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GROWING MEMORIES

- A Research-based Design Proposal for Björklunden Dementia Facility

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- A Research-based Design Proposal for Björklunden Dementia Facility

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ABSTRACT

Access to outdoor environments at dementia institutions can help maintain and improve mental and physical well-being. There have been several beneficial aspects identified in research such as lowering stress and agitation and studies suggest that familiar plants with their sensory traits may help people with dementia recall memories. Staff members and health care professionals can be an important asset when designing a dementia garden by sharing their experiences. There are indications that show that combining a research phase with the design process may produce a better dementia garden specifically suited for its user group. This thesis aims to apply relevant science to a case study and design project at two gardens at Björklunden dementia facility in Kristianstad municipality.

The garden designs are adapted to meet the needs of the staff, residents diagnosed with dementia and their relatives. The following reading will explore how a literature study influences a design proposal. The goal was to produce a safe and calm environment that increases the recreational value of the dementia facility.

This thesis was produced based on literature studies, staff interviews in collaboration with the dementia facility, and on-site inventories. Based on this knowledge, design principles were developed and utilised to build a design proposal for the dementia facility's gardens.

The result is a design proposal that includes vegetation and management plans which reflect the design principles derived from the literature study. Numerous design faults were avoided because the design principles were the primary contributors to the final design concept.

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Finally, we would like to thank all of our families who helped us with the thesis. - both professionally and personally.

AMALIE SVENDSEN

LINNÉA ANDERSSON

PREFACE

This master project was conducted in collaboration with Kristianstad Municipality's Björklunden dementia facility. Kristianstad Municipality will build the project as part of the development of its dementia units. Their objective for this initiative was to create dementia facilities that were scientifically grounded to get a satisfactory result

All figures and tables are made by the authors unless else is stated in figure text.

TABLE OF CONTENTS

INTRODUCTION

1

1.1 BACKGROUND

From a historical perspective, gardens have been a part of human activities since the first settlements. Gardening holds aesthetic, spiritual, restorative, and psychological advantages that exceed the initial goal of plant cultivation (Rachel and Stephen, 1989; Dunnett and Qasim, 2000). Generally speaking, there seems to be an agreement that green spaces, gardening, and nature have great beneficial mental and physical health values. Researchers are constantly exploring how these benefits can heal various health issues. Garden areas can be used for therapy through so-called healing- and therapeutic gardens. Healing gardens are usually designed to support healing processes and stress recovery. They are generally situated near care institutes and adapted to different target groups with special demands, like Alzheimer's patients (Elings, 2006). Such gardens are often referred to as dementia gardens.

Dementia gardens have become increasingly important structures and elements in care facilities as the number of people living with dementia grows. About 140 000 people were living with a dementia diagnosis in Sweden in 2017, and with life expectancies rising, a report by Socialstyrelsen (2017) suggests that the number will have increased by 78% by 2050. The statistics are projecting explosive growth in dementia-affected individuals. It is critical to remember that the person with dementia will suffer from their symptoms, but relatives and friends are also indirectly affected.

Dementia is not a specific disease but a combination of symptoms, with Alzheimer's disease being the most common cause (Alzheimer's Association, 2022) Dementia can develop problematic symptoms such as memory loss, reduced thinking speed, mental sharpness, language and speaking, understanding, judgement, changes in mood, mobility, hallucination, and other concerns that can make daily activities difficult. As a result, a person with dementia and their relatives often experience that the ill person faces changes in interests, mood, and ability to be independent. Due to dementia symptoms, many afflicted people experience personality changes (NHS, 2017). Often, these individuals have to be situated at a nursery home or a dementia care facility to help with daily life. Unfortunately, there is currently no cure for dementia. However, research suggests that certain measures can slow down the development of the disease, helping people with dementia maintain longer mental function, improve life quality, and support individuals in adapting to a new and difficult life situation (NHS, 2017).

According to researchers, access to outdoor environments for individuals with dementia has been explored to give stimulation and lower agitation. Through access to green spaces and therapeutic environments, it is possible to improve the quality of life for people living with dementia. Installation of gardens at dementia facilities that the residents have free access to can reduce inappropriate behaviour, like agitation, aggression, and pacing (Cohen-Mansfield and Werner, 1998; Detweiler et al., 2008; Gonzalez and Kirkevold, 2014). Through visiting gardens, fewer falls and improved mood were recorded, leading to a higher quality of life for dementia residents (Gonzalez and Kirkevold, 2014).

Building environments that stimulate the senses and encourage physical exercise is a non-pharmacological technique for improving one's quality of life (Detweiler et al., 2008; Gonzalez and Kirkevold, 2014; Uwajeh, Iyendo and Polay, 2019; Motealleh et al., 2021). People living with dementia need protection from factors that could worsen their condition while maintaining enough stimuli for well-being. Engaging activities and sensory environments seem to have more beneficial effects than medication on behavioural and psychological symptoms in dementia patients. Visiting nature or being outside, in general, opens up the possibilities for multisensory environments; however, dementia residents often have little to no access to nature (Gonzalez and Kirkevold, 2014).

Having access to a garden at a dementia care facility enhances the likelihood of the residents walking, making it easier for them to go outside and spend time in daylight. Time outdoors is important for the wake-sleep cycle and can alleviate some sleep disruptions that certain dementia patients may experience. Additionally, gardens can increase social interactions as they provide a topic of conversation (Gonzalez and Kirkevold, 2014). Positive feelings like satisfaction, happiness, personal well-being and interest increased when residents had access to a garden. Simultaneously negative feelings like sadness, anger, and anxiety decreased. The overall quality of life improved when residents visited gardens, whether or not they participated in an activity or were passive (Detweiler et al., 2008; Gonzalez and Kirkevold, 2014).

According to Gonzales and Kirkevold (2014), changes in behaviour occur to a greater extent in residents who use the garden often than in residents who use the gardens more seldom (Gonzalez and Kirkevold, 2014). Gardening or other horticulture therapy for as little as five to ten minutes per day can help persons with dementia maintain their cognitive capacities and inspire continuing engagement in horticultural activities, fostering a feeling of self-worth (D'Andrea, Batavia and Sasson 2008).

There will always be associated risks with the introduction of gardens at dementia facilities. Dementia residents often experience impaired functioning, such as bad eyesight, reduced strength, and reduced balance (Cohen-Mansfield and Werner, 1998; Gonzalez and Kirkevold, 2014). Participating in garden activities can become too challenging and increase the risk of falling, especially when residents can spend time in the gardens by themselves. Being aware of these challenges is important as there is also a risk that the gardens do not get used by the residents (Gonzalez and Kirkevold, 2014). If staff, family, or residents do not feel comfortable in the gardens, a lack of use can occur (Gonzalez and Kirkevold, 2014). Policy and practice at the dementia facility influence the use of the gardens. Staff could be educated on utilising the garden, which can increase the possibility of it being used (Uwajeh, Iyendo and Polay, 2019).

It is critical to understand the users and the obstacles that may occur for the specific user groups to give a satisfactory design proposal for dementia gardens. The gardens must be well suited to the wide range of demands present in a dementia care facility as part of this thesis. This thesis will investigate how a researched-based design can create and strengthen the design of a therapeutic dementia garden.

1.1.1 COLLABORATION WITH BJÖRKLUNDEN DEMENTIA FACILITY

During our thesis work, we have been able to collaborate with Kristianstad municipality. They aim to develop a new dementia care facility, Björklunden and want to establish better garden areas. Tove Björnfot was the project leader for developing the gardens and head of the dementia facilities but has since resigned. All of our work was done in collaboration with Björnfot. In the task description, Björnfot required that the design proposal should be research-based, focusing on the needs of people with dementia, as this is the user group at Björklunden. Another requirement was to work with their staff, utilising their competence. For more detailed information, see Appendix 1.

Using research, staff knowledge and relevant literature, we have created design principles that can be applied in our design proposal. The proposal strives to support mental and physical health throughout the year. Plant selection should have qualities throughout all seasons,

1.2 AIMS & PROSPECTS

This thesis aims to create a design solution for outdoor environments that supports mental and physical well-being for residents and staff at Björklunden dementia care facility. The final design proposal should strive to be grounded in staff knowledge as well as a literature study that investigates specific needs and wishes of people affected by dementia. The proposal should be experienced as a comfortable, inspiring, and safe environment for the residents. Hopefully, the gardens can provide some relief and joy to residents, family members, friends, and staff in what surely must be a challenging stage of life.

The topic of our thesis is relevant as dementia-related diseases are expected to increase dramatically. As landscape architects, we can help people suffering from a dementia diagnosis to slow down the progression of symptoms and improve life quality through well-designed outdoor spaces. The target group of this thesis will be people working as health care professionals or with the construction and design of elder care facilities, such as architects and landscape architects.

1.3 RESEARCH QUESTIONS

We generated a research question as part of our thesis work to help us navigate the most relevant and significant information to study. We hope to find an answer to the following question:

How can we create a garden adapted to the specific needs of individuals with a dementia diagnosis?

We have included some sub-questions to answer the main research question:

- How will a literature study based on relevant and available science influence a design proposal?
- In what way can a designer use the knowledge of health care professionals to improve design solutions?
- How can a research-based design proposal be applied to a specific case study such as Björklunden dementia facility?

1.4 METHOD

During the thesis, we worked back and forth between a literature study investigating relevant research, concept sketching, interviewing staff members and creating design proposals. Our working method has been an essential factor in the later structure of the thesis. We discussed the relevant research, created a case study, conducted interviews, and described our design process, leading to a design proposal where the research was put into practice.

As a result and summary of the research and staff interviews, we formulated design principles to guide us when designing the gardens at Björklunden. Through our method, we have been able to produce a design proposal that is well-rooted in available science while still being able to work on conceptual sketches and have creative freedom.

The method used to create our thesis is illustrated in Figure 1.

1.4.1 LITERATURE STUDY

In order to write our literature study, we spent much time finding relevant sources and literature through available research reports from the fields of architecture, horticulture, landscape architecture, neuroscience and psychology to mention some. Other documents we used were reports from health care professionals. As we were writing the literature study we tried to find the latest and most relevant papers. We used this approach for the literature study to ensure that the information found in our thesis is up to date and beneficial to our work. To find the information and research we used Google Search, Google Scholar and Primo. We used search words like “dementia garden”, “therapeutic garden”, “horticultural garden”, “dementia”, “garden design”, “landscape design”, “design for dementia”, “design and science”.

1.4.2 CASE STUDY AND SITE ANALYSIS

The case study is the part of our thesis where we explore the site where the dementia facility is situated. To conduct the case study and site analysis we had to speak with the project leader Björnfot and schedule visits to the site. The site analysis is based on a combination of data analysis from public maps and private registrations which was done by the authors using measure tapes, on site mapping as well as documenting the site through pictures.

During this phase we did vegetation inventories from looking at the buds on the vegetation that were present in the gardens at the time. The vegetation inventories were done in February posing some difficulties in determining the specific species. The data gathered in the site analysis was further processed in Archicad and AutoCAD to create background maps for 3D-models and plan drawings. Being on site for the site analysis, though more time consuming than data analysis alone, was chosen as a way to become familiar with the actual site and get to know the staff members at the dementia facility.

1.4.3 ILLUSTRATIONS, 3D-MODELLING, AND RENDERS

To produce our illustrations, maps and similar for the inventory and the results, we have used Illustrator, InDesign, Photoshop, Archicad, and AutoCAD. To understand the spatiality and feel of the gardens, we found it helpful to create a 3D model to create an easy-to-read visualisation of the design for ourselves, the staff at Björklunden and others who may look through our proposal.

The 3D model and renders were created in Archicad, with adjustments in Photoshop. The renders illustrate a conceptual image of the gardens somewhere around June-July, based on flowering species in the model. Trees, shrubs, and perennials are only concept sketches and will likely appear different in the built garden. However, they do visualise an idea of flowering, colours, and textures for the given time. The size of all vegetation visualises a fully mature garden where the species have reached full size. Some element and vegetation models were imported from Sketchup 3D-Warehouse.

1.4.4 MAP MATERIAL

Through contact with ABK, the owners of the dementia facility and other neighbouring infrastructure, we were given construction drawings of the building from 1992. We also received drawings from multiple companies through Ledningskollen to check for power lines, sewers and similar infrastructure. As we compared the different background data from the technical drawings, we noticed large differences in the measurements on the different maps. After consulting with our supervisor and getting permission from Primagaz Gasol Sverige AB we decided to use their technical drawing. They had drawings of the main building and the surrounding infrastructure, including connecting paths and roads, which were the closest to our site measurements.

Figure 1. The method flow illustrates how the thesis work was not a linear process but an ongoing work of rechecking and revisiting earlier parts of the process as we found new relevant information. Other times we had to reassure that the research questions, literature study and the design was coherent and communicating well.

1.5 LIMITATIONS

The design proposal in our thesis is restricted to the gardens of Björklunden dementia facility located in Tollarp outside Kristianstad. The design proposal will include the garden's layout with an illustration plan and material and plant plans, but no technical drawings will be provided. Plant species and quality will be based on the nursery Billebäcks plant catalogue, limiting us from using a variety of species.

The interview with the staff who will be working daily with the residents was limited in time, scope and number of participants, conducted during one single meeting. It was not possible to interview residents as none lived at Björklunden during that phase of the project.

There was little available background information about Björklunden in terms of maps and technical drawings. The different maps and technical drawing materials provided by various companies did not completely reflect the reality and the measurements we took at the site, resulting in deviations between our drawings and the actual site.

Though the project leaders at Björklunden strongly desired budget calculations, we could not provide this as we could not gain information on plant, material, and construction costs. The cost estimates will differ widely depending on the contractor and the municipality's framework agreements. Therefore, we will advise the municipality and the project leaders to contact contractors or put the project out to tender, for more accurate estimates.

LITERATURE STUDY

2

2.1 DESIGNING OUTDOOR ENVIRONMENTS FOR PEOPLE WITH DEMENTIA

Healthcare facilities are often designed to accommodate specific functions. They can be sterile looking, which can be adverse for patients, visitors, or staff as stress levels may increase in such environments (Ulrich, 1999). A good dementia care facility should fulfil the psychosocial needs of the individual resident. Although individuals with dementia may experience a decrease in cognitive function, their energy and the urge to live active lives and participate in social events in the surrounding world remains strong (Brawley, 2007). Stress can affect a person's healing process. Feelings like loss of control and privacy can increase the stress in hospitalisation settings (Ulrich, 1999). Similar feelings might occur when individuals are moved to a dementia care facility. Researchers worldwide have carried out numerous studies investigating how designers, horticulturists, architects, and landscape architects can provide better living conditions for individuals with dementia.

When designing for a specific user group, such as dementia residents, it is important to include other user groups that are directly or indirectly affected by the design. People living with dementia vary in age, interests, personality, mobility, and needs. The product of our thesis will be a garden designed specifically for Björklunden dementia facility. It is essential that all residents, staff, and relatives are acknowledged as user groups and feel included and safe in our proposal. The garden design should bring comfort to all its visitors, reduce the feeling of being institutionalised and help normalise the experience of the dementia facility (Ulrich, 1999; Zeisel, 2007).

2.2 COMBINING RESEARCH AND DESIGN

The way we look at the designers has changed from the designer as the supreme artist making all the decisions to the designer who needs to adhere to sustainability, social responsibility, and human health. It makes the design process a complex challenge, with research a vital component for urban planners, architects and landscape architects (Milburn and Brown, 2003). Instead of relying on theoretical knowledge, design knowledge often builds on other good designs that serve as inspiration (Lawson, 2013). There is no custom in landscape architecture to analyse completed projects, which increases the possibility of repeating mistakes or losing out on good design solutions. Furthermore, many landscape architecture practices are founded on beliefs rather than facts (Brown and Corry, 2011). According to Stankos and Schwarz (2007), research can be hard to turn into design solutions as designers have little experience using research in their creations.

Many of the available studies on outdoor environments investigate the needs and experiences of the patients, but few studies look specifically at research applied in a design project (Lawson, 2013).Most research is focused on one specific group of patients and does not find design tools for a range of illnesses (Bengtsson and Grahn, 2014). Lawson's (2013) Design and the Evidence examines how evidence and design interact. Good and bad design, according to Lawson, can have a significant impact on human health and well-being.

Evidence-based design (EBD) has its roots in evidence-based medicine (EBM), and EBD is commonly applied within the healthcare system as it is an adaptation of EDM (Stankos and Schwarz, 2007). Although awareness of EBD has expanded, its application has lagged behind (Bengtsson and Grahn, 2014). Designers may find it difficult to keep up with new findings, limiting creativity (Hamilton, 2003). When new evidence arises, it might be difficult to incorporate it into a design since design solutions frequently solve numerous problems (Lawson, 2013). There is also a concern that EBD can lead to a mould-like design where everything looks the same (Hamilton, 2003).

According to Bengtsson et al.'s (2018) compilation of studies on the issue, there is a divide between scientists and designers. The research is clear, but it risks remaining in the research community unless tools and models are introduced into the designer's domain. It may be impossible for a designer to sift through a significant amount of research before constructing a new design. As a result, designers are largely disconnected from current research, while EBD remains an academic subject (Lawson, 2013). Milburn et al. (2003) produced a set of models on how to use research in the design process in landscape architecture practices. The models are based on interviews and surveys from landscape educators and practitioners and can act as guidance on how to use research in landscape projects. The authors also found that creativity was not lost when the designer incorporated research into the design process.

2.3 ACTIVITIES FOR MENTAL AND PHYSICAL HEALTH

Access to outdoor spaces provides people with fresh air and sunlight (Brawley, 2007) while also offering them a variety of additional benefits. While dementia can evoke negative emotions and inappropriate behaviour, research-based evidence suggests that these personality traits sometimes improve when individuals access natural environments (Cohen-Mansfield, 2001; Gonzalez and Kirkevold, 2014). Dementia gardens can be designed to support and enhance the beneficial parts of having access to natural settings. Having gardens that allow patients to wander showed increased feelings of freedom, better life quality, and less agitation in the users (Detweiler et al., 2008; Gonzalez and Kirkevold, 2014).

By giving access to outdoor environments, the residents at Björklunden can potentially be engaged in a range of appropriate activities supporting a more active lifestyle and promoting positive feelings such as having a purpose and feeling useful. These activities would include raised garden beds with flowers or vegetables, birdfeeders and birdbaths, cutting or picking flowers to make arrangements, or other garden work such as sweeping the walkway (Brawley, 2007). Gardening has been shown to increase cognitive capacity, and activity levels and promote positive feelings (Uwajeh, Iyendo, and Polay, 2019).

As the different residents at a dementia facility have individual capacities, interests and wishes, the activities need to be of different activity levels and vary in how challenging they are. The garden design has to allow for both activities and relaxation (Uwajeh, Iyendo and Polay, 2019; Motealleh et al., 2021). Birdwatching is a passive activity, but in one study by Spring et al. (2011), they found it could be more active by having residents count and log which birds they saw.

2.4 SENSORY EXPERIENCES

Sensory experiences allow a person to experience a smell, touch, sight, or sound that they may remember. Strengthening the feeling of familiarity is a good resource to create a sense of security for people living with dementia. A garden that focuses on awakening the senses is often referred to as a sensory garden and holds a diversity of plant species that are vibrant in colours, have strong pleasant smells, might make a sound while moving in the wind, have beautiful visuals and interesting touch. The use of such a diversity of plants is beneficial to humans that visit the garden, but it will also attract insects and wildlife.

Through the phenology of plants, one can use the vegetation in a garden to serve as a guide to interpret what season it is (Zeisel, 2007). Through personal observations, the early bloom of crocuses and magnolias is a clear indication of spring. At the same time, the vibrant colour of perennial beds is part of the summer. Ripe fruits and the orange, yellow and red leaves of trees and shrubs signal autumn's arrival. As the winter sets in, we are left with the naked stems of trees and shrubs, the white body of perennials all glittering in the early morning frost.

In a limited study of a residential home for people with dementia, the researchers and staff agreed on some benefits of using plants in indoor and outdoor settings. It was reported that the plants created a homelike and welcoming sensation and were recognised to visualise the season and to attract wildlife like birds. In addition, the plants were beneficial for creating new activities, stimulating senses, and enhancing positive emotions. The staff reported that activities with plants helped the residents maintain skills and functions, raised self-esteem, and the exposure to fresh air helped them get better quality of sleep. Being exposed to familiar plants, which sometimes can elicit memories, also calmed anxious residents (Rappe and Lindén, 2004; Uwajeh, Iyendo and Polay, 2019).

When Gonzalez and Kirkevold (2014) looked at multiple studies, they found that residents who could produce edible plants indoors benefited from it. Some results were, among others, significantly improved sleep and sleep patterns, less agitation, and improved cognition. However, it should be noted that the residents had a proclivity for eating or in other ways damaging plants, berries, and soil. They were especially interested in plants with colourful flowers or berries (Rappe and Lindén, 2004; Gonzalez and Kirkevold, 2014), making a safe and non-toxic plant selection a critical part of the design.

2.5 FAMILIAR AREAS

Long term memory can be divided into implicit and explicit memories. The difference is that explicit memories are connected to a conscious recall of information, such as solving a maths problem using pre-remembered formulas. In contrast, implicit memories are more unconscious and automatic or unintentional. They are often connected to a process of doing something, like washing the dishes or remembering driving a car, how to get dressed or knowing the lyrics of an old song (Bauer, 2013; Cherry, 2022). The two ways of storing and recalling memories differ in how they function, and studies suggest that people with dementia have better prospects of remembering implicit memories. On the other hand, explicit memories are often more difficult to recall and a greater struggle for dementia patients. Researchers suggest new approaches for dementia care focusing on implicit memory, putting theory to practice (Harrison et al., 2007).

The idea that certain memories can be implicitly recalled through activities and senses and not through actively working on recalling them is valuable to apply to the garden design at Björklunden. Incorporating familiar indoor and outdoor elements through natural features such as plants and animals can activate implicit memories for people with dementia who had such features in their prior homes or while growing up. Evoking old and familiar memories may result in more comfort and less agitation for the residents at a dementia facility (Harrison et al., 2007).

Outdoor environments, like a garden, can offer a place for activities familiar to the residents of a care facility, like physical activities, socialisation, and reflection in a safe setting. Even though the effects on people with dementia are limited (Calkins, Szmerekovsky and Biddle, 2007), it seems unlikely that safe outdoor environments will increase dementia symptoms.

2.6 SOCIAL AREAS

Providing more opportunities to sit and rest will increase the likelihood of older adults going outside for a walk (Brawley, 2007). Both Göteborg and Malmö municipalities recommend that benches should be placed at 25 metre intervals in high-traffic areas (Malmö Stad, 2022; Göteborg Stad, n.d.). As part of the design, one needs to plan for having seats close to paths and have seats directed at features like bird feeders, fountains and similar, to engage in activities.

Zeisel (2007) suggests "intimate seating areas, comfortable benches surrounded by flowering bushes, and planted areas for vegetables all build on the health of the amygdala in Alzheimer's disease". The amygdala is the one part of the brain responsible for "emotions and feelings". Designers should make areas for both shared spaces and areas to be alone. The residents need to find comfort in the garden, which could be achieved by recognising some places as their own. It could be a bench or a vegetable patch presented as several smaller places where individuals can "take over" for a while (Zeisel, 2007).

There should also be places for groups, even if it is just two or three people. The dementia diagnosis often comes with loneliness and social isolation. People with the diagnosis often experience that family and friends become less present in life, making it important to fill the need for human connection in the dementia facility. This may be achieved by facilitating areas to sit together and have group activities (Brawley, 2007; Zeisel, 2007). In order to not exclude a group of people, the common spaces and the solitary areas must accommodate wheelchair users (Uwajeh, Iyendo and Polay, 2019).

2.7 LAYOUT AND CONSTRUCTION

Already at our first visit to Björklunden Dementia Facility, the project leader stressed the importance of having a path that always leads “back home”. This concern is supported by several researchers and reports stating that circular walkways returning to the starting point are beneficial in garden design for people with dementia. Additionally, visible destinations should be easy to understand, including landmarks that help the users orient themselves along the path. Making the garden easy to understand and navigate will motivate the residents to use it more (Zeisel, 2007; Uwajeh, Iyendo and Polay, 2019). The landmarks or signs must be placed at a height that allows wheelchair users to read them easily and be available for closer examination by people with impaired vision (Boverket, 2014).

It is suggested that where two paths intersect, they should be designed to meet at a 90° angle so that all paths are clear and obvious, promoting a conscious choice for the resident in whether they want to walk somewhere or not (Zeisel, 2007; Gonzalez and Kirkevold, 2016). The greater the distinction between the main path and a shortcut, the better it can make an ‘environmental announcement’ of the intersection. This may be achieved by changing materials, colour schemes or placing planting beds at the intersection (Zeisel, 2007).

All paths should make room for at least two residents either walking or using a wheelchair next to each other (Cochrane, 2010), and by Swedish standards, this means that the paths must be 150 cm wide, and the turning zones must have a diameter of 150 cm (Boverket, 2014). The edges of the path should be made visible by using contrasting colours or being raised to illustrate the movement of the path (Cochrane, 2010; Boverket, 2014). While the paths might need technical regulations to avoid incidents, their placement can be favourably positioned along specific elements to help residents participate in activities and socialisation in their walks, thereby improving the value of the walk itself and increasing the use of the garden (Brawley, 2007).

Helping the residents understand and navigate the garden will result in a more suited design for dementia patients. If a garden presents the same features each time the patients see and use it, then the routine and repetition of the garden support their memorisation. Also, certain features can have a striking emotional or symbolic presence, like “a striking rose bush, a chicken coop, a barbeque” (Zeisel, 2007). Ensuring that there are obvious clues and visible connections to important destinations and familiar areas is important to facilitate (Brawley, 2007).

People living near green spaces or observing nature through a window may experience positive health outcomes (Keniger et al., 2013). Clear sightlines from the inside areas of the dementia residency may help staff feel comfortable allowing patients unrestricted use of the garden, securing their maximum benefit from it (Brawley, 2007; Cochrane, 2010).

2.8 SAFETY MEASURES

The design of the dementia gardens has to be perceived as safe by all user groups, and this should be an essential part of the design strategy (Brawley, 2007). There should not be any hidden areas that can confuse the users (Zeisel, 2007) or where the residents can hide from the staff (Uwajeh, Iyendo and Polay, 2019). Securing the gardens is vital, and it needs to be surrounded by a fence, though this should be done with consideration to not making the garden feel confining (Brawley, 2007). A fence is a way to limit the potentially dangerous spaces outside the garden (Zeisel, 2007; Gonzalez and Kirkevold, 2014). A designer should find good techniques to disguise or shift the focus away from the fences to concentrate on the garden itself rather than its restricting boundaries (Brawley, 2007). Using vegetation to cover up fences will lessen the feeling of being in an enclosure, making fences less obvious (Cochrane, 2010). Exits should be camouflaged to make it harder for residents to find them and wander off (Gonzalez and Kirkevold, 2016).

All elements that are accessible to the resident must hold the weight of a person leaning on them. If an element is too fragile, it must be placed out of reach for the resident (Zeisel, 2007). The design proposal must ensure enough elements to sit on and that these seated areas are stable, preferably fastened, that help residents sit down or get up on their own. Use strong material for the seated areas and have benches or seats with armrests for comfort and accessibility (Cochrane, 2010; Boverket, 2014). The seats need to have suitable sizes and be stable. Furniture should not have rough materials that can be damaging to the skin. The heights of the seats should be adjusted, so it is easy to sit down and get up from them (Brawley, 2007). People dealing with dementia may struggle to differentiate between indoor, outdoor, and “in-between” environments like parking and roads. It is important that the design supports a good orientation in their environment and keeps the residents safe.

As another safety measure, good pathways should have enough slope to avoid puddles during precipitation, and the material must remain non-slippery when exposed to water. It is also crucial that the pathways are maintained to support use. A lead cause of outdoor falls is glare reflection from bright materials such as white paving (Brawley, 2007; Boverket, 2014). Acceptable surface materials include concrete slabs, smooth stone slabs, firm and flat gravel surfaces, and asphalt (Boverket, 2014). Stairs can be very limiting for the residents and should be avoided, and when there are elements such as paths and ramps, the material must not become too slippery (Zeisel, 2007).

Though spending time outside is mostly beneficial, some issues need to be considered. Sunlight is important for vitamin D production (Uwajeh, Iyendo and Polay, 2019). It increases serotonin levels (Ulrich, 1999) and helps the sleep and wake pattern, however, when the sun is too bright, shade must be provided (Calkins, Szmerekovsky and Biddle, 2007; Gonzalez and Kirkevold, 2014). Pergolas or vegetation can shelter the sun and provide a light shade (Uwajeh, Iyendo and Polay, 2019). Seating areas and paths should vary in sun and shade conditions to provide residents with various options based on their preferences (Bengtsson and Grahn, 2014).

2.9 STAFF INVOLVEMENT AND EDUCATION

While there is a consensus on the healing powers of therapeutic gardens in care facilities and institutions, the gardens often fail to make sure that the residents can use them (Brawley, 2005). Chapman, Hazen and Noell-Waggoner (2007) argue that it is essential to implement a training program for the staff working with therapeutic gardens in dementia residencies. Simply building a garden does not guarantee that it will be used. Therefore, it is essential to provide the employees with information, time, and knowledge and make sure that there is enough funding to take full advantage of the garden.

According to Brawley (2005), one of the primary reasons gardens in dementia facilities become underutilised or inaccessible to residents is staff concerns that residents might wander away or injure themselves. A successful garden becomes part of residents' lives and is constantly used (Brawley, 2007). Involving the staff in the design process increases the likelihood of the gardens being more used (Ulrich, 1999).

2.10 LAWS AND RECOMMENDATIONS

There are several laws connected to people with dementia and their care. Socialstyrelsen (the National Board of Health and Welfare) in Sweden regulates the care for people with dementia and ensures that laws are upheld with good and safe care (Socialstyrelsen, 2018). According to Socialstyrelsen (2020), good and safe care must be individually based, knowledge-based, efficient, equal, and available. Socialstyrelsen has made a list of recommendations on caring for people with dementia. The list contains 76 recommendations for different measures and actions to help people with dementia (Socialstyrelsen, 2018). Out of the 76 recommendations, there are three that could be connected to this project and one that is directly connected. The recommendations connected to this project are listed in Table 1.

Demensförbundet (the Dementia Association) is an organisation that works actively for the rights of people with dementia and their relatives (Demensförbundet, 2019). Demensförbundet has made a list of preferred living conditions for people with dementia. Living conditions are better when they focus on the needs of its elder residents instead of being staff oriented. The association voices that the elderly should have an opportunity to maintain their prior lifestyle to the extent possible. It is crucial that the staff know the elderly's history and keep up with daily activities like eating together to have stimulating conversations (Demensförbundet, n.d.). Demensförbundet describes activity as a critical measurement for people with dementia and issues that the activities should be adapted for the individual's needs and ability, not restricted by budget (Demensförbundet, 2019).

Table 1. The table showcases recommendations from Socialstyrelsen in regards to dementia care. The priority of the actions are given a value and the authors describe its relevance to the project at Björklunden dementia facility.

NUMBER	STATE AND ACTION	MOTIVATION TO THE RECOMMENDATION	PRIORITY	LINKING TO THE PROJECT
49	**Dementia** Opportunities to outdoor stay	Address basic needs that a person with dementia has difficulty meeting without support.	2	This is directly connected to the project. If the gardens are built, the residents can have free access to outdoor environments or at least access them with the help of a caregiver. This increases the opportunities to go outside.
51	**Dementia, mild to moderate** The daily operations adapted for people with dementia	Proven experience suggests that the measure has a positive effect. Through meaningful daily life, the measure contributes to maintained functions. The measure is also an essential component of person-centred care. It can potentially improve the situations of the relatives.	1	The garden design will be based on science and, therefore, can help the residents.
90	**Dementia** Cognitive stimulation	Affects important outcome measures, such as quality of life.	6	In a garden, cognitive stimuli are high, which helps the residents to increase their quality of life.
95	**Dementia, moderate to severe** Care facility adapted for people with dementia	Proven experience suggests that small scale inclusive care facilities positively affect critical outcome measures for the person with dementia, such as behavioural and psychological illnesses, independence, and social participation.	2	Björklunden already offers small living environments. However, with the addition of gardens, the feel of familiarity will increase. Since the design gives opportunities for cultivation, the independence will also be increased.

CASE STUDY

3

3.1 SITE ANALYSIS

3.1.1 ABOUT THE FACILITY

Björklunden dementia facility is located in Tollarp, a small village in Kristianstad municipality, see Figure 2, with approximately 3500 inhabitants (as of 2020) (Regionfakta, 2021). It is a care- and nursing home for people who need professional care. Björklunden holds four units for elderly care.

Two of the units at Björklunden will be renovated and altered into a specialised care facility for dementia patients in 2022. The units are named Silvertärnan on the eastern side of the building and Svalan on the Western side. Both have a separate garden plot, see Figure 3.

During our thesis, we will refer to the different units and the garden belonging to them as Svalan and Silvertärnan. Silvertärnan and Svalan are placed on the ground floor of the building and shall hold a capacity of 18 residents in total, having nine residents in each unit. There is no direct connection between the two units as of today. The previous project leader, Björnfot, expressed that there shall continue to be no connection between the gardens due to safety measures and staff capacity.

Today, the people who work at Björklunden dementia facility aim to have a safe and pleasant environment that preserves the freedom and integrity of its residents. There are some organised activities at the facility like gymnastics, bingo, song- and music, baking, and religious services arranged at the nursing home (Kristianstads kommun, 2022).

Figure 3. The image is an overview photograph of Björklunden dementia facility. There are two separate dementia units at the dementia facility, identified as Svalan and Silvertärnan, that are referred to in writing on the roof of the building. Image provided via email by Mats Betram, Kristianstad Municipality.

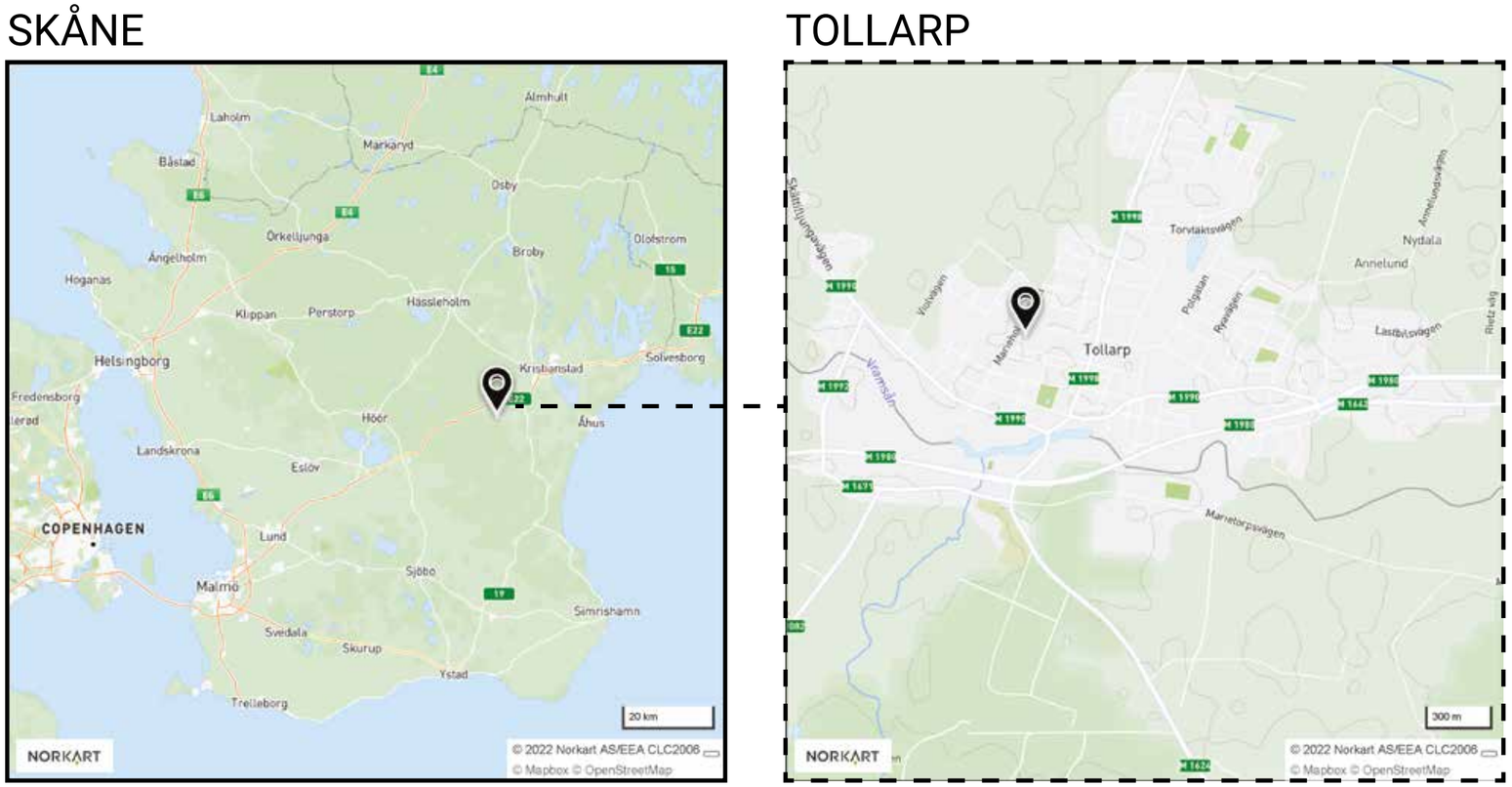


Figure 2. The maps are generated from Kommunekart.no and show where Björklunden dementia facility is located in Skåne with the exact location in Tollarp.

3.1.2 USER GROUP

There will be various people using the units at Björklunden. As part of this thesis, all user groups must be considered. We can divide the users into two groups: long- and short term users. The primary users of the dementia units Svalan and Silvertärnan will naturally be the residents living there. When creating a design proposal and finding relevant literature, they should be our main concern. However, it is essential to recognise the work that the staff does at the units and try through our proposal not to add to any stress or workload and secure their wellbeing and comfort at work. Both residents and staff will be staying for long periods, often over many years. Therefore they should be considered long term users. These users are the focus of this thesis.

Short-term users will be identified as friends and families of the residents using the facility as a place to visit and spend time with the resident they know. Such meetings may be filled with mixed emotions of both happiness and sadness, and the proposal should consider that the users may need areas to process feelings and host social arenas.

3.1.3 AREA BOUNDARY AND IDENTIFICATION

The boundaries for the gardens are a combination of where the municipality draws the property line and where the project leader at Björklunden wanted it. The project leader wanted the garden's fence to run along the bike lane.

Svalan will have a garden of 804 m² and Silvertärnan's garden will be 776 m². Each garden has a patio that takes up 18 m² as of today. The patios are placed outside a common room with an entrance leading into the building. They will continue to work as the main entrances between the gardens and the units.

Björklunden is neighboured by single-family homes to the south and a residential building for senior citizens to the east. A bike lane in the south surrounds the building and a parking lot in the north. Svalan has a bike lane and road to the west of the garden.

Figure 4. Illustration showing soil conditions at Bjørklunden dementia facility.

3.1.4 SOIL CONDITIONS AND PRECIPITATION

The site soil consists of sandy moraine and is a relatively nutritious and standard soil type , see Figure 4 (SGU, 2022). It should be favourable for most common garden plants, trees, and shrubs. The yearly precipitation in Tollarp is 700 mm/year (SMHI, 2020).

3.1.5 SUN AND CLIMATE CONDITIONS

Björklunden is situated in the south of Sweden and is placed in hardiness zone 2 according to the Swedish hardiness zone system (Växtzoner, no date). The unit Svalan is southwest facing, and Silvertärnan is facing southeast, giving them different sun and shade conditions. To better understand the sun's movement and when and where the residence building and surrounding buildings cast shadows on the gardens, a sun and shade analysis was made, see Figures 5-20.

The times chosen for the analysis are based on when the residents are likely to venture outside. The sun analyses show sun and shade conditions on the 15th of March, May, July, and September 2021 to showcase early and late spring, summer and early autumn.

MARCH

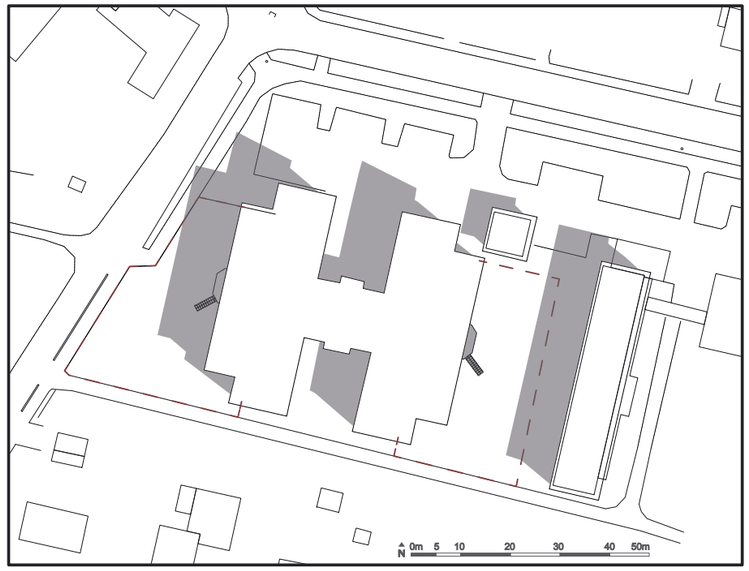


Figure 5. Sun analysis at Björklunden 15th March 09.00.

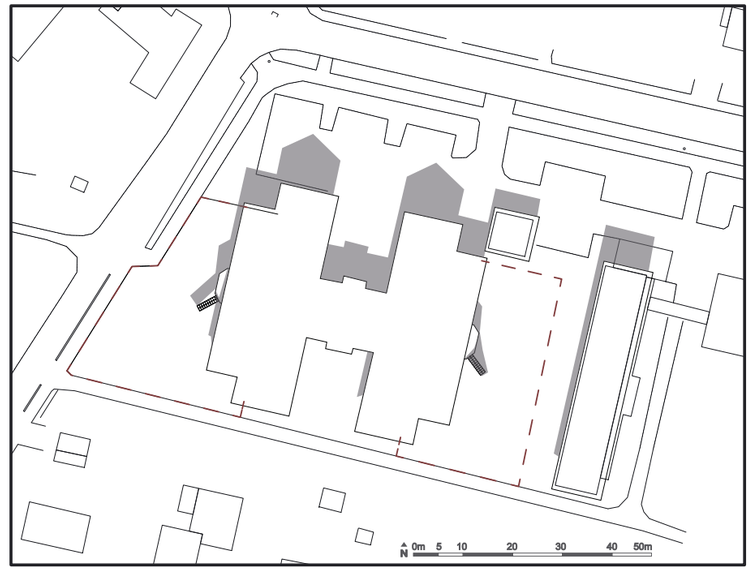


Figure 6. Sun analysis at Björklunden 15th March 12.00.

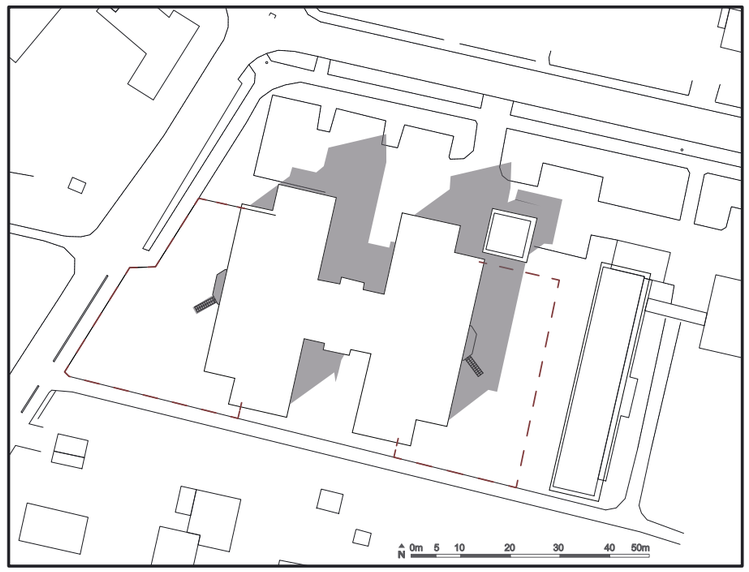


Figure 7. Sun analysis at Björklunden 15th March 15.00.

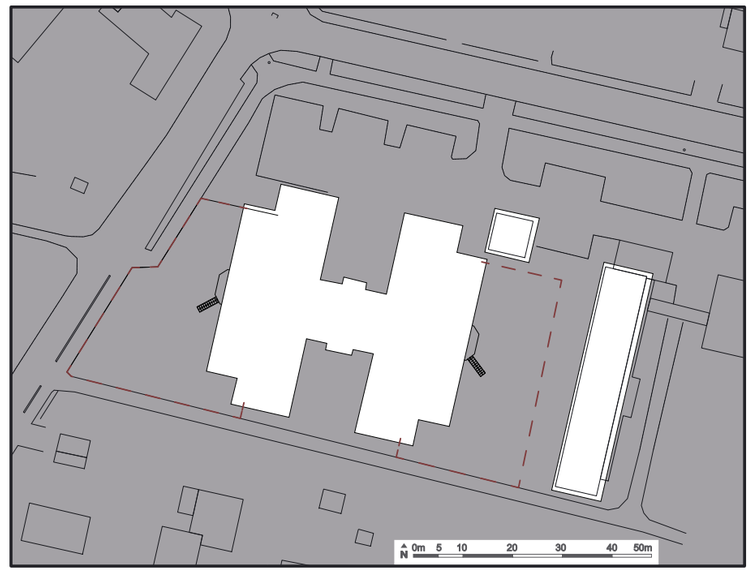


Figure 8. Sun analysis at Björklunden 15th March 18.00.

MAY

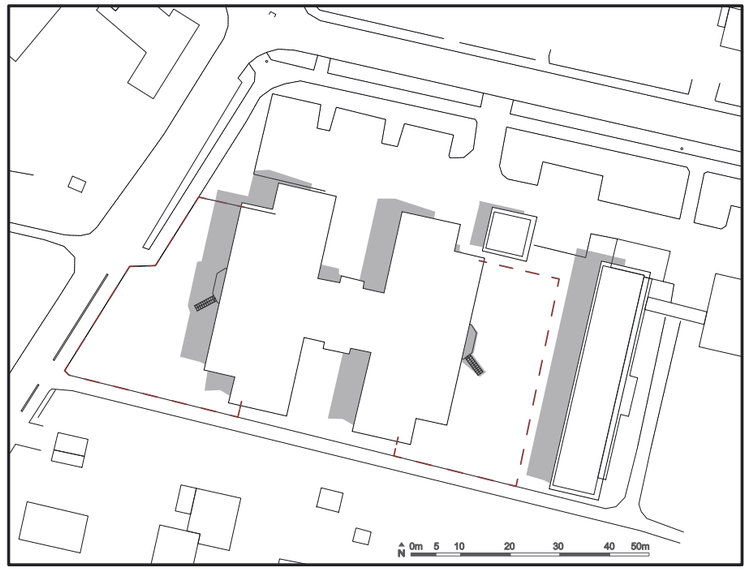


Figure 9. Sun analysis at Björklunden 15th May 09.00.

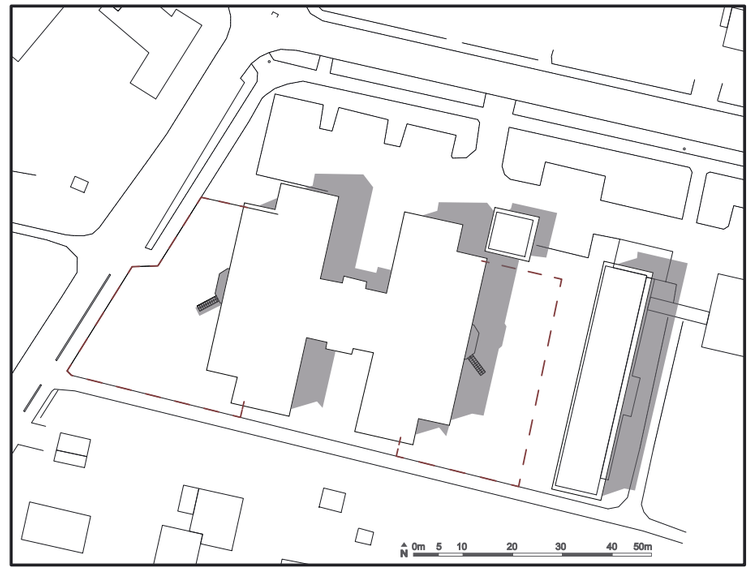


Figure 10. Sun analysis at Björklunden 15th May 12.00.

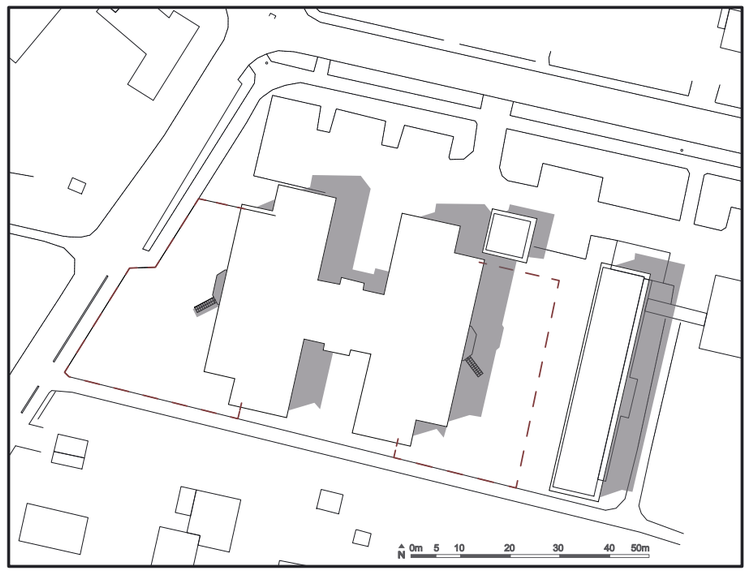


Figure 11. Sun analysis at Björklunden 15th May 15.00.

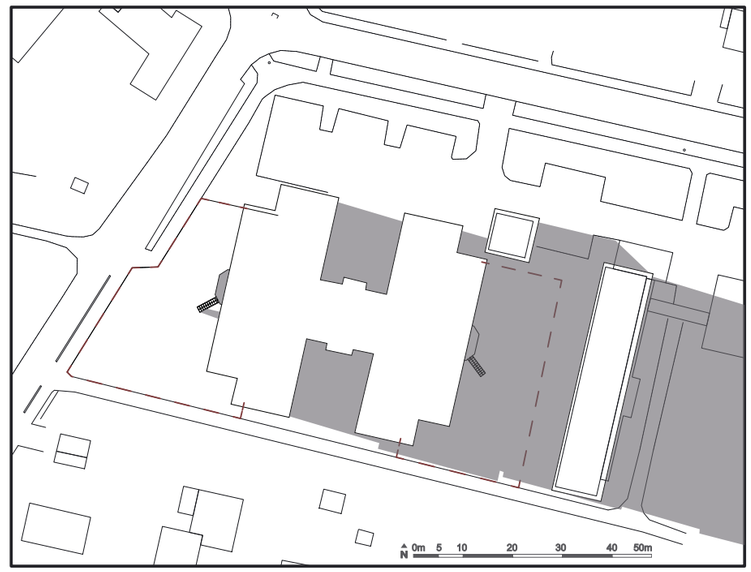


Figure 12. Sun analysis at Björklunden 15th May 18.00.

JULY

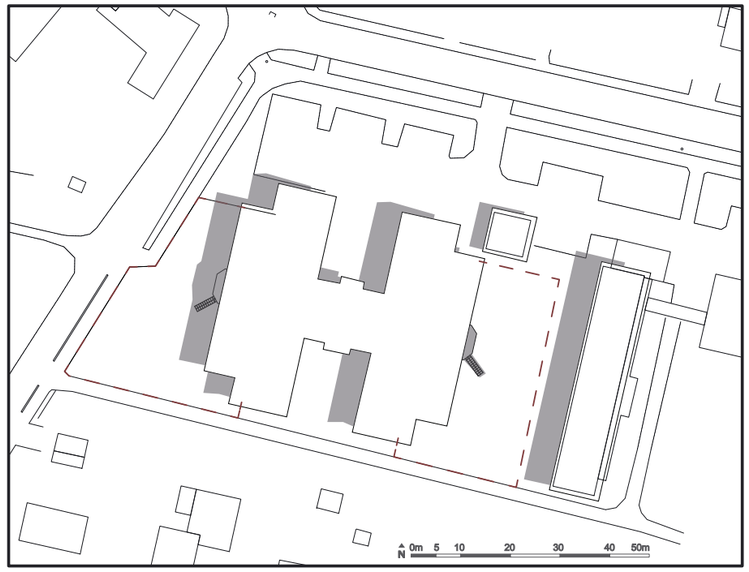


Figure 13. Sun analysis at Björklunden 15th July 09.00.

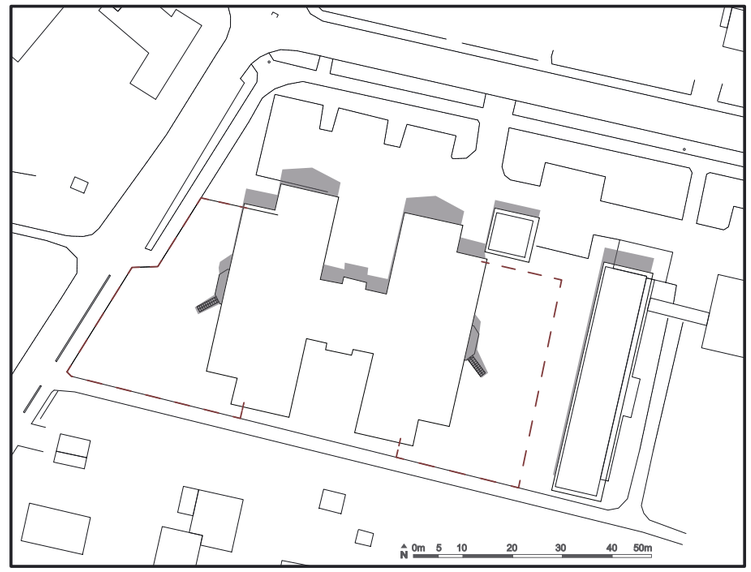


Figure 14. Sun analysis at Björklunden 15th July 12.00.

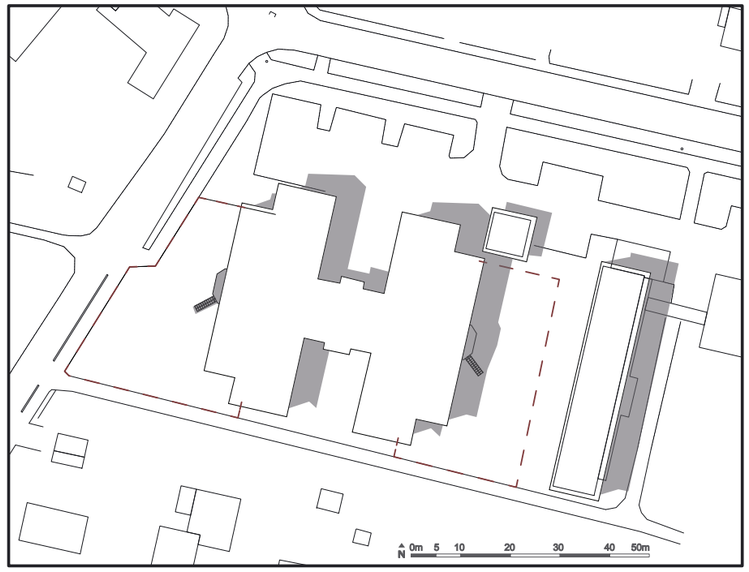


Figure 15. Sun analysis at Björklunden 15th July 15.00.

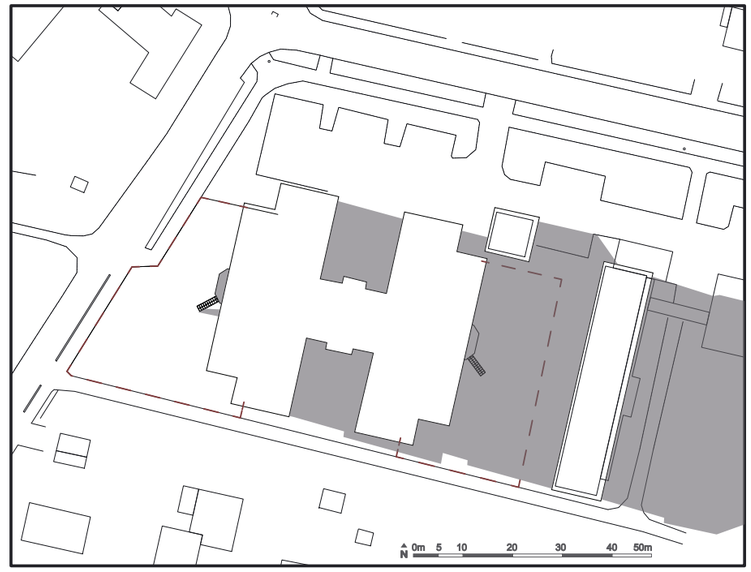


Figure 16. Sun analysis at Björklunden 15th July 18.00.

SEPTEMBER

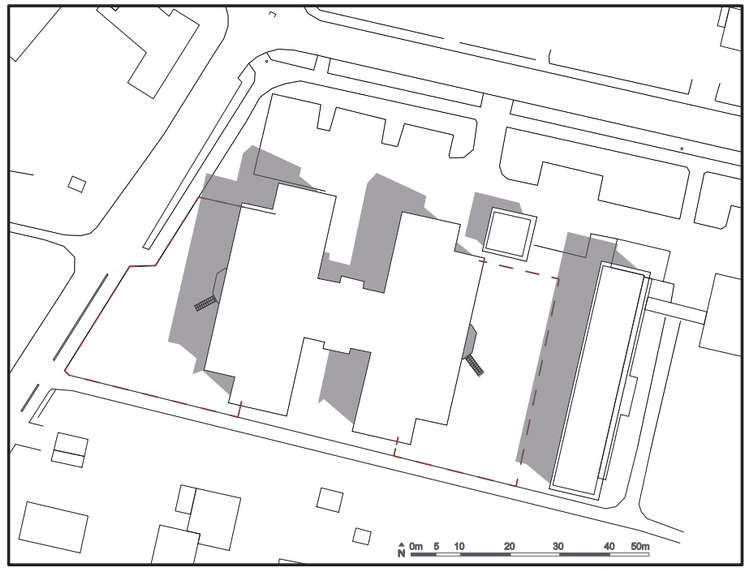


Figure 17. Sun analysis at Björklunden 15th September 09.00.

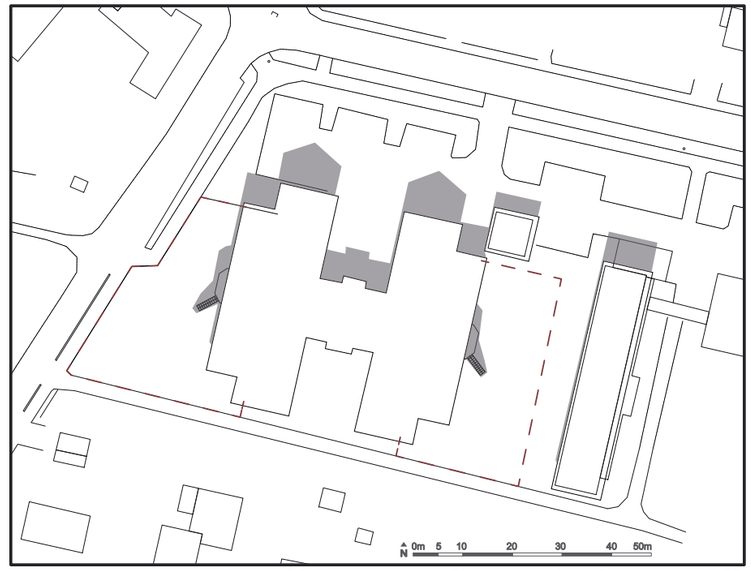


Figure 18. Sun analysis at Björklunden 15th September 12.00.

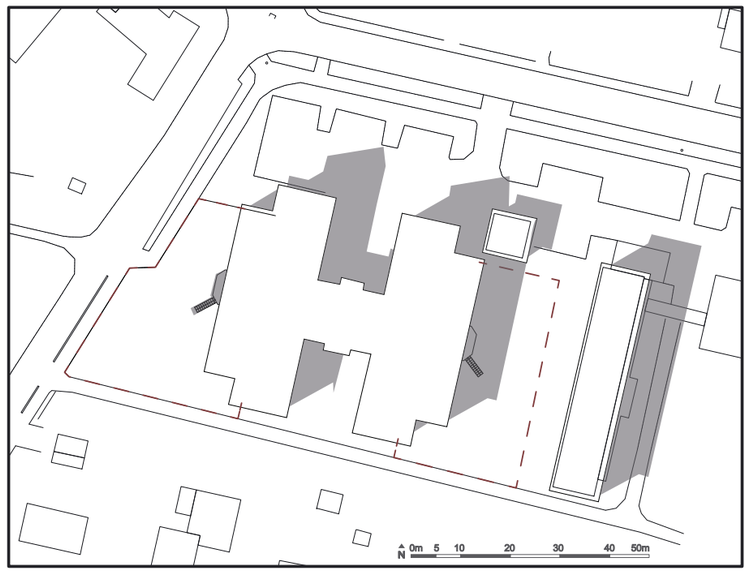


Figure 19. Sun analysis at Björklunden 15th September 15.00.

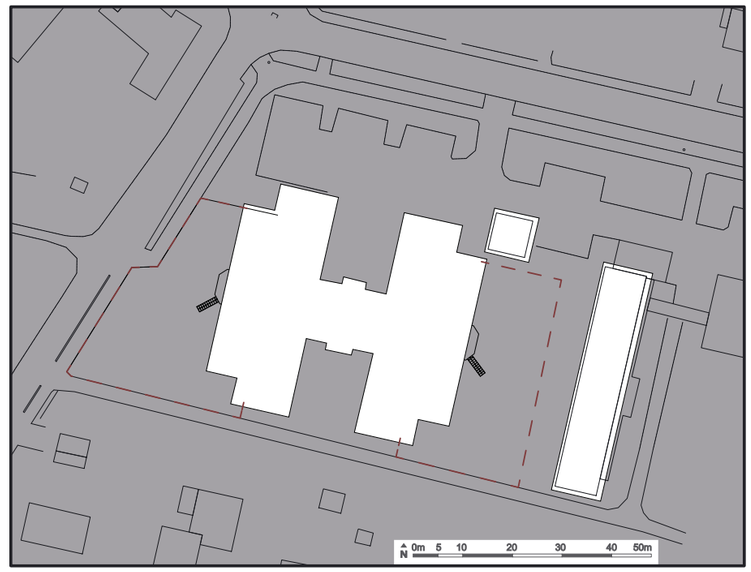


Figure 20. Sun analysis at Björklunden 15th September 18.00.

SITE REGISTRATION FEBRUARY 2022

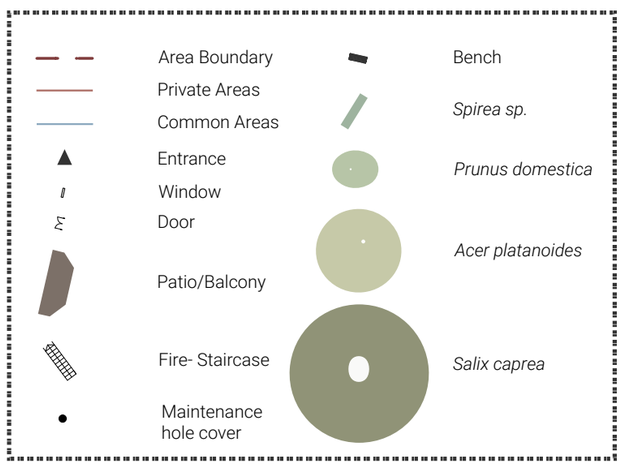
Figure 21. Site registration from both garden areas at Björklunden dementia facility. The registration was done by the authors in February 2022.

3.1.6 VEGETATION REGISTRATION & INVENTORY

As part of the site analyses, an inventory of existing vegetation, materiality and elements was done. During the inventory, the size of the vegetation was mapped. Measurements such as the canopy and stem width of the trees and the length and depth of the hedges were noted, see Figure 21.

The garden areas are close to empty plots with few trees, a surrounding hedge, a cut lawn, and no fencing. The terrain is considered entirely flat on both garden sites.

LEGEND



At Svalan, there have been registered two *Prunus domestica*, see Figure 26, that are in bad condition with fungi and wounding from poorly pruning techniques. A well established *Spiraea* hedge runs along the western side of the garden, see Figure 24.

Silvertärnan has a significant *Salix tree,* see Figure 23, that also has some wounding from pruning. However, fungi have not yet infested it, and it is in a better shape than the plum trees.

The gardens have a patio with a balcony above, as seen in Figure 25. The patio provides an easily accessible outdoor area; however, it is relatively small and will not fit the soon to be nine residents.

On a visit to the garden on April 22, we could note that the grass plains of both Svalan and Silvertärnan have a variety of wildflowers, which should not be mistaken for weeds. As we took more photographs of the site, we observed both butterflies, honeybees and bumblebees, see Figures 22 & 27.

What is common to both gardens is that there are little to no physical structures and no laid-out paths. However, as registered in the site analysis, the garden at Svalan has three maintenance hole covers that should be considered when planning the new design.

Although the two gardens are surrounded by bike lines and car roads leading to residential areas, we did not observe much traffic. Björklunden seems to be sheltered from traffic, and during interviews, we held at a later stage, the staff that participated stated that they do not experience that there is much traffic.


Figure 22. Butterfly on wildflower at Svalan.


Figure 23. Garden at Silvertärnan with *Salix caprea* February 22nd.


Figure 24. *Spiraea* hedge at Svalan garden February 22nd.


Figure 25. Patio and entrance to common rooms April 22nd.


Figure 26. Garden at Svalan with *Prunus domestica* February 22nd.


Figure 27. Wildflowers in the grass April 22nd.

3.1.7 SWOT ANALYSIS

SWOT analysis is a tool for identifying and analysing strengths, weaknesses, opportunities, and threats in the project at Björklunden Dementia Facility and seeing how these measurements will impact the project and users of the dementia facility. The SWOT analysis is based on the site analyses, inventories, and general thoughts. It will help decision-making in designing and choosing what to keep in focus. The SWOT analysis can be somewhat generalising as some things are both positive and negative.

STRENGTH

- Much free space.
- Little traffic around.
- South-facing, sunny gardens.
- There are few adjustments to gardens.
- Mostly grass lawns in gardens.
- The terrain is flat.
- Well established hedge at Svalan.

WEAKNESS

- Gardens lack universal design.
- No arrangements for activities.
- Lack interresting views from windows when staying inside.
- Prunus trees are in poor condition.
- Close to residential homes and bike traffic.
- Very few seated areas.
- Poor pruning routines.
- Few areas with shade.
- The gardens do not feel inviting.
- No fences around the gardens.
- The gardens do not feel inviting.
- Salix is losing much branches and will potentially collapse due to age in the future.

OPPORTUNITIES

- Possibilities to improve seated areas.
- Possibilites to include new activities.
- Good conditions fo gardening, walking, bird watching.
- Good possibilities to establish universal design.
- Possibilities to improve and add green infrastructure.
- Possible to build a fence and hide it with vegetation
- Posibility to increase outdoor time for the residents.
- Posibility to increase space for the residents to use.

THREATS

- Traffic accidents could occur.
- Slippery paths (when built).
- Hard materials such as paths might make the gardens feel more institutionalized
- Confusing the residents with poor design choices.
- Residents eating poisonous vegetation.
- Resident trying to escape the gardens.
- Residents being somehow harmed by the design solutions.
- The area not being used by staff and residents.
- Lack of maintenance/ knowledge about it.
- Could be a problem with fallen fruit on the paths in the autumn.

TODAY **IN THE FUTURE**

3.2 INTERVIEWS WITH BJÖRKLUNDEN STAFF

3.2.1 THE MEETINGS

Public participation in planning processes is recognised as a basic premise in sustaining a local democracy (Kommunal-og Moderniseringsdepartementet, 2014). If stakeholders have had a chance to voice their opinions, often there will be less disapproval later (Länstyrelsen Västerbotten, 2011). Furthermore, the utilisation of staff engagement in the design process of this thesis may result in a greater sense of unity and interest in the garden, which might also lead to increased usage and care for it (Ulrich, 1999). As a part of the agreement for collaborating with the municipality, we were obliged to include the staff and residents in the planning process.We had four meetings with the staff; they are described in the following four sections.

3.2.2 1ST MEETING

First meeting was a rather informal meeting with the project leader Tove Björnfot and one of her colleagues. We were given a tour around the facility's premises, looking at the case areas and learning how the gardens were used today. Björnfot showed us around inside Silvertärnan since it was empty at the time. We were told both Silvertärnan, and Svalan looks the same. We were shown the common room, which will be the entrance to the gardens after construction. Björnfot briefed us on some ideas for the project, varying from establishing universal paths and increasing the vegetation to having a chicken coop and jacuzzi. However, during the meeting, we were told that we should design what we believed to be best for the gardens if it was rooted in science during the meeting.

3.2.3 2ND MEETING

On March 1st, we held an online workshop with the staff at Björklunden. We started by presenting what we would do in the project and, in turn, what they could expect from us. Their opinions matter since, in the end, they will use the garden together with the residents. After the presentation, we gave them questions to discuss in groups. The questions concerned how they would like to use the gardens, what elements they thought should be included, their interest in using the gardens, how they experienced the surroundings, and safety measures they felt should be taken. For more detailed information, see Appendix 2.

From the interviews, we could tell that most of the staff feel enthusiasm for having gardens and feel like they could put in approximately two hours per week into gardening. They want colourful gardens that have different fragrances and are easy to maintain. A recurrent theme is that they want flowers suitable for picking and fruit-bearing trees and shrubs. Cultivating edible plants with the residents was a popular thought. However, the staff would prefer plants that are easy to grow.

Suggestions like potatoes, carrots and strawberries were voiced as well as a herb garden. Multiple staff members pointed out that the cultivation opportunities should be adapted to wheelchair users. Staff members mentioned that the seasonal changes were important, and plants used as seasonal markers were wanted. It was important for the staff to have an easy overview of the garden to give the residents more personal independence. However, concern has been raised that there is no fence around the gardens. It was suggested that a fence would be needed to secure the safety of their residents. Both gates and fences should be covered with plants to reduce the feeling of enclosure and lower the risk of residents trying to escape.

3.2.4 3RD MEETING

On April 6th, we had an online meeting with Björnfot to clarify some questions about the project. Björnfot was briefed on our design, and we made preparations for our presentation on the 22nd of April. Björnfot informed us that there would be no budget because she was unable to get an answer from the local politicians. Björnfot also indicated that her boss was positive about the project, and the likelihood of the gardens being constructed was high.

3.2.5 4TH MEETING

On the 22nd of April, we went to Björklunden and presented the project to the staff and management. We showed our illustration plan, visuals of how the gardens would look after planting and when the trees and shrubs have had time to grow older, what the perennial plantings would look like and a phenology scheme. Overall, the response was positive, and the staff thought we had listened to them. We received several budget and management cost questions that we could not address because those aspects of the project had not yet been completed. We got invited to present our project to other management staff during June. We found out that Silvertärnan had opened during this meeting, and residents had started moving in. According to Björnfot, most residents were highly functional and did not need the staff for most daily tasks.

3.3 DESIGN PROCESS

3.3.1 GOALS AND CHALLENGES IN THE DESIGN

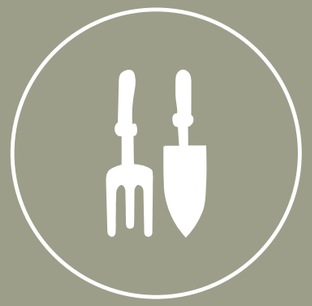
As stated in the literature study, people developing symptoms of dementia, regardless of their state or prognosis, live through a challenging time with much confusion and complicated feelings such as anger and sorrow. Hopefully, the gardens will create a calm and safe environment with some familiar elements and vegetation that may help stimulate senses and recall memories of their past life, find comfort in their current life situation, and support their mental and physical well-being.

When designing the gardens at Björklunden Dementia Facility, it was important to create a familiar, safe, and intriguing solution for users, especially residents. The gardens need areas to be social and active while also having room for one to sit alone and contemplate. The activities incorporated in the design of the gardens must consist of different intensities so that it is possible to participate in more challenging chores like gardening or be part of a more passive group or by themselves engage in bird watching or similar.

3.3.2 DESIGN PRINCIPLES FOUND FOR BJÖRKLUNDEN

To create a good design, the proposal had to combine the literature study results and the staff's wishes at Björklunden. For that to happen, we have created design principles based on our research phase and interviews with the staff at Björklunden. The design principles serve as a toolkit when designing, and we have summarised them into five categories: Activity and use, Layout and Construction, Social Areas, Plants and Safety.

ACTIVITY & USE



- Include elements like birdfeeders and birdbaths.
- Allow and facilitate gardening for both staff and residents.
- Paths that encourage walking.
- Having vegetation suitable for flower picking
- Vegetation suitable for harvest.
- Raised garden beds for gardening.

LAYOUT & CONSTRUCTION

- Create obvious paths and layouts that support mental mapping.
- All paths must lead back to the starting point.
- Intersecting paths shall meet each other at a 90° angle and be visible.
- Where two paths meet, use different materials, sizes, colours, planting schemes, or similar.
- Use landmarks to help users orient in the gardens. More important, close to the entry/exit of the garden.
- Paths and paving can be marked with contrasting colours or a raised edge to make them more visible.
- Main paths should have space for at least two wheelchairs or people next to each other.

SOCIAL AREAS

- Include enough places to sit.
- Include areas to be alone.
- Plan for areas to socialise.
- Include elements like birdfeeders and birdbaths.
- Seating areas should be close to paths and activities.
- Seating should face away from fences, private windows, and gates.

PLANTS

- Must be non-toxic.
- Use several edible plants.
- Familiar plants evoke memories.
- Present some plants through raised garden beds.
- Use vegetation to hide some constructions, like fencing.
- Promote sensory experiences.
- Make vegetation available for every user.

SAFETY

- Paths need to have a slope to avoid water puddles.
- Choose path material that does not get slippery.
- Maintain paths and structure to avoid deterioration.
- Materials should not cause bright reflections.
- Include fences around the garden.
- Few or no hidden areas.
- Stable constructions that support a grown person's weight.
- Constructions must be inclusive for people with disabilities.
- Benches and chairs should have armrests.
- Incorporate shaded areas.

3.3.3 STARTING THE DESIGN PROCESS

Having the design principles in mind, we started sketching ideas for the gardens. We thought we should focus on one garden at a time but fell quickly into designing both to make a more coherent design. The same elements are used in both gardens, and it made sense to design them together. We started hand sketching in the same room but found it better to separate and not copy each other. Later we moved on to sketching digitally and made different rough sketches which we later combined. It all amounted to a concept we both were happy with. We kept the design principles in mind throughout the process and tried to meet them. Illustrations from our process is visualised in Figures 28-33.

Figure 28. Sketching first draft of the garden layout at Svalan.

Figure 29. Illustration from a concept sketch for both gardens at Björklunden we worked on together which was important for the final design.

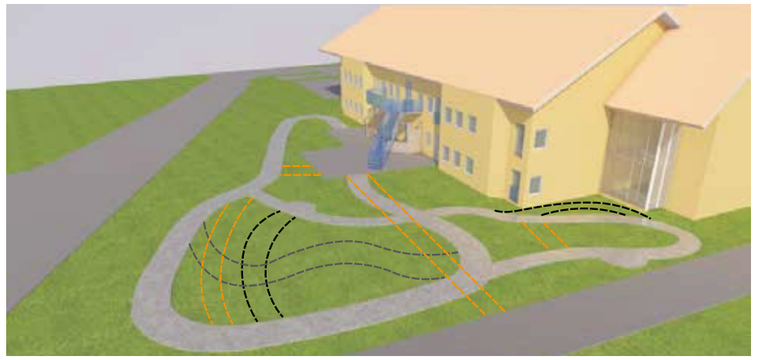


Figure 30. Using 3D model for spatial awareness when planning paths. Example from Svalan.

Figure 31. Illustration Plan in progress. Placing vegetation for spatial awareness in both gardens.

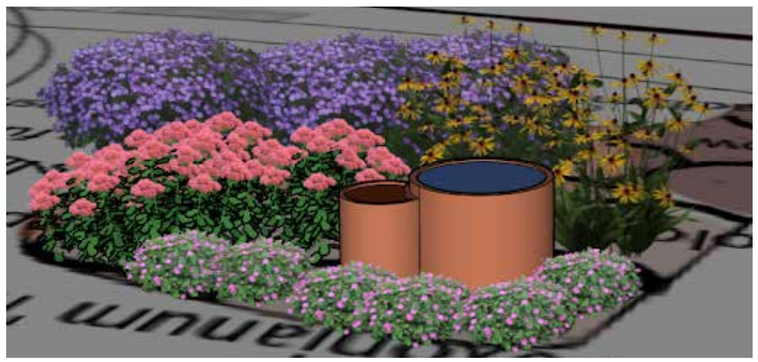


Figure 32. 3D model to test how the perennials could be combined regarding shape, colours, height and texture.

Figure 33. Idea sketching of different activities that could be implemented in the gardens at Björklunden.

3.3.4 CONCEPT: GROWING MEMORIES

Our thesis and concept landed on 'Growing Memories'. The name reflects how the gardens alter an arena to evoke old memories and provide or grow new memories and experiences. The gardens had to incorporate vegetation, and other common elements from a private garden, reminding the residents of gardens they had encountered earlier in life. In most gardens, there are some fruit trees, a place for gardening, one or two perennial beds, and places to sit down, both social and alone.

The idea was to create different sections of the gardens that invite users to explore its diversity. There will be a Fruit Garden, a Kitchen Garden, and a Flower Garden, see Figure 34 & 35. The paths in the gardens will be laid out so that users of the garden can visit all "three" gardens or whichever part they desire. Shrubs, trees, and perennials are specifically placed to create interesting and beautiful visuals for the users. It also manipulates sightlines and draws attention away from gates, fences, parking lots, roads, and other housing areas. As a result, it reduces the feeling of being "gated in" and hopefully prevents creative escape ideas from the residents' minds

Figure 34. The illustration shows the division of the different concept areas that were used to design the final design at the gardens at Björklunden. The concept areas are alike on Svalan and Silvertärnan.

3.3.4.1 THE FRUIT GARDEN

The Fruit Garden is an area where you may harvest apples, eat cherries, and relax in the shade. The trees also provide shielding from the parking lot. This portion of the garden has been established so that workers, residents, and family members may enjoy familiar trees and shrubs with fruits and berries. Fruit trees, which are commonly seen in private gardens, can assist inhabitants in recalling memories from previous experiences. The Fruit Garden was placed in this specific location to ensure that the trees would not throw any shade on the Kitchen Garden. The south-facing half of the garden should be kept warm and sunny, placing the Fruit Garden in the northern part, providing more shade.

3.3.4.2 THE KITCHEN GARDEN

This part of the garden is dedicated to raised garden beds filled with edible plants of the facility's own choice. The idea is that the Kitchen Garden should be close-to-home close to the garden's entrance. One can also find a patio and a big table for the residents at this place. Having a kitchen garden near the outdoor dining table and close to the windows of a common room may support the residents in remembering to use their vegetables and herbs and inspire residents and staff to use the plants in their meals. Solitary fruit-bearing shrubs will be an important part of the Kitchen Gardens, where the fruit can be used in activities like baking or jam making indoors.

3.3.4.3 THE FLOWER GARDEN

Svalan and Silvertärnan will have an area dedicated to flowering perennials and highly ornamental shrubs. Although not all perennials are edible, none of the chosen plants is known to be dangerous or toxic. The plants in this section are chosen due to their scent, touch or visual appearances. Other plants to be found are familiar cultural plants like lavender. The flower gardens are supported with seating areas for groups and individual seatings. Additionally, the perennial beds are easily visible from the windows inside the facility, especially in the common rooms. Some of the perennials were chosen to be suitable for picking flowers.

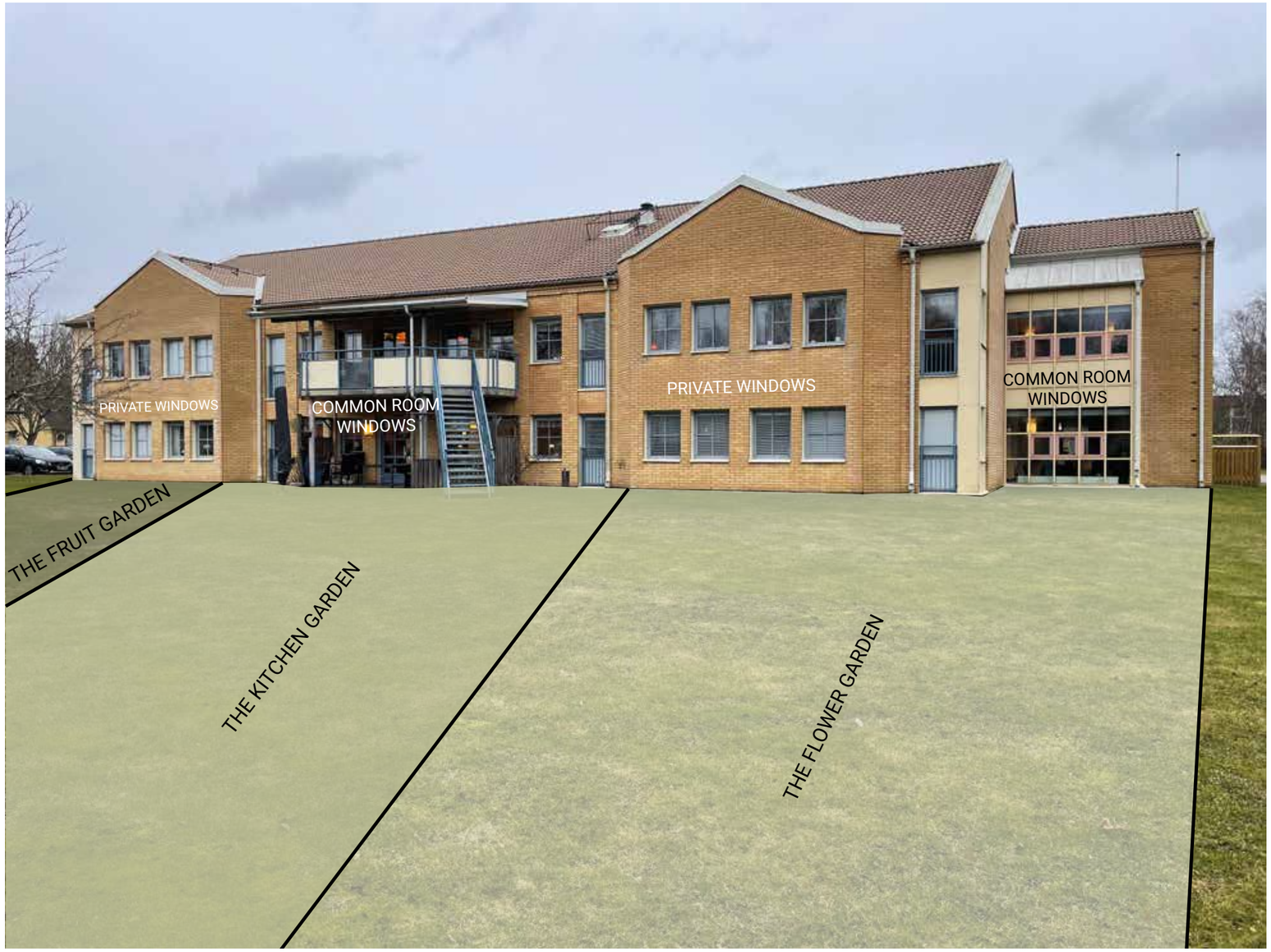


Figure 35. Picture of concept zones in relation to private and common rooms windows. Here applied at Svalan.

3.3.5 MOVEMENT

The layout of the paths was a natural starting point as they made up a significant part of the design principles and had to be tailored for the garden sites. The route arrangement very much drew itself throughout the garden to maximise the length of the path. It was divided into a 1.5 m wide main path with 1m narrow sub-paths, see Figure 36. The main path ensures enough space for two wheelchairs in width, following staff wishes and recommendations from Boverket, while the narrow paths are more suited for being alone. Together they provided walking routes that varied in length. We created paths with prominent movement lines that contrast the lawn in colour and material to adhere to the science. The paths were placed in a circular shape that always led back to their starting point. Intersecting paths intersect at a straight angle, often accompanied by perennial beds or other markers, allowing the resident to decide where to walk next.

We had to ensure that people using the paths would not disturb the residents with windows facing the gardens. Therefore the movement of the path was strongly connected with the placing of vegetation and other garden features. We built 3D models to get spatial awareness to ensure that the paths fit within the gardens and do not take too much space.

DESIGN PRINCIPLES IN MIND

- Paths that encourage walking.
- Create obvious paths and layouts that support mental mapping.
- All paths must lead back to the starting point.
- Intersecting paths shall meet each other at a 90° angle and be visible.
- Where two paths meet, use different materials, sizes, colours, planting schemes, or similar.
- Paths and paving can be marked with contrasting colours or a raised edge to make them more visible.
- Main paths should have space for at least two wheelchairs or people next to each other.
- Make vegetation available for every user.
- Choose path material that does not get slippery.
- Materials should not cause negative reflection.

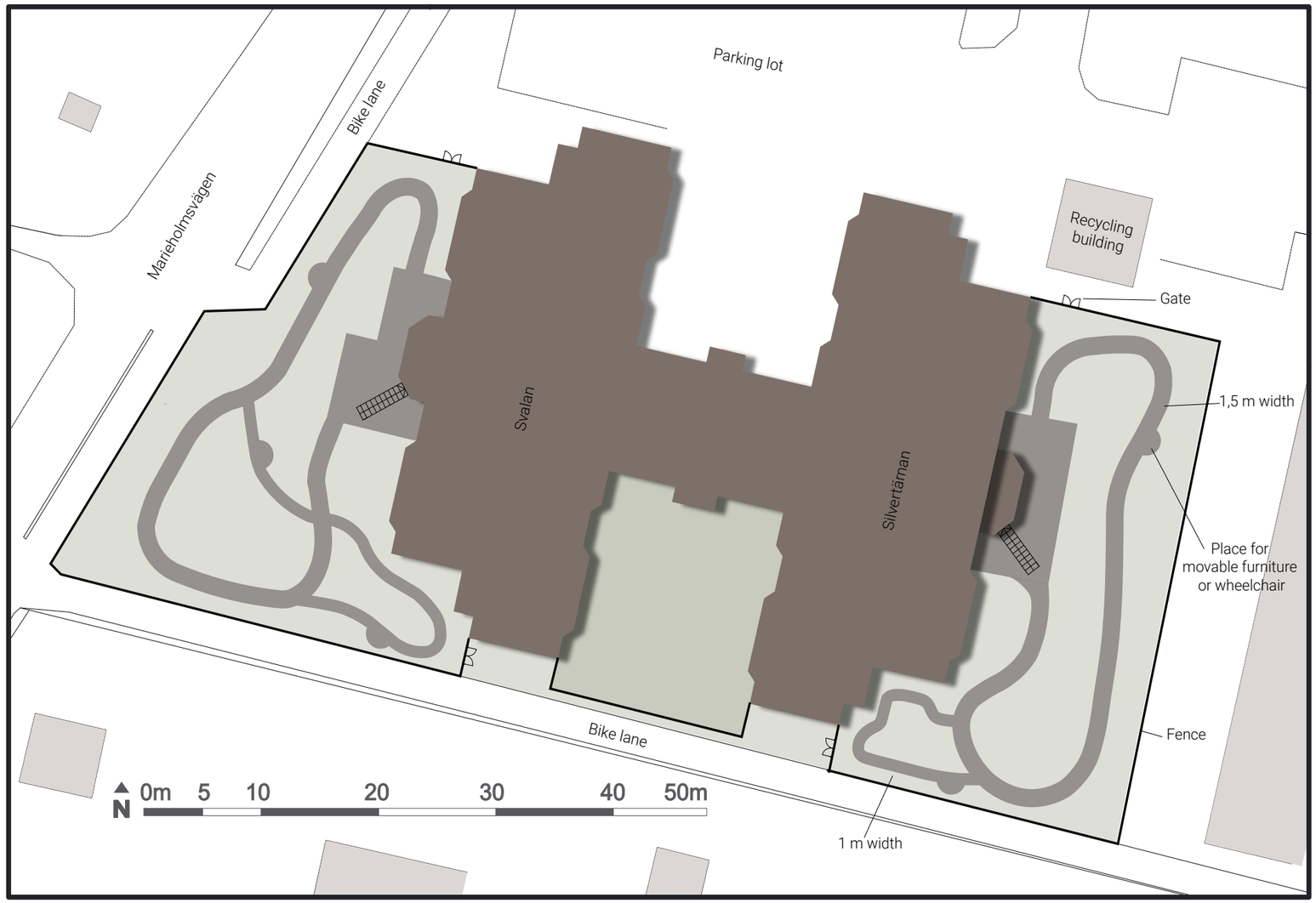


Figure 36. Illustration showing the layout of the paths in Svalan and Silvertärnan. The paths were designed to maximise the lengths of walking routes while also providing universal desgin.

3.3.6 SEATING AND ACTIVITIES

Benches have been put beside the paths and throughout the gardens to allow residents to walk and rest when needed. For ease of access, the benches are situated perpendicular to the pathways. Along the walkway, some half-circles have been added to the path. The half circles allow for the placement of extra seats or the accommodation of wheelchair users during their visits to the garden. The seats were designed to provide residents with a place to relax and sit for recreational purposes. The seating areas have been placed in sunny conditions and shade to cater to different preferences and needs.

In the Kitchen Garden, a big table that fits all the residents and working staff will be placed. This table can function as the dinner table outside and seat larger gatherings of friends and family. A pergola with a smaller table will be placed for the more intimate gatherings or for residents to enjoy during hot days. The number of benches and other seating areas makes it easy to find a spot to be alone or socialise. The closeness to activities makes it easy to be part of an activity or enjoy it from a distance.

Placement for the raised garden beds, fountains, and birdbaths with bird feeders has been suggested, see Figure 37. The different elements are meant to engage in activities and have been placed intentionally where they can be easily accessible with strategic placements when it comes to sightlines. Meaning that they are visible from the common rooms and some private rooms, making them useful from within the building and outside. The raised garden beds are suggested to be put close to the gardens' entrance, in the Kitchen Garden, so that they are visible from the inside and have short walking distances to the kitchen in case they will be used for edible plants and herbs.

DESIGN PRINCIPLES IN MIND

- Include elements like birdfeeders and birdbaths.
- Allow and facilitate gardening for both staff and residents.
- Paths that encourage walking.
- Having vegetation suitable for flower picking.
- Raised garden beds for gardening.
- Vegetation suitable for harvest.
- Include enough places to sit.
- Include areas to be alone.
- Plan for areas to socialise.
- Seating areas should be close to paths and activities.
- Seating should face away from fences, private windows, and gates.
- Make vegetation available for every user.
- Stable constructions that support a grown person's weight.
- Constructions must be inclusive for people with disabilities.
- Benches and chairs should have armrests.
- Incorporate shaded areas.

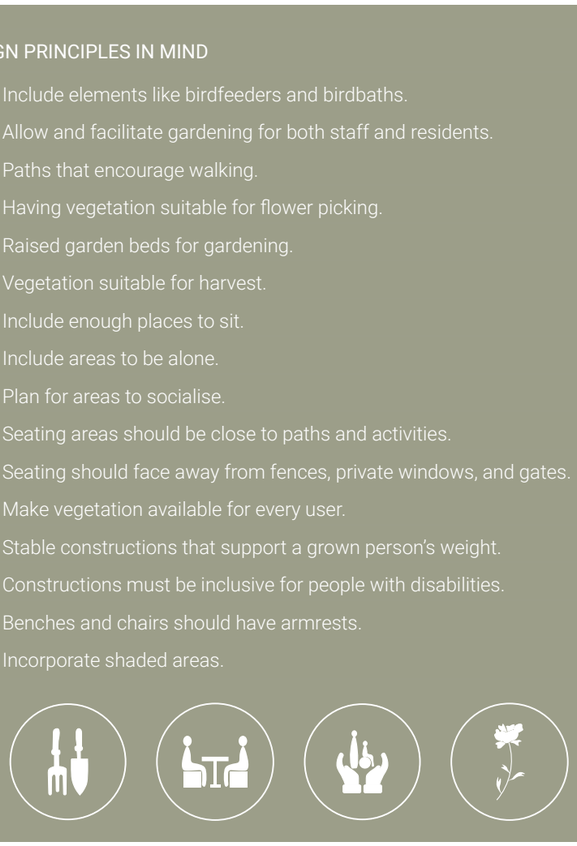


Figure 37. Illustration showing how seated areas and activities were placed in convenient locations close to the paths to maximise the chance of them being accessible, safe and used.

3.3.7 VEGETATION CHOICES

3.3.7.1 VEGETATION TODAY

The *Salix caprea* in the garden of Silvertärnan is a fully functioning multi-stemmed tree with good vitality. The tree is probably as old as the building (30-40 years) and will most likely become a problematic tree in the somewhat near future due to age. When visiting in January, February and April, the tree had dropped smaller branches. Fallen branches can become obstacles on the path, becoming elements that residents can trip on or get wheelchairs and walkers stuck. It will be challenging to protect the roots of the Salix during the construction of the garden. The damage to the roots will decline the health of the tree and likely increase the number of branch droppings. In addition to the previous arguments and the fact that Salix caprea is a short-lived tree, we suggest removing and replacing it with several Carpinus betulus. The removal should happen before construction. Removing the Salix later will most likely increase work amount and construction cost considerably.

DESIGN PRINCIPLES IN MIND

- Must be non-toxic.
- Use several edible plants.
- Familiar plants to evoke memories.
- Present some plants through raised garden beds.
- Use vegetation to hide some constructions, like fencing.
- Promote sensory experiences.
- Make vegetation available for every user.
- Few or no hidden areas.
- Incorporate shaded areas.

The *Prunus domestica* trees in Svalan's garden are not in good shape due to poor maintenance and pruning practices. According to staff, the trees are still fruit-bearing, but there are several fungi on both. We aim to keep them in the garden for now, but as part of the planting plan, we will place a new *Prunus avium* close to the plum trees as a future replacement.

A fully established *Spiraea* hedge with a relatively rectangular shape runs along the western edge of the garden in Svalan. The hedge should be kept as it is, moving along the west border of the garden. However, a fence shall be installed on the outside of it. We recommend that the side of the hedge that grows towards the garden be allowed to grow freely with minimal pruning to increase the flowering and disguise the fence.

3.3.7.2 CHOOSING VEGETATION

The plant proposal at Björklunden gardens results from much consideration and intention. Each species has been carefully chosen for its ability to thrive in the given soil, sun, and climate condition. While there has been chosen a set of trees and shrubs bearing fruits and berries that are edible, none of the more ornamental plants could be known as toxic, poisonous or have any other harmful traits. When choosing the different vegetation, we aimed to find species that are stimulating to the senses and relatively common garden plants in the hope of evoking memories for the residents. We included plants with long flowering and strong seasonal characters, with good winter structures. It was critical that people with varying requirements could interact with the plants. In our proposal, residents and wheelchair users may touch, smell, and harvest the majority of the plants, trees, and perennials.

To decide on shrubs, trees, climbers, and perennials, we used plant catalogues from Billebäck, the plant nursery used by Kristianstad municipality. As the nursery did not have some of the relatively common shrubs, an additional plant list has been made that needs to be bought elsewhere. It has been challenging to find spring bulbs that are not toxic, and therefore we have decided not to have any. Instead, we focused on early flowering trees, shrubs, climbers, and perennials. To decide on the individual species, we combined our knowledge of plants suited to the site with common plants recognised in science articles and suggestions from the staff.

3.3.7.3 PERENNIAL PLANTINGS

Intermingling perennial drifts were used in the perennial planting beds at Svalan and Silvertärnan. Each plant planting bed had clusters of different shapes, structures and foliages. The combination of plants provides a long seasonal interest. It was chosen to use perennial drifts rather than a perennial mix to assist residents in distinguishing between different species.

In their much-appreciated book, Planting: A New Perspective, Piet Oudolf and Noel Kingsbury recommend that every planting bed have at least 70% plants that hold a strong structure throughout plant seasons. The remaining 30% of the plants may be used as fillers such as geraniums. Our design has followed their principle using various perennials with robust architecture that hold significant structures even after wilting, such as *Echinops* and *Hylotelephium*. Certain plant species will occur several times in the same planting bed. Most species were used in multiple beds in each garden to create a holistic pattern of repetition and continuity.

Each of the different perennial species fills a function in the planting beds and has been divided into functional groups: Ground cover (GC), which are low growing and cover the surface, companion plants (CO) which are stable components, weavers (W) which may seed in-between the other plants, and structure plants (S) that are emerging and stable (Svensson, 2021).

3.3.7.4 RAISED GARDEN BEDS

Svalan and Silvetärnan have raised garden beds. They are placed in the Kitchen gardens close to the entrances of Björklunden, where one can find the kitchens. We did not provide any plant suggestions for the raised garden beds but hope that the staff and residents find herbs, vegetables or annual summer flowers that they can sow and use for garden activities.

3.3.7.5 TREES, SHRUBS & CLIMBERS

The different sections of the gardens will give various expressions due to the vegetation choices made. In the Fruit Gardens, it was important to use trees and shrubs that bear fruit. Apple and pear trees mingle with elderflower and mini-kiwi climbers. The trees will provide shade

and a spot for contemplations under the canopies. The Fruit Garden move into The Kitchen Garden, where edible plants are part of the concept. Here smaller shrubs with a bounty of berries are places to let staff and residents eat straight from the plant or use in cooking. The Flower Garden focuses on finding ornamental trees and shrubs with fall colours, flowering, great architecture or interesting bark. Shrubs like magnolias, Japanese maple and witch hazel can be found. The trees give shade without being too big, and species like katsura, magnolia and blood-barked maple provide an ornamental roof. The climbers have been chosen for their beauty and will intermingle on the fence and gates, hiding it and giving it a softer look.

3.4 DESIGN PROPOSAL

The illustration plan visually represents our achievements in the design process. Both Svalan and Silvertärnan have been given dense vegetation cover, with a vibrant mixture of trees, shrubs and perennial planting beds. Many species will vary in sensory experiences. For example, the tall miscanthus grass creates a soft sound when blowing in the wind. The gardens will have year-round interest and provide a range of activities with different challenging levels. In the gardens, seated areas will serve as social arenas and have areas that are intended for being able to sit alone. The design proposal, see Figure 38, is thought to create a welcoming and inspiring environment that feels safe and restorative.

In the following pages, planting and material plans for both gardens will be presented. In addition to this, detailed sections and illustrations from the gardens will be provided.

3.4.1 ILLUSTRATION PLAN

Figure 38: Illustration plan showing the final design proposal for both gardens at Björklunden dementia facility.

3.5 SIGHTLINES

We worked with the vegetation to disrupt the “unwanted” sightlines, see Figure 39. The process was similar to placing the furniture so that the residents would not be looking into private windows or plan escape routes from the garden. The greenery has been strategically positioned to provide pleasant views from the benches, pergolas, the common rooms and private windows.

LEGEND

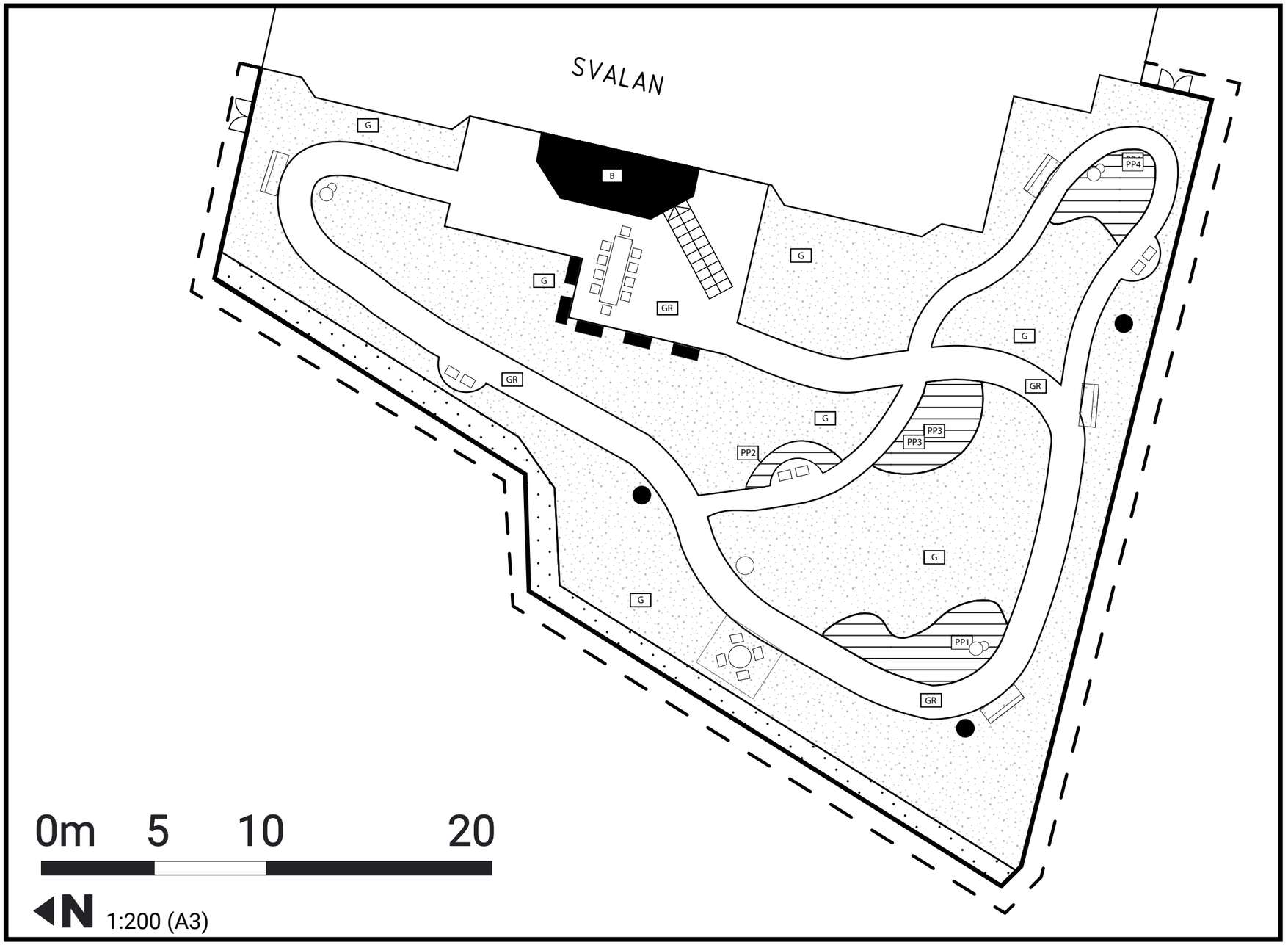
- SIGHTLINE FROM SEATING AREA
- PRIVATE ROOM WINDOW
- COMMON ROOM WINDOW

Figure 39. Illustration showing how vegetation was used to manipulate sightlines for example to maintain privacy close to private windows or to guide the user towards flower beds with activities.

3.6 DESIGN PROPOSAL SVALAN

In the following pages, we will explore the design propsal looking into the garden at Svalan in detail. Sections, render images, material and planting plans will be provided, see Figures 40-52.

3.6.1 MATERIAL PLAN SVALAN



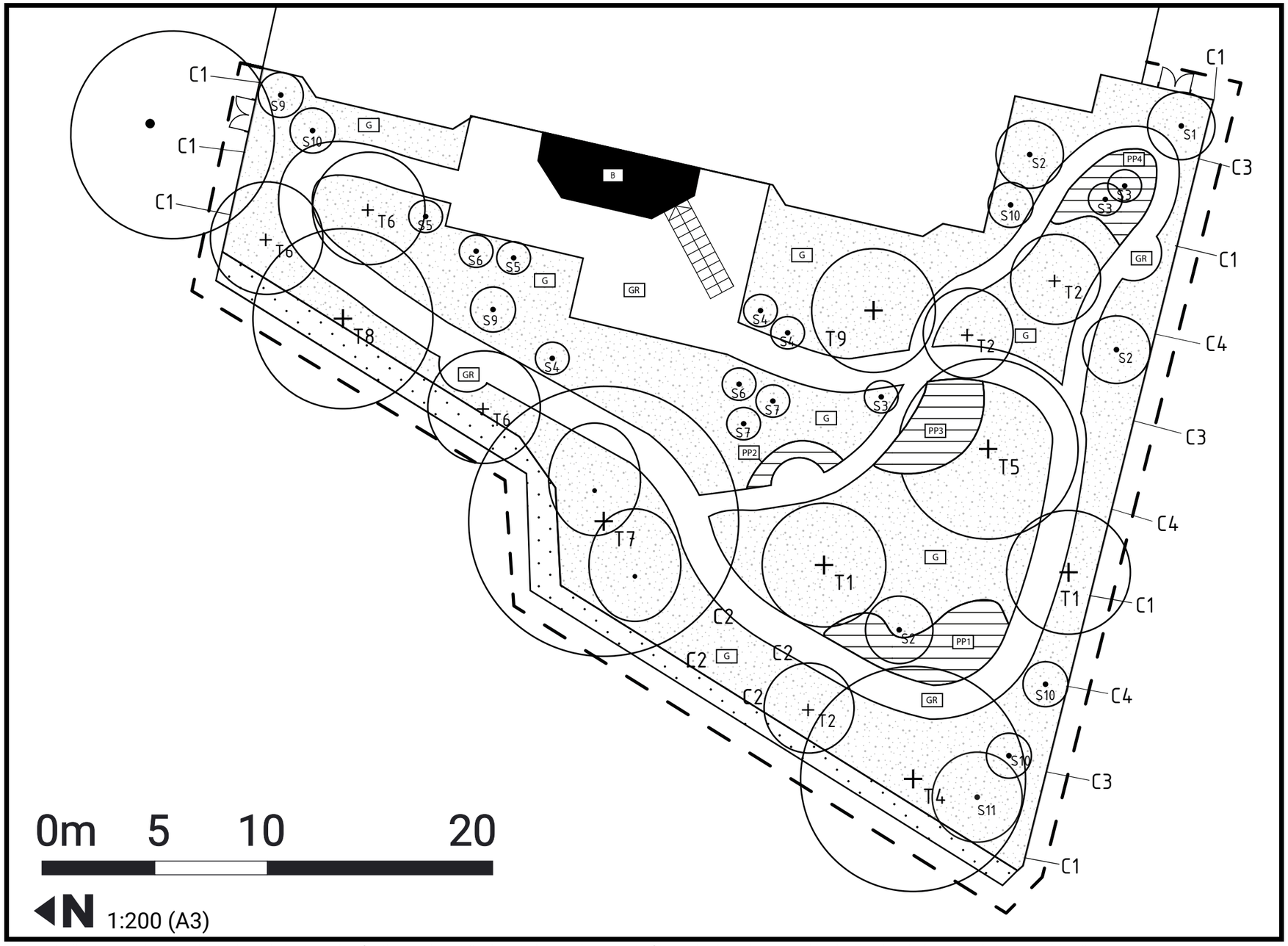
LEGEND

- AREA BOUNDARY
- G — GRASS
- PP0 — PERENNIAL PLANTING WITH PAVING STONE EDGE
- GR — GRAVEL WITH PAVING STONE EDGE
- B — BALCONY
- HEDGE
- FENCE
- FIRE STAIRCASE
- GATE
- FOUNTAIN
- BIRDBATH AND FEEDER
- BENCH
- PERGOLA WITH SEATING
- TABLE WITH CHAIRS
- MOVABLE CHAIRS
- RAISED GARDEN BEDS
- MAINTENANCE HOLE COVER

Figure 40. Illustration showing the technical material plan for the garden at Svalan. It shows existing and added materials, elements, and furniture in the gardens and their relation to the paths and building.

3.6.2 PLANTING PLAN SVALAN

See Appendix 3 for Plant lists.

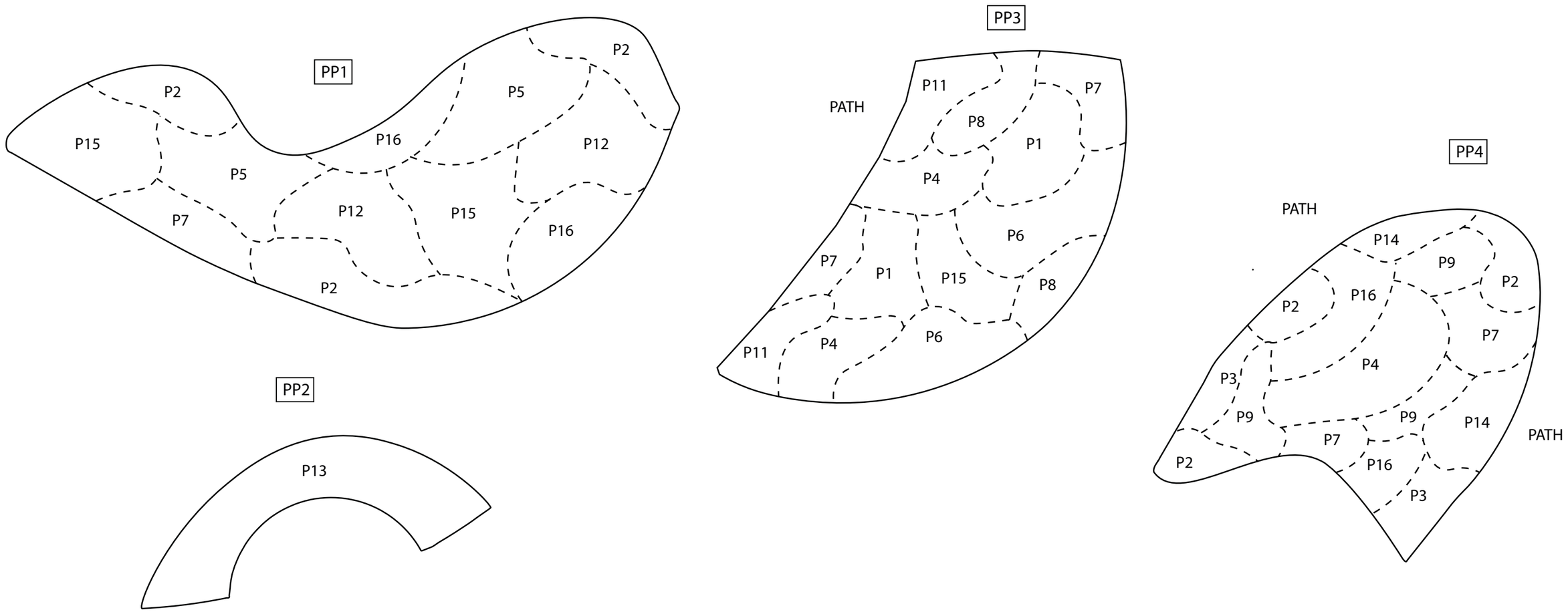


LEGEND

- AREA BOUNDARY
- GRASS
- PERENNIAL PLANTING
- GRAVEL
- BALCONY
- EXISTING TREE
- NEW TREE
- NEW SHRUB
- NEW CLIMBER
- FIRE STAIRCASE
- GATE
- FENCE

Figure 41. Illustration showing the technical planting plan for the garden at Svalan. It shows placement of tree, shrub and perennial beds. For detailed species lists, see tables 2-4.

3.6.3 PERENNIAL PLANTINGS SVALAN



P1	*Agastache* 'Black Adder'	P9	*Hylotelephium telephium* 'Herbstfreude'
P2	*Alchemilla epipsila*	P11	*Lavandula angustifolia*
P3	*Anemone* x *hybrida* 'Wild Swan'	P12	*Leucanthemum vulgare* 'Majdrottningen'
P4	*Astrantia major*	P13	*Miscanthus sinensis* 'Kleine Silberspinne'
P5	*Echinops bannaticus* 'Taplow blue'	P14	*Rudbeckia fulgida* 'Little Goldstar'
P6	*Eurybia herveyi* 'Twilight'	P15	*Rudbeckia fulgida* var. *sullivantii* 'Goldsturm'
P7	*Geranium pratense* 'Brookside'	P16	*Sesleria heufleriana*
P8	*Hakonechloa macra*		

Skala 1:50 (A3)

Figure 42. The illustrations show the planting schemes for the different perennial beds at Svalan. For a detailed species list, see table 2.

PERENNIAL PLANTING 1

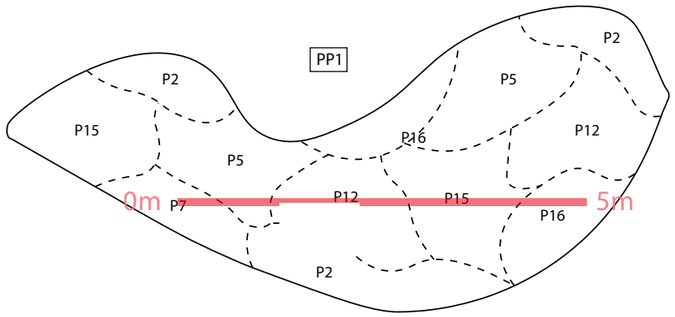


Figure 43. 5 meter section through PP1.

SECTION PP1
Svalan

Figure 44. Illustration showing a 5-metre section through the planting bed.The perennial bed PP1 follows a curve of the main path in the southern part of the garden at Svalan. It is placed close to a seated area and has a birdbath and a bird feeder to increase recreational values. Echinops is the dominant structure plant that creates impulsive and robust architecture among the other perennial drifts.

PERENNIAL PLANTING 2

Figure 45. Illustrion showing a 5-metre section through the planting bed. PP2 is a Monoculture of miscanthus used for its all-year structure. It enhances a seated area and provides a shelter and a soundscape where one can sit ‘alone’ among the monumental grass while listening to its stems blowing in the wind. The grass is built like walls or a hedge around a bench. It gives shelter to those who need to hide and be alone for a while, which was focused on in this design.

PERENNIAL PLANTING 3

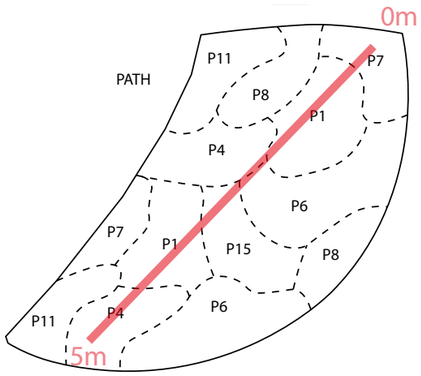


Figure 46. 5 meter section through PP3.

SECTION PP3
Svalan

Figure 47. Illustration showing a 5-metre section through the planting bed. PP3 combines weaving drifts that pose vibrant colours and late flowering, much like the other perennial beds. It has been placed at a crossroad where two paths meet, leaving the residents to decide which path to continue. The perennial bed is the first planting area in the Flower Garden and marks its beginning. The perennial bed may assist the residents in deciding whether or not to continue their tour around the Flower Garden.

PERENNIAL PLANTING 4

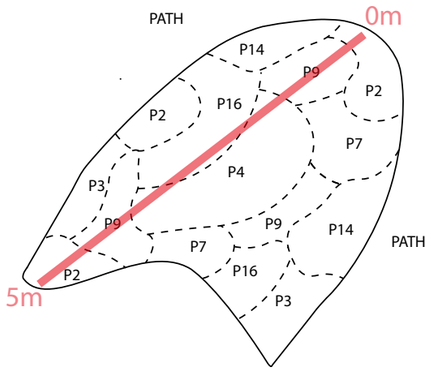


Figure 48. 5 meter section through PP4.

SECTION PP4
Svalan

Figure 49. Illustration showing a 5-metre section through the planting bed. PP4 is located near a popular common room. Seating areas have been placed nearby in the garden. The planting bed needed to have a distinct personality because it would be used for both outdoor and inside recreation. Low growing perennials and small Magnolia stellatas were chosen to complement each other throughout the seasons. For recreational purposes, a birdbath and a bird feeder were included.

3.6.4 RENDERS SVALAN

SVALAN FRUIT GARDEN

Figure 50. Render of a potential view of the Fruit Garden at Svalan. The bench faces south and has a view of the Kitchen Garden and Flower Garden.

SVALAN KITCHEN GARDEN

Figure 51. Render of the Kitchen Garden at Svalan showing the garden beds with the surrounding garden.

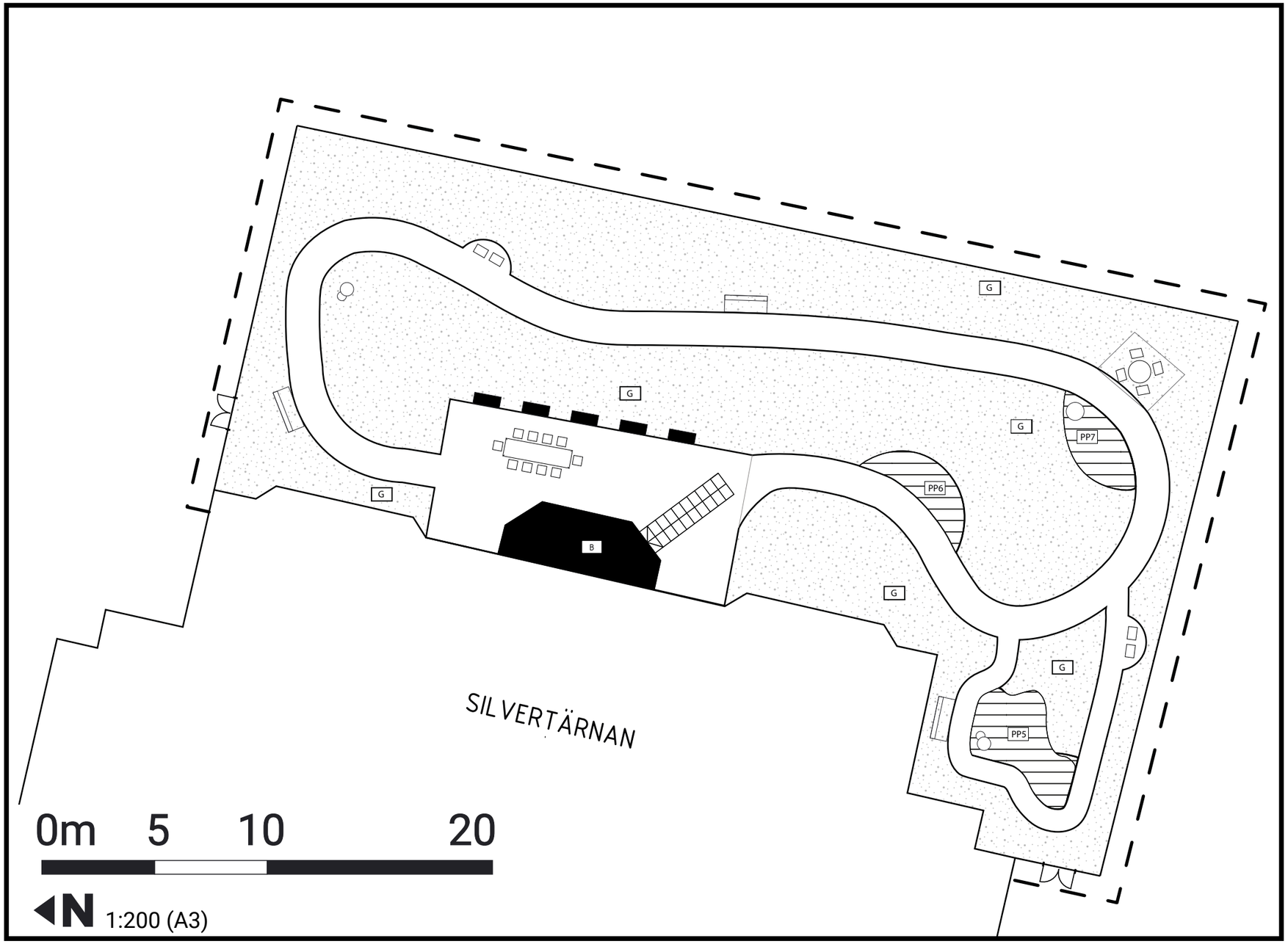
SVALAN FLOWER GARDEN

Figure 52. Render showing the Flower Garden in Svalan with pereinnal plantings and flowering shrubs and trees.

3.7 DESIGN PROPOSAL SILVERTÄRNAN

In the following pages, we will explore the design propsal looking into the garden at Silvertärnan in detail. Sections, render images, material and planting plans will be provided, see Figures 53-64.

3.7.1MATERIAL PLAN SILVERTÄRNAN



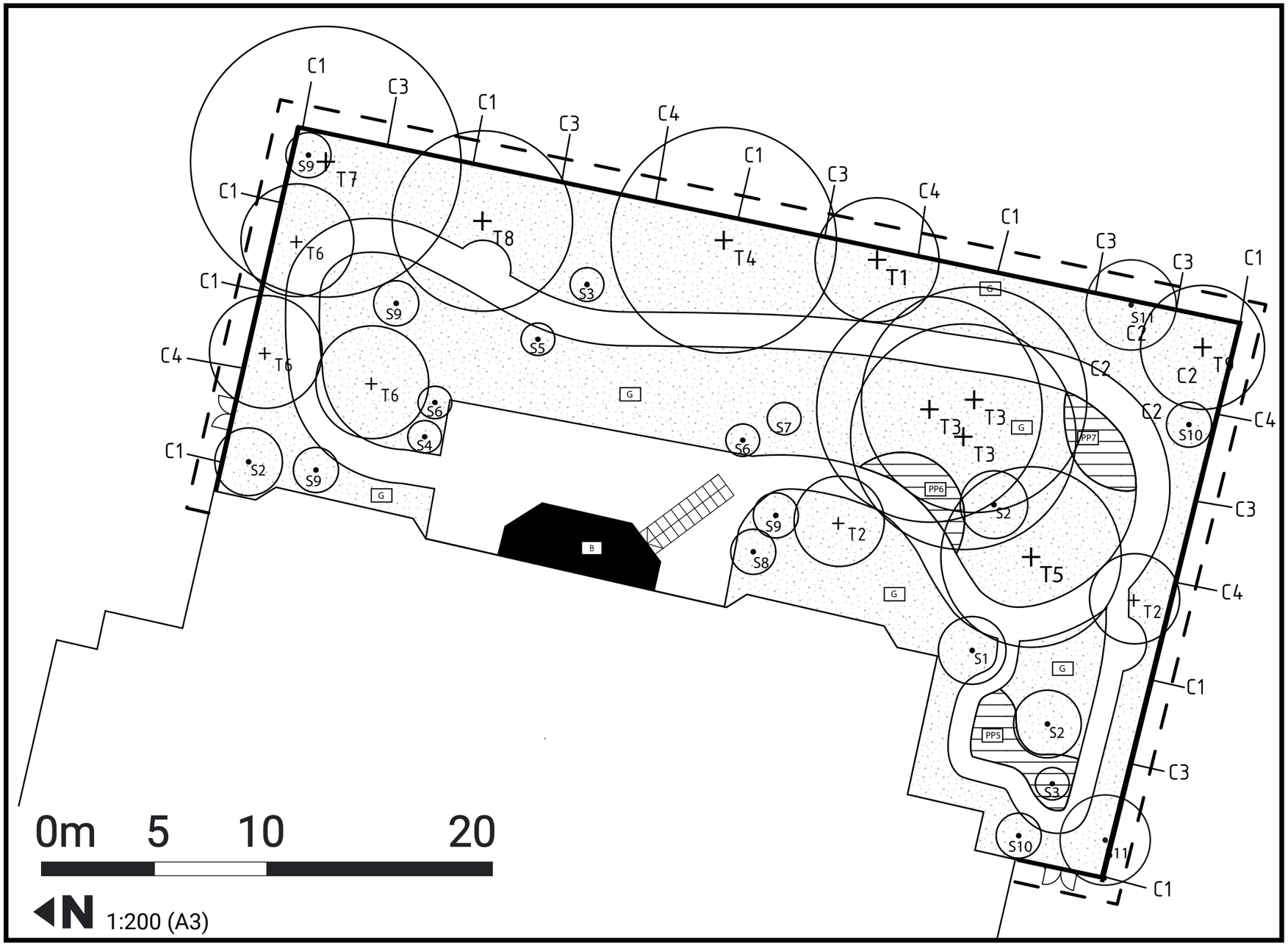
LEGEND

- AREA BOUNDARY
- GRASS
- PERENNIAL PLANTING WITH PAVING STONE EDGE
- GRAVEL WITH PAVING STONE EDGE
- BALCONY
- FIRE STAIRCASE
- GATE
- FENCE
- FOUNTAIN
- BIRDBATH AND FEEDER
- BENCH
- PERGOLA WITH SEATING
- TABLE WITH CHAIRS
- MOVABLE CHAIRS
- RAISED GARDEN BEDS

Figure 53. Illustration showing the technical material plan for the garden at Silvertärnan. It shows existing and added materials, elements, and furniture in the gardens and their relation to the paths and building.

3.7.2 PLANTING PLAN SILVERTÄRNAN

See Appendix 3 for Plant lists.



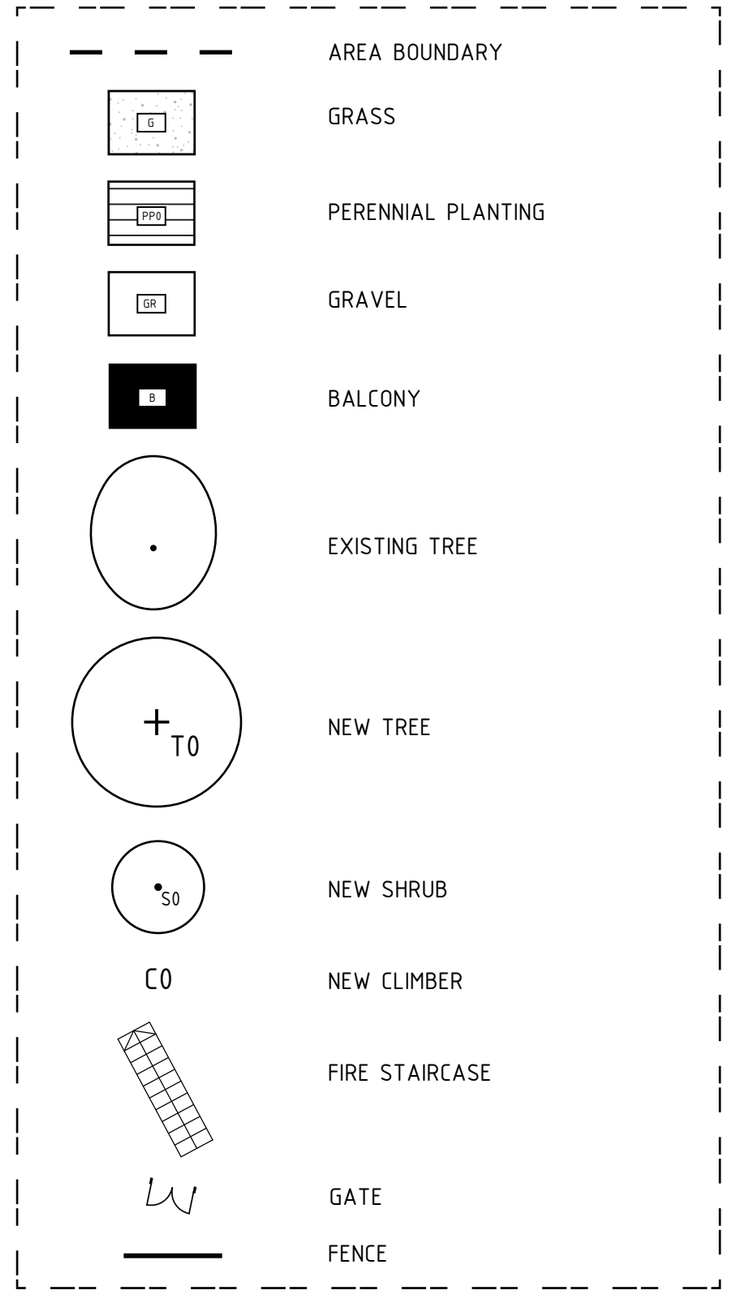
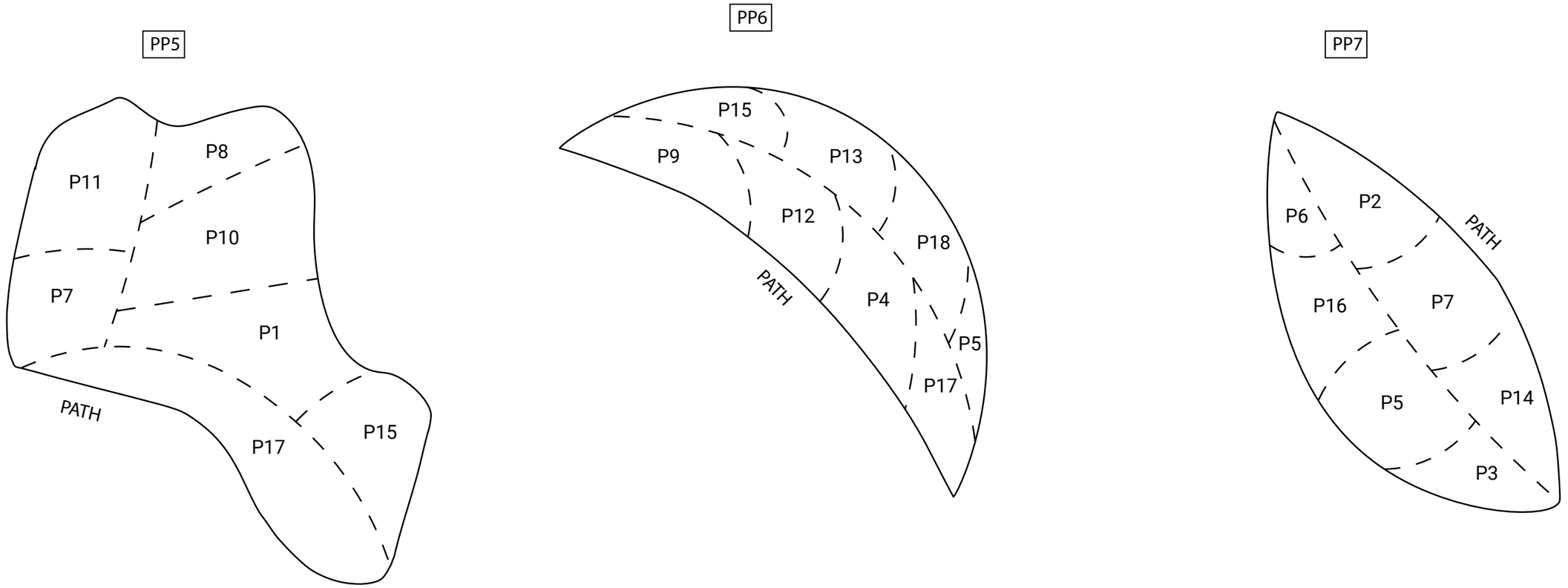


Figure 54. Illustration showing the technical planting plan for the garden at Silvertärnan. It shows placement of tree, shrub and perennial beds. For detailed species lists, see tables 2-4.

3.7.3 PERENNIAL PLANTINGS SILVERTÄRNAN



P1	*Agastache* 'Black Adder'
P2	*Alchemilla epipsila*
P3	*Anemone* x *hybrida* 'Wild Swan'
P4	*Astrantia major*
P5	*Echinops bannaticus* 'Taplow blue'
P6	*Eurybia herveyi* 'Twilight'
P7	*Geranium* 'brookside'
P8	*Hakonechloa macra*
P9	*Hylotelephium telephium* 'Herbstfreude'
P10	*Hylotelephium telephium* 'Matrona'
P11	*Lavandula angustifolia*
P12	*Leucanthemum vulgare* 'Majdrottningen'
P13	*Miscanthus sinensis* 'Kleine Silberspinne'
P14	*Rudbeckia fulgida* 'Little Goldstar'
P15	*Rudbeckia fulgida* var. *sullivantii* 'Goldsturm'
P16	*Salvia nemorosa* 'Amethyst'
P17	*Sesleria heufleriana*
P18	*Veronicastrum virginicum* 'Album'

Figure 55. The illustrations show the planting schemes for the different perennial beds at Silvertärnan. For a detailed species list, see table 2.

PERENNIAL PLANTING 5

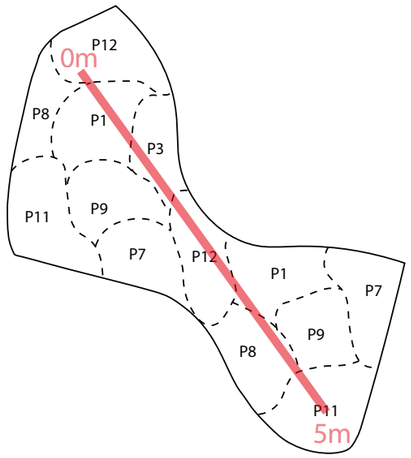


Figure 56. 5 meter section through PP5.

SECTION PP5
Silvertärnan

Figure 57. Illustration showing a 5-metre section through the planting bed. PP5 has been deliberately positioned close to the windows of the common rooms inside the Silvertärnan. It has important qualities in the garden but strives to produce recreational quality for residents viewing it from the inside of the building. Benches in the area are also placed to benefit from the pleasant view of the flowers. From the material plan, it has been suggested to complement the planting bed with a birdbath and a bird feeder to increase the recreational value of the planting bed. In the southern part of the planting bed, there has been placed a magnolia that, together with the perennials, creates a unit of strong aesthetic structures.

PERENNIAL PLANTING 6

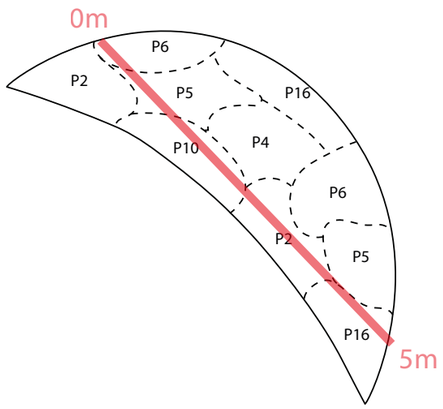


Figure 58. 5 meter section through PP6.

SECTION PP6
Silvertärnan

Figure 59. The perennial bed marks the flower garden's start as one walks along the west side of Silvertärnan. It is close to seated areas and visible from many private rooms. Illustration showing a 5-metre section through the planting bed.

PERENNIAL PLANTING 7

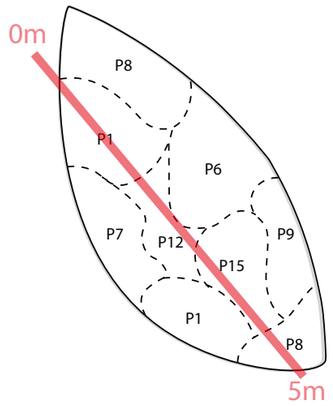


Figure 60. 5 meter section through PP7.

SECTION PP7
Silvertärnan

Figure 61. The planting bed is close to the pergola in the south-eastern part of the Flower Garden. It has been complemented with a water fountain to add recreational value through sound and visuals. Illustration showing a 5-metre section through the planting bed.

3.7.4 RENDERS SILVERTÄRNAN

SILVERTÄRNAN FRUIT GARDEN

Figure 62. Render of a potential view of the Fruit Garden at Silvertärnan. The bench faces south and has a view of the Kitchen Garden and Flower Garden.

SILVERTÄRNAN KITCHEN GARDEN

Figure 63. Render of the Kitchen Garden at Silvertärnan showing the garden beds with the surrounding garden.

SILVERTÄRNAN FLOWER GARDEN

Figure 64. Render showing the Flower Garden in Silvertärnan with pereinnal plantings and flowering shrubs and trees.

3.8 SEASONAL CHARACTERS & PHENOLOGY

3.8.1 PERENNIALS

Table 2. Table showing phenology scheme perennial species for both gardens at Björklunden.

SCIENTIFIC NAME	ENGLISH NAME	SPRING	EARLY SUMMER	SUMMER	LATE SUMMER	FALL	WINTER
Agastache 'Black Adder'	Giant Hyssop						
Alchemilla epipsila	Dwarf Lady's Mantle						
Anemone x *hybrida* 'Wild Swan'	Anemone						
Astrantia major	Greater Masterwort						
Echinops bannaticus 'Taplow blue'	Blue Globe Thistle						
Eurybia herveyi 'Twilight'	Michaelmas Daisy						
Geranium 'Brookside'	Cranesbill						
Hakonechloa macra	Japanese Forest Grass						
Hylotelephium 'Herbsfreude'	Stonecrop						
Hylotelephium 'Matrona'	Stonecrop						
Lavandula angustifolia	Lavender						
Leucanthemum vulgare 'Majdrottningen'	Oxeye Daisy						
Miscanthus sinensis 'Kleine Silberspinne'	Chinese Silver Grass						
Rudbeckia fulgida 'Little Goldstar'	Rudbeckia						
Rudbeckia fulgida var. sullivantii 'Goldsturm'	Black-eyed Susan						
Sesleria heufleriana	Blue-green Moorgrass						

LEAVES

FLOWERING

STRUCTURAL INTEREST

3.8.2 TREES & CLIMBERS

Table 3. Table showing phenology scheme tree and climber species for both gardens at Björklunden.

SCIENTIFIC NAME	ENGLISH NAME	SPRING	EARLY SUMMER	SUMMER	LATE SUMMER	FALL	WINTER
Acer griseum	Blood-bark maple						
Acer palmatum 'Bloodgood'	Japanese Maple						
Carpinus betulus	Hornbeam						
Cercidiphyllum japonicum	Katsura						
Magnolia kobus	Kobus Magnolia						
Malus domestica 'Rödluvan' E och 'Aroma' E	Common Apple						
Prunus avium 'Stella'	Mazzard Cherry						
Pyrus communis 'Ingeborg' PBR E	Common Pear						
Syringa reticulata	Japanese Tree Lilac						
Actinidia kolomikta	Kolomikta Kiwi						
Rosa hybrida Helenea-Gruppen	Rambling Rose						
Schizophragma hydrangeoides	Japanese Hydragena vine						
Vitis coignetiae	Crimson Glory Vine						

LEAVES
HARVEST
FLOWERING
STRUCTURAL INTEREST

3.8.3 SHRUBS

Table 4. Table showing phenology scheme shrub species for both gardens at Björklunden.

SCIENTIFIC NAME	SWEDISH NAME	SPRING	EARLY SUMMER	SUMMER	LATE SUMMER	FALL	WINTER
Cornus kousa var. *chinensis* 'China girl'	Blomsterkornell						
Hamamelis x *intermedia* 'Pallida'	Trollhassel						
Magnolia stellata	Stjärnmagnolia						
Ribes nigrum 'Narve Viking'	Svarta vinbär						
Ribes rubrum 'Gullan'	Vita vinbär						
Ribes rubrum Rödavinbärsgruppen 'Jonkherr van Teets'	Röda vinbär						
Ribes uva-crispa 'Tatjana'	Krusbär						
Sambucus nigra FK BÅLSTA E	Fläder						
Sambucus nigra 'Black Lace'	Blodfläder						
Viburnum bodnantense 'Charles Lamont'	Hybridkejsarolvon						
Viburnum rhytidophyllum	Rynkolvon						

LEAVES
HARVEST
FLOWERING
STRUCTURAL INTEREST

3.9 SUCCESSION

To get a more established looking garden and give the vegetation a higher success rate, bigger sizes of trees and shrubs have been chosen from the nursery. Figures 65 & 67 showcases what the gardens will look like directly after planting. Figures 66 & 68 showcases the gardens approximately 20-30 years after planting if the recommended sizes are used. The fruit-bearing trees and shrubs will likely produce fruit and berries for harvest the first year after planting or within five years.

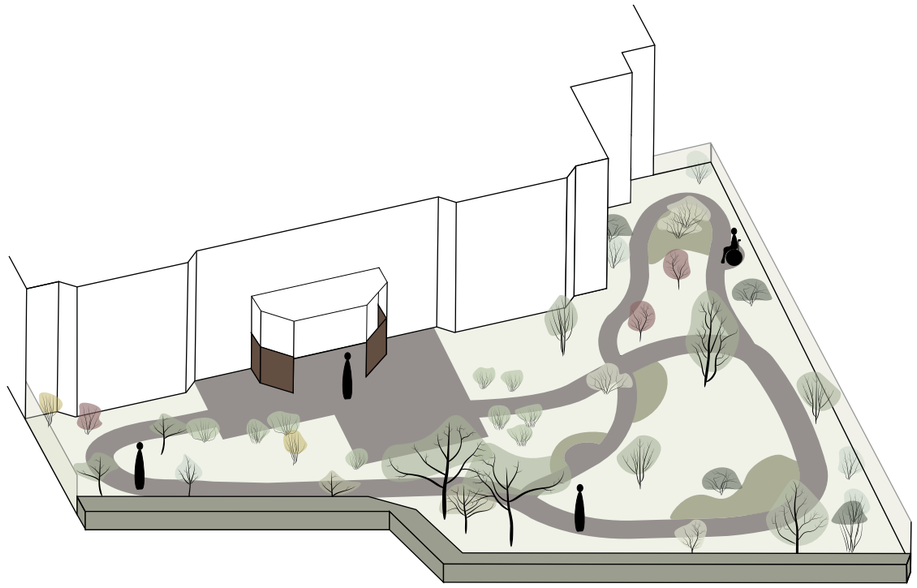


Figure 65. Axonometric perspective after directly after planting at Svalan.

Figure 66. Axonometric perspective 20-30 years after planting at Svalan.

Figure 67. Axonometric perspective directly after planting at Silvertärnan.

Figure 68. Axonometric perspective 20-30 years after planting at Silvertärnan.

3.10 MANAGEMENT OF THE GARDENS

After dialogue with the developers and project leaders at Björklunden, it was established that the facility, or the municipality, will hire professional gardeners to maintain the Svalan and Silvertärnan. In the following section, we have made some suggestions on preparing the soil, establishing-, pruning - and maintaining trees, shrubs, and perennials. Note that gardeners' experiences and skills should be respected and acknowledged. If they feel that any adjustments should be made to simplify management, they should make them. We would like to point out that we do not accept personal responsibility for the new plants.

3.10.1 SOIL PREPARATION

We advise that the existing soil at the site will be used for the new plantation. However, it should be slightly improved by de-compacting, improving the soil structure, and increasing its organic content. As we have an area consisting of sandy moraine, adding organic content can increase the water retention capacity and retain nutrients in the soil whilst making it easier for plant roots to penetrate it (Folkesson, 2021).

Organic content can be added using compost blended approximately 10 cm down in the topsoil where perennial beds and new trees and shrubs will be planted.

3.10.2 PLANTING AND ESTABLISHING TREES & SHRUBS

Before planting, trees, shrubs, and climbers need to be thoroughly watered, bindings around the canopies should be removed, and damaged branches should be cut. The root system should be planted at the same depth that it has been in the pot, and the soil mount should be approximately 3 cm higher than the surrounding soil to make room for soil compaction (Sjöman, Slagstedt and Lagerström, 2016). The topsoil should be mixed with organic matter to add nutrients to the trees and shrubs (Vollbrecht, Alm and Veltman, 2017). It is also vital that the roots of trees and shrubs in pots are thoroughly untangled, except in the case of the Magnolias, as their roots are highly sensitive. Magnolia trees and shrubs should be planted with little disturbance (Hauer, 2021). Roots must not be twined in the pot. If they are, they should be returned to the nursery. When possible, stem protection should be applied to all trees and shrubs to ensure protection from rodents (Sjöman, Slagstedt and Lagerström, 2016). Support should be installed for the trees (Vollbrecht, Alm and Veltman, 2017). Watering bags should be placed at each tree (Sjöman, Slagstedt and Lagerström, 2016), and watering should be carried out during the growing season (Stål, Walter and Åkerblom, 2018). Shrubs should be watered during drought periods.

3.10.2.1 PRUNING TREES AND SHRUBS

The first years after planting, pruning needs to occur regularly. The first pruning should take place two years after planting to keep good and even structures of the canopies. All pruning should occur during July, August or September (Vollbrecht, Alm and Veltman, 2017). The trees should be pruned five times in total in two-year intervals. Fruit trees should be pruned as fruit trees to make picking easier. All trees should be pruned according to good pruning practices, and all pruning should be done by professionals. Branches that grow on a level that will interfere with the future paths should be pruned early. Certain species should be kept with multi-stemmed architecture, if possible:

Acer griseum
Acer palmatum 'Bloodgood'
Carpinus betulus
Cercidiphyllum japonicum
Cornus kousa var. *chinensis* 'China girl'
Hamamelis x *intermedia* 'Pallida'
Magnolia kobus
Magnolia stellata
Ribes nigrum 'Narve Viking'
Ribes rubrum 'Gullan'
Ribes rubrum Rödavinbärsgruppen 'Jonkherr van Teets'
Ribes uva-crispa 'Tatjana'
Sambucus nigra FK BÅLSTA E
Sambucus nigra 'Black Lace'
Syringa reticulata
Viburnum bodnantense 'Charles Lamont'
Viburnum rhytidophyllum

Fruit trees:

Malus domestica 'Rödluvan' E and 'Aroma' E
Prunus avium 'Stella'
Pyrus communis 'Ingeborg' PBR E

Due to the municipality's concern that the project might be more expensive than their budget can allow, we have suggested how one can go about preparing the gardens. It can be done over several years if that is convenient for Björklunden. Figure X shows the order in which we believe it is important to prioritise the elements in the garden:

3.11 MANAGEMENT & ESTABLISHMENT OF PERENNIALS

It is recommended that the perennial beds are established using plug plants. During the establishment, the number of plug plants per square metre should correspond to the cc-distance provided by the plant nursery and the square metres dedicated to each plant in the planting plan, see Appendix 3. The first 4-6 weeks after planting, the perennials need to be provided with enough water to establish properly (Dunnet, 2019).

3.11.1 YEARLY MAINTENANCE

The perennial beds will acquire some maintenance to maintain health and keep the drift structure intact. The dynamic between the species might cause some movement of the individual drift, causing some to become more dominant than others. Based on Nigel Dunnets recommendations for maintaining perennials published in his book Naturalistic Planting Design, a management plan can be found in Table 5.

It is highly recommended that the perennial beds keep their structures, stems and seed heads throughout the winter to provide insects and wildlife with habitat and food resources. In addition, many of the perennials were chosen due to their aesthetic winter structures after wilting.

Table 5. Proposal for management plan for perennials.

MONTH	MANAGEMENT ACTION	FREQUENCY
March.	Cut back remaining deciduous perennials.	Yearly.
Early march - Mid April.	Detailed weeding. Remove any self-sown seedlings. Divide over-vigorous plants.	Yearly: if necessary.
Mid April - Mid June.	Spot weeding.	Yearly: Can be done if needed.
October- November.	Remove messy perennial stems.	Yearly: if needed.
Note that for every visit, the gardeners should dispose of garden waste.		

3.12 MAINTENANCE OF EXISTING VEGETATION

The hedge along the western side of Svalan should be trimmed as before on the outside, in a square fashion, but the inside facing the garden should be growing free to have more flowering. The plum trees at svalan should be removed after approximately ten years.

3.13 ESTABLISHING THE GARDEN

- one step at a time

Due to the municipality's concern that the project might be more expensive than their budget can allow, we have suggested how one can go about preparing the gardens. It can be done over several years if that is convenient for Björklunden. Figure X shows the order in which we believe it is important to prioritise the elements in the garden:

ESSENTIAL ELEMENTS

Must be prioritised from the first stage of the development of the gardens.

- Paths and expand patios
- Fences with gates
- Benches
- Pergolas for immediate shade

- Consider removing Salix caprea

PRIORITY 1

- TREES
- CLIMBERS
- RAISED GARDEN BEDS

PRIORITY 2

- SHRUBS
- BIRDBATHS
- BIRDFEEDERS

PRIORITY 3

- PERENNIALS
- WATERFOUNTAINS

PRIORITY 4

- OTHER ACTIVITIES
- CHICKEN COOP
- GREEN HOUSE

DISCUSSION

4

4.1 DISCUSSION & REFLECTION

This thesis is the outcome of a collaboration between the authors and the municipality of Kristianstad. It has investigated currently available science, staff interviews, and reports exploring how outdoor environments may best be suited and incorporated into a facility for individuals with dementia.

To adress our research questions, a dementia garden can benefit from having a research-based design proposal. We have used the literature studies as guidance that helped us avoid many mistakes and incorporate beneficial design idéas other researchers have identified. The knowledge and collective wishes of the staff at Björklunden were unproblematic to incorporate into the design principles from the literature study as they often correlated. The staff and the literature study has been working as a guide to how we should create the design proposal, constantly steering our design choices to create an outdoor environment fit for people with dementia.

Without a literature review and interviews with the staff, the design proposal would have failed to acknowledge a substantial proportion of the design principles. We believe that the quality of the design proposal would have been significantly lower had it not been for them.

4.2 METHOD DISCUSSION

We began our thesis work by gathering background information on Björklunden before working with concept sketching and a literature study, switching back and forth between the two until we landed a design proposal. Using the literature study when sketching was a helpful resource to feel confident in the design choices we suggested while also checking how the theory looked in a practical case study.

The literature studies were a huge help to us during the design phase. We uncovered dementia garden examples, design ideas, and studies showing how a garden may improve people's mental and physical well-being of people with dementia. Our process of designing and exploring research, see Figure 1, was a simplified version that combined the models Milburn et al. produced (2003). During the literature review, it became clear that designers often do not have a research phase like ours before a project (Brown and Corry, 2011; Lawson, 2013), making our project "stand out" from a conventional proposal. We have previously used literature in design proposals during our master's program courses, although our professors often provided the literature. It has been a rewarding experience during the thesis work to learn how to find and implement research into a design proposal more independently.

We could assemble design principles from the literature study used in the final design proposal. The design principles may serve as a toolkit for future designers working with a similar user group. The design principles have been specifically chosen with Björklunden in mind, affecting how they translate to other projects. Having design principles to follow did affect our design choices. However, we did not experience that it ruined the creative process. It was a concern from the start of the project that a set of "rules" on how to design might limit the creative process. Other designers might use our design principles for similar user groups, but we wonder if the proposals will resemble one another if applied to multiple projects.

We visited Björklunden's gardens three times between January and April 2022. The inventory and analysis served as the foundation for our thesis work. It provided us with a clear understanding of the type of project we were dealing with and visualised some of the needs of our user groups. Since the inventory took place during winter and early spring, that posed some disadvantages in identifying species at the site. It was not possible to represent the overall seasonal character of the location. However, we do not believe that this caused any impediments to our work as the gardens had very little vegetation. By visiting the gardens more than once, we were allowed to visualise how the measurements and arrangement of features in our design proposal might look. The inventories helped us to develop ideal design solutions for our site.

Having interviews with the staff members at Björklunden dementia facility was one of the key tasks given by Björklunden. During the workshop on March 3rd, we held a presentation about our work progress and conducted a small interview and questionnaire with a representative group of the staff. Though the questions were rather subjective and without quantitative results, we feel that it has been beneficial to our thesis work and gave us a good view of how the staff felt about the gardens and their commitment to using them. The staff had good insight, experiences, and suggestions on how we could best adapt the garden to the needs of the user groups that we would not have discovered in our literature study.

One evident disadvantage of the interviews was that we could not question prospective residents, thereby missing out on the opportunity to learn about what they desired while becoming acquainted with a representation of our main user group. One may argue that residents who stay at the facility will change over time, yet, talking to individuals with dementia about their challenges, needs, and wishes would have been a valuable opportunity to improve the quality of our study.

4.3 DESIGN PROCESS DISCUSSION

The design process has been the most time-consuming part of our thesis. We have worked on finding the best drawing techniques and ways of visualising our proposal. Starting with hand drawings, producing quick results that could translate to a more thorough process in computer-aided drawings. Sketching in Illustrator and "playing" with shapes and colour compositions naturally evolved into making maps and adding more accurate scales and measures to the elements we included in the design.

Being two students collaborating, we decided to work with vector shapes for some sections and plan drawings. It was then easy for both to do small changes and corrections when needed. Likewise, we could discuss our illustrative work and develop a style that suited us both. Through the illustrations in the design proposal, we aim to capture the spaciousness and the general feel of how the gardens may look after being built.

During the design process we had to go back to the design principles and make sure that we met as many as possible. This meant that we were frequently required to adjust design aspects to meet a design principle or the site conditions, resulting in a domino effect where other parts needed changing too. The creative process did not suffer by following the design principles but it changed from what we have experienced in other projects where we stood free to design based on experience and ideas. Where we previously would have run with an idea in other projects we had to make sure that the idea worked with the design principles. Certain design choices were simple, such as the path

movement, where we tried to maximise the length of the walk without compromising other components in the garden. Others were more difficult, such as positioning vegetation to conceal entrances or private windows. The research and the opinions from the staff weighed heavily in our design choices. The design would not look like the finished proposal if we had not had the design principles to guide us.

Throughout the process, we were frequently required to adjust design aspects to meet a design principle or the site conditions, resulting in a domino effect where other parts needed changing too. Certain design choices were simple, such as the path movement, where we tried to maximise the length of the walk without compromising other components in the garden. Others were more difficult, such as positioning vegetation to conceal entrances or private windows.

We spent much time on plant design as part of the design process. The staff at Björklunden wished for a design that incorporated much vegetation and flowering. Non-harmful vegetation was necessary to encourage residents to spend time in the gardens by themselves. Working with plants found in Billebäcks catalogues that do not cause harm, have an all-year interest, are sensory stimulants, familiar to the eyes of elderlies, and fit the site conditions was a challenge. Although it has been somewhat restrictive in our work, we have used it as an opportunity to find fewer but well-suited plants for this specific project. In our most recent presentation to the Björklunden staff, we presented drawings of the gardens after planting and a successional estimate after 20-30 years. We did it to provide the staff with a realistic idea of what the gardens may look like in the first few years after they were established. Some were surprised at how long it took to grow a mature garden and stated that the illustration helped them comprehend the process better.

Certain decisions concerning the gardens are out of our control, such as what furniture the municipality decides to use. However, we trust that they follow the design principles when doing so. Likewise, is it not up to us to decide when and whether everything will be built. How the residents and staff at Björklunden will use the gardens is their decision. We can only try to create gardens that make the residents and staff feel curious and comfortable enough to use them.

4.4 CONCLUSION

This thesis aimed to produce a design proposal for two gardens at Björklunden dementia facility, based on relevant research and information and the staff's wishes. A major concern for us was to create gardens that did not feel like an institution. We feel we have achieved our aim and created a design proposal well suited to individuals with dementia based on research and adheres to the staff's preferences. However, we do not know if we could have received further insights and enhanced the design if it had been tested on dementia residents.

Collaborating with Björklunden Dementia Facility gave us a new insight into working together with a client and a new exploration into environmental psychology. After presenting our design proposal to a handful of staff and project leaders at the dementia facility and municipality, reactions were good. We were told that they were satisfied with the result and that the gardens seemed to be a nice place to stay. It has been humbling to know that we gained the trust of the involved parties to produce the design of their future gardens and to have been met with such understanding and positive feedback. Despite the good responses, there is always the chance that the gardens will not be developed or that, if built, they would not be used by staff and residents. Since the presentations, there have been some alterations to the proposal. However, we believe them only to have increased the result of our proposal and look forward to sharing our results with Björklunden.

4.5 FURTHER WORK

A way to move forward from this thesis is to do further studies at Björklunden if the gardens are built according to the design principles established by the thesis. More research could be conducted, focusing on the design principles applied to other dementia facilities. Further research should inquire if the design principles were composed differently if landscape architects with more experience conducted a similar project. Further studies could involve people with dementia to incorporate experiences from the target group into research.

Another topic that might be investigated further is using research to design solutions in landscape architecture to understand better how research and design can work together to use the knowledge available.

We hope that our thesis will be relevant in future projects associated with the construction of dementia facilities as well as other projects of a similar nature. Furthermore, we hope that other students and professionals will be motivated to use evidence-based design as part of their work.

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APPENDIX

APPENDIX 1 - TASK DESCRIPTION FORM BJÖRKLUNDEN DEMENTIA FACILITY

ORIGINAL, SWEDISH

Gestalta trädgård för demensboende

Vill du skriva ditt exjobb inom evidensbaserad design där ditt förslag kan bli verklighet? Kristianstad Kommun ska göra om två avdelningar på äldreboendet Björklunden till demens och då ska trädgårdarna totalrenoveras. Här har du som är med möjlighet att påverka i hela genomförandeprocessen från vad som ska bevaras till vad som ska läggas till. Det finns möjlighet att planera både gårdarna eller välja en beroende på vad du föredrar och vilket intresse som finns. Du som väljer detta kommer att få stöd och nära dialog med mig som Enhetschef samt omvårdnadspersonal som har erfarenhet av trädgårdsutformning. Det är även obligatoriskt att involvera boende och personal i processen. Vi erbjuder stöd med vår kompetens igenom hela processen men erbjuder stort utrymme för dig att utforska och komma med kreativa lösningar. Du som student har stora möjligheter att påverka utformningen. Det är viktigt att förslaget bygger på forskning och är anpassat till brukargruppen. Det finns stora chanser att förslaget blir verklighet. Vid intresse så diskuteras upplägget och ramarna för projektet mer ingående. Välkommen till oss på Björklunden i Tollarp

Tove
Tove Björnfot | Enhetschef

ENGLISH, TRANSLATED

Design garden for dementia residents

Do you want to write your thesis in evidence-based design where your proposal can become a reality? Kristianstad Municipality will convert two units at Björklunden nursing home into dementia facilities and then the gardens will be completely renovated. Here you have the opportunity to influence the entire implementation process from what is to be preserved to what is to be added. It is possible to plan both gardens or choose one depending on what you prefer and what interest there is. You who choose this will receive support and close dialogue with me as project leader and nursing staff who have experience of garden design. It is also mandatory to involve residents and staff in the process. We offer support with our expertise throughout the entire process, but offer plenty of space for you to explore and come up with creative solutions. You as a student have great opportunities to influence the design. It is important that the proposal is based on research and is adapted to the user group. There is a good chance that the proposal will become a reality. If interested, the structure and framework for the project are discussed in more detail. Welcome to us at Björklunden in Tollarp

Tove
Tove Björnfot | Project leader

APPENDIX 2
Answers from workshop with Björklunden 01.03.2022 (Swedish/ English)

Vad förväntar du dig av trädgårdarna? Hur mycket engagemang känner du? **What do you expect from the gardens?How much commitment do you feel?**

Participant	Svenska	English
1	*Mycket*	A lot
2	*Mycket engagemang, mycket doft, vatten porlande , mycket färg*	A lot of commitment. A lot of scents, rippling water, a lot of colour.
3	*Känner att detta ska bli roligt och att de väcker en lust till att gå ut mer och engagera de äldre.*	Easy access, a lot of colour and color changes with the seasons. I feel like this will be fun and a growing desire to go outside more and engage the elderly.
4	Att det blir lite odling så som potatis och morötter. Även att det kommer att finnas jordgubbar och smultron. Jag känner ett stort engagemang för detta.	Some cultivation of plants like potatoes and carrots. Also that there will be some strawerries and wild strawberries. I feel a great commitment towards this.
5	Jag vill ha olika dofter och blandat med blommor och buskar bär	I want different fragnances mixed with flowers and shrubs with berries.
6	Det ska vara lättskött	It should be easy to maintain.
7	Lugn och rofylld trädgård, lättskött. Spännande.	Calm an peacefull gardens, easy to maintain. Excitement.
8	Känner stort engagemang men vill ha något lättskött.	Feel great commitment but want something that is easy to maintain.

Hur mycket tror du att trädgårdarna att användas? **How much do you think the gardens to use?**

Participant	Svenska	English
1	Mycket	A lot
2	Mycket	A lot
3	Blir de bra så kommer den användas varje dag när vädret till låter.	If they turn out good they will be used every day when the weather allows for it.
4	Jag tror att det kommer att vara väldigt uppskattat och att det kommer att användas flitigt när det är fint väder.	I think it will be much appriciated and that they will be used frequently when the weather is nice.
5	Mycket	A lot
6	Mycket	A lot
7	Förhoppningsvis mycket. Beror på brukarna också, deras intresse och vilja. Upp till oss personal också att locka till att vara ute.	Hopfully a great deal. It depends on the residents and their interest and willingess. It is also up to us as staff to entice them to spend time outside.
8	Mycket, speciellt vår och sommar.	A lot, especially during spring and summer.
9	Mycket särskilt vår sommar tidig höst	A lot, particularly during spring, summer and early autumn.
10	Ej anställd	Not a staff member.

Vad vill du ha i trädgårdarna? (tex. träd, buskar, sittplatser osv.) **What do you want in the gardens? (eg trees, shrubs, seats, etc.)**

Participant	Svenska	English
1	Lite blandat	A little of everything.
2	Lavendel, doftande blommor. Sittplatser, gångstigar, vinbär, jordgubbar, örter vatten spel som porlar	Lavendar, fragrant flowers. Seating areas, paths, current shrubs, strawberries, herbs, rippling water.
3	Träd, buskar, frukt träd och blommor som både är fina att titta på men som man även kan ta in som ex. Snittblommor. Och att de doftar mycket när man är ute.	Trees, shrubs, fruit trees and flowers that are nice to look at but also possible to pick. And they should smell a lot when you are outside.
4	Frukt och bär träd. Även smultron, jordgubbar, potatis och morötter. Bra sittplatser som gör att det är lätt för kunderna att sätta sig samt att resa sig igen.	Trees with fruits and berries. Also wild srawberries, strawberiies, potatoes and carrots. Good seatings that is adapted for the costoumers need to easily sit and get up.
5	Ja blandat vindruvor rosor klematis	A little of everything, grapevines and clematis.
6	Sittplatser fjärilsbuskar mycket färg Hönshus	Seating areas. Butterflu shrubs, a lot of color Chicken coop
7	Mycket sittplatser längs gångar. Träd och buskar, gärna ätbart. Vattenspel. Odlingsbänkar.	A lot of seating along the paths. Trees and shrubs, prefrebly edible. Water elements. Garden beds.
8	Odlingsbänkar, bärbuskar, fruktträd. Hörna för eventuella	Garden beds, shrubs with berries, fruit trees. A corner for future chickens

Vilka växter tror du kommer passa i trädgårdarna? Tänk gärna på din egen trädgård och trädgårdar du har uppskattat genom ditt liv. **Which plants do you think will fit in the gardens? Feel free to think about your own garden and gardens you have appreciated through your life.**

Participant	Svenska	English
1	Fruktträd o smultron	Fruit trees and wild strawberries
2	Lavendel, höga & låga växter, färgade växter,	Lavendar, tall and low growing plants, plants with colours.
3	Träd med mycket färg både på sommar och vinter, de finns även träd som kan ge frukt på vintern.	Tress with kots of colours both during sommer and winter, there are also trees that can bring fruit during the winter.
4	Har inga direkta förslag där mer än det jag redan har nämnt.	I have no more suggestions but the ones I've already said.
5	Mycket färg och dofter	A lot of colours and scents/fragnance
6	Bärbuskar växter som blommar alla årstider	Shrubs with berries, plants that bloom througout the year
7	Bärbuskar, fruktträd. Lättskötta blommor.	Shrubs with berries, fruit trees. Flowers that are easy to maintain.
8	Mycket blommor som blommar länge, blommor man kan plocka och sätta på borden.	A lot of flowers with long flowering periods, flowers you could pick and put on the tables.
9	Buskar och blommor med dofter	
10	Växter de boende känner igen, torktåliga och blommor som är snygga även efter blomning. Grön stomme, vintergrönt och lökväxter till våren. Inget som sprider dig ohämmat, marktäckare. Nävor, hostor, hortensior, blommor med doft, blommor att kunna plocka in i vas. Trädgården får gärna vara utformad så att den är fin inifrån, den mesta tiden är de inne.	Plants the residents recognize, drought tolerant and flowers that look good even after flowering. Green frame, evergreen and onion plants for spring. Nothing that spreads you uninhibited, ground cover. Fists, coughs, hydrangeas, fragrant flowers, flowers to be picked in a vase. The garden can be designed so that it is nice from the inside, most of the time they are inside.
11	Klassiska växter.	Classic plants.

Finns det något intresse för dig att odla växter som en aktivitet tillsammans med de boende? **Is there any interest for you to grow plants as an activity together with the residents?**

Participant	Svenska	English
1	Yes	Yes
2	Ja något litet odlings bord upphöjt, där vi kan odla morötter tex eller rädisor, kryddor men även ha perenna kryddor	Yes, a small cultivation table raised, where we can grow carrots for example or radishes, spices but also have perennial spices
3	Absolut, både växter, grönsaker och kryddor.	Absolutely, both plants, vegetables and spices.
4	Ja det finns det.	Ja det finns det.
5	Lättare som räddisa morot jordgubbar hallon	simpler as radish carrot strawberries raspberries
6	Ja det är en bra aktivitet	Yes it is a good activity
7	Ja.	Yes
8	Ja	Yes
9	Eventuellt i odlingsbänk ex rädisor lite 1 årsblommor	Possibly in the cultivation bench ex radishes a little annuals
10	Inte personal	not staff
11	Möjligen...	possibly...

Hur mycket av din tid kan du investera i trädgården? Uppskatta i timmar per vecka**. How much of your time can you invest in the garden? Estimate in hours per week.**

Participant	Svenska	English
1	Natten	Night shifts
2	1 timme per vecka hoppas på mer	1 hour per week hoping for more
3	Ca 2-3 timmar	ca 2-3 hours
4	Beror ju på hur det ser ut med allt omvårdnads arbete men ca 4 timmar i veckan.	Depends on what it looks like with all the nursing work but about 4 hours a week.
5	Vet ej 2 timmar	Do not know 2 hours
6	4 timmar per vecka	4 hours per week
7	Kvart om dagen kanske	Kvart om dagen kanske
8	Osäkert, ett par timmar.	Unsure, a couple of hours.
9	Ca1 timme per dag	About 1 hour a day
10	Inte personal	Not staff
11	Osäkert.	unsure

Vilka växter tror du kommer passa i trädgårdarna? Tänk gärna på din egen trädgård och trädgårdar du har uppskattat genom ditt liv. **Which plants do you think will fit in the gardens? Feel free to think about your own garden and gardens you have appreciated through your life.**

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3	Träd med mycket färg både på sommar och vinter, de finns även träd som kan ge frukt på vintern.	Tress with kots of colours both during sommer and winter, there are also trees that can bring fruit during the winter.
4	Har inga direkta förslag där mer än det jag redan har nämnt.	I have no more suggestions but the ones I've already said.
5	Mycket färg och dofter	A lot of colours and scents/fragnance
6	Bärbuskar växter som blommar alla årstider	Shrubs with berries, plants that bloom througout the year
7	Bärbuskar, fruktträd. Lättskötta blommor.	Shrubs with berries, fruit trees. Flowers that are easy to maintain.
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9	Buskar och blommor med dofter	
10	Växter de boende känner igen, torktåliga och blommor som är snygga även efter blomning. Grön stomme, vintergrönt och lökväxter till våren. Inget som sprider dig ohämmat, marktäckare. Nävor, hostor, hortensior, blommor med doft, blommor att kunna plocka in i vas. Trädgården får gärna vara utformad så att den är fin inifrån, den mesta tiden är de inne.	Plants the residents recognize, drought tolerant and flowers that look good even after flowering. Green frame, evergreen and onion plants for spring. Nothing that spreads you uninhibited, ground cover. Fists, coughs, hydrangeas, fragrant flowers, flowers to be picked in a vase. The garden can be designed so that it is nice from the inside, most of the time they are inside.
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Participant	Svenska	English
1	Yes	Yes
2	Ja något litet odlings bord upphöjt, där vi kan odla morötter tex eller rädisor, kryddor men även ha perenna kryddor	Yes, a small cultivation table raised, where we can grow carrots for example or radishes, spices but also have perennial spices
3	Absolut, både växter, grönsaker och kryddor.	Absolutely, both plants, vegetables and spices.
4	Ja det finns det.	Ja det finns det.
5	Lättare som räddisa morot jordgubbar hallon	simpler as radish carrot strawberries raspberries
6	Ja det är en bra aktivitet	Yes it is a good activity
7	Ja.	Yes
8	Ja	Yes
9	Eventuellt i odlingsbänk ex rädisor lite 1 årsblommor	Possibly in the cultivation bench ex radishes a little annuals
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4	Beror ju på hur det ser ut med allt omvårdnads arbete men ca 4 timmar i veckan.	Depends on what it looks like with all the nursing work but about 4 hours a week.
5	Vet ej 2 timmar	Do not know 2 hours
6	4 timmar per vecka	4 hours per week
7	Kvart om dagen kanske	Kvart om dagen kanske
8	Osäkert, ett par timmar.	Unsure, a couple of hours.
9	Ca1 timme per dag	About 1 hour a day
10	Inte personal	Not staff
11	Osäkert.	unsure

Upplever du att det är hög ljudnivå från tex trafik eller annat utanför byggnaden?
Do you experience that there is a high noise level from, for example, traffic or other things outside the building?

Participant	Svenska	English
1	Ja	yes
2	Nej	no
3	Ja	yes
4	Nej	no
5	Nej	no
6	Sidan mot vägen hörs trafik och förbipasserande	Side and road, traffic and passers-by are heard
7	Beroende på vilken sida. På "Svalan-sidan" är där ju trafik som kan störa.	Depending on which side. On the "Svalav side" there is traffic that can interfere.
8	Nej	no
9	Nej	No
10	Inte personal, (vatten som porlar kan ta bort trafikljud.)	Inte personal, (vatten som porlar kan ta bort trafikljud.)
11	Nej, vanligen inte.	No, usually not.

Har du något exempel på saker som varit bra i andra utemiljöer för människor med demens eller äldre personer? **Do you have any examples of things that have been good in other outdoor environments for people with dementia or the elderly?**

Participant	Svenska	English
1	Nej	No
2	Djur, sittplatser , ombonat, avlappnande ljud, vatten, en träbänk runt de stora trädet på silvertärnan där är skugga under tex	Animals, seating, cozy, relaxing sounds, water, a wooden bench around the large tree on the silver tern where there is shade under e.g.
3	Att de är en bra höjd så att de kan vara delaktiga även om de sitter i rullstol, ska vara lätt att ta sig runt på gångstråk men även att man ska kunna känna olika underlag.	That they are a good height so that they can be involved even if they are in a wheelchair, should be easy to get around on footpaths but also that you should be able to feel different surfaces.
4	Saker som de känner igen och saker som dom själva kan hjälpa till med, tex odling.	Things that they recognize and things that they themselves can help with, such as cultivation.
5	Vet ej	Don’t know
6	Vattenspel	Water mirror
7	Lampor längs gångarna så att det lyser upp även på mörka kvällar.	Lights along the corridors so that it lights up even on dark evenings.
8	Nej	No
9	Mycket färger och en trädgård som är i förändring året runt. Så blommor och buskar som har olika blomnings tid	Lots of colors and a garden that is changing all year round. So flowers and shrubs that have different flowering times
10	Ombonad, skyddad miljö, samtidigt skall de inte känna sig innestängda. Sittplatser med jämna mellanrum så de kan våga sig ut på promenad.	Cozy, protected environment, at the same time they should not feel trapped. Seating at regular intervals so they can venture out for a walk.
11	Nej tyvärr.	No, unfortunately.

Beroende på var vi väljer att lägga gränsen till trädgårdarna kan vi i vårt designtförslag göra en design där en boende går runt ett hörn och inte är fullt synlig för tillfället. Hur viktigt är det för dig som anställd att alltid se de boende i trädgården? **Depending on where we choose to add the border to the gardens, we can in our design proposal make a design where a resident walks around a corner and is not fully visible at the moment. How important is it for you as an employee to always see the residents in the garden?**

Participant	Svenska	English
1	5	5
2	5	5
3	5	5
4	5	5
5	4	4
6	2	2
7	5	5
8	4	4
9	5	5
10	3	3
11	4	4

Vad tycker du om smalare stigar genom vegetation? (tillräckligt breda för att en rullstol ska få plats) **Vad tycker du om smalare stigar genom vegetation? (tillräckligt breda för att en rullstol ska få plats)**

Participant	Svenska	English
1	Mycket fint	Very nice
2	Fint men de ska va så en rullstol kan komma mellan	Fine but they should be so a wheelchair can come between
3	Behöver vara bredare, finns både små rullstolar Men även den bredaste rullstolen ska få plats.	Needs to be wider, there are both small wheelchairs But even the widest wheelchair should fit.
4	Inte bra	Not good.
5	En rullstol måste få plats	A wheelchair must fit
6	Mycket bra	Mycket bra
7	Det ska vara bra även för rullstolar.	It should also be good for wheelchairs.
8	Fint	Nice
9	Väldigt viktig för trädgården ska vara för de boende först och främst	Very important for the garden should be for the residents first and foremost
10	Trevligt på några småsträckor.. måste kunna mötas på de större gångarna.	Nice on some small stretches .. must be able to meet on the larger corridors.
11	Bra.	Good

Ska det finnas grindar ut från trädgårdarna mot tex väg eller cykelbana eller ska man endast nå dem från byggnaden? **Should there be gates from the gardens towards, for example, a road or cycle path or should you only reach them from the building?**

Participant	Svenska	English
1	Ja	yes
2	Ja	yes
3	Mot cykelbanan	Towards the bike lane
4	Ja det ska det finnas, men inte för långt iväg	Yes, there should be, but not too far away
5	Ja	Yes
6	Ska finnas grind men den ska vara dold	There should be a gate but it should be hidden
7	Ska finnas ut från trädgården.	To be found out from the garden.
8	Grind	Gate
9	Ja	Yes
10	Bra, men skyddat så att det inte lockar att gå ut/ rymma.	Good, but protected so that it does not attract to go out / escape.
11	Ingen uppfattning.	Do not know

Hur fungerar det att har sittplatser utanför någons fönster? Kan det vara störande eller fungera utan problem? **How does it work to have seating outside someone's window? Can it be disruptive or work without problems?**

Participant	Svenska	English
1	Bra	Good.
2	Kan va störade utanför någons fönster	Can be disturbed outside someone's window
3	Kanske inte precis utanför fönsterna	Maybe not right outside the windows
4	Skulle kunna vara ett problem om det är en orolig kund som har sitt fönster där	Could be a problem if it's a worried customer who has his window there
5	Inga problem	No problem
6	Störande	Disturbing
7	Störande om det är precis utanför.	Disturbing if it's just outside.
8	Störande	Disturbing
9	Ja	Yes
10	Inte så trevligt, varken för de som sitter inne eller ute. Ingen gillar att bli betittad.	Not so nice, neither for those sitting inside nor outside. Nobody likes to be watched.
11	Mindre bra.	Not so good.

Något övrigt du vill att vi ska veta?
Is there something else you would want us to know?

Participant	Svenska	English
1	Nej	No.
2		
3		
4	Nej	No.
5	Ätbara bär vill jag ha	I would like edible berries.
6	Nej	No.
7		
8		
9	Nej	No.
10	Jättebra att det finns en dialog mellan er och personalen på boendet.	Great that there is a dialogue between you and the staff at the accommodation.
11		

Ska det finnas räcken i trädgårdarna? Om inte varför? Om det behöver, på vilka platser är det viktigt?
Should there be railings in the gardens? If not why? If necessary, in what places is it important?

1	Nej	No
2	Kanske där de öppet eller där de är smalt	Maybe where they are open or where they are narrow
3	Kan vara bra att de finns räcken som en stöttepelare för de som går själva.	It can be good that there are railings as a mainstay for those who walk by themselves.
4	Vet inte.	Don’t know.
5	Vet ej	Don’t know.
6	Ska finnas längs gångstigen någonstans	Should be along the footpath somewhere
7	Vet inte	Don’t know.
8	Vet ej.	Don’t know.
9	Vi går ju i regel ut med dom	We usually go out with them
10	Vid höjdskillnader.	In case of height differences.
11	Ingen uppfattning.	No idea.

APPENDIX 3: PLANT LISTS

PLANT LIST: PERENNIALS

ID	Scientific name	Height (cm)	CC	Flower color	Flowering	Spreading	Spreading ability	Persistence	Self sowing	Function
P1	*Agastache* 'Black Adder'	80	35	Dark violette	July-Oct	Vegetatively				
P2	*Alchemilla epipsila*	30	30	Green-yellow	June-Aug	Seed	Mod	Hi	Hi	Ground cover
P3	*Anemone* x hybrida 'Wild Swan'	40	35	White/light purple	June-Sept	Micro-propagated	Mod	Hi	Lo	Companion
P4	*Astrantia major* 'Roma'	60	30	Light pink	June-july	Seed	Slo-Mod	Hi	Hi	weaver
P5	*Echinops bannaticus* 'Taplow blue'	100	35	blue-violette	Aug-Sept	Vegetatively	None	Hi	Mod-hi	Solitary/Structure
P6	*Eurybia herveyi* 'Twilight'	60	40	ble-violette	Aug-Sept	Vegetatively	Mod	Hi	Lo	Companion
P7	*Geranium pratense* 'Brookside'	50	30	blue-violette	June-sept	Vegetatively	Lim	Hi	mod-hi	Ground cover
P8	*Hakonechloa macra*	60	40	-	Jul/aug	Vegetatively	Slo	Hi	Lo	Companion
P9	*Hylotelephium* 'Herbstfreude'	50	35	Grey-ish pink	Aug-Oct	Vegetatively	None	Hi	Lo	Companion
P10	*Hylotelephium* 'Matrona'	60	40	Red-pink	Aug-Oct	Vegetatively	None	Hi	Lo	Companion/small structure
P11	*Lavandula angustifolia*	35	30	violette	July-Aug	Vegetatively	Slo	Hi	Hi	Companion
P12	*Leucanthemum vulgare* 'Majdrottningen'	70	40	white	May-Jun	Seed	Mod/Hi	Med	Lo	weaver
P13	*Miscanthus sinensis* 'Kleine Silberspinne'	150	45	Brown/silvery	Aug-Oct	vegetatively	mod	Hi	Hi	Solitary/Structure
P14	*Rudbeckia fulgida* 'Little Goldstar'	40	30	Yellow	July- Sept	Vegetatively	mod	Med	Lo	Companion
P15	*Rudbeckia fulgida* var. sullivantii 'Goldsturm'	70	40	Yellow	July- Sept	Micro-propagated	mod	Med	Lo	Companion/Groundcover
P16	*Sesleria heufleriana*	30/50	35	svart	April-May	Seed	mod	Hi	Lo	Companion plant

PLANT LIST: SHRUBS

ID	Latin name	Height (m)	Width (m)	Flower color	Flowering		Quantity
S1	*Cornus kousa var. chinensis 'China girl'*	2-3	2-2,5	White	June-July		2
S2	*Hamamelis x intermedia* 'Pallida'	1,5-2	2-4	yellow	Jan-Mar		5-1
S3	*Magnolia stellata*	1-2	1-2,5	White	April-May		4-1
S4	*Ribes nigrum 'Narve Viking'*	1-1,5	1,5	Lime green	May		3-1
S5	*Ribes rubrum 'Gullan'*	1-1,5	1,5	White	May		2-1
S6	*Ribes rubrum Rödavinbärsgruppen 'Jonkherr van Teets'*	1-1,5	1,5	White	May		3-1
S7	*Ribes uva-crispa 'Tatjana'*	1	1,5		May		2-1
S8	Sambucus nigra FK BÅLSTA E	3	2-4	White	June		4-1
S9	*Sambucus nigra* 'Black Lace'	2-2,5	2	Pink	June		2-1
S10	*Viburnum bodnantense 'Charles Lamont'*	2-3	1,5-3	Pink	Feb-April		4-1
S11	*Viburnum rhytidophyllum*	3-4	3-4	Creme white	May-June		2-1
						SUM	41

PLANT LIST: TREES AND CLIMBERS

ID	Latin name	Height (m)	Width (m)	Sun conditions	Soil	Flower color	Flowering		Quantity
TREES									
T1	*Acer griseum*	4-5	4-6	Sun to half shade	Not picky	-	-		2-1
T2	*Acer palmatum* 'Bloodgood'	2-4	4-6	Sun to half shade	Well drained				4-1
T3	*Carpinus betulus*	10	6-8						2-1
T4	*Cercidiphyllum japonicum*	10-20	6-12	Sun to half shade	friskt	-	-		1-1
T5	*Magnolia kobus*	8-12	6-8	Sun	Well-drained	White	May		1-1
T6	*Malus domestica* 'Rödluvan' E och 'Aroma' E	4-7	4-5	Sun	not picky	white to pink	may-june		5-1
T7	*Prunus avium* 'Stella'	15-30	<12	Sun	not picky	white	april-may		1-1
T8	*Pyrus communis* 'Ingeborg' PBR E	6-10	3-5	Sun	not picky	White	May		1-1
T9	*Syringa reticulata*	5-8	5-6	Sun to half shade	frisk	yellowish white	june-july		1-1
								SUM	24-1
CLIMBERS									
C1	*Actinidia kolomikta*	3-4	2-3	sun to half shade	Well-drained nutrient-rich, high in organic matter	white	May-june		17
C2	*Rosa hybrida Helenea-Gruppen*	5-7	6	Sun to half shade	Well-drained nutrient-rich, high in organic matter	Light yellow	June-July		16
C3	*Schizophragma hydrangeoides*	5-10	12	Sun to half shade	Well-drained nutrient-rich	White	July-aug		10
C4	*Vitis coignetiae*	20-30	4-6	Sun to half shade	Not picky	Light green	July-aug		8
								SUM	51