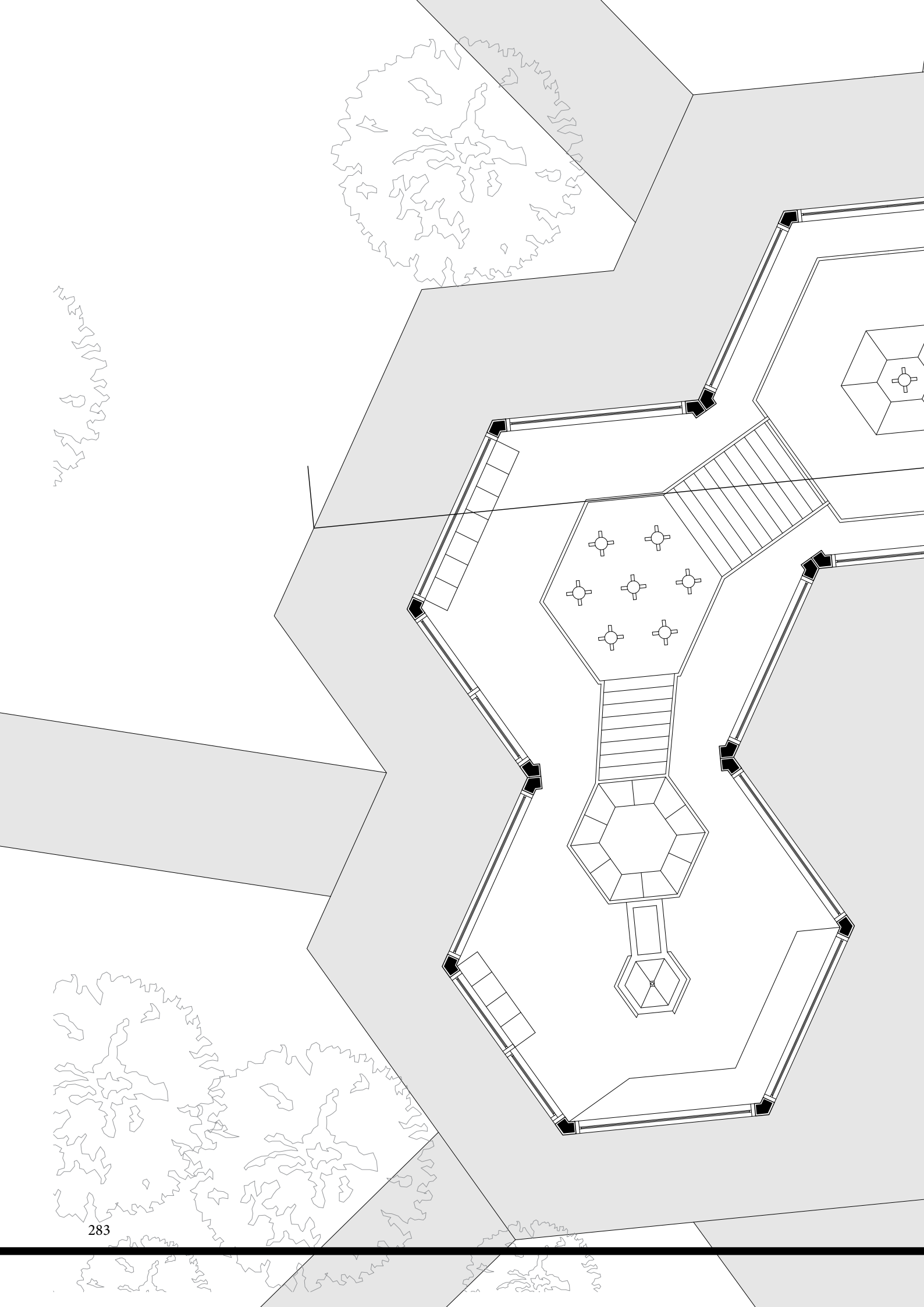


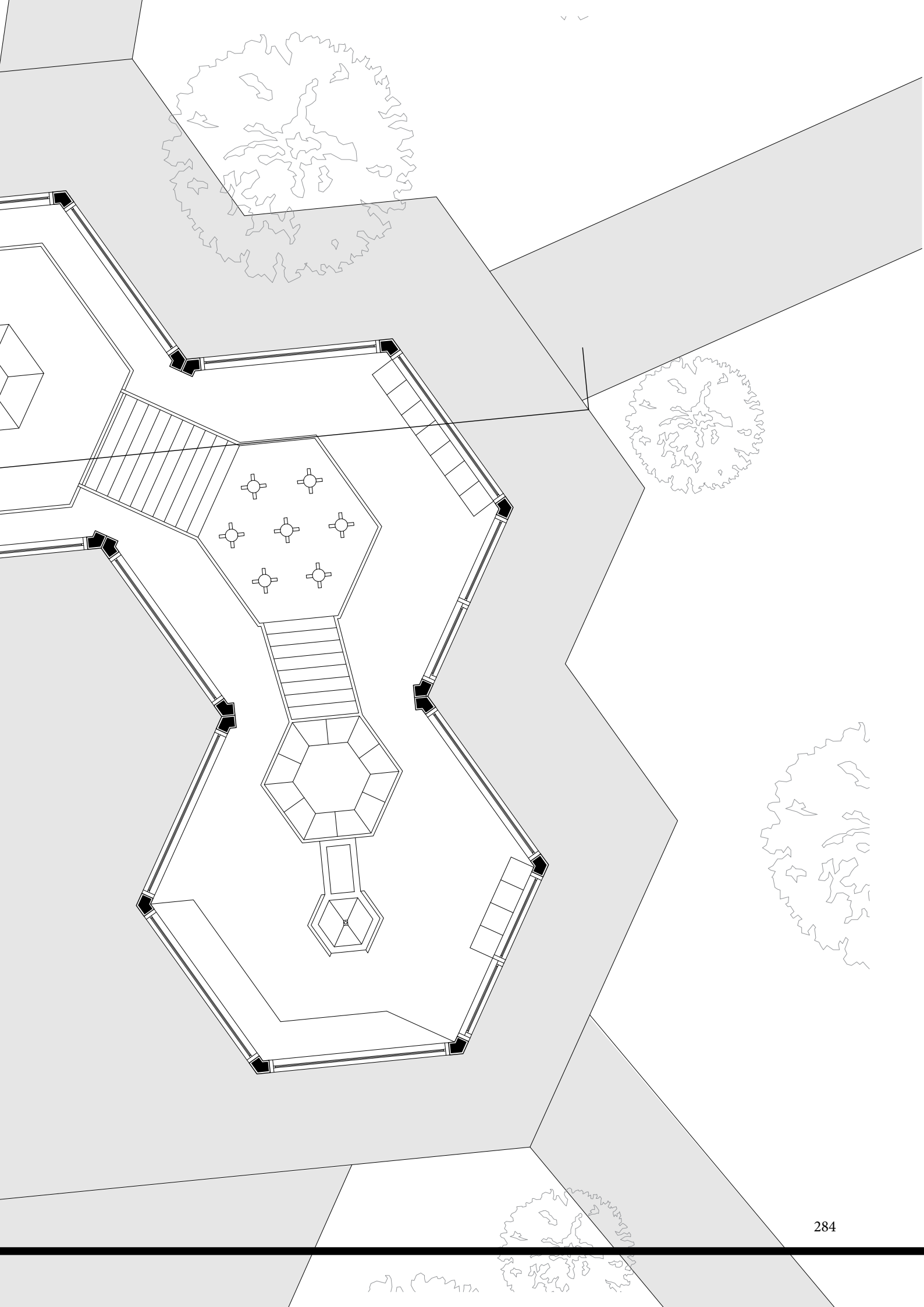


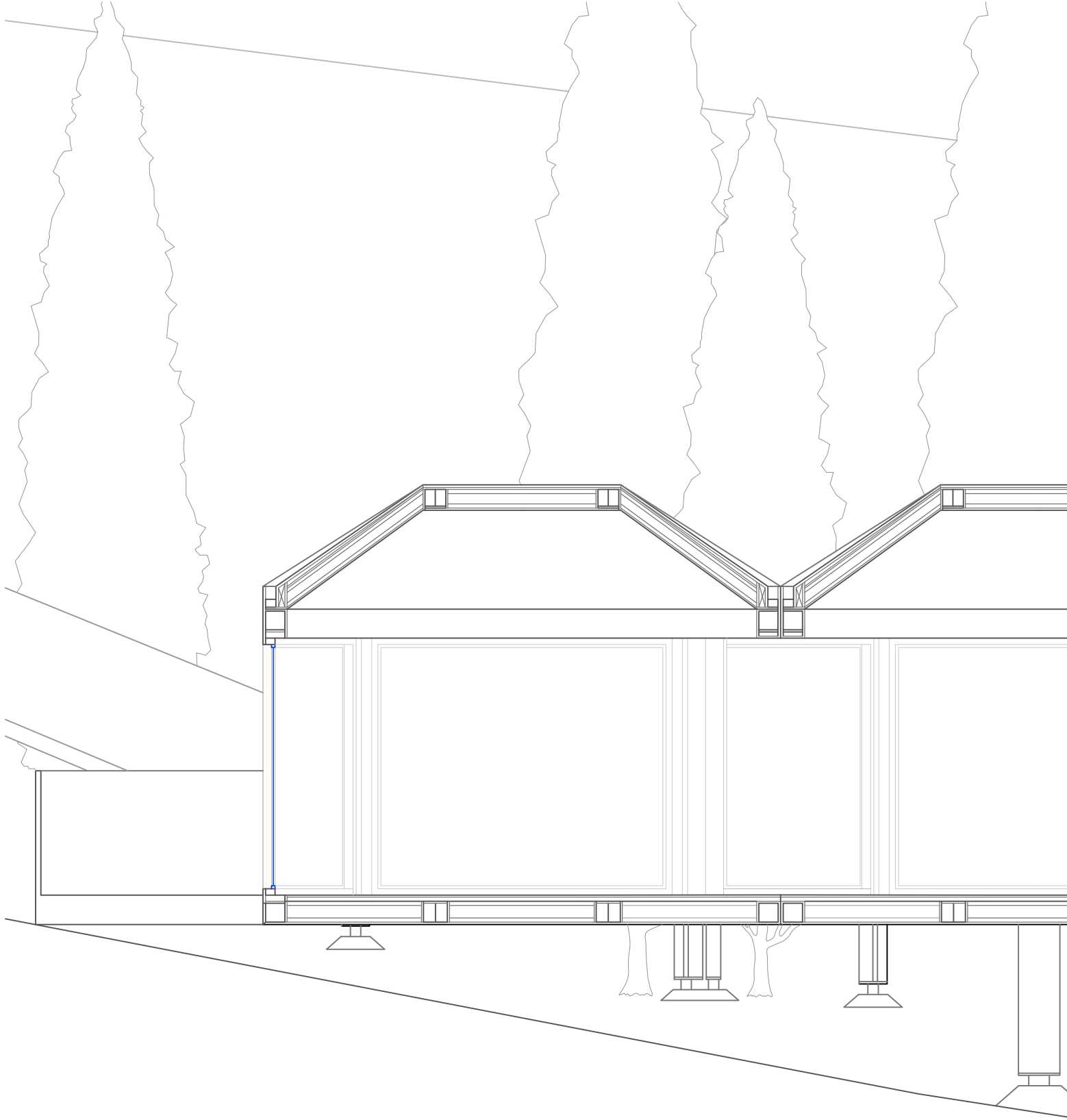


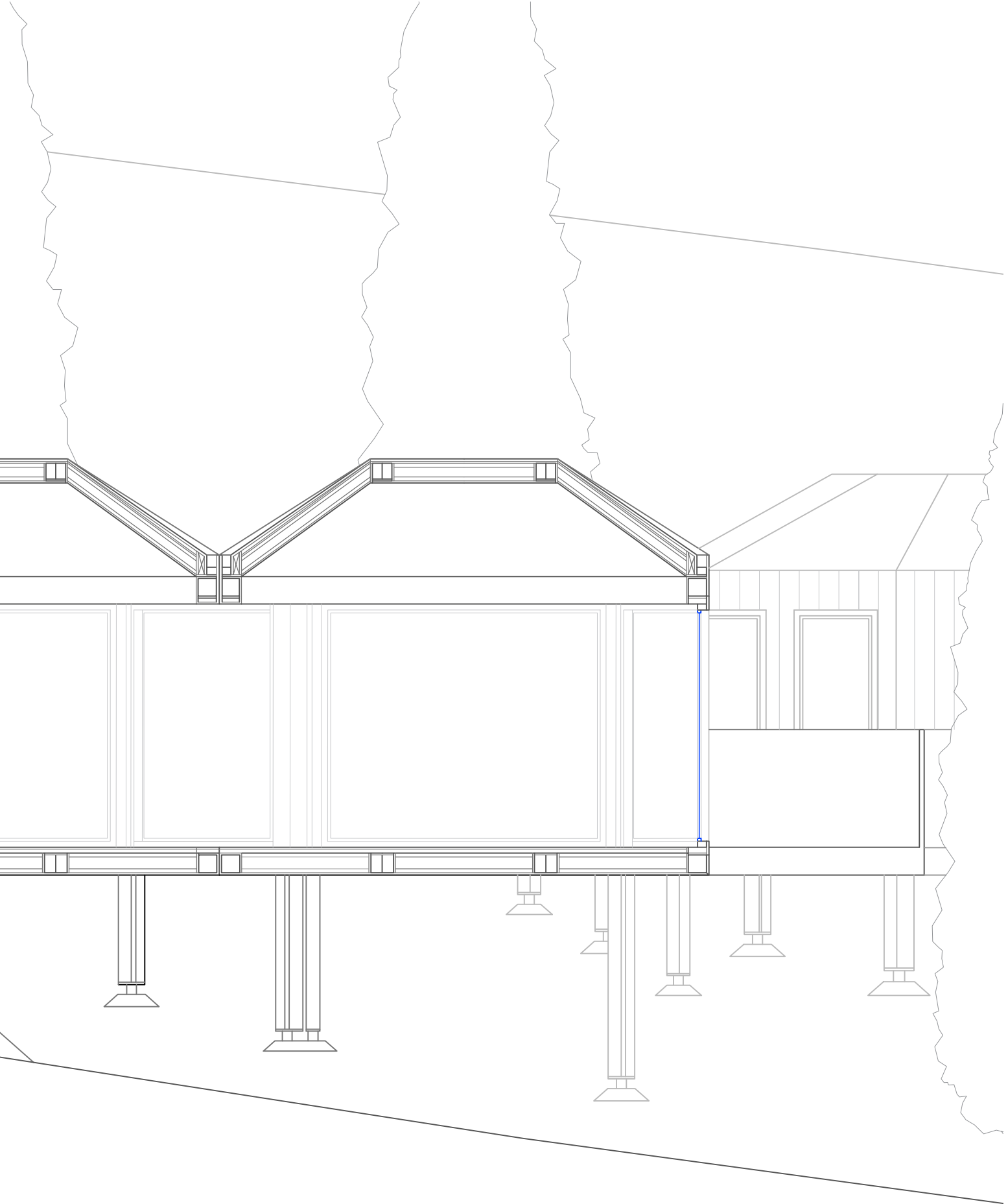












Conclusions

Conclusions

The aim of this thesis project was that of understanding deeply both the Japanese and the Italian thermal sector, to be able to understand the crisis that both compartments have been undergoing at the end of the 19th Century and promote some measures for the regeneration of the field in Italy.

In light of the research carried on and of the projectual experiences completed in both Countries, the conclusion the author reached is that the two experiences seem mirrored: in Japan the search is for baths more similar to the ones that used to be popular in the Peninsula and the other way around.

The project developed for the Case Study of Bacedasco is an attempt at compromising between the two tendencies, by giving relevance to the Italian concept of wellness, beauty and health, as well as the Japanese one of healing through nature. Moreover the proposed strategy introduces a constructive technique which could be beneficial in such a volatile market.

Appendix

Appendix

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