

A HOME TO REMEMBER

Design for dementia | Research on the life of elderly with dementia in order to design a living environment that provides them with quality of life and the care they need



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30 April 2024

MSc Architecture
AR3AD110 Dwelling Graduation Studio
Designing for Care in an Inclusive Environment

RESEARCH REPORT

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ABSTRACT

This research is about designing for people with dementia. The Dutch population is aging and double aging, causing an increase of people with dementia. This also causes a growing imbalance between people who need care and people who can provide care. Adding to this are the current living arrangements for people with dementia not sufficient. Therefore the central question in this research is: what living environment features can contribute to the quality of life of people with dementia, and provide them with the care they need.

The aim of this research is to define design guidelines that provide people with dementia with sufficient housing and a qualitative living environment through all stages of dementia. And to see if this can contribute to the efficiency in care, so that people with dementia can still get the care they need.

This research obtains information through literature study, case studies and a fieldwork in an elderly care home to provide an answer to the main question.

This research defines four main topics that contribute to the quality of life of people with dementia: distinctiveness, familiarity, independence and biophilic. This research investigates these topics on different scales. First the scale of the dwelling, than the building, and at last the near surroundings. Finally, this research has a chapter from the perspective of the caregiver on the living environment for people with dementia. This results in design guidelines.

It can be concluded from this research that by bringing together the fields of dementia, dementia care and architecture, a qualitative living environment can be created for people with dementia with a high quality of life. A higher quality of life will contribute to the efficiency of care and a decrease in the demand for care.

Key words | dementia, biophilic, distinctiveness, familiarity, independence, care, design

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CHAPTER 1: INTRODUCTION

1.1 | PROBLEM STATEMENT

The population of people of sixty years old and older is increasing worldwide. From the year 2000 until the year 2050, the world's aging population will triple from six hundred million to two billion (World Health Organization: WHO, 2022). In the Netherlands the percentage of people above sixty-five years old will increase as well from nineteen percent in 2020 to twenty-five percent in 2050 (NIDI & CBS, 2020).

There is not just aging, but we can also speak of an upcoming, so called, double-aging, because the number of people over eighty years old is increasing in percentage terms more than the number of people over sixty-five (NIDI & CBS, 2020). The group of people above seventy-five in the Netherlands is expected to grow from 1,4 million in 2018 to 2 million in 2030. Within this group the amount of people above 85 years old will grow from 375 thousand in 2018 to 560 thousand in 2030 (De Klerk et al., 2019).

The older people get, the higher the risk on dementia. This double-aging population will cause for approximately half a million people to have dementia by 2040, and this is expected to go up to 620 thousand in 2050 (Factsheet Cijfers en feiten over dementie, z.d.).

The fact that the amount of people above eighty-five years old will keep growing from 2030 till 2050 is important for the care (Gopal et al., 2021). The demand for care will increase, but the number of people available to care for the elderly will decrease significantly over the years. The shortages of healthcare professionals are increasing further and the number of potential informal caregivers is also decreasing (De Klerk et al., 2019). This will also have its consequences for people with dementia that need care.

Caregivers already see problems in dementia care. Currently, eighty percent of the caregivers thinks that the housing supply is not sufficient for people with dementia (Van den Buuse & De Boer, 2021). Research shows that there is need for a new form of living between a normal house and a nursing home for people with dementia, where they feel at home, and get the care they need. Now several problems occur when people with dementia have to move; they are ripped out of their familiar and known surroundings, they lose freedom and control and they associate

the nursing home with death (Van den Buuse & De Boer, 2021).

Designing for people with dementia needs extra attention. For elderly people with dementia, the living environment can be a source of stress, uncertainty and confusion. Because a large part of our well-being and sense of familiarity has to do with our immediate environment, it is extremely important to pay a lot of attention to the design (Wat is dementie, 2023).

To summarize, there are three important challenges:

1. Aging and double aging population causing an increase of people with dementia
2. Growing imbalance between people who need care and people who can provide care
3. No sufficient and supportive living arrangements for people with dementia

1.2 | THEORETICAL FRAMEWORK

The Dutch Alzheimer association has an initiative for dementia friendly living. This proposal takes into account the whole spectrum of living environment. It goes from the coloring of the apartment, to lighting, to a recognizable front door, to the design of staircases in the building, to meeting spaces with other inhabitants, to walking routes outside. They built upon the idea of aging in place by answering to the need of elderly and elderly with dementia to not have to move again (Wat is dementievriendelijk wonen, z.d.). They did a research and questionnaire and came up with guidelines and conditions (figure 1). This idea still is a vision and takes the ideal situation. The question remains how this can be implemented in the real world.

There has already been an extensive research on dementia friendly design (J. Nillesen et al., 2013; Halsall & Macdonald, 2015; Van den Buuse & De Boer, 2021; Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018).

This overview of the literature about designing for people with dementia gives a lot of elements that are of importance considering their quality of life (figure 2). From this literature can be concluded that there are four main topics that should be looked in to in this research. These four main topics cover all aspects and are considered most relevant. When these four topics are taken into account in a design for people with dementia, they, combined, can

provide them with quality of life. These four being:

1. Familiarity
2. Independence
3. Distinctiveness
4. Biophilic

Of these four, biophilic design is a relatively new concept. Design that implements contact with nature is proven to have a positive effect on health, healing and health promotion. Biophilic design can reduce stress, improve cognitive function and creativity, improve our well-being and expedite healing (Browning et al., 2014). Recent studies also relate this to dementia care facilities. Appropriate levels of thermal, acoustic, visual and air quality in buildings, has long been linked to occupants' satisfactory health, wellbeing, productivity and overall comfort. For example, adequate indoor air quality and thermal level controllability is of critical importance to human health, behavior, and wellbeing. In long-term-care residents, a non-supportive ambient indoor environment was identified as the principal source of behavioral disturbances among residents, disturbances caused specifically by poor acoustics, lighting levels, and inadequate ambient air quality-thermal conditions (Peters & Verderber, 2021).

The link between the biophilic aspects, that add to quality of life for people with dementia, and the other key elements that contribute to this, is currently missing.

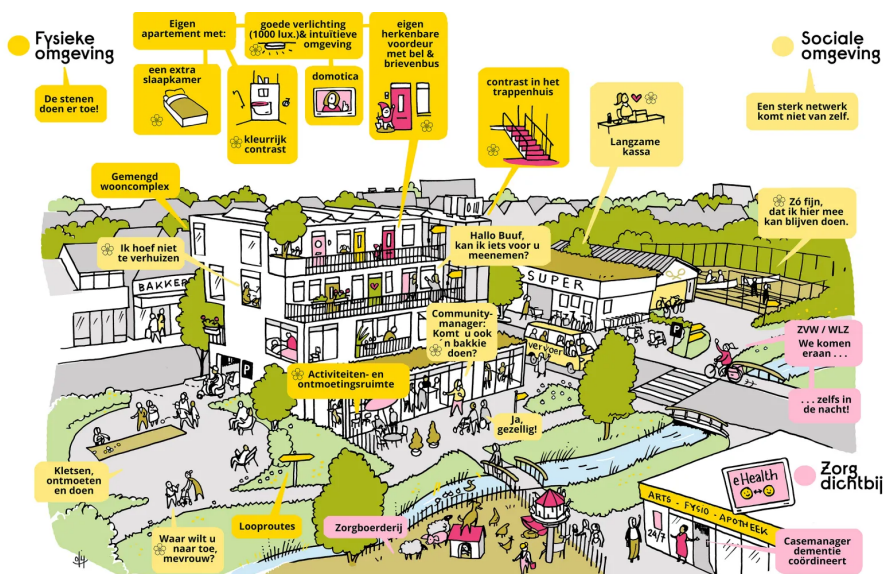


Figure 1. Dementia friendly living. Derived from Wat is dementievriendelijk wonen? from Alzheimer Nederland, 2021 (<https://www.alzheimer-nederland.nl/belangenbehartiging/standpunten/woonvormen-voor-mensen-met-dementie/wat-dementievriendelijk-wonen>). Copyright, Alzheimer Nederland.

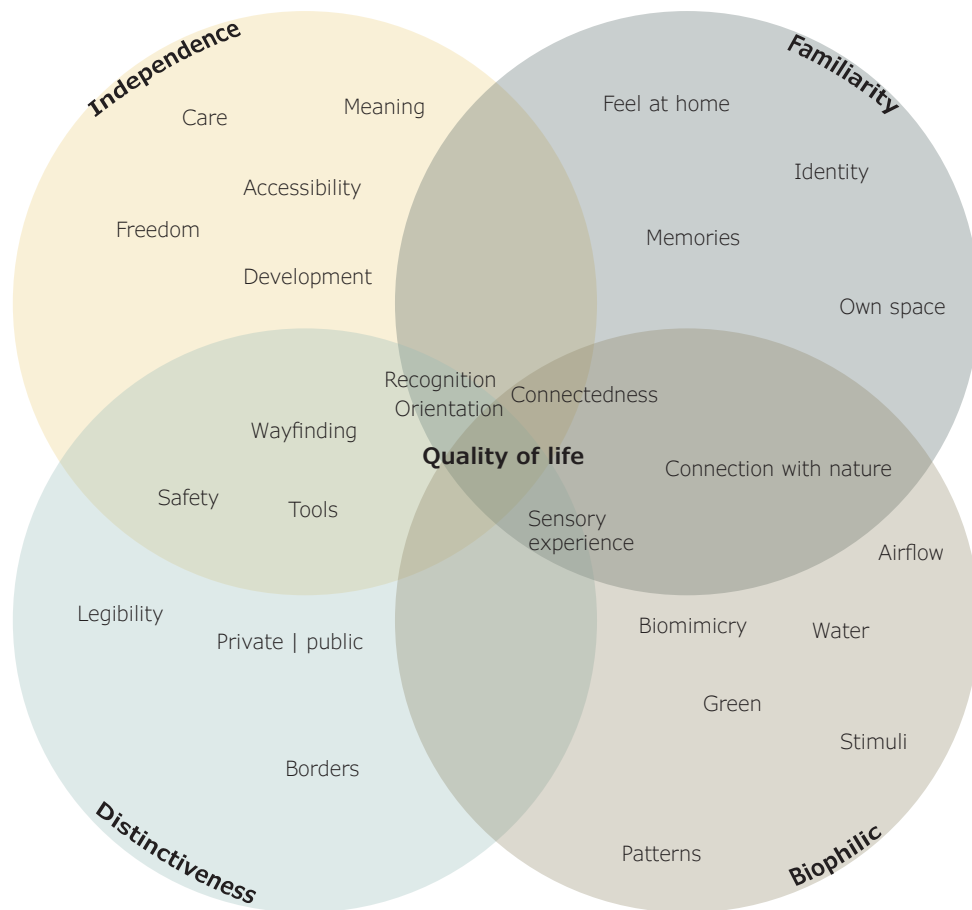


Figure 2: Topics that are of relevance when designing for people with dementia subdivided in four main topics(own image).

1.3 | DESIGN HYPOTHESIS

By bringing together the fields of dementia, dementia care and architecture, a qualitative living environment can be created for people with dementia (figure 3). A higher quality of life will contribute to the efficiency of care and a decrease in the demand for care. In this way, people with dementia can still get the care they need in a society where the imbalance, between those who need care and those who can provide care, is growing.

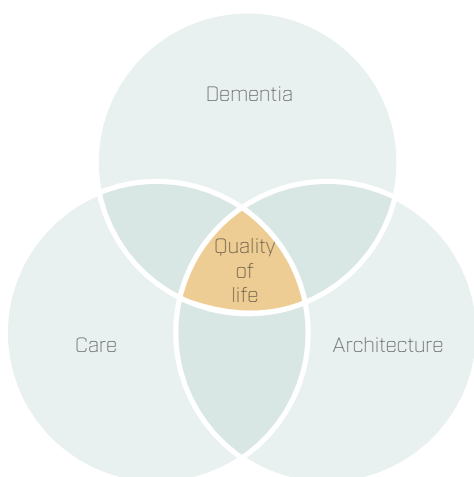


Figure 3: Research plan to achieve quality of life for people with dementia(own image).

1.4 | RESEARCH GOAL

The aim of this research is to define design guidelines that provide people with dementia with sufficient housing and a qualitative living environment through all stages of dementia. And to see if this can contribute to the efficiency in care, so that people with dementia can still get the care they need. The goal is to create a living environment that comforts and supports the life of people with dementia.

1.5 | RANGE

This research will only focus on elderly with dementia, and therefore exclude the early onset dementia.

This research will only focus on the situation in the Netherlands. Although some principles might be universal, the living arrangements are based on Dutch principles. The fieldwork, observations and questionnaires will all be done with Dutch people.

This research will include all stages of dementia. From the early stage, with more independence and less care demand to the severe stage, with a 24-hour care demand.

Because all forms of dementia are progressive, this research will exclude the concept of a healing environment. And focus more on a healthy environment, that supports and might slow down the process.

Considering the living environment, this research will focus on all scales; from room, to apartment, building and near surroundings. This research is user-based. Its main focus is the perspective of the person with dementia, but it will also include their partners, family and caregivers.

1.6 | RESEARCH QUESTION

This all leads to the following research question:

Which living environment features provide people with dementia with quality of life and the care they need?

1. What architectural features in the *dwelling* can contribute to the quality of life for people with dementia?
2. What architectural features in the *building* can contribute to the quality of life for people with dementia?
3. What architectural features in the *near surroundings* can contribute to the quality of life for people with dementia?
4. What architectural features contribute to *providing care* for people with dementia?

1.7 | DEFINITIONS

Dementia

There are many different types of dementia. They have in common to be progressive; people with dementia will get worse over time. They get problems with memory, thinking, perception and behavior. At some point they need a lot of assistance with daily living. Dementia can be explained in three stages; early, middle and late stage, or mild, moderate and severe. These stages differ per person and may overlap (The progression, signs and stages of dementia, 2021).

Adding to this, people with dementia also perceive their surroundings differently. Despite the subjectiveness of the topic, are there some general aspects. For example, the brain of one with dementia cannot stimulate itself but it must be given stimuli, orientation and organization become problematic, they have no conscience of what is 'behind' them, so they can't comprehend sounds and movement behind them, which causes confusion and fear (J. Nillesen et al., 2013).

Quality of life

"Referring to an overall sense of well-being with a strong relation to a person's health perceptions and ability to function. On a larger scale, quality of life can be viewed as including all aspects of community life that have a direct and quantifiable influence on the physical and



Figure 4. Domains of well-being and the ten principles from Eden Alternative. Derived from The Framework from Eden In Oz & Nz, 2020 (<https://edeninoznz.com.au/framework/>). Copyright 2023, Eden In Oz & NZ Ltd.

mental health of its members.” (Healthy Places Terminology, 2009)

Well-being

Related to this are the domains of well-being. The Eden Alternative is a philosophy that seeks to address loneliness, helplessness and boredom and it serves as a template for driving successful culture change in long term care facilities (figure 4). It is focused not only on the care of the human body, but also on the human spirit and the well-being of residents in nursing homes (The Eden Alternative, 2023).

The notion of well-being consists of two key elements: feeling good and functioning well. Feelings of happiness, curiosity and engagement are characteristic of someone with a positive sense of themselves. Having positive relationships, control over your own life and a sense of purpose are all attributes of functioning well (Huppert, F., & So, T. (2013).

Living environment

“The living environment is represented by the space in which organisms (biota) live and interact with each other or with the non-living environment (the abiota)” (Living environment, z.d.). The non-living environment is in this research defined as architectural features on different scales. From the details in the room to apartment, to building, to neighbourhood.

Biophilic design

Biophilic design is an approach to architecture that seeks to connect building occupants more closely to nature. Biophilia is humankind’s innate biological connection with nature (Browning et al., 2014).

Care

Caregiving is the process of protecting someone or something and providing what that person or thing needs (Care, 2023). Or “caregiving is providing care for the daily needs of someone that is unable to care for themselves (About caregiving, z.d.). This broad definition can have many interpretations. In this research, when spoken about care, it is medical care and support in daily activities. But cleaning for example is excluded.

Healthy environment

A spatial setting that does not have a bad influence on one’s health.

Health promotive environment

Spatial and architectural elements that stimulate a person to live healthier.

Age in place

“The ability to live in one’s own home and community safely, independently, and comfortably, regardless of age, income, or ability level.” (Healthy Places Terminology, 2009)

Health

“A state of physical, mental, and social well-being and not merely the absence of disease and infirmity.” (Healthy Places Terminology, 2009)

1.8 | METHODS

Literature study

Literature study is done on existing toolkits and design principles for people with dementia. There has already been an extensive research on dementia friendly design (J. Nillesen et al., 2013; Halsall & Macdonald, 2015; Van den Buuse & De Boer, 2021; Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). Different theories on different scales are combined to get the whole picture on where architecture can contribute and support the living environment for people with dementia.

There are also previous studies and questionnaires done regarding this target group, their living arrangements and their care. These are used as extra data, to broaden the input from the target group (Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018; Halsall & Macdonald, 2015).

Fieldwork

There has been a fieldwork for five days in an elderly and dementia care facility. This is a mixed living group with vital elderly but also people with severe dementia. The building also has a function for the neighborhood. This week is used to get to know the daily life of people in different stages of aging and different stages of dementia. Especially to see what spatial and architectural features influence their life. But also to find out what living environment features they are still lacking or wishing for. This information is gained first of all through observation. The four points (distinctiveness, familiarity, independence, biophilic) are the

guidelines for the observation and also the interviewing.

Focus points in observation:

- daily schedule
- movement through the building
- movement outside
- what spaces are used/ not used
- floorplan
- outdoor space
- communal area

These observations are in sketches and drawings on floorplans. Photography is used to capture:

- Tools for orientation
- Things that make it feel like home

Another method to get information for the research is interviewing. The inhabitants, including people with dementia, are interviewed or listened to in a more informal way during meals and their normal activities. Some dwellings are visited and the inhabitants were asked about their likes and dislikes considering the design.

Their caregivers are also questioned. This is to find out what care people with dementia need in different stages of dementia, and how their life changes as the disease progresses. Especially regarding their built environment; what becomes more important or less important. In this case the interview is also be focussed on the independence of people with dementia and the possibilities for that.

This is also to find out how the built environment features helps them with their job. What is supporting them and what is not working well, and do they have suggestions in changing this for the better.

Lastly the family members and others around them are interviewed. This is to see why they choose a certain facility for their relatives. They are asked about their likes and dislikes, considering the living environment.

Case studies

Case studies include the building as well as the people and the interaction between both. They are used to research earlier implementations of certain key elements in designing for people with dementia.

Criteria for these case studies:

- Focused on dementia care specifically
- Based on research
- They all together grasp the whole range from room to neighborhood

1.9 | RESEARCH PLAN

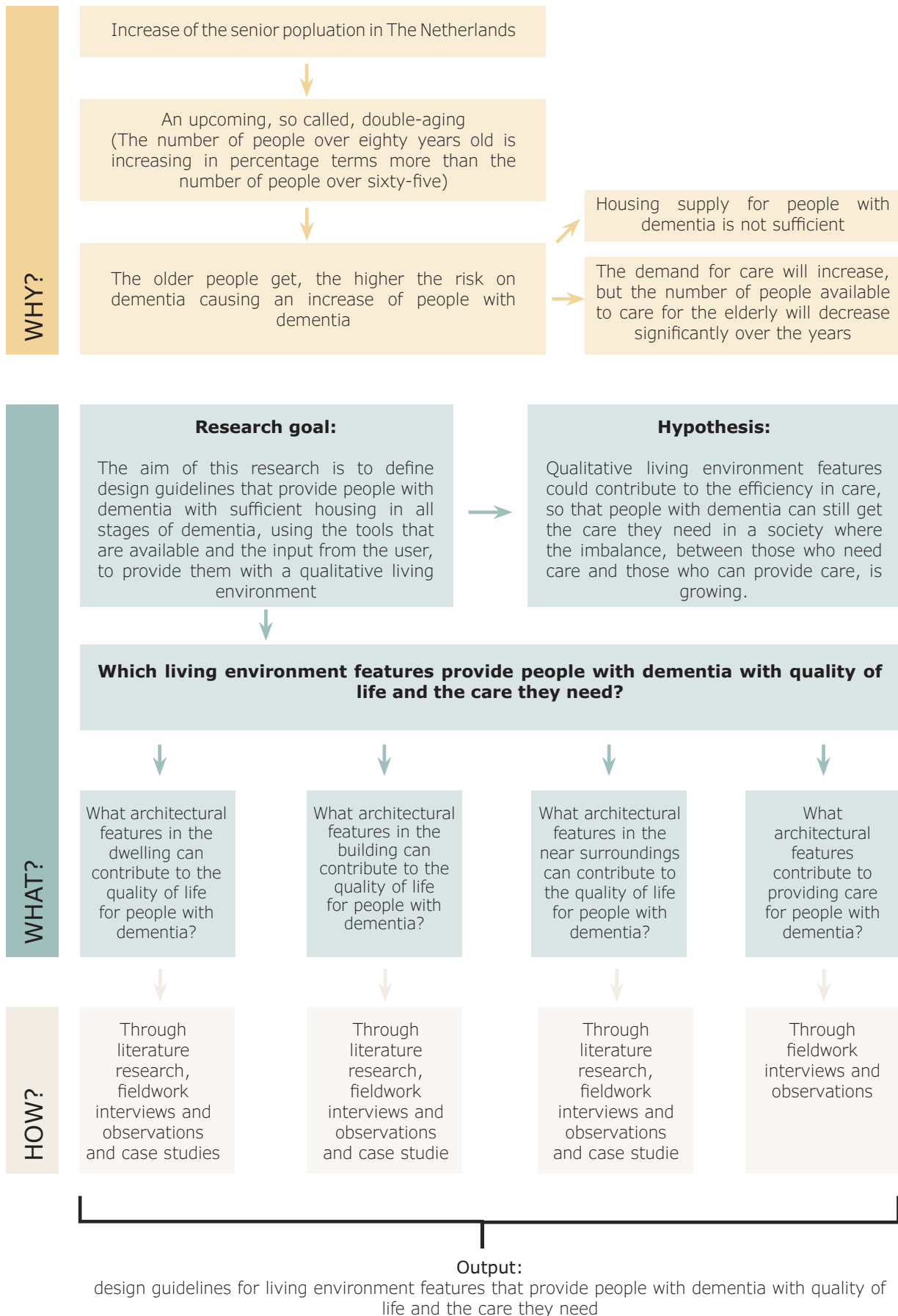


Figure 5: Research plan(own image).

FOUR MAIN THEMES

What architectural features in the dwelling can contribute to the quality of life for people with dementia?

This research will find an answer to the question how architectural features can provide quality of life for people with dementia. From the introduction four main topics in designing for people with dementia arose, being; distinctiveness, familiarity, independence and biophilic. When these four topics are taken into account in a design for people with dementia, they, combined, can provide them with quality of life (figure 6). Therefore these topics will be briefly explained.

The chapters will focus on different scales, from dwelling to building to neighbourhood. There will be some overlap between the topics at some points. On every scale these four topics will be mentioned. This will result in guidelines on different scales on the four main topics.

A booklet is added with all the observations and conversations from the fieldwork. Not everything is mentioned directly in this research. The findings are taken into account in the guidelines at every end of the chapter.

Distinctiveness

“the quality of being easy to recognise because of being different from other things” (Distinctiveness, 2023b). This is an important topic in designing for dementia. When your brain starts failing you clear structures and lines are helpful. The element of distinctiveness covers topics like legibility, borders and wayfinding.

Familiarity

In times of memory loss and confusion, familiar items, places and faces become very important. Getting dementia is already a big change and challenge in life. Therefore familiarity is a very important design aspect. It covers topics like feeling at home, having an own space, identity and memories.

Independence

People with dementia, especially in early and middle stage, are still capable of doing a lot themselves. But because of their mental and physical impairments this becomes harder in normal situations. Designers can do a lot in making it possible for them to still be independent. This gives more value to their life and makes them feel worthy. The design aspect of independence covers topics like accessibility,

freedom, development and safety. This aspect is also really important when thinking about decreasing the demand for care.

Biophilic

Biophilic design is proven to have a positive effect on health, healing and health promotion. Also in dementia care facilities adds this feature in design to the quality of life. Introducing the topic of biophilic in dementia care is extremely relevant given the growing numbers of people with dementia and the growing body of evidence that natural elements improve cognitive functioning (Peters & Verderber, 2021).

Biophilic aspects that are considered are the fourteen patterns of Browning et al. (2014) as shown in appendix B. They are proven to have a proven positive effect on mental and or physical health and well-being.

‘Nature in space’ is about the direct physical contact with nature.

‘Nature analogues’ is about indirect evocations and biomimicry.

‘Nature of the space’ concerns the spatial configurations in nature.



Figure 6: Four main topics of this research, combined in design they provide quality of life for people with dementia (own image).

CHAPTER 2 : DWELLING

What architectural features in the dwelling can contribute to the quality of life for people with dementia?

This research starts with the smallest scale, being the scale of the dwelling; the personal apartment of the person with dementia.

2.1 | DISTINCTIVENESS

Overall can the experience of dementia be described with the following words: Lonely, unsure, anxious, lost, unclear, bewildered, aggressive, perplexed, confused, disoriented and agitated (Halsall & Macdonald, 2015).

Recognition and differentiation of elements, spaces and materials become more difficult for people with dementia. One of the main causes for this is the fact that their sight is getting worse. They yellowing of the eye makes for the blue end of the spectrum to get lost. Therefore it is easier to see warmer colors. Also colors with a greater intensity and saturation should be used to compensate for the ageing eye (Halsall & Macdonald, 2015). This knowledge can be used to accentuate key features, edges and hazards. By using high contrast, people with dementia can still distinguish these elements. To make this work good lighting is needed as well.

People with dementia are benefitted by a clear layout of the dwelling, and a usable home that has considered their specific needs. They should be able to orient themselves well in their dwelling. To provide this, they need a space with simple, clear movement patterns, that make it easy to find your way around (Halsall & Macdonald, 2015). The floorplan should provide clear walking paths without obstacles. Simple methods such as changing wall colors

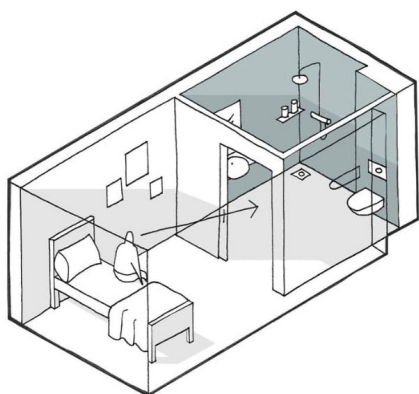


Figure 7. Design concept of a dwelling for a person with dementia. Derived from Willow Valley Memory care home of the future from NORD Architects, 2023 (<https://www.nordarchitects.dk/projects/willow-valley/>).



Figure 8. Hallway of the John Morden Centre in London. Derived from The John Morden Centre from Mae, 2019 (<https://www.mae.co.uk/projects/morden-college>). Copyright Mæ.

to give each section a unique identity, can help the residents remember where to go. This is also done in the apartment by Nord architects shown in figure 7. The layout of the rooms are designed with direct views and accessibility to increase independency of the residents. The image shows direct view from the bedroom to the toilet. The sliding door and absence of a threshold improve the accessibility. The toilet and shower are equipped with handles. The bathroom should not be all white. With impaired sight this will cause for all the objects to become one blur. Color contrasts can help with this. The floor and especially the shower should be anti-slip. During the night they should also be able to find the toilet. A lighted walking route or a light above the toilet can help with this.

(Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018).

Because their sight gets worse, people with dementia also get visuo-perceptual problems. It is hard to see depth and to judge distances. The apartment should not just be clear, but also safe for that reason; without height differences and elements sticking out. In finishes of walls and especially floors it is therefore good to check the light reflecting value of the material. If adjacent materials are close in value, than their appearance for people with dementia will be unnoticed. But if the values change, they can interpret this as a difference of height (Halsall & Macdonald, 2015).

The John Morden Centre in London (figure 8) shows how certain design elements can be made distinguishable. The glass on one side of the hallway provides for a lot of daylight. There is a railing along the glass, dividing the big glass part in two. In this way a person with bad sight does not interpret this as an opening. There is also a black line on the ground alongside the glass marking this border. On the place of the door this line is interrupted to mark where one can go outside. If you have bad sight the choice of wall material might not be ideal. The wall in the back of the picture and the wall on the right can be interpreted as one, leading to the idea that one can only turn left. The benches on the side are in a high saturated color and standing out from the rest of the materials and in this way easy to find.

Figure 9 shows a sketch of dwelling A from the closed facility at the fieldwork building. There was no clear sequence of spaces or visual connection between them. The doors with different functions looked similar and there were thresholds. It should be clear which door leads to what function. When they want to go somewhere, it should be easy to find this target. For example the toilet. Signs, symbols, light and objects can help with this. (Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). You can see the inhabitant sitting next to the window and next to the bed.

The inhabitant from dwelling B (figure 10) did not like to see her bed from her living room, and was always positioned with her back towards it.

2.2 | FAMILIARITY

“It would be best if people with dementia don’t have to move at all. They are ripped out of their familiar surroundings and lose everything that is trusted.” This is what the case worker of well-being at the fieldwork said, and is also the general approach in Van den Buuse & de Boer (2021). But sometimes it is not safe or possible to stay at home anymore for a person with dementia. In their already confused state of mind this can be really difficult. Therefore their new dwelling should feel like home. The person should be able to keep identity, dignity and a place of their own. It is important to have a space of their own. Where they can retreat and feel safe, with objects that they recognize and are familiar with. Also for family it is nice to have a space to be alone with the family member (Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018).

The concept of aging in place would meet in halfway, because in this way people who move do not have to move again. The dwelling therefore should be prepared for heavier care options when they might need more care in the future.



Figure 9: Sketch and observations of a dwelling of a woman in the closed facility of the fieldwork building (own image).



Figure 10: Sketch and observations of a dwelling of a woman in the closed facility of the fieldwork building(own image).

Elements that can help with feeling at home are for example a clearly visible own front door. This will engender the dignity of the individual (Halsall & Macdonald, 2015). The dwellings, but also the shared living room and other collective rooms should have furniture appropriate to the function to create a homelike atmosphere. A reading room for example should have practical placing of the shelves, good lighting and comfortable chairs(GillyCraft, 2021).

Another tool seen during fieldwork is a small box next to the front door to put some personal belongings(figure 11). This does not just give identity to the apartment, but also serves as a point of recognition. Since dementia will cause

impaired memory, memorable objects and points of recognition can be of help.

Since people with dementia become very sensitive to stimuli, these should be limited to create a calm space. Echo and reverberation give unnecessary stimuli. When many different sounds come together, this causes a lot of confusion and trouble. Sound-dampening materials should be installed on the wall and ceiling, but also in interior to limit this. Plants also absorb sound very well. And they provide a healthy moisture balance, more oxygen in the air and have a calming effect(Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). To control the stimuli the bedroom should have curtains that can fully blind the light.

Some people, on the other hand, get restless. Things as a sound installation can help. At fieldwork in the closed facility, music was constantly playing in the living room. In some apartments the music was constantly playing to provide stimuli. It was obviously observed that music is of big importance for people with dementia. There was a church service, and all the people who went there sang the songs along by heart, eventhough they had not spoken or rarely spoken all day. To provide stimuli it should also be taken into account that enough can be seen from the bed, especially in the further stages of dementia (Verbraeck & Van Der Plaats, 2016).

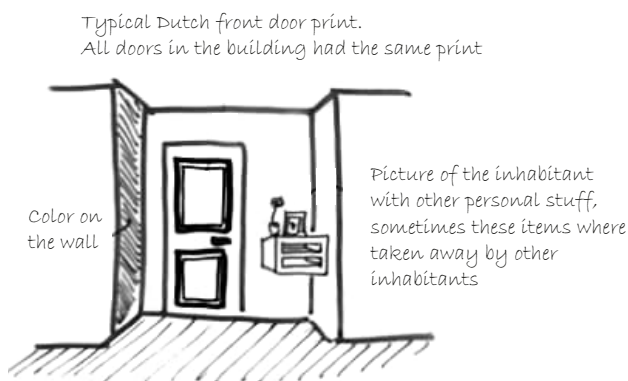


Figure 11: Sketch and observations of a front door in the building at the fieldwork location(own image).

2.3 | INDEPENDENCE

Dwellings for people with dementia should be influenced by promoting independence and normalized living, rather than control (Halsall & Macdonald, 2015). The growing imbalance between people who need care and people who can provide care also promotes for more independence. People with dementia are still capable of a lot. But because of the impairments that come with dementia, they need a supportive living environment that provides for the possibilities to do so. In the early stage of dementia they get trouble with memory and planning. Their orientation gets difficult and it becomes difficult to judge distances (The progression, signs and stages of dementia, 2021). Figure 12 shows how the different stages of dementia relate to their independence. The further the progression of the disease, the more they depend on care. Also their living environment becomes smaller.

It is proven that involvement and responsibility benefits the person with dementia. This was researched by an exercise to take care of plants. And over a period of eighteen months the group that had been given control and personal responsibility had an improved health status (Peters & Verderber, 2021). Having something to do or a responsibility gives them purpose and meaning in life and the feeling that they are still of use.

The dwelling therefore should support autonomy and force and support independence. In order to be independent, there are some tools that makes this easier and will prevent accidents. One example is the visual link between bedroom and bathroom. In this way a person with dementia can easily find it by themselves on time (Halsall & Macdonald, 2015). Elements mentioned in the chapter of distinctiveness also help in being independent.

Some tasks might individually become unsafe and impossible. These can be done in a group. Especially in the advanced stage of dementia where they rely on 24 hour a day care at some point and need help with eating (The progression, signs and stages of dementia, 2021). In the dwelling there is no need for an extensive kitchen in this way, eating and cooking can be

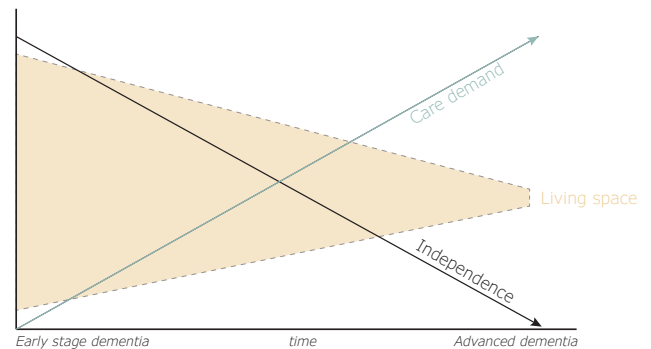


Figure 12: Graphic of the relationship between the different stages of dementia, the independence of the person and the size of their living space (own image).

done in a shared kitchen with help.

The bathroom can be facilitated in different ways. Beside safety, physical and mental competence is there also the issue of budget. When a person with dementia can still shower by themselves, they really appreciate having an own bathroom (fieldwork experience). A bathroom of their own provides them with privacy, feeling at home and independency (Nillesen, Opitz & Plaats, 2013). But for people who are depending on care for showering or bathing, it is different. Fieldwork experience showed that when the bathroom is too small, a person with a wheelchair was not showered by the staff (figure 10). Therefore priority in the design of the bathroom is that it should be accessible and large enough for a wheelchair or a stroller. Since some people have to be showered by the staff, it can be considered to share this facility. There are bathrooms specially designed for people with dementia, with a lot of stimuli. They have music, colored light and smells (fieldwork).

2.4 | BIOPHILIC

A biophilic aspect that should be implemented in the dwelling is 'the view on elements of nature, living systems and natural processes'. Research shows that plants and a view from the window on natural elements contribute to ones well-being (image x[grote table uit onderzoek]). It even benefits the blood pressure and emotion of people (Peters & Verderber, 2021). Ideal would be to have an empty beach and a constantly moving sea with a bird flying over here and then. But this is not realistic, but the implementation of water can have this effect also on a smaller scale. Also slowly moving traffic, not too close to the living space, can provide positive stimuli.

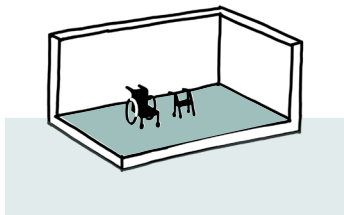
(Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). At fieldwork it was mentioned by the residents that it was nice to have view on water, trees, birds and people walking by. Things to see and activity were highly appreciated.

Not just the view, but also the non-visual connection with nature can have positive influence on ones well-being. This can be auditory, haptic or olfactory(Browning et al., 2014). Inclusion of plants and the opportunity to engage with nature indoor and outdoor contributes to reduce the sensory deprivation that comes with dementia(Rappe & Linden, 2004). In this way all senses can be activated and stimulated to create a more direct physical contact with nature. Therefore good accessibility of gardens and outdoor space should be provided. Something like a wintergarden will allow for this opportunity for even a longer period of the year(Halsall & Macdonald, 2015).

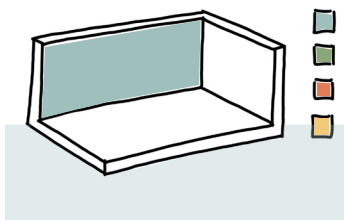
Another important biophilic aspect mentioned by Browning et al.(2014) is the sensory variability in the dwelling and in the whole building. The varying levels of thermal, acoustic, visual and air quality in buildings is linked to residents health, wellbeing, productivity and comfort. These elements influence the cognitive behavior, and are especially of influence on characteristics that come with dementia. Poor indoor environment qualities are identified as the main source for disturbances among residents(Wong et al., 2014). Natural ventilation provides sensory stimulation as feel and smell(Peters & Verderber, 2021). Insufficient self-controllability of these aspects of the residential setting resulted in feelings of boredom and introvertedness (Peters & Verderber, 2021).

2.5 | DESIGN GUIDELINES

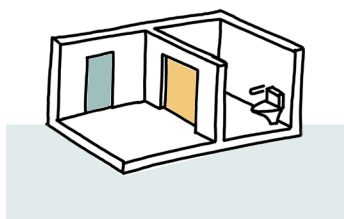
DISTINCTIVENESS



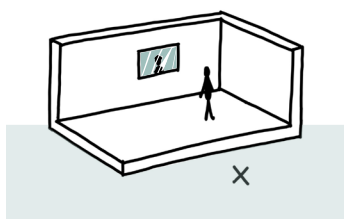
Whole dwelling accessible for wheelchairs and strollers. Clear layout, simple walking route without obstacles



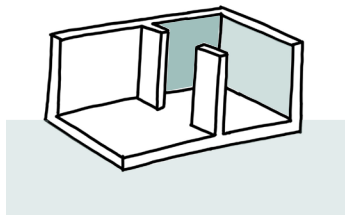
Use warm colors and colors with great intensity and saturation



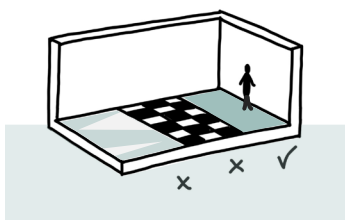
Rooms with same function the same colored door. Different function, different color



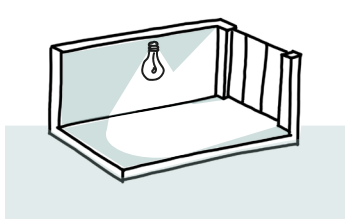
No mirroring surfaces



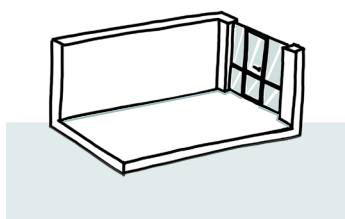
Visual link between rooms. Changing facade color for each section



No shining floors or patterns. No change of colors, just one color on the floor

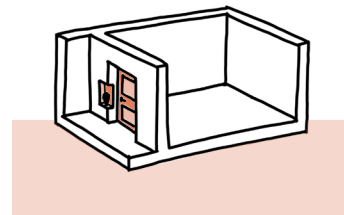


Good lighting and natural daylight

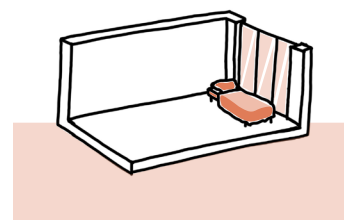


No full glass part, but a bar or separation. Use lineage to guide; to mark a border or show passage

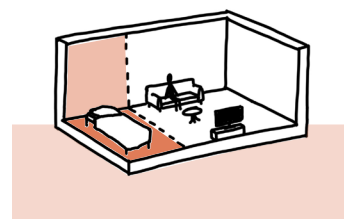
FAMILIARITY



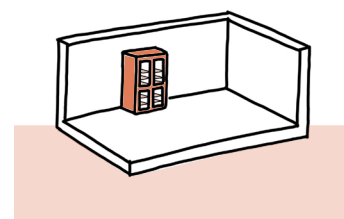
Own front door with a place to place a personal point of recognition and piece of identity



Option to place bed next to the window, an adaptable floorplan to personal preferences

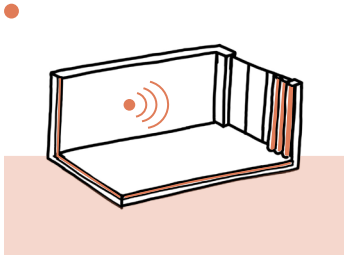


Option to separate bed from living room

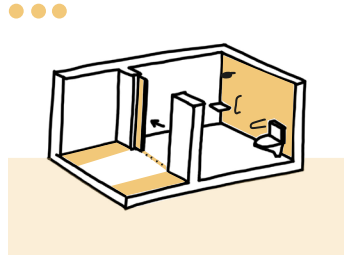


Space to store and show personal belongings and memories, made of transparent material

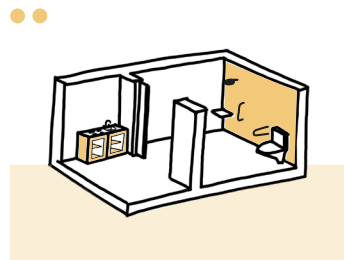
INDEPENDENCE



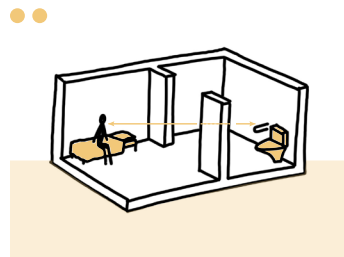
Good sound insulation; walls, floors, curtains



Accessible bathroom; sliding doors, handles next to toilet and shower, lighted path at night to toilet

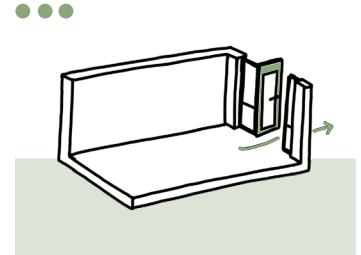


Option to shower and cook themselves

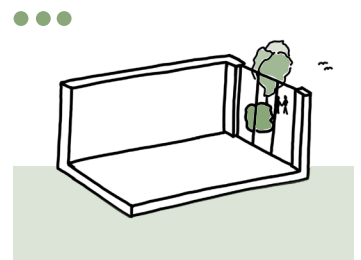


Visual link between bed and toilet

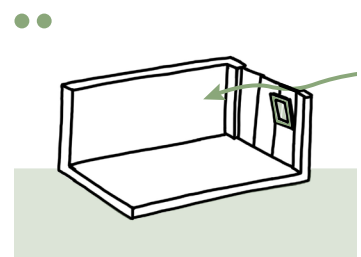
BIOPHILIC



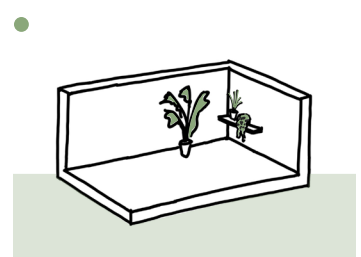
Accessible outdoor space



View on (changing) nature outside, activity and people



Operable windows to allow fresh air to come in



Plants inside

CHAPTER 3 : BUILDING

What architectural features in the building can contribute to the quality of life for people with dementia?

Van den Buuse et al.(2021) state that a new type of building is needed for people with dementia. The typology, design and type of inhabitants should be reconsidered. The current living arrangements are not suitable for the needs of people with dementia. There is need for an in between option between their own home and a nursing home. A place where there are enough activities, but also privacy and autonomy, and where they can get care if they need it. It should be possible to live here even without a care indication. Sometimes partners of the person with dementia like to move with them, but this is often not possible (Van den Buuse & de Boer, 2021). The concept of aging in place should be woven into this new type of building. It is important that the building does not get the stigma of dementia. A combination with somatic patients for example can be good. In this case they don't have to move far or at all if they get a psychogeriatric condition, which is a situation that often occurs(Nillesen, Opitz & Plaats, 2013). The building at fieldwork had 24-hour care patients separated from the other inhabitants. But it was noticed that especially early stage dementia patients can be helped by other inhabitants, and stay much more independent and free. People prefer to move just once. Therefore the building should provide to option to scale up to 24-hour care and thus facilitate people with all stages of dementia, different type of care or no care at all.



Figure 13: Sketch of the hallway and signs in the building at the fieldwork location(own image).

3.1 | DISTINCTIVENESS

A person with dementia needs a legible and clear layout to be able to orient and find the way in a building. Their impaired learning and reasoning makes this difficult for them in normal situations(Halsall & Macdonald, 2015). Well-designed hallways are the main desing tool

to support them. Hallways are the connection between the different living areas in the building. The shape, length and width have influence on the use of the hallways and the wellbeing of the inhabitants(Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). To help with orientation hallways should not be too long and the amount of doors connected to the hallway should be limited (Nillesen, Opitz & Plaats, 2013). To limit the amount of doors for people with dementia, it should be considered to make the doors that they cannot use invisible, and they doors they need to use visible (Nillesen, Opitz & Plaats, 2013). This can be done by painting the door the same way, or the opposite way as the color of the wall.



Figure 14: Sketch of the hallway and signs in the building at the fieldwork location(own image).

Clear movement patterns make it easier to find the way in a building. This can be achieved by making destinations and entrances visible and in obvious positions. Landmarks and recognizable

art can enable intuitive movement to guide someone through the building. The building should have clear signage which is easy to read and on eye level. The example from the fieldwork in figure 13 shows that the font was really small and hard to read. The signage was put high up on the wall, not on eye-level. The symbols for toilets were easier to distinguish, they were facing the walking direction and the image was relatively large (figure 14). Signage should be consistent, clear, simple in text and format, with picture graphics to help those who cannot read. Inhabitants at fieldwork mentioned that the names should be simple. Just 'kitchen' instead of a difficult themed name.

Besides signs and landmarks, colors also can be used to give clues for navigation (Halsall & Macdonald, 2015). By creating different zones, or character areas, one can have a sense of space and help them knowing where they are in the building. The fieldwork building had a lot of long hallways, which were similar in all directions and on both levels (figure 15).



Figure 15: Sketch of the hallway of the fieldwork building (own image).

There used to be different colored floors on different wings, which really helped with orientation. Another aspect they mentioned during the fieldwork is that hallways should not have an ending, but be continuous. Hallways that

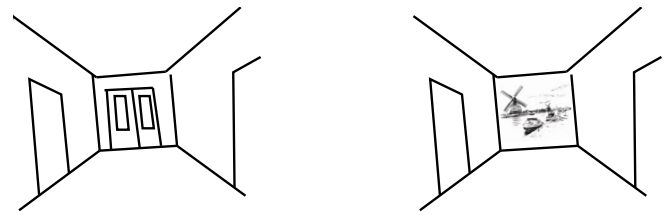


Figure 16: Sketch of the dead end of the hallway in the closed facility of the fieldwork building, the previous situation (left), and the new situation with a solution for the locked up feeling (right) (own image).

had an ending caused for a lot of disturbance in the closed facility of the fieldwork building. They hid the ending by placing an image on the door (figure 16). In this way it does not seem like an ending and it does not feel as if the inhabitants are locked up, but it is better if the hallways go round. Nillesen et al. (2013) confirm this by stating that people with dementia should be able to walk around and be stimulated to move. By creating experiences along the hallway, people can be guided through the space.

Verbraeck & Van Der Plaats (2016) identify three types of people with dementia. The zen-type, the wanderers and the balance seekers. Especially the wanderers make use of the hallways. A lack of stimuli makes the wanderers uneasy and they go on their way to find them. Hallways can provide in this spots where they are stimulated or guided towards. There should be attractive walking circuits with enough light, movement and sound.

People have two basic needs in the environment: to understand and to explore (Browning et al. 2014). Curving edges and inviting spaces can create the aspect of mystery, that invites to explore the space and trigger the mind. This can be done indoor and outdoor. There have to be places to rest as well. The fieldwork hallways did not invite for anyone to walk through. It was only apartment doors and the hallways had a dead ending.

A clear border or guidance between private and public is also necessary. In dementia care there are a lot of shared places, causing different degrees of private and public. Where the private part of the building starts depends on the concept. The entrance is here of importance; this defines the accessibility of the building. This is where you come home or where you visit. One option can be to make the whole building one

home with an entrance for the inhabitants. Inside are several bedrooms and a kitchen. In this case the border is on the outline of the building. The building from the fieldwork had a different concept where the building is public, the hallways are the streets, and the actual private home is the apartment. This concept had some disadvantages. The inhabitants felt unsafe, and younger people used it as a place to hang out and destroyed property. The inhabitants would much more like to have their own people in their own home. The distinguishment between public and private should be respected and clear. The sequences of spaces should provide this, by for example not passing the bedrooms to get to the living room(Nillesen, Opitz & Plaats, 2013).

With further stages of dementia control over the front door becomes difficult, but the concept is still important. The idea of coming home, to your own spot and being able to find it should stay. Visibility of the entrance and connection to routes in the public space are important for this accessibility.

3.2 | FAMILIARITY

Not just the dwelling but also the building for

people with dementia should have a domestic feeling rather than an institutional one. To provide this, spaces should be domestically scaled. Communal areas should be broken down into smaller living room sized spaces rather than larger communal rooms (Halsall & Macdonald, 2015). Therefore these spaces should look like a living room, kitchen, not like a restaurant or dining room. Scale is of importance here (Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). The living room and the kitchen are the heart of the building for people with dementia. This is where most people stay the whole day eating, watching tv, talking (Nillesen, Opitz & Plaats, 2013). The communal space for the somatic patients and the people with early stage dementia at the fieldwork building had this undomestic scale. It was too large for the group, and described as cold and hollow. They came together in a smaller spot in the building to have coffee every day. This was too crowded often but had the atmosphere of a living room(figure 17). There was old furniture and two different groups. One table with chairs, and a couch and some comfortable chairs. This space was used for the daily coffee moment and games. There was natural daylight and a view outside.

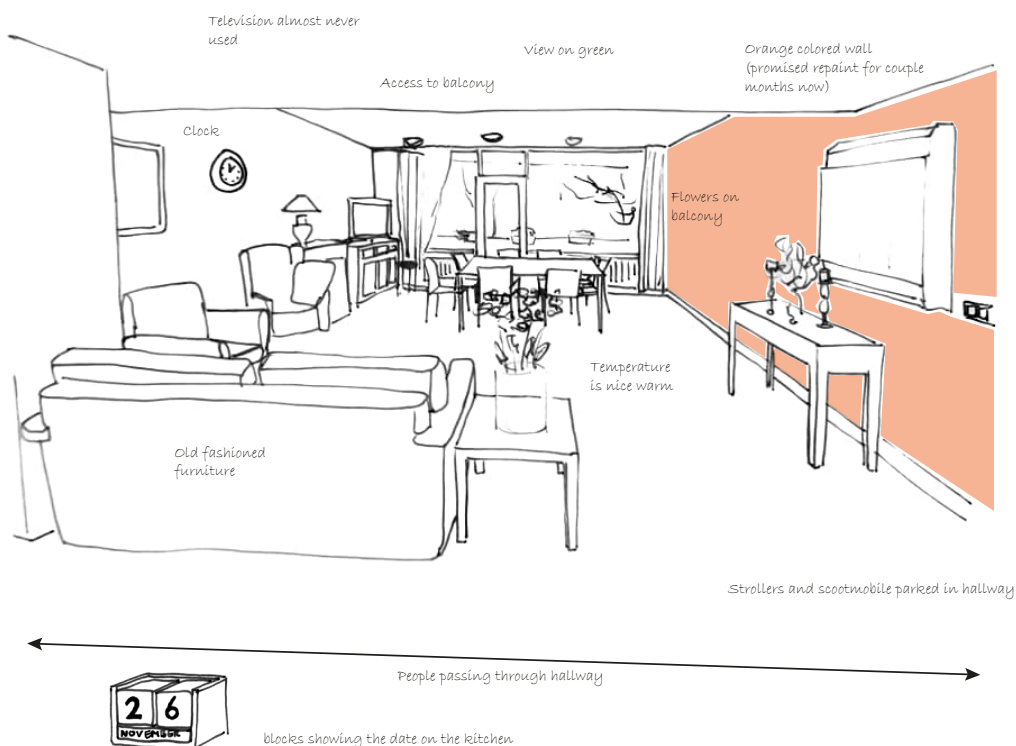


Figure 17: Sketch and observations of the living room in the hallway of the fieldwork building(own image).

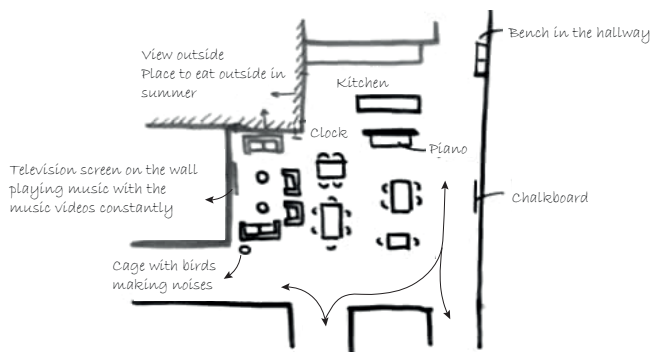


Figure 18: Sketch and observations of the living room with a lot of stimuli in the closed facility of the fieldwork building(own image).

The communal room in the closed facility at the fieldwork location, had this division into two smaller domestic scaled spaces. They let people choose where they wanted to sit, or used their experience to decide where they would like it best. One was more calm and quite. The other living room had a lot of stimuli and had a central spot in the building as can be seen on the floorplan in figure 18. There were birds the television was playing music and showing the videos all day. People were also bringing their animals which gave a positive response from the inhabitants. Animals give good stimuli, and they help to lower the stress (Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). But still many inhabitants were sleeping in their chair. One of the former caregivers suggested that it would be nice if everyone sat together in a larger space. So they would have enough to see and listen to.

The living room was in direct contact with the hallway. Circulation spaces that are in direct contact with the living room can cause for distress(Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). This made it feel like a workspace instead of a home. There was a lot of disturbance behind the people from the staff and movement.

3.3 | INDEPENDENCE

In order to be more independent the building should invite to participate in activities. Visual links between spaces helps promote independence and reduce anxiety (Halsall & Macdonald, 2015).

Musculo-skeletal problems come with ageing and dementia(Halsall & Macdonald, 2015).

To be more independent and reach activities, people are sometimes forced to use mobility scooters and strollers to get from one place to the other. Storage of these tools and charging facilities are an important consideration in the design of current dwellings and care homes. The fieldwork building had not considered this usage in the design. In some apartments the material chosen for the floor was not strong enough, and was damaged by the use of mobility scooters. The doors were also too small to drive them inside. This caused for them to be placed in the hallways which was not approved by fire regulations(image x). The hallways should be wide enough for wheelchairs, mobility scooters and pedestrians to pass each other with ease and safety.

It would be best if people could still walk by themselves and did not need to bring or use these tools. A railing along the hallways can help with this. The inhabitants from the fieldwork mentioned that they used to have a railing along the wall in the hallway, which they could hold on to and lean to take a break when going from one place to another. Now that the railing is removed, some people were forced to use a stroller for this activity.

3.4 | BIOPHILIC

Dementia causes for a disturbed circadian rhythm(Halsall & Macdonald, 2015). This is a natural pattern that is important for people with dementia. Research has found that built environments where people are chronically unsynchronized with the body's natural circadian predilections can negatively impact sleep cycles, appetite, body temperature cycles, cardiovascular functions, mood and emotions, levels of activity and cognitive functioning (Royer et al., 2012). Connected to this is the importance of seasonal awareness(Browning et al., 2014). Using natural daylight is a tool to make these rhythms visible. Daylight also helps to provide positive calm stimuli. Which people with dementia are always looking for. Daylight is healthy but also helps with the visibility of the space(Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018).

Another simple but effective tool is a clock showing the date and time of the day(morning, afternoon, evening). It is best to provide easy

access to the outdoor space, they contribute to the awareness of this natural rhythm (Halsall & Macdonald, 2015). These spaces can reduce stress, improve an overall sense of wellbeing and can provide relief from pain. Its positive benefits are proven for people with dementia, their visitors and members of staff (Halsall & Macdonald, 2015).

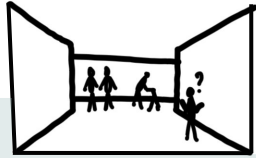
The importance of sequence and hierarchy of spaces, like between private and public, is also a natural pattern that can improve the wellbeing of a person with dementia. There is need for interesting, identifiable spaces which are sequenced and connected. One can navigate through following a path like in the forest (Peters & Verderber, 2021).

For facilitating group activities and shared spaces it is important to integrate the natural pattern of prospect-refuge. A space that provides the characteristics of prospect feels open and freeing, but also gives a sense of safety and control. The pattern of prospect is to provide a condition where one can inspect the surroundings for opportunity and also hazard. Especially when a person is alone or in a new environment, this pattern is appreciated. (Browning et al., 2014)

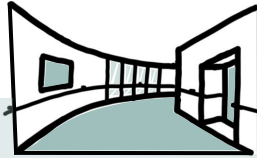
The characteristics of a space that provides refuge is that it is a place for protection, from being seen, from being heard, but also from weather conditions. There is some relation still with the surroundings, visual or audial, to provide surveillance. This will provide the option to not to have a view on what is happening without necessarily having to engage with it directly (Peters & Verderber, 2021). At the living room from image x some people just came to sit on the couch and knit or do something for themselves instead of joining the activity. But they came everytime just to listen and have people around them. In this way the design can respond to the different needs; people can join, watch, or choose to withdraw from what is happening.

3.5 | DESIGN GUIDELINES

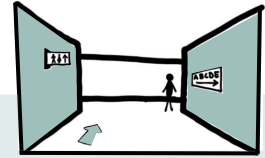
DISTINCTIVENESS



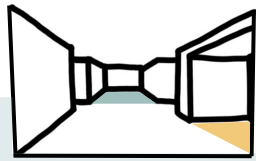
Combine different types of elderly, healthy, partners, somatic patients and people with all stages of dementia



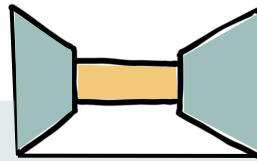
Continuous hallways without dead ends. Attractive walking circuits with experiences. Curving edges and a railing



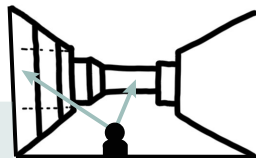
Clear signage on eye-level, use symbols where possible, easy names for rooms, large and clear font



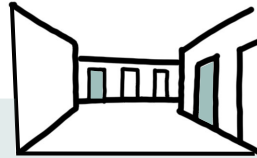
Living rooms with different atmospheres. Limit the visibility of work and cleaning services from living room



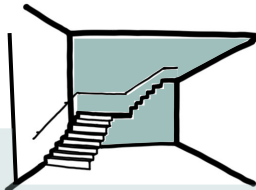
Divide the building in different zones using color or material differences, make the hallways different from each other



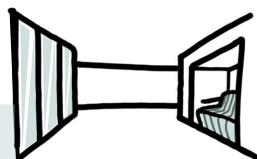
Make short hallways and provide visual links between different spaces and functions



Limited amount of doors, doors that are not supposed to be used invisible. Doors with same function same color

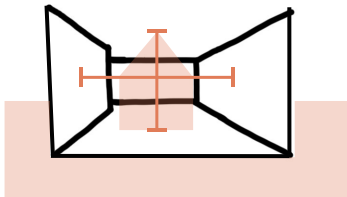


Steps not too high, railing, platform to rest, accentuated color to promote use, color of step and rise different



Places to rest along hallway with view outside, enough daylight in the hallway

FAMILIARITY



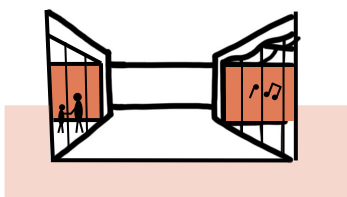
The spaces should be domestically scaled, avoid a clinical look, make it more home like in color and lighting



Create spaces with a lot of stimuli, using music, sounds, animals, view outside, screenplay and color

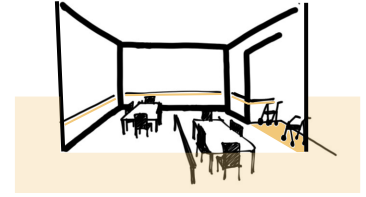


Use acoustic materials in spaces where multiple conversations are held at the same time

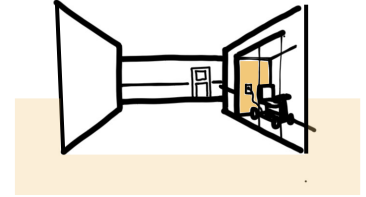


Provide a space for the inhabitants to meet with family, provide a room for music and church services

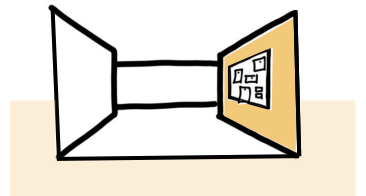
INDEPENDENCE



Enough space in shared functions to store strollers and scootmobiles. Walking support tools to get to seating spot

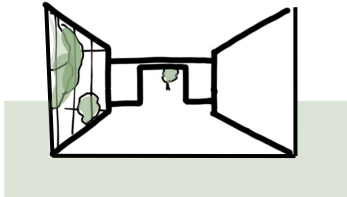


Provide spaces where the scootmobiles can be charged, also make the floors strong enough for these machines

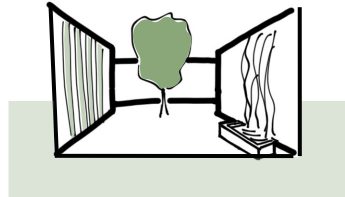


Place bulletboards on different visible spots in the building

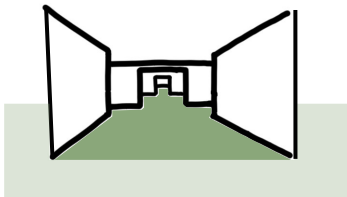
BIOPHILIC



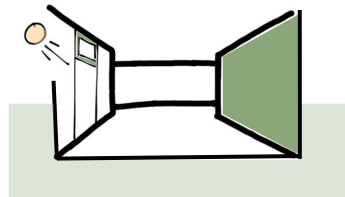
Create a visual and physical connection with nature



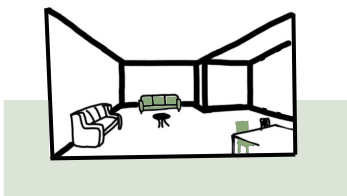
Integrate nature in the design



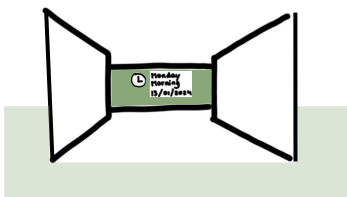
Create sequenced and connected spaces



Spaces should not heat up too much from the sun. Stabilized temperature in the building, fresh air, good ventilation



Provide different options in activity rooms, to participate or retreat or observe



Place clocks on different spots in the building, which also show the date and part of the day

CHAPTER 4 : NEAR SURROUNDINGS

What architectural features in the near surroundings can contribute to the quality of life for people with dementia?

4.1 DISTINCTIVENESS

By surroundings we mean, first of all, the personal outdoor space. This can be a balcony, terrace or garden. It is an outdoor extension of the dwelling. It should invite to make use of it, active or passive, where one can feel, smell, hear nature and enjoy plants and animals. (Halsall & Macdonald, 2015). A well maintained, clear garden, with birds and animals creates a feeling of safety and conviviality. (Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). The surroundings of the fieldwork were appreciated by the inhabitants. There were many large trees and they mentioned the sound of the bees in summer. The greenery attracted many birds. Some were really happy with the balcony, and others did not use it at all. The people in the closed facility at fieldwork were not allowed to go outside by themselves. They had a small private outdoor space outside where they could sit with family, but this was rarely used (figure 19). The coordinator of well-being said: 'Even prisoners come outside more often than the people in the closed facility.'

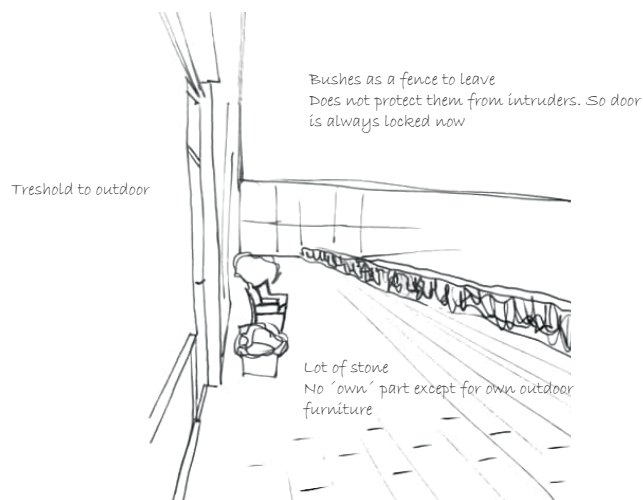


Figure 19: Sketch and observations of the personal outdoor space on the groundfloor of the fieldwork building (own image).

The private outdoor space extends to the further surroundings, the shared outdoor space and the public space. Simple, clear movement patterns in the outdoor space, make it easy to find your way around. The near surroundings should provide enjoyable, legible green spaces and gardens should be planted to attract life (Halsall & Macdonald, 2015). The outdoor space can also be a meeting place with the neighborhood. Than it is accessible for people from the neighborhood as well. It should be well considered if this does

not cause to much disturbance (will be elaborated further under Independence) (Nillesen, Opitz & Plaats, 2013). This connection with the neighbourhood was considered necessary by the volunteers during the fieldwork. They mentioned that loneliness among elderly for example is not just in the building, but also in the area. Therefore it should be accessible to others as well. A public function will lower the threshold to information and help, but also connection with others for people from the neighbourhood.

A well-thought design of the surroundings can make it easier for people with dementia to make use of it. Halsall & Macdonald (2015) did a research with people with dementia, their caregivers and other elderly. Cue cards were used to distract information by collecting responses on different design elements in the neighbourhood. This gives the perspective of elderly and elderly with dementia on the built environment.



Figure 20. Photo cue card image of a street with houses. Taken from DESIGN for DEMENTIA Volume 2 - Research Projects (p. 12) by B. Halsall and R. MacDonald, 2015, Liverpool: The Halsall Lloyd Partnership. Copyright 2015, Halsall Lloyd LLP.

When figure 20 was shown the comments were mostly about the building. They mentioned the risk that highrise can lead to isolation. But also that even though the lines are clear, they would find it difficult to find their own door, because they all look the same. It was also noticed that the steps in front of doors are not safe and there is no wheelchair access. The boundaries were considered vague and the cars on the pavement as a blockade (Halsall & Macdonald, 2015).



Figure 21. Photo cue card image of a street and sidewalk. Taken from DESIGN for DEMENTIA Volume 2 - Research Projects (p. 14) by B. Halsall and R. MacDonald, 2015, Liverpool: The Halsall Lloyd Partnership. Copyright 2015, Halsall Lloyd LLP.

With figure 21 it was often mentioned that the pavement was unsafe. The change in color is often misinterpreted as different heights. The cobbled stones bring the risk of tripping, and overall is the pavement uneven in the image. The boundaries are unclear and it is hard to see where you can walk, and what is destined for cars. It is also not wheelchair and stroller friendly. A flat walkway in a visible colour, cutting through cobbles would help people with dementia as well as wheelchair users (Halsall & Macdonald, 2015).



Figure 22. Photo cue card image of a public square. Taken from DESIGN for DEMENTIA Volume 2 - Research Projects (p. 16) by B. Halsall and R. MacDonald, 2015, Liverpool: The Halsall Lloyd Partnership. Copyright 2015, Halsall Lloyd LLP.

Figure 22 was overall experienced as confusing and unclear. People liked the open space but did not like the elements on it. The tree base was considered as poorly designed. There is too much street furniture and the bikes and flagpoles are on a unlogical place. The transition in the flooring color is confusing, and this type of pavement gets slippery when it rains. Furthermore is it

unclear what the recommended footpath is. The signs on the street are considered confusing and unclear (Halsall & Macdonald, 2015).



Figure 23. Photo cue card image of a sidewalk and shop entrance. Taken from DESIGN for DEMENTIA Volume 2 - Research Projects (p. 16) by B. Halsall and R. MacDonald, 2015, Liverpool: The Halsall Lloyd Partnership. Copyright 2015, Halsall Lloyd LLP.

The comments on figure 23 are mostly about the step in front of the stop. For the respondents it was unclear if it is a step, which made it a trip hazard. The color of the pavement and the color of the actual rise should be more contrasting. The floor in the shop was interpreted as uneven. The sign in front of the shop is confusing because it is not straight, and unclear because it is too small. And it was mentioned that it is better if signs are not just viewable from the front (Halsall & Macdonald, 2015).

4.2 FAMILIARITY

The fact that people with dementia easily get lost, is one of the main reasons to keep people with dementia inside. In early stage dementia, this is something that the person with dementia is aware of themselves as well. At fieldwork there was a woman who knew her mind was getting worse, and she took the same route everyday. She followed a roundgoing path that leads back to the starting point, so she would not get lost. Providing landmarks and recognizable pathways that they remember can help people with dementia to go outside and have a sense of familiarity. People at fieldwork also mentioned that a lot of activities were too far away. They were able to walk to the end of the street, had to rest there, and return already. Therefore facilities should be at walking distance, and places to rest should be along the way there.

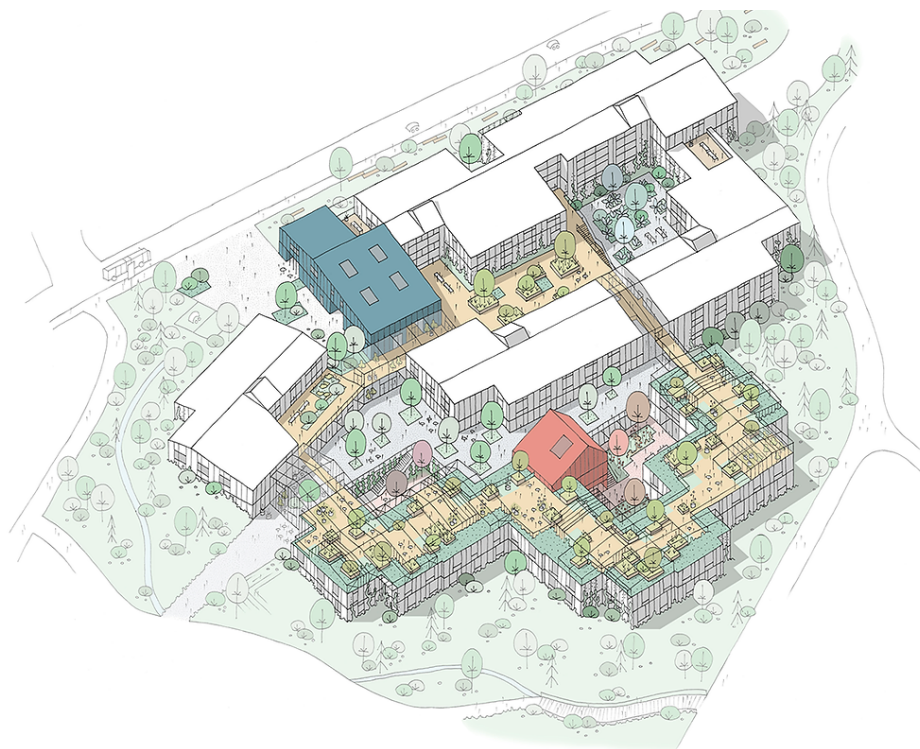


Figure 24. Design of an Alzheimer village with clear routing with activities and marked buildings. Derived from Furuset Hageby Alzheimers Village from NORD Architects, 2023(<https://www.nordarchitects.dk/projects/furuset-hageby/>).

Figure 24 shows a design by Nord architects. This is a dementia village in Norway. In this project the intention is to let people carry on with their usual and daily activities to create a continuity in life and avoid the experience of being in an institution. The village should act like a safe and caring community where the people with dementia feel at home and safe in recognizable environment that are healthy, natural and local

(Furuset Hageby - NORD Architects, 2023). This case study shows how a colored pathway can create a clear routing. The village street continues (grey). The yellow route is lifted from street level. These two levels, create an active plinth on different levels. Along the route are many different activities. The public houses are colored to make them recognizable. Because of the scale, the fact that it is enclosed is not experienced. All functions that are needed for daily life are provided within this safe circle. This separates the inhabitants completely from the rest of society. The possibilities for real integration in the neighborhood is limited. But the feeling of being part of it is important (Halsall & Macdonald, 2015).

4.3 INDEPENDENCE

One of the main topics in dementia design is

whether a person should be kept inside or is free to go where he or she wants. It is the discussion of risks versus freedom.

To protect residents with dementia from harm, nursing homes often have closed-door policies. However, research suggests a positive influence when people with dementia are free to independently move to another place. Compared to close facilities, freedom of movement can have a positive impact on bodily functions, mental functions and perception, quality of life and social participation. This causes for a relation between freedom of movement and the use of psychotropic medication. But also number of severe falls had decreased. To realize this a designer can opt for an enclosed garden within a closed setting. This is proven to improve long-term memory, mood and spatial abilities. When the garden was not accessible, agitation levels increased (Ford Murphy et al., 2010).

Figure 25 shows an overview of findings per level of freedom of movement (open, semiopen, and closed settings), categorized by the six dimensions of Positive Health. This shows disadvantages and advantages on the different concepts (Van Liempd et al., 2022).

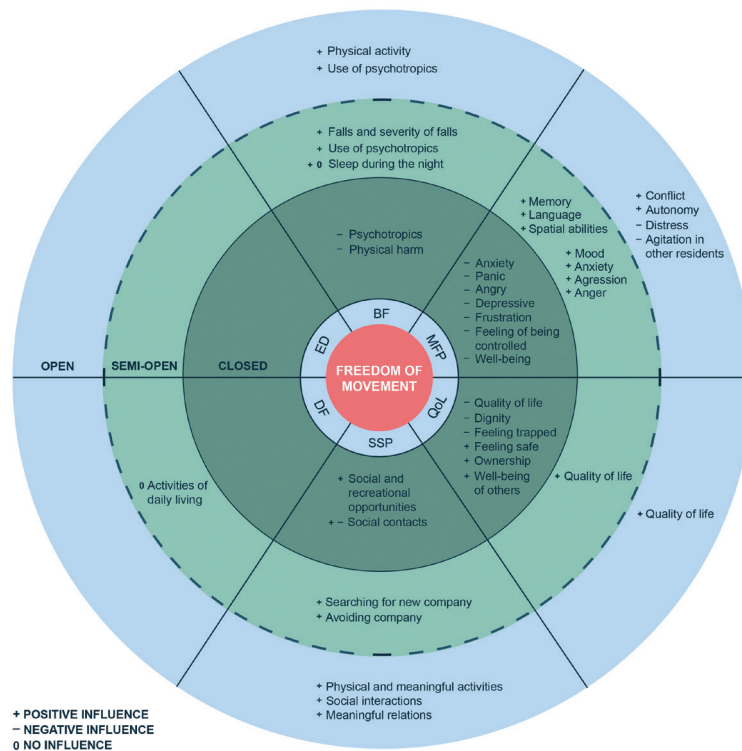


Figure 25. Overview of findings per level of freedom of movement categorized by six dimensions of Positive Health. (Note: BF = bodily function; MFP = mental functions and perception; ED = existential dimension; QoL = quality of life; SSP = social and societal participation; DF = daily functioning). Taken from Influence of Freedom of Movement on the Health of People With Dementia: A Systematic Review (p. 1360) by S. Van Liempd et al., 2022, Tilburg: The Gerontologist.

Another option is an open setting, where people with dementia can go outside independently. These settings have shown that it avoids moments of conflict and anxiety, that can be caused by trying to open a locked door. This can make inhabitants frustrated, angry and panicking (Wigg, 2010). Similarly, windows to outside spaces caused frustration in some residents living in a closed setting because everything happening behind these windows is visible, yet unreachable for them (Van Hecke et al., 2018). In a closed facility residents expressed feelings of being controlled and the need to ask permission to go outside (Fisher et al., 2018). They relate the feeling of being trapped to a loss of dignity. Residents want to get out, which makes their behavior worse because they feel trapped; "this entrapment causes frustration, frustration causes anxiety, and anxiety accelerates everything" (Dreyfus et al., 2018).

Evidence shows that there are things a person with dementia can do to keep their abilities for longer. One of these is taking part in physical,

mental and social activities (The progression, signs and stages of dementia, 2021). It should be made possible to garden, by making this nearby and partly rising the garden to make it accessible in physically bad conditions. A small tool as making this or for example a bench visible from inside, can promote and invite inhabitants to go outside.

On the other hand can fences have a positive impact as well. They can help anxious and confused people help to feel safe and secure. It can also provide a form of protection and ownership of the space (Van Liempd et al., 2022).

The case manager well-being at the fieldwork preferred freedom over safety. "there are too many rules now, if you want to avoid all the risks, there is no life left." Nillesen et al. (2013) stat that visual and audial contact should always be possible between inhabitants and staff, and therefore defines the seize of the garden. A closed garden or patio can enhance the safety and rest. If a border is created, people with dementia should have the sense to be free.

Therefore the border need to be subtle and made of natural elements. The safety should still be priority, but bushes or plants are a good alternative(Nillesen, Opitz & Plaats, 2013).

Defining the border is of importance in dementia design, because people tend to get lost. Or there is the idea that they would. The closed facility at the building of the fieldwork had no option to go outside, the border was the outline of the building. Other dementia care facilities have a border around the plot. Allowing people to go outside, but not leave the terrain. The design by Nord archtitects in France shows this principle(Figure 26). "The houses are spread out in the landscape, in which the residents can move independently, freely, and safely. Paths full of experiences and sensory inputs with different characteristics lie as loops in the landscape. They lead through nature and vegetation and provide several ways of staying in close contact with nature. The complex is grouped into four clusters, each housing around 30 residents who live in smaller 'families' with all the necessary facilities and outdoor spaces" (*Alzheimer's Village Dax - NORD Architects, 2023*).



Figure 26. Natural border around village. Derived from Alzheimer's Village Dax from NORD Architects, 2023(<https://www.nordarchitects.dk/projects/alzheimers-village-dax/>).

4.4 BIOPHILIC

The aspect of biophilic is woven in to the scale of the surroundings. The outdoor space provides direct contact with nature. Wind, smell, movement of plants, hearing and seeing birds,

and being able to walk slowly by themselves is important for people with dementia(Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018).

Results showed spending time in gardens to reduce agitation in care home residents with dementia(Peters & Verderber, 2021). Literature review reported garden settings in reduction of pain, improvement in attention, lessening of stress, modulation of agitation, causing the lowering of medications and reduction of falls. Research in a geriatric home showed benefits in heart rate, blood pressure and concentration after a rest in a garden.

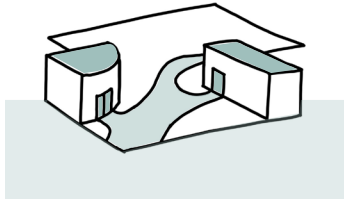
Sensory elements such as varied scents, colors, textures, and sounds helps fight against sensory deprivation among people with dementia(Peters & Verderber, 2021). "This non-rhythmic sensory stimuli differs from non-visual connection with nature in that it is inclusive of all sensory systems and is most commonly experienced at a subconscious level through momentary exposure that is not typically sought out or anticipated" (Peters & Verderber, 2021. p. 28). Examples of non-rhythmic sensory stimuli for people with dementia are experiencing the outdoors over time, and engaging with it through different activities. This can be gardening, meeting with others or watching birds(Peters & Verderber, 2021).

Water is the a really powerful biophilic design tool, because of its multisensory appeal. It provides sound, movement, reflection, and is everchanging. It is ideal to incorporate in the outdoor spaces, but also indoor water elements can be included(Kellert, 2018). Findings showed that studies that used real nature stimuli had positive effects on cerebral and autonomic nervous activities (Peters & Verderber, 2021).

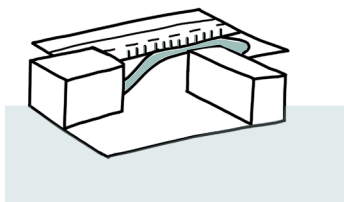
The natural idea of mystery is proven to have positive impact on mood and emotion(Browning et al., 2014). A choice between multiple routes promotes individualized wayfinding. Different zones with different lighting, activities and stimuli allow occupants to self-determine which path to take and how long to be there.

4.5 | DESIGN GUIDELINES

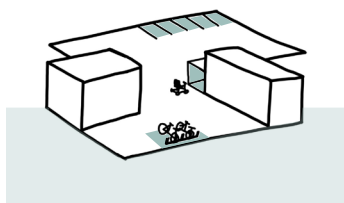
DISTINCTIVENESS



Distinguishable entrances and buildings. Entrances on viewlines and along pathways

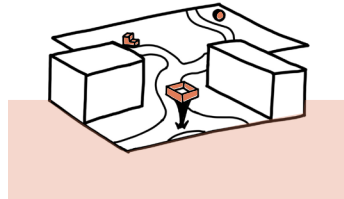


Clear boundary between what is accessible and not, clear flat recommended footpath, in visible single color

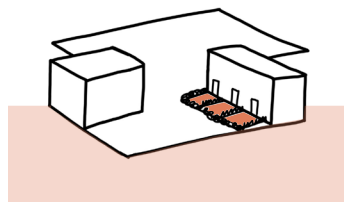


Bike, car and scootmobile parking spots for inhabitants, visitors and staff

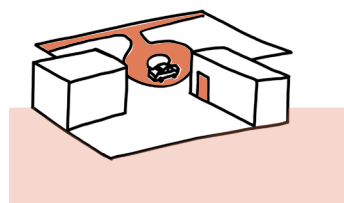
FAMILIARITY



Landmarks and points of recognition along the pathway

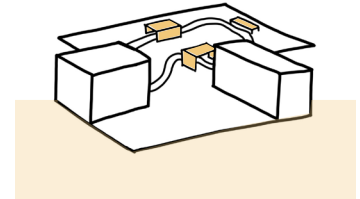


Own green outdoor space that is private and can be personalized. Should have a fence to protect for strangers to enter

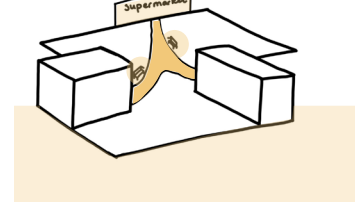


Place, near the entrance, to pick up someone or drop someone off

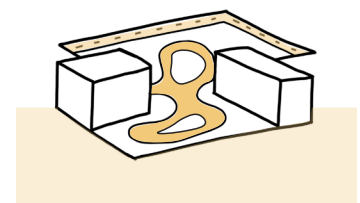
INDEPENDENCE



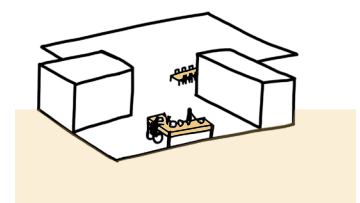
Clear wide paths as loops full experiences and activities.



Supermarket and other facilities on walking distance. Places to rest along the way with armrests.

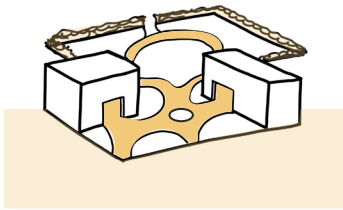


Safe walking route that does not cross car roads.

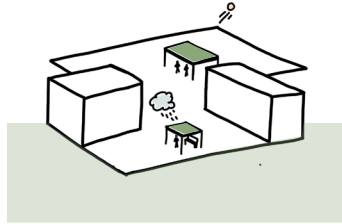


Accessible gardening and options to eat outside together

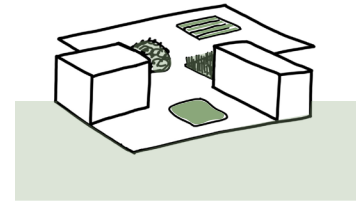
BIOPHILIC



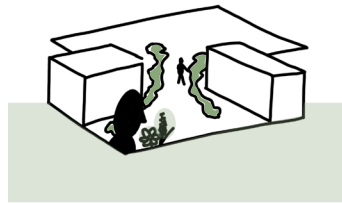
Freedom of movement for inhabitants. Subtle natural fence. Make the access points invisible, not along main path



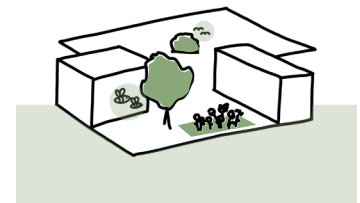
Gardens where time can be spent, also when it rains or sun is burning. Winter garden to enjoy nature all-year long



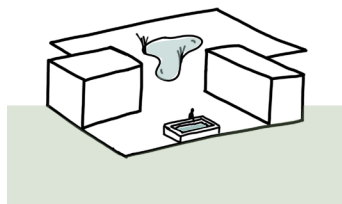
Provide varied sounds, textures, scent and colors



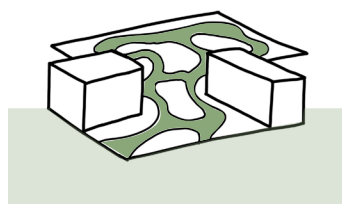
Make plants and flowers accessible for touch and smell



Use plants and flowers that attract wildlife. Place trees (shadow, birds, seasonal change)



Water elements outdoors (and indoors)



Provide multiple routes with different lengths

CHAPTER 5 : CARE PERSPECTIVE

What architectural features contribute to providing care for people with dementia?

5.1 THE BUILT ENVIRONMENT FROM A CARE PERSPECTIVE

There is a lot that can be done in designing for people with dementia to make the dwelling, building and surrounding more usable and comfortable and through this improve their quality of life. It is important to realize that: “you don’t stop living in a care home, you should start living in a better way than when you were on your own” (Lori Pinkerton-Rolet (Third-age design) A person with dementia moves because he or she needs more help and assistance in daily activities. Therefore it is important to also look from the perspective of the caregiver. They become a big part of the life of a person with dementia as the disease progresses. Since we have to deal with a staff shortage, which will only become worse in the upcoming years, efficiency in providing care is important. People with dementia are depending on their caregivers for daily life at a certain point, first in small aspects and later on 24 hours a day.

A favorable environment, suited to the needs of people with dementia, ensures fewer symptoms of illness. Symptoms of illness can be caused by stress, which is often related to the environment. When people with dementia are forced to move to a different facility, it can seem as if their condition is getting worse. At fieldwork one of the caregivers mentioned that a person who started to live there had many problems in the beginning. He would pee his pants and get angry. His family was shocked by this fast decrease. But it was only the surroundings that were not helping the person. This false indication often leads to a start with medical treatment, while the cause of the problem is the surroundings. Brain diseases cannot be cured medically, so the only option for relief is so-called environmental care (Verbraeck & Van Der Plaats, 2016). Providing a favorable environment reduces behavioral problems. This offers dementia sufferers a more pleasant life and relieves the burden on carers.

When people with dementia get too few or too many stimuli they might try to find a place that fits their mood and needs. This wandering can lead them to unsafe or unsupervised spaces. A former caregiver at the fieldwork building mentioned that from a care perspective a completely open facility is therefore also not

ideal. Domotica can help to increase safety easily. Cameras or tracking devices will give an overview of where the inhabitants are. It is also possible to design certain life circles, if a person leaves this circle the caregiver gets a sign (Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018). This will help the caregiver to still have an overview, since they have the responsibility for the inhabitants. Informal caregivers were positive about the autonomy of residents living in open settings (De Boer et al., 2019). Residents in a closed setting often panicked or became angry and verbally expressed their frustrations towards locked doors, showed depressive behaviors, or withdrew (Wigg, 2010).

Materialization can make the job of caring easier and more efficient. The flooring for example, a smooth floor makes it easy to move people around. It costs less energy to move a bed or wheelchair over a smooth floor than for example carpet. Also when accidents happen with spilling or incontinence, a smooth floor is easier to clean than carpet. But carpet does have a dampening effect when it comes to sound reflections. This makes it more pleasant and on the longer term this will reduce disturbances and wandering so the care demand also decreases (Aedes-Actiz Kenniscentrum wonen en zorg & KAW architecten, 2018).

A smooth floor will also help the elderly themselves when walking with a stroller. And, as was seen during the fieldwork, the inhabitants also help each other to get from one place to another. Since their powers are lessening, a smooth roll will help them in helping each other. This independence among inhabitants will take work from the caregivers. At the fieldwork building inhabitants took care of each other. They took each other to and from activities. They struggled with the thresholds. Also the caregivers mentioned that these should be removed. Focussing on this independence in design will lower the pressure on care. It should be possible to get somewhere themselves and easy to find their target.

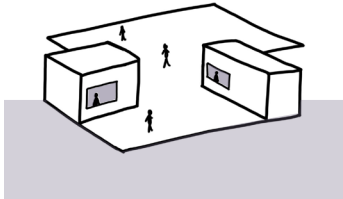
The measurements of the building should be fitting for providing care. The fieldwork building was a transformation project. This made the toilets and bathrooms not suitable for

wheelchair users. The staff also mentioned that if someone falls in the bathroom there is not enough space to help the person get up. Not just the measurements, but also the shape of the building can make care more efficient. A more efficient shape can decrease the walking distance between patients and activities. At fieldwork they said: "We had electric scooters for the nightshift because of the large distance between patients, but that did not work", "This job is topsport".

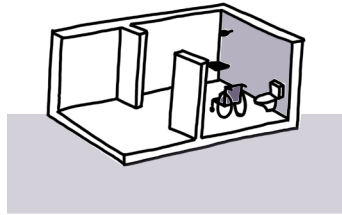
Finally should the building not just provide a qualitative living environment for the inhabitants, but also for the caregivers. Their office should be a good working space. The office at the fieldwork was the opposite; there was just a small strip of daylight height on the ceiling. There was no view to the outside. And the indoor qualities were really bad, there was mold in the office because of water damage. And the internet connection was bad. The office had a good central location on a crossing point of the hallways. In this way people could easily contact them. Next to the office there was a separate lunchroom just for staff. But most of the time, the caregivers ate with the inhabitants.

5.5 | DESIGN GUIDELINES

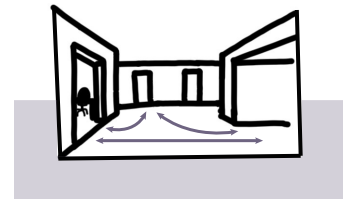
CARE



Visual connection between staff inside and inhabitants outside



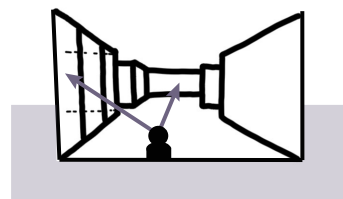
Dimensions suitable for people with wheelchair/stroller. Large enough spaces to provide help



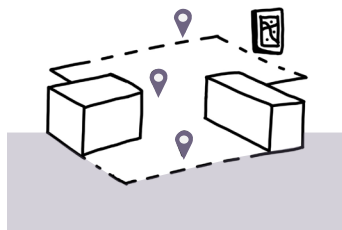
Short distances between apartments and activities. Practicle shape of building that limists walking distance



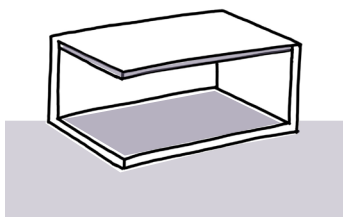
Nice workspace with view outside, good wifi-connection. Central in building, promote connection with inhabitants



Viewlines to other parts of the building



Smart systems integrated to track inhabitants(with permission)



Smooth floors and sound dampening materials. Use materials that are easy to clean

CHAPTER 6 : CONCLUSION

CONCLUSION

In this research report the following question has been researched:

Which living environment features provide people with dementia with quality of life and the care they need?

The goal of this research is to provide design guidelines in designing for people with dementia. It can be concluded from research that designs that have considered distinctiveness, familiarity, independence and biophilic provide people with dementia with quality of life.

The first subquestion researches what architectural features on the scale of the dwelling can contribute to the quality of life for people with dementia. Results show that distinctive elements can contribute to the quality of life by making a space understandable and readable for a person with dementia. It can be concluded that having a place of their own, feeling at home and keeping identity contribute to the quality of life of a person with dementia. It also adds to quality of life if the dwelling supports independence. In this way a person with dementia still is and feels useful. It gives them more control over what to do. This ultimately depends on the stage of dementia. Finally, the biophilic aspects of having connection with the outdoor space and a view on nature and activity also adds to the quality of life.

The second subquestion researches what architectural features on the scale of the building can contribute to the quality of life for people with dementia. Literature as well as fieldwork experience show that especially the design of the hallways can make a big difference in how distinguishable a building is. It can be concluded from literature as well as fieldwork that a domestically scaled building is experienced more positive. The building needs different spaces where a person with dementia can be among people. Results show that it adds to quality of life if there is visual and physical connection with nature. Integration of nature in the design of the building is improving the quality of life.

The third subquestion researches what

architectural features on the scale of the surroundings can contribute to the quality of life for people with dementia. From the results of this research can be concluded that freedom of movement contributes to the quality of life. Landmarks and distinguishable pathways and buildings are helping to make this possible for a person with dementia.

The fourth subquestion researches what architectural features contribute to providing care for people with dementia. Results show that caregivers are benefitted by control and an overview of the inhabitants within the building, but also outside. Their job is easier if the building provides enough space to help a person and wheelchair accessibility is taken into account. Finally, it can be concluded from fieldwork that a building that has shorter walking routes between inhabitants and between activities makes the job more efficient.

To sum up, it can be concluded that this research confirms the hypothesis. By bringing together the fields of dementia, dementia care and architecture, a qualitative living environment can be created for people with dementia with a high quality of life. A higher quality of life will contribute to the efficiency of care and a decrease in the demand for care. In this way, people with dementia can still get the care they need in a society where the imbalance, between those who need care and those who can provide care, is growing. The four topics that contribute to the quality of life of people with dementia can be implemented in the design on different scales of the living environment. Distinctiveness contributes to the decrease of accidents and confusion for the person with dementia. This, combined with the focus on independence, adds to the quality of life and decreases the demand for care. Familiarity and biophilic design add to the quality of life and the calmness and happiness of people with dementia. In this way the restlessness and disturbance caused by people with dementia decreases.

An overview of the living environment features that provide people with dementia with quality of life and the care they need, are visualized and valued in graphic design guidelines on page 47 and 48.

DISCUSSION

Quality of life is a subjective concept, and different for each individual. The topics that resulted from the research to provide quality of life are an overview of a lot of different elements that contribute to this. But it should be noted that not every single feature necessarily contributes to someones quality of life, since some are more relevant to an individual than others.

The topic of freedom of movement is open for discussion. The research provides clear evidence of the positive impact on someones well-being and quality of life when freedom is increased. But safety should always be considered too. Also viewing from a care perspective, a certain border or control makes it easier to provide care, since they have and feel a certain responsibility for the people with dementia.

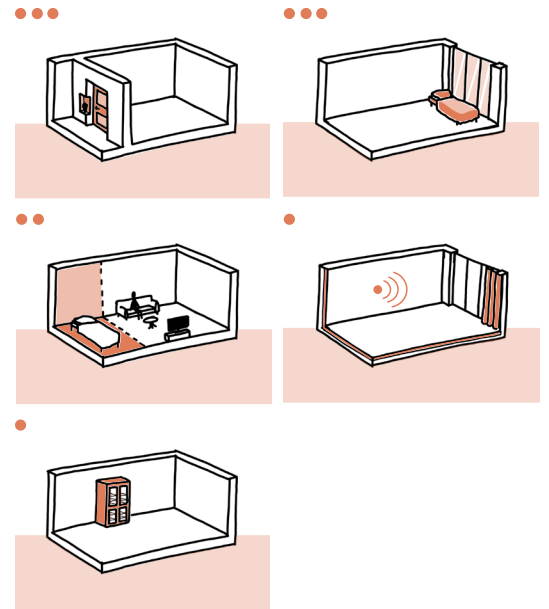
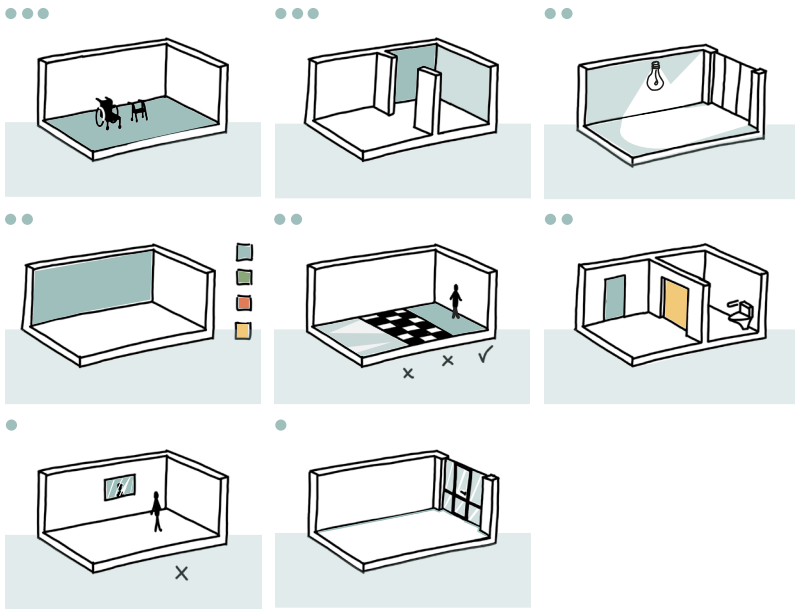
A limitation in this research is the fact that it retrieves a lot of information from the fieldwork, while this is only done on one location. For further research it would be good to visit different facilities, with different concepts and design principles.

Another one is that the case studies in this research could have been researched more in depth. Beside that do different case studies come from the same architecture firm. In further research can this be more diverse.

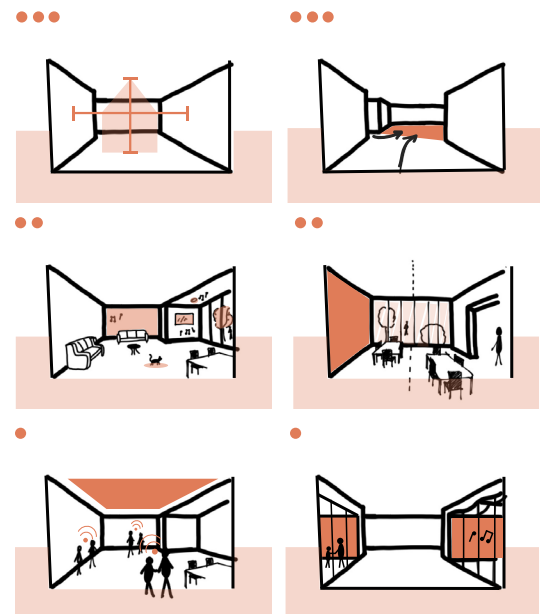
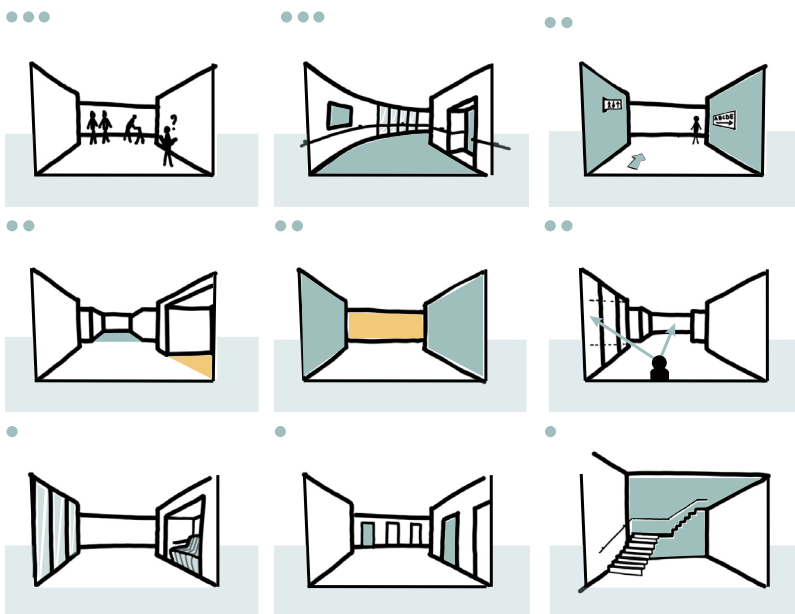
DISTINCTIVENESS

FAMILIARITY

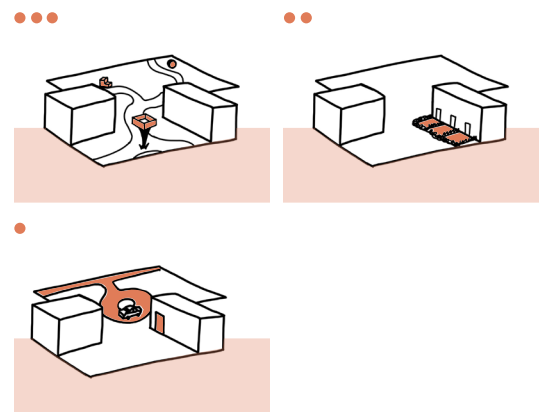
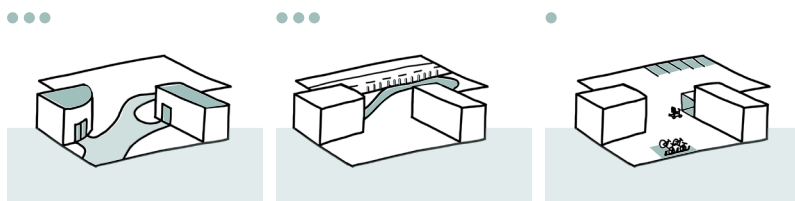
DWELLING



BUILDING



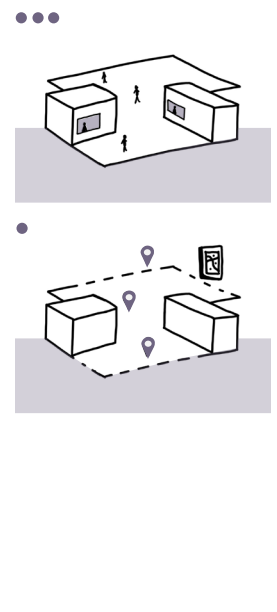
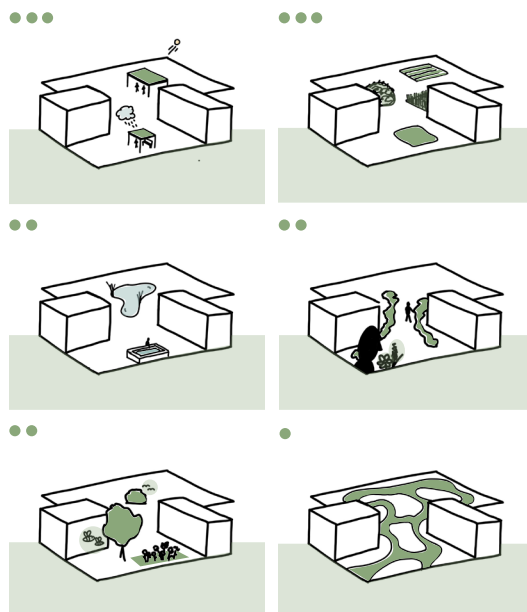
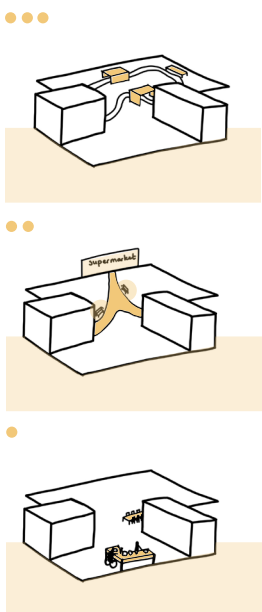
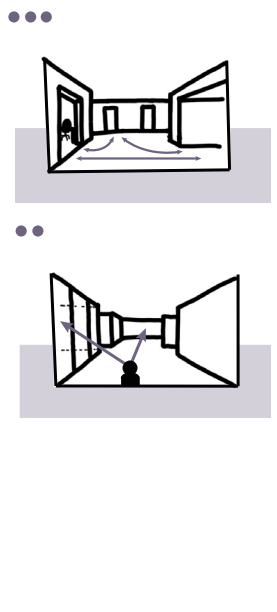
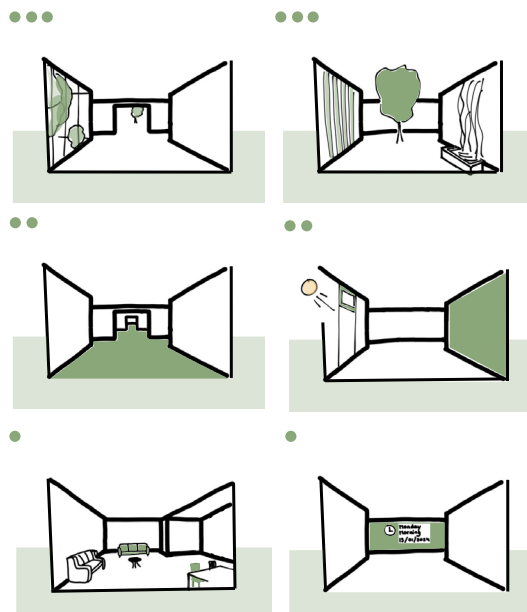
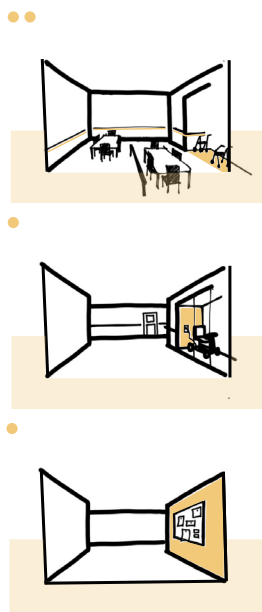
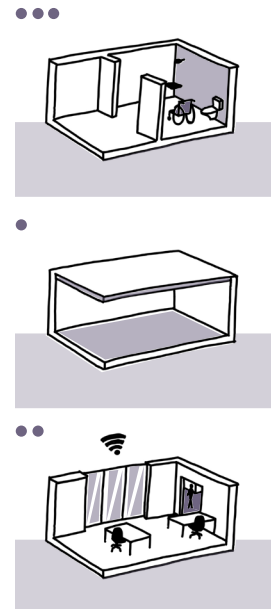
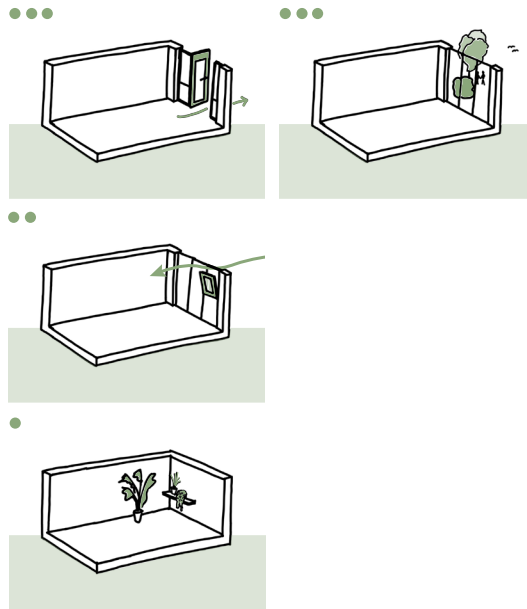
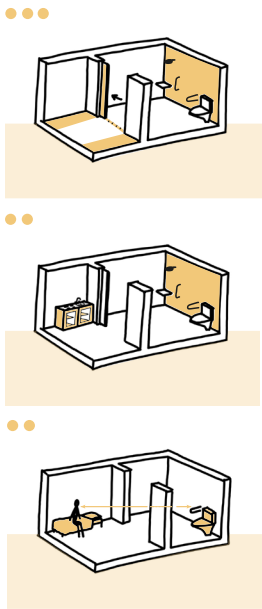
NEAR SURROUNDINGS



INDEPENDENCE

BIOPHILIC

CARE



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<https://doi.org/10.1093/geront/gnac114>

APPENDIX A

Questions inhabitants

- Do you feel at home, what elements in your apartment help with that?
- How long have you been living here, are you happy with this place and why?
- Why did you choose this facility/place over other places?
- What is your favorite place in your apartment?
- What do you like about the apartment?
- What do you miss in your apartment?
- What is your favourite place in the building?
- What do you like about the building?
- What do you miss in the building?
- Where do you like to go?
- What is your daily routine like?
- Is there something you would like to do, that is not possible now?
- Are there things you can no longer do?
- Is the building and apartment helping with your conditions?
- Do you get care or help with things?
- What do you still do on your own?
- What can you still do on your own but is not possible in this building?
- Is it easy to find your way around in the building?
- Did you move here by yourself or with others?
- Do you have people coming over often?
- What is your least favorite place in the building and why?
- What things are necessary for you to be happy in the building?
- Are there elements in the building that can be improved?
- What makes you happy?

Questions for caregivers

- What can you tell about the different stages of dementia?
- How independent are people with dementia?
- Is this mixed living helping with the efficiency in care?
- What elements in the apartment help you with your work?
- What elements in the building help you with your work?
- Can people go outside?
- Do they do that often?
- How far do people with dementia go?
- What do you think of a closed facility?

- What do you think will help to avoid accidents?
- What do you think would help against wandering or feeling lost?
- Are there sometimes accidents or is there confusion or fear or sadness among people with dementia?
- What makes them happy?
- Do they fill their own day or is there a schedule?
- What in the building will make your job easier?
- Are there elements in the building that can be improved?
- Can partners of the people also move with them?
- Are the apartments adjustable when the care demand changes?
- Do they wander a lot or get lost? What would help with this?

Questions for family and relatives

- Why did you choose this facility for your partner/parents/etc. Or did they choose it themselves?
- What stage of dementia is he/she in?
- Was moving here difficult? what made it easier, or would make it easier?
- Do they feel at home here?
- What do you think of this apartment, this facility?
- Is your family member happy here? What makes it so?
- What would you like them to do or have in the apartment or building?
- How would you like to get old?
- Are there elements in the building that can be improved?
- What makes them happy?
- What do you think about their freedom? Or do you want borders?
- What activities are important for them?

APPENDIX B

TABLE 1. BIOPHILIC DESIGN PATTERNS & BIOLOGICAL RESPONSES

Table 1 illustrates the functions of each of the 14 Patterns in supporting stress reduction, cognitive performance, emotion and mood enhancement and the human body. Patterns that are supported by more rigorous empirical data are marked with up to three asterisks (***), indicating that the quantity and quality of available peer-reviewed evidence is robust and the potential for impact is great, and no asterisk indicates that there is minimal research to support the biological relationship between health and design, but the anecdotal information is compelling and adequate for hypothesizing its potential impact and importance as a unique pattern.

14 PATTERNS	*	STRESS REDUCTION	COGNITIVE PERFORMANCE	EMOTION, MOOD & PREFERENCE
NATURE IN THE SPACE	***	Lowered blood pressure and heart rate (Brown, Barton & Gladwell, 2013; van den Berg, Hartig, & Staats, 2007; Tsunetsugu & Miyazaki, 2005)	Improved mental engagement/ attentiveness (Biederman & Vessel, 2006)	Positively impacted attitude and overall happiness (Barton & Pretty, 2010)
	***	Reduced systolic blood pressure and stress hormones (Park, Tsunetsugu, Kasetani et al., 2009; Hartig, Evans, Jamner et al., 2003; Orsega-Smith, Mowen, Payne et al., 2004; Ulrich, Simons, Losito et al., 1991)	Positively impacted on cognitive performance (Mehta, Zhu & Cheema, 2012; Ljungberg, Neely, & Lundström, 2004)	Perceived improvements in mental health and tranquility (Li, Kobayashi, Inagaki et al., 2012; Jahncke, et al., 2011; Tsunetsugu, Park, & Miyazaki, 2010; Kim, Ren, & Fielding, 2007; Stigsdotter & Grahn, 2003)
	***	Positively impacted on heart rate, systolic blood pressure and sympathetic nervous system activity (Li, 2009; Park et al., 2008; Kahn et al., 2008; Beauchamp, et al., 2003; Ulrich et al., 1991)	Observed and quantified behavioral measures of attention and exploration (Windhager et al., 2011)	
	**	Positively impacted comfort, well-being and productivity (Heerwagen, 2006; Tham & Willem, 2005; Wigó, 2005)	Positively impacted concentration (Hartig et al., 2003; Hartig et al., 1991; R. Kaplan & Kaplan, 1989)	Improved perception of temporal and spatial pleasure (alliesthesia) (Parkinson, de Dear & Candido, 2012; Zhang, Arens, HuiZenga & Han, 2010; Arens, Zhang & HuiZenga, 2006; Zhang, 2003; de Dear & Brager, 2002; Heschong, 1979)
	**	Reduced stress, increased feelings of tranquility, lower heart rate and blood pressure (Alvarsson, Wiens, & Nilsson, 2010; Pheasant, Fisher, Watts et al., 2010; Biederman & Vessel, 2006)	Improved concentration and memory restoration (Alvarsson et al., 2010; Biederman & Vessel, 2006) Enhanced perception and psychological responsiveness (Alvarsson et al., 2010; Hunter et al., 2010)	Observed preferences and positive emotional responses (Windhager, 2011; Barton & Pretty, 2010; White, Smith, Humphries et al., 2010; Karmanov & Hamel, 2008; Biederman & Vessel, 2006; Heerwagen & Orians, 1993; Ruso & Atzwanger, 2003; Ulrich, 1983)
	**	Positively impacted circadian system functioning (Figueiro, Brons, Plitnick et al., 2011; Beckett & Roden, 2009) Increased visual comfort (Elyezadi, 2012; Kim & Kim, 2007)		
				Enhanced positive health responses; Shifted perception of environment (Kellert et al., 2008)
NATURAL ANALOGUES	*			Observed view preference (Vessel, 2012; Joye, 2007)
			Decreased diastolic blood pressure (Tsunetsugu, Miyazaki & Sato, 2007) Improved creative performance (Lichtenfeld et al., 2012)	Improved comfort (Tsunetsugu, Miyazaki & Sato 2007)
	***	Positively impacted perceptual and physiological stress responses (Salingaros, 2012; Joye, 2007; Taylor, 2006; S. Kaplan, 1988)		Observed view preference (Salingaros, 2012; Hägerhäll, Laike, Taylor et al., 2008; Hägerhäll, Purcella, & Taylor, 2004; Taylor, 2006)
NATURE OF THE SPACE	***	Reduced stress (Grahn & Stigsdotter, 2010)	Reduced boredom, irritation, fatigue (Clearwater & Coss, 1991)	Improved comfort and perceived safety (Herzog & Bryce, 2007; Wang & Taylor, 2006; Petherick, 2000)
	***		Improved concentration, attention and perception of safety (Grahn & Stigsdotter, 2010; Wang & Taylor, 2006; Wang & Taylor, 2006; Petherick, 2000; Ulrich et al., 1993)	
	**			Induced strong pleasure response (Biederman, 2011; Salimpoor, Benovoy, Larcher et al., 2011; Ikemi, 2005; Blood & Zatorre, 2001)
	*			Resulted in strong dopamine or pleasure responses (Kohno et al., 2013; Wang & Tsien, 2011; Zald et al., 2008)

© 2014 Terrapin Bright Green / 14 Patterns of Biophilic Design

Figure 27. Biophilic design patterns and biological responses. Taken from 14 PATTERNS OF BIOPHILIC DESIGN IMPROVING HEALTH & WELL-BEING IN THE BUILT ENVIRONMENT (p. 14) by W. Browning et al., 2014, Washington: Terrapin Bright Green.

FIELDWORK BOOKLET

Building with mixed living with possibility of care and a closed facility for 24 h care
13 - 17 november 2023

CONTENT

1	Activities	P.	x
2.	Observations building	P.	x
3	Public function in the building	P.	x
4	Appartments	P.	x
5	Outside	P.	x
6	Geriatric psychiatry	P.	x
7	From a care perspective		

1 | ACTIVITIES

Central common space

The building had a big gathering space on the ground floor. This is now, unfortunately, only available when rented.

The space was described as 'cold' and 'hollow'. The space felt really big and uncomfortable when it was used by smaller groups.

The space was used for group activities such as crafts workshops, lectures, ball games and happy hour. This place was first the place where all the inhabitants would eat together. But with the rental situation this is not possible anymore.

Shared kitchen

The building also has shared kitchens. These are not frequently used. Some volunteers come once or twice a week to cook for a small group of people.

Another shared living room/kitchen is used to have a church service once a week. The inhabitants with hearing impairments cannot hear clearly in the local church. This smaller service in the building is better for them. But one of the inhabitants mentioned that it is often cold in these rooms.

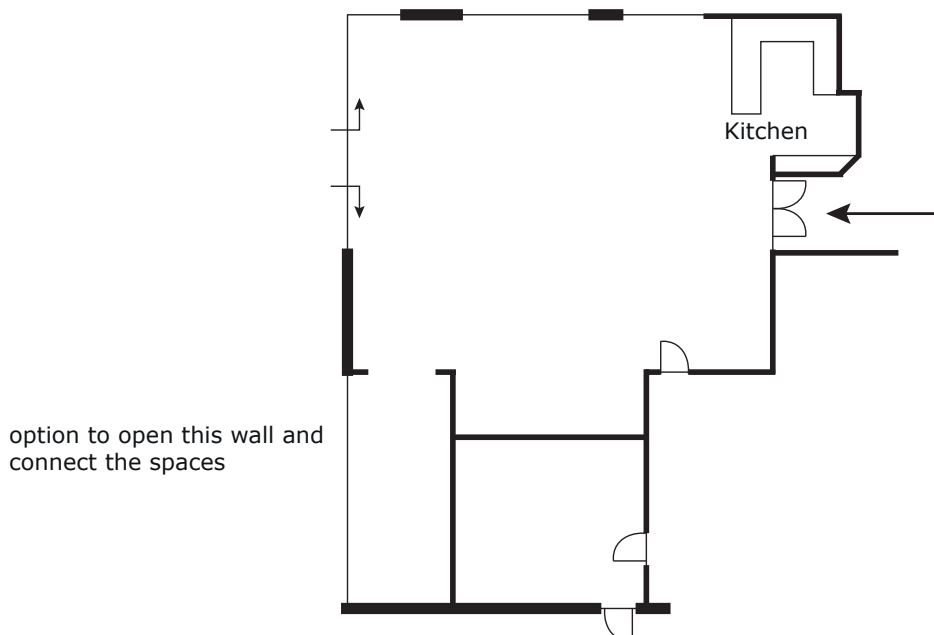
“Something is missing for elderly from the area to also participate or visit. Loneliness is not just in a building it is also in the area. A café or restaurant would be nice, that is way more accessible. The barrier should be removed for others to enter and join. In this way they also can get information and conversations without forcing them”

- Volunteer

Observations

- Between activities the building is quiet
- After the afternoon activity everyone eats in their own home and the day is over
- It gets too hot in most of the shared spaces because of too much sunlight coming in, big window openings on South or rooflights.
- FAMILY of great importance, for most of them reason to move there, to be close to them. They also rely on them for certain activities.
- Floors are damaged by scootmobiles, floor was not meant for these devices.

View on green



Shared living room

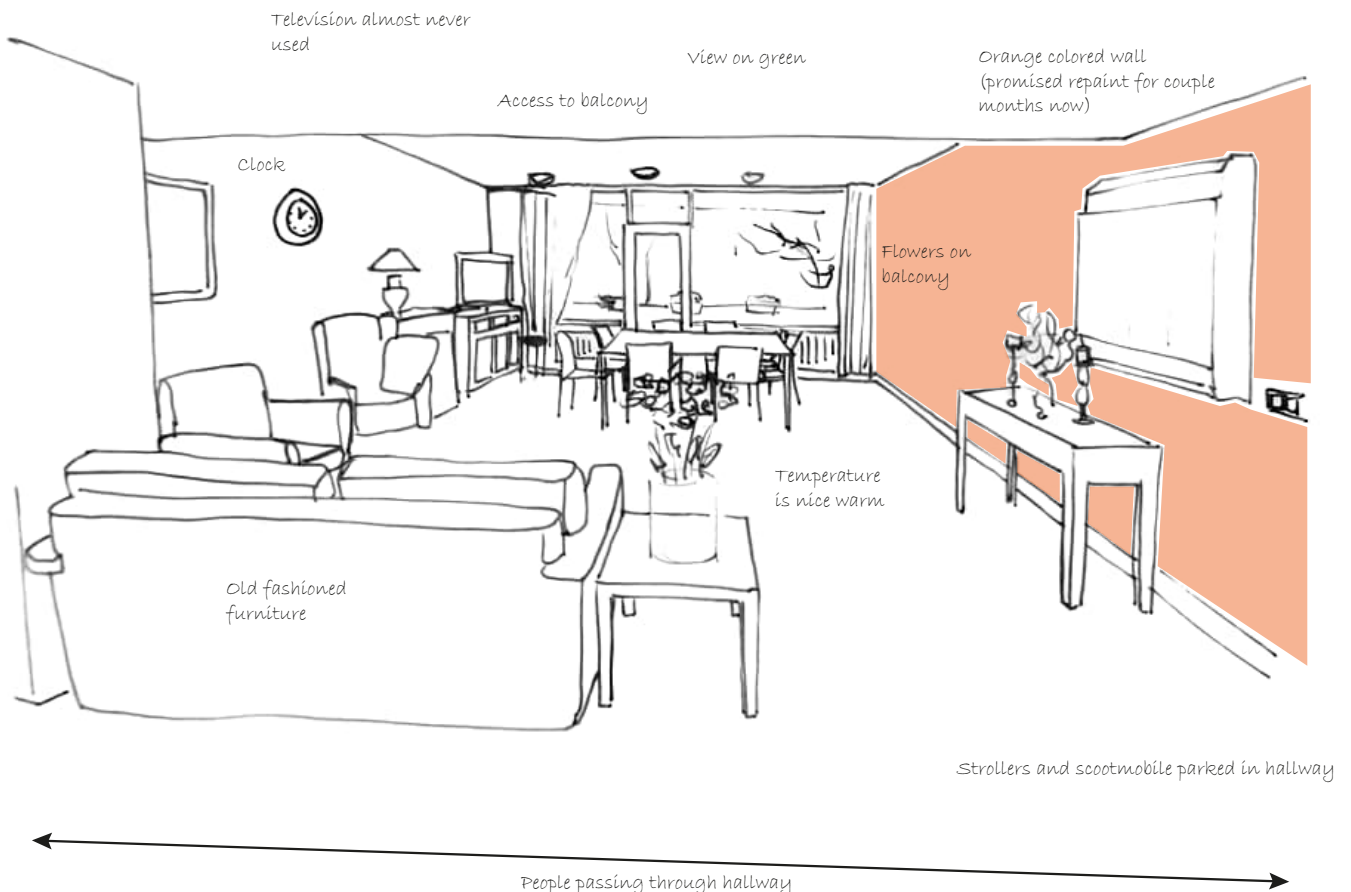
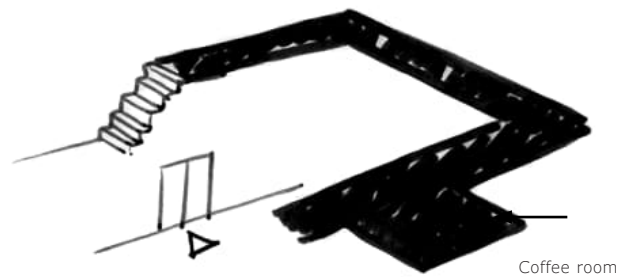
Because the common meeting room is not available anymore, the people use a shared living room in the hallway of the first floor for their daily coffee moment. The main meeting place is in this way tucked away in the building

Observations

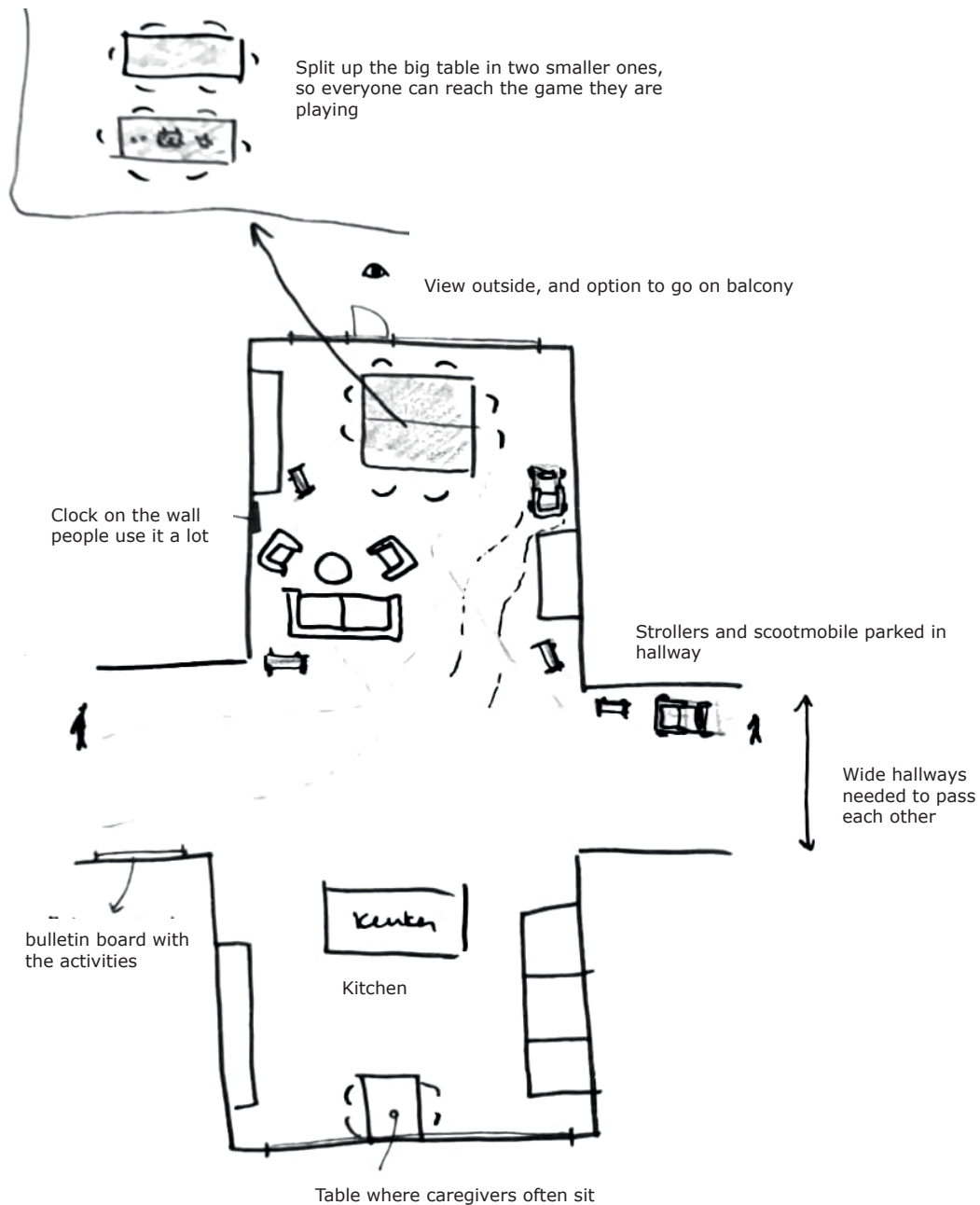
- there is no space to park the scootmobile
- there is no space for all the strollers
- and nothing to hold on to when it is parked in the hallway
- daylight from one side
- there is a closet, but you can't see what is in there (game was lost and ended up being in there)
- good light is needed when playing games to distinguish black and blue for example
- busiest moment of the day
- most important meeting space for the people

is put away far in the building on the first floor

- two groups; one sitting around the table, and one on the couch and chairs
- kitchen and staff on the other side of the hall, they join the coffee moment
- Inhabitants help each other back to their room, they struggle with the threshold. One lady needed three push attempts to pass the threshold.



blocks showing the date on the kitchen



The bulletboards are on multiple places throughout the building in the hallways. They show the planning of activities for that week. But also news memo's about the building or people. And advertisement for hairdressers or dentists for example. The weekplannings are printed by the staff and a man who rents a home their but is still healthy brings them around to contribute to the community in the building.

"My wife as severe dementia. We live seperatly but in the same building. It is nice that I can live close to her and be with her everyday. But I also have my own friends and life here. That is really nice."
 - Inhabitant



2 | OBSERVATIONS BUILDING

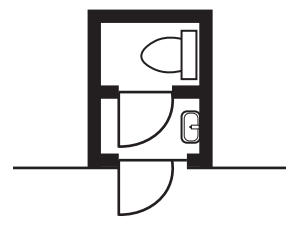
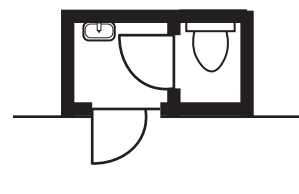
All hallways in the building look the same. Orientation is really difficult. The hallways are quite clinical. The walls are at some points laid back a bit, to create a small space in front of every apartment door. This alteration is colored. The colors are used multiple times in the building, and only visible from one side. The hallways downstairs look exactly the same as upstairs.

The elevator is hidden away in the building. It is laid back and the doors have the same color as the surrounding walls and ceiling.

Public facilities are marked by a black outline of the door. For example toilets and the washing rooms are in this way distinguished from the other rooms.

The signs are all really high on the walls, almost ceiling height. The signs are white with blue color. The letters are not really big, the signs are clear.

The toilets are not ideal for people with strollers. As seen in the image is the stroller left outside. Inside it is also not ideal. There is a double door and almost no space to turn. There are no handles to hold on to. The toilets are well distributed through the building. Beside a personal toilet in every apartment there is one in almost every hallway.



3 | PUBLIC FUNCTION IN THE BUILDING

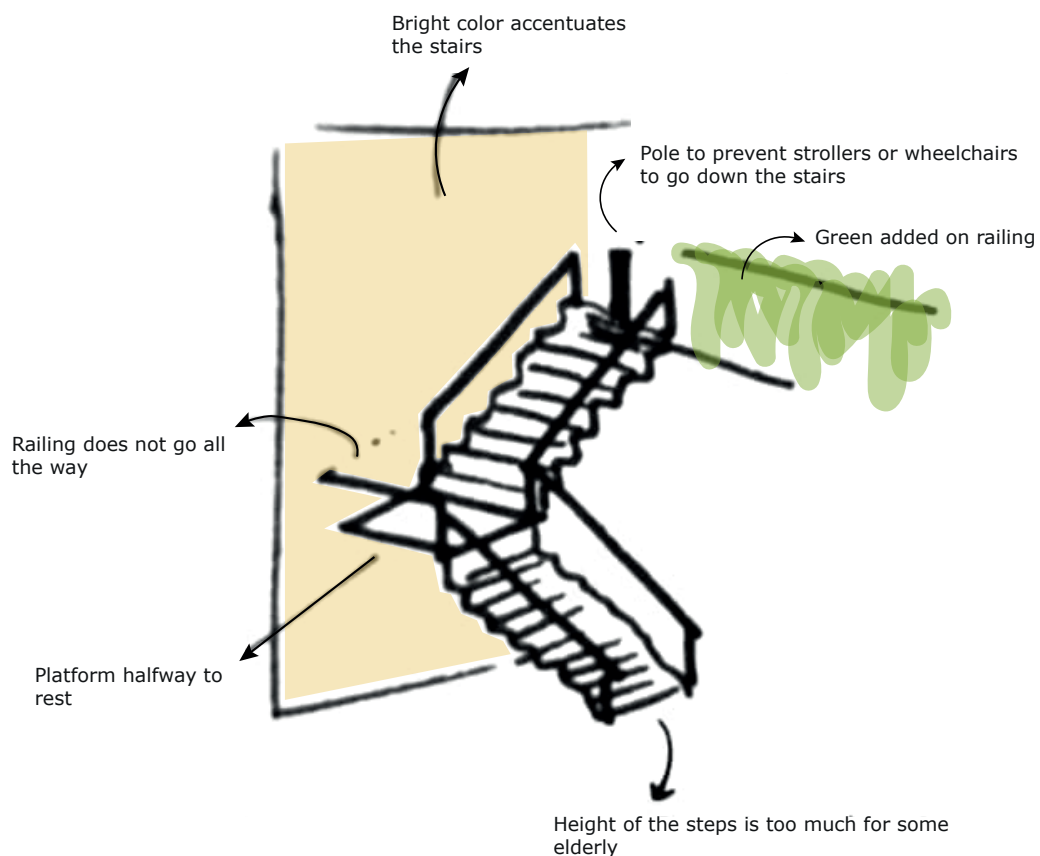
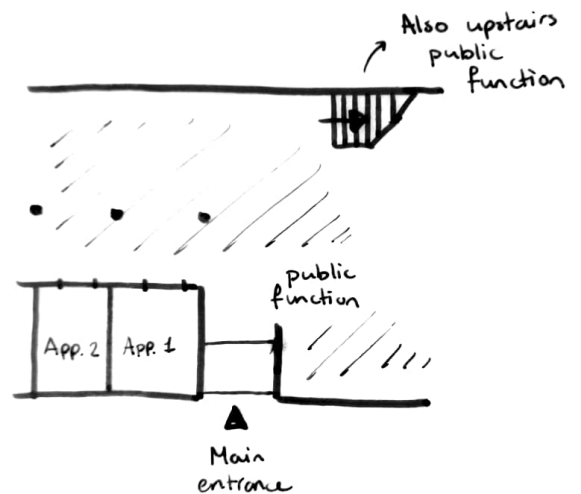
“Now the hallways are the streets and the door to their apartment is the front door”

“a lot of young people hang around and there is no supervisor around”
 - *Coordinator well-being*

“I prefer to live protected with more rest, that it is just our building”

“If you tell young people to behave themselves they are rude and they make a mess of the place”

“we have made sure that the building is closed at 5 p.m. instead of 8 p.m. now”
 - *Inhabitants*



4| APARTMENTS

Typologies

The building has a mixed user group. Mostly elderly but some younger people. There are three sections to be distinguished:

1. More expensive rental with option for care
2. Free rental with option for care
3. Closed facility with 24h care

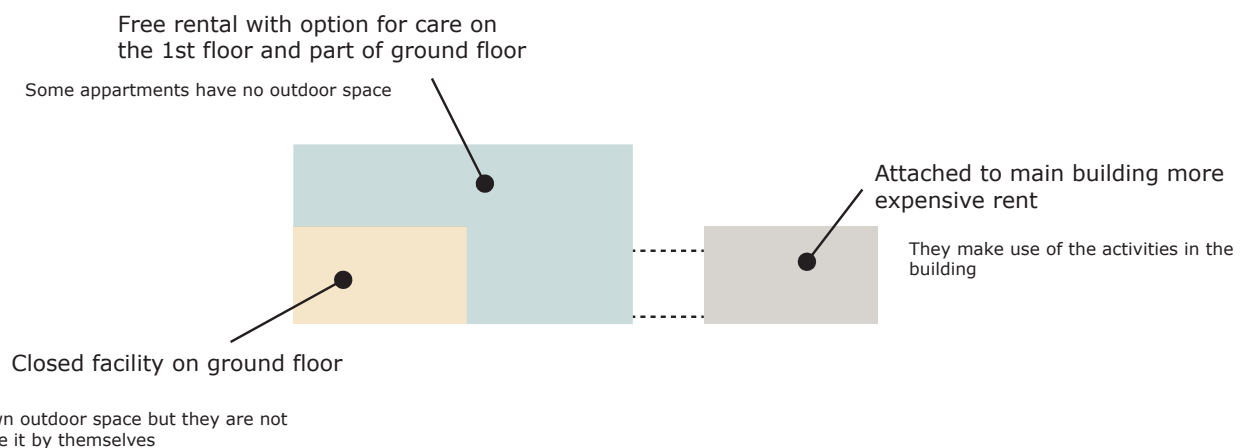
“Ideal would be to have small scale ‘hofjes’ in small villages. Where people can have a glass of wine, watch movies and play games. The feeling of a small village. Small scale, no multi-storey building”

- Family member

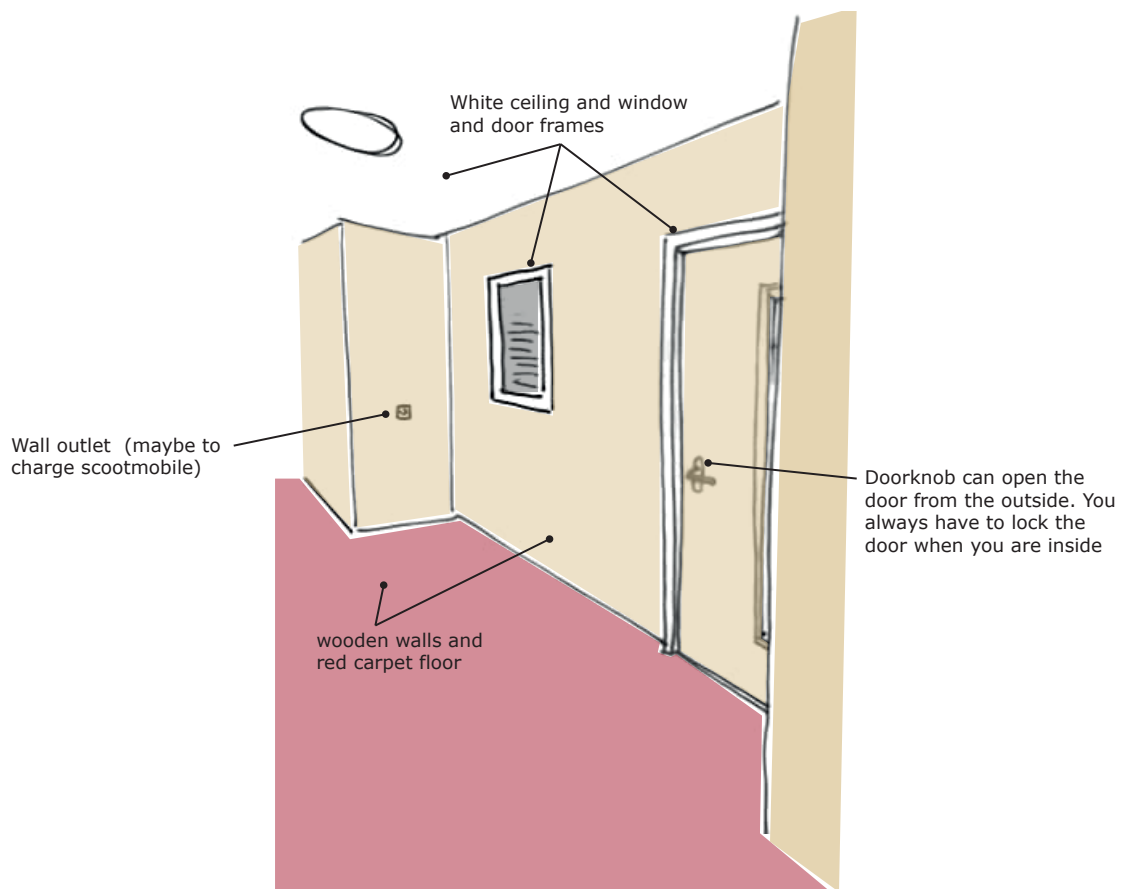


“I wish there were more luxurious apartments for elderly. We live in a way too big house now, but there is nowhere nice to move to. My whole street is the same generation and we all think this way. If you combine something with care facility I can keep working as volunteer”

- Volunteer



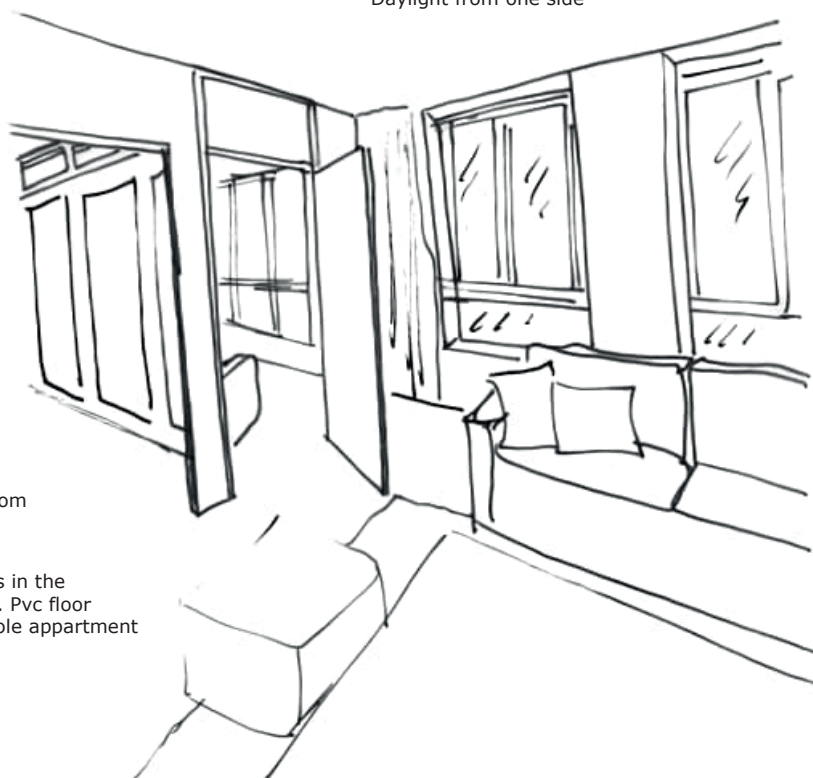
Appartment type 1



Reading room with windows that can open.

Lot of windows
Daylight from one side

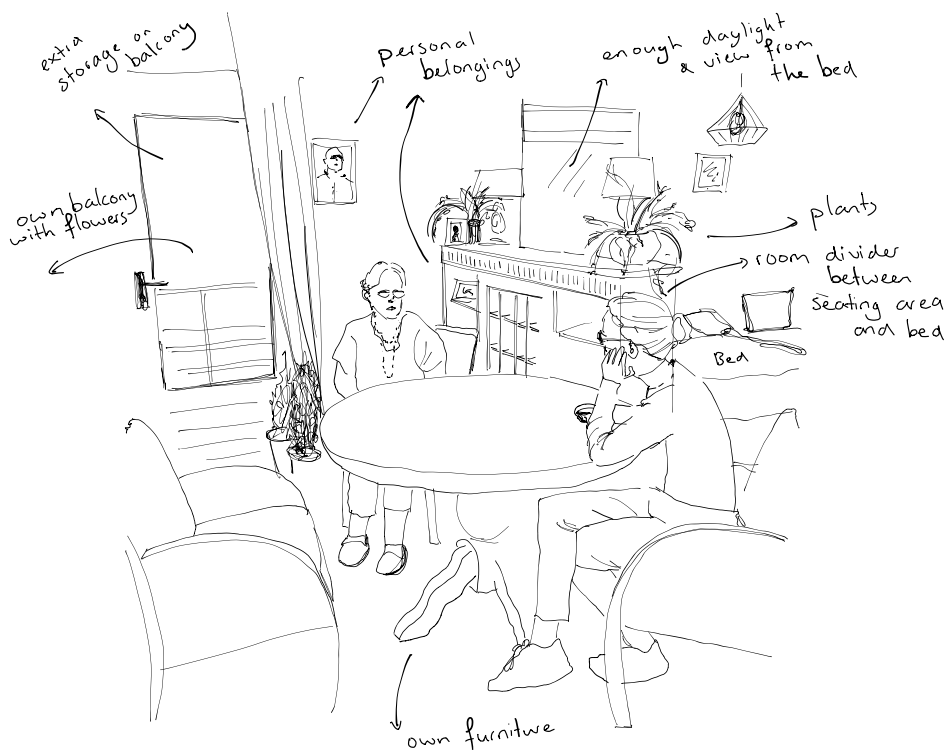
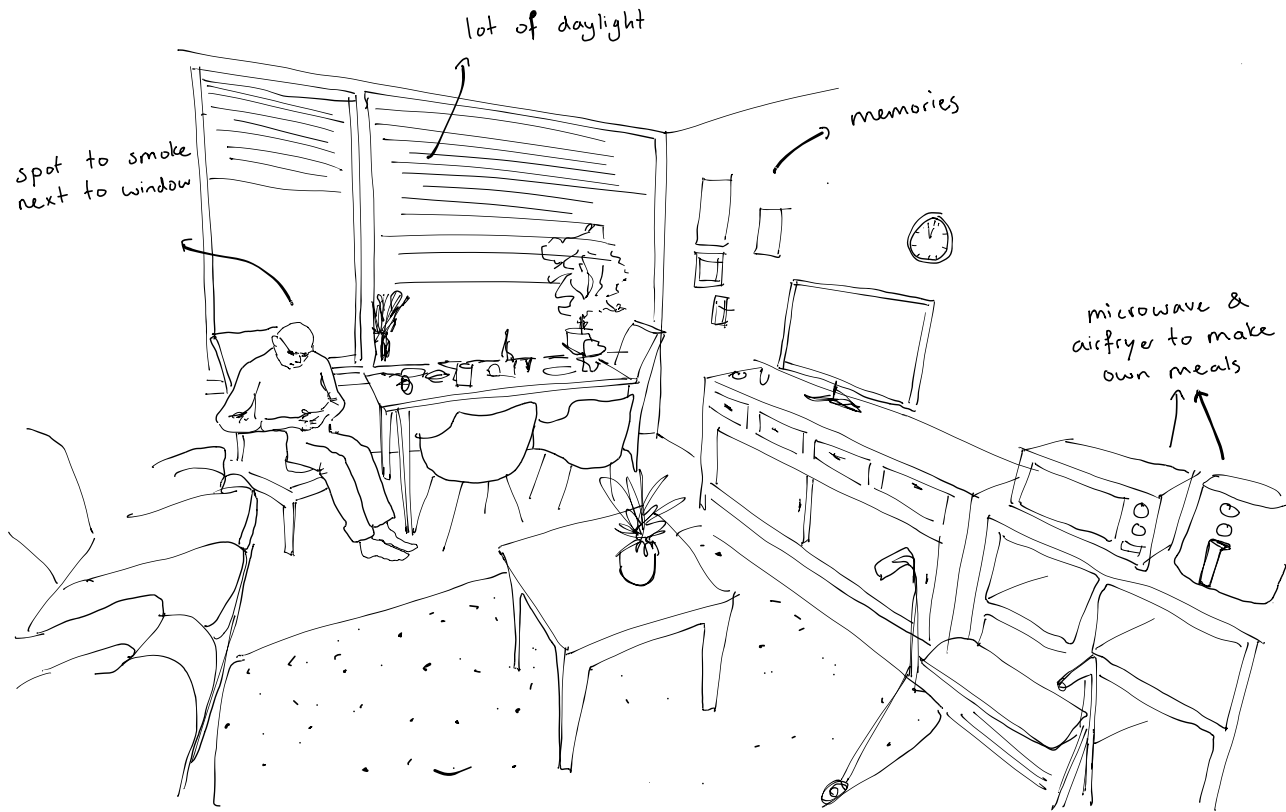
Small permanent openings to get fresh air. Only fresh air when door/window in reading room is open. This is not safe during the night, so at night no fresh air...



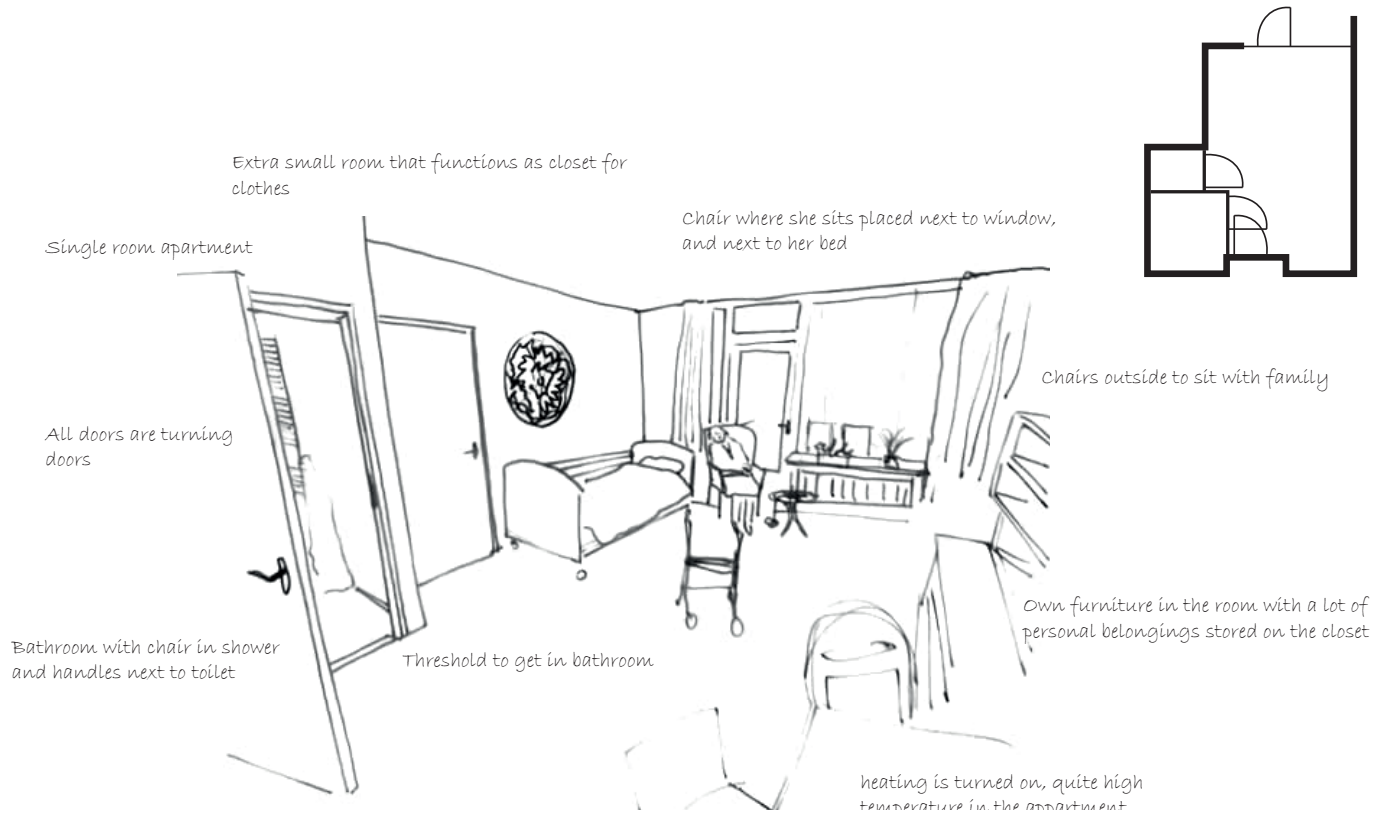
Sliding door to bedroom

No thresholds in the apartment. Pvc floor through whole apartment

Apartment type 2



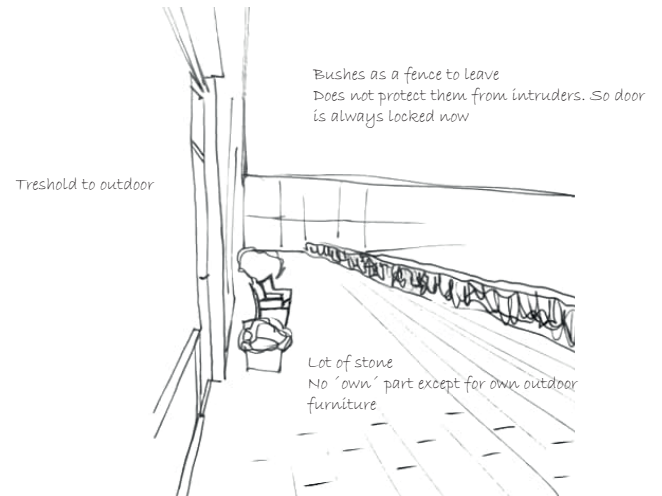
Apartment type 3



5| OUTSIDE

Observations

- It is possible to walk a big round without crossing any big streets
- Water and green in the area
- Lot of birds
- Many big trees
- No points of recognition
- No clear routing or marking of the entrance



"I can walk till the end of the street, than I rest on a bench and walk home again"

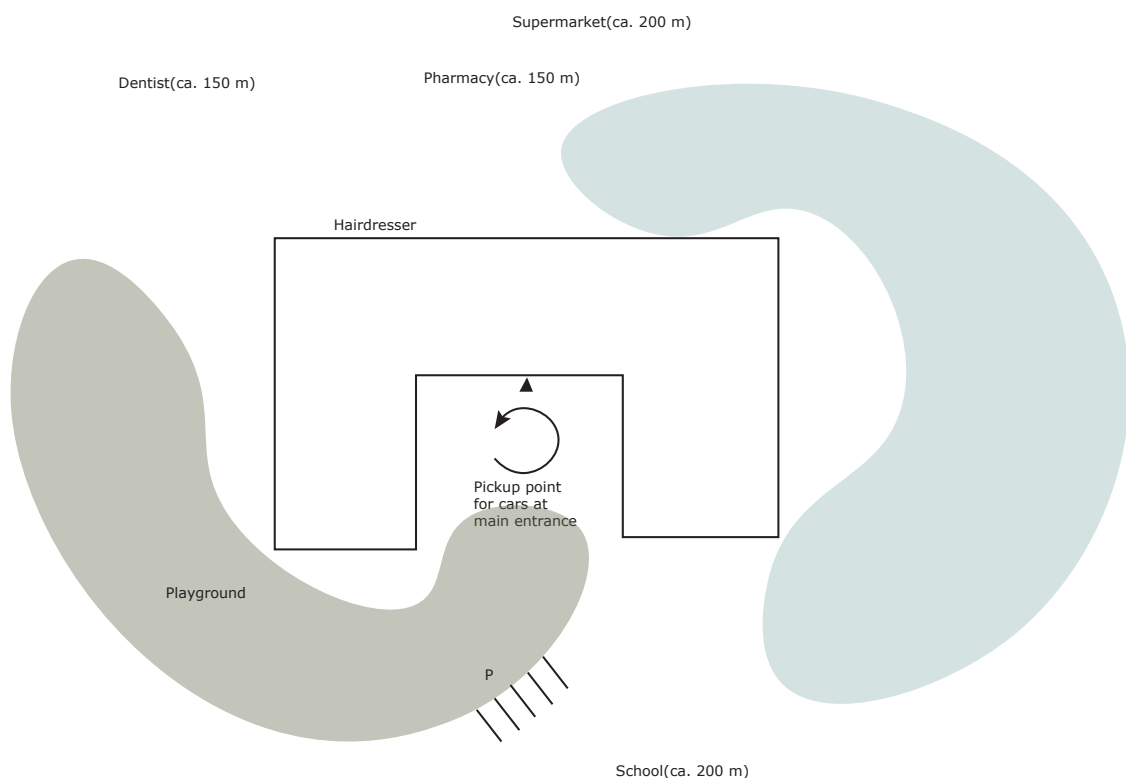
"There is no place outside to sit when it rains or when the sun is really bright"

"The trees are really beautiful"

"Everyday after lunch I go for a walk. I take the same route everytime otherwise I get lost"

"I miss that I can't go outside when the weather is bad"

- *Inhabitants*



6 | CLOSED FACILITY

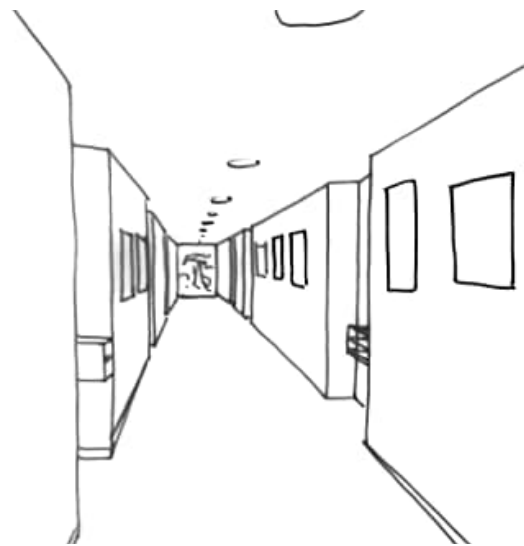
Geriatric psychiatry

People who live here need twenty-four hour care. "Geriatric psychiatry emphasizes the biological and psychological aspects of normal aging, the psychiatric effect of acute and chronic physical illness, and the biological and psychosocial aspects of the pathology of primary psychiatric disturbances of older age" (Geriatric Psychiatry, 2023). The visited facility was completely locked. The inhabitants could not leave unless someone else took them outside. This facility had 28 people living there.

(Geriatric Psychiatry. (2023). American Psychiatric Association. <https://www.psychiatry.org/psychiatrists/practice/professional-interests/geriatric>)

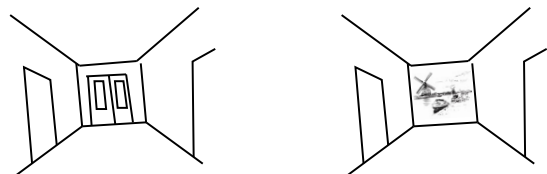
Notes from conversation with coordinator well-being

- All the hallways look the same, there is no recognition or zoning
- Hallways have a dead end now, people should be able to keep walking with no 'end'
- There was always a lot of disturbance on such an endpoint in the hallway. Because this was glass before, and people felt locked up and saw people walking behind it. Now there is a picture of nature covering the wall and doors. Now there is no banging on the doors anymore, because they don't associate it with a door and being locked up.
- Some people in the closed facility are mentally still good, and they know the code to get out
- "a prisoner comes outside more often than an average elderly"
- The end goal is to be completely open, but is not realistic now.
- The main discussion is between safety and freedom. "What is left if you take away all



risks? I prefer freedom over safety, there are too many rules now, and there is no life left"

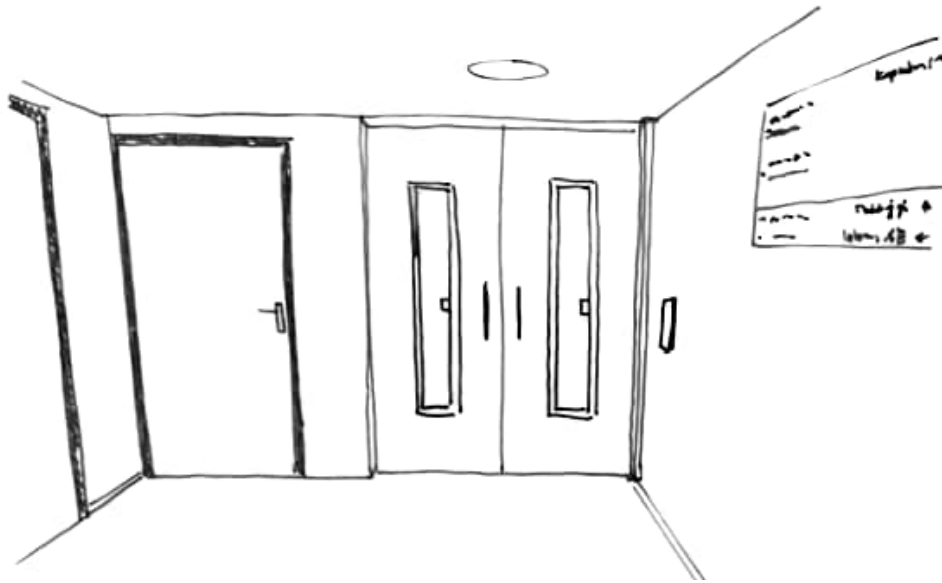
- The supermarket is bit too far away. There is no possibility to rest on the way there. And the benches have no railing or support to stand up after.
- She cried when she felt the rain, because she hadn't felt it in years
- In early stage dementia the aim is to keep living at home, otherwise they lose all structure. When they move they will decline faster, all known and familiar is taken away.
- "being among people is the most important factor for well being"



Notes from conversation with family member and former employee

- Windows in the apartments are big and low, a lot to see and much light
- people with different stages of dementia live together, in this way they don't have to move often
- hallways have dead end, they should be able to walk in circles
- own shower and bathroom is too small for wheelchair.
- There is a luxurious bathroom with lot of stimuli, sounds, light and music for everyone





to use but it only has a bath. My mother does not dare to go in the bath. If they add a shower to this room she can use it as well. The caregivers are not showering her in her own small bathroom, so I have to do it myself or she would not be showered.

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a shower to this room she can use it as well. The caregivers are not showering her in her own small bathroom, so I have to do it myself or she would not be showered.

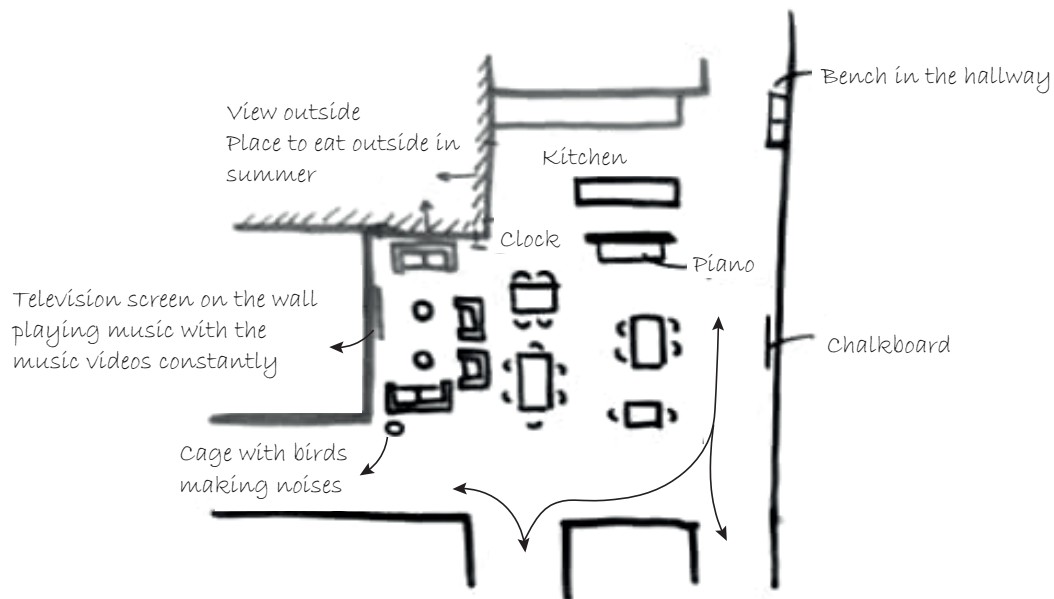
- There is no central living room with enough noise and enough to see. It is better if they are all together in the same room
- from a care perspective is an open facility not nice. The area to keep an eye on will be too big, and there are already not enough employees
- They should use the garden more often and go outside more often
- The door to the private outdoor spaces from the apartment is now locked. This is done so that intruders cannot get in. If this is done better, every inhabitant at least has the possibility to go outside if they want.

Typical Dutch front door print.
All doors in the building had the same print



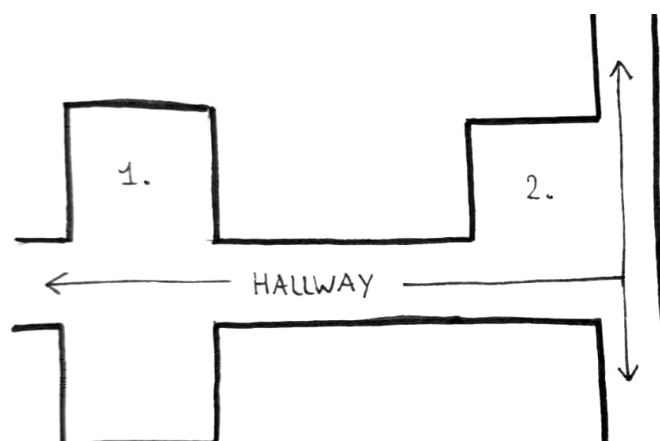
Color on the wall

Picture of the inhabitant with other personal stuff, sometimes these items were taken away by other inhabitants



Observations

- There are two different living rooms in the closed facility. 1: more calm and silent. 2: a lot of stimuli.
- The second, busy living room is on a crossingpoint of three different hallways. Staff is constantly walking around and talking loudly together.
- The carts with laundry are placed in the hallway blocking almost half of it. This also makes it more of a working place than a home.
- The hallways smell bad like toilets at some points
- Staff are walking in and out of peoples 'homes'. No rest and privacy.
- There is a large chalkboard in the hallway showing the planning of the week.
- Hallways are the same as upstairs. And thus also confusing and disorienting.
- The people living there don't do anything unless someone is taking them somewhere.
- Music and singing is of great importance. During a church service they all sang along. They remembered the psalms by heart. Even the people who where silent during the other activities sang along.
- The housecat is really appreciated. Also people bringing their dogs gives a lot of positive responses.
- The staff is not drinking coffee together with the people. They gather together.



7 | FROM A CARE PERSPECTIVE

Observations

- The shape of the building can be more efficient to decrease walking distance for the employees

Observations office

- There is just a small strip of daylight height on the ceiling. It is not possible to look outside
- There is mold in the office because of water damage
- From the office there is a view on a crossing point in the hallway, so they see people walking by. And inhabitants can easily walk in and ask something if needed.
- There is a bad internet connection
- Next to the office is a separate lunchroom just for staff

Design advice

- When a person enters the bathroom the light should turn on automatically
- No thresholds

“We had electric scooters for the nightshift because of the large distance between patients, but that did not work”

“If someone falls in the bathroom there is not enough space to help the person get up”

“This job is topsport”

“This building was transformed from an elderly home to a care home. The measurements are not right for providing care. It would also be good if there are not thresholds at all”

- Caregivers

