Future of Work

Mixed-use unit design proposal for work from home

Master's Thesis - 2022

BY

Prem Madugula

Future of Work

Mixed-use unit design proposal for work from home

Master's Thesis - 2022

CHALMERS

BY

Prem Madugula

Examiner: Paula Femenias
Supervisor: Walter Unterrainer

Architecture and Planning beyond Sustainability (MPDSD)
Chalmers School of Architecture + Building design for Sustainability
Department of Architecture and Civil Engineering
Chalmers University of Technology

Acknowledgement

I would like to thank

Walter Unterrainer,
For your constant advice, support and guidance throughout the thesis.

Marie-France Stendahl,
For your input regarding the project and guidance along the semester.
&

Friends and Family
For sharing your perspectives, stories, input and presence along the process.

Abstract

The recent pandemic has allowed us to operate remotely while remaining connected to our work life. Restrictions are gradually being eased around the world and people are returning to their pre-pandemic lifestyles. However, working environments and patterns must now be reevaluated since many employees and companies believe that it is not required to be in the office every day. As a result, a hybrid scheduling system can be a better alternative, in which individuals gather in the office a few days a week while working from home or remotely rest of the time.

Current housing layouts are not suitable for remote working in long term and this study offers a guideline for spatial organization in housing typologies. In a work-from-home environment, this concept intends to promote social ties and exchanges. It can be observed that working from home has negative effects on mental and physical health, productivity, and focus. Research is done to address these issues through literature studies, case studies and provide solutions in private and social spaces.

Housing layouts, materials understanding, social spaces, and synergies among different users are investigated in case studies from both the international and Swedish contexts.

The research and case study inputs are reflected by designing a mixed-use building which consists of housing, neighborhood working spaces and retail spaces on a selected site in Gothenburg as a future work from home solution.

Keywords: housing, work from home, well-being, social interaction.

Student Background

I am a Designer with experience in working within various international contexts for both educational and real-life projects. I find translating elements that are often perceived rigid and bland into fun and playful an exciting proposition. Therefore, the proposal of sustainable housing units in remote working situation, seems an interesting opportunity. The wide scope of topics covered within this proposal sets a challenging task of bringing balance across various aspects. However, it intrigues my designer skills while also catering to my interests in upcoming technological trends.

Educational Background

M.Sc. – Chalmers University of Technology, Gothenburg- MPDSD (2020-2022)
• 	Architectural geometry - MVE560
• 	Building design lab - ARK415
• 	Sustainable building: Competition - ARK350
• 	Sustainable architectural design - ARK466
• 	History, theory and method 1 - ARK590
• 	Managing design projects - ARK630
• 	Planning and design for sustainable development in a local context ARK174
• 	Sustainable development and the design professions - ARK650

B.Arch. – School of Planning and architecture, Vijayawada, India (2014-2019)

Work Experience

Junior Architect – Amaravati Capital Region Development Authority, India
Worked as a part of core design team responsible for the holistic development of government schools that functioned primarily through the public participatory approach.

Intern Architect-- RNG architects, Bengaluru, India
Scope of work: Residential, Educational, Hospitality and Commercial

Contents

1. Introduction

Background

Remote working or working from home is an option chosen by many during the recent pandemic. People across many professions were forced to adapt to remote working without proper guidelines. To adapt to the new working methods, people adjusted their existing housing spaces and made subtle adjustments for a feasible working space. This situation has provided us with an opportunity to rethink existing work patterns, spaces, and work-life balance.

Post pandemic, the restricted means to work from home has led to a shift in how people perceive working in the future resulting in the need for a better divide between personal and professional activities. Remote working provides employees the flexibility to schedule personal and work life effectively. Therefore around 71% of people globally want to either continue working remotely or in a hybrid structure post the pandemic (Analytics, 2021).

However, there are limitations to completely working remotely such as the lack of physical interaction, spontaneous meetings, loneliness, and lack of division between personal and professional space. These issues need to be addressed for better success for the concept of remote working moving forward.

The housing shortage in Sweden has seen a major rise in the past decade leading to an increase in housing prices all over the country, including Gothenburg (McElroy, 2017). The rising population and the desperate need for housing have created several opportunities for new housing structures. The housing typology has been going through many trends and subsequent effects on the design of the spaces within. The design changes might be leading to additional rooms or spaces within the apartments themselves or common amenities within the building. The recent pandemic can be considered as a cause of a trend where the boundaries between the working spaces and living spaces are bleak. This leads us to question the role of working spaces in relation to housing moving forward.

Purpose

Working environments and living spaces, prior to the pandemic, were separately defined, distinct spaces. However, the pandemic has forced these two activities to be performed from the housing units themselves. Even though such an arrangement is acceptable for temporary usage, the role and placement of working areas with respect to housing units is something that needs to be addressed moving forward.

Working from home or remote working has offered employees flexibility in working hours and patterns. It also helps employees adjust their work-life according to personal activities. These personal chores or responsibilities can be more important to parents or caretakers in families. Such positive aspects have promoted the use of working from home for many, making it a mainstream working option moving forward. However, for a successful transition in the longer term for remote working, the solutions for negative aspects related to productivity, well-being, and comfort must be considered.

Aim

To create a guideline for designing housing units suitable for work from home and implementing these guidelines into a design of a collaborative mixed-use unit in the city of Gothenburg.

Thesis Questions

1. What elements should be enhanced for healthy environments in housing for Remote working?
2. How to improve the productivity and effectiveness in Work from home set ups?
3. What should be the characteristics of the working spaces in remote working?

Delimitations

1. Detailed construction techniques would not be discussed.
2. Furniture Design won't be explored.
3. While we provide acoustic enhancing methods, The results can't be obtained from the finished design proposal.

Methodology

The thesis is performed with multiple stages of research, analysis, and design. The output is a design proposal, achieved through an explorative system of three main stages to understand various aspects of working from home. The three stages are Research, Contextual study, and Design development. Along the process, these stages were developed in order, and takeaways were translated into further stages.

Stage 1: Research

The research is a combination of exploration into the need of the project and ways of developing the project. The stage consists of the theoretical framework and research which can be useful for the design stage. Elements related to the workplace and factors required for making the transition into remote working in longer-term are studied.

Stage 2: Contextual analysis

The segment focuses on analyzing the selected site in both macro and micro stages. The stage focuses on proposed development plans by the city and their impact on the site. The analysis acts as base work for the design development phase.

Stage 3: Design Development

The stage is a result of takeaways from the analysis of various elements in the previous stages. The segment explores various possibilities of design development through finding, spatial exploration, and final design proposal.

Reading Instructions

The document consists of six chapters starting, through an introduction to the project and ending with a design proposal. The present chapter explains the introduction to the project and explains the purpose of the thesis. The second stage is research through different methods such as literature studies, case studies, and participant surveys. The third stage explores the impact of the neighborhood and region's influence on the selected site. The fourth stage talks about the immediate surroundings and impact on the site. The fifth stage showcases the exploration of design and form-finding through various guiding factors. The sixth chapter showcases the design proposal developed through the analysis and takeaways taken from previous chapters.

Stage 1
Research

Introduction
Introduction
Aim
Purpose
questions

Research
Work from home
Future of work
Wellbeing and Productivity
Case studies
Survey

Stage 2
Contextual
Analysis

Contextual Study
Region history
Context
Development plans
influence on region

Site study
Connectivity
Site Boundaries
Topography
Views and Scale

Stage 3
Design
developement

Design Development
Spatial Program
Shadow analysis
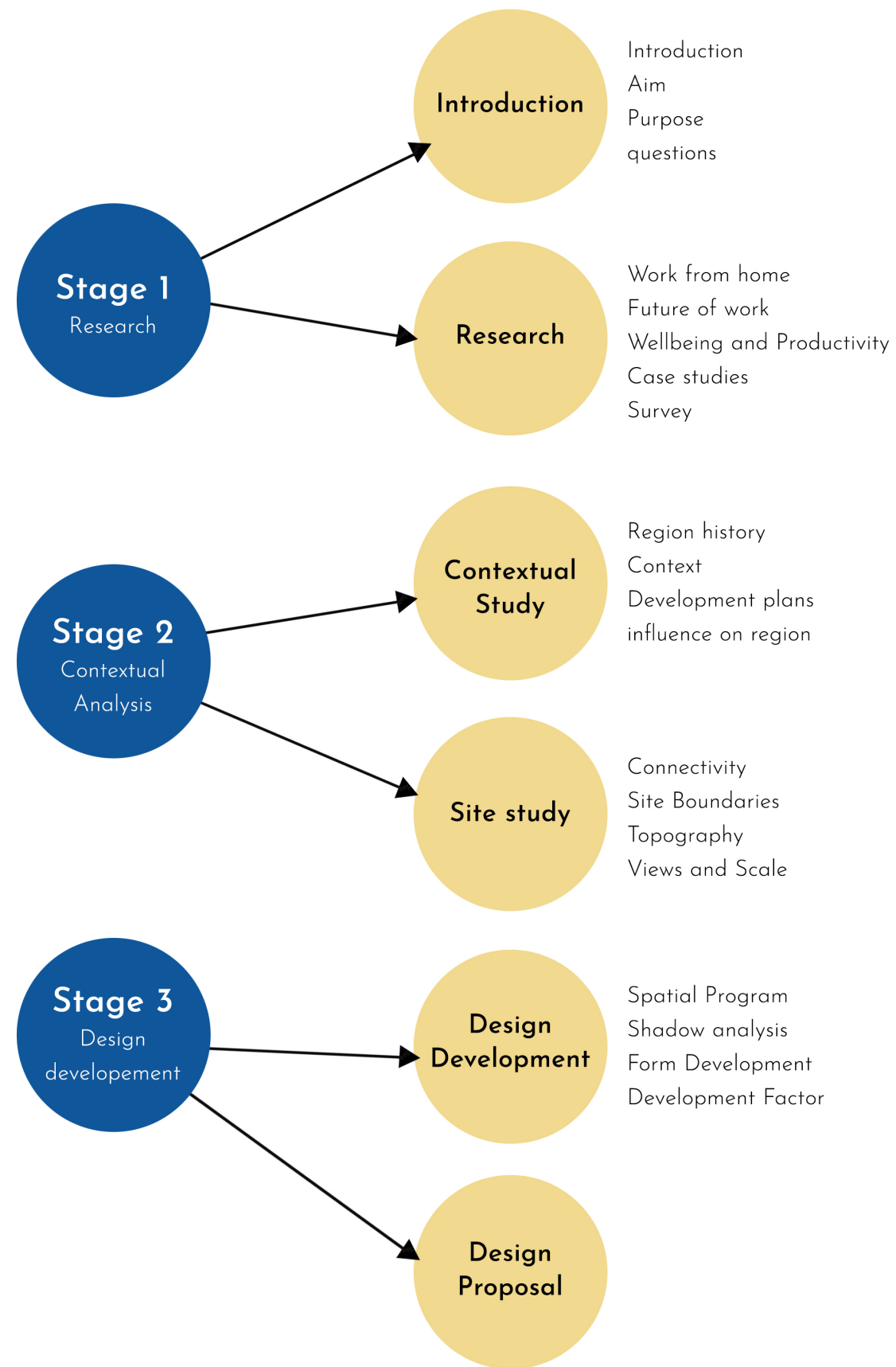Form Development
Development Factor

Design Proposal

Fig 1: Reading Intructions

2 Research

Work From home
Wellbeing and comfort
Casestudies
Hybrid Working

Work From Home

Definition and Impact

Work from home is a scenario wherein employees can carry out professional work from their living spaces. This allows for flexibility concerning hours, commute, and comfort. There is also a chance to maintain a healthy work-life balance and be more productive. Due to these factors, many employees, and employers, prefer this method of working (Team, 2020).

Many people across the globe have shifted their working patterns after the pandemic. The possibility to perform work remotely without attending the office space on-site has given options for post-pandemic working situations. Remote working has mentioned possibilities to attend work from individual homes, cafes, or outdoors (comfortable weather). This leads to the question of whether the existing housing layouts and living conditions are suitable for remote working in long-term situations.

History of working from home

The idea of utilizing the same space for work and housing originated long before the recent IT era. The concept has been in existence before industrialization when people conducted business from home. The utilization of the housing spaces was used to provide services such as selling daily supplies, food, etc. The industrialization has provided people the need to move away from home to work and initiated the start of modern-day working patterns.

The modern-day remote working concept was initially mentioned in the book "Telecommunications - transportation tradeoff", by Jack Nilles as telecommuting. In the late 20th century, technological firms such as IBM conducted experiments of allowing few employees to work from home. Eventually, the numbers increased to 2000 within a few years. The trend got traction by the end of the century with the establishment of new businesses in garage offices set up by entrepreneurs, due to a lack of funds in the initial stages of career. These garage start-ups have now grown into successful businesses, and many continue with remote working (Gupta, 2020).

The working setups constantly evolved in the 21st century giving rise to new patterns of working. The number of people opting to work remotely has seen a significant rise of around 400% in the last decade forcing companies to simultaneously adapt (Butler, 2021).

Future of Work

The recent pandemic has made remote working a necessity over preference across many professions. Even though many employees were not equipped with enough resources for remote working, companies have quickly acted to support this need. This has provided many employers with an opportunity to consider the future working modes as many tasks can be done remotely, thus decreasing the resources required for on-site working spaces.

A survey has been conducted in Sweden about the employees' choices of working mode moving forward post-pandemic among 2055 individuals, in 2020 and 2021.

At the beginning of the pandemic, 53% of the workers were working from home, either part-time or full time. Most people who were satisfied with working from home were homeowners. However, the size of the home has not shown any significant effect on the impact of working from home (Netigate, 2021).

A year later, in a post-pandemic situation, the same candidates were asked for their choice of working among working from home, working from office spaces, and working from both spaces. 73% of respondents preferred to work both from home and office spaces moving forward. The distance to work has some effect on people choosing to work from home, however, the employees chose to work from home and on-site equally (Netigate, 2021).

Considering all factors, in the future, any tasks across different professions which have the possibility to be performed online can be done through remote working. While the tasks or work might vary, the working setups in remote working should be enhanced.

These situations lead to the creation of four possibilities on how the future of work can be envisioned.

Return to office

In this scenario, the employees return to the office spaces identical to the pre-pandemic situation. However, employers and management teams can reduce office maintenance costs by remote working. Hence, this option may not be the best possible choice.

Hybrid

Selective people.

The existing office spaces are reduced to cater to fewer employees physically present while the rest of the employees work remotely. This reduces the cost of operation and yet creates smooth working conditions. However, this might create a divide between the employees with respect to importance and role within the company. Selective days

This option explores the solution where all the employees work remotely on select days and attend physically only during important meetings and/or select days. This provides the physical and social interactions which are important for an effective workspace.

No office

In this direction, the physical offices are abandoned, thus reducing costs in yearly maintenance, and rent. People interact remotely throughout the year, and the environmental impact will be drastically reduced. However, healthy working conditions cannot be guaranteed for each employee since living situations can vary significantly for everyone.

Considering all the above factors, the future of the work environments will preferably be hybrid as it offers the best of both worlds and creates a balance between remote and physical offices (Ro, 2020).
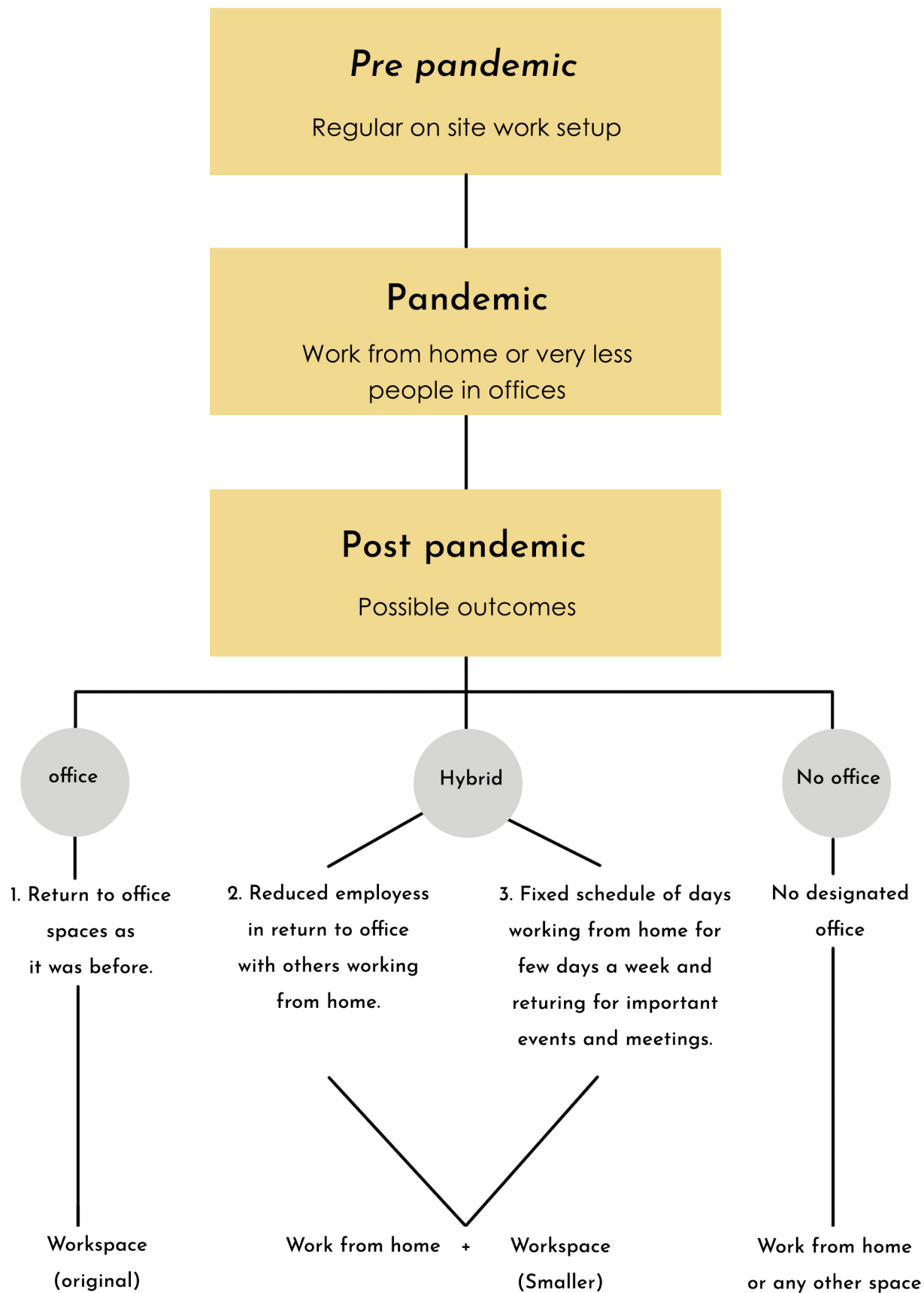
Fig 2: Working patterns

Benefits of working from home or remote working.

The reasons to choose work from home can be several; reducing or eliminating the commute time, adapting personal activities for more flexibility, maintaining the balance between work and personal life, possibilities to follow fitness, less energy and money spent.

Reduction of commuting time

Many professionals spend much time in transit due to office spaces being far away from their residential areas. Moreover, the time to prepare for the workplace, in terms of being presentable and preparation of meals becomes cumbersome. Reduction or elimination of these periods can save a lot of time and energy, along with contributing to a greener environment. The saved time can be reallocated for adjusting personal activities within individual employees' daily lives such as adding a fitness regime, picking up a new hobby, and spending quality time with families (Ipsen, 2021).

Personal work

Many professionals have a hard time managing personal and professional life balance due to on-site work. Remote working offers possibilities to have chores done by taking small breaks during work to break out from stress. This can be beneficial to lower stress, and reduce work that might be put off for weekends, leading to the effective usage of time throughout the week (Ipsen, 2021).

Less consumption of resources

Working from home can lead to a drastic reduction in the use of office supplies, fuel and money used to commute, use of paper and plastic at workspaces, and power consumption. These are beneficial to both the employees and the companies. Along with these, lower usage of fuel and fewer vehicles on the streets have a huge impact on the environment (Sanchi, 2020).

Flexibility

Employees working from the comfort of their homes have more flexibility with respect to work hours, breaks, and space. They are no longer tied to a particular attire or working area, and this can reduce stress and be motivating. There is also an advantage for parents being able to care for their children while working. The flexible schedules and methods can be incentives to retain present employees and be appealing to new recruits (Info, 2020).

Time

Resources

Personal work

Multi Tasking

Fig 3: Advantages of remote working

Drawbacks of working from home or remote working.

However remote working has also many drawbacks such as keeping up with focus, willpower, balancing routine, waiting for instant answers which are possible in on-site working, missing important calls, and slow pace of work.

Lack of tools and focus

One of the major benefits of onsite working is the atmosphere being suitable for work, along with having all necessary tools at disposal. The environment is conducive to motivating and driving employees to work. However, in working from a home situation the possibility of a distraction-free zone may not be guaranteed as living conditions may vary vastly for each employee. Adapting to work from home also requires all essential tools to be available to everyone which might not be feasible in all professions and may incur costs (Mishra, 2022).

Fatigue

Fatigue can be constant in any working scenario (on-site and remote). However, with working from home there are new aspects added to this; the sudden shift was overwhelming and led to major lifestyle changes for most employees. Mental exhaustion saw a rise as well with a lack of work-life boundaries. Spending work time entirely on a device, having consecutive meetings on remote applications, and lack of scheduled breaks, all of this can be causes of increased fatigue (Lal, 2021).

Quality control and motivation

Working patterns and productivity hours vary vastly for every individual. Due to distance and lack of monitoring, employee output may vary, leading to quality control issues. Even though having a common schedule and working hours, employees tend to work overtime. Therefore, creating a space that can motivate and encourage working can increase productivity (Mishra, 2022).

Socializing and networking

Technological advances have made it possible to carry out most activities remotely. However, it does not cater to the needs of human interaction and can isolate employees from each other. There have been many socializing events conducted via online tools and these have been received well. There is still a lack of interpersonal communication and networking opportunities. These factors can affect the relationships among employees and affect mental well-being (Lal, 2021), (Rambhai, 2021).

Focus

Fatigue

Quality control

Multi Tasking

Motivation

Networking

Loneliness

Fig 4: Drawbacks of remote working

The Multitasking phenomenon during remote working

Multi-tasking has been prevalent at the workplace even before the pandemic; switching between several tasks, and working lunch, all of these have been in practice during on-site work. The pandemic has made this common practice a choice. With most professions working remotely, the separation of work and personal lives has been challenging (Schieman, 2021).

One major benefit of the multi-tasking possibility during remote working is the flexibility it offers, to alternate between working and carrying out home tasks (Shan Xu, 2021). Many employees found it beneficial since it helped them complete tasks during breaks and free up time for after-work hours. This balancing act made them feel more productive and happier. It was possible to wash a few dishes or fold the laundry while waiting for an online meeting to start. Looking after personal matters such as banking that is possible only during business hours became hassle-free with working from home. (Schieman, 2021).

There were multiple employees responding to a survey conducted by Social Indicators Research, who had a positive experience with working from home. It gave them extra time with families and children, a sense of freedom, improved efficiency, and a chance to manage household chores that would need to wait until the weekend (Schieman, 2021).

Remote meetings also offer the chance to multi-task, checking on emails or catching up on other work while attending a non-crucial meeting. This is also possible because of the ease to turn off the audio and video settings on remote applications and be unnoticed while doing other tasks. People are more likely to multitask during meetings where they are not essential or present to only listen rather than participate. Apart from this, the overwhelming volume of remote meetings has been the cause of increased anxiety among many, and multitasking during these has helped individuals regain focus and stay motivated (Cao, 2021).

Multitasking has numerous advantages, but it also has some disadvantages. Multitasking, often known as "rapid task switching," can lead to a lack of concentration on any job. Constant shifts in attention can lead to a loss of concentration and productivity. More information must be processed, which might cause the mind to wander between tasks, unable to accomplish any of them. Hodgson (Hodgson, 2020).

The additional tasks undertaken during breaks or during a slow meeting, while being fruitful, have led to increased mental fatigue. Even if it is a small task, the effort to constantly shift and regain focus can be exhausting. While it is individualistic, the pressure to complete all possible tasks simultaneously can be extremely overwhelming and lead to anxiety or high levels of stress (Cao, 2021)

Additionally, while being a part of an online meeting, it can seem arrogant or disrespectful to be engaged in other tasks. Even with the video turned off, it can be noticed when somebody is not paying attention. Remote work also poses the challenge of being easily distracted, by several factors: the doorbell, the

television, caring for children, and cooking, among many others (Cao, 2021).

While being very individualistic, multi-tasking while remote working can have both advantages and disadvantages. It gives one the flexibility to work as they wish but can also lower productivity. It is important to have separations between tasks, to be able to focus and stay motivated. This can be brought about by having boundaries between work and personal spaces.

Survey Questionnaire

A digital survey has been conducted by the author among 35 participants of different age groups and occupations, to understand their perspectives on different aspects of working from home. The majority of the participants belong to the age group of 20-30, and 30-40 being the second highest.

The overall understanding of the results is that many agree it's hard to divide personal and professional life during work from home. Many participants prefer having a dedicated space or area for working.

Many participants highlighted the positive effect of remote working. However, some issues should be addressed and a possible solution is needed moving forward.

The majority of the issues mentioned by the participants are:
• Distraction,
• Motivation
• Less interaction with colleagues or isolation.

Further questions are placed in appendix.

A common working spaces description was provided and the following question of

Would you prefer to work in common spaces of the housing? (in general)
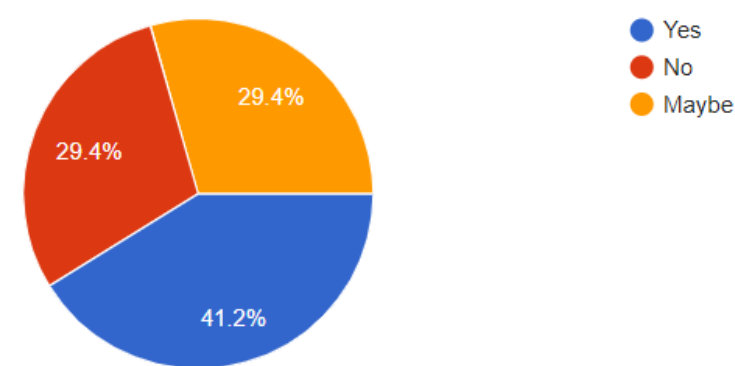
34 responses

Fig 5: preference of working

Problem Finding

The Majority of the drawbacks during remote working are analysed and possible methods to tackle them are outlined. The analyzed solutions are classified into two major categories of well being and productivity. Further research is done on directions to improce the productivity and wellbeing of the user in working and housing environments.
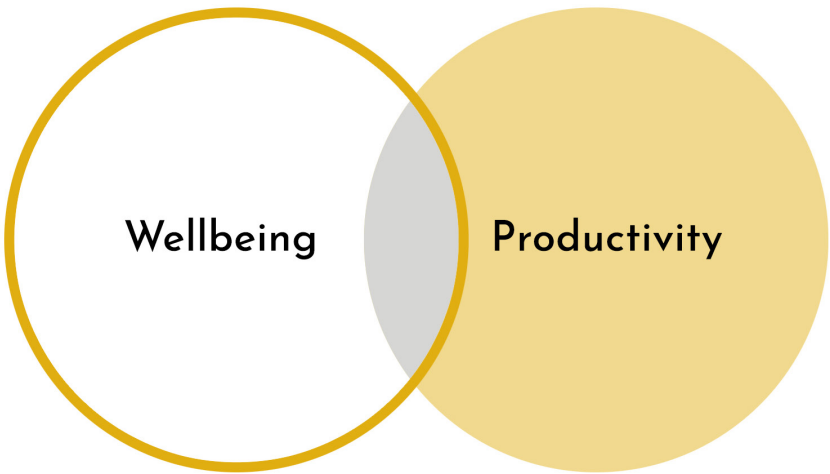
Fig 6: Link between drawbacks and research

Elements which effect positively for wellbeing and Comfort

Work from home has many setbacks and the existing housing layouts may not be efficient for this setup. Many elements need to be addressed for the betterment of remote working patterns. The major issues in remote working are well-being, productivity & social ties. Some elements that can be used to enhance the aforementioned aspects are investigated here, along with ways to integrate them into the design proposal.

Daylight

Daylighting has been linked to a better mood, higher morale, less weariness, and less vision problems (Robbins, 1986). The quality of light can improve worker performance and productivity in office, industrial, and retail settings. Companies have reported a 15% boost in staff productivity after relocating to a new building with better daylight conditions, resulting in significant financial gains (Edwards, 2002). Another study found that higher levels of contentment with lighting conditions (both natural and artificial lighting) correlated to environmental satisfaction, which in turn led to higher levels of work satisfaction (Veitch, 2008).

In addition, access to ample daylight can also lead to healthy environments for users (Martins, 2014). Naturally well-lit spaces can avoid sick building syndrome effects and promote the mental health of the users (Meehan, 2019).

The Daylight factor values for offices and houses might be the same with each level of performance (bronze, silver, gold), but differ within as the level of performance increases. Therefore, the percentages to be followed in working planes in remote working conditions should also be placed according to suitable daylight conditions and minimum DF values.

Spaces	Bronze	Silver	Gold
Housing	DF >= 0.8%	DF >= 1%	DF >= 1.3%
Premises	DF >= 0.8%	DF >= 1%	DF >= 1.3%
Work places in halls and trade focal Points	DF >= 0.8%	DF >= 1%	DF >= 1.3%

Fig 7: Df values in different contexts (Miljöbyggnad)

Biophilic Design

The desire to feel connected to nature, known as biophilia, is innate in humans. Individuals' neurological, physiological, and psychological responses to contact with nature result in reduced stress, decreased blood pressure, enhanced relaxation, happy emotions, and increased concentration. Biophilia has several benefits including reduced illness, absenteeism, and presenteeism, higher retention, enhanced job performance, and reduced stress and exhaustion (Graham Lowe, 2020). While biophilia can be expressed in design in many ways, the aspects of usage of timber and placement of plantation is chosen based on context for further research.

(i) Timber

Timber is a natural material and its usage in construction material increases the proximity of user to the natural element. Using wood as a construction material has many benefits other than the above-mentioned in biophilic Design.

Coronaviruses on wooden surfaces can last up to 12 hours, whereas the viruses multiply for up to 96 hours on surfaces consisting of plastic, stainless steel, glass, and masonry (Konrad Domig, 2020).

Utilization of wood as a construction material can maintain a humidity range (40-70 percent) for extended periods of time. This can assist in minimizing the transmission of bacteria and viruses, as well as allergic irritations (Enso, 2021).

Therefore, the usage of timber promotes healthy living spaces. This aspect is especially vital moving forward considering the increased usage of housing spaces as faced during the recent pandemic. The housing typology needs to be enhanced in terms of healthy spaces for a better and resilient stance for the future.

(ii) Plantation

The percentage of time people will be spending indoors might be increased due to remote working. Therefore, indoor environments might have to be enhanced for long time usage.

Indoor plants have been discovered to have a subconsciously beneficial effect on task performance, health, and stress levels. Indoor plants can act as air purifiers; they are a great way to lower pollutants indoors and lessen human exposure (Deng, 2018).

Moreover, indoor plantation can also improve acoustic properties of a room by reducing echo and travelling of noise in open plans, providing better privacy (Marinova, 2019).

Therefore, utilization of natural materials, accessibility and connectivity to nature can have a positive impact on mental and physical health and have less negative impact on environment.

Acoustics

"70% of office workers say they would be more productive if their offices were less denoisy" (Partners, 2007).

A number of things influence workplace productivity. A significant aspect of this is sound, or acoustics. It's critical to keep noise levels under control as we move away from segregated worker zones and toward more open floor patterns. The sound levels in open workstations were found to be between 50 and 70 dB, and sometimes even higher. For comparison, traffic noise at 85 decibels can be compared to this. (Fitzgerald-Redd, 2016).

While noise levels of 85 dB or greater are required to cause long-term hearing impairment (Association, n.d.), office workers are not exempt. A large workplace frequently has a noise level of about 50 decibels (Day, (n.d.)), which is not only enough to cause huge distraction, but also may result to employees wearing headphones and turning up the volume, which can end up causing hearing problems if the volume is loud enough to drown out office noise.

The collaborative open plan layouts have the benefits of better interaction and communication. However, they also pose limitations in terms of acoustics, by producing reverberation and echo, as open plans have unobstructed volumes. (Vorm, 2021).

To improve productivity, it is important to maintain segregation in open collaborative environments by acoustic and spatial interventions. This will avoid employees being provided with irrelevant information from their surroundings and getting distracted (Partners, 2007).

Techniques and solutions for better acoustics in offices (Green, 2019):

- Acoustic panels.
- Introduction of plantation.
- Organization of floor layout avoiding long uninterrupted volumes.
- Separate rooms for meetings and machinery.

Sound Pressure Levels (dB)	Source	Subjective Response
Safe Range*		
0	No sound	Hearing threshold
10	Rustle of leaf	Faint
20	Buzzing Insect	
30	Quiet Whisper	
40	Quiet Office	
50	Window Air Conditioner	Moderate
60	Conversation	
70	Freight train	
80	Computer print room	

Fig 8: Sound ranges of different Activities (Council, 2018)

Color

Color can play a role in impacting mental health and must be considered while designing working and living environments. Color psychology considers the effects of colors on productivity, emotions, and behavior that might be useful considering the longer times spent in homes in remote working setups (Cherry, 2020).

Different colors have been found to have different effects on the emotions of employees that can influence the work environment and hence either promote or hinder productivity (Mandie, 2018).

Blue

When employees are required to do challenging tasks, blue in the workplace might help them relax and focus. To strengthen cognitive process and boost worker productivity blue can be a great choice to maintain a peaceful state of mind and improve attention to detail (Mandie, 2018).

White

White might be the color of least positive effect for a workplace. It can give an impression of being in a medical examination space that can have a negative influence on people's moods. White is said to impair productivity and give off a cold, alienated vibe, according to studies. If it must be used, white should be utilized only as a finishing touch (Vozza, 2015).

Orange or Yellow

These colors are often associated with, and stimulate, creativity and positivity. When employed in an office space, yellow can inspire original and fresh ideas from employees in several creative areas (Mandie, 2018).

Red

Red is a color that can energize people, particularly those who work in physically demanding vocations. By raising the heart rate and even generating a modest rise in blood pressure, red can influence the ability to do physical tasks. Red can also be a great aid for drawing customers' attention to marketing messages (Mandie, 2018).

Green

Depending on its shade, green can evoke both positive and negative feelings. Painting the office in a calm tone of green could help employees unwind and feel more comfortable (Mandie, 2018).

Casestudies

The case studies have been selected based on the different typologies of spaces that will be accompanied by the project. The elements which have been observed as a positive inspiration within these projects will be mentioned. A brief description of these inspiration elements is also mentioned for better understanding.

Inspiring elements and explanations

Spatial organization
Connectivity with different spaces with varying privacy levels in a harmonious manner is very important. Especially between two different typologies of spaces. The organization of spaces plays a crucial role in these scenarios for better functioning

Social Interactive elements
Striking the right balance between healthy spaces which promote interaction is very crucial. The possibility to create spaces that have spontaneous meeting areas without affecting access and surrounding activities.

Access
Access to different typologies of spaces with unique and calm characters is important. The intervention or design element affecting can be of different scales. However, the impact created should be on a positive note. This can be creating bright entrances which are welcoming and create a safer feeling to access. The private entrances can be accompanied by smaller volumes.
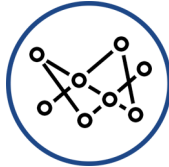
Outdoor connectivity
The connectivity to outdoor areas is very crucial. The connectivity can be either visual or a path to reach outdoor spaces. The path leading to outdoor spaces should have lesser barriers to create a sense of openness as we move towards the outdoors. The visual connectivity to the outside and nature can be a healthy proposition.

Sustainability design elements
Sustainability has a major role in designing buildings. The design development and planning phase should include sustainable outcomes. This allows and helps in decision making along the design process which will in turn help in saving energy spent during various stages of construction such as acquiring materials, construction, and maintenance stage.

Usage of levels
Levels can be integral and a fun way of planning activities, especially when dealing with activities of different uses and privacy levels. Maintaining a visual connection to create vibrancy between spaces and establishing separation for privacy and transition

Spatial Organization

Interactive elements

Access

Outdoor Connectivity

Sustainable design

zones can be a useful factors. Specific care should be given to spaces' universal accessibility when dealing with different levels.

Common activities
The effective usage and placement of common activities zones can transform spaces into lively and well-functioning areas. The vibrancy created by the usage of many users can promote a sense of safety. The balance should be achieved between maintaining comfort for the users and not creating spaces with chaotic spaces which hinder productivity or comfort in surrounding spaces.
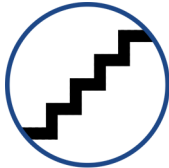
Color
Color usage can be a very important element in determining the mood and energy of the users in a space. The color combination will be detrimental in establishing the qualities of the activities in space. The functions designated to certain spaces can be well executed if chosen colors can complement the space for better mood and productivity.

Materiality
The materiality of the spaces can affect the users' mental and physical well-being. The proximity to natural elements will benefit productivity and promote healthy spaces.

Volumes
The usage of volumes of spaces can be useful in experimenting with privacy levels of various functions. While relative public functions can be benefitted from bigger volumes, the smaller and human-scale volumes can create comfortable and private spaces.

Levels

Color

Materiality

Volumetric changes

Fig 9: Takeaways from casestudies

Qvillestaden Apartment Building / Bornstein Lyckefors

Numbers
Location: BRÄMAREGÅRDEN, SWEDEN
Architects: Bornstein Lyckefors
Area: 8453 m²
Year: 2018
Typology: Residential

Inspired by the "Landshövdinge-houses", a classic structure in Gothenburg that combine a brick ground floor and two to three levels of wood, Bornstein Lyckefors has designed this apartment building to suit the current development trends (Pintos, 2020).

The timber facades were replaced with sheet metal, the block's facades with brick, and the upper stories with corrugated zinc. With the segmented blocks and color schemes, the building established a link between the conventional closed-block structure and a mid-block division. Each section also has a separate balcony railing, which when combined with minor design alterations makes for a variation in the landscape by reducing the volume (Pintos, 2020).

The design of the courtyard is made to be the opposite of the busy city streets. The shared spaces including the terraces, common balconies and the courtyard are positioned to receive the maximum sunlight possible. The goal was to design efficient plans with good lighting and a vibrant social environment (Pintos, 2020).

The circulation cores are extended into the courtyard acting as an aesthetic element and yet not disrupting the generous volume of the courtyard. Material usage of wood acts as complimenting element in the courtyard spaces contrary to steel and brick usage towards the street facade.

Takeaways:

Outdoor Connectivity | Interactive elements | Materiality | Color | Access
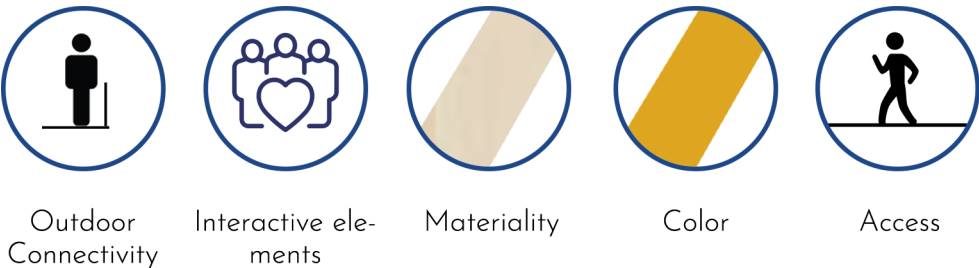

Fig 10: Picture overlooking residential courtyard (Bornstein Lyckefors, 2018).
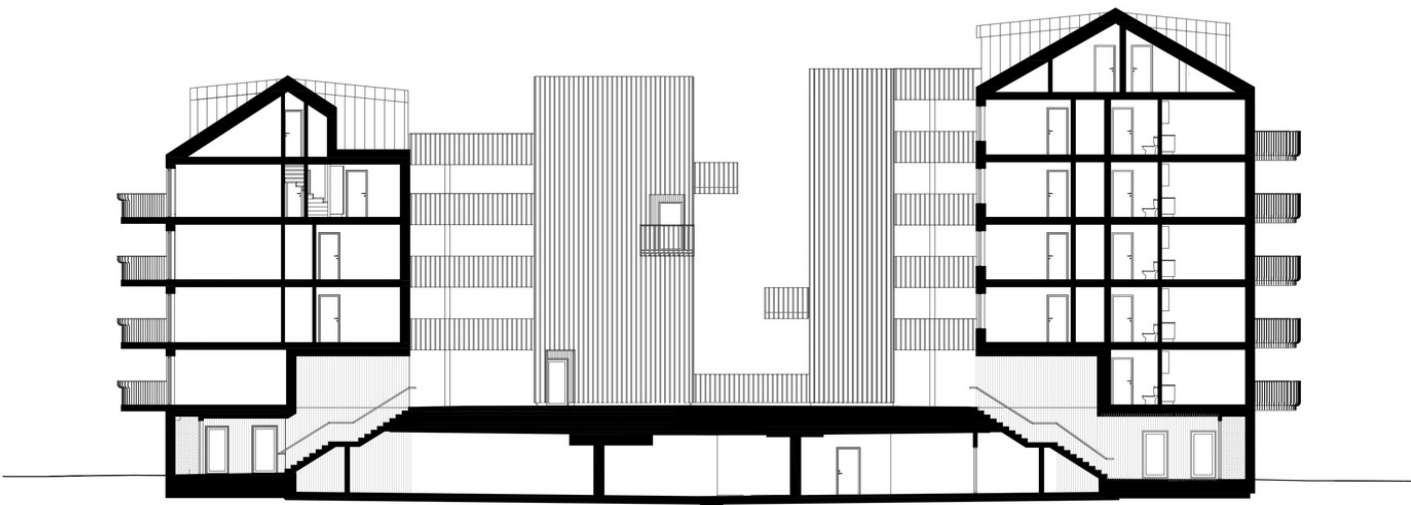

Fig 11: Section showcasing usage of levels for services and courtyard (Bornstein Lyckefors, 2018).

Happyworks Working Pod

Numbers
Location: KOLKATA, INDIA
Architects: Abin Design Studio
Area : 93 m²
Year : 2021
Typology: Office

Early 2020 brought an unprecedented change in working conditions, with remote working becoming an absolute necessity. This forced the design of new workspaces depending on professional requirements. Companies accepted employees working remotely for extended periods and used existing office spaces only for essential collaborations. The HappyWorks working pod is one such design that rapidly adapted to this new working environment (Abdel, 2022).

The responsibility of customizing living units for addition of workspaces falls on the employee and this is not a possibility for all. The working pod provides an alternative to this situation to all those who aim to have a formal working setup over making temporary changes in their housesAbdel, 2022).

There are a variety of workstations in the pod, ranging from spaces for individuals to small teams. To enable a stress-free environment, there are indoor screening areas, a cafeteria, an outdoor courtyard, and an amphitheater. These spaces are well-connected and allow employees to navigate easily through them. The natural illumination in common spaces and the open courtyard lets individuals enjoy the outdoors while creating opportunities for social interactions (Abdel, 2022).
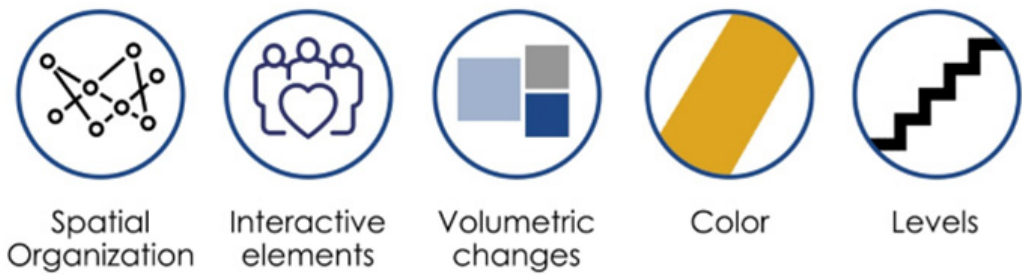
Takeaways:

Spatial Organization   Interactive elements   Volumetric changes   Color   Levels

Fig 12: Picture towards the entrance volume (Abin Design Studio, 2021).

Fig 13: Open working layout (Abin Design Studio, 2021).

Exploration of hybrid working

After the exploration into the various aspects of remote working and working patterns, hybrid working is chosen as the most suitable way to move forward. Therefore, different possibilities within hybrid working are mentioned.

The housing unit of every employee and the office space are the two major elements of the hybrid working pattern. Post pandemic the office spaces might need subtle changes and renovations to host multiple meetings and interaction zones. However, the majority of the changes are needed in the housing typology as the existing housing layouts are not suitable for working from home in the longer run.

While few might have made subtle furniture and organizational changes and renovation, it's not a possibility for many to include them. These can be due to various factors such as space unavailability, no privacy within housing layouts, or lack of funds.

Moving forward, remote working can be possible in the long term without compromising the health and productivity of users, by a combination of three possible changes.

1. Working area or Room within a housing unit

- Sets the working environment
- Helpful for handling house chores
- Provides possibilities for privacy

2. Common workspaces within the building.

- Promotes social ties with neighbors
- Possibility to meet people from different professions.
- Alternative to the stagnant atmosphere within individual housing.
- Tackles loneliness
-Separation between workspaces and personal spaces.

3. Working space for the neighborhood.

- Interactive working area for people who don't have the suitable work from home setup.
- Improves social ties within the neighborhood.
- Possibility to meet people from different professions.
- Alternative to the stagnant atmosphere within individual housing.
- Tackles loneliness
-Separation between workspaces and personal spaces.
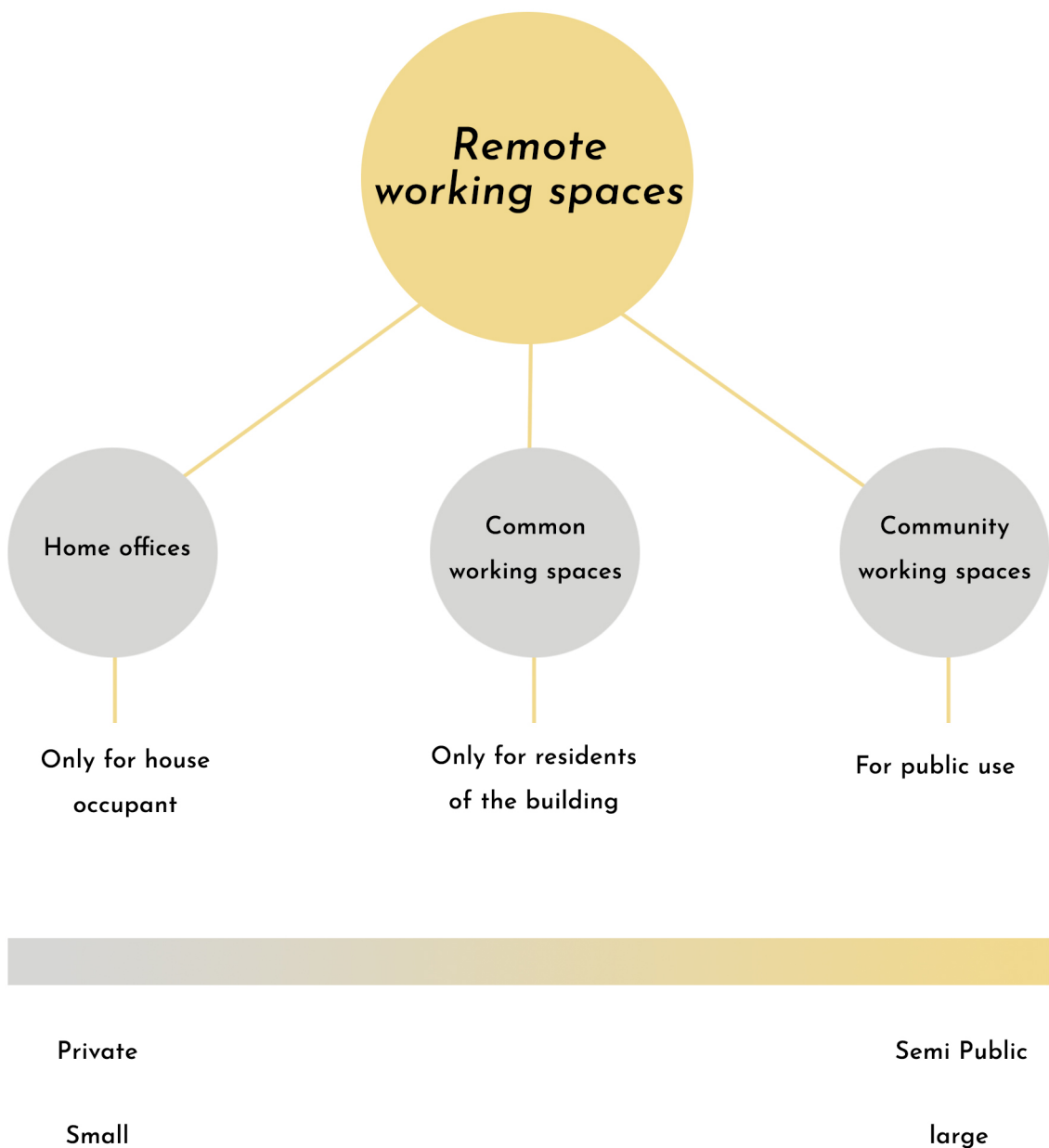
Fig 14: hybrid working possibilities

3. Contextual study

Context Study - Macro
Development plans influence on region and site

Context Study (macro)

Region and history (Masthugget)
The harbor of Gothenburg until the 17th century, Stora Hamnkanalen, was affected by a landslide rendering it unusable. This gave rise to a new port, presently Masthuggskajen. The name "Masthugget" itself comes from the manufacture and shipping of ship masts to mast harbors. The establishment of the new harbor led to the development of new buildings and warehouses, along with housing, upwards until the mountains (Masthugget, (n.d.)).

During the 18th century, the Masthugg area developed into one of Gothenburg's first suburbs. Later in the 19th and early 20th centuries, there was a rise in construction of buildings in the Masthugget area, from governors' residences and wooden dwellings to the houses seen presently. The older Masthugget continues to be a working-class neighbourhood of shipping. The community was known for its unity (Masthugget, (n.d.).

The present day Masthugget consists of various typologies of structures ranging from housing, commercial, industrial, and public interaction zones.

Site Boundaries and context (macro)

The Masthugget district is located on the western part of Gothenburg. It shares boundaries with Stigberget and Haga towards the west and east respectively. The Stigberget and Majorna on the west have many residential buildings. The Masthugget district shows the gradient change of the typologies from mixed use to residential respectively from east to west. The region acts as a transit zone between districts on the western side of the city and city center.

Fig 15: Masthugget and surrounding districts

Development plans influence on region and site

1.River City Gothenburg

The city is undergoing a substantial transformation in terms of its development plan, which will open new opportunities in the areas of housing, office space, and public interaction. These improvements are mostly part of the Gothenburg River City concept and proposals for inner-city development (Stad, 2012).These plans aim to enhance housing capacity by more than 9000 units by 2022 and build 15000 new dwellings between 2022 and 2035 (Stad G. , Development Strategy Gothenburg 2035, 2014).

The selected site is in one of the areas of focus within the river city project. It is located on the edge of the inner city and proposed river city project.

NEW HOMES: EAST

FORECAST UNTIL 2022	500
EXPANSION POTENTIAL AFTER 2022	500

CENTRUM

NEW HOMES: WEST

FORECAST UNTIL 2022	700
EXPANSION POTENTIAL AFTER 2022	2 500–3 000

NEW HOMES: SOUTH

FORECAST UNTIL 2022	2 500
EXPANSION POTENTIAL AFTER 2022	1 500–2 500
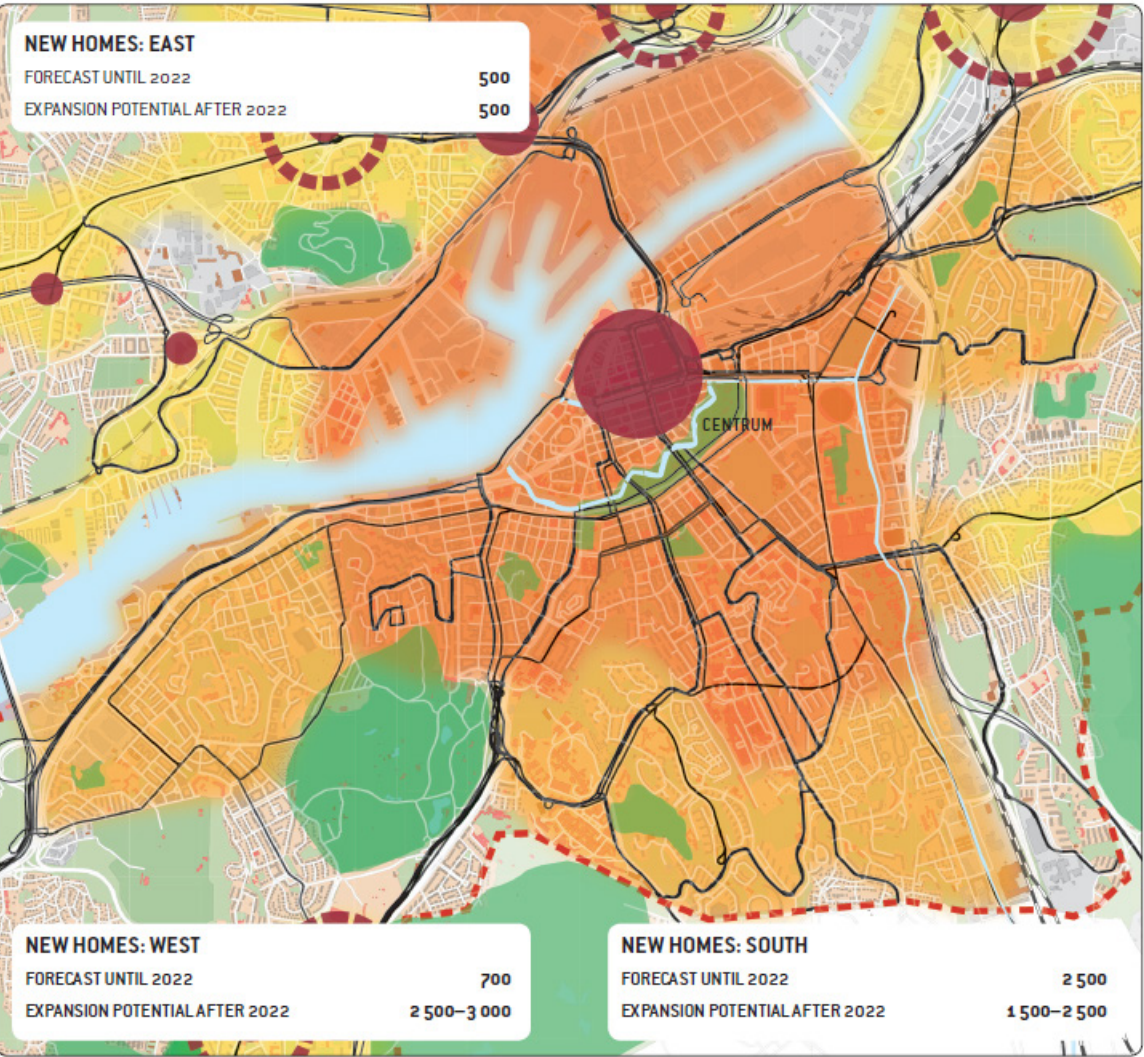
Fig 16: Gothenburg development plan (Stad G. , Development Strategy Gothenburg 2035, 2014)

A sustainable region

With the development plans, Masthuggskajen will be an area where people can interact and have fun, rather than just a district used for cars and parking lots. Socializing is also possible in the district's latest parks on Masthamnsgatan, for people of all age groups (Stad G. , Masthuggskajen - staden växer västerut, 2019).

The goal of life on Masthuggskajen, is to make sustainability simple and this has led to major investments in lanes for pedestrians and cyclists, public transportation, parking areas and alike. The aim is to bridge the gap between the old and the new, the large and small scales, local and global vendors, and a mix of street life and culture (Stad G. ., Masthuggskajen - staden växer västerut, 2019).

The Detailed plan

The city of Gothenburg is aimed to be more unified in terms of its social and spatial aspects, and the goal of the Masthuggskajen plan is to facilitate this. A new high-density district with three distinct routes will be developed; one along the river, one that extends Linnégatan down to the water, another that extends Nya Allén's green route more west. In the internal eastern parts, there are higher buildings, and subsequently the structures descend towards the harbor and west along Första Langgatan. Around 1,200 residences, along with stores, offices, and companies, are included in the project (Stad G. . Masthuggskajen - staden växer västerut, 2019).

Personal Observations

- Majority of the district in the present day is used for industrial purposes
- Residential connectivity both physical and visual is evident
- Scope of development for new structures and connectivity to nature.

Fig 17: Proposed development of Masthuggskajen (Stad G. , Masthuggskajen - staden växer västerut, 2019)

4. Site study

Connectivity
Site Details
Views and Scale of neighboring structures
SWOT analysis
Summary and takeaways

Connectivity

The site is located on the edge of the masthugget district and very close to Mast-huggstorget tram station. It has close proximity to the river. The region is very close to the majorna and stigbergets district. However, it is very close the stigberget district, especially to the residential area. It is also in 10 min walking distance to the residential neighborhood of Majorna district.
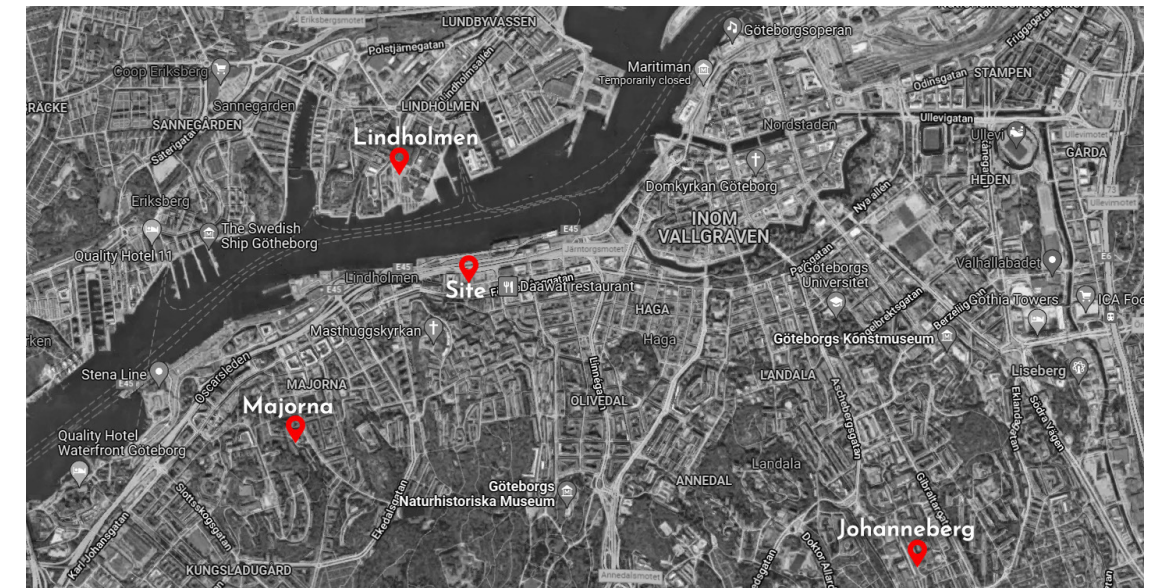
Fig 18: Site location in relation to city of Gothenburg

Fig 19: Site connectivity to residential part of neighborhood (10 min walking radius)

Site Details

The site shares immediate boundary with an office building on the western side and a parking lot and shipping building on the eastern side. The northern side has highway passing on the immediate boundary. However, this highway is under proposed change into an urban street which provides better connectivity to the river and more pedestrian friendly. The southern edge has a parking lot. The site is relatively flat and with minimal slopes towards the river (from the south to the north side)

Site area: 5443 sq. m
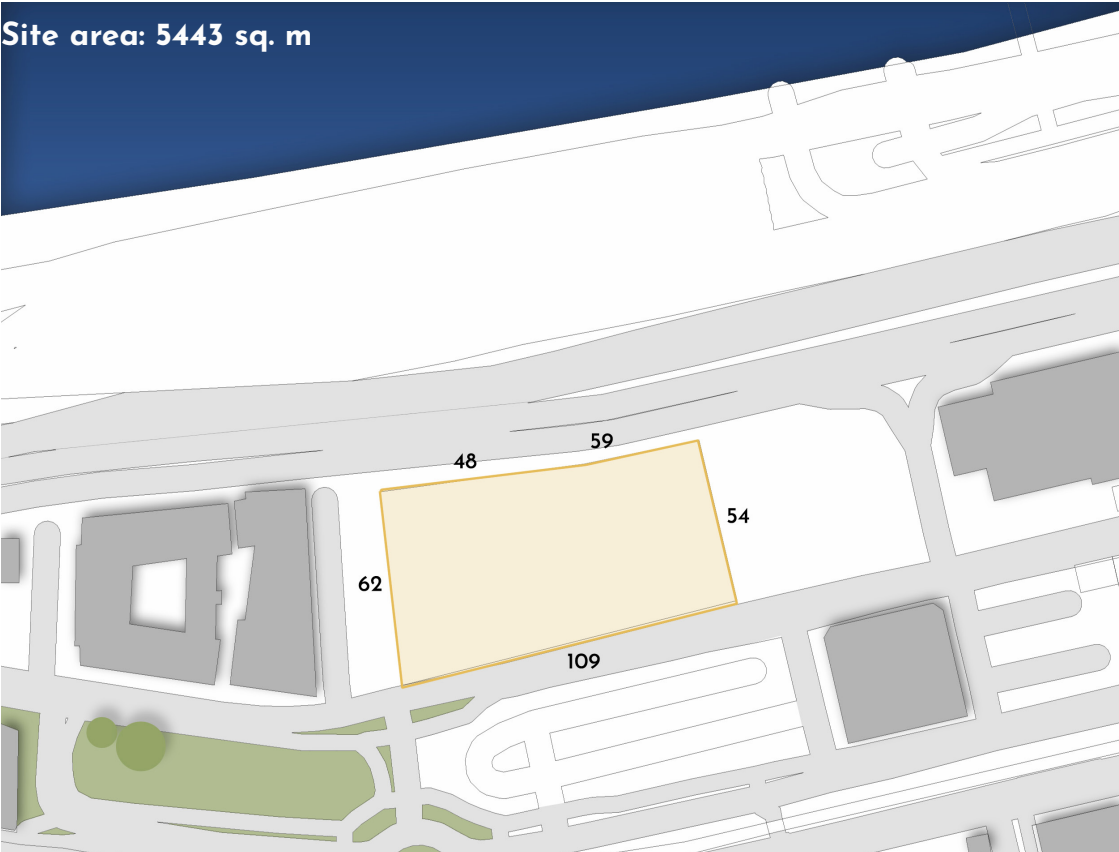
Fig 20: Site boundaries

Fig 21: View overlooking parking and industrial buildings

Fig 22: View overlooking the office building and highway

Views and scale of neighboring structures

The site is visually well connected to the residential areas of Masthugget and Stigberget. Majority of the buildings in the vicinity are around 7 stories high. Most of the views towards the south focus towards the residential blocks and the skyline is positively affected by the church on top of the hill.

The visual connection towards the river is completely blocked by the highway at the ground level on the northern side of the site. The barricades placed for the safety further affect this cause. However, the height of these obstructions will only be affecting on the base floor.

The view towards the eastern side of the site consists of industrial buildings and parking lots. The height of the buildings is relatively like the residential blocks in the vicinity. However, these blocks might be replaced in the proposed development plan of the region.

Fig 23: View Overlooking the Masthugget hill.

Fig 24: View towards water blocked by highway

Fig 25: View overlooking highwayon the northern edge

SWOT analysis

Strength

- Residential neighborhood connectivity.
- Good accessibility.
- Unblocked view towards the river.
- Access to public transport.

Weakness

- Currently only residential block on this side of road
- Noise pollution
- Mostly deserted during the nights

Opportunity

- Under many developmental plans
- The location can postively influence any commercial activity planned within the proposal as many travelling from the western suburbs pass from the site while travelling to central city.
- Connectivity to various natural aspects can be established.

Threat

- Drastic change in activity and number of people around the site during day and night.
- Neighboring construction proposals might be delayed, causing isolation of the structure.
- Harsh winds

Summary and takeaways from context & site
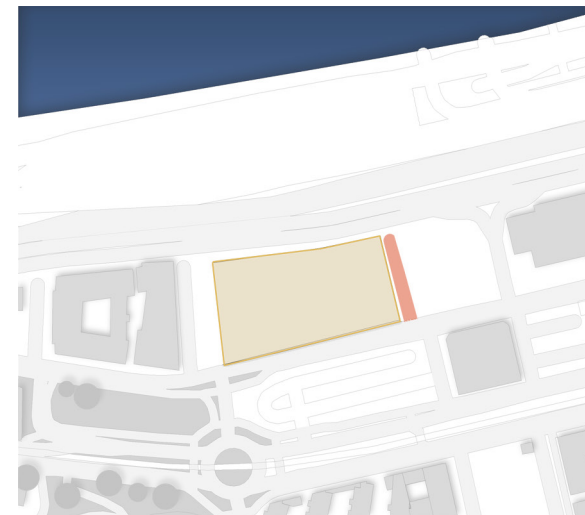
Fig 26: new access road

New road connections

It is intended that the road network be strengthened in the future, allowing access to the site from the eastern side. This might be a huge plus when it comes to designing distinct entrances for various typlogies.
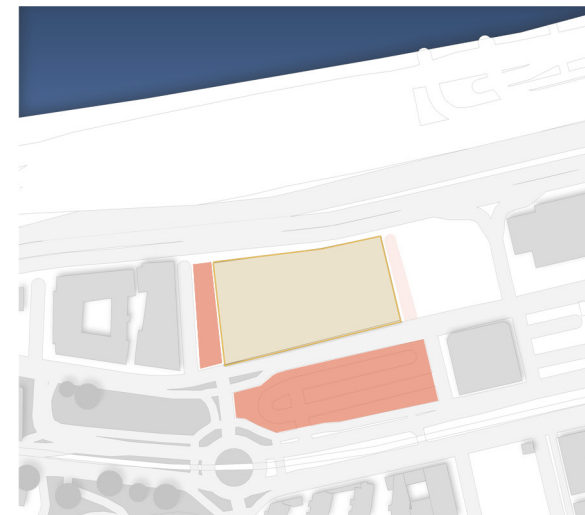

Fig 27: parking zones

Parking areas

The site has adjacent public parking spots to wards the west and the southern edges. These spaces can help valuate the need for parking spaces within the site for the residents and users. The existing parking spaces can be helpful for both residents and visitors.
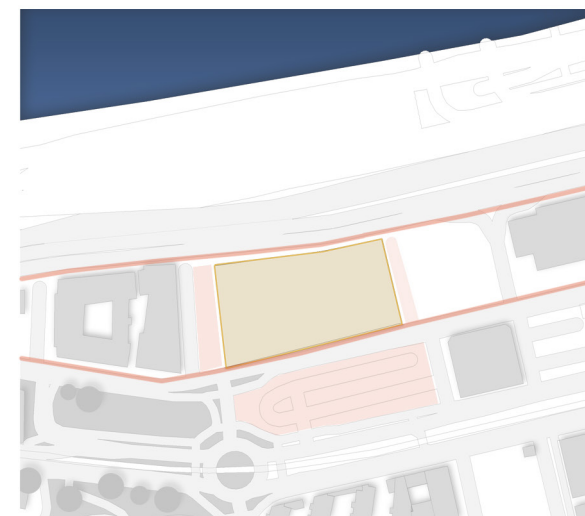

Fig 29: possible retail areas

Pedestrian access

The existing infrastructure for pedestrian access is very minimal. However, the new development plans aim to create pedestrian-friendly and vibrant street spaces. This includes positive reinforcement for the access routes on both the southern and the northern edges of the site. The increased footfall can be catalyzed and utilized for well-suited functions at the base level.

5. Design guideline and evolution

Spatial program development
Form Finding through solar analysis
Form Development
Design Guiding factors

Spatial program

The major issue from working from home is staying in the same spaces as the living conditions. Therefore, the possibility of flexibility for places to work within the building as you stay provides options for the individual. These options may have varying types of uses, privacy levels and services. These spaces act as alternative working spaces and create a possibility for difference between place of stay and place of work. The physical difference between living spaces and working spaces are important as they cater to different needs in daily lives. The separation created for working spaces plays a huge role in avoiding carrying of fatigue and work stress into the personal spaces.

Places of work
Based on research done through literature, case studies and personal analysis, three different spaces of varied scales are proposed for working spaces within the same building of housing for employees for remote working.

Working zone within house (private)

The designated zone for working within the apartments itself for shorter working times and meetings. The designated desks will cater to comfortable seating options and promote healthy standards for working in longer term. This will avoid poster and other health issues which might occur due to lack of proper seating. The desk will also be placed in areas with proper daylight and have different material and color usage to create different atmosphere relative to other areas within the housing. In the larger apartments, this smaller working zone can also be replaced by secondary room.

The working zone is also placed in proximity with the kitchen spaces, creating a possibility for the people who might prefer multitasking.

Common working areas (semipublic)

A common space within each floor, which is designed for different working needs of remote working. This space caters to various activities during working hours such as private spaces for meetings, working desks for daily tasks and responsibilities, interactive stair seating for casual or informal approach to working and flexible desks for attending work through either sitting or standing.

The common spaces for work act as source of interaction and aims to address the issue of lesser networking options through remote working. It also helps employees to avoid loneliness and possibilities to strengthen ties with neighbors.

The common working areas also help employees adjust balance between personal and professional roles during remote working, due to the proximity to apartment. The common spaces will also have good daylight access and view towards water body. The connection towards nature is also helpful for various aspects sucha s reducing stress and helps employees relax as they might spend considerable amount working hours during the weekdays.

Side hustle or secondary jobs are pursued by a few during the weekends or after work hours. These common spaces can be helpful in this scenario, considering privacy and focus required for performing tasks. The interactions possible through these spaces can also promote various networking possibilities for professional growth.

Neighborhood level working zone (public)

Many of the existing housing blocks or apartments may not be having suitable working conditions for its users in a longer term for remote working in this area. The neighborhood working area promotes a working space for people who want to have a formal working approach while remote working. The proposition can be attractive to people within the residential part of the neighborhood. The minimal walking distance (10 min) has many residential establishments, and its users can be benefitted through this.

The working zone offers working spaces of different privacy levels and spaces suited for different activities of daily working schedule. The spaces also have an interactives zone, quite zone, and play areas to cater the needs of different professionals working in this space.

The working zone offer possibility of interaction across various professions and multiple networking opportunities, while maintaining balance between interaction and privacy needed for work.

Places of housing

Apartment A
The layout is of a two-room apartment with balance between living and working area. The plan includes all the functions of an apartment such as kitchen, living areas, bedroom, and balcony with view towards the water. The layout has designated workspace within the apartment in access to living room and kitchen. The size of the apartment is chosen to balance financial and occupational density within the whole building. The smaller apartment is suitable for people in mid and early stage of the career, making it feasible for younger citizens to stay close to the center of the city.

Apartment B
The layout is for a three-room apartment with possibility for transformation into a four-room apartment. The layout includes balance between open and private spaces. The spaces include a kitchen, living room and dining spaces, and two bedrooms (master bedroom and smaller bedroom). The smaller bedroom is majorly for children. However, the smaller room can be utilized as a working room.

Places of interaction

Green house
The greenhouse can be source of major interaction within the proposal. The access to the green house can be through multiple spaces surrounding the green house at the base level such as community working spaces, café and a small preschool. The idea of the green house is to an interactive space which promotes networking

and hosts activities of various kinds. The covered space with access to daylight and planation will create a vibrant and collective environment.

Café
The café will be inviting factor for various people into the proposal. The idea offers relaxation opportunities for the people working within the community working areas. In addition, the café also extends as an alternative to the place of work.

Gym
The aspect of working daily from desktops and laptops during majority of the day can create health issues in long term. The possibility to include a workout space for the residents of the building can promote healthy breaks in between or after work. The gym spaces can also promote interaction within the residents.

Common laundry room
The common laundry room serves an important daily function. The aspect that the ground level has many public functions, should be considered in placement of the room, while maintaining the ease of access for residents and maintaining privacy from other functions.

Bicycle parking
The bicycle parking spaces can be placed in the base level, with easy access from the street level. The spaces will be provided with day light for repairing bikes and creating vibrant common areas.

Retail spaces
The retails spaces will act as a source of break and will be promoting interaction of the project of the whole with the neighborhood. The function caters to the proposed pedestrian and shopping friendly areas of the neighborhood in future and familiarizes working zones for the community to the city. In addition, the retail front will help in maintaining the balance between the financial aspects of the project.

Storage
Storage units for each residential unit will allow possibility of having a safe space for having excess material. This can be helpful in considering the apartment sizes and open plan for better daylight and lesser obstructions.

Form finding through solar analysis

Multiple forms have created with basic massing volumes to understand the effects of shadows on the site and the building. The Aim of all these options was to have maximum apartments facing the sea and daylight into the housing units.

Shadow projected by each option is analyzed from 12 different instances along 4 different days of the year. (Solstices and equinoxes). However, based on shadows and expected spatial usage, option 2 and option 3 have a better direction moving forward.

Fig 30: form 1
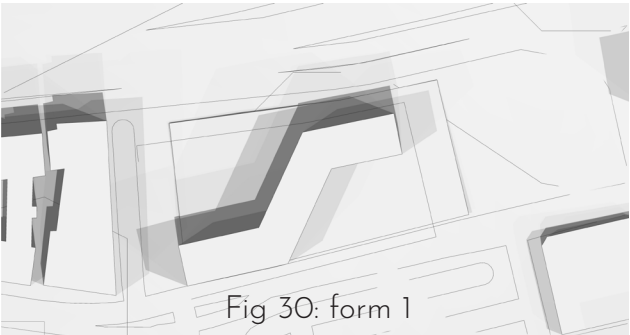
Form 1

-Courtyards not shaded
-Double loaded corridor
-Long facade not exposed to direct sunlight

Fig 31: form 2
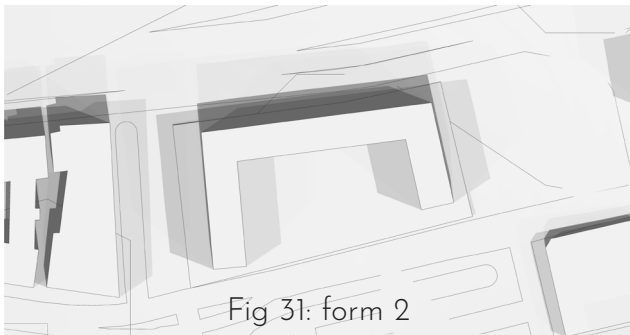
Form 2

-Courtyards not shaded
-Half of the apartments not facing sea
-wind protection for courtyard

Fig 32: form 3
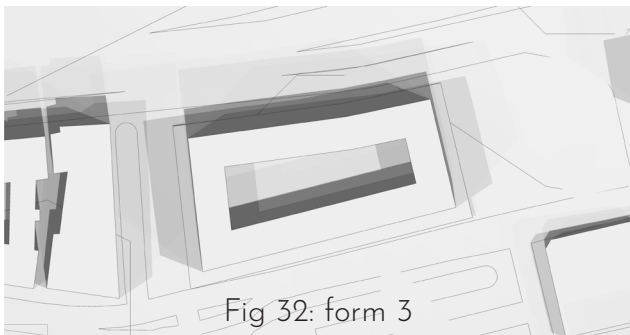
Form 3

-Courtyards shaded
-quarter of the apartments not facing sea
-wind protection for courtyard
-No direct sunlight for apartments in lower levels.

Fig 33: form 4
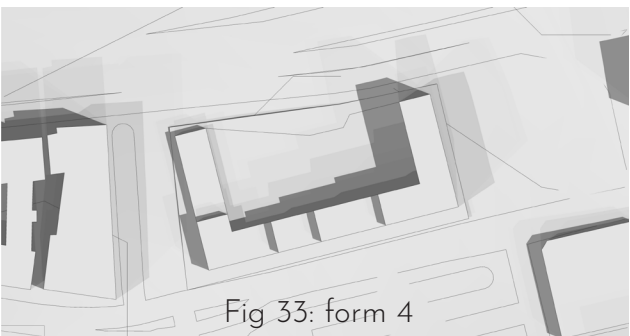
Form 4

-Courtyards shaded
-All apartments facing sea
-No wind protection for courtyard
-No direct sunlight for apartments in lower levels and right wing

Form Development

The form exploration is further done based on shapes selected from solar analysis. The mentioned forms are facing north in the table and multiple aspects were taken into consideration. The factors were rated based on the if the majority of the spaces are benefitted through the form. Based on the exploration the option number 5 is further developed into a design proposal. Consideration was also given to the balance between good occupational density and sunlight for interactive spaces for afternoon sun.

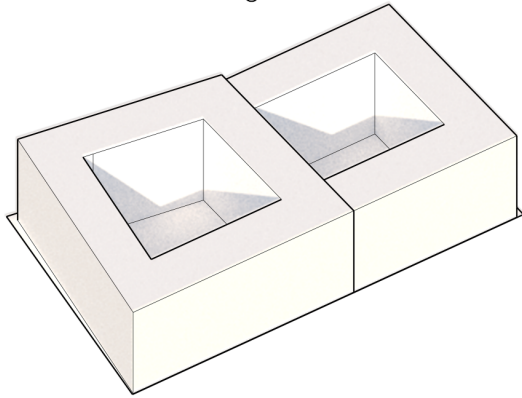| Form	View towards sea	Density balance	Daylight	Sunlight common spaces	Wind protection
	●				
	●	●			●
	●				●
	●	●	●		
	●	●	●	●	●

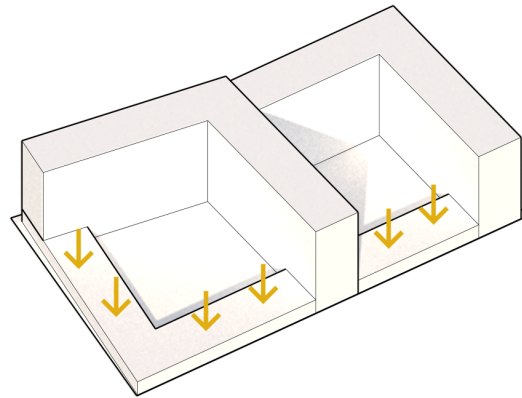Fig 34: form developement and marking with guiding factors

■ positive effect

Stage 1
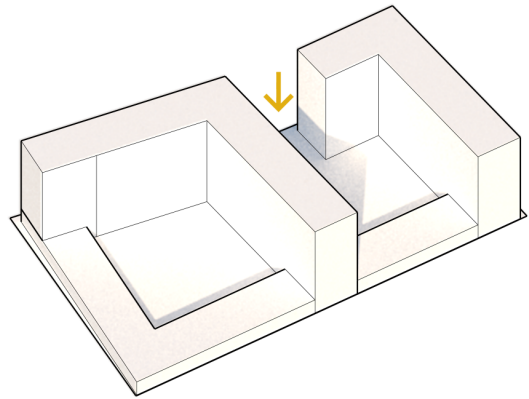
Consideration to wind protection, and maximum usage
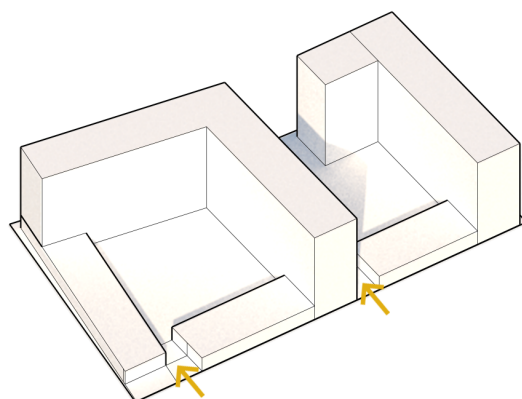
Stage 2

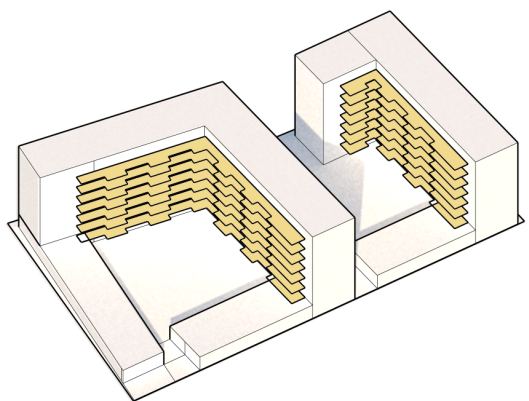Consideration to Daylight

Stage 3

View to towards water

Stage 4

Access into courtyards

Stage 5

Access corridor

Stage 6

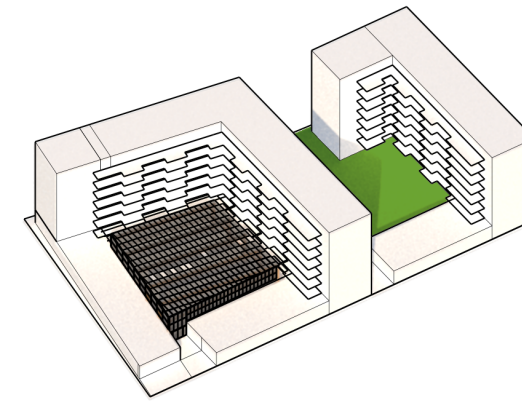Greenhouse and residential courtyard

Fig 35: Final form developement

Design guiding factors

After various stages of literature and design explorations, certain guidelines are developed to help and refer to during the design proposal. These guidelines are classified into three main categories, with further sub classification elements

Spatial organization
Outdoor connectivity
Volumes
Usage of levels

Sustainability
Sustainability design elements
Materiality
Daylight

Interaction
Social Interactive elements
Access
Color
Common activities

Spatial organization   +   Sustainability   +   Interaction

Fig 36: Design guidelines

6. Design proposal

1.Entrance square
2.Residential entrance
3.Residential Courtyard
4.Residential block 1
5.Residential Block 2
6.Greenhouse
7.Cafe Entrance
8.Retail entrance

Andreegatan

4

2

5

3

6

8

2

7

1

Masthamnsgatan

Oskarsgatan

Johanneplatsen

Masthuggstorget station

Entrance level floor plan

Community working space
10.5 X 36.5 M

Pre School
26.5 x 10.5 M

Recycling space
7.5 X 4.6 M

Common Laundry
8.3 X 4.9 M

Entrance Core
10.5 X 3.5 M

Storage
10.5 X 21.9 M

Entrance Core
8.3 X 4.4 M

Common laundry
8.3 X 3.6 M

Entrance Core
10.5 X 4.7 M

Bike parking
12.6 x 10.5 M

Storage
10.5 X 21.9 M

Residential Courtyard
32.4 X 27.9 M

Entrance volume
10.5 X 9.5 M

Kitchen
9.5 X 5.3 M

Cafe
20.1 X 11.2 M

Retail space
10.5 X 11.2 M

Retail space
18.8 X 11.2 M

Retail space
18.8 X 11.2 M

5   10

Community working space

The community working space is placed on the western wing of the entrance level. It is placed in proximity to a neighboring office building west of the site. The zoning is also influenced by the nearest point toward the residential areas. The entrance to the building is marked with a double-height volume pathway that leads to interactive play and kitchen areas and continues to the working zones.

The working zones consist of different privacy and furniture layouts to match the needs of different tasks during remote working. These include meeting spaces, working desks, and informal seating spaces. The northern area is a calm and noise-free zone, suitable for tasks that require concentration and calmness.

The play and kitchen are kept at the southern end close to the entrance to create an interactive space. This zoning also allows noise zones to be kept away from the working spaces. The open working layout plans are accompanied by meeting rooms for quick meetings.

The open plan is subtly interrupted with volumes to avoid long un interrupted volumes. The walls and ceilings are equipped with acoustic panels.

The layout follows a mix of the open floor plan and separate office spaces to adjust to various needs.
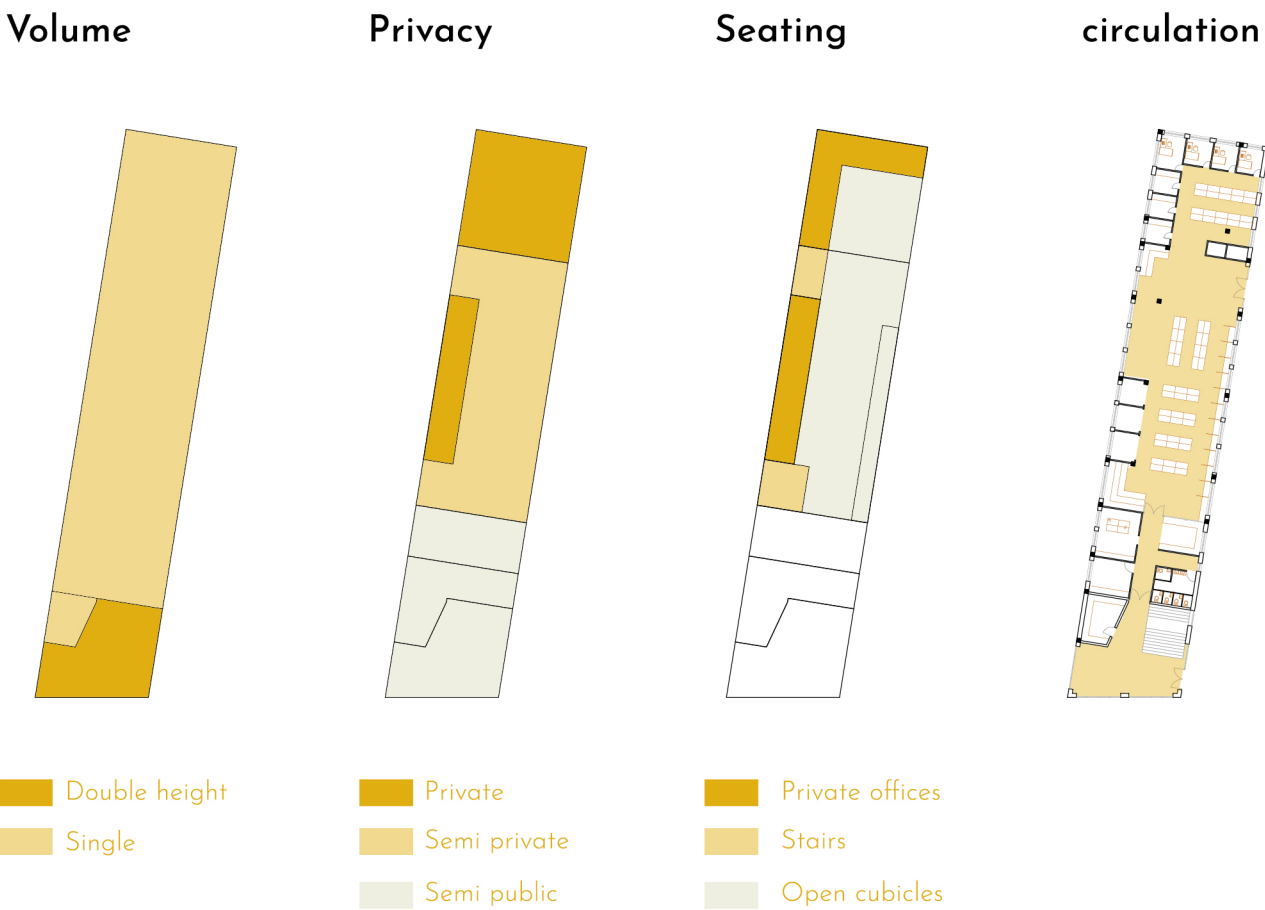
The openings created on either facade maintain a good daylight factor in the work planes.

Fig 41: View Overlooking entrance plaza and volume

Fig 40: View of community working space

Volume	Privacy	Seating	circulation

Double height   Private   Private offices

Single   Semi private   Stairs

Semi public   Open cubicles

Greenhouse

The greenhouse acts as a major interaction and multi-utility zone in the entire proposal. The greenhouse hosts users from every part of the site. Immediate access is provided from outside in the southern corner. The plaza created at the entrance also acts as the entrance to the community working space. The residential access can be directly from the entrance core of residences. The entrance on the northern edge acts as the smaller entrance in consideration of future possibilities.

The community working space extends into the greenhouse with various seating options. The cafe extends into the greenhouse with subtle differentiation by the pathway between the work zone and the cafe zone.

The entrance is directly into the generous double-height volume of the greenhouse. The greenhouse hosts spaces of different scales to adapt to different requirements of people. the smaller volumes provide the option for enclosed spaces, whereas the bigger volumes for more open spaces.

The pre-school extends its open indoor play area and dining space into the greenhouse. To have controlled boundaries for the safety of the kids, the pathway along with subtle barriers keeps them in the greenhouse and also in a monitored area by the teacher. During less occupancy by other spaces, the playschool can extend into the entire greenhouse under supervision.   The greenhouse acts as an acoustic shelter to the noise generated.
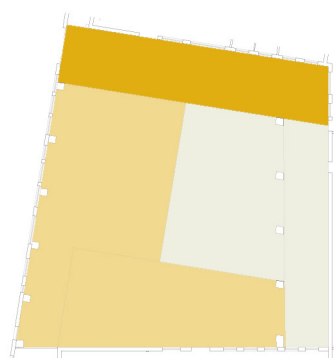
The different occupational patterns of users create unique, vibrant spaces in the greenhouse throughout the year.
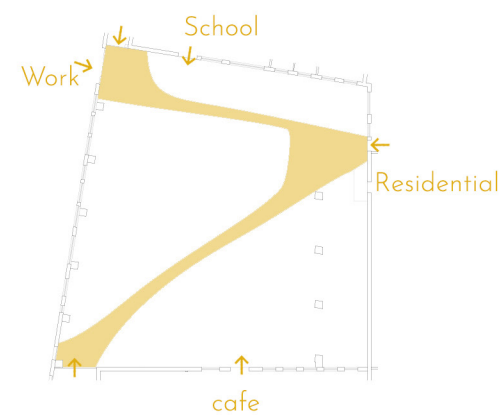
Volume

zoning
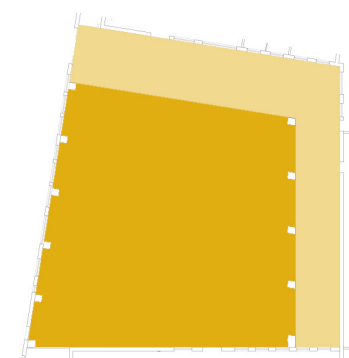
Circulation

- Double height
- Single

- School
- Cafe and work
- Residential and relax

School
Work
Residential
cafe

Fig 44: View from the greenhouse entrance

Cafe

The cafe is an interactive and relaxing aspect of the proposal. The position of the cafe is towards the southern edge. The placement is done in consideration of the accessibility of the public zone and the utilization of the increased footfall. The cafe is in line with commercial spaces in the southern wing. The cafe also acts as an entrance into the greenhouse. The seating extends into the greenhouse. The furniture placement is also placed in both the smaller and bigger volumes in the greenhouse.

The cafe can host up to 70 people in the indoor seating layout. The numbers can increase based on the demand for the greenhouse. The kitchen access is created from the street for easy access to service and storage. The staircase leading to the second level near the cafe acts as a space for outdoor seating as well during the sunny days. The external staircase can also be a break zone or interaction zone for the community working space users.

The cafe also can be benefitted from the after-work activities by the users of the community working spaces or the residents. Remote working can also be achieved through the cafe.

Pre school

The preschool is located on the northern wing of the entrance level. Access is provided from the entrance vestibule from the northern edge. The entrance is through the cloakroom into a spacious multi-utility play area. The school hosts group rooms, sleeping rooms, and activity rooms. These spaces will help in engaging younger minds in different activities and tasks. The preschool also hosts a kitchen space and different dining spaces for the kids

The dining space is on the edge of the greenhouse. The extended play area has a single-height volume and gradually enters the double-height volume. This provides different volumes for the kids and moves long the enclosed to open spaces. The smaller height of the play area zone will help in reducing the echo into the entire greenhouse. The barrier through vegetation and subtle railings will maintain visibility into the greenhouse while maintaining the supervision space.

The pre-school is beneficial for different users of the working spaces in the building. The users working in the community space or visiting the cafe can drop the kids at the pre-school and continue with work tasks. The proximity will also help in maintaining interaction during work hours with the kids. A similar use is also applied to the residents of the housing units. The residents can drop the kids at the pre-school to attend on-site office spaces during weekdays or when following a busy work schedule.

.

Fig 45: Pre-school play area within greenhouse.

Residential Courtyard

The courtyard in the eastern direction is designed for specific usage for the residents of the building. The courtyard is accompanied by retail space in the south and bike parking space in the north.

The aim is to create interactive and vibrant open spaces for people of all age groups. The winds from the water are partially blocked by the residential wing. The access is provided through the residential cores and from the southern and northern directions.

Playing areas are created for kids along the enclosure created by the retail wing. Grilling and barbecue stations are placed along the pathway between both the residential cores.

The volume is accompanied by terraces and balconies from both the residential blocks, creating strong visual connectivity between the majority of the units and courtyard.

Bike Parking and electric charging points

The collective bike parking located on the northern edge will act as a strong point of interaction. The openings created in the space, establish a well-lit community space.

Parking also holds space for bike repair stations and has a capacity of 60 parking spaces. The remaining bikes can be parked in the extended terraces near the housing units.

The site also hosts electrical charging spaces on the west to the bike parking. The strong connection to public transport and proximity to public parking spaces led to the choice to have no in site car parking spaces. However, the electrical charging points can be utilized by the residents.

Entrance core

The entrance core to the residential hub can be accessed in two different ways for each block. The residential courtyard acts as a common entrance space for both these cores. The access through the greenhouse can be used for the residential block on the west and the new proposed street for the eastern block.

The core consists of three different functions. at the entrance level.
Vertical movement
Common Laundry spaces
Recycling unit

Fig 46: View of residential courtyard

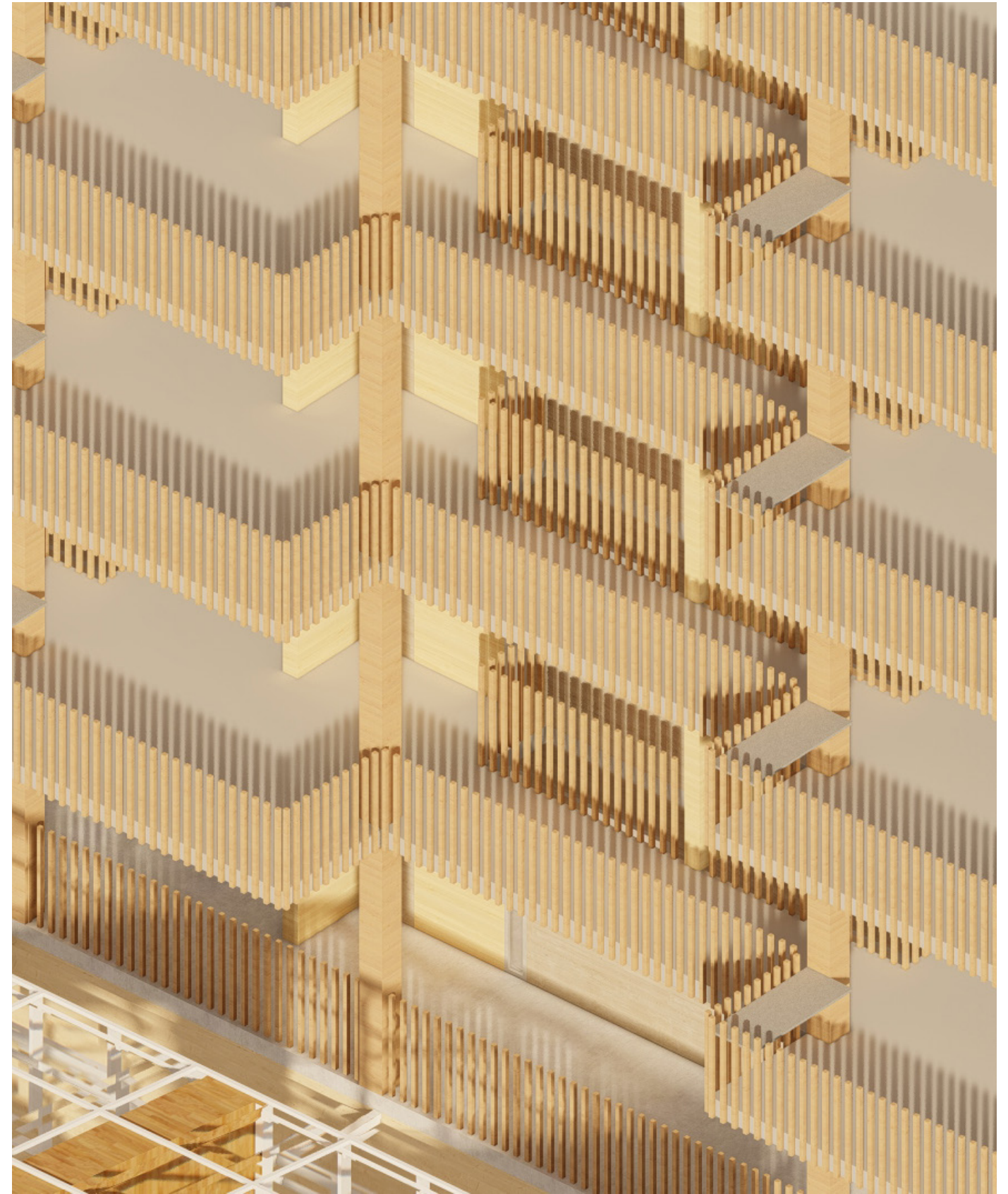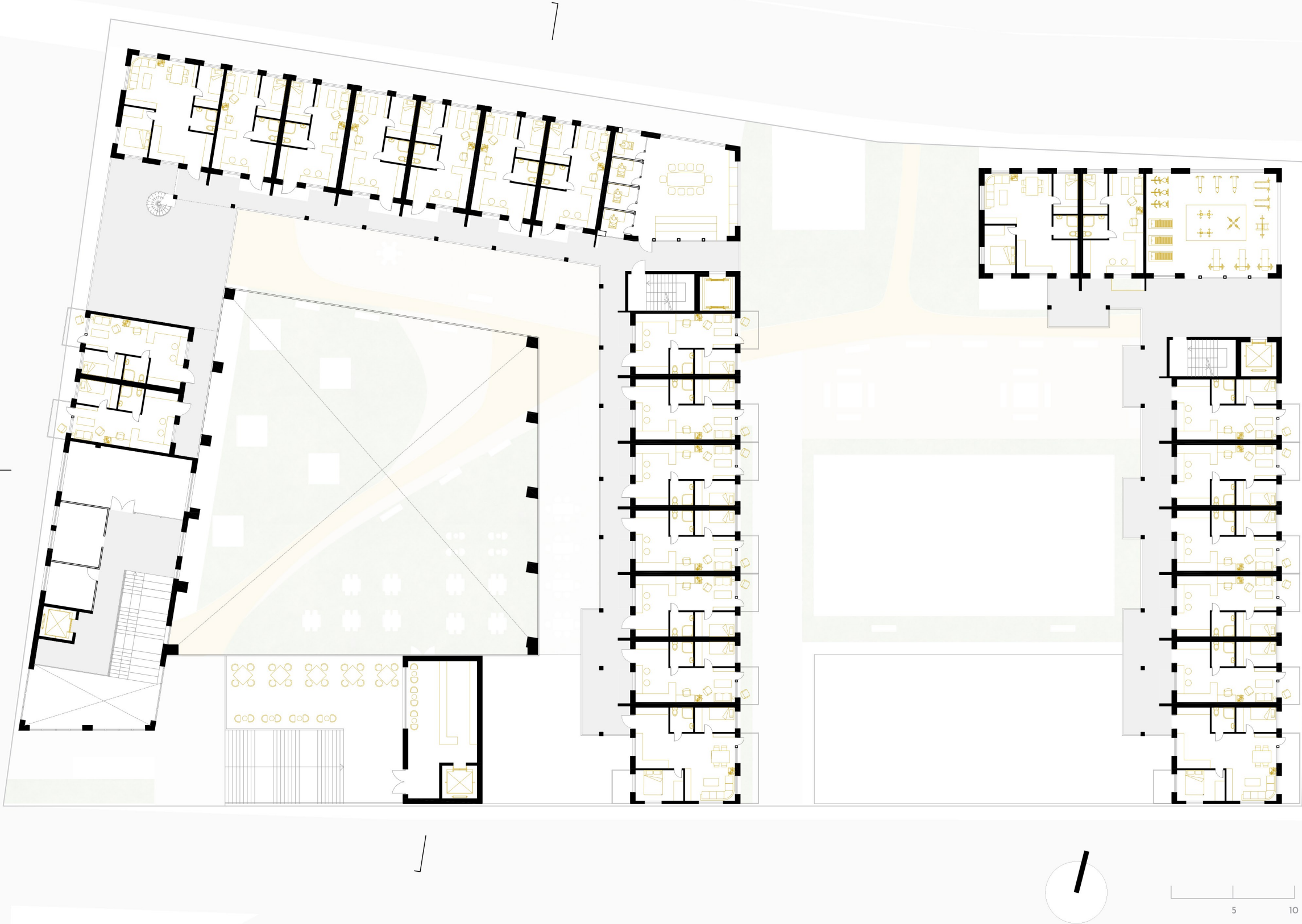Fig 47: View from the south western corner of the site

Fig 48: Isometric view of access corridor

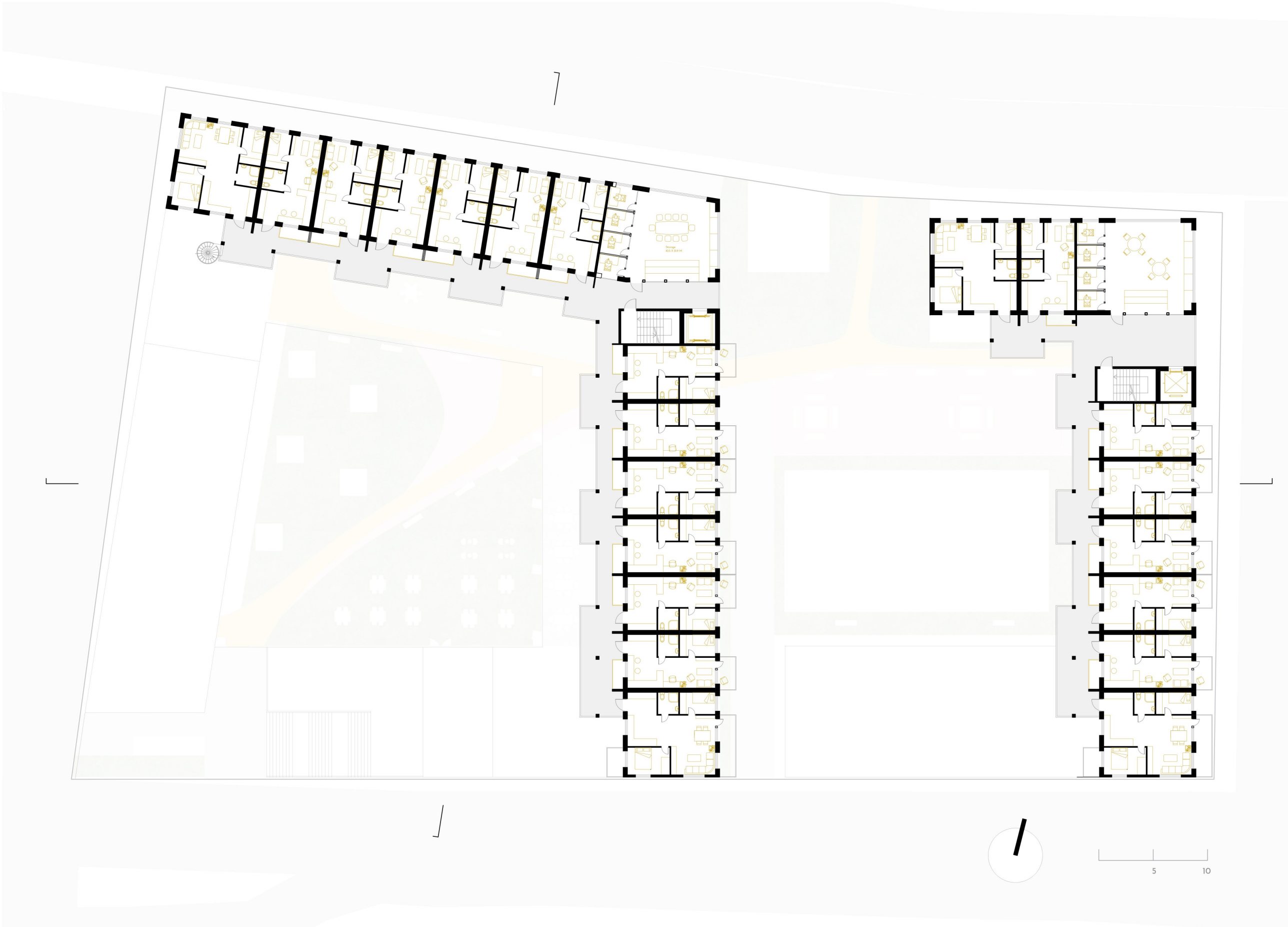## Section through the greenhouse and the residential courtyard

Second level floor plan

5   10

Typical residential floor plan

Access Corridor system

Access to the residential units is through a corridor placed on the inner side of the wing, towards the courtyard. The aim of the corridor is to have functional use other than the circulation. The corridor system is a space of interaction and storage and extends as a relaxation space.

The access corridor is extended towards the courtyards near the entrance unit of every house. The Entrance system is started with the enclosure created in front of the main door by two walls. Big openings are placed in this facade to capture the solar gains and optimum usage of daylight and direct sunlight.

However, the proximity of others passing by near the opening might create a distraction or disturbance. Therefore voids are placed in front of the openings, creating a safe distance for the residents using the corridor and the residents inside the housing unit. The railing system is established by using thin wood blocks, which will allow light seepage through the corridor. This method also helps in achieving good daylight factor values for the housing units.

The extended terraces can be utilized for multiple purposes throughout the day. They can be used for parking the bike, taking a break and relaxing with a beverage, and having impromptu interactions with the neighbors, without disturbing the movement of others.

The extended walls for the enclosure break the straight wall and help in reducing strong wind speed. In addition, The terraces can be helpful in reducing the horizontal rain and having an outdoor space for relaxation during rain.
.

Fig 52: Perspective view of access corridor in second level
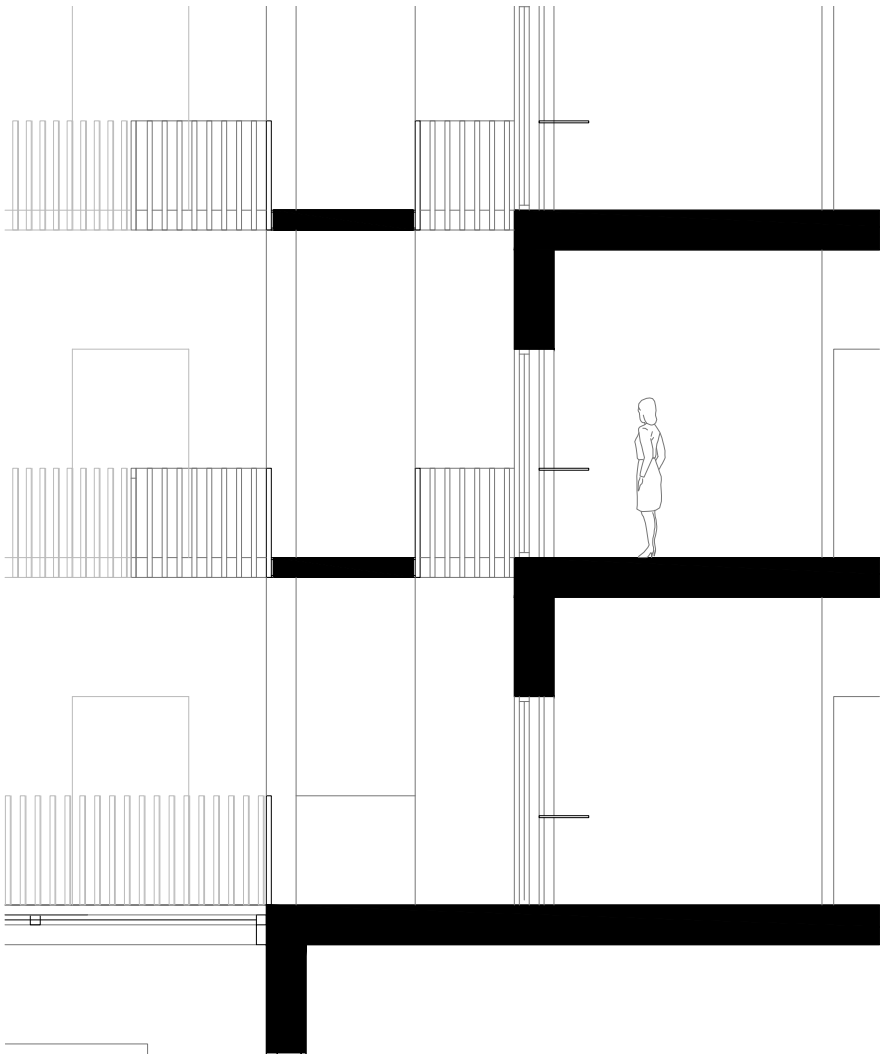

Fig 53: Perspective view of access corridor

Fig 54: Section of corridor

Common working spaces

The common working spaces are located close to the entrance core on the residential floors. These spaces are located on the north corner of both the residential blocks.

The common working areas act as an extension of the housing. These working spaces can be utilized only by all the residents of the housing units. The working areas provide possibilities for having a different physical environment for remote working. Differentiating personal and professional life is important, especially during working from home. These spaces provide an opportunity to address this problem.

The zoning is placed in the northern corner and in proximity to the entrance core for reducing the possible noise. The working areas include spaces of different volumes, seating typology, and privacy. This helps in adjusting to various requirements of the tasks performed by the users during the daily working schedule.

Fig 55: View of Common working spaces

Housing Units

Total number of housing units: 132
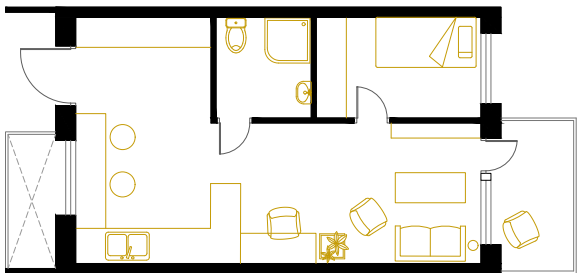
Units in Block 1 : 84

Units in block 2 : 48

Type A Apartments :

Size : 40 sqm
Number of apartments: 108 units
Suitable for : Single Occupant, Two occupants

Type B Apartments :

Size : 61 Sqm
Number of apartments: 24
Suitable for : Two Occupants, Family with one or two children

Apartment A

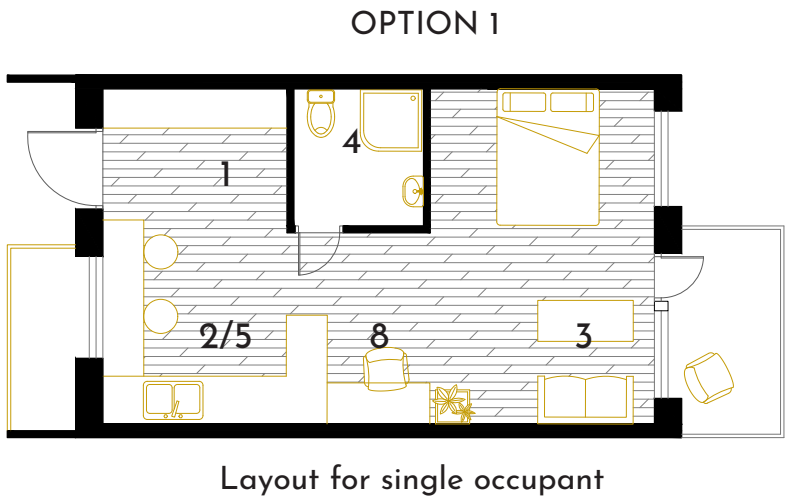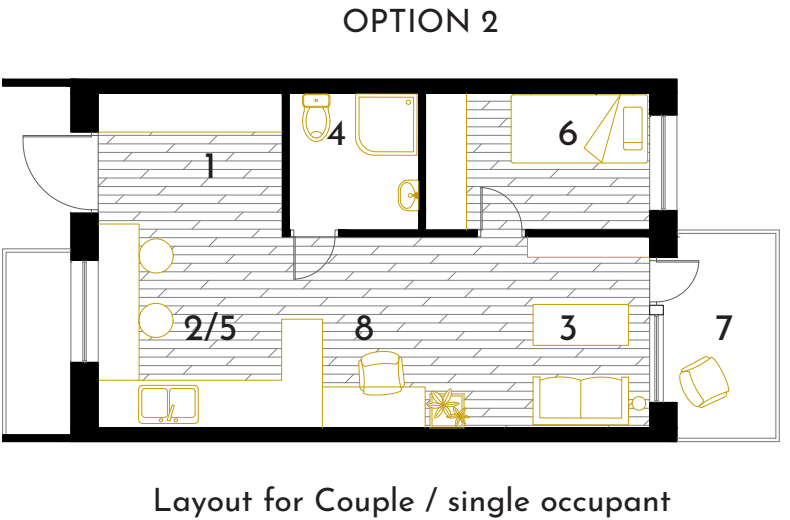
Apartment B

1 2 4 8

Apartment A

This option is a two-room or a single-room apartment. The layout is suitable for single occupants and couples. The apartment has an open floor kitchen extending into living space along the width of the block.

The work zone is placed in the middle of living and kitchen spaces, for creating an opportunity for people interested in multitasking. The balconies are placed on the edge of the living spaces providing a view of the water.

The kitchen counter also acts as a dining space or the space on the left to the entrance volume can host the dining area. The living area can be increased by the removal of the bedroom wall for a bigger living area.
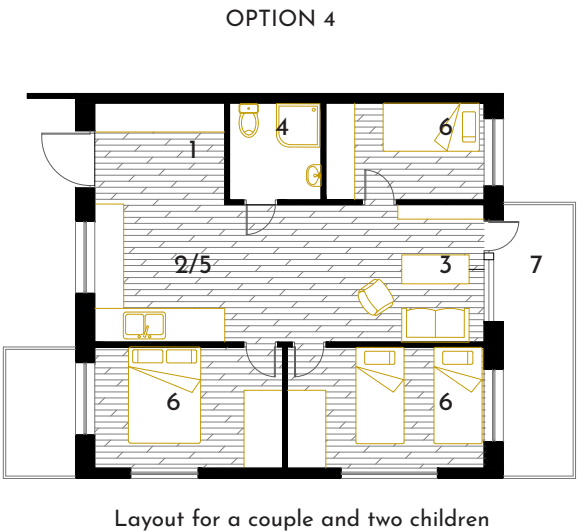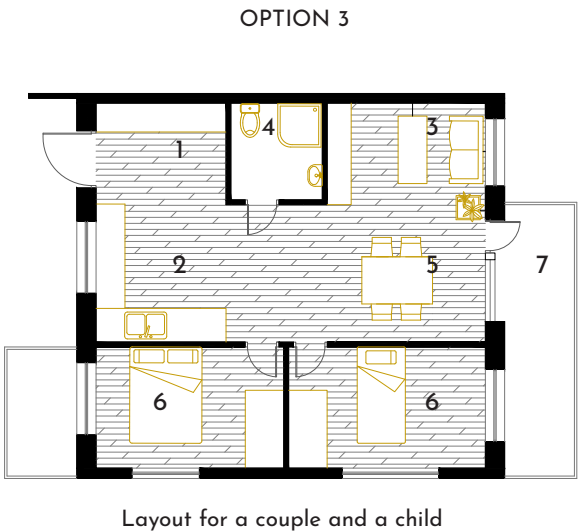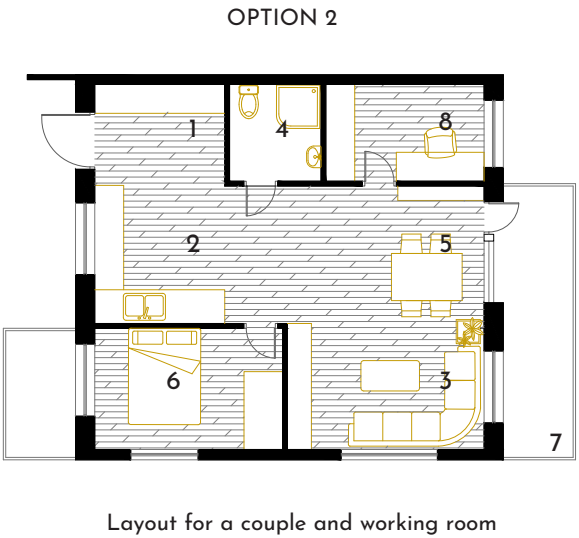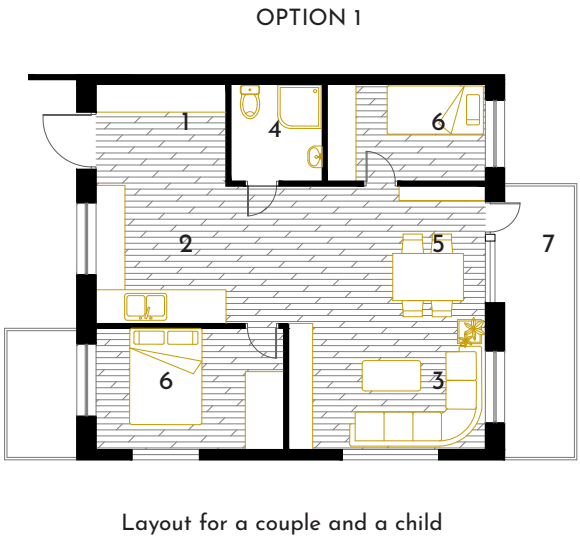
Apartment B

This option is of a three-room and possible extension into 4 rooms. Below mentioned are possible options for layout arrangement in apartment type B. The combinations are made within children's rooms and working rooms with changes in the living room and bedrooms.

All the plans follow an open kitchen layout and bigger space for future changes in furniture layout and flexibility.

The openings and the corner placement of these apartments maintain good Daylighting factors and direct sunlight access.

OPTION 1

Layout for single occupant

OPTION 2

Layout for Couple / single occupant

1. Entrance
2. Kitchen
3. Family room
4. Bathroom
5. Dining
6. Bedroom
7. Balcony
8. Work Space

OPTION 1

Layout for a couple and a child

OPTION 2

Layout for a couple and working room

OPTION 3

Layout for a couple and a child

OPTION 4

Layout for a couple and two children

1   2   4   8

Probable situations for stay and work

Based on multiple possibilities for remote working and factors influencing such as the number of people in an apartment and place of work, certain scenarios have been enlisted. The spatial usage for work and living will be related to these scenarios and explained how multiple working patterns can be executed.

Situation 1- Staying alone and remote working
Situation 2 - Staying with a partner and one of the remote working or only one of the partners is working
Situation 3 - Staying with a partner and both remote working
Situation 4 - Both partners remote working and have a child who needs supervision
Situation 5 - Both partners are remote working, and the child is at school or doesn't need supervision.

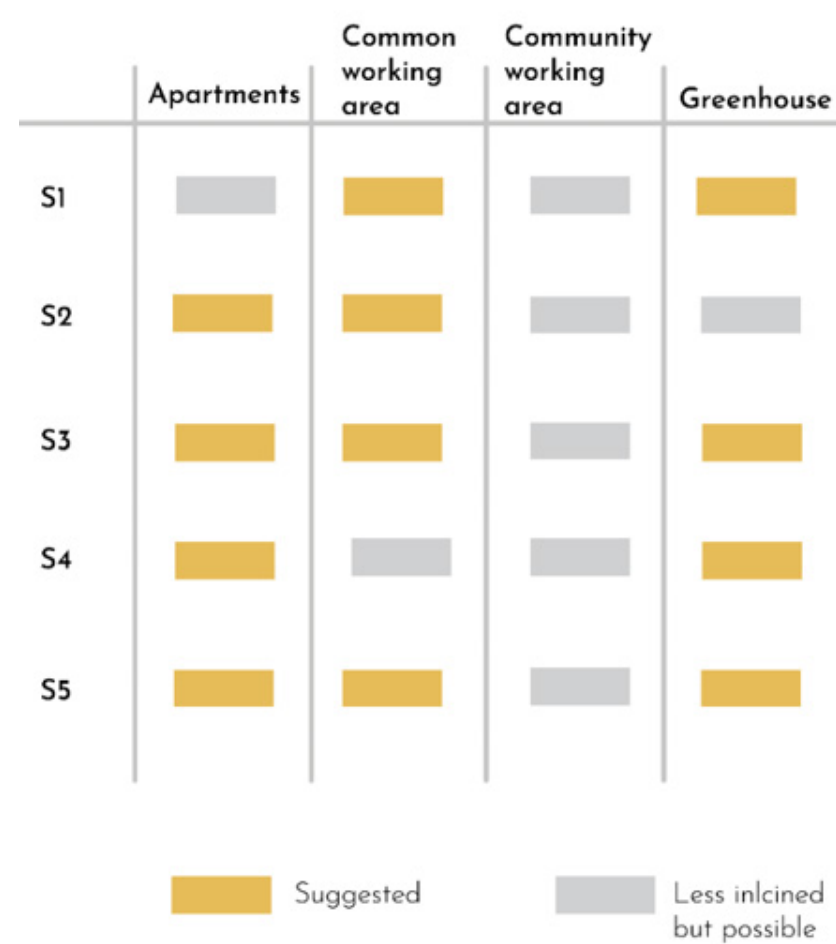|	Apartments	Common working area	Community working area	Greenhouse
S1	Less inclined	Suggested	Less inclined	Suggested
S2	Suggested	Suggested	Less inclined	Less inclined
S3	Suggested	Suggested	Less inclined	Suggested
S4	Suggested	Less inclined	Less inclined	Suggested
S5	Suggested	Suggested	Less inclined	Suggested

■ Suggested   ■ Less inlcined but possible

Fig 59: probable working scenarios.

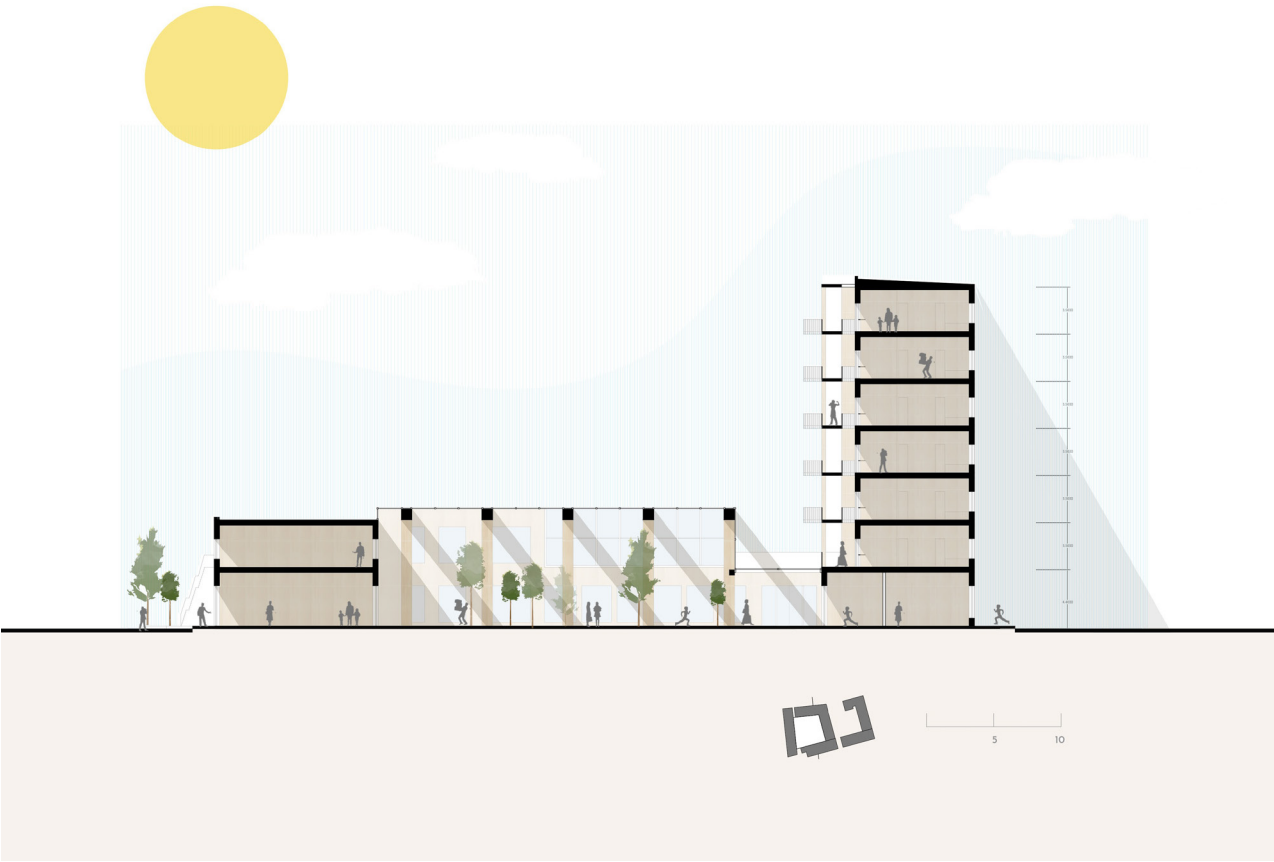Fig 60: view towards the residential block A

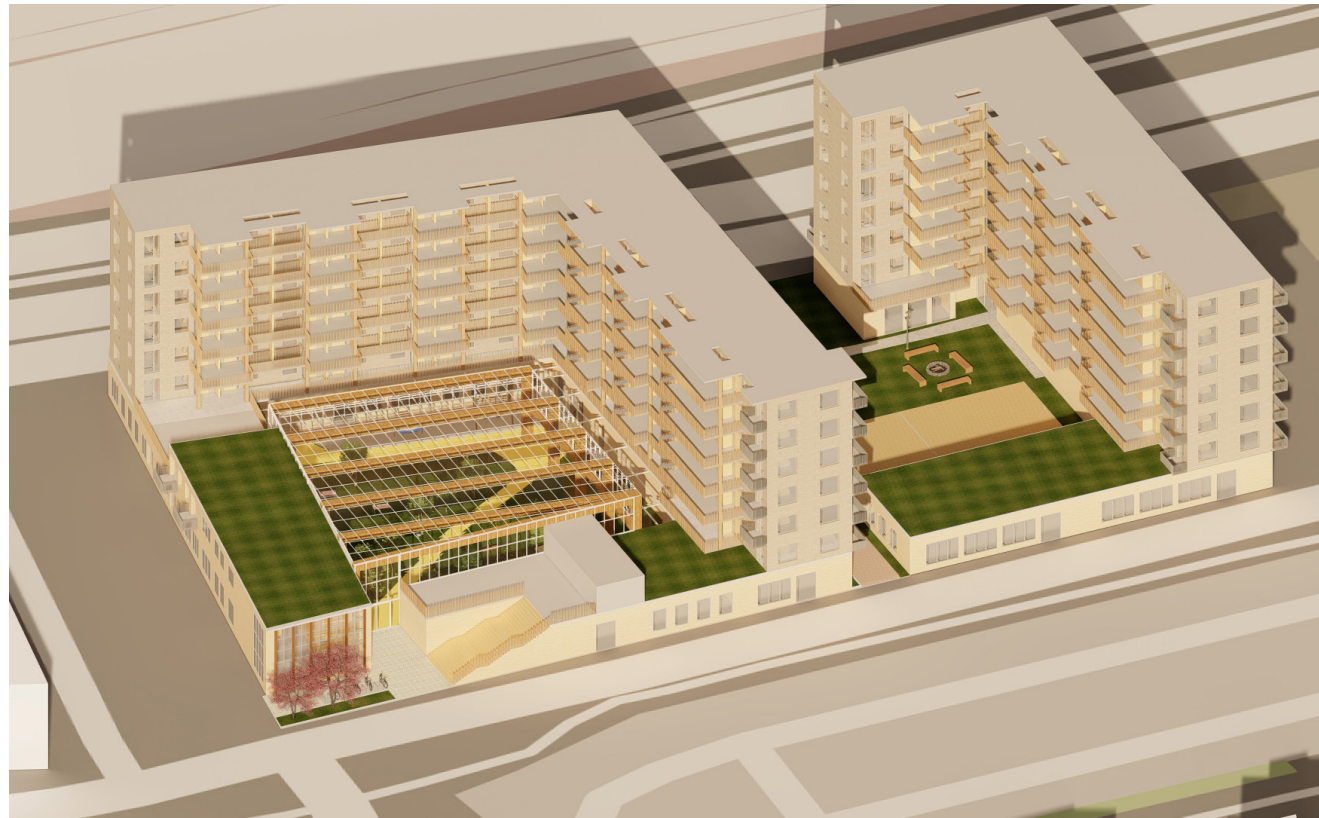Fig 61: Section through preschool, greenhouse and cafe..

Fig 62: Isometric view of proposal

Fig 63: View overlooking volume between greenhouse and housing at second level.

Conclusions

The thesis originated from the point of remote working during the pandemic. Though started as a temporary solution, remote continued in existence even after the pandemic. This was the initial thought which made me question the role of working spaces and housing spaces and where should be the divide between them.

The thesis explored the idea of what remote working is about with considerations about the history of remote working and its possible future role of it. Based on these explorations possible outcomes for future work were derived. The outcomes themselves individually can exist moving forward. However, the proposal is a culmination of all the outcomes into a single proposal.

The drawbacks and advantages of remote working are studied with the aim of possible solutions to the issues. Even though these drawbacks are discussed in an overview, certain aspects could be studied with a more critical approach for a better understanding of perspectives on remote working. The case studies were analyzed by creating a takeaway factors list and correlating it with influencing elements within each case study. The survey questionnaire investigated the need for interaction, options of working patterns in remote working, and possible views of aspects to be developed in remote working.

The site understandings were based on both macro and micro region analysis. The various aspects impacting and possible impact on the selected site are outlined and possible outcomes are generated. These outcomes are utilized for design development.

The form development has considerations of sunlight on the facade and the common spaces, views, and wind protection. multiple forms were considered and these forms were filtered gradually with the help of guiding elements. The final form was developed to adjust the needs of a spatial program developed to cater to the remote working patterns.

In the final stage, the proposal is established with various possible spaces for remote working. These spaces follow different privacy levels from public to private showcasing the possibilities of remote working spaces included in housing typology. This stage can be further developed with a deeper focus on working spaces. The working spaces in the proposal are major, community, common working, and private working spaces. Though the role and need of community working can be questioned in various cases, it is a suitable option for this site.

In conclusion, the projects explored the possibilities of imagining working spaces as smaller and individual elements accustomed to various users across various professions in a housing setup.

Discussions and Reflections

The basic framework of what rules and parameters affect remote working has been established initially. The depth into different roles of what remote working pertains to has been explained overall. In addition, these aspects could be explored in detail individually. The linkage between each stage of analysis and research is a bit chaotic at the moment and could be explained with more coherence. However, the aspects investigated are well in the right direction for future work.

The approach to include different perspectives within Scandinavian and Swedish contexts into the project at the early stage through user surveys and research work well. The explorations and takeaways from this stage could be summarised in a graphical way for better translation of data and understanding for everyone.

The site has been studied both at macro and micro levels to understand the impact and possible directions for the proposal. The summary and takeaways presented graphically at the end work well for the narratives.

The form development considers various aspects starting from solar analysis to the financial balance for the proposal. These spaces were taken into consideration to create a balance between all aspects for a productive and interactive design approach.

The design proposal explains the balance between the supporting spaces and core spaces for working. The narrative from various privacy levels of working is explained well. The traditional methods of housing are explored with subtle changes within the layouts for the proposal. However, the norms of traditional housing could have been questioned a bit more and a possibility for a bit more radical output could have been tested within housing units.

While interactive spaces do act as a positive aspect, the negative aspects within this factor could have been discussed a bit furthermore. This would provide more critical analysis and consideration of wider user input for the project.

The hard-defined spaces have been chosen within the common activities at the ground level for clearer and separation of activities. The role of mixing these activities into single spaces could be explored moving forward.

The common working spaces have a directive for comfort and productivity and address the issues caused by remote working. However, for the people who wouldn't want to interact with neighbors, other alternative solutions should be highlighted.

In summary, the project answers many questions posed related to remote working and hopes to be a baseline for future typology within the housing and remote working spaces.

Bibliography

Abdel, H. (2022, January 05). Happyworks Working Pod / Abin Design Studio. Retrieved from ArchDaily: https://www.archdaily.com/974532/happyworks-working-pod-abin-design-studio?ad_source=search&ad_medium=projects_tab

Analytics, G. W. (2021, December 06). Retrieved from https://globalworkplaceanalytics.com/: https://globalworkplaceanalytics.com/brags/news-releases

Association, A. S.-L.-H. ((n.d.)). Loud Noise Dangers. Retrieved from www.asha.org: https://www.asha.org/public/hearing/loud-noise-dangers/#:~:text=Sounds%20at%2085%20dBA%20can

Butler, H. (2021). The History of Remote Work: How It Became What We Know Today. Retrieved from Croosover: https://www.crossover.com/perspective/the-history-of-remote-work

Cherry, K. (2020, May 28). Color Psychology: Does It Affect How You Feel? Retrieved from Verywell Mind: https://www.verywellmind.com/color-psychology-2795824

Council, C. S. (2018, January 05). Office Noise and Acoustics. Retrieved from Canada Safety Council: https://canadasafetycouncil.org/office-noise-and-acoustics/

Day, I. N. ((n.d.)). Common Noise Levels - Noise Awareness Day. Retrieved from noiseawareness.org: https://noiseawareness.org/info-center/common-noise-levels/

Deng, L. D. (2018). The basic roles of indoor plants in human health and comfort. Environmental Science and Pollution Research.

Edwards, L. a. (2002). A Literature Review of the Effects of Natural Light on Building Occupants. Golden: National Renewable Energy Laboratory.

Enso, S. (2021, April 16). New study highlights 10 wellbeing benefits of building with wood. Retrieved from https://www.storaenso.com/: https://www.storaenso.com/en/newsroom/news/2021/4/study-on-wellbeing-benefits-of-wooden-buildings

Fitzgerald-Redd, S. (2016, May 04). Acoustics Affect Productivity and Well Being. Retrieved from Insulation Institute: https://information.insulationinstitute.org/blog/noise-affects-productivity-and-well-being

González, M. F. (2021, April 15). Brf Viva Housing Complex / Malmström Edström Arkitekter Ingenjörer. Retrieved from ArchDaily: https://www.archdaily.com/960035/brf-viva-housing-complex-malmstrom-edstrom-arkitekter-ingenjorer

Graham Lowe, P. (2020). Wood, Well-being and Performance:The Human and Organizational Benefits. Forestry Innovation Investment.

Green, C. (2019, July 20). 7 Amazing Acoustic Solutions For Your Office Interior. Retrieved from Medium: https://medium.com/@ciaogreen/7-amazing-acoustic-solutions-for-your-office-interior-c6c324c4d5d9

Gupta, A. (2020, September 23). The History of Remote Work: How it Came to be What it is Today. Retrieved from Sorry, I Was on Mute: https://www.sorryonmute.com/history-remote-work-industries/#:~:text=While%20modern%2Dday%20remote%20work,option%20to%20work%20from%20home

Info, N. B. (2020). Advantages and disadvantages of employees working at home. Retrieved from NI Business Info: https://www.nibusinessinfo.co.uk/content/advantages-and-disadvantages-employ-

ees-working-home

Ipsen, C. v. (2021). Six Key Advantages and Disadvantages of Working from Home in Europe during COVID-19. Basel: International Journal of Environmental Research and Public Health.

Konrad Domig, R. W. (2020, March 16). Coronavirus on wood surfaces – Is there a risk? Retrieved from Timber-online.net: https://www.timber-online.net/wood_products/2020/03/coronavirus-on-wood-surfaces---is-there-a-risk-.html

Lal, B. D. (2021). Working from Home During Covid-19: Doing and Managing Technology-enabled Social Interaction With Colleagues at a Distance. Information Systems Frontiers.

Mandie, A. (2018, June 13). The Surprising Effect of Color in the Office. Retrieved from www.linkedin.com: https://www.linkedin.com/pulse/surprising-effect-color-office-mandie-lee/

Marinova, E. (2019, March 06). The secret acoustic benefits of plants at the office. Retrieved from Re:public: https://www.re-publicspace.com/the-secret-acoustic-benefits-of-plants-at-the-office/

Martins, A. (2014, November 06). Five keys to use light in our favor and sleep better. Retrieved from https://www.bbc.com/mundo: https://www.bbc.com/mundo/noticias/2014/11/141106_cinco_claves_usar_luz_dormir_mejor_am

Masthugget, B. ((n.d.)). Masthuggets historia. Retrieved from Brf Masthugget: https://brfmasthugget.se/masthuggets-historia/

McElroy, C. (2017, March 09). Sweden's housing crisis: A balancing act gone wrong. Retrieved from S&P Global: https://www.spglobal.com/marketintelligence/en/news-insights/trending/Bf9u6cZrFvm-WSllCy1pArQ2

Meehan, S. (2019, January 31). Air Quality, Ergonomics, and Lighting - Sick Buildings may be Harming your Health. Retrieved from https://www.thebodywiseclinic.ie/: https://www.thebodywiseclinic.ie/toxic-office-healthy-workplace/

Mishra, A. (2022, March 04). How To Be Productive When You Work From Home 5 Tips. Retrieved from Data Trained: https://www.datatrained.com/post/how-to-be-productive-when-you-work-from-home/

Netigate. (2021, March 16). Working remotely in Sweden set to continue after the pandemic. Retrieved from Netigate: https://www.netigate.net/articles/netigate-insights/working-remotely-in-sweden-set-to-stay-after-the-pandemic/

Partners, A. M. (2007). Office of the Future Sustainable Design and Workplace Productivity: A Research Review. https://www.acmartin.com/sites/default/files/ACMResearch-SustDesign-WorkplProd-L.pdf.

Pintos, P. (2020, December 24). Qvillestaden Apartment Building / Bornstein Lyckefors. Retrieved from ArchDaily: https://www.archdaily.com/953848/qvillestaden-apartment-building-bornstein-lyckefors

Rambhai, J. (2021, January 28). Working from home leads to "Zoom fatigue.". Retrieved from People Management: https://www.peoplemanagement.co.uk/article/1746349/working-from-home-leads-to-zoom-fatigue#:~:text=The%20study%20looked%20at%20how,as%20emails%2C%20texts%20and%20chats.

Ro, C. (2020, August 31). Why the future of work might be "hybrid". Retrieved from BBC: https://www.bbc.com/worklife/article/20200824-why-the-future-of-work-might-be-hybrid

Robbins, C. L. (1986). Daylighting Design and Analysis. New York: Van Nostrand Reinhold Company.

Sanchi. (2020, October 05). Top 6 environmental benefits of remote work. Retrieved from Airmeet: https://www.airmeet.com/hub/blog/environmental-benefits-of-remote-work/

Stad, G. (2012). RIVERCITY GOTHENBURG ViSiOn. Gothenburg: City of Gothenburg.

Stad, G. (2014). Development Strategy Gothenburg 2035. Gothenburg: Planning and Building Authority.

Stad, G. (2019). Masthuggskajen - staden växer västerut. Retrieved from Goteborgs Stad: https://goteborg.se/wps/portal/start/byggande--lantmateri-och-planarbete/kommunens-planarbete/plan--och-byggprojekt?uri=gbglnk%3Agbg.page.bb7386fd-1152-47cb-9da4-d06bd7780a77&projektid=BN0402%2F13

Team, M. S. (2020, December 15). Retrieved from https://www.mbaskool.com/: https://www.mbaskool.com/business-concepts/human-resources-hr-terms/16870-work-from-home.html

Veitch, J. &. (2008). Lighting appraisal, well-being and performance in open-plan offices: A linked mechanisms approach. Lighting Research and Technology.

Vorm, D. (2021). How Acoustic Challenges Impact Well-being in the Office. Retrieved from journal.devorm.nl: https://journal.devorm.nl/blog/how-acoustics-challenges-impact-overall-wellbeing-in-the-office

Vozza, S. (2015, April 07). Why You Should Never Paint Office Walls White. Fast Company. Retrieved from Fast Company: https://www.fastcompany.com/3044601/why-you-should-never-paint-office-walls-white
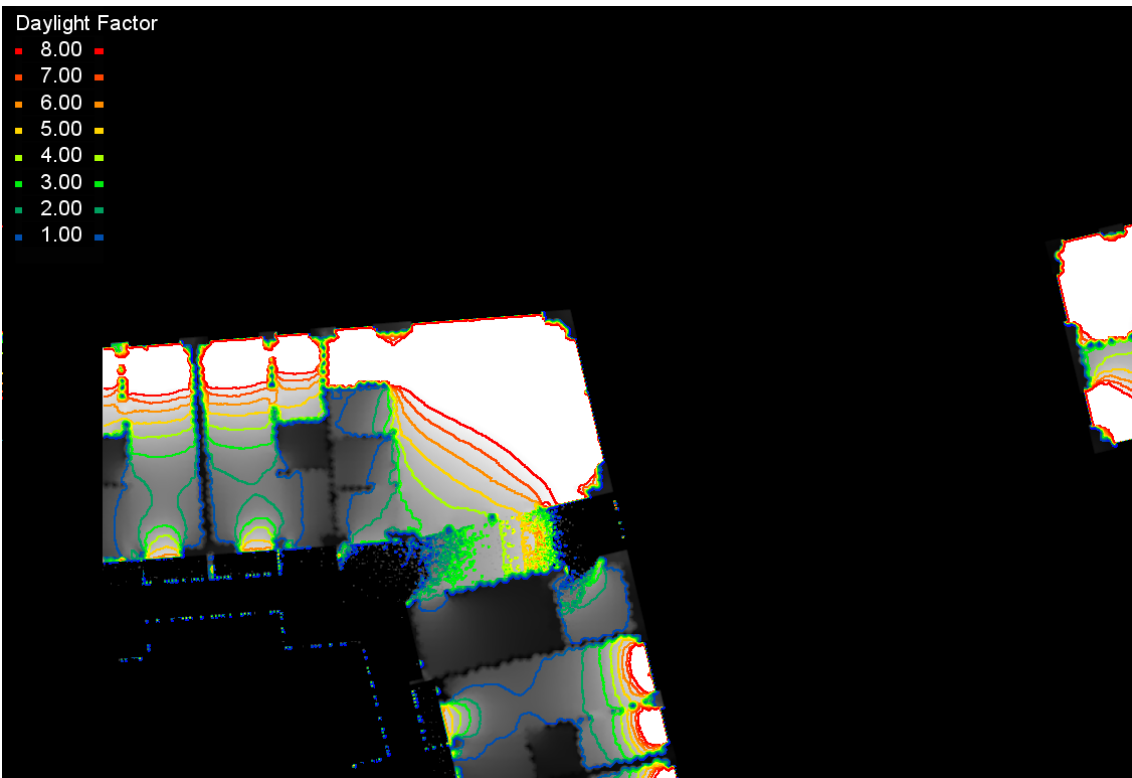
Appendix

Daylight simulations
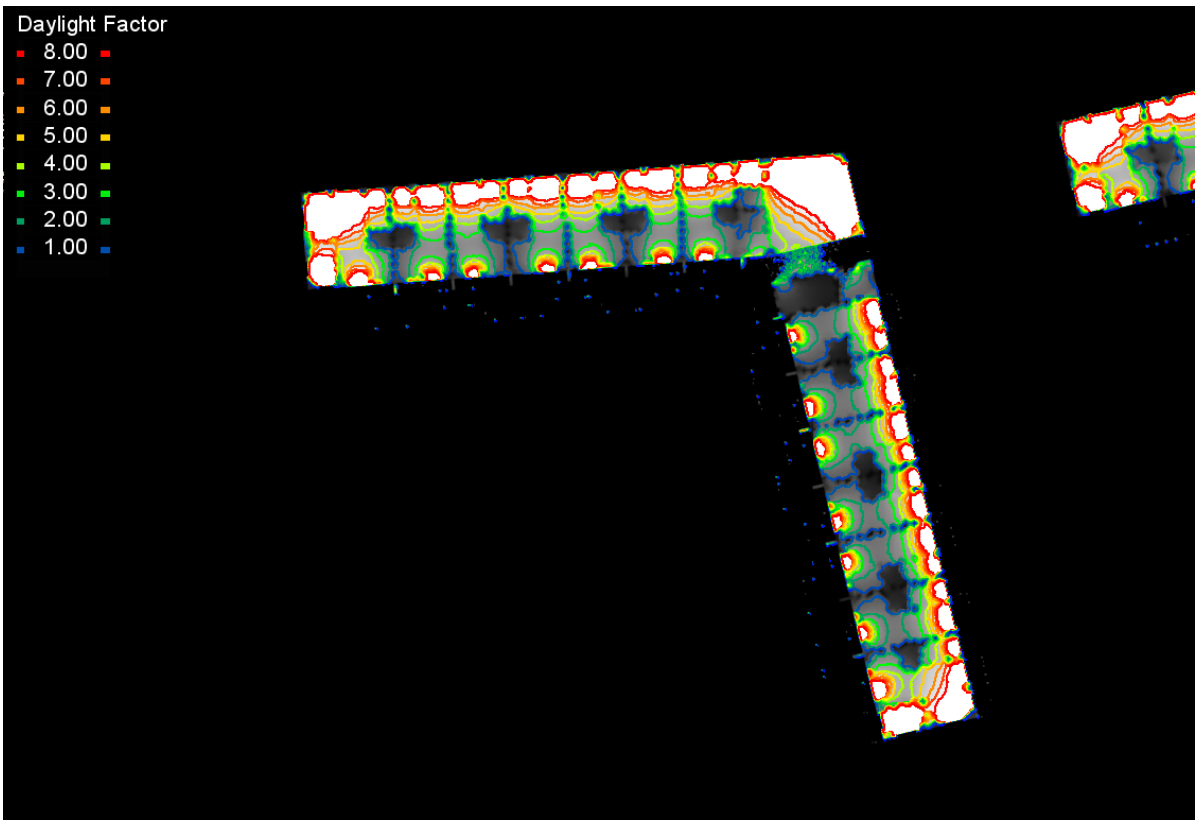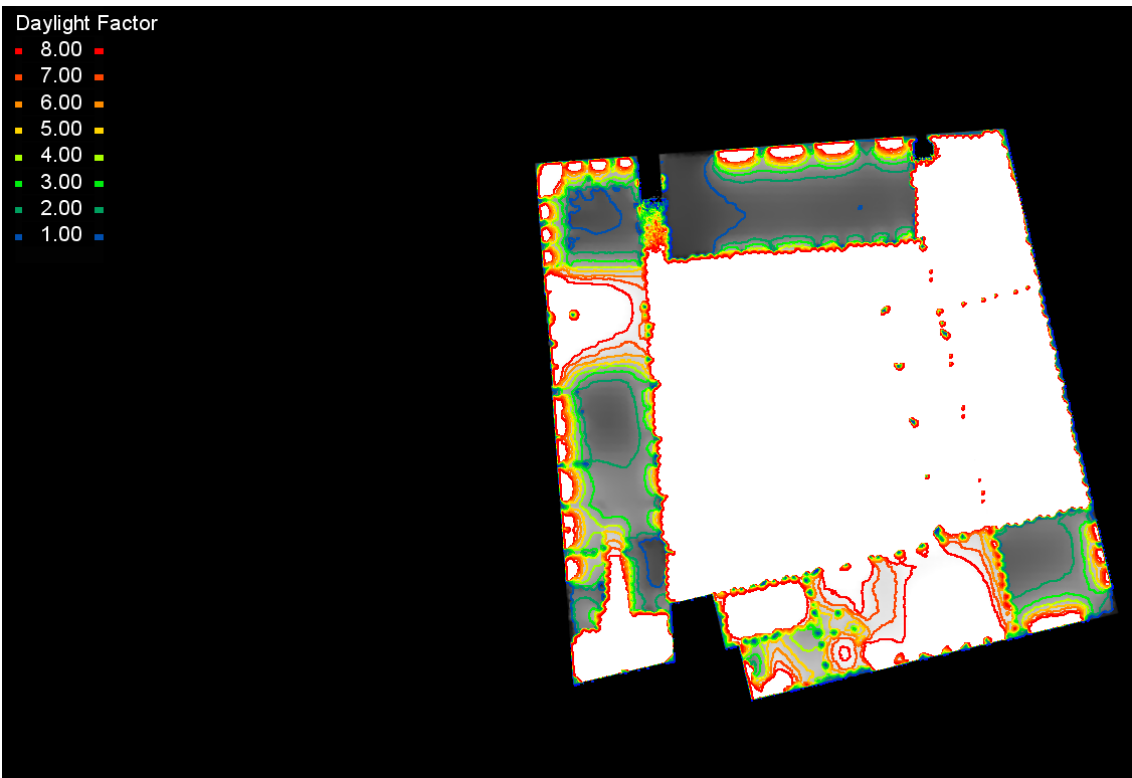

Fig: Common working spaces

Fig: Ground level (community working, school)

Fig: Residential floor plan

Survey

Age
34 responses

Legend:
- 15-20
- 21-30
- 31-40
- 41-50
- 51-60
- >60

76.5%
17.6%
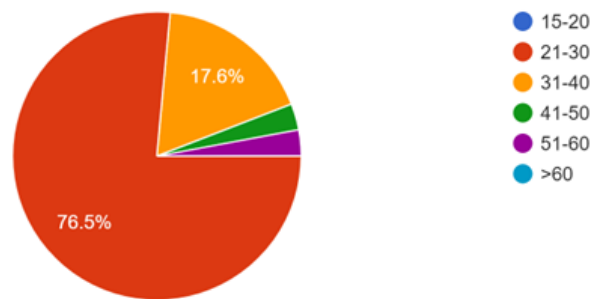
How is your productivity affected during the WFH?
35 responses

Legend:
- Increased from regular office spaces
- Decreased from regular offices spaces
- Didn't get effected much

40%
8.6%
51.4%
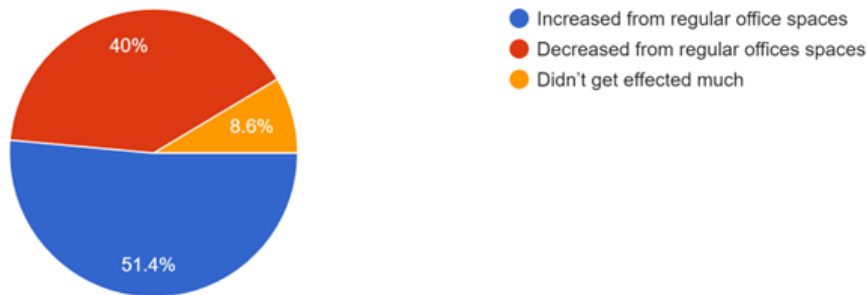
What was your preferred seating arrangement during work from home (WFH)?
35 responses

- Chair — 6 (17.1%)
- Bed — 5 (14.3%)
- Sofa — 3 (8.6%)
- Standing — 8 (22.9%)
- Chair and Work desk — 23 (65.7%)
- Dining table — 1 (2.9%)
- chair — 1 (2.9%)
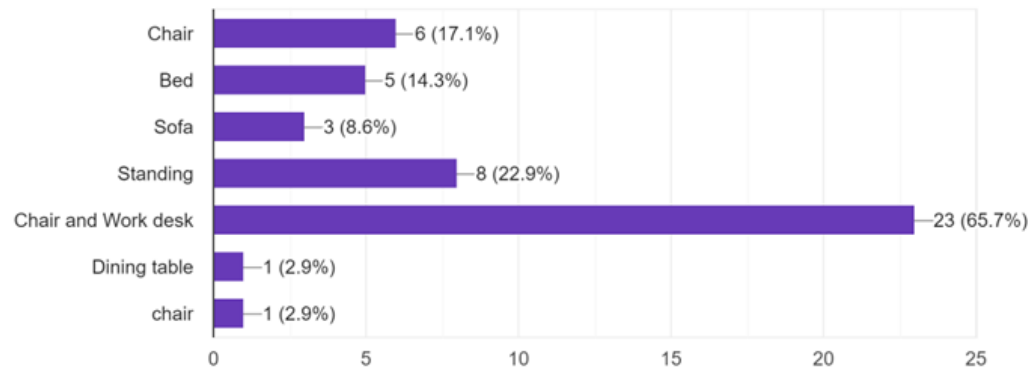
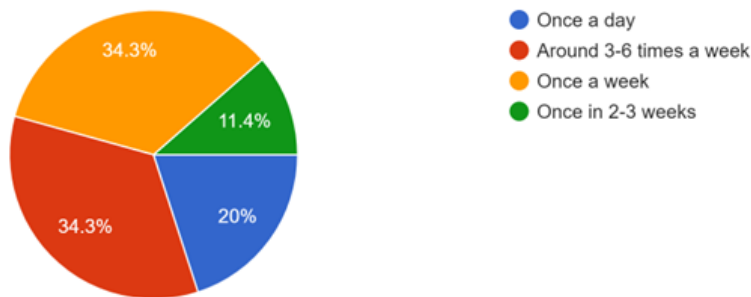### Do you find it difficult to have separation between professional life and personal life during WFH?
33 responses

Legend:
- Yes
- No

42.4%
57.6%
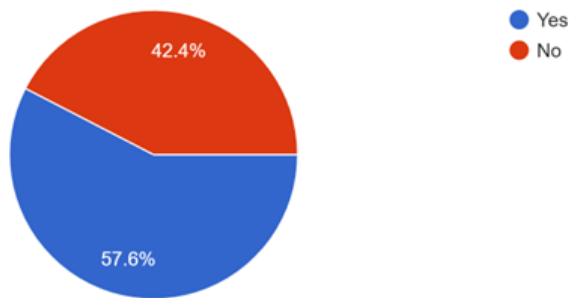
Most used space for working during WFH? (Within the house)
35 responses

Legend:
- Bedroom
- Work desk (assigned)
- Kitchen
- Living Area
- Balconies
- Living room/bedroom
- Work study room

25.7%
22.9%
42.9%
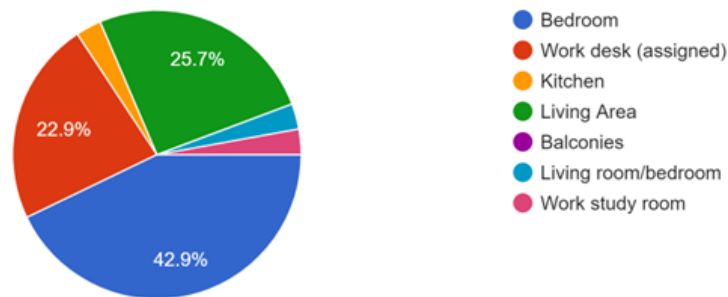
How often did you interact with your Neighbors prior to the pandemic?
35 responses

Legend:
- Once a day
- Around 3-6 times a week
- Once a week
- Once in 2-3 weeks

34.3%
11.4%
34.3%
20%

Would you prefer to get to know people within and around the community you are living in?

34 responses
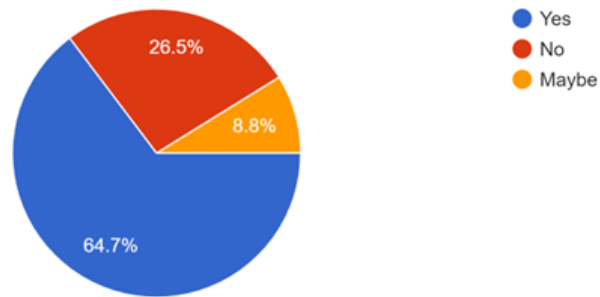
- Yes
- No
- Maybe

26.5%

8.8%

64.7%

Would you prefer to work in common spaces of the housing? (in general)

34 responses

- Yes
- No
- Maybe

29.4%

29.4%

41.2%
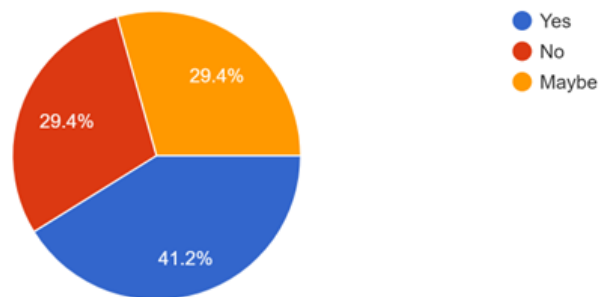
Do you think the existing housing layouts are suitable for remote working in the long term?

35 responses

- Yes
- No
- Maybe

17.1%

68.6%

14.3%

Thankyou