Spaces for Hope

In what ways can community spaces be used to foster preparedness among residents in anticipation of a predicted earthquake in Istanbul?

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Content

00 Fascination

Figure 0.1 Children in Karsu, Hatay helping the Architectural Recovery Team (July, 2023)

My family from Izmir, Türkiye, my origins have made the threat of an earthquake potentially affecting my family, a part of my whole life. While growing up, I heard my family talking about earthquakes, and fearing them. I always thought: Why be scared of them? Is this building not safe enough?

In February 2023, a devastating earthquake hit another part of Türkiye, Kahramanmaraş and Hatay. Witnessing the immediate aftermath of this disaster, I took the initiative to form a foundation, the Architectural Recovery Team. In this foundation, a group of students came together to see how we could help rebuild the villages around Hatay, which were affected by the earthquake. This included visits to the earthquake area. This raised many questions. I thought about how the scale of the consequences of this disaster could be minimized. I was fascinated by the engagement of local communities and individuals who came together to help each other. Figure 0.1 shows a drawing of my observations during one of the field trips, where the children from the village wanted to help us document the rubble and empty plots. They were eager to learn how the rebuilding would take place. For us, this was a learning point. We could learn from the children how they experienced the earthquake, how they were living at the moment, and how they were looking at their futures. This topic has become my graduation theme, and the studio Explore Lab allowed me to explore this theme in my own way. I am curious how I can learn from these communities in disaster areas, and implement the learning points to prepare for other earthquake-prone areas, such as in Istanbul.

I would like to thank my tutors, Aleksandar Staničić, Erik Hehenkamp, and Caroline Newton, for their guidance throughout my graduation project.

A special thanks to Job Schroen, who not only taught and guided me throughout the year but also introduced me to numerous contacts and opportunities.

I am also grateful to the Architectural Recovery team members, who have helped me and guided me, with the knowledge they have from the practice in Turkiye. Lastly, I would like to express my gratitude to my parents, family and friends for their support.

01 Introduction

Problem Statement

Earthquakes are a global phenomenon, occurring irregularly and varying in magnitude in various regions. The impact of earthquakes, however, differs significantly on multiple scales. It depends on the magnitude, the location, and social and economic factors. The result of earthquakes, or other natural hazards, is called a disaster, as the UNISDR (2009) describes it.

"Disaster impacts usually include death, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation."

UNISDR (2009)

Jenny Chandler, Alpine Fault magnitude 8 research assistant, explains that although it feels like earthquakes have been happening more frequently over the last couple of years, this is not the case. The number of earthquakes has not increased; however, the disasters caused and people affected by earthquakes have. This is mainly because of overpopulation and the density of major cities (Chandler, 2018).

"While the number of earthquakes has not increased, the numbers of disasters caused by earthquakes and the numbers of people affected by earthquakes have been steadily increasing."

Jenny Chandler (January 2023)

While earthquakes are a global issue, some cities, like Istanbul, are particularly vulnerable. Marco Bohnhoff, a German earth scientist, describes it as:

"Experts are in no doubt that the Bosporus metropolis, with its population of at least 16 million, is facing a major earthquake. The question is not if it will happen, but when?"

Marco Bohnhoff (2023)

The vulnerability of Istanbul is due to its position on top of active fault lines. Apart from that the city also faces other complex risks due to the high population density, and its political and economic situation (Müller-Mahn and Everts, 2013).

Why is this a problem?

The aftermath of an earthquake, the disaster, is marked by many problems that affect various aspects of society. To limit or solve the negative consequences of disaster, it is first of all crucial to understand these problems. These problems vary in time and scope. Firstly, the most immediate and devastating consequence of earthquakes is the loss of human lives. The earthquakes can result in a significant number of fatalities, leaving families and communities in mourning. Survivors often face trauma, anxiety, and fear, which can persist long after the physical debris has been cleared. The amount of destruction and debris can also result in illnesses, and the psychological toll not only affects individuals but also affects entire communities.

Secondly, the seismic forces can cause extensive damage to buildings and infrastructure, leading to the displacement of countless individuals and families. The loss of homes not only disrupts people's lives but also creates a pressing need for shelter and reconstruction. Entire cities can be destroyed, this not only causes physical and economic losses but also disrupts the social fabric of communities. Rebuilding these urban areas is a monumental challenge.

Thirdly, the economic consequences of earthquakes are far-reaching. Businesses are forced to cease operations, transportation networks are disrupted, and the cost of reconstruction is enormous. This economic standstill affects not only the affected regions but can have effects on a national and even global scale.

As mentioned in the problem statement, earthquakes do not occur more often, but disasters caused and people affected by these earthquakes are occurring more often. Considering the problems caused by such disasters, we can state that designing better earthquake-resilient cities can be a solution to prevent these disasters.

Design got us into this mess, so how can design help us out of this mess?"

Saskia van Manen (July 2023)

This question by Saskia van Manen highlights the role of planning and management during a design process to mitigate the impact of earthquakes. By recognizing the impact on human lives, communities, and economies, and by embracing design and psychological support, we can work towards a more resilient and disaster-ready society.

Conclusion

The basis of this research paper focuses on how design can help communities limit the disasters earthquakes cause and limit the number of people who are affected in Istanbul, Türkiye. This research aims to form a proposal for a communal building and space, where people are stimulated to come together and prepare physically and psychologically for earthquakes that experts predict. This building and space will not only be used as a preparation tool but also aims to be a space which can be used before, during and after a disaster. The overall aim of this research is to stimulate individuals and communities to live and build resilient cities, and to limit the disasters caused by earthquakes.

02 Relevance
Kahramanmaraş Earthquake

On February 6, 2023, a powerful earthquake struck southern and central Türkiye, as well as northern and western Syria, with the epicenter near the city Gaziantep. A second Mw 7.7 earthquake occurred hours later, 95 km north-northeast of the first earthquake. Both events resulted in extensive damage. The affected area, approximately the size of Germany, experienced significant destruction, impacting 14 million people, leaving an estimated 1.5 million homeless.

The confirmed death toll reached 59,259, with 50,783 fatalities in Türkiye and 8,476 in Syria.

The rescue and relief efforts were challenged by damaged infrastructure, winter storms, and communication disruptions. Despite a substantial domestic response, Türkiye sought international assistance, leading to the involvement of over 141,000 people from 94 countries in the rescue effort.(UNDP, 2023)

The Kahramanmaraş earthquake revealed significant deficiencies in both governmental and community responses. At a governmental level, a significant gap was the lack of effective coordination and a lack of management during and after the disaster. This was mainly caused by the noticeable lack of emergency preparedness before the disaster occurred. The failure to collect and share crucial data and the absence of a long-term plan for recovery and reconstruction resulted in the continuation of all current problems. Not much has changed in the nine months after the earthquake happened. These points were stressed during the “lessons learned workshop” in September 2023, organized by the Connecting Business initiative and the United Nations Development Program. (Figure 2.1)

At the community level, a distressing lack of coordination and information flow from authorities and humanitarian organizations left residents uninformed and vulnerable. Preparedness for this expected earthquake was nearly non-existent at a community level. This is mainly due to four elements, according to (Tanner, 2018). Firstly, the low social economical level of the area, the lack of trust in the government, the culture of neglect and the feeling of helplessness and fear, caused people not to act on the early warnings of this earthquake. A timeline of consequences can be seen in Figure 2.1, comparing the governmental and municipality level to the community level of actions.

During the disaster, necessities such as water, electricity, and communication were disrupted, with emergency shelters arriving late in the first couple of days and weeks after the disaster. The scarcity of first aid, materials, and hospital beds made the first couple of weeks very difficult in the city, due to emergency rescue teams not being able to reach the city. Additionally, the lack of coordination in the distribution of food and clothing resulted in leaving most of these essentials scattered on the streets. After the first couple of weeks, personal observations show that communities took action by themselves. These community-led initiatives have had a positive impact on the affected area. Giving people the opportunity to help others and come up with solutions after the disaster, gave people more hope, a way to heal their traumas, and a reason to start up life again. Most community-led initiatives, however, are still lacking funds and supplies. Moreover, the people do not have designated space to meet or coordinate their actions; they gather in the rubble or tents.

The severe earthquakes have sent a huge wave of horror throughout Türkiye. Since then, many citizens outside the disaster area have also become concerned about their safety, due to the countries geographical location.

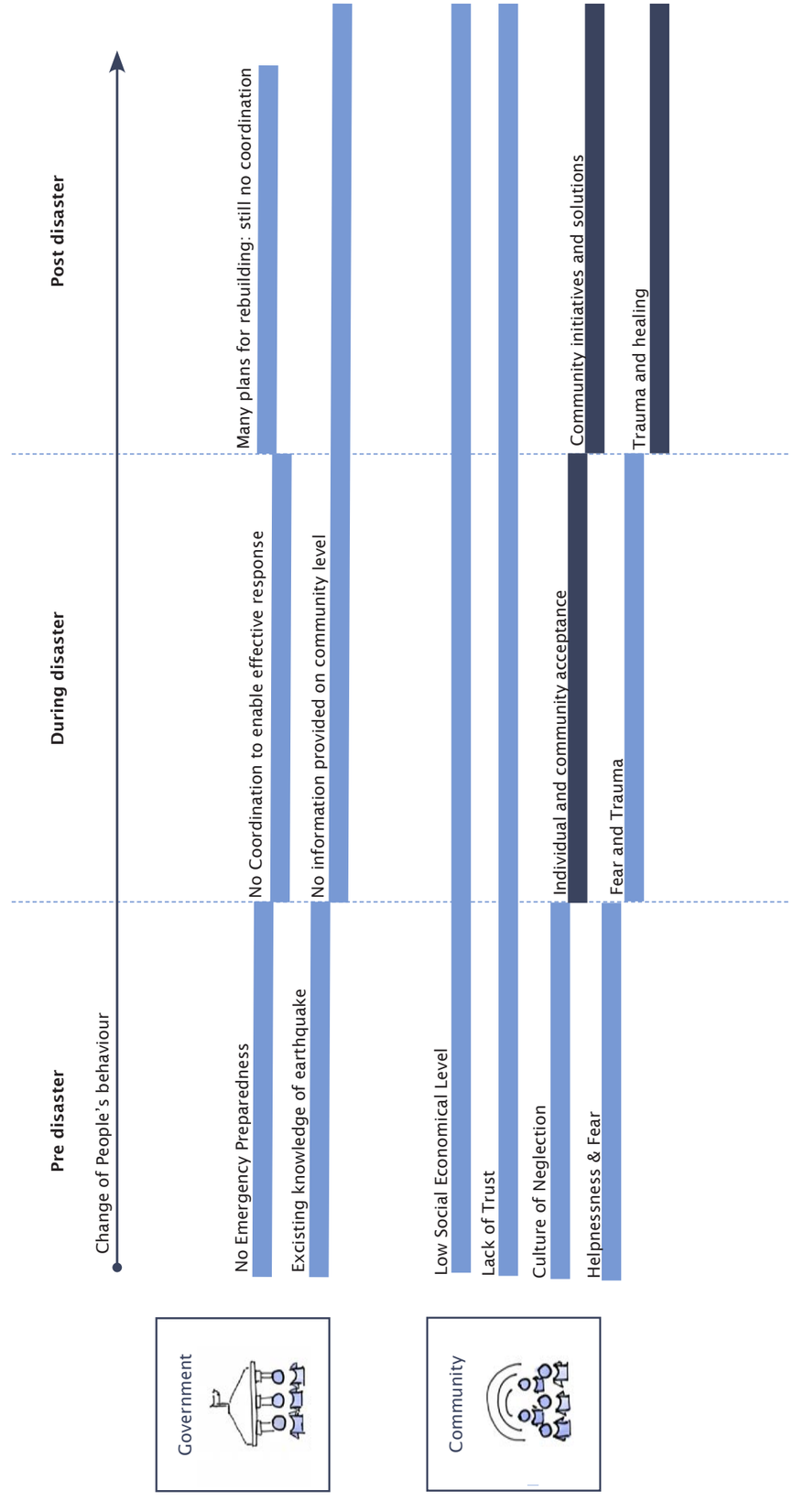


Figure 2.1: Own observations and literature for government and communities before, during and after the Kahramanmaras earthquake.

The Architectural Recovery Team

Most of the information gained about the relevance of the Kahramanmaraş earthquakes were because of the team fellow students and I started in light of the disaster. The aim of the Architectural Recovery Team is to empower earthquake-affected communities through collaborative innovation aiming to provide safe and sustainable homes.

The team focuses on long term housing solutions in the villages in Hatay, providing them with modular, flexible and sustainable design solutions, which fit the needs of the local people.

During the building process, a lot of contact were made within Türkiye, but also across the Netherlands with companies working for the earthquake zones. These companies include, engineering companies Arup, ABT and Rothoblaas. The Turkish Consulate Generale in Rotterdam, and the Embassy of The Netherlands in Ankara, or other mayors in the region in Hatay, are also in contact with the team. Lastly, we had various meetings with the architectural firms, working for the area such as Foster and Partners, Benjamin Derman or Kuiper Compagnon

This foundation and its research about the Kahramanmaraş earthquake, are used in this graduation thesis. This approach is chosen because of the parallels between the earthquake in Kahramanmaraş and the anticipated one in Istanbul across various aspects, including scale, population, economic status, cultural attributes, political factors, and building regulations.

Figure 2.2: The Architectural Team presenting their design to all their partners.

Figure 2.3: Pictures of Disaster taken during the Architectural Recovery Team fieldtrip, November 2023

Figure 2.4. Pictures of Disaster taken during the Architectural Recovery Team fieldtrip, November 2023

Figure 2.5: Pictures of Disaster taken during the Architectural Recovery Team fieldtrip, July 2023

Figure 2.6: Pictures of Disaster taken during the Architectural Recovery Team fieldtrip, July 2023

03 Research Question

The problem statement, my fascination, and the recent earthquakes that took place in Kahramanmaraş (Türkiye) forms the basis of my research, which leads to my main question:

In what ways can community spaces be used to foster preparedness among residents in anticipation of a predicted earthquake in Istanbul?

To answer this question, a literature study is done conducted. This focused on two questions.

(1) How can communities and individuals prepare for a disaster caused by an earthquake?

(2) How can space stimulate communities to come together in order to take action before an earthquake?

After the literary research, a contextual analysis is made to form conclusions about the needs of Istanbul and to make a proposal for a safe community space in a weaker area of Istanbul.

(3) How has the municipality, together with AFAD, been preparing the city of Istanbul, and how far are the plans for urban transformation?

(4) Analysis of Istanbul, Küçükçekmece, Kanarya, based on the data provided by the Municipality to define the weaker areas, which would be affected the most during a magnitude 7.5 earthquake scenario at nighttime.

During the research, a design proposal is made according to the outcomes of the literary research and the contextual research. This design leads to a proposal for the municipality of Küçükçekmece, Kanarya. This proposal for safe community spaces can form a network of buildings within the city, which inhabitants can use before, during and after a disaster, making the area more earthquake-resilient, and a place where people feel at home.

This research, together with the design proposal, aims to stimulate inhabitants of Kanarya to prepare for earthquakes. Afterwards the proposal for Kanarya is shown in a program of requirements which can then be used in other areas of Istanbul.

Step 1: Preliminary program of requirements, and design proposal to stimulate preparedness in communities in Kanarya by designing community spaces.

Step 2: Network map proposal of community spaces in Kanarya.

Step 3: Program of requirements and manual which can be used by local communities to build up a community centre, which can also be used before, during and after a disaster.

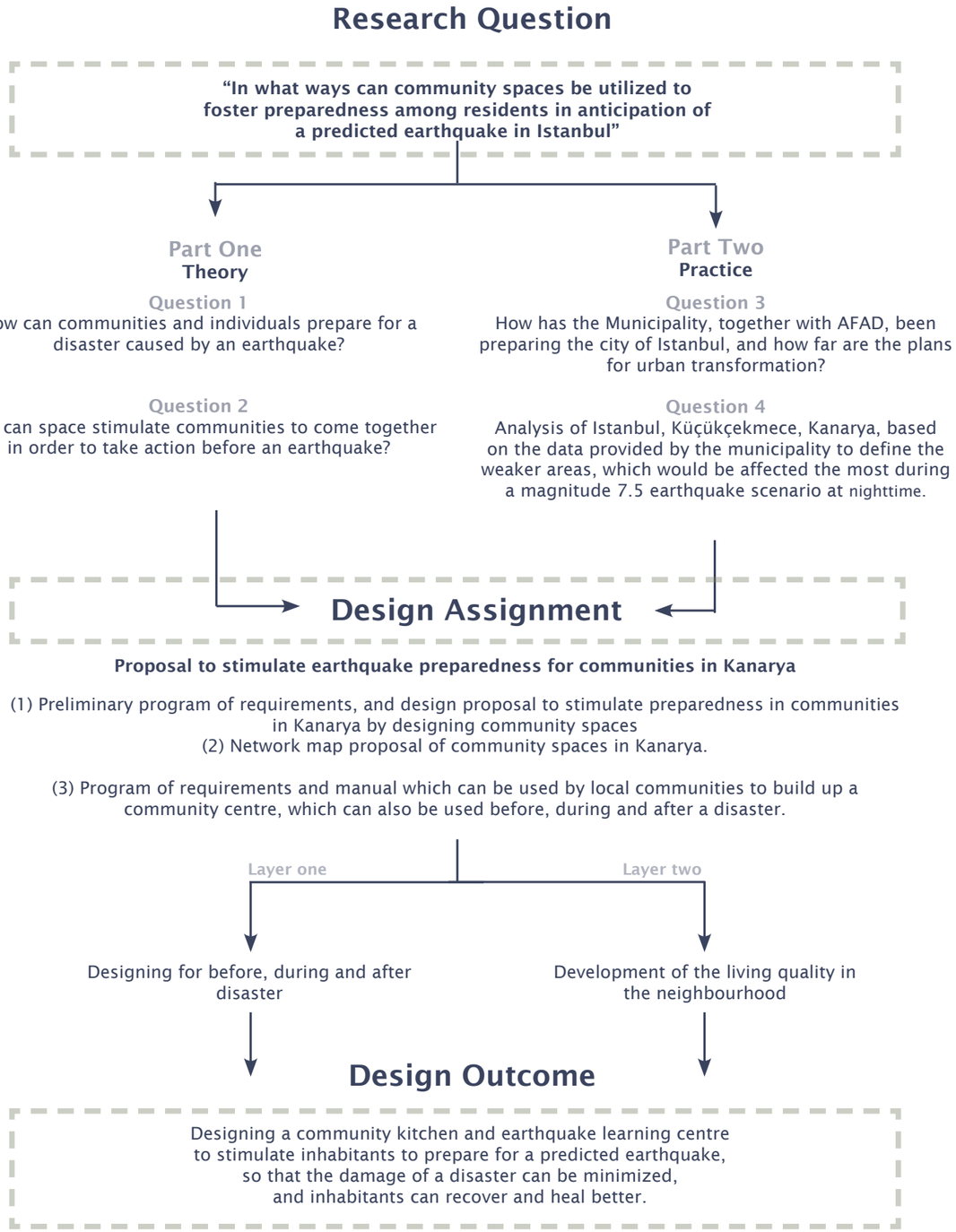


Figure 3.1: Analytical Framework

Conclusion

This research forms a design proposal for a communal building and space, where people are stimulated to come together and prepare physically and psychologically for earthquakes that specialists predict, focusing on Istanbul. This building and space will not only be used as a preparation tool but also aims to be a space which can be used during and after a disaster.

The overall aim of this research is to stimulate individuals and communities to live and build up resilient cities, to limit the disasters caused by earthquakes.

04 Methods

The primary objective of my research is to make strategies for establishing a network of community spaces in the most vulnerable areas of Istanbul to stimulate individuals and communities to prepare for a predicted earthquake in Istanbul. Different methods are used to answer my research question and sub-questions.

Personal Observations

Direct observations were conducted in both Antakya, a disaster setting, and in Istanbul where a potential disaster is predicted. These firsthand experiences provide valuable insights into the practical knowledge of preparedness in different contexts. Besides these, observations are made to learn more about the daily habits and needs of the people in Kanarya, Küçükçekmece, where the final design is made.

My fascination for the topic of post-disaster recovery and architecture for emergencies started before but developed after the Kahramanmaraş earthquake. During many discussions and talks with people from the area, the likelihood that this earthquake was going to happen was known, and the effects this disaster would have were shared. However, no action was taken beforehand on a governmental or community level, which resulted in the great destruction in the area. These problems made me wonder why inhabitants of a city where the likelihood of an earthquake happening was high, would not prepare beforehand. This is how I came to my research question and started by looking into literature about preparedness and the psychology behind preparedness, but also the built environment. This also made me wonder how Istanbul, where it is known a disaster will happen, has been preparing for an earthquake. By using variable methods during my research, such as literature Research, personal observations, talks with experts and analyzing data, a wide range of information can be combined in order to answer my research.

Within the big range of information I collected, I acknowledge the influence of political and economic factors on the earthquake-affected region. However, this thesis primarily concentrates on individuals and their everyday experiences, emphasizing the methods employed within this scope of research.

Literature Research

A preliminary literature research study is done, focusing on the themes of preparedness for natural disasters and how architecture and the built environment can stimulate people to take action. Numerous papers and research studies are explored these two focal points, often accompanied by detailed case studies.

This thesis combines the knowledge acquired from these two topics and takes three case studies into account, namely: in Italy, Japan and in Antakya, following earthquakes of various scales. While researching, conclusions are drawn about possible architectural interventions that could be used in a design process. However, during the literature research, various variables needed to be taken into account before turning them into concepts for the design process. These variables mainly

focus on the target group, site specific design, and the economical and political conditions. The general development of a neighborhood influences the quality and the amount of preparedness that has started in an area, which also depends on the amount of space there is in the neighborhood. Secondly, the culture and daily habits of inhabitants, need to be taken into account when looking at the preparedness of communities, as well as how communities have been responding to disaster and disaster warnings this far. These conclusions are taken after reading various literature researches, and comparing them with the post-disaster communities in Kahramanmaraş.

Data Analysis

Data obtained from municipal and governmental research, Boğaziçi Üniversitesi Kandilli Rasathanesi, on the predicted earthquake scenario with a magnitude of 7.5, was used for a thorough analysis to choose a location for the design. This data is then compared with personal observations to draw connections and insights about a program of requirements for a potential design. The outcome of the collected data determins the choice of this area with a focus on selecting the region that is projected to be most affected by the predicted earthquake, as indicated by the information in these publications.

Talks with experts in the field

While working on the rebuilding after the earthquake, conversations were held with professionals in architecture, construction, and other diverse disciplines during visits to Antakya. Additionally, discussions with architects and constructors in Istanbul helped to get useful insights for my research and design location. Additionally, talking to academics and practitioners in the field, helped to strengthen my arguments in the research and helped me to define a program of requirements for my design (see appendix for contact list).

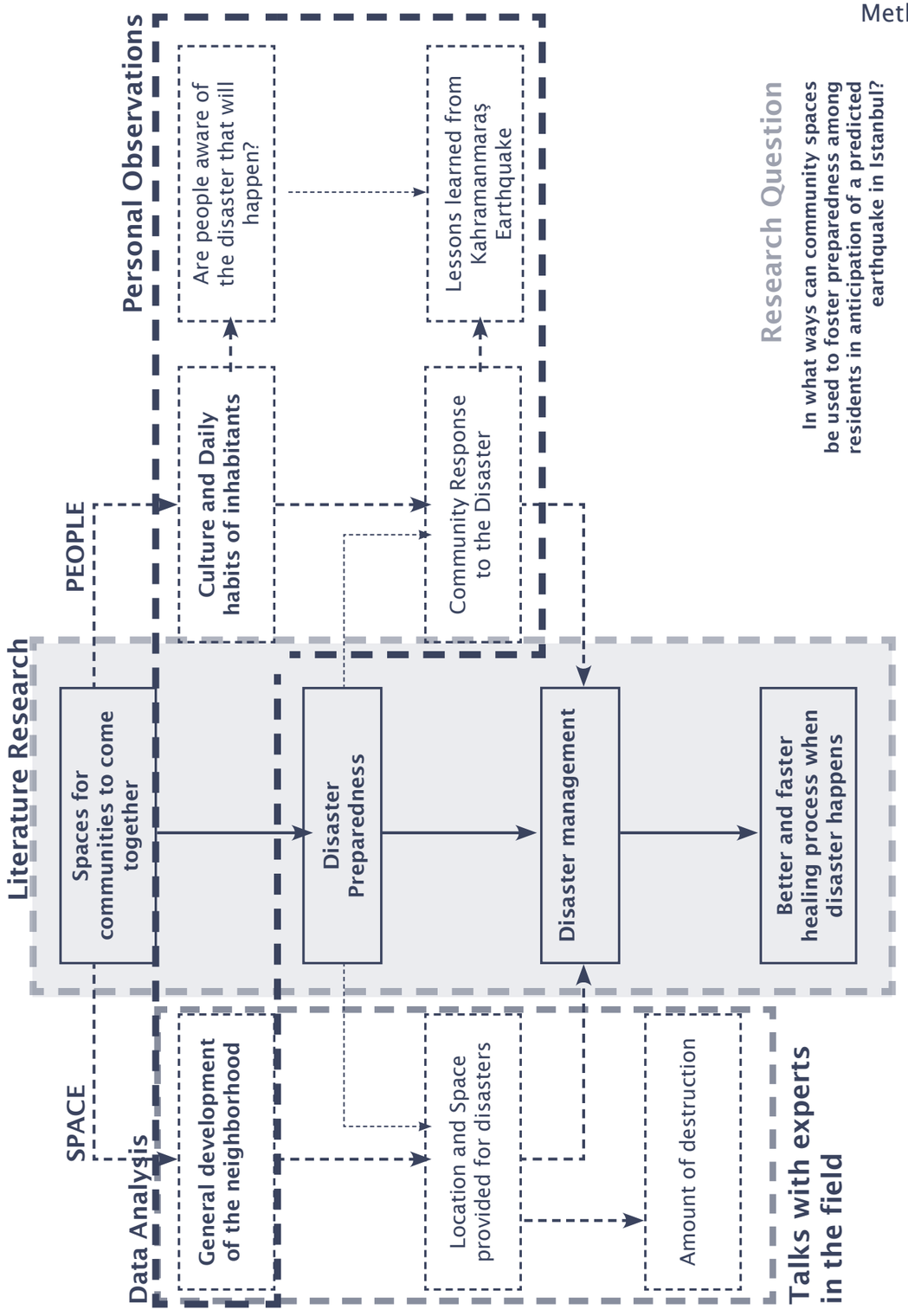


Figure 4.1: Theoretical and conceptual approach

Research

September 2023 - January 2024

05 Literature Research

(1) How can communities and individuals prepare for a disaster caused by an earthquake?

What is disaster preparedness?

The importance of preparedness during natural disasters, particularly unpredictable large, damaging earthquakes, cannot be ignored. However, the rarity of the events makes it difficult for people to fully understand the consequences of these disasters. This makes it very difficult for people to prepare (Strick, 2008).

Preparedness, as articulated by the United Nations International Strategy for Disaster Risk Reduction (UNISDR, 2016), involves the knowledge and capacities developed by various entities, from governments, and communities to individuals. Its goal is to define preparedness strategies which are designed to empower individuals to cope, adapt, anticipate, respond to, and recover from the impacts of likely disasters (Paton, 2015).

Many people are not preparing for disaster, Jenny Chandler (2022) explains. “It can be scary and overwhelming to think about the next big earthquake” she mentions. However preparing and learning from past disasters can help us minimize the risks of a future disaster, and create more resilience.

The following section will focus on the relevance of this model for the design process. The following questions will be answered: “Why is it important to prepare for disaster?”, “How to prepare on different scales?”, and lastly the question “The things that can go wrong during preparing?” will be discussed.

Importance preparedness for a disaster

The aftermath of an earthquake is marked by many problems that affect communities. In chapter 002, the problems and side effects of disasters are discussed. These problems vary in time and scope. By preparing for disasters, many problems could be prevented and essentual needs can be secured.

Firstly, the loss of human lives can be prevented and people’s well-being can be kept intact, if individual preparedness for an earthquake is stimulated. The number of deaths can be lowered, and preparedness can help people overcome their traumas and fear faster (Cvetkovic et al., 2019).

Secondly, the extensive damage to buildings and infrastructure is discussed. Rebuilding these urban areas is a monumental challenge. However, if building regulations are followed before an earthquake occurs, the loss and damage to buildings can be minimized. Next, predicting the number of shelters that will be needed gives inhabitants immediate shelter after an earthquake. This leaves more time for disaster management and coordination for long-term planning.

Thirdly, the economic consequences of earthquakes are mentioned. Preparing a business plan beforehand, which indicates the measures that need to be taken in case of an emergency, could help many small and big businesses to anticipate what would happen after a disaster happens, minimizing the economic damage.

How can we prepare for a disaster?

Individuals, municipalities, neighborhoods, and smaller communities, as well as organizations at the national level, can all participate in earthquake preparedness efforts. Community and individual preparation are the main themes of this section. Preparedness is different for everyone, and working as a community is the most effective approach overall (Chandler, 2022). In this section, the focus is put on community and individual preparation.

The UNISDR strategy highlights the significance of communities and individuals preparing mentally, alongside taking physical measures (Paton, 2019). Combining these two measures is necessary for comprehensive disaster resilience, and minimizing potential damage due to a disaster, such as an earthquake (Altindag, 2005; Boylan & Lawrence, 2020). Both measures go hand in hand. However, it is important to start with psychological factors, in order to be able to continue with physical preparations.

Psychological factors

Psychological preparedness is essential to improving individuals' ability to anticipate, cope, and recover from disaster events. Nevertheless, the concept of psychological preparedness continues to be an under-researched area.

Psychological preparedness, rooted in stress inoculation theory, involves the anticipation, identification, and management of emotions, providing individuals with the tools to cope psychologically and emotionally in threatening situations. This complex concept contains both knowledge-based aspects, such as understanding risk, and coping-based elements like self-efficacy. (Boylan, J. L., & Lawrence, C., 2020).

Studies on the Kahranmamaraş earthquake highlight the need to be well-prepared. This study demonstrates the link between physical harm and the level of social support received by individuals, which in turn leads to the development of Post Traumatic Stress Disorder (PTSD) and depression (Altindag, 2005). The earthquake also instilled significant concern in other earthquake-prone regions, particularly in densely populated areas, where inhabitants feel there is no way to escape the tall, high-rise concrete buildings. This aspect of urban anxiety was examined in a separate study conducted by young Dutch architects (Angst & Ruimte, 2004). They discuss the dread that might be evoked among city dwellers due to the overwhelming nature of vast and densely populated urban areas, where they may feel trapped within impersonal, towering concrete structures. In conclusion, architects must consider the psychological aspects of individuals while constructing buildings in these urban areas.

Bescker et al. (2012) stress the importance of emotions and feelings in disaster preparedness. The study concludes that people who experienced higher levels of fear or stress were more likely to follow a process towards getting prepared than those who were simply concerned or uneasy. Stress and fear can motivate people to take action and regain control of their situation. This increases fear of disasters and influences psychological preparedness.

Key fears include concerns for the life and health of family members, a lack of resources, and personal well-being. Prioritizing family and community needs over individual concerns proves essential in planning for effective disaster responses (Cvetkovic et al., 2019). Studies show that experiences with intense weather conditions and exposure to disaster consequences through media also contribute to fear intensity. It is also important to keep gender differences in mind while looking at fear levels. Females and children generally express higher fear intensity across various disaster types (Cvetkovic et al., 2019).

The main conclusion of this section is that understanding fears is crucial for effective risk communication and public education in disaster preparedness. The next step is addressing the physical aspects of disaster preparedness.

Physically factors

As mentioned above, acknowledging, recognizing and accepting a disaster is an initial step for communities to start physical preparations for potential danger. In his research, Russell (1995) outlines three key components of physical preparedness:
1. Structural measures like securing homes,
2. Survival tactics such as ensuring a water supply during utility loss, and
3. Planning, including household earthquake plans and community meetings.

While earthquake-prone regions typically have disaster management plans in place, the ability to act effectively during a disaster is of great importance. Individual preparedness is crucial, involving the creation of family plans specifying contact procedures and meeting points post-disaster. Participation in earthquake simulations at community centers, workplaces, and schools makes sure people learn to take appropriate actions. The necessity of an emergency kit containing vital supplies, such as water, non-perishable foods, and medication, and tools, cannot be overstated (World Health Organization, 2011).

It is also important to ensure the structural measures. This can be done by safely securing the physical surroundings in which people are based. This includes fastening heavy furniture, securing breakables, and ensuring the safety of water heaters, gas lines, and electronics.

Communities must prioritize earthquake-resistant building materials, by also monitoring a new construction process. Regular reviews and updates of earthquake preparedness materials maintain their condition and accessibility. Conducting earthquake drills within families ensures collective awareness and readiness during seismic events.

Case Study Japan

For many years now, Japan has been actively preparing and has strict building codes and measures for earthquakes. New technology and structural engineering have been developed

for buildings to withstand heavy earthquakes. Besides this, other ideas are tried in densely built cities, such as earthquake parks. In these parks, measures are taken in case of a heavy earthquake, such as benches that can be turned into cooking plates, huts which can be turned into emergency shelters, or holes in the grass which are connected to the sewage system and can be used as emergency bathrooms.

The Tokyo Rinkai Disaster Prevention Park is the headquarters of the disaster strategy response unit preparing the Tokyo metropolitan area. The park has a visitor center, where visitors are able to join simulations of large scale earthquakes in an urban setting. (Tokyo Convention & Visitors Bureau, n.d.). These types of parks are researched to also be implemented in Türkiye, guidelines have been set up, and the specific requirements of these spaces are also noted. However, after various case studies and projects, the real implementation has never been done. (Gülgün et al., 2016)

What are things that go wrong in disaster preparedness ?

The management of post-disaster communities necessitates both physical and psychological preparedness; however, it is observed that such preparedness is not always approached appropriately. Inadequate preparation for anticipated disasters can be attributed to a multitude of factors. This assertion is substantiated by a retrospective examination of the February 2023 Kahramanmaraş earthquake, where the extent of the devastation underscored a significant shortfall in preparedness efforts.

Firstly, during the earthquake itself, there was a lack of coordination as everyone rushed outside without clear guidance, leading to people ending up in unsafe areas. Having documented safe areas and given this information to the inhabitants in a clear way would have resulted in better management (Architectural Recovery Team, 2023). However, this information should be passed on very carefully. Risk literacy is often conveyed through maps placed in communal spaces. However, not everyone properly interprets or even acknowledges these maps (Jaenichen, 2023). During an interview, Claudine Jaenichen, Associate Professor of Graphic and Information Design at Chapman University, USA, emphasized the need for “information confrontation,” highlighting the importance of directly presenting information to individuals and creating awareness for the public. “By speaking to communities and involving them in the disaster planning process, we ensure that people know what to do when disaster comes” – Jaenichen mentions. Jaenichen further explores crowd psychology, noting that people tend to follow each other in emergencies, which can be beneficial in the case of communities teaching each other regularly what to do during an earthquake and following up on this knowledge during a disaster, leading communities in the right way under pressure. Nevertheless, again, it is important to do this in the right way; too much pressure or too much fear can create challenges facing individuals. As outlined by Boylan and Lawrence (2020), being too scared can cause individuals to overlook threats, create narrowed focus, and difficulties in decision-making during crises.

Secondly, looking back at the Kahramanmaraş earthquake, we see that there were insufficient shelters, limited access to essential supplies like water and food, and a shortage of tents and emergency shelters. Roads were closed, and the open routes were not adequately mapped, making it challenging for emergency aid workers to reach those in need. The earthquake was so powerful that the basic preparation provided in earthquake preparedness lessons, which are typically taught in schools, was insufficient. Furthermore, adults were not taught these lessons, and if they were, they proved ineffective.

Thirdly, before the earthquake, there were significant issues with poorly constructed buildings that lacked proper inspection by constructors. Moreover, there was a notable absence of an emergency plan or information dissemination to the residents during the Kahramanmaraş earthquake. The government plays a crucial role in disaster preparedness by inspecting buildings and disseminating information. While preparing for the disaster, the information given by the government to the communities is often unclear and not properly passed on. Additionally, poor coordination, inadequate risk assessments, and political and bureaucratic challenges can hinder preparedness efforts (Architectural Recovery Team, 2023 and Jaenichen, 2023).

However, it is important to mention that the scale of the multiple earthquakes was significant, resulting in a large amount of destruction. This amount of destruction could not have been fully anticipated or prepared for. To be able to address these issues, and overcome the problems while preparing for a disaster, addressing these factors requires a community-centered approach, involving ongoing education, community engagement, resource allocation, and effective communication at various levels of society, where we as designers are co-designing together with the community (Jaenichen, 2023).

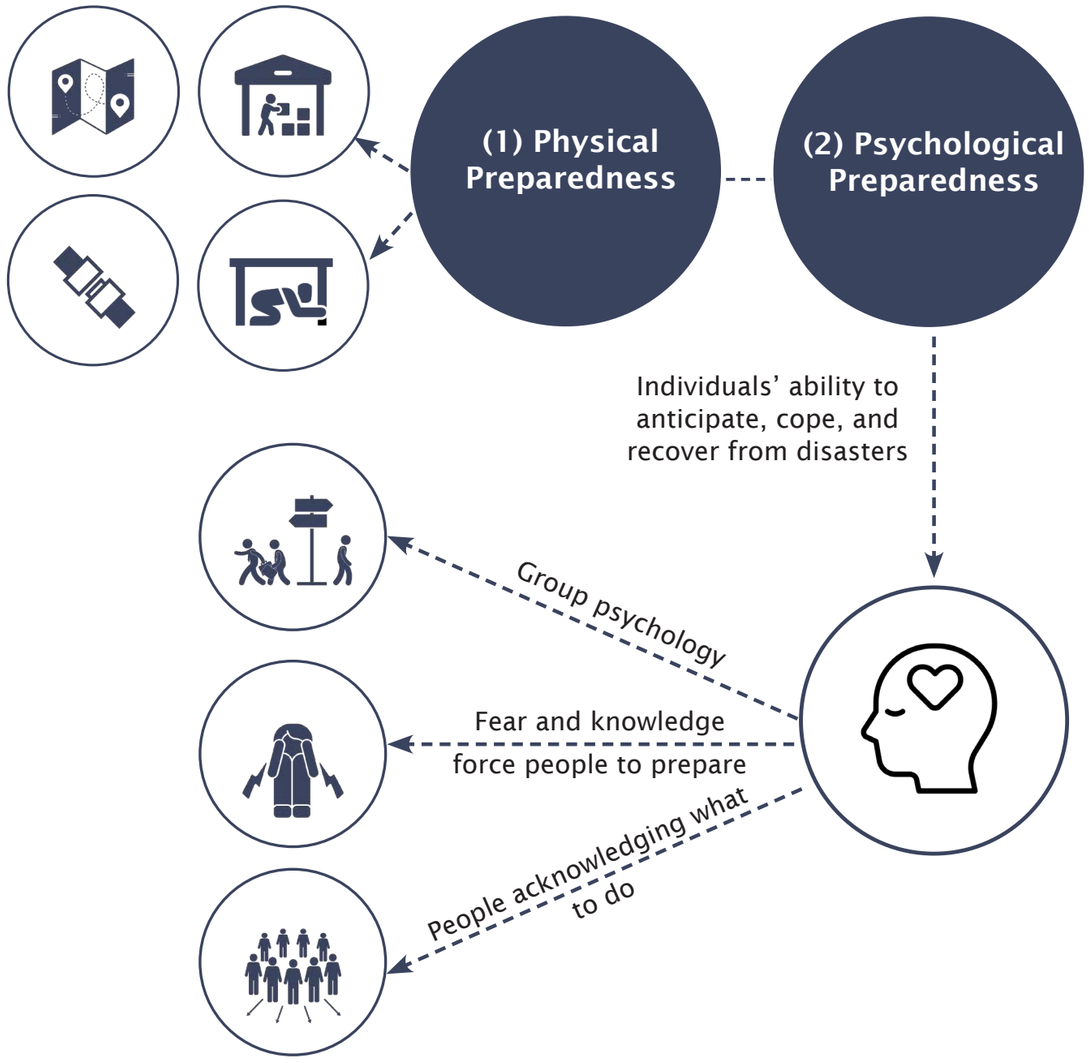


Figure 5.1: Earthquake Preparedness steps

Figure 5.2.: Earthquake preparedness parks in Japan. Multiple spatial objects in the area can be transformed into objects which can be used in a disaster setting. (January 2020)

(2) How can space stimulate communities to come together in order to take action before an earthquake?

Introduction

The importance of preparedness involves discussions and actions. It also requires a communal space where individuals feel comfortable addressing and facing the predicted destruction in their neighborhood. This raises an important question: How can architecture play a role in creating these interactions and safe spaces, but more importantly, stimulate people to take action?

To understand the concept of space influencing people, a literature study was done, which searched for the connection between the built environment and the effects on people to take action. It can be stated that architecture has a major impact on our emotions, actions, and overall well-being, yet in the design process the psychological dimensions of human-centric design are often overlooked (Karnik, 2023). This is particularly the case when it comes to disaster preparedness and recovery where more time is spent on physical measures and first aid (Saniewski, 2023).

From the previous subquestion, it can be concluded that preparedness is a multifaceted approach; however, in order to stimulate people to prepare, individual and communal human behavior should be taken into account to persuade people living in earthquake-prone areas to prepare for disaster. In his model, Bandura posits that human behavior is shaped by three primary factors (Bandura, 1978):

1. Personal determinants, encompassing cognitive aspects such as knowledge, expectations, and attitudes, are often symbolized by “beliefs” and “uncertainty”.
2. Behavioral determinants, including skills, practice, and self-efficacy, which represent “Intentions to prepare”, and “preparedness”.
3. Environmental determinants, involving factors like social norms, community access, and people’s environments, result in “getting information.”

Addressing these three factors is essential for effective disaster preparedness, to be able to stimulate people’s behavior to prepare for a disaster.
However, researchers point out the lack of information and the significance of emotions, particularly in the context of earthquake preparedness, where ‘Emotions and feelings’ emerge as crucial in shaping beliefs and behavior (Becker et al., 2012).

The Bandura model shows the importance of preparedness by using people’s fear and worry before a natural disaster, particularly earthquakes. Secondly, creating spaces that not only respond to physical needs but also stimulate proactive behaviors to prepare for predicted earthquakes is an important aspect of this connection.

Concept of architectural psychology and pushing people to take action

Architectural psychology explores and combines the influence of architecture, the built environment and spatial designs on the psychological well-being, and experience of individuals (Abel, 2021). Architectural psychologists investigate how various architectural elements, such as lighting, color, spatial layout, and materials, influence occupants’ moods, productivity, and overall experience, but most importantly contribute to our memory. The goal is to create environments that not only serve practical purposes but also contribute to the psychological comfort and satisfaction of those who inhabit or interact with the space (Karnik, 2023). Positive responses to well-designed spaces evoke feelings of joy, creativity, and calmness, while negative reactions may lead to dissatisfaction and restlessness.

The built environment plays a significant role in shaping human experiences, affecting factors like stress levels, concentration, social interactions, and overall quality of life. By integrating psychological principles into architectural design, architects aim to optimize spaces for human well-being and improve people’s overall experience.

In the context of disaster preparedness and recovery, architectural psychology becomes crucial in designing spaces that give a sense of safety, resilience, and community engagement (Strick, 2008). These spaces should encourage the engagement of communities. This can be done by creating spaces where people can easily take action, spaces that are easily accessible and also respond to the daily needs of life, which creates a sense of belonging to a certain space (Saniewski, 2023). The space design should also have a clear function in the environment. It should encourage people to make use of the space daily before a disaster comes and help restart life after a disaster. Information about the disaster, emergency kits and storage of tents should be available to make people aware of where the gathering point is during a disaster. Another approach could be contrasting with the rest of the ‘unsafe’ neighborhood by, for example, using different materials, making the building very spacious and maybe vary in height (Angst en Ruimte, 2004). Furthermore, the buildings’ earthquake-resistant techniques should be demonstrated and taught to its users.

Spaces before, during and after disaster

The environment in which people are situated is critical during the healing process following a disaster that causes trauma. By looking at a previous study about the earthquake of Italy in 2016, “Healing the landscape, healing the community”, an interview was held with Marta Saniewski (Environmental Psychologist) and Michael Saniewski (Architect). In the following part, several suggestions were incorporated, and the importance of these two disciplines is connected by referring to the pre, during and post-disaster setting. These suggestions were compared to the way the people in Antakya are now rebuilding their lives after the Kahramanmaraş earthquakes in 2023. This was done in order to see how space is used in a post-disaster setting in order to understand the need for space before an earthquake.

Before | Understanding the psychological dynamics of individuals and communities is essential in architectural design to stimulate preparedness. “Healing the landscape, healing the community” focuses on places that are not just functional spaces but also spaces that keep people’s emotions and attachments. Place attachment, as described by Giuliani (2002), goes beyond mere functionality, as demonstrated in the Italian context where, even after earthquakes and great loss, older individuals return to their damaged villages due to the emotional ties they share with the location. Architectural design should create a “Sense of place”,” incorporating elements of remembering, forgetting, and cultural heritage when building a city or building for the first time (Saniewski, 2023). Sensitivity to the psychological impact of architectural choices is important in creating spaces that encourage preparedness even before disaster strikes.

During (up till two months) | The immediate response to a disaster requires spaces that prioritize safety, accessibility, and ease of evacuation. Architectural features should consider the psychological well-being of individuals during chaotic events. Emergency shelters, evacuation routes, and gathering spaces should be designed to decrease stress and promote a sense of security. When it comes to the Kahramanmaraş earthquake, many residents were unaware of the emergency spaces provided by AFAD, a governmental disaster management agency under the Turkish Ministry of Internal Affairs, where people could receive first aid for the first few hours. This resulted in inhabitants gathering in the wrong place, between the two major earthquakes, which were dangerous due to a possible landslide (interview village head Karsu, 2023). This also meant that the disaster management was not well coordinated and it was very hard for people to get help because they didn’t know where to go.

After (after two months – 5 years) | During post-disaster recovery it is important to take psychological well-being in rebuilding communities and cities into account. Architecture plays a vital role in creating spaces that facilitate healing and recovery. However, doing this in the right way is very important. First of all, people indicate that they are scared of tall concrete buildings after an earthquake (Architectural Recovery Team, 2023), because during an earthquake the collapse of these buildings is what causes the disaster (Vale, 2007). It is important to look at the use of materials, space and height of buildings to design new buildings. Secondly, while rebuilding cities and helping communities recover, individuals are forced to stay and see the changes in their surroundings. “Disasters that affect one’s physical surroundings create further problems for one’s psychological recovery” – Susan Leigh Strick (2008) states. Disasters make many survivors homeless and leave few belongings behind, which means that their identity, which these belongings represent, disappears. If we look at designing for communities that recover, we first need to understand the concept of loss of place and the memory of the places affected to understand what is needed (Strick, 2008)

The case study from Italy, reveals that discussions within communities about their environments, needs, and memories stimulate a collective response to rebuilding. In this case, the communities indicated that they missed the sounds of the church bells, which were destroyed during the earthquake. The Italian architects acted on these needs as a first step. After this participatory design workshop, and after a couple of years where nobody inhabited the village, rapid change was seen after the new church tower, and people moved back into the village, stimulating individuals also to rebuild their own houses again. When looking at the Kahramanmaraş earthquake, we see that communities and individuals try to take action in the spaces that are still left: damaged buildings, tents, containers, etc. are all turned into spaces where groups of people can come together. For example, children talk to psychologists in tents, or a community gets together to plan how to get shelters to survive the winter (See sketches from Antakya and Samandağ, figure 6.1 and 6.2).3.). However, these spaces were not always safe or suitable for the healing process people have to go through, due to the temporary solutions and the idea that these spaces where they gather will probably also be demolished. This idea was discussed in depth in a workshop in Antakya, organized by the Vereniging Nederlandse Gemeenten (VNGI, 2023).

Conclusion

Understanding what people find important involves an ongoing conversation between designers and the people. Designing for disaster recovery necessitates a collaborative process that engages communities, allowing architects to anticipate and address psychological needs before, during, and after a disaster. Public spaces and gathering areas become spaces for dialogue, allowing architects to create environments that empower communities to recover from the impact of disasters, by understanding the local culture and language.

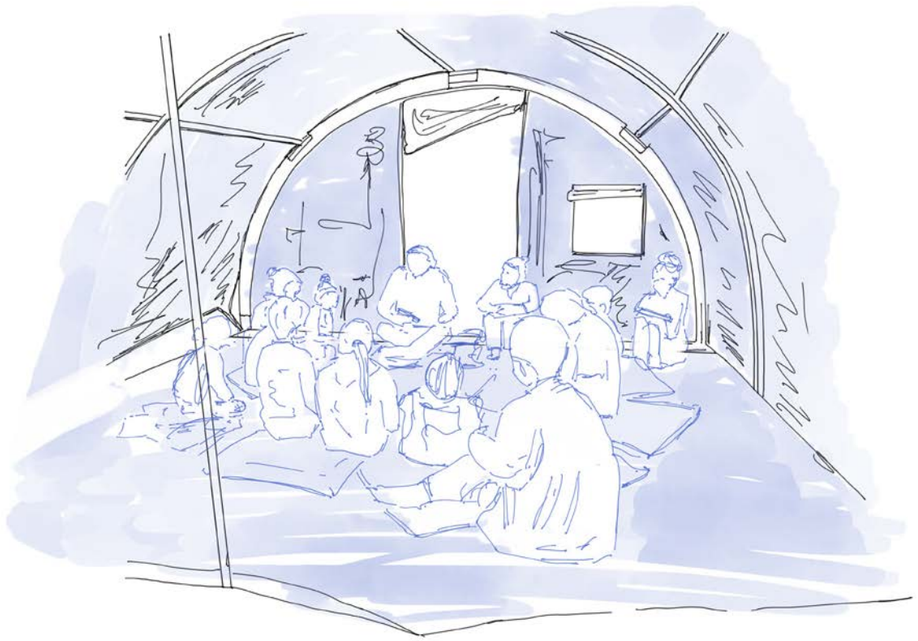


Figure 5.3: Own observations of children getting psychological help (2023).

Figure 5.4: Own observations of communities coming together between the rubbles to find solutions after the earthquake. (2023).

Figure 5.5: Conclusions obtained from literature about architectural psychology

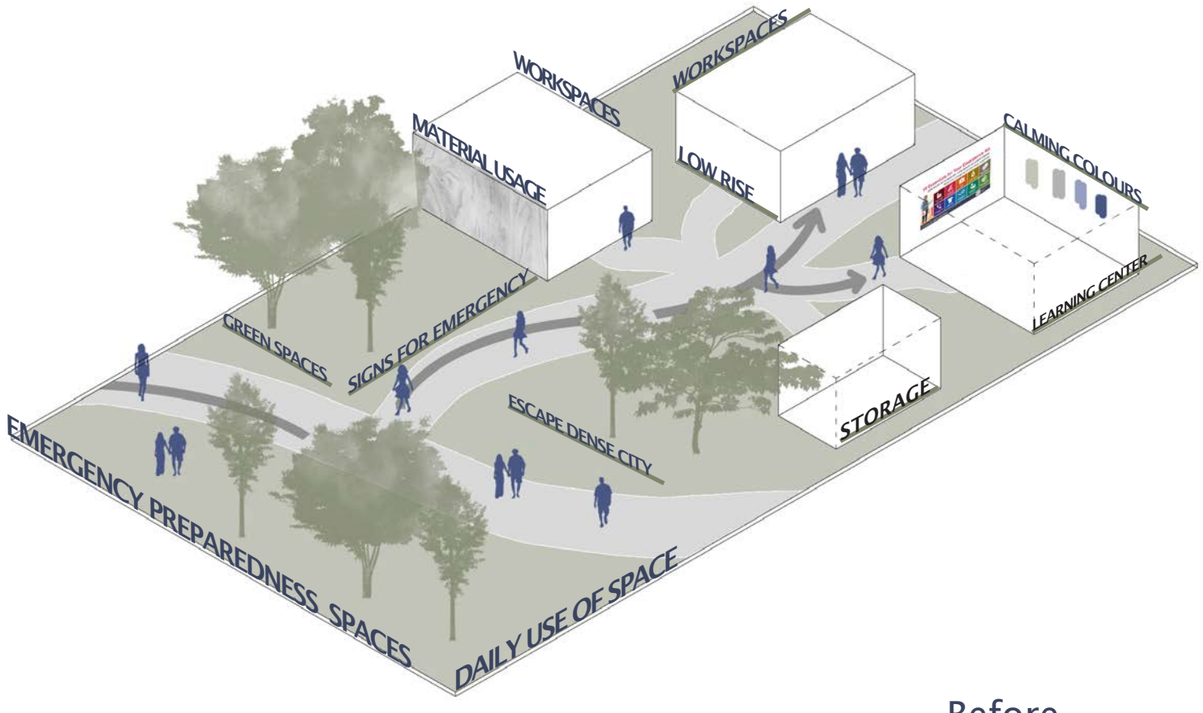
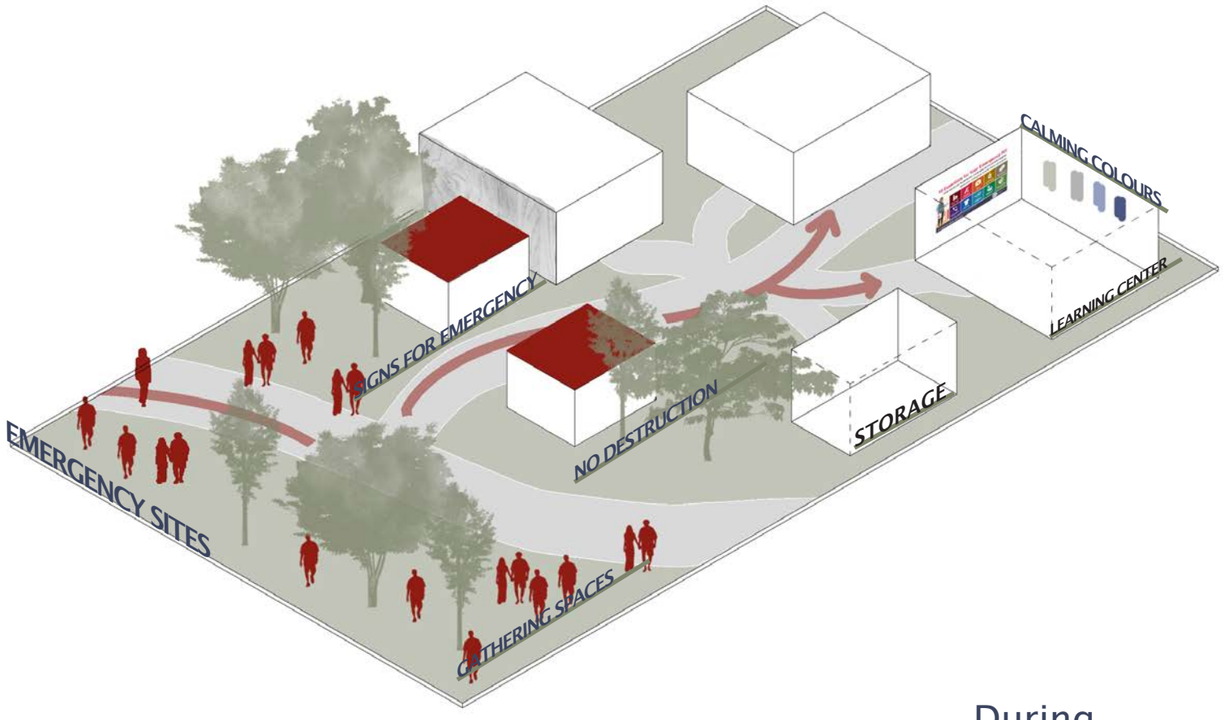
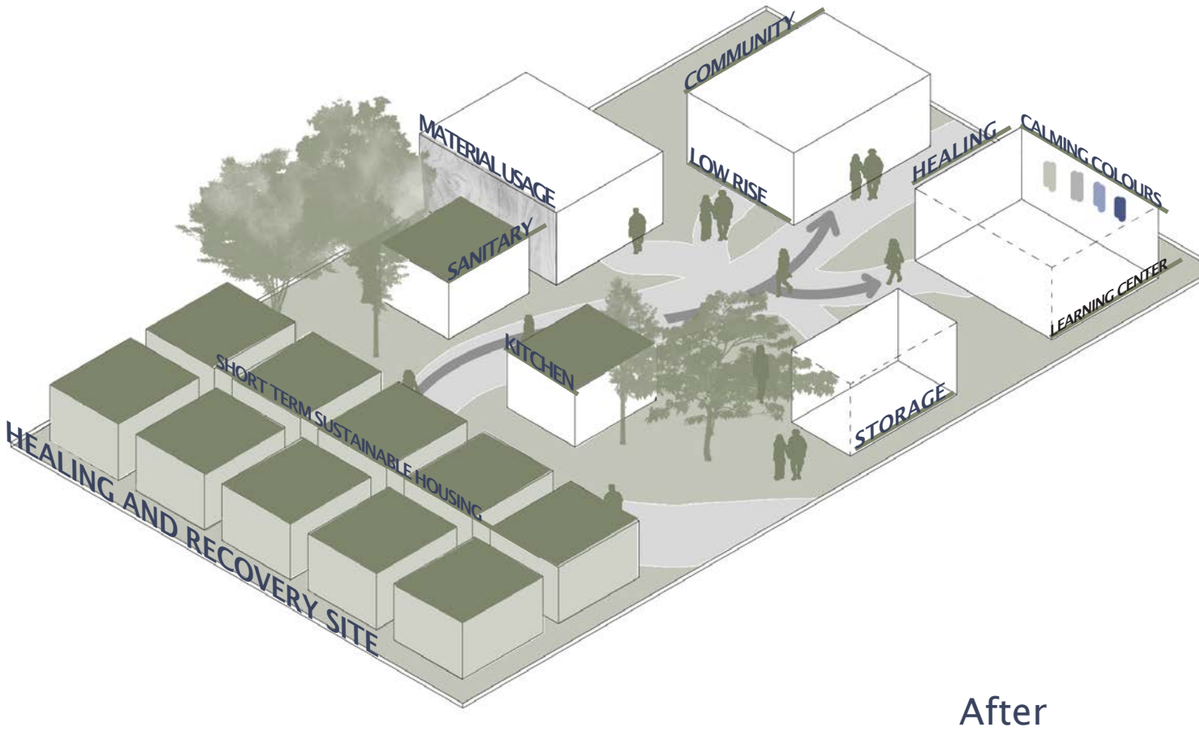


Figure 5.6: Conclusions & Architectural Interventions



During Disaster

Figure 5.7: Conclusions & Architectural Interventions



After Disaster

Figure 5.8: Conclusions & Architectural Interventions

06 Contextual Research

(3) How has the municipality, together with AFAD, been preparing the city of Istanbul, and how far are the plans for urban transformation?

Preparedness Istanbul

The next step in this research is to document and see what actions have been taken in the city of Istanbul to make the city earthquake resilient and prepare the city for a predicted earthquake. It is important to note that the results of the research done by different political parties and in different economic situations were compared and used. In this research, the data used is provided by governmental sources. The municipality of Istanbul and the Earthquake Risk Management and Urban Earthquake Improvement Department (AFAD) provided data, as did the municipality of Küçükçekmece and the Urban Transformation offices. These are the main and only resources for data about Istanbul. This research is therefore based on this data. As with all data, the accuracy and validity of the data still need to be critically questioned; however, within the scope of this research, the data provided is used and trusted.

As mentioned in the introduction, Istanbul is vulnerable due to its position on top of the active North Anatolian fault line. The North Anatolian Fault Line, stretching across northern Türkiye, is a significant seismic zone. This fault marks the boundary between the Eurasian and Anatolian tectonic plates, resulting in frequent earthquakes, such as the devastating 1999 Izmit earthquake or the 1933 earthquakes which left Istanbul being destroyed (Bulut et al., 2019). However, the predicted earthquake will cause bigger destruction risks this time due to the high population density and growth of 16 million inhabitants, as well as its political and economic situation (Müller-Mahn and Everts, 2013).

However, despite the fear of the predicted earthquake happening in Istanbul, many precautions and actions have already been taken. In 2012, Istanbul took a significant step in improving its earthquake resilience by revising building codes and introducing a stricter approach to construction standards. This shift can be seen by the Law on the Transformation of Areas Under Disaster Risk No. 6306, enacted on May 16 (2012). This regulation aimed to identify risky structures and areas, determine reserve building zones, facilitate the demolition of unsafe structures, plan for transformation, assess the value of properties to be transformed, and establish procedures for agreements with stakeholders. The regulation aimed to address various faces of earthquake preparedness within the framework of the law.

Between 2020 and 2022, extensive research was done, throughout the whole of Istanbul, on the preparedness for the predicted earthquake that is forecast to happen in the next couple of years. Each municipality conducted distinct research projects, evaluating vulnerabilities and potential impacts for their respective areas. These research projects are crucial to understanding the impact an earthquake will have on the city and stimulating people to take action based on the research.

In February 2023, the earthquake in Kahramanmaraş caused many concerns among the inhabitants of Türkiye, specifically Istanbul. The earthquake reminded inhabitants of the urgent need for action and emphasized the necessity for effective measures to strengthen the city's preparedness.

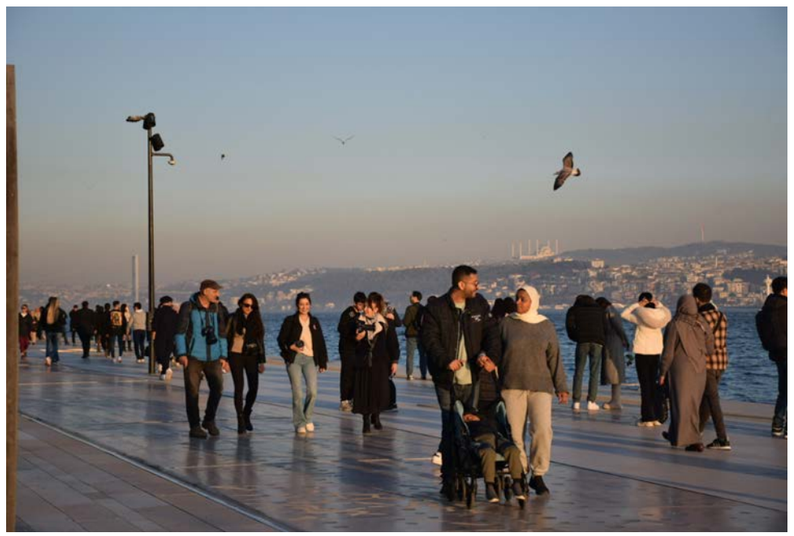


Figure 6.1: Pictures from Istanbul, streets in the city centre
Pictures taken by the author, December 2023

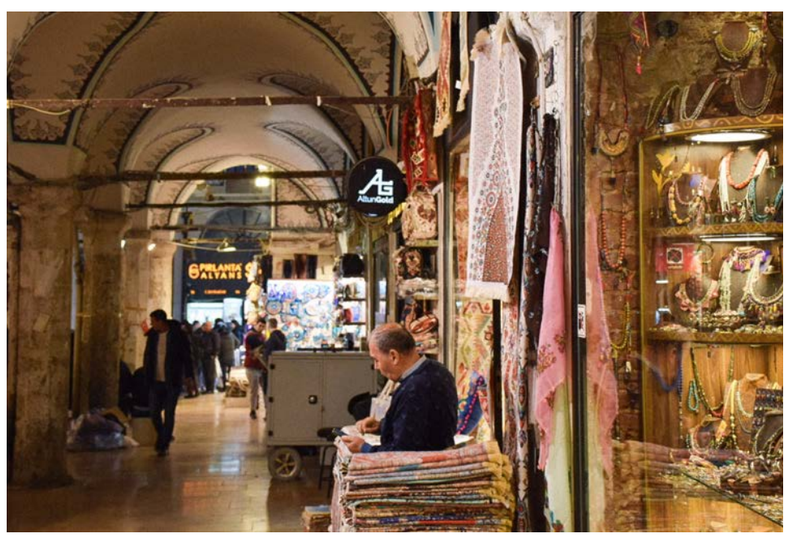


Figure 6.2: Pictures from Istanbul, traditional elements in the streets
Pictures taken by the author, December 2023

AFAD

The government organization AFAD focuses on disaster management in Türkiye before, during, and after a disaster. The main part of these disaster management plans is indicating what to do during a disaster. AFAD has located “escape spaces” in Istanbul and in cities such as Izmir. These spaces are open plots of land or parks without buildings that serve as safe places for people to go right after a disaster, where AFAD can set up emergency tents and provide emergency supplies. The main aim is to bring people together in a secure space and offer collective assistance during emergencies. Additionally, plans are in place to inform residents about what to do during emergencies. Brochures containing information about earthquakes are available on the website and are part of emergency training in schools. However, despite all the actions being taken, there is a need to improve how this information can be shared with people in schools and workplaces or how these spaces can be promoted to the residents.

Istanbul municipality research

The Istanbul municipality together with the Earthquake Risk Management and Urban Earthquake Improvement Department and Ground Investigation Directorate and the Boğazici University Kandilli Observatory, and Earthquake Research Institute and Engineering Department have been documenting and researching the city of Istanbul. The research encompasses projections regarding structural damage, fatality counts, injury incidences, disruptions in transportation infrastructure, and requisites for provisional habitation in anticipation of a nocturnal seismic event posited at 7.5 on the Richter scale. This inquiry underscores the significance of evaluating seismic hazards and vulnerabilities within Istanbul, drawing upon empirical insights from historically catastrophic temblors—namely, the 1999 Gölcük (Magnitude = 7.4) and Düzce (Magnitude = 7.2) earthquakes. Nonetheless, the document acknowledges the potential for actual earthquake repercussions to deviate, attributed to inherent uncertainties.

Küçükçekmece municipality research

Partly based upon the urgent need for change and the research done by the Istanbul municipality, smaller municipalities within Istanbul started making strategic plans for making parts of the city earthquake-resilient. The Urban Transformation offices define regions which need to be transformed. In the context of Istanbul, this means strengthening or rebuilding buildings to make them earthquake-resilient. The “Urban Transformation Strategy Document” for the Küçükçekmece district, developed under the “Law on the Transformation of Areas Under Disaster Risk” No. 6306 (2012), aims to address issues such as unsafe construction, aging buildings, and unplanned urbanization. The document compiles data on the district’s physical structure, building inventory, ownership, and current plans. It identifies problems and prioritizes transformation areas.

Observations

During the field trip in December 2023, various observations were made in Istanbul. Different neighborhoods across the city were visited. These visits showed diverse cultures, different economic levels, and a range of functions from residential or work areas to touristic highlights. Throughout the field trip, information about risk management was collected in public spaces. Despite the lack of information in public spaces, the information about gathering spaces in case of an emergency is indicated in large open spaces within the city. The main signs indicated the tsunami risk direction people should take in case of a disaster, and the signs by AFAD indicated disaster-safe open spaces. Figure 6.3 shows an example.

These spaces, however, are not big enough for the large population in the area. They are indicated to be used for a short amount of time. Secondly, these spaces are often in schoolyards, which all have high fences around them and only one main entrance door.

In higher-developed neighborhoods like Kadıköy, preparedness and action being taken could be seen through the number of buildings transforming due to their vulnerability to earthquakes. Nevertheless, a lot of buildings still need to undergo this transformation. While residents in wealthier, more developed areas are aware of earthquake risks, there is a reluctance in other areas to take proactive measures. This reluctance can be explained due to the high cost of rebuilding structures and concerns about the reduction in apartment sizes, particularly for buildings constructed before 1970. In less developed areas, awareness of potential seismic events existed, but inhabitants did not feel the need to take action. Residents are feeling helpless and rely on fate rather than taking individual or community action. This difference in preparedness highlights the challenges associated with earthquake resilience across different socio-economic levels within a city and also highlights the difficulties in convincing people to take action (Kadikoy Müdürlügü, April 2023)

(Own observations; fieldtrip, 2023)

(Olasi Deprem Kayip Tahminleri Kitapcigi, 2020)

(Kenstel Donusum Strateji Belgesi, 2020)

(AFAD, Information Booklets for individuals, 2020)

Figure 6.3: AFAD sign, indicating gathering space in a park in case of a disaster (Photo by author, December 2023).
Figure 6.4.: Olasi Deprem Kayip Tahminler Kitapcigi, 2020

Figure 6.5: Kenstel Donusum Strateji Belgesi, 2020
Figure 6.6.: AFAD, Information Booklets for Individuals, 2020

(4) Analysis of Istanbul, Küçükçekmece, Kanarya, based on the data provided by the municipality to define the weaker areas, which will be affected the most during a magnitude 7.5 earthquake scenario at nighttime.

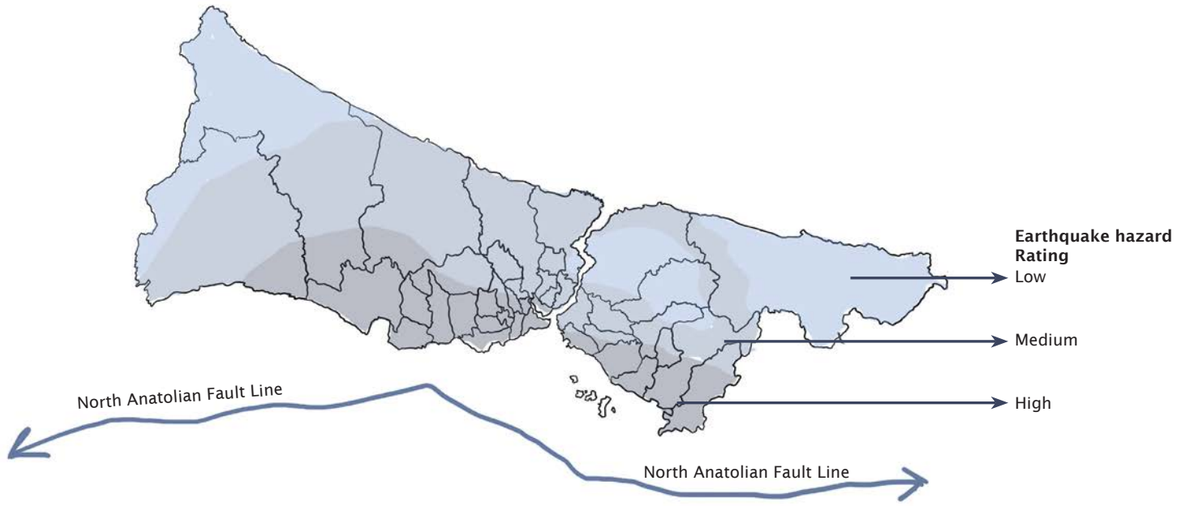
Istanbul

Despite all the plans and efforts made by municipalities and governments, the city still struggles with the high destruction that will take place during and after an earthquake, especially in the less developed areas, due to the economical problems the people face. The earthquake in Kahramanmaraş has left a lasting impression, leaving some individuals to move away from the city, recognizing the heightened risk of earthquakes in the region. The combination of urban density, the memory of past disasters, the economic level, and the urgent need for action contributes to a sense of unease among the city's residents.

Analyzing the Istanbul municipality research reveals the amount of destruction. The projected number of people that will be affected is 61 million, and the number of affected buildings is estimated at 1.16 million. Furthermore, the disaster is expected to impact infrastructure and have significant economic consequences. While the knowledge is available, residents themselves are not taking action. Research and estimations which provide a lot of data do not suggest sufficient solutions.

Stimulating people to take action together would stimulate preparedness for this predicted disaster. Emphasizing the importance of community and individual readiness again is crucial. However, to stimulate individuals and to start preparedness, a space is needed. In the following part, an analysis will be made by using the data from previously mentioned research to determine the weakest areas in Istanbul. Field studies in the chosen area accompany this data to define a site and function for these disaster spaces.

The overall seismic vulnerability of Istanbul, as indicated by research done by Bogazici University, reveals the weaker areas in the southern parts of the city, as illustrated in Figure 6.7, due to the location of the fault line. A more detailed analysis from Boğazici Kandili Rasathanesi highlights four particularly vulnerable areas—Bakirkoy, Adalar, Fatih, and Küçükçekmece —based on building damages in a hypothetical earthquake scenario, during the night with a magnitude of 7.5.



Worst areas based on amount of destruction if earthquake scale Mw 7.5 would occur.

Adalar | Summer area
Bakirkoy | Old airport
Fatih | Touristic area
Küçükçekmece | Residential

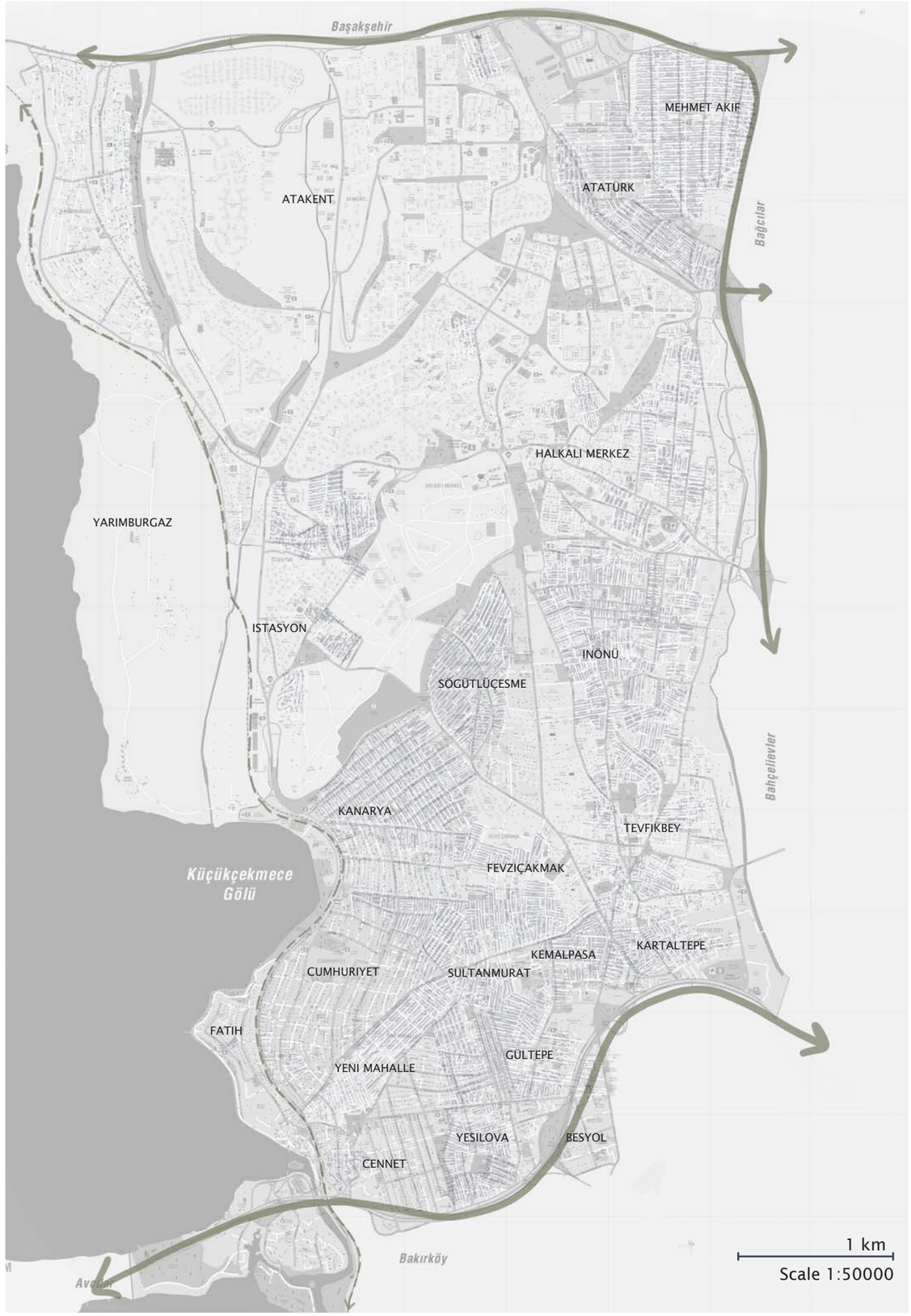
Figure 6.7: Istanbul Hazard map, 2023

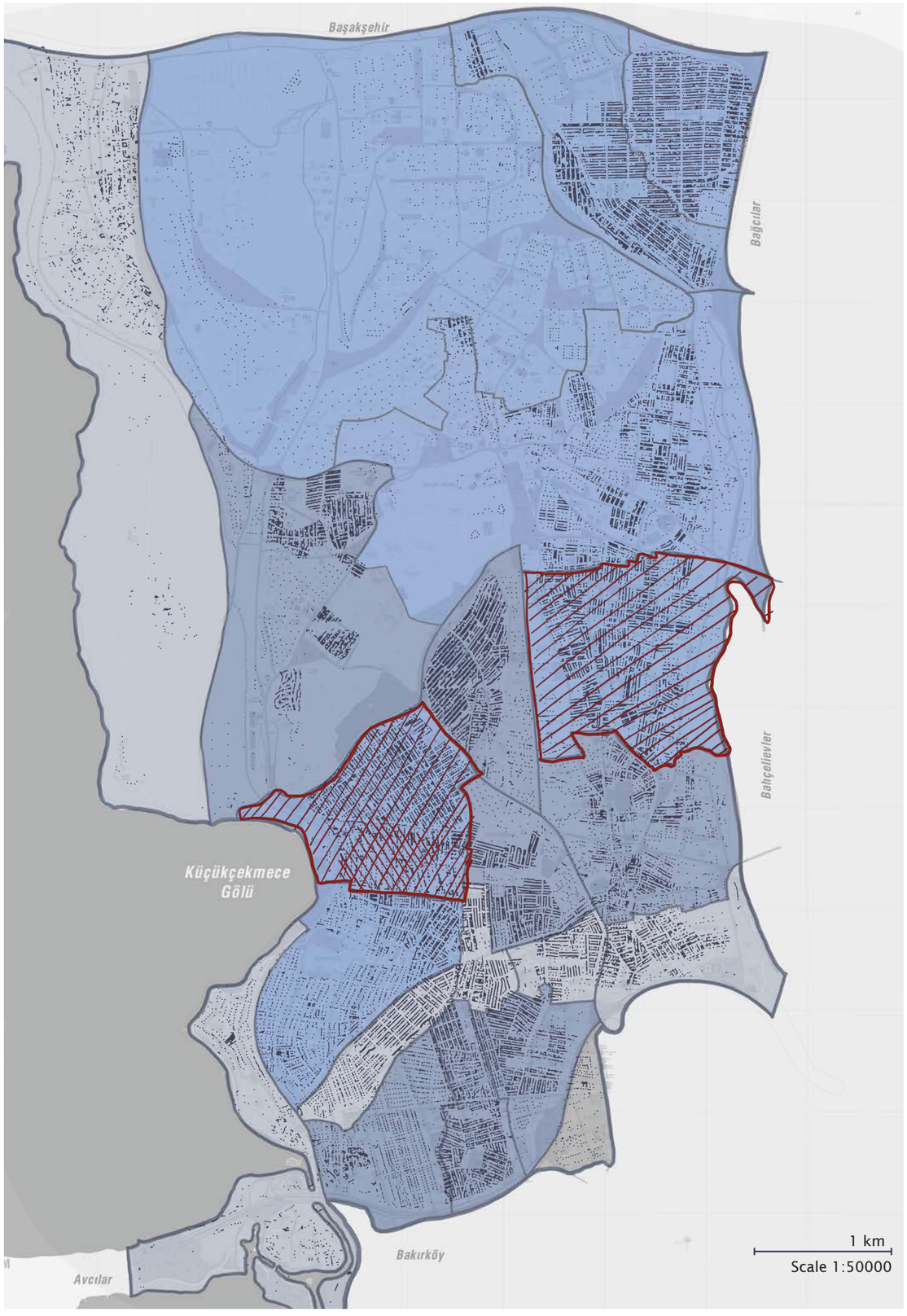
Küçükçekmece

Zooming in further, the focus in this project, is put on Küçükçekmece, due to its residential character, the target group and spactial qualities.

This residential area, is positioned on the western side of Istanbul, is a densely built up area with 40,136 buildings, half of which are between 1-4 floors, the other half can go up to 19 floors. The district lacks adequate healthcare facilities, work opportunities, sports, leisure amenities, green spaces, and significant empty areas. The vulnerability of Küçükçekmece comes from its nature as a migration area, where individuals establish new lives, often segregated from the larger parts of the city, but also from eastern countries, resulting in limited space for economic development (Korkmaz, 2011).

Looking further at the earthquake risks, the settlement suitability map shows that the two areas—Kanarya and Inonu— are particularly unsuitable residential areas. This is due to landslides and insufficient earthquake mitigation measures.




Başakşehir
Bağcılar
Bahçelievler
Küçükçekmece
Gölü
Bakırköy
Avcılar
1 km
Scale 1:50000


Başakşehir
Bağcılar
Bahçelievler
Küçükçekmece
Gölü
Bakırköy
Avcılar
1 km
Scale 1:50000

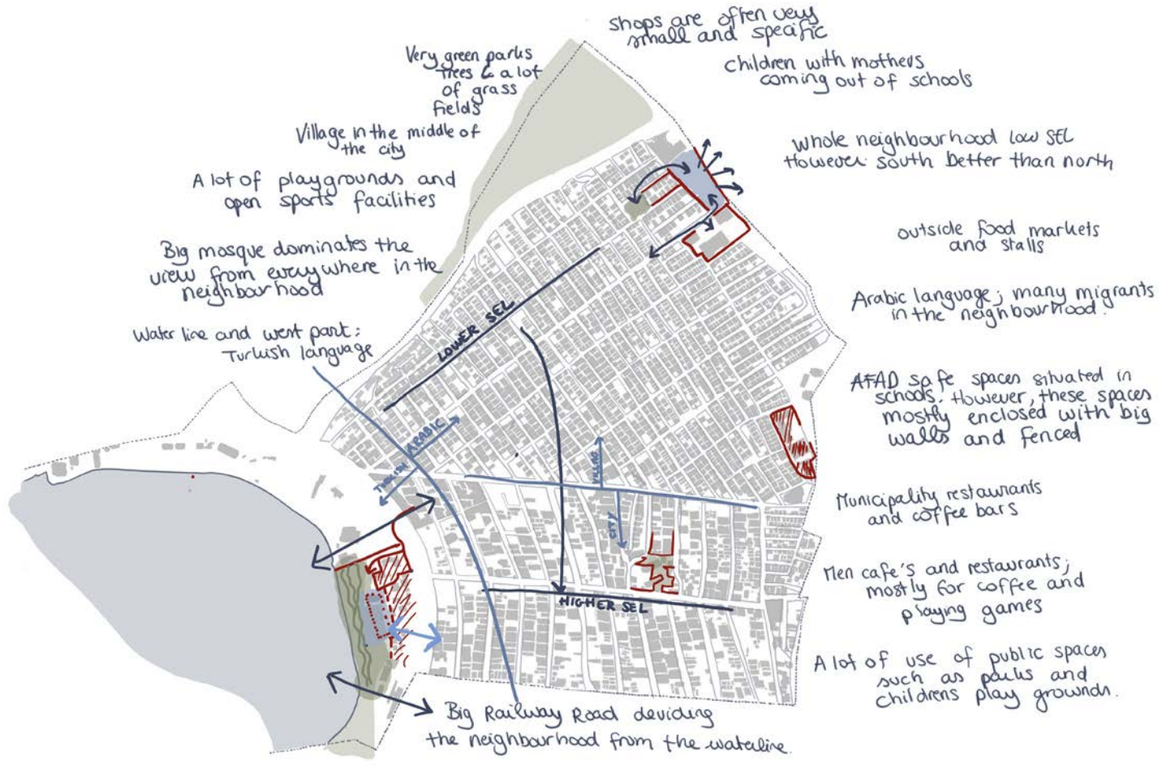
Kanarya

Zooming in to Kanarya, observations (figure 6.11) of the area during the field trip showed a noticeable community affected by migration. The number of people speaking the Arabic language is noticeable. The neighborhood exists of densely built areas, ranging from older structures to newer, low-quality constructions, particularly in the northern region. Green spaces are rare and small, with the waterfront being one of the only recreational areas for residents. Unfortunately, this waterfront area is difficult to reach due to a train line that is enclosed by high fences and barbed wire.

Daily life in Kanarya revolves around women picking up their children from school, strolling through the streets, visiting the waterfront park, and meeting other people in this park (figure 6.15). Next to that, shopping at the local market can be seen on nearly every corner of the neighbourhood. Men are noticeably absent during these hours, likely occupied with work. In the smaller streets, there are small ateliers for both men and women working on knitting and other activities in workshop spaces (figure 6.14). These workshop spaces do not form a shop, and questions arise about if these products are sold, or only produced in these areas.

Identifying the community's needs shows a desire for spaces that bring people together, and create a sense of purpose, especially for women, and new migrants. Although the existing playground serves as a gathering point for the community, there is potential for a more substantial local economy and inside spaces, such as bigger workshop spaces (which would create job opportunities) or a bigger market space which could stimulate the local economy.

It can be concluded that there is a need for new job opportunities for women, communal spaces for inhabitants to come together inside, and a self-sustaining local economy.



Scale 1:10.000

Figure 6.11: Kanarya observation map, Drawn by the author, 2023

Figure 6.12: Pictures from Kanarya, taken by the author, December 2023

Figure 6.13: Pictures from Kanarya, taken by the author, December 2023

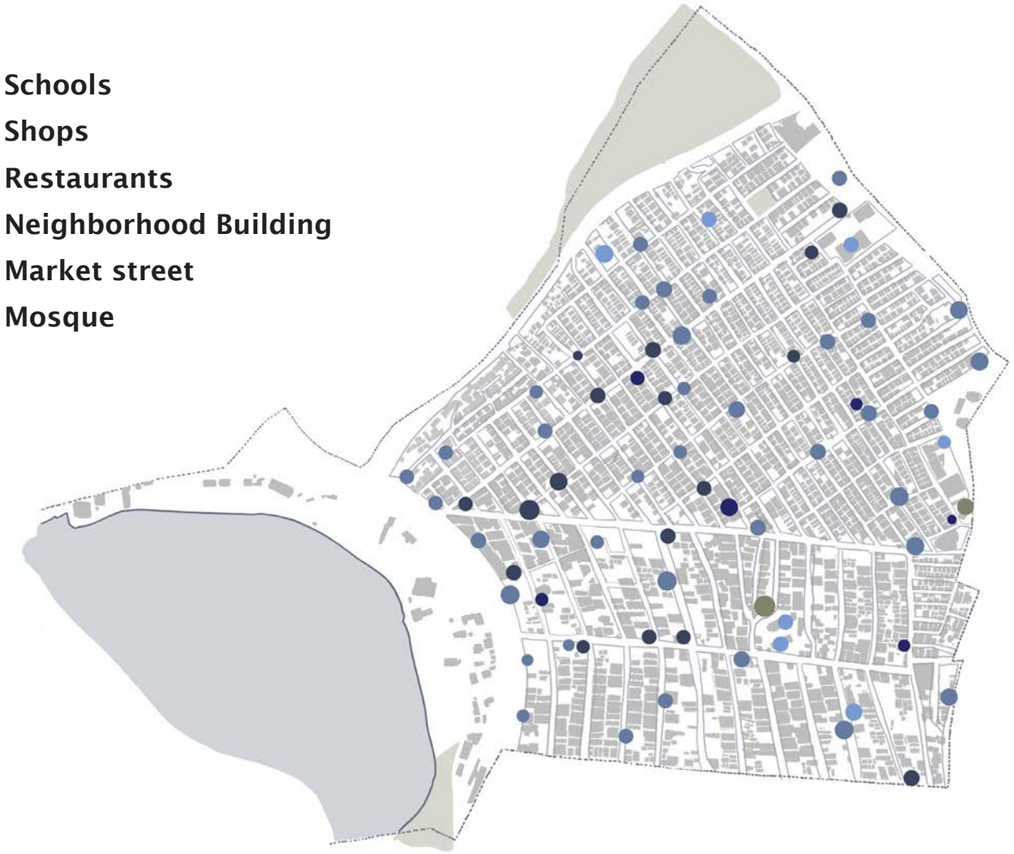


Figure 6.14: analysis communal spaces, Drawn by the author, December 2023

Restaurant Cafe, where man were playing board games and drinking thee (December 2023)

Women grocery shopping in outside markets (December 2023)

Workshop spaces, indicated as shops, where men and women were knitting (December 2023)

Sportsteam going for a run in the park (1) (December 2023)

People going for a walk in the parks (1) (December 2023)

Community gathering in the parks next to the schools. Use of sports facilities & playgrounds. However overcrowded. (2) (December 2023)

Scale 1:10.000

Figure 6.15: analysis green spaces, Drawn by the author, December 2023

Scale 1:10.000

Figure 6.16: analysis schools & childrens playgrounds,
Drawn by the author, December 2023

Children playing on the streets, while parents are observing them from upstairs apartments (December 2023)

Mothers bringing children to School, and picking them up at different times during the day (December 2023)

07 Conclusions

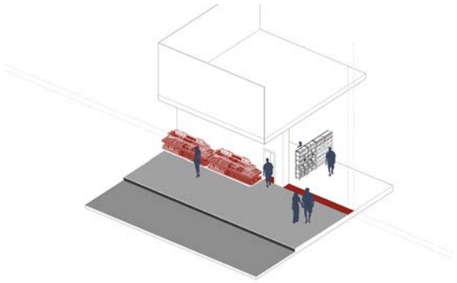
To conclude, this research aims to get answers on the question: “In what ways can community spaces be used to foster preparedness among residents in anticipation of a predicted earthquake in Istanbul?”

This question is answered by first looking at the literature and by analyzing three case studies. The outcomes of the literature review show how spaces in a city can be used before, during and after an earthquake, how spaces should be designed in order to attract and stimulate individuals to take action and what the exact meaning of preparedness is, in both a physical and psychological way. These outcomes aim to create a manual which can be used while designing communal safe spaces in anticipation of a predicted earthquake.

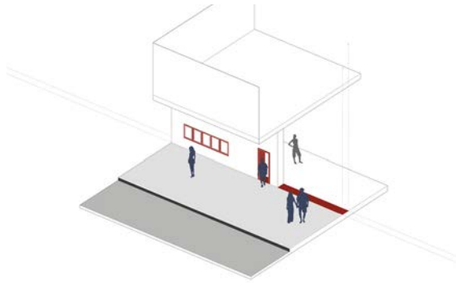
The contextual research aimed to put the literary research into the context of Istanbul, Türkiye. By analysing the current situation in Istanbul on earthquake preparedness, the specific needs of smaller communities are shown. After that, by analysing the data provided by the municipality, the weaker areas within the city were portrayed. The outcomes of the data analysis pointed out that the municipality and smaller communities within Kanarya, Küçükçekmece, require help in disaster preparedness.

Looking further at the design proposal, this research aimed from a starting point to design a space where individuals can come together to address the challenges posed by earthquakes. The community hub in Istanbul aims to prepare individuals to prepare for an anticipated earthquake. Secondly, this proposal supports the local economy and residents, raises awareness about earthquake preparedness, provides emergency aid during seismic events, and serves as a communal area for post-disaster healing and rebuilding efforts.

By integrating environmental psychology with architectural principles, this research aims to effectively persuade individuals to take steps towards earthquake preparedness, thereby developing the overall resilience of Istanbul’s urban landscape.



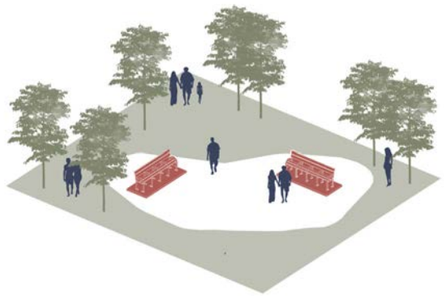
Outside Market spaces



Connection with inside/outside

Playgrounds

Sport Facilities



Benches

Figure 7.1: Outcome analysis, spatial qualities Kanarya, Drawn by the author, December 2023

Self sustaining neighbourhood

So that the community can stick together

Need for inside space for ateliers, and (market) shops.

So that people can create a local economy and sell their products, which they create in their ateliers.

More outside spaces, more parks and play grounds for children.

Current parks are very full, need for more spaces in different areas of the neighbourhood

Figure 7.2: Needs community of Kanarya, Drawn by the author, December 2023

Design Proposal

February 2024 - July 2024

08 Concepts and goals

GOALS

(1) The proposed design is a **safe space** and **first aid shelter** in **case of a disaster.** The building is **self sufficient** and hosts **all the needs** of the inhabitants for the first three weeks after an earthquake disaster takes place (**psychologically and physically**).

(2) Designing a **community kitchen,** where through cooking and eating together, the people of Kanarya, come together and get work opportunities. Besides that, the location provides inhabitants a space where **earthquake preparedness** is taught, and where inhabitants are **stimulated** to prepare for an earthquake.

CONCEPTS

During the design proces five concepts were implemented to secure these goals were used. made.

(1) Involvement of people
(2) Place of belonging and wellbeing
(3) Technical Earthquake Resilience
(4) Flexibility
(5) Sustainability

Involvement of people

Place of belonging and wellbeing

Technical Earthquake Resilience

Flexibility

Sustainability

09 Network Map

By using the information and observations mentioned in the previous research sections, the next step in the project was to construct a network of spaces, based upon the AFAD safe spaces in the neighborhood, Kanarya, in Küçükçekmece. The aim is to construct a network map of community spaces on different scales in Kanarya, to create new buildings serving the needs of the community, whilst also providing a place which can be used before, during, and after disasters. The production of the network map involves researching suitable locations for these centers. In a next phase, this should lead to designing a building that can serve various purposes in disaster scenarios in Kanarya, Küçükçekmece.

The network map made for Kanarya, Küçükçekmece, is based on the four safe spaces indicated to be “safe spaces in case of an emergency” by AFAD, see Figure 9.1. All four areas were visited and photographed during the field trip in December 2023. The first location is situated on the waterfront and creates a park where people come for walks, to have a coffee, or to play with their children. The second location is the busiest of all. This smaller park is mostly used by many mothers with their children, who make use of the outside sports facilities and playground. It is situated between two schools in the middle of the neighborhood. The third location is the police and fire station. This location is on the edge of the neighborhood and is not very well accessible. The last and fourth location is the market space, which is used as a market on Monday and Thursday morning. For the rest of the week, this location is used as a car park.

Based on the size, usage and accessibility of these spaces, a network map was constructed. Below, the network map of these four buildings and spaces is indicated. Based on three different scenarios: Before, during or after the disaster.

Figure 9.1: Network map of public spaces and proposed two new community centres, before a disaster strikes.

Figure 9.2: Network map with proposal for new community centres and usage of safe spaces, which can be used during a disaster.

Figure 9.3: Network map with a proposal for a new community centre, which can be used after a disaster as a healing space.

Conclusion

An analysis of the network maps show that the two locations most suitable for a community space proposal are location number one, the park, and number four, the market space.

This proposal for a community space, serving the needs of a local community or a neighborhood, could later on also be implemented in other areas in Küçükçekmece, and other areas in Istanbul such as Bakirköy, Fatih or Adalar. In lower-developed areas, empty plots can be used, as done in Kanarya. In higher developed areas an analysis can be made of existing buildings and how they can be transformed into safe spaces.

In case of an emergency these community centers have the purpose of also communicating with each other, supporting each other and helping with the supplies.

10 Program of Requirements

To make the two main goals applicable to any area, a program of requirements was established as a hold on while designing. The program of requirements has two layers: the emergency layer and the disaster layer. The develelopment layer, are flexible rooms and spaces, these spaces differ based on the location and needs of the inhabitants. The emergency layer has fixed elements which can be placed in any area and neighbourhood, and can be used during disasters such as earthquakes. Based on the literature research, talks to experts, observations and data analysis, the conclusions were made and translated into architectural interventions. These interventions are from the program of requirements.

As an example, figure 10.1 and 10.2, show two variants of this program of requirements, based on the site waterside plot in Kanarya, Küçükçekmece.

With these requirements, the community space in Kanarya will include a community kitchen and workshop spaces. Here, residents can grow plants, cook together, and have the opportunity to sell fruits and vegetables, which aims to provide economic growth within the community.

Additionally, the second layer focusses on addressing the need for a safe space that serves the daily requirements of the residents before an earthquake, but also functions as an emergency area during disasters (based on the AFAD designated areas), serving as a gathering point for the community before, during, and after disasters, in this case, earthquakes.This initiative, in Kanarya, targets the focus group of women and children, aiming to address their specific needs and contribute to the overall growth of the Kanarya.

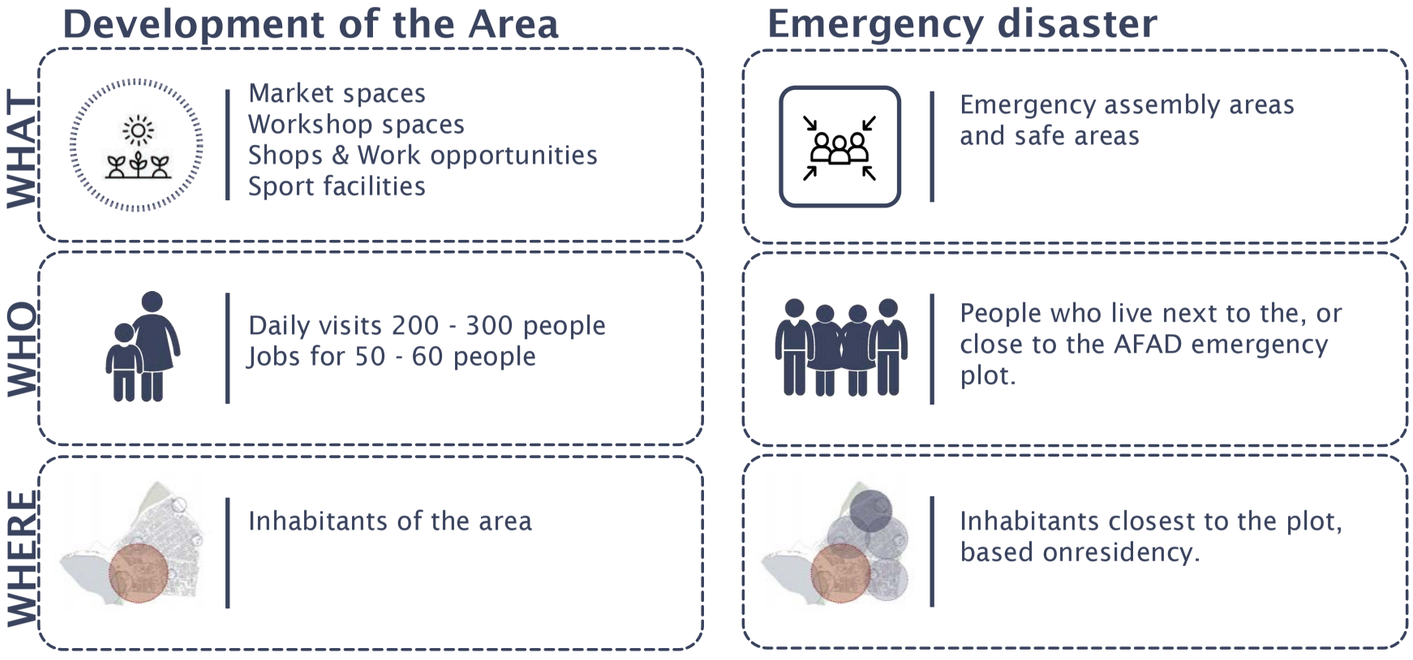


Figure 10.1: Program of Requirements, not site specific

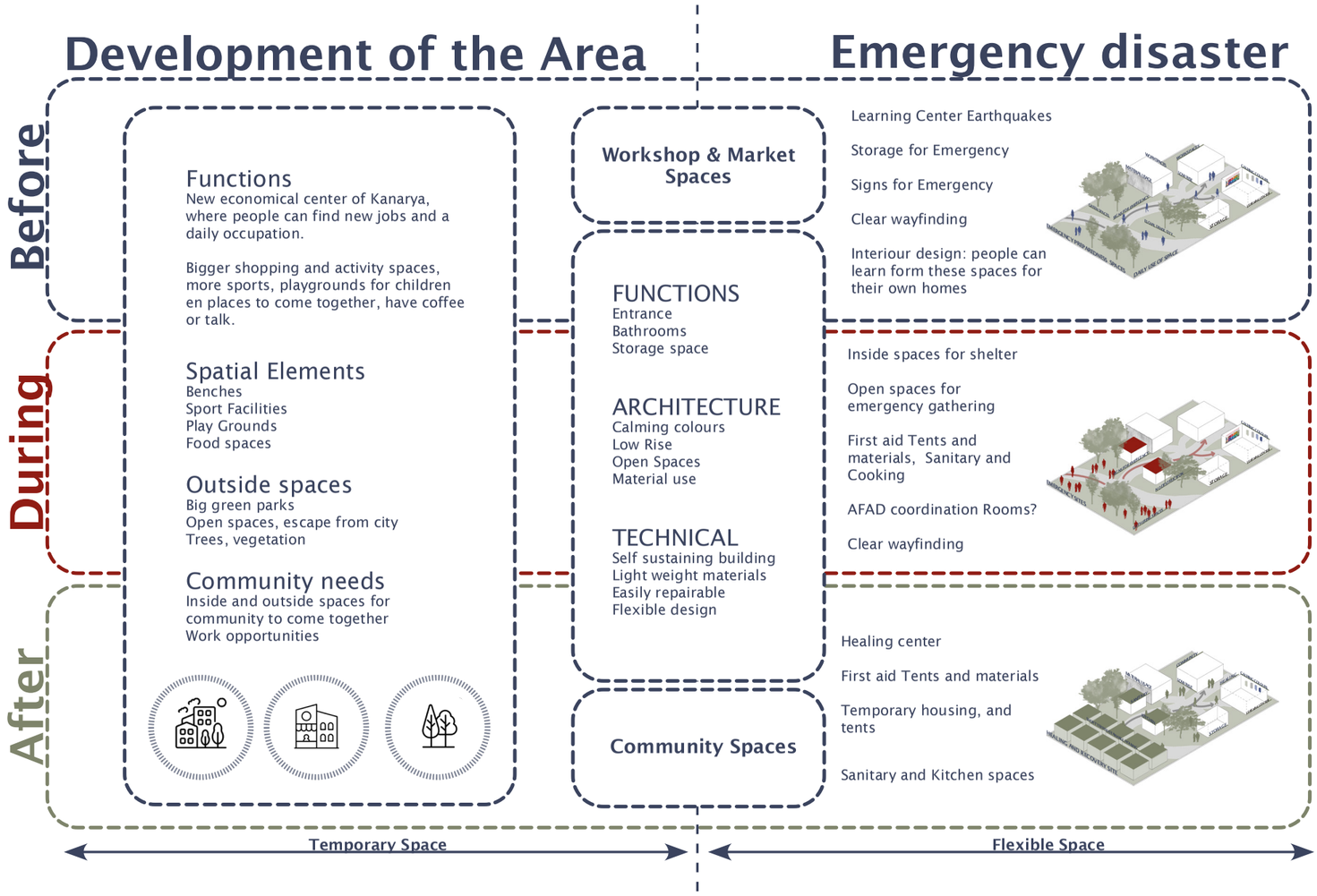


Figure 10.2: Program of Requirements, site specific

11 The Example Location

In chapter 09, Network map, it was concluded that the two locations most suitable for a community space proposal are location number one, the park, and number four, the market space.

For the proposed design, location number one will be used: Kanarya Waterfront. This location offers many different qualities. The most important one being that the location which is situated next to the water, and is clearly separated from the densely built neighborhood. Secondly, this location marks the end of the bigger Küçükçekmece park, which makes this location both accessible via the city (on foot, by train or by car).

Figure 11.1: urban scale map, Kanarya water front.
Scale 1:1000, Drawn by the author, January 2023

Figure 11.2: urban scale map Analysis, Kanarya water front.
Scale 1:1000, Drawn by the author, January 2023

Figure 11.3: Pictures from Kanarya seafront, taken by the author, December 2023

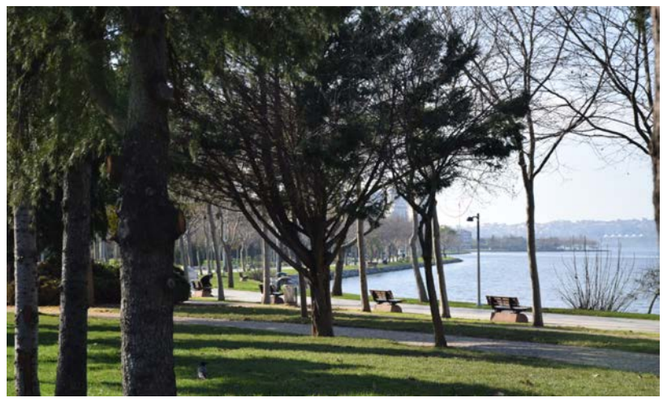


Figure 11.4: Pictures from Kanarya seafront, taken by the author, December 2023

12 The Design Proposal

As mentioned in the previous section, this design proposal is a suggestion for the municipality of Kanarya to implement primarily to establish a safe space that provides all the necessary tools which are needed after an earthquake disaster. The residents of the neighborhood can come together in the self-sustaining building, which serves as a gathering point (based on the AFAD designated areas) after a disaster to have a safe space, away from the (probably) destroyed neighborhood. After a disaster the building would facilitate the community with its “healing” character and give the community the space to recover

The second goal is to use the proposed building before a disaster occurs. The reasoning behind that is to ensure that ommunities can get familiar with the facilities, and create memories and a sense of belonging to the place. The design of the building, which is of a community kitchen in the Kanarya neighborhood contributes not only to the daily lives of its residents but also contributes to the overall development of the area, creating employment opportunities and facilities to attract people from outside. The community kitchen aims to provide inhabitants of Kanarya, most of them having an immigration background, with a daily goal that aligns with the community’s needs.

These requirements in mind, the community kitchen in Kanarya includes a market area and workshop spaces. Here, residents can grow food, cook together, start small crafting projects, such as knitting, and have the opportunity to sell their creations, which also aims to provide economic growth within the community.

The building is accessible to people coming from outside, who can stumble upon the building while walking next to the waterfront in the Küçükçekmece Park. However, these visitors can also join the market days, the workshops or the lectures given inside the building.

In this section the building will be introduced, by showing floor plans, elevations, sections, 3D visualizations and technical 1:20 and 1:5 drawings.

Figure 12.1: Entrance from the city

Figure 12.2: Entrance from Community side

Figure 12.3: Garden Plan, 1:500

The Gardens

The gardens are an important component of the design. In Türkiye, growing fruits and vegetables is a very cultural element, with people growing their own food in their villages. Traditional villages are surrounded by agricultural land and the climate allows a wide range of agricultural activities. Traditional village housing also has the opportunities to dry fruits and vegetables on the (roof) terraces, which are also a part of the traditional cuisine. Currently, in cities, this activity is limited to leisure gardening, often with small pots on balconies for growing vegetables.

The gardens are designed around four key concepts: agriculture, experience, activities, and healing & recovery.

(1) Activities
During the field trip, observations showed that outdoor playgrounds and sports facilities are heavily used. Simple recreational spaces in public areas can provide residents with engaging activities, promoting physical and social well-being.

(2) Agriculture
Growing food and cooking together is one of the most traditional and cultural element in Türkiye, which helps bringing people together. This practice also helps the neighborhood's self-sufficiency, reducing the dependence from imported goods.

(3) Experience
Walking through the garden, surrounded by greenery and water, induces a sense of calm. The sensory experiences, such as the scent of fig and lemon trees, can create and stimulate memories and create a serene environment.

(4) Healing & Recovery
The garden's natural curves, familiar layout, and sense of belonging can help reunite people after a disaster. Additionally, creating activities that support family, friends, or oneself fosters a sense of purpose and community. This helps individuals overcoming post-disaster trauma and quick the healing process.

Kanarya Community Kitchen

The main concept of the design is creating a building block (24000 X 10500), which is placed four times in such a way it creates an inner courtyard typology. This typology is a traditional way of building, also allowing different functions to take place in the same building. The creation of a courtyard, or Havus, further contributes to the building's stability and usability.

The building is placed in such a way that there are three "Streets" which a visitor can take while walking from the city, towards the neighborhood. The first one is the public street; this part connects the restaurant and terrace to the water. The second street leads visitors to the inner courtyard where the market takes place, The third street, which is not easily accessible from the main walk way, is the connection between the storage and machine hall, the gardens and the community building.

The design allows someone to pick up vegetables, walk towards the building, wash the fruits and vegetables in the outside kitchen, bring them either to the kitchen, the storage space or the market. In the market, visitors can buy the vegetables and bring them to the restaurant, where the restaurant owner will cook them for you, and bring them to the table at the waterfront. These cooking and agricultural activities are accompanied by the learning center, where the workshop spaces, the offices and the exhibition area is situated on the opposite end of the building.

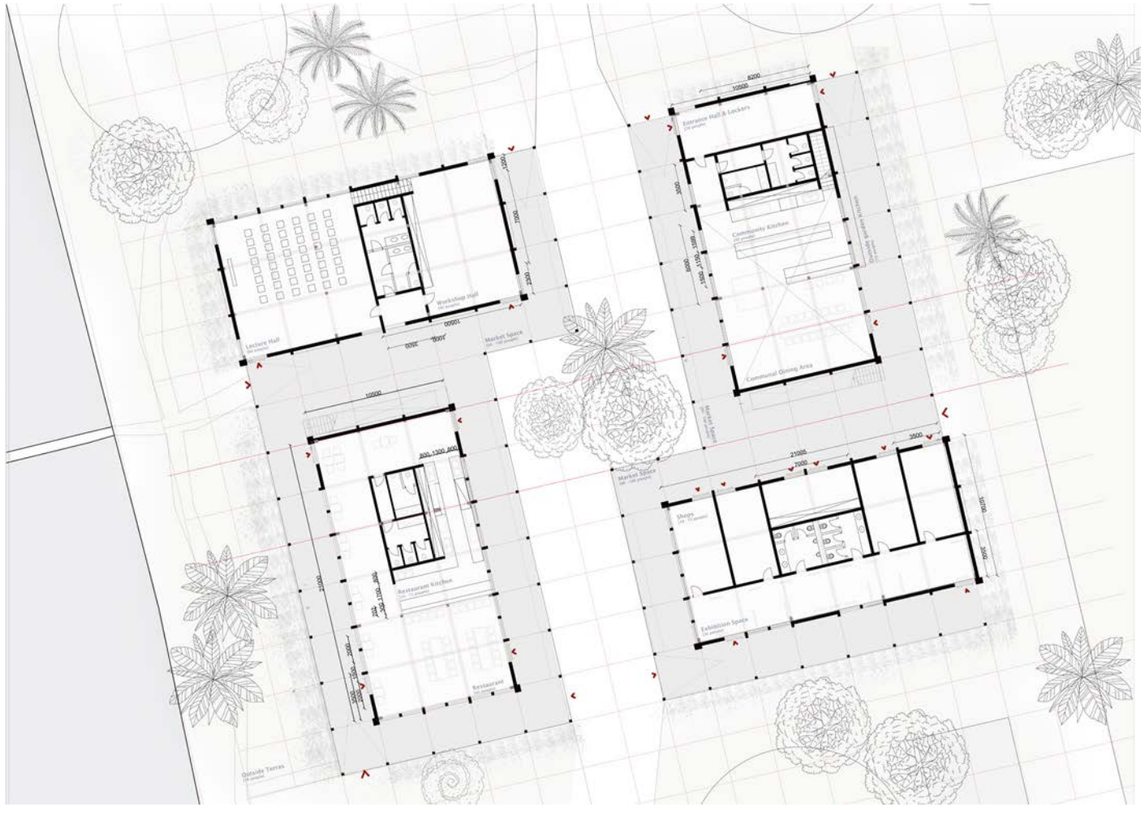


Figure 12.4: Floor plan ground floor, 1:100

Figure 12.5: Market space

Figure 12.6: Front terrace overlooking the water

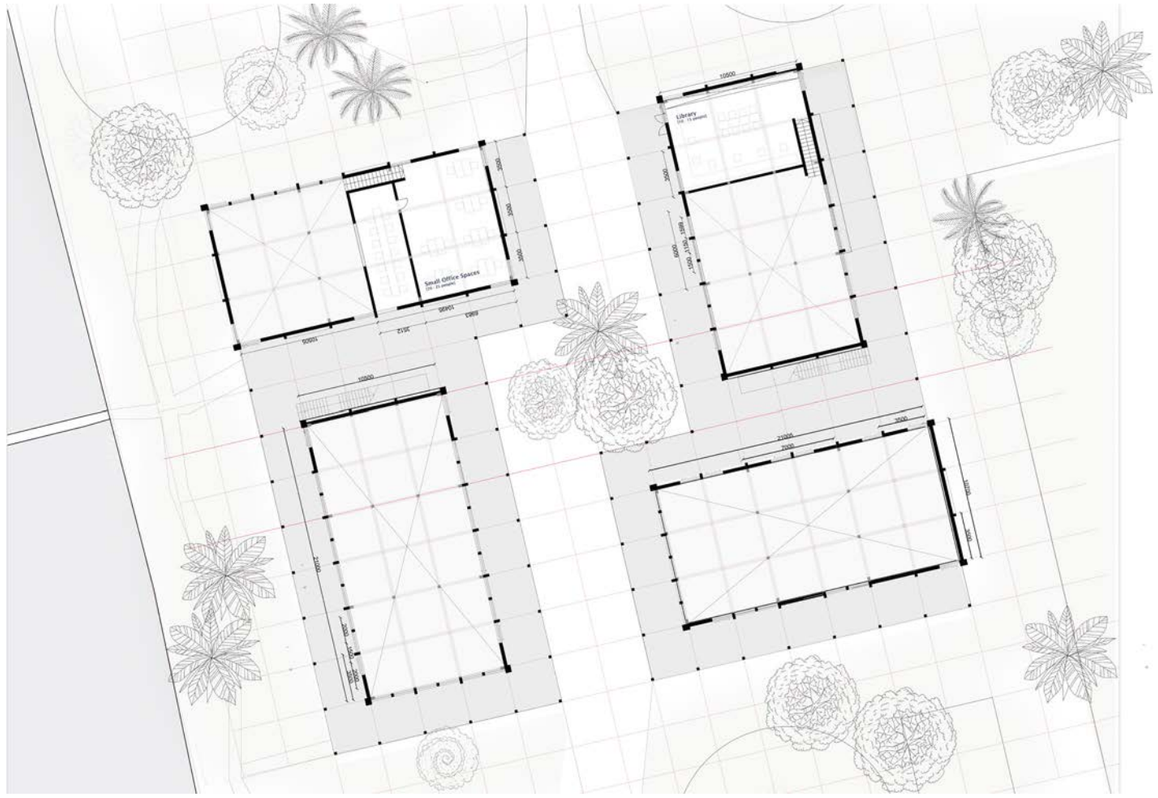


Figure 12.7: Floor plan first floor, 1:100

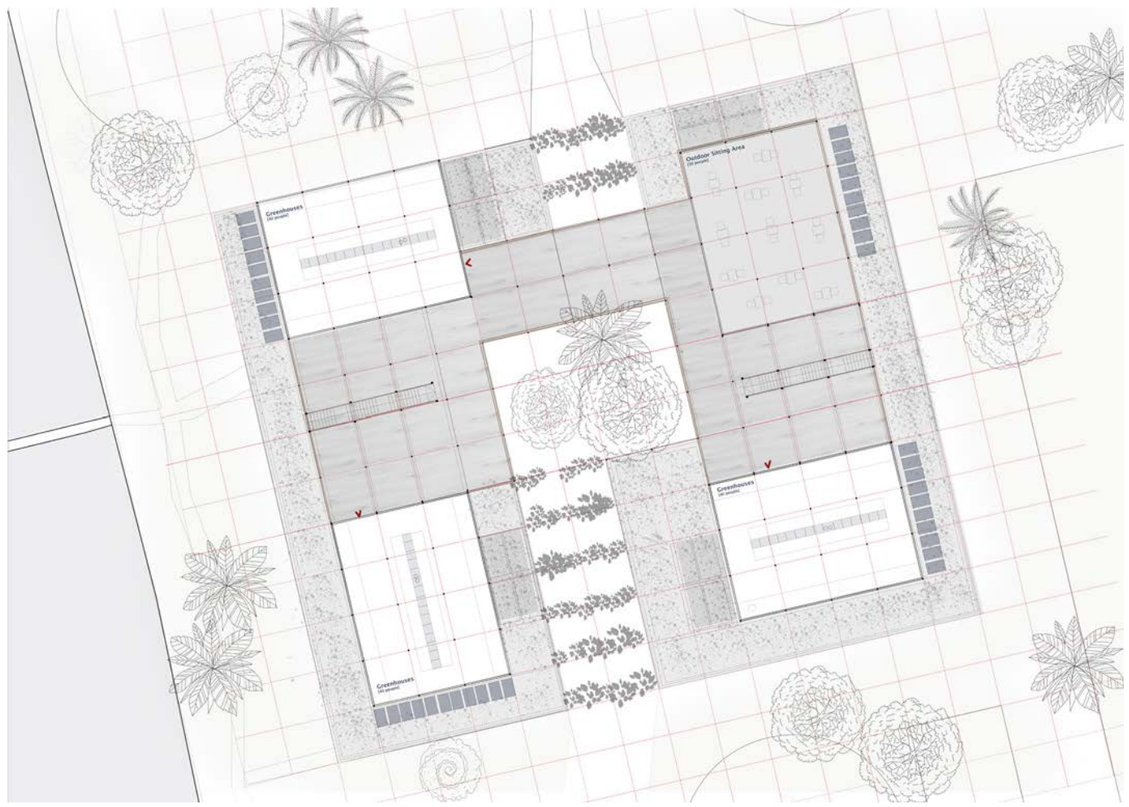


Figure 12.8: Floor plan roof, 1:100

Figure 12.9: Roof terrace

The Roof

The roof is another important part of the design, combining traditional habits with modern functionality. A very common habit, in the city, is that people sit and observe the outside world from their balconies or living rooms overlooking the street. Many people want to see outside, but do not always want to be seen themselves.

In the context of this neighborhood, maintaining a connection with the main street is essential, allowing residents to see and engage with the life outside at any moment, and creating a sense of safety to know that you are never alone.

In this design, access to the roof is provided from inside the market space. As one ascends, the busy atmosphere of the market is left behind, transitioning to a calm rooftop area where water views and greenhouses create a park-like ambiance. The greenhouses on the roof serve different purposes: growing food and hosting workshops on gardening and food production, especially during the winter months. Flexible pergola's and sunshades are designed to protect against rain in winter and provide shade during hot summers, ensuring the space is usable year-round.

Interior

Within the interior of the building the focus is put on three different concepts. These concepts are identified during the research (see chapter ‘literature research’), where the main question is how an environment can stimulate people to take action.

The first element is the use of colors such as green, which is mostly linked to wellbeing and calmness, and the use of orange, which is more of a motivational color. The second element is creating a sense of belonging by using traditional elements and making sure people create memories in a place. In this design, traditional elements include the roof terrace and the plants which are used as sun shading, and the pergola’s where the market takes place. Besides these, the building inside stimulates people to participate in activities, such as shopping at the market, going to see the exhibition, gardening, sports or enjoying time with children in the playground.

Figure 12.10: Interior design decisions

Building Engineering

In the following part, the design is shown from a building engineering perspective. The construction, materiality and facade elements, and the climate design will be explained.

Within the building, four main materials are used.

(1) The ecological materials, which are used for the facade, roof and after interior are made out of regional soils and clay to create a natural look.

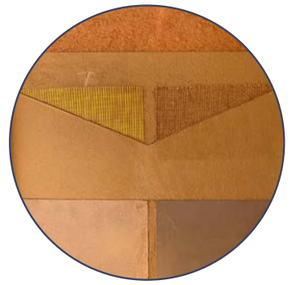
(2) The construction is made out of cross laminated timber. This material is not a locally produced material yet, however it is a material which is likely to be used very frequently in the future.

(3) The sun shading hung onto the roof is made out of wooden patterned panels. These panels provide shade for the buildings and the market space.

(4) In order to control the growth of the plants, aluminum wiring is placed in some parts of the building, ensuring the plant growth in the right direction, so that the plants can create shading in the summer, and drop their leaves in the winter, leaving light to come in during the darker days.

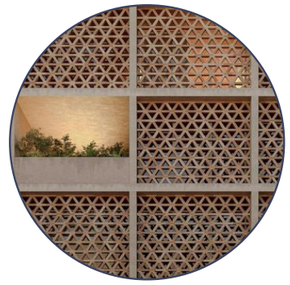
The following part shows the details of the facade, the roof, the walls, the floors and the foundation. Various materials are used and combined The different materials are used and combined in a way to make them earthquake resilient as much as possible.

A main example is the window detail (Figure 12.15), where rubber is placed between the window frames to catch vibrations during an earthquake, and in a normal circumstance insures no water can be allowed into the building. Another example is the use of plastering, where inhabitants can see cracks (that have no harm or damage to the building), caused by earthquakes, from an early stage, and can be considered as an early warning. These cracks can easily be fixed with the use of new soil and water.



Ecological Materials | Facade & roof
Regional Soil, Clay and insulation materials

Wood | CLT construction
Imported from outside Türkiye (for now...)



Sun Shading | Wooden Patterned Panels
Build on site through community?

Green | Aluminum wiring for plant growth

North 1:200

South 1:200

East 1:200

West 1:200

Figure 12.11: Elevations 1:200 of Community Kichen, Kanarya

Figure 12.12: Section drawing west side, 1:20.

Figure 12.13: Section drawing north side, 1:20.

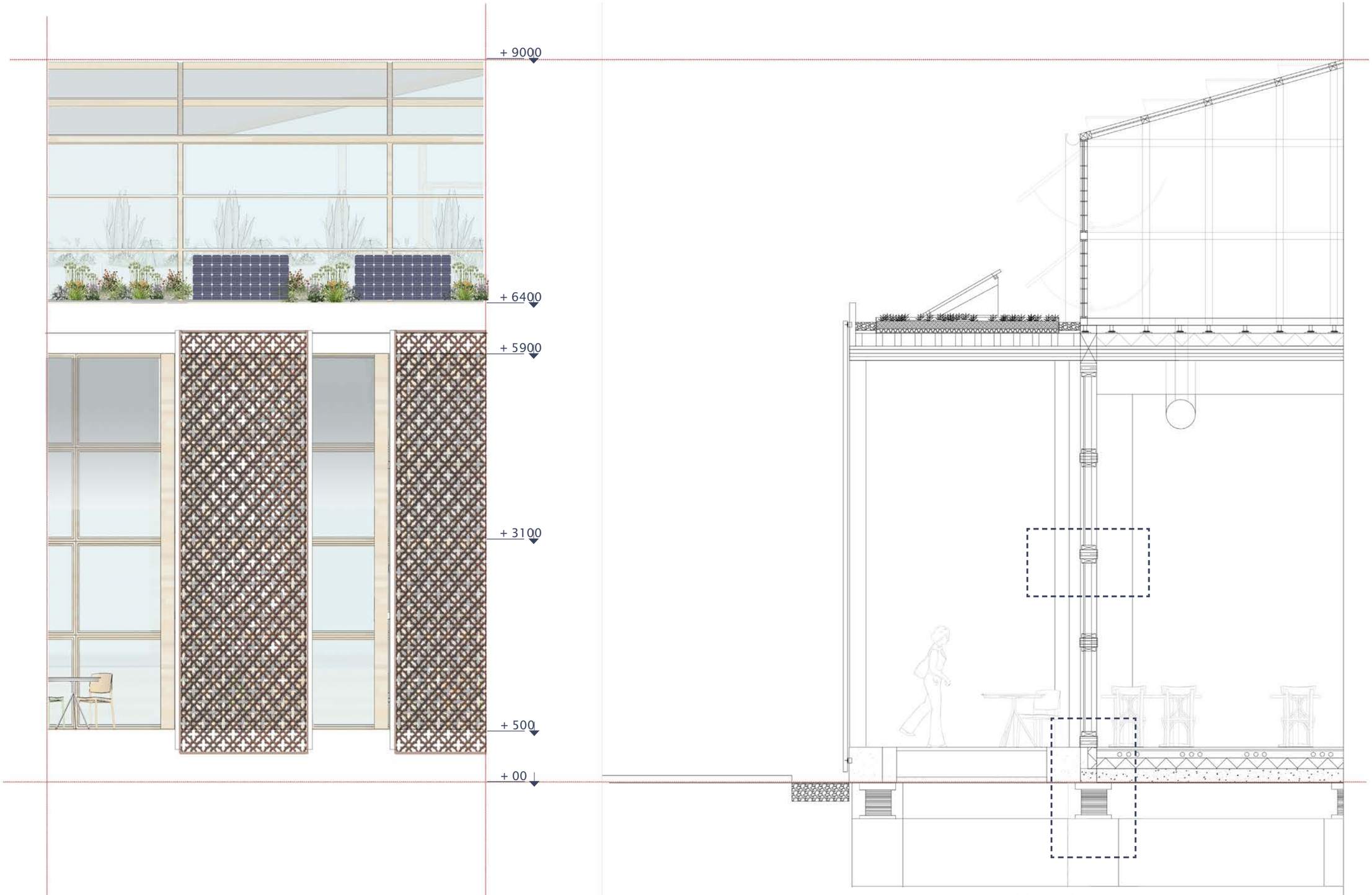
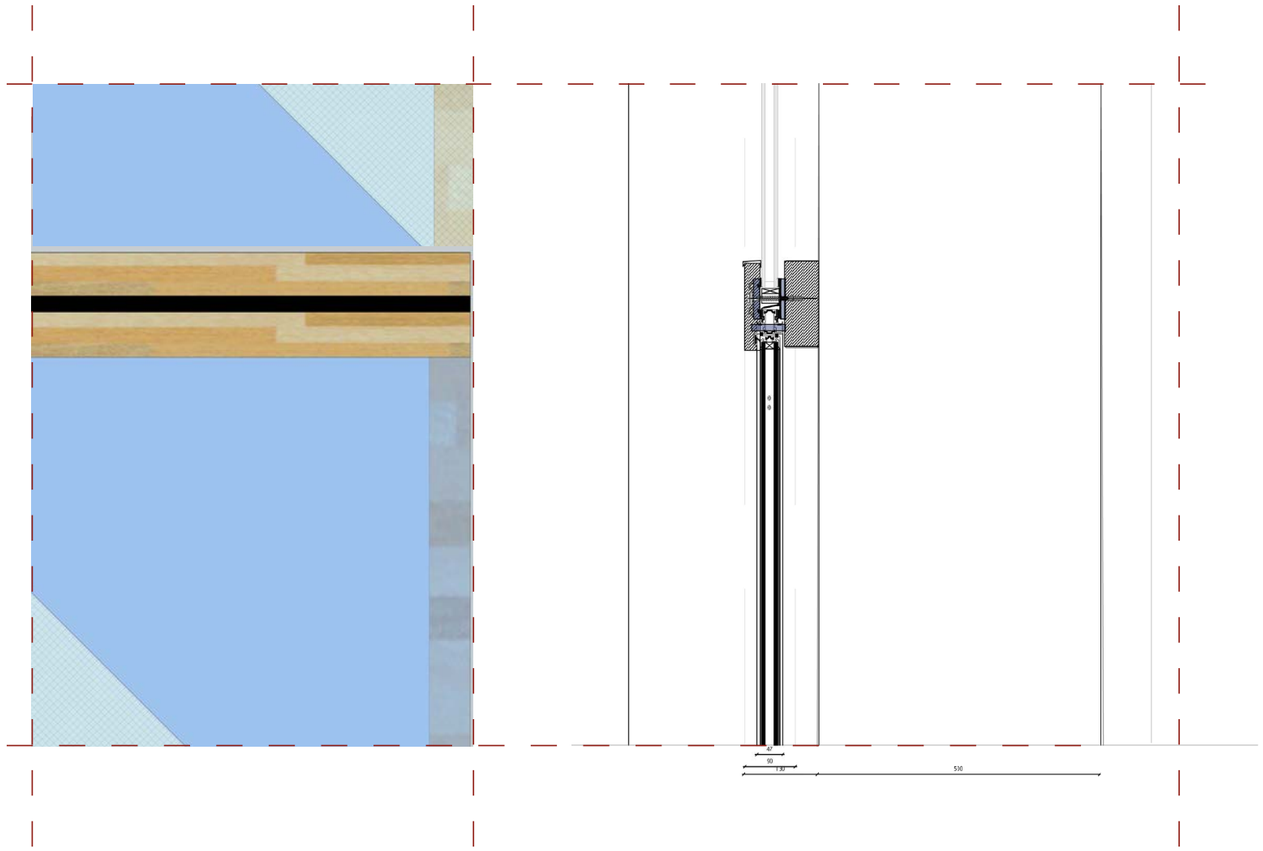


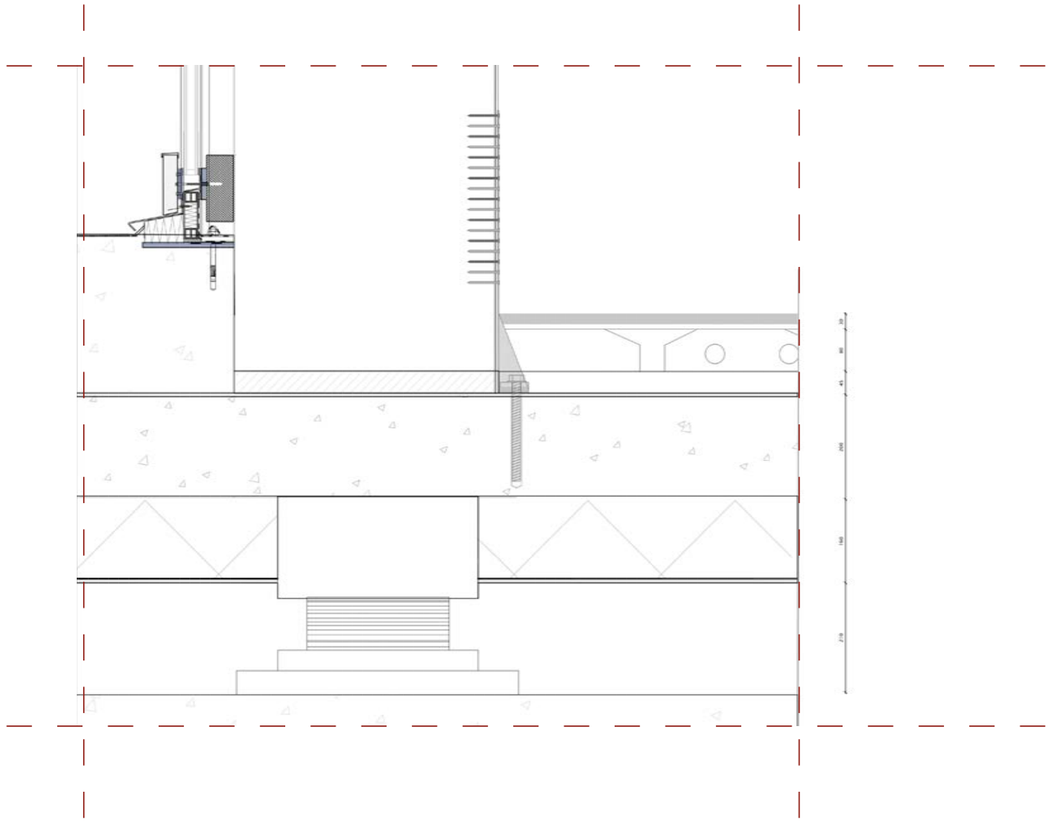
Figure 12.14:Section drawing facade, west side, 1:20



Window Connection
(1) Tripple glass
(2) Protection Foil

(1) Wooden window frames
(2) Between frames rubber bands for resistance

Figure 12.15: Detail 1:5, window



Foundation Connection
(1) Wooden floor (30 mm)
(2) Aluminium Plates (2 mm)
(3) Floor Heating pipes (18 mm)
(4) Insulation (150 mm)
(5) Concrete floor slab (200 mm)
(6) Seismic base isolation

Figure 12.16: Detail 1:5, foundation

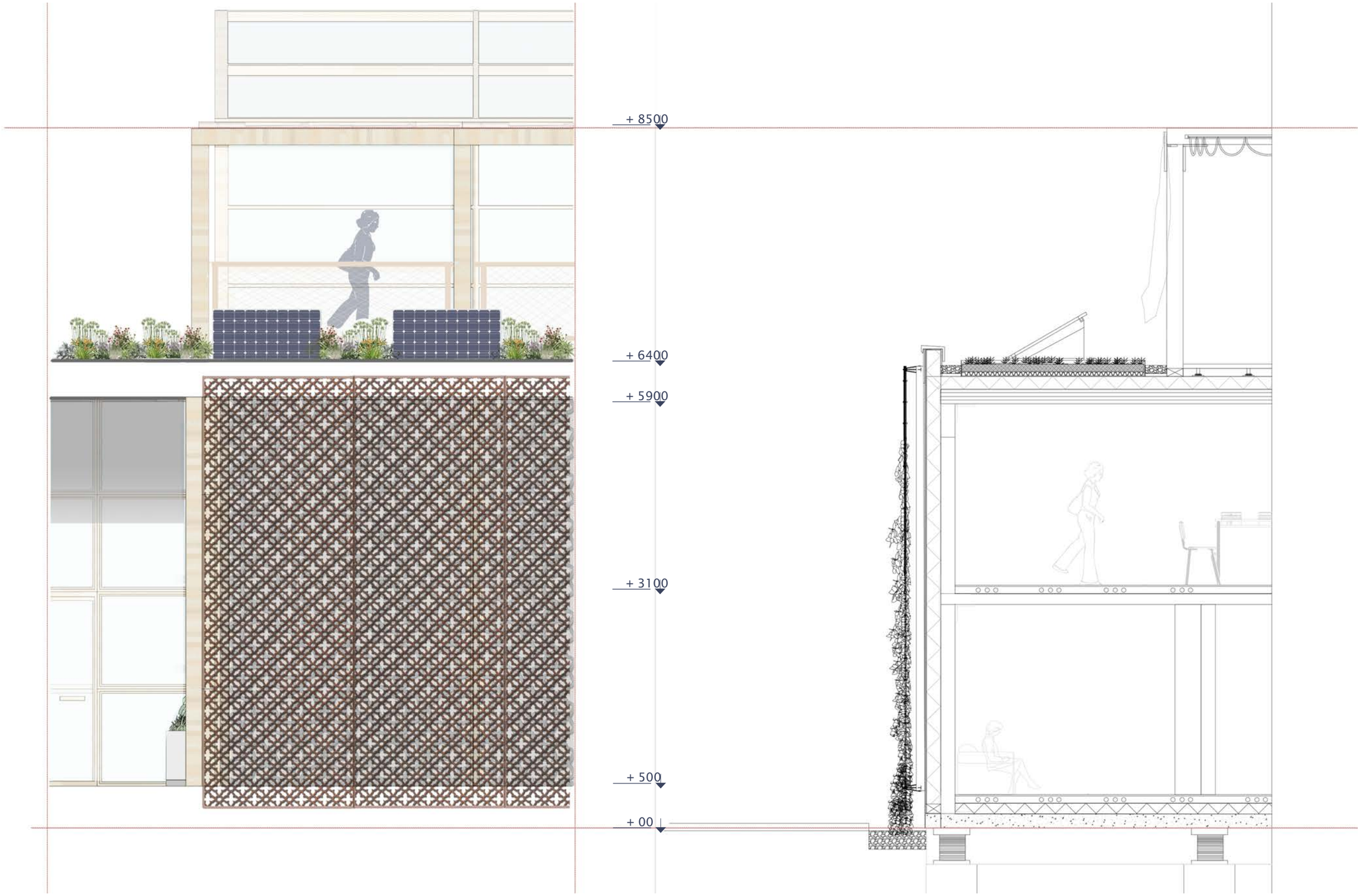
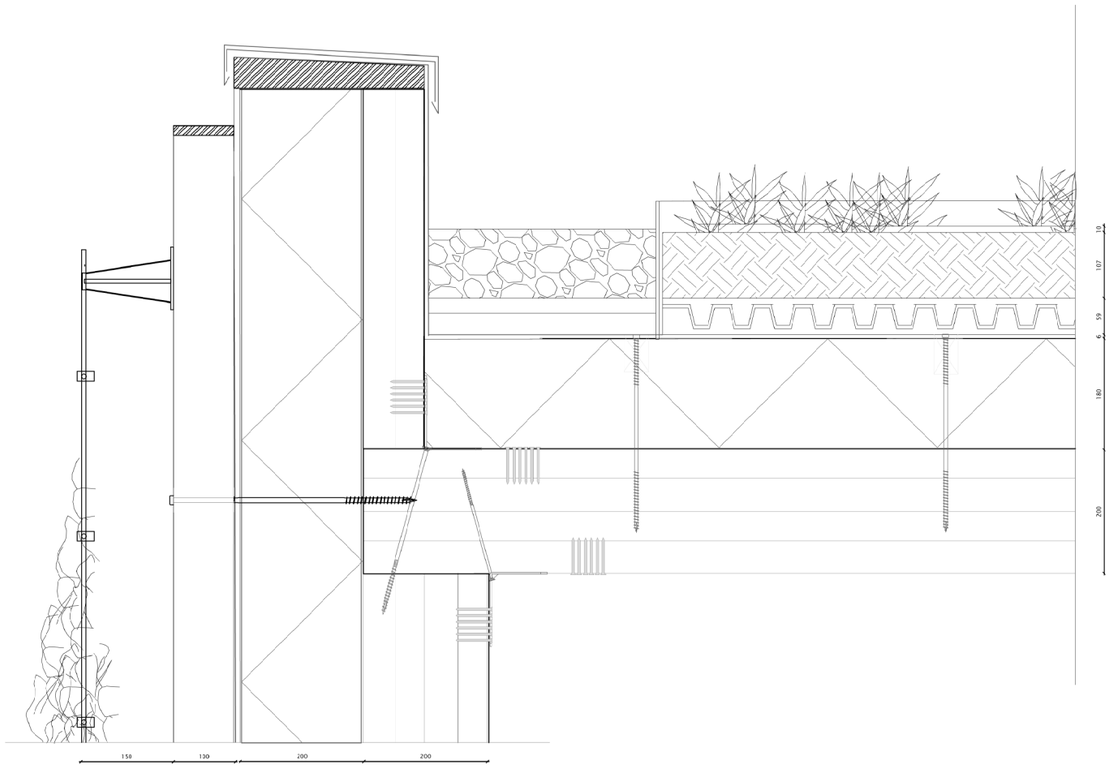
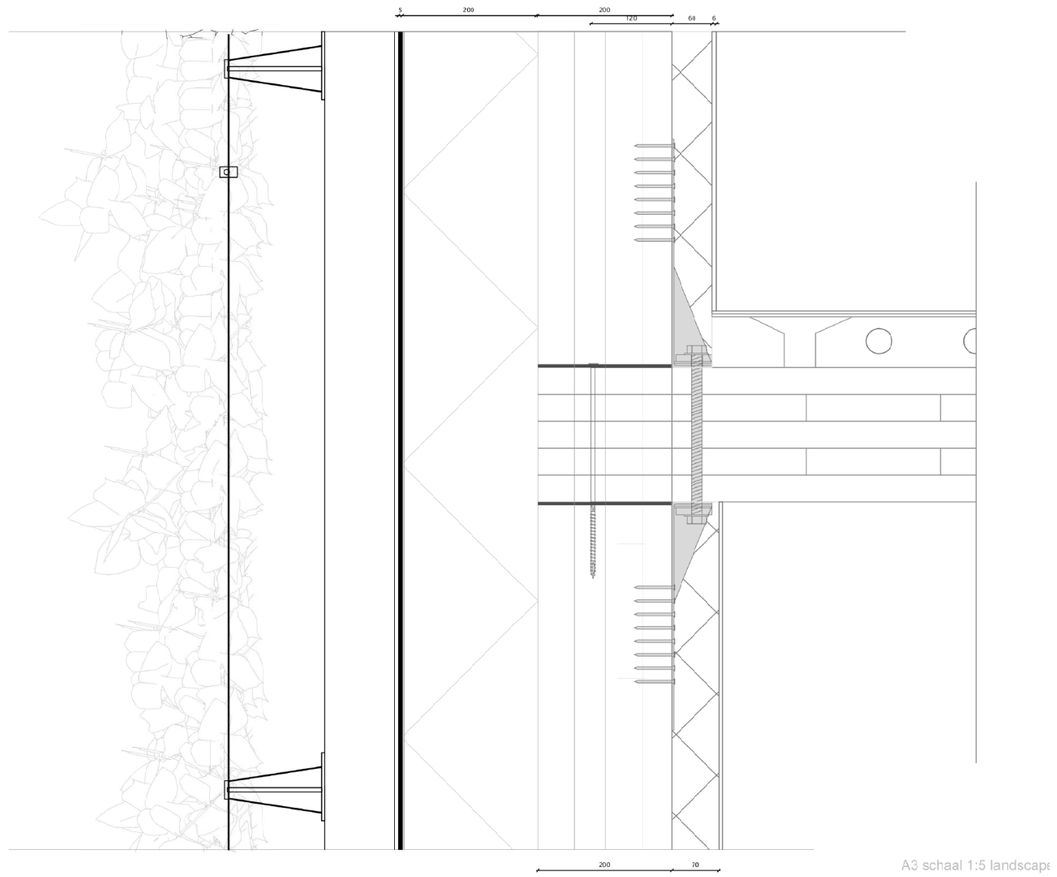


Figure 12.17: Section drawing facade, North side, 1:20



Roof Connection
(1) Solar Panels
(2) Vegetation & Plants
(3) Growing Substrate (100mm)
(4) Drainage element, water reservoir and roof barrier (60 mm)
(5) Waterproof membrane (2mm)
(6) Rigid Insulation, hennep (180 mm)
(7) Vapour control layer (2mm)
(8) CLT Flooring system (200mm)

Figure 12.18: Detail 1:5, roof to facade connection



Facade Structure
(1) Climbing Plants
(2) Open timber panel with pattern (20 mm)
(3) Ecoplastering (20 mm)
(4) Hempcrete Insulation Blocks (200 mm)
(5) Okil Thin Plaster Layer (10mm)
(6) Okil Decorative Plastering (3 mm)

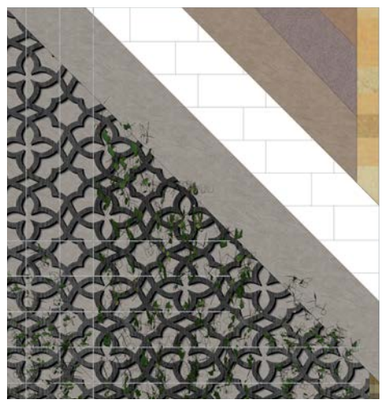
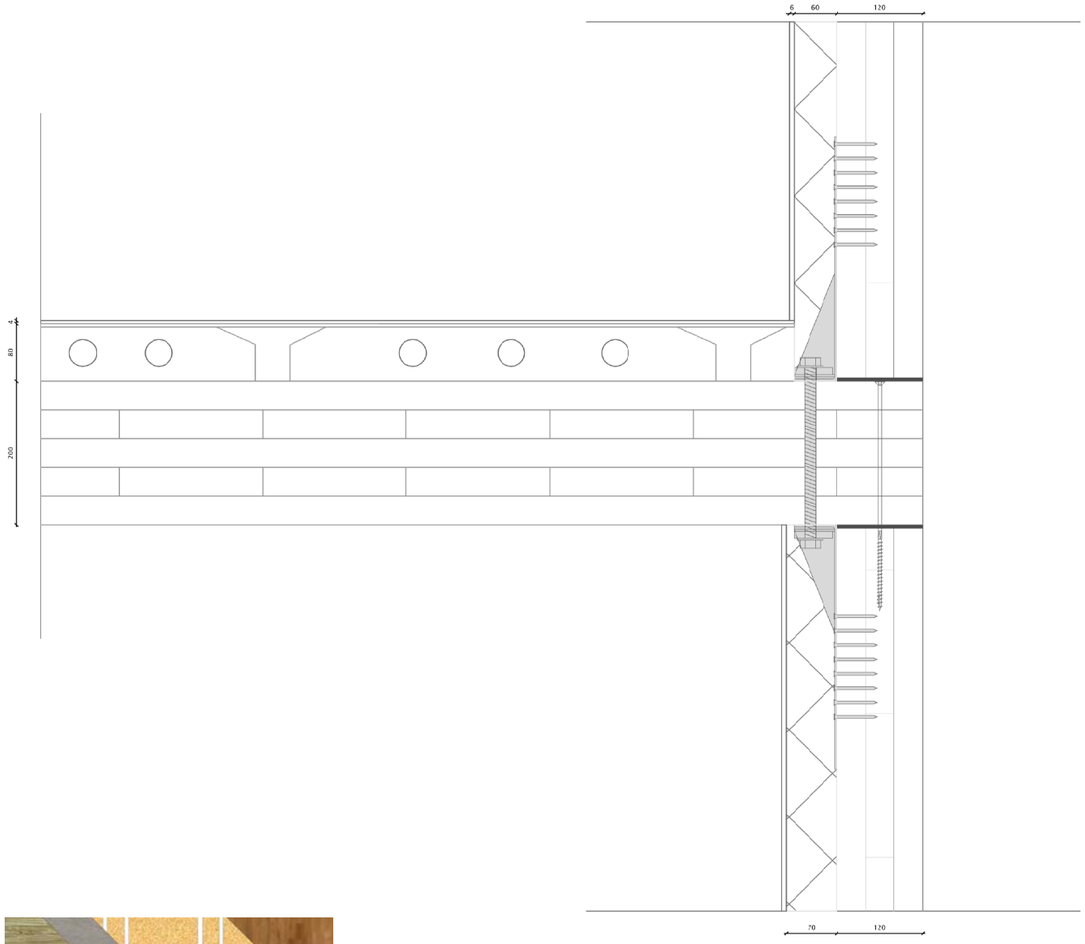


Figure 12.19: Detail 1:5, outside wall to floor connection



Floor Structure

(1) Wooden floor (30 mm)
(2) Aluminium Plates (2 mm)
(3) Floor Heating pipes (18 mm)
(4) Insulation Acoustics (50 mm)
(5) Cross laminated Timber Floor (100 mm)

Figure 12.20: Detail 1:5, inside floor to wall connection

Structural Design

Cross-laminated timber (CLT) and Glulam construction are used in this building for several reasons. Firstly, they offer excellent thermal conductivity and insulation properties, making them energy efficient. These materials are also sustainable and contribute positively to health and well-being due to their natural look. Moreover, the construction process with CLT and Glulam is quick, which is advantageous for timely project completion.

Using timber in a seismic area provides resilience and lightness, which are crucial for withstanding earthquakes. Timber's flexibility and strength help absorb seismic shocks better than many building materials, such as concrete, bricks and steel.

The foundation of this building is made out of a smaller seismic base insulation. On top of that storage spaces are places. These storage areas, which raise the building for half a meter, provide for spaces to be used to store various emergency equipment and essential survival materials in preparation for a disaster.

The design emphasizes earthquake-resilient construction, incorporating a wooden construction and steel bracketing system, which connects the wooden structure. On top of this land, four identical structures are placed, all connected with one roof. The structure's grid (7500 x 10,500) with horizontal and vertical CLT separations enhances stability, and allows for different functions to take place within the four buildings.

Experiments, tests, and presentations followed by the Architectural Recovery Team (ART) show the efficacy of this construction method. This type of construction can be adapted for various locations, using a flexible frame to create different structures that operate self-sufficiently.

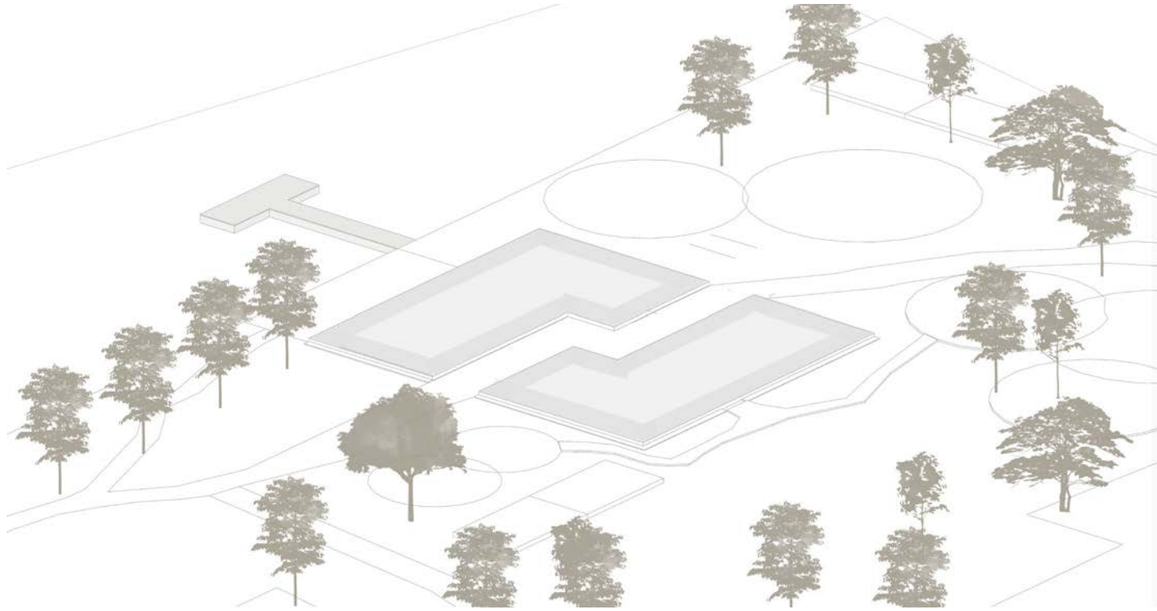
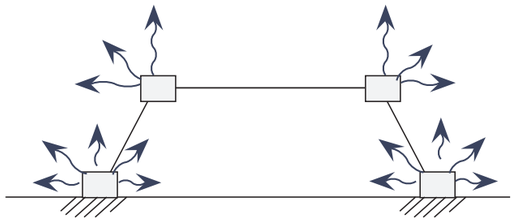
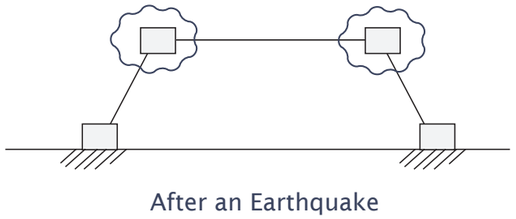


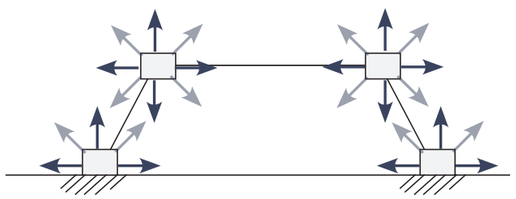
Figure 12.21: Foundation Drawing



During Earthquake

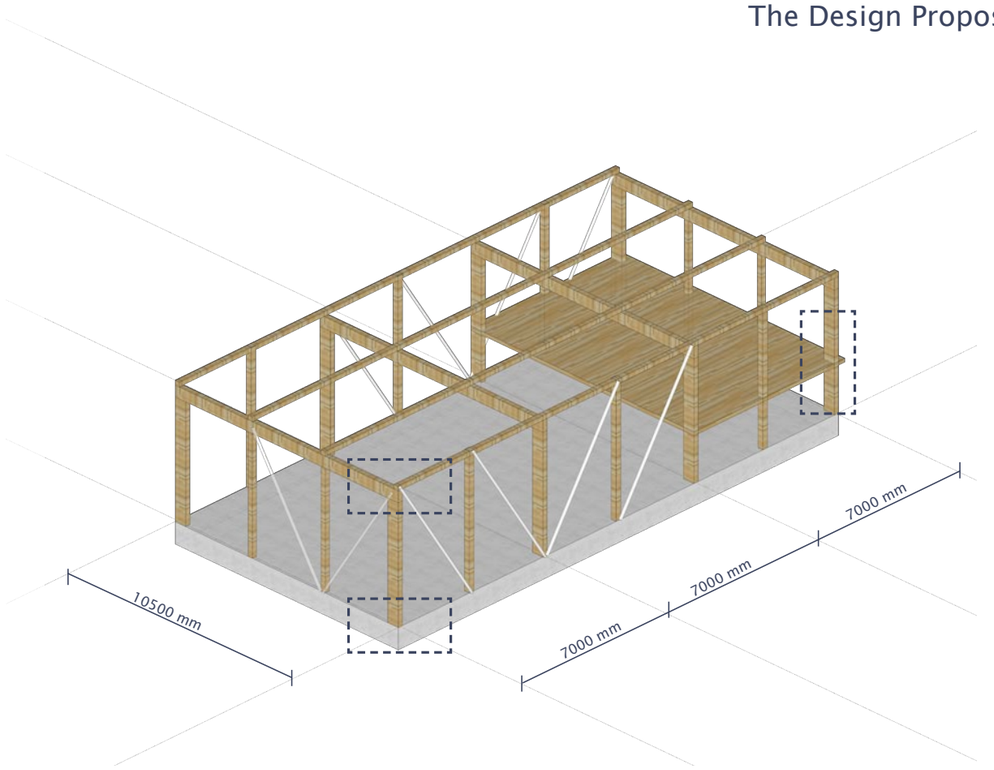


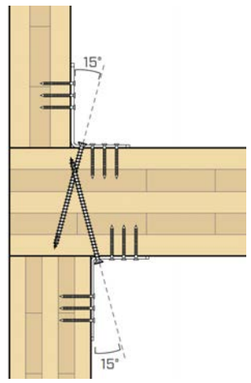
After an Earthquake



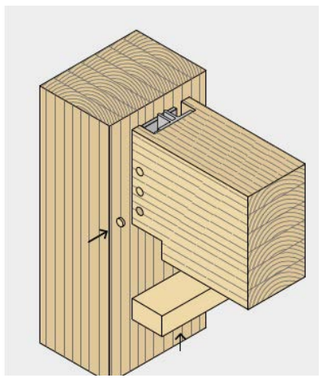
Solution | Seismic resilient Bracketing system

*Figure 12.22: Bracketing system for seismic design. *Information obtained from Rothoblaas*

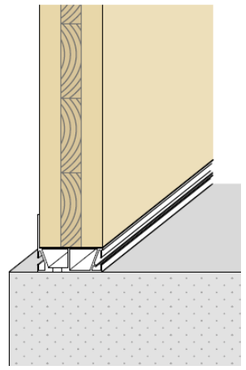




Connection Column - Floor
(Designed to have great stiffness, associated with a ductile failure.)



Connection Column - Beam
(Primary Structure - fully concealed connection)



Connection Floor - Wall
(Primary Structure - transferring shear, tension and compression stresses to the foundation.)

*Figure 12.23: Construction System of building, Bracketing system for seismic design *Information obtained from Rothoblaas*

Climate Design

The four individual constructions all serve as individual climatically working buildings. These units are self sufficient when needed and allow inhabitants to use the building in case of an emergency, not needing to rely on the city's infrastructure.

Heating and cooling:
(1)Naturalcoolingandreductionurbanheat Island
(2) Thermal Panels + boilers which heat water in summer and winter.
(3) Hot air from greenhouse is collected by heat exchangers
(4) Hot and cold air is stored in aquifer.
(5) Heat is distributed through floor heating

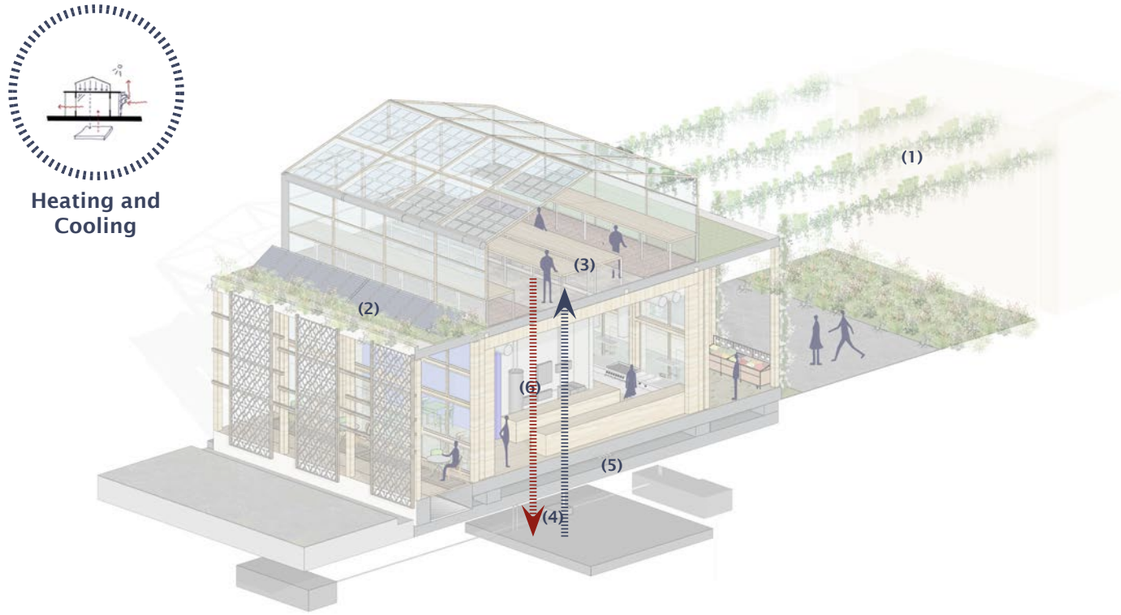
Water
(1) Filtering and catching rainwater through green roof.
(2) Rainwater stored underground in tanks: use for plants, cleaning after market days and flushing toilets, or sprinkler system in case of fire.
(3) Too much water guided to lake.
(4) Drink Water Tank & Filter system for water.
(5) In case of shortage (in summer); the system is connected to the net to ensure there is always enough water in case of emergency.
(6) Sewage system

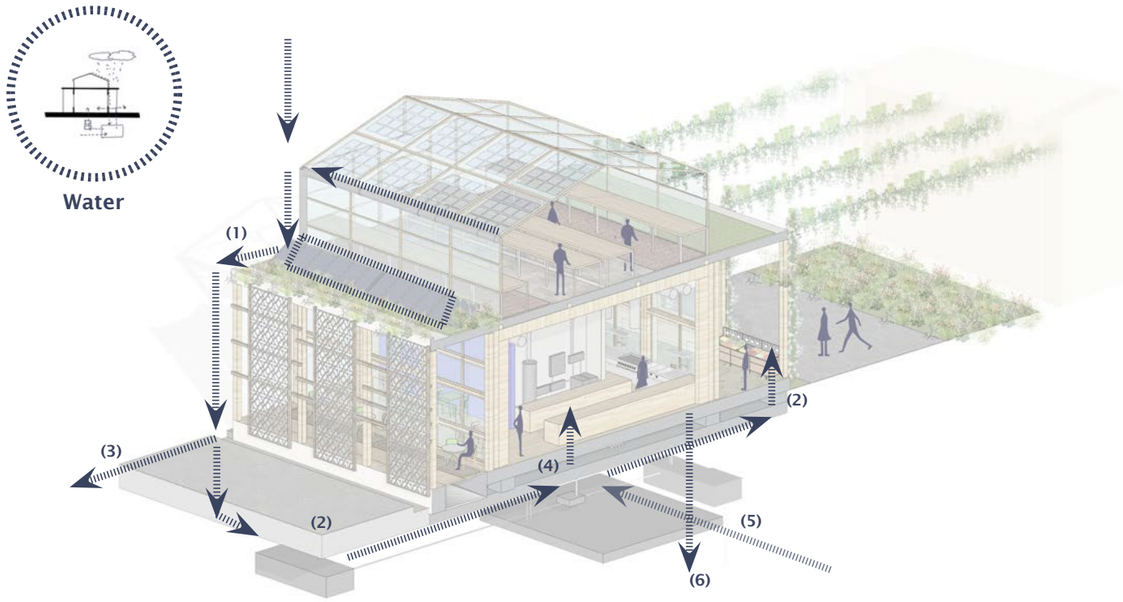
Electricity
(1) Solar Panels on the greenhouse cover the electricity of the individual buildings
(2) A battery in the building stores electricity for overnight usage or usage during days with less sun.

Light
(1) Light through big windows
(2) Shade created through plants and shading system.
(3) Inside lighting regulated based on summer/ winter and day/night usage.

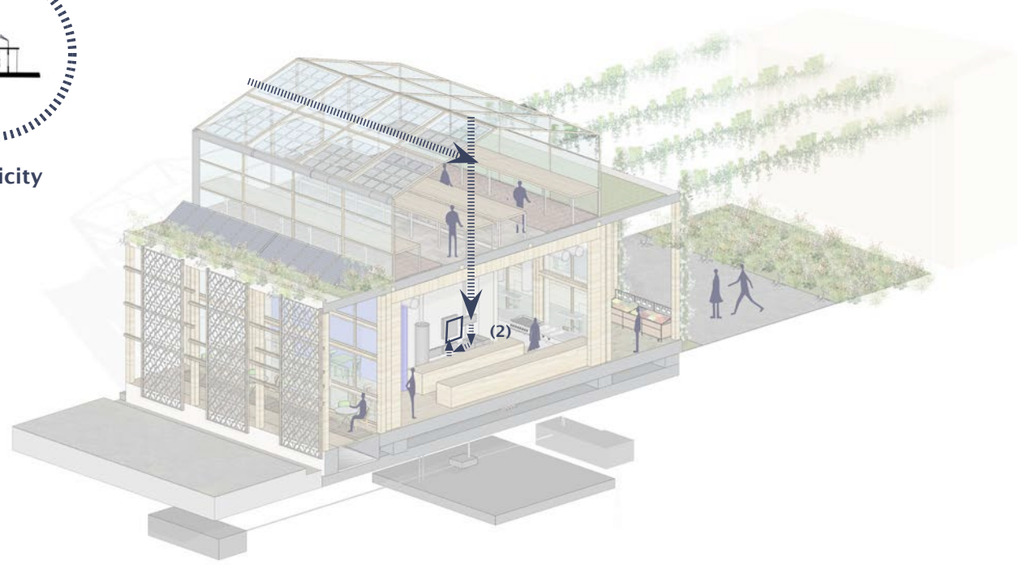
Ventilation
(1) Roof openings and windows which can be opened, Cooling effect (Cross ventilation)
(2) Mechanical ventilation, to suit the requirements during the summer/ and in the kitchen.
(3) CO2 extracted from inside to the greenhouses.

Food Growth
(1) Gardens (Food Production)
(2) Market Space (Economy)
(3) Community Kitchen (Social Connection)
(4) Restaurant (Connection with the Outside)
(5) Waste is used in compost heaps

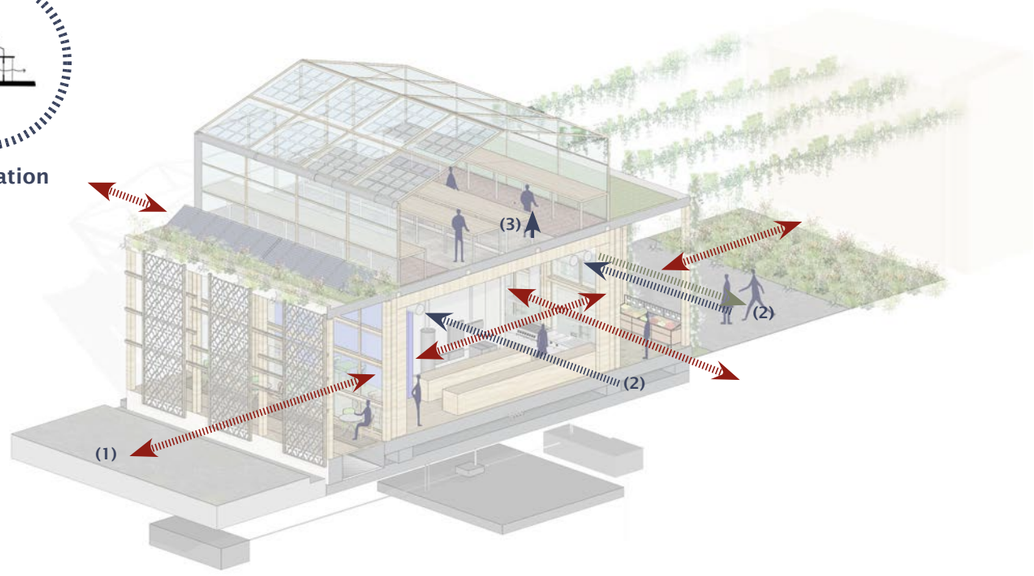




Electricity



Ventilation



Light

Food Growth

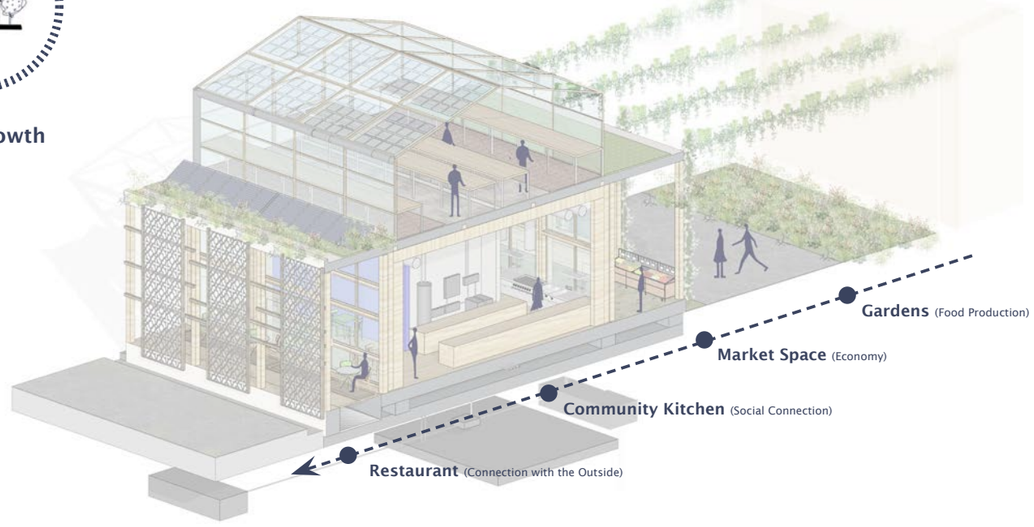


Figure 12.24: Climate Design Sketches: (1)Heat and Cooling; (2)Water; (3) Electricity; (4)Light; (5)Ventilation; (6) Food growth

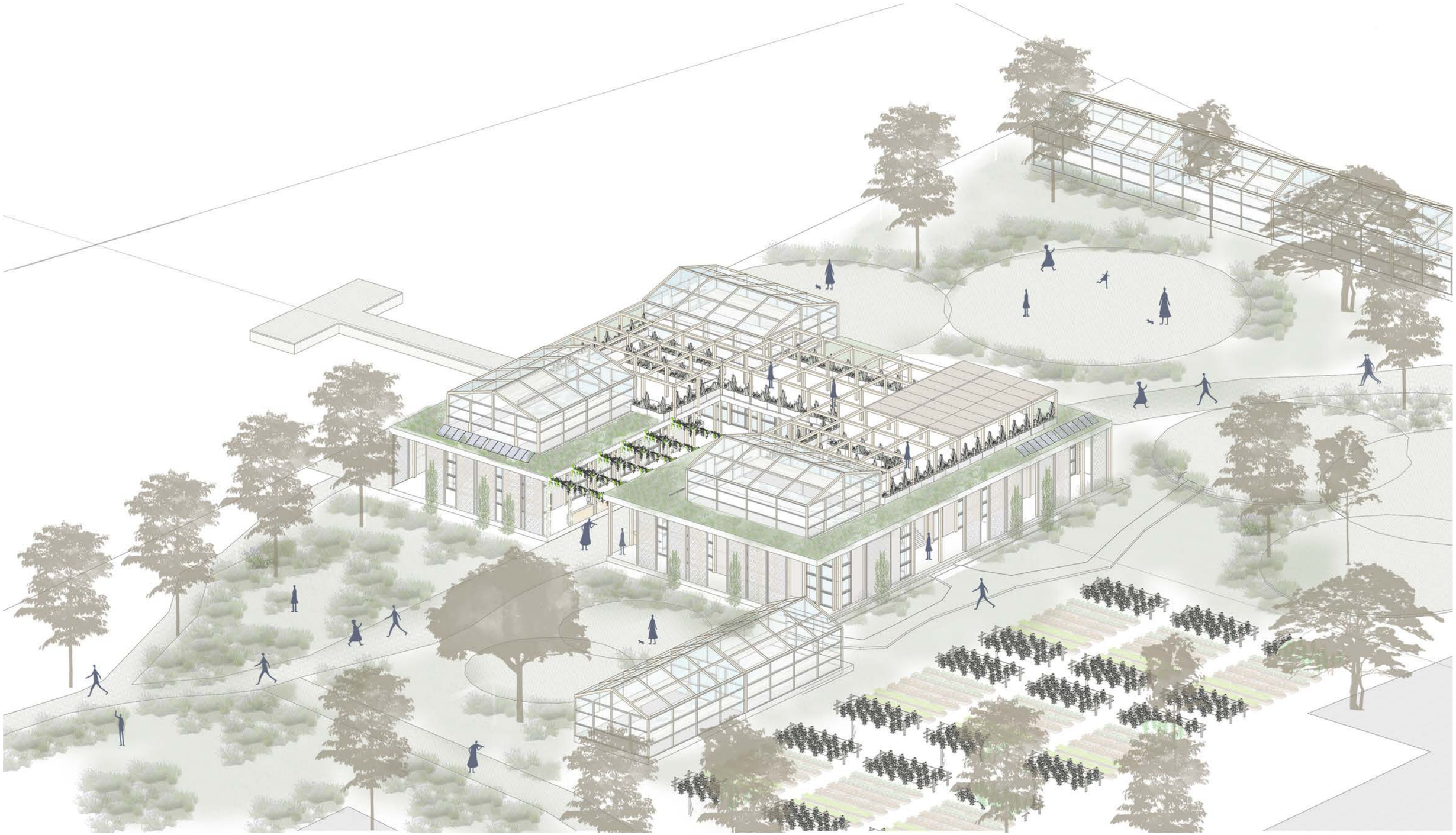


Figure 12.25: 3D Visualisation Building & Gardens

13 Emergency Scenario

As architects and designers, it is not only to design buildings which serve as functional or esthetically pleasing spaces, but it is also our role to empathize with and understand the needs of (affected) communities, contributing to solutions that aim to create safe and resilient cities and buildings before, but also during and after a disaster.

In the following section of the design, a focus will be placed on coordination and management during an earthquake. The proposed design will be explained in the predicted scenario of a 7.5 magnitude earthquake occurring at nighttime. This is also the scenario for which governmental institutions are preparing and anticipating.

Before discussing the community kitchen of Kanarya in this scenario, it is important to reflect on some lessons learned from Antakya, which I have integrated into my research.

When the earthquake struck, people immediately ran outside their buildings and onto the streets. Families wandered through the streets, seeking a place to stay during the first few hours. In Karsu village, villagers explained that after the first earthquake, people did not want to return to their houses. In the morning, they all gathered next to the open plot near the cemetery situated above, which is in this case a dangerous, landslide area. Secondly, first aid and rescue teams arrived very late to the site, with some taking up to three weeks to reach certain quarters of the city. People stayed next to the rubble of the buildings where their families lived, having nowhere else to go. There were no “clean places” to rescue people, complicating first aid efforts. Communities stuck together, trying to save their families and initiate community efforts to cope with the disaster. However, these communities didn’t know where to start, or what they could do.

Reflecting on these lessons, it becomes clear that planning for such scenarios is crucial. The design and function of the community kitchen of Kanarya are aimed at addressing these issues by providing a safe, organized, and resilient space for the community where people know what to do in case an earthquake occurs, and also have all the means within this building.

Day 1 | 00.00 - 00.30

The big earthquake happens, in a scenario of Mw 7.5, at a nighttime, it is predicted that X amount of buildings will collapse during the first tremors, and X will be very dangerous.

People in antakya describe the first moments as: “Suddenly, the curtains start to move, and then the ground starts to shake. There is a lot of white light, dust and screams.”

The ideal situation is that individuals can sit safely in their bedrooms and wait till the shaking is over. As soon as this happens, it is important they take their own emergency kit bag, and leave the building and go to the safe spaces provided by AFAD. In this case, the Kanarya waterfront.

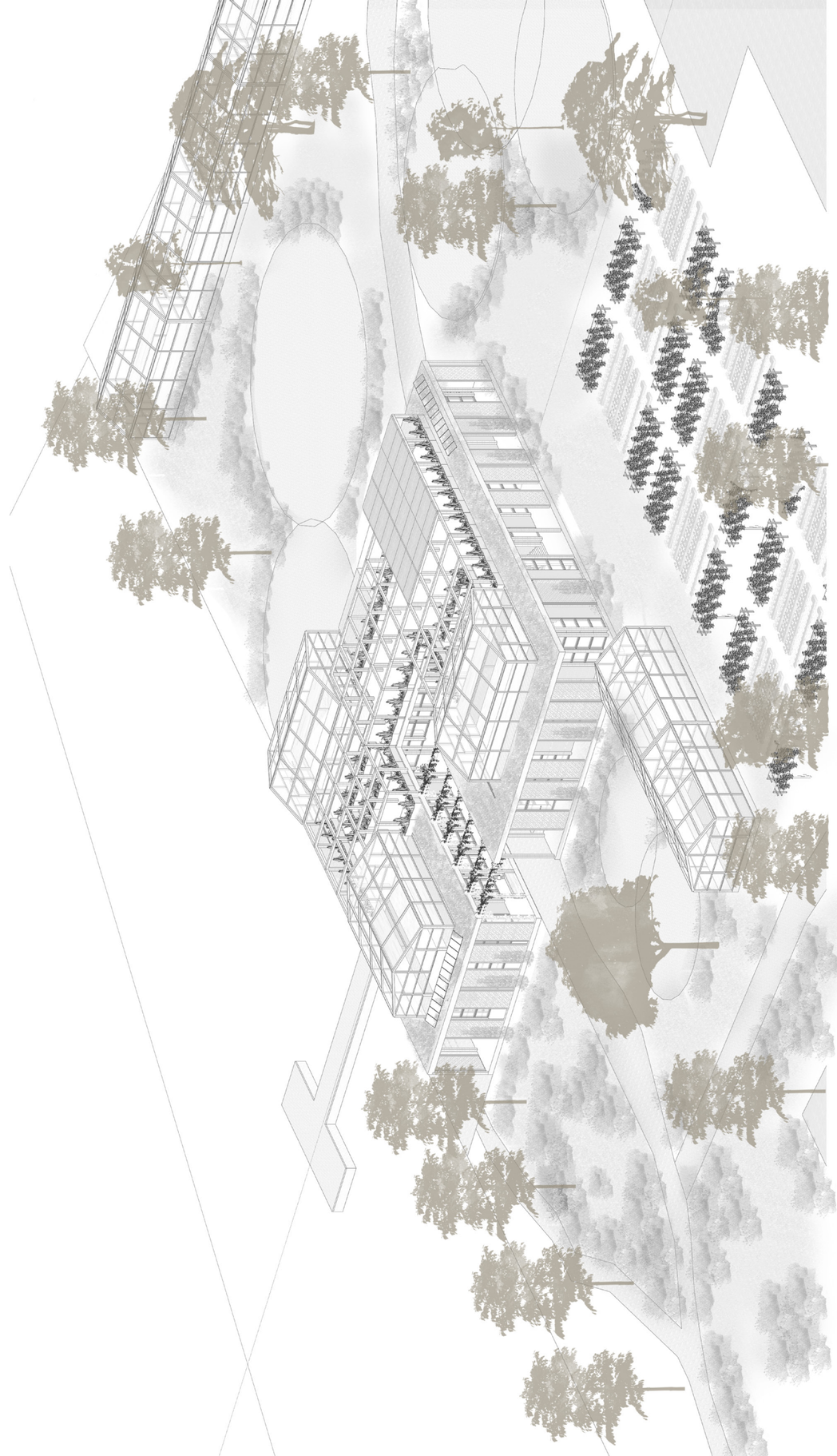


Figure 13.1: Emergency Scenario Drawing, Kanarya

Day 1 | 00.30 - 06.00

As soon as smaller families, and the first groups of people start to arrive, different groups are made. The focus is on the coordination and management, so that everyone knows what to do, and that rescue teams can start going back to the neighborhoods with the right supplies and first aid. The formation of the teams is done beforehand. People know where to go and what their tasks are.

The different teams are:

(1) Rescue Team
(2) First aid Team
(3) Coordination Team
(4) Children's Team
(5) Food Team
(6) Shelter Team
(7) Building coordination Team

In the first couple of hours, the necessary materials are taken out, the first groups of people are hosted and they are provided with first aid, warm cloths and basic food and water outside the building.

At the same time the Kanarya community building is checked, and secured where necessary and the rooms are all prepared for coordination, first aid and food distribution. After the checks, children can be hosted on the roof terrace, where they are all kept safe.

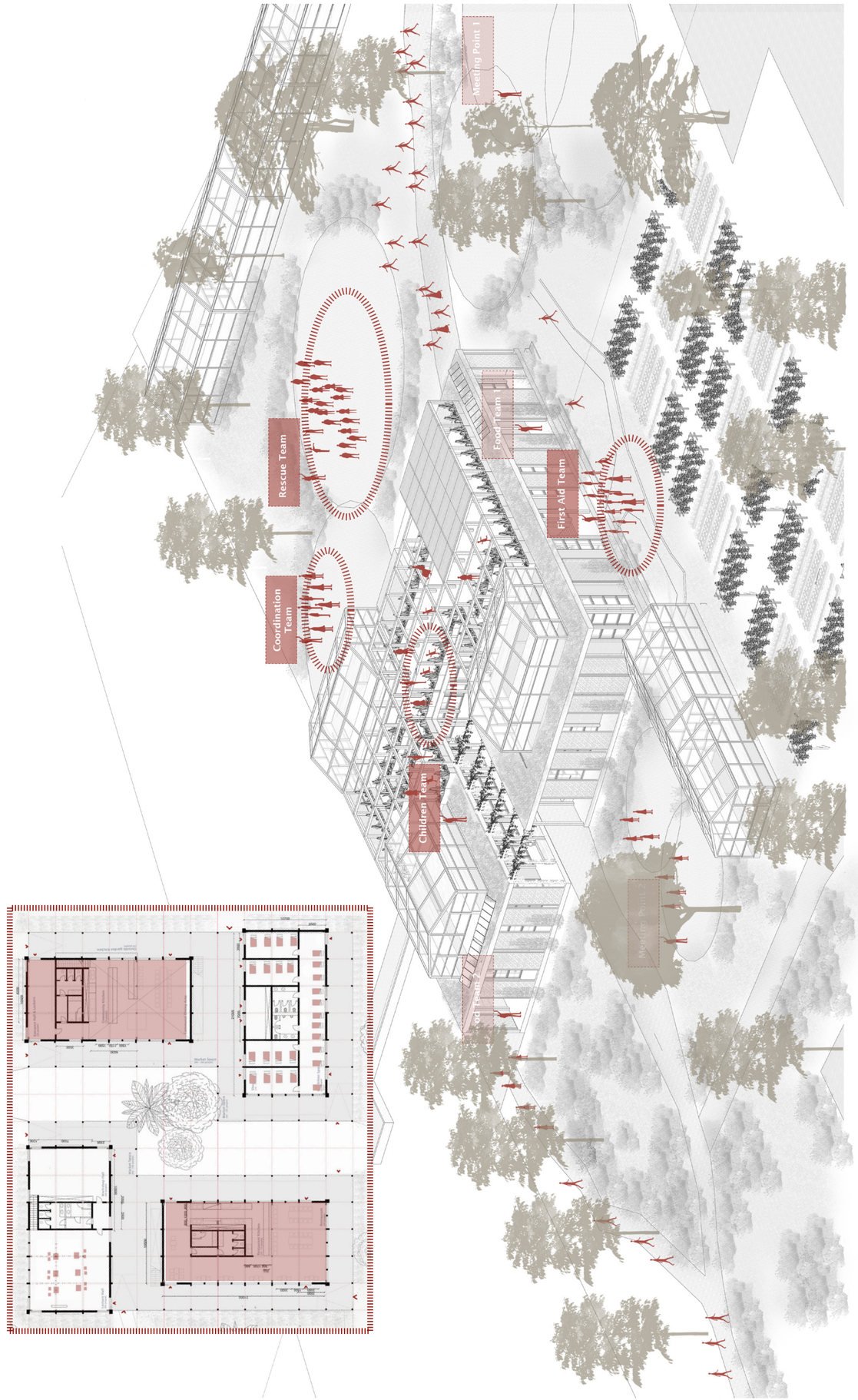


Figure 13.2: Emergency Scenario Drawing, Kanarya

Day 1 | 06.00 - 24.00

The first day continues with rescue teams saving people, and helping them with first aid. The coordination team guides people to the necessary help spots or gather places, where they either get a task, or are assigned to wait.

First aid, food, water, blankets are distributed to the people in the waiting spots. This is all done in the two community kitchens who provide food for their side of the building (south side gathering spot and North side gathering spot).

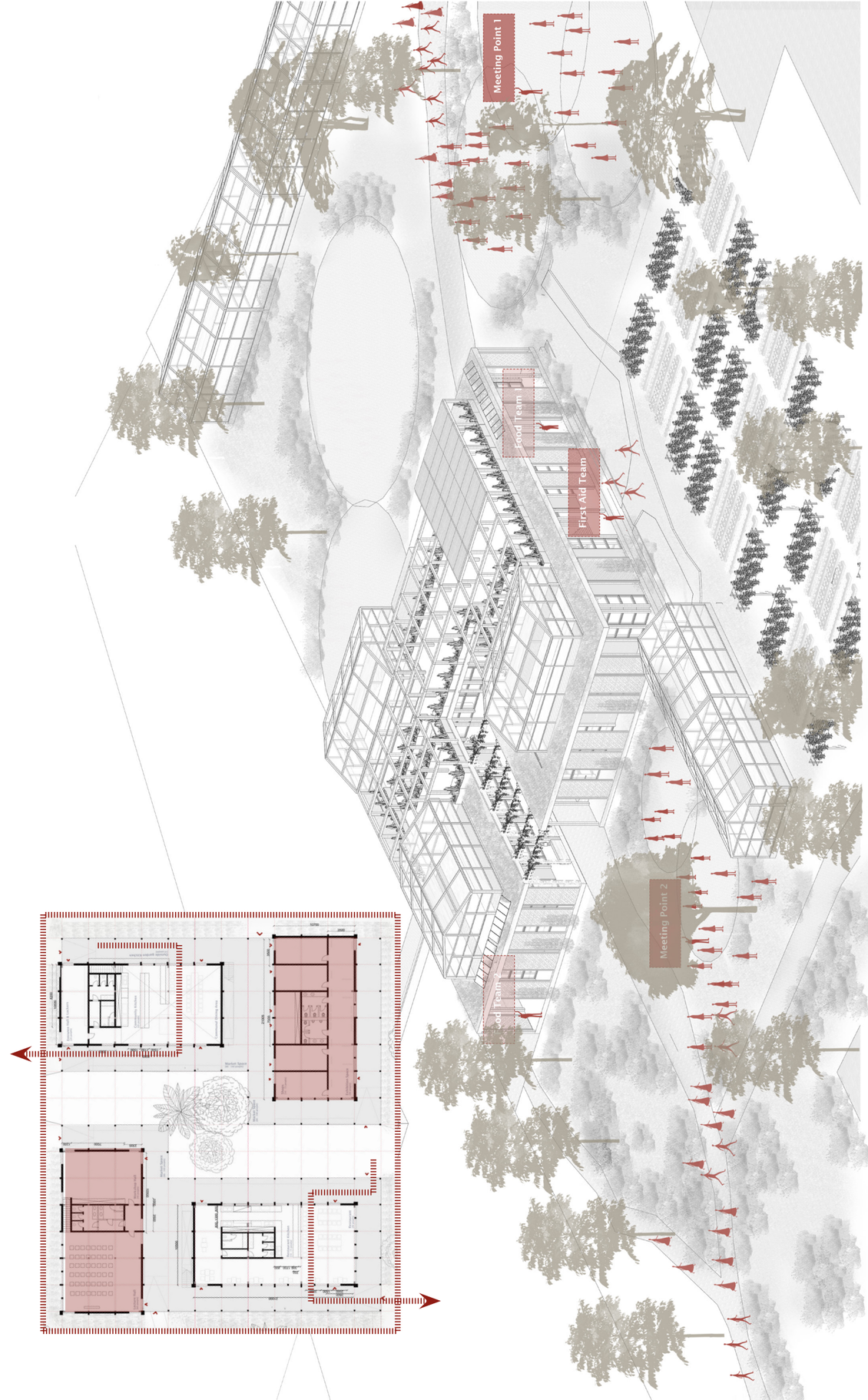


Figure 13.3: Emergency Scenario Drawing, Kanarya

Week 1

In the first week the focus stays on rescuing people, and providing everyone with enough water, food, first aid and necessary clothing or blankets.

There are two spots where people first gather and wait:

(1) North Side Gathering Space: 1400 m2
(2) South Side Gathering Space: 600 m2

If you calculate that every person who stand in the designated circle space has 1m2, and can then find a spot in the gardens the put up temporary shelter, the building could host around 2.000 people the first weeks.

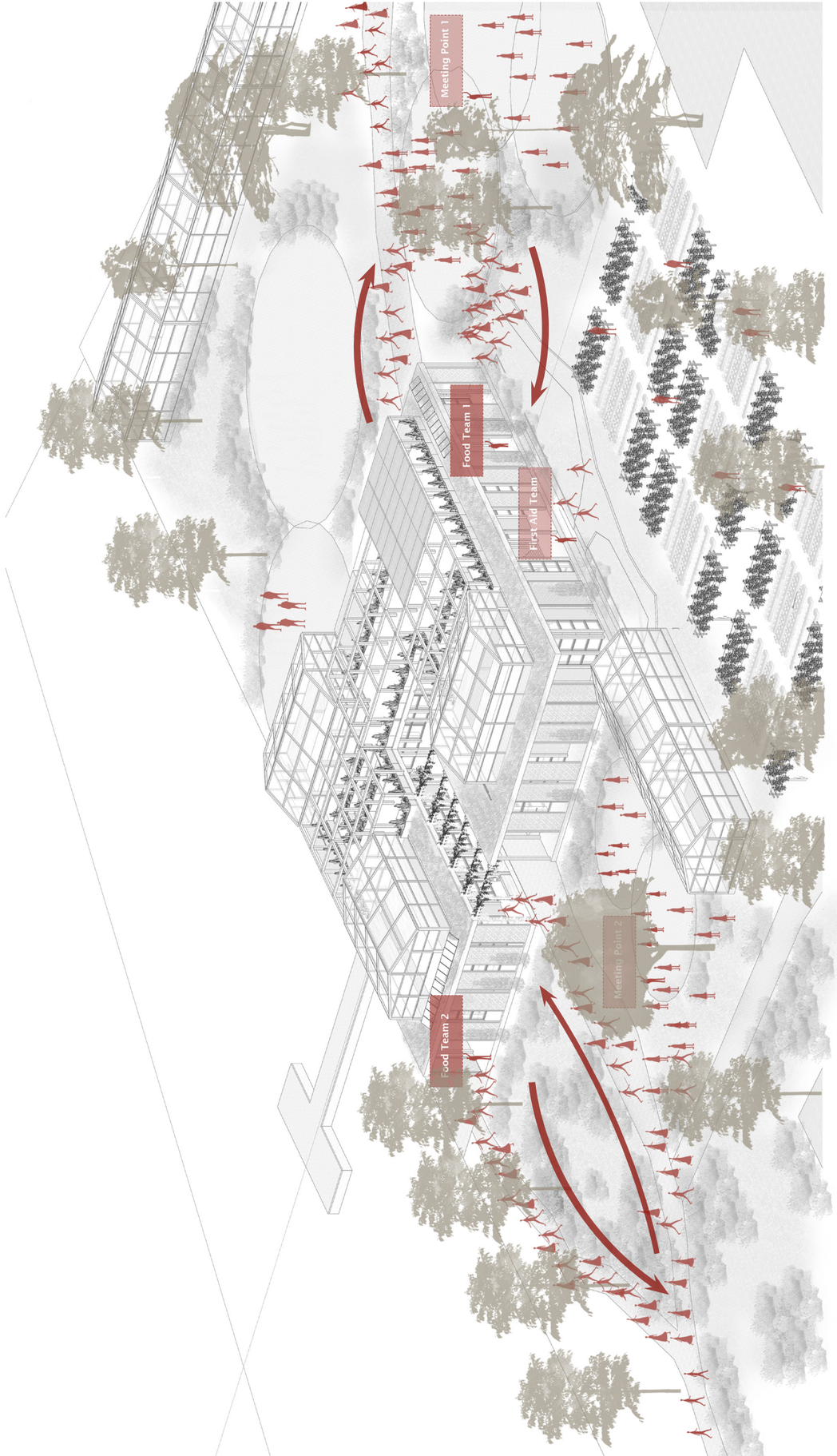


Figure 13.4: Emergency Scenario Drawing, Kanarya

Week 2

The second week is in light of putting up tents, in the communal areas, and extra tents for first aid. When those are finished, the coordination team can start with distribution family tents (18 m2 - 5-6 people per tent) to those who are in urgent need of a sleeping place.

Besides this, the focus is still on rescuing people, giving them food and water and providing them with safe spaces.

The rescue teams are now (after 10 days), stopping there rescue attempts, and are now documenting the safe and not safe apartments, so that inhabitants can start moving back into their own houses, or apply for a tent/shelter next to the community center.

Contact with all the other rescue centers should be made (within Kanarya) to see if any help can be provided to each other.

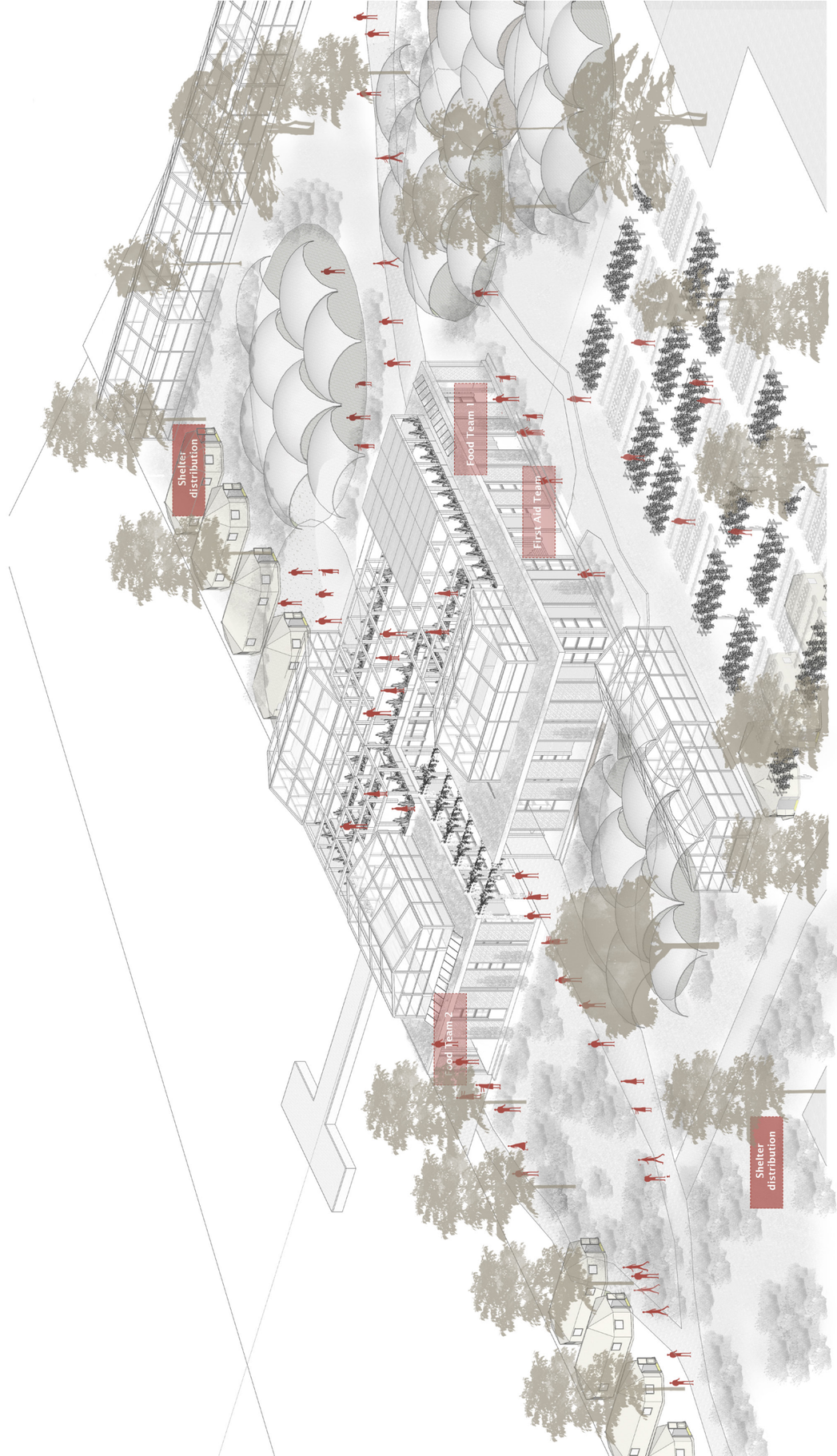


Figure 13.5: Emergency Scenario Drawing, Kanarya

Week 3

By week three, every family will have a place to sleep. Approximately 1,400 tents can be set up on the north side of the park, using the space provided by the car park. These tent spaces can also be allocated before a disaster, to families who already know their buildings will be unsafe after an earthquake.

Initiating psychological support and resuming operations at the community center can facilitate quicker healing for the community once the immediate disaster has passed.

In week three, it is crucial to combine coordination efforts by communicating with different centers. By this time, most supplies will be finished, and there will be an increased need for additional tents and food supplies.

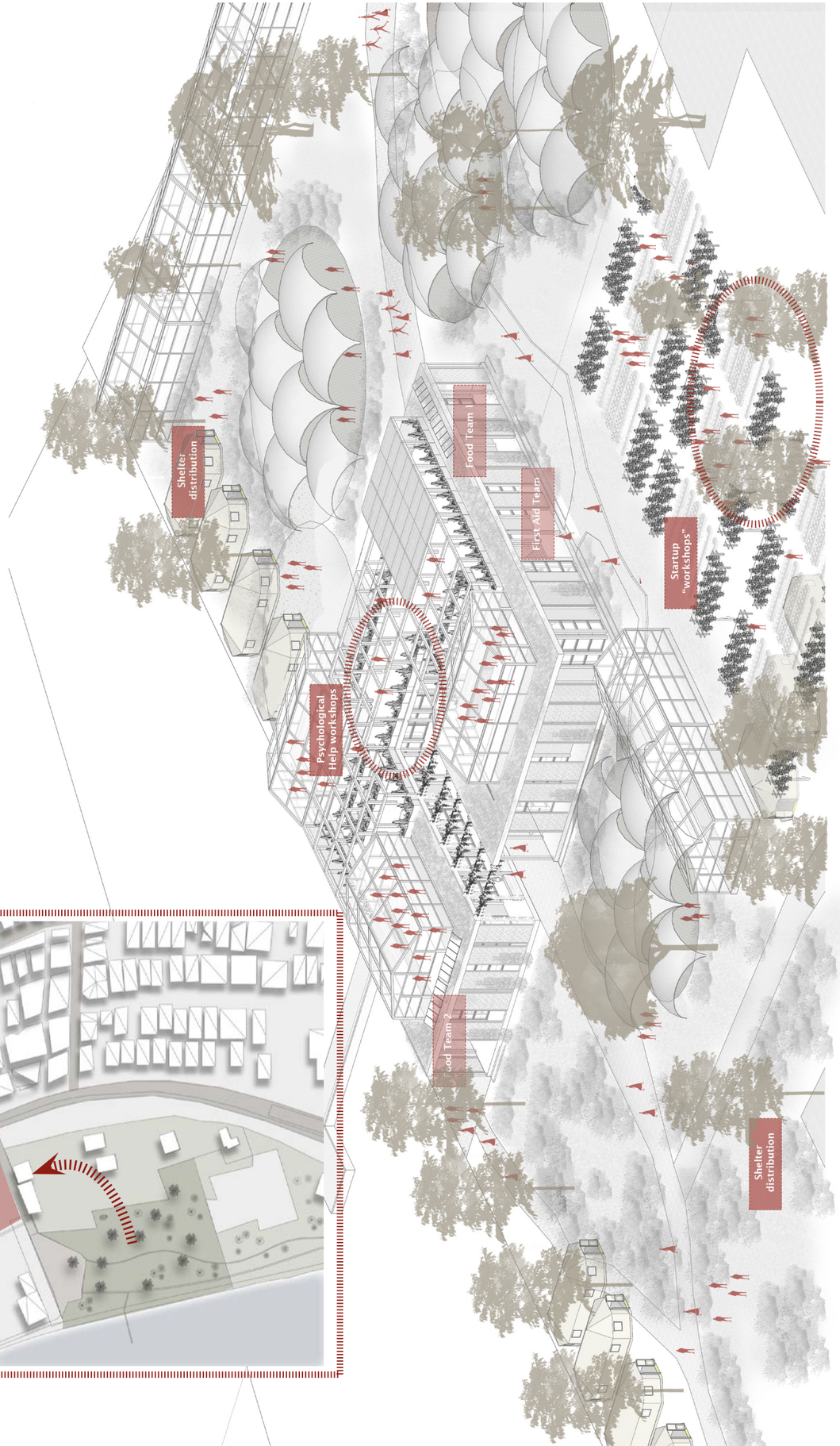


Figure 13.6: Emergency Scenario Drawing, Kanarya

Week 4

Reflecting on the worst-case scenario in Antakya, it took up to three weeks for outside first aid and rescue teams to arrive in some areas of the city. Considering that this region is less developed and not centrally located, it is anticipated that such organizations will only reach the location after three weeks.

When the first rescue organizations arrive, they will be hosted by the coordination center, which will direct them where to go and who to assist first. These organizations can arrive by boat, car/bus, or by walking along paths near the water side.

These organizations will provide the neighborhood with additional shelters and food supplies, which will likely be finished within the first three weeks. They will also aid in the community's post-disaster recovery, assisting with individual houses and buildings, and later collaborating with the community on re-planning the neighborhood.

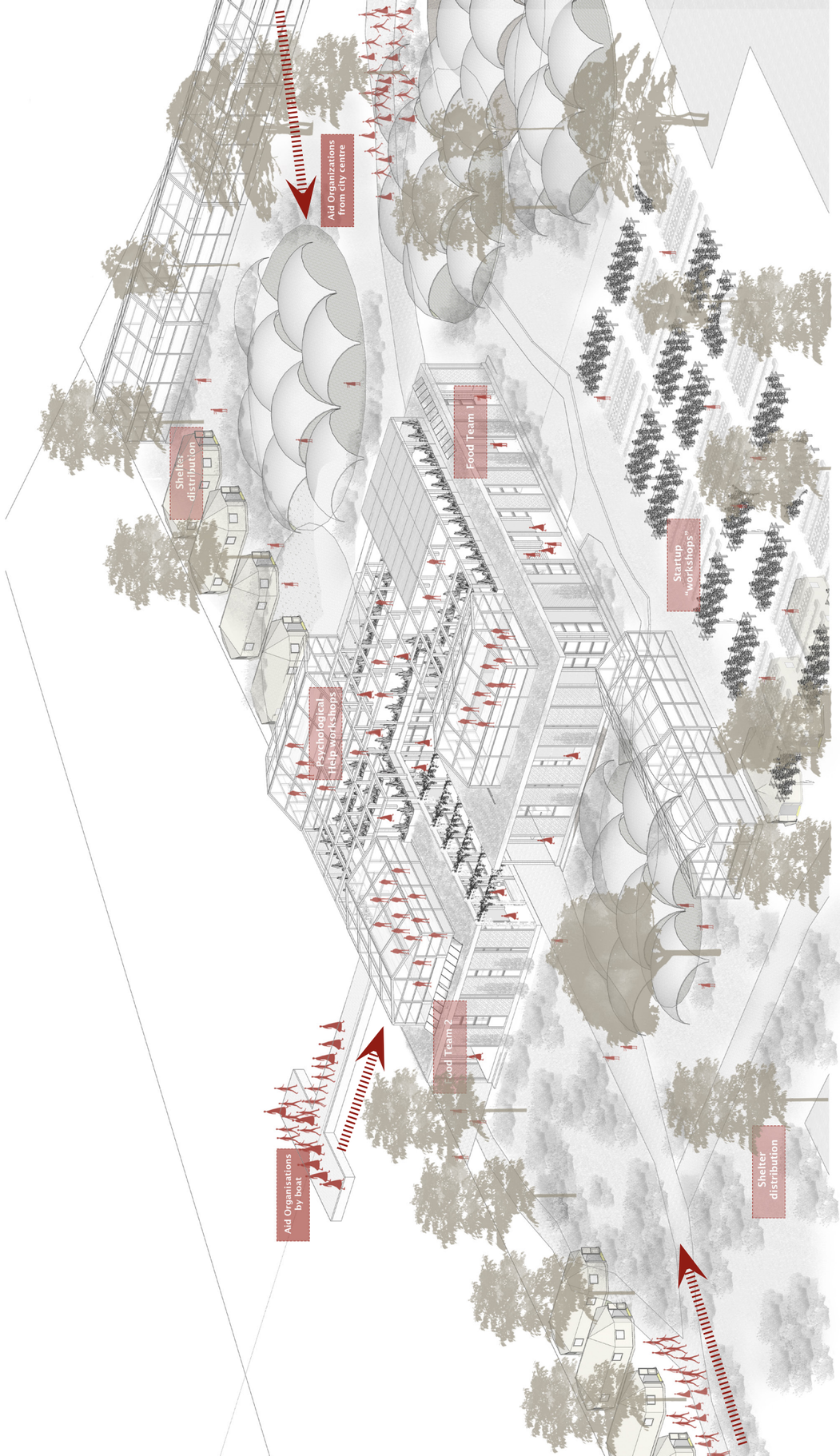


Figure 13.7: Emergency Scenario Drawing, Kanarya

Healing the community and the city

After the initial phase of the disaster has passed, the first steps involve beginning the healing process for the community. This healing can take place within the community kitchen of Kanarya.

The interior design of the building facilitates healing through various means. The use of calming colors, particularly green, creates a soothing environment. The building offers an “escape from the city” with its proximity to water, opportunities for food cultivation, job prospects, and spaces for communal gatherings.

Residents can start growing their food and vegetables again, helping them rebuild their lives away from the rubbles. These centers provide coordination and information, ensuring that people do not feel hopelessly abandoned.

The healing process for the city can take 10 to 15 years. It is crucial to plan for greater disaster resilience while also incorporating a bottom-up approach that listens to individuals during the planning process. This ensures that the city’s diverse memories, traditions, and culture are preserved.

Healing the building

The last part of the healing proces is checking if the buildings which are still standing are strong enough for future earthquakes.

For the community kitchen of Kanarya, six steps need to be taken to make sure the building could survive the next earthquake.

(1) Strengthing Construction Bracketing
(2) Restoring windows & checking foundation
(3) Emptying Sewage & Water system
(4) Replanting gardens & cleaning outside spaces
(5) Restoring old functions of the building
(6) Refilling storage spaces

14 Conclusions & Reflection

Main Goal

My design focuses on creating a community space in Kanarya, Istanbul, with two main goals. The primary goal is to establish a safe space that provides all the necessary tools which are needed after an earthquake disaster. The residents of the neighborhood can come together in the self-sustaining building, which serves as a gathering point (based on the AFAD designated areas) after a disaster to have a safe space, away from the probably destroyed city. Later the building will facilitate the community with its “healing” character and give the community the space to recover after a disaster.

The second goal is to use the proposed building before a disaster occurs. The reasoning behind that is so that communities can get familiar with the facilities, and create memories and a sense of belonging to the place. The building design, of a community kitchen, in the neighborhood Kanarya (before the disaster) contributes not only to the daily lives of residents but also to the overall development of the are by creating employment opportunities and facilities that attract people from neighboring localities. The community kitchen aims to provide inhabitants with a daily goal that aligns with the community’s needs.

Keeping these requirements in mind, the community kitchen in Kanarya will include a market area and workshop spaces. Here, residents will be able to grow food, cook together, start small crafting projects, such as knitting, and have the opportunity to sell their creations, which aims to provide economic growth within the community.
Many design decisions made during the design process are primarily based on the experience of people after the earthquakes on the 6th of February 2023 in Kahramanmaraş. This knowledge was mainly acquired during my work for the Architectural Recovery Team, a foundation created with fellow students to reconstruct long-term housing after the disaster. Besides that, my design decisions are based on the research conducted about disaster preparedness and the psychological influences of space to create a resilient city.

My Research and Design Progress

During my graduation project on the architecture track, I tried to combine different aspects of design on different scales, connecting the urban plan, the landscape plan together with the more technical aspects of design for an earthquake prone region. During my studies I followed various courses on topics related to buildings in extreme conditions from an engineering point of view as well as studying the social impacts a neighborhood has on the residents. To combine these two topics, I developed an interest in the relationship between the built environment and its impact on individual or community psychology.

Although this project is currently planned to be based in Istanbul, it can also be considered and adapted for other areas, cities or countries. The broader scope of my project addresses people who not only loose their homes, houses and neighborhoods but also their memories due to natural disasters, and hopes to create safe spaces for those who are displaced, by preparing them in advance to face such disasters.

In the societal and professional context, the relevance of my graduation work becomes evident when looking at the frequency of global natural disasters. As architects, or designers, it is our role to empathize and understand the needs of affected communities, and play a role in creating a solution which aims to create safe and resilient cities. The academic value of my graduation project lies in its approach to addressing real-life challenges faced by communities in the aftermath of disasters. By focusing on the often-overlooked aspect of disaster preparedness, my project fills a gap in the existing urban transformation plan of Istanbul and the process of preparing for the predicted Istanbul earthquake, by relating it to existing literature. Ethically, the project focuses on individual communities and individuals in the big city of Istanbul, leaving the questions of politics and the economic situation of Türkiye behind, which is often the primary cause of disasters, and only focusing on the well-being and safety of people. While within the scope of the master's graduation, it has been good to leave these two factors out, it is necessary to look into the economic situation (affordability) and the political situation of the area before implementing a project such as a community place.

On a personal level, my work connects with the work I am doing in parallel to my studies, the reconstruction of Antakya, Türkiye. This experience provides insights into the daily challenges faced by those affected by disasters and the role I can play in this recovery process.

Due to the work balance of combining this foundation and my graduation, a different vision was formed at certain points of my graduation. I often faced the challenge of working on my my graduation topic in addition to working on the project related to the recovery of Antakya. Both topics are very current and need action. However, keeping in mind that the graduation project is a master's thesis, I have encountered some difficulties in sometimes leaving the pragmatic and practical way of thinking to come to an innovative design and thinking out of the box. Reflecting in hindsight, more time in the design process would have let me experiment more with the architectural compositions and the space around of my building.

The positive aspect of having very similar projects to work on, is that throughout the year I could easily reach out to experts from the field to introduce my research and pitch my design. This ranged from introducing my research to the Turkish Head Architect of the new master plan of Antakya, Bunjamin Derman, to the architects and Urban planners who work at Foster and Partners to redesign a part of Antakya, and to those who are involved with environmental psychology in a post-disaster setting. All my contacts were very enthusiastic about my work and project. Besides that, I have been working together with companies such as Rothoblaas and Derix, whose expertise in CLT and seismic regions have helped me to introduce these materials during my graduation project. Lastly, the many different conferences where I attended and gave presentations of my work, gave me insights to the different topics on the field of disaster management or designing for post-disaster recovery. These presentations also allowed me to talk to many professors and students at various universities studying the same topic and ensured that I combined their knowledge into my research and design proposal.

What is next?

I am hoping to present my proposal to the Istanbul Municipality, specifically involving the Urban Transformation Office, and the Turkish Design Council (TTV). While the focus of my design lies on the Kanarya waterside area, this proposal can be implemented across various locations within the city, adaptable through adjustments in both size and function. During their visit in February, the head of the TTV was interested in the progression of my project and expressed that they wanted to see the outcomes of my research and design.

To conclude, my graduation project tries to combine different disciplines to give a proposal of how further steps can be taken. However, it can be said there is still potential to take this project into practice, and besides that, the potential to explore the topic of how to stimulate disaster preparedness within smaller communities.

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