

Norwegian University of Life Sciences  
Faculty of NMBU  
Department of Landscape Architecture and  
Spatial Planning

Master Thesis 2014  
30 credits

# The Urban Green as an Area for Physical Exercise for the Elderly

## Det Urbane Grønne som Arena for Fysisk Trening for Eldre Mennesker

Lydia Guðrún Gísladóttir





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## Acknowledgements

I want to thank all those that helped me with the writing of my master thesis. Jan Kristian Jensen, Jens Kjell Aabø, Helge Skog Lund-Johnsen in GEO and data and Hilde Sandbo, Statens vegvesen for a computer analysis from GIS that provided information about where seniors live and where shops are located within the neighbourhood. My children who gave me support and drive to finish my thesis.

This master thesis is a 30 study ECTS and is the final project of my five years of studying for a master of landscape architecture at the Norwegian University of Life Sciences.

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Lydia Guðrún Gísladóttir

## Abstract

This project explores the relationship between the design of a park and seniors physical activities. I will conduct a case study in two parks in Oslo city, i.e. Frogner park and Holmlia park. These two parks are different in style, design, shape and age. Frogner park is an old park that has developed through the years with restorations and extensions. This park is considered to have strong baroque lines which are framed in with lines of large trees and allées. Between the paths are large lawns. A pond with a fountain is one of the attractive features. Holmlia is a nature park that was designed parallel with the residential area. In its design the focus was to make all paths cut through existing woodland so as to lead pedestrians away from car traffic. This was an experiment to find out if this could be a successful design. The general idea was to have regular viewpoints and open lawns in the park to increase the enjoyment value.

In the comparison of these two parks, differences of design and location within Oslo city will be studied to see if there is a noticeable difference when it comes to physical exercise for elderly citizens. The research questions are:

1. What is it that inspires and encourages the elderly to use parks for physical exercise?
2. Are the facilities for activity sufficient to encourage the elderly to choose to visit this particular green area?
3. In order to fulfil expectations for elderly citizens' engagement in physical activity, how may current existing parks be improved?

The answer to the first question is based on my literature review of studies on landscape showing that health and landscape are connected and have significant impact on elderly citizens and their physical activity. My answer to the latter two questions (2 and 3) was based on my spatial analysis and observation in the two parks in Oslo city (Frogner park and Holmlia park). I devised a list of questions based upon my literature review: one for the analysis and one for the observation; in order to get a deeper understanding of whether the facility is acceptable or what needs to be improved in the parks and surrounding neighbourhoods.

The thesis contains two parts:

- **Theoretical background** – based on literature review,
- **Spatial analysis** – based on case studies in Frogner and Holmlia parks and evaluation.
- **Observation** – what are elderly citizens in Norway doing in the parks?

## Sammendrag

Dette prosjektet undersøker relasjonen mellom design av en park og elders fysiske aktivitet. Jeg kommer til å lage en casestudie om to parker i Oslo kommune, Frogner parken og Holmlia parken. Disse to parkene har forskjellig stil, design, form og alder. Frogner parken er en gammel park som har utviklet seg gjennom årene med utvidelser og restaurering. Denne parken ansettes for å ha sterke barokk linjer som er innrammet med store trær og alléer. Mellom stiene er plassert store gressflater. En dam med fontene er en av parkens attraktive egenskaper. Holmlia er en naturpark som ble designet parallelt med boligområdet. Hovedfokuset med parkens design var å la stiene ligge rett igjennom eksisterende skogsområdet for å lede gående bort fra trafikken. Dette var et eksperiment for å finne ut om dette kunne være et vellykket design. Generelle ideen var å ha regelmessige utsiktpunkter og åpne gressflater for å øke på underholdnings verdien. Det som kommer til å bli sammenlignet mellom parkene er forskjellen på design og sted innen Oslo kommune, det blir studert for å oppfatte om det er en merkbar forskjell når det gjelder fysisk aktivitet for eldre borgere. Forskers spørsmålene er:

1. Hva inspirere og oppfordrer de eldre til å bruke parker for fysisk aktivitet?
2. Er fasilitetene for aktivitet tilstrekkelige for å oppfordre de eldre til å velge det å besøke et bestemt grønt område?
3. For å kunne oppfylle eldre borgernes forventninger til fysisk aktivitet, hvordan kan nåværende eksisterende parkene bli forbedret?

Svaret på første spørsmålet er basert på litteratur gjennomgangen min på landskap, som viser at helse og landskap er tilkoblet og har en betydelig påvirkning på eldre borgere og deres fysiske aktivitet. Svaret mitt på siste spørsmålene (2 og 3) ble basert på rom analysene mine og observasjonen på de to parkene i Oslo kommune (Frogner parken og Holmlia parken). Jeg uttenkte en spørsmåls liste basert på litteratur gjennomgangen min: en for analysene og en for observasjonen; for å kunne oppnå dypere forståelse på om fasiliteten er akseptabel eller om hva som trengs å forbedre i parken og omkringliggende nabolag.

Denne masteroppgaven inneholder to deler:

- **Teoretisk bakgrunn** – basert av litteratur gjennomgang.
- **Rom analyser** – basert av case studier og evalueringer I Frogner og Holmlia parken.
- **Observasjon** – Hva er det som elder borgerne i Norge gjør I parkene?

# 1. Introduction

The aim of my thesis is to examine whether green spaces have an inspiring effect on elderly citizens' physical activity. I will conduct a case study at two parks within Oslo. One that is in an old and well-established neighbourhood and the other in a neighbourhood that is relatively new. In my analysis I will seek an understanding of the functionality in the neighbourhoods and the connections with the park and how its residents use the park. The age group studied consists of elderly citizens in Oslo, age 67-99+. The focus is on Norwegian culture. It is assumed that immigrants have managed to adapt to Norwegian culture. Therefore, other cultures are not taken into consideration in this project. To find out the standard in the neighbourhoods, I will examine various aspects that affect the life of elderly citizens, such as education and financial and marital status. In that way I can predict social rank within the neighbourhoods. I will attempt to locate the elderly citizens and find out whether they still live at home or in retirement homes. The overall experience and the design of the area will be evaluated from an architectural perspective. I will use a questionnaire that I created to be able to record the results of my study trips. This will give me an opportunity to register if the area and the relationship between the neighbourhood and the park are inspiring or motivating the elderly to be physically active. Conditions for people with reduced mobility will be examined and evaluated as many elderly citizens suffer from reduced mobility. Based on the case study I will make a comparison of these two parks to review differences in design and usage of the parks. I will present the elements and facilities that are lacking to fulfil the needs of the elderly and suggests possible improvements.

## 1.1 Theme

Over the last decades the health care system has improved diagnosis and treatment of diseases. This together with an easier lifestyle in the western part of the world has led to a longer life expectancy and therefore an increase in numbers of elderly citizens. It is estimated that in the year 2050 the population of today's elderly citizens will have doubled in Europe (Engedal & Dalgard 2011; ORGANIZATION 2003; Organization 2010). According to WHO there will be more people over sixty-five in the world than new-borns. It means that the cost of the health care system will increase greatly, such as for hospitals and nursing homes. This is related to the fact that people in western societies suffer from so-called lifestyle diseases (NCD's) and are increasingly exposed to stress factors. Lack of physical activity puts old people at greater risk of developing these lifestyle diseases. The physical diseases are: heart diseases, high blood pressure, stroke, type 2 diabetes, colorectal cancer, breast cancer, obesity and osteoporosis. The mental disorders are: depression, anxiety, panic disorder dementia and schizophrenia. These may be delayed, ameliorated or prevented by better cardiovascular endurance, muscle strength, muscles, stamina, flexibility and body composition (Engedal & Dalgard 2011; Organization 2010; RACIOPPI et al. 2002; Woolley 2003). To cater to the enormous increase in costs that are foreseeable in the health care system, preventive measures can be used. These features may include making each person more aware of his/her health with regard to diet, physical exercise and strength. We are talking about lifestyle changes where daily physical exercise in the green environment becomes a habit. The individual that chooses healthy food and exercise, has greater overall strength, better physical balance and mental health and will be in better shape. This applies especially to people who are middle-aged now and are exactly the same people that will become part of this tremendous increase of elderly citizens. Physical activity and strength can improve the immune system and resistance against diseases by reducing diseases or preventing them from becoming serious and, in some cases, prevent them from developing altogether. It is recommended that people have the option of getting in contact with nature on a daily basis. This is considered to have a great impact on every aspect of general health, both physical and mental. Therefore, it is essential to design and provide multiple functional spaces within every city and make it interesting enough to encourage people, especially elderly citizens, to go outside and exercise (Engedal & Dalgard 2011; Organization 2010; RACIOPPI et al. 2002).

According to a population prediction from Statistice Norway, the number of senior citizens is estimated to be about 94,733 in 2030. This is a 36.9% increase from what it is today. Therefore, it is of great concern how health care is prepared to deal with this tremendous increase of seniors. The health care costs will increase with the necessary services it has to provide forexemple need for more serviced apartments and hospital beds. The projected increase of people over 67 is illustrated in table 1.

The number of seniors in Norway, aged 65 – 99, are 790,612, 353,325 men and 437,287 women. The age dis-

tribution is shown in Table 2 and shows a gradual decrease in population that starts in the age group of 70-74. Women generally seem to live longer than men. This might be because men are more likely to have worked in conditions where they are exposed to various risks and work-related stress.

Women were more at home and lived in a relatively safe environment. They were less likely to do physically hard work and to be exposed to work-related stress.

Egendal og Dalgard (2011) has demonstrated that about 100,000 senior citizens in Norway suffer from depression. It is 19% of those who are 60 years of age and older and the numbers rise to about 20% when people are 80 years of age and older. Examples of causes: reduced mobility and diseases, loss of a loved one and others that are close to them which may lead to reduced social interaction.

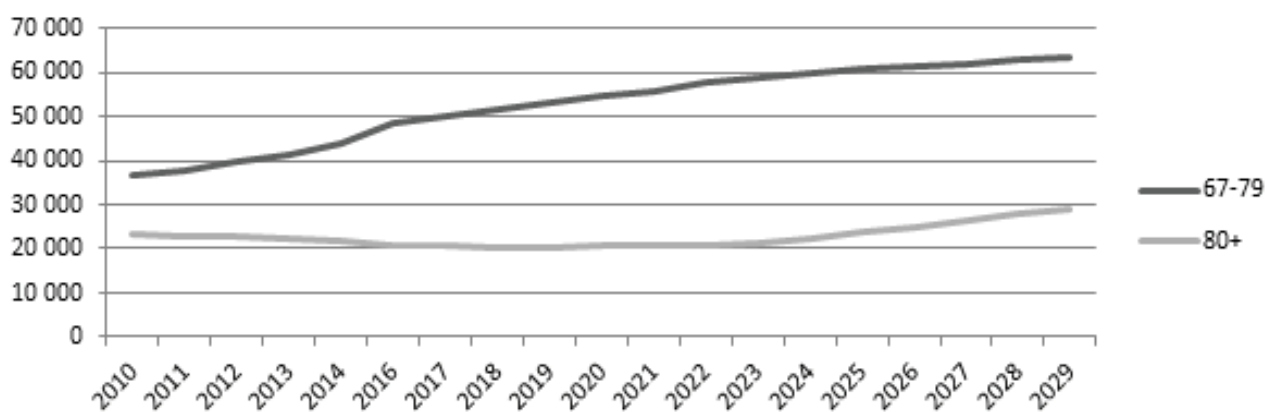


Table 1 shows the projected increase of senior citizens until 2030. The increase has occurred in age group 67-79 and by year 2029 seniors have increased about 25.000. From 2023 the increase picks up again, especially within age group 80+ (statistisk arbok utviklings 2013).

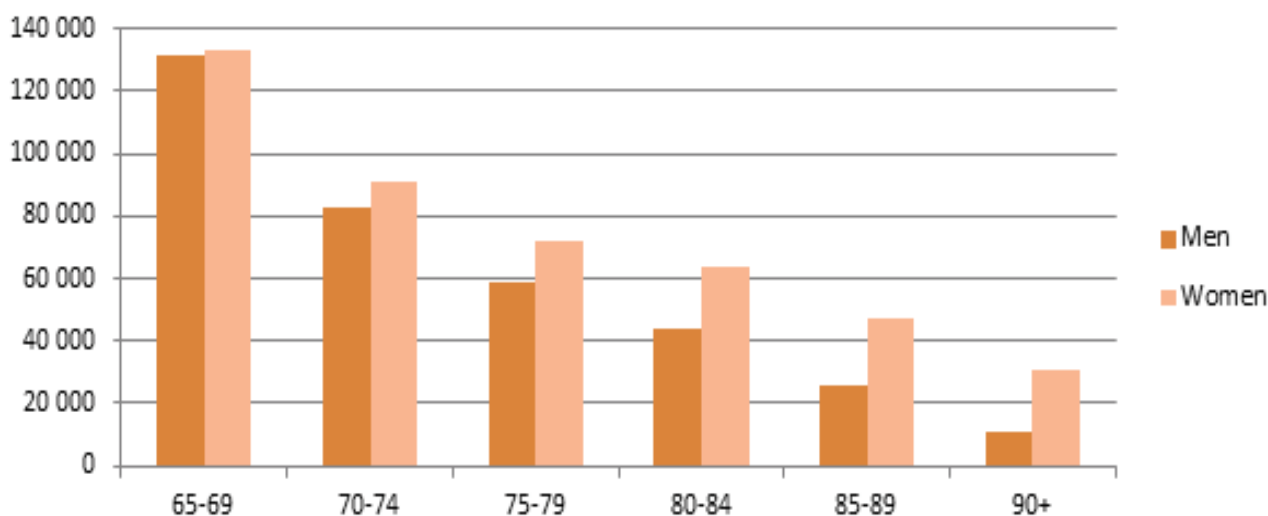


Table 2 shows the population of senior citizens in Norway 1 January 2013. X - axis shows the number of seniors and y - axis shows age. (statistisk arbok utviklings 2013)

This is often described as a lack of interest in life which leads to inability to take part in activities that once were enjoyable to them. People become passive and helpless (Lae & Listhaug 2009).

### 1.1.1 Senior citizens in Oslo

The number of elderly in Oslo aged 67-99 is 66,155, according to Statistics Norway and the static of Oslo 2014, of which there are 27,681 men and 38,378 women. Table 3 shows the distribution of senior citizens between neighborhoods in Oslo. There are certain neighborhoods that stand out when we look at senior resident choices. These are Frogner, Vestre Aker, Østensjø and Nordstrand. These seem to be neighborhoods that appeal more to elderly citizens than other neighborhoods in Oslo. The neighborhoods that have the fewest senior

residents are Gamle Oslo, Grünerløkka, Sagene and Søndre Nordstrand.

### Criteria population of districts by age 1.1.2014

	67-74 år	75-79 år	80-84 år	85-89 år	90 år +	I alt
01 Gamle Oslo	1 408	397	300	216	187	2 508
02 Grünerløkka	1 366	367	318	232	239	2 522
03 Sagene	1 274	383	316	236	238	2 447
04 St.Hanshaugen	1 267	383	300	215	218	2 383
05 Frogner	3 401	1 198	867	650	549	6 665
06 Ullern	2 577	867	664	545	326	4 979
07 Vestre Aker	3 322	1 050	918	703	499	6 492
08 Nordre Aker	2 620	1 011	867	667	433	5 598
09 Bjerke	1 342	557	546	443	241	3 129
10 Grorud	1 528	628	511	334	212	3 213
11 Stovner	2 270	767	542	266	150	3 995
12 Alna	2 822	968	825	522	347	5 484
13 Østensjø	2 571	1 444	1 488	1 000	506	7 009
14 Nordstrand	3 062	1 220	1 122	921	619	6 944
15 Søndre Nordstrand	1 626	411	329	191	93	2 650
16 Uten registrert adresse	70	18	17	20	12	137
<b>Oslo i alt</b>	<b>32 526</b>	<b>11 669</b>	<b>9 930</b>	<b>7 161</b>	<b>4 869</b>	<b>66 155</b>

Table 3 shows the population of senior citizens in Oslo 1 January 2014 and how they are distributed within the neighbourhoods. It is possible to make the conclusion that Frogner, Vestre Aker, Østensjø and Nordstrand are better than Gamle Oslo, Grünerløkka, Sagene and Søndre Nordstrand. It can also show that Oslo systematically gathers together the elderly citizens at certain places in the city. (*www.utviklings og kompetanseetaten* 2014)

Table 4 and 5 illustrate the gender division among seniors within each neighborhood in Oslo. In the age group of 67-79, men count 20,375 while women count 23,767. The number of women in the age group is higher than men by 3,392, or 7.7%. Age group 80-89 has 6,160 men and 10,907 women, 4,747 more women than men, or 27.8%. Age group 90+ has 1,146 men and 3,704 women, 2,558 more women than men, or 52.7%.

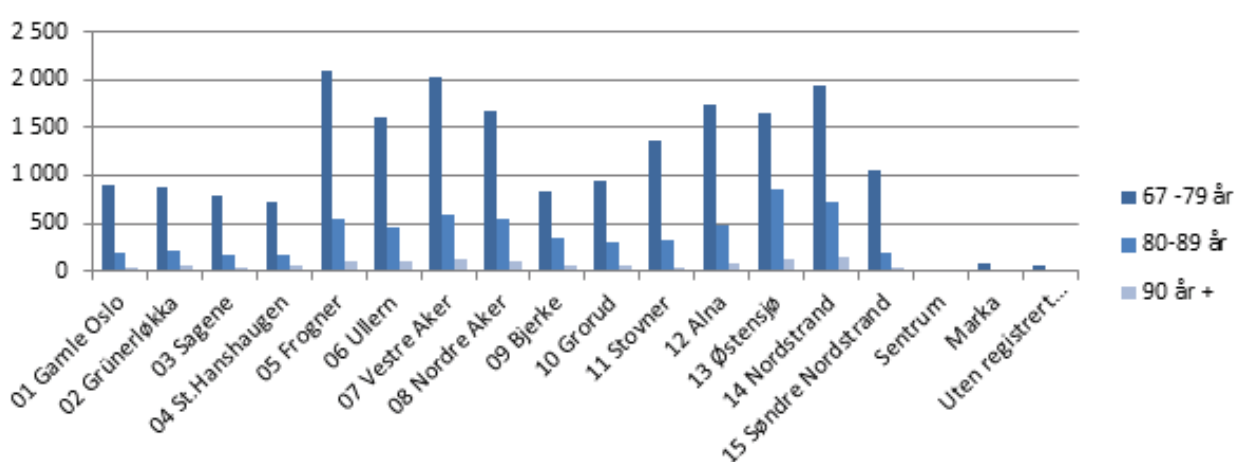


Table 4 shows the number of male senior citizens in Oslo, January 1, 2014. X - axis shows the number of males and y - axis shows the districts in Oslo. Frogner has the highest score in age group 67-79, Østensjø in age group 80-89 and Nordstrand in age group 90+. (*www.utviklings og kompetanseetaten* 2014)



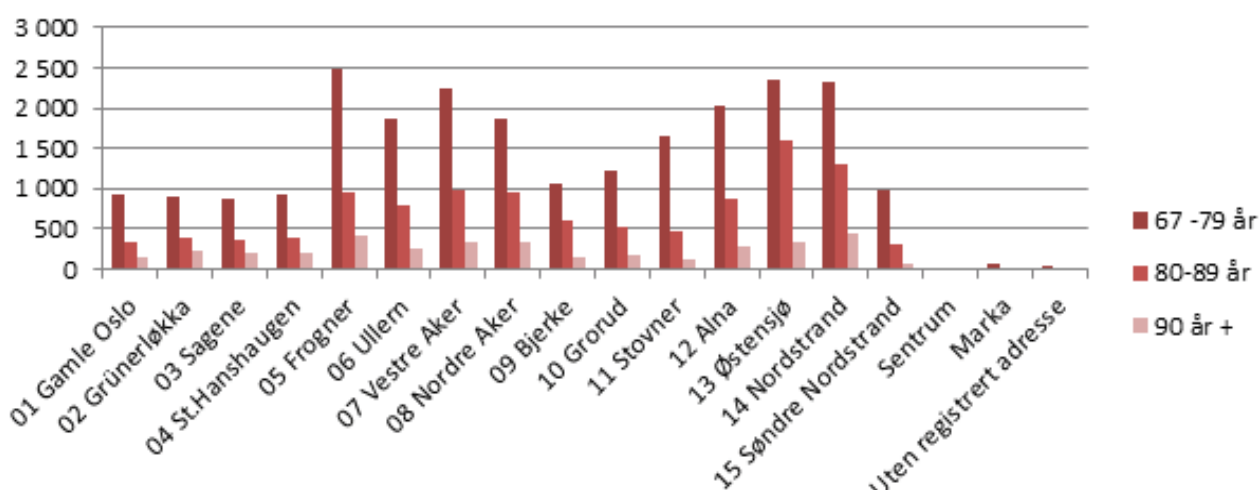


Table 5 shows the number of female senior citizens in Oslo, January 1, 2014. X - axis shows the number of females and y - axis shows the districts in Oslo. Frogner has the highest score in age group 67-79, Østern in age group 80-89 and Nordstrand in age group 90+. (*www.utviklings og kompetanseetaten* 2014)

It is safe to draw the conclusion that women in the given age groups live longer than men. It can be considered because of the changes in the status of women in society today that longevity of women will not be as noticeable as before. It can be assumed that it will tend to even out. Especially in the Western world where work has become less physical but with more mental weight.

The education level of senior citizens within Oslo is surprising. According to the data, women seem to be in majority when it comes to common education, up to lower levels, such as BS degree in University. It is possible to estimate from this information that men have chosen to participate in the labour market at an early age, engaging in highly physical demanding jobs to provide for their families. It can also show that it was easier for women to seek formal education than before. At higher education levels, men surpass women. More women than men have no education at all. See table 6.

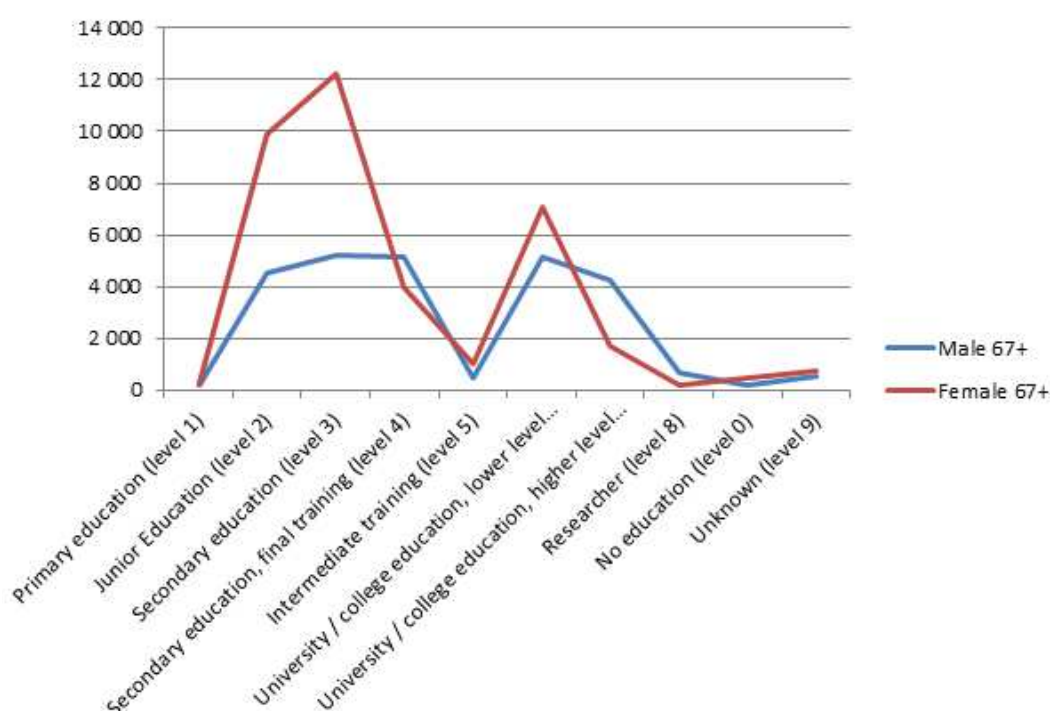


Table 6 shows the highest education level among elderly citizens aged 67 – 99, 01.01.2013. Secondary education is the most common among women, or 12,264. Around 7,038 women have university education (level 6). Men score higher in university education, higher level, or 5,170.

By studying gross income by age and gender for seniors from 67 years and older living in Oslo, we can see that

the majority of women have an income between 150,000 – 399,900, and very few earn more than that. Men have a higher income, between 400,000 – 800,000+, and are more likely to earn more than that. This goes together with the education level that is described in table 6.

Higher level of education gives higher income. Income distribution within Oslo is obvious and shows clearly which neighbourhoods are upper class and in which ones could be defined as lower class.

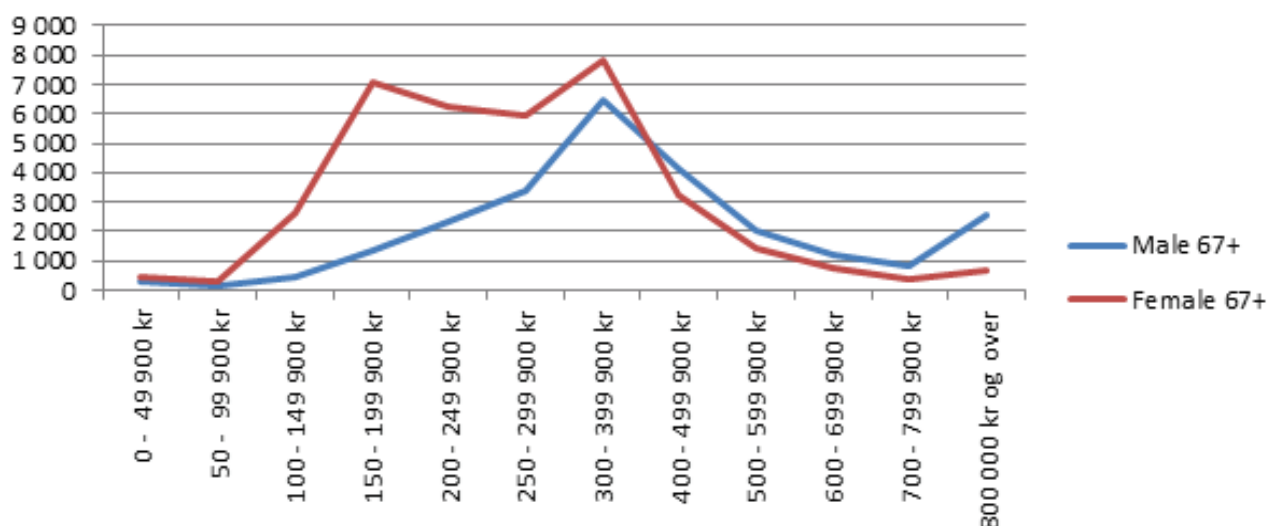


Table 7 shows annual income for men and women 01.01.2012. The salary is in line with the education level as shown in table 6, especially the one that provides higher income. The education level is university, higher level or more.

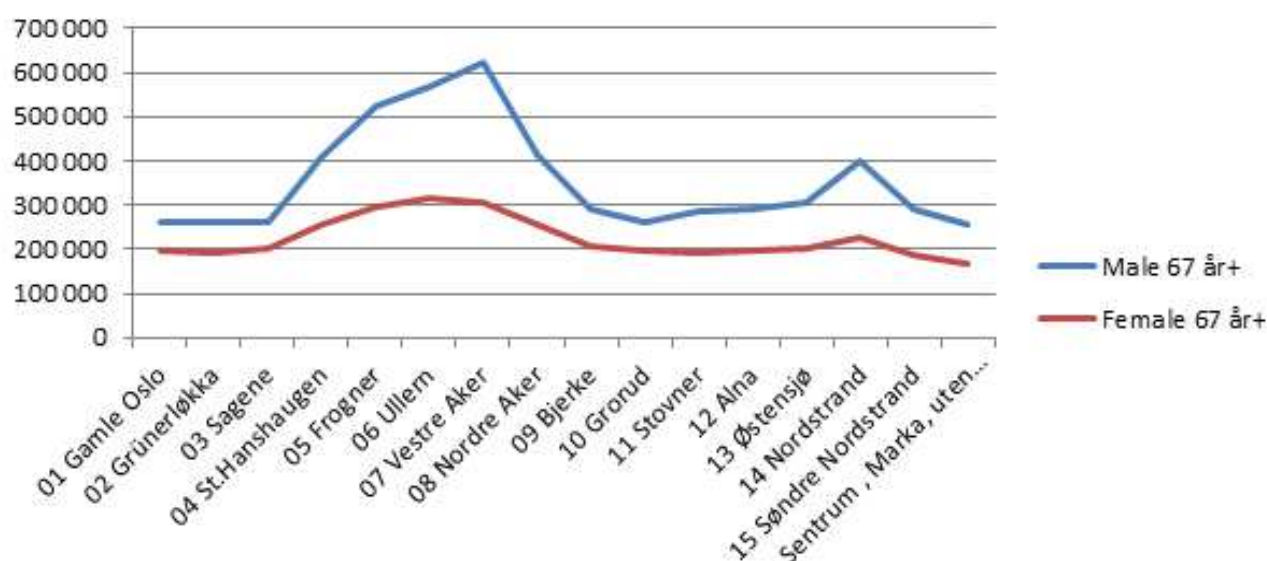


Table 8 shows annual income within the neighbourhoods in Oslo, 01.01.2013. Neighbourhoods 05 - 08 are upper class. 04, 08, 13 and 14 could be considered as middle class, 01 – 03, 09 – 12, 15 and center/city outskirts could be considered as lower middle class to lower class to poverty.

Elderly citizens that have the alternative to continue working, or delay their retirement, usually live in neighbourhoods that are considered to be upper class. Nordstrand is the only middle class neighbourhood that has a high number of elderly citizens which choose to postpone their retirement, and is followed by Alna and Østernsjø. By studying table 9 it is clear that seniors in upper class neighbourhoods choose to work longer than those in lower class areas.

The reason could be more interesting jobs or that the elderly has a firm and wants to work as long as it can. The job in lower class is likely to be uninteresting and then retirement is a relief.

It is possible to find out the distribution of elderly citizens in Oslo that are not working by studying who is receiving pension by gender and age. This is illustrated in table 10.

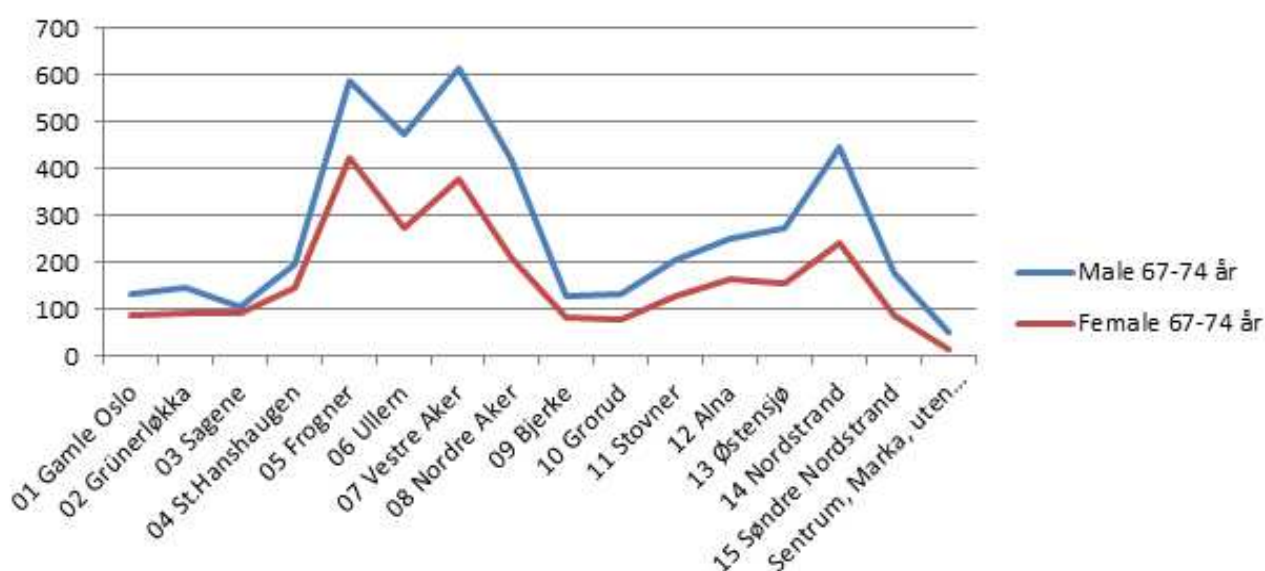


Table 9 shows those elderly citizens that are employed at quarter 4 of 2012. It is age group 67-74. This is in line with table 8 and 9. Those who decide to work mostly live in upper class neighbourhoods. Male are in majority of delaying their retirements.

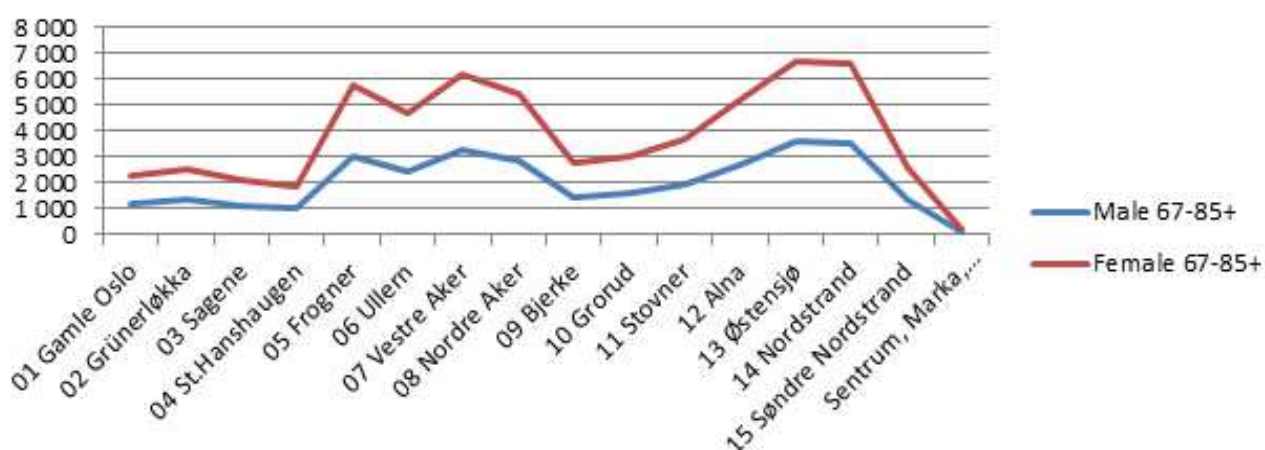


Table 10 shows annual income within the neighborhoods in Oslo. Neighbourhoods 05 – 07 and 13-14 have most seniors on pensions. But majority of seniors lives there. Pension in toughs area were fewer live shows that most of them get pensions.

## Summary

The proportional numbers of senior citizens is growing in Norway and that includes Oslo. The division of residential areas within Oslo is illustrated in Table 3 and by gender in Table 4 and 5. The most popular neighbourhoods are Frogner, Vestre Aker, Østensjø and Nordstrand. Fewer live in Gamle Oslo, Grünerløkka, Sagene og Søndre Nordstrand. Women in Oslo have a higher life expectancy than men.

Though table 6 illustrates that higher education levels are more common among females, it does not necessarily yield higher wages. Table 7 shows us that men earn more than women at higher education levels and that they can have a similar salary as women, despite less education. Tables 6 and 8 illustrate that those popular neighbourhoods have a high percentage of elderly citizens with higher level education and high wages. The less popular neighbourhoods are inhabited by elderly citizens that have very little or no education and therefore lower wages. Table 9 reveals that seniors living in the upper class neighbourhoods have better connection to the labour market because they choose to postpone their retirement. Table 10 illustrates where people receiving pension are living. This does not mean that all seniors that receive pension are wealthy people. Instead, it much rather shows where seniors choose to spend their last years, regardless of their former living standards.

## 1.2 Objectives

The objectives in the thesis are to search the scientific literature for the needs, activity level, physical and mental health of seniors and how they relate to the availability and usage of green areas and parks within the city. Based on the material found, I created a framework for analysis of two chosen parks within Oslo. The objective of the analysis is to examine if those green areas can fulfil the requirements needed to encourage people to go outside and exercise.

## 1.3 Research questions

The research is based on the following questions:

1. What inspires and encourages elderly citizens to use parks or outdoor environment for physical exercise?
2. Are the facilities for activities sufficient to encourage the elderly to choose to visit a particular green area?
3. In order to fulfil requirements for elderly citizens' engagement in physical activity, how may current existing parks be improved?

## 2. Method

In my master thesis I will demonstrate the relationship between green areas and physical activity for elderly citizens. I will examine what encourages seniors to engage in physical activity and what they consider to be a hindrance. In the fall of the year 2011 I had a meeting with Professor Anne-Katrine Halvorsen Thoren to discuss how I could gather and construct material for my master thesis. I wanted to write about how green areas could be used as an inspiring and stimulating environment for people to be physically active. Professor Thoren suggested that I would write about elderly citizens in the age group from 67 to 99. It is the age group we call pensioners. These are mostly individuals that are retired from work. Studies on connections of green environments to certain age groups have been made in Norway, excluding elderly citizens. This gives me an unexpected opportunity to do a case study on elderly citizens and their connections with green areas or parks near seniors' residential areas. Further discussions for my master thesis involved how to perform the case study and what kind of fundamental foundations were available and how to proceed further with the conduct of the study. The choice was between 3 categories of combination in residential areas with elderly citizens.

1. All the popular neighbourhoods where many seniors live today.
2. All the unpopular neighbourhoods where very few seniors live today.
3. A combination of the two categories above, enabling a comparison of the two.

Category 3 was most interesting for me because in that way I could learn what elderly citizens consider to be encouraging for physical activity and the quality of the park and neighbourhood. Based on that information it is possible to come up with potential suggestions, e.g., how to make improvements in the parks in these neighbourhoods.

My master thesis is comprised of 3 parts:

- Part I – Literature review
- Part II – Case study
- Part III – Observation

### Part I – Literature review

In my literature review I used search engines to find scientific literature. These were: BIBBSYS, ISI Web of Science, NORART, WHO and google.com. ISI Web of Science and BIBBSYS gave the best results. When searching for material, I used key words such as *elderly, old, active, mental, stress, acquired diseases, park, walking*

*distance, health, quality of life and nature.* All the words were used in combination with *park, elderly* or *old people*. Different combinations of words were used to create various results within the search engines to get more diverse material. The most difficult part was to find materials that were only related to elderly citizens in Norway. Those found were outdated and didn't have the same quality as the material I had already found. The ones I found that were newly written were basically reproduction of the material that I had already found. It also didn't have any case studies related to elderly citizens in Norway and therefore failed to add any value as a reference. There were a few that I chose to use because that one brought in value that I didn't find elsewhere. The material that was chosen included studies, articles, books and websites from reputable sources such as the World Health Organization (WHO), Statistics Norway (SSB) and the State Road Administration. The Ministry of Health and the Health Care Administration in Oslo and Oslo's Municipality website for parks was used.

The material that was chosen had to be connected to a spatial perspective; the base point of the material had to be a designed environment, with green areas and include how the environment affected elderly citizens' participation in physical activity. It had to demonstrate if the park and the neighbourhood were motivating or discouraging. It was a challenge to find reading material that covered most aspects of human behaviour that was especially written about the elderly. I had therefore to rely on studies that covered all age groups and included facts about elderly people.

Studies that were based on social factors, behaviour, neighbourhoods, environment, activity, distance, choice and the quality of life that took place in green areas were the material for this thesis that I searched for. Furthermore, studies or reports that could prove or assert the importance of arguments that supported the assumption that green environments were important for physical activity of the elderly.

## Part II – Case studies

Based on the findings of the literature review, I wanted to evaluate the design of open green spaces in Norway. To determine if the conditions that the elderly citizens require or consider as a quality or a barrier are present in the two chosen case study areas. These studies were the foundation when I constructed the questions to use in the evaluation process of the parks and in the observation. These basic studies did not cover all aspects to complete my questions. Materials from different studies were used to complete the list but in some aspects I had to create my own. I will explain this in the chapter on the case study lists. A criterion is created to help with the evaluation and to make it more visualised to understand with known measurements and standards for explanations.

The main purpose is to visit two parks in Oslo, four times over a period of one year, i.e. one visit per season. Evaluation is made of each area and an observation of what the elderly are doing in the park. Each visit lasted the whole day from 10:00 -18:00. The list of questions was answered and photos taken to support the answers. Then answers and pictures were used to make an analysis and a map to make it easier to understand and visualise the area. Text and photos for further explanations were added. This gives information about how the function is in the park and if the design is supporting and motivating elderly citizens to be physically active. The results give a foundation to compare the two parks and see the difference between their designs in function.

## Part III - Observation

In the Observation I go over what the elderly are doing in the parks. The observation was done by watching what seniors did in the park. I did not ask the seniors themselves, but I had a list of questions that I filled out. From these results I could predict what elderly citizens are doing in each park. The questions were derived from statements from elderly citizens in other studies. In these studies elderly citizens were asked similar questions or asked to describe lacking, inspiring elements, improving or good qualities in the park. The questions were adapted to Norwegian conditions. The results are shown in Excel, maps, pictures and written texts to present the information clearly with visual support.

The findings from part II and III are summarized and compared. The design difference is the main focus in this comparison, i.e. the natural park versus formal baroque. There will be a discussion of whether the design has a major impact when it comes to physical exercise and motivation for seniors.

I will make a list of the qualities that elderly citizens require and consider to be motivating for physical ac-



tiveness. From that list I will make proposed amendments to the previously selected areas for improvement to strengthen the existing design so that the parks can achieve the purpose for which they were originally designed, including adaptation to the needs of elderly citizens.

### 3. Part I - Literature review

In this chapter I will present chosen material and theories that I considered relevant for my thesis. This is the material that I will use further to create my list of questions for the case study and observation.

#### 3.1 Importance of green areas within the city

In this chapter I will present what significance green areas have in the city and their purpose. I will reveal the connections between green areas and how they are connected to the pedestrian system in the city. I will show that the size of a green area is as relevant as the design purpose. The importance of maintenance will be presented.

##### 3.1.1 The significance of green areas in the city

Nature created people and taught them how to survive in the environment. To live in a green environment is an everlasting general therapy for pack animals as people are. All meaning and behaviour quickly evolves in parallel. People today have evolved further away from nature and are spending more time indoors. This is an indirect pressure from society. Majority of employees work indoors. Most hobbies are also enjoyed indoors. The result is that people spend less time outside. The body does not follow this evolution and the mental side is in poor shape. People need to go outside into nature to achieve proper ground connections and a minimum mental balance. To be tired and mentally exhausted can be a sign that the person simply does not spend enough time outside in nature. It is not enough just to be outside in the grey city environment, it is the green areas that people need and are important. Civilization is breaking the bonds between man and nature and it shows in modern city formations. It is assumed that parks are organized with nature beaten where there is no space given for the free form of nature itself (Kaplan & Kaplan 1978; Maller et al. 2009; Simons & Andel 2006). Fredrick Law Olmsted said 1857 “driver of unconscious processes to relax and relieve tension created by the artificial surrounding the urban life” (Maller et al. 2009).

Maller et al (2009) quote in Hancock (1999) that green areas as parks have enormous effects on people and are effectively the key factor in maintaining physical health, mental balances and thrive.

Inside the city people can find green areas in various sizes and with different purposes. Connections between green areas are important. The main areas in this green network are often large open areas or parks. Connections of green spaces has several advantages:

- Enables pedestrian circulation
- Ecological connectivity
- Traffic free zone
- Stress free zone
- Playground
- Entertainment

Ghel (2010) argues that a city which contains green areas for various usage has unlimited possibilities. Green areas need to have a purpose so that each area can inspire people to come and use them. They need to be able to change their function unexpectedly if necessary (Aspinall et al. 2010; Schipperijn et al. 2010; Sugiyama et al. 2009). Stigsdottir et al. (2010) argue that the size of the green area affects its usage possibilities. She recommends dividing urban green areas into smaller areas. This gives acceptable outcome both in terms of physical and mental health by combining large and small areas. Stigsdottir et al. (2010) argue that studies have shown that people mainly uses the areas that are closest to their homes. This is an important factor for the necessity for green areas in the neighbourhoods. Thorén & Nyhuus et al. (1994) argue that it is possible

and necessary to have continuous connections between green areas and to maintain the scale difference. This depends on whether the focus is on levels of experience, nature or restoration. Thorén & Nyhuus et al (1994) argue that you can divide the public green areas in Oslo roughly into four categories that are divided up according to what role they play within the city:

1. **Large areas** – These are areas that range from 1 to 5 hectares in size and where people can experience nature. These areas have exceptionally high value within the city (Schipperijn et al. 2010; Thorén & Nyhuus 1994; Ward-Thompson & Travlou 2007).

Areas of this size are often fitted into the city's centre as parks or on the city outskirts as natural forests (Thorén & Nyhuus 1994). The focus is on the experience. An area that lies in the centre of the city provides more services compared to the areas that lie on the outskirts of the city (Aspinall et al. 2010; Thorén & Nyhuus 1994; Ward-Thompson & Travlou 2007).

Within the city limits the parks can be different kind of spaces:

- Places that had significance prior to the construction of the park.
- Protected areas with rivers or streams.
- Other open areas that could not be utilized for construction for some unknown reason.

Parks are places that are open to everyone who is interested in visiting them. These are often areas that contain designed landscapes where every square meter has a purpose. Within them are located the city's pedestrian systems that connect different parts of the city. The areas have multiple purposes in addition to the normal park usage. (Aspinall et al. 2010; Gehl 2010; Schipperijn et al. 2010; Thorén & Nyhuus 1994; Ward-Thompson & Travlou 2007) They provide necessary facilities so everyone can use the areas that are available. It is easier to have parks that provide variety. What is provided as variety is limited to the size of the park. Normal facilities are divided by:

- Usage
- Place
- Purpose
- Neighbourhood

(Aspinall et al. 2010; Kaplan & Kaplan 1995; Schipperijn et al. 2010; Sugiyama & Thompson 2007; Thorén & Nyhuus 1994).

To attract people to the park they offer a program of events that are scheduled throughout the season. These events are limited to different areas in the park. Parks inside the city are livelier and provide a greater city atmosphere where people interact and participate in events (Gehl 2010; Kaplan & Kaplan 1995).

1. **Corridors and connections** – According to Thorén & Nyhuus et al (1994), these areas connect the other green areas from city outskirts, center to the sea. These are interface areas where you can find a pedestrian system that covers the city, such as:

- Allées
- Flowerbeds along the streets.
- Vegetation near paths in neighbourhoods.

These areas within a neighbourhood are often away from the main traffic lanes. They are used by people that choose to walk where there is less indirect environmental pressure from the traffic and advertisements. These are important areas that can easily be used for physical exercise, including elderly citizens (Aspinall et al. 2010; Gehl 2010; Thorén & Nyhuus 1994; Ward-Thompson & Travlou 2007).

3. **Buffer areas** - These are areas that can often be categorized as buffers, and are almost left untouched. It is possible to find these areas at regular intervals inside the city limits. They often have hidden pathways or shortcuts between neighbourhoods or connections to forest paths. The only boundaries

are the seasons, for the paths can easily disappear over the winter months (Thorén & Nyhuus 1994; Ward-Thompson & Travlou 2007).

4. **Small zones** - - These are areas that are often categorized as leftover areas and serve no real purpose. If these areas are inside the city centre they are usually filled with some kind of vegetation and even benches. If these areas are in the suburbs then it is very likely that they are full of weed and therefore serve a biodiversity purpose (Thorén & Nyhuus 1994). They can also be the little places inside the residential areas with a bench where neighbours can meet and can be used as a resting place for the elderly and others (Thompson et al. 2010).

Thorén and Nyhuus et al (1994) quote Grahn (1994) who has a system of dividing large areas into categories; it is based more on the level of experience:

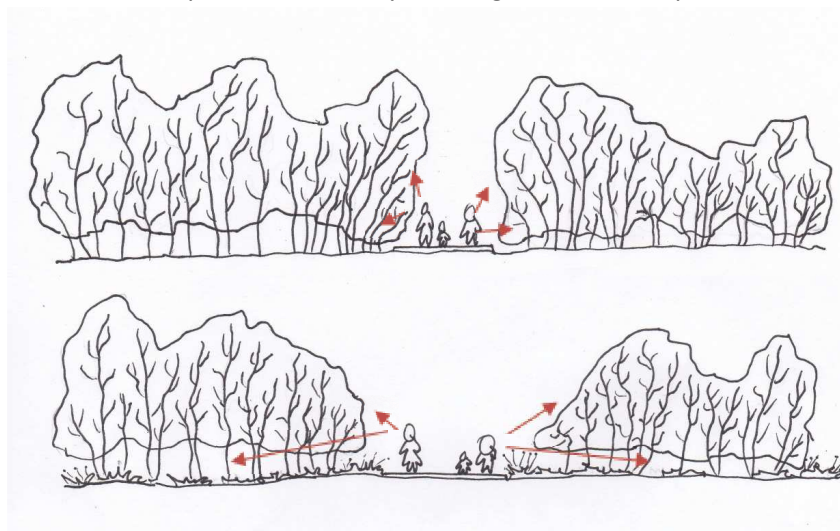
1. **Wild** – Places considered being untouched. Imagination can be released.
2. **Infinite** - Forest areas that function infinitely and you can go for long walks without being disturbed by grey areas.
3. **Variations** – It focuses on the buffer zone between cities and nature. Where ecology is rich. This is an area where it is possible to investigate and explore.
4. **Quiet** - Large open areas with tall trees. Views, stillness and quiet are prevailing.

Thorén & Nyhuus et al (1994) quote Grahn (1994) that green areas are divided up according to what role they play within the city and also divide medium areas and small areas into four categories:

1. **Area for fun** - Designed areas that are intended to provide different kinds of entertainment options and a place to visit for a picnic or a barbecue. Vegetation takes the form of lawns and trees.
2. **Culture** - A place where statues of well-known people are on display. There are often benches and beds of vegetation around. A quiet area to visit.
3. **Playgrounds** - Are designed openly and provide a space for children to use their imagination to create their own fantasy world.
4. **Flat** - Open flat spaces in green, brown or greys that are utilized for ball games or other similar activities.

### 3.1.2 Maintenance

Maller et al (2009) argue that green areas that people love to visit are often areas that are well maintained and feel safe. It is important to create areas that are safe, clean and quiet. For example; remove factors like enclosed places that create the possibility of people being attacked (Bell 1999; Maller et al. 2009). Vegetation that grows freely in all directions fails to meet the requirement of achieving its natural growth form. It doesn't matter whether it is a constructional park or a natural woodland, although the constructional park requires considerably more care than the natural woodland. Both parks need pruning, cutting and weeding on regular bases until the preferred security that vegetation has to provide is acceptable (Gunnarsson 2012).



Picture 1 shows how vegetation is cut back to create insight visions on a path or pavement that lies within vegetation. The arrows on the picture above show narrow space and no insight to the side. This is a wall. On the picture below is a wider sight and lends a feeling of a larger space.



Parks are designed to create a specific atmosphere to attract people. If the design is not maintained, the atmosphere disappears and the park becomes uninteresting and therefore loses its potential of attracting visitors. Residents in the neighbourhood stop going to the park and it loses its social significance. Most green areas inside the city are under heavy pressure of being used for building construction. A green area that does not have sufficient usage by the residents in the neighbourhood is at great risk of being turned into construction sites. That is why it is important that green areas are designed with a plan for maintaining and renewing the elements in the parks so that they remain manageable (Aspinall et al. 2010; Schipperijn et al. 2010; Sugiyama et al. 2009; Thompson et al. 2010; Thorén & Nyhuus 1994).

### Summary

Grahn (1994) divides green areas into eight categories, four for large areas and four for small areas. Stigsdottir (2010) points out that size matters and recommends that large areas should be divided up into smaller units. That way, it is possible to give each area a purpose and make the park multipurposed. Ghel (2010) and Aspinall (2010) point out that it will increase popularity of the park and that the usage will rise. After all, parks are areas where everyone is welcome as long as people want to go there. Thorén & Nyhuus (1994) point out that corridors are the connection between areas and small green areas are connections for biodiversity. Maintainers in green areas help to increase the lifetime of the design. It makes the area more attractive for visitors because it seems to be safe and that gives a sense of wellbeing.

## 3.2 The experience of space-forming elements in the area

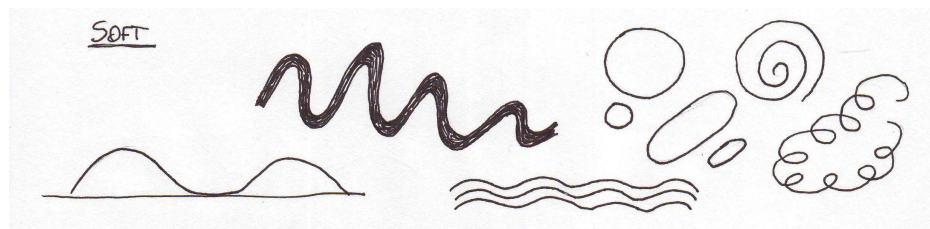
In this chapter I will shed a light on the effects that natural places and topography lines have on all people, especially elderly persons and what to avoid when a city environment is designed. I will examine how it is possible to perceive space and elements that create it. The perception controls the way we experience the space and evaluate it as safe or not.

### 3.2.1 Space formation

The form of topography has an effect on people's behaviour at all ages. Slopes and lines have two basic forms; hard and soft. These forms can be clean, abstract or a mixture of the two. The experience of these forms is measured in the scale; large, medium or small. The individual evaluates every area as positive or negative from the scale, lines and forms that the topography creates, in the city it is the construction of buildings and open spaces between them. It is this combination in scale that brings out reactions in elderly people. The area can either appear to be overwhelming, or safe and comfortable. These feelings decide if the area is worth examining for further qualities or not.

#### Positive landscape - Soft

- Areas with rounded mountain slopes with U-shaped valleys.
- Soft lines are evaluated as comfortable.
- The person experiences the area as safe.
- It's easy to defend yourself against an assault from an enemy or animal.
- The place is interesting for a closer examination to find out the negative and positive aspects.
- Environments like these are often seen as assets for residential living.
- The positive is written in the landscape.



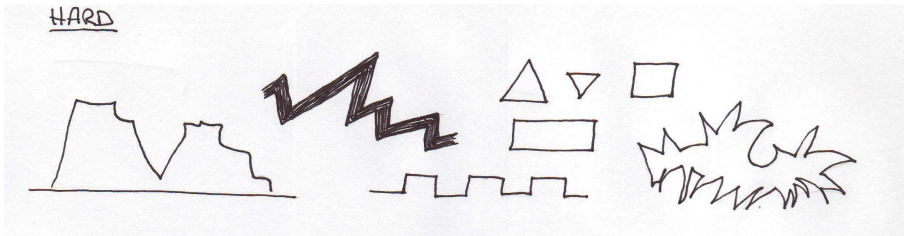
Picture 2 shows soft lines. Bow shaped mountain hills and U wall-eyes, waves, circles, ovals, soft river forms, curling lines and round shapes.

#### Negative landscape - Hard

- Magnificent landscape, an overwhelming mountain or a mountain pass and V-shaped gorge gives the landscape decisive majesty.

- Sharp lines are evaluated as cold and uncomfortable.
- The person experiences the area as overwhelming and therefore feels insignificant.
- Many hiding places, which is seen as unsecure because of the danger of being attacked.
- The place gives no reason for further examination of the area.
- Area that will not be evaluated as suitable for residential living.
- The negativity is written in the landscape.

(Bell 1999; Kaplan & Kaplan 1978; Simonds 1998).



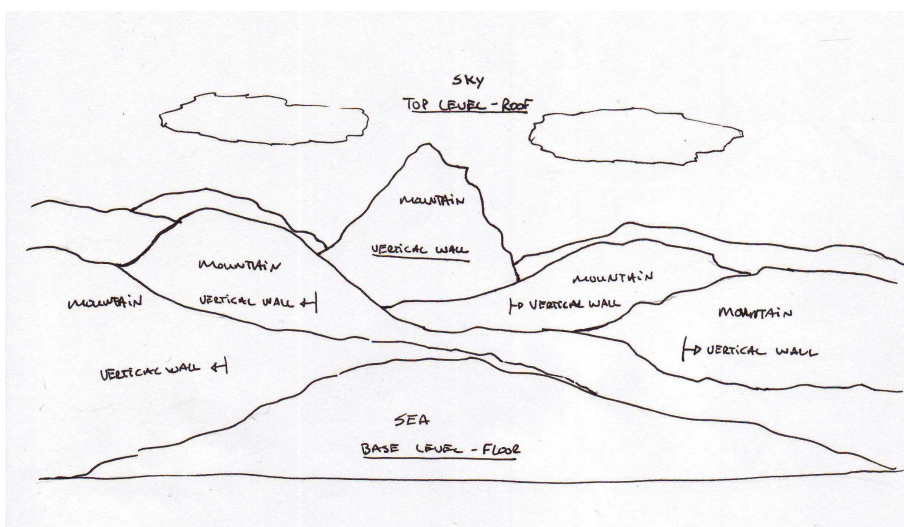
Picture 3 shows hard lines. Sharp edges mountains and steep slopes of V valleys, angular lines, abstract forms, triangular forms, square and rectangle and hard rectangular lines.

Beaches and rivers are a great example of lines that shape the earth's topography. These lines stretch almost endlessly both ways and are a combination of soft and hard effects. It is the water that creates the attraction by forming other elements around it. People are dependent on water for survival which gives it a special attractiveness (Bell 1999; Kaplan 1982; Simonds 1998).

Space formation is the connection between the factors that surrounds the area. The factors can create two kinds of effects.

- Enclosed effect – Is a strong impact, of two factors work together. This interaction requires that there is a balance between them so that the other may not dominate the space. This applies to the smaller areas.
- Expansive effects – Larger distance-region as a whole or the mountain in the distance.

The things we observe and have the strongest impact on us are vertical and horizontal lines. Where they begin and end, how they meet and how the perimeter line of the floor area composite. The size and distance of various aspects of the individual space along with features and land surface are presenting within us a certain experience. The scale is determined from the person's location based on the distance from the perimeter line. The topography of urban landscape is irreverent. The reality is that the better balance in the area, the greater is our experience, irrespective of the area that evokes our feelings. This is visual balance (Aspinall et al. 2010; Bell 1999; Motloch 2001; Schipperijn et al. 2010; Simonds 1998; Stahlschmidt 2001; Sugiyama & Thompson 2007; Thorén & Nyhuus 1994).

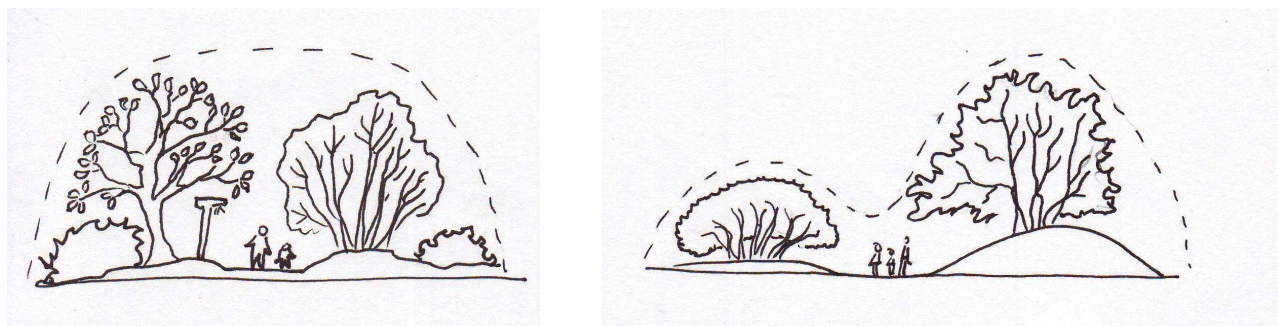


Picture 4 shows space formation where the mountain in the middle of the picture becomes the main focus with a distance effect and an ending point of this panorama. The mountains on the sides serve as vertical walls for this room. The sky is the roof and the sea is the floor. The perimeter line lies from the sea and up to the mountain and splits the overall picture up into two units. The valley itself is one unit when you are actually in it but from a distance it becomes two units (Bell 1999; Motloch 2001; Simonds 1998; Stahlschmidt 2001).

Being able to hide from ongoing threats is the primary requirement. If a hiding place is supposed to function to breed and raise descendants and build a future in, the place needs to be able to provide necessary support and the possibility of achieving goals. There, the individual seeks to explore the environment and has to be

able to react with knowledge rather than ignorance. This is an ability which all animals at the top of the food chain can master, that is, monitoring others without being visible. Anxiety and inability to relax are the consequences of an area or environment that does not offer the necessary security that the individual needs. To be hidden and at the same time see what is going on is absolutely vital for us and we build our basic existence on it (Appleton 1975). Appleton (1975) further states that those who are exploring the environment are more successful. The "Prospect- Refuge theory" is *"the ability to see and the ability to hide are both important in calculating a creature's survival prospects, we must next see whether we can find some means and erecting a system for classifying the components of landscape according to this simple principle, whether or not they are conducive to the observer's seeing and hiding. Where he has an unimpeded opportunity to see we can call it a prospect. Where he has an opportunity to hide, a refuge"*. The Prospect – Refuge theory is basically to watch others and our surroundings without being seen. This is a step to fulfil the need of the environment to ensure that the successes will be exclusively more than prospected to build up continuing wellbeing and aesthetic value (Appleton 1975).

If something in our environment poses as a threat, we show reaction. Being sophisticated or civil does not matter. The reaction is beyond our control and is in fact a reflex. All people have inherited reflexes through evolution. Something triggered a chain reaction that brought out these reactions. The reasons for these reactions today are unknown. But we know that they were used to find a safe place, shelter or hiding places when danger was imminent. It was a question of survival (Bell 1999) This is immensely important to all people. Everyone uses it to estimate their environment or surroundings. All our decisions are based on these assessments. Especially when we are facing critical situations that demand an immediate reaction. This survival instinct is something that we still use today and plays a major role in is how we analyse our environment continuously (Gehl 2010; Simonds 1998)



Picture 5-6 shows space formations and how it is possible to divide the space. The picture on the left shows an unbroken unit but the picture on the right shows division.

### 3.2.2 Space perception

Appleton (1975) states that the "Habitat theory" is *"a proposition that aesthetic satisfaction, experienced in the contemplation of landscape, stems from the spontaneous perception of landscape features which, in their shapes, colours, spatial arrangements and other visible attributes, act as sign-stimuli indicative of environmental conditions favourable to survival, whether the area is favourable or not"*. What triggers the habit is actually what we use as basic instinct to survive. We just colour it with aesthetics to induce the experience and stimulation that leads us to maintain routine. This all depends on how people experience the landscape that exists and how they can use it as an advantage over other human beings, animals and nature. This creates a habit and it is a spontaneous reaction in our habitats that sustain our biological needs. As we get to know the environment, this reaction disappears and the need for response reduces over the time. These responses are kept in the genes of future generations so they can use it if needed. We use this feature more often than we recognize and experience it as a pleasure to be able to guarantee our life basis without the inconvenience of making us visible and vulnerable. The Habitat theory is aesthetic sense in the landscape from the viewers experience and that the area can guarantee us all biological necessities and needs from the environment (Appleton 1975).

Appleton (1975) argues that the visual experience of the landscape is dependent on how the sun's retransmission appears in our eye level. And also the light that reflects our eyes from the sun. This is a combination



of retransmissions from objects or area and light reflections in our eyes. The optimal situation for us is to be able to be covered partly by the opening of the eye to detect what is around us. In that way the feeling is refuge and safety and we have a chance to respond to what we value as a threat.

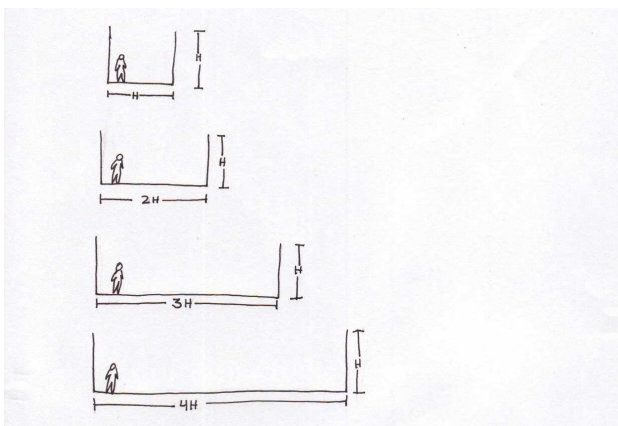
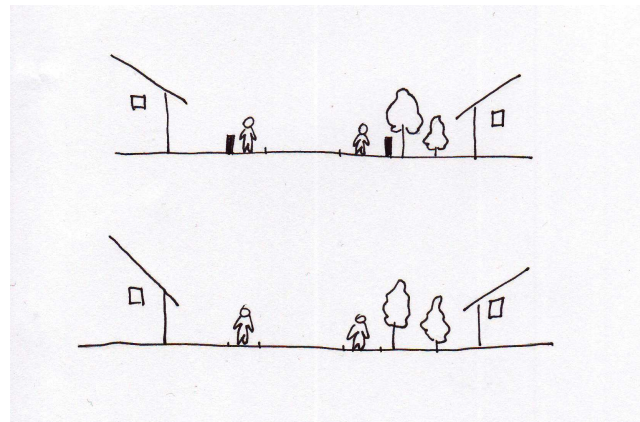
The perception is based on:

- The ability and attitude of the individual to the state: experience, good, beautiful, ugly, difficult etc.
- Motion processes (horizontally and vertically), perception changes from where the experience is coming (from which direction).
  - Strategy
  - Speed - Expansive effects, for instance a car driving at 100km/klst,  
Enclosed effects - individual cyclists
- Coherence between different areas and their structures. This is very clearly defined within buildings. But the green areas in the nature and diverse spaces and boundaries are often unclear.
- Perception is the understanding and characteristics of space
  - Different and unlike elements that create and build the space.
  - For example, areas with a certain style of houses and gardens which add form to the street vision and experience that is created (Lynch & Hack 1984; Motloch 2001; Simonds 1998).

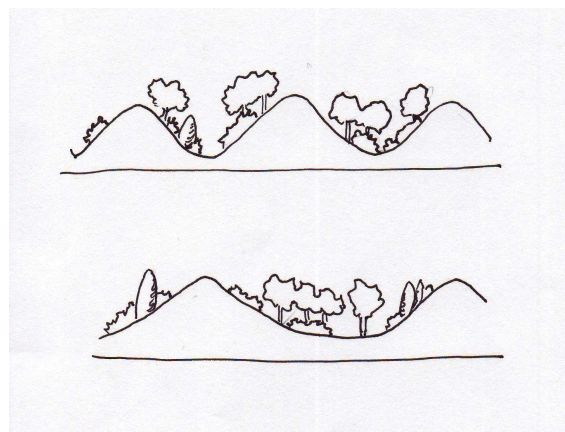
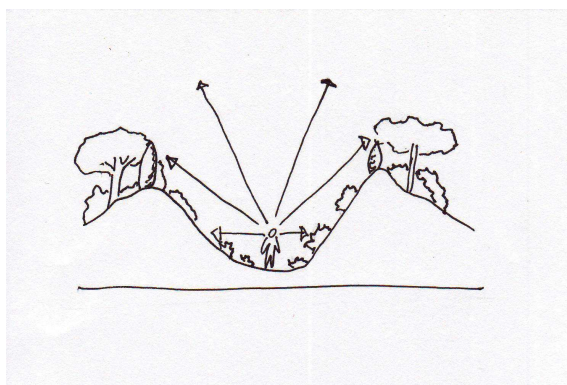
Motloch (2001) asserts the importance of an element that is supposed to give a feeling of security needs to be at eye level. We seek out these places for a sense of refuge so that the area feels less threatening. If walls are more than one, they provide greater security, especially if you have an overview of the whole area.

If you add a roof to the space it provides better security than before. If the area is too closed it tends to create inverse reactions like claustrophobia, that leads to a quick abandonment of the area with no returning back (Appleton 1975).

Picture 7 shows space formation and what happens when elements are removed from the street. It changes the overall picture of the street. If you look at the picture below you can see that the wall has been removed. On the right side the private space is defined by the vegetation and gives the person more space at the same time. But on the left sight the line between private space and street is unclear. The person is also more vulnerable. There is no shelter or buffer for the ones that stand looking. This leads to a sense of insecurity and makes the street less interesting for walking (Bell 1999; Lynch & Hack 1984; Simonds 1998).



Picture 8 deals with visual perception of space size. Space that is equal in height and length is difficult to experience as a whole, but every detail is visible. This is an enclosed space. If the length is doubled, then the space becomes partially enclosed. If the length is three times the height the space is still dominant but has a relation with the elements and it becomes minimally enclosed. When it becomes four times the height or more it becomes comfortable and the elements represent a part of something that is whole, that is if it is not meant to stand out. The space becomes unenclosed (Appleton 1975; Lynch & Hack 1984; Motloch 2001).



Picture 9-11. The picture on right shows different shapes of a valley. The shape above is V and below it is in the shape of U. The picture on the left shows the enclosing that creates form the V shape (Motloch 2001).

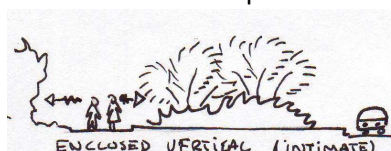
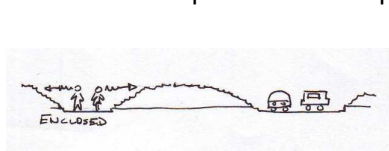
### 3.2.3 Visible landscape

Visible landscape is a panoramic image of the character that the landscape provides and is visible from more than one side. It has an amazing attraction that gets people to travel long distances to enjoy it. This can include:

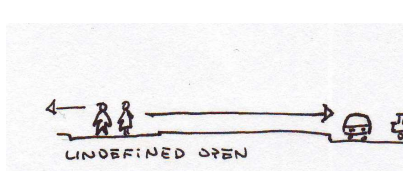
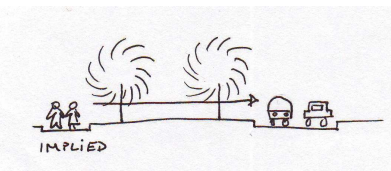
- Narrow, illustrates the viewpoints that open up as the person moves farther inside the area.
- An opening in closed woodland that gives unexpected view over a fjord or an area.
- Closed areas showing limited viewpoints but still give a slight impression of what is on the other side.
- Different angulated panoramic image that highlights different items ranging from stillness to majestic mountains.
- It can be characterized by strong contrasts in unexpected places. Brings out the character that is in the area and gives interesting, varied views.

(Bell 1993; Bell 1999; Lynch 1960; Motloch 2001).

The sketches explain the vision points that are visible on a path:



Picture 12-14 shows the viewpoints on a path. Picture on the left is an enclosed area. The vegetation is above the eye level and makes a vertical wall. The picture in the middle is an enclosed vertical path where the vegetation has formed a wall with high trees on both sides. This area gives an intimate feeling. The picture on the right is an asymmetrically enclosed path that gives vision on the one side and wall on the other. This gives an opening into the path without affecting the security factor (Motloch 2001).



Picture 15-17. The picture on the left shows a canopied open path. This gives vision to both sides and a shelter from the skyline. The picture in the middle shows implied path, with a tree row planted to divide the area. Vision is on both sides. The picture on the right shows undefined open. Vision is all over and no refuge. This gives a sense of insecurity and complete exposure (Motloch 2001).

To make the elderly feel comfortable within an area it is crucial to create places that can provide both an overview and a refuge. This is done by dividing larger areas into smaller rounded ones. Vegetation is often used to soften lines and use as background. The lawns between vegetation and other elements need to be of the right size. If they are too narrow the area feels too enclosed. If it is too wide, it is considered as insecure. Lines are systematically used in park designs to create viewpoints towards the elements or factors that the

park has to provide (Motloch 2001; Stigsdottir 2011; Thompson 2010). It is important to draw out the factors that provide relaxation or security. This gets elderly citizens to relax and stress level falls down and they begin to enjoy being in the park (Gehl 2006; Grahn & Stigsdottir 2003; Motloch 2001).

### 3.2.4 Mind maps

Grahn & Stigsdottir et al. (2010) quotes in Bucci (2003) state that people registers and categorizes everything they see and experience in three main sections. These sections are symbolic, symbolic pictures and verbal symbolic. People have developed this method throughout the ages and it is stored in our cells. All our senses are almost constantly at work. People do not realize this, because it happens so fast and instantly.

Good examples of this are:

- When a person feels uncomfortable in an area.
- When a person feels tired or sick.
- When a person can not grasp the functions in its mind.

This is a sign of that a person does not thrive in the area. The perception gives the feeling: I want to abandon this area as soon as possible (Bell 1999; Simonds 1998).

People have learned to set up filters that simultaneously sort everything out that is considered normal. Everything else that is new or strange is brought up to the surface to draw our attention to it (Bell 1999) To accomplish this people uses known characteristics, symbols or other things that connect them to the environment. In that way a person is able to deepen the understanding of the environment each time they go by. Everyone has his own mind map of the environment and perceives if it is safe to be in or not (Gehl 2010; Lynch 1960).

One of the things people do when they are walking is to make a mind map of the area and the pathways they are walking through. Especially if a person is walking through an area that is unfamiliar. People do this unconsciously and automatically. The purpose of this is to know how to get from point A to B in the quickest and easiest way (Lynch 1960).

To help people to make their mind maps, it is important to design the environment so it can be easily remembered. This concerns children and elderly people especially. Characteristic attributes in the area make it easier for people to make a mind map. This is not easy to design. These elements should be directing and not disturbing the overall picture. If the design is a success, the neighbourhoods and parks become more comprehensible and increase the quality of life (Lynch 1960; Walford et al. 2011) Day et al (2008) argue that the easiest way to make the environment more comprehensible is to use signs with symbols and colours. Kaplan et al (1998) argue that people makes different mind maps where they combine places and experiences of events. People categorize information systematically and store it in the brain for later use. Because of this attribute a person can create more than one mind map at the same time (Kaplan 1982) It takes time to build up one good mind map that you can rely on. It comes with experience. All the information of what happens around us is registered in the mind map. People do not always notice the small changes around them but if the changes are so big that they need to change their habits, they find new ways to get from A to B. This happens slowly. Updating a mind map is a process that takes time. If a person is to be interested in having the necessary updates for a particular area then the area itself needs to be encouraging and interesting enough so that the person will take the time to explore it again (Kaplan et al. 1998).

Elderly citizens have formed many mind maps and are thoroughly familiar with their environment and all the advantages and disadvantages it possesses; all concealed paths and shortcuts they are familiar with, where are the safest ways to walk and the best areas to be in and here they can access the services required and where green areas are. The elderly have also mapped where it is best and safest to sit and enjoy the view. They know where the best lighting is in the evening and at night. What places they should avoid after dark and why they should be avoided. This data is gathered through decades of training and experience in the neighborhood. This is what the elderly exploit when traveling around the neighborhood on daily errands, exercises and maintaining social connections. Their friends are here, acquaintances and the fellows who practice their hobbies together. The elderly know exactly where they are and how to get there.

### 3.2.5 Experience in the space

To be able to experience green areas we need to see and understand what is going on around us, hear the environment and have the possibility to communicate. It is also important to know where to find areas for physical activity or relaxation. This depends on what we are going to do and who we are with.

To perform our evaluation it is necessary to have a clear vision of the environment at eye level. (Gehl 2010) Sjerp (2010) argues that experience is something that encourages us to go outside. We discover the current area by using our senses of sight, smell, hearing and touch (Bell 1999; Gehl 2010). Gehl (2010) argue that seniors require to have the best possible experience from one place if they are to come again. This is divided into three sections: Safety level, comfort and experience. Each section is then divided into sub-sections.

The scale of the elements that build the area is an important factor in how we experience this particular area. Especially buildings in the neighbourhood and open areas between them. This has an effect on our everyday behaviour. Buildings as well as the vegetation form the area that we are surrounded by in our everyday life. The design is very important as well as the material chosen. The buildings in the area should not be overwhelming. The choice of material has to connect the buildings and vegetation for it to become a whole. Otherwise there is a risk that one factor dominates the others and weakens the overall picture. The area becomes uninteresting and the experience becomes inferior.

Experience is how we discover the things that are happening around us. The question is if the elderly are in a condition to comprehend what is happening. That can be for instance:

- Taking a walk outside with a good friend.
- Experience the flowers blooming when they are in their most beautiful state.
- When the vegetation shows seasonal changes.
- The experience created by going outside and exercising with a set goal in mind, alone or with a partner.
- Create memories by playing with your children or grandchildren.
- Go out to your secret hiding place to read a good book.

(Bell 1999; Gehl 2010; Motloch 2001).

To enjoy comfort the elderly need to feel safe. Without both safety and comfort they will experience the environment as unsafe and that does not encourage them to choose to be outside. However with the necessary safety and comfort, the experience is likely to give satisfaction and therefore inspire and stimulate the elderly to return again (Ward-Thompson & Travlou 2007).

#### Summary

Appleton (1975) speaks of "Prospect-Refuge theory" and "Habitat Theory". These are compelling theories that maintain that all people, including elderly citizens, choose to be in a positive landscape with rounded and soft lines. These are areas where it is easy to have an overview and at the same time expectable back support or hiding places. This reduces spontaneous reactions and gives a sense of safety and wellbeing. Being able to relax and enjoy being in an environment has a decisive impact on whether we value the aesthetics of the landscape in the area. The experience is decided from the area's balance between the form giving elements. The scale is determined from the senior's position from the perimeter line and the open area between the elements. How we experience this particular area depends on life experience. We make mind maps of everything we see and experience. The environment is under constant evaluation and we are constantly on the watch. The mind maps we create are one of our most valuable direction systems. It gives us information on how to get from A to B in the least amount of time in the best and safest way.

### 3.3 Distance and movement

The chapter demonstrates the continuous pedestrian system and the qualities it needs to have. The distance to parks and other green areas is discussed. Potential solutions, will be presented, on how we can get elderly citizens to walk longer distances to get to the park.

To walk is an activity that is natural to people. This activity is popular and almost everyone can participate in



it (Berge 2012; Grahn & Stigsdotter 2010; Maller et al. 2009) The quality of the paving surface is an important factor for everyone who uses them, including elderly citizens, regularly or occasionally. This is the surface texture and the structure of the pedestrian system. Pavements and paths can be different, uphill, downhill and with steps. The challenges in walking can be easy, hard or average. It is important when designing the pavement or pedestrian system to consider whether the surface can be easily maintained and that the gradient is not too steep. Water can become an obstacle. Therefore, it is important to have enough tilt to hinder water gathering in big puddles. The incline has to be symmetrical and the path of the correct width. Asphalt and concrete have to be solid and without potholes or ripples. Any faults on the paving surface will create a risk of a fall, especially for elderly citizens (Berge 2012; Dahlman 2005; Holgersen & Dam 2002; Joseph & Zimring 2007)

Joseph & Zimring et al. (2007) use four questions when they evaluate whether the paving surface is good enough or if there is something that needs to be added to it.

- How long is the path?
- How is the connection to other paths and areas?
- Are there any steps on the way?
- What are the visual aspects?

Joseph & Zimring et al. (2007) argue that people choose to walk outside for two reasons:

- Walking is their main way of moving from A to B, from work or another place.
- Visual aspects and pleasure. Having fun walking and experiencing wellbeing or doing physical exercise.

Ghel (2010) states that experience is conducted through our senses. In that way we can gather information from what is happening around us.

The pavement system's only limitation is the environment and what it provides. The difficulty level is important so that each and every person can choose his own path (Joseph & Zimring 2007). Sugiyama & Thompson (2009) argue that it is the character in the path or the paving that weighs most when the elderly are choosing to perform their daily exercise. There are few things that influence people when paths are selected:

- Social connections, to meet other people and interact.
- Meet up with friends on the way.

Daily exercise with a friend (Gehl 2006; Sugiyama & Thompson 2007; Sugiyama et al. 2009).

### 3.3.1 Distance and time

The average distances in daily walking or cycling are 2-8 km. Most seniors choose to walk if the distance is not more than 2-4 km. If the distance is over 4 km, cycling is chosen over walking. The limit is 8 km but for more than 8 km they use public transport or cars (RACIOPPI et al. 2002). Green areas can have a positive effect on an elderly person that is experiencing reduced mobility and also on those who are healthy. The fact is that if it takes longer than 30 minutes to walk to the green area, healthy people lose interest. The reason is how long it takes to reach the destination. This leads to that the elderly with or without reduced mobility choose to use public transports or drive. Countermeasures have to be made to get old people to walk for 30 minutes to a park. That is done by adding resting places with benches as break points at regular intervals so that they can sit down and rest during their walk (Joseph & Zimring 2007; Lachowycz & Jones 2011; Walford et al. 2011). Thorén & Nyhuus et al (1994) point out how far different age groups can walk in 10 minutes. Those who travel the shortest distance are the elderly; they are able to walk 200 - 300 m in 10 minutes.

Thorén & Nyhuus (1994) argue that 500 m is a sufficient length to a park. Stigsdottir (2010) argues that 600 m is a suitable distance to a park. Both require a resting places with benches on the way. The European Environment Agency (EEA) argues that 900 m distance to a park is reasonable and does not mention any resting places. For those who really need the parks, and the green areas, further than 900 m is too long (Barbosa et al. 2007; Bell 1999; Grahn & Stigsdotter 2010; Thorén & Nyhuus 1994) Grahn & Stigsdottir (2003) argue that the time it takes each person to walk to a park can also be a hindrance. The shortest distance is preferably the



best choice to attract the elderly to the park. Maximum distance is 500 m. As the distance grows longer, the amount of visits to the parks is reduced. Distances of about 500 m reduced the visits by 15% and at a distance around 1000 m had them reduced by 50% (Barbosa et al. 2007).

### Summary

The pedestrian system needs to be continuous and easy to walk, easy to understand and designed for all ages. Maintenance of the surface has to be acceptable to hinder formations of holes or other roughness. Distance for the elderly to walk to the park cannot be longer than 500-600 m. That makes the distance to the park and back 1000-1200 m. To make this as an interesting choice for the elderly, there have to be resting places with benches every 300 m. The time it takes to walk to the park must not be more than 30 minutes or 60 minutes both ways.

## 3.4 Universal Design

In this chapter I will go over the elements that are classified as universal design. I will look at the groups of people who need more help from the environment to be able to go out. This includes elderly citizens and their aging process. Possible solutions for this group will be discussed.

When designing green environment that elderly citizens are going to participate in and use on a regular basis, we need to take in consideration things and elements that help them to evaluate the places as safe and secure to be in. There are elements that can easily become an obstacle if the architect is not careful when designing. The healthy individual does not notice this. The area is easy to walk and is lacking an adequate challenge. The design in this kind of area needs therefore to provide both healthy and disabled people an adequate surroundings that support their needs. In that case there are some areas within the park that are not made for those who have restrained mobility. To accommodate everyone, it can be said that the main areas should be designed for everyone with easy and safe access. There can also be areas with different difficulty levels that could help a person to improve or maintain its strength. (Gehl 2010; kommune 2011; Thompson 2010; Ward-Thompson & Travlou 2007).

New laws were implemented in Norway regarding discrimination for those with reduced mobility in 2008. This law requires that public areas, indoors and outdoors, should always be accessible to everyone. This includes open green areas as parks. Those factors that we need to take in to consideration when designing according to standards for universal design are height differences and readability in the environment (Asmervik 2009).

### 3.4.1 Height differences

The factors that need to be available, for those that have reduced mobility to increase their opportunity to participate in physical activity, in the environment are:

- The elderly that suffer from reduced mobility often find it difficult to walk. They lose balance easily and are therefore at greater risk of falling (Asmervik 2009).
  - Inequalities and holes on the surface of the pavement increases the risk of falling.
  - Stairs without handrails and rest platforms are hard.
  - High rises demand an effort to elevate the foot. Something that is almost impossible for the one with the reduced mobility to do.
  - High curb stone increases fall risk.
  - Heavy gateway is difficult or almost impossible to open.
  - To rise up from a bench can be difficult especially if the elderly have lost strength in their hands.

(Asmervik 2009; Aspinall et al. 2010; Henriksen & Bergh 2004; Thompson et al. 2010)

### 3.4.2 Pedestrian system

Pavements according to Norwegian standard should be at least 2.5 m wide with max. 1:20 in deficit. In short

periods the deficit can be 1:2 and distend cannot go over 3 m. Cross fall can be max 2%. Rest areas have to be at the beginning of the deficit and after every 0.6 km. The length of the rest area is minimal 1.6 m. For pavements the surface has to be hard covered, like asphalt, concrete or paving stones. Paths can be hard or soft covered like compressed gravel. In paths its recommended to have rest area if deficit is longer than 500 m. All vegetation needs to be cut back in to 1 m horizontally and up to 2.25 m vertically (Henriksen & Bergh 2004; Standard 2011).

### 3.4.3 Stairs

Stairs are often used to bridge the height difference in the land. Designing stairs can be challenging predominantly because the rises are not supposed to be too high and the steps should be sufficiently wide for the foot to fit on. Stairs have to be accessible for the majority of elderly citizens to use. People with reduced mobility have difficulty in using stairs that are designed by Norwegian standards. The standard in Norway recommends that rises are 15-18 cm. That is simply too high for people with reduced mobility. A study was made in Iceland on rises in stairs for the elderly. The results were that preferable height for rises is the same as used when stairs are designed for children, or 10.5 cm. It is preferable to have a ramp parallel with the stairs to give the elderly choice between stairs and ramp.

The correct ratio between rise and step is 63 cm. The formula is  $B+2H=63$  cm. For those that have reduced mobility the correct ratio between rise and step is 50 cm (Holgersen & Dam 2002; Rannsóknarstofnun byggingariðnarins 1998).

The correct ratio between rise and step in walking stairs is 150 - 180 cm. The formula is  $B+(2*H)+(2*63)=\text{length of vertical}$ . That means that it must be possible to count three steps on each vertical. In that way it is ensured that the elderly can easily use the left and right foot alternately. If the steps are only two on each vertical then the elderly will always use the same foot when stepping up on the rises. This makes the stair extremely hard to walk and the strain on the muscles is tremendous (Holgersen & Dam 2002; Rannsóknarstofnun byggingariðnarins 1998).

Both types of stairs need to have a resting platform after 8 steps. This is after elevation of 20-120 cm (Holgersen & Dam 2002; Rannsóknarstofnun byggingariðnarins 1998).

All steps need to have double rails from ground 0.7 - 0.9 m. The rails have to start 0.30 m before and after the ramp and be continuous. Guiding line has to be at the top of the stairs and at the beginning and have to cover the wide (Standard 2011). Light has to be 50 lux (Dahlman 2005; Standard 2011).

### 3.4.4 Ramp

Ramps must not be too steep. It is difficult for the elderly with walkers to get safely up and down. The deficit should not exceed 1:20 (5%). If the length is less than 3 m then the deficit can be 1:12. Resting area 1.6 m length needs to be before and after the ramp. The width can be from 0.9m and over. Ramp needs to have edges on the sides, min. 0.10 m and double rails from ground 0.7 - 0.9 m. The rails have to start 0.30 m before and after the ramp and be continuous. Guiding line has to be at the top of the ramp and has to cover the width (Henriksen & Bergh 2004; Standard 2011).

### 3.4.5 Tunnels and bridges

Tunnels are often scary and dark and can seem like a barrier. That is why it is important to keep them as short as possible, wide and well lit. Bridges work better for people in general because they experience them as an open space. Ramps going upwards have to be at the right incline according to universal design standards. Steps can act as an obstacle and need to have lower rising.

Norwegian standards require that the surface of the tunnel and the bridges to be hard, durable and with flat surface. The deficit should not exceed 1:20. The description shall be 30 lux. Railings have to be two levels, 0.7 m and 0.9 m, and need to be on both sides (Dahlman 2005; Standard 2011).

### 3.4.6 Readability in the environment

The factors that need to be available to increase readability in the environment are:

- The elderly that are visually impaired need clear instructions to navigate the environment. The main problem is the onset of twilight and the interaction between daylight and shade. That leads to total blindness. Those who are visually impaired use a combination of other senses, such as touch, hearing and smell for orientation. Helpful elements for orientation are:
  - Differences in pavements or paths' surfaces that indicate either danger or height difference, for example at the top and ending of stairs to prevent the risk of falling. Also at the ending of pavements where the visually impaired need to cross roads.
  - White lines in the pavement to guide the visually impaired on the safest way to their destination and back home. Lighting is often used in combination with the white lines to increase their reflection. That gives the white line an increased effect especially at night.
  - Colors increase environmental comprehension. Strong colors are used to draw out important factors. Light tones reflect light more than dark colors. That's why light tones mixed with dark ones are a better solution than to use two dark tones together.
  - For space perception it is better to have a dark tone on floor materials and walls in light tones.
- Those who suffer from dementia may have difficulty remembering their environment or learning to find their way in a new one. Some have difficulty perceiving distances and directions. Signs with much text or numbers can be hard to understand.
  - Environment that is easy to navigate, where turns are kept to a minimum and free of countless side streets and detours.
  - Easy to identify the environment and known landmarks.
  - Signs need to be of a similar size but may be in different forms. They must be simple and easy to understand, for example in light tones with pictures.
  - Signs need to be visual from three directions.
  - Signs need to stand at least 1.4-1.6 m above ground.
  - Signs need to have a soft surface and rounded edges.
- Those with reduced hearing often have difficulty with distinguishing between sounds in the environment. Hearing people recognize all environmental noises whereas the elderly suffering from hearing loss do not understand or perceive the environment, and do not discern environmental risks. People with impaired hearing use a combination of other senses, such as touch, sight and smell to perceive their environment. Most of the hearing impaired use lip reading to keep up with conversations in places where the noise is excessive.
  - Lip reading can be difficult if the lighting is not sufficient or if the silhouette is too high.
  - Background in irregular colors can be overwhelming. For those who need to rely on sign language, it is quite hopeless to see what is said.
  - Preferably, areas should be free from excessive noise and designed in such a way that speech easily travels within the area.
  - Good lighting from all sides helps with clearer vision.
  - All the extra sounds are put to a minimum.
  - All warning signs need to be lighted and the light needs to be clearly visible from all directions.

(Asmervik 2009; Rannsóknarstofnun byggingariðnarins 1998; Standard 2011)

### 3.4.7 Green areas

#### Nature area

These are areas with free access to nature. These are often areas that have been preserved due to valuable flora or that have always been undisturbed. It is often challenging to include all the elements in the universal design and it is often only successful when the preserved landscape is more frequented than assumed in the original planning. Signs have to be put up to guide directions. Overview signs need to be put up at regular

intervals. Benches should be at regular distances with sitting level of 0:45 m. The path deficit must at the most be 1:20 with exception to 1:12 for short distances since it is not possible to keep the deficit lower except to walk on land. Height deficit may go to 1:10 but there must be a rest platform at least 1.6 m in length and at 25 m intervals at the longest. Water deficit level shall be 2%. Vegetation should be cut from the trail and the headroom shall be not less than 2.25 m. The surface of the path must be a solid, flat, even surface with continuous material (Asmervik 2009; Standard 2011).

### Park area

This area is designed for active movement and social interaction. Vegetation is an important factor and gardens should be planted to give the best experience and diversity. Here you can lay forms as requested and highlight all things and viewpoints interesting to see. Signs have to be put up to guide directions. Overview signs need to be put up at regular intervals. The signs need to have lighting strength of min. 50 lux. Lighting on pavements and paths has to be 30 lux for added environmental safety. Pavement design (see above). Pavements shall have guidelines to assist visually impaired individuals to navigate both day and night. The width of guidelines shall be from 0:21 - 0.6 m. Toilets should be designed according to the Norwegian standard NS to claim 11001-1 or -2 It is expected that the park provide a rest area with benches for sitting (Asmervik 2009; Standard 2011).

### Summary

Universal design is very important for the elderly. It enables them to use the area for a longer period, especially when aging starts affecting their bodies. It has now been implemented in Norway. Height differences can be a problem for the elderly, especially stairs and ramps. The thread must be of an acceptable height and not more than 15 cm, walk stairs should be calculated with 3 steps for each thread, if otherwise they are inaccessible, handrails must be on all stairs and ramps for support. The deficit in the ramp should not exceed 1:20. The readability of the environment must be easy for adequate navigation. Signs should be of dark background and light color that show the symbols, pictures or short text. Maps should be on a white background with black letters and map. The text should be short and focused. Maps and signs should be visible from at least 3 directions. In environmental design care must be taken not to mix too many colors and forms together. It creates irregularity that affects the visually and hearing impaired. It is necessary to create environment free of unnecessary noise, but speech must be able to travel through the facility. Lighting has to be satisfactory so as to include minority groups. All warning signs must be clearly visible, uniquely identifiable with light.

## 3.5 The effect of green areas and urban environment on elderly citizens' health

In this chapter it will be present which possibilities elderly citizens have for physical activity in green areas and why it is so important for them to be physically active. It will also be revealed how exercise can act as a deterrent factor for preventing or delaying physical illness. It will also be shown how green area can help with chronic stress and indirect environmental aggravation.

WHO definition of the word health is the combination of the physical and mental state and social status of the person. These factors need to be considered when examining the general wellbeing of people, including elderly citizens (Maller et al. 2009; RACIOPPI et al. 2002). It is known that there are certain social groups at a higher risk of developing diseases due to their lifestyle. These are usually persons with low annual income or classified as middle class. This group of people is under more stress than those who are wealthier and of higher social rank and more likely to suffer untimely deaths than those of a higher class (omsorgsdepartementet 2011; Organization 2010) Bull (Thompson 2010) argues that the environment people thrive in on a daily basis is what encourages them to exercise. Environmental design is a combination of buildings, walls and green areas. By making it interesting for people to be outside and be physically active, it is possible to apply preventive measures so as to decrease the number of elderly citizens who will potentially increase pressure on the health care system. One of the things that are easy to achieve is to make the continuous pedestrian and bicycling networks more exciting. If stores and other service are connected to this network, it can provide more diverse usage and experiences. Sjerp (Thompson 2010) argue that people who cannot get in touch with

nature use designed green areas more than those who regularly go out into nature. In some cases, the green areas are overly designed and leave no space for the imagination or free thought. It is extremely important to give people the freedom to build their own experiences instead of it being controlled by the design (Gehl 2010; Simonds 1998). Grahn & Stigsdottir et al. (2003; Stigsdottir 2011) argue that fewer cases are reported referring to stress related diseases when people spend more time outside. Green areas have positive impact on the physical and mental wellbeing. It is of social benefit that each elderly person takes time every day to disconnecting from daily stress to help maintain mental balance. Bull et al. (2008) quote in an article for the United States Department of Health and Human Services (US DHHS) that "In th[e] analysis it is stated that regular physical exercises have a positive and relaxing effect on those who suffer most from stress. Exercising regularly can prevent untimely death." Maller et al. (2009) and WHO (2003) state that studies have confirmed that green areas have a positive effect on elderly citizens' health, both physically and mentally. It is known that regular exercise can prevent or postpone lifestyle diseases that a person develops through his lifestyle based on stress factors, lack of physical activity, healthy nutrition and social connections (Organization 2010). Sugiyama (2007) quotes from Singh (2002) that all physical exercise has an effect on physical diseases which can be inherited or developed over time and help preventing or suppressing the symptoms chronic diseases as for example: muscle pain, coronary, diabetes and arthritis that often affect elderly citizens. It is known that regular daily exercise helps the elderly to maintain general flexibility, strength and balance. Wolley (2003) quotes in DiGilio and Howze (1984); Jacobson and Kulling (1989) that confirms that elderly citizens who are not physically active are more likely to develop all kinds of muscular decline and unnatural body composition. They state that regular physical activity can prevent osteoporosis. Sugiyama (2007) quote from Skelton (2001) that general physical exercise reduces the risks of falling. Daily movement helps the elderly to maintain balance and expectable understanding of their surroundings. Lachowycz (2011) argues that obesity is reduced by around 40% where there is good access to a park or interesting green areas. Another fact about the elderly is that they often suffer from sleep disorders or irregular sleep. Sugiyama (2007) quotes from Driver and Taylor (2000), Ohayon et al. (2001) and Morgan (2003) where they claimed that exercising outdoors can positively affect the sleep quality of the elderly. This is why walking outside on a daily basis is extremely important. Sugiyama (2007) quotes from Taffe (2001), who gathered results from a large study conducted in the US. The results were that if women exercised regularly for a long period of time it prevented natural aging by 6 – 8 years compared to women that did little exercise. Sugiyama(2007) quotes from Weuve et al. (2004) who made a long time study on older women's' motion patterns. The result was that women who exercised at least for 1.5 hours per week had better memory and were generally more positive. The blood flow to the brain improved as well as brain function, which resulted in general wellbeing. Sugiyama(2007) quoted from Blaser (2003) and Strawbridge et al. (2002), which conducted a 5 year study on elderly citizens that had increased mobility and were more active sitting outside in a green environment. The result was a reduction in depression. Sugiyama & Thomson et al. (2007) confirm that physical training is not the same as being able to enjoy the physical and mental benefits of the environment. They recommend using a combination of exercise, scenery and experiences. Sugiyama(2007) quotes from Mazzeno et al. (1998), that physical exercise has great effects on general health, especially for the elderly. Kaplan et al. (2008) argue that it is clear that people would rather be out in nature than in designed areas if they had an opportunity to choose. Ward-Thompson & Travlou (2007) argue that areas which are located on the outskirts provide the opportunity to experience a walk through the forest where you can disappear in between the trees in peace and quiet. The person can listen to birds singing, brooks flowing nearby, or if lucky, see the forest animals play.

### 3.5.1 Physical

What makes parks so interesting is that they are meant for all age groups and are easy to get to. Parks are considered to be safe areas, also for elderly citizens, to use them for physical activities (Thompson 2010). It is possible to do all kinds of fitness exercises in the parks, which is unlimited by age or sport. The possibilities are countless and are only limited by the person's own imagination. (Gehl 2010; Maller et al. 2009; Sugiyama et al. 2009; Thorén & Nyhuus 1994).

WHO's recommendations for physical activity for a 65 year old person are:

- Estimated 150 minutes each week doing aerobics activities that are intended to increase strength and stamina.
- For those who want to get in better shape it is recommended to train for at least 300 minutes per



week. Stamina and strength exercises are increased up to 150 minutes per week.

- To maintain general flexibility it is recommended to stretch well two times a week.
- For those with restrained mobility and that are not capable of participating in the general training program it is suggested that they walk at least three times per week to maintain or to increase balance.
- The elderly who are completely incapable of taking part in any physical activity, are recommended to participate in social life as much as each individual possibly can (Organization 2010)

In the research which Humpel et al (2004) wrote, he speculates about what it really is that encourages people to go outside and exercise physically. Usually it is because there are many sorts of activities that people can choose from that demand different things from the environment. These different areas can be in different places in the neighbourhoods. Furthermore, Humpel et al (2004) writes that the sexes have different needs. When the men go out, they move with purpose. This encourages men to walk in their neighbourhood and they are more likely to do so than women. They like how easy it is to get on and want comfort. They are less likely to just go out for a walk. Women like to go out for a walk around their neighbourhood and use it as a physical exercise to keep the body in shape. Either can function inhibitory for both genders.

### 3.5.2 Mental

The environment elderly citizens live in is becoming more stressful and normal daily life requires much of people and demands more than they are often able to give. Direct and indirect environmental pressures have increased to the extent that people do not perceive them anymore and experience them as normal. The populations in the cities are increasing every day and is generally higher in the cities than in small towns out in the countryside (Grahn & Stigsdottir 2003; Stigsdottir 2011; Velarde et al. 2007). Simmons et al. (1998) argue that stress is a natural reaction that still occurs. These are the responses that we have developed from our primitive state and kept us alive. Stress makes all our senses wake up and raises our attention. It also activates muscles and our reflexes, increases blood flow to prepare the body to be ready for sudden attacks. It enables other hormones that we use to escape or fight. Diseases can arise from chronic stress and are related to the environment that the elderly live in. These are mental illnesses such as loneliness, depression, anxiety, obsession, fatigue. Therefore it is necessary to break up the stress cycle. Vegetation is considered to have very strong effect on the elderly who suffer from mild mental disorders. It gives people a chance to recharge themselves (Grahn & Stigsdottir 2003; Grahn & Stigsdottir 2010; Stigsdottir 2011; Velarde et al. 2007). It is considered to be extremely important to help people with mild mental disorders before they deepen. To prevent an increase in mild mental disorders it is important to encourage people to spend more time outside and to be physically active in a green environment. Stress which occurs from psychological or psychiatric diseases is a fact because people are less able to cope (Grahn & Stigsdottir 2010; Stigsdottir 2011). Stigsdottir & Grahn et al. (2010) (2011) argue that stressed out people do not want to be social and lose the ability for empathy. Stigsdottir et al. (2010) conducted a study in the Alnarp park, sometimes called "the stress park", located in Alnarp, Sweden. She has concerted factors that support the aged among others in relaxing and getting rid of stress and fatigue. One of the conclusions was that it is important to design a park that can include the widest group of people without weakening the park form. The park should be divided up so each area should be able to flourish without dominating the environment. Alnarp park is divided into four sections. Each part has its own theme that plays on the senses and creates experience with flowers, water, signs, nature and taste. These areas flow effortlessly together. Smaller areas are made to provide the feeling of safety were people can hide to get away from whatever is bothering them. The flowers that are used in the park do not have strong colours because it causes too much indirect assault on the senses. The colours which are mainly used are white and blue flowers. In some places the areas are more natural with local blooming weeds. Because the environment is completely natural the people do not experience these bright colours as irritating. The point of departure is that people can choose a place that fits their stress level. This includes elderly citizens that often feel stress and pressure because of the loss of friends, family members or a spouse. This can lead to extreme loneliness and depression (Day 2008; Thompson et al. 2010). Kaplan(1995) argue that the visual impression of green areas and general health are connected. This has also been shown in a research conducted by Grahn and Stigsdottir (2003) The research showed that time spent outside in green areas prevents the development of diseases that are caused by stress and environmental pressures. Therapeutic landscape has been examined by Milligan (2004) who conducted a study on the effects green areas have on seniors that

spend time together gardening in allotment gardens. The result was that the group work improved general mental health, which made the elderly more satisfied. Self-confidence increased in tune with the results of their work. Kaplan et al. (1998) write about green spaces that can give people enough security to let their mind wander freely. It provides the person with an opportunity to release pressure. This helps those who suffer from fatigue and need to find tranquillity. Maller et al. (2009) argue that water is one of the elements that have the most calming effect during stressful periods. It instils a sense of general wellbeing, and manages to sharpen attention and keep focus on what is being dealt with. This helps to find solutions to current problems. This is called a state of relaxation. Bull et al. (2010) argue that daily exercise has a positive effect on depression and reduces the symptoms. This applies to other psychological disorders that are caused by stress and indirect environmental pressure.

### Summary

Green areas have a positive impact on the health of elderly citizens, physically and mentally. Bull (2010) argues that the environment has a motivating effect on seniors that are physically active. There is in itself nothing that stops the elderly from being physically active. The only thing that really effects them is reduced mobility. WHO estimates that people over the age of 67 need to exercise for 150 minutes per week to maintain their strength. To enhance physical skills and strength requires 300 minutes of exercise per week. Stigsdottir & Grahn (2003) state that green areas have a great function for those who have a tendency toward mental illnesses. Larger areas should be divided into smaller areas. Vegetation should be soft and rounded with flowers in white and blue colours. Green areas should be free of advertisements and other harassment. Motloch (2001) states that as long as the elderly have an overview of refuge places, they will find wellbeing in these places.

## 3.6 Quality of life

In this chapter I will demonstrate the things that the elderly require to be in a green area. To be able to use that particular area for physical exercise and outdoor activity and what it is that hinders seniors from going out.

### 3.6.1 Barriers

Elderly citizens are a minority and vulnerable group in today's society. Elderly people who are beginning to experience reduced mobility or diseases that prevent full mobility, have limited motion (Matsuoka & Kaplan 2008) It is important that the people can live at home and take care of themselves as long as possible. Therefore, it is essential that the environment is both easy to understand and easy to use. Having good connections to shops and other services, such as community centres, is important as is being able to spend time outside. The environment in which people live, influences all their choices. Changes in a peoples lives that can cause joint stiffness, balance being disrupted or reaction for unexpected factors in the environment reduced, then suddenly a regular routine of going to the store will become difficult. Changes to a path that was regularly chosen becomes less attractive when a sudden hindrance appears which the person cannot handle. This can lead to the person finding walking to the store too difficult and the feeling of anticipation in relation to these routine walks has turned into a feeling of discomfort. Negative experience of the environment can result in the elderly and others that have impaired mobility to be unable to get out. When people grow older they become stiffer and the strength of the body weakens. Simple movements are slow and rigid (Ward-Thompson & Travlou 2007).

Sugiyama (Sugiyama & Thompson 2007) quotes Shumaway-Cooke et al (2003) who argues that the environment itself can be a hindrance when normal physical outdoors exercise suddenly become more subjective and more difficult when people experience reduced mobility.

Day et al (2008) conducted a study where they interviewed elderly citizens about their health and local environment.

The first question asked was "What do you consider to be an obstacle in the environment when using the area?"

- What most people wanted was being able to go outside where the pollution was not too bad and where places were free of trash and dog litter.
- Dust from the traffic, machines and noise from groups of people/teenagers were elements that could disturb their physical and mental balance, especially when people shouted unexpectedly..
- The largest obstacles for the elderly were the uneven paving surfaces and poor maintenance.
- High curb stones and uneven landscape that was too steep. This was especially mentioned in the cases where the person suffered from some sort of a heart disease. They chose to walk where there was a small slope.
- Most agreed that the lack of benches to rest on was a problem. The benches are in some instances the only thing that encourages elderly citizens to go out at all. They are a kind of lifebuoy making it possible to get between shops and services and then back home.
- Traffic was considered an obstacle. Major traffic arteries, which are hard to cross, and too brief traffic lights. This can make older people lose their independence, forcing them to rely on others to get around (Day 2008; Ward-Thompson & Travlou 2007). Some were frightened and unable to deal with the problem. Elderly citizens are at particular risk of being involved in traffic accidents or getting hit by a car (Joseph & Zimring 2007) They rather chose to walk in areas where the traffic was below average.
- The area is not easy to understand and the person gets lost in it.
- Encouragement in the environment was highly appreciated. To be in an environment where the individual can thrive and feel at ease. Fun places which encourage people to visit them.
- It was vital to be able to watch something like water, the ocean, boats, etc.
- Toilet facilities can provide security for senior citizens and it is necessary to have them at regular intervals.
- Cafés were mentioned for social interaction and also good public transportation.

The second question was about physical exercise “What do elderly citizens need to be able to perform the necessary daily physical exercise?”

- For walking, the elderly prefer a continuous pavement system that is flat with an even surface.
  - Low curb stones.
  - Frequent resting places.
  - Less traffic in the streets creates less noise.
  - Key services on the walking routine.
  - Public transport. Taking the bus to the center or the park and then walk back.
- (Aspinall et al. 2010; Ward-Thompson & Travlou 2007)

### 3.6.2 Habits

Sugiyama (2009) studied daily walking habits of the elderly. Daily walking maintains the body’s flexibility and general health and in this regard the green areas between neighbourhoods as well as around the residential areas are quite important. Daily walks in these green areas furthermore have a positive effect on mental health and provide an increased sense of satisfaction. When the elderly enjoy themselves and experience happiness while walking it gives particular paths much higher value than others. This simplifies things and encourages people to go to these special places that were so surprisingly interesting (Sugiyama et al. 2009).

### 3.6.3 Safety

Within this section you will find:

- Traffic, traffic lights and overall traffic safety and how to move around and cross streets without risk of accidents.
- Park security and police presence also falls under this section. It is expected that people can travel in areas without being attacked, robbed or abused in any way.

Lighting is important in streets, paving systems and also in green areas. Lighting that reaches into



all the dim hiding places so that an attacker cannot hide and jump unexpectedly in front of people.

- Buildings and vegetation protect us from the weather and if the design is a success then it can reduce the effects of wind and provide shelter from the sun.
- The vegetation provides us with shade from the strong summer sun and a protection from unexpected events, especially when it is used as back shielding in combination with benches.
- The vegetation can be threatening during the day if it is too dense and obscures visibility. This density has a greater effect at night where street lighting is not sufficient. Thick walls of evergreen vegetation are considered unsafe and are in fact the opposite of leaf growing vegetation. It is visibility that makes the difference, whereas overview is important to seniors (Gunnarsson 2012).
- Noise and pollution can cause stress and have an adverse effect on health. The noise causes indirect environmental pressure and stress while pollution negatively affects the respiratory system. Too much of either one encourages us to avoid these areas and we consider them unsecure (Gehl 2010)

### 3.6.4 Comfort

Within this section you will find:

- If the areas have the quality elements to support and are able to fulfil needs like continuous pavements with a smooth surface.
- Something exciting to see and experience while walking or resting in a green environment.
- Places where people can stand or hang around.
- Areas where people can sit down are important. They do not necessarily need to have benches. It can be areas where you can sit down and rest for a minute like a wide edge on an elevated surface.
- The experience is connected to being able to see what is happening in the area. Sight lines need to be relatively clean for example when looked at from a reasonable distance.
- Another factor that affects the experience is the ease of communication. Most people like to have a chat while others just want to enjoy their surroundings.
- Therefore it is important to have a certain control over the noise so that it is possible for people to communicate effortlessly.
- Places that provide many possibilities of engaging in physical exercise without being especially designed for sports and are interesting and encouraging. (Gehl 2010)

### 3.6.5 Validations

It is common to go outside and experience something new and exciting (Schipperijn et al. 2010). Ward-Thompson & Travlou et al. (2007) argue that what draws us out is our memories and the positive joyfulness that the elderly experienced in the past:

- The memory of joyful times as a child in nature or parks.
- The old games in the neighbourhood give you the desire to engage in physical activity through playing and challenge yourself to do better.
- To have an urge to examine areas and discover something new and exciting or simply enjoy their surroundings.
- This applies to all age groups and both genders. Teenagers gather in places that are noticeable so they can show the world who they are.
- The younger generation is ready to fill their life with romance.

Sugiyama(2007) quotes from Palys and Little (1987) who argue that the elderly value more when their objective is related to the environment and social connections. In reality the objective of each and every person is incredibly important, because this is what inspires the elderly to go outside. The fact is that elderly citizens need to experience that the environment supports them. It is an important factor because they are usually more vulnerable to their environment than younger people.

Bullock (2008) argues that studies prove the importance of having variations or diversity in vegetation in

open green areas to provide encouragement to use the parks for physical exercise. The scientific community discusses double experience, the need and the capability. Sugiyama (2007) quotes from Wallenius (1999) who argues that senior citizens associations have to be able to demand that the environment fulfils certain standards so their requirements are met. Sugiyama (2007) quotes from Little (2000) who argues that what elderly people want in the environment is based on their own experience of the area or similar places. It has been shown that the elderly experience purpose when they are doing well in their life.

### 3.6.6 Social

Parks are places inside a city that are open to everyone who is interested in them. They can be used for social interaction and meeting new people (Gehl 2010; Maller et al. 2009; Sugiyama et al. 2009; Thorén & Nyhuus 1994). Maller et al. (2009) argue that social connections are extremely important for the elderly. Sjerp et al. (2010) argue that elderly citizens enjoy taking a walk in their neighbourhoods and then stop by the park. This is some sort of a social ceremony to maintain relationships that are very important factors for the elderly. Sugiyama & Thompson et al. (2007) argue that it is more about the social network, meeting other people and to practice all kinds of physical exercises together. It provides an opportunity to see other people and to be seen. The elderly can visit the park every day and maybe choose their own spot, which they visit daily, so that the person has created a personal routine. The park provides the possibility of meeting up with friends or to make new acquaintances. (Gehl 2010; Kaplan & Kaplan 1995). Sugiyama (2007) quotes from Kuo et al. (1998) that those who used the park regularly forged stronger social bonds. This was again confirmed in Kweon's (1998) research, which Sugiyama (2007) quotes. There it was demonstrated that elderly citizens often forge stronger bonds to a park. Physical function is a good way to see how active the communications are between the elderly. It is possible to do all kinds of fitness exercises or sports in the parks, which are unhindered by age. The possibilities are countless and are only limited by our own imagination (Maller et al. 2009; Sugiyama et al. 2009; Thorén & Nyhuus 1994). Sugiyama (2007) quotes from Avlund et al. (2004) how social connections among elderly citizens prevents depression. Furthermore, Sugiyama (2007) quotes Wang et al. (2007) that it is a fact that proper training with regular companions reduces memory loss.

### 3.6.7 Choice

The most important factor is that the green areas serve a purpose for each person so that they may find a place to rest and get a break from their daily life and recharge themselves both physically and mentally. Ghel et al. (2010) argue that every person needs to have the opportunities to choose what he wants to do or think. The choice of what to do is the most important factor and it will increase visits and usage of the park (Aspinall et al. 2010; Gehl 2010; Schipperijn et al. 2010; Sugiyama & Thompson 2007). Studies show that people choose to use the green area closest to their home for daily exercise (Aspinall et al. 2010; Ward-Thompson & Travlou 2007). If the open area is large enough it can be used both for an active or relaxing purpose. That way, people can choose what they want to do each time. Visiting without having to choose what to do is a choice. This is the experience of peace and quiet without having to take the responsibility or being compelled to choose. Perhaps the person sees something interesting or entertaining and chooses to participate or just to sit down and watch. To be able to "just be" in the area and watch the others is a positive experience in itself (Gehl 2010; Kaplan & Kaplan 1995; Ward-Thompson & Travlou 2007). Bullock (2008) shows how important it is to go outside into nature and walk in peace and quiet. This also applies to open green areas that are within the city and are therefore seen as natural areas, even though they lack certain features of nature, e.g. forests. There are infinite possibilities to social interactions regardless of age. You can also exercise whether you are doing intense exercises or more relaxing ones like yoga, in a group or alone. There are many choices and you can always have new ideas. The most important part is that every individual can choose whatever he or she wishes every time they visit. The greater the range of choices, more people will visit and use the park (Aspinall et al. 2010; Gehl 2010; Schipperijn et al. 2010; Sugiyama & Thompson 2007).

### 3.6.8 Requirements

When we start to grow older we lose the ability to move as freely as we did at a younger age. Slowly we stop being able to do things that were so easy and fun before. This makes a difference between what the elderly can do and what they want to do. When the elderly experience that the environment does not support them,

it automatically becomes negative. The environment does not fulfil the persons requirements and therefore becomes less attractive (Sugiyama & Thompson 2007). Kaplan et al. (1998) argue that green places are designed to provide mental and psychological balance. This is what the elderly need and want to use the green areas for that purpose. That is what the areas have to provide. As long as the elderly feel that their needs are met, this particular area is selected. Day et al. (2008) argue that there is a minority of elderly people in hospitals and nursing homes. The majority is out there living their life and enjoying it to the fullest. It is important that the environment is inspiring and interesting because the elderly travel less and often sit together for a long period of time.

Ward-Thompson & Travlou et al. (2007) argue that the need to travel around one's neighbourhood demands a certain quality of the environment.

- One of the main points is to use the pedestrian system and that its connected and has a smooth surface.
- Another important factor is to have a chance to experience something exciting, interesting or entertaining. A place to buy a cup of coffee; toilet facilities and large open green spaces not far from home are things that elderly people consider an improvement of their quality of life.
- Public transport can potentially have a profound effect, especially if it is too far to walk or the individual does not have a driver's license or a car.

Ward-Thompson & Travlou et al. (2007) conducted a study on people's needs in the park and what attracted them the most. The results showed that the green areas that most people sought out, where areas that had water or sea and provided peace and quiet. These were areas where people experienced freedom in nature without any pressure from the environment. The results show that the elderly require safety in their environment:

- The elements in parks such as steps, benches, stairs and poor maintenance can create a risk of falling (Aspinall et al. 2010; Sugiyama & Thompson 2007; Walford et al. 2011; Ward-Thompson & Travlou 2007).
- Young people or groups of teenagers move quickly. They often do something unexpected or suddenly change direction which can make elderly citizens insecure.
- Criminal behaviour such as theft or assault scares elderly citizens and may cause unwillingness of the seniors to go out, and therefore close themselves off inside their houses. (Aspinall et al. 2010; Sugiyama & Thompson 2007; Ward-Thompson & Travlou 2007).

Barbosa et al. (2007) argue that there is one group of citizens that seeks to live as close to green areas or parks as possible. These are elderly citizens in the age group of 65 - 84 who are able to take care of themselves. The distance to the nearest park is usually not more than 300 m.

Matsuoka & Kaplan et al. (2008) summarised the results of studies that have been made on people's need for access to green areas, including elderly citizens. They divided the articles into three categories:

- Geographic representation
- Urban natural context
- Empirical methods

From these categories they listed people's needs in green areas. The results were divided into two categories:

1. Natural needs
2. The human interaction required

Within these two categories the material was classified according to different needs.

#### 1. Natural needs:

- 92% of the papers that were available had articles that discussed natural needs.
- 70% thought that there was a strong connection between green areas and neighbourhoods.

- The effects that green areas have on people are beneficial, particularly for their health, both mentally and physically.
- Being able to walk beside a lake or beach was in the highest quality category.
- Areas that contained large old trees were also in the highest quality category.
- Pleasure was mentioned in 54% of cases.
- Within this category, people reflected on the beauty of the nature, sounds in the environment and the hygiene standards in the area.
- Recreation and play came up in 40% of the cases.
- Various sports that could be practiced or played.
- Various ways to practise yoga and meditation.

At the same time it was pointed out that every park did not necessarily have to meet all these requirements. Small areas were also deemed suitable as long as their size was considered adequate and suitable for every instance.

## 2. Human interaction required:

- 56% of the papers available included articles which stated required human interaction.
- Social interaction and privacy occurred more frequently, or 58% of the cases. Here the focus was on whether the design of the green areas could increase social interaction or provide privacy.
- Participation in the design process was evident in 46% of the cases. Residents of the neighbourhood were allowed to participate in the neighbourhood design by communicating what they felt was missing or by coming up with new ideas. In that way it was possible to get the local community to put more money into the construction and preparation of these green areas.
- Sense of community identity was mentioned in 38% of the cases. The characteristics of the area being designed was removed. That mainly occurred because the designer decided not to take the character of the area into consideration. He decided to use another interesting one which had already been put up somewhere else and forced it into the new design. The result is that the new design is not in harmony with the character of the area, its people or the culture of the neighbourhood.

Sugiyama & Thompson et al. (2007) questioned elderly people on what they felt was missing in the neighbourhood:

- Most of the elderly people considered the environment to be monotonous.
- Access to stores was considered to be lacking. Stores were considered uninteresting and of poor quality.
- Lack of services.
- Distances that demanded driving through uninteresting surroundings to reach the destination.

Long distances between places discourage physical activity. The result is that the person living in the neighbourhood simply has no interest in using the area for activity.

Humpert et al. (2004) argue that the genders have different needs:

- Men go out and they exercise with purpose. They take walks in their neighbourhood and are more likely to do so than women. Men like it to be easy to get around and they want comfort. They are less likely to just go out for aimless walks.
- Women like to take walks around their neighbourhood for physical exercise and to keep their body in shape.

Weather can have negative impact for both genders. People who do not use the environment as an excuse for not going out, do not let the weather stop them.

Aspinal (2010) argue the importance of parks being designed so as to encourage elderly citizens to use them and exercise more.

The results were gathered into a model with the following findings:

- The most common concern of seniors was noise and disturbance from teenagers and young people, dogs on the loose, attacks of all kind and other similar things. The most important factor for seniors was safety. They were afraid of being robbed and attacked.
- Factors like toilet facilities, coffee houses etc. were mentioned secondly.
- The third factor was vegetation (perennial and all flowers in general), traffic and views, as well as trees and bushes and maintenance of vegetation and the surface of the pathways.
- Most of the seniors participating in the study mentioned lack of services such as cafés, toilets and similar.
- Lack of maintenance in the park and poor variety of vegetation was also mentioned.
- The traffic within the park was a factor when it was considered too heavy.
- Paths for walking had to be in good condition and maintained.
- Parks containing elements which were more directed towards the elderly were considered to be more attractive. Here the difference in physical capability and the individual's different condition played a role.

Kaplan et al. (1998) noted that people suffering from fatigue needed to have an area which was rich in interesting characteristics, with emphasis on experience. This empowers the person and has a positive physical and mental effect so that they become more functional. Bull (2010) writes that smaller places within large areas that are rich in nature and experience of nature, help people to reconnect with their emotions. In that way people are able to accept their environment and enjoy its harmony. Stigsdottir & Grahn (2011) argue that people feel sufficiently secure in these places which leads to a state of relaxation.

## Summary

The environment can be interesting, difficult, stressful or yield indirect environmental pressure. It can also be a mixture of these items. In reality there is no one decisive factor which governs the outcome, rather a combination of several different factors (Sugiyama & Thompson 2007). This is defined as the quality of the area or the neighbourhood and is seen as a quality of life for the elderly. This lends the possibility to make suggestions on the things that are missing in order to fulfil the needs and requirements of elderly citizens (Sugiyama & Thompson 2007). Bullcok (2008) states that parks containing elements that are more directed towards the elderly are more attractive to them. Aspinall (2010) argues the importance for the elderly to have access to open green areas due to the need of interaction with other people and preferably with a short distance to residential areas. This is valued to be a quality of life. The boundaries between official green areas and private gardens have to be clear and easy to distinguish so that the elderly can easily notice the difference. This will make the elderly feel more welcome in the green area. If there is doubt the elderly choose to go somewhere else. The area has to have clear and visual structure, with acceptable stability and obvious purpose which protects it from being used for something else than the enjoyment of open green areas (Thompson et al. 2010). Parks are similar to an open square. People can come without having to do anything in particular. Just being at there without obligations or duties (Gehl 2010; Thompson et al. 2010). Quality of life is not limited to an open green area, it is the combination of an area, neighbourhood and park which creates this overall picture. This could be a park but can also be an interesting street in a city (Sugiyama et al. 2009).

## 3.7 Summary

The size of the park matters as well as the number of green areas. The most important thing is to have coherent areas or small green connections between large open green areas. (Thorén & Nyhuus 1994) point out that these corridors are the connections between areas and small green areas are important connections for biodiversity. Increased biodiversity enhances the value assessment of the site and adds to the variability which can be viewed and enjoyed. (Thorén & Nyhuus 1994) divide green areas into eight categories, four for large areas and four for small areas, where every area has its own purpose. (Stigsdottir 2011) supports this theory and points out the size matters and recommends that large areas be divided into smaller units. In that way it is possible to give purpose to each area and give the park a multiple purpose. Diverse use of green areas prolongs a persons' lifetime and (Gehl 2010) and (Aspinall et al. 2010) point out that it will increase the parks' popularity and lead to better usage. These areas will become more valuable as the utilization increases from generation to generation. (Gehl 2010) and (Aspinall et al. 2010) point out that parks are areas where everyone

wanting to enter them are welcome to do so. The maintenance of in green areas helps to prolong the lifetime of the design. It makes the area more attractive for visiting since it appears to be safe and gives an impression of wellbeing (Gunnarsson 2012).

(Appleton 1975) speaks of "Prospect-Refuge theory" and "Habitat Theory". These are compelling theories claiming that all people, including elderly citizens, choose to be in a positive landscape with rounded and soft lines. These are areas where with a rather easy overview and at the same time acceptable back support or hiding places. That diminishes the danger for negative reaction and gives a feeling of safety and wellbeing. Being able to relax and enjoy their environment has decisive impact on whether people value the aesthetics of landscape. It is precisely this division of the areas which creates this sense of security within people. The landscape creates perimeter lines with excellent view, at the same time as it gives the elderly an image of being sheltered or hidden. This subjective imagination causes the elderly to relax. This is one of the most important need to be met when creating green landscape for the elderly. The experience is based on the balance in the form-giving elements in the areas. The scale is determined from the elderly's position from the perimeter line and the open area between these forms. How they experience this particular area depends on the life experience of the elderly persons. People make mind maps of everything they see and experience, the elderly being no exception. The environment is under constant evaluation and it is necessary to be constantly on the watch. The mind maps people create are one of the most valuable direction systems at their disposal. It gives information on how to be able to get from A-B in the minimum amount of time and in the best and safest way. The pedestrian system needs to be continuously easy to walk, easy to comprehend and designed for all ages. Surface maintenance must be good to hinder hole formations or other roughness which can create fall risk for seniors. The distance for the elderly to walk to the park must not be longer than 500-600 m. That makes the distance to the park and back 1000-1200 m. For visiting the park to be an interesting choice for the elderly, a resting place with benches have to be put up every 300 m. The walking distance to the park must not be more than 30 minutes or 60 minutes both ways. If the time is more than 30 minutes the elderly will choose the bus or the car over walking.

Universal design is very important for the elderly as for others with reduced mobility. It enables the elderly to use the area for a longer period of time, especially when aging starts affecting their bodies. It is now established in Norwegian law that all public places including green areas have to be designed according to universal design. Height differences can be a problem for the elderly, especially stairs and ramps. Therefore it is important to put up interval resting platforms, preferably with a bench. The step must be at an acceptable height and not more than 15 cm, a preferable height would be 12.5 cm. Walking stairs should be calculated with 3 steps for each rising thread (?) rising, otherwise they are inaccessible. If there are but two steps, the elderly will use the same foot for the rises all the way up the stairs. That will increase unnecessary strain on joints and muscles. With three steps the elderly will use the left and right foot equally up the stairs. Handrails for all stairs are obligatory as well as ramps for support, which should be continuous. The deficit for the ramp should not exceed 1:20 m. The readability of the environment must be easy so that adequate navigational understanding may be reached. This is very important for elderly people. The navigation has to be clear and leave no room for doubt, this especially applies to elderly people suffering from dementia. Familiar signs or color can help the elderly to find their way back home. Signs should have a dark background and light color to show the symbols, pictures or short text. Maps should be on a white background with black letters and map. The text should be short and focused. Maps and signs should be visible from at least 3 directions. In environmental design, caution must be shown not to mix too many colors and forms together. It creates irregular contrasts that affect the visually impaired and deaf. It is necessary to create an environment without unnecessary noises and without blocking the travel of speech. Lighting must be satisfactory for all, including minority groups. All warning signs must be clearly visible, lighted and uniquely identifiable. The readability of the neighbourhood and the park is utilized to create a mind map.

Green areas have a positive impact on both the physical and mental health of elderly citizens. Bull (2010) claims the environment to have a motivating effect on the elderly who still are physically active. In itself, there is nothing that stops the elderly from being physically active, ther than reduced mobility. (ORGANIZATION) estimates that people over the age of 67 need to exercise for 150 minutes per week to maintain their strength. To enhance physical skills and strength 300 minutes exercise per week is required. Stigsdottir & Grahn (2011) state that green areas are of great benefit for those having tendency to mental illnesses. The Alnarp park or the Stress garden in Sweden is a good example of this. This is a rehabilitation park for people suffering from tremendous stress and/or fatigue. The rehabilitation takes 3 weeks. The formation for the vegetation should



be soft and rounded with flowers in mild colours such as white and blue. Green areas should be free of all advertisements and other marketing harassment. (Motloch 2001) claims that as long as the elderly have an overview from refuge spots, they experience security and wellbeing there.

The environment can be interesting, difficult, stressful or with an indirect environmental pressure. It can also be a mixture of these factors. In reality there is no one deciding factor that is the cause, but a combination of different factors (Sugiyama & Thompson 2007). This is defined as the quality of the area or the neighbourhood and what is regarded as a quality of life for the elderly. This gives a possibility to make suggestions on things that are missing in order to fulfil the needs and requirements of elderly citizens (Sugiyama & Thompson 2007).

Bullock (2008) states that parks with elements more directed towards the elderly have more attraction to them. Aspinall (2010) argues the importance for the elderly to have access to open green areas because of the need for interaction with other people, and preferably with a short distance to residential areas. This is regarded to be a quality of life. The boundaries between official green areas and private gardens have to be clear and easy to distinguish so that the elderly can easily notice the difference. This will make the elderly feel more welcome in the green area. If there is doubt, the elderly choose to go elsewhere. The area has to have clear and visual structure, with acceptable stability and obvious purpose which protects it from being used for something else than the enjoyment of open green areas (Thompson et al. 2010). Parks are similar to open squares. People can come without having to do anything in particular. Just being there without obligations or duties (Gehl 2010; Thompson et al. 2010) Quality of life is not limited to an open green area, it is the combination of an area, neighbourhood and park which creates this overall picture. This could be a park but can also be an interesting street in a city (Sugiyama et al. 2009).

Various factors and elements can be a barrier for an elderly person. It depends on the physical and mental state of each and every individual. An elderly person with reduced mobility has totally different problems from an elderly person suffering from fatigue or depression. Therefore, the environment needs to support as wide a group of elderly citizens as possible. A walking routine is important, as it motivates them to go out and be physically active. A neighbourhood that is easy to navigate and provides unexpected variations which break up the monotonous daily routine is something that gives the elderly the possibility to create a habit. To create a comfortable environment in a park it is necessary to ensure safety so that the elderly may feel safe there. Through that, the elderly persons are made to feel comfortable and starts to relax and enjoy themselves. Senior citizens prefer recognition from the environment and to have a purpose. Parks are of high importance when it comes to encouraging the elderly to go out and be physically active, because they use open green areas for social interaction. The thing that draws the elderly to a park is its proximity and the limitless possibilities of choices.

Sugiyama (2007) study more the quality of life and maintain that:

- Elderly citizens need to feel secure in their environment. They need to be able to find their way easily in the neighbourhood and to have access to a continuous network of pathways.
- Elderly citizens like to visit green areas that provide social connections or possibilities to interact with others.
- Elderly citizens want to be in better physical shape and like to walk daily to improve stamina and to maintain good balance to prevent falls.
- Elderly citizens can reduce mental symptoms such as depression and stress with regular exercise. Especially those who suffer from reduced mobility.
- Elderly citizens considered a good green area in the neighbourhood that is easy to walk to give more quality of life.

The green areas need to have diversity in experience. The elderly need places where they can play, sit down, stand and walk (Grahn & Stigsdottir 2003). Gehl (2010) argue that most elderly citizens like to watch other people and see what they are doing. This is often done where people can sit or stand in perimeter of the area and where the elderly have a good overview. If this is transferred to parks then perimeters of the beds is the vegetation in the park that serves as the back safety. Other useful things are bridges, streetlights, signs and trees that provide the possibility to stand by. These areas are not necessarily the perimeter. These areas are

often in open spaces between smaller sections of the parks. The quality in life is defined by the elements that facilitate our environment, such as readability, continuous pedestrian system and something to see. This is called quality in the neighbourhood or the park. As long as the elderly's needs and requirements are met, the standards are maintained. To have access to a green area at a short distance is quality of life. Green areas that provide the elderly with various choices and give the opportunity to socialize is of high value. To be able to watch children play or having place to play is quality. To meet with other people is popular, e.g. meeting your best friend for coffee is a privilege and of high value. To relax and feel safe in the park is quality. To be able to stay there without having to do anything and to have no responsibility is popular. (Gehl 2006; Gehl 2010; Milligan et al. 2004; Sugiyama & Thompson 2007; Sugiyama et al. 2009)

I have chosen to conduct the case study and the observation from those two theories that Appleton (1975) states:

- Habitat theory - is essentially aesthetic ease landscape for the viewer and provision of an area which can guarantee all biological necessities and environmental needs.
- Prospect-Refuge theory - in fact, to be able to observe without being seen is a step towards satisfying the capacity circulating silicon device to ensure that success is greater, thus continuing the ease and aesthetic value.(?)

I want to establish whether the park meets these basic needs of senior citizens which today are considered to be Quality of life. In the aim of applying these theories to the case study and the observation I have chosen two studies for reference together with the material I have chosen for literary review. I will make questionnaires to analyse two parks in Oslo. These studies are:

- *Preferring and relative importance for environmental attributes of neighbourhood open space in older people*, written by Aspinall, Thompson, Sugiyama, Brice and Vickers (2009). Deals with the things that are lacking or required in the park from elderly citizens' perspective.
- *Outdoor environment, activity and the wellbeing of older people: Conceptualizing environmental support*, written by Sugiyama and Thompson (2007). Deals with the quality of life in parks and neighbourhoods.

I have chosen Grahn (1994) ideology and how he divides green areas into 8 categories. That is 4 for large areas: wild, infinite, variations, quiet and 4 for small areas: area for fun, culture, playgrounds, flat. Concurrent with this, I have decided to choose Stigsdottir's (2010) ideology to divide larger areas into smaller to be able to give the park a multi-purpose possibility to create basis for the "Prospect- Refuge theory". This includes all green connections in the neighbourhood that undeniably have a strong impact on the experience of the "Theories Habit" as Thorén & Nyhuus (1994) points out; that these corridors are the connections between areas and small green areas are connections for biodiversity. Maintenance of green areas helps to prolong the lifetime of the design. It makes the area more attractive for visiting since it issues an aura of safety and wellbeing. The quality of the pedestrian system, such as pavements and paths is elementary to whether the elderly people choose to be physically active and carry out the necessary exercise that they need. I will use the study that Joseph & Zimring (2007) did to evaluate if the pedestrian system needs to be continuously easy to walk, easy to comprehend and designed for all ages. Maintenance of the surface has to be acceptable to hinder formations of holes or other roughness. The distance to the green area will be measured and how long it takes to get there. It will be estimated based on the theoretical level Stigsdottir (2010) which argues that the distance for the elderly to walk to the park may not be longer than 500-600 m. That makes the distance to the park and back 1000-1200 m. For this to be an interesting choice for the elderly, a resting place with benches has to be put up every 300 m. It must not take more than 30 minutes to walk to the park or 60 minutes in both directions. The park design will be estimated from this and universal design. Norwegian standard is used to compare with the design. The ideology in Norwegian standards and Asmevik (2009) is used for the elderly who are visually impaired, hearing impaired and with reduced mobility. This relates directly to the Prospect-Refuge theory.



## 4 Part II - Case studies

I have selected one study and one theory to use as basis for my own case study. Both of these studies are based on the connections that elderly citizens have to green areas around their residential areas. They both contain the elements that seniors considered to be of quality and motivations for being physically active.

- Apleton Prospect- Refuge theory
- *Preferring and relative importance for environmental attributes of neighbourhood open space in older people*, written by Aspinall, Thompson, Sugiyama, Brice and Vickers (2009). It is about the things that are lacking or required in the park from elderly citizens.

### 4.1 Areal selection

To find interesting areas for my project or category 3, a combination of these two categories above to compare, professor Thoren suggested I would conduct a case study in two neighbourhoods in Oslo. These neighbourhoods had to have a park or an open green space. The most interesting part was that they had to be in areas occupied by different social classes. That way I could find out if there were any difference in qualities when comparing the two neighbourhoods. Thoren recommended that I should contact Reidun Stubbe at the Urban Environment Agency in Oslo for advice. Reidun has worked for many years in Oslo municipality and has extensive understanding of the different parts of Oslo. I contacted Reidun and explained my project and asked her to recommend areas for conducting a case study in Oslo. The parks didn't have to be of the same design but they had to be important parks within Oslo, one in an upper class neighbourhood and one in a lower/middle class. The difference in design could even make my case study more interesting, giving an opportunity to see whether the design has some inspiring or discouraging effects on the physical activity of elderly citizens. Stubbe suggested three places within Oslo, Frogner park, Akerselva and the Holmlia park. All these places are unique in their own way.

1. Frogner park is an old 16<sup>th</sup> Century park areal in Oslo. The park has been in constant development until it was designed in strict Baroque style. Not all areas inside the park are original, but the main axis has been preserved as well as side areas. This axis lies through the park and is framed in by a large tree allée and sculptures made by Vigeland. Side areas are mainly large lawns framed in by large tree rows. The newest part of Frogner park follows the Frogner river down towards the sea. That part is especially formed in the English landscape design. This design flows up to the older part of Frogner park and combines with the strict lines of baroque. Frogner park is placed in an upper class, inner city neighbourhood in Oslo, called Frogner that lies on the city's west side.. This neighbourhood is in particularly good maintainance. The demographic structure of the majority is ethnic Norwegians with higher education and considered to be financially well established. Frogner park is in the same class as the Royal palace park and the maintainance of the same quality. This is the highest form of maintainance in Oslo.
2. Akerselva park lies on the boundaries between east and west. The park area lies side-line to the river Akerselva. This park is under further development. The main focus is to reconstruct and open up Akerselva and restore the closest area to its original form. This is a park that provides a pedestrian system away from traffic and near a river with combination of trees, bushes, natural floral meadows and grass. Due to being under construction and development this park is not suitable for my case study.
3. Holmlia is a rather new park or since 1960. This park is on a suburban estate on the east side of Oslo. It was designed and built at the same time as the neighbourhood. The reason was to preserve as much of the natural woodland between small house areas. Therefore the park lies in between the housing area and creates connections from the city outskirts, through the neighbourhoods and down to the sea. Within these connections lies the pedestrian system away from the roads and harassment from bright signs. The idea was to create areal for people to walk through on their way to work or home and to release all stress and be revitalised. The park is mainly a woodland, but you can find sport fields, open lawns and a beach there. The demographic structure of the inhabitants is 50% ethnic Norwegian's and 50% immigrants. In this neighbourhood the education status is low and the people are considered to be of lower middle class down to poverty with social support. Maintenance in this

neighbourhood is low negligence when it comes to the park and the pedestrian system is evident. The choice is to conduct a case study on Frogner park and Holmlia park. The parks chosen are of very different design and demographic structure.

## 4.2 Spatial analyses

In the section here below I will explain what the analysis contains and what it can show to give a clear representation of the parks.

- **Location of the area and its content** – In this analysis is the forming of the neighbourhood's structure, demographical structure, economic status, socioeconomic status, the proportion of elderly citizens, sizes of flats or houses, education level. The environment design in the neighbourhood is evaluated based on the elderly's needs.
  - **Topography** – Counter lines are studied and the landform portrayed. I will note the steepness of the inclination to predict the deficit.
  - **Water** - All water is showed; rivers, ponds and the ocean. The design around each element is evaluated to see if the area fulfils the elderly's requirements.
  - **Vegetation** - The vegetation in the neighbourhood and the park is evaluated to find out if it gives the necessary support and security for the elderly as they requires. Usage of vegetation in the design is evaluated to find out if the park is divided in smaller sections that give the possibilities to seek shelter. The edge in larger area is evaluated to see if the vegetation gives the necessary support, security and overview for the elderly. The vegetation will be evaluated based on different manifestations and variations by seasons.
  - **Spatial analysis of the park and viewpoints** – The park area is introduced. All areas within the park are evaluated to see if the design provides necessary support and security for the elderly and whether they fulfil standard requirements.
  - **Viewpoints** - Existing viewpoints within the neighbourhood and park are evaluated. The design for the viewpoints be evaluated to find out the purpose of the view and what it is supposed to show.
- **Residential areas with elderly people** - All retirement homes are mapped.
  - **Age group distribution in the neighbourhood** – In this analyses the elderly are divided in groups and their residential home is shown. Comparison is made between the groups within the neighbourhoods to find out where the majority of elderly citizens live within the neighbourhood.
  - **The Distance to the park** – From the analysis above, the distance from the elderly's residential homes to the park is evaluated and mapped. The distances measured are 300 m, 600 m, 800 m, 1000 m and over. If the distance is more than 300 m, resting places will be marked in on the map.
- **Circulation** – The main focus is to see if the pedestrian system is continuous within the neighbourhood and how it is connected to the park. Evaluation of all factors is made to get an understanding if the basic needs are present or if improvements have to be made.
  - **Readability** – The design in the neighbourhood and park is evaluated from the readability to find out how easy it is to navigate through the neighbourhood.
  - **Signs** – The design of signs in the neighbourhood and park are evaluated to see if they are easily understood.
  - **Steps** – Treads and rises are evaluated in the neighbourhood and park to find out if the elderly citizens can use the stairs and be safe.
  - **Ramps** – The defect on the ramps in the neighbourhood and the park is evaluated to find out if it is usable for the elderly that use walkers or wheelchair.
  - **Resting places** – This analysis will show if there are enough resting places in the neighbour-

hood and park. The overall design and situation are evaluated.

- **Barriers and threats in the design** – The density of traffic are evaluated and the road categories are mapped. All elements for crossing streets are mapped and evaluated to find out if the design is suitable for the elderly to use.
  - **Vehicular access** – This analysis will show how the elderly can use cars or public transport to visit the park. Parking spaces, parking houses, bus, train and tram routes are mapped and time schedules shown.
- **Service within the park** - The services in the park are mapped and evaluated.
  - **Toilet facilities** – The design and function is evaluated. Are toilets available for the elderly to use in the park? What about the neighbourhood? The design and function is evaluated.
  - **Café** – Cafés within the park are evaluated in terms of placement and provision. Also will be examined whether there are any café near the park that can provide viewpoints to the park? The design and function is evaluated.
  - **Lighting** – Is the lighting sufficient in the park and the neighbourhood for walking and safety after dark. The design and function is evaluated.
  - **Trash and garbage containers** – An examination will be to see if there are trashcans at regular intervals and trash containers by the entrances. The design and function is evaluated.
  - **Bicycle stands, bicycle rental** - An examination is done to see if there are any bicycle stands and bicycle rental. The design and function is evaluated.
  - **Playground for children** - The playground for children in the park is mapped. The design and function is evaluated.

### 4.3 Case study list

Based on the analysis, a chart is made to show the results visually. In addition, I have made a list of different criteria for evaluating the parks and will the following elements also be used to evaluate the parks. The criteria can give three different ratings: Good, satisfactory or unsatisfactory. The rating is from 1-10. 1 is the lacking, 5 is satisfactory and 10 is good condition. The criteria is:

- **Good** – What is in good condition and does not require any changes. Areas or elements can continue to stay like they are as long as they are properly maintained. Some elements have characteristics that need to have the possibility of developing and then it is a question of management to maintain the experience or a similar experience (Bullock 2008).
- **Satisfactory** – Here improvements have to be made, adding or simply just changing. This can vary from small maintenance work that is easy to implement or having to redesign the whole area to be able to achieve the desired experience.
- **Unsatisfactory** – Here changes have to be done so that the area or the element can be used in the way it was intended to be used.

#### Case study list:

##### Park and spatial analyses

1. How is the park connected to the surrounding environment? (Sugiyama)
2. Does the park have value for increasing the Quality of Life in the neighbourhood? (Joseph and Zimmering)
3. How is the design? (LGG)
4. Does it have any function? (LGG)
5. Is the park divided into small areas? (Stigsdottir)
  - a. If Yes. How are they divided?

- b. Are they variable or monotonic?
- 6. What is the overall quality of the park? (Sugiyama, Aspinal, Thompson)
- 7. What are the characteristics of the areas (*Genus loci*)? (Stigsdottir)
- 8. How is the condition of the park, taking into account the overall picture? (LGG)  
1 2 3 4 5 6 7 8 9 10
- 9. What is the experience of the security in the park? (Aspinal)
  - a. Do the facilities in the park, including vegetation, create necessary support? (Aspinal, Stigsdottir, Ghram)
  - b. Are there a lot of disturbances and assaults in the parks? (Aspinal, Bull, Day)
- 10. What kind of experience is available in the park? (Aspinal, Sugiyama, Ghel)
- 11. How is the quality of the experience in the park (Sugiyama, Stigsdottir, Ghram, Thompson)  
1 2 3 4 5 6 7 8 9 10
- 12. Is there anything interesting to see? (Aspinal, Sugiyama, Ghel, Stigsdottir, Ghram)
- 13. Do the seasons have different visual impact in the park? (Stigsdottir, Ghram)
- 14. Is there something overwhelming? If something, write an explanation. (Stigsdottir, Ghram)
- 15. How can you make use of the park for physical exercise? (Aspinal, Sugiyama, Bull, Thompson)
- 16. How can the park be used for relaxation and mental restoration? (what can the park provide) (Stigsdottir, Ghram, Bull)
- 17. What is missing in the park? (LGG)

### Circulation

- 1. Is the distance relatively short? (Joseph and Zimmering, Bull, Day)
- 2. Are the pavements and paths continuous in the neighbourhood? (Joseph and Zimmering)
  - a. What is lacking?
- 3. Are there obvious barriers or hindrances that restrain the senior citizens when walking on the pavements or paths? (Joseph and Zimmering, Bull, Thompson, Sugiyama)
- 4. How is the sloping in the path? (Joseph and Zimmering, Bull, Day)
- 5. How are the crossings and traffic lights distributed with consideration to the pedestrian system? (Joseph and Zimmering, Thompson, Sugiyama)
- 6. Does the individual have to take a detour to get across the street? (Joseph and Zimmering, Thompson, Sugiyama)
- 7. Are the entrances visible? If not, write an explanation. (Ghel, Thompson, Sugiyama)
- 8. Are the boundaries between private and official parks clear and visible? If not, write an explanation. (Ghel, Aspinal, Thompson, Sugiyama)
- 9. How readable is the park? (Aspinal, Thompson, Sugiyama, Stigsdottir, Ghram)  
1 2 3 4 5 6 7 8 9 10
  - a. What makes it difficult to read?
  - b. What makes it readable?
- 10. Are there navigation signs? What is their condition? (Aspinal, Thompson, Sugiyama, Asmervik)  
1 2 3 4 5 6 7 8 9 10
- 11. What is the condition of the pavements in the park? (Joseph and Zimmering, Thompson, Sugiyama, Bull)
- 12. Is there anything interesting to see? (Aspinal, Sugiyama, Ghel, Stigsdottir, Ghram)
  - a. Condition  
1 2 3 4 5 6 7 8 9 10
  - b. Quality of the experience

1 2 3 4 5 6 7 8 9 10

i. In what way?

c. Type

1 2 3 4 5 6 7 8 9 10

d. Surface quality

1 2 3 4 5 6 7 8 9 10

e. Snow clearing

1 2 3 4 5 6 7 8 9 10

f. Maintenance

1 2 3 4 5 6 7 8 9 10

### Vehicular access

13. Does the municipality provide parking spaces in the park or in nearby area? (Ghel, Aspinal, Thompson, Sugiyama, Bull, Day)
14. What kind of public transport is provided and in what form? (Ghel, Thompson, Sugiyama, Joseph and Zimmering)
15. How frequent are the tours? (Ghel, Thompson, Sugiyama, Joseph and Zimmering)

### Servis

16. How is the access to services within the park? (Aspinal, Bull, Day)

### The quality of the facilities

17. What kind of vegetation is in the park? (Here a general idea is provided without going through individual examination). (Aspinal, Bull, Barbosa, Day )
  - a. Trees
  - b. Bushes
  - c. Perennials
  - d. Summer flowers
  - e. Grass
18. What is the condition of pruning and cutting of the vegetation? (Aspinal, Bull, Barbosa, Day)
 

1 2 3 4 5 6 7 8 9 10
19. How is the maintenance in the park?
 

1 2 3 4 5 6 7 8 9 10
20. What is the condition of the steps in the park? (Joseph and Zimmering, Bull, Day)
  - g. Risers
 

1 2 3 4 5 6 7 8 9 10
  - h. Treads
 

1 2 3 4 5 6 7 8 9 10
  - i. Length
 

1 2 3 4 5 6 7 8 9 10
  - j. Resting platform
 

1 2 3 4 5 6 7 8 9 10
  - k. Ramp
 

1 2 3 4 5 6 7 8 9 10

    - i. How many? \_\_\_\_\_
  - l. Maintenance

1 2 3 4 5 6 7 8 9 10

21. What is the ratio between steps and rises? (Joseph and Zimmering, Bull, Day)

22. Other facilities in the park. (Aspinal, Sugiyama, Thompson, Bull, Stigsdottir, Ghram, Ghel)

m. Benches

i. How many: \_\_\_\_\_

ii. Condition:

1 2 3 4 5 6 7 8 9 10

n. Toilet facilities

i. How many: \_\_\_\_\_

ii. Condition:

1 2 3 4 5 6 7 8 9 10

o. Trash bins

i. Condition:

1 2 3 4 5 6 7 8 9 10

p. Lighting

i. Condition:

1 2 3 4 5 6 7 8 9 10

q. Cafés

i. Condition:

1 2 3 4 5 6 7 8 9 10

r. Other services

i. Which \_\_\_\_\_

ii. Condition:

1 2 3 4 5 6 7 8 9 10





## The location of the area and the containness

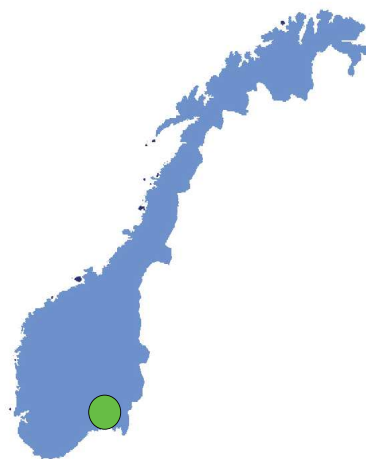
### 4.4 Spatial analysis

Holmlia is in district Søndre Nordstrand which is placed in the south-east part of Oslo, Norway's capital city. The region extends up to the boundary of South Oppegård municipality. This is a suburban area. Around 1960, buildings started to rise in Holmlia, low blocks of two floors terraced houses, low blocks on 3 floors and the average high blocks of 5 floors and detached houses on 3 floors. The project leader was Mette Sjølie. The development was approved in 1976 and in 1978 Holmlia centre was opened. Holmlia station opened in 1988 and was designed by Arne Henriksen. The inhabited area is divided into two parts because of its geographical location. In the centre between these two parts is woodland. The surrounding area of the house groups is covered by woodland (Brochmann; Kommune 2004; Kommune 2011; Torfinn 2010; Vidar 2009). Residential houses shows sign of a low and low middle class income. The houses are poorly maintained and the same goes for public buildings and open spaces like the train station and all the open green areas in the neighborhood..

The resident combination of this neighbourhood is mixed. Almost 50% of the residents are immigrants.

The residential capital in Holmlia, as mentioned in the Introduction chapter, is considered to be lower middle class to poor. The education level is low and very few have a college degree. Most of the people that have diplomas have industrial or craft education or an equivalent educational level. To be uneducated is common. The wages are low, which can be seen in annual income. The price of houses and apartments is generally low and it is easy to acquire a large property for a small amount. The number of elderlies is low, only 3%, and decreasing. That is visible when viewing the age of the majority of the property owners. But 75% owners are at age 30 and over. This means that there is considerable renewing in the neighbourhood.

Picture 12 shows Norway and the location of Oslo.



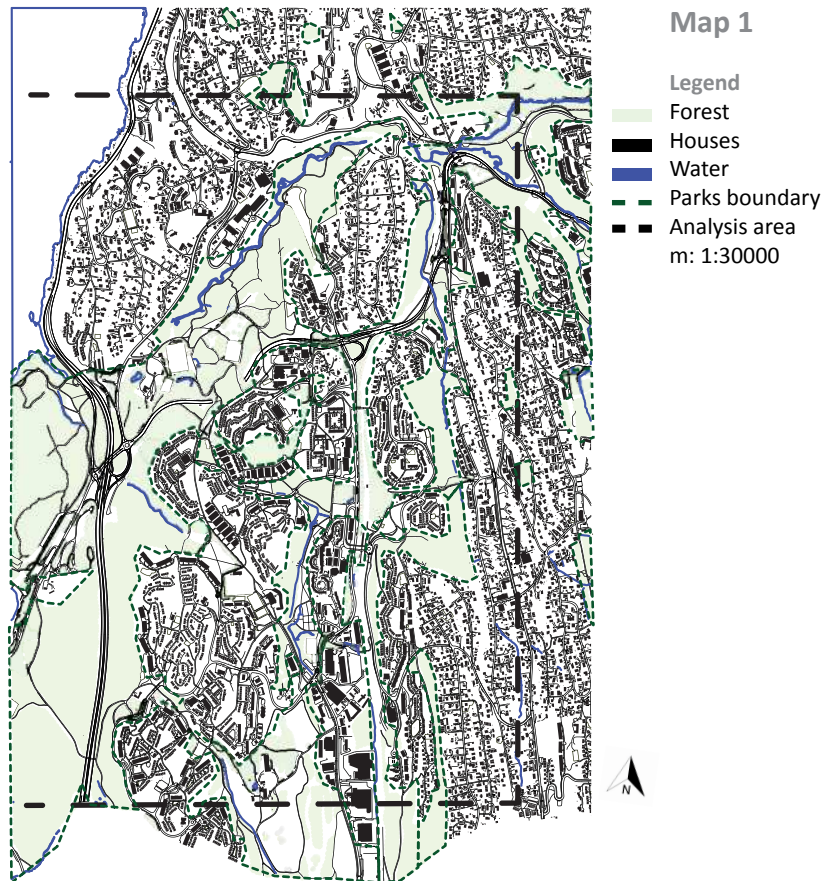
Area analysis of Holmlia	
Content	
Current population	1097 persons
In daytime on workdays	1127 persons
Demographic distribution	Young people and middle aged
Elderly citizens	3 %
Majority of apartments	100-159m2
Secondary size of apartments	0-100m2
Apartment owners	30 years and older or 75%
Individual's average income	NRK 160 thousand/year
Gender distribution	Male 49% Female 51%
Marital status	Single and childless, 37%
Children	Preschool - elementary school
Education level	General education
Public transport distance	Short distance
Public transport	Relatively good
Vehicular access	Easy to get around
Parking spaces	Hard to find
Neighbourhood safety	Good

## The location of the area and the containness

Frogner is in Akershus district which is placed in south-western part of Oslo, Norway's capital city. This area that includes the following established neighbourhoods: Frogner, Majorstuen, Skøyen, Blindren and Borgen. The table shows the difference in current residential, demographic distribution, economic status, educational level and marriages status inside of each neighborhood.

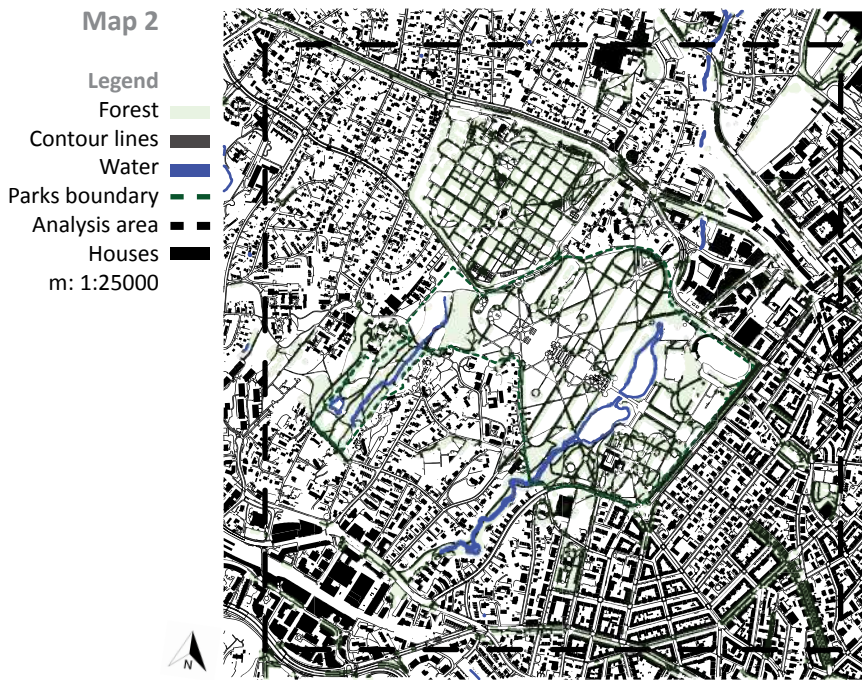
dren and Borgen. The table shows the difference in current residential, demographic distribution, economic status, educational level and marriages status inside of each neighborhood.

Area analysis of the neighbourhood Frogner					
Neighbourhoods	Frogner	Majorstuen	Skøyen	Blindren	Borgen
Content					
Current residential	3100 persons	1491 persons	2811 persons	201 persons	1496 persons
During daytime on workdays	3439 persons	1367 persons	8907 persons	2715 persons	1408 persons
Residential demographic distribution	Young people	young people or middle aged	young people or middle aged	young people or middle aged	young people or middle aged
Elderly citizens	12 %	7 %	11 %	3 %	10 %
Majority of apartments	0-100 m <sup>2</sup>	0 – 100 m <sup>2</sup>	0 – 100 m <sup>2</sup>	0 – 100 m <sup>2</sup>	0 – 100 m <sup>2</sup>
Second of apartments	100-159 m <sup>2</sup>	100 – 159 m <sup>2</sup>	100 – 159 m <sup>2</sup>	few 160 m <sup>2</sup>	100 – 159 m <sup>2</sup>
Apartment owners	30 years and older or 75%	30 years and older or 77%	30 years and older or 76%	30 years and older or 74%	30 years and older or 75%
Individual's average income	NRK 358 thousand/year	NRK 303 thousand/year	NRK 405 thousand/year	NRK 207 thousand/year	NRK 513 thousand/year
Gender distribution	Male 50.6% Female 49.4%	Male 48.7% Female 51.3%	Male 50.8% Female 49.2%	Male 53.7% Female 46.3%	Male 48.5% Female 51.5%
Marital status	Single and childless, 63%	Single and childless, 73%	Single and childless, 51%	Single and childless, %	Couples with children, 38%
Children	preschool - elementary school	preschool - elementary school	preschool - elementary school	preschool - elementary school - high school	preschool - elementary school
Education level	High university degree	High university degree	High university degree	High university degree	High university degree
Public transport distance	Relatively short distance	Relatively short distance	Relatively short distance	Relatively short distance	Relatively short distance
Public transport	Relatively good	Relatively good	Relatively good	Relatively good	Relatively good
Vehicular access	Easy to get around	Easy to get around	Easy to get around	Easy to get around	Easy to get around
Parking spaces	Hard to find	Hard to find	Hard to find	Hard to find	Easy to find
Neighbourhood safety	Good	Good	Good	Good	Good



Holmlia park is 600 ha and mainly the remainder of the original woodland. The design is based on existing woodland and openings. Path lies in the woodland to connect different parts of the neighbourhoods instead of pavements. There are smaller areas or green openings that have been clear-cut to make space for some activity. With regard to the size of the park the areas have poor visible connection. This makes the experience of the park rather confusing. The area does not give the feeling of security or welcomeness. There is no way of knowing which direction to go or what there is to see in the park. The scattered small areas within the forest need renewing of basic facilities. The design is very simple, too simple in fact, with not enough basic facilities so that it does not meet the necessary standard requirements for parks. The main focus in the design was to keep things as natural as possible. This natural style creates a certain irregularity. To give an example, for an outsider it is impossible to figure out that Hvervenbukta is a part of Holmlia park.

Map 1 shows the area used for analyses. This map gives an overview of the area. In the fly photo you can see that the woodland is larger than the map indicates. That's because the woodland indicated on the map is a public area and outside of it rest is in a residential area. The designs of the residential area is irregular and form clusters. The residential area is placed on the hilltops where the contour line forms a sloping inclination. On the wood side of the residential area are paths that connect different clusters together and create a pedestrian system. In the analyses below, each aspect of the design will be evaluated based on answers to the questionnaire.



The resident combination of this neighbourhood is in majority ethnic or around 80%. The residential capital in Frogner like I mention before in the Introduction chapter, is considered to be above middle class to high class. The education status is high and the majority holds a university degree. Therefore the wages are high. The price of houses and apartments is generally high and it is expensive to buy a large property. Majority of apartments are from 0-100m<sup>2</sup> and secondary properties are above 100m<sup>2</sup>. The number of elderlies is low. The difference between neighbourhoods varies from 3-12% and the number is constant. That has to do with the residents homes for elderly people in Frogner. This is one of the most popular neighbourhood among the elderly. The majority of property owners are around 30 or 75%. This means that there is considerable renewing in the neighbourhood.

Frogner park is an old park from the 13<sup>th</sup> century and measures 32 ha. Known writings are from the 15<sup>th</sup> century. The park's development has been diverse over the years. The strict lines found in the park are remnants from the baroque style, 1700. Kristiana (the old name of Oslo) purchased Frogner park in 1896 and the park became an official property. Today the park is divided into two parts, Vigelands park, which is the park with the axe and all the sculptures, and Frogner park, which is the rest of the park, which is all the green areas that were around the park before, including The English park.

Map 2 shows the analysed area within Frogner (Haug 2006; Jensen Morten et al 2004; Nielsen; Norge; Oslo).

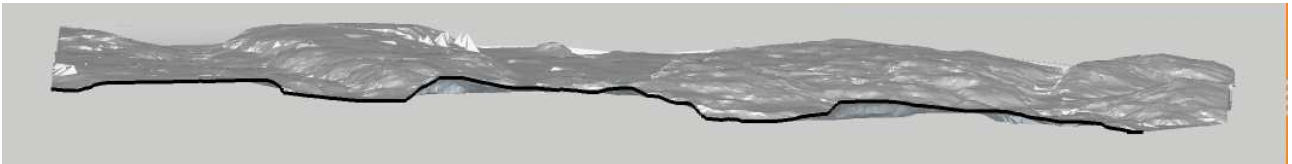
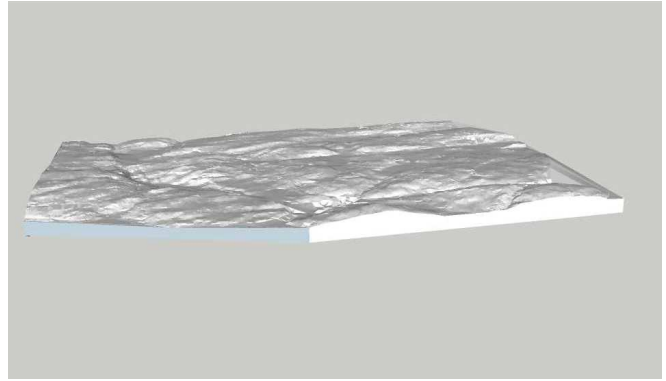
The map 2 shows the area that is used in the analyses to find out where the seniors live within the neighbourhood. The park is within the analysed area. This is the house that stands next to the park. The design in the area differ between these following neighbourhoods: Frogner, Majorstuen, Skøyen, Blindren and Borgen.

Frogner and Majorstuen are is rigid squares divided urban landscape. Skøyen is between cluster forms and light rigid squares. That's the area that lies up to Borgen and light rigid squares divided urban landscape. That is the area that lies up to Frogner. Blindern is a scattered cluster form of urban landscape Borgen is a clustered form of urban landscape. In the analyses below each and every aspect of the design will be evaluated based on the answers from the questionnaire.

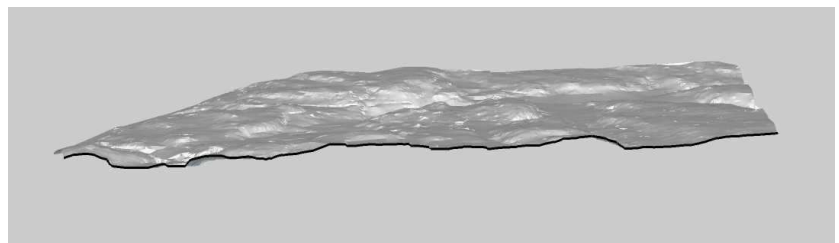


## Topography

The slopes are visualized on the 3D sketch 1. The scale in land gradient is big. The gradient can vary from being light to very steep. Height difference can go up to 30 m. It is common to have a height difference from 12 – 20 m in a narrow area. The woodland slopes from the ocean and up to the centre are extremely steep. Ljanshill that lies in Hverfenbukta rises up to 83 m above sea level. Mastemyrhills rises up to 93 m above sea level. In Ravenåsen, the gradient goes up to in 122 m over the sea. The highest land rise in Grønliåsen is 228 m. Grønliåsen lies in the woodland between the neighbourhoods and is not on the map.



Longitudinal view makes the gradient more visual and the land usages in 3D, sketch 2. This shows us how the placing of houses is on the sloping hillsides and where the open green area is between them. The longitudinal is taken from the center of the map.

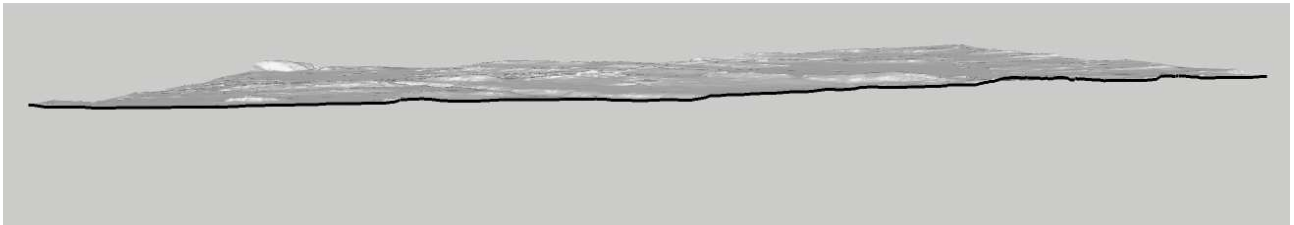
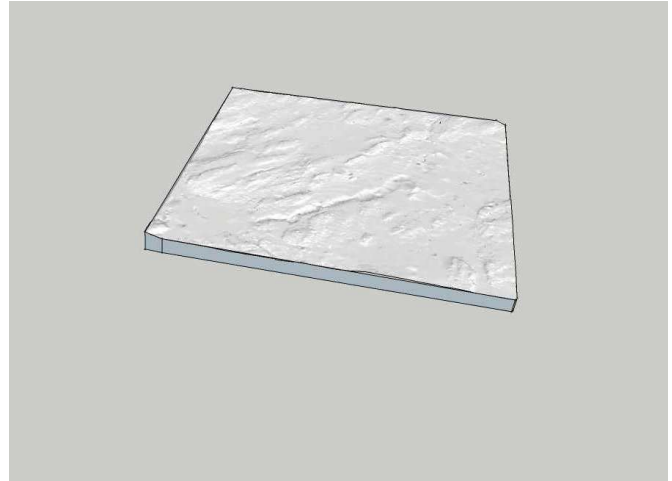


Transversal view. Residential areas placed where the contour lines are sloping while the woodland area is extremely steep. This puts a question mark behind the idea to have a residential area in the woods for people to enjoy. It looks more like the woodland exists because it was not fit to be used for residential buildings. This reduces the usefulness of the green area in which the utilizing of the woodland is where the contour lines are sloping. This gives a small open green area between the tall trees. This is visualised in 3D sketch 3. The transversal view is taken from the center of the map.

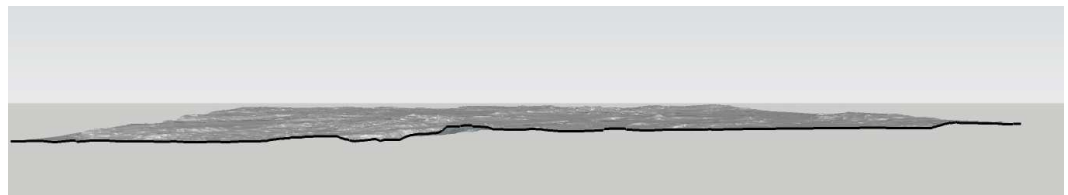
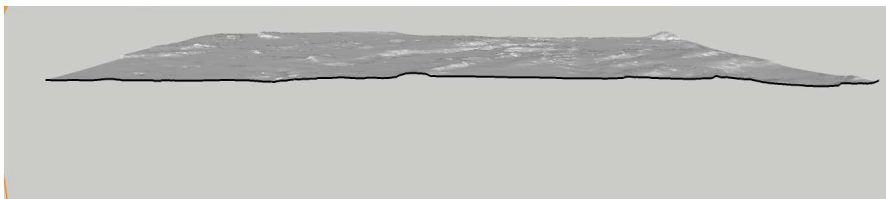


## Topography

The slopes are visualized on the 3D sketch 4. The scale in land gradient is small with rounded slopes. Lawns are slanted towards the pond. The area where the main sculpture is found have a rising and the elevation is divided with stairs or ramps.



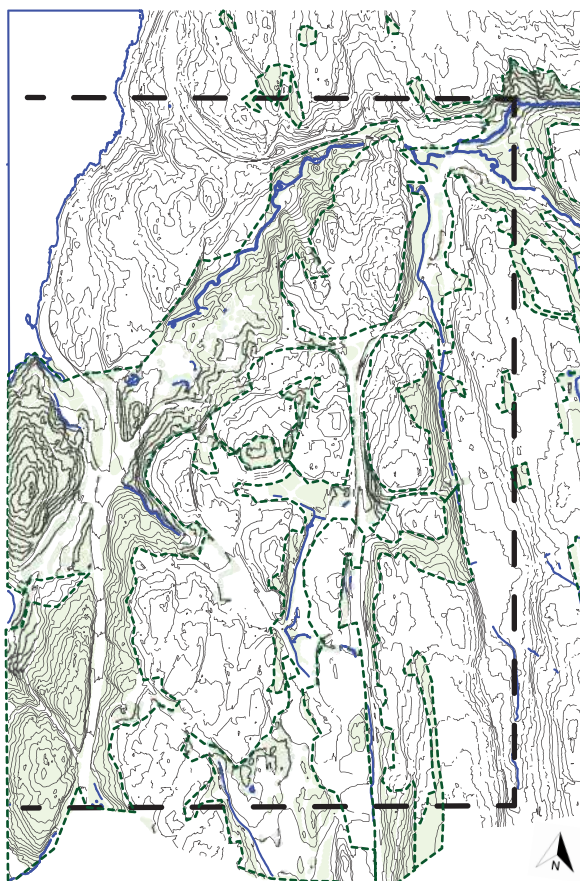
Longitudinal view makes the gradient more visual and the land usages in sketch 5. This shows us how the placing of elements are within the park and the opening between them. The longitudinal is taken from the center of the map. This is visualised in 3D sketch 3. The transversal view is taken from the center of the map.



Transversal view shows the low land rises in the slopes and how even the gradient is. This makes this park easy to use and to perform any physical activity. This is visualised in 3D sketch 3. The transversal view is taken from the center of the map.

## Water

In Holmlia it is the sea that attracts people in Hverfenbukta and Lijanskollen are those places and are located on the map 2. Path lies around Lianskollen and is popular for walking. Hverfenbukta is coastal sites where people come to lay in sunbathing and swimming in the sea. This place offers many possibilities. There are numbers of small creeks in the woodland and a river, Ljansriver that is created from two lakes, Skraperudlake in Skullerud og Gjersrudlake in Holmlia. The creeks from these two lakes are combined in Ljabrustreet.



Map 3

### Legend

- Forest
  - Contour lines
  - Water
  - Parks boundary
  - Analysis area
- m: 1:30000

## Vegetation

Vegetation in the park is constructed of the natural forest in the area. Natural progress is the style and there is excellent growing condition for trees. The combination of trees in the forest is mainly pines and leaf trees.

Map 3 shows two places in the park where construction design is in the Hverfenbukta and the green area in the centre. In Hverfenbukta is an old allée by the parking spaces. This gives an interesting combination with the natural style and an opportunity to experience something new. In the open areas, lawns are narrow and surrounded by a thick wall of forest. The forest that surrounds the pedestrian system has taken over and former viewpoints are overgrown. This natural effect is out of control and instead of giving comfort and security it provides enclosure. The trees and under forest vegetation have grown unhindered in all directions and preform walls and a roof in some places.



Map 5

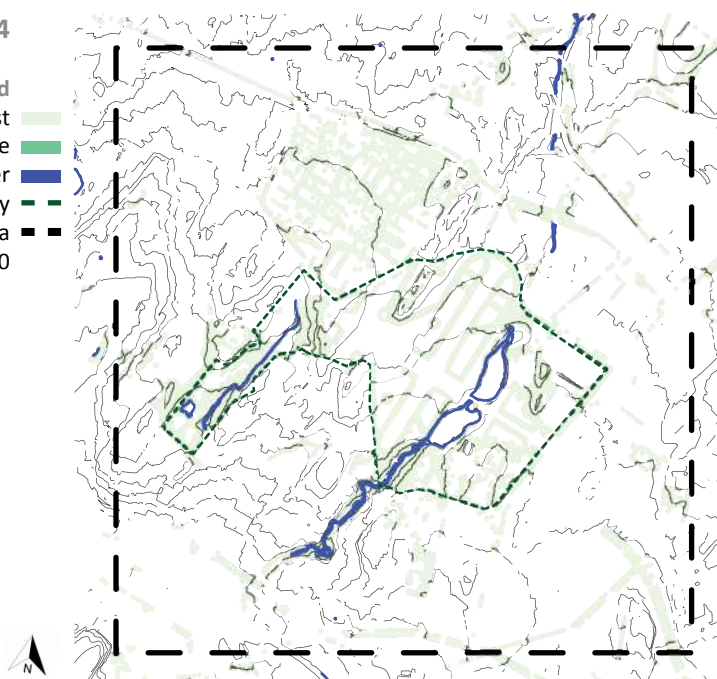
### Legend

- Forest
  - Contour lines
  - Parks boundary
  - Analysis area
- m: 1:30000

## Water

Map 4

**Legend**  
 Forest  
 Hedge  
 Water  
 Parks boundary  
 Analysis area  
 m: 1:25000

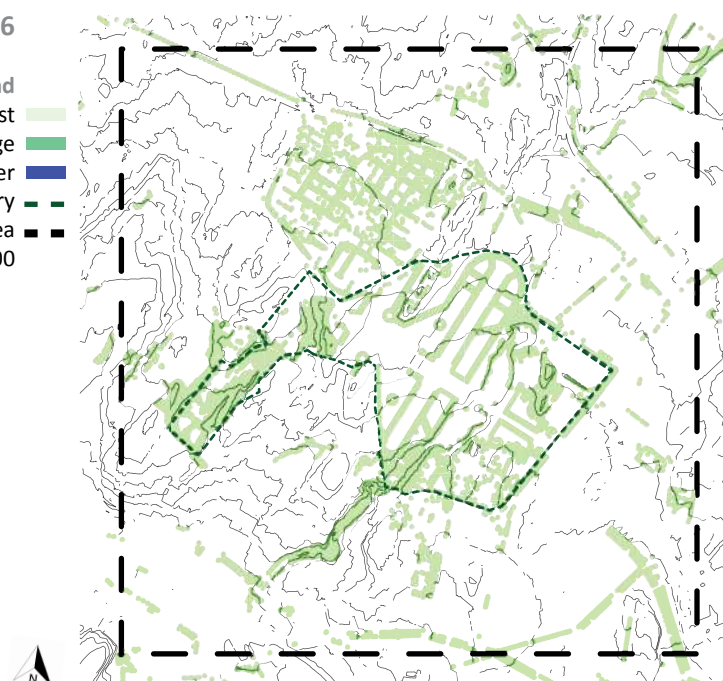


In Frogner park are ponds and fountains that is one of the attraction for people. The pond provides a calm environment and an area for restoration and relaxing. Frogner river runs in and out of the ponds and continue further down to the sea.

## Vegetation

Map 6

**Legend**  
 Forest  
 Hedge  
 Water  
 Parks boundary  
 Analysis area  
 m: 1:25000



The vegetation in the park is magnificent and there are big trees that stand in a line and allées. This is a distinctive characteristic of the park. Little shrub vegetation can be found around the steps towards the main sculptures. The summer flowerbeds are to the side by the main entrance and towards the sculpture platform. They are colourful, short grown flowers that are supposed to be in some sort of baroque style, but it fails. The grid and diagram that is used does not fulfil the standard of baroque summer flowerbeds. The rose garden is midway of the main axis. There is one type of rose in every bed. In closer view it looks like hydra-

tion was lacking, as was the fertilising. Roses need tremendous maintenance to be able to be at their best. I question whether they are properly cared for. Frogner park have always been a place that preserve all kinds of rare species of vegetation and other more common. This is mainly in the English park. In this park you can find very old trees that have been preserved. Another factor that characterizes in the park is the lawns that are large and rounded sloping.



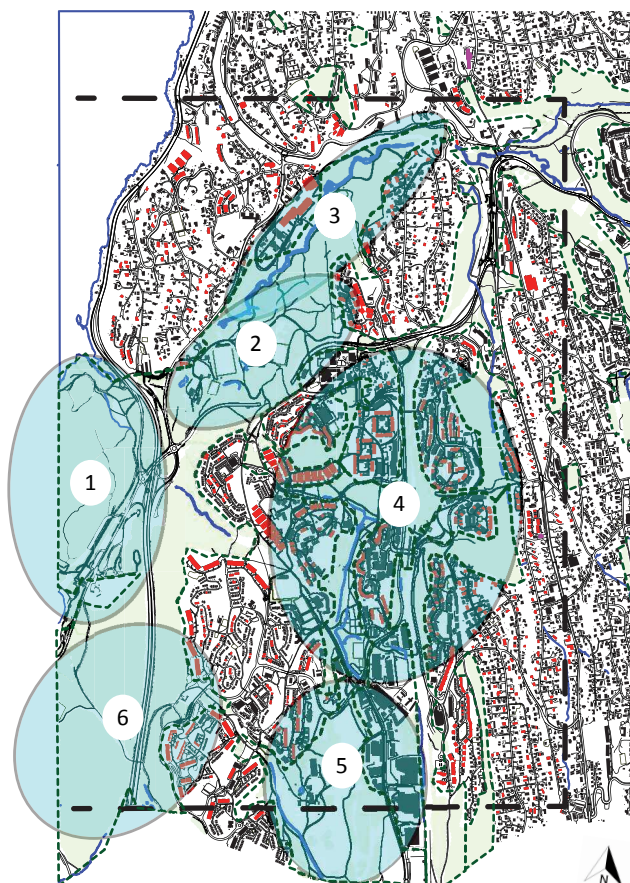
## Spatial analysis and viewpoints

In these analyses of the open green area the prospect – refuge theory will be tested to see if the area fulfils the basic needs for people and elderly people.

Map 4 shows open areas within Holmlia park and the existing viewpoints that were made.

**1. Ljanshill og Hvervenbukta** - A popular path lies around Ljanshill that gives an opportunity to walk around the hill and enjoying the view over Oslo fjord on one side and to be in woodland on the other side. The design in the area is a simple path with resting places regularly divided for the start on the fjord side. Then they seem to suddenly stop and vanish. By closer look the resting places are connected to former viewpoints. The view over the fjord is clouded by overgrown trees and bushes. This is a very quiet, friendly and relaxing path, but is much livelier during the summer. It's the most popular path for elderly citizens all year around. Most of them drive to this place. Few elderly walk all the way down from their homes. On the other side of Ljanshill, or on the shadow side in the woodland, the atmosphere is colder, both physically and mentally. You can literally feel it in the winter time. Resting places are missing and on the crossroads to the walking bridge and the tunnel, the signs are confusing, that is if they are still standing.

Hverfenbukta is the beach area in Holmlia. It lies next to Ljanshill. This is a peaceful area even when it is crowded with people and children playing, full of life and joy. The area swallows the noise, preserves the stillness and is great for relaxing. It gives this area a great dignity and is ideal to visit all year round. The design of this area is mostly in toilets and changing rooms. Former houses are used for design and artist gallery and café over the summer season. The parking place has an allée that indicates the way to the beach. This area needs some renewing, especially for springboard into the sea and the rating system down to the boat docks at the Ljansbruket. Hverfenbukta has a narrow view over Oslo fjord and nearby areas. This is an area that the elderly visit for sunbathing and swimming in the sea in the summer time. It is nice to come and sit down in the sand and listen to



Map 7

### Legend

- Forest
  - Houses
  - Water
  - Parks boundary
  - Analysis area
  - Spatial analysis
- m: 1:30000








the waves and seals and to feel the sea breeze on the skin and breathe in the smell of the sea.

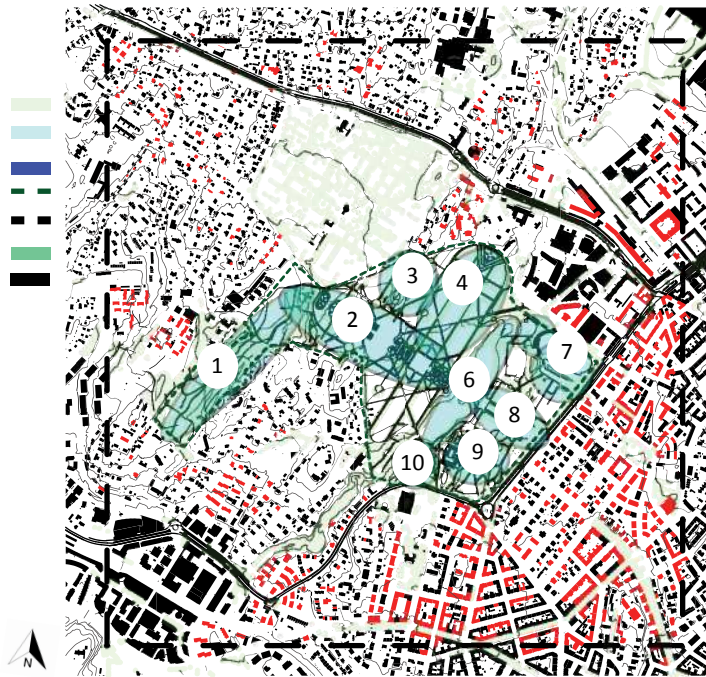
Both of these areas give a necessary security. Around Ljans hills are many small places to be at and have an overview over the path. It provides safety. Hvervenbukta is naturally divided and the forest gives back support. It is like being on the perimeter line and at the same time have a great overview. You can see who is coming and going and who is going to walk on the path around Ljanshill. Both of these areas are basically in accordance with the prospect – refuge theory.



Picture 16 Hverfenbukta

Map 8

**Legend**  
 Forest   
 Spatial analysis   
 Water   
 Parks boundary   
 Analysis area   
 Hedge   
 Houses   
 m: 1:25000



place is too difficult to view. The reason is that they lack space between them so each and every one can flourish. It would help if the human sculptures were spread around the park.

This is a place for happiness. If something is happening then it is here from the gate and up to the main artwork. This is where the immigrants come and play for money. They make all kinds of noise on the harmonica and play the same tune until they realise that it is not giving any money and then they change to something else just as boring. This means that there are least 3-4 in

The Frogner Park is divided into smaller areas which together create one completed area. It isn't possible to get into all areas because some of them have fences and you have to pay to get in. Thinking areas do not belong to the park any more.

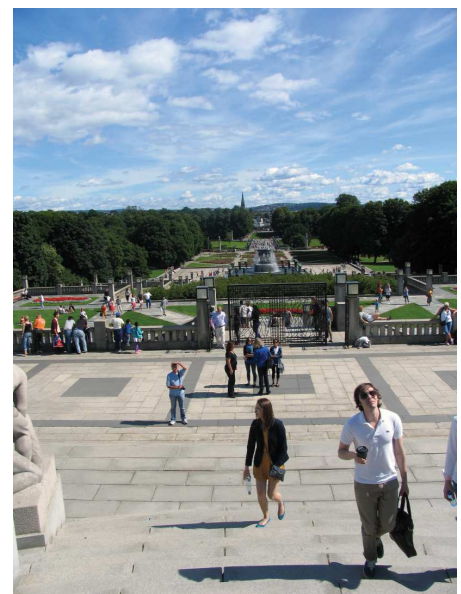
The division of the park is shown in map x8

These areas are:

**1. The English Park** – This part is designed in the English landscape style. This is the part where you can find values that are specifically related to instances of deciduous forests and calcareous meadows with rare plant species, but also fungi, insects and birds. This is a quiet place and relaxing and interesting to walk and take a closer look especially if you like plants. This is an area that is divided in smaller sections where the overview for every area is good. This area is in accordance with the prospect – refuge theory

**2. Vigelands Park** – This part of the park that is best known for the installation on sculptures made by the artist Gustav Vigeland and the design around it. The sculpture are placed on the bridge and on the highest viewpoint on the main axis. This is the first thing that is visible when entering the park through the main gate. There is a magnificent interaction between vegetation and art. Stiff and strict tree lines frame in the axis and lend dignity to the area. All this sculpture in one place is overwhelming. After a while you stop noticing and start to investigate something else. That is because this amount of sculpture in one

different places on the bridge. The noise is so loud that it is almost impossible to converse. This is negative for the park. This spoils the experience that is created by the sculptures and allées. This place gives the feeling of exposure but because of the crowd you don't feel unsecure. However, if the person or elderly was alone in the park, this area would be overwhelming, unsecure and scary. There is no place to hide. All lines are stiff and no hidden places to go to. This area is not in accordance with the prospect – refuge theory



Picture 17 shows the view over the park



**2. Ljansriver** - This is an area that lies next to Ljans river. The design is simple. Forest environment with a path. The path has a roof and has a forest wall on the left side and an occasional opening on the right side to the river. This can be relaxing and peaceful for the people who are familiar with the area. For an unfamiliar visitor it can seem enclosed and confusing or it can give the feeling to be lost in the woods. Resting places are needed to provide more qualities to this area. Especially for the elderly. Because this area cannot give an overview it is not considered to fall under the prospect – refuge theory.



Picture 18 shows the path in Ljansriver

**3. Hallager sports field** - Hallager sports field is a sport field space lays northwest of the centre and contains one of two of the connections down to the sea. In Hallager sports field you can find open field to practice ball games like football. The area can also be used for other kind of sports and activities if desired. Thick and tall forest walls surround the sports field but the fields are wide enough to prevent enclosure. Little above the sports field is a dog free space and another sports field. This is a place for people and seniors to play in. The path in this area could use more breathing space and openness. It is enclosed in parts and gives a shabby feeling. In the openings there is a possibility to sit near the perimeter line in the grass and get the necessary back support. In the resting places the back support is missing. But you will get the overview over the area. Therefore the area falls partly under the prospect – refuge theory.

**4. Ravenåsen** - This is the centre of the neighbourhood and is supposed to be a suburban area but looks more like a ghetto. Most of the service and shops are located here. The train and bus stations are here. On the north and the northwest side of this part is also a green open space, called Holmlia park. This is rather strange and confusing because it bears the same name as the park itself. This green

opening in the forest is used for celebrating the national day 17th of May and other big events.

This area is a quiet environment with a relatively small lawn that is framed in with a forest and apartment blocks. The forest frame is tall and heavy. The apartment blocks are tall and massive. This building mass that seems to fill up the space. This makes the scale between lawn and frame inconsistent and the lawn seems smaller. The area feels enclosed without any space for thoughts or imagination. The frame is overwhelming and the experience gives suffocating atmosphere. The perimeter line between forests, apartment blocks and lawn doesn't give any possibilities for hiding places or shelter. The individual is exposed and that gives rather uncomfortable feeling. Benches without any back support stand beside the pavilion and a pond in a neglected and poorly maintained area. See picture 18. The pond looks more like a swamp. There is a bridge over the pond. New playgrounds have been added since 2012. They include benches that do not have necessary back support. The one standing there is exposed and does not provide the security necessary.



Picture 19 shows the path in the lawn and the blocks.

On the south side of the centre is the sports- and swimming hall with a lawn. This area has been opened up. See picture 26-27 that where taken 2012 and 2014. I expect the sports- and swimming hall to



Picture 20 shows the playground next to the altoment garden.





Picture 21 shows the view up to the main skulpture

The viewpoints are up and down the axis all the way through the park and to the side. Se picture 22-23.

**3. Open space at the rear entrees** – This is a place with tourist shops and a window that sells coffee and ice-cream. Here you can find toilets but you have to pay to use them. Benches are nearby to sit down with the coffee and relax. This place is not designed to increase the pleasure of the area. This is merely a fixing to provide some service. This area is not in accordance with the prospect – refuge theory.

**4. Slekten** – Another place that is designed with large artwork, some kind of a gate. The lawn frames it in with tree lines that provide a feeling of security. People come to play, rest and to enjoy themselves. The lawns are large and give room for all kinds of activity. The atmosphere is peaceful, quiet and relaxing. The paths lie at the perimeter line and you can sit there on the grass and be hidden but with a great overview. It is also possible to sit on the lawn but there you are in the open without any back support. This area is partly not in accordance with the prospect – refuge theory.

**5. Frognebadet** – A swimming hall. Closed area and you have to pay to get inside.

**6. The Frogner pond** – the pond lies between the slopes. It is a design that makes Frogner river gather up and create a pond. The river flows further down into the valley and out to the sea. This area is calm and at the same time full of life. Ducks, swans and other water birds swim there and beg for bread. There is a hidden place on the left side of the bridge. You have to walk down to the pond to a platform that is round shaped and full of benches. This is a great place to be at for relaxing. But further down the pond, the bank is overloaded with vegetation. On the right side it is possible to go all the way down to the pond and sit on the lawn that surrounds it partly. This place is still. All noise disappears and the



Pticture 22-23 shows the pond and the bridge.



relaxation is complete. Even though you sit on the lawn the slope provides back support and you feel secure.

This is a created environment that provides calmness. You can find hiding places there. The entrances down to these places are hidden. The experience is exciting and something unexpected. The view is magnificent. Sensitive, beautiful and calm. Ponds - The design provides the areas where you can sit down and watch the birdlife. On the left side of the bridge it is possible to walk down to a circular platform that is framed in by bushes, a shelter. The platform contains benches that are evenly spread around it. The bridge is lively and contains monstrous noise from uneven musicians who produce the most noise in hope of earning a few dollars. This small hidden place completely escapes all sound and provides a resting area. This place is in accordance with the prospect – refuge theory

**7. Frogner tennisklubb** – You have to be member to get in.



Picture 24 shows the opening and the cutback on the trees.

be in efficient use. The change in the green area is from or enclosed not used area to partly open not used area. Or so it seems.

A little further south of the sports and swimming hall is an allotment garden with a lawn. These are small crop fields that residents living in the apart-



Picture 26-27 shows the entrance to the swimming hall. The picture above is from 2012 and the below is from 2014.



ment blocks can rent from the municipality to grow vegetables. This is a very popular place for the elderly, especially the men. The waiting list for a growing space is long. The experience when walking through the area was joyful and it was exciting to see what was being cultivated. This place gave an opportunity to socialise and to make new friends and acts as a therapeutic garden. There is also a possibility to walk around this allotment garden and enjoy the view over the gardens crops and flowers. This gives a relaxed atmosphere and invites you to have a seat and enjoy yourself, there is if there were any benches. This area is not used to its fullest potential. This is an ideal place for elderly citizens. In this area is a kindergarten, creek and some vegetation that is growing and developing. Some openings have been made in this part too, see picture which were taken 2012.

Because of this partly opening and partly cleaning in the area and neglect which is still visible in the

area. This open green area doesn't fit the prospect – refuge theory. There are still some dead areas that give this area this ghetto feeling. The opening should have been done all the way and the open lawn should have been divided in smaller sections to create places that gives the prospect – refuge feeling. That would draw elderly out to be in the open area. It would give the necessary security to choose to sit down and enjoy them. The people and elderly on the picture are going from A-B without a chance of a resting place.

Picture 25 shows the playground next to the allotment garden.



**5. School area** - The primary and secondary schools are situated here, as well as a sports field for the school and other activities. This place looks like a ghetto. The buildings are raw and the concrete audience platforms are shabby. The negligence is everywhere. One wants to walk through this area as fast as possible. Street lights lean in all directions and almost none of them stand straight. The new playground on the field doesn't quite fit in the area. The benches beside the playground totally lack back support and the back is turning to the path, which makes people feel vulnerable and exposed to possible attacks. Old and worn benches and facilities mixed with brand new benches and facilities somehow increase the ghetto feeling. The area is partly divided into smaller sections, especially the sports field area. On the other side of the playground is a large and undivided, open lawn, which creates exposure and insecurity. This open green area doesn't fit the prospect – refuge theory.

Picture 28 shows the ghetto bench.





**8. Frogner main gates** – The main entrance has the same design as the axis. It is framed with a magnificent oversized gate. In front of the gate is an asphalt lot which is meant for tourist buses. This sight is not welcoming to pedestrians. The tourist buses stand in the way and block the view to the gate. When you walk through the gate you are faced with spectacular interaction from the grand artworks and strictly planted vegetation. Because of the trees' height and the strict placement that the trees form, the vegetation actually softens up the other areas that are in reality overloaded with sculptures. This is the toning effect that the vegetation is capable of. The area is in balance and therefore it is possible to walk up the axis without feeling exposed and insecure from other facilities and sculpture. This place is not in accordance with the prospect – refuge theory.



Picture 29-30 shows the gate and the viewpoint framed by strong tree allé.

**9. Oslo museum** – On the left side of the gates is a popular playground. This is usually crowded with families and children playing. There are a few benches there, a bit too few. This is an area that is in accordance with the prospect – refuge theory.

Further into the park, past the oldest part, where you are met with scattered trees, you find Oslo Museum. The trees on the way are comfortable to be around. They provide an overview or rather an underview of the area. Relaxing and embracing. This gives a great sense of security. This area is in accordance with the prospect – refuge theory.

**10. Vigeland museum** – A museum that contains the park's history and more.



**6. Søndre Ås farm.** - t is a farm that lies within the suburban area. It is an experiment in combining the rural society and the capacitor residential areas. Therefore are open spaces with fences to keep the animals within for the residents to watch and enjoy. Around the fences are roads that are used for the farming and as a path. It creates a calm atmosphere. The path is framed in with forest on the left side and fence on the right side. Resting places are missing. This area has all the potential to fit the prospect – refuge theory, and does so to an extent.

**7. Mastemyrhills** - This is the other connection to the sea. The design was to focus on the path and the walking bridge that lies over E 18. The path is partly carved in the cliff and down to the bridge. On the other side the path lies through the woodland. The vegetation is overwhelming and creates a wall. It is not possible to see into the woods and no possibility of seeing the animals in the woods. The forest has grown freely and all viewpoints are missing. The design is not universal and are missing necessary facilities. For example, there are no resting areas on this path. This area does not fit the prospect – refuge theory.



Picture 31. Søndre Ås farm.





Picture 32 shows the lawn between tre rows.



Picture 33 shows prespectiv to one of the skulp-  
ture framed inn by the lawn between tre rows.



Picture 34 shows prespectiv to  
the artwork at the end of the  
park rihgt before you enter  
Slekten. As you can see the  
main axis is held all the way  
throug tha park.



## Residential areas with elderly people

Map 5 shows the age distribution of the elderly citizens from the age of 65 – 99, live within in Holmlia. There are no seniors home in the analysed area. But there is one service- and activity centre for seniors. This map shows where elderly live. It is expected that they live at home and are able to take care of them self or have a light support from the home serves that municipality operates. This will give more information on the number of elderly people that can be physically active in the neighbourhood.

The red houses are the resident places where the elderly live. They are almost equally divided in the neighbourhood. One area seems to stand out and that is Ravenåsen. This tells us

where the neighbourhood renewals will take place over the next 15 - 25 years. It is expected that young people will buy these house properties. This also tells us where children will be in the neighbourhood



in the same timeframe. This gives the municipality an opportunity to adjust the green environment for each age group.

## Age groups distribution in the neighbourhood

To find out the distribution by age group in the neighbourhood the elderly were divided in age groups and mapped:

65 – 69 – map 6

70 – 74 – map 7

75 – 79 – map 8

80 – 84 – map 9

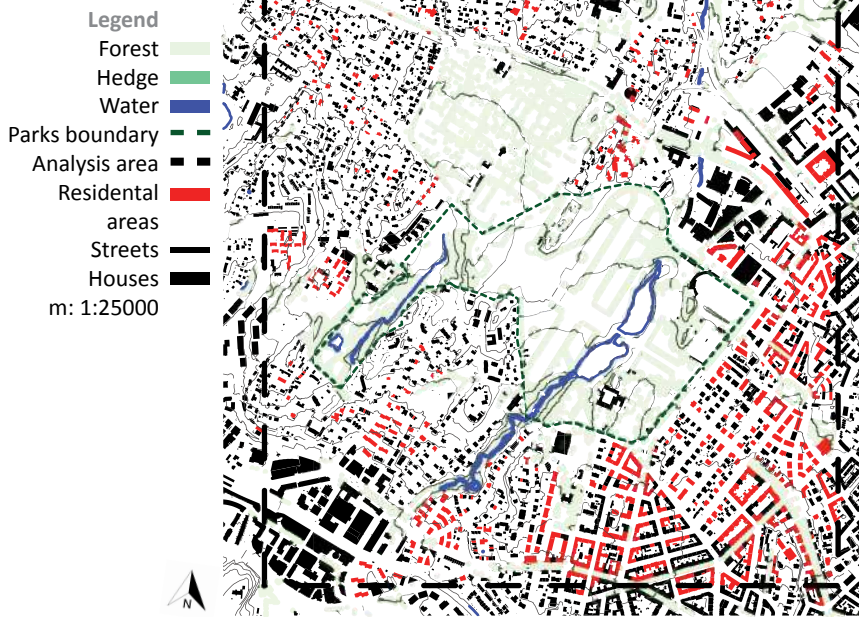
85 – 89 – map 10

90 and over – map 11

As shown in maps 11 - 21, the majority of seniors are in the age group 65 – 69. The number of elderly decreases as people get older. Around age group 70 – 74, the number of elderly has decreased by 1/3. It is not as dramatic a reduction in the age group 75-79. Again, a significant reduction is in the older population aged 80-84. The ratio of elderly remains fairly constant for this age group 85-89. Then the number decreases slowly when they reach the age group 90 and over. This tells us that elderly citizens who are physically healthy and in mental balance live longer and therefore can be physically active at the age of 90 and even older. This brings up the question of why the municipality has not made all green areas suitable for all kinds of people in all age groups. After all it is their official duty to do so.



Map 10



The map 10 shows the distribution of the elderly citizens from the age 65-99+, living in Frogner. Most of the seniors live in the area that is considered to be Frogner and Majorstue, few live in Skøyen, Borgen and Blindern. Frogner and Majorstue are the oldest parts of the neighbourhoods, which can explain why the elderly citizens live there. It can be expected that the elderly have bought their apartment/house in their younger years and therefore still live there. Sufficient renewal has not occurred yet.

The service apartments for the elderly are placed in these neighbourhoods. Two of them are

within the analysis area; one is just outside of it. Two of them are in Majorstue, Amalthus and Rosenberg, Bogstadveien apartments. One is in Frogner, Frogner – Skillebekk senior-Centre. The one in Frogner is closest to the park. The other ones have a relative longer distance (IO. NO 2012).

Retirement homes are Fargerborghjemmet og Frognershjemmet in Frogner. In Majorstue there are Majorstuden bo- og behandlingssenter og Uranienborghjemmet. All these retirement homes are marked on the map.

## Age groups distribution in the neighbourhood

To find out the distribution by age group in the neighbourhood, the elderly were divided into age groups:

- 65 – 69 – map xx
- 70 – 74 – map xx
- 75 – 79 – map xx
- 80 – 84 – map xx
- 85 – 89 – map xx
- 90 and over – map xx

As can be seen in map 12-22 then the majority of the seniors in the age 65 – 69. The number of elder-

lies decreases as the age grows. Around age group 70 – 74 the number of elderlies have decreased by 1/3. The reduction is not as dramatic in age group 75-79. Again, a significant reduction occurs in the older population aged 80-84. The ratio of elderlies remains fairly constant for the age group 85-89, but then the number of elderlies decreases slowly when they reach the age group 90 and over. This tells us that elderly citizens who are physically healthy and in mental balance live longer and therefore can be physical active at the age of 90 and even older. This raises the question why the municipality hasn't made all green areas suitable for all kinds of people in all age groups? After all, it is there official duty to do so.

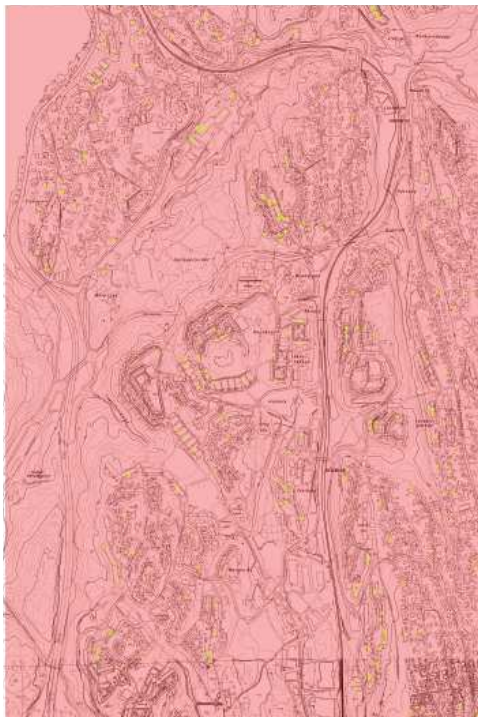
**Map 11**  
65-69



**Map 13**  
70-74



**Map 15**  
75-79

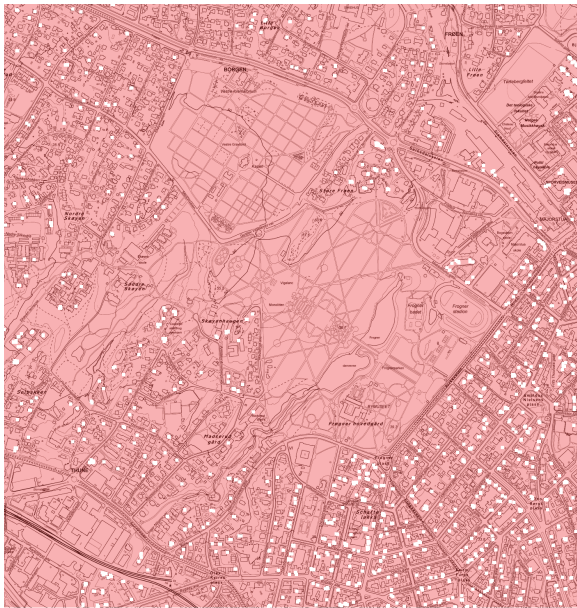


**Map 17**  
80-84

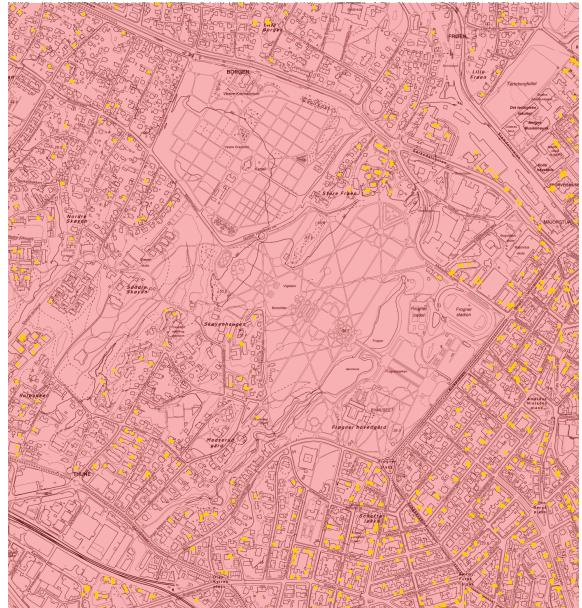




**Map 12**  
65-69



**Map 14**  
70-74



**Map 16**  
65-69



**Map 18**  
70-74



**Map 19**  
**85-89**



**Map 21**  
**90 and above**





Map 20  
65-69



Map 22  
70-74

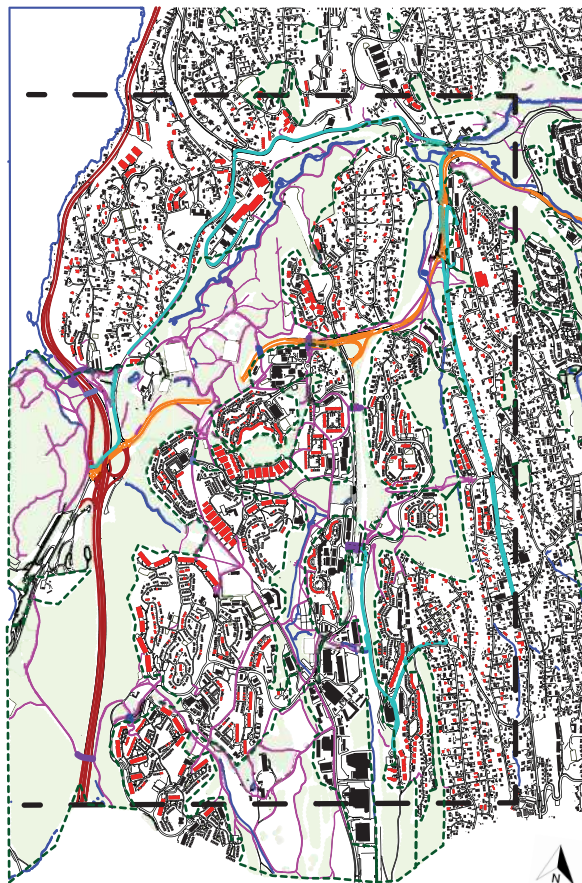


## Circulation

The pedestrian system in Holmlia was incredibly important in the design and the main concept was to offer the individual to walk in the neighbourhood almost without having to cross any roads. This transportation system connects to other larger pedestrian system in Oslo and is supposed to connect other neighbourhoods in Oslo together. The idea was to create an environment that was free from all the pressure from traffic and other harassment from the merchant's environment and safe for children to play in (Brochmann ; kommune 2011; Torfinn 2010; VIDAR 2009) This is visualized in map 23.

Map 23 shows the pedestrian system in the park and

neighbourhoods. It is a network that lies through the forest, open area and between houses. It connects open area and neighbourhoods together. A few pavements can be found beside the collection roads. Their purpose is to connect to the paths in the forest. All crossings over train tracks, E 18 and R 155 are solved with walking bridges or tunnels. Collection streets have walkways and in some cases traffic lights.



Map 23

### Legend

- Forest
- Contour lines
- Water
- Path
- Pavement
- R 155
- E 18
- Residential areas
- Houses
- Parks boundary
- Analysis area
- m:1:30000

The most popular paths are shown in map 23. These are paths where you can find the majority of people when walking for pleasure. The intensity is greatest around rush-hour when people are traveling to and from work. It is very clear when the school starts and ends. The paths are overflowed with youngsters. Seniors are seen walking during daytime to dinner time, or 17:00.

The design idea for the circulation is basically good and seems to have good function in a way.

The overall condition of the paths is in rather poor shape. The ones that cross the woods are rippled and uneven. That is because the tree roots are getting bigger and take more space in the ground. That causes the asphalt to crack and lift and to create an uneven surface that again creates a great risk of falling for the seniors. The woods that surround these paths have grown wild without any visible control. The woods create walls and in some parts roof. The insight to the woods and the life within is hidden. There are no possibilities for an overview or under view to navigate nor are there overview signs on the way that can give information about where you are or if you are on the right path. The surface of the pedestrian system can vary: from gravel to asphalt. Maintenance on the pedestrian system is in an unsatisfactory condition. The pedestrian system that



Picture 35 shows tunnel under E 18



Picture 36 shows bridge over E 18



Map 24



**Circulation** –The pedestrian system in Frogner is in very good condition in Frogner, Majorstue, Frognerpark and Blindren and on all paths that lead to the neighbourhoods Skøyen and Borgen. Skøyen and Borgen have more unsecular path system. The map xx shows the pedestrian system in the neighborhoods and how they are connected to the park. It is a network through the streets and other green areas and connects them together. Most of the pedestrian system is paved and in the

green areas and Frogner park are paths. All crossing over tram tracks and R 161 are slowed with walkways and traffic lights. The most popular paths in Frogner park are shown in the map. This is the paths where you can find the majority of people and elderly when walking for pleasure. Seniors are seen walking during daytime to dinner or to kl: 17:00.

These pavements have different width and surface material from being gravel to asphalt. There are sidewalks along the street and are continuous in Frogner, Majorstue, Frogner park and Blindren. The pavement system has more effect designed in Frogner and Majorstuen compared to the other districts. There are sidewalks by the state and local roads. The pedestrian system in the areas that were available were generally in a good condition and comfortable for walking.

Where there are residential streets in Skøyen and Borgen, sidewalks are lacking in some places and the elderly have to walk on the side of the road. This causes insecurity for the elderly because they have to rely on drivers seeing them in good time so that their reaction time for breaking becomes as short as possible, not more than a tree sec. During winter these lanes become tighter because of snow derbies, which make them very dangerous.

The readability in the neighbourhoods is good and easy to follow the grid system in Frogner, Majorstue, Frogner park and Blindren. They have good signs and are easy to read and navigate.

It is always a little bit more difficult to read the neighborhoods that have irregular street systems like Skøyen and Borgen. An irregular neighbourhood needs to have better signs and oversight maps to help with navigation.



Picture 37-38 shows the Walkways, traffic light and elderly crossing over the street.



lies in and around Ravenåsen has one connections point that binds most the other paths in the neighbourhood together because this is where the centre of the neighbourhood is. It is around the allotment gardens. What the design is lacking is that the paths are not designed for everyone. The universal design is missing.

The paths that lie between lawns and houses have similar kind of surface problem. They have holes and have begun to fall apart. Some have clear directions, but others are just as confusing as the one in the forest. Then it is the one that lie between the houses. You need to be familiar with the neighbourhood to navigate. The pavements lies away from the streets and shops at the back in the neighbourhood and the view are fences and vegetation from house gardens that is used to block the insight. I found out that all paths have names and these names are in no connections with the street names or the environment. The naming is based on history that was perverse-ly in the area. For the one that is unfamiliar with Holmlia and the history this gives no information for navigation. The experience is enclosed confusion between houses. The path surface is not inspiring for seniors to make the choice to be out walking.



Picture 39-40 shows the damages in the asphalt.

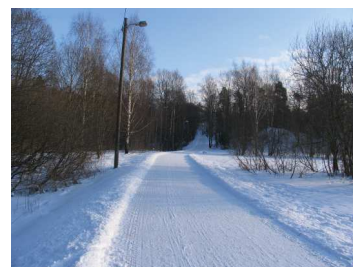
There are two paths that lie to the sea. One in Hallanger sports field area and the other is between the Mastemyr hills. These are very steep slopes hard for elderly to use:

1. In Hallanger sports field the path starts by the walking bridge that lies over Ljabrudigalen and down to the sea. It is too steep for the seniors and is dangerous over the wintertime when it is freezing and icing. The gradient is at least 1:50. The elderly spotted walking during the year of observation needed to crawl up the path especially over the winter time and spring before the winter gravel is swept up. Going down the elderly is in constant danger of sliding in the ice and falling. In spring time sliding in the gravel isn't better. Resting places are few and it is

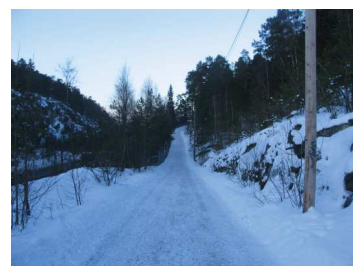
to long distance between. The path is simply not design with universal design standards. That gives the elderly tremendous difficulties to use this connection to walk to the sea. An elderly in good physical shape can easily walk this distance and in the summer time it is priceless to be able to walk down to the beach and swim in the sea.

2. The path that lies down to the Mastemyr hills is steeper than in Hallanger sports field. It is partly carved in the cliffs and seems to be almost impossible to change in usable sloping for seniors. I didn't see any senior using this path and very few people used it general. The hardest part is before you enter the bridge over E18. After that it is more sloping on the way down to the sea.

Picture 41 shows the way down to the sea in Hallanger sports field



Picture 42 shows the way down to the sea in Mastemyr.



The path that lie around Lianskollen is unclear when the fjord view stops and the signs didn't help with navigation. They were unclear and twisted. It was impossible to use them for directions especially in the crossroads or to find in which direction the bridges over E18 were. Visitors have to know the area or have a map with them.



Picture 43 shows the path in Ravenåsen



The park is readable and it is easy to find the way forth. "To get lost" is difficult in the park. The quarter system is easy to navigate. The park has oversights maps with all entrance. The design on the map needs to be the same on all maps. This is something that is lacking. It doesn't on the navigation but it creates an inconsistency. The design for the signs is not according to standards for the visually impaired. The background colors are red-brownish and dark green and have small white characters.

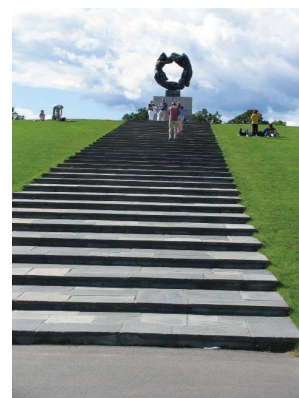


Picture 45 shows one of the signs. Notes how small the images and letters are.

The slopes in the neighbourhoods and Frogner park have very little gradient and are considered to be mild slopes. The solid lines from the baroque period in the parks design leads the people and elderly systematically through the park in a constructive way. It is intended that people follow the form theory that is straight and that they experience each area for themselves and what the area has to provide, whether it is pleasure or relaxation. When you get past the strict designed part and get to the museum and the English landscape park the curved and rounded lines take over with more softness. The general condition of the pavement is acceptable. Curb stones and sidewalk ledges should not be higher than 15 cm so it is easy to get up and down. This should be the same height as for the rises for steps. In a crowd the curb is not visible and can therefore create a risk of falling.

**Steps** - There is a considerable amount of steps in the middle of the park. This is to get people up the height difference that between the main ground and up to the main sculpture. This is an older design. Measures that were made on all the steps in the park show that the rises on the stairs differ and vary from about 3 – 4 cm or from 14 – 18.5 cm. The height difference can be traced to that the soil did not have necessary compression when laid out and the water drain system is in some way inactive. This causes the gravel to slide out and away from the elements they are supposed to support. In this case the steps. The sinking differs from platform to platform. This height difference in the rises makes it harder for elderly citizens to walk up and down the stairs. Sud-

Picture 44 shows the walking stairs.



den changes in rhythm when walking upwards can cause the elderly to trip on the step's edges and fall. Especially when there is no railing to hold on to. This also applies when walking down the steps, an unexpected longer gap down to the next step can lead to that a person loses balance and falls down the stairs. There are diagonal ramps beside the steps on the right side. These ramps are designed to make the area a universal design for people that are physically disabled or have reduced mobility. In a few places are 2 – 3 steps used to take the height difference. This is unnecessary and should have been slowed with a ramp. Walking stairs are found in the park. The design does not have a correct ratio between rises and steps. The steps are too small. When walking you always have to use the same foot for the rises. This makes the stairs incredibly hard to walk, especially for seniors. This gives a tremendous stress on one foot and can lead to that the elderly feel exhausted.



Picture 46-47 shows the stairs.

**Signs** - Within the park there are many models of signs in different colours and shape which are supposed to help to guide us around and find the direction to our destination. It is assumed that everyone knows the area well and understands the variations in the names that are written on the signs. This is sufficient for those who live in there but incomprehensible in every way for those who are unfamiliar to the area. Many of the signs within the neighbourhood and beside the pavements were skewed, with taggings or hidden in vegetation. Some have missing letters and were therefore unreadable. In the centre was an overview sign that pointed in all directions but no overview map for clarifications. The sign are for those who live in the area, not for visitors who want to come and experience the park. The signs in crossroads are very unclear in which way they were pointing. Often they don't point to the paths you are supposed to follow. Some of the signs were special design for this neighbourhood. This is the signs that have the names that are related in Holmlia history. The base tone is blue with silver letters. Overview signs are missing and that increases the insecurity and gives a great confusion.

**Stairs and ramps** - There are few stairs in the park. Stairs are found in the centre of Holmlia. These stairs have correct ratio between risers and steps. They are comfortable for walking and have handrails on both sides for support if needed. Ramps lay beside the stairs and are in same quality as the stairs and easy to walk in right gradient 1:20. Both stairs and ramps are of universal design.

**Resting places** – There are limiting resting places in Holmlia. The center has one that is mainly designed for the exchange station. Along the main pavements are resting places in poor shape irregularly distributed throughout the park. This applies to all open areas and paths.

Tough's benches that have back support for vegetation are neglected have not been maintained for years. The vegetation has either taken over or is in a rather poor shape because of a visible neglected maintenance. Viewpoints are missing because the vegetation has grown freely. The only reminder of these former viewpoints are benches that seem to be turning in wrong direction, see picture xx – xx. Most of benches found in Hallanger sport field and have no function. Some are old and are turned in direction with no meaning. I can't image why someone wants to stare at the forest wall instead of viewing the people walking by or people playing ball games. The resting places in Ljans hill by the sea are neglected and the view over the fjord is overgrown by the



Picture 48-52 shows signs here and there in Holmlia.



Picture 53-54 shows resting areas in Holmlia. One new and one old.



vegetation. The design seems to be bench with a back support, garbage can and viewpoint. There was a function in this design before the vegetation took over. Some of the viewpoints are magnificent and some gave opportunity to watch other people. It is a shame that you cannot utilize them longer. There is an overall lacking of a resting places in Holmlia park.



**Ramps** – All ramps in the park have a right deficit.

**Resting places** - The benches in Frogner Park are overall comfortable to sit on and give good back support. Benches have armrests, which make it easier to stand up and the height is right. The benches are placed with the thought to have something to look at, whether it is in more crowded areas or for relaxation. In most places the benches are in good condition but there some benches which are hard to find

in between the vegetation and can therefore not serve their purpose. There was only one place where there was an absolute need for more benches, that was SW of the entrance. It is clear that the area has been restructured recently. It can be seen on the vegetation, which is relatively young. The stair platform and below the stairs need benches where it is possible to sit and enjoy watching the new planting.

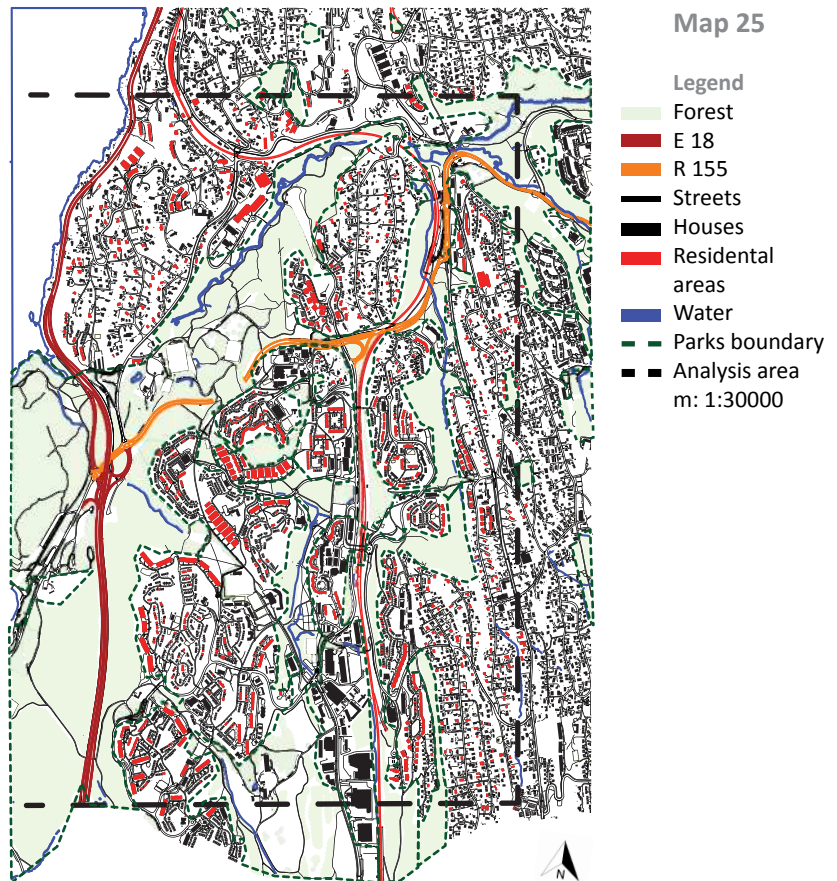


Picture 55 shows resting areas in Frogner.



Picture 56-57 shows resting areas in use.

## Vehicular access



The map shows the road system in Holmlia. Main traffic roads are the state roads and collection roads. The main traffic is on these roads. The private roads lie in between the residential areas. E6 is the largest hindrance for moving between areas within the park. Overlapping bridges and tunnels are used to solve this problem. You can hear deafening traffic noise when walking over the bridges. On the collection roads are pedestrian crossings and traffic lights. The collection roads bear the most traffic, during the rush hour with associated noise, but are quiet otherwise.

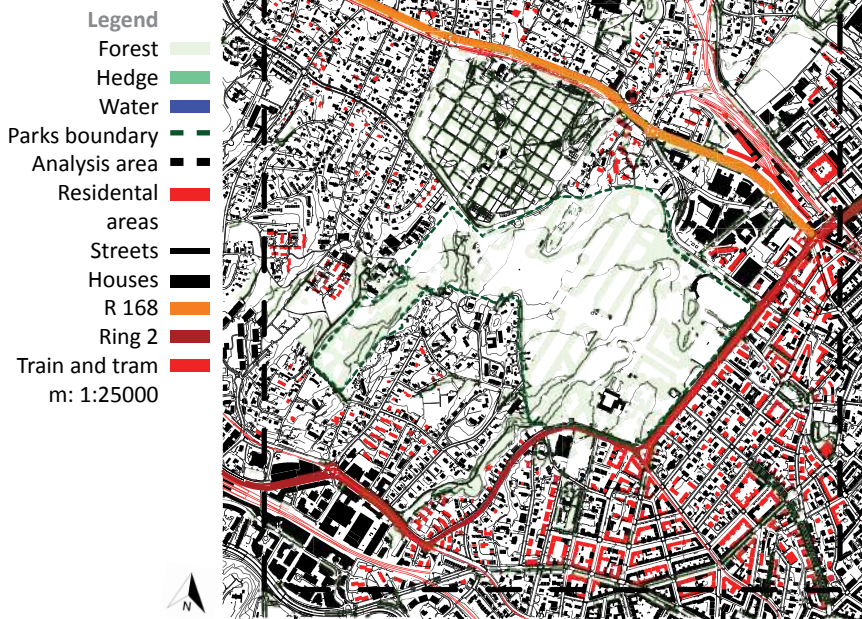
**Vehicular access** - Public transport can increase the usage of an open green areas or the forest and help those that have reduced mobility. The main public exchange station for busses and trains is in Holmlia's centre. There the exchange takes place in the public

transport to get between areas within Holmlia. The design is grey and sterile. Benches are mounted on the walls. The material is grey concrete and black steel. Light posts have a form of flowers to give the place some green feeling. It is uncomfortable to sit there. The exposure is overwhelming.

It is easy to get to Holmlia by private car, but there is a shortage of parking spaces. It is possible to find one parking building in Holmlia centre. That one is mostly for the shops and service. A parking building for public to use is a good distance away from the centre, it is Park Smart, which lies by Toppåsveien, see the map (maps 2012). There are also good parking spaces by Hvervenbukta, though it can be a problem to find parking spaces during the summer time due the population for the bathing area. Map 13



Map 26



The map 26 shows the road system like it is in Frogner. The main traffic roads are the state roads, R 161 and collection roads. On these collection roads the traffic is heavy and constant. These roads are also the biggest hindrance in the neighbourhoods. Pavements, traffic lights and crossings go together. The collection roads have heavy traffic during rush hours but are otherwise quiet. It is important to have pavements and lighting on the local state and communal roads, especially for people and elderly who are walking in the traffic. Traffic lights have long enough time so that the elderly can cross the street.

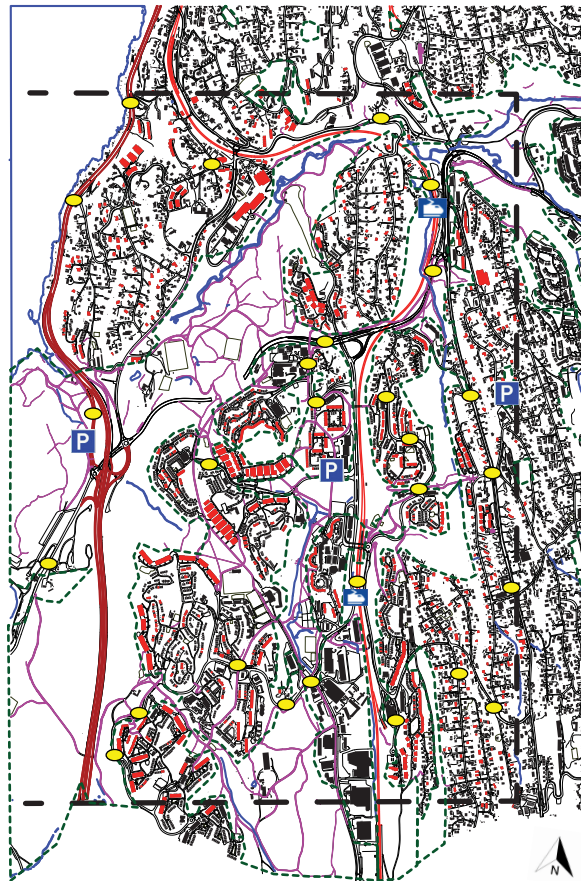
**Vehicular access** – Most of the public transportation system is in Frogner, Majorstue and Blindern. The stopping stations are on Kirkeveien, which also serve Frogner Park. This is the main road for those who live further away in Frogner and Majorstue. There are also good connections to the park by Skøyen and Blindern. Those who live NW of the park can use the

stations in Borgen. It is rather easy to get to the place with your personal car in Frogner and Majorstue. It is considered harder to do that in Skøyen, Blindern and Borgen.

Parking spaces around the park are limited. The maximum period that you can park a car is three hours. Parking spaces along streets in Frogner and Majorstue are tight. Borgen is the only place where it is easy to find a parking space.

Parking spaces are provided in three places by the park, as marked on the map. One parking house is in Skøyen, Sameiet P-house. One is in Majorstue, Colosseum Parking Q-Park. It is intended that people use the public transport. This is to reduce pollution, noise and particulates. The noise in these neighborhoods is indirectly disturbing.

## Public servis



Map 27

### Legend

- Forest
- E 18
- R 155
- Streets
- Houses
- Residential areas
- Water
- Parks boundary
- Analysis area
- Bus
- m: 1:30000

### The schedule:

**Bus:** From all places it is 15 minute waiting for the next bus. These are buses number 77, 79, 80, 119, 77B, 80E.

The bus stations are usually one post with a schedule table.

**Train:** Holmlia's train station lies in the centre L2 L22 L2X, the local train arrives at 30 min intervals, for other trains it is one hour.

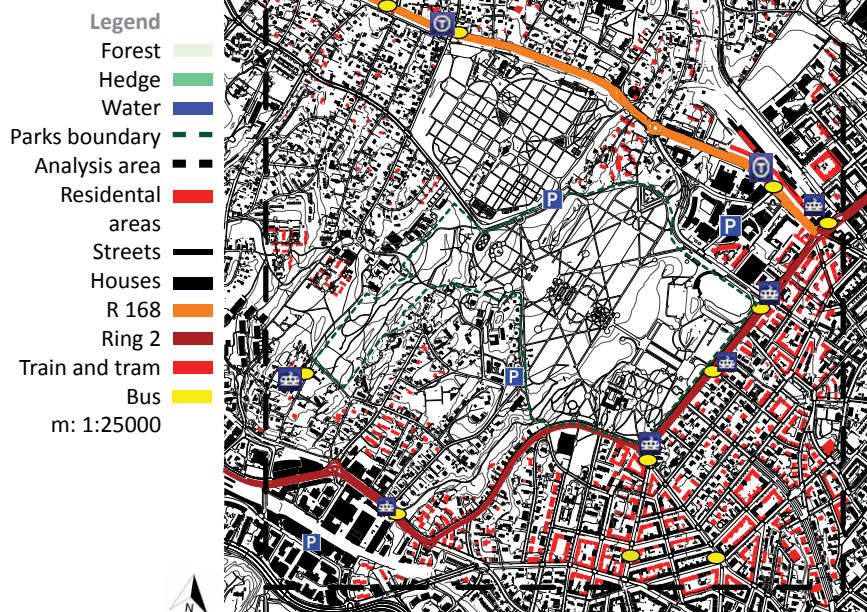


Picture 57 shows the train and busstation

The public transport comes very regularly and the waiting time is rather short. The public transport system seems to be very functional.



Map 28



### The schedule:

#### Bus:

Sørkedalsveien 28, 45 and N2 every 30 min.

Slemdalsveien 22, 25, 46 and N12 every 30 min.

Krikjeveien 11, 12, 19, 20, 28 and 111 every 20 min.

#### Bus and tram:

Kirkeveien - In front of the entrance of the park 12, 20, 112, 156 and N12 every 20 min.

Halvdansvartes gate 13, 20, 31, 121, 129 and 131.

**Subway – Stops** by Sørkedalsveien train 2 and 5, and by Slemmedalsveien train 1, 2, 3, 4, 5 and 6.

The public transport comes by very frequently and has a short waiting time. It seems like the transport network is functioning in this place.



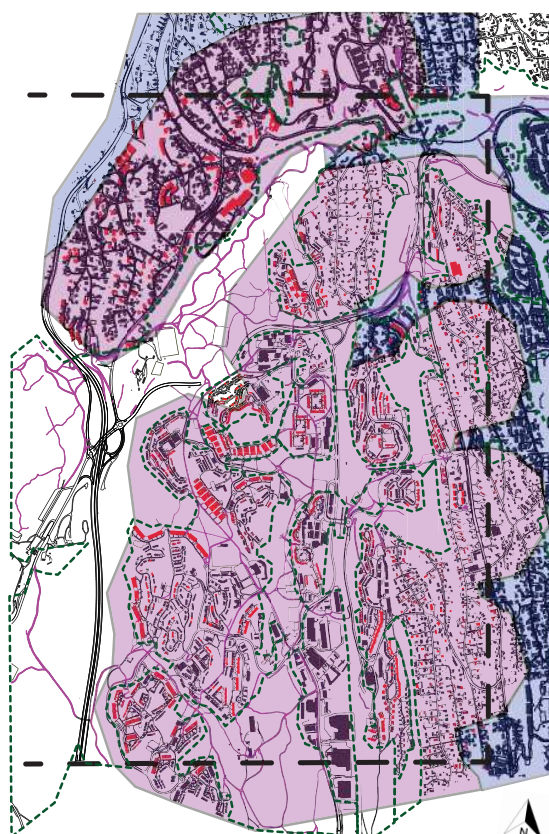
Picture 58-59 shows the tram and busstation



## The distance to the park

The path system in Holmlia gives an easy access to an green area within the park. These maps show the distance from the seniors residential to the green areas. Map 15 have tha r. 300 m from the center of each ring. Map 16 have tha r. 600 m from the center of each ring. Within the analysed area the longest distance to green area is 600 m. A resting place need to be on the 600 m way to give the senior a chose to experience the feeling to be able to go to the park.

**Service within the park** - Services can be found within the centre and in Hvervenbukta, such as shops, companies and other services, i.e. a health care centre. There are shops that sell design products in Hvervenbukta. Other services can be found during the summer like for example cafés and toilet facilities.



Map 29

### Legend

- Forest
- Distance  $r=300m$
- Vehicular access
- Houses
- Residential areas
- Water
- Parks boundary
- Analysis area Distance  $r=600m$
- m: 1:30000

## Serves within the park

Toilets can be found in Hvervenbukta. There are two of them and they are open during the bathing season at summer time.

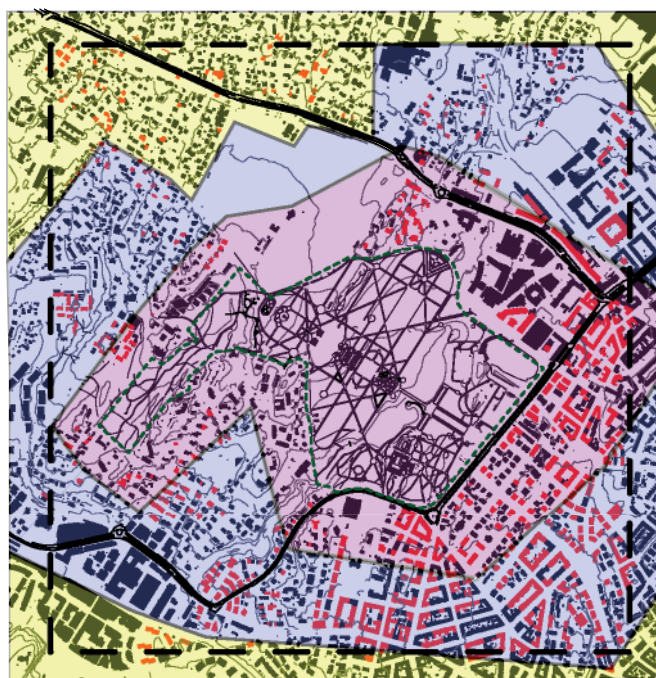


Picture60-61shows the servis above is kaffé that is open during the som-mer sesaon and below are toilets that have sommer opening.





## The distance to the park



Map 30

Legend

Forest

Hedge

Water

Parks boundary

Analysis area

Residential

areas

Streets

Houses

R 168

Distance

r=300m

Residential

houses

Distance

r=600m

Distance

r=900m

m: 1:25000

**The Distance to the park** - This

map shows the distances to Frogner Park from residential areas:

300 – 400 m

500 – 600 m

750 – 1000 m

Retirement homes and service apartments for the elderly is about 300 – 500 m from the park.

The distance to the park is suitable for elderly citizens. Compared to the short distances and good public transport connections, Frogner park increases the neighbourhoods' overall quality of life.

## Serves within the park

There are toilets in all the three houses where service is provided. In the same houses you can find cafés, shops and tourist shops. You can sit outside for coffee and baked goods, ice cream or other delicacies. In one of the houses you can sit inside if the weather is bad.

There are two museums in the area Oslo museum and Vigeland museum to nourish the spirit with cultural heritage and history.

**Lighting** - Lighting is found throughout the whole park. The distance between each light pole is a bit too long so there is not enough lighting during the night. They still provide rays of light and probably more when the lowest branches have grown up to the right height. The condition of the light poles is overall good. They are in this typical green that fade into the tree colours so they become nearly invisible in the vegetation.

**Trash and garbage containers** – Trash cans are found at regular intervals and are overflowing. People seem to choose the trash containers when they have to clean up after a picnic instead of filling the containers. Their colour is the typical dark green colour that blends into the environment.

**Bicycle stands, bicycles rentals** - These are areas meant for storing bicycles and they are used by many so it can be hard to find a space for a bike. Some keep their bicycles in the park and leave them standing or lying in the grass. There is a bicycle rental by Frogner swimming hall where you can rent a bicycle to cycle through the park and close by areas.

**Playgrounds for children** – Playgrounds for children are placed on the left side of the park near the main gate. There is a gigantic castle, some swings and small sandboxes. The area is crowded and it is clear that the young generation is having fun playing while the seniors watch.



## SWOT analyses

### Strength

Hvervenbukta - attraction

Pedestrian system – good solution

Walking bridge - good solution

Tunnels - good solution

Allotment garden – gives elderly chose to have a garden. An interesting experience

Sport fields – necessary to encourage elderly to play. Generally in good condition.

Large real estate reasonably priced apartments – easy to have big house

Vehicular access – good and easy

Parking spaces – good and easy

Public transport system – generally good and easy

### Opportunities

Green paths – possible to open and give it more excitement, increases the experience.

Signs – they have to be guiding and look alike.

Viewpoints – reopen old ones and create new ones.

Open areas – needs to open up.

Restaurant and caffè – draw more people to the park and gives wellbeing. Gives an oppertunetie to come and watch other people.

### Weakness

Maintenance – totally lacking

Poverty/middle class neighbourhood - visually

Ghetto feeling – is existing and hard to remove. Has to do with the design of the houses.

Waist bins - lacking

Resting places with a bench – lacking

Toilet - lacking

### Threats

Neglecting – the whole neighbourhood looks like this and needs to be cleaned up. This would reduce the ghetto filing.

To steep slopes – change in 1:20

Poor navigation and environmental readability – good signs that give directions.

Path lighting – don't save the lights, that increases security and reduces crimes.

Path surface – always even and without holes.

Oversight signs and signs in general – Needs to tell you were you are and show you the navigating possibilities.

## Strength

Connection to the neighbourhoods – is good  
 Pedestrian system – in good condition  
 Baroque design - attraction  
 Large lawn - openings  
 Frogner pond – wather attraction  
 Benches - plenty  
 Trees and vegetation – in good harmony  
 Museum - attraction  
 Public transport system - good  
 Viewpoints – good and interested  
 Vehicular access - good  
 Parking space – good  
 Maintenance – in acceptable condition  
 Good navigation - easy

## Weakness

Toilet – should be more, line forms in front  
 Invaders musicians – noisy and boring  
 Tourist shops – unnecessary in the park  
 Service – lacking and should be in level with the dignity of the park  
 Tourist bus stop at the front gate – in the back near the graveyard  
 Oversight signs – all need to be alike.

## Opportunities

Restaurants and cafés – creates attraction  
 Playgrounds for children - creates attraction  
 Playgrounds for seniors - creates attraction  
 Bicycle stands – makes it easy for people to come and leave the car behind  
 Water stands – lack of drinking water, the one in the toilets is disgusting

## Threats

Stairs – different heights in rising is dangerous  
 Handrails – are lacking  
 Lights – lacking, the park is in a danger zone by nightfall and in winter season.

## 5 Part III – Observation

I have selected one study and one theory to use as a basis in my own case study. Both of these studies are based on the connections that elderly citizens have with green areas around their residential areas. They both contain the elements that seniors considered to be qualities and motivations for being physically active.

- Appleton - Habitat theory
- *Outdoor environment, activity and the wellbeing of older people: Conceptualizing environmental support*, written by Sugiyama and Thompson (2007). It deals with quality of life in parks and neighbourhoods and how open green areas can increase the qualities and how the environment is influencing in practice. This study was made on elderly people in age group 67 – 99+. It took in personal factors like physical and mental condition, environmental attributes, unmet needs and if the senior had personal projects. This provided information on whether the person thought that the neighbourhood and the open green areas met its needs or not. From this article I formed questions to estimate if the area could meet the elderly people's needs.

### 5.1 Observation list

The elderly are being monitored to see what they are doing in the parks. The observation took place once every season or four times over the year. This was done to observe if the behavioral pattern changes over the seasons. Four questions were answered based on material from: Sugiyama, Thompson, Stigsdottir, Day og Grham.

1. What kind of physical activity are the elderly doing?
  - a. Walking
  - b. Running
  - c. Bicycling
  - d. Playing with grandchildren
2. Do they use relaxing places within the park for restoration?
  - a. Yoga
  - b. Talk
  - c. Sitting
  - d. Reading
  - e. Quietness
  - f. Watching other people
  - g. Watching Water/ocean
  - h. Watch children play
3. Are the elderly alone or with someone?
  - a. Alone
  - b. Friend
  - c. Family
  - d. Group
  - e. Courses
4. Is it possible for the elderly to make new contacts with other people?
  - a. Other elderly
  - b. People in general

The criterion was kept simple, yes or no. Were the elderly doing what was asked in the question or not.

Observation in Holmlia and Frogner								
	Holmlia				Frogner			
Question/answer	Summer	Spring	Fall	Winter	Summer	Spring	Fall	Winter
<b>Question 1</b>								
<b>What kind of physical activity are the elderly doing?</b>								
Walking	yes	yes	yes	yes	yes	yes	yes	no
Running	yes	yes	no	no	yes	yes	yes	no
Bicycling	yes	yes	yes	no	yes	no	no	no
Playing with grandchildren	yes	yes	yes	no	yes	yes	yes	no
<b>Question 2</b>								
<b>Do they use relaxing places within the park for restoration?</b>								
Yoga	no	no	no	no	no	no	no	no
Talk	yes	yes	yes	yes	yes	yes	yes	no
Sitting	yes	yes	yes	no	yes	yes	yes	no
Reading	no	no	no	no	yes	yes	no	no
Quietness	yes	yes	yes	yes	yes	yes	yes	no
Watching other people	yes	no	no	no	yes	yes	yes	no
Watching water/ocean	yes	no	no	no	yes	yes	no	no
Watching children play	yes	yes	no	no	yes	yes	yes	no
<b>Question 3</b>								
<b>Are the elderly alone or with someone?</b>								
Alone	yes	yes	yes	yes	yes	yes	yes	no
Friend	yes	yes	yes	yes	yes	yes	yes	no
Family	yes	yes	yes	yes	yes	yes	yes	no
Group	no	no	no	no	yes	yes	yes	no
Courses	no	no	no	no	yes	yes	yes	no
<b>Question 4</b>								
<b>Is it possible for the elderly to make new contacts with other people?</b>								
Other elderly	yes	yes	no	no	yes	yes	yes	no
People in general	yes	no	no	no	yes	yes	yes	no

Table 12 shows the response ratios in Holmlia - and Frogner park.

When the answers are viewed for question 1, it shows that there is more variety in what people do in Frogner park. However, it seems that Holmlia park would be more utilized throughout the year for walking.



Question 2 shows that people generally utilize Holmlia park throughout the year to come and talk. This is often associated with walks. Frogner park seems to be used more to sit down and have a cozy time and read. It came specifically just to be around other people without having to do anything. This was not the case in Holmlia park. Frogner also seems to have a better offer for older people when it comes to sitting and watching the pond or watching their grandchildren play.

Question 3 was a bit difficult to answer, that is if people were alone or with friends or a couple. But there were proportionately more couples walking together in Holmlia park than in Frogner park. There are more friends walking together and usually of the same sex in Frogner park. It was more common to see individuals alone in Holmlia park than Frogner park and it was mainly men 80 years and over. Individual that were alone in Frogner park were mainly women. There is more of all kinds of group activities and courses in Frogner park. None were found in Holmlia park.

Question 4 was an evaluation of social connections. Frogner Park is an area that is open and welcome and contains a considerable amount of people as well as tourists. It is much more likely that the elder can create new relations with other older people mainly through group activities, but there is nothing to preclude that they can form connections on their own. The possibility is there. Therefore it can be said that Frogner park extends to meet the needs that the elderly require from a park.

The Frogner park is in accordance with the habitat theory.

## 6 Result

The results from the questionnaire in Holmlia park and Frogner park is re-examined. These are the same questions that were used to create the analyses. The differences of the parks is examined as the design and their value in extending the quality of life in the neighbourhood. A list will be made for things that are missing, in unsatisfactory state or with missing universal design standards. Renewing those projects will increase the value of the park. Facts from the analyses and observation are presented. The learning process from the literature review will be connected to the case study and observation.

Comparison between Holmlia park and Frogner park		
Question/Parks	Holmlia	Frogner
<b>Park and spatial analyses</b>		
How is the park connected to the surrounding environment?	satisfactory	good condition
Does the park have the potential of increasing the Quality of Life in the neighbourhood?	yes, very good potential	yes
How is the design?	natural woodland	baroque
Does the design have any function?	satisfactory	good function
Is the park divided up into small areas?	yes	yes
If Yes. How are they divided?	Spread	regularly divided
Are they variable or monotonic?	monotonic	variable
What is the overall quality of the park?	satisfactory	good condition
What are the characteristics of the areas ( <i>Genus loci</i> )?	freedom and tranquillity	prestigious and cultural
What is the condition of the park, taking into account the overall picture?	unsatisfactory	good condition
What is the experience of security in the park?	unsatisfactory	good condition
Do the facilities in the park, including vegetation, provide necessary support?	no	some
Are there a lot of disturbances and assaults in the parks?	no	disturbances
What kind of experience is available in the park?	walking in the forest, sports fields, relaxation, family gathering, physical activity, nature viewing	art viewing, viewpoints, relaxation, excitements, socialising, family gathering, physical activity
What is the quality of the experience in the park?	unsatisfactory	satisfactory
Is there anything interesting to see?	Oslo fjord and the sea	many interisland viewpoints based on the sculptures and two over sights points over Oslo

Do the seasons have different impact in the park, visually?	spring, fall, winter	spring, summer, fall
Is there something overwhelming?	tree walls	sculptures
How can you make use of the park for physical exercise? (what can the park provide).	paths, sports fields	paths, lawns
How can the park be used for relaxation and mental restoration? (what can the park provide)	Hvervenbukts and Ljans river	Frogner pond, The English Park
What is missing in the park?	playground for elderly and children, resting area and paths in universal design, large lawns	playground for elderly and children, water post
<b>Circulation</b>		
Is the distance relatively short?	not over 600 m	
Are the pavements and paths continuous in the neighbourhood?	Yes	yes
What is lacking?	universal design and maintenance	maintenance
Are there obvious barriers or hindrances that restrain the senior citizens when walking on the pavements or paths?	Yes	no
How is the sloping in the path?	in multiple places over 1:20	in consistence with universal design
How are the crossings and traffic lights distributed with consideration to the pedestrian system?	good condition	good condition
Does the individual have to take a detour to get across the street?	No	no
Are the entrances visible? If not, write an explanation.	No, hard to find all of them. Scattered	partly, tourist bus cloud this view
Are the boundaries between private and official parks clear and visible? If not, write an explanation.	yes	yes
How readable is the park?	unsatisfactory	good condition
What makes it difficult to read?	you can't see where you going	irrelevant
What makes it readable?	irrelevant	it is open and gives a great overview
Are there signs that explain the navigation? What is their condition?	yes, but unsatisfactory	yes, satisfactory
What is the condition of the pavements in the park?	unsatisfactory	satisfactory
Quality of the experience	unsatisfactory	satisfactory

In what way?	enclosed	easy
Type	asphalt and gravel	Asphalt and gravel
Surface quality	unsatisfactory	satisfactory
Snow clearing	satisfactory	satisfactory
Maintenance	unsatisfactory	satisfactory
<b>Vehicular access</b>		
Does the municipality provide parking spaces in the park or in nearby areas?	yes	Yes
What kind of public transport is provided and in what form?	bus, train	bus, train, tram, subway train
How frequent are the tours?	bus every 15 min, train every 30 min	bus every 20-30 min, tram every 20 min, subway train every 10 min
<b>Service</b>		
How is the access to services within the park?	unsatisfactory	satisfactory
<b>The quality of the facilities</b>		
What kind of vegetation is in the park? (Here a general idea is provided without going through individual examination).	woodland	structured
Trees	yes	yes
Bushes	no	yes
Roses	no	yes
Perennials	no	no
Summer flowers	no	yes
Grass	yes	yes
What is the condition of pruning and cutting of the vegetation?	unsatisfactory	satisfactory
How is the maintenance in the park?	unsatisfactory	satisfactory
What is the condition of the steps in the park?	good condition	unsatisfactory
Risers	good condition	unsatisfactory
Treads	good condition	satisfactory
Length	good condition	satisfactory
Resting platform	irrelevant	satisfactory
Ramp	good condition	satisfactory
Maintenance	unsatisfactory	satisfactory
What is the ratio between steps and rises?	correct	not correct
<b>Other facilities in the park.</b>		



Benches	few	many
Condition	unsatisfactory	good condition
Toilet facilities	few	satisfactory
Condition	satisfactory	good condition
Trash bins	few	satisfactory
Condition	satisfactory	good condition
Lighting	satisfactory	unsatisfactory
Condition	satisfactory	unsatisfactory
Cafes	few	satisfactory
Condition	satisfactory	unsatisfactory
Other services	yes	yes
Condition	gallery	tourist shops

Exel 13 shows the results from the analyses.

### Park and spatial analyses

The material used to create the questions supported the evaluation of the answers and analyses. Toughs authors were referred in the questionnaire. Both parks have acceptable connections to the neighborhoods around. The quality of the neighborhood rises in Frogner because of the park. The value of the neighborhood in general is more and the real estate price rises. Holmlia has great potential of becoming a valuable neighborhood with a valuable park. These results are similar to those observed in the studies which Sugiyama, Thompson and Joseph and Zimmering, fundu út. The design itself didn't make any difference when it came to the amount of visitors. This don't includes the tourist in Frogner park. Frogner park is establish park and have through the years develop a great function. Holmlia is relative young park and is still developing the function needed. The park division is Frogner is regular and linear and it is easy to find all of them as Stigsdottir og Grahm points out that while Holmlia park have spread division without a discernible connection. Overview signs would have helped tremendously. Frogner park with sculpture and designed that is in baroque style has all the variation needed. This variation is missing in Holmlia and most of the areas end up like the others and it gets this monotonic touch. The exception in Holmlia park is Hvervenbukta. The overall quality in Holmlia is neglected wich is a sad situation compare to the excellent condition that is in Frogner park. The character is different in the parks and important. This is what Stigsdottir and Grham consider that makes people want to be in the area. This can be the difference in the design. These straight rigid lines in Frogner park creates and demands respectfulness and in addition with all the sculpture it is highly cultural. The natural flow in Holmlia creates flower children feeling of freedom and tranquility to act on your instinct. The environment in Forgnier park gives a certain security. There is a good overview besides all the tall tree rows and allés. Aspinal is very concerned about the facilities and the vegetation are giving the necessary support that is needed for the elderly. This cannot be found in Holmlia park, the vegetation creates confusion and it is easy to get lost in the woods. An oversight sign would have been great help. This gives insecurity. Because Forgnier park is established and old, the park has developed of experience with the qualities required. The most important quality that Frogner park has is the socializing. This is one of the most crucial factors that one park can provide according to Sugiyama, Thompson, Stigsdottir and Grahm. Both parks have unique viewpoints and they both have elements that are overwhelming.

### Circulation

The distance to the park is important factor according to Joseph and Zimmering, Bullock and Day. It is crucial that the elderly can manage to walk this distance. Holmlia fulfil this standard and the longest distance to the park is 600 m. In Frogner it goes up to 750 m which is too long. The elderly will probably choose public transport instead. This is entirely consistent with the studies that have been conducted by Joseph and Zimmering, Bullock and Day. Paths in Holmlia lack universal design standards. The slopes are too steep, over 1:20. This can occur as a barrier for the elderly. Frogner park is in line with the standards of universal design. Crossing over the street are in excellent condition in both parks and neighborhoods. The entrances are hidden in Holmlia

park. Frogner park has big parking space for tourist bus in front of the main gate. The buses prevent the insight to the gate and the experience of the artworks that it is made of. The park readable and navigation is good in Frogner park but in Holmlia park it is hard to find the way. It is the vegetation that prevents the necessary overview in Holmlia park. Signs need to be universal design in both parks and significant higher number of them in Holmlia. Most of the paths in Holmlia park are in poor condition and that creates fall risk for the elderly. The paths in Frogner park are mostly in good condition. Paths in both parks have asphalt and gravel.

### Vehicular access

This is a factor that is very important for touch's that don't have the physical ability to walk to the park according to Ghel, Thompson, Sugiyama, Joseph and Zimmering. Both parks fulfil these requirements for car and public transport.

### Serves

There is unsatisfactory service in both parks. In Frogner park it is better because they have toilets and cafés on both ends. It is only found in one place in all Holmlia park and that is in Hvervenbukta. The problem there is that the toilets and cafés are only open in summer.

### The quality of the facilities

This was the factor that Aspinall, Bullock, Thompson, Sugiyama and Day thought that made a difference for the elderly. Vegetation of the forest in Holmlia is everywhere and free growing. In some places the forest has taken over. In Frogner park everything is in straight line and under control. There is more variation in vegetation in Frogner park and the lawn are large and comfy. The maintenance is satisfactory in Frogner. I miss though the quality that comes from toughs garner that have pride and affection for the plants and it is visible in the park. In Holmlia the maintenance is lacking and it is visible all over. The stairs in Holmlia park are in perfect shape and in correct ratio between the rises and steps. In Frogner park the stairs that lies to the enterprise sculpture need some fixing. The ratio between the rises and steps is uneven and it creates a great fall risk for the elderly. The difference is up to 5 cm. The walking stairs is rather new and have also wrong ratio between the rises and step. The step is too shallow in depth and makes the stairs hard to walk on. In Holmlia, there are some new benches and some old and some that should not be in use at all. They are few and the interval is long between them, too long. Frogner has no bench problem. The park has plenty and they are in good shape and condition and always full of people. Both park needs more toilets. Holmlia are in greater needs for toilets and trash bins. Frogner is in need to improve the condition of lighting in the park to give security in the evening and over the winter season. Both parks need more café and restaurants. Frogner has the most potential to be able to encourage the elderly to come. Holmlia park has all the potential to do the same but fail to meet the requirements.

### Proposed solution for Holmlia

Holmlia has great potential of becoming a well established park area that will attract people and seniors from other neighborhoods in Oslo. These are the project and facilities that needs improvement or new designs to increase the usefulness in the park.

Project 1 – To open up to the fullest the green area in Holmlia center down to the allotment gardens and all the way to Søndre ås farm That means clear-cutting the area up to the cliffs and makes the creek and ponds visible. That can give an excellent opportunity to illuminating the cliffs to increase the experience seasonally. The large lawns that will be created need dividing and resting places with a benches that have this necessary back support that is needed for people and elderly to feel secure enough to choose this area to sit down and relax. A combination of playground, water, lights, resting places, playground for the seniors, toilet facilities and café would increase the use of this new area with a multiple purpose.

Project 2 – Ljanshills. Provide clear path all around Ljans hill with suitable evenly divided resting places to watch the fjord and the sea. An area that has good signs and overview map to show what it is to see and how to navigate the area. A connection sign that views the different parts of the park and how to get there by walking in the forest paths.

Project – 3 Hvervenbukta is in need for renewing for bathing facilities. A café that is open all year around

should be here. That would increase the area use and have a great effect on the path that lies around Ljanshill.

Project – 4 Ljansriver needs an opening in the vegetation mass to the river sight to give a stronger bond between the river and the forest. Resting places are needed, equally divided throughout the area. That will increase the usefulness of this area for the elderly. An oversight map needs to be on the way to help people and elderly to get an understanding of the geography and the location. This will give the path more security and less confusion.

Project – 5 Hallager sports fields needs more opening on the paths and insight to the woodland. That will give more possibilities to find and experience the animals that live in the forest. The path is partly to steep and need an universal design to increase the possibilities for the elderly to be able to use this path. This will increase the value of this path. Resting places are needed equally divided all the way down to the Ljanshills path. That will give the elderly an opportunity to walk this distance to the sea to be at the beach or to sit in the café. The resting places can also give an opportunity to come and watch others play ballgames or encourage seniors to come together and play.

Project – 6 Mastemyrhills is a challenging project. The paths slope need to be lighter and preferably no more than 1:20 if it is possible. That means that this path has to have the standard of universal design. The forest walls needs insight to give a view to the forest live.

### **Proposed solution for Frogner**

Frogner park have a great opportunity to increase the qualities within the park that will attract more people and seniors from other neighbourhoods in Oslo. This area, the project and facilities need improvement or design to increase the usefulness in the park.

Project 1 – The park is in great need for cosy and interesting restaurants and cafés with toilets. These do not have to be large places. They have to give an opportunity to sit outside over summer time and inside over the winter time. They have to be open all year around.

Project 2 – Playgrounds for children and seniors in viewing distance from the restaurant and café. Small playground for children and a place to exercise balance for the elderly together in one. Or scathed over the parks.

Project 3 – Finding new area for the sculpture on the bridge. The idea is to spread them around the park.

Project 4 – Oversight signs with universal design.

Project 5 – Water stands for visitors to fill up water bottles and for the dog.

Project 6 – Tourist bus stop on the other side were the graveyard is.

I want to implement changes in one item from both parks to show the idea of change that could increase the value of park area. In Holmlia park, I would like to take a project 1 in Frogner park project 1 and 2 since they correlate. With these proposals, I can increase the quality of the park networking and increased usage.

Project 1 is chosen for Holmlia and porject 1 and 6 in Frogner.

## 7 Discussion

### The importance of the literature review.

The literature covered most factors that affected the green areas and elderly citizens. The most difficult task was to find material on the type of physical movement engaged in and what kind of exercises was recommended that they practice. It seemed to be completely under each and every what was done. Most of the articles that were found on green areas and elderly citizens discussed the mental side and how it could be possible to deter, delay or prevent the light mental illness to occur in an individual. Next were the articles that discussed how it was possible to deter, delay or prevent the NCDs disease to occur in the body of the elderly. It seemed like the medical scene had been most studied. But it was often too theoretical medically or psychologically. I needed to know more about what the older liked and what they attended, chose to do and wanted. Then the search was narrowed to focus more on what demonstrated the requirements and needs for the elderly. This has not been studied much but I found some very good articles that gave comprehensive information about the needs and the requirements that the elderly prefer, which was mixed with the elderly physical ability to perform the activity that was desired. These studies became the ground material for this study. The studies that included psychological or physical background information related to green areas were utilized to find out arguments that proved that physical activity had a beneficial effect on health. What was most surprising in the reading material was that many diseases and mild mental illness can be delayed or prevented with regular outdoor activities and exercise in a green environment. This confirmed the importance of green areas is crucial in keeping the elderly healthy mentally and physically. It also provides a strong argument for the value of green areas that really should be more urban contemporary. Quality green area is extremely important when it comes to the use of its potentials. That the design area, entitlement to genetic behavior of people is really what gets people and senior citizens off the couch and out in the fresh air to visit this wonderful green area in some strange way resets everything and makes life so much better. See Excel 14

What lacked was research conducted in Norway confirmed that senior citizens that are physical active have better physical and mental health. It lacked to find statistics that confirmed that the elderly citizens in Norway were healthier with daily exercise. This material was not found.

Authos	Tittel	Magasin	Land	Age goup	Grene area	Acctivet	Relevant
Egnedal & Dalgard	Eldre og Depresjon	Raport	Norway	Elderly	Green area	Physical and mental	Relevant
Humpel, Owen, Iverson, Leslie, bauman	Perceived enviroment attributes residential location, and walking for praticular purpose	American jornal of preventive medicine		All ages	Neighbourhood Physical activity	Physical/mental	Medium
Cohen, McKenzi, Sehgal, Williamson, Golinelli, Lurie	Contribution of public parks to physical activity	American journal of public health	USA	All ages	Physical activet	Physcal	Light
Amervik	Universal utforming	Book	Norway	All ages	Public area	Universal design	Relevant
Appleton	The experience of landscape	Book	USA	All ages	Landscape	Physical and mental	Relevant
Bell	Landscape	Book	USA	All ages	Landscape	Physical, mental, socoail, behavioral	Relevant
Bell	Landscape, pattern, perception ans process	Book	USA	All ages	Landscape	Physical, mental, socoail, behavioral	Relevant
Bell	Visual design	Book	USA	All ages	Landscape	Physical, mental, socoail, behavioral	Relevant
Dahlman	Gåboka	Book	Norway	All ages	Physical activet	Physcal	Relevant
Ghel	Public space, public live	Book	Danmark	All ages	Square	Physical, mental, socoail, behavioral	Medium
Ghel (2010)	Byer for mennesker	Book		All ages	Square	Physical, mental, socoail, behavioral	Relevant
Kaplan	The experience og nature	Book		All ages	Green area	Physical, mental, socoail, behavioral	Medium
Kaplan (1982)	Humanscape. Enviro-mental for people	Book		All ages	Behavioral	Physical, mental, socoail, behavioral	Relevant



Autos	Tittel	Magasin	Land	Age goup	Grene area	Acctivet	Relevant
Kaplan (1998)	With people in mind	Book		All ages	Green area	Physical, mental, socoail, behavioral	Relevant
Lynch	Image of the city	Book		All ages	Mindmap and navigation	Physical/mental	Medium
Lynch & Hackman	Site planning	Book	USA	All ages	Mindmap and navigation	Physical/mental	Medium
Motloch	Landscape Design	Book	USA	All ages	Landscape	Physical, mental, socoail, behavioral	Relevant
Simonds (1997)	Landscape architecture	Book	USA	All ages	Landscape	Physical, mental, socoail, behavioral	Relevant
Thompson, Travlou (2007)	Open Space - People space	Book,samling av artikaler		all ages, elderly	Green area	Physical, mental, socoail, behavioral	Relevant
Thoren, Nyhus (1994)	Planlegging av grønnstruktur i byer og tettsteder	Book	Norway	All ages	Pysical	Pysical	Medium
Thopson, Aspinall, Bell (2010)	Innovative Approaches to Researching landscape ahd Health	Book,samling av artikaler		All ages	Green area	Physical, mental, socoail, behavioral	Relevant
Ward - Thompson	Open space: people space	Book	England	All ages	Green area	Physical, mental, socoail, behavioral	Relevant
Woolley	Urban open spaces	Book	England	All ages	Green area	Physical, mental, socoail, behavioral	Medium
Joseph, Zimmering	Whereactive older adults walk- Understanding the factors related to path choice for walking among active retirement community residents.	Enviroment and behavior		elderly	Neighbourhood Physical activity	Physical/mental	Relevant
Kearney	Rasidential development patterns and neighborhood satisfaction - Impacts of destsity and nearby nature	Enviroment and behavior		All ages	Neighbourhood Physical activity	Physical, mental, socoail, behavioral	Medium
Kweon, Sullivan, Wiley	Green common spaces and the social integration of inner-city older adults	Enviromental and behavior	USA	elderly	Green area	Social	Medium
Sugiyama, Thompson, Alves	Associations between neighborhood open space atributes and quality of life for older people	Enviromental and behavior	Skotland	elderly	Neighbourhood Physical activity	Physical and mental	Relevant
Aspinall, Thompson, Alves,Sugiyama, Brice,Vickers (2010)	Prefrence and relative importance for environmental attributes of neighbourhood open space in older people	Enviromental and planning	Skotland	elderly	Physical activet	Pysical	Relevant
Sugiyama, Thompson (2007)	Outdoor enviroments, sctivity and the well-being of older people: conceptualising environment support	Enviromental and planning	Skotland	Elderly	Neighbourhood Physical activity	Pysical	Relevant
Sugiyama, Thompson, Alves (2009)	Enviroment and behavior	Enviromental design research assosiation	Edenburgh	All ages	Physical and mental activity	Physical, mental, socoail, behavioral	Relevant
Bullock	Valuing urban green space: Hypothetical alternatives and the stadus quo.	Enviromental planning and management		Elderly	Green area	Physical, mental, socoail, behavioral	High
Holgersen & Dam	Befæstelse	Forlaget grønt miljø	Danmark	all ages	All area	Maintaines	Relevant

Autos	Tittel	Magasin	Land	Age group	Greene area	Activities	Relevant
Day	Local environments and older people's health: Dimensions from comparative qualitative study in Scotland	Health and Place	England	Elderly	Physical activity	Physical, mental, social, behavioral	Relevant
Sitgsdottir, Grhan, Ivarson, Bengtsson (2010)	Using affordances as a health-promoting tool in a therapeutic garden	Innovative approaches to researching landscape and health.	USA	All ages	Therapeutic garden	Mental/relaxing	Relevant
Simons, Anel	The effects of resistance training and walking on functional fitness in advanced old age	Journal of aging and health		Elderly	Green area	Physical	Medium
Oreaga- Smith, Payne, Godbey	The older interaction of stress and park use on psycho-physiological health in older adults	Journal of leisure research		Elderly	Green area	Mental/stress	Low
Sullivan	Perceptions of the rural-urban fringe: citizen preferences for natural and developed settings	Landscape and urban planning	USA	All ages	Farming	Mental	Low
Walford, Samarasundera, Phillips, Hokey, Foreman (2011)	Older people's navigation of urban areas as pedestrians: Measuring quality of the built environment using oral narratives and virtual routes	Landscape and urban planning	England	Elderly	Mindmap and navigation	Physical/mental	Relevant
Sitgsdottir, Grhan (2010)	The relation between perceived sensory dimensions of urban green space and stress restoration	Landscape and urban planning	Denmark	All ages	Public green spaces	Mental	Relevant
Gunnarson, Janson, Fors, Kristensson	Vegetationsstyring för öknad trygghet	Landskap Trädgård jordbruk	Sverige	All ages	Green area	Maintains	Medium
Manson, Greenland, Iacox, Stefanick, Mouton, Oberman, Siscovick	Walking compared with vigorous exercise for prevention of cardiovascular events in women	New England Journal of Medicine		Elderly	Green area	Physical	Medium
Norsk standard	Universal utforming av opparbeidete uteområder. Krav og anbefallinger	NS 11005:2011	Norway	All ages	Landscape	Universal design	Relevant
Lachowycz, Jones (2011)	Greenspace and obesity: a systematic review of evidence	Obesity prevention	England	All ages	Green area	Fat	Low
Kessel, Green, Pinder, Wilkinson, Grundy, Lachowycz (2009)	Multidisciplinary research in public health. A case study of research on access to green space	Public health		All ages	Connection to green areas	Physical	High
Shores, West, Theriault, Davidson (2009)	Extra-individual correlates of physical activity attainment in rural older adults	Rural health	USA	Elderly	Physical	Physical	Medium
Barbosa, Tratalos, Armsworth, Davies, Fuller, Johnson, Gaston (2007)	Who benefits from access to green space? A case study from Sheffield, UK	ScienceDirect	England	All ages	Social	Physical, mental, social, behavioral	High

Autos	Tittel	Magasin	Land	Age goup	Grene area	Acctivet	Relevant
Matsuoka, Kaplan (2008)	People needs in the urban landscape: Analysis of landscape and urban planning contributions	Siencedirect	USA	All ages	Needs	Physical/mental	High
Velerde, Fry, Tveit ( 2007)	Health effects of viewing landscape - Landscape types in enviromental psychology	Siencedirect	England	All ages	Visual	Mental	Medium
Milligan, Gatrell, Bingley (2004)	Cultivating health: terapeutic landscapes and older people in norten England	Social science & medicine	England	Elderly	Needs	Physical, mental, socoail, behavioral	Medium
Berge, Haug, Marshall	Nasjonal gåstrageti	Staden vegvesen	Norway	All ages	All area	Physical	Medium
Wallberg, Grönvall, Johansson, Hermansson, Linderholm, Nilsson, Söderström, Öberg, Niska	Gcm - handbok	Trafikverket	Sweden	All ages	All area	Physical	Low
Schipperjin, Stigsdottir, Randrup, Trolsen ( 2010)	Influences on the use og urban green space - A case study in odense , Denmark	Urban forestry & urban green	Denmark	All ages	Green area	Physical, mental, socoail, behavioral	Relevant
Sitgsdottir, Grhan (2003)	Landscape planning and stress	Urban forestry & urban green	Denmark	All ages	Green area	Mental	Relevant
Sitgsdottir, Grhan (2011)	Stressed individuals preference for activies and enviromental charactistci in green spaces	Urban forestry & urban green	Denmark	All ages	Public green spacesr	Mental	Medium
Maller, Townsend, Leger, Henderson-Wilson, pryor, Prosser, Moore (2009)	Healthy parks, Healthy people: The health benefits of contact with nature in park context	WHO	Spain/ norway	All ages	Green area	Physical, mental, encouragemen, maintaines	Relevant
Racioppi, dora, Krech, Ehrenstein	A physically active life though everyday transport.	World health organization	Europe	Elderly and children	All area	physical	Relevant
WHO	Global recomendations on physical activity for health	World health organization	Switzerland	Elderly	All area	physical	Relevant

The literature selected was not equally matched for analytical process and I picked out especially those authors and theories that matched to use in the case study and observation. Material on specific diseases, elderly and green space was not meant to be used for analysis and observation. It was more used for the design part. The material used in the case study and observation was the material that discussed requirements and needs. Appleton (1986) introduced the prospect - refuge theory and habitat theory. These were the basis theories of spatial analysis and helped me evaluate whether the area would be in right proportions and would fulfil these basic needs of the people and elderly. What supported the theories presented by Appleton for dividing up the area which Grahn presented and the effect it has from the studies from Stigsdottir. These relationships were evaluable if the area would attract people or not. It also assessed how to evaluate the characteristics of the area and what impact it had on people. Asmervik instructed how the area should be for people with some sort of reduced function. It was useful when evaluating the deficit in the slopes and to evaluate the signs from the universal design. In Holmlia park the path slopes were estimated from the universal design information. Forming in the area was evaluated based on the theoretical for human being from Motloch and Bell. Were forms and lines are evaluated to find out which element or facilities could trigger unwanted responses. Both parks had it. These were the elements that gave the evaluation as overwhelming, suffocating or threatening. Frogner park has too many sculptures by m2 but in Holmlia park was a wild forest and its uncontrolled growth was considered a drawback. Needs and requirements for senior citizens are vital.

If they are not met, then the older person won't come. The risk is that the older person chooses to be inside and does not go out at all. Some, however, are lucky and can choose another area that caters to it. As Sugiyama points out, this is a mix of neighbourhood and green areas that creates one whole area.

The proposed changes made in the parks are also derived from this same material. The material that contains the things that the elderly want to see and enjoy was collected. It is also intended to meet the needs for training to help the elderly to maintain their physical fitness and flexibility. The balance is one of the most important things that the elderly trained continues. Just to be able to keep a good balance prevents unnecessary fall and associated fraction of the hips, thighs and legs and arms. Hip fractures are almost fatal for the elderly to encounter. The injured elderly can be at risk of not healing properly again, which can impede all normal mobility. It is extremely important to set out the playground for elderly citizens to train the balance and strengthen the muscle groups that are needed for balance.

Another factor is lacking completely in both parks, these are cafés that can serve the guests effectively, with the possibility to sit outside and watch and enjoy daily life. Those in Frogner park needs changing in order to adapt them to the elderly's requirements. The service needs to be considerably better. It is simply not reasonable to expect that the senior citizen who uses a walking stick can carry the coffee cups to the point selected to sit down without any spillage. It should be easy to come and to be able to sit down and have coffee cups brought to you.

Efficiency perspective was introduced out in prospect - refuge theory and that was lacking in Holmlia park. It was established that the amendment was to open up the centre and welcome guests and eliminating its ghetto standard. There was a total lack of toilets as well as services, such as a cafeteria. All new playgrounds in the area were for children. None were intended for adults or elderly. It would be a good idea to include a playground for elderly citizens to enhance the quality of park area. But as mentioned earlier, I then Holmlia park all the possibilities that can stand out as quality neighbourhood park that lifts up and enhances the quality of the park.

## Answers to research questions

**Research question 1:** What is it that inspires and encourages elderly citizens to use parks or an outdoor environment for physical exercise?

Elderly citizens like to have comfort and to be safe. They seek areas that provides that safety and gives them an opportunity to go out and enjoy them self's. What elderly like to every day is to experience different things and to have something happening in life. That's what incurrence them to go out every day. The things that elderly citizens like to do are:

- Life satisfaction health has a big effect on what the elderly consider as a quality.
- The chose is important:
  - Open green areas and the possibility to choose physical exercise on the level that we feel comfortable.
  - The choice to do what you want in the neighbourhood.
  - There aren't any restrictions and therefore the possibilities are limitless.
  - This is what draws out people to a certain place.
  - Gives the elderly motivation to make this park part of the daily life routine.
  - As soon as the choice disappears then the people disappears.
- Elderly citizens choose to use areas that lie within the neighbourhood or the city's centre.
- If there is an open area and green corridors like avenue in the neighbourhood.
- Continuous high quality pedestrian system which is comfortable walking is encouraged to exercise more. Or at least 2.5 times per week.
- The distance to the destination has a significant effect.
- The usage and the distance can create an interesting diversity.
- If the design is good it is possible to find something for everyone to do.
- The structure in the neighbourhood and if it is it easy to navigate.



- The length to an open green area.
- Limitless possibilities in the way of doing things.
- To meet other people, socialize and be able to create connections.
- The variation in vegetation though the seasons. Always something to see.
- Watch the sea, lake, ponds or fountain.
- Watch children play.
- The possibilities to perform physical exercise and be physical active.
- The possibilities to have relaxation and restoration.
- Good accessible areas for the elderly with reduced mobility.
- Something that is surprising to see or experience.
- To have something happening to ease the elderly's lives and break up the daily routine

**Research question 2:** Are the facilities for activities sufficient to encourage the elderly to choose to visit this particular green area?

The facilities have great impact for the elderly to choose to go to an area. They have more needs for stability in the environment and are more sensitive for the lacking than younger person. The stability gives certain security and routine which is important for the elderly. Those facilities that need to be in place to attract seniors to the park or open space are:

- Continues circulation where the deficit is equally spaced and the surface is smooth.
- Resting area for every 300m with a bench. This is crucial and can determine if the elderly is able to walk the distance to the park.
- Stairs with even rising not more than 12,5 cm, preferable height would be 10.5 cm. Same height as for children. With handrails.
- Ramps for those that have reduced mobility and cannot use stairs. With handrails and security list to prevent falling.
- Toilets are crucial for the elderly. Because many take medicine that have side effects and are therefore in great need to one.
- Lights to see when the daylight goes out. Gives more security and prevents falling.
- Traffic lights and the time to cross over walkways have to be reasonable.
- Curb stones that do not have more height than 15 cm and have fláa skorinn í við gangbrautir til að auðvelda það að ganga inn og út af gangstéttinni.
- Playground for elderly to train balance, strength and flexibility. Access to sport fields for ball games.

**Research question 3:** In order to fulfil requirements for elderly citizens' engagement in physical activity, how may currently existing parks be improved?

## Recommendations

### Holmlia park

#### Project 1

To open up to the fullest the green area in Holmlia center down to the allotment gardens and all the way to Søndre ås farm and to connect the NW side where Holmlia school is to the centre. On map 32 is the area that I have decided to connect together. This will be done clear-cutting the forest back in to the cliffs to open up the area. That will give larger lawn in the centre and open up the pond area. The creak that lies beside the cliffs and the cliffs will be visible all the way to the allotment garden. The two volleyball courts will be removed. They are not in any usage. There is a green area that lies south of the allotment garden that contains a sports field and a creek. This needs to be opened up to draw the creek out and make it visible. That will open up the connection to Søndre ås farm And Holmlia School and make it more visible. This will give the area more depth.

The map 31 shows the existing area. Connections are narrow and sheltered.



The map 32 shows the area after the cutting and the opening that has occurred in the connection points. The cliffs are visible and gives great opportunity to play with lights provides excellent opportunities to play with lighting and light up the rocks. This provides the option of changing the lighting between seasons and use different colors. It would also be possible to control the placement of the lighting. It is possible to create a different atmosphere in an area and give the still burning more diversity. All the area needs benches with back support. The new playground should be adjusted so that it fits into its environment. A café is placed near by the allotment gardens. This gives at opportunity to watch the people working there. They can also be at the new playgrounds.



The football field was have new purpose and is now a home for skaterpark and skaterpark children.

The connection to Holmlia school area, sports fields and the large lawn and the forest has been cut all the way down to the creek in the valley. A new playground for eldrelly is places on the side to the new playground for children. This is a place were the elderly can to exercise balance, strength training and flexibility. The same idea and instruments are used as are used in rehabilitation centres for people who have had a serious accident or disease.

The area around the Holmlia school after the trees have been cut down and the opening that is formed to Holmlia school. Here is also a creek that is visible. It is the same creek that lies beneath the cliffs in the centre.

The connection from Holmlia school area to the large lawn and the new playground for children. Playground for the elderly to exercise balance, strength training and flexibility. The same idea and instruments are used as are used in rehabilitation centres for people who have had a serious accident or disease

The area around the ponds and to the Holmlia church was opened up. The choice was to have the area around the church half open to give the area a mystical aura. The church can be used to find peace and relaxation. The ponds need to be deepened and to reduce the vegetation. It is important to make sure that there is continuous flow of water through the ponds to prevent the water to become stale and algae growth.

The forest area around the ponds and cliffs are cleared cut and openings are increased. The cliffs are now visible. Lights will be used to create different atmosphere. The connection to the ponds and the centre is open and it is easy to get an clear overview. This area is divided into smaller areas with resting places.

### Frogner park

#### Project 1 – 2.

The park is in great need for cosy and interesting restaurants and cafés with toilets. These do not have to be large places.

The map 33 shows the existing area in Frognerpark.





The map 34 shows places in Frogner park with a new café/restaurant that gives an opportunity to sit outside during summer and inside during winter. They have to be open all year around.



Playground for the elderly to exercise balance, strength training and flexibility. The same idea and instruments are used as are used in rehabilitation centres for people who have had a serious accident or disease. Playground for the children is nearby. That gives the elderly an opportunity to play with the children because the children can use the senior playground.

Existing playground and new playground for seniors are visible on the map 35. It is the playground on the left side.

existing caffé have been changed and the outside area is adjusted for the seniors. See mað 35

Existing toilet area, new caffé and playgrounds for seniors and children is were the babmington field was.

Existing area with a tourist shop and toilet. The tourist shop has to go and the area gets cáffé instead. Play-ground for seniors and children. This is ins the seneria. Busstopp for tourist have been moved to the same place on the left side rihgt next to the residents homes.



## 8 Conclusion

A case study and observation was conducted in this thesis. Chosen area for these studies were two parks in Oslo, Frogner park and Holmlia park. In the case study the prospect – refuge and habitat theory was verified in these two parks to find out if these parks could fulfil the necessary basic needs for the elderly. The result was that Frogner fulfil most of the needs. What was lacking was more serves with in the park like toilets, caffè and places for exercise. The stairs in Frogner park did not fulfil the universal design standards.

Holmlia park failed to meet the elderly needs. What was lacking was the serves that could only be found in Hvervenbukta over the summer time. There was no place that was specific for elderly for exercise. The path system did not fulfil universal design standard. The design did not have significant influence on the number of visitors in the park. But because of the neglected situation in Holmlia the visitors were in the area that was most prospecting and could fulfil their needs. These place was Hverfenbukta and Ljans hill.

Proposal solutions were introduced and one was carried out for each park to show how it is possible to fix and solve the problem that occurred. I like to it opportunities. This study gave clear structure for how to evaluate parks in Norway and how to find out if they are meeting the elderly citizen's needs and requirements.

A futher study on the observation were the elderly area involved to get there aspect on the attter by sending the questionaure to answer on how they use the park and what they like to do.

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- All picture in the master thesis were taken by Lydia Gudrun Gisladdottir
- All drawings are by Lydia Gudrun Gisladdottir.









Norwegian University  
of Life Sciences

Postboks 5003  
NO-1432 Ås, Norway  
+47 67 23 00 00  
[www.nmbu.no](http://www.nmbu.no)