Senior's Urban Fresh

Therapeutic environment for seniors with dementia: urban green care farm

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"WHERE SENIORS CAN FEEL CONNECTED TO NATURE AND CONTRIBUTING & USEFUL MEMBER OF THE COMMUNITY BY DOING A MEANINGFUL ACTIVITY"

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SENIORS URBAN FRESH

THERAPEUTIC ENVIRONMENT FOR SENIORS WITH DEMENTIA: URBAN GREEN CARE FARM

SENIORS' URBAN FRESH

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PREFACE

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Firstly, I would like to thank my supervisors Masi Mohammadi, Olivia Guerra Santin, Leonie van Buuren, and Maarten Willems for their supervision and feedback during the graduation studio. In addition, I want to thank Caro van Dijk for her time and well-aimed remarks.

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Lastly, I would like to dedicate my thesis to my beloved grandfather Faik Budak who suffered from dementia in the last stage of his life.

ABSTRACT

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Thanks to the advances in medicine and other factors, people are living longer. As a result, the number of seniors is increasing rapidly in the Netherlands and worldwide. It affects the number of people with dementia, as dementia is related to age. This increasing number of seniors with dementia will create more need for long-term care services soon. In addition, it will give rise to a greater demand for innovative nursing homes because traditional nursing homes are not responding to seniors' social and physical needs with dementia.

This thesis aims to find a solution by examining the benefits of green care farms as person-centered & nature-based care practices and improving this typology with the help of dementia-friendly design considerations and vertical farming systems to make it possible to implement this typology in the cities.

The research addresses the problems tries to solve the problem based on the proposed design of the urban care farm unit. A complete research and design proposal have been made by applying selected guidelines derived from literature review, interviews, and case studies.

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INTRO-DUCTION

1.INTRODUCTION

Dementia is identified by memory loss or decline in other cognitive skills, which are dangerous enough to decrease a person's ability to perform daily activities. The literature review illustrates that the mortality rates are reducing the most at ages over 65. Life spans are rapidly increasing, so the number of senior citizens is rising. It affects the number of people with dementia, as dementia is related to age. It is expected that the worldwide number of people with dementia will increase from 9.95 million in 2010 to 18.65 million by 2050 (Boer,2017). Also, the number of seniors is rising exponentially in The Netherlands. This increasing number of seniors with dementia will create more need for long-term care services soon and give rise to a greater demand for nursing homes in the Netherlands (Boer,2017). It will create a shortage in nursing facilities around the world and the Netherlands. Therefore, increasing demand for nursing homes should be considered immediately.

Unfortunately, it is not the only problem that senior citizens with dementia will be facing. Additionally, most nursing homes for people with dementia are based on a medical model of care. This model is focusing on the physical needs of seniors and keeping the residents safe. Thus, many of them don't give the necessary attention to residents' social and physiological well-being. Additionally, seniors with dementia in these traditional care complexes have limited access to outdoor environments, so they rarely get in touch with nature and hardly take advantage of the therapeutic benefits of nature. Therefore, innovative person-centered care is getting more attention because they support seniors' physical, social, and psychological well-being besides their physical needs.

One of the innovative person-centered nursing home types which have an increasing trend is green care farms. Netherlands and Norway are the top counties in this field (Boer,2017). In 2013, the first green care farm providing 24-hour nursing home care for seniors with dementia had been opened in the Netherlands, and, since then, more green care farms have gradually started up and now provide nursing home care (Boer, 2017). This new type of dementia care facility offers an opportunity to bring seniors with dementia and nature together. It aims to use healing features of nature on people with dementia. This thesis aims to study the positive effects of therapeutic environments at green care farms that provide 24-hour nursing home care for seniors with dementia and discuss how they can be improved to implement this typology in the cities with the help of urban farming systems and dementia-friendly design strategies.

1.1. BACKGROUND INFORMATION ON DEMENTIA

Dementia is identified by memory loss or decline in other cognitive skills that are dangerously enough to decrease a person's ability to perform daily activities. It is often followed by an impaired function in communication, attention, reasoning, or visual perception (Alzheimer's disease facts and figures, 2017). Dementia is progressive, so it is continuously getting worse as time passes by. Alzheimer's disease is the most regular sort of dementia, accounting for 60 to 80 percent of

the cases (Alzheimer's disease facts and figures, 2017).

1.1.1 Stages of Dementia

Stage 1: No Impairment

In this stage, dementia is not detectable, memory problems or other symptoms related to dementia are not visible (Schüssler & Lohrmann, 2015).

Stage 2: Very Mild Decline

The senior and his family may observe minor memory issues such as losing some stuff around the living environment. However, it is not where the memory loss can be differentiated from average age-related memory loss (Schüssler et al., 2015).

Stage 3: Mild Decline

At this stage, people who live with the senior may start to see some problems in the senior's cognitive skills. A person in this stage of dementia may also often lose personal belongings, including valuable possessions. (Schüssler et al., 2015).

Stage 4: Moderate Decline

In stage four of dementia, clear-cut symptoms of dementia are visible (Schüssler et al., 2015).

Stage 5: Moderately Severe Decline

During the fifth stage of dementia, senior starts to require assistance with many daily activities. However, the senior in this stage maintains functionality. He still can bathe or use the bathroom independently. Also, a person in stage five generally still recognizes his family members and remembers some details about his personal history, mostly about his childhood and youth (Schüssler et al., 2015).

Stage 6: Severe Decline

The senior in this stage of dementia need regular assistance and frequently needs professional care (Schüssler et al., 2015).

Stages 7: Very Severe Decline

The seventh stage is the last part of dementia. It is because the dementia is terminal, a person in stage seven is impending death. In this stage, a person loses the ability to talk/communicate or respond to his surroundings. Whereas he may still say some words, he has no understating of his condition and needs support with all daily life activities (Schüssler et al., 2015).

Table 1.1: Symptoms and symptoms of dementia in each stage according to Reisberg Scale adapted from (DementiaCareCentral, 2020)

Global Deterioration Scale (CGS) / Reisberg Scale			
Diagnosis	Stage	Signs and Symptoms	Expected Duration of Stage
No Dementia	Stage 1: No Cognitive Decline	– Normal function – No memory loss – People with no dementia are considered in Stage 1	N/A
No Dementia	Stage 2: Very Mild Cognitive Decline	– Forgets names – Misplaces familiar objects – Symptoms not evident to loved ones or doctors	Unknown
No Dementia	Stage 3: Mild Cognitive Decline	– Increased forgetfulness – Slight difficulty concentrating – Decreased work performance – Gets lost more frequently – Difficulty finding right words – Loved ones begin to notice	The average duration of this stage is between 2 years and seven years.
Early stage	Stage 4: Moderate Cognitive Decline	– Difficulty concentrating – Forgets recent events – Cannot manage finances – Cannot travel alone to new places – Difficulty completing tasks – In denial about symptoms – Socialization problems: Withdraw from friends or family – Physician can detect cognitive problems	The average duration of this stage is two years.
Mid-Stage	Stage 5: Moderately Severe Cognitive Decline	– Major memory deficiencies – Need assistance with ADLs (dressing, bathing, etc.) – Forgets details like address or phone number – Doesn't know time or date or where they are	The average duration of this stage is 1.5 years.
Mid-Stage	Stage 6: Severe Cognitive Decline (Middle Dementia)	– Cannot carry out ADLs without help – Forgets names of family members – Forgets recent events – Forgets significant events in past – Difficulty counting down from 10 – Incontinence (loss of bladder control) – Difficulty speaking – Personality and emotional changes – Delusions – Compulsions and Anxiety	The average duration of this stage is 2.5 years
Late-Stage	Stage 7: Very Severe Cognitive Decline (Late Dementia)	– Cannot speak or communicate – Require help with most activities – Loss of motor skills – Cannot walk	The average duration of this stage is 1.5 to 2.5 years.

Table 1.2: Description of dementia in each stage according to Clinical Dementia Rating (CDR) Scale adapted from (DementiaCareCentral.com, 2020)

Clinical Dementia Rating (CDR) Scale		
Stage	**Description**	**Expected Duration of Stage**
CDR-0	No Dementia	N/A
CDR-0.5	Very Mild Dementia – Memory problems are slight but consistent. – Some difficulty with time and problem solving – Daily life is slightly impaired – Individuals can perform personal care activities	The average duration is a few years up to 7 years.
CDR-1	Mild Dementia – Memory loss is moderate, especially for recent events, and interferes with daily activities. – Moderate difficulty with solving problems – Cannot function independently at community affairs – Difficulty with daily activities and hobbies, incredibly complex ones	The average duration is two years.
CDR-2	Moderate Dementia – More profound memory loss, only retaining highly learned material. – Disorientation concerning time and place – Impaired judgment, with difficulty handling problems – Little to no independent function at home – Can only do simple chores – Fewer interests	The average duration is just under two years to 4 years.
CDR-3	Severe Dementia – Severe memory loss. – Disorientation concerning time or place – No judgment or problem-solving abilities – Cannot participate in community affairs outside the home – Requires help with all tasks of daily living – Requires help with most personal care – Frequent incontinence	The average duration is one year to 2.5 years.

1.1.2. Needs of Seniors with Dementia

Social, psychological, and physical needs are basic human needs, so all those needs of seniors with dementia should be considered as a whole, and they all should be met equally. It is believed that seniors' psychosocial and social needs and physical needs are primary aspects of high-quality dementia care (Hansen, Hauge, & Bergland, 2017). Individual care should go beyond meeting physical needs, such as nutrition, medication, personal hygiene, and domestic chores, and consider social and psychological needs such as social participation, collective attachment, developing trust, social belonging, social cohesion, and developing solid relationships. As seniors with dementia have a substantial risk of being socially and physically isolated from the community and feeling lonely, having social contact with others, developing confident relationship, and joining meaningful & varied activities are essential to improve the quality of life and social & physical well-being of seniors with dementia (Hansen et al., 2017).

When social needs are not satisfied, this can lead to mental health problems like depression, anxiety, apathy, and irritability. (Hansen et al., 2017). Similarly, unmet social needs can cause reduced physical health; for example, an unmet need for social connection may lead to decreased appetite and malnutrition. (Hansen et al., 2017). Therefore, it should be considered that psychological and physical health profoundly impact each other.

As a result, physical and psychological needs should not be separated, but they must be addressed simultaneously.

According to literature, participation in hobbies and volunteer work, being connected contribute to their well-being and a feeling of independence (BRUGGENCATE, LUIJKX, & STURM, 2017). Previous studies stated that staying active by doing volunteer work or participating in (leisure) social activities satisfies social needs (BRUGGENCATE et al., 2017). Therefore, researchers suggest that interventions focus primarily on the older adult's connectedness, participation, and independence (BRUGGENCATE et al., 2017).

1.1.3. Life Quality of Seniors with Dementia

Defining factors related to the life quality of seniors with dementia could allow us to find ways to increase it. Numerous factors affect their life quality.

These factors cover physical, psychological, social, and environmental aspects (Jing, Willis, & Feng, 2016). Additionally, the factors affecting their life quality depending on their life settings and perspectives (Jing et al., 2016).

1.1.3.a) Physical Factors

Physical factors related to the life quality of seniors with dementia are physical independence, physical health, and physical activities (Jing et al., 2016).

Previous research suggests that active participation in daily physical activities contributes to the life quality of seniors with dementia. Such physical activities can involve bodily exercise (like aerobic, balance, and flexibility) and leisure activities (Jing et al., 2016). In addition to physical activities, keeping physical body-safe, cleanliness, comfort, and nourishment positively impacts their life quality (Jing et al., 2016).

1.1.3.b) Psychological and Emotional Factors

Psychological and emotional factors, including psychological and behavioral symptoms, positive mood, control, autonomy, dignity, contributing, and self-efficacy perception, play a vital role in

the life quality of seniors with dementia. (Jing et al., 2016)

1.1.3.c) Social Factors

Regarding social factors, having a good relationship, communication, social connection, and volunteering are four crucial aspects of life quality of seniors with dementia (Jing et al., 2016). It is claimed that a higher quality of relationship with family, friends, neighbors, and caregivers, either family caregivers or care staff, positively influences their life quality (Jing et al., 2016). Moreover, social connection with family, community, and nature, such as gathering and talking with family, friends, and neighbors, access to nature, and participation in social activities contribute to a higher level of life quality (Jing et al., 2016).

1.1.3.d) Environmental Factors

Features of the surrounding environment are also valuable for life quality in dementia, specifically for seniors with dementia in care institutions. For instance, high or low temperature and low lightening in their bedroom or high noise level could decrease their life quality (Jing et al., 2016).

Additionally, having a single room, a window to look out and take fresh air, placing their personal belongings in the environment through familiar objects such as furnishings and photographs, and a homelike environment could improve the life quality of seniors with dementia (Jing et al., 2016).

1.1.4. Conclusion

In this research, the target group will be senior citizens between the first and seven stages of dementia. This decision aims to cover all the stages to make it worthwhile for seniors from all stages of dementia. These stages cover mild-moderate and late stages of dementia, so it will be essential to take into account the sign and symptoms of each step and provide care according to their needs to create a dementia-friendly environment for seniors.

Additionally, this section has reviewed various vital factors that determine the life quality of seniors with dementia from physical, psychological, social, and environmental aspects and their social, physical, and psychological needs. Consequently, to increase the life quality of seniors with dementia, it is essential to provide a dementia-friendly environment, such as a familiar and comfortable living environment for seniors with dementia where their social, physical, and psychological needs are met equally.

Moreover, a dementia-friendly environment should go beyond the physical environment to a human environment where seniors could actively engage with the surrounding. It may help seniors with dementia to have a feeling of warmth and being loved. (Jing, Willis, & Feng, 2016)

Table 1.3: Progress of Dementia

Progress of dementia	Symptoms
Mild Dementia Average duration seven years Independent living & Daycare	• Forgetfulness arises • Communication difficulties (e.g., finding the right words) • Losing track of time • Problems of instrumental activities (e.g., household, finances) • Mood and behavior changes (e.g., depression, anxiety, aggression)
Moderate Dementia (Average duration four years) Assisted Living	• Forgetfulness progress (e.g., recent events, names of people) • Communication problems progress • Difficulties with time and orientation • Problems of instrumental activities progress • Unable to live alone safely • Issues with some daily activities • Behavioral changes progress (e.g., wandering, aggression, disturbed sleep
Severe Dementia Average duration two years Intensive Care	• Incontinence (loss of bladder control) • Difficulty speaking/ Cannot speak or communicate • Delusions and Anxiety (Personality and emotional changes) • Require help with all activities / Cannot carry out ADLs without help • Loss of motor skills / Cannot walk • Disorientation concerning time or place

1.2. PROBLEM DEFINITION

1.2.1. Aging Population & Increased Number of People with Dementia

Due to advances in medicine and other factors, people are living longer in the world. Therefore, a high proportion of the population is over 65 age and above. Also, it will dramatically raise both in developed and developing countries in the coming years (Grazuleviciute-Vileniske et al., 2020). The literature review illustrates that the mortality rates reduce the most at ages over 65, and life spans are most rapidly increasing at over 75 years (Crews & Zavotka, 2006). Because of the

increase of the period mentioned above groups in the last years, the number of senior citizens is rising.

Moreover, it affects the number of people with dementia as dementia is related to age, and the population in the world is getting older every day. It is expected that the worldwide number of people with dementia will increase from 9.95 million in 2010 to 18.65 million by 2050 (Boer,2017).

Additionally, the number of seniors is rising exponentially in the Netherlands. Nowadays, about 15% of the Dutch population is older than 65 years old, and it is accepted that it will increase to about 24% by 2050 (Bongers, Verweij & De Beer, 2008). By 2050 the number of seniors with dementia in the Netherlands is estimated to increase from 250,000 to 410,000 (Health Council of the Netherlands, 2002). This trend is typical for the western part of the world (Bruin, Oosting, Zijpp, Enders-Slegers, & Schols, 2010).

This increasing number of seniors with dementia will create more need for long-term care services soon and give rise to a greater demand for nursing homes in the Netherlands (Boer,2017).

1.2.2. Main Problems Dementia Care Approach in Traditional Nursing Homes

Most of the nursing homes for people with dementia are based on a medical model of care. This model is focusing on the physical needs of seniors and keeping the residents safe. Thus, many of them have an institutional appearance and still rely on this medical model of care. Traditional dementia care is usually delivered in large-scale facilities, and the daily life routines of residents are decided mainly by the nursing staff. It is limiting the residents' independence (Boer, 2017). Researches demonstrate that seniors with dementia who stay in nursing homes spend most of their time doing little or nothing during the day while remaining in a lying or sitting position, without any social interaction with other people or any interaction with their surrounding environment (Ice, 1970). However, creating possibilities for social engagement is essential for seniors with dementia to maintain their social well-being.

Additionally, having social contacts is a basic human need, and it should be considered while designing dementia care centers. As mentioned in the first chapter, to increase the well-being of seniors and their life quality, their social and psychological needs should be met as equally as their physical needs. Unfortunately, this is usually not the case in traditional dementia care centers.

Moreover, people staying in traditional dementia care centers are rarely engaged in meaningful activities. This situation causes some problems because having something meaningful to do is essential for nursing home residents. It allows them to interact with other people and experience feelings of pleasure and success during routine activities (Vernooij-Dassen, 2007). Participation in activity is an essential indicator of nursing home quality. As Ouden (2015) states, daily life is a dynamic and multidimensional concept constituted by more than activities. The physical environment of nursing homes is also significant for the daily life quality of their residents. For example, outdoor areas that accommodate activity may reduce levels of agitation in people with dementia (Tolson, D. et al.,2011). However, seniors with dementia in these traditional care complexes have limited access to outdoor environments, so they rarely get in touch with nature and hardly take advantage of the therapeutic benefits of nature.

1.3. RESEARCH QUESTION

"How can an innovative dementia care approach with the help of smart urban farming systems and dementia-friendly design strategies enhance the psychical and social wellbeing of senior citizens with dementia?"

General Problem

- Increasing aging population and number of seniors with dementia

General Objective

- Architectural solution for solving the care need for senior citizen with the help of innovative care approaches

Actual Problem

- Actual Problem1 : the problems of traditional care approach
- Actual Problem2: need for innovative person centered dementia care approaches

RESEARCH QUESTION

- *How can an innovative dementia care approach by help of smart urban farming systems and dementia friendly design strategies enhance the psychical and social wellbeing of senior citizens with dementia?*

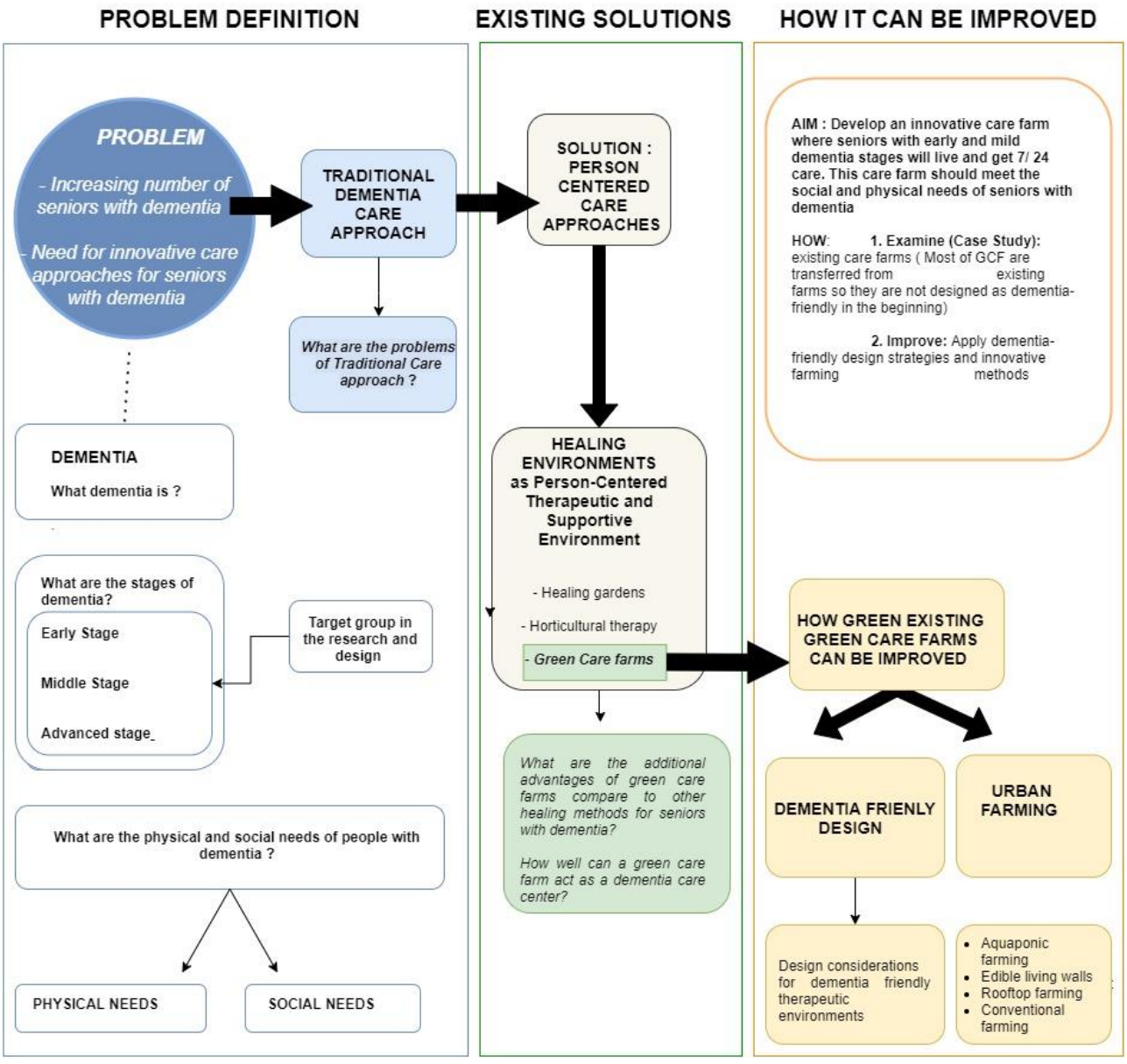
Factors

-Benefits of care farms
- Dementia friendly design
-Therapeutic design
- Healing environments
-Vertical farming
-Rooftop farming
- Green care farms

Figure 1.1: Structure of the research

1.4. DEVELOPMENT OF RESEARCH

Table 1.4: Development of the research – Detail version is in the appendix



1.5. METHODS

The research tools of this thesis are literature review, comparative case studies, interviews, personas, and research through design.

Literature review

- The literature has been based on the following main topics:
- Problems related to the aging population
- Increasing need for dementia care because of the increased number of people with dementia
- Background information on dementia such as stages of dementia, social, physical, and psychological needs of people with dementia, factors affecting life quality of seniors with dementia
- Traditional dementia care approach
- Main problems about traditional dementia care approach
- Existing solutions to central issues of conventional dementia care approach such as horticultural therapy, therapeutic horticulture, therapeutic garden healing garden, and care farms
- Green care farms and their benefits on seniors,
- Vertical farming method and its benefits & effects on seniors
- Dementia-friendly design strategies,
- A daily program for senior citizens in green care farms

The first part of the literature study is aimed to get a better understanding of dementia, the existing situation in care facilities, and problems of the current situation. At the same time, further research is more focused on solutions to those problems, such as green care farms, and how those solutions can be improved by architectural implementations essential to address the needs of seniors with dementia. From these sources, a series of guidelines were retrieved, constituting a framework for the design process. Additionally, in the last part of the literature review, vertical farming and its methods have been studied to understand better how those innovative systems can improve care farming typology and seniors' life quality in green care farms.

The various types of scientific literature were used, such as books, articles, journals, conference papers, guides, website scientific articles, etc.

Case studies

In total, 6 case studies were investigated. Two case studies were green care farms. The main criteria of choosing those care farms were that they are providing 24-hour care. Those care farms were analyzed in terms of daily life in green care farms. Other four case studies were investigated to understand dementia-friendly design strategies better and their implementations in nursing home design. A comparative analysis of four case studies was done in terms of outdoor area, common& private areas, circulation, room layout, and the relation between courtyard, corridors, common areas, and remote units. The main aim of the comparative case study was to understand their design application on those points.

Interview and investigation of previous one-to-one interviews with seniors with dementia & their family caregivers

One of the caregivers from De port Zorgt was interviewed by email. Visiting care farms or some other objects of case studies was not possible due to Covid 19 measures. Therefore, questions were sent by email. She shared information about the daily life of seniors at the care farm. Additionally, previous papers that collect one-to-one interviews with seniors with dementia & their family caregivers were analyzed to understand better the vision of seniors and their family members on green care farms and vertical farms. One of those papers was written by Bruin,

Buist, Hassink, & Vaandrager, (2019). They interviewed 39 people with dementia attending nature-based ADSs in urban areas and their family caregivers, and 17 providers of these services and gather all those information in the paper called: 'I want to make myself useful': the value of nature-based adult day services in the urban area for people with dementia and their family care givers. Shu-Ying Tsai and Yi-Shan Tsai wrote another paper. They interviewed 12 seniors staying in the Happiness Community in Taipei City to understand vertical farms' effects on their living environment.

Research through design

One of the main tasks of this thesis was to create a design in which design solutions derived from case studies, literature reviews, and interviews can be tested and implemented. Therefore, design strategies are implemented on the design proposal—issues and challenges faced during the process solved by researching those weak points again.

Aim for the Design proposal

Bringing green care farm typology for seniors with dementia into the cities with the help of innovative farming methods and dementia-friendly production and feel a contributing member of society. Design strategies to make them able to be part of actual agricultural production.

2

EXISTING SOLUTIONS

2.EXISTING SOLUTIONS ON PROBLEMS OF TRADITIONAL CARE APPROACH IN NURSING HOMES

When all related aspects of daily life for seniors with dementia are considered, living in a traditional nursing care center is not meeting the social and physical needs of seniors with dementia. Additionally, the International Association of Gerontology and Geriatrics & the World Health Organization has stated that there is an increasing demand for innovative care approaches to enhance the quality of care in nursing homes (de Boer,2017). Therefore, alternative innovative care approaches to traditional care approaches will be analyzed for seniors with dementia in this chapter.

2.1. PERSON-CENTERED CARE APPROACH

There is a gradual shift from traditional long-term care and support services, such as ADS centers, which have a solid medical orientation, to a more psycho-social care approach that focuses more on the psycho-social consequences of dementia (Bruin et al., 2015). Thus, there is a shift to person-centered care that focuses on well-being and individuals' sense of identity (Finnema, Droes, Ribbe, et al., 1997). According to Bruin (2015), due to this paradigm shift, innovations in dementia care have taken place, including new types of small-scale and homelike facilities.

As a result, traditional large-scale dementia care centers are being replaced into smaller groups that provide a more homelike environment and a familiar atmosphere for people with dementia. Moreover, various alternative facilities to traditional nursing homes are developing all around the world. Some examples are small-scale living facilities, stand-alone units. Nowadays, green care farms that provide 24-hour nursing home care for people with dementia have started (de Boer, B. S.2017).

2.2. HEALING ENVIRONMENTS WITH THE HELP OF NATURE FOR PEOPLE WITH DEMENTIA

There is a growing interest in the effects of a green environment and nature on seniors' social, psychological, and physical well-being with dementia. Green Care farms, city farms, healing gardens, and horticultural therapy are practical examples of the relationships between nature and health (Elings & Hassink, Farming for Health in The Netherlands). In these methods, they are trying to focus on engaging seniors with dementia in activities. Their main goal by doing

this is giving seniors a feeling of meaning in life, enabling them to feel accomplishment, allowing them to express themselves, and creating possibilities for socializing (Verbeek, Rossum, Zwakhalen, Kempen, & Hamers, 2008). Although horticultural therapy, therapeutic horticulture, healing gardens, green care farms, therapeutic gardens have similar purposes, they have slight differences.

- "Horticultural therapy is the use of plants by a trained professional as a medium through which certain clinically defined goals may be met." (Elings,2016) (Sempik 2003)
- "Therapeutic horticulture is the process by which individuals may develop wellbeing using plants and horticulture. This is achieved by active or passive involvement." (Elings,2006)
- "Care farming is the use of commercial farms and agricultural landscapes as a base for promoting mental and physical health, through normal farming activity." (Gorman, 2020)
- "Therapeutic garden is a plant-dominated environment purposefully designed to facilitate interaction with the healing elements of nature. Interactions can be passive or active depending on the garden design and users' needs." (Williams, About Therapeutic Gardens)
- "Healing gardens are specifically designed to stimulate senses, to experience rest and beauty, and to activate people. They are usually part of a hospital or a health institution. (Sempik 2003)

2.2.1. The Distinction Between Healing Gardens and Therapeutic Gardens in The Healthcare Environment

The term healing garden or therapeutic gardens has generally used interchangeably. However, some papers state the distinction between those terms more clearly. A healing garden has been defined as an area designed to provide certain therapeutic benefits for most users (Uwajeh, Polay, & Iyendo, 2018). The distinction between healing gardens and therapeutic gardens is that the design of a healing garden aims to achieve a broad set of goals. In contrast, creating a medicinal garden is chiefly dictated by one or more specific patient groups (Uwajeh et al., 2018). However, horticultural therapists often refer to healing gardens or therapeutic gardens as environments that offer gardening activities and encourage physical movements (Uwajeh et al., 2018).

2.2.2. Effects of Therapeutic Gardens on People with Dementia

In the specialized healthcare setting, therapeutic gardens have been found to impact people with dementia positively. It suggested that a therapeutic garden within a healthcare environment can decrease the agitation and behavioral changes of seniors with dementia (Uwajeh, Iyendo, & Polay, 2019). Additionally, it is claimed that seniors with dementia derive benefits from exposure to gardens that provide opportunities for walking, socialization, improving self-esteem, decreasing depression and aggressive behaviors, and reducing isolation and vulnerability (Uwajeh et al., 2019). Studies suggest that seniors with late-stage dementia who have access to an indoor Japanese garden at a nursing home had reduced heart rate. Also, they improved short-term and long-term memories and improved behavioral symptoms (Uwajeh et al., 2019).

2.2.3. Effects of Gardening and Horticulture Therapy on People with Dementia

Previous research suggests that gardening activities have both psychological, spiritual, and social benefits. It can be cost-effective to enhance the well-being and quality of seniors with dementia (Uwajeh et al., 2019. Additionally, physical activities in gardens have been highly recommended to seniors with dementia for therapeutic rehabilitation because gardening has reduced agitation, inappropriate or aggressive behaviors, and increased mental status (Uwajeh et al., 2019). Additionally, gardening activity may likewise promote general health and quality of life, cognitive function, as well as physical strength, and socialization (Uwajeh et al., 2019).

2.3. CONCLUSION

To sum up, a person-centered care approach and healing environments with the help of nature for people with dementia are essential to increasing their life quality and social, physical, and psychological wellbeing. Green Care farms, city farms, healing gardens, and horticultural therapy are prominent examples of the facilities that establish relationships between nature and health. In the next chapter, green care farms will be analyzed regarding their effect on senior's wellbeing.

3

CARE FARMS

3.CARE FARMS

Meaningful activities and allowing seniors with dementia to maintain their quality of life as much as possible have a vital role in providing person-centered care for people with dementia (Lawton, 2001). This situation causes a high demand for various innovative nursing homes that meet individuals' psychological, social, and physical needs. Green care farms with a person-centered care approach are giving 24- hour care for seniors with dementia. It is a new type of small-scale living typology developing in the Netherlands (de Boer, 2017).

Care farming (also referred to as 'farming for health,' 'social farming,' or 'green care in agriculture) defined as 'the use of commercial farms and agricultural landscapes as a base for promoting mental and physical health, through regular farming activity (Gorman, 2020).

According to de Boer 2017, there are approximately a thousand green care farms. Almost 200 of them provide care for seniors with dementia (de Boer, 2017).

All green care farms have some degree of farming and care, but the ratio between agriculture and care may change. For example, some green care farms are real farms with agricultural production, while for others, providing care is the primary income, and agricultural production is a secondary source of income (Boer,2017).

Table 3.1: Number of care farms according to the database of the national support center agriculture and care (Hassink, Hulsink, & Grin, 2014*)*

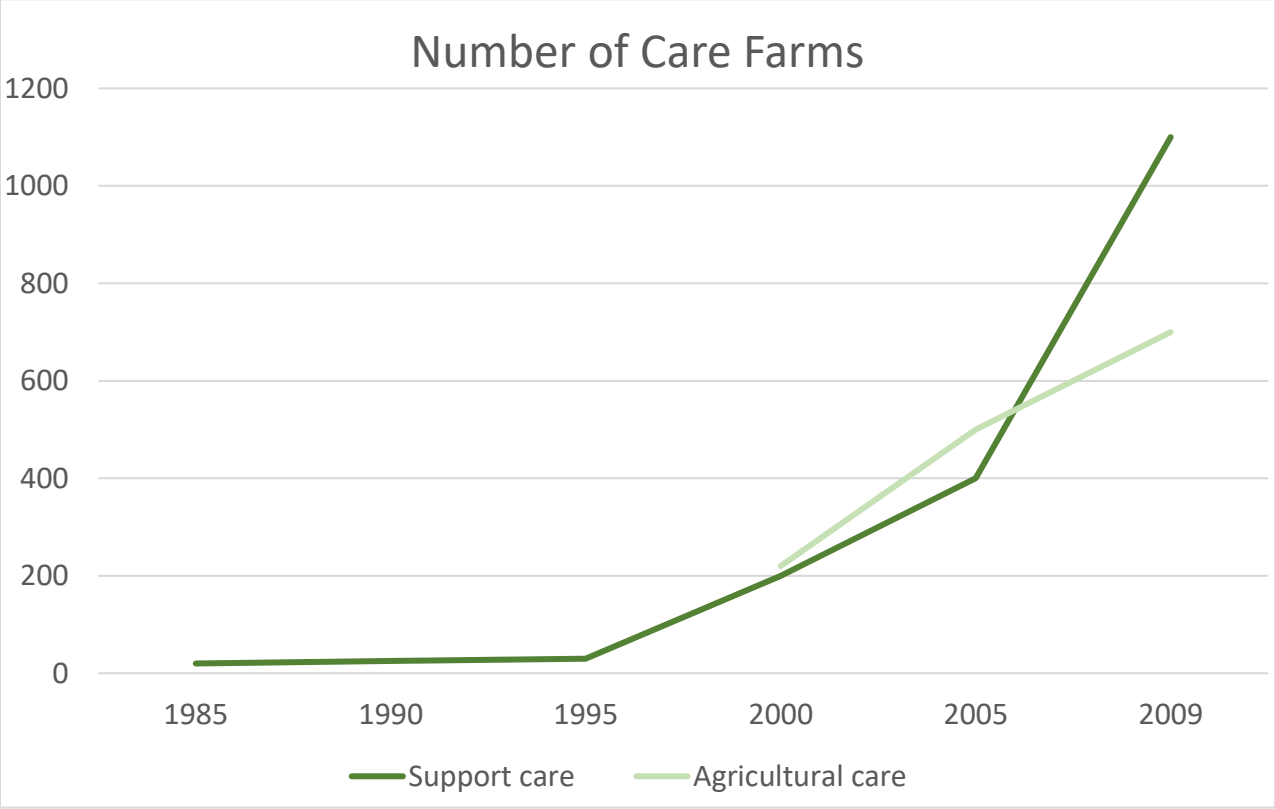


Figure 3.1: Impression of care farms (Boer et al., 2017)

3.1. DIFFERENCE BETWEEN OTHER HEALING ENVIRONMENTS AND GREEN CARE FARMS

The main difference between horticultural therapy and green care farms is that horticultural therapy uses plants as a therapeutic medium. It aims to reach therapeutic goals; agricultural production is not essential. On a Green Care farm, working with plants is a commercial activity. Crop quality and quantity are important; residents of care farms participate in the agricultural production process (Elings, M., & Hassink, J. 2004).

Research shows that green care farms can be a healthy working environment for seniors with dementia. The physical work on the farm brings residents back to themselves; they feel their own body and contact with their immediate environment. In addition, the residents of green care farms learn to work with other participants and produce a quality product. (Elings, M. et al., 2004).

Additionally, Elings (2004) claims that a specific value of working on a green care farm with actual agricultural production is higher compared to working on a green care farm that produces agricultural products as a hobby. His study shows that the presence of a farmer is significant for seniors. The farmer is a role model, and he is not a therapist or a social worker. The farmer is an expert in farming and has a strong bond with the farm, which gives participants safety and clarity. They can always count on the knowledge and expertise of the farmer. The farmer makes the participant use the farming environment as a challenge for development (Elings, M. et al., 2004).

3.2. 24-HOUR GREEN CARE FARMS

A few green care farms are now offering 24-hour nursing home care, which means people with dementia live on the farm in the same way as other nursing homes. According to Boer (2017), there is no similar care facility to green care farms. Green care farms have similar characteristics to small-scale living facilities for seniors with dementia. A small group of residents lives together in a home-like and noninstitutional house on the terrain of a farm (Boer,2017). The environment of the green care farms is distinct from existing nursing homes. People living in green care farms can go outdoors independently and take care of gardens or animals when they want. Other daily activities of 24-hour green care farms involve housework, farming activities, social activities, and recreational activities. Most importantly, this wide range of activities is a part of normal daily life, so they occur naturally. (Bruin et al., 2010).

3.2.1. 24-Hour Green Care Farms as Alternative to The Traditional Nursing Home

Boer has done a literature study to investigate whether seniors who stay in care farms that give 24-hour nursing care involve more in (physical) activities and social interaction than seniors who

remain in other nursing homes (Boer et al., 2017). According to the results of his study, green care farms can be a valuable alternative to traditional nursing homes because they provide an attractive, homelike environment and activities, which positively affect engagement and social interaction, which can improve seniors' social, physical, and psychological wellbeing and quality of life(Boer et al., 2017).

3.3. MAIN DIFFERENCES BETWEEN TRADITIONAL NURSING HOMES AND GREEN CARE FARMS

Green care farms have an open environment. It means that residents have the freedom to move around as they please. One of the main aims of green care farms is providing a stimulating atmosphere that encourages people with dementia to be active and involves in daily activities more. Boer (2017) states that by providing care in such an innovative environment, green care farms offer the chance to have an active and meaningful life, which is difficult to achieve in more traditional nursing homes. As mentioned before, seniors are primarily dependent on the nursing staff in conventional nursing homes and don't have an active life. This situation decreases the independence and quality of their lives. In the long term, it causes a result of losing their meaning of life. However, green care farms, helping continuous meaningful activities, develop a feeling of success and independence.

Besides, in traditional nursing homes, several interventions provide residents with activities (animal-assisted therapy, nature-based interventions, recreational activities, other social and physical interventions). However, as at regular day-care services for people with dementia, these interventions are not continuously present in the nursing home environment (Boer,2017). It contrasts with green care farms, where many elements of the mentioned interventions naturally occur in the environment that can stimulate people with dementia using sounds, touch, and tastes (animals, fresh fruit, and vegetables). Therefore, additional sensory stimulation interventions are not necessary. The same applies to interventions aimed at physical activity; instead of offering interventions aimed at physical activity, the environment and possibilities for activities stimulate people to be physically active (walking in the garden, getting vegetables from the yard) (Boer,2017).

Additionally, green care farms provide more opportunities to get in touch with other residents and staff. It increases the level of social interaction which seniors have during the day. Thanks to this high-level social interaction, they can develop social cohesion and social belonging more quickly to the community of green care farm. Thus, it is helpful to decrease the feeling of loneliness and anxiety which occurs due to the isolation from the community.

The goal of green care farms is to continuously provide residents all these opportunities and improve the physical, social, and psychological well-being of seniors with dementia with the help of nature and an open environment.

Table 3.2: Main advantages of green care farms over traditional nursing homes

TRADITIONAL NURSING HOMES	GREEN CARE FARMS
Depending on nurses	Having an opportunity to go outdoors and take care of plants or animals independently
Limited physical activity	Providing a stimulating environment that encourages people with dementia to be more active and to initiate daily activities themselves
Several interventions are used to provide residents sensory activities; however, these interventions are not continuously present in the environment of the nursing home	Interventions naturally occur in the environment of green care farms. Therefore, additional sensory stimulation interventions are not necessary
Spending most of their daily life doing little or nothing while remaining in a lying or sitting position, without social interaction	The environment and possibilities for activities stimulate people to be physically active (walking in the garden, getting an egg from the chicken, or vegetables from the yard)
Rarely engaged in meaningful activities	Having meaningful purpose and activity
Limited connection with other people and to experience feelings of pleasure during their day	Opportunities for social interaction and friendship
They feel isolated from the community	They feel still a participating member of the community
Not feel like they are part of the community in the nursing home	Developing social belonging for the farm

3.4. BENEFITS OF DEMENTIA CARE PROVISION AT FARMS IN TERMS OF HEALTH AND SOCIAL WELLBEING

1. There are various therapeutic benefits in terms of health and wellbeing of being outdoors and maintaining connections with nature, such as improved emotional and mental wellbeing, restoration, physical relaxation, improved mood, and decreased depressive feelings. Also, natural sunlight can help regulate the sleep-wake cycle. Besides, after a certain point in dementia, many seniors with dementia might risk significant weight loss and dehydration. Therefore, living on a farm could improve their food and fluid intake (Caspi, 2015)

2. Seniors who are living on a farm are physically more active. Living on a care farm offers many opportunities for naturally occurring physical activities such as gardening, harvesting fruits and vegetables, planting, farming, and taking care of farm animals like chickens (Caspi, 2015).

3. Green care farms offer multisensory stimulation to their residents. The characteristics of farms and the wide variety of activities offered in many farms enable seniors with dementia to use their five senses (smell, taste, touch, hearing, and sight). In addition, being in nature offers frequent and spontaneous organic opportunities for using these senses (Caspi, 2015).

4. Doing the different works on the green care farm can give seniors with dementia the feeling that they are needed, useful, productive, and helpful to others and contributing members (Caspi, 2015).

5. Green care farms provide lots of possibilities for learning and personal growth. Many seniors with dementia can learn pretty well through repetition, practice, clear and consistent routine. Additionally, the various activities and works on green care farms can promote choice, personalization, a stronger sense of autonomy, and identity (Caspi, 2015).

6. Working closely together with farmers and peers may provide natural opportunities for socialization and friendships. It can decrease social isolation and feelings of loneliness (Caspi, 2015).

8. Most of the time, seniors with dementia struggle to maintain their self-esteem and confidence. Appreciating their contributions to the work on the farm could encourage seniors to take responsibility, which may strengthen their sense of independence (Caspi, 2015). Furthermore, it is worth mentioning that developing close and trusting relationships are essential for people with dementia. Working together with the same farmer over time can strengthen these relationships, reinforce a sense of reciprocity and mutual appreciation (Schols et al., 2006).

9. Engagement of seniors with dementia in the various activities and green care farms could help reduce behavioral changes and promote positive emotional states when these activities are planned and delivered well. For example, it could lead to a reduction in feelings of anxiety and aggressive behaviors. Also, it could decrease the use of psychotropic medications that are mostly ineffective and expensive and have many dangerous side effects (Hassink et al., 2010).

10. Green care farms provide natural opportunities to meet the spiritual needs of seniors with dementia include simply being in regular connections with nature, caring for

animals, working in the fields, and growing & harvesting vegetables & fruits. (Caspi, 2015).

11. Green care farms have a small-scale environmental feature that helps seniors with dementia develop a sense of being at home (Bruin et al., 2010).

Figure 3.2: Impression of care farms (Prades, 2019)

Table 3.3: How care farm benefits respond to physical needs of seniors with dementia

Physical Needs of Seniors with Dementia	Physical Benefits of Care Farms for Seniors with Dementia
• Physical activity includes leisure time activity (e.g., gardening)	• Physical activities • Contact with nature and animals
• Transportation (e.g., walking)	• Quality Time spent outdoors
• Planned exercise in the context of daily life	• Activity engagement
• Family activities • Community activities	• Meaningful outdoor activities with community and family members

Table 3.4: How care farm benefits respond to social needs of seniors with dementia

Social Needs of Seniors with Dementia	Social Benefits of Care Farms for Seniors with Dementia
• Social participation	• Mental engagement and social interactions
• Collective attachment • Social cohesion	• Sense of accomplishment and being a part of collective work
• Spend time with family	• Encourages family interaction
• Social belonging	• Sense of meaning in life
• Sense of independence	• Feel understood, recognized, and seen as people who can give a significant contribution

3.5. CASE STUDIES WITH 24 HOUR GREEN CARE FARMS

3.5.1. Goddard House Brooklyn

Goddard House is an organization to support seniors with dementia by assisted living and memory support in a care farm setting. It is located in the USA. They have outdoor organic vegetable gardens with six garden beds that stand at waist height and allow residents to do gardening activities from a standing or sitting position. Ginny Mazur (2019) states that gardening provides an opportunity for meaningful activity and socialization with other residents. Everything harvested from the garden is served in the dining room of Goddard house. Residents work with a farmer to plant, grow, maintain, and harvest various vegetables and herbs, from tomatoes, onions, and banana peppers to rosemary, mint, and parsley. Last year, over 200lbs (90kg) of vegetables were harvested and served in the dining room.

Additionally, although scientific research has yet to confirm this, chickens' positive effects on residents have been observed at Goddard House (Mazur,2019). Having farm animals at Goddard House seems to have a therapeutic calming impact on residents. Collecting fresh eggs each morning, feeding, and caring for the chickens have become part of residents' daily lives at Goddard House. The chicken coop is situated along with one of the walking paths, and two park benches have been placed nearby so that residents can sit, observe, and interact with the animals.

Farming programs at Goddard House have had to be put on hold during the winter months because of weather conditions; therefore, an indoor garden has been built. Now farming activities continue all year long with the help of 24/7 sun lamps (Mazur,2019). Bok choy, mint, lettuce, cilantro, parsley, and chard is growing in the indoor garden. Every week, residents and farmers harvest the herbs to add a tasty touch to the dining menu during winter. Aside from providing a pleasant taste of the outdoors, these indoor gardens allow gardening all year-'round. It is growing in Goddard house Brooklyn: Blueberries, zucchini, garlic, chives, lettuce, ornamental flowers, beans, oregano, radishes, cucumbers, lavender, sage, carrots, and beets.

Figure 3.3: Photographs from Goddard house Brooklyn

3.5.2. De Port Zorgt

De Port Zorgt is a 24/7 care farm located on the southern side of the Netherlands. They are specialized in seniors who have psycho-geriatric problems and dementia. There are three houses where 27 people live, so in each housing unit, nine people accommodate. Generally, people with later-stage dementia stay on the ground floor, and the upper floor is mainly for seniors with early-stage dementia.

According to the information Maud Coolen, one of the caregivers at De Port Zorgt, shared that the morning starts at the farm around 9:00 am. After breakfast, seniors drink a coffee, read newspapers, and discuss what needs to be done on the farm that day. Then, half of the residents prepare the food (they prepare the lunch themselves, with fresh vegetables from the vegetable garden). The other half will take care of the animals under supervision and work on farming and planting activities. In the garden, hoeing in the garden, planting plants, and taking care of animals are given by Mrs. Coolen as activity examples in which seniors with dementia usually engage.

There is also a daycare on the care farm, and people who visit the daycare are in phase 1 or 2 of dementia. Thus, they can communicate well and can physically assist with activities that happen on the farm. Seniors can join daycare activities Monday to Friday from 10:00 to 16:00. They decide which activity they prefer. These activities can vary from simply enjoying the countryside and the outdoors, helping feed the animals, preparing the hot meal, making decorations for home and garden, and being active in the vegetable garden under supervision.

In the 24-hour care farm, people with a later stage of dementia participate in activities based on their capacities, and they are often less active than people from daycare. Example activities for the latest stage are picking beans or strawberries in the raised vegetable trays, sitting next to a table and processing the vegetables, or simply watching someone else do the activities. According to Maud Coolen, it is about a pleasant daytime activity, not about work. Also, she mentioned that if senior likes it, involvement in agricultural activities can occur up to the last stage of dementia.

Lastly, the 24-hour care farm employs +/- 25 caregivers, nurses, and three employees, and ten volunteers work on the daytime activities. Stuff members do not have their room on the care farm.

Figure 3.4: Photographs from De Port Zorgt

3.6. INTERVIEWS ON NATURE-BASED ADSS IN URBAN AREAS

Bruin, Buist, Hassink, & Vaandrager (2019) interviewed thirty-nine seniors with dementia participating in urban nature-based ADSs (Adult Day Services), their family members, and seventeen care providers of these services. They gathered all that information in the paper called 'I want to make myself useful': the value of nature-based adult day services in the urban area for people with dementia and their family caregivers. In this chapter, all the information is taken from that paper (Bruin et al., 2019).

Responses they get from interviews show that nature-based ADSs in urban areas positively impact the health and well-being of people with dementia. According to Bruin et al. (2019), these services enhance contact with nature and animals, engagement in an activity, physical activity, daily structure, social communications, healthy eating, a sense of meaning in life, and a focus on daily life.

Both seniors with dementia and their family caregivers underline the importance of being active and spending time outdoors for them. Additionally, the green and natural environment is a significant reason for choosing nature-based ADSs in urban areas. According to Bruin et al. (2019), some seniors with dementia had a garden themselves, so they like being in a green environment. Other seniors with dementia just like being outdoors and doing outdoor activities (e.g., going for a walk) and activities related to animals. Some seniors with dementia did not closely relate to green environments and green activities in the past. Nevertheless, they like being in a nature-based ADS because, according to them, there is a relaxing atmosphere (Bruin et al., 2019). Moreover, family caregivers claim that a diverse range of stimuli is an important advantage of ADSs in a green environment (Bruin et al., 2019).

Table 3.5: The main themes emerging from the interviews to understand the motivation to initiate nature-based ADSs in an urban area, adapted from (Bruin et al., 2019).

Motivation to initiate nature-based ADSs in an urban area:
Possibility of being active
Possibility of spending time outdoors
Presence of green and natural environment
Opportunity to meet people of one's age
Presence of a diverse range of stimuli

3.6.1. Value of Nature-Based ADSs For People with Dementia

Table 3.6: Main themes emerging from the interviews to understand the value of nature-based ADSs for people with dementia, adapted from (Bruin et al., 2019).

Value of nature-based ADSs for people with dementia:
Contact with nature and animals
Activity engagement
Physical activity
Structure
Social interactions
Healthy eating
Meaningfulness
Focus on daily life

3.6.1. a) Contact with Nature and Animals

Being outdoors in a green environment and having contact with animals are appreciated by seniors. Seniors and their family members state

that the nature-based ADSs offers space for seniors to walk, sit outside, sit in the sun and work in the garden (Bruin et al., 2019). Additionally, seniors mention that they can relax at the nature-based ADSs. Some participants experience the green environment as 'calm' and others as 'lively.' According to family members of seniors and providers, animals are 'just there, which can put people with dementia at ease' (Bruin et al., 2019). Participants can establish close relationships with animals, and for some, it may be easier to bond with animals than with human beings (Bruin et al., 2019). Additional benefits of nature-based ADSs for seniors with dementia mentioned by care providers are spending time outdoors, reducing medication, and a better day-night rhythm (Bruin et al., 2019).

Related quotes from interviews: "*Being outside brings back happy memories of my childhood. "*(Bruin et al., 2019).

"There is space, both literally and metaphorically: And it all feels right, because it is all very 'back to basics, with both feet on the ground. And for me, that is quite comfortable. (Participant 20)" (Bruin et al., 2019).

"Absolutely, yes, it is related to the fact that people can go outdoors, in the fresh air, that they are meeting animals that do not ask anything. Anything goes, it is relaxed … Taking care of or feeding the animals. These are the kinds of skills that they do maintain. (Family carer 14)." (Bruin et al., 2019).

3.6.1. b) Activity engagement

Seniors underline that they would like to be active and participate in the different everyday activities and jobs they can do at the nature-based ADS. They also appreciate that there is a lot to see, like animals, trees, and plants (Bruin et al., 2019).

Some of the seniors mention that it is significant for them to be active and be stimulated. At home, they sit on the couch and easily fall asleep during the day. Family caregivers also state this. According to them, nature-based ADS provides positive stimuli and activates the brain of people with dementia (Bruin et al., 2019).

Although the different activities and jobs are appreciated, seniors and family caregivers also indicate the value of being inactive and doing nothing (Bruin et al., 2019). As one of the family caregivers says:

"Within the possibilities, everyone is being motivated to function at his or her level. What I also really like is that anything goes … If you don't want it, no problem at all. (Family carer 5)" (Bruin et al., 2019).

Related quotes from interviews: *"What I often hear from relatives is that they see their partner, father, or mother change to a certain extent. That someone is becoming more active, also about housekeeping. So, less awaiting and passive … And here, at work, we see, of course, that people are reviving because they are being activated. (Provider 15)"* (Bruin et al., 2019).

"Here, they can expend their energy … We have several relatively young men with dementia, and they are coupled with someone [volunteer or professional] who is working in the garden. And then, they can expend some of their energy. They will go home tired, and if they can do so, they will also have something to tell [their relatives]. (Provider 6)" (Bruin et al., 2019).

"Well, that you can just go to the garden if you don't feel like doing anything anymore. That's fine as well. That you can just stop … anything goes. (Participant 12)" (Bruin et al., 2019).

3.6.1. c) Physical activity

Another benefit of nature-based ADSs, which care, providers, seniors, and family caregivers are told, is physical activity. The different types of

activities, jobs, and the outdoor environment with other places to go to (e.g., garden, stable, orchard, work shed) stimulate people with dementia to be physically active. Most of the seniors mention enjoying being physically active (Bruin et al., 2019). Also, family caregivers are happy that their relatives are physically active, at least some days of the week.

Related quotes from interviews: *"[Name of participant] is very sporty, but he also likes to read or to stare out of the window. However, because he is active on Mondays and Fridays [at the nature-based ADS], he is also more active on the other weekdays. And should he be inactive on Tuesdays and Wednesdays, that wouldn't matter; at least he was active on Mondays and Fridays. (Family carer 9)."* (Bruin et al., 2019).

3.6.1. d) Structure

According to family members, the nature-based ADS provided structure for seniors. There is mostly a fixed day structure at the ADS, with dedicated times for activities and jobs, coffee - tea, and meals (Bruin et al., 2019). Additionally, every day, some actions need to be done, such as caring for animals, harvesting crops for lunch, preparing vegetables for lunch, and so on (Bruin et al., 2019).

3.6.1. e) Social interactions

Another benefit of nature-based ADSs told by care providers, seniors, and family members is social interaction. Three types of social interaction are stated (Bruin et al., 2019):

- interaction with other participants,
- interaction with other visitors (e.g., general public, children) to the nature-based ADS
- interaction with staff

Seniors state that they enjoy meeting other people, and it is easy to get to know one another (Bruin et al., 2019). For some of the seniors, social interactions are considered the most valuable aspect of the ADS. Additionally, family members are glad that their relatives are meeting new people (Bruin et al., 2019).

Bruin et al. state that some nature-based ADSs have a shop, a restaurant, or freely distributed fruits and vegetables to people in the community, resulting in different people visiting the ADS. Family members and care providers find this very beneficial for seniors with dementia. The ADS enabled people with dementia to remain part of society and stimulated a sense of belonging (Bruin et al., 2019). Moreover, social interactions with staff members at the nature-based ADS are appreciated by seniors and their family members. Some seniors mention that they connect well with the staff members (Bruin et al., 2019).

Related quotes from interviews: *"Other visitors, from the community, visit this place [nature-based ADS] as well, so this is some sort of miniature society, a faithful reflection of society. I think this is the value that we are not only a group of people with dementia but that there are all kinds of people here. (Provider 3)"* (Bruin et al., 2019).

"What I find is that people are working with passion here. The professionals, and also the volunteers, have consciously decided to work with people with dementia. That's what you see in their approach; they are always calm, friendly …, also my husband said so. They deal passionately with everything and talk about the people here. So, yes, that is special. (Family carer 5)." (Bruin et al., 2019).

3.6.1. f) Healthy eating

Bruin et al. (2019) state that at most nature-based ADSs, a communal meal prepared and consumed around lunchtime is seen as a main component of the day. According to family members and care providers, communal dining stimulates social interactions between

participants and seems to encourage healthy eating (Bruin et al., 2019).

Related quotes from interviews:

"It was challenging for her to regain the weight. And then she started at the farm …And since then, we noticed that she gained weight, had more appetite, started to eat better. It has absolutely to do with the fact that people can go outdoors there, in the fresh air. (Family carer 14)." (Bruin et al., 2019).

3.6.1. g) Meaningfulness

Seniors mention that they like to do something meaningful for themselves. It is also approved by their family members and caregivers (Bruin et al., 2019). Especially the relatively younger participants state that doing satisfying and meaningful work is essential for them (Bruin et al., 2019). Participants with knowledge of gardening mention that they are happy to use and share their knowledge with others and mean something to others (Bruin et al., 2019).

Related quotes from interviews:
"Here I am, in my boots, doing outdoor work, like a kind of farmer, or well, whatever … with a shovel and a spade. And at the end of the day, when I am going home, I'm feeling great. (Participant 20)" (Bruin et al., 2019).

"Yes, I want to make myself useful. Physically, I can still do a lot. My mind may not be quite there, but my body can still handle a lot. (Participant 1)" (Bruin et al., 2019).

"So, we just see that he is feeling better, he is meaningful again, he means something to people. A sense of meaningfulness is significant for people with this condition. You just see that he revives whenever he goes there. (Family carer 4)." (Bruin et al., 2019).

"Yes, after some time, though not from everyone, we hear that they like being here. They are enjoying themselves, and they are feeling useful. (Provider 10)" (Bruin et al., 2019).

3.6.1. h) Focus on everyday daily life

Care providers state that a significant benefit of a nature-based ADS is just a regular, non-institutional kind of area and life type. According to them, in this way, there is a higher sense of belonging (Bruin et al., 2019).

3.8. CONCLUSION

Literature studies, case studies, and interviews show that care farms have a wide range of benefits that can affect people's health and well-being with dementia and their family members. They can increase the life quality of seniors in many ways. Green care farms offer multisensory stimulation to seniors. The characteristics of farms and the wide variety of activities offered in many can enable people with dementia to use all their senses (smell, taste, touch, hearing, and sight). Doing the different works on the green care farm can give seniors with dementia the feeling that they are needed, useful, productive, and helpful to others and contributing members.

Furthermore, it is evident that person-centered care for people with dementia has a vital role in their psychological and social well-being. Care farms have positive effects on seniors with the help of a person-centered care approach and healing features of nature. In that regard, meaningful activities provided in care farms and a high level of social interactions with other people allows seniors with dementia to maintain their quality of life as much as possible. Moreover, being outside, getting fresh air and sunlight helps seniors to regulate their rhythm. Being physically active is also beneficial for their physical well-being.

Responses from interviews that Bruin et al. (2019) conducted show that nature-based ADSs in urban areas positively affect the health and

well-being of seniors with dementia. According to Bruin et al. (2019), these services support contact with nature and animals, activity engagement, physical activity, structure, social interactions, healthy eating, a sense of meaning in life, and a focus on daily life.

As a result, green care farms can be a valuable alternative to traditional nursing homes because they provide an attractive, homelike environment and activities, which positively affect engagement and social interaction, which can improve seniors' social, physical, and psychological wellbeing and quality of life (Boer et al., 2017).

4

HOW GCF CAN BE IMPROVED

4. HOW GREEN CARE FARMS CAN BE IMPROVED

Besides all those benefits of green care farms mentioned in the care farm chapter on the psychosocial, physical, and social well-being of seniors with dementia, there are also drawbacks. Green care farms are generally located far from cities and primarily located in rural areas. Although it is not necessarily a negative aspect of green care farms, it is not an option anymore for seniors who would like to stay in the cities. They must move to the rural areas. It is because green care farms need large fertile agricultural fields since they cannot be applied everywhere.

In rural areas, green care farms are primarily practicing conventional farming in the outdoor spaces, which sometimes can be physically too demanding for seniors with dementia, especially during cold and rainy days. Additionally, the harvest rate of farms is affected by weather conditions and natural disasters. Lastly, most of the green care farms are transferred from an existing farm. Therefore, they are not designed as dementia-friendly initially.

As a result, the upcoming chapters aim to investigate methods to minimize these negative aspects of existing care farms by dementia-friendly design strategies, introducing innovative urban agriculture methods, and planning daily routines for personas with different stages of dementia.

5

DEMENTIA FRIENDLY DESIGN

5. DEMENTIA-FRIENDLY DESIGN APPLICATIONS

As is indicated before, most of the care farms are transferred from an existing farm. Therefore, most of them are not designed as dementia-friendly in the beginning. Thus, applying therapeutic & dementia-friendly design strategies can enhance the quality of green care farms. Four case studies have been analyzed to see which design applications are suitable for a dementia-friendly design approach. In addition, the literature review has been done on therapeutic & dementia-friendly design strategies. Lastly, design considerations and guidelines have been shaped according to the information drawn from case studies and literature reviews.

5.1. CASE STUDIES

Four case studies have been examined. They are Krebsestien, Tradgardarna, Olsrød nursing homes, and Alzheimer's Village:

1. The general features and dementia-friendly design applications of each project are discussed.

2. Comparative analysis has been conducted. Case studies are compared in five categories: greenery & outdoor areas, circulation, common & private areas, courtyard, corridors, common areas, individual units, and room layout.

Analyzing these case studies and comparative analysis aims to derive dementia-friendly design strategies to shape guidelines for the design proposal.

5.1.1. Krebsestien nursing homes

Address: Esbjerg, Denmark
Scope: 11524 m², 100 homes
Year: 2017, Competition
Architect: CF Møller Architects
Typology: Nursing Home

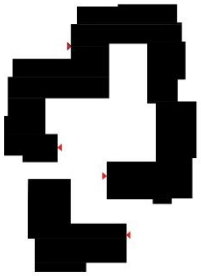


Figure 5.1: Layout of Krebsestien nursing home

One of the major purposes of this project is to create a place that seems and feels like home not like an institution. According to the project's architects, the home-like environment can be achieved by maintaining elements of the everyday activities that residents are used to in their normal daily lives. To do so, in the nursing home center Krebsestien, they tried to create a hub of the mini-town, called the Senior Town. It aims to connect the nursing home center with the rest of the town and create a close and attractive area for the senior residents. The Senior Town allows the seniors to "go to town" to do their daily activities, just as they have done all their lives (Krebsestien - nursing homes).

The nursing home center consists of four buildings. Three include housing and recreational areas for the seniors. The fourth building is a culture house. Public functions have been placed in this building, such as a café and a nursing clinic (Krebsestien - nursing homes).

Combining all public functions in this 'Culture House' aims that it can be used by all the community then it can give this space a character of a town center. Separating the housing from the practical functions also ensures that the homes for the seniors have a home-like atmosphere. Additionally, collecting all the facilities together enhances the idea of senior town because all people should go to this area, and it will increase the possibility of encounter your neighbor in this communal area (Krebsestien - nursing homes).

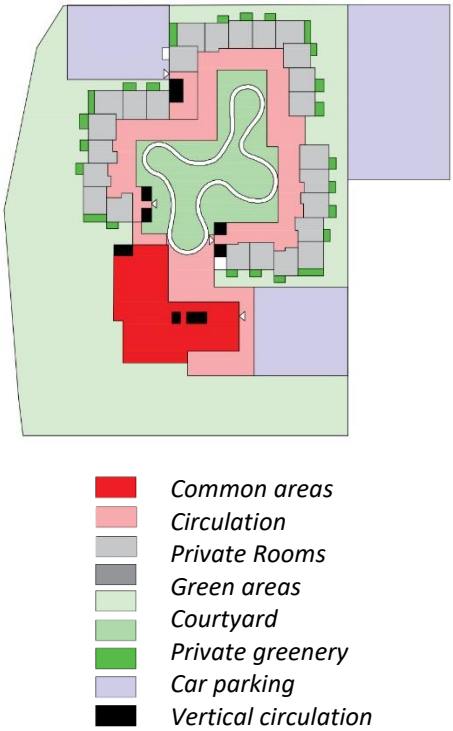


Figure 5.2: Functions of Krebsestien nursing home

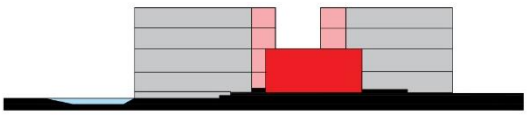
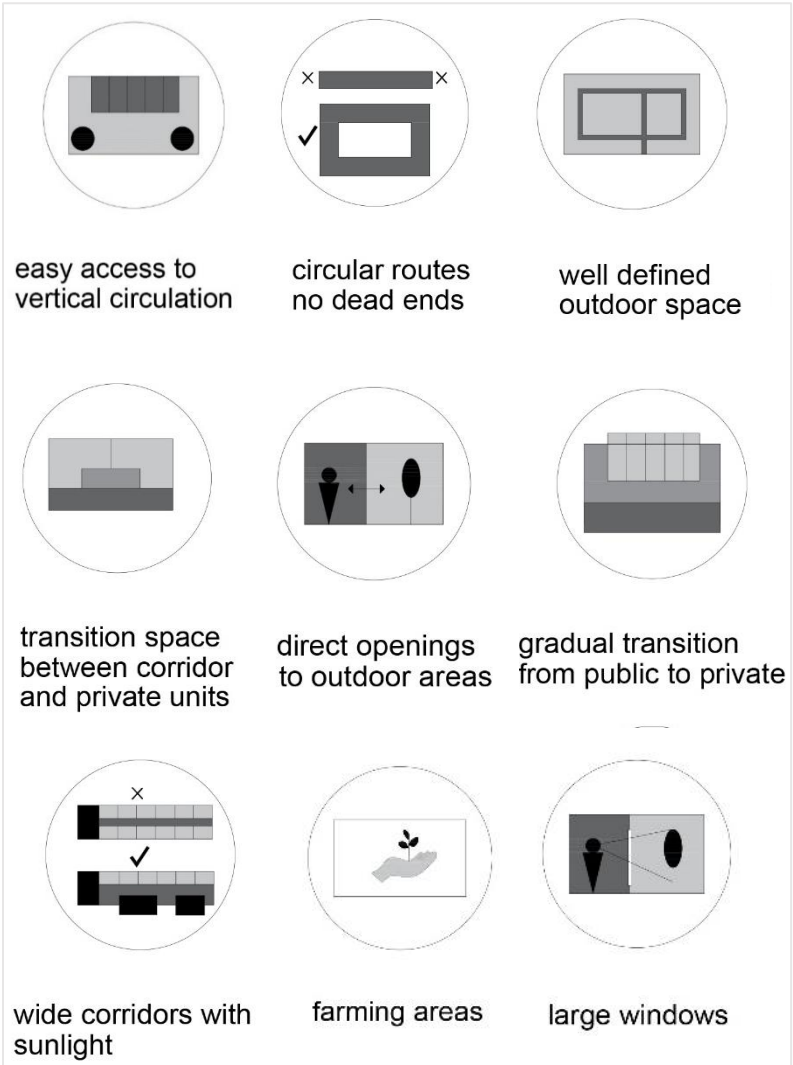


Figure: Conceptual section of Krebsestien nursing home



There is an inner courtyard garden in the middle that is safe and secure for residents with dementia. Nature's therapeutic and healing effect is used in the nursing home center's internal courtyard garden.

Additionally, private rooms for the seniors are located only on one side of the corridor. It enables to get more sunlight inside the hall and direct visual connection with outside in circulation area. Therefore, it enormously enhances orientation and wayfinding. Additionally, horizontal circulation is creating loops rather than dead ends. Consequently, it is also an essential aspect of wayfinding.

Figure: 5.3 Design applications of Krebsestien nursing home

5.1.2. Tradgardarna Nursing Home

Address: Orebro, Denmark
Scope: 6400 m², 56 homes
Year: 2016
Architect: LAND Architects
Typology: Accommodation for seniors & Nursing Home

Figure 5.4 : Layout of Tradgardarna nursing home

Tradgardarna Nursing Home is a modern care and nursing home facility on the outskirts of Örebro.

Three courtyards on the ground floor and an indoor garden on the first floor are eye-catching aspects of this design. These courtyards create well-defined, secure outdoor spaces for people with dementia, and they promise different experiences. Linda Björn says, "The smallest courtyard has a calm and peaceful setting, where residents can enjoy the flora, walks along the soft bark paths, and rippling water that attracts insects and birdlife. The medium-sized courtyard combines areas for celebrations and large gatherings with tranquil nooks and crannies. Between two of the buildings is the largest and busiest courtyard, adjacent to the restaurant. Integration and activity is the central focus here, and residents have access to an outdoor gym, space for keep-fit sessions and yoga, croquet, and areas for socializing." (Trädgårdarna – Input interior – Projects 2018)

Moreover, they aimed to get away from an institutional feeling and tried to create a homelike environment. For that purpose, they keep the height of the building limited with two-story, provide human scale, using pitched roofs, and pick up the green and yellow for the façade and warm wood materials in the interior. (Trädgårdarna – Input interior – Projects 2018)

There is a transition space in between the corridor and private rooms also. In this way, they break the longitudinally of the wall in the corridor.

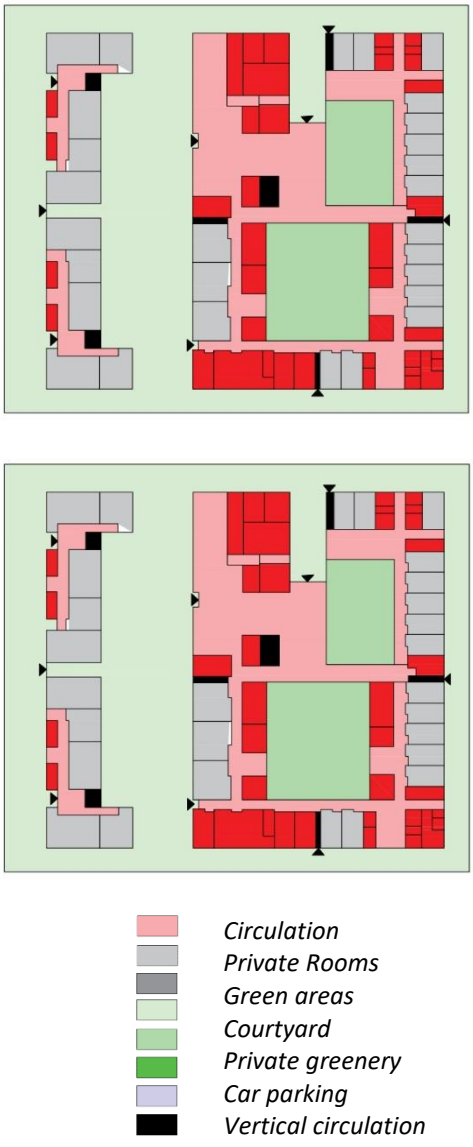


Figure 5.5: Functions of Tradgardarna nursing home

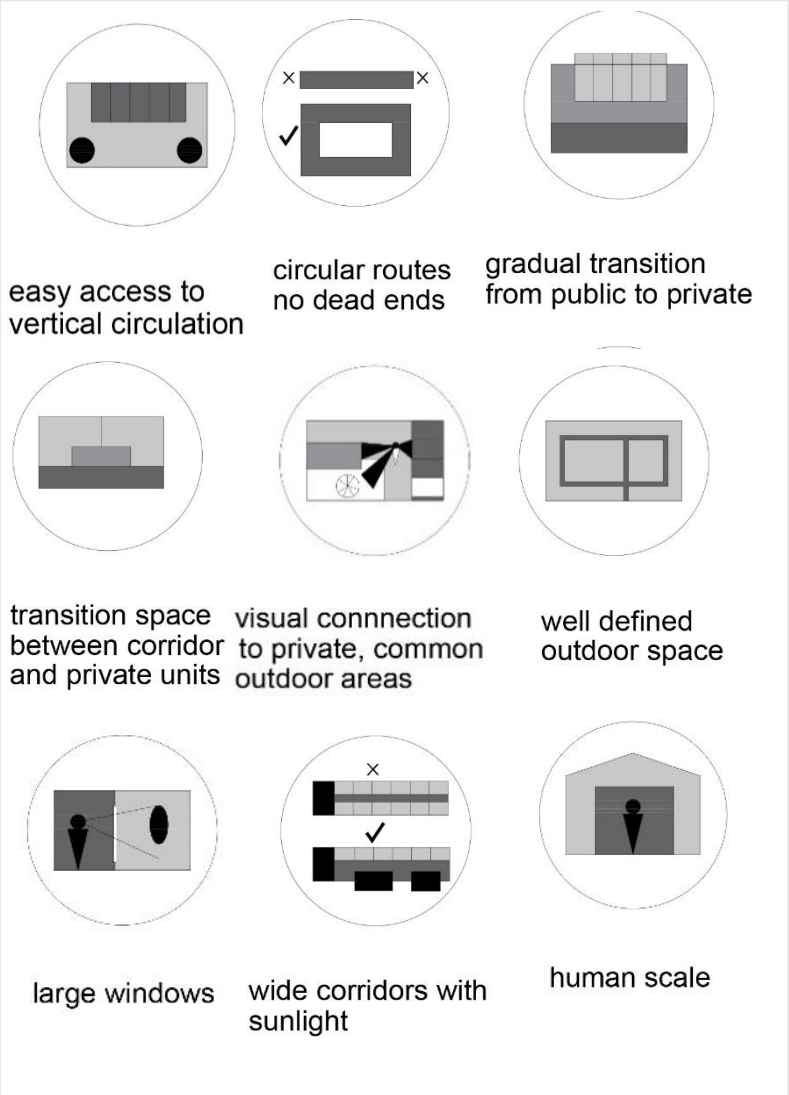


Figure 5.6: Design applications of Tradgardarna nursing home

They avoid classic double-sided hallways. Rather than that, the personal housing units face shared areas, as residents can see and hear other people meet at shared spaces.

Also, they have wide corridors with a direct visual connection to the courtyard. This layout also helps to get more sunlight inside the hall. Common areas are generally located in between private rooms and courtyards. It enhances the gradual transition from public to private.

On the second floor, they have a winter garden with curtain walls, and they have large openings on the walls in the common areas. It improves the visual connection with the outside. They have circular loops rather than dead ends in the horizontal circulation, and vertical circulation is easily accessible on each side of the building.

Figure 5.7: Conceptual section of Tradgardarna nursing home

Figure 5.8: Photographs of Tradgardarna nursing home (The Gardens, Carehome for elderly: Marge Arkitekter AB)

5.1.3. Olsrød Nursing Home

Address: Tonsberg, Norway
Scope: 12000 m²
Year: 2019
Architect: NORD Architects
Typology: Health Care Center

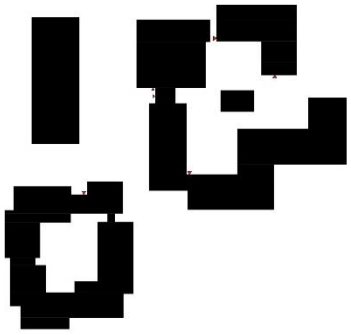


Figure 5.9: Layout of Olsrød Nursing Home

Nursing homes are arranged around a series of courtyards, so they create a secure environment for residents and a gradual transition from public to private.

Buildings don't characterize as an institution but as a small home like environment. Two Norwegian "tun," or courtyard ensembles, are placed close to one another, creating a balance between public, semi-public and private spaces (Olsrød nursing home: 3RW arkitekter).

The common areas are located around the courtyard at the main entrance. It is creating the notion of a small-town square. By dividing main volume into smaller parts and maintaining a height of two stories, they easily form a complex with a human scale it helps to create homelike environment and enhance wayfinding. Also, differentiating the buildings in color and shape, helps wayfinding for seniors with cognitive disabilities.

All the housing units have outdoor access through their shared areas, and all the resident's rooms face to the shared rooms rather than a corridor. All horizontal circulation spaces are thought of as loops of various sizes to enable physical movement without getting lost or going into a dead end.

The clusters share common, and service functions and they are connected at two levels to create the logistic functionality of one building. Prefabricated CLT elements are used, the choice of materials and focus on sustainability bring a better inner climate.

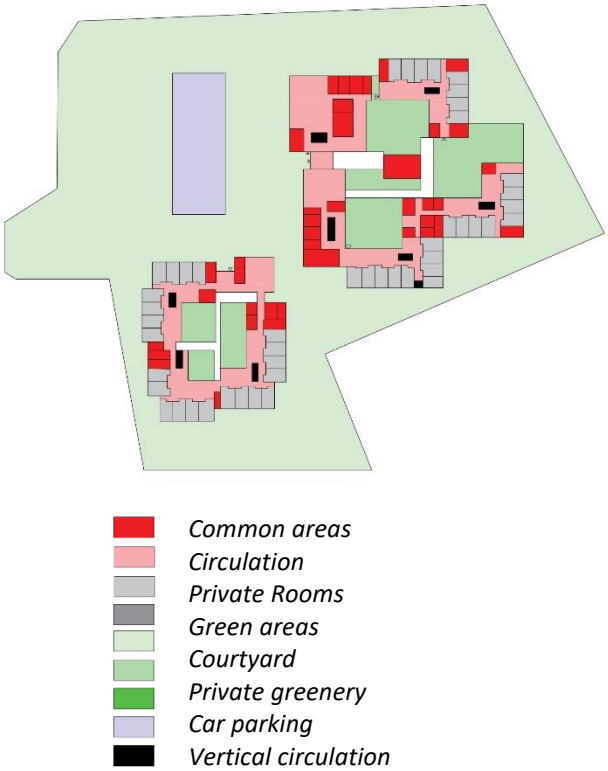


Figure 5.10: Functions of Olsrød Nursing Home

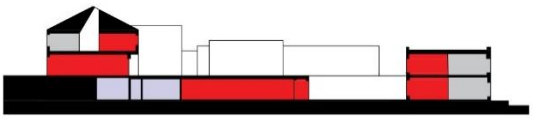


Figure: Conceptual section of Olsrød Nursing Home

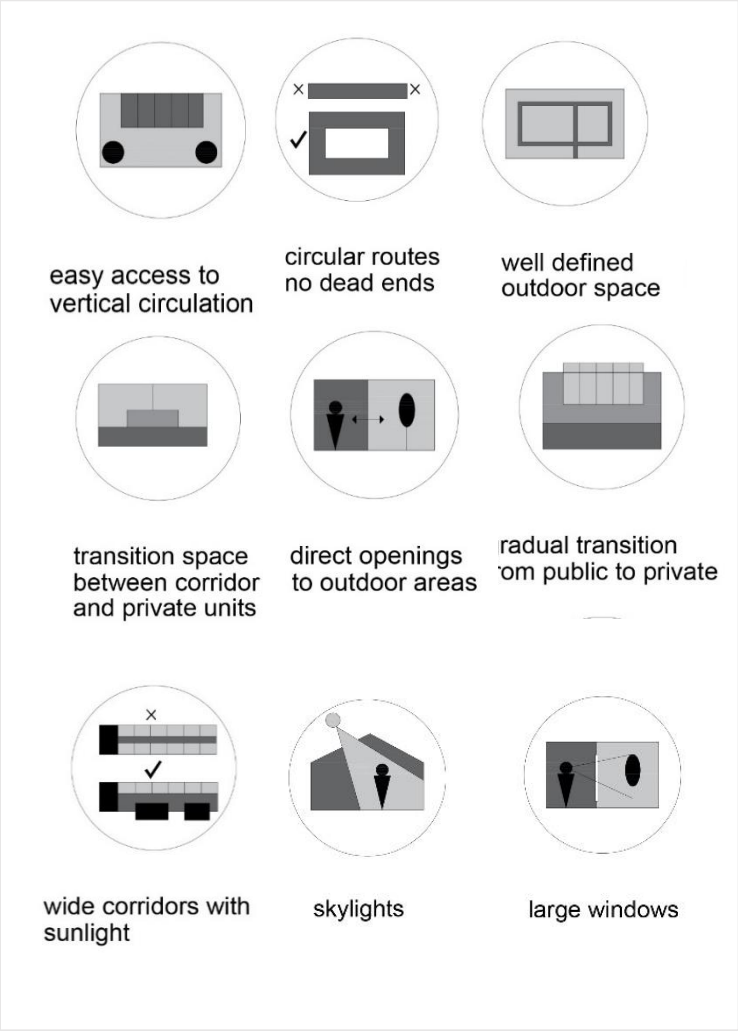


Figure 5.11: Design applications of Olsrød Nursing Home

Figure 5.12: 3D Diagram of Olsrød Nursing Home
Adapted from: (Olsrød nursing

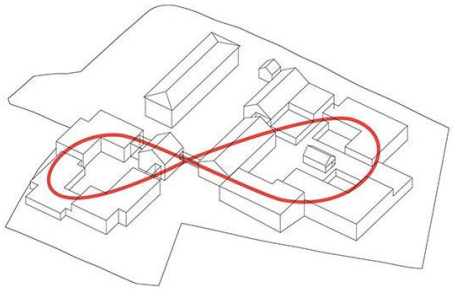


Figure 5.13: Uninterrupted Circulation Adapted from: (Olsrød nursing home: 3RW arkitekter)

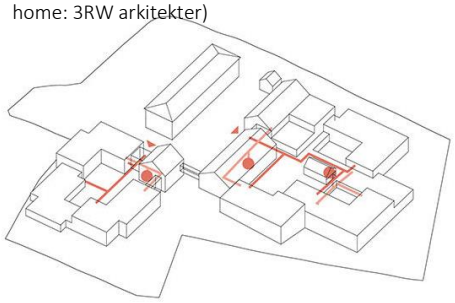


Figure 5.14: Entrances & Circulation
Adapted from: (Olsrød nursing home: 3RW arkitekter)

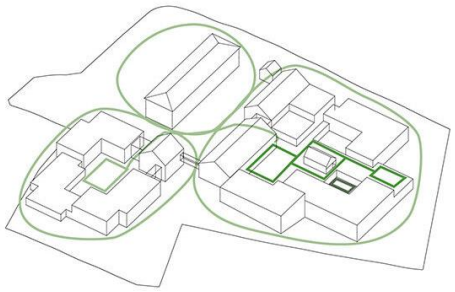


Figure 5.15: Circulation
Adapted from: (Olsrød nursing home: 3RW arkitekter)

Figure 5.16: Photograph of Olsrød Nursing Home (Olsrød nursing home: 3RW arkitekter)

5.1.4. Alzheimer Village

Address: Dax, France
Scope: 18000 m²,340 residents
Year: 2020
Architect: NORD Architects
Typology: Village

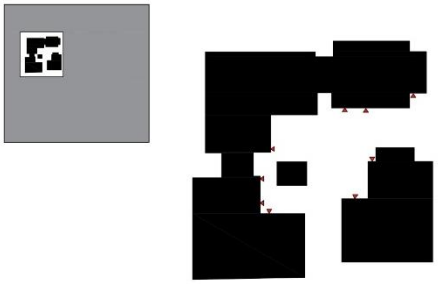


Figure 5.17: Layout of Alzheimer Village

In the Alzheimer's Village in Dax, France, residents live in smaller houses. Therefore, providing a human scale is one of the main aspects of this project.

Houses are spread out in the landscape, in which the residents can move freely and safely. The Alzheimer's village contains familiar elements from the residents' previous daily routine. Therefore, facilities they prefer to visit often include a local shop, hairdresser, restaurants, cultural center, and a healthcare center are positioned as tiny houses in the complex.

According to a partner at NORD Architects Morten Gregersen, the design is about creating a homely atmosphere that will support the experience of continuation in everyday life. People with Alzheimer's or dementia need to recognize their surroundings and disturb their cognitive abilities. He explained that it is also why they design with an explicit local character and elements of the regional building style. Thus, a cultural continuation can ease the transition from living at home to living in an Alzheimer's village with severe mental disease.

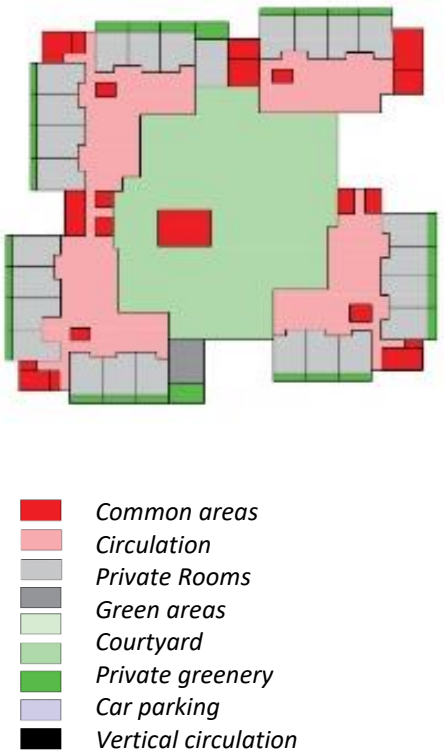
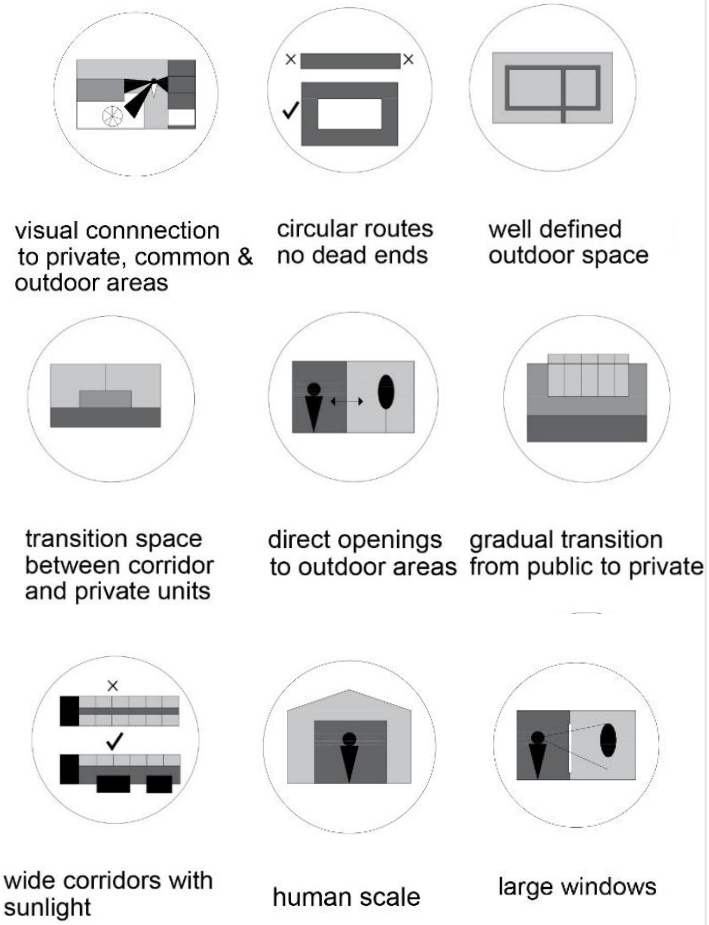


Figure 5.18: Functions of Alzheimer Village



Nursing homes in the Alzheimer's village have an open plan. Thus, common areas like the shared kitchen and living room are located in between courtyard and private rooms. In this way, there is not a strict boundary between the circulation area and common areas. This layout can enhance the social interaction between seniors living in the nursing home. When they get out of their room, they most probably come across other residents in this open plan.

Additionally, in this way, they have larger circulation areas and better visual connection with the outside. It also helps to get more sunlight into the corridors.

Moreover, there is a transition area in between the corridors and the private rooms. It is helpful to make a smooth transition from common circulation are to private units.

Courtyards are creating well-defined and safe outdoor spaces for seniors with dementia.

Figure 5.19: Design applications of Alzheimer Village

Figure 5.20: Design applications of Alzheimer Village (Alzheimer's Village: Nord Architects Copenhagen)

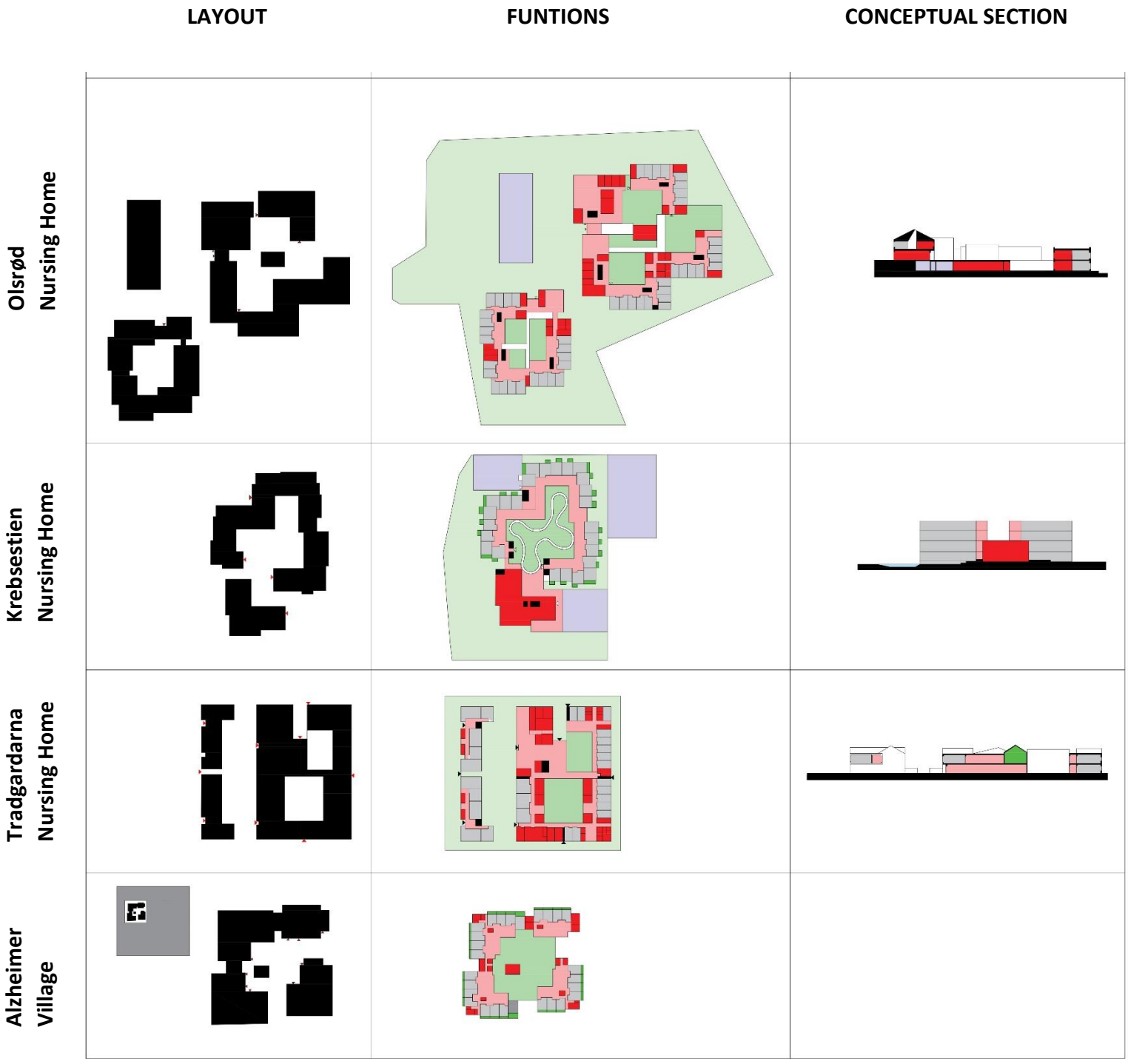


Figure 5.21: Case Studies

5.2. COMPARATIVE ANALYSIS OF CASE STUDIES

5.2.1. Greenery

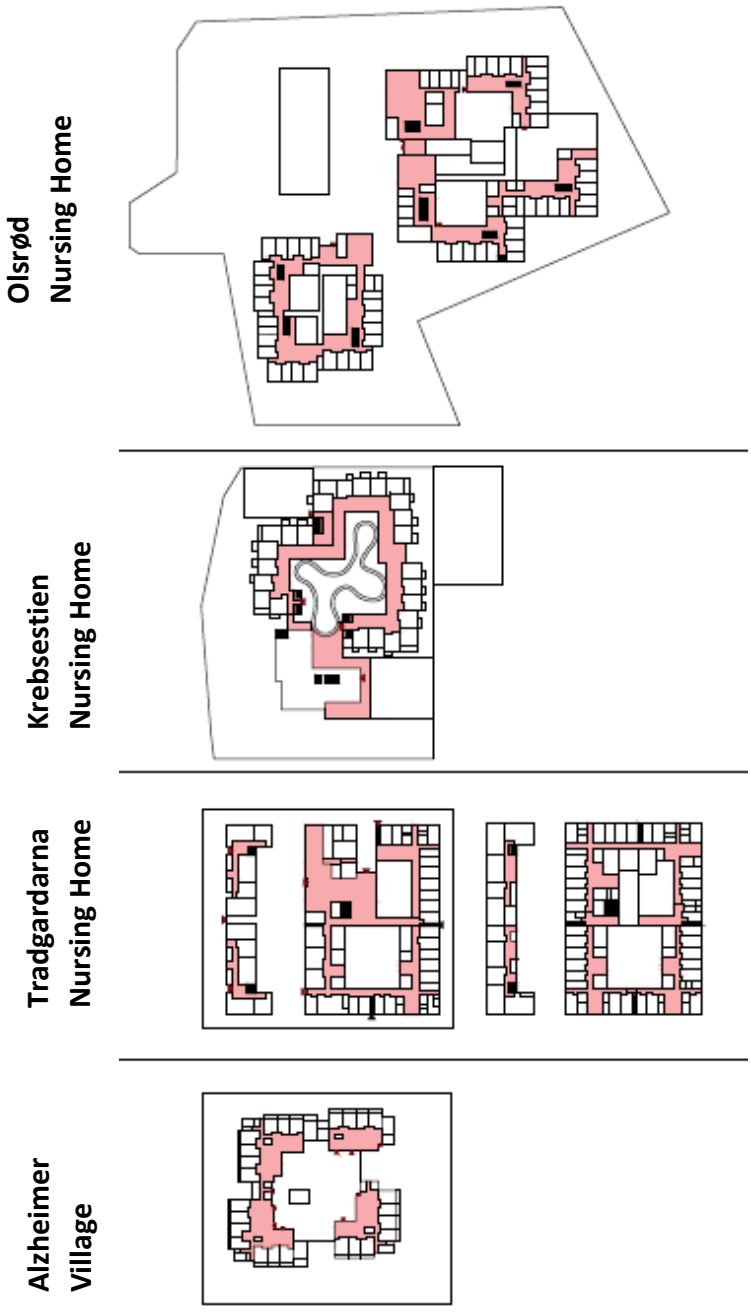
All four projects are developed around a courtyard or courtyards. The existence of a well-defined outdoor space encourages seniors to go outside safely and get in touch with nature. Additionally, this area provides an opportunity to have a social connection with other residents.

In all projects, there is a direct access to the outside from common areas. Because, having a visual connection to outdoor space from common areas is essential to enhance orientation and wayfinding.

When there are multiple courtyards, like in Tradgardarna Nursing Home, it helps to have outdoor spaces with different characteristics and atmospheres. Additionally, when there are various courtyards, it helps to create a gradual transition from public to private.

In Krebsestien Nursing Home and Alzheimer Village, residents have private green areas and direct connections to outside from their private rooms.

5.2.2. Circulation



In all projects, horizontal circulation creates loops rather than dead ends. Because, it is an essential feature for wayfinding. Furthermore, in each project, there is a visual connection from the circulation space to the courtyard. Consequently, it is enhancing the wayfinding features of the complex and orientation. Additionally, it helps to get sunlight into the corridors. As, it also has an essential role in wayfinding and orientation.

Moreover, in each project, vertical circulation points are located carefully. Therefore, they can be seen easily, and, they are easily accessible.

5.2.3. Common& Private Areas

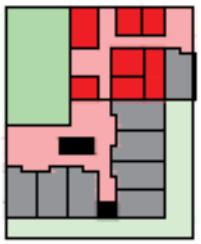
In Olsrød Nursing Home and Tradgardarna Nursing Home, common areas are mixed with private units. Common areas are located in between private rooms or in between private rooms and the courtyard. This layout is suitable for enhancing social interaction in the circulation areas. Common areas are close to the rooms, so it is easily accessible for seniors.

In Krebsestien Nursing Home, private units and common areas are separated. It enhances the idea of stimulating everyday life by leading people to the "center of town," but in this way, common areas are not close to private rooms.

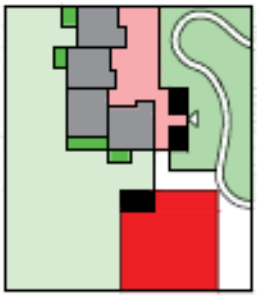
Lastly, in Alzheimer Village, there is an open plan, so there are no strict boundaries for common areas. Instead, they are blended in the circulation area. Therefore, it is helpful to increase the social interaction between people because there is not a wall as a boundary between the people in the common rooms and the corridor.

5.2.4. The relation between courtyard, corridors, common areas, and private units

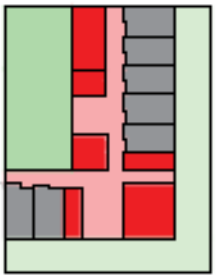
Olsrød Nursing Home



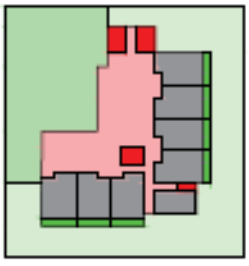
Krebsestien Nursing Home



Tradgardarna Nursing Home



Alzheimer Village



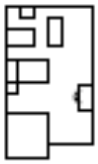
There is a transition area in all projects between the horizontal circulation area and the private rooms. It creates a personal space next to the door for people living in this unit, and it helps to make the entrance more personal with a sitting area and a niche with personal belongings. Additionally, in this way, they avoid having one very long wall in the corridor. Instead, they divide it into smaller pieces.

Locating common areas between the courtyard and private rooms is also an essential aspect of all case studies. In this way, they create a transition from the open public space to the closed private rooms. Additionally, seniors have a visual connection and physical access to the courtyard from common areas.

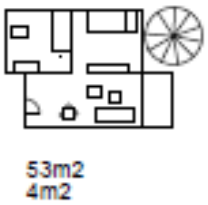
In all projects, they give importance to get natural sunlight inside the horizontal circulation area. To achieve this, they put gaps between rooms like in Tradgardarna and Olsrød Nursing homes. They keep open one side of the corridor, looking to the courtyard in Krebsestien Nursing Home or applying an open plan like Alzheimer Village.

5.2.5. Room Layout

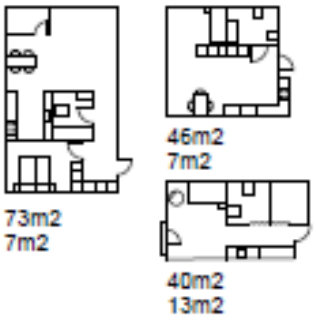
Olsrød Nursing Home



Krebsestien Nursing Home



Tradgardarna Nursing Home



Alzheimer Village

All projects have a compact design for private rooms with a small sitting area, sleeping area, and private bathroom. Generally, the size of single rooms varies from 40m2 to 50m2. There is also room for a couple in Tradgardarna Nursing Home, and it is 73 square meters.

Olsrød Nursing Home and Alzheimer's Village have similar layouts, in each of them, the bathrooms are located on the corridor side, and, there is a combined sleeping and sitting area. Krebsestien Nursing Home has a separate bedroom and sitting area.

In Tradgardarna Nursing Home, there are three different types of rooms. Two of them are single rooms, and the other one is for couples. Existence of different types of rooms provide additional options for seniors.

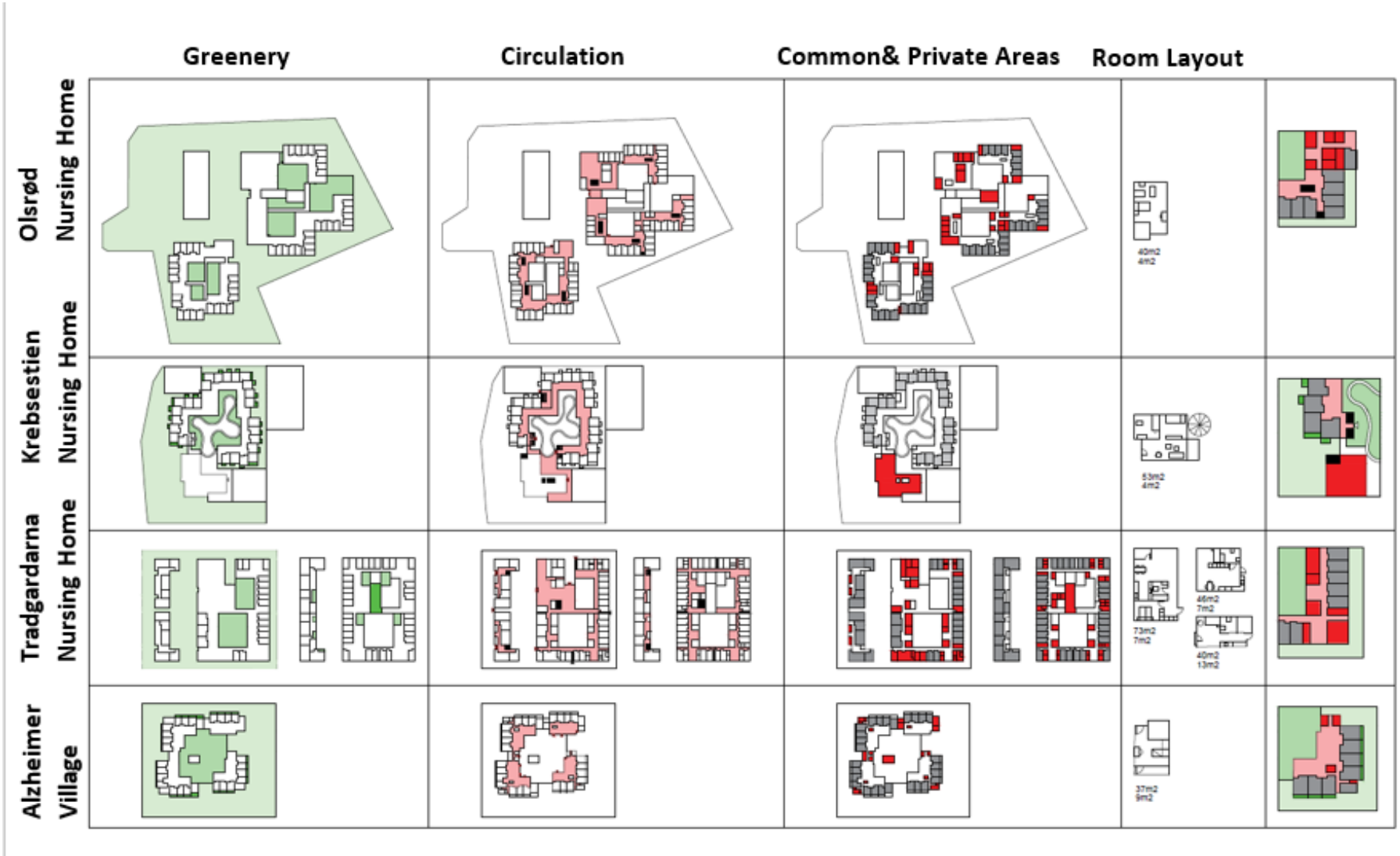


Figure 5.22: Comparative analysis of case studies

5.3. THERAPEUTIC & DEMENTIA-FRIENDLY DESIGN STRATEGIES

According to Gillis and Gatersleben (2015), the therapeutic design approach is the design philosophy that integrates the elements and features of nature in designing the human environment. This design approach gives importance to environmental qualities such as light, color space, shape, air, materials, vegetation, animals, water.

The therapeutic design approach primarily focuses on human well-being and the positive human experience generated by nature (Grazuleviciute-Vileniske et al., 2020). Therapeutic design can be related to the concept of sensory design, where the design solutions are targeted at activating human senses. Therapeutic design can be referred to as environmentally responsible sensory design (Grazuleviciute-Vileniske et al., 2020).

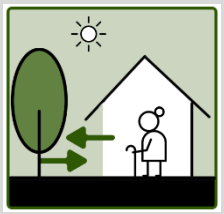
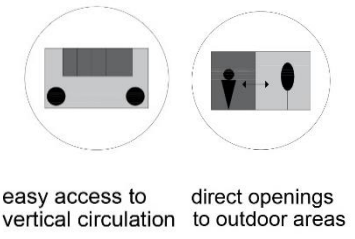
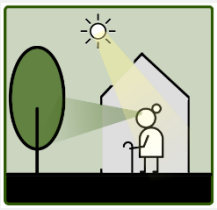
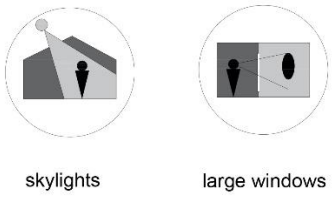
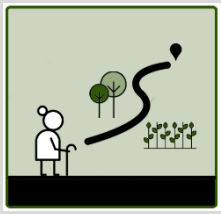
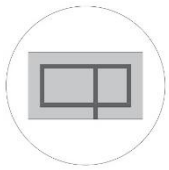
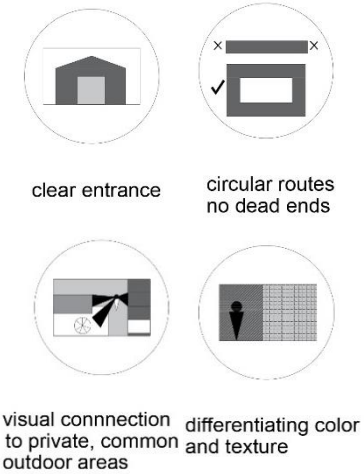
Table 5.1: Features of the physical environment dementia-friendly design

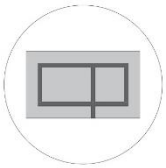
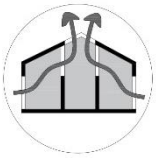
Features of The Physical Environment Dementia-Friendly Design
• Provision of adequate lighting
• Avoidance of glare
• Voidance of excessive noise
• Inadequate outdoors and indoor temperatures (too cold/too hot)
• Optimal levels of stimulation (to avoid causing the person to feel overwhelmed)
• Elimination of distracting clutter
• Reduction of uneven walking surfaces that contribute to falls
• Use of clear signage (with dementia-friendly font and contrast) to increase their ability to navigate their way around successfully

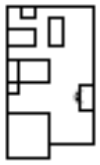
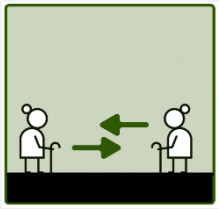
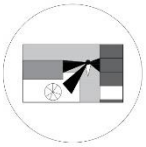
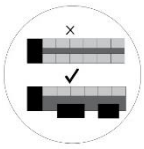
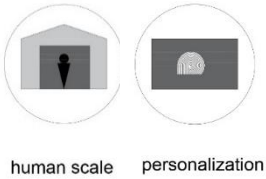
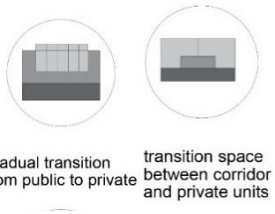
5.4. CONCLUSIONS ON DESIGN CONSIDERATIONS & RECOMMENDATIONS

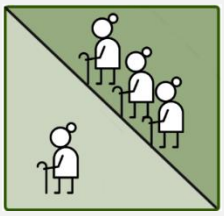
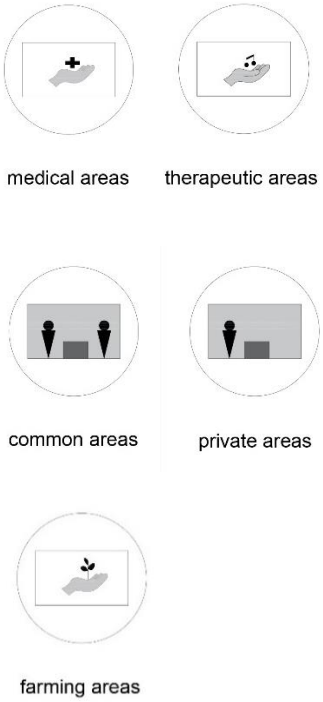
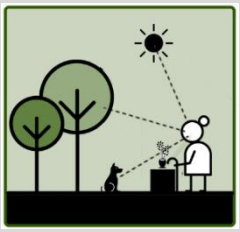
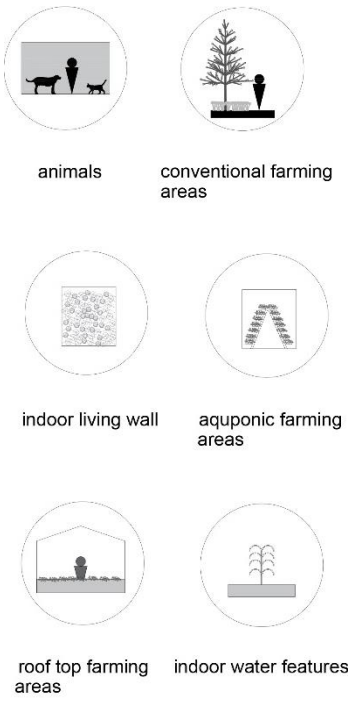
In the table below, design considerations, recommendations, and applications are categorized with visualizations to achieve dementia friendly therapeutic environment. It has been done to classify all the information gathered from literature reviews and case studies. Design considerations consist, easy access, orientation, wayfinding, movement, sustainability, safety considerations, increasing air quality inside the building, suitable room layout for seniors with dementia, providing social interactions & allowing people to see and be seen, providing a homelike environment, providing different levels of privacy and sensory stimulation. There are also design recommendations and applications to transform those considerations to architectural design more efficiently for those design considerations. At this point, visualizations are helpful to show how each of them can be applied to the plan or section.

Table 5.2: Design Considerations and Design Recommendations for Therapeutic & Dementia-Friendly Design. Sources: (Uwajeh, Iyendo, & Polay, 2019),(Campernel & Brummett, 2010),(Pollock & Fuggle, 2013), (Freeman,2019)

Design Considerations	Design Recommendations	Design Application	Visualization
 • **Easy Access**	Provide clear, legible routes and entrances Provide easy access from communal rooms to gardens	Olsrød Nursing Home: All the housing units have outdoor access through their shared spaces.	 easy access to vertical circulation direct openings to outdoor areas
 • **Orientation**	Provide information from the environment such as allowing views to accessible outdoor areas to increase residents' orientation to time of day and season by large windows and openings	Olsrød Nursing Home: Large windows are used to get maximum possible sunlight inside the building and provide an excellent visual connection with the outdoors.	 skylights large windows
 • **Movement**	Provide obvious and signposted footpaths Provide seats with adequate space for wheelchair access	Alzheimer village: Paths safely lead through nature. They are suitable for wheelchair and senior citizens.	 well defined outdoor space
 • **Way Finding**	Integrate appealing colors for signage on floors and pathways to improve wayfinding Introduce 'circular' walking routes that return residents to their starting point	Olsrød Nursing Home: All circulation spaces are thought of as loops of various sizes to enable physical movement without losing or running into a dead. Differentiating the buildings in color and shape helps wayfinding for people with dementia.	 clear entrance circular routes no dead ends visual connnection to private, common outdoor areas differentiating color and texture

Design Considerations	Design Recommendations	Design Application	Visualization
 • **Sustainability**	Introduce solar panels Rainwater collection system. Green environment. Hydroponic farming systems		
 • **Safety considerations**	Adopt natural boundaries to increase safety Avoid steps or sudden changes in level Provide handrails for support Avoid planting toxic plant species Use non-slippery materials to prevent falls	Alzheimer village: The complex is densely surrounded by trees. By doing this, it is aimed create natural boundaries to increase the safety of seniors with dementia.	 well defined outdoor space
 • **Increasing air quality inside the building**	Design the building according to natural ventilation principles Use biobased – sustainable, breathable materials	Olsrød Nursing Home: Prefabricated CLT elements are used as primary construction material. The choice of primary construction materials and focus on sustainability leads to a better inner climate and a better atmosphere to work and live in.	 natural air circulation

Design Considerations	Design Recommendations	Design Application	Visualization
 • **Suitable apartment Design**	Small kitchenette with dining table Sitting area with a visual connection to the outdoors Easy access to the bathroom from the sleeping area.		 40m2 4m2
 • **Providing social interactions & allowing people to see and be seen**	Create opportunities to socialize and interact with friends, family, children, pets Place easily recognizable key places, such as a lounge room, dining room, kitchen, and an outdoor area Provide good visual access. Good visual access opens opportunities for engagement	Olsrød Nursing Home: All the resident's rooms face the common rooms rather than a corridor	 visual connnection to private, common & outdoor areas  wide corridors with sunlight
 • **Homelike environment**	Provide a homelike environment. Proving human scale is so essential for seniors. Three components define scale: the number of people the individual encounters, the overall scale of the building, and the size of each part, such as rooms, doors, and corridors. The scale should help seniors feel in control. Also, the existence of personal belongings enhances a homelike feeling.	Olsrød Nursing Home: By dividing the mass into smaller parts and maintaining a height of building with two stories, the complex has been designed with a human scale	 human scale personalization  gradual transition from public to private transition space between corridor and private units

Design Considerations	Design Recommendations	Design Application	Visualization
 • **Providing different levels of privacy – providing opportunities to be alone or with others**	Provide various spaces. Some for a quiet talk with one or two others and some for a larger number of people and areas where seniors can be by themselves. These internal and external spaces should have various purposes: reading, talking, playing instruments, cooking, meeting with others, or sitting and looking out the window. *Common areas *Private Areas (but not isolated – good visual connection with outside) *Recreational areas *Therapeutic areas	Olsrød Nursing Home: The layout of the project goes from common to private. The project is arranged around a series of courtyards; the facility becomes not only a safe environment for seniors but, thanks to the gradient of public access, also an active place for the people of the local community. Therefore, it is also important to encourage interaction.	
 • **Sensory Stimulation**	Provide indoor and outdoor greenery and meaningful activities related to nature Therapeutic design for engagement and connection to the natural surroundings Indoor and outdoor water features that provide sensory experiences linked to hearing, seeing, touching, and smelling are essential and provide a cooling effect, positive distraction, visual appeal, and mask noises	Tradgardarna Nursing Home: The courtyard has a calm and peaceful setting, where residents can enjoy the flora, walks along the soft bark paths, and rippling water that attracts insects and birdlife.	

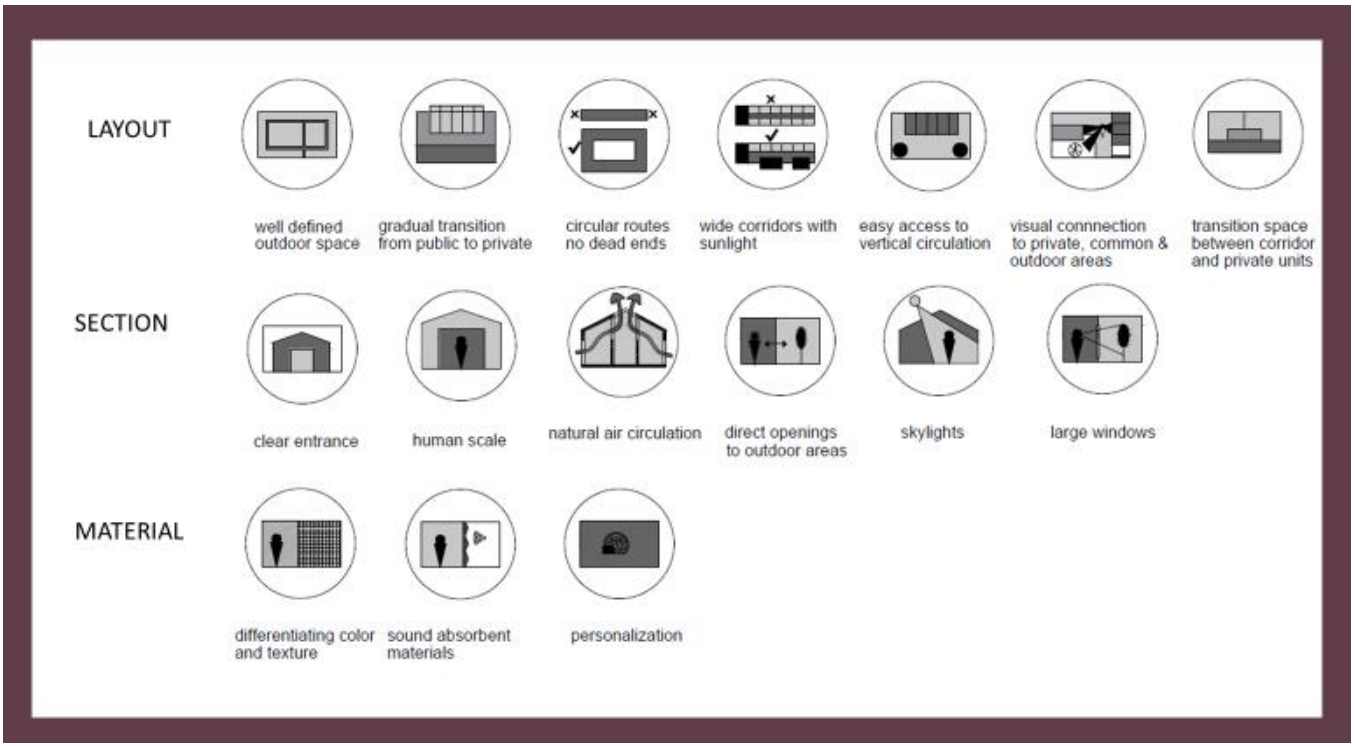


Figure 5.23: Visualization of design applications can be applied to the development of the plan, section, and material selection

Figure 5.24: Visualization of design applications can be applied to the development of the outdoor spaces, facilities, and areas to enhance connection with nature

6

VERTICAL FARMING

6. INNOVATIVE URBAN AGRICULTURE METHODS

As mentioned before, green care farms are located far from cities and generally in rural areas because they need large fertile regions. Therefore, they are not applicable everywhere, especially in the cities. Introducing urban innovative agriculture methods can be helpful to bring care farm typology into the cities because, with these methods, very few areas are needed. Additionally, these methods don't require a fertile field. They don't affect weather conditions to increase the flexibility in terms of location choice to develop new care farm facilities.

This chapter will examine innovative urban agriculture methods like vertical farming systems, edible walls, and rooftop urban farming. Why vertical farming is essential, how it works, what types of vertical farming systems exist, the benefits of these new systems compared to conventional farming methods, and how innovative urban agriculture methods can affect seniors' well-being and improve care farms will be discussed.

6.1. WHY VERTICAL FARMING IS A NECESSITY FOR THE FUTURE

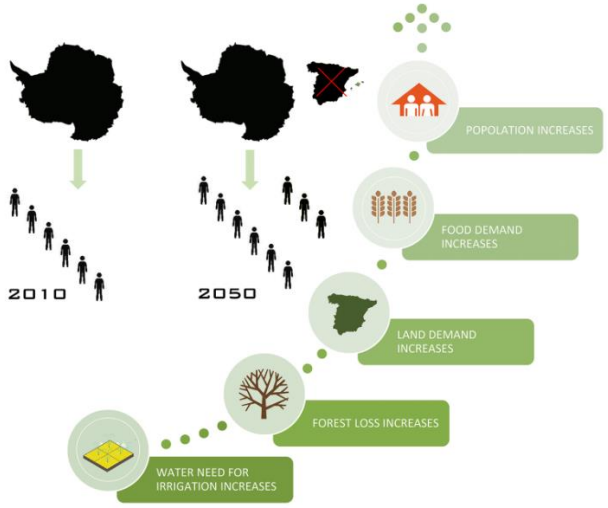


Figure 6.1: Hydroponic farming system

The world's population is expected to increase up to 9.7 billion people by the end of 2050 (World *population Prospects 2019: Highlights*, 2019). Because of industrial development and urbanization, arable lands are decreasing every day. In 2015, researchers stated that the earth had lost one-third of its arable lands over the previous 40 years (Sinclair, December 2015).

A growing population, increasing food demand, climate change, and a shortage of arable land are key challenges humankind will face in upcoming decades. Also, these problems will probably cause a serious challenge to food security and, ultimately, to human life (Hub, 2020).

Vertical farming offers an opportunity to change the way people grow and consume food. Current agricultural practices and conventional farming systems cannot answer the increased demand in

yield to sustainably feed our population. Researchers consider vertical farming as the 'future of agriculture' because of the high level of monitoring and increased efficiency, which is expected to bring innovation and improvement to farming (Hub, 2020).

6.2. VERTICAL FARMING

Contrast to greenhouses or conventional farming where foods are growing on a single level; vertical farming is the practice of producing food in vertically stacked layers commonly integrated into other structures production that enables fast growth and planned production by controlling environmental conditions (Vertical farming - vertical farm institute: Leading research network, 2020). Its purpose is to provide crop protection and maintain optimal growing conditions in an environment that controls light, CO_2, temperature, humidity, air circulation/exchange, water, pH levels, and nutrients (Hub, 2020). Also, vertical farms can be integrated into existing structures. Many cities have applied this model in new and old buildings, including warehouses that have been repurposed for agricultural activities (Al-Kodmany, 2018). Additionally, vertical farming occurs on the rooftops of old and new buildings, a top of commercial and residential structures, and restaurants and grocery stores (Touliatos, Dodd, & McAinsh, 2016).

6.3. HOW VERTICAL FARMING WORKS

There are four main aspects of vertical farming. They are physical layout, lighting, growing medium, and sustainability features. Firstly, the primary aim of vertical farming is to produce more foods per square meter. To reach this purpose, crops are cultivated in stacked layers. Secondly, a perfect combination of natural daylight and artificial lighting is used to maintain the ideal light level in the room to grow food 7/24 in day and nighttime. Thirdly, instead of soil, aeroponic, aquaponic, or hydroponic growing mediums are used. These methods will be examined in detail in upcoming chapters. Finally, the vertical farming technique uses various sustainability features to decrease the energy cost of vertical farming (Vertical farming - vertical farm institute: Leading research network, 2020).

6.4. VERTICAL FARMING METHODS

Vertical Farming can be classified into three methods of production. They are hydroponics, aquaponics, and aeroponics.

Hydroponics is a soilless method of food production that grows crops directly in nutrient-rich water (Garcia & Briceño, 2018). By this method, they have successfully produced vegetables such as onions, lettuce, and radishes. According to researchers, hydroponic is more productive, reliable, and water-efficient (Al-Kodmany, 2018).

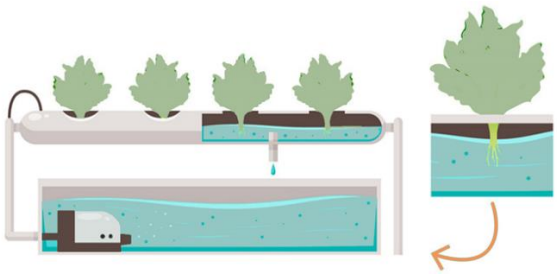


Figure 6.2: Hydroponic farming system

Aeroponics is a technologically advanced derivative of the hydroponic method. The

significant difference between hydroponics and aeroponics is that hydroponics use water to grow while aeroponics has no growing medium. This type uses mist or nutrient solutions instead of water, so in this technique, food is growing in a nutrient-rich mist without soil or water (Garcia & Briceño, 2018). Aeroponics systems are extremely water-efficient (%95 more efficient in water usage than conventional farming) and require minimal space for production. However, aeroponic systems are more complex to set up, maintain and control minor failures in the system of nutrient mist compare to hydroponic systems (Garcia & Briceño, 2018).

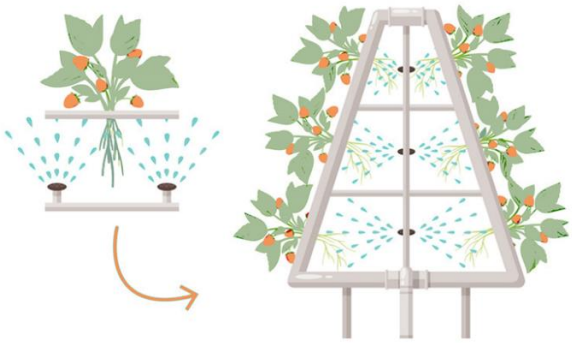


Figure 6.3: Aeroponic farming system

Aquaponic systems are a sustainable method of raising both fish and vegetables at the same time. It is a bio-system integrating recirculated aquaculture (fish farming) with hydroponic farming to establish symbiotic relationships between the plants and the fish. It achieves this symbiosis through a system that nutrient-rich water that comes from fish becomes fertilizer for the plants, and then the plants purify the water for the fish and create a loop (Al-Kodmany, 2018). Researchers envision that the aquaponics system can become a model of sustainable food production by achieving the 3Rs (reduce, reuse, and recycle).

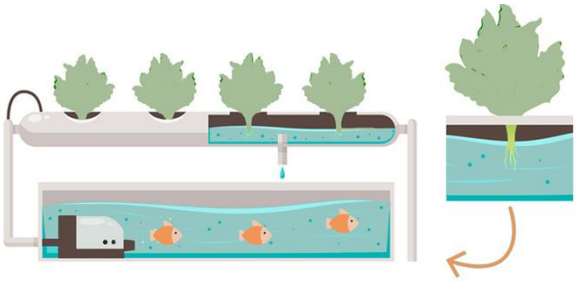


Figure 6.4: Aquaponic farming system

Benefits of Aquaponic farming (Al-Kodmany, 2018):

- Producing clean water for fish
- Producing organic fertilizers from fish that is essential for the plants
- Providing efficiency in the system as the waste products of fishes serves as organic fertilizers for plants
- Saving a considerable amount of water because water is used again after biological filtration. This feature of aquaponic farming is attractive, especially in areas that lack water
- No need for chemicals and artificial fertilizers, so %100 percent organic food can be produced
- Resulting in a polyculture that increases biodiversity
- Supplying locally grown healthy food since the only fertility input is fish feed and all of the nutrients go through a biological process
- Facilitating the creation of local jobs

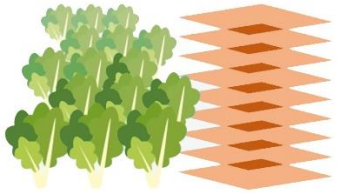
Table 6.1: Vertical Farming Methods adapted from Al-Kodmany, 2018

Farming Method		Benefits	Drawbacks
Hydroponics	Soilless; uses water as a growing medium	Fosters rapid plant growth; eliminates soil-related cultivation issues; decreases use of fertilizers and pesticides.	• Lack of oxygen to roots may result in less tasty food production.
Aeroponics	Variant of hydroponics Soilless; involves spraying the roots of plants with nutrients.	In addition to Hydroponic benefits, it requires less water.	• They require heavy maintenance. • Temperature shifts within the system are quick due to a lack of medium or substrate. • They require extensive system control.
Aquaponics	Hydroponics integrated with fish farming	Creates a closed nutrient system using the symbiotic relationship between plants and fish. Nutrient-rich fish 'waste' provides food for plants, and the plants clean the water for the fish.	• Lack of oxygen to roots may result in less tasty food production.

6.5. DIFFERENCES BETWEEN VERTICAL FARMING AND TRADITIONAL FARMING

Traditional farming can be defined as growing crops in soil, open-air, irrigation, and the active application of nutrients, pesticides, and herbicides. Conventional agriculture can have a wide range of negative effects on the environment. Some of the adverse effects of traditional agriculture are the high and inefficient water usage, requirement for large and fertile land, high concentrations of nutrients and pesticides, and soil degradation accompanied by erosion (Barbosa et al., 2015). The predicted benefits of vertical farming reduce the effects of conventional agriculture. By moving food production indoors, the surface land and water needed to produce food are reduced. Vertical farming enables all-year-round local production without affected by environmental conditions. Local production decreases the food miles and needs for storage. Additionally, no pesticide is used in vertical farming systems, so the products are 100% organic (Al-Kodmany, 201

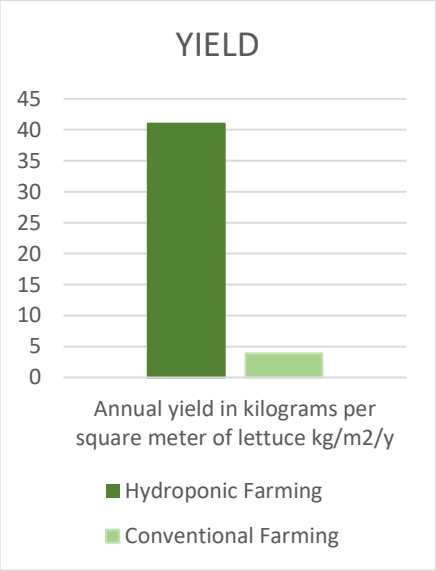
Table 6.2: Vertical Farming Methods adapted from Al-Kodmany, 2018

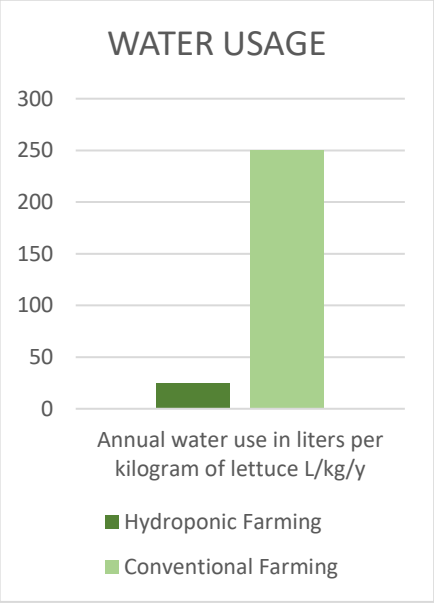
VERTICAL FARMING	TRADITIONAL FARMING
	
Yield 27 TONES per month	Yield 6.4 TONES per month
250-300 CROPS per square meter	18 CROPS per square meter
ALL YEAR-ROUND production	SEASONAL production
90% of crops are harvested	50% of crops are harvested
LOCAL production	Food travels 2000 MILES
%95 LESS WATER is used	FRESHWATER is used
100% ORGANIC food is produced	PESTICIDE is needed for the production
LESS LAND is needed	100 MORE LAND is needed
Can be ANYWHERE	FERTILE SOIL is needed
WEATHERPROOF	DEPEND ON WEATHER

6.5.1. Lettuce – Comparative Analysis of Yield and Water Usage in Vertical Farming and Traditional Farming

Hydroponics' land and water requirements have been compared to conventional agriculture by the example of lettuce production in Yuma, Arizona, USA (Barbosa et al., 2015).

Table 6.3: Vertical Farming Methods adapted from Barbosa et al., 2015





In terms of yield per area, lettuce's hydroponic production was 11 times greater than its conventional equivalent. Precisely, hydroponic lettuce production was calculated to yield 41 kg/m2/y, while traditional production of lettuce was projected to yield 3.9 kg/m2/y (Barbosa et al., 2015).

Water consumption between the hydroponic and conventional production of lettuce in Arizona was comparable on an area basis, but when normalized by yield, the average was 13 times less water demand of hydroponic output compared to conventional production. Specifically, hydroponic lettuce production had an estimated water demand of 20 L/kg/y, while traditional production of lettuce had an estimated water demand of 250 L/kg/y (Barbosa et al., 2015).

6.5.2. The differences between vertical farms and greenhouses

Indoor farming is practiced in both vertical farms and greenhouses. However, greenhouses depend on daylight. Therefore, they are practicing farming on a horizontal plane to get sunlight. Because of that, a large amount of space is required, so greenhouses are best suited to rural or suburban areas (*Vertical farming vs. Greenhouse FARMING: Which is more efficient?* 2020). On the other hand, vertical farms can be implemented in urban areas since they need drastically less space than greenhouses to produce the same food. As mentioned before, vertical farms have plants stacked in layers and depend on sunlight and artificial light (*Vertical farming vs. Greenhouse FARMING: Which is more efficient?* 2020).

Moreover, in the 2018 study "Comparing the Profitability of a Greenhouse to a Vertical Farm in Quebec," it is claimed that growing lettuce in a vertical farm can be more profitable than growing it in a greenhouse (Eaves & Eaves, 2017). They attributed this to increased yield per square meter and centralized distribution (Eaves &

Eaves, 2017)2020). The main advantage of vertical farms over greenhouses is the greater yield per square meter. Although vertical farms have higher lighting and heating costs, they benefit from the amount of food grown per unit of soil (*Vertical farming vs. Greenhouse FARMING: Which is more efficient?* 2020). Consequently, even though vertical farms cost more to operate, they produce more crops, resulting in higher revenue. The 2018 study supports this through the results of a simulation, which showed that lettuce grown in a vertical farm has a slightly higher yield than that produced in a greenhouse (Eaves & Eaves, 2017).

6.6. WHAT CAN BE PRODUCED BY VERTICAL FARMING METHODS?

Hydroponic systems are very versatile. Various crops can be grown by using hydroponics, including the most popular ones' tomatoes, cucumbers, basil, peppers, eggplants, strawberries, and many more. Leafy vegetables can also be grown in aquaponic systems such as lettuce (Barbosa et al., 2015).

Vegetables grown in hydroponics are lettuce, spinach, tomatoes, peppers, cucumber, celery. Herbs grown in hydroponics are tarragon, peppermint, oregano, basil, sage, lemon balm, rosemary.

Hard to grow vegetables are carrots, pumpkins, potatoes, corns, turnips, and zucchini.

Figure 6.5: Vegetables can be grown in hydroponic systems adapted from (Max - last updated on December 9, 2020)

6.7- ADVANTAGES AND DISADVANTAGES OF VERTICAL FARMING METHODS

6.7.1. Importance of local production- Reducing Food Miles

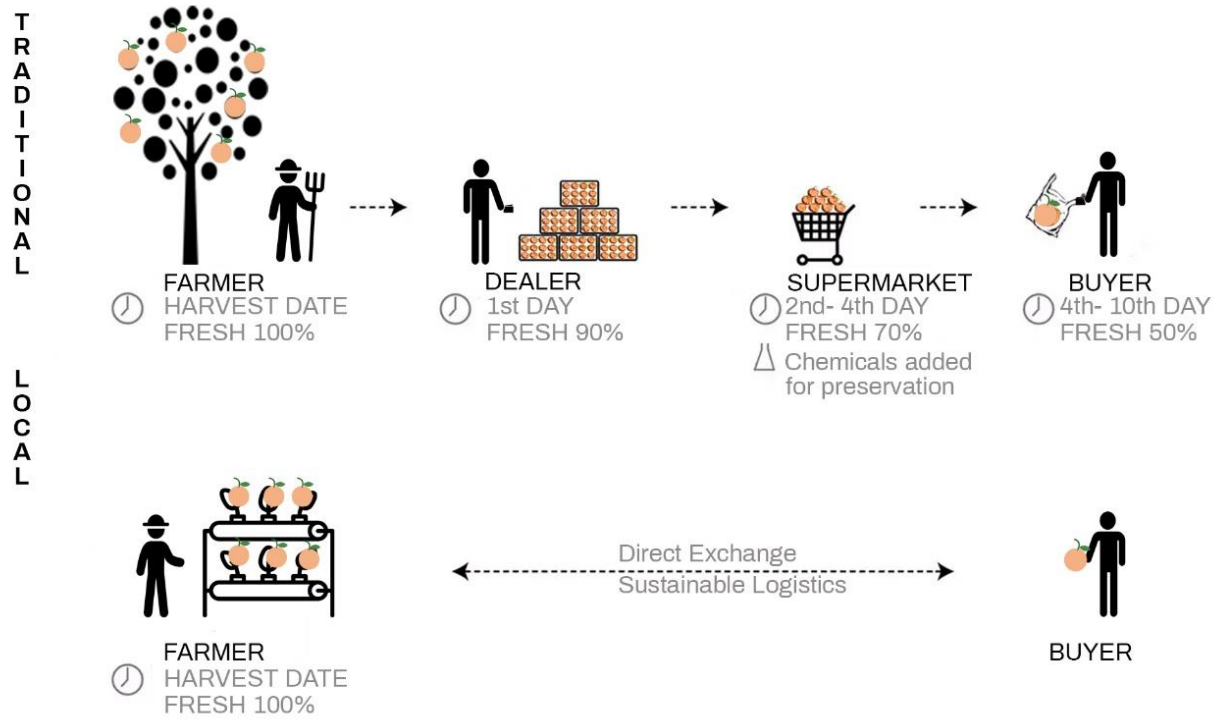


Figure 6.6: Closing gap between farmer and consumer – Local production

Production of traditional agriculture approximately travels 2000 miles worldwide because farmers mostly settle wherever the best fertile agricultural field and good climate for food production are (Cicekli & Barlas, November 2014). However, vertical farms can be established anywhere, independent of the environment or fertility of the soil. So, they can settle near consumers, enabling local production and harvesting of crops decreases the amounts of 'food miles, reducing travel costs and carbon footprint (Al-Kodmany, 2018). Additionally, several steps in the supply chain are skipped, thanks to local production. It increases the freshness of the crops as their travel time is decreased by almost one week. Vertical farming also boosts healthy, locally produced food within the cities (Al-Kodmany, 2018). Compared to foods grown outside of cities, locally produced foods have better nutritional profiles and are much fresher when they reach the consumer. The lack of transportation and dependence on fossil fuels also moderates food prices (Al-Kodmany, 2018).

6.7.2. Advantages of Vertical Farming Methods

The predicted benefits of vertical farming reduce the effects of conventional agriculture. Mainly these can be categorized as environmental & social & economic benefits of vertical farming. The environmental benefits of vertical farming are listed in table 6.4. Vertical farms also have plenty of projected social and economic benefits like improved living conditions and improved health and well-being. Close connection with nature has been proven to positively affect mental health because it reduces stress and decreases obesity (Safikhani, Abdullah, Ossen, & Baharvand, 2014). Numerous studies have also shown that closeness to nature improves individual focus, creativity, and stability; lowers stress levels; and promotes a positive self-perception and self-value (Afrin, 2009).

Table 6.4: Environmental benefits of vertical farming systems adapted from Al-Kodmany, 2018

1. Reliable harvests	Controlled indoor systems are independent units of outside circumstances like weather, and they provide consistent and reliable growing periods to meet delivery schedules on time.
2. Minimum overheads	Production overheads would decrease by 30%.
• Low energy usage	The use of high-efficiency LED lighting technology to be the use of minimum power use for maximum plant growth
• Low water usage • Reduced washing and processing	Vertical farms use around 10% of the water needed for conventional open-field farming. Vertical farms have bio-security procedures to get rid of pests and diseases.
• Reduced transport costs	The placing of facilities nearby the point of a sale dramatically decreases food miles, refrigeration time, need for storage, and transport costs.
3. Increased growing areas	Vertical farms have almost ten times more growing area than conventional farms.
4. Maximum crop yield	Vertical farms can produce more crops per year than open-field conventional agriculture and other farming types. Additionally, crop cycles are faster because of controlled environmental features such as temperature, humidity, light, etc.
5. Wide range of crops	Vertical farms provide a wide range of crops.
6. Fully integrated technology	Vertical farms can be fully monitored, controlled, and automated.
• Optimum air quality	The environmental conditions such as temperature, CO2 level, and humidity percentage of the vertical farm can always be optimized.
• Optimum nutrient and • mineral quality	biologically active nutrients are provided in all crop cycles because providing organic minerals and enzymes ensures healthy plant growth.
• Optimum light quality	High-intensity, low-energy LED lighting can be developed and used for maximum growth rates, high reliability, and cost-effective operations.

6.7.3 Disadvantages of Vertical Farming Methods

The most critical disadvantage of vertical farming is the energy cost for artificial lighting; therefore, an efficient lighting system is an essential component of successful vertical farming. LEDs with 68% efficiency have been produced at Philips by Dutch lighting engineers (Al-Kodmany, 2018). This progress in lighting efficiency will sharply decrease energy costs. Also, PlantLab, a Dutch-based group, has lately developed a lighting technology that might help grow food on a small footprint. This new lighting technology provides the correct lighting colors plants need for photosynthesis—blue, red, and infrared light (Al-Kodmany, 2018).

6.8. OTHER FARMING METHODS FOR URBAN FARMING

6.8.1 Rooftop farming

Rooftop farming involves the growing of fruits and vegetables on a rooftop. With a shortage of suitable land for urban farming, rooftops are frequently seen as a usable space for producing food. It can also provide a sustainable future for cities. Like green roofs, rooftop farms are necessary to combat the heat-island effect, mitigate stormwater runoff, and insulate buildings in the cities. On top of these environmental benefits, rooftop farming supplies fresh products, promote modest-scale urban farming and provides physical connections to nature.

Common vegetables grown on rooftops can be listed as kale, collard greens, carrots, radishes, peppers, beans, beets, cherry tomatoes, and various herbs.

6.8.2. Edible green wall

An edible green wall is an unconventional way of producing fresh food. Edible food-producing wall panels mounted on walls of buildings, growing fresh produce without the use of pesticides. Plants grow vertically, either indoors or outdoors, by using hydroponic farming methods. Green walls can be beneficial in dense urban areas to produce food. Edible walls can produce fruit, vegetables, and herbs by using less space. Additionally, it lowers food costs, increases the nutritional quality, and cuts fuel consumption & carbon emissions by using fewer delivery trucks. (*Edible Walls Grow in Popularity, 2020*)

6.9. VERTICAL FARMING AND SENIOR CITIZENS

Vertical farming is an unconventional form of agriculture that integrates farming activities and buildings. Vertical farming introduces innovative farming systems in the cities to have sustainable urban growth. This chapter will discuss how vertical farms can affect senior citizens psychologically, socially, and environmentally. With the help of vertical farms, senior citizens can experience joy and a sense of achievement at the psychological level (Shu-Ying Tsai & Yi-Shan Tsai, 2015). Additionally, seniors can have higher social interaction with their families, friends, and neighbors in the community. Finally, vertical

farming can enable urban production and create green and health-friendly living spaces for seniors (Shu-Ying Tsai & Yi-Shan Tsai, 2015).

As a result, senior citizens can better connect with the community and their families with vertical farms in the city context. Additionally, green and healthy living spaces in cities can be created for seniors thanks to vertical farming.

Moreover, by being active in daily farming activities, seniors can regain their self-esteem, enabling them to cope with problems that arise from dementia.

6.9.1. Effects of vertical farming on Senior Citizens & Seniors' ideas on vertical farming

Shu-Ying Tsai and Yi-Shan Tsai from the *architecture department of National Taipei University of Technology* conducted semi-structured interviews with 12 senior citizens residing in the Happiness Community in Taipei City to understand their perceptions regarding the effects that vertical farms have on their living environment (Shu-Ying Tsai & Yi-Shan Tsai, 2015).

Table 6.5: Demographic data of 12 participants to the interviews derived from: (Shu-Ying Tsai & Yi-Shan Tsai, 2015)

No. Sex	Interview participant Age
A1 Female	Housewife 75
A2 Female	Retired high school teacher 65
A3 Male	Retired hotel executive 65
A4 Female	Retiree 60
A5 Female	Retiree 60
A6 Male	Retiree from Railways 70
A7 Female	Retiree 65
A8 Female	Housewife 75
A9 Male	Retired public servant 60
A10 Male	Restaurant owner 70
A11 Male	Retiree 65
A12 Female	Retired painting worker 75

6.9.1. a) Psychological Effect That Vertical Farming Has on Senior Citizens

Vertical farming can allow senior citizens to interact with nature in the cities and have psychological support for nature's therapeutic effect. Living with the vegetables and fruits they grow, seniors have an opportunity to feel a sense of success from the plants they grow. These people can experience a sense of accomplishment, joy, and self-identity (Shu-Ying Tsai & Yi-Shan Tsai, 2015). These feelings can improve the life quality for senior citizens throughout the aging process.

Participant A4: "Although the vegetables I grow do not look as good as the ones sold in the market. I am
happy if I can harvest a small number of them. It allows me to feel a sense of success." (Shu-Ying Tsai & Yi-Shan Tsai, 2015)

Participant A10: "Skyscrapers surround us. Being able to see flowers and plants is relaxing." (Shu-Ying Tsai & Yi-Shan Tsai, 2015)

6.9.1.b) Social Effect That Vertical Farming Has on Senior Citizens

Generally, seniors have a smaller circle of friends after retiring from the workplace, and social isolation often causes them to feel lonely. In vertical farms, seniors can share their farming experiences with other people, develop social cohesion in this community, and have more social interaction with other people (Shu-Ying Tsai & Yi-Shan Tsai, 2015). Also, they can share the vegetables and fruits they harvest with other people. Furthermore, this provides opportunities for senior citizens to communicate with their families, staff members, volunteers, and other community members (Shu-Ying Tsai & Yi-Shan Tsai, 2015). Therefore, the social environment where they live is expanded.

Participant A3: "I am pleased knowing that vegetables are always hanging at the front door. We also share the jam we made with other people. It is like in the countryside in the past where people shared fruits and experiences." (Shu-Ying Tsai & Yi-Shan Tsai, 2015)

Participant A1: "Indeed! While growing vegetables, I can communicate with people that have the same hobby as me. It is a good way to share experiences." (Shu-Ying Tsai & Yi-Shan Tsai, 2015)

6.9.1.c) Environmental Effect That Vertical Farming Has on Senior Citizens

Throughout the aging process, seniors often have physiological degeneration and difficulties with mobility. Therefore, according to Shu-Ying Tsai and Yi-Shan Tsai, vertical farms should be established at a height that permits convenient daily maintenance and yields vegetables and fruits at a reachable height. Preferably, older adults should not need to bend their backs or climb to reach the plants (Shu-Ying Tsai & Yi-Shan Tsai, 2015).

Participant A1: "Preferably, the vegetables and fruits are within arm's reach. At my age, I cannot reach them if they are too high. The height of a fence would be great." (Shu-Ying Tsai & Yi-Shan Tsai, 2015)

Participant A5: "It should be between approximately 60cm from the ground and at a reachable height. That will be easier for me to care for the plants." (Shu-Ying Tsai & Yi-Shan Tsai, 2015)

6.10. CONCLUSION

The aging population and the increasing urban development consequence in high-density living areas, whereas green and arable land decrease. Therefore, in cities, the traditional farming model is extremely limited in its application, but vertical farms can be a possible alternative. Additionally, it needs less water usage and area compared to conventional farming. It has more yield percentage per area. It enables all-year-round local production. It is not affected by weather conditions and natural disasters, so it is applicable everywhere. Therefore, vertical farming methods can be applied in the care farms in the cities to use less area but more sufficient.

Furthermore, vertical farms are easy to maintain for seniors because it is physically less demanding. It also creates options for seniors to continue farming activities all year long in a controlled climate, in indoor farming areas.

Promoting vertical farming in urban care farms enables residents to close contact with nature while connecting with city life. In addition, eating the vegetables they grow gives a sense of achievement and joy to seniors. Additionally,

living a farm life in the city can enhance the social cohesion in the community of seniors and increase the social interaction with other people like volunteers, caregivers, nurses, and other residents.

To make sure seniors have convenient harvesting, the height of vertical farms should be between 60cm to 180cm above the ground, and farming beds should 60 cm above the ground. It is an optimal height at which seniors can easily maintain the farms with minimum help from someone else.

As a result, by developing urban care farms with the help of vertical farms, seniors can achieve joy and a sense of achievement at the psychological level. They can have a higher level of communication with volunteers, other residents, friends, and neighbors. At the environmental level, comprehensive ecological communities can be achieved. Therefore, building urban care farms with vertical farming systems is beneficial for improving seniors' quality of life.

7

DAILY ACTIVITIES & PERSONAS

7. DAILY STRUCTURE FOR PERSONAS WITH DIFFERENT STAGES OF DEMENTIA

Creating personas and developing a daily structure are helpful methods to see how complex can respond to residents' needs. Therefore, in this chapter, firstly, everyday activities in care farms will be analyzed. Secondly, three personas with three different stages of dementia will be shaped, and lastly, different programs will be assigned to each persona according to his needs.

7.1. ACTIVITIES IN THE CARE FARMS

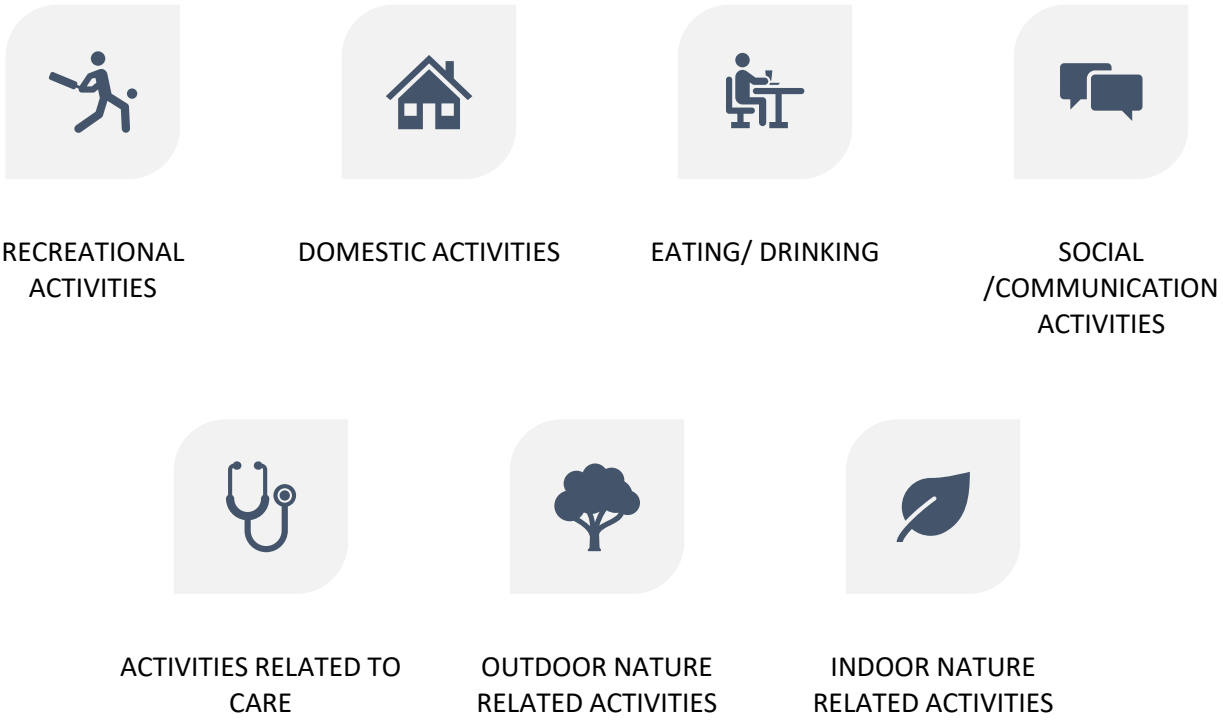


Figure 7.1: Activities in the care farms

Activities in the care farms are not limited to farming activities. Residents also spend their time with recreational, domestic, and care-related activities. Also, they devote considerable time to eating, drinking, and social activities.

Table 7.1: Activities that seniors attend in care farms, engagement level with the activity and the location of the activity derived from (de Boer et al., Daily lives of residents with dementia in nursing homes: development of the Maastricht electronic daily life observation tool 2016)

ACTIVITY	DESCRIPTION/COMMENT	ENGAGEMENT	LOCATION
1. Eating and drinking	Consumption of food or drinks/ if a caregiver is giving food to a senior also counts as social interaction.	Active engagement	Common / private kitchen
2. Farm activity	Activities like looking at animals, collecting fresh eggs, feeding and caring for the chickens, etc.	Active engagement	Garden
3. Visitation by (para) medical services	Visit from, e.g., physiotherapist, ergo therapist, etc.	Passive engagement	Private room
4. Gardening, taking care of plants	Watering plants, flower arranging, etc.	Active engagement	Garden / Roof terrace / Indoor farming area
5.Domestic activities	Setting the table, cleaning dishes, etc.	Active engagement	Shared kitchen/ Private room
6. Cooking	Preparing a meal or helping (e.g., peel potatoes)	Active engagement	Shared kitchen/ Private kitchen
7. Exercising/ sports	Gymnastics, etc.	Active engagement	Gym
8. Dancing	Dancing alone or with others	Active engagement	Gym / Multipurpose room
9. Spiritual or Religious activity	Going to the church or chapel, praying, etc.	Active engagement	Private room/ Chapel / Church
10. Handcrafts/ arts	Knitting, drawing, etc.	Active engagement	Art room/ Common living room/ Private room
12. Excursion or shopping	Going to the store	Active engagement	Store / Supermarket
13. Taking a walk outside	Taking a walk alone or participating in an organized walking group	Active engagement	Park/ Forest
14. (Self) Care activity	Take a shower, do your hair, go to the toilet, brush teeth, receive care from a nurse or aid such as getting medication, etc.	Active engagement	Private room
15. Playing cards, playing a game, doing a puzzle	Playing board games, etc.	Active engagement	Game room
16. Reading, writing, crossword puzzle	Individual reading or as a group	Active engagement	Shared living room / Private room
17. Beauty activity	Manicure, hairdresser, make-up	Active engagement	Hairdresser / Private room
18. Having a phone call	Making a phone call	Active engagement	Private room

19. Interacting with pets	Taking care of pets like dog, cat, Fish	Active engagement	Common areas
20. Talking groups	Volunteers can also do an organized activity	Active engagement	Shared living room/ Multipurpose room
21. Watching television or listening to the radio	Alone or organized with others	Active engagement	Shared living room/ Private room
22. Doing an activity with family or others outside the care facility	The resident is going out from the facility with family or someone else (e.g., going to the store or church).	Active engagement	Outside of the facility
23. Walking	The resident walks around the living room, in the building, or the garden	Active engagement	Corridors, indoor & outdoor common areas
24. Resting	Sitting or lying down & having a nap in the afternoon	Passive engagement	Shared living room/ Private room
25.Meaningless (repetitive) behavior	Tapping on the table, rubbing hands without reason, picking, wandering, mumbling, etc.	No engagement	-
26.Sleeping	having a nap in the afternoon or sleeping at night	No engagement	Private room

These are the main activities of seniors who stay in nursing homes or green care farms. Therefore, in the design stage, those activities and the areas for those activities will be considered, and the design proposal will be shaped according to seniors' needs.

7.2. DAILY PROGRAM FOR SENIORS

This daily program has been made according to seniors' activities in nursing homes and green care farms. This program will be used in the design proposal chapter to investigate how an elderly spends time in the urban green care farm design.

TYPICAL DAY AT FARM

07.00: waking up

07.30: getting ready

08.00: having breakfast with others in the shared kitchen

08.30: reading the newspaper or having a chat with other residents in the shared living room.

09.30: Walking in the garden and take care of animals (checking chickens, feeding them, and getting eggs)

10.00: Involving in some farming activities indoor or outdoor according to weather, picking up fresh vegetables

11.00: package the food. - workshop

11.30: Before lunch, helping caretakers to prepare meals, peeling, and cutting vegetables, and cooking.

12.30: Having lunch together

13.30: Having a nap

14.30: After the nap, some personal time in his/her outdoor space or living room in the housing unit

15.00: Walk and reach to the activity rooms like hairdresser, café or small fitness center, a small chapel

16.00: Wandering in the garden

16.30: Chill out and playing card with friends

17.30: helping to prepare dinner

18.00: having dinner together

19.00: common activity - like singing, bingo, arts, and

crafts or small concert.

20.30: preparing to go to the bed

7.3. PERSONAS

Early Stages of Dementia

Sophie - 68

Sophie is in an early stage of dementia with mild cognitive decline. She is a housewife and married to Tom, 72. Her forgetfulness has been increased in the past two years. She has slight difficulty in concentrating and finding the right words. Her memory problems are small but consistent. She can perform personal care activities. She requires assistance in complicated tasks such as handling finances, traveling alone to new places, taking a walk in the neighborhood, planning complex activities. She likes to be outside and taking fresh air a couple of times a day. She has an interest in handcrafts. She likes to make flower arrangements in the afternoon from the flowers she picks up in the morning. She also enjoys picking up strawberries from indoor farming beds and cooking homemade jams with other residents. Moreover, she goes to the small market they have in the facility twice a week and have some small roles like packing, but at the same time, she has conversations with people from the neighborhood.

Moderate Stages of Dementia

Maria- 75

Maria is in a moderate stage of dementia with moderate cognitive decline. She is a retired high school teacher and has more profound memory loss. However, Maria has no problem with highly learned materials. She is a person who has a lot of interest and engagement but not the cognitive capability of focusing on an activity too long. She has little independence at home because she can only do simple chores. Therefore, she is more comfortable in assisted living facilities. She likes to take care of animals in the courtyard and pick up fresh vegetables from inside aquaponic farming beds and farmers' help. They can make a salad from fresh vegetables they pick up in the morning and enjoy together. She also likes to have tea with his friends in the afternoon and playing the piano.

Late Stage of Dementia

Lucas – 82

Lucas is in a late stage of dementia with severe cognitive decline. He has severe memory loss. His speech ability has declined, and he has limited ability to communicate. He cannot walk well; therefore, he is using a wheelchair. He needs 24-hour intensive care for all the activities. However, he still likes to touch fresh samples of various vegetables and herbs. Drinking and smelling relaxing herbal tea helps him to be calmer.

7.4. DIFFERENT PROGRAMS REGARDING THE STAGE OF DEMENTIA OF THE RESIDENTS

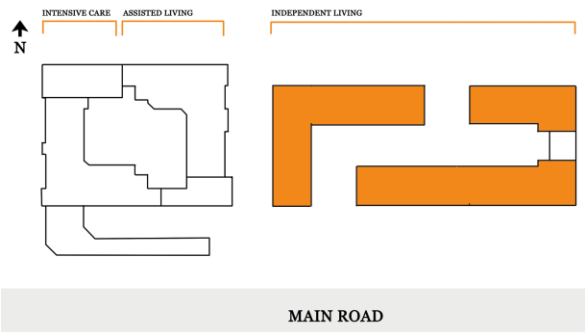
Hands-on farming activities help residents stimulating senses and memories while fostering a connection with nature. However, care farms should shape their activities depending on residents' mental and physical capabilities. Having variety in this sense is important because it is not realistic to expect everyone from all stages of dementia to participate in the same activities related to farming. Activities can be categorized as independent living, assisted living, and intensive care.

7.4.1. Possible farming-related program for independent living (Early stages of dementia)

Indoor and outdoor farming areas can be used as beautiful, shared community spaces where seniors in independent living can work together on works related to farming. While doing so, they can have an opportunity to get to know each other better and socialize. Residents can harvest fresh vegetables from indoor hydroponic farming beds or outside farming beds to enjoy themselves or in the shared kitchen.

Programs can include working on hydroponic farming beds, traditional farming beds with touching to the soil, container planting, which provides seniors with skills and plants they can care for in their own living spaces. (Green city Growers)

Example program for independent living: After a community activity to plant in the herb garden, seniors participate in the workshop to learn how to maintain their living walls with easy-to-maintain herbs. They can then practice on their living wall on their balcony.



7.4.2. Possible farming-related program for assisted living (Middle stages of dementia)

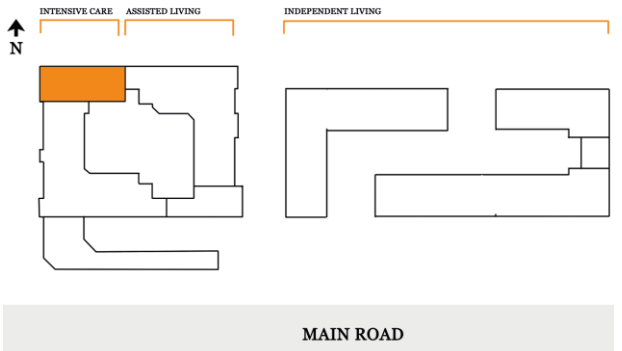
In the assisted living facility, indoor and outdoor farming areas can be used as communal spaces where seniors can come together and work with the help of farmers. Farmer can provide materials &guidance and model garden activities so that seniors can complete the tasks both independently and as a group. In green care farms designing and installing custom raised garden beds are essential to allow seniors to get closer to the garden with wheelchairs. (Green city Growers)

Example program for assisted living: Seniors plant easy-to-maintain herbs in outdoor beds and pick up fresh vegetables from an indoor hydroponic farming unit. Outdoor activity is followed by lunch inside with a fresh vegetable salad. When the weather is so cold or rainy, farming activities can continue in indoor farming areas. (Green city Growers)

7.4.3. Possible farming-related program for Intensive Care (Late stages of dementia)

In intensive care units, indoor farming areas can be used only for therapeutic purposes. A sensory garden made up of non-toxic plants and edibles, bursting with colors and aromatics is ideal for seniors with moderate and late stages of dementia. Programs related to farming in intensive care units can be only based on sensory and tactile activities. The farmer provides guidance, tasks with seniors and adapts tasks to be accessible and adjusted to the seniors' goals. (Green city Growers)

Example program for intensive care: Seniors still can see colors, smell, and taste fresh samples of various herbs. Farmer helps residents make their tea bags filled with fresh herbs, and the group enjoys a tea party together. In the late stage of dementia, fresh vegetables can create sensory stimulation to touch, see and smell. Also, they can enjoy tea from fresh herbs, which also can help them feel more peaceful. (Green city Growers)



7.5. CONCLUSION

Creating personas with different stages of dementia and see how seniors are spending time in green care farms will be helpful for the further stages because this method provides us an opportunity to look from seniors' perspective.

Analysis of which type of activities taking place in which variety of spaces will be helpful to shape the design proposal in the following stages. According to this analysis, the expectations of end-users can be met better. Information derived from this chapter will be used in the design proposal, and in chapter 9, A day of Maria, will be shown in the design of urban green care farm.

8

SITE ANALYSIS

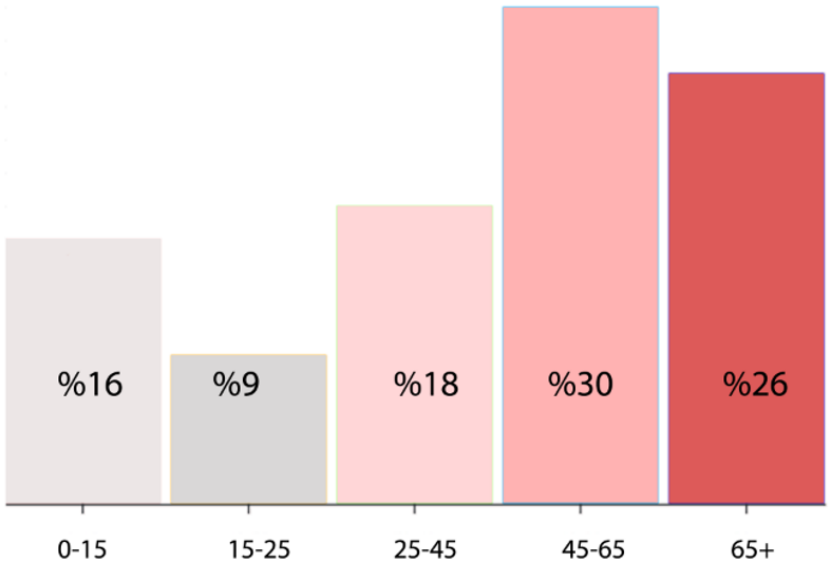
8.SITE ANALYSIS

The project site is located on the south side of Eindhoven in the town of Waarle in Voldijn. It is mainly a residential area with retail and other services placed at the southern side of the plot.

The dominant typology of the buildings in this area is three-story high pitched roof row houses.

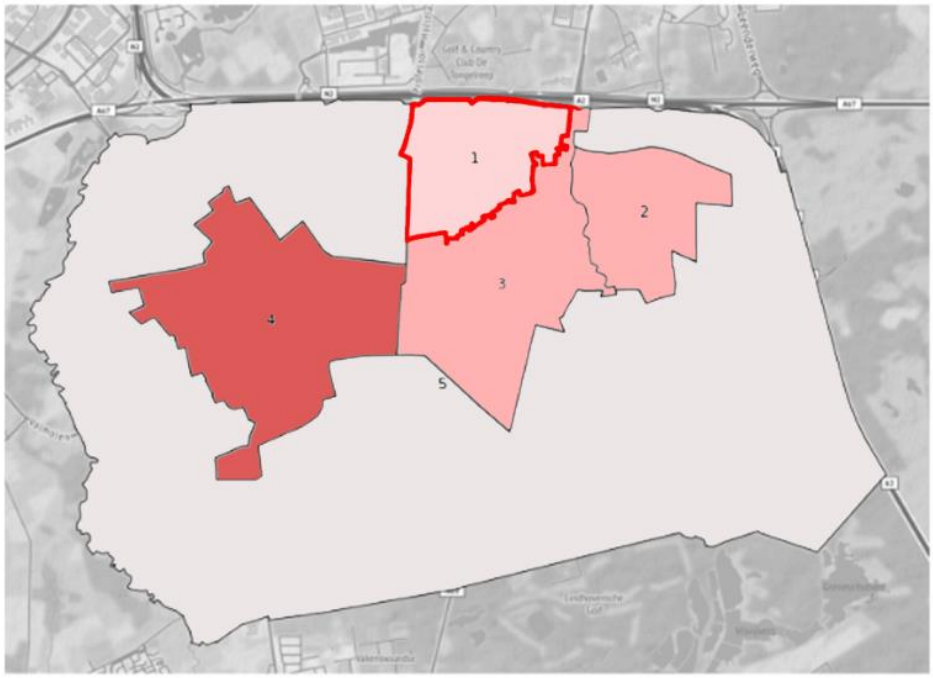
Figure 8.1: Location of the project: Waalre

8.1. DEMOGRAPHIC ANALYSIS



The majority of the population of Voldjin is between 45 to 65 age group with 30% percent. The second group is +65 years old people with 26% percent. Therefore, it can be said that there are mainly senior citizens are living.

Figure 8.2: Neighborhood Voldjin 2020 Age Groups

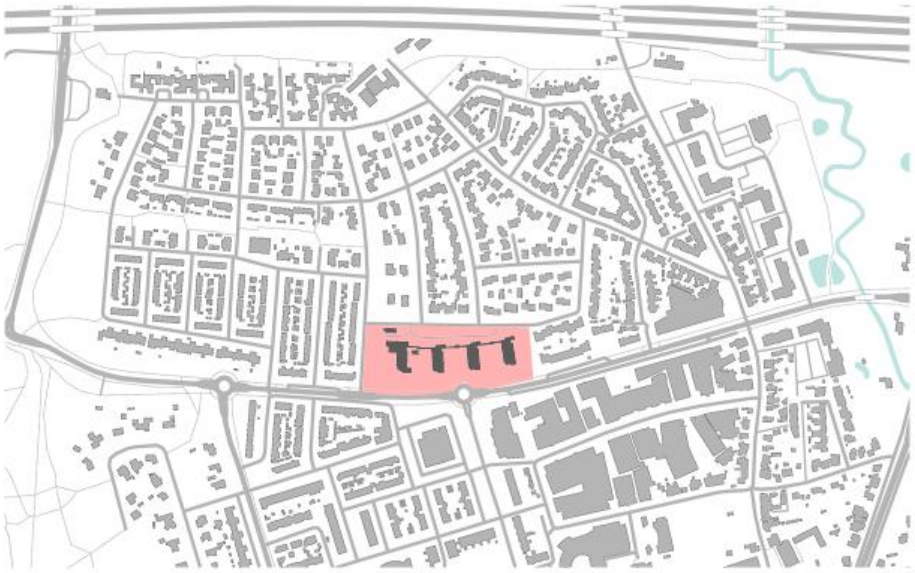


5000-6000
3000-4000
2000-3000
1000-2000

1. VOLDIJN
2.EKENOOI
3.AALST
4.WAALRE
5.VERSPREIDE HUIZEN

Figure 8.3: Population Map

8.2. PLOT & EXISTING BUILDINGS



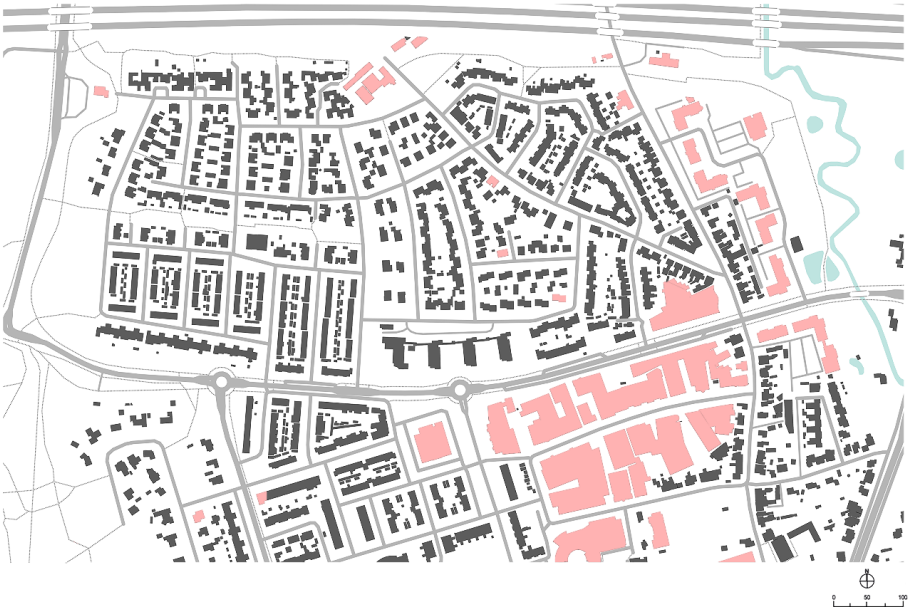
Building on the west side of the plot is six stories high, and a care organization manages it.

The other three buildings are housing for senior citizens with five stories.

PLOT
EXISTING BUILDINGS
SURROUNDING

Figure 8.4: Plot & Existing Buildings

8.2. FUNCTIONS



Residential buildings are dominating the northern part of the Waalre.

Services are present on the southeast part of the site.

Figure 8.5: Functions

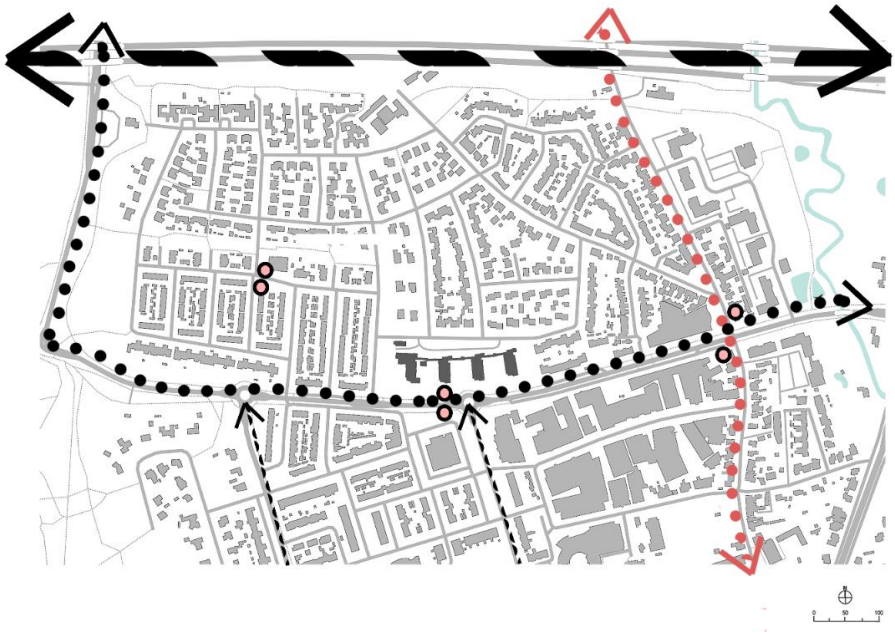
8.3. PUBLIC GREENERY AND WATER ELEMENT

Green areas surround the neighborhood of Waalre.

The nearest public greenery accessible is on the west of the site, and it is in 250m distance.

Figure 8.6: Public green & water element

8.4. TRANSPORTATION LINES & BUS STOPS



There is a bus stop nearby on the south side of the plot.

Public transport to Eindhoven is situated far away from the site.

In the north, there is an N2 highway.

Figure 8.8: Transportation and Traffic

8.5. VOLUMETRIC ANALYSIS

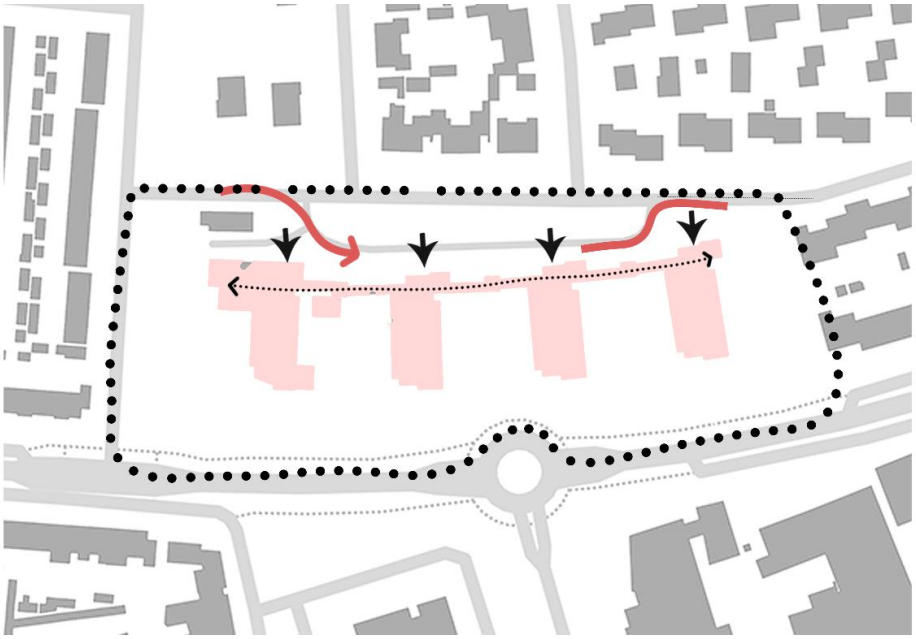
The main typology in this district is low-rise buildings.

Retails and warehouses in the southeast part of Voldijn are relatively higher than residential areas, but they are not higher than 15 meters.

The only high-rise is located far away from the plot.

Figure 8.9: Volumetric Analysis

8.6. ACCESS TO PLOT



Car access is from the north side of the site.

Similarly, the entrances of the buildings and the main connection route of the buildings with bridges are situated on the northern side.

Figure 8.10: Access to the site

8.7. GREENERY ON THE SITE

There are many trees on the plot and the immediate surrounding.

Greenery on the plot presents mainly on the south side of the plot to protect the site from the noise coming from the main road and create a natural boundary in between.

TREES ON THE PLOT

SURROUNDING TREES

Figure 8.11: Greenery on the plot

8.8. PLOT

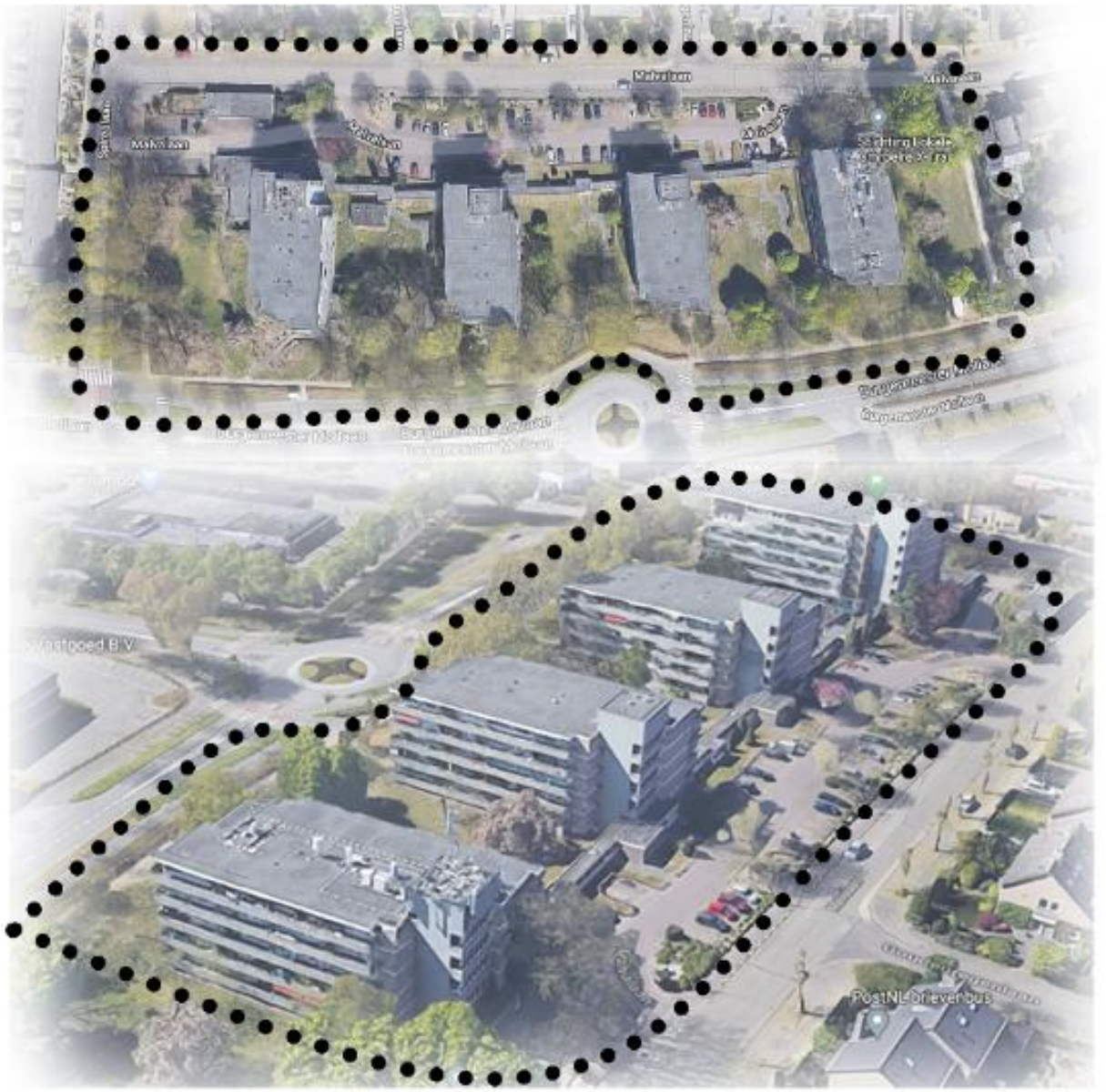
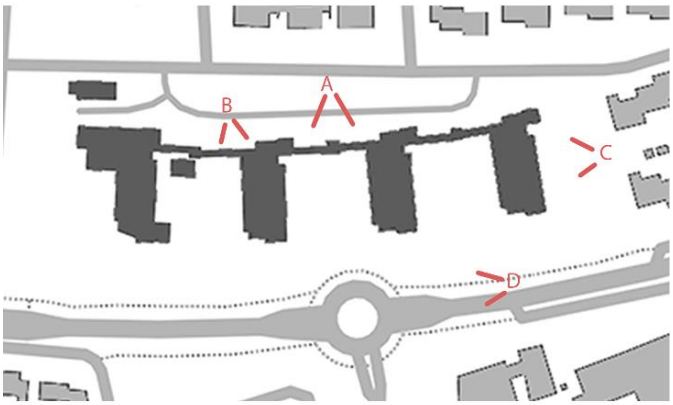


Figure 8.12: Plot



On the site, there are six buildings, four dwelling units, and one garage. They were built in 1980's.

Thanks to their East-West direction, they have proper insolation from noisy Burgemeester Mollaanstreet because the shorter sides of the buildings are looking on that side with no windows.

They are the tallest building in the whole neighborhood, and with their massive form, they are very distinguishable buildings among other buildings.

Bridges in between buildings are cutting the connection between the north and south side of the plot.

Overall, for the new project, all the existing buildings should be demolished.

Figure 8.13: Photographs from site visit

8.9. INFORMATION ABOUT THE SITE

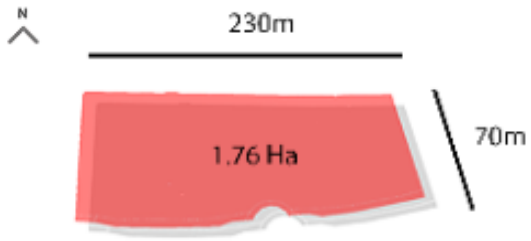


Figure 8.14: Dimensions of the site

Figure 8.15: Existing buildings on the site

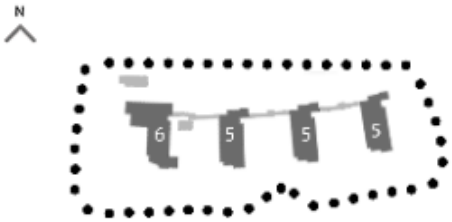


Figure 8.16: Height of existing buildings on the site

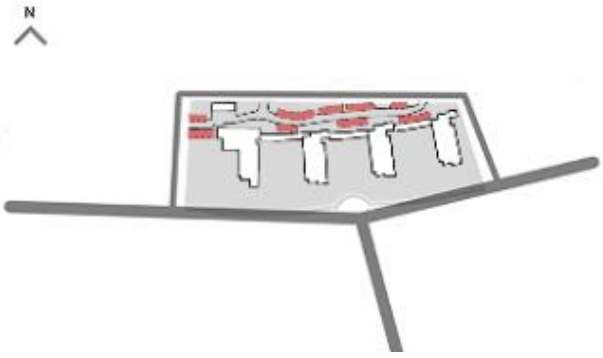


Figure 8.17: Car parking areas on the site

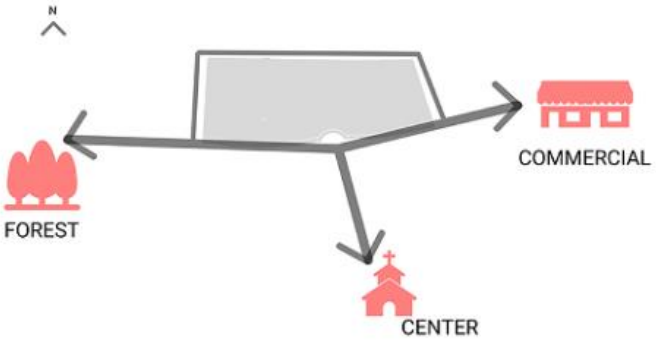


Figure 8.18: Main directions

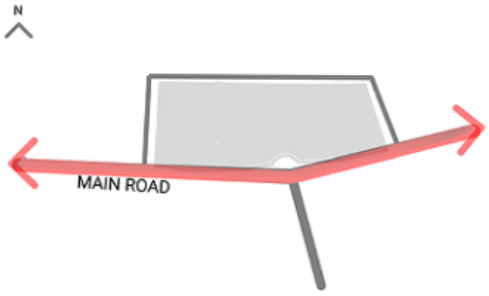


Figure 8.19: Main road next to site

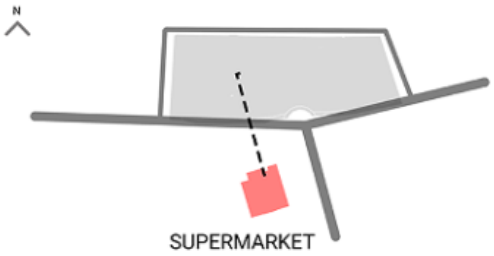


Figure 8.20: Main facility next to site

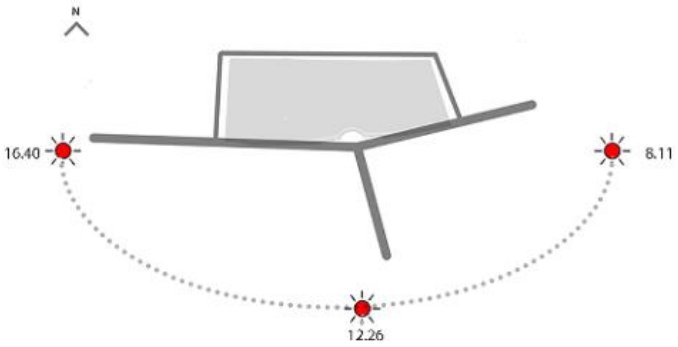


Figure 8.21: Sun Path

9

DESIGN PROPOSAL

9.DESIGN

This proposal aims to create a prototype in which design guidelines derived from case studies, interviews, and literature reviews can be tested and developed further.

This proposal aims to bring green care farm typology for seniors with dementia into the cities with the help of innovative farming methods and dementia-friendly design strategies to make them able to be part of actual agricultural production and feel like contributing members of society.

9.1. EARLY CONCEPT

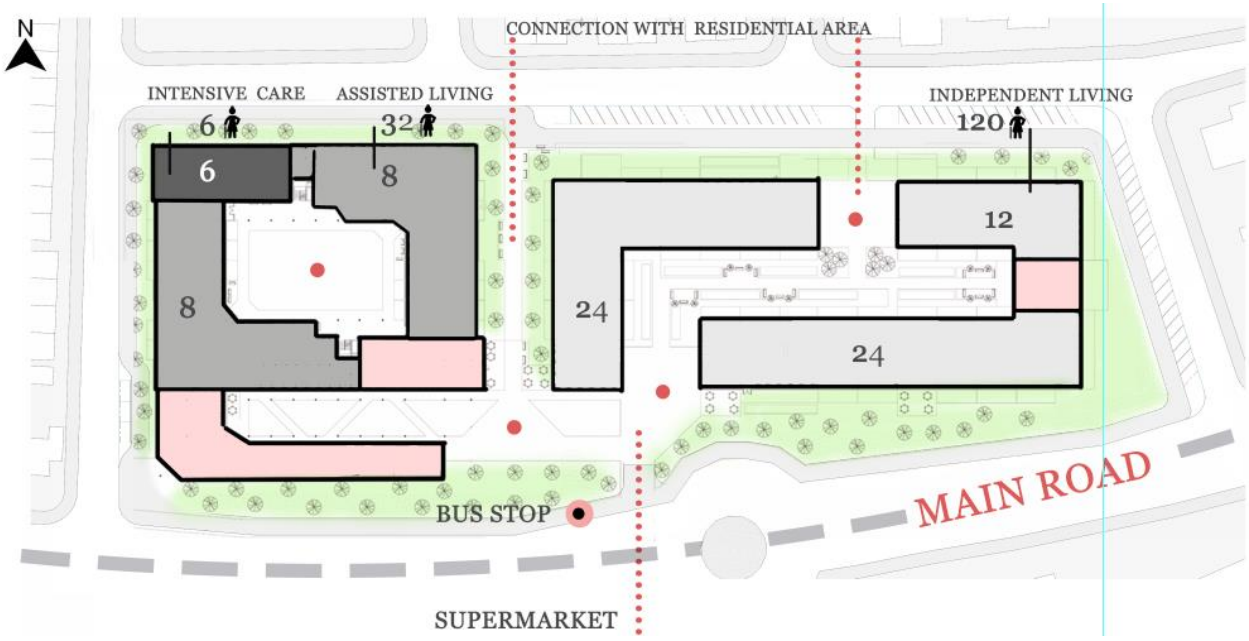


Figure 9.1: Early concept diagram

This design proposal includes different unit types: intensive care unit, assisted living units, and independent living units (see Figure 9.1).

Intensive care units and assisted living units are located around a closed courtyard to create a safe environment for seniors with dementia (see Figure 9.1).

The independent living part creates a semi-open courtyard and connects the residential area on the north and commercial areas on the south side. The south side of the main road entrance is located close to the bus stop and nearest supermarket (see Figure 9.1). Additionally, retail facilities are located closer to the main road.

In assisted living part, there are four groups of eight seniors with dementia. Two groups are located on the ground floor (see Figure 9.1), and the other two groups are located on the first floor. Additionally, there is an intensive care unit for six people on the ground floor (see Figure 9.1).

On the other hand, one hundred twenty seniors will accommodate the independent living part (see Figure 9.1). Sixty people on the ground floor and sixty people on the first floor will stay in the independent living part.

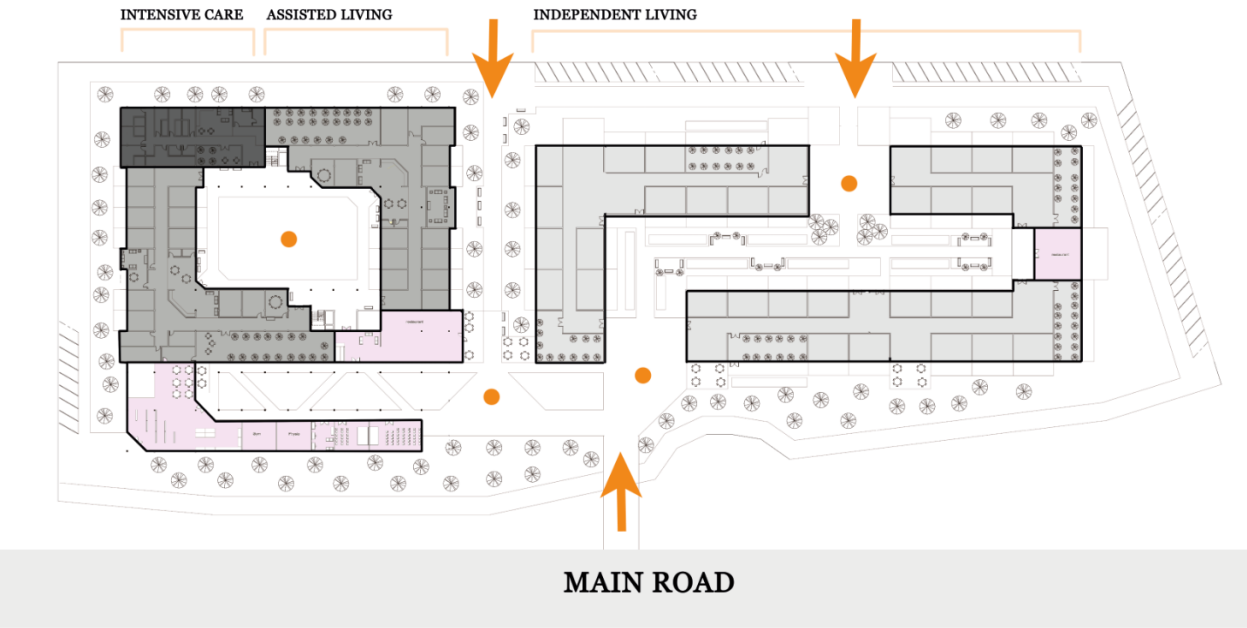


Figure 9.2: Layout of the ground floor of the design proposal

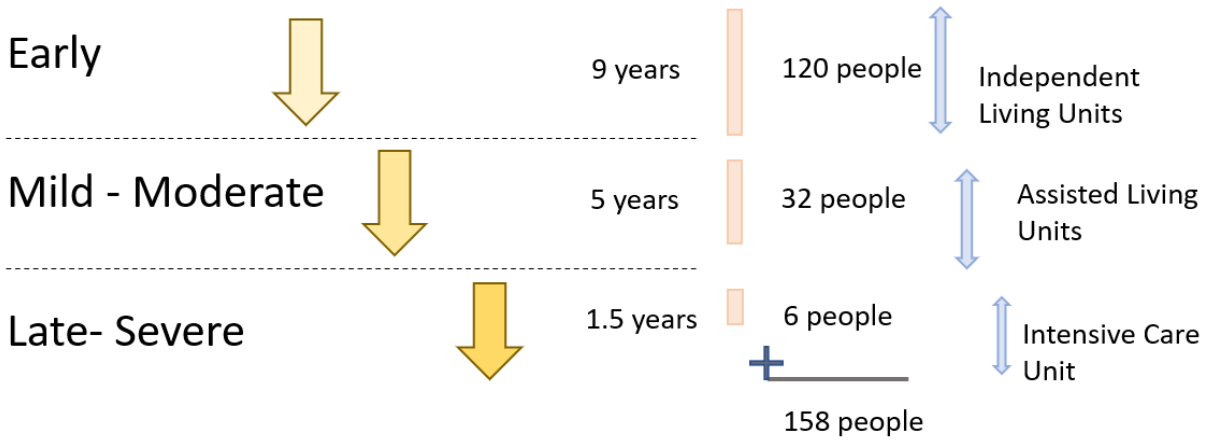


Figure 9.3: Different type of units according to the stages of dementia

People living in the independent living units have no dementia or early-stage dementia. Therefore, they do not need assistance for their daily activities. However, there are caregivers in the common areas to helps seniors when it is required. Additionally, in farming areas, they are assisted by farmers.

Seniors living in assisted living units have mild or moderate stage dementia and require assistance in their daily activities. In each assisted living unit, eight seniors accommodate, and they have a closed safe courtyard to use every time of the day independently. There are caregivers in each unit to helps seniors with daily activities. Additionally, in farming areas, they are assisted by farmers.

In the intensive care unit, seniors with late-stage dementia accommodate and need assistance with all kinds of activities. In intensive care units, farming areas are only used for therapeutic purposes.

The number of people in each assisted living group is limited, with a maximum of 8 people (see Figure 9.1) because a home-like environment is tried to be achieved. In this way, seniors can easily recognize others in their group and accept them as their house members.

In care farms, it is suggested to have people between 5- 12 because creating a homelike environment is not only about the scale of the building but also the number of people seniors see each day. Limiting this number by nine will help them to recognize and know everyone very well.

Figure 9.4: Semi-open Courtyard with Facilities for residents of complex and Neighbors

Next to the main entrance to the assisted living area, there is a common semi-open courtyard where seniors from all blocks can meet. Additionally, this area is open to the public, so neighbors also can come here. It will increase the chance of encounters with other people. All the commercial facilities are located in this area. These facilities are hairdressers, a small market, a multipurpose room, a gym, a small chapel, and physical therapy unit. They are located around one semi courtyard because creating a new environment is tried to be achieved where seniors can visit those facilities and feel like they leave their home and come to the center of town. This idea will be enhanced by changing the color and material of the facades in this area.

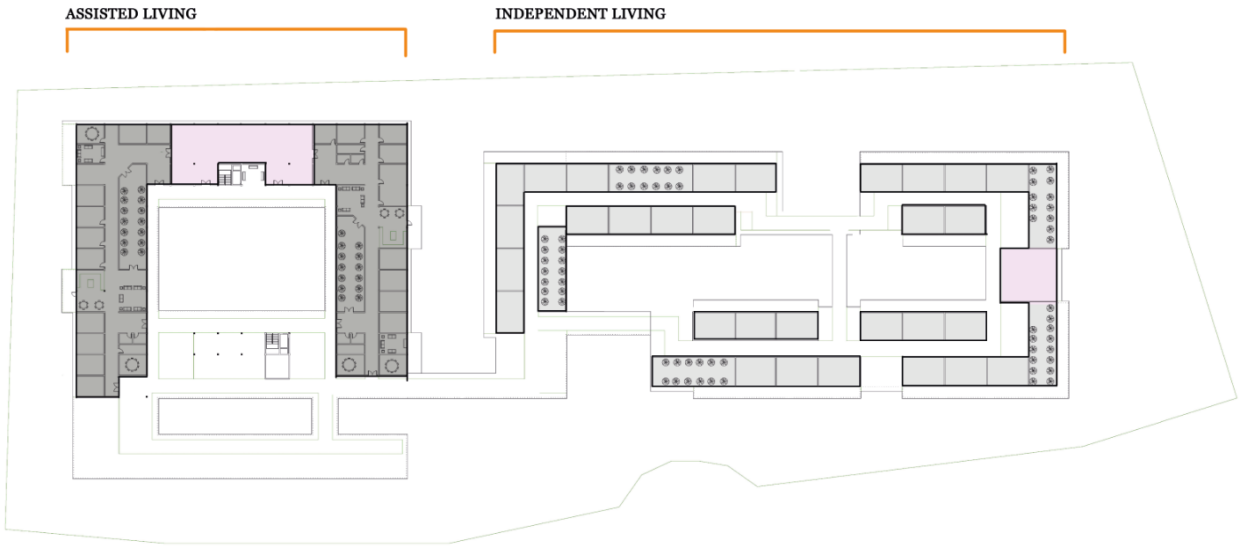


Figure 9.5: Layout of the first-floor plan

There will be three entrances to the site: two from the north side and one from the south side (see Figure 9.2) because there is a busy road on the south side, and mainly residential units are located on the north side. Therefore, there is only one entrance to the site from the south to limit the interaction with the main road. However, the entrance on the south is located close to the supermarket to provide easy access to this facility (see Figure 9.2).

Additionally, there will be a larger buffer zone with trees on the south side because, in this way, it could be safer and quieter inside the complex.

Orange dots are representing the small piazzas (see Figure 9.2). Also, they are decision-making points when seniors are navigating through the complex. Therefore it is planned to locate landmarks on those points such as clock tower, fountain, or colorful sculpture so seniors can better recognize space (see Figure 9.2).

In this planning, seniors also have indoor and outdoor farming areas and common areas where residents can come together and socialize in the independent living part.

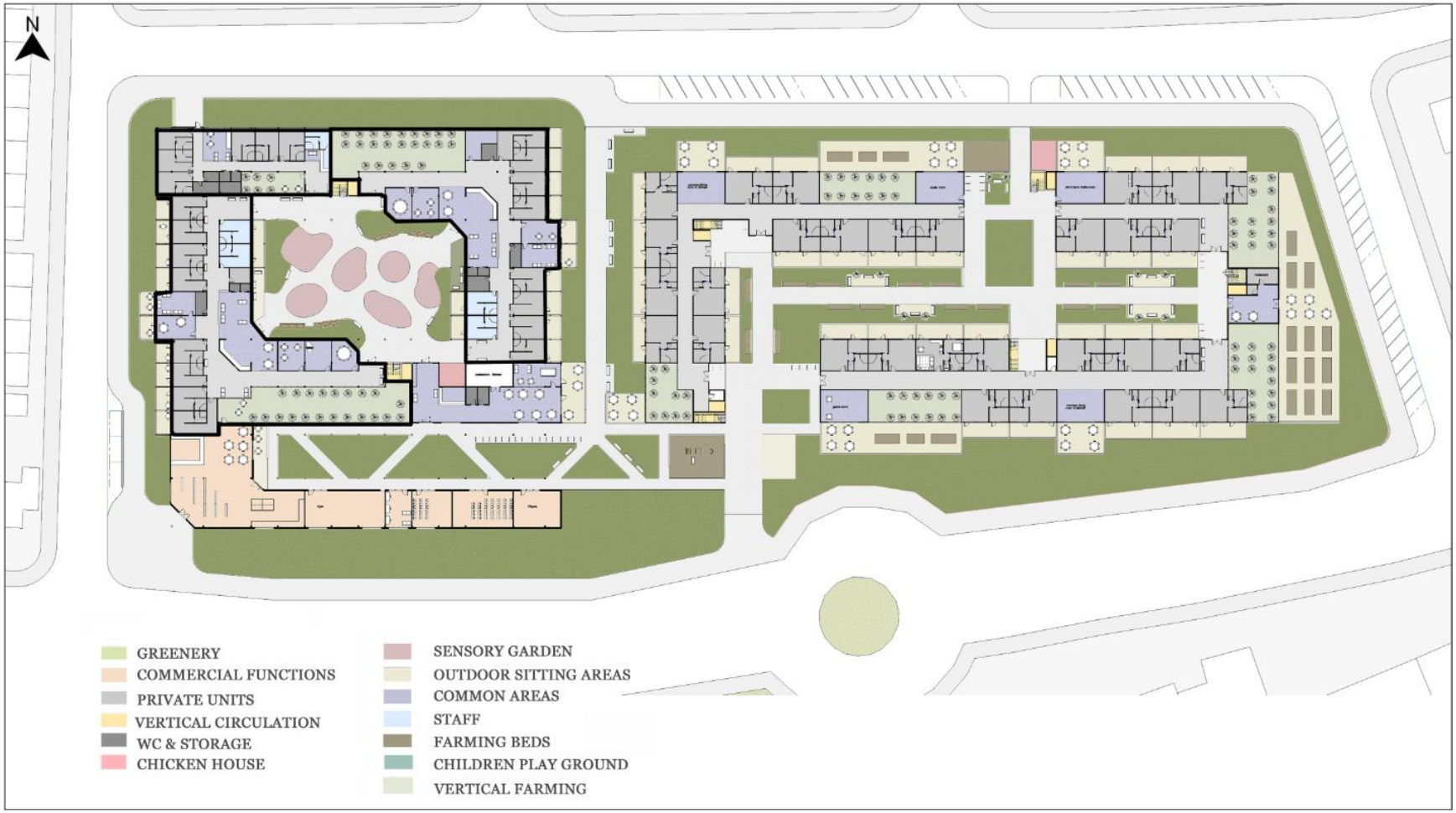


Figure 9.6: Functions- Ground Floor

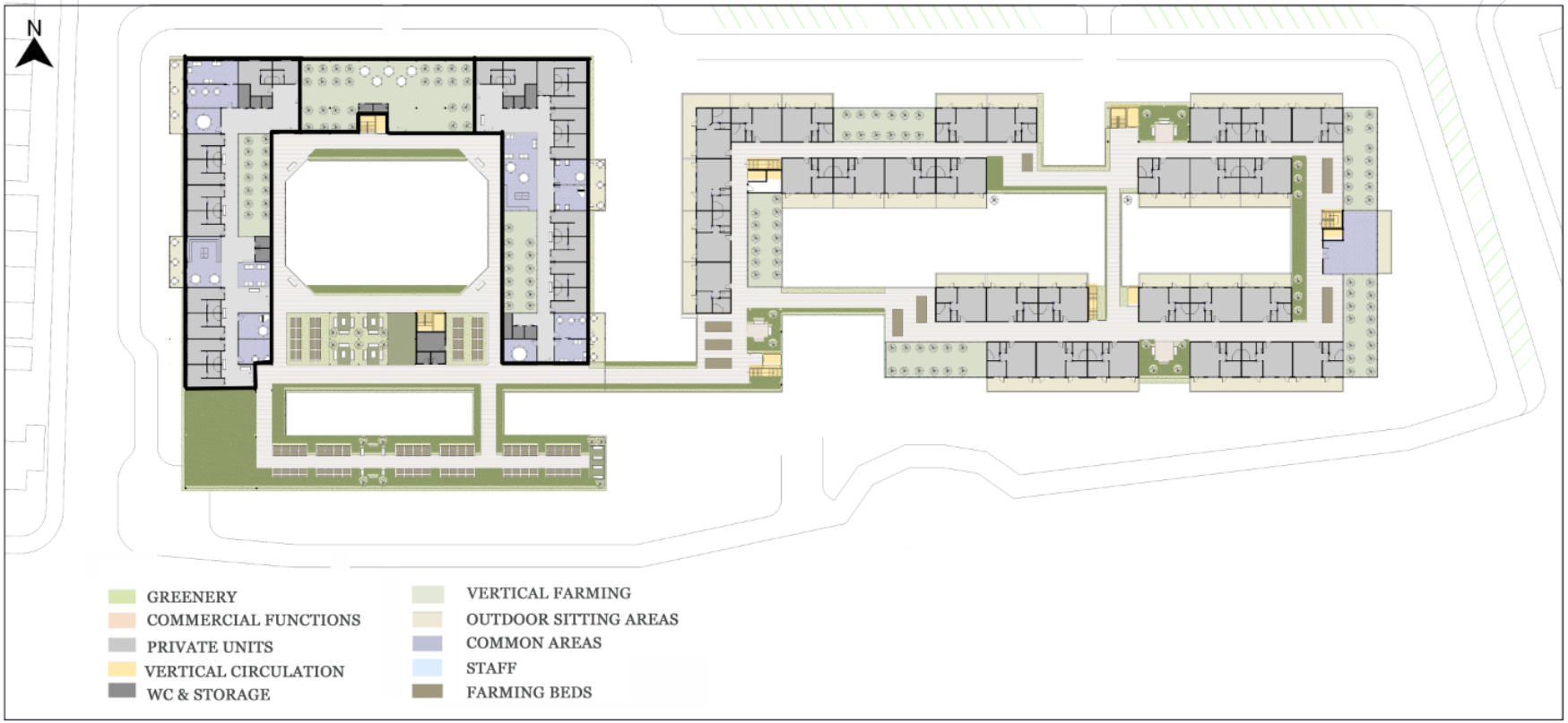


Figure 9.7: Functions- First Floor

9.1.1. Ground Floor Planning

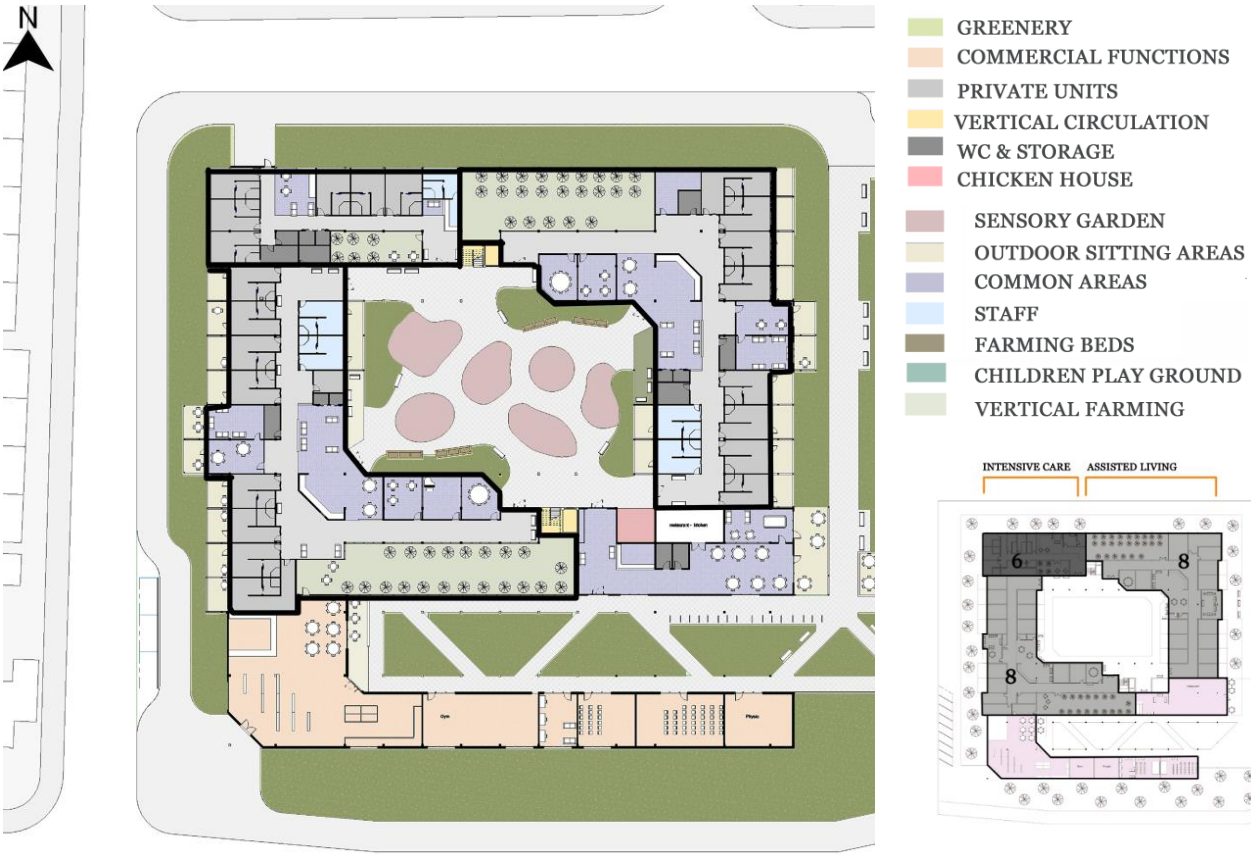


Figure 9.8: Detailed layout of assisted living units on ground floor

Assisted living part of the design proposal will be developed further. At the main entrance of the assisted living complex, a common area leads seniors to the courtyard (see Figure 9.8). There are two assisted living units and one intensive care unit on the ground floor. In each assisted living block, common areas are located next to the courtyard (see Figure 9.8). Thus, seniors can have a visual connection with the courtyard while spending their time during the day.

Similarly, indoor farming areas are located next to common areas (see Figure 9.8). Therefore, seniors also have a visual connection with them. In addition, indoor farming areas are located in a defined space close to the kitchen and common areas so residents can recognize these areas as farming areas and visit them during the day. They will not be affected by the weather, and farming activities will continue all year.

Common areas are placed between private rooms to divide the corridor, get more sunlight inside the hall and avoid long narrow dark corridors (see Figure 9.8). Additionally, when seniors enter the block from one side and follow the corridor, they will reach the courtyard again, so there will be no dead-end points and create a loop (see Figure 9.8).

9.1.2. First Floor Planning

Figure 9.9: Detailed layout of assisted living units on the first floor

On the south side of the assistant living area, outdoor farming beds are located on the first floor (see Figure 9.9). This way, plants can get the most sunlight. Additionally, there is no building on the south side to not block the sunlight coming to the courtyard on the ground floor. There are many outdoor sitting areas, some of them are more closed &private, and others are located on open terraces so seniors can take breaks on those points. There is a similar logic with the ground floor regarding the planning of assisted living blocks.

9.1.3. Sections

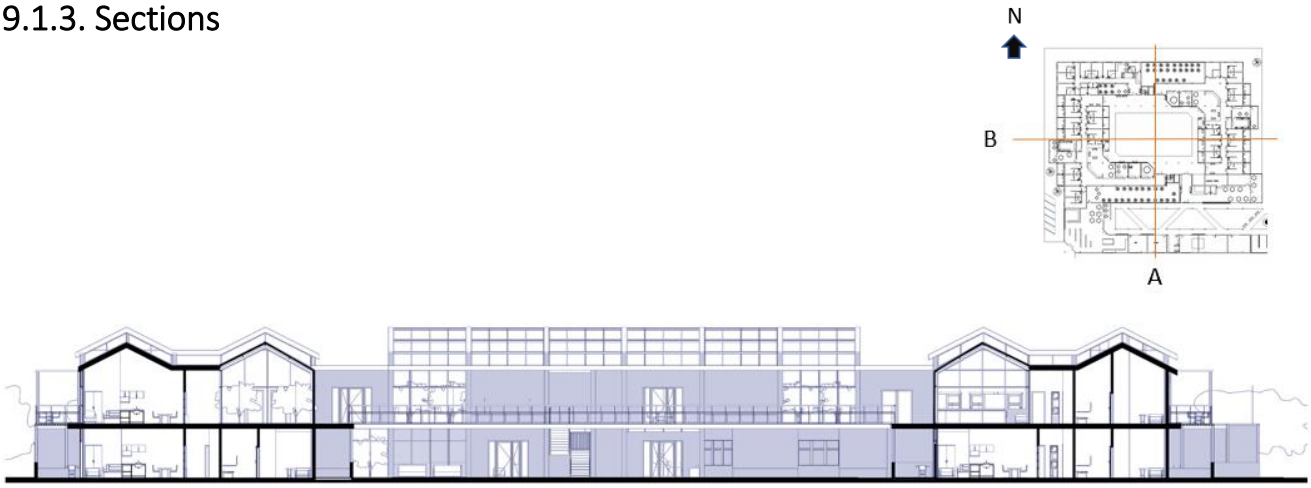


Figure 9.10: Early Concept Section B

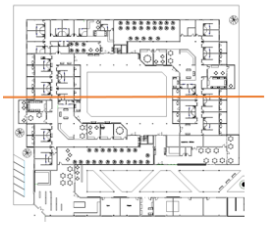
Figure 9.11: Early Concept Section A

9.1.4. Elevations

Figure 9.12: Early Concept West Elevation

Figure 9.13: Early Concept West Elevation

9.1.5. Section Perspectives



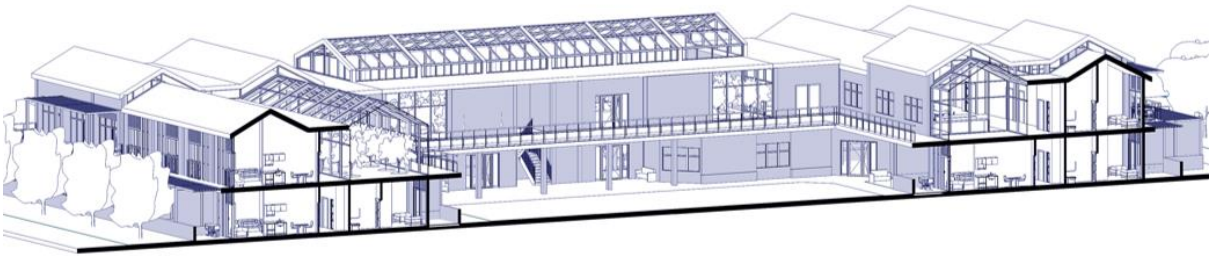
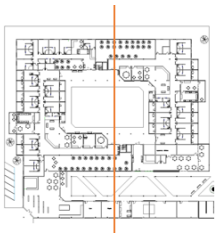


Figure 9.14: Section Perspective



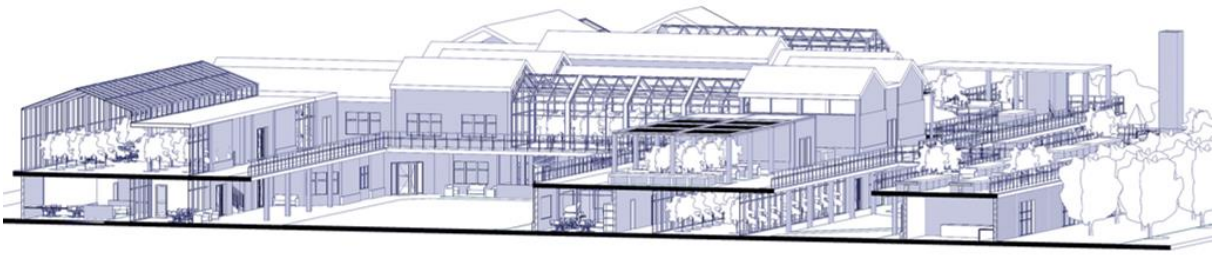


Figure 9.15: Section Perspective B

9.1.6. 3D Views

Figure 9.16: Roof Terrace Farming

Figure9.17: Outdoor Sitting Areas

Figure 9.18: Façade Design

9.2 GOALS OF THE DESIGN PROPOSAL

These are the main conclusions derived from the 4 case studies and literature review. They will be considered and transferred to design applications in the design proposal.

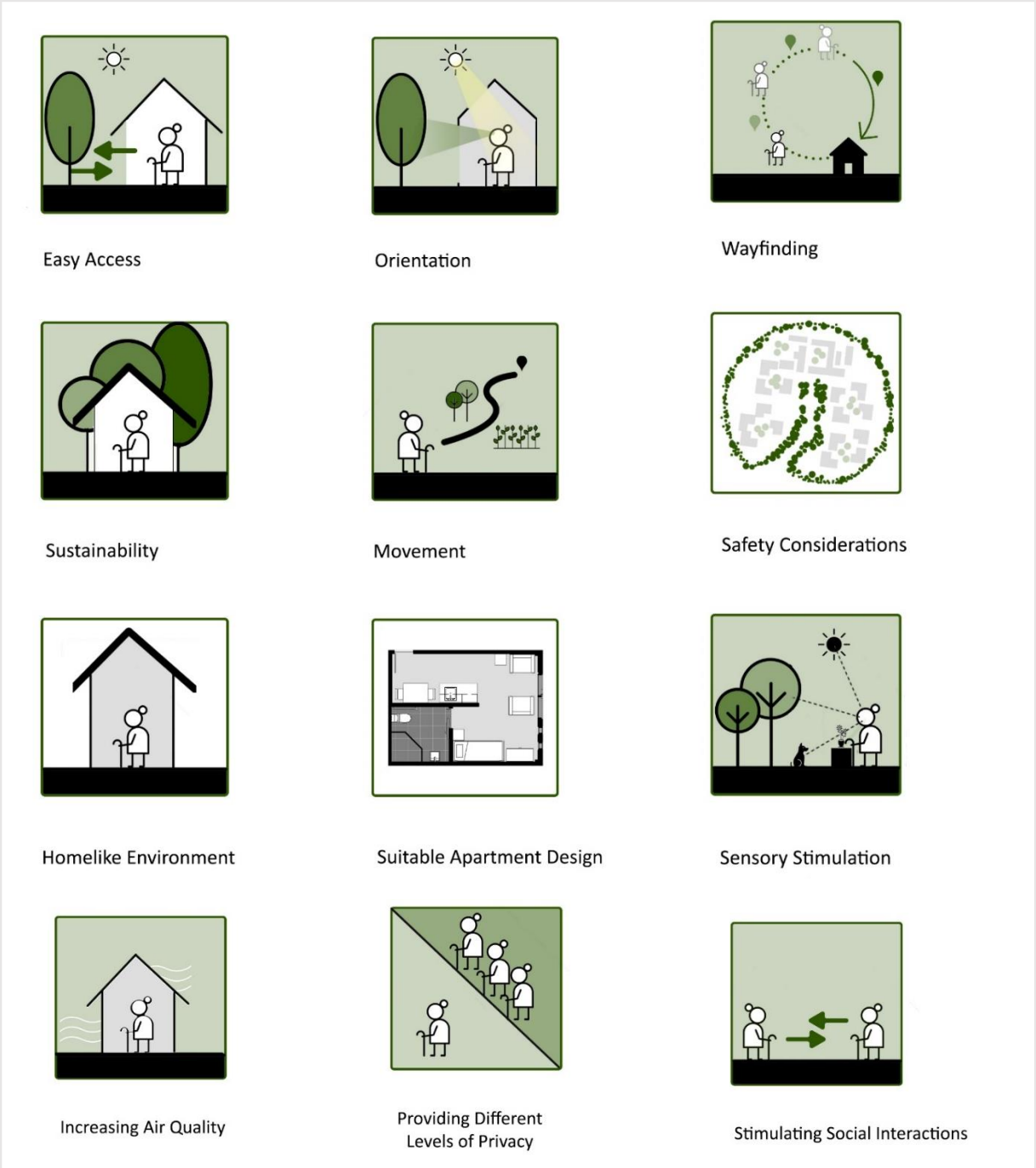
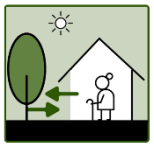


Figure 9.19: Design objectives

9.2.1. Easy Access



9.2.1. a) Easy Access to Vertical Circulation

Vertical circulation points are visible from the courtyard and easily accessible for seniors with dementia.

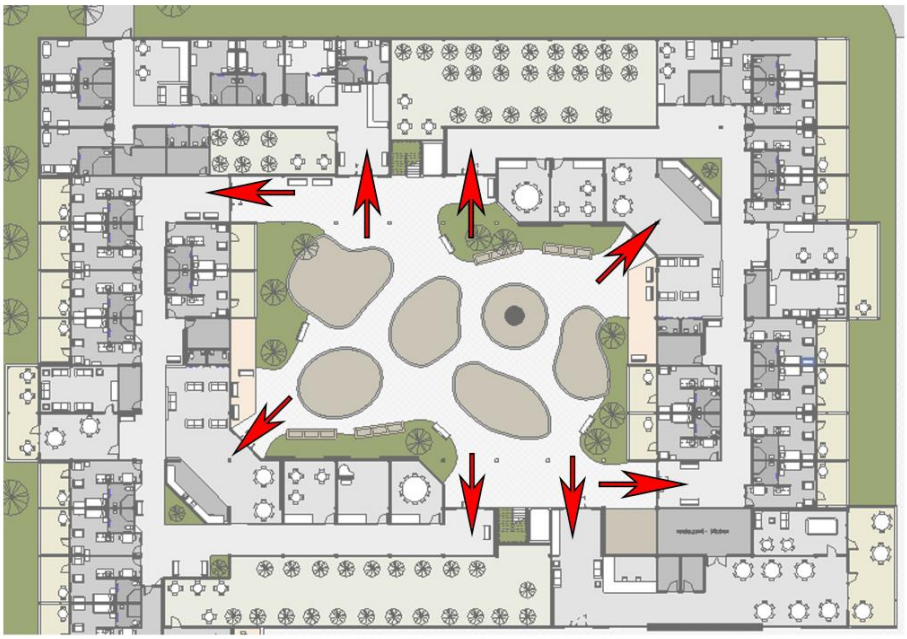
Figure 9.20: Access to vertical circulation points from the courtyard

9.2.1.b) Easy Access to Common Areas from Private Rooms

Common areas are located close to private rooms so seniors can easily access the common areas in each unit.

Figure 9.21: Common areas in assisted living units

9.2.1.c) Easy Access to Outdoors



There are many openings to the shared courtyard., There are access to the courtyard from the common living room & kitchen area in assisted living units. Those entrances are placed on a diagonal wall to make sure they can be seen from all directions.

Figure 9.22: Entrances from the courtyard

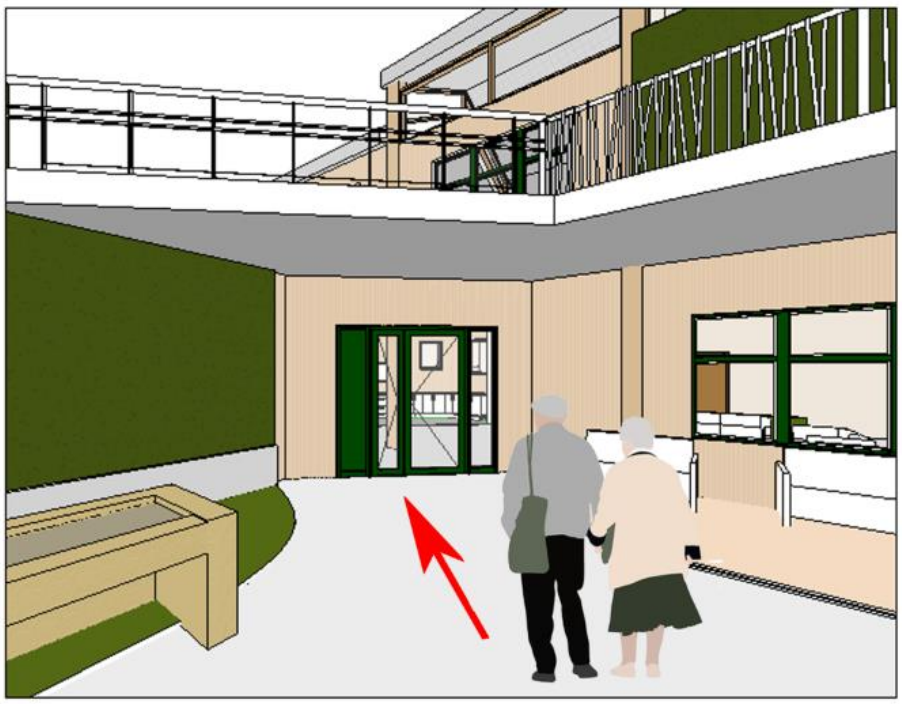
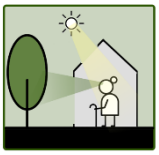


Figure 9.23: Entrance from the courtyard to the common in the assisted living units

9.2.2. Orientation



9.2.2.a) Large Windows to get more sunlight inside the room

It is important to have natural sunlight inside to enhance the orientation of seniors. Therefore, large windows have been placed in each room. Shading elements can be closed until the floor when the sun comes directly into the room or during the night to avoid the black hole effect.

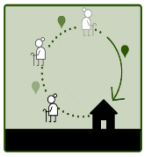
Figure 9.24: View from a private room in the assisted living unit

9.2.2.b) Light and Wide Corridors & Visual Connection with Outdoors

For improving orientation, it is also essential to have enough natural light inside the corridors; therefore, roof is lifted on some points to have more natural sunlight inside the hall.

Figure 9.25: View from the corridor of assisted living unit

9.2.3. Wayfinding



9.2.3.a) Landmarks at Important Decision-Making Points

There are some important decision-making points when seniors are navigating through the complex. Therefore, it is planned to locate landmarks on those points such as clock tower, fountain, or colorful sculpture so seniors can have better recognition of space.

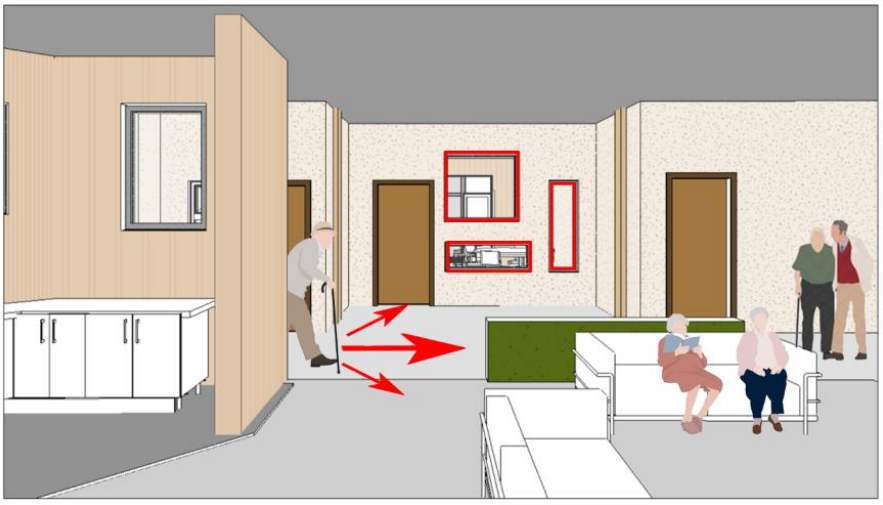
Figure 9.26: Fountain as a landmark on important decision-making point

9.2.3.b) Color & Material Differentiation

Figure 9.27: View from semi-open courtyard

In the semi-open courtyard where commercial facilities are located, brick is selected as a material for facades. The purpose of this is to use a different material than the housing units. In this way, it is aimed to create a different atmosphere in this commercial area. Also, in each facility, brick with different colors is used to enhance wayfinding.

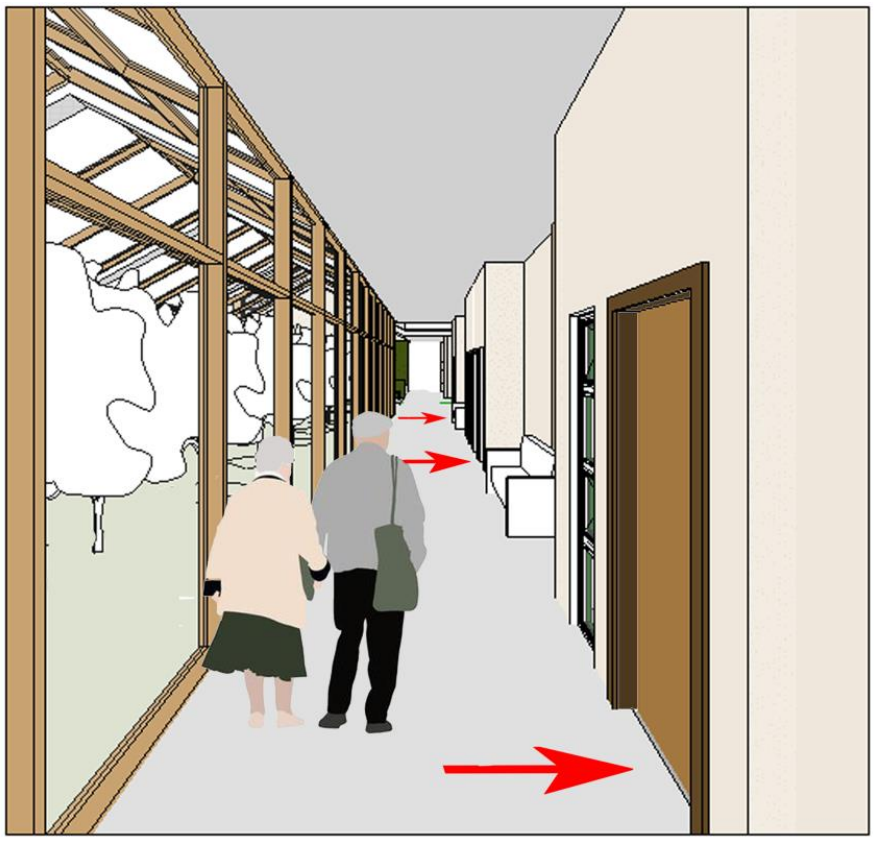
9.2.3.c) Easily Recognizable Common Areas while Walking on the Corridors



Open plan is preferred for common living room & kitchen. In this way, seniors can have a better visual connection with common areas. For common rooms, windows are placed on the side of the corridor to be able to see inside while walking on the corridor.

Figure 9.28: Common areas in assisted living units

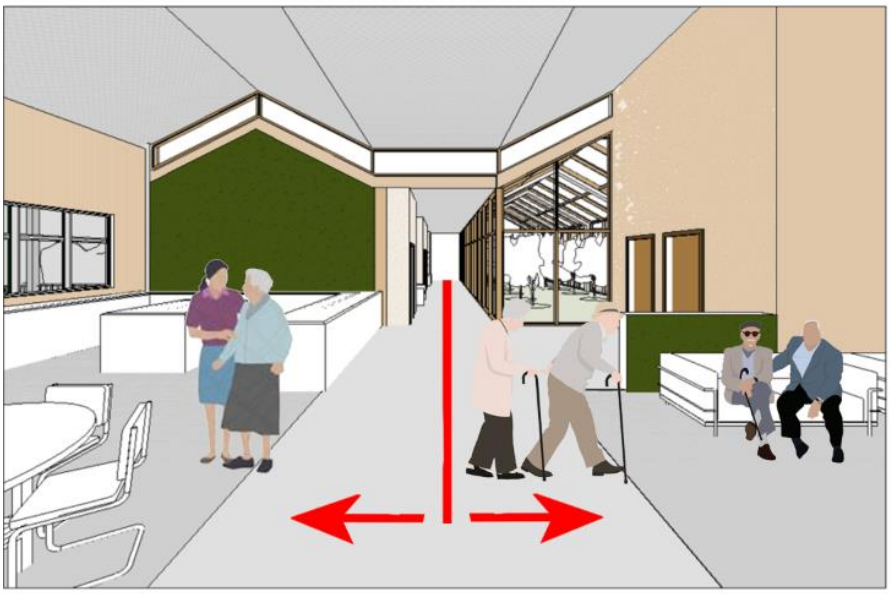
9.2.3.d) Private Rooms are Located on the One Side of the Corridor



Private rooms are located only on one side of the corridors, and there are other facilities on the other side. In this way, seniors do not have to check both sides to find their room, as it is an important design aspect to enhance wayfinding.

Figure 9.29: View from the corridor in assisted living units

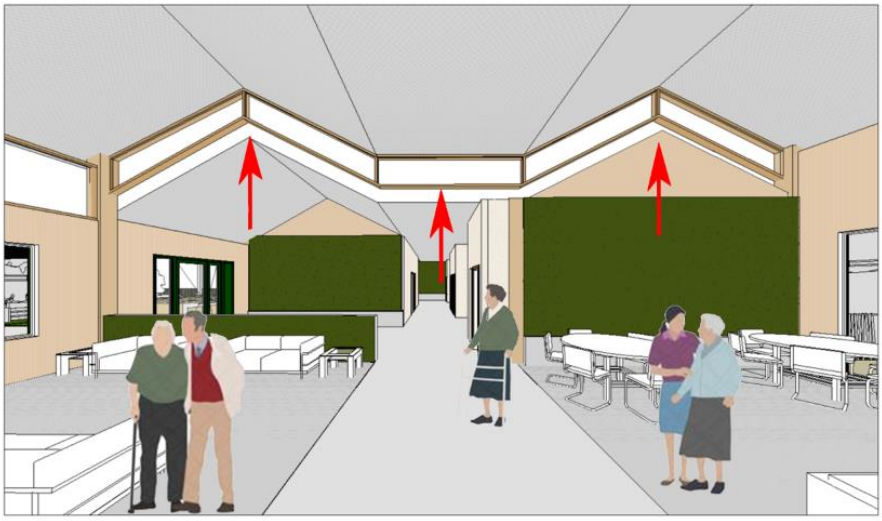
9.2.3.e) Long Corridors Divided by Common Areas



Common areas like an open kitchen and living room are located in between private rooms. It helps to divide the long corridor and to create resting points for seniors. Additionally, it is important to avoid long corridors to enhance wayfinding.

Figure 9.30: Common areas dividing long corridors

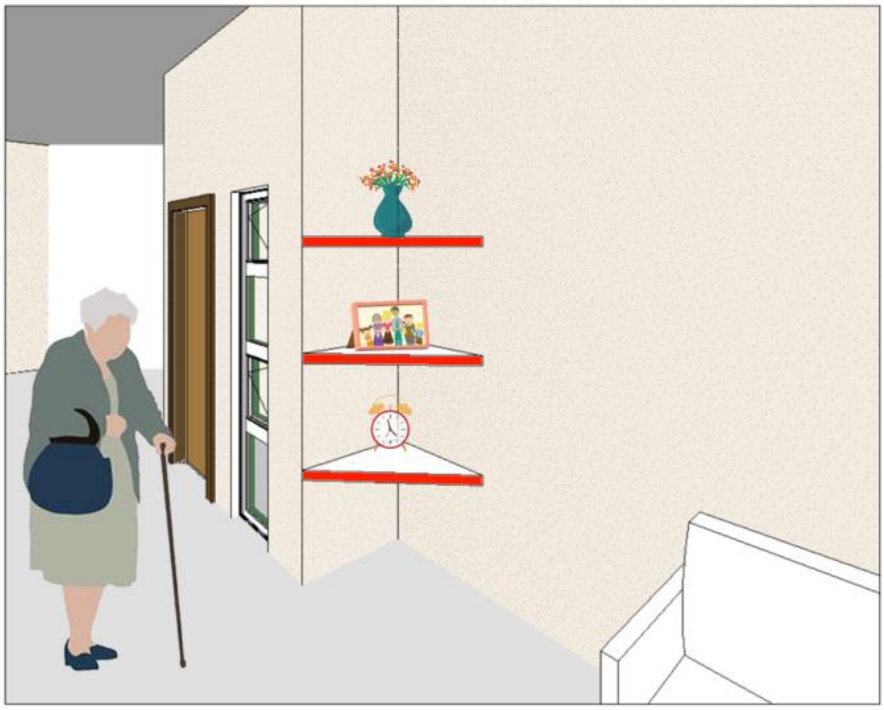
9.2.3.f) Elevated Roof to Get More Sunlight Inside the Corridor and Common Areas



The roof is elevated to get more sunlight inside the corridor and common areas because having enough natural light is essential for wayfinding. In this way, it is aimed to get more sunlight inside the building.

Figure 9.31: Elevated roof

9.2.3.g) Contrast Color Doors& Selves with Personal Belongings next to Private Units



Doors are selected with a contrasting color to the wall to make them more obvious and easier to see. Additionally, next to the entrance of each private room, there are shelves with personal belongings. It is essential for wayfinding because seniors can recognize their personal belongings and also their room in this way.

Figure 9.32: Entrance of private rooms

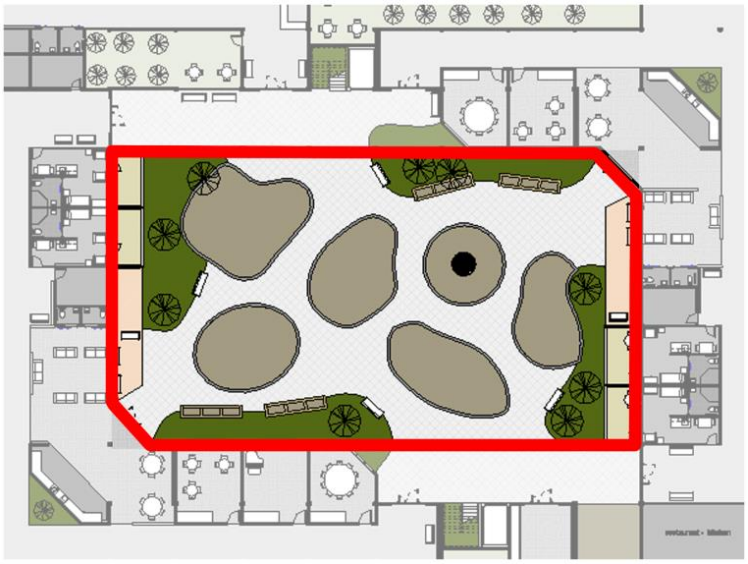
9.2.3.h) No Dead Ends

There are no dead ends in the corridors. When they follow the hall, it leads them to the courtyard again, so it is creating loops rather than dead ends. There is an emergency exit for the ambulance in intensive care units, which can make dead-end, but next to this point, the common area is located, so now it is not a dead-end but a meeting point.

Figure 9.33: Loops

9.2.4. Movement

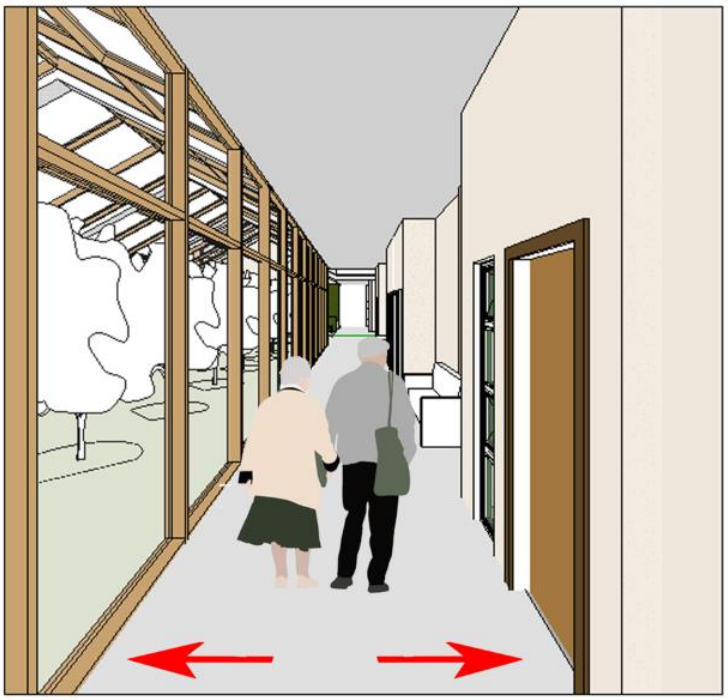
9.2.4. a) Well Defined & Safe Outdoor Area



There is a well-defined area, a closed courtyard located in between the assisted living unit and intensive care unit. This area is just for the residents of the complex and their family members, so it is a safe environment for seniors with dementia. They can go to this courtyard when they would like to go during the day or night.

Figure 9.34: Courtyard

9.2.4.b) Wide & Bright Corridors



Corridors are wide enough to move easily. Additionally, it is wide enough for a wheelchair. Also, there is enough sunlight inside the halls to walk safely.

Figure 9.35: View from the corridor in the assisted living unit

9.2.4.c) Different Door Types

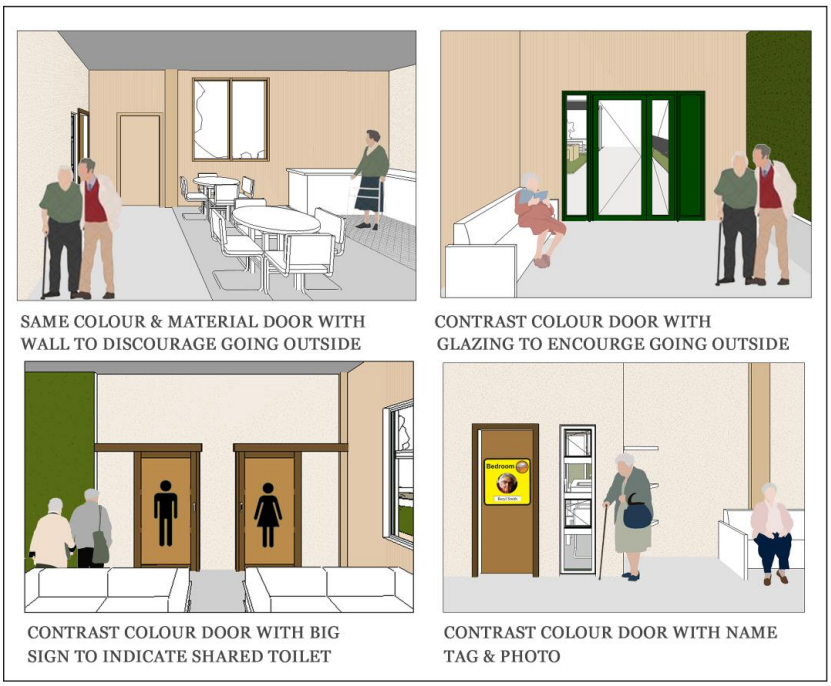


Figure 9.36: Entrances of assisted living units

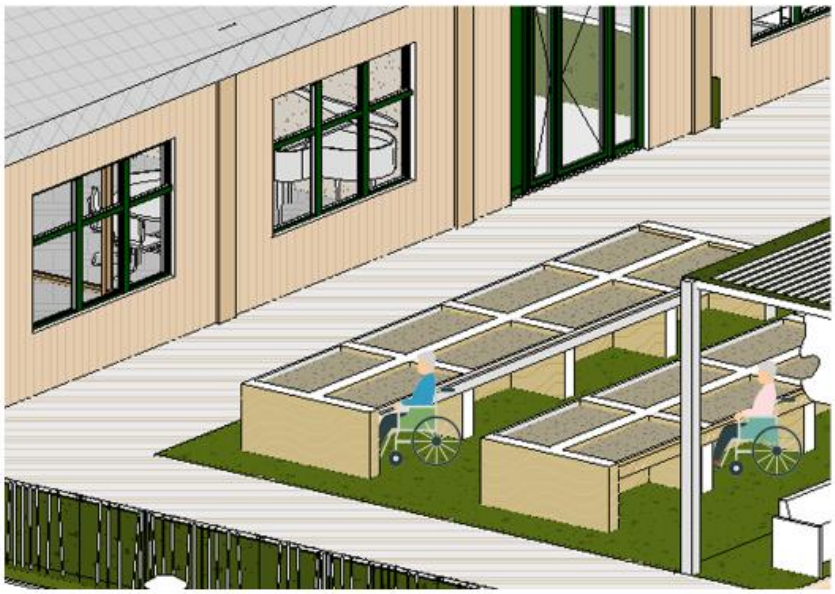
Same color doors with walls have been used to discourage seniors from going outside. When it is in the same color, it does not attract attention and does not create a desire to go outside from that entrance. On the contrary, in the main entrances of assisted living units, contrast color doors with glazing have been used to encourage seniors to go to the courtyard or terrace. Contrast color doors with a big sign have been used to indicate shared toilets. Contrast color doors with name tags and photos of seniors who stay in that room have been used to identify each private room.

9.2.4.d) Sitting Areas on the Corridor

Figure 9.37: Indoor sitting areas

There are sitting areas on the corridor to create resting points for seniors. Additionally, these areas are points where they can come across to other seniors and communicate with each other.

9.2.4.e) Accessibility with Wheelchair



All rooms assisted living facilities, courtyard, and farming areas are accessible by wheelchair. For farming areas, raised farming beds are used to make them wheelchair friendly.

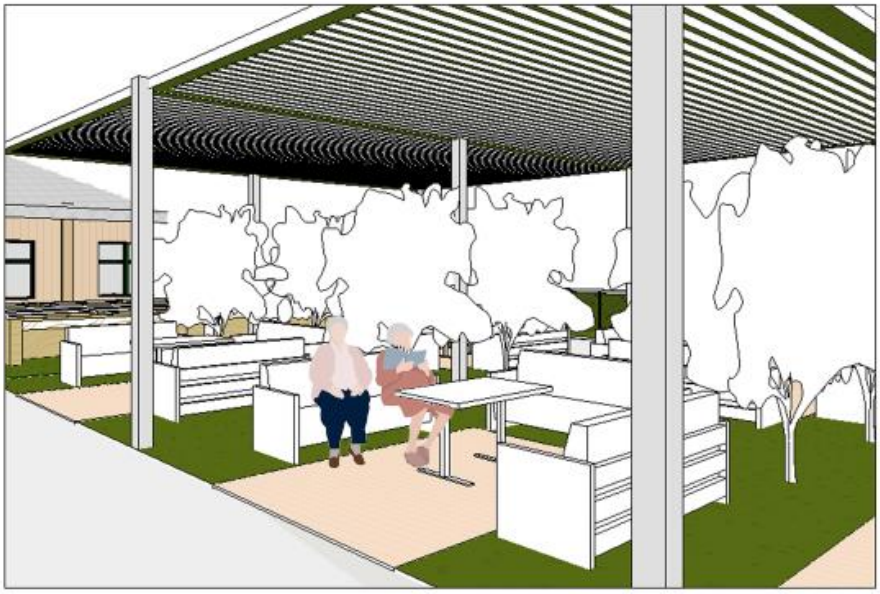
Figure 9.38: Raised farming beds for wheelchair friendly design

9.2.4.f) Clear Material Differentiation

There is material differentiation on the floor to distinguish common areas and circulation paths. In this way, seniors can distinguish the spaces better and navigate easier.

Figure 9.39: Material differentiation to define spaces

9.2.4.g) Outdoor Sitting Areas Under Shade



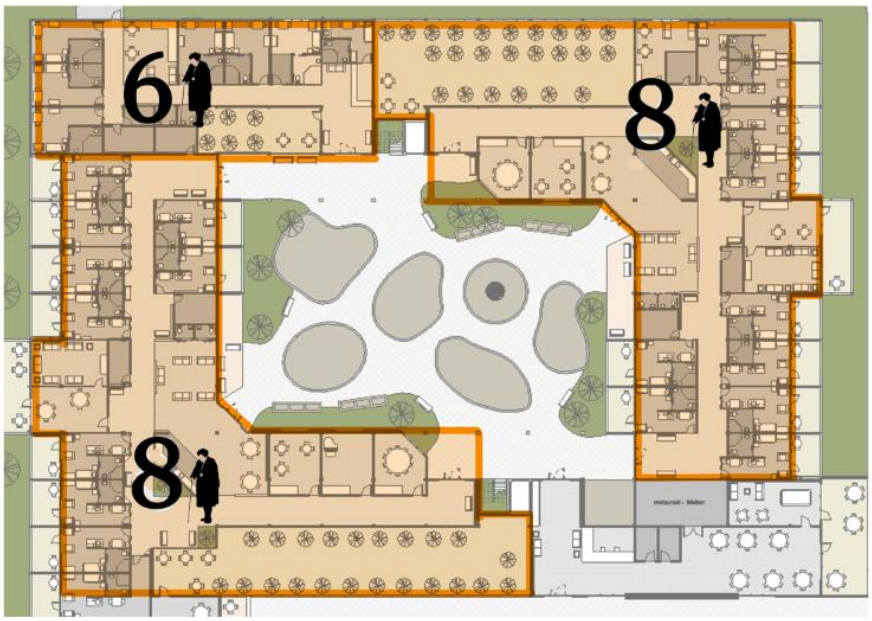
There are sitting areas also in outdoor spaces. These areas are creating resting places for seniors while they are navigating inside the complex. Additionally, it provides protection from the rain.

Figure 9.40: Outdoor sitting areas

Figure 9.41: Sheltered area

9.2.5. Homelike Environment

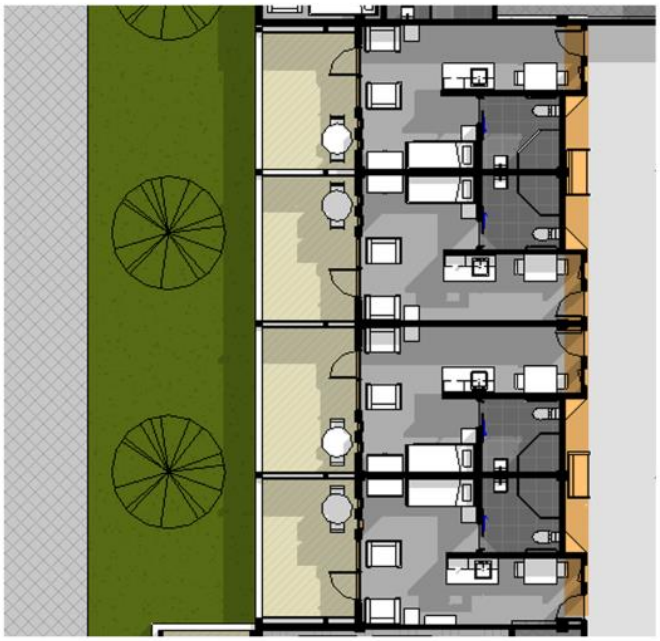
9.2.5. a) Limited Number of People



The number of people in each assisted living group is limited with a maximum of 8 people because a home-like environment is tried to achieve. In this way, seniors can easily recognize others in their group and accept them as their house members.

Figure 9.42: Maximum 8 people in each unit

9.2.5.b) Transition Area in Between Corridor and Private Rooms



There is a transition area between the corridor and private rooms where shelves with personal belongings and resting areas can be placed. Again, it is enhancing the sense of a homelike environment.

Figure 9.43: Transition area

9.2.5.c) Providing Human Scale Buildings

The building is two-story high with a pitched roof. The human scale is essential to give the sense of a homelike environment because the complex is more similar to the house than a hospital-like building in this way.

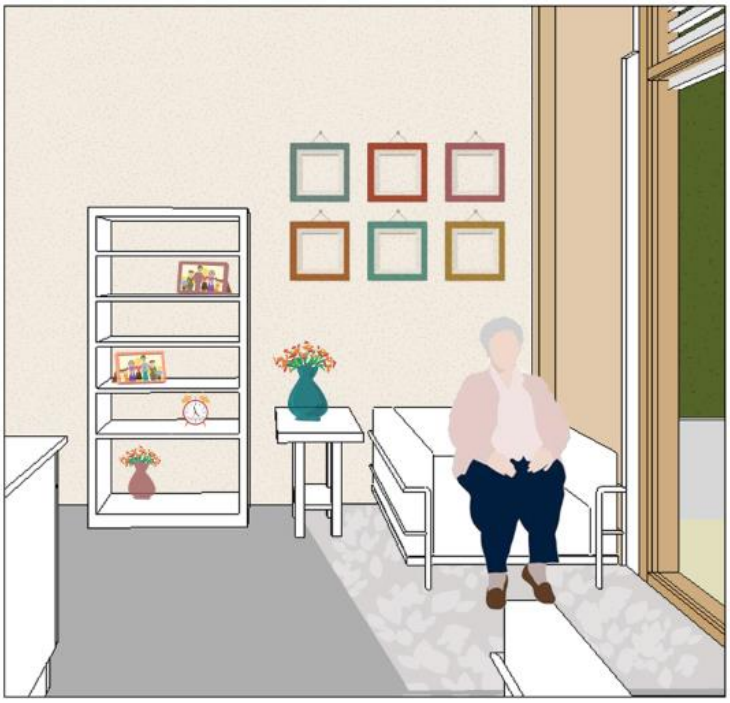
Figure 9.44: Section of the assisted living unit

9.2.5.d) Private Rooms with Small Kitchen & Bathroom Similar to Home Environment

There is a living area with a very small kitchen with a small refrigerator, sink and microwave to prepare snakes when it is needed, in each private unit similar to regular houses. Although seniors are not supposed to cook in their room, there is a shared kitchen in each assisted living group.

Figure 9.45: Private rooms

9.2.5.e) Personal Belongings in Private Rooms



There is a corner with personal belongings in each private room. It makes the rooms more homelike for seniors, and they can more easily accept this area as their home.

Figure 9.46: Inside the private rooms in assisted living units

9.2.5.f) Gradual Transition from Public to Private

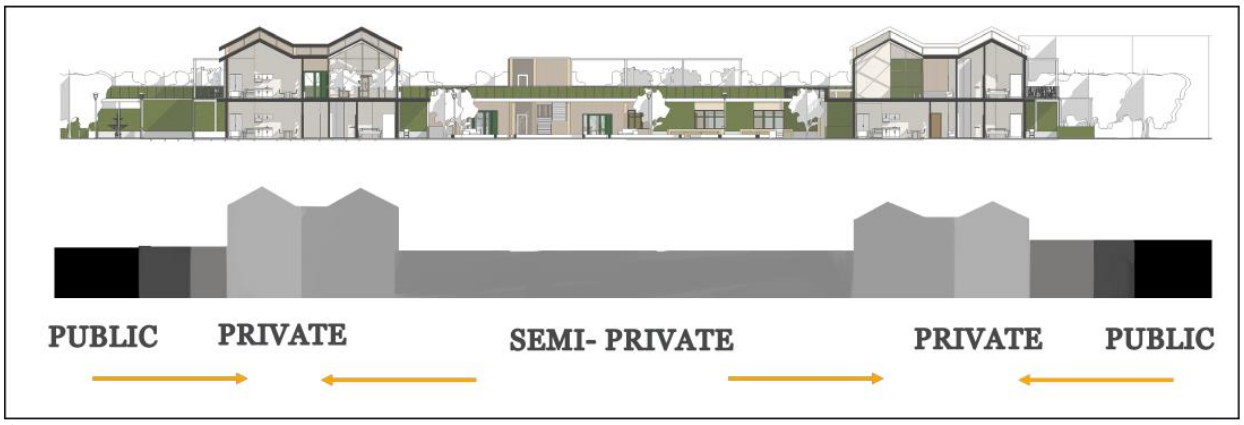
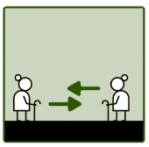


Figure 9.47: Section of the complex

There is a gradual transition from public to private, this design feature enhances homelike environment inside the complex.

9.2.6. Social Interaction



9.2.6. a) Indoor Spaces for Collective Activities

There are indoor spaces for collective activities like indoor farming areas, café & restaurant. In those spaces, seniors can come together and socialize with others.

Figure 9.48: Indoor farming area & meeting point for seniors

9.2.6.b) Common Rooms (Game, Music, Art)

There are rooms for common activities like music, art, game room in each assisted living facility. Seniors can meet with other residents and enjoy the activities together.

Figure 9.49: Game room

9.2.6.c) Common Kitchen

There is a shared kitchen in each assisted living unit. Seniors can meet there three times a day and spend some time together.

Figure 9.50: Common kitchen

9.2.6.d) Well Defined Outdoor Area

There is a safe courtyard that can be accessible all day long, so seniors can come together there whenever they want.

Figure 9.51: Courtyard

9.2.6.e) Sitting Areas on the Corridor

There are sitting areas on the corridors, these areas are resting places, but also they are enhancing social connection among residents because, in this way, they come across each other and have a chat.

Figure 9.52: Indoor sitting areas

9.2.6.f) Outdoor Sitting Areas

There are also outdoor sitting areas. Seniors can meet at those points and enjoy the good weather together.

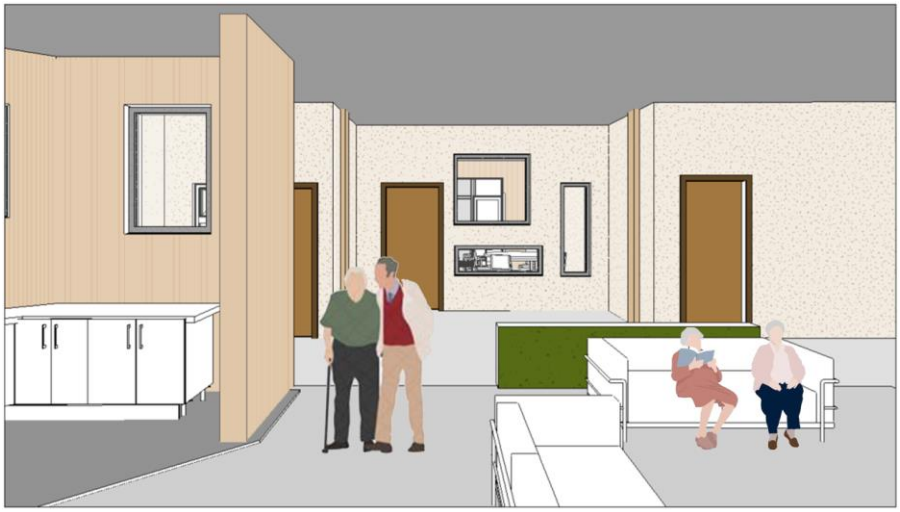
Figure 9.53: Outdoor sitting areas

9.2.6.g) Semipublic Courtyard – Space for Meeting with Neighbors

A semi-open courtyard where commercial facilities are placed can be used by not only residents of the complex but also neighbors. Therefore, this area is a space for meeting with neighbors.

Figure 9.54: Semi-open courtyard

9.2.6.f) Visual Connecting to Common Areas from Corridor



Seniors can see common areas and other seniors who spend time in common areas while walking on the corridor. If they want, they can go next to them to have a small chat. Visual connection increases social interaction.

Figure 9.55: Common areas

9.2.7. Sensory Stimulation

9.2.7.a) Outdoor Farming Beds

There are outdoor farming beds to practice traditional farming. Touching the soil and plants is so helpful for sensory stimulation.

Figure 9.56: Practicing conventional farming in farming beds

9.2.7.b) Indoor Hydroponic Farming Areas

There are indoor farming areas. In those areas, seniors can continue their farming activities all year because aquaponic farming systems are not affected by the weather. They can grow their vegetables there.

Figure 9.57: Hydroponic farming

9.2.7.c) Hydroponic Walls

There are hydroponic walls inside and outside. They also provide sensory stimulation with the plants' smell, and touching the plants is essential for sensory stimulation. Additionally, hydroponic walls are easily reachable for seniors while they are walking.

Figure 9.58: Hydroponic walls

9.2.7.d) Traditional Farming Areas

There are traditional farming areas where seniors can grow vegetables and herbs in the courtyard on the ground floor.

Figure 9.59: Traditional farming areas

9.2.7.e) Different Textures

Different textures can be found in the assisted living units like glass, wood, and plants. This variety is also important for sensory stimulation.

Figure 9.60: Different materials

9.2.7.f) Animals

There is a small place for chickens, cats and dogs. Having a close relationship with animals is important for seniors because they enjoy taking care of them and spend time with them.

Figure 9.61: Chicken house

9.2.7.g) Sensory Garden

Figure 9.62: Sensory garden

Figure 9.63: Sensory garden

There is a sensory garden in the courtyard on the ground floor. There are farming beds, water element & birdhouse, colorful flowers, vegetables, and edible plants. These elements are activating the five senses of seniors and create sensory stimulation.

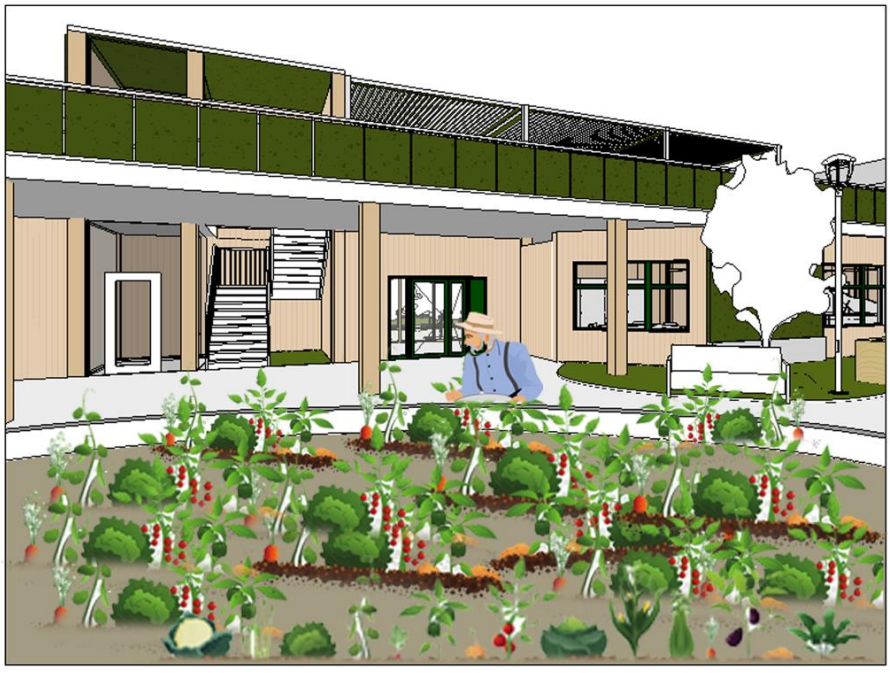
9.2.8. Safety Considerations

9.2.8.a) Higher Handrails on the Upper Floor

Handrails on the upper floor in common areas & terraces are higher than the normal above 1.1m. Its purpose is to prevent accidents.

Figure 9.64: Terrace on the upper floor

9.2.8.b) Non- Toxic Plants (Herbs and Vegetables)



All the plants are non-toxic. In addition, there are herb gardens, vegetables, non-toxic colorful flowers, and edible plants.

Figure 9.65: Vegetable garden

9.2.8.c) Well Defined & Safe Outdoor Area

A closed courtyard in between assisted living areas is a safe outdoor area. As seniors with dementia cannot get lost, it is available for them all day long, and they do not need assistance.

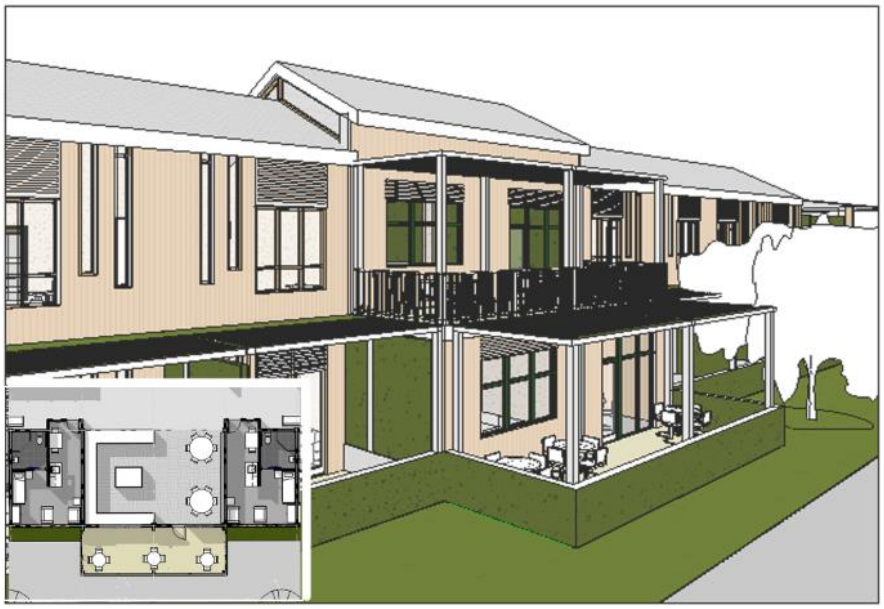
Figure 9.66: Closed courtyard

9.2.8.d) Non-Slippery Materials

Non slippery materials have been chosen to prevent accidents.

Figure 9.67: Interior of assisted living units

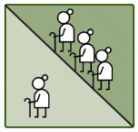
9.2.8.e) No Balconies in Private Rooms on the Upper Floor - Only in Common Areas



There is not a balcony in the private rooms on the upper floor to prevent accidents. There are balconies only in common areas with high handrails.

Figure 9.68: Façade of assisted living unit

9.2.9. Providing Different Levels of Privacy



9.2.9.a) Private Rooms

Single rooms provide personal private time for seniors. They can invite their friends or family members in their room when they want.

Figure 9.69: Single room

9.2.9.b) Common Areas in Each Unit for Seniors from the Same Unit

There are shared facilities like common kitchen and living room and common rooms like music, art, game room. They are for the use of eight people living in the same unit. It allows creating a small community in each unit.

Figure 9.70: Common areas

9.2.9.c) Indoor Areas Where Seniors Can Meet with Seniors from Other Units

There are indoor areas where seniors from all units can meet and spend time together.

Figure 9.71: Collective areas

9.2.9.d) Outdoor Areas Where Seniors Can Meet with Seniors from Other Units

There is a courtyard on the ground floor and open terraces on the first floor where seniors from all units can meet and enjoy open-air activities.

Figure 9.72: Courtyard

9.2.9.e) Semipublic Area Where Seniors with Dementia and Neighbors Can Meet

There is a semi open courtyard, and it is also a semipublic area where seniors with dementia and neighbors can meet.

Figure 9.73: Semiopen courtyard

9.2.10. Suitable Apartment Design for Seniors with Dementia

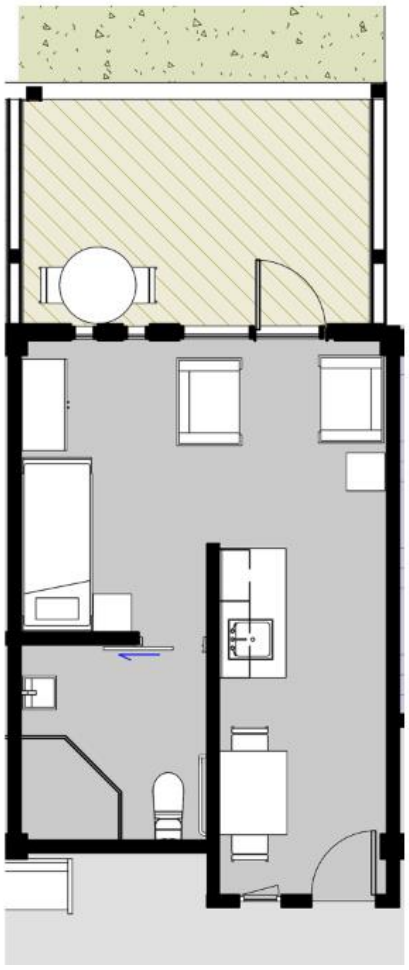


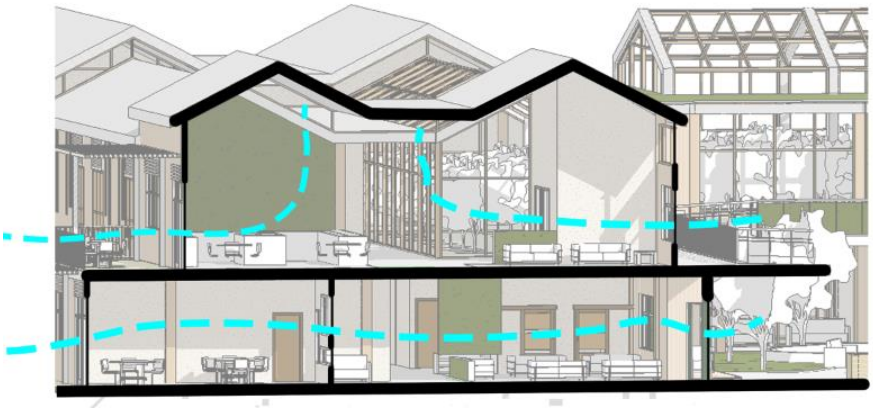
Figure 9.74: Assisted living unit

Each room is accessible by wheelchair. There is a quite big bathroom where seniors can move easily and can have help from a caregiver while they take a bath. The sleeping area is close to the bathroom. Large windows are located close to the sitting area, and narrower windows are on the sleeping area.

There is a small kitchenette to prepare sneaks when needed, but they are not supposed to cook in their room. There is a shared kitchen in each assisted living unit for eight people. Also, there is a small table for two people in each private room. There is a small window next to the room entrance to have cross ventilation inside the room.

9.2.11. Air Quality

9.2.11.a) Cross Ventilation



Natural ventilation is essential for increasing air quality inside the building, and it is achieved by cross ventilation.

Figure 9.75: Natural ventilation diagram

9.2.11.b) Sustainable Breathable Materials

Figure 9.76: Interior of assisted living units

Sustainable and breathable material like CLT is chosen as the primary construction material to increase the air quality inside the building.

9.2.12. Sustainability

9.2.12.a) Solar Panels

Figure 9.77: Solar panels on the south, west, and east sides of the roofs

9.2.12.b) Green Environment

Figure 9.78: Outdoor farming areas

9.2.12.c) Aquaponic Farming Systems

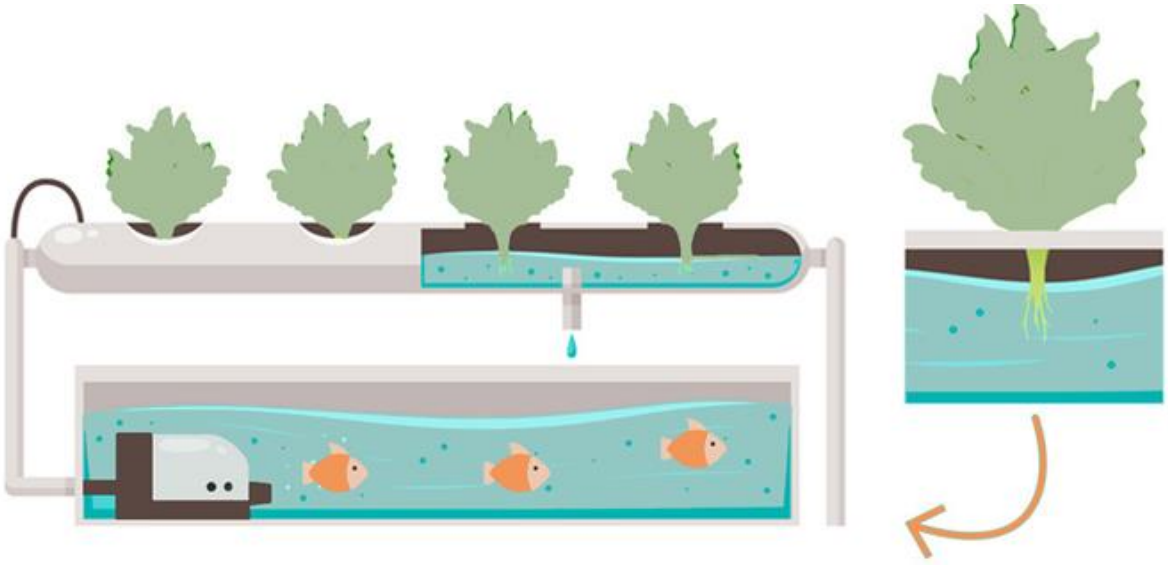


Figure 9.79: Aquaponic farming system diagram

Aquaponic farming is a sustainable method of raising both fish and vegetables at the same time. It is a bio-system integrating recirculated aquaculture (fish farming) with hydroponic farming to create symbiotic relationships between the plants and the fish. It achieves this symbiosis through a system. First, water from fish produces a natural fertilizer for the plants. After that, the plants purify the water for the fish again and creates a sustainable loop. (Al-Kodmany, 2018). Researchers envision that the aquaponics system can become a model of sustainable food production by achieving the 3Rs (reduce, reuse, and recycle). Therefore, aquaponic farming will be used as an indoor farming system.

9.3. FINAL DESIGN PROPOSAL

9.3.1. Housing Units

9.3.1. a) Assisted Living Units

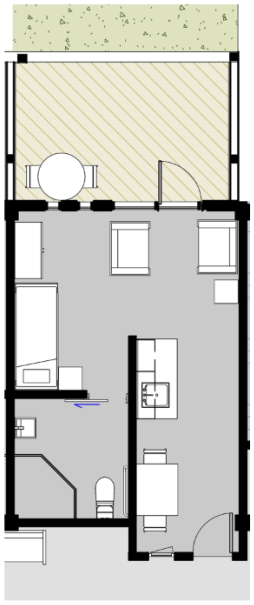
SINGLE ROOM

21 M2

PRIVATE BATHROOM

SMALL KITCHEN

SITTING AREA



9.3.1.b) Independent Living Units

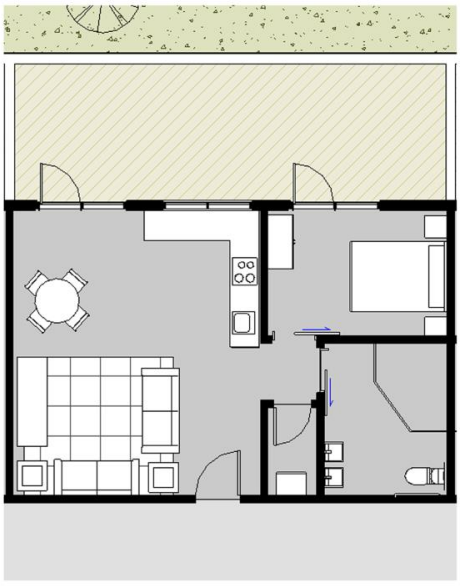
1+1 FLAT

54 M2

1 BEDROOM

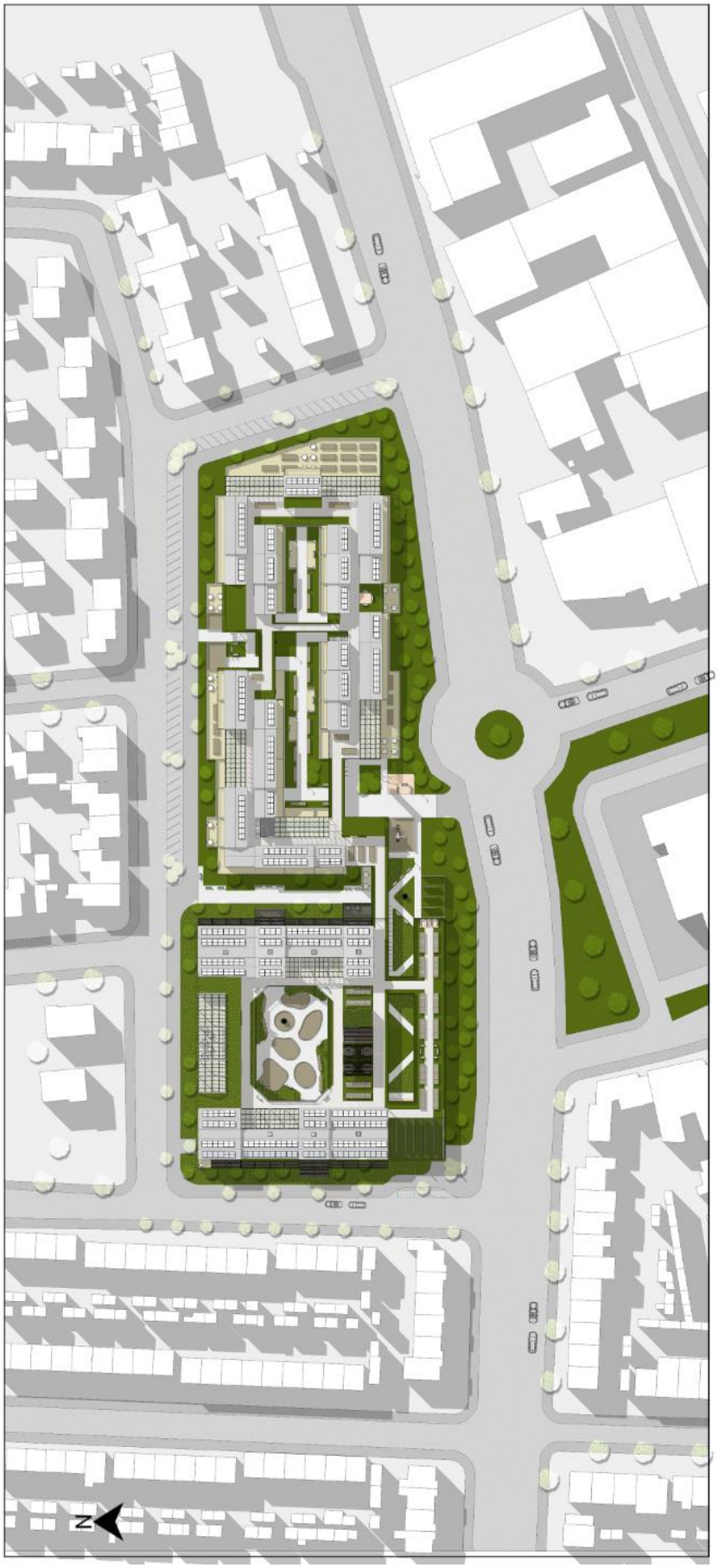
LAUNDARY ROOM

BATHROOM



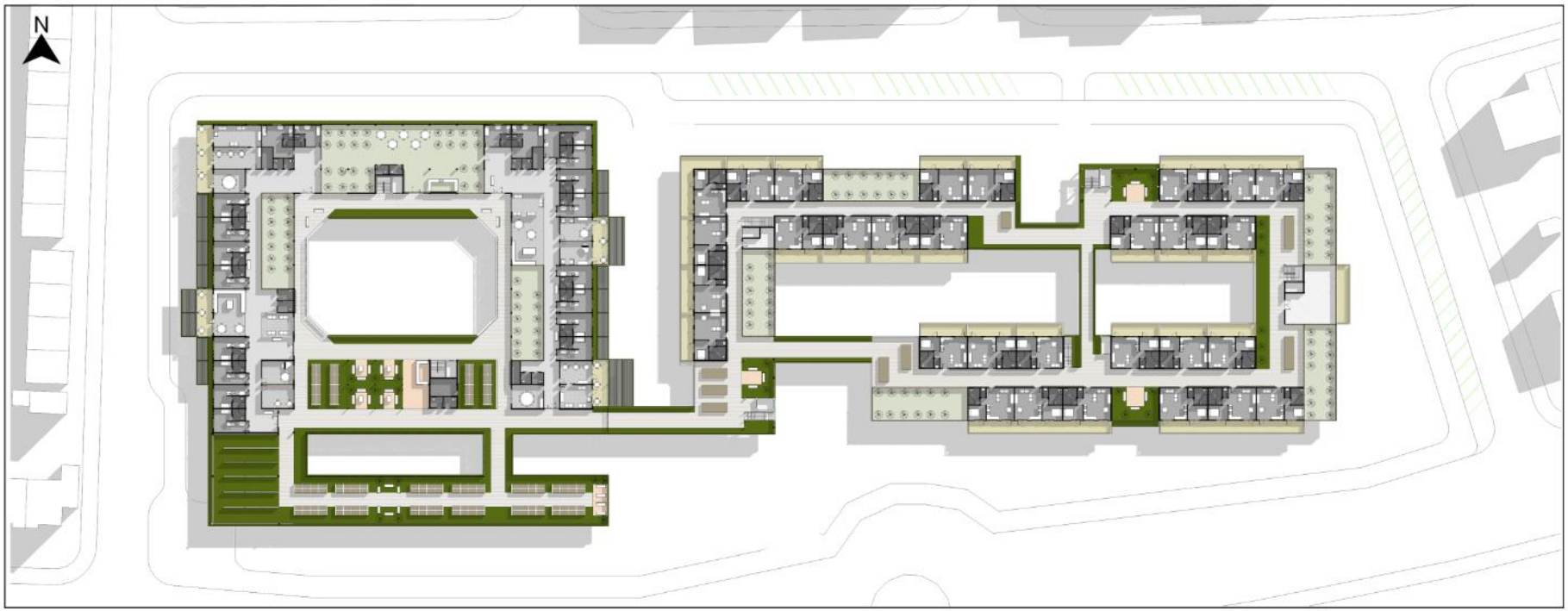
9.3.2. Site Plan &

Floor Plans



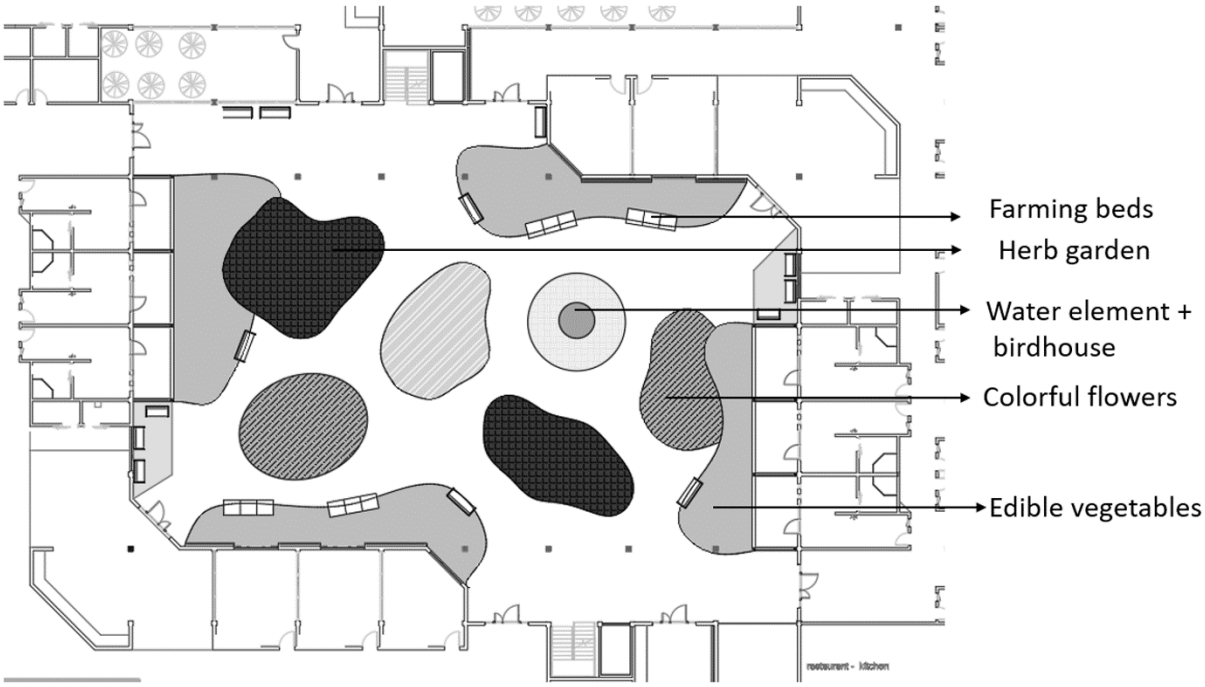
Site Plan

Ground Floor Plan



First Floor Plan

9.3.3. Sensory Garden



There are farming beds, water element & birdhouse, colorful flowers, vegetables, and edible plants in the sensory garden. These elements are activating the five senses of seniors and create sensory stimulation.

- Smell – herb garden

- Chamomile, Basil , mint, rosemary, lavender

- Taste – edible vegetables

-Berries, strawberries, tomatoes

- Sound – water element + birds

- Fountain, birdhouse

- Touch – animals + farming beds

- Chicken, turkey, cats and dogs

- Sight – colorful trees and flowers

- Fragrant lilac bushes, Fragrant flowers (Rose. Lavender. Gardenia Freesia Jasmine)

Figure 9.80: Image from the courtyard

Figure 9.81: Sensory garden- water element

Figure 9.82: Sensory garden – herbs

Figure 9.83: Sensory garden – colorful flowers

9.3.4. Farming Activities

Figure 9.84: Indoor aquaponic farming

Figure 9.85: Roof terrace farming - farming beds

Figure 9.86: Living walls

Figure 9.87: Conventional farming

9.3.5. Independent Living

Figure 9.88: Independent living complex

Figure 9.89: Independent living complex

9.3.6. Landmarks

Figure 9.90: Children playground

Figure 9.91: Fountain

Landmarks like the clock tower, fountain, or children's playground are placed on critical decision-making points to enhance wayfinding in the complex.

9.3.7. Outdoor Renders

Figure 9.92: Street view in between typologies

Figure 9.93: West facade view

Figure 9.94: Street view from the west side

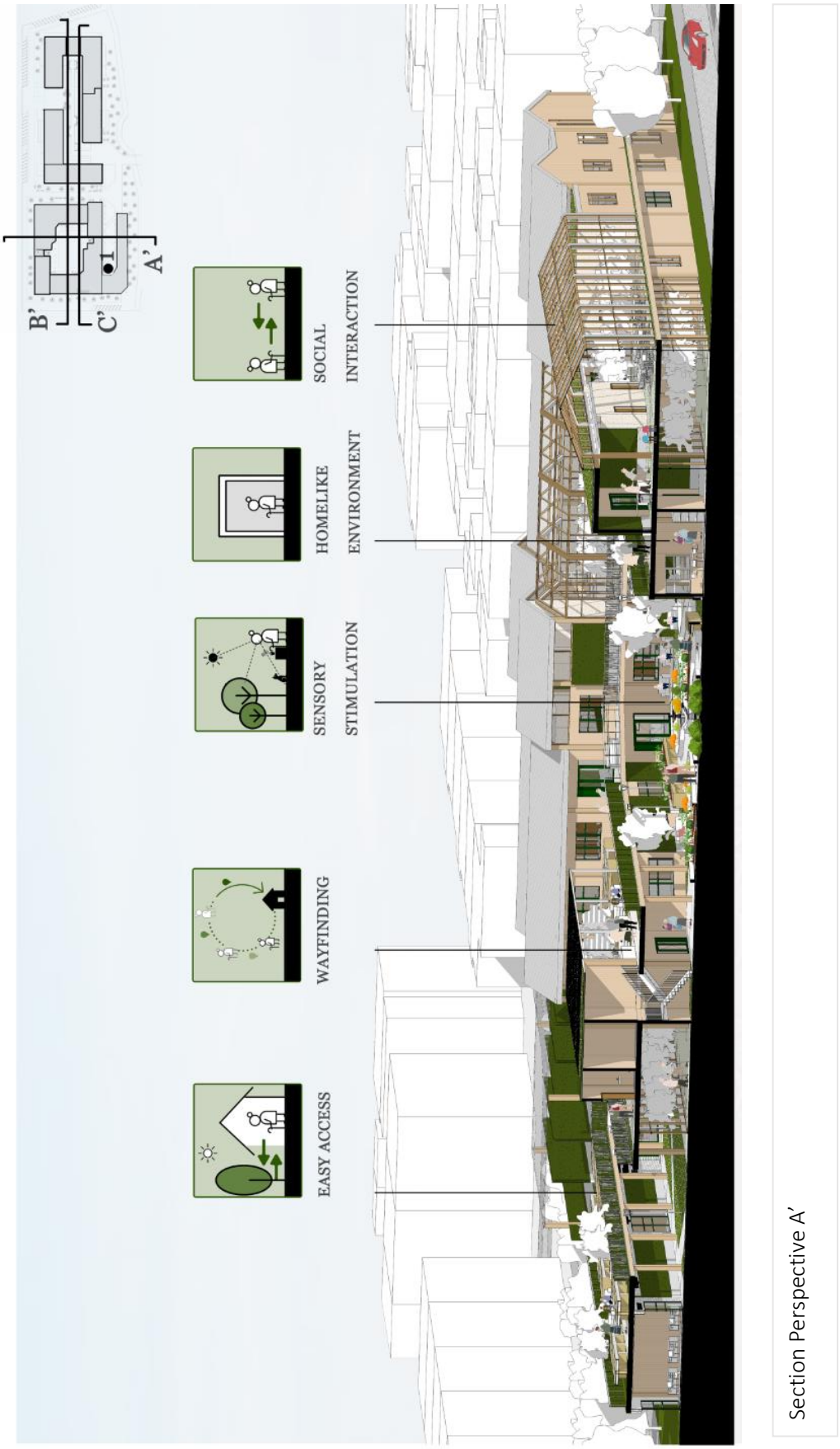
Figure 9.95: Semiopen courtyard

9.3.7 Interior Renders

Figure 9.96: Interior view from the ground floor of assisted living unit

Figure 9.97: Interior view from the first floor of assisted living unit

9.3.8 Sections



Section Perspective A'

Section Perspective B’

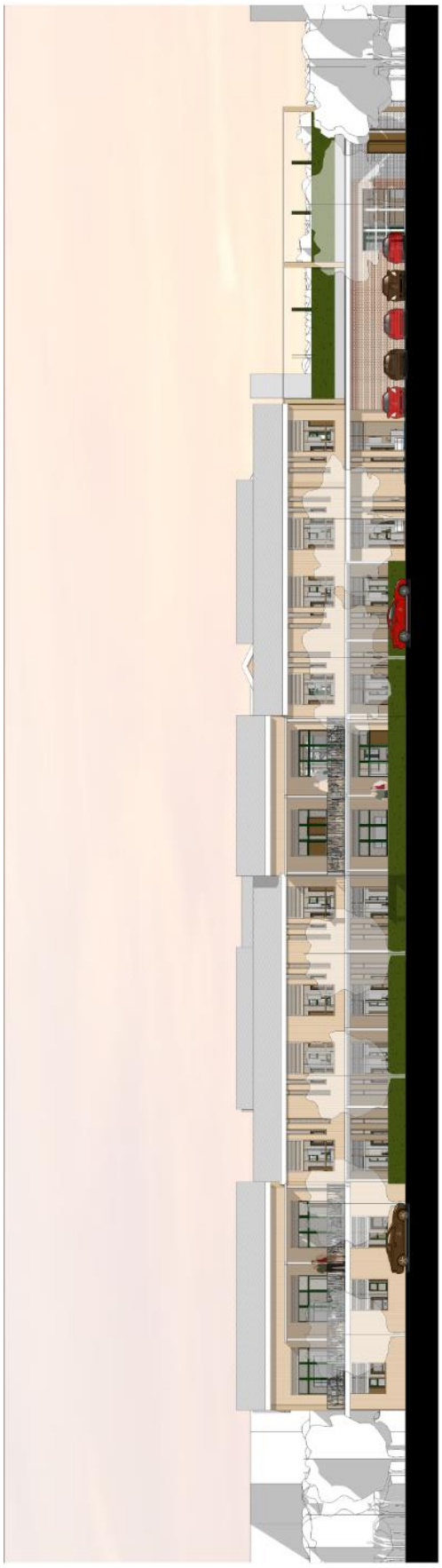
Section Perspective C’

Section Perspective D'

Section Perspective E’

9.3.9 Elevations

North Elevation



West Elevation

9.3.10. Detail

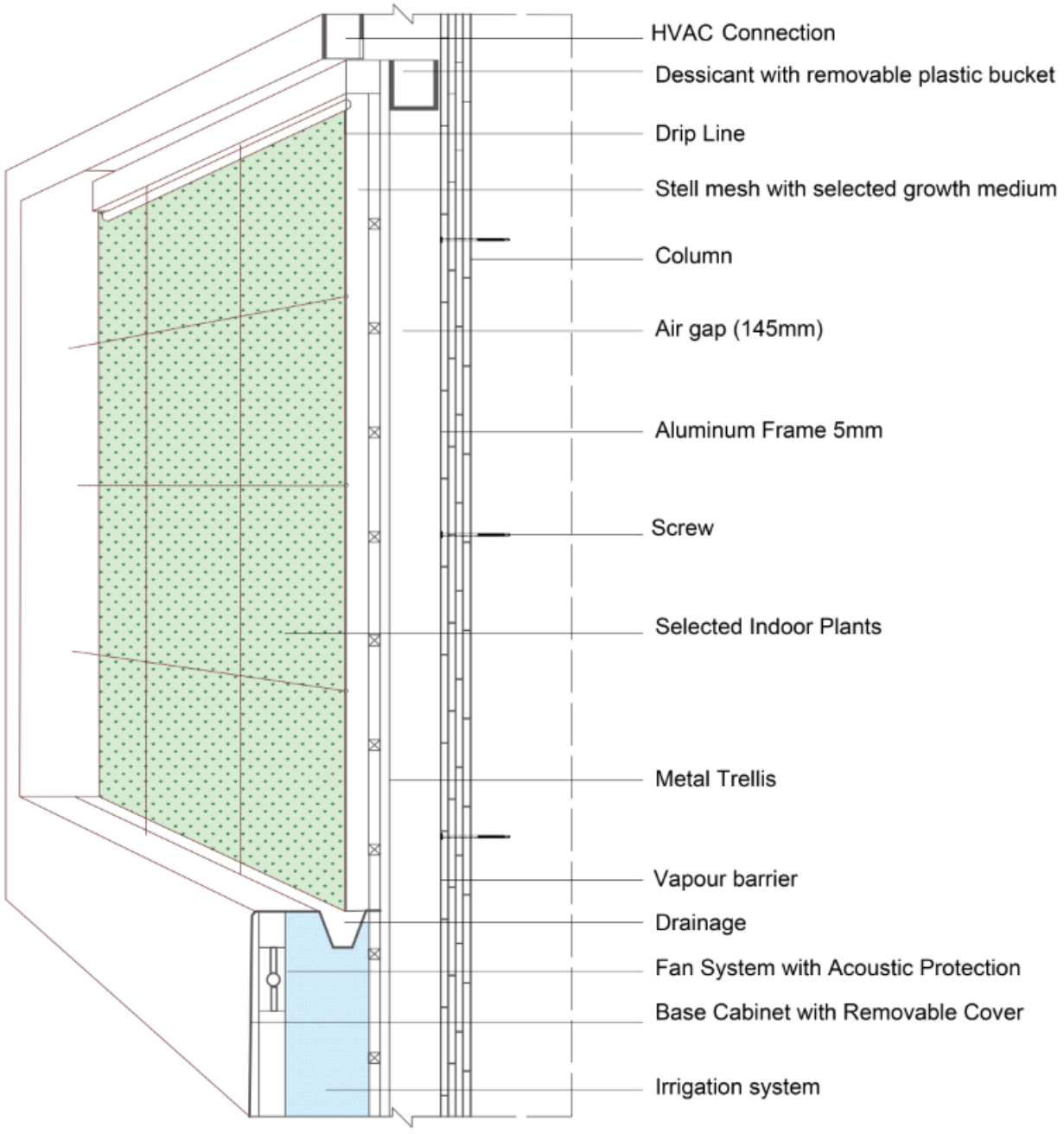


Figure 9.98: Perspective section of a detail of connection point of living wall and clt wall

9.4. A DAY OF A SENIOR WITH DEMENTIA AT SENIORS' URBAN FRESH

- 75 years old
- Moderate stage of dementia
- Retired high school teacher
- Living in assisted living facility in Seniors' Urban Fresh
- Likes taking care of animals, picking up fresh vegetables, playing piano

Maria is one of the personas created in chapter 7. In chapter 7, these personas have been developed to understand seniors with dementia and their needs better. In this chapter, one day of maria will be demonstrated to see how she spends on this urban green care farm.

To remember Maria again, she is in a moderate stage of dementia with moderate cognitive decline. She is a retired high school teacher and has more profound memory loss. However, Maria has no problem with highly learned materials. She is a person who has a lot of interest and engagement but not the cognitive capability of focusing on an activity too long. She has little independence at home because she can only do simple chores. Therefore, she is more comfortable in assisted living facilities. She likes to take care of animals in the courtyard and pick up fresh vegetables from inside aquaponic farming beds and farmers' help. They can make a salad from fresh vegetables they pick up in the morning and enjoy together. She also likes to have tea with his friends in the afternoon and playing the piano.

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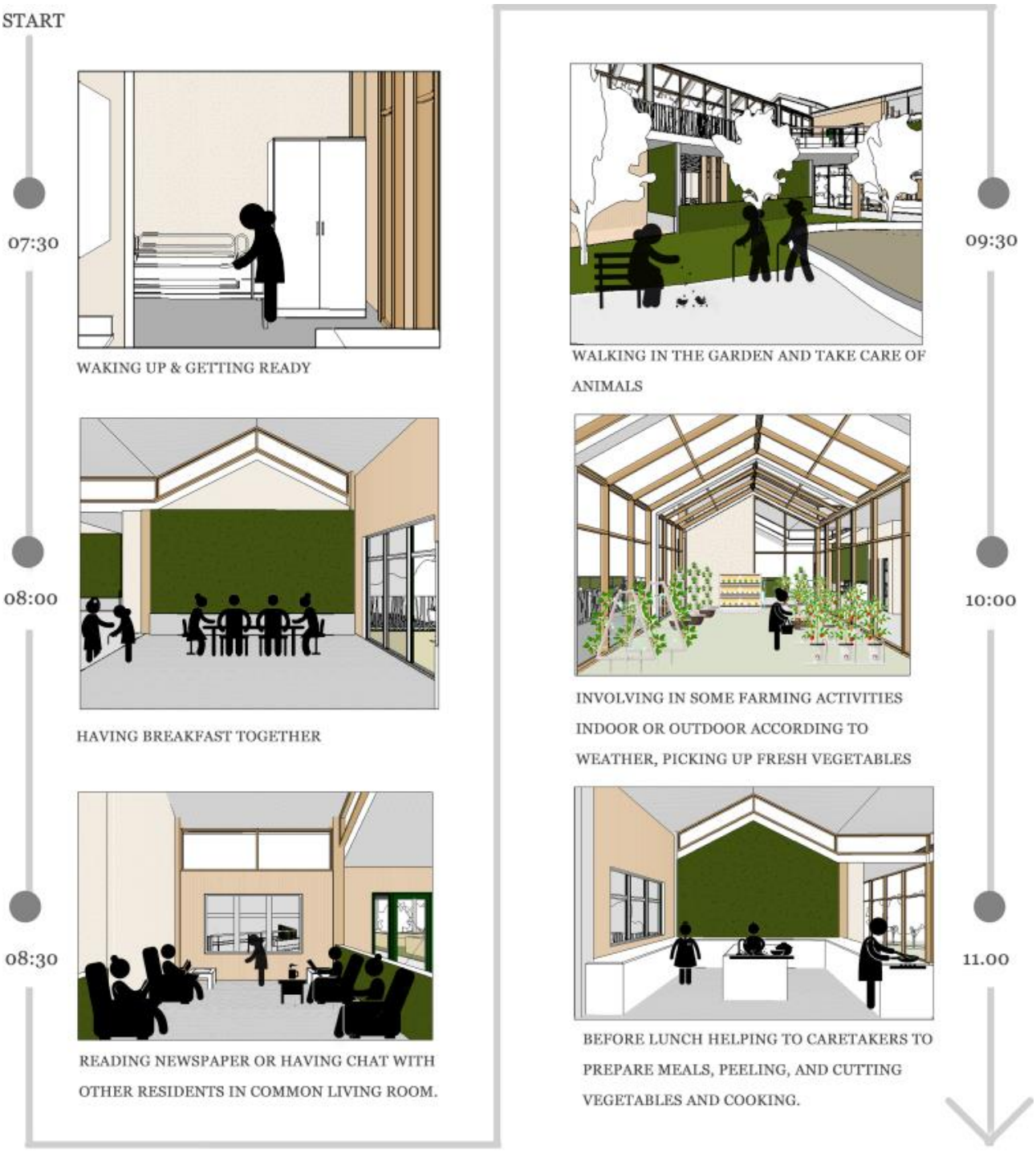


Figure 9.99: A day of Maria -Part 1

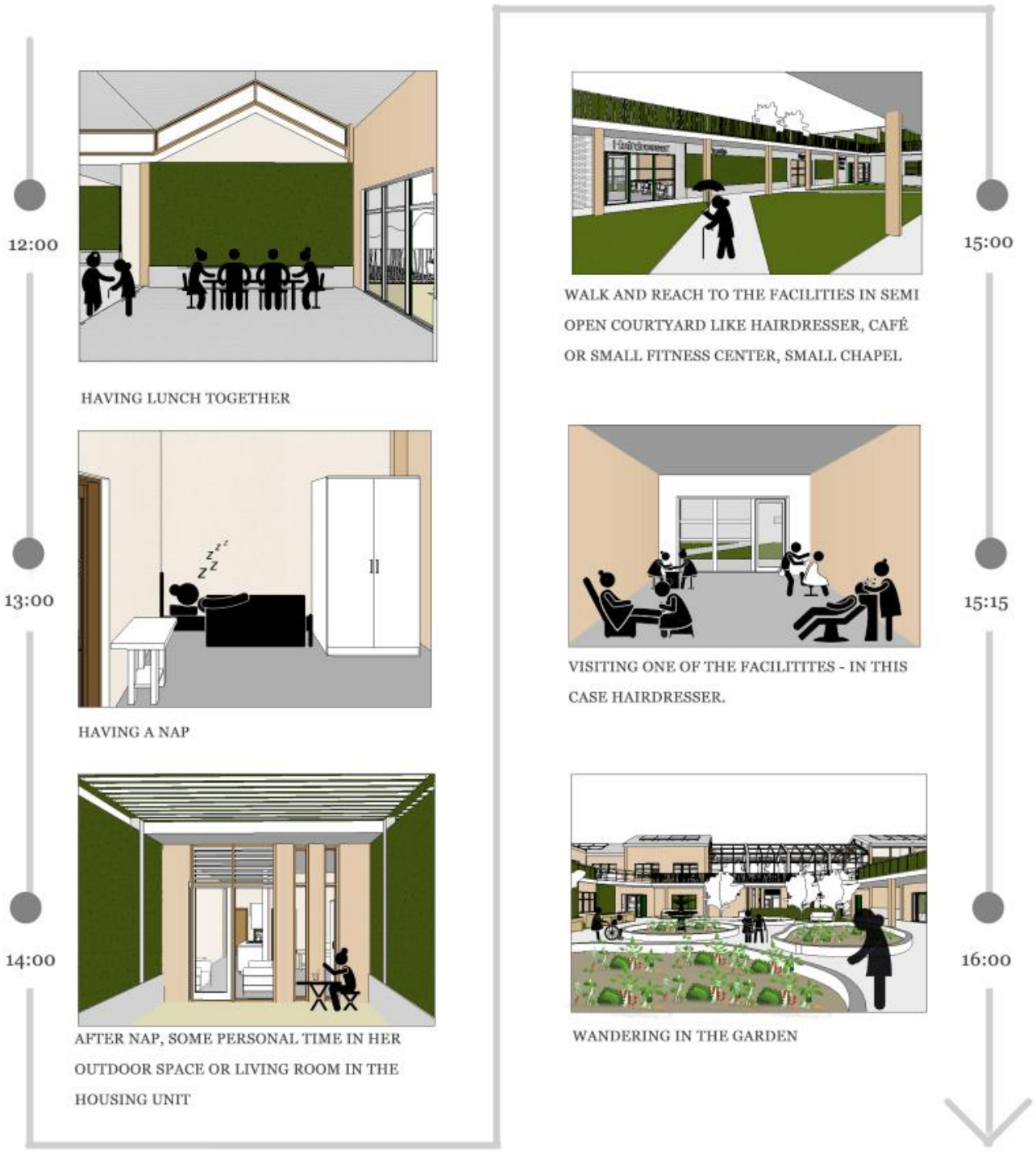
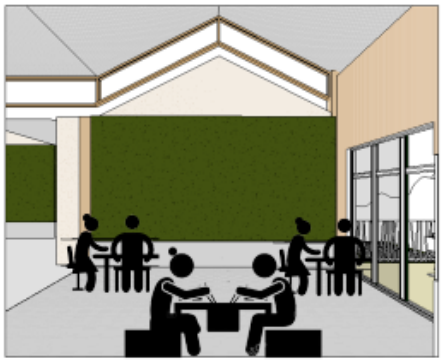


Figure 9.100: A day of Maria -Part 2

16:30

CHILL OUT AND PLAYING CARD WITH FRIENDS

18:00



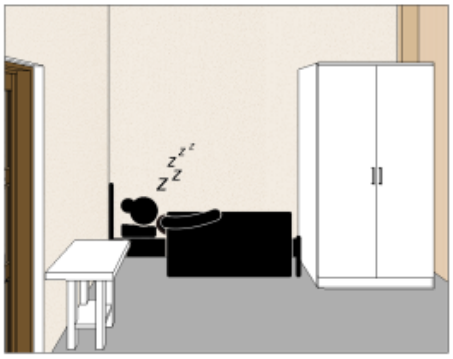
PREPARING & HAVING DINNER TOGETHER

19:00

COMMON ACTIVITY LIKE SINGING AND PLAYING PIANO

COMIING BACK TO ROOM FOR PERSONAL TIME & PREPARING TO GO TO THE BED

20.30



SLEEPING

21.30

END

Figure 9.101: A day of Maria -Part 3

10

CONCLUSION

10.CONCLUSION

In this project, the research and design proposal define a strategy to establish an innovative person-centered care approach and develop a suitable environment for seniors with several stages of dementia. Literature proves that nature-based therapeutic settings are increasing life quality and wellbeing of seniors with dementia. Therefore, care farms that have a person-centered care approach and give 24- hour care for seniors with dementia have been analyzed deeply. It is a new type of small-scale living typology. It has been found that green care farms can be a valuable alternative to traditional nursing homes. They provide an attractive, homelike environment, person-centered care approach, and activities that positively affect physical engagement and social interaction, improving seniors' social, physical, and psychological well-being and quality of life.

Nevertheless, his typology has some drawbacks. First, they are located far from cities. Second, farming activities are depending on the weather conditions and cannot continue all year long. Sometimes, outside farming activities are physically too demanding for seniors, especially in cold and rainy days. Lastly, most of the green care farms are transferred from an existing farm. Therefore, they are not designed as dementia-friendly initially. Therefore, dementia-friendly design strategies and innovative urban agriculture methods have been applied to minimize these negative aspects in the urban green care farm design proposal.

Design guidelines are categorized to develop a dementia-friendly therapeutic environment. It is done to classify all the information gathered from literature reviews and case studies. Design guidelines consist of easy access, orientation, wayfinding, movement, sustainability, safety considerations, increasing air quality, suitable room layout for seniors with dementia, providing social interactions, providing a homelike environment, and providing different levels of privacy and sensory information stimulation.

Furthermore, vertical farming systems were analyzed, and aquaponic farming is decided to use because it is a sustainable method of raising fish and plants. This innovative farming system uses less water, has more yield, enables all-year-round weatherproof local production, can be established anywhere because it does not need large fertile fields. Moreover, vertical farms are easy to maintain for seniors because it is physically less demanding. It also creates options for seniors to continue farming activities all year long in a controlled indoor climate. Promoting vertical farming in urban care farms enables seniors to close contact with nature while connecting with city life. Also, growing their own vegetables gives them a sense of achievement and joy. Living a farm life in the city can enhance the social cohesion in the community of seniors and increase the social interaction with other people like volunteers, caregivers, nurses, and other residents. Also, edible walls and rooftop farming systems have been used to enhance the connection between nature and seniors.

To sum up, in the presented design proposal, seniors with several stages of dementia are considered. A therapeutic and suitable environment for seniors with dementia has been created under the light of literature and case studies. This design proposal is a researched-based proposal that indicates in which direction green care farms can develop. In the literature, various benefits of care farms have been found, and this typology is tried to be improved with dementia-friendly design strategies and innovative urban farming systems. At the end, a design proposal has been presented that aims to create an environment where seniors can feel connected to nature and contributing & a valuable member of the community by doing a meaningful activity.

REFLECTION

REFLECTION

The graduation studio of Stimulating Healthy Environments has been an exciting studio, and I should say that I really enjoyed working on my graduation project. Even if it has been hard times for us and the whole world because of the pandemic, thanks to my mentors, who helped me during the entire process, I organize my research well-structured and find my way to design.

First, it took time to define the target group very well, understand seniors with dementia, their needs, and put myself in their shoes. After that, I learned the importance of design through research, and I tried to improve a strong relationship between research and design. It was the first time I worked on a research-based design, and I really enjoy this experience. This graduation studio helped me improve my ability to conduct research by asking the right questions, understanding the users and their needs, and defining the correct problems to design later. Moreover, after learning about dementia and the requirements of seniors who live with dementia, I aimed to use the power of architecture by creating an environment that improves their social, physical, and psychological well-being. To achieve this goal, I translate design guidelines obtained from literature and case studies into a uniform design.

Finally, the whole journey of graduation consists of challenging and memorable moments, and I tried my best to create a therapeutic environment for seniors with dementia where they can feel a valuable contributing member of society.

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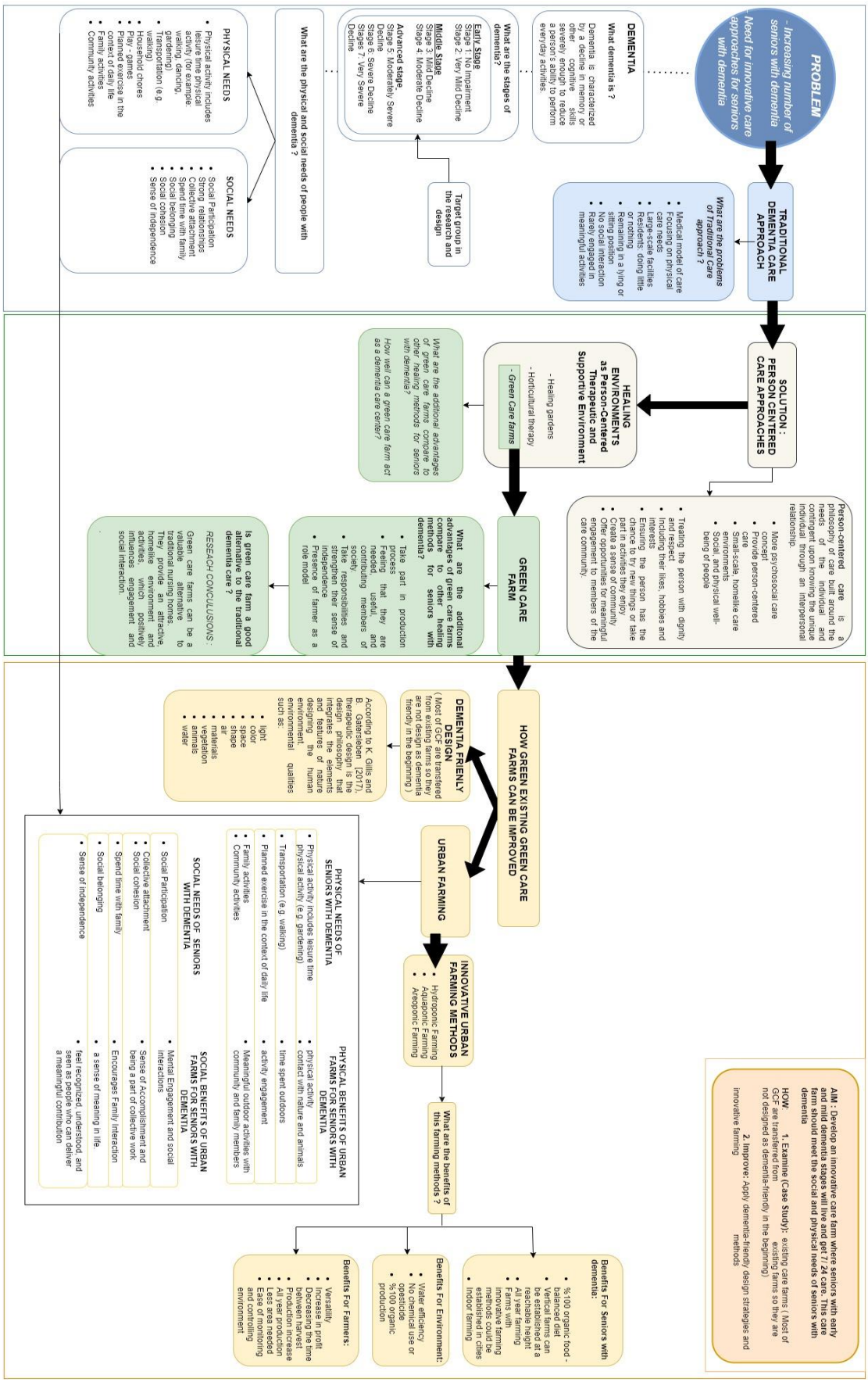
APPENDIX

APPENDIX


PROBLEM DEFINITION
EXISTING SOLUTIONS
HOW IT CAN BE IMPROVED
AIM
PROBLEM
- Increasing number of seniors with dementia
Need for innovative care approaches for seniors with dementia
TRADITIONAL DEMENTIA CARE APPROACH
What are the problems of Traditional Care approach ?
Medical model of care
Focusing on physical care needs
Large-scale facilities
Residents doing little or nothing
Remaining in a lying or sitting position
No social interaction
Rarely engaged in meaningful activities
DEMENTIA
What dementia is ?
Dementia is characterized by a decline in memory or other cognitive skills severely enough to reduce a person's ability to perform everyday activities.
What are the stages of dementia?
Early Stage
Stage 1: No Impairment
Stage 2: Very Mild Decline
Middle Stage
Stage 3: Mild Decline
Stage 4: Moderate Decline
Advanced stage
Stage 5: Moderately Severe Decline
Stage 6: Severe Decline
Stage7: Very Severe Decline
Target group in the research and design
What are the physical and social needs of people with dementia ?
PHYSICAL NEEDS
Physical activity includes leisure time physical activity (for example: walking, dancing, gardening)
Transportation (e.g. walking)
Household chores
Play - games
Planned exercise in the context of daily life
Family activities
Community activities
SOCIAL NEEDS
Social Participation
Strong relationships
Collective attachment
Spend time with family
Social belonging
Social cohesion
Sense of independence
SOLUTION : PERSON CENTERED CARE APPROACHES
Person-centered care is a philosophy of care built around the needs of the individual and contingent upon knowing the unique individual through an interpersonal relationship.
More psychosocial care
Provide person-centered care
Small-scale, homelike care
Social and physical well-being of people
Treating the person with dignity and respect
Including their likes, hobbies and interests
Ensuring the person has the chance to try new things or take part in activities they enjoy
Create a sense of community
Offer opportunities for meaningful engagement to members of the care community.
HEALING ENVIRONMENTS as Person-Centered Therapeutic and Supportive Environment
- Healing gardens
- Horticultural therapy
- Green Care farms
What are the additional advantages of green care farms compare to other healing methods for seniors with dementia?
How well can a green care farm act as a dementia care center?
GREEN CARE FARM
What are the additional advantages of green care farms compare to other healing methods for seniors with dementia?
Take part in production process
Feeling that they are needed, useful, contributing members of society
Take responsibilities and strengthen their sense of independence
Presence of farmer as a role model
Is green care farm a good alternative to the traditional dementia care ?
RESEACH CONCLUSIONS:
Green care farms can be a valuable alternative to traditional nursing homes. They provide an attractive, homelike environment and activities, which positively influences engagement and social interaction.
HOW GREEN EXISTING GREEN CARE FARMS CAN BE IMPROVED
DEMENTIA FRIENLY DESIGN
(Most of GCF are transfered from existing farms so they are not design as dementia friendly in the beginning)
According to K. Gillis and B. Gatersleben (2017), therapeutic design is the design philosophy that integrates the elements and features of nature and designing the human environment. environmental qualities such as:
light
color
space
air
materials
vegetation
animals
water
URBAN FARMING
INNOVATIVE URBAN FARMING METHODS
Hydroponic Farming
Aquaponic Farming
Areoponic Farming
What are the benefits of this farming methods ?
PHYSICAL NEEDS OF SENIORS WITH DEMENTIA
Physical activity includes leisure time physical activity (e.g. gardening)
Transportation (e.g. walking)
Planned exercise in the context of daily life
Family activities
Community activities
PHYSICAL BENEFITS OF URBAN FARMS FOR SENIORS WITH DEMENTIA
physical activity
contact with nature and animals
time spent outdoors
activity engagement
Meaningful outdoor activities with community and family members
SOCIAL NEEDS OF SENIORS WITH DEMENTIA
Social Participation
Collective attachment
Social cohesion
Spend time with family
Social belonging
Sense of independence
SOCIAL BENEFITS OF URBAN FARMS FOR SENIORS WITH DEMENTIA
Mental Engagement and social interactions
Sense of Accomplishment and being a part of collective work
Encourages Family interaction
a sense of meaning in life.
feel recognized, understood, and seen as people who can deliver a meaningful contribution
Benefits For Seniors with dementia:
%100 organic food - balanced diet
Vertical farms can be established at a reachable height
Fully integrating innovative farming methods could be established in cities
Indoor farming
Benefits For Environment:
Water efficiency
No chemical use or opesticide
%100 organic production
Benefits For Farmers:
Versatility
Increase in profit
Decreasing the time between harvest
Production increase
All year production
Less area needed
Ease of monitoring and controlling environment
AIM : Develop an innovative care farm where seniors with early and mild dementia stages will live and get 7 /24 care. This care farm should meet the social and physical needs of seniors with dementia
HOW: 1. Examine (Case Study): existing care farms (Most of GCF are transfered from existing farms so they are not designed as dementia-friendly in the beginning)
2. Improve: Apply dementia-friendly design strategies and methods
innovative farming