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# Design and uses of green areas in urban environments on the basis of evaluations of people's experience

A study of Hammarby sjöstad, Stockholm, Sweden

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Design and uses of green areas in urban environments on the basis of evaluations of people's experience  
- A study of Hammarby sjöstad, Stockholm, Sweden

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## **Abstract**

In the era of rapid urbanization, we are facing a lot of challenges to maintain the natural balance of our living environment. Green space plays a vital role in keeping this natural balance; It is an essential element in urban planning. Thus, providing sustainable and effective green areas for users in an urban area is challenging for planners. This study investigates urban green spaces' design and how residents experience and use their nearby green areas; investigating the residents' experiences because they are the primary users and successful effective planning mainly depends on the users. Specifically, it explores the gap between planning and local needs (that has not been taken into consideration). The result can be used as a background for further development for planning strategy. To do this study, I have chosen the green areas of Hammarby Sjöstad, Stockholm. This area has been designed and developed to achieve certain specific 'environmental goals' laid down during its planning, and the main objective of this study is to investigate the overall operational goals and performance of green spaces of this area. For the research, a questionnaire survey has been done ( online survey and by post).To examine residents' experiences within the green areas ( five specific green areas ) "Meerci™" method has been applied. The results help to understand the green spaces' present condition and the lack of planning management for the green area. These findings help to provide a further guideline to develop the green areas of Hammarby Sjöstad, which will work as a green space strategic plan.

Key words: Hammarby Sjöstad, urban green area, social responses, strategic planning.

## Popular science summary

Urban green areas are one of the vital elements in urban planning. My thesis study is about investigating the design of urban green spaces and the experiences of residents within urban green areas. For the study, I have investigated the green areas in a specific neighborhood in Stockholm called Hammarby Sjöstad. This study helps to explore the local needs and further needed implementation for the green areas where the residents' experiences will work as a background study. My thesis study is consists of seven chapters.

- Chapter one gives an introduction and background information to the study. This elaborates the reasons as to why the study is important and the purpose and the aim of this study. And also, why I choose Hammarby Sjöstad as a case study.
- Chapter two gives detailed information about the theoretical framework of urban green space and a comprehensive understanding of a short historical overview of urban green space. This chapter provides an overview of the significance of green space in an urban area. Besides, this chapter explores the green space planning ways, approaches, and strategies.
- Chapter three presents a general idea about spatial planning in Hammarby Sjöstad, along with some weak points of the Hammarby Sjöstad project.
- Chapter four describes the methodological approach and procedure of the research. It describes the methodological components of the study to clarify how the research study has been done, describe the research question and which method has been followed to get the answer.
- Chapter five contains comparative analyses of the collected data and presents the result of the research study. It also provides an overall observation about the green areas of Hammarby Sjöstad
- Chapter six discusses the Interpretation of findings and provide a guideline based on the main findings of the study. And also explain the strength of the study.
- Chapter seven draws conclusions from the content of the study, together with some recommendations.

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# Chapter 1- Introduction

## 1.1 Background

The importance of cities has significantly changed human life over the centuries. Over the past few decades, cities expand rapidly and become very dense, which leads to both social and environmental impacts on human life. According to the UN, 55% of the world's population lives in urban areas. As a consequence, people are getting busy with their urban life and lose contact with nature, and individuals disconnect from nature and thereby increases unsustainability by disturbing the ecological balance. And also, biodiversity and ecosystem services decrease with dense urbanization (Farrell, 2018). The urban expansion reduces the number of common green space, parks, and natural woodland. As a result, urban communities are facing many problems such as degradation, shifting green space to artificial surfaces, loss of ecosystem services, and increasing the risk of natural disaster. In cities, we are losing the natural environment; we are unable to connect ourselves with nature in our everyday life since we are not taking nature into account in a significant way (Lehmann, 2019).

As there is a high pressure to maintain the natural environment in urban areas, the design of urban green areas has risen and has become one of the most significant interests for landscape designers and planners. Urban green spaces significant to the prosperity of individuals in the city, and the environmental, social, and social qualities are broadly perceived in urban planning. Urban green spaces have a vital role in the public sector, such as culture, recreation, health and wellness, natural environment, and community development (Duggal, 2014) (Haq, 2011). Beyond these typical uses, urban green spaces offer individuals a shelter from city life, a place where they can relax and get away, socialize, and be in contact with nature (Ellis & Schwartz, July 2016). Responsibilities for urban green areas lie on those who are involved in planning and implementing the current development models, likewise planners and consumers. Understanding the roles of urban green spaces in a broad context and local people's involvement will help us to integrate them better in planning and practice.

According to some researchers if local people take part while making strategies for green areas then people feel safe, comfortable, and graceful to positive perceptions of social cohesion and promote interest in using urban green spaces (Jennings & Bamkole, 2019). This is why I feel, there is an urgent need to work on the grass-root level and motivate and involve the ordinary people in planning to bring better results. My thesis investigates parts of the consequences of the changes concerning green areas, and for this investigation, I choose a specific neighborhood

"Hammarby Sjöstad " in Stockholm as a study area. Here, I studied residents' experiences towards green areas and the reason behind it to understand the current green space scenario, which helps to provide a better understanding for further development.

## **1.2 Emerging issues between rapid urbanization and nature**

We are facing climate change significantly, and we cannot deny that humans are responsible for this. One of the main reasons is the unsustainable urban expansion that is occurring over the last few decades. Because of the rapid growth of urbanization within a short time, humans have experienced the transition from a life predominantly spent outside towards a very different life inside buildings (Lehmann, 2019). We have changed how we live and a crucial change in our relationship with nature. Climate change is already around us and impacts our daily lives. All this has results that we need to deal with our cities differently.

The earth began to develop around 4.5 a billion years ago. Although Homo sapiens emerged some 200,000 years ago, we are a comparatively young species, and all the while, we have been continuously pulling back from nature. Although we have seen ourselves increasingly separate from and superior to nature, our impact upon nature has been immense. In this balanced system, the planet's biodiversity has grown to include 30 million different species. Each species is necessary for keeping something in balance in the natural world, yet we have not respected or maintained this delicate balance (Lehmann, 2019). If we fail to maintain the ecosystem, then human existence on this planet will be very short. According to (Cronon, 1996) one of the essential ethics as a human is that we should always keep in mind that we are also part of this ecological system, not apart or above it, and this ecosystem is helping us to survive on this planet. Because of rapid urbanization and busy urban life, we humans forget these ethics and detach from nature. As a result, nature and the environment have become a central issue to urban change and urban politics to provide a sustainable living environment. It is not possible to fix the balance of our environmental ecosystem overnight, but as planners, we can take a step towards nature base solutions and bring nature into the city in a realistic way.

In the book "City of Flows: Modernity, Nature, and the City" the author mention (Kaika, 2004) that typically, cities and nature are perceived as geographic opposites, cities being manufactured social creations, and nature being outside of human construction. Kaika shows that this is not the case. Rather, nature and the city are fully intertwined, with cities integrating nature at every level of activity.

According to (Kaika, 2004) the modern scientist or engineer, the advanced researcher, architects would be the new Prometheus<sup>1</sup> for this modern world, who battles for human liberation through the mastery of nature. The planners and architects are more focused on incorporating green space inside the city in a characteristic manner. As a planner, we have to incorporate nature into our urban area to increase biodiversity and to fulfill many urban context functions that benefit environmental balance and people's quality of life.

### **1.3 Purpose and Aim**

Planning of urban green spaces is a strategic planning approach that aims to develop the networks of green structures within urban areas. The purpose of this study is to contribute to sustainable development by examining the interests of people, their experiences, and appreciation of green spaces or parks within the urban area. Also, to see how people are engaged with their nearby nature in their everyday life; to find the gap between the planning and the outcome of the result considering urban green space. The main aim is to explore what factors need to be considered when working with urban green spaces. What qualities are important to plan for, and what are the risks for shortcomings?

The study also suggests how to improve the social sustainability and cohesion of urban green spaces by analyzing shortcomings in people's experiences. Qualities and shortcomings add up to a description of how to plan in a caring way with a holistic perspective for the people's urban green space.

Urban green areas evaluation criteria attempt to examine the individual interaction between urban green areas and their community to get most of its benefits. If we can address the sustainability aspects to help and understand this relationship, it will be possible to design and manage to deliver the most optimal advantages of urban green areas.

For this study to understand the social responses towards green or natural spaces within the city by investigating people's experiences of qualities, I have chosen the green spaces of Hammarby Sjöstad, Stockholm. Hammarby Sjöstad also has green spaces in semiprivate courtyards that my thesis does not investigate.

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<sup>1</sup> <https://en.wikipedia.org/wiki/Prometheus>

### 1.3.1 The study, Why Hammarby Sjöstad?

Hammarby sjöstad<sup>2</sup> is an urban development project in Stockholm's south of the city center. The European Commission recognized Stockholm as the first European Green Capital in 2010. Around 30 major urban development projects are currently underway or being planned. Many of them use Hammarby Sjöstad as a role model for sustainability. Hammarby Sjöstad is the first eco-city in Stockholm. It is a 'town around a lake' where the planning strategies began in the 1980s with an opportunity to expand the inner city of Stockholm in a sustainable way (NATURVATION, 2017-2020). It is one of Stockholm's most significant urban development projects, and it focuses on water and eco-friendly solutions.

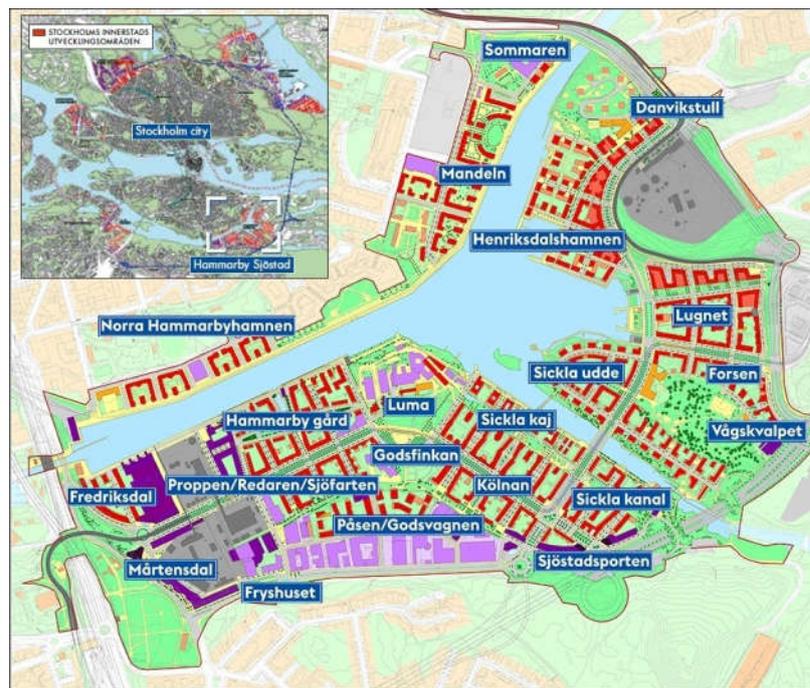


Figure 1: The location of Hammarby Sjöstad in Stockholm and its sub-areas.  
Source: (Stockholms stad, 2020)

While planning the area, the main goal was to create a city district of inner-city qualities that would make Hammarby Sjöstad full of life and an extension of the inner city with the same density. Hammarby has been designed and developed to achieve certain specific 'environmental goals' laid down during its planning. The vision, and the overall goals, describes a holistic perspective and view of the environmental profile, strongly focusing on system based technical solutions. The implementation of such a holistic environmental profile for a whole district was new in 1996, which has drawn attention both from national and international levels (Pandis & Brandt, 2009).

<sup>2</sup>[https://en.wikipedia.org/wiki/Hammarby\\_Sjöstad](https://en.wikipedia.org/wiki/Hammarby_Sjöstad) (1 September 2020)



Figure 2: Areal view of Hammarby Sjöstad and name of its sub-areas.  
Source: Lennart Johansson see (Stockholms stad, 2020)

But few implementations didn't reach to their projected goals during the design phase (Hammarby Sjöstad2.0). I have chosen this area to research individual's participation and involvement in urban green. The main objective of this research study is to investigate the overall operational goals and performance concerning open green areas within Hammarby Sjöstad area by investigating people's emotional experiences towards open green areas and which will be taken into consideration in strategic planning procedure.

# Chapter 2- Theoretical framework

## 2.1 Urban green areas

Green spaces exist in a great variety of shapes, structures, and types within the city or urban fabric. (GreenKeys Project Team, 2008). In land-use planning, urban green areas are open-space areas reserved for parks and other "green spaces," including plant life, water features, and other kinds of the natural environment.

Table 1: Typology of urban green areas in terms of uses by Dunnet 2002 (Yılmaz & Mumcu, 2016)

	Terms	Features	Type	Example
<b>ALL URBAN GREEN AREAS</b>	<b>Recreational green areas</b>	These kinds of green spaces are primarily designed for access to both visual comfort and recreational comfort. In particular, they consist of public places but also include private lands.	Recreation Green Area	Parks and Gardens Informal Recreation Areas Outdoor Sports Areas Play Areas
			Incidental Green Area Space	Housing Green Space Other Incidental Space
			Private Green Area	Domestic Gardens
	<b>Functional green spaces</b>	Some of these green spaces could be allocated for recreation and serve for city-dwellers for this purpose, however, their principal purpose is the function. The purpose of their use by the city-dwellers is the functions they have. Their basic functions include use for agriculture, horticulture, cemeteries, education and for other institutions.	Productive Green Area	Remnant Farmland City Farms Allotments
			Burial Grounds	Cemeteries Churchyards
			Institutional Grounds	School Grounds Other Institutional Grounds
	<b>Semi-natural green space</b>	These kinds of green spaces consist of seminatural living spaces. These living spaces are created by their transformation into new living spaces along with the improvement of the rural areas prior to being included in urban green areas and of the abandoned or degraded areas. All these habitats may or may not be accessible to the public, but they make a vital contribution to the urban landscape	Wetland	Open/Running Water Marsh, Fen
			Woodland	Deciduous woodland Coniferous woodland Mixed woodland
			Other Habitats	Moor/Heath Grassland Disturbed Ground
	<b>Linear green spaces</b>	These green spaces are defined by their linear features; including rivers and streams as well as transportation routes (roads, railways). Although significant portions of linear green spaces are planned for the recreational purpose and nature conservation, some of them are also planned to include both features.		River and Canal Banks Transport Corridors (road, rail, cycleways and walking routes) Other linear features (e.g. cliffs)

Most urban open spaces are green spaces but occasionally include other open areas (Wikipedia contributors, 2020). Urban green spaces can be classified in different ways according to the term of usages (active green spaces and passive green spaces), ecological function (historic gardens, greenbelts surrounding the city, agricultural areas, and buffer greens), and recreational functions (parks, thematic parks, and gardens, sports fields, playgrounds, natural and semi-natural areas, corridors) (Yilmaz & Mumcu, 2016). Urban green areas mostly serve common purposes, but they are defined by different types. The types of urban green spaces can be ranged from playing fields to highly maintained environments to relatively natural landscapes. Table 1 explains the typology of urban green space, which is developed by Dunnett (2002) (Yilmaz & Mumcu, 2016). Usually, in urban areas, we find all kinds of urban green space. It is very important to identify the type of green space before we make a green infrastructure plan or strategic plan for the green space.

## **2.2 History of urban green/park area in landscape architecture**

Landscape architecture is indeed as old as civilization. Gilgamesh (2800-2500 BC, King of Uruk) boasted, 'One-third of the whole is the city, one third is garden, and one third is the field.' Only the term Landscape architecture is more recent (Landscape Architects Association, 2020). The modern term 'landscape architecture' comes from the title of a book published in 1828; written by Gilbert Laing Meason, a Scotsman, it deals with relating architecture to landscape. William Andrews Nesfield, who designed garden areas for Buckingham Palace in London and Castle Howard in Yorkshire, was the first person to use 'landscape architect' as a professional title. The first person to use the term for the art of designing public open space, which in its modern usage, was Frederick Law Olmsted in 1863. Frederick Law Olmsted (1822–1903) was an American landscape architect. He is popularly considered to be the father of American landscape architecture.

Frederick Law Olmsted's was famous for co-designing many well-known urban parks. From Buffalo to Louisville, Atlanta to Seattle, Baltimore to Los Angeles, the Olmsted's work reflects a vision of American communities and American society still relevant today—a commitment to visually compelling and accessible green space that restores and nurtures the body and spirit of all people, regardless of their economic circumstances. Olmsted always sought to look beyond current taste and fashion and base his designs on human psychology's fundamental principles. In particular, he drew from the analysis of earlier British theorists of naturalistic landscape and their emphasis on the special qualities of "pastoral" and "picturesque" scenery. The epitome of the pastoral landscape was the English deer park, with its sense of

extended space and its gracefully modulated ground and smooth, close-cropped turf. This style he found to be a special antidote to the ill effects of urban life. The "picturesque" style he applied to steep and broken terrain, planting thickly with a variety of ground covers, shrubs, vines, and creepers to achieve an effect of bounteousness, profusion, and mystery (The National Association for Olmsted Parks).

The Olmsteds believed in the landscape's therapeutic value that parks can bring social improvement by promoting a greater sense of community and providing recreational opportunities, especially in urban environments. Olmsted believed that it was the purpose of his art to affect emotions. This was especially evident in his park design, where he created passages of scenery in which the visitor would become immersed, experiencing the restorative action of the landscape by what Olmsted termed an "unconscious" process. To achieve this result, he subordinated all elements of the design to the single purpose of making the landscape experience most profound (The National Association for Olmsted Parks).

### **2.2.1 Historical importance of urban green areas**

From the history of western towns and cities, urban green areas had traditionally functioned like a representation, wellbeing, and urban hygiene (Historical importance and development of parks and public green grids). In the 18th and 19th centuries, green areas functioned as a representation, such as the terrace-shaped gardens of the Renaissance and landscaped gardens. Only the elite people were responsible for having formal gardens and lawns between housing blocks. At the end of the 19th century green area planning developed as an urban planning element because of industrialization. But at that time, it was restricted to building green regions inside the locale area and building blocks. Also, building construction was more important than green areas in urban planning of that era. Green areas are mainly aimed at those who had the opportunity to walk and appreciate the daylight. Parks were created for recreational purposes in the form of a landscape design. Public parks such as New York's Central Park occur only in Western societies and socialist countries( (Lichtenberger, 1998) see (Historical importance and development of parks and public green grids)); serve as a function of leisure and recreation for the citizens. The need for allocating more spaces to natural areas in cities has begun to be supported by this change, and the concept of "urban green area" has emerged as an important element of the cities (Yilmaz & Mumcu, 2016).

The concept of connected green areas emerged at the beginning of the 20th century. Initially, this was in the form of green belts, like that surrounding Vienna's city, while later, as a result of the persistent growth of cities and traffic, it developed more in

the form of radials, such as in Berlin. Even then, together with recreation, urban ventilation was the most important reason for creating these green belts of woodland and meadows around towns and cities ((Lohrberg, 2001) see (Historical importance and development of parks and public green grids)).

Now in the 21st century, because of Increasing urbanization, there is greater demand for a quality environment in an urban area, as a result of sustainable planning processes having adopted to fulfill this demand. And green area within cities has become an important resource in some cases. The green area in blue-green grids can perform various functions such as recreation, food production, nature development, water storage and purification, biomass production, pleasant and safe routes for slow traffic, urban lungs, and urban cooling (Historical importance and development of parks and public green grids). Compared to before, urban green areas/park has become more significant in the planning process.

### **2.3 The significance of green spaces in urban area**

According to the United Nations (UN), although urban area occupies just 3% of the earth's land surface area, they represent between 60% and 80% of energy consumption and are responsible for 75% of carbon emissions. It should be clear that urban spaces are not necessarily a terrible thing. After all, we as a human need somewhere to live and the progression of urban area is a natural development aspect of human life from the very beginning of civilization. However, the way in which they are built and managed is essential. This is why we need to focus on environmental urbanism as Cities need to invest in green spaces, renewable energy, bio-architecture. And, policies to promote recycling and responsible consumption in order to reduce pollution, and make them healthier and more livable places. Environmental urbanism is driving the energy transition towards a less carbon-dependent model that more effectively combats climate change by reducing CO<sub>2</sub> emissions (Iberdrola, 2020). Adequate green initiatives within urban development could minimize these adverse effects. Thus cities need to focus on green areas in a significant way to compensate for CO<sub>2</sub> emissions and preserve their links with nature.

According to WHO, Green spaces and other nature-based solutions offer innovative approaches to increase the quality of urban settings, enhance local resilience, and promote sustainable lifestyles, improving both the health and the well-being of urban residents. Moreover, urban green spaces or parks are considered far more than the 'lungs' (Iberdrola, 2020) as green spaces help us in economic improvement, environmental benefits, provides more outstanding quality of health and well-being within the urban area.

### **Economic improvements**

In a purely economic sense, we cannot deny the value of green space. Urban green areas create a widespread economic impact. Green areas attract investments by increasing the quality of the areas where they exist, increase the values of those areas in a particular way, increase the values of the real estates in their surroundings (Yilmaz & Mumcu, 2016); In many statistics, it has been proven that if green space is appropriately managed, then the price of houses increase 5 to 7 percent (Alsecco UK Ltd, 2018). At the same time, it benefits not only the owner of the house but also other citizens of the surrounding areas. Those green spaces are needed to be managed for long terms also create employment. It is also true that green space in the urban community doesn't contribute to the local economy directly, but it creates a position in such a way as to maximize the potential economic source, for example, potential tourist spots. Besides, these urban green areas help to decrease the heating and cooling cost of the building by their climate balancing features (Yilmaz & Mumcu, 2016).

### **Environmental benefits**

The environmental benefits of urban green areas are associated with the features of improving air quality and climate, positive effects on wildlife and habitats, Reduced flooding, and improving the aesthetic appearance of the urban landscape (Yilmaz & Mumcu, 2016) within the city.

**Improve air quality and climate:** Urban green areas have always played a crucial role in helping to keep the air clean and reduce the death toll. Shrubs and trees are able to remove harmful gases and particles from the air. The plants that constitute the urban green areas minimize air pollution by seizing the particles, absorbing the heavy metals and polluting gasses, and assuming the task of filtering air (Yilmaz & Mumcu, 2016). In fact, some specific types of trees in urban areas are very useful for absorbing such pollutants. Besides this, urban green areas create cool urban spaces and mitigate the urban heat island effect (Dunnett et al., 2002; Lawton, 2007 see (Yilmaz & Mumcu, 2016). Studies have indicated that green areas can cause average city temperatures in those green areas to fall by around 1 degree. (Alsecco UK Ltd, 2018). As a result, it reduces the use of air conditioning as well as other forms of energy usage. This has a benefit to the surrounding area to improve air quality.

**Positive effects on wildlife and habitats:** From the larger woodland areas, parks, as well as smaller green areas within cities provide a naturally more suitable area for a range of wildlife and insects to live. Thus the green areas naturally play a host role in the protection of natural habitats to ensure the natural life cycle for the continuity of the species (Yilmaz & Mumcu, 2016). Which helps to provide natural biodiversity

within urban area. Moreover, having more diverse green areas in urban areas can do wonders for a variety of species. Even if animals or other habitats don't live their whole lives in a city environment, these green areas still have a vital role to play in aiding migration and also perform as "wildlife corridors" that allow species to travel between cities to other rural areas (Alsecco UK Ltd, 2018).

**Reduced flooding:** Urban areas tend to be far less permeable than rural areas due to the nature of materials used to cover the ground's surface (Alsecco UK Ltd, 2018). As heavy rainfall can often cause drainage systems overwhelmed and result in flooding. Green areas have natural drainage solutions that can reduce rainwater runoff. Besides this, trees can play their role in helping to avoid flooding, especially if they are planted in areas with permeable soils. They can also help to prevent soil erosion and unwanted landslides due to roots better gripping the surrounding earth. Therefore, it is important that measures are put in place now to incorporate more green areas within urban areas to prevent flooding risks (Alsecco UK Ltd, 2018).

**Improving the aesthetic appearance of the urban landscape:** The rapid urban development has resulted in urban appearances consisting of many building blocks with so many roads. This gives the urban area a cold and boring effect, and these effects are embellished with natural elements such as a tree, water, landform, grass surface that are the components of green areas. These elements bring a different kind of character and identity, which softens the monotonous structure of urban life. The green areas help to increase the aesthetic quality of the urban environment with their physical functions such as the regulation of the urban texture and the stabilization of density, and the natural landscape components they contain (Yılmaz & Mumcu, 2016). Besides this, urban green areas allow cities to breathe and make them livable by creating definable spaces in cities, as they bring harmony within the urban landscape.

#### **A greater quality of health and wellbeing**

Urban green space associate with numerous positive qualities to improve urban living environment such as improve air and climate, Improve the aesthetic appearance of the urban landscape, keep a balance between ecosystem, buffering of noise pollution and mitigation of impacts from extreme events. This is why the presence of urban green areas plays an important element in the quality of life for the city-dweller. Urban green areas create a feeling of satisfaction among an individual, along with escaping from their busy and monotonous daily routines. The components of urban green space( such as a tree, water, landform, grass surface) bring harmony in an individuals life; this helps to get rid of their thoughts, refresh people, and provide them with a sense of peace and calmness (Yılmaz & Mumcu, 2016). In many studies, it has been shown that having more green areas within the

living environment can help individuals to be happier and reduce their stress levels and improve their mental health. Besides this, in the physical aspect, green areas also help to promote physical activities such as sports, guided trails for walking, running, and cycling routes (Alsecco UK Ltd, 2018). In addition, urban green space facilitate social interaction and promote community cohesiveness (World Health Organization/Europe, 2017), and even provide a wider social responsibility in some cases (Yilmaz & Mumcu, 2016).

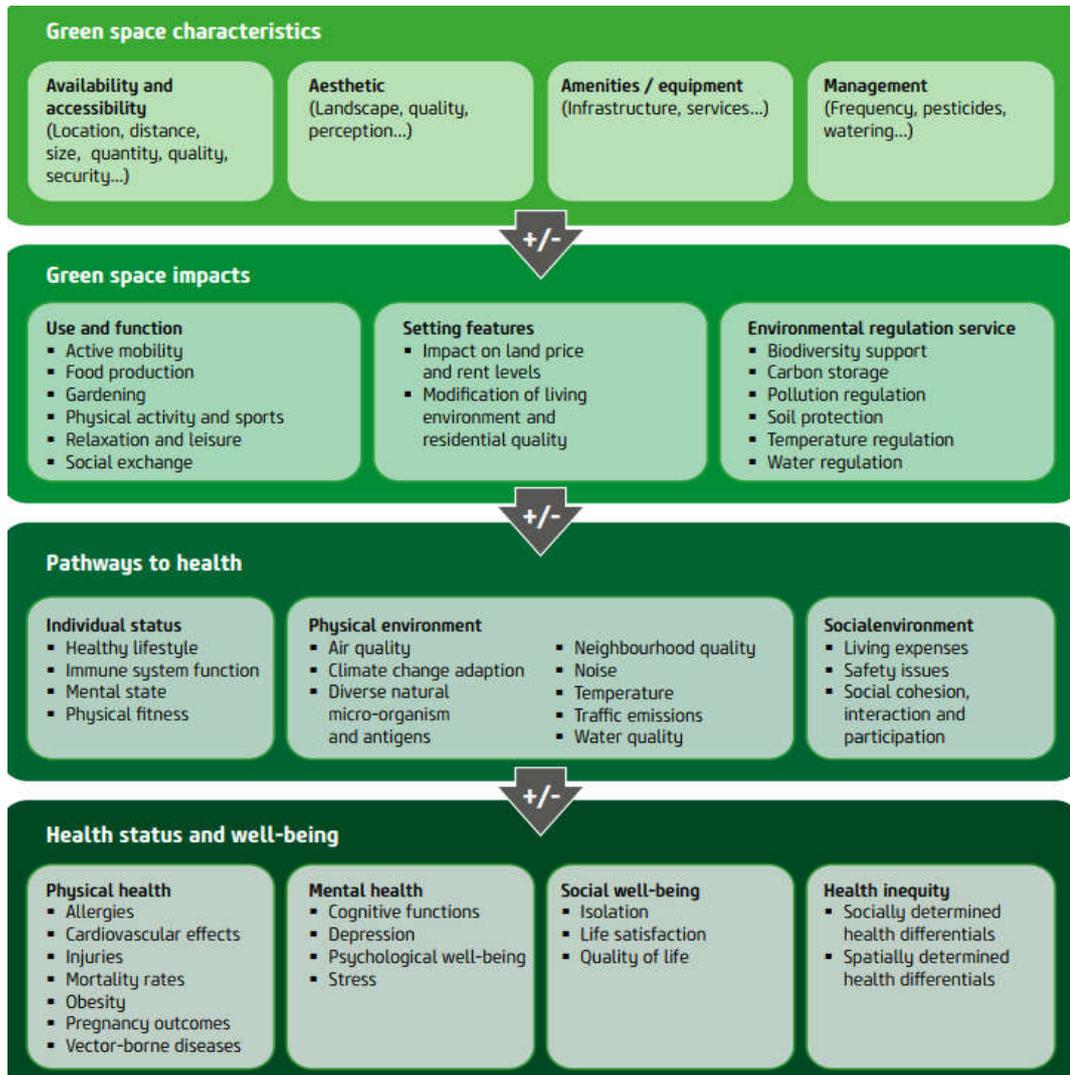


Figure 3: A causal model of the impacts of urban green spaces on health and well-being  
 Source: developed from a figure created by A. Roué-Le Gall in Milvoy & Roué-Le Gall (2015) see (World Health Organization/Europe, 2017)

## **2.4 Urban green infrastructure Planning (UGIP)**

Urban green space is a component of “green infrastructure” (World Health Organization/Europe, 2017). Urban Green Infrastructure planning (UGI) is a strategic planning approach that aims to develop networks of green and blue spaces in urban areas, designed and managed to deliver a wide range of ecosystem services and other benefits at all spatial scales (Hansen, Rall, Chapman, & Rolf, September 2017). Overall the world, because of urbanization, people are becoming progressively urban species. In fact, from the beginning of the 19th-century urban planning developments join with green open spaces in urban areas to have a long-standing association with wellbeing advancement. Nowadays, it has become very evident to follow the urban green infrastructure planning (UGIP) rules to have a sustainable, livable place. Urban green infrastructure Planning fit for tending to an expansive scope of urban difficulties, for example, monitoring biodiversity, adjusting to environmental change, supporting the green economy, and improving social cohesion. Besides this, It is an important part of public open spaces and common services provided by a city and can serve as a health-promoting setting for all members of the urban community (World Health Organization/Europe, 2017). It is, therefore, necessary to ensure that public green spaces are easily accessible for all populations.

### **2.4.1 Core principle of urban green infrastructure Planning**

In recent years, both the European Union and city administrations have seen the need to ensure the presence of green spaces in cities to improve environmental conditions and the health and well-being of citizens Science 2013 member of the European Union’s have been working to create more natural areas for sustainable development and trying to implement this by creating new policies that pursue ecological, economic and social benefits through natural solutions. (Hansen, Rall, Chapman, & Rolf, September 2017). This new policy can support such an approach by providing a guideline on how to plan for and develop urban green infrastructure. So that we can address the following challenges-

- Adapting to climate change
- Protecting biodiversity
- Promoting a green economy
- Increasing social cohesion

In this regard, UGI planning is actually based on four principles; (Hansen, Rall, Chapman, & Rolf, September 2017).

- Green-grey integration
- Connectivity
- Multifunctionality
- Social inclusion

First, **Green-grey integration** - combining green and grey infrastructure; Green grey integration mainly focuses on physical and functional cooperation between urban green space and other kinds of infrastructure, such as transport systems and utilities. This targets primary infrastructural needs as well as tries to provide extensive environmental, social, and economic benefits. Simultaneously, this is based on sound knowledge from different disciplines and sectors, and on cooperation between them.

Second, **Connectivity** – UGI planning for connectivity involves creating and restoring connections to support and protect processes, functions, and benefits that individual green spaces cannot provide alone. (Hansen, Rall, Chapman, & Rolf, September 2017). By creating green space networks that involve both structural and functional connections between green spaces, in order to create added value from an interlinked system. An urban green infrastructure network is made up of many elements that together facilitate movement through the city landscape, such as green roofs, pocket parks, parks, green corridors, backyard, large natural areas, etc. These functional linkages between them provide benefits for humans and wildlife by recognizing the different kinds of connectivity (ecological, social, and a biotic). This connectivity matches certain aims and strategies to different spatial scales – regional, city, and local – and ideally is integrated across them.

Third, **Multifunctionality** – delivering and enhancing multiple functions and services within green spaces. Urban green spaces provide a range of functions and services, which can be grouped into four broad types (see table 2) (Hansen, Rall, Chapman, & Rolf, September 2017). UGI planning aims at collaborating these different functions to enhance the capacity of urban green space to deliver multiple benefits. Moreover, planning for Multifunctionality seeks to create collaboration between functions while reducing conflicts and trade-offs. The aim is to secure and increase the multiple ecological, socio-cultural, and economic benefits of UGI.

Table 2: Function and services of urban green space; *Source:* (Hansen, Rall, Chapman, & Rolf, September 2017)

1) Cultural function and services	2) Biodiversity function	3) Regulating services	4) Provisioning service
<ul style="list-style-type: none"> <li>• Recreation</li> <li>• Nature contemplation</li> <li>• Aesthetics</li> <li>• Sense of place, heritage</li> <li>• Social encounters</li> <li>• Education, science</li> <li>• Inspiration</li> <li>• Urban structure</li> <li>• Mobility</li> <li>• Tourism</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Habitat(common species)</i></li> <li>• <i>Habitat( rare species)</i></li> <li>• <i>Wildlife environment</i></li> <li>• <i>Structural diversity</i></li> <li>• <i>Native biodiversity</i></li> <li>• <i>wilderness</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Regulation of air quality</i></li> <li>• <i>Global climate regulation</i></li> <li>• <i>Temperature regulation</i></li> <li>• <i>Noise mitigation</i></li> <li>• <i>Ventilation/wind buffer</i></li> <li>• <i>Water flow regulation</i></li> <li>• <i>Flood control</i></li> <li>• <i>Erosion control</i></li> <li>• <i>pollination</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Agricultural products</i></li> <li>• <i>Gardening products</i></li> <li>• <i>Consumable wild plants</i></li> <li>• <i>Fresh water</i></li> <li>• <i>Wood, pulp</i></li> <li>• <i>Medicine</i></li> <li>• <i>Game, fish</i></li> </ul>

Forth, **Social inclusion** – collaborative and participatory planning; Social inclusion aims to include all social groups in the planning process of UGI while emphasizing the most vulnerable ones (Hansen, Rall, Chapman, & Rolf, September 2017). UGI planning aims for social collaboration. This means that planning processes are open to all and incorporate the knowledge and interests of diverse groups. By doing this, it will provide an opportunity for many residents and stakeholders to participate in planning processes more easily. This will promote dynamic interaction between stakeholders. The result will be a tangible outcome to support planning and management decisions.

The following section shows how the four core principles of UGI planning can address urban challenges;

Table 3: Linkage between UGI planning and urban challenges; *Source:* (Hansen, Rall, Chapman, & Rolf, September 2017)

	Core principle				
		INTEGRATION	CONNECTIVITY	MULTIFUNCTIONALITY	SOCIAL INCLUSION
<b>Urban challenges</b>	<b>CLIMATE CHANGE</b>	Green-grey measures for flood retention or urban cooling.	Connected green structures that enhance natural ventilation and cooling	Regulating services that contribute to climate change adaptation as an integral part of planning for multifunctionality	Inclusion of groups vulnerable to climate change impacts in UGI planning.
	<b>BIODIVERSITY</b>	Habitat provision, supporting native plants as one of the co-benefits of green grey solutions	Networks for ecological connectivity.	Protecting ecological functions and habitat as an integral part of planning for multifunctionality.	Fostering awareness among all groups of the value of biodiversity.
	<b>GREEN ECONOMY</b>	Reduced management costs through integrated green-grey systems; avoided costs through risk mitigation	Promotion of sustainable transport systems, e.g., walking and biking to lessen environmental impacts	Cost effective UGI solutions through providing multiple benefits in the same space.	Promotion of a green economy, through co-creation, co-management and co-governance of urban green spaces.
	<b>SOCIAL COHESION</b>	Consideration of the usability and amenity values of integrated UGI measures to promote social cohesion.	Provision of equitable access to urban green spaces.	Provision of UGI to meet identified demands and needs of all groups.	Consideration of vulnerable and less vocal groups' needs and their empowerment through collaborative planning.

## 2.4.2 Approaches for urban green infrastructure planning process

UGI planning is also responsible for an individual's behavior towards urban spaces. This is why to experience urban green space at the local level, a few general aspects need to be considered within the UGIP process. The following approaches are for UGIP and practitioners to consider during the process

Table 4 : Approaches for urban policy maker and practitioners to consider during UGIP process. Source: (World Health Organization/Europe, 2017)

<p>First, Be clear about the <b>objectives</b> of green space planning;</p>	<ul style="list-style-type: none"> <li>• What type and size of urban green space is being planned?</li> <li>• What are its main functions to be?</li> <li>• Which population groups are expected to make use of it?</li> <li>• Who is responsible for its maintenance and management?</li> <li>• Might the planned urban green space be a way to upgrade a deprived area?</li> </ul>
<p>Second, Have a <b>long-term perspective</b> and remain;</p>	<ul style="list-style-type: none"> <li>• Green spaces are a long-term investment: they may need some time to establish before they are fully usable, and they require long-term maintenance.</li> <li>• The benefits of urban green spaces may only become apparent over time.</li> <li>• Urban green spaces should be planned and designed in a flexible way, making functional adjustments possible to adapt to changing future demands.</li> </ul>
<p>Third, Make use of the urban/local <b>planning context</b> and frameworks. These will ensure that planners;</p>	<ul style="list-style-type: none"> <li>• create a long-term vision of a green city within the local authority;</li> <li>• integrate urban green space infrastructure needs in urban master plans;</li> <li>• consider green spaces within infrastructural projects (housing, transport, business parks, community and health facilities) and urban rehabilitation approaches;</li> <li>• consider regional planning frameworks such as green corridors and networks;</li> <li>• Engage the local community as part of the local planning process.</li> </ul>
<p>Forth, Consider green space projects to be a <b>public health and social investment</b>.</p>	<ul style="list-style-type: none"> <li>• Providing green spaces in urban settings is an investment in health, well-being and quality of life, creating places for relaxation, recreation and social interaction.</li> <li>• Urban green spaces are valuable settings for community organizations to host cultural or recreational events or provide space for (intercultural) gardening.</li> </ul>

Besides this, the **Urban Green Index** is an indicator that allows the number of green areas per inhabitants in urban areas to be calculated, as well as the surface area of green areas in a city. According to the World Health Organization, between 10 -15

square meters of green space per inhabitant are needed to ensure a healthy urban ecosystem (URBAN ESPORA, 2019).

## 2.5 Strategic Planning in Green Space Management

Green spaces exist in various shapes, structures, and types within the city or urban fabric. The successful protection, creation, and development of the spaces are key elements required to achieve sustainable urban development. Thus, the process of building the Urban Green Space Strategy helps a city to Strengthen its long-term perspectives and promotion of sustainability, Promote a more holistic overview and a better understanding of the urban green space situation, provision, and quality as well as the needs, priorities, and values of its inhabitants. Green Space Management helps build a collective vision of its own urban green space development, discover effective ways to solve urban green space problems and develop its urban green space potentials. It also improves the quality of life, i.e., improving its environment and its facilities for recreation, leisure, and social activities.

Incorporate the urban green space issues into its planning system and legislation raise public and political awareness for urban green spaces and generate public participation. Strategic planning generates stakeholder and interdepartmental cooperation to develop long term funding and management opportunities. (Greenkeys manual UPIRS, 2007).

According to Greenkeys manual UPIRS 2007, the main purposes of green space strategy are;

- to safeguard the future of green spaces;
- to improve the quality of urban areas and especially the neighborhoods;
- to make urban areas more attractive and thereby attract more resources;
- to enhance the well-being of local people and tourists.

Moreover, the green space strategy should lead towards the better use of green space potentials and help resolve conflicts in advance.

According to the GreenKeys project (GreenKeys Project Team, 2008), the green space strategy needs to be open and flexible enough for all different city situations, and at the same time also supportive enough to make the development of green space strategy 'simple and possible.' There will always be three parts to be developed and formulated for a successful and realistic outcome in this regard.

1. **Starting part** (preliminary activities)
2. **Analytical part** (information gathering and evaluation)
3. **Action part** (formulation of strategy)

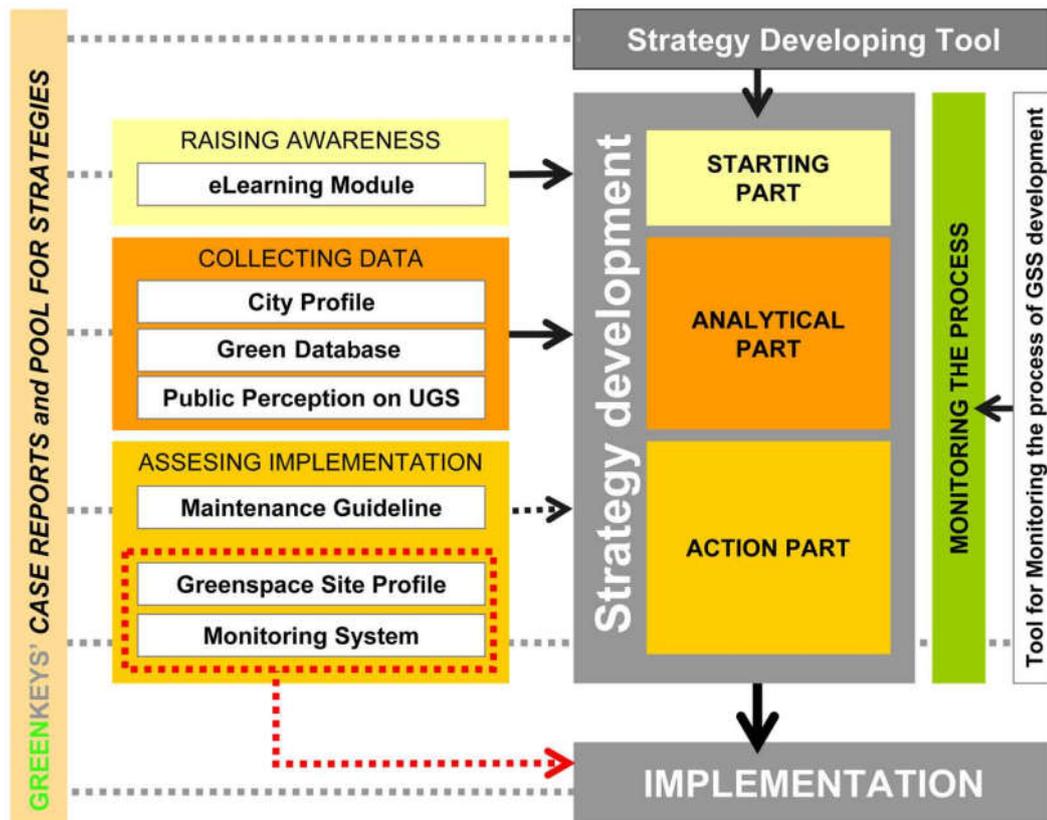


Figure 4 : The use of Green Keys Tools in the urban green space development and management process and how they support the formulation of an Urban Green Space Strategy

Source: (GreenKeys Project Team, 2008)

First, **Starting part (preliminary activities)**; this phase is mainly about preliminary activities that are important for preparing a supportive background for developing a strategy that is aimed at;

- Securing public, political and financial support; this step is mainly about the confirmation of any mission statements, visions, or goals that result from the strategic dialogue is only of value once accepted and confirmed by the political representatives—creating a supportive environment for green space strategy at the government or political level (which is a strategic concern by itself). Besides this, a learning module needs to be set to provide support for increasing the awareness and knowledge of politicians, decision-makers, and municipal administration about green space management.
- Defining the planning procedures; In these planning procedures, a primary mission and vision for the strategy should be formulated, which sets out its general purpose and the values it will follow. It will also outline the future directions of urban green space development and refined and adjusted up

until the end of the process. These will set down the scope of the exercise and the program of further work.

- Identifying the links with other city strategies; Identifying the links with other city strategies
- and spatial documents; and Organizing the work for the strategy

Second, **Analytical part (information gathering and evaluation)**: The analytical part includes the data collection and analysis of the 'objective data' and subjective information necessary to put the strategy onto a satisfactory empirical basis. At the same time, this part helps to understand the planning context, state of urban green space, local needs and demands, development trends and tendencies, potentials, challenges and opportunities, problems, and obstacles for urban green development in the city.

Third, **the Action part (formulation of strategy)**; this part manages the compilation of the strategy process results and the preparation of a draft version of the strategy document based on the results of the previous activities. Different proposals for achieving the vision and aims of the Green Space Strategy are set down, together with the development of a clear concept on how to implement the most important strategic decisions. The 'Action part' incorporates the following aspects;

- Defining strategic issues and final priorities of the strategy
- Preparation of the spatial concept of urban green space development
- Defining the ways and means to implement the priorities and goals.
- Monitoring the green space development to get effective the green space strategy.

## Chapter 3 - Hammarby Sjöstad

### 3.1 Spatial planning in Hammarby Sjöstad

Spatial planning includes an all-round planning strategy of a place before attempting any development process. While considering issues concerning individuals encounters and appreciation of green spaces or parks within the urban area becomes significant such that it incorporates all of those activities which help an individual to accomplish generally of his step by the step work plan, from transportation to everyday shopping; and from waste disposal to recreation exercises. As indicated by the National Environment and Planning Agency (2013) role of spatial planning is to create the conditions for an enhanced quality of life and meeting the challenges of sustainable development. Along these lines, the primary goal of spatial arranging is to guarantee that the use of the land resource is planned and implemented in an organized way to address the issues of the present and future generations.

When the Hammarby Sjöstad project started, environmental goals were ambitious. It was supposed to be a modern sustainable suburb using the latest technology. The main concept was that Hammarby Sjöstad would be the most sustainable city district, which is ever built; Hammarby Sjöstad was designed to be twice as good as anything built when it comes to sustainability. The urban setting of Hammarby Sjöstad shows that the planners tried to focus on nature based solutions to create a sustainable city. Planning in Hammarby Sjöstad depends on receiving an all-encompassing methodology through the association of a variety of enterprises like town organizers; modelers; organizations working with waste, transport, and energy; and a joint effort that helps to create a sustainable area for urban development.

Hammarby Sjöstad has an environmental planning program (see table 4), which summarizes the original operational goals that the City Planning Administration devised for Hammarby. These goals were established for new insights into how to achieve an eco-friendly and safe neighborhood for all. Hammarby Model is the eco-cycle that describes environmental solutions used for energy, waste, water, and sewage, which is considered a step towards sustainability in the long term.

Table 5: Examples of original operational goals divided into nine categories (Source: City of Stockholm, 1996) see (Svanqvist, 2019)

Category	Operational Goal
Energy	The total requirement of supplied energy is not to exceed 60 kWh/m <sup>2</sup> of which electricity is not to exceed 20 kWh/m <sup>2</sup> and the total being the sum of all residential energy consumption that includes energy from solar cells/collectors.
Transportation	80% of all commuters are using public transport, cycling or walking.
Material flows (waste and recycling)	The total amount of recyclable and waste material, both of which are the responsibility of municipal authorities and various commercial interests, is reduced by 20% in weight.
Water and drainage	Water consumption (excluding re-circulated water) per person is reduced by 50% compared with the average supply to new housing in the inner city area
Building materials	Recoverable materials are to be used as far as is technologically and economically possible
Land use	100% of all developed land is to be re-developed and adapted for the district.
Contaminated Soil	Areas of contaminated soil are to be sanitized prior to development, to such an extent that they no longer represent a risk to either public health or the environment.
Lake Restoration	All storm water from roads and parking areas is to be purified.
Emissions/Disturbances	All housing is to have a noise-free side, where the equivalent noise level outside the window does not exceed 40 dB.

The general strategy of Hammarby Sjöstad is to make an urban region that would be twice as great regarding diminished ecological effect, and which would use half of the amount of energy used in typical development. Here in this project, sustainable development is highly connected with environmental issues. The Hammarby model forms the environmental program, which is the core of Hammarby Sjöstad, Stockholm, and with its environmental objectives to create a sustainable region. In general, the Hammarby Sjöstad project is, as demonstrated, in line with the City of Stockholm's relatively new environmental goals (Stockholms Stad, 2019).

The urban settings for Hammarby Sjöstad are;

- external building greens, green roofs,
- Parks and (semi)natural urban green areas,
- Large urban park or forest,
- Pocket, parks/ neighborhood green spaces,
- Green corridor,
- Green areas for water management,
- Sustainable urban drainage systems.

These urban settings are also referred to as a natural base solution for a sustainable city. The “Hammarby model” shows that wastewater can be used in multiple different ways and that rainwater can be returned to the natural cycle (Hammarby Sjöstad, Stockholm, Sweden); rainwater infiltrates the ground directly or is drained off through canals. The residents of Hammarby have the option of monitoring their energy and water consumption via the internet to increase their awareness of their habits. Wastewater goes to the nearby treatment plant “Henriksadalsverket” which was modernized as part of the plans for Hammarby Sjöstad. The sludge produced by the treatment process is recycled and used for fertilizing farmland and forestry land (Moore, 2016).



*Fig 5: Buildings are facing towards lack*  
Source: (Ignatieva & Berg, 2014)



*Fig: 6 Inner green space*  
Source: (Ignatieva & Berg, 2014)



*Figure 7 Walkway adjacent to the lack*  
Source: (Ignatieva & Berg, 2014)



*Figure 8: Walkway adjacent to the lack*  
Source: (Ignatieva & Berg, 2014)

In this project, the planners took all the necessary steps to make a healthy, livable place for the residents, including empowering ecological balance by connecting the inner green space with near nearby green wedge and further out in large nature reserve, Nacka nature reserve, through two Eco ducts. The planners have tried to design all the residential blocks facing towards the lake and Pockets Parks. Common green space has been created to bring nature as near as possible to the people in Hammarby Sjöstad that residents could connect the nature in their everyday life. That’s why it has been considered a dense green-blue city district. A large part of the southern Lakeshore was planted with trees where a popular recreational boardwalks system was built.

### 3.1.1 The land use plan

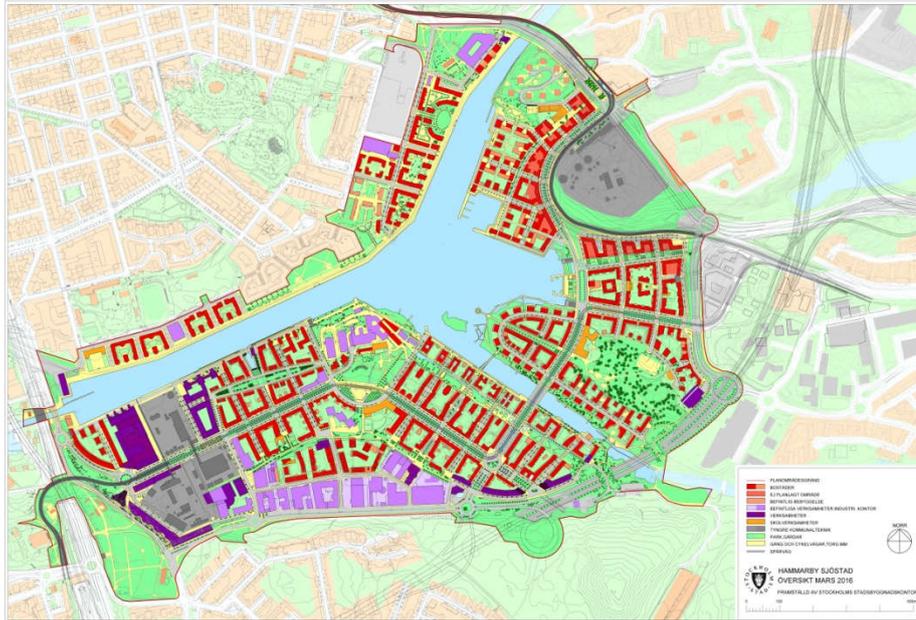


Figure 9: The land use plan of Hammarby Sjöstad, Hammarby Sjöstad

Source: (Stockholms stad, 2020)

*The red structures are residential building structures with commercial uses in the bottom floors; the purple color signifies the business area; the orange color signifies the educational facilities; the grey color stands for heavy municipal infrastructure systems such as district heating and water and sewer plant; the green color highlights the parks and yards; and the yellow color shows the footpath network, bicycle paths and squares.*

### 3.1.2 The "Hammarby model"

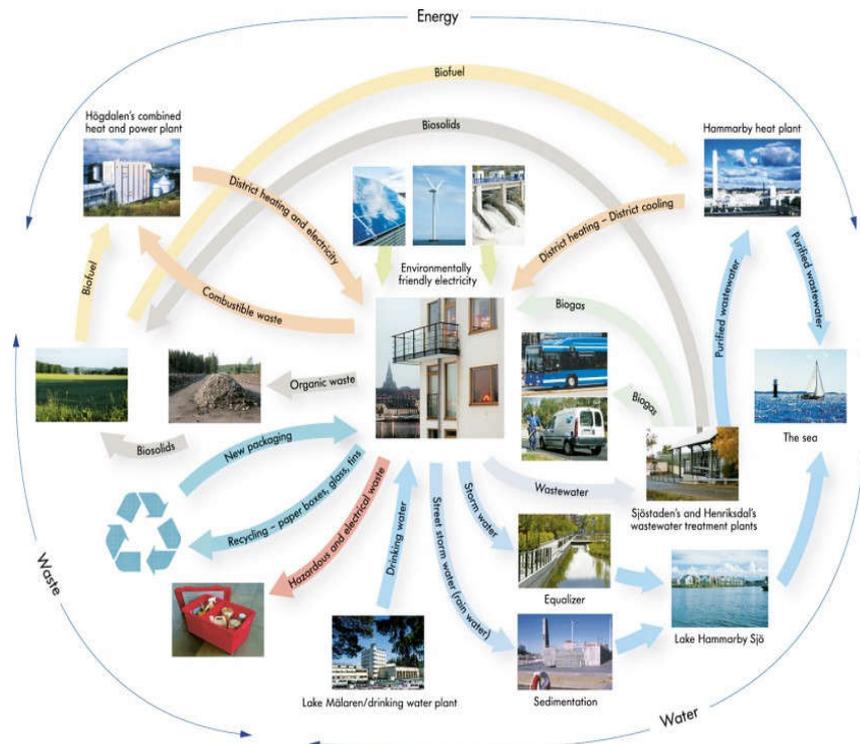


Figure 10 : Integral energy, waste and water system © Bumpling AB  
Source: Copyright by Bumpling AB see (Stockholms stad, 2020)

The Hammarby model, an eco-cycle in itself describes the environmental solutions for water and sewage; waste; and energy. Following are included in the Hammarby model (Stockholms Stad, 2019).

#### Energy

- Combustible waste becomes district heating and electricity.
- Bio fuel becomes district heating and electricity.
- From the purified wastewater you get both district heating and district cooling.
- Solar energy is converted into electrical energy or used to heat water. Electricity should be well-eco-labeled or equivalent.
- Biogas is extracted from sewage sludge and food waste.

#### Waste

- Combustible waste is converted into district heating and electricity.
- Food waste is digested into biogas for vehicle operation and the soil becomes nutrient-rich fertilizer.
- All material that can be recycled goes to recycling: newspapers, cardboard, glass, metal etc.
- Hazardous waste and electrical waste are processed or sent to landfill.

### Water and sewer

- Rainwater from streets is treated locally and does not burden the sewage treatment plant.
- Rainwater from farms and roofs is led to Hammarby Lake.
- The wastewater is purified and then contributes to district heating and cooling.
- Biogas is extracted when the sewage sludge is digested.
- The digested sewage sludge is used for fertilizer.

### 3.1.3 Approaches to Landscape Architecture of Hammarby Sjöstad project

Within the Hammarby Sjöstad area, there is a network of various parks, green spaces, and walkways run through the district to provide a counterbalance to the dense urban landscape and at the same time provide space for outdoor activities. The amount of public green space is about 19 percent of the total area (Svanqvist, 2019). The public green space of Hammarby Sjöstad is connected to the city-wide structure of green wedges and green links. The green networks also connect to walking and cycling paths in surrounding nature preserves and to eco-ducts over larger roads. The development stipulates 25 m<sup>2</sup> of public green space per apartment unit (Svanqvist, 2019).



Figure 11: Green space network of Hammarby Sjöstad project  
Source: (Stockholms stad, 2020)

Green surfaces and trees that have been planted help collect rainwater locally instead of having it drain into the sewage system. The vegetation will also filter the pollutants from this stormwater runoff and ensure cleaner air. Even two wide bridges over the busy Sodra Lanken road have also been covered with vegetation. These bridges also provide a link and a shortcut between Hammarby Sjostad and the nature reserve outside of the city (Stockholms Stad, 2020).

The natural landscape, where possible, has been preserved and has inspired the development. The original reeds and rushes remain along the waterfront, where built secluded walkways extend into the water. There is also a carefully preserved oak forest on-site (Stockholms Stad, 2020).

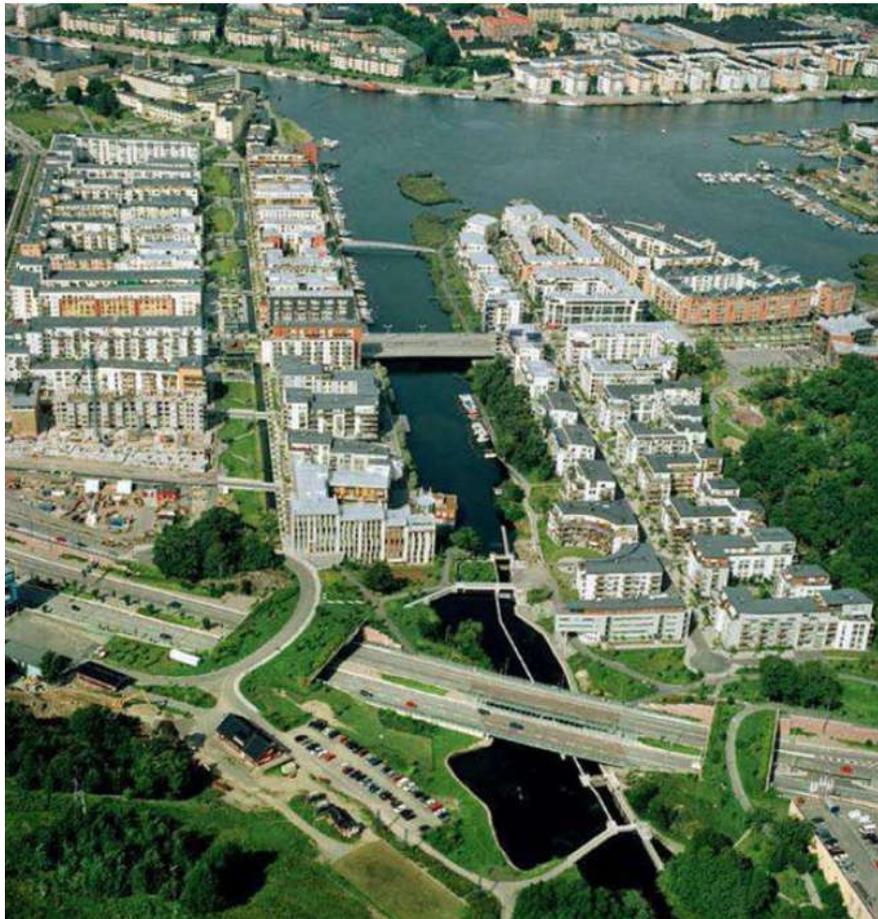


Figure 12: Ecoduct<sup>3</sup>. An ecoduct was installed above the road to help wildlife cross safely.  
Source: (Stockholms stad, 2020)

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<sup>3</sup> Ecoduct is a wildlife crossing bridge allowing animals to cross human-made barriers safely. Wildlife crossings may include underpass tunnels, viaducts, and overpasses or green bridges; amphibian tunnels; fish ladders; canopy bridge, tunnels and culverts; and green roofs. Usually an ecoduct was installed above the road to help wildlife cross safely.

### 3.2 Some weak points of Hammarby Sjöstad project

According to (Hammarby Sjöstad2.0) the main focuses of this project were;

- Residential and commercial energy consumption should be low;
- People would choose public transport rather than cars,
- Recycle almost everything such as garbage would be used to produce district heating and food waste would be turned into biogas for cooking and fuel for vehicles,
- Various parks, green spaces, and walkways run through the district to provide a dense green environment, the material that would be used for buildings should be eco friendly.

Though sustainable environmental goals are impressive, the city has faced challenges in achieving its sustainable goals for the project. As many studies show, it didn't turn out as planned.

There are many positive qualities in Hammarby Sjöstad; it has an enormous public space, relatively many green spaces, a good public transport network, a variety of functions of its buildings, and a decent and safe nearby condition where individuals can have general decent prosperity. But still, there is a need for proper intermediary scale green areas, which makes it significant to re-develop "leisure commuting" both to the southern green wedge across the two eco ducts built over the main South link freeway and across the Hammarby lake to the South Island. Today the Hammarby Sjöstad offers a more sustainable framework for everyday life than the average Swedish city but hardly challenges its inhabitants to lead a more resilient life than it was considered (Ignatieva & Berg, 2014).

To achieve ambitious environmental goals, planners have integrated the housing area into the natural surroundings. To provide a good view from the apartment, many windows face lack and receiving much light and energy. This affects the temperature (reach high) in the apartments, especially in summer. And also another important issue is that apartment windows are their sheer size. It is very common in modern architecture to use large glass windows, and it is also often desired by the inhabitant. As the Hammarby Sjöstad project is environmentally sustainable, these large windows don't fit the planning strategy to reduce energy use. The planners could have used another type of windows to provide adequate insulation, which could work better for conserving heat than the present situation (Poldermans, 2006).

Another important issue of the project concerns car parking spaces. With the environmental goals, car mobility was intended to be severely reduced and increase the public commuter system in Hammarby Sjöstad to reduce emissions. But at this

point rather to reduced car mobility, it has been increased and affecting public transport. The initial car parking standards 0.25 parking spaces per apartment, but soon it was decided to rise to 0.7 per apartment. This measure conflicted with environmental goals (Poldermans, 2006).

There is also another issue of not having enough core centers and smaller local cultural centers, theater and music stages, and public indoor meeting places. The demographic structure is biased towards young families, which will create peaks of societal needs (daycare, schools, secondary schools, jobs). Also, social diversity is low, and the area is isolated by only highly income people. The Hammarby also need to fortify its social attachment to provide its sustainable lifestyle habits for all (Ignatieva & Berg, 2014).

From the literature study (Svanqvist, 2019), it appears that; In this project, the environmental program of Hammarby Sjöstad came late in the planning process, which resulted in contradictions between different goals in the project of Hammarby Sjöstad, including UGS planing. This resulted in difficulties in implementation of the environmental program. The governing of the City of Stockholm was not clearly manifested in the implementation of the environmental program. The environmental program goals were not clearly stated in written agreements between the City of Stockholm and the building contractors. It is also evident that there was nothing written in the environmental program of Hammarby Sjöstad from 1996, stating how the program was supposed to be followed-up and the responsibility for that .

Beside this the green areas in Hammarby sjöstad that I have investigated are designed by different landscape archtiects. There was not an overall green infrastructure masterplan made by landscape archtiects at the program level for Hammarby sjöstad. But the program included descriptions of topography and vegetation within and around Hammarby sjöstad (Stockholms stad, 2020). The program also included descriptions of social needs within in green open space in Hammarby sjöstad and the overall plan at the program level show the green infrastructure with a green color connecting water areas on the map. It seems that landscape architects show low interest for comprehensive planning and masterplans for neighborhoods, large districts, riverlandscapes and so forth.

### 3.3 Summery

If I want to evaluate the Hammarby Sjöstad project as a whole, I have to agree that there are positive and conflicting aspects of the project. We cannot deny that conflicts appear when different sustainable planning goals are tried to achieve at the same time. In this case, we can also see the conflicts that appear in the Hammarby Sjöstad project also, although when this project started, environmental goals were ambitious. It was supposed to be a modern sustainable suburb using the latest technology. The main concept was that Hammarby Sjöstad will be the most sustainable city district, which is ever built; Hammarby Sjöstad was designed to be twice as good as anything built when it comes to sustainability. The urban setting of Hammarby Sjöstad shows that the planners tried to focus on nature based solutions to create a sustainable city.

Though sustainable environmental goals are impressive, the city has faced challenges in achieving its sustainable goals for the project. As many studies show, it did not turn out as planned (Hammarby Sjostad2.0). Some environmental goals are not achieved; for example- the large windows provide excellent views of the natural surroundings, it causes unnecessary heat losses in the colder times of the year due to the building using so much energy. Furthermore, too many cars, which were meant to be heavily discouraged, are higher than predicted. Besides this, the whole sustainability concept is challenged as long as the Hammarby Sjöstad waste-food cycle is not better developed in micro-regional and local scales (Ignatieva & Berg, 2014).

It seems that inhabitants of Hammarby Sjöstad did not choose this neighborhood for its sustainable environmental aspects but rather because of an attractive location close to the city center. It is important that as a society live one with nature and appreciated every day as a part of our lives (Cronon, 1996). Though Hammarby Sjöstad is not an entirely successful project, it is an interesting project, and a lot has already been learned from it. It can be said that it is a step towards sustainable urban development, but the planners still have plenty of work left in the future to try and find the best ways to achieve sustainable urban development goals. Besides this, there is a lacking of spreading information about how the residents should implement the environmental program in their lifestyle to make the Hammarby project more successful.

# Chapter 4 - Methodology

## 4.1 Research Methodology

Many studies have been undertaken from different perspectives to understand various issues involved in Hammarby Sjöstad. Still, I find a lack of studies of how Hammarby Sjöstad reached certain general planning goals. This study, which is focused on understanding and interpreting of inhabitants' experiences in green space environments of Hammarby Sjöstad, aims to add a lacking piece in evaluating the planning of Hammarby Sjöstad.

To reach the overall objective of this study to contribute to sustainable development, I have applied quantitative and qualitative research methods through an online survey platform. The research questions examined people's experiences and appreciation of green spaces within Hammarby Sjöstad, according to a specific method; Meerci™. The survey also included how people are engaged with their nearby nature in their everyday life.

I have used the survey results on "people's experiences of green spaces in Hammarby Sjöstad" in the analysis of qualities and shortcomings in the physical environment and how the spaces are used. I have derived the analysis results and try to formulate them as guidelines to improve the social sustainability and cohesion of urban green spaces in Hammarby Sjöstad. The discussion of the results will use the background theory to evaluate how likely this thesis's results can be considered as general results.

The questions that have been designed for this research are structured, semi-structured, and open-ended. In the thesis, a special method has been used to measure the experience of urban green areas.

One part of the survey is about how the participant's affective appraisals of five different green spaces in Hammarby Sjöstad. The 18 different positive or negative emotions in the question to answer are used in validating the Meerci method in a doctoral thesis by Lena Steffner (2009). The circumplex model of affect builds on research by James Russell and is widely applied within the subject environment psychology (James A Russell 1980).

The Participants are asked to mark what emotions they spontaneously remember in their associations with a specific place. A circle diagram describes the results in the form of measurement of the affective appraisal. The diagrams show how many

percent of the participants experience the environment as exciting, pleasant, and safe or its opposites; boring, unpleasant, and unsafe (Lena Steffner,2009).

In an exciting place, the participant can feel	Interested Revived Happy
In a Pleasant place, the participant can feel	Inspired Stimulated Harmonic
In a Safe place, the participant can feel	safe Calm Relaxed
In a Boring place, the participant may feel	uninterested Bored Depressed
In an Unpleasant place, the participant may feel	Annoyed Frustrated Irritated
In an Insecure place, the participant may feel	Stressed Worried Scared

Translated into English from Lena Steffner,2009, p-44; Evaluation of urban environments, a method to measure experience.

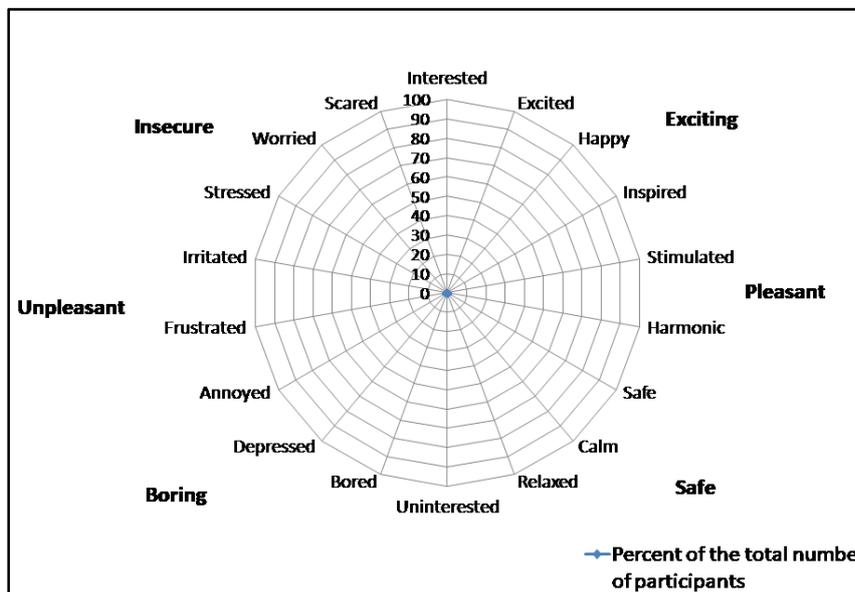


Figure 13: Diagrams of emotional experiences in different urban environments; Translated into English; Source: Lena Steffner,2009

The participants were also asked to mention reasons for their affective appraisal, reasons in the physical environment, or activities in the places. The reasons are the basis for analyzing the emotional impact of qualities and shortcomings at the different places measuring.

An on-site implementation survey usually requires a group to be on-site at the same time, which means risk that the individuals influence each other. Measuring experience based on images instead of directly on-site has other benefits of providing a more integrated memory image of how the place is usually experienced instead of measuring at an opportunity that may be affected by temporary factors. It is also important that the questionnaire is answered based on the individual experience's memory than any influence from other people's experiences. This is why this survey question is designed based on images. (Steffner, Evaluation of urban environments, a method to measure experience, 2009)

The research questions were answered by the inhabitants of Hammerby Sjöstad online through a Facebook group and few questionnaires were sent to the inhabitants of Hammerby Sjöstad by regular mail to answer. The link to the survey question was posted to this Facebook group with the help of Inger Johansson (who is the former head of the neighborhood organization at Hammarby Sjöstad) as well as the questionnaires by regular email. The survey questions were organized in two languages, English and Swedish, so that the participants felt comfortable answering the questions. Formal information consent was taken before the participants took part in the online research survey. Everyone who participated in the survey is anonymous in the presentation of the results.

## 4.2 Research questions

The research question was set up, keeping in mind the present study's research questions. General open questions on how the area is experienced are asked in this online survey. The questions are designed to balance open-ended questions, structured questions,, and semi-structured questions to ensure that the outcome could be used as an opportunity for further research for this thesis study (to provide a guideline). And also, the questions are designed in a way so that the participants would feel encouraged to connect their experiences of the urban environment with their emotions (moreover, it helps to know more about the local needs and demands, development trends and tendencies, potentials, challenges, and opportunities).

The online survey started with the basic information about the individual participant like name, age, gender, and occupation, how long they have been living the area. This helped to form a basis level of understanding about the participants. The main research questions regarding the objective of the thesis study formed in the next part of the survey, which are as follows:

Question 1 According to you; what was the Environmental Program for Hammarby Sjöstad mainly about?

- To improve natural environment around.
- To help fight global climate problem
- To highlight Sweden as environment friendly country
- To improve quality of life of the inhabitants

This question aimed to know whether the respondents relate the nature friendly living environment of Hammarby Sjöstad to Environmental program or not. The responses in this question will help understand how much aware are people about the planning policies followed or implemented for their living areas.

Question 2 Are there any open green spaces, like public parks or open spaces that you specifically notice in your area?

- Yes
- No

This question relate with next four questions. The aim of asking this questions is to observe that being aware of open spaces around them, whether people move into them or not?

Question 2.1 Are there any open green spaces, like public parks or open spaces that you specifically notice in your area? If yes, what is the name of the areas?

This question helps to understand their awareness about open green spaces around them.

Question 2.2 Are they easily accessible from your home or office?

- Yes
- No

When they answered yes, this question help to understand that the respondents are aware of the open spaces and they visit them. But when this question is answered as no, then it help to understand that being aware of the open spaces, the respondents hardly visit there. The responses gained here forms the base for further research that even after creating open spaces in the city, why people do not visit them?

Question 2.3 How do you get there?

- By feet
- By cycle
- By car

The answers gained from this question will help for further research as well as the individual reasons.

Question 2.4 How long does it take to go there?

- Less than 15 min
- Less than 30 min
- Less than 1 hour
- More than 1 hour

The answers gained from this question help for further research.

Question 3 How frequent do you visit green spaces?

- Daily
- Once a week
- More than once a week
- Never

The answers gained from this question will help for further research as well as the individual reasons.

Question 4 According to you; how does green space affect your everyday life?

- Positive
- Mostly positive
- Doesn't effect
- Mostly negative
- Negative

The answers gained from this question will help for further research as well as the individual reasons.

Question 5 Whenever you go to open spaces, what motivates you to go there?(mark one or several)

- Location
- Easy accessibility
- Design
- Functionality
- Personal Reasons

This question was aimed to understand whether location or easy accessibility is the reason for going in open spaces, or there are some other personal reasons.

**The following map will be used for the question 6-8 to answer by the participants.**

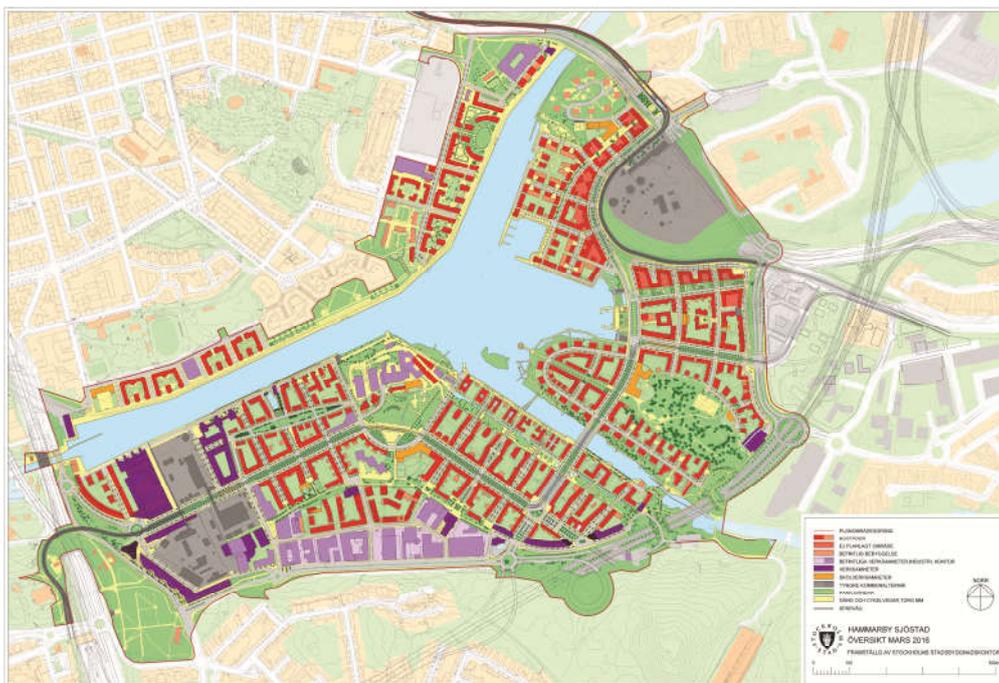


Figure 14: The land use plan of Hammarby Sjöstad, Hammarby Sjöstad  
Source: (Stockholms stad, 2020)

Question 6 Mark a place in the area that you like, with a ring on the map.

Question 6.1 Reason why you like this place?

Question 6.2 Underline some feeling that you have circled reinforces within you?

- Interested
- Happy
- Inspired
- Safe ,Calm, Relaxed

Above three question are relate to each other . The answer from these questions will help to understand the reason behind participant's emotional experiences. Also the answers gained from this question will help for further research in order to have basis for guidelines.

Question 7 Mark a place in the area that you do not like with a ring on the map.

Question 7.1 Reason why you donot like at this place?

Question 7.1 2Underline some feeling that you feel at that place that you do not like.

- Uninterested
- Bored depressed
- Annoyed
- Frustrated
- Worried/Afraid
- Insecurited

Above three question are relate to each other . The answer from these questions will help to understand the reason behind participant's emotional experiences of certain areas. Also the answers gained from this question will help for further research in order to have basis for guidelines.

Question 8 According to you is there any open green space that needs to be developed? Mark by drawing on the map.

Question 8.1 what is the reason behind it?

Above two question are relate to each other . The answer from these questions will help to understand the reason behind participant's emotional experiences of certain areas. Also the answers gained from this question will help for further research in order to have basis for guidelines

Question 9. According to you, what is your thought about the green space or open space in Hammarby sjöstad, Stockholm ?

The answers gained from this question will help for further research as well as the individual reasons.

*(i.e.. Question no.6-9 was sent to the inhabitants of Hammerby Sjöstad by regular mail to answer. Accept these questions all other questions were answered by online survey.)*

Question 10. Images of five representative urban environments. What positive or negative feelings would you spontaneously associate with this place as you personally know it? Mark one or several of the 18 options. (Meerci™)

- |               |                  |
|---------------|------------------|
| 1. Interested | 10. Uninterested |
| 2. Excited    | 11. Bored        |
| 3. Happy      | 12. Depressed    |
| 4. Inspired   | 13. Annoyed      |
| 5. Stimulated | 14. Frustrated   |
| 6. Harmonic   | 15. Irritated    |
| 7. Safe       | 16. Stressed     |
| 8. Calm       | 17. Worried      |
| 9. Relaxed    | 18. Scared       |

The answered will help to understand participants emotional experiences and to connect them to certain elements in the physical environment or to specific uses of the place. An understanding of the connection between the affective appraisal and the environment make it possible to work knowingly with strengthening for example the affective appraisal of safety, pleasantness and excitement at a place, or to reduce unsafety, unpleasantness and boredom at a place.

(The participants were also asked to mention reasons to their affective appraisal, reasons in the physical environment or activities on the places in next question.)

Five representative urban environments at HammarbySjöstad;

1. Lummaparken,
2. Inner green area ,
3. Large parts of the southern Lake shore was planted with reeds,
4. Observatorium and
5. Extended deck with sitting arrangement.

On the questioners survey there will be the picture of these five selected areas.

*Reason behind choosen this five different urban environments;*

- *Each areas have different characteristic*
- *These areas are most popular among the inhabitants*
- *At the time of my site visit I also observe that more activities are happening at these areas*

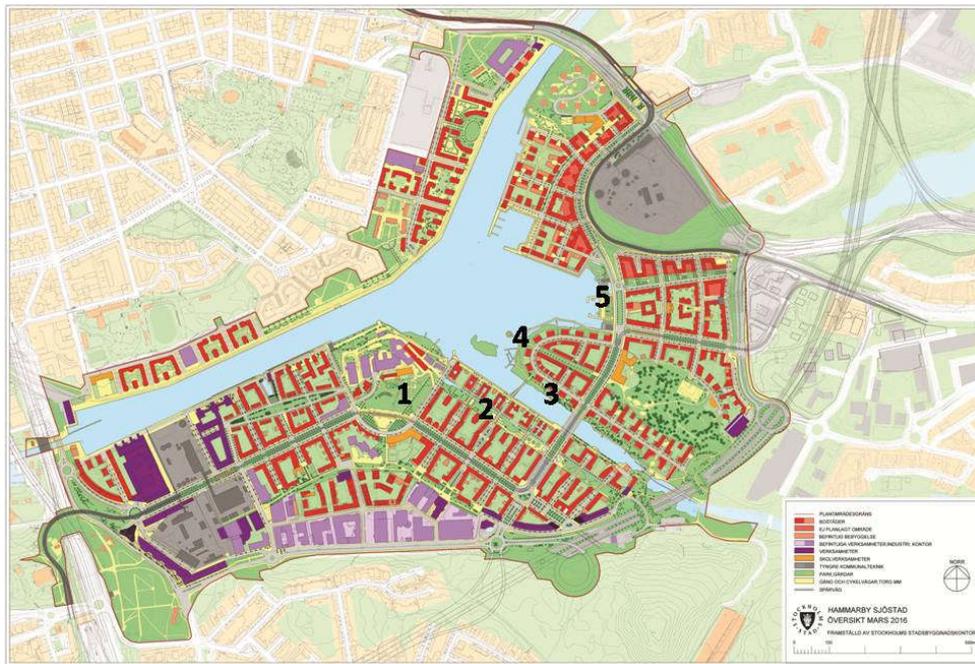


Figure 15: The land use plan of Hammarby Sjöstad, Hammarby Sjöstad and the number represent the Location of five representative urban environments at Hammarby Sjöstad; 1. Lummaparken, 2.Inner green area, 3.Large parts of the southern Lake shore was planted with reeds, 4.Observatorium, 5.Extended deck with sitting arrangement  
Source: (Stockholms stad, 2020)

Question 10.1 Describe reasons behind your emotional memory. The reasons can be the physical environment of the place or it can be activities that you remember has happened at this place.

This question relates with the above question. The answer will help to understand the reason behind participant's emotional experiences. Also the answers gained from this question will help for further research on qualities and shortcomings in the physical environment and of the uses in order to have basis for guidelines.

### 4.3 Data collection

Data collection is an important aspect and process of collecting information from all the relevant sources to find answers to the research study, test the hypothesis, and evaluate the outcomes. Data collection methods can be divided into two categories: secondary methods of data collection and primary methods of data collection (Data Collection Methods). In this research study, Primary methods have been used, and within the Primary data collection methods, both can be the quantitative and qualitative dimensions have been applied to get the necessary answer for the study.

To collect necessary data, the online survey provides a great way to automatically gather responses from the participants. Then I had to combine and summarize the

response to get an overall answer. There were many responses (31 responses in total) received from an online survey on both English and Swedish. But there were not many responses (5 responses) received from the questionnaires sent by regular post. However, I was very pleased to get certain responses; in general, five responses were collected.

For the online survey, "Google Form" has been used to gather responses from people. Google Forms is a survey administration software (Wikipedia contributors, 2020). "Google Form" allow us to collect information from people via personalized quizzes or surveys. We can share our form via email, a direct link, or on social media and ask everyone to participate and then connect the information to a spreadsheet on Sheets, which automatically records the answers. Since Forms is an online tool, the spreadsheet then populates with the quiz or survey responses in real-time (GAVIN, 2019).

With the help of this online survey platform, I have received the responses in two ways;

1. As a summary of responses (this gives an overall understanding of their responses).
2. Also, get individual responses from all the participants (which helps me understand their responses in a more detailed way).

The participants participate in this online survey and mailed questionnaires by post between 11th Sep and 20th Oct 2020. All of them live in of Hammarby Sjöstad area or work in this area. About 85 % of them were women, and 15 % of them were men. All of the people were between 30-72 years old. The participants are living in this area for at least 1.5 years to max 16 years. Participants are involved in different kinds of professions. Formal consent was taken before they take part in the survey.

To get the answer for the participant's affective, emotional appraisals of five different green spaces in Hammarby Sjöstad, the following steps have been used to produce the "Diagrams of emotional experiences."

- Data from the questionnaires are entered in excel sheets with information per each individual.
- The individuals' noted feelings for each image of a representative environment are added together.
- The percentage in the bottom line is obtained by letting excel perform a function of the number notes per emotion divided by the total number of participants times 100, which then, by fill under edit, let excel fill in the entire row of calculated percentages. ( Here, the percentages express a proportionate part of the total participants)

Besides this, the responses that have been received as the reason behind participant's emotional experiences have been categorized into positive and negative experiences in terms of physical environment and activities to be able to make a comparative analysis for this study.

## **4.4 Limitations and Delimitations in the present study**

Delimitations and limitations illustrate the boundaries, exceptions, and reservations inherent in every study. Therefore, it is necessary to identify limitations and delimitations before carrying out any research study to the conclusion. Limitations, however, aim to identify those characteristics that impact or influence the results achieved.<sup>4</sup> Limitations occur in all types of research and are, for the most part, outside the researcher's control. Delimitations are also factors that can restrict the study area. However, they are based on intentional choices about drawing the boundaries of the study. In other words, they confined the scope of a study and the aspects which will not be undertaken or looked into while conducting the research to maintain a focused path to achieve the research objectives laid.

### **4.4.1 Limitations**

Like every research study, this study also has some limitations which are mentioned below:

**a) Methodological Limitations:**

The method Meerci™ needs 30 people to have a result that is scientifically validated. The validation showed no difference between gender and ethnicity. But the validation showed that there can be differences in experience of the environment at different ages. A complete validated Meerci™ measurement should therefore have 30 participants from age groups of young people 15-30, grownups 30-70 and elderly 70 and older, to be able to say that this is a measurement of the experience of the environment. In my thesis the conclusions from the results should be further tested on young people and on elderly.

**b) Limitations of the researcher:**

**Pandemi situation (Covid-19):** Because of the pandemic situation (covid 19) access can be denied or impossible to some places and physical meetings, because of not having proper situation. As in the beginning I wanted to do interviews.

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<sup>4</sup> <https://researchpaperadvisor.com/lets-get-started/state-the-study-delimitations-and-limitations/>

**Timeframe:** The total timeframe to carry out this research study was limited. It was not possible to collect all data in this period and further, to carry out a very detailed investigation for the research study.

**Language:** Being in Swedish culture, language can act as a possible constraint in collecting data during the survey (since the survey was done in both languages), because majority of participants did the survey in Swedish and I had to translate the response in English by the help of Google Translate. This is why there might be a possibility to miss information.

#### **4.4.2 Delimitations**

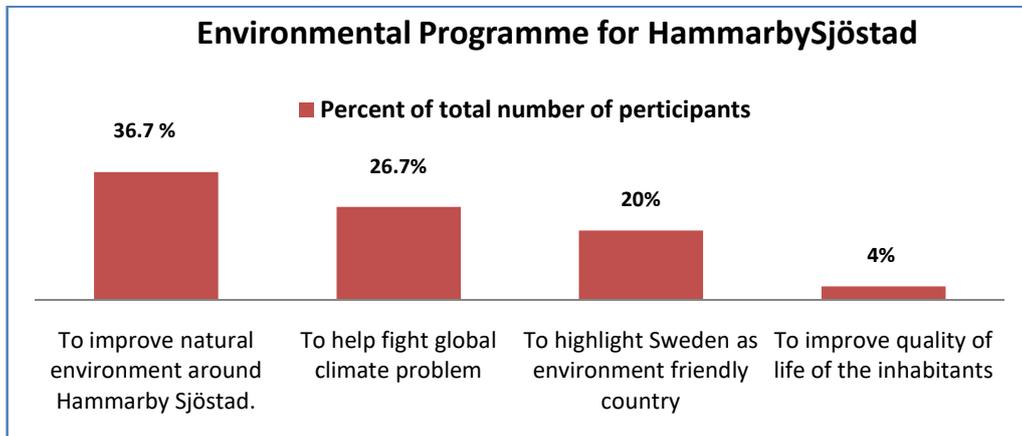
Along with the above mentioned limitations; this study project has delimitations as well. That means this research will not go into the following mentioned areas:

- The project will not go in-depth into the history of the Hammarby Sjöstad area other than going through the years when it became relevant in terms of spatial planning for sustainable green area development.
- The study will not search for the introduction or advancement of any other technological infrastructure, transport systems and waste management, in the suburb, which is used for environmental protection.
- The study will not have any economic, geographical or political functions of the area.
- Only green/ open environment sustainability and planning strategy will be looked into.

# Chapter 5 –Result and observation

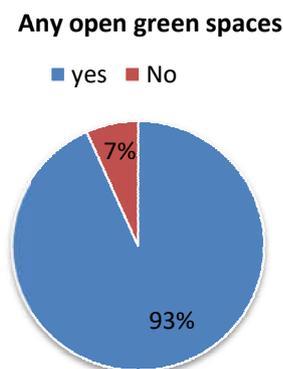
## 5.1 Result and Analysis of survey questioner

1. According to you; what was the Environmental Programme for HammarbySjöstad mainly about?



Comparative analysis: Most of the participants (see the illustration in the above graph) consider that the Environmental Programme for Hammarby Sjöstad is mainly to improve the natural environment within the area. Which is actually one of the major operational goals for the whole Hammarby project.

Question 2.1 Are there any open green spaces, like public parks or open spaces that you specifically notice in your area?



Comparative analysis: According to the above illustrated result most of the participants notice open green spaces around them. Only a few don't notice which means- thought there are open green space around them, they are not interested to be in those places. This is why they don't notice it.

Question 2.1 Are there any open green spaces, like public parks or open spaces, that you specifically notice in your area? If yes, what is the name of the areas?

Name of the green area	% of participants notice the area
Sickla park	3.22
Sickla kanal	3.22
the bridge between Sickla cape and Henriksdalskajen	3.22
sicklasjön,	3.22
Lumaparken	41.94
Slusparken	3.22
Hammarby parterren	22.6
Anders Franzén's park	6.4
Nackateservatet	22.6
The primeval forest along Årstaviken and Hammarbybacken	3.22
Hammarbybacken,	6.4
Hammarbyskogen	6.4

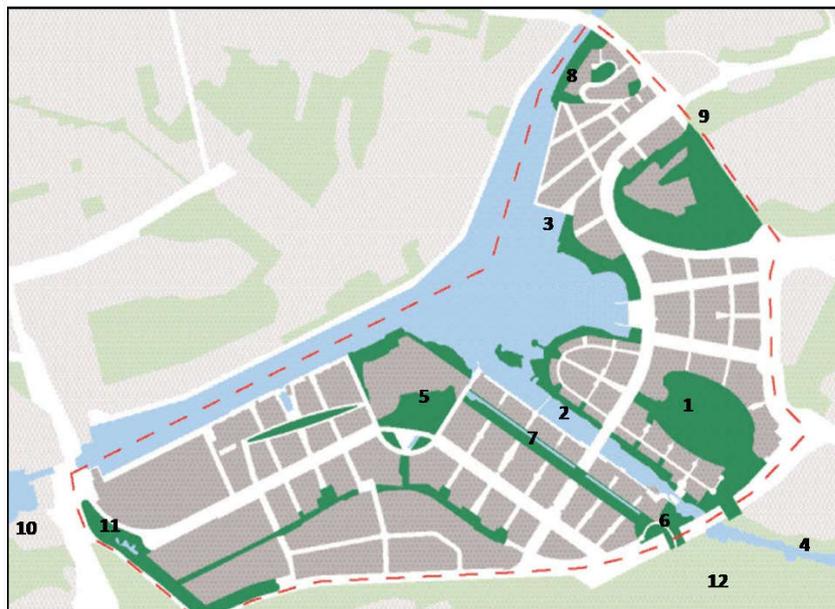
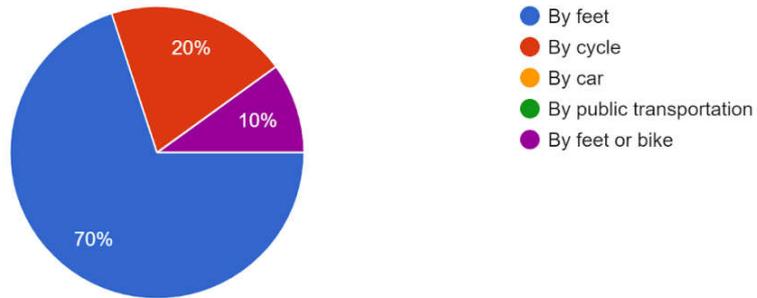


Figure 16: Green space network; Number represent the location of the noticed area by the participants  
Source: (Stockholms stad, 2020)

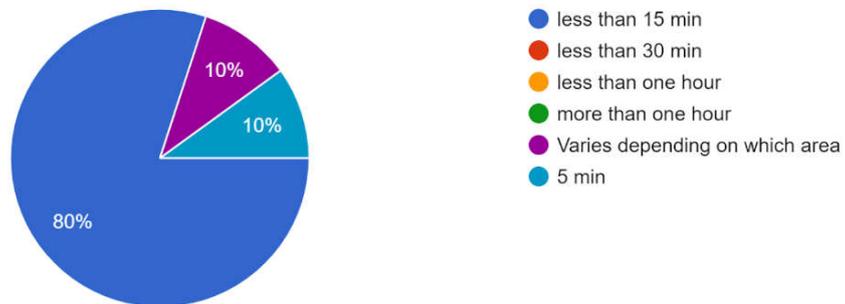
- |  |   |
|--|---|
| 1. Sickla park   | 7. Hammarby parterren                                       |
| 2. Sickla kanal  | 8. Anders Franzén's park                                    |
| 3. the bridge between Sickla cape and Henriksdalskajen | 9. Nackateservatet  |
| 4. sicklasjön,   | 10. The primeval forest along Årstaviken and Hammarbybacken |
| 5. Lumaparken  | 11. Hammarbybacken,   |
| 6. Slusparken  | 12. Hammarbyskogen  |

Comparative analysis: Most of the places that is noticed by the participants are within the Hemmerby area (the results are illustrated in figure 16). Only a few areas are outside Hemmerby area. But not so far from Hemmerby, very adjacent.

## 2.2 How do you go there?

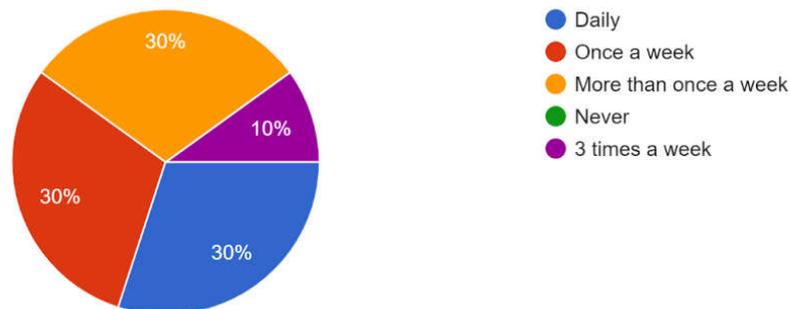


## 2.3 How long does it take to go there?



Comparative analysis: According to the above two illustrated pie chart, participants mostly go to green space by feet or cycle and they don't use public transportation or the car as they can arrive at the place within 5-10 min.

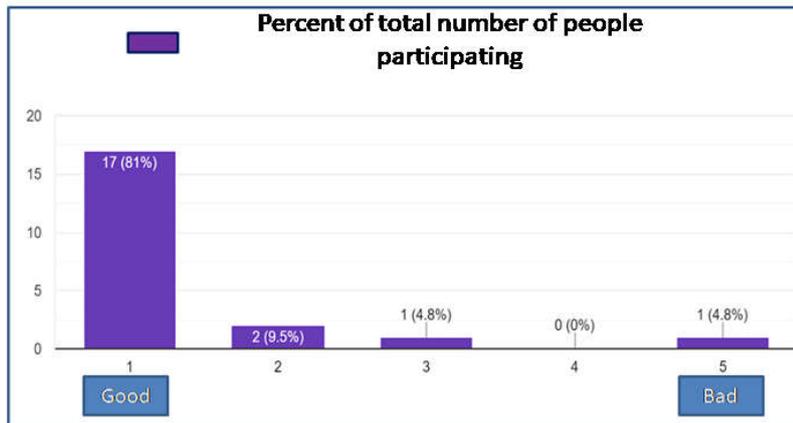
## 3 How frequent you visit green spaces?



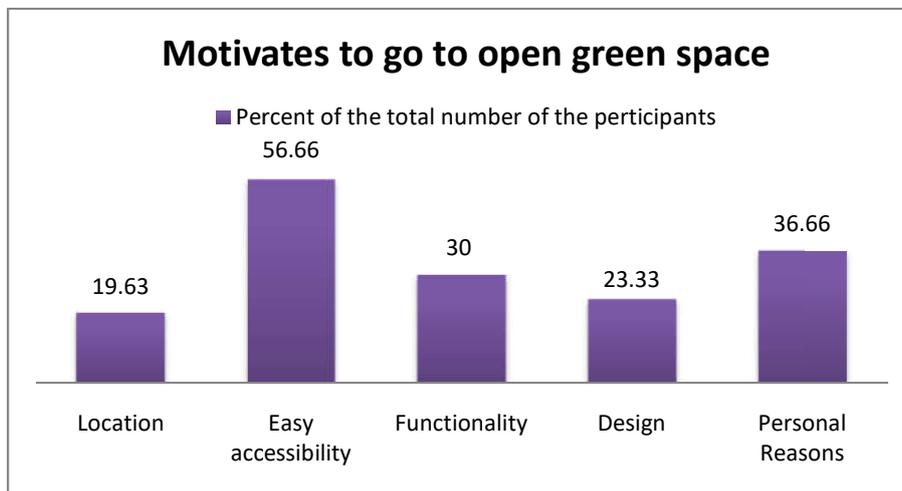
Comparative analysis:

The result from the above pie chart shows that participants visit the green spaces very often. It seems that they appreciate the fact of visiting green space.

4. According to you; how does green space affect your everyday life?



5. Whenever you go to open green spaces, what motivates you to go there?



**Comperative analysis:** According to the above two illustrated graph most of the participants consider green space effect their everyday life in a good way and easy accessibility motivate mostly to go to the open green space.

Question 6 Mark a place in the area that you like, with a ring on the map.

Question 6.1 Reason why you like this place?

Question 6.2 Underline some feeling that you have circled reinforces within you?

According to most of the participants' the marked areas in figure-17 is liked mostly.

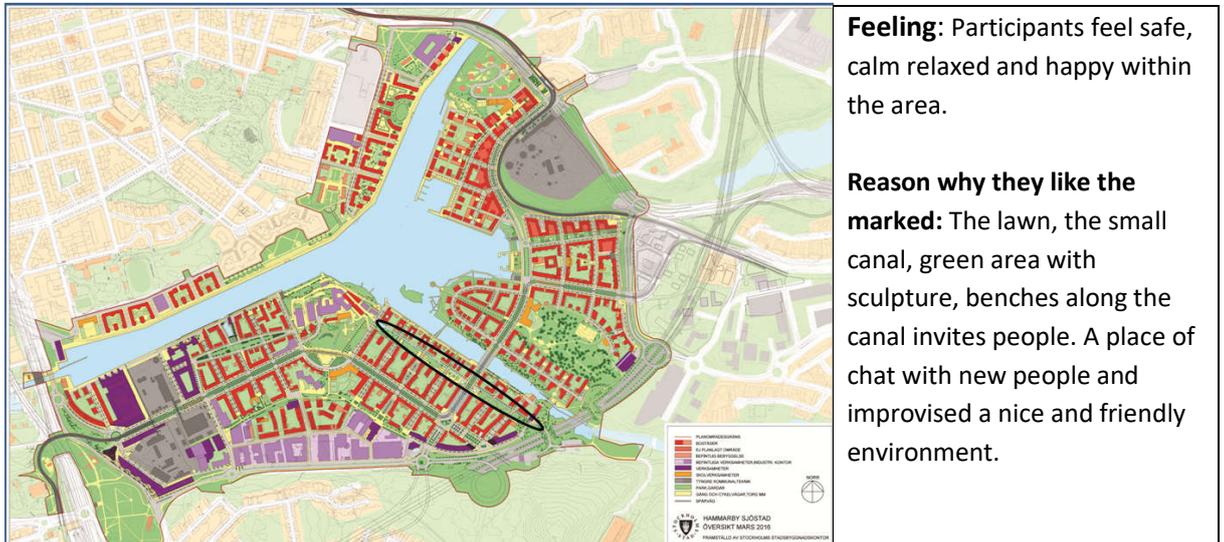


Figure 17: Summary of the participants' response for Question 6-6.2;

Source: (Stockholms stad, 2020)

Question 7 Mark a place in the area that you do not like with a ring on the map.

Question 7.1 Reason why you do not like at this place?

Question 7.2 Underline some feeling that you feel at that place that you do not like.

According to the participants' the marked areas in figure-18 are not liked by them.

Number explains the reason why these area needs to be developed.

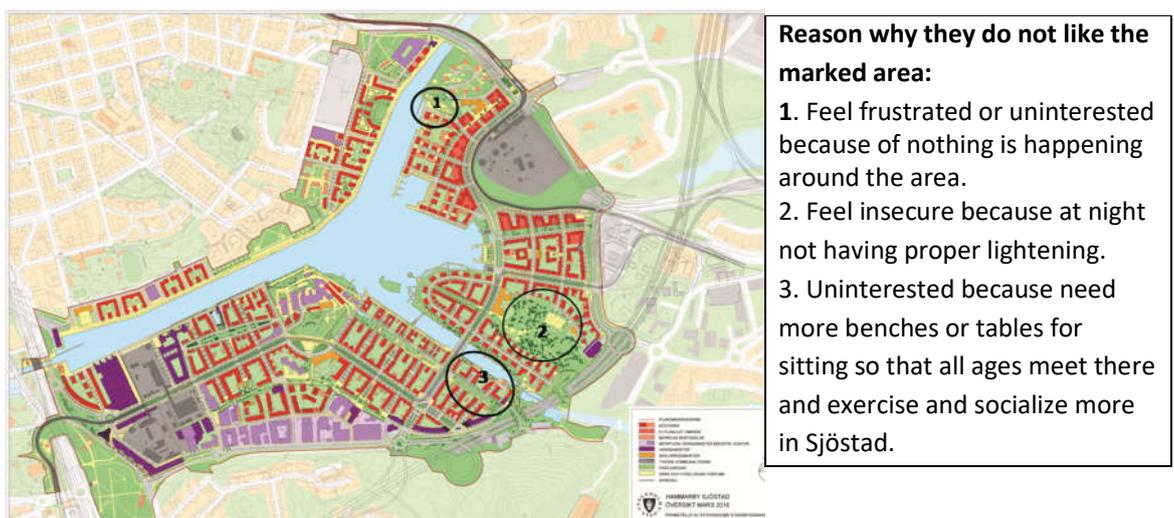


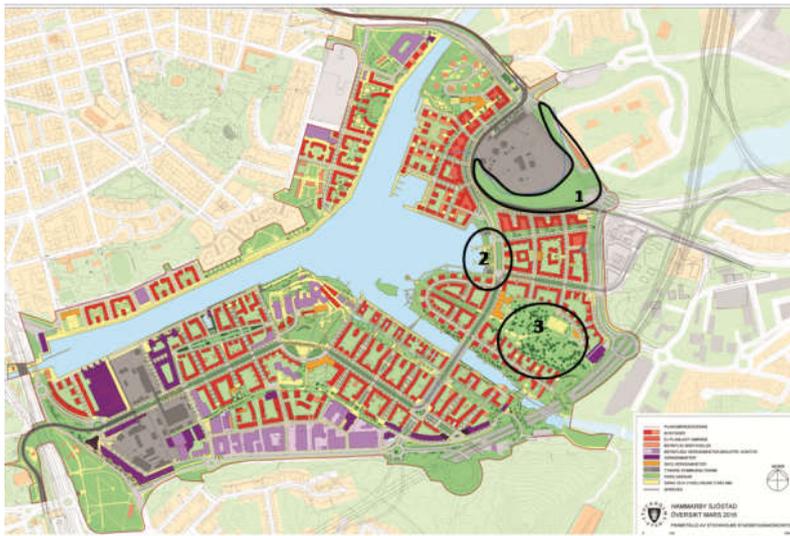
Figure 18 : Summary of the participants' response for Question 7-7.2; Source: (Stockholms stad, 2020)

Question 8. According to you is there any open green space that needs to be developed? Mark by drawing on the map.

Question 8.1 what is the reason behind it?

According to the participants' the marked areas in figure-19 need to be developed.

Number explains the reason why these area needs to be developed.



**Reason why need to be developed these marked areas:**

1. Put some benches and tables for sitting, chess table, some training bikes mounted on the ground (not marble) that should encourage families/groups, to visit the place more often.
2. a) Lots of broken pieces you can improve over.  
b) The place was meant for people to gather around. But now it has been shabby and need to be repaired, perhaps with more green plants, better places to sit down, and some restaurants or coffee houses. Now it's not cozy enough.
3. It's too dark, uneven lighting, difficult to get an overview

Figure 19: Summary of the participants' response for Question 8-8.1;  
Source: (Stockholms stad, 2020)

**Question 9. According to you, what is your thought about the green space or open space in Hammarby sjöstad, Stockholm ?**

Table 6: A summary of participants thought about the green space in Hammarby

	Positive Experience	Negative Experience
<b>Physical Environment</b>	<p><i>"so proud and so glad to be live in a part of stockholm which really had decied to take care of the architecture, the parks and everythings else in order to make a good environment for the people who lives here."</i></p> <p><i>"Nice areas"</i></p>	<p><i>"In general the area could be more developed for sport and social activites to become more attractive for both young people and adults."</i></p>

Comparative analysis: Table-6 summerises the participants experience into positive and negetive feelings in terms of physical environment. Accordig to table-6, Hammarby sjöstad is a nice and safe environment where lots of initiatives have

been taken to make it happen although there were possibilities to do more in terms of social cohesion.

Question 10. Images of five representative urban environments. What positive or negative feelings would you spontaneously associate with this place as you personally know it? Mark one or several of the 18 options.

- |               |                  |
|---------------|------------------|
| 1. Interested | 10. Uninterested |
| 2. Excited    | 11. Bored        |
| 3. Happy      | 12. Depressed    |
| 4. Inspired   | 13. Annoyed      |
| 5. Stimulated | 14. Frustrated   |
| 6. Harmonic   | 15. Irritated    |
| 7. Safe       | 16. Stressed     |
| 8. Calm       | 17. Worried      |
| 9. Relaxed    | 18. Scared       |

Question 10.1 Describe reasons behind your emotional memory. The reasons can be the physical environment of the place or it can be activities that you remember has happened at this place

# 1.Lummaparken



Figure 20: Picture of LummaParken; Source: Taken by the Author

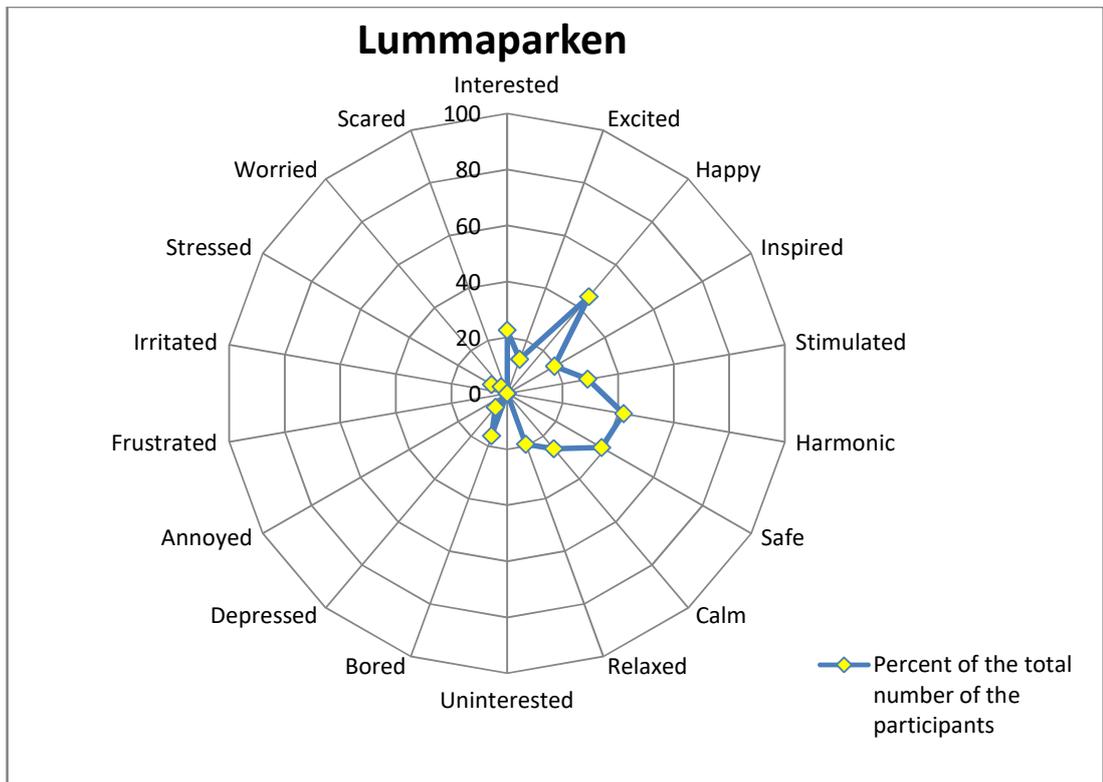


Figure 21: Diagrams of emotional experiences for Lummaparken

Table 7: A summary of the reasons for most common positive and negative experience for “LummaParken” is given below on the basis of physical environment and activities (Translated into English).

	<b>Positive Experience</b>	<b>Negative Experience</b>
<b>Physical Environment</b>	<p>“Beautiful with cherry trees that bloom in spring. Lots of space to sit on”.</p> <p>“Open green spaces, happy children in preschool”</p> <p>“Hilly park so something new is happening in different places.”</p> <p>“Appreciate the water installation”</p> <p>“The only green park in the middle of Hammarby Sjöstad”</p> <p>“Small green area in the middle of Sjöstad - surrounded by concrete and buildings.”</p> <p>“Playground for surrounding school.”</p>	<p>“is not maintained as well as it should be needed”</p> <p>“I get nervous about the it is so open (without gates or natural entrances / exits) that makes it easier to keep track of the children”</p> <p>“a pretty boring park”</p> <p>“Could be a little more harmonious”</p> <p>“surrounded by stressed people on their way somewhere and always on the go”</p> <p>“There is so much more that can be done”</p> <p>“It's an uninspiring design”</p>
<b>Activities</b>	<p>“Children sledding in the winter walking with my dogs”</p> <p>“room for imagination if you are a child”</p> <p>“a lot of activities there with training and sledding in the winter”</p> <p>“Trained dog and had a picnic with grandchildren”</p>	

**Comparative analysis:** The results from figure 21 shows that about 40-50% of the participants associated with feelings of being calm, happy, and harmonic in Lummaparken area. As presented in figure 21, The participant's response leans towards the positive feeling side though it has few negative feeling side also. Table-7, summarises the reasons for most common positive and negative experience for “Lummaparken that the participant experiences the Lumaparken environment mainly as beautiful and pleasant because of the small green area, as it is placed in the middle of the urban environment. This place is mostly used as a playground, sledding in the winter, training spot and picnic spot. The participants appreciate the features of the area such as open green space, water installation, hilly area, cherry blossom, but at the same time, they think there are possibilities to do more to make the area more attractive and hermonious. As the area placed adjacent to the road, participants get stressed about the proximity of the traffic as there is no natural entry/exit, which will help the participant to feel more safe and comfortable.

## 2. Inner green area



Figure 22: Picture of Inner green space at Hammarby Sjöstad; Source: Taken by the Author

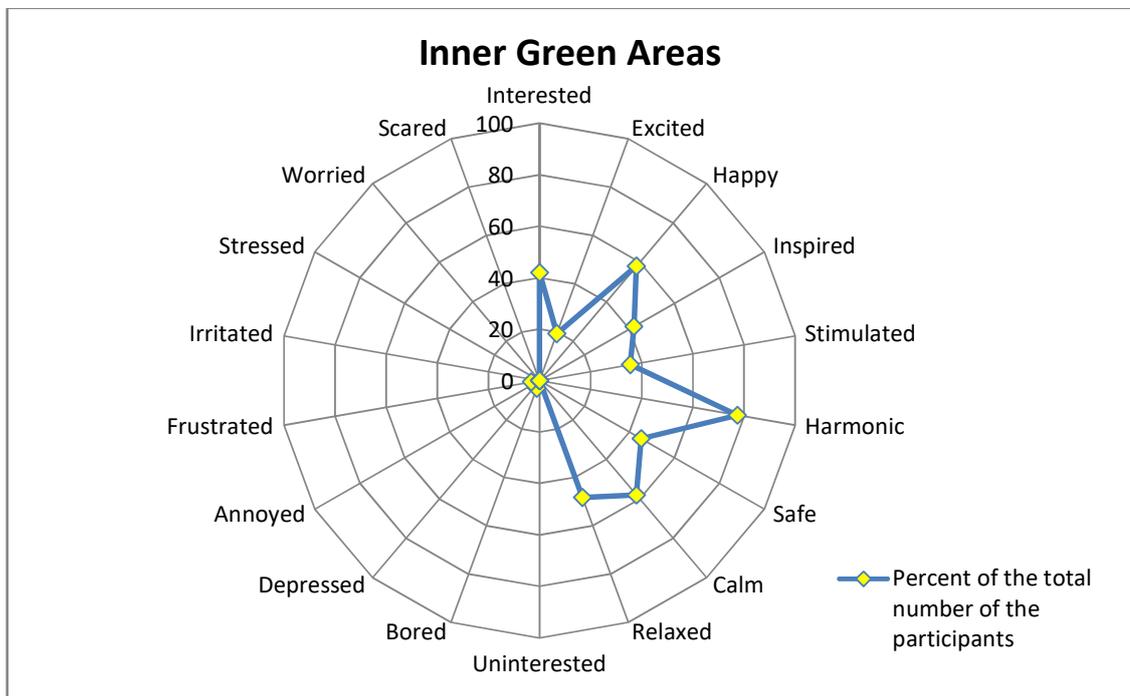


Figure 23: Diagrams of emotional experiences for Inner green areas

Table 8: A summary of the reasons for most common positive and negative experience for inner green space is given below on the basis of physical environment and activities (Translated into English).

	<b>Positive Experience</b>	<b>Negative Experience</b>
<b>Physical Environment</b>	<p>“still needed as green space improves life quality” “positive affect on my wellbeing”</p> <p>“Feel peace and cozy when walking along</p> <p>“Water, trees, architecture that is calming and beautiful</p> <p>“There are many such small green patches in Hammarby Sjöstad and they feel safe and calm to pass”</p> <p>“Calm and relaxing areas. Beautiful and quiet, especially when the cherry trees are in bloom”</p> <p>“So beautiful with water flowing, cooling under the shade of the trees”</p> <p>“Here are usually very beautiful plantings. Harmonious with the mixture of grass surfaces / trees and water”</p>	<p>“Often they are too small. There is almost no opportunity to land in them for real.”</p> <p>“Rarely are there benches or other things that invite you to stay longer there.”</p>
<b>Activities</b>	<p>“the dogs can be loose and play with others, dog owners meet and talk, new friends”</p> <p>“In the summer usually with people sunbathing and having a picnic”</p> <p>“used by so many different people, from picnics, yoga, dog play etc.”</p>	<p>“Sad that so many people throw rubbish in the water”</p>

**Comparative analysis:** The results from figure 23 shows that about 78% of the participants feel the inner green space is in harmonic character. The participants mostly associated with feelings of being calm, happy, and relaxed in inner green space. As presented in figure 23, The participant's response leans towards the positive feeling side. According to table-8, the participants experience this environment as pleasant and safe due to the positive effects of the wellbeing of nature (green area). The participants considering the area is helping to improve life quality and appreciate the mixture of grass surfaces, trees, and the harmonious water flow within the area. Still, there is a lacking of proper sitting arrangements to stay for a long time and less scope of being in the area as few of them are very small in size.

### 3. Large parts of the southern Lake shore was planted with reeds



Figure 24: Picture of large parts of the southern Lake shore was planted with reeds; Source: Taken by the Author

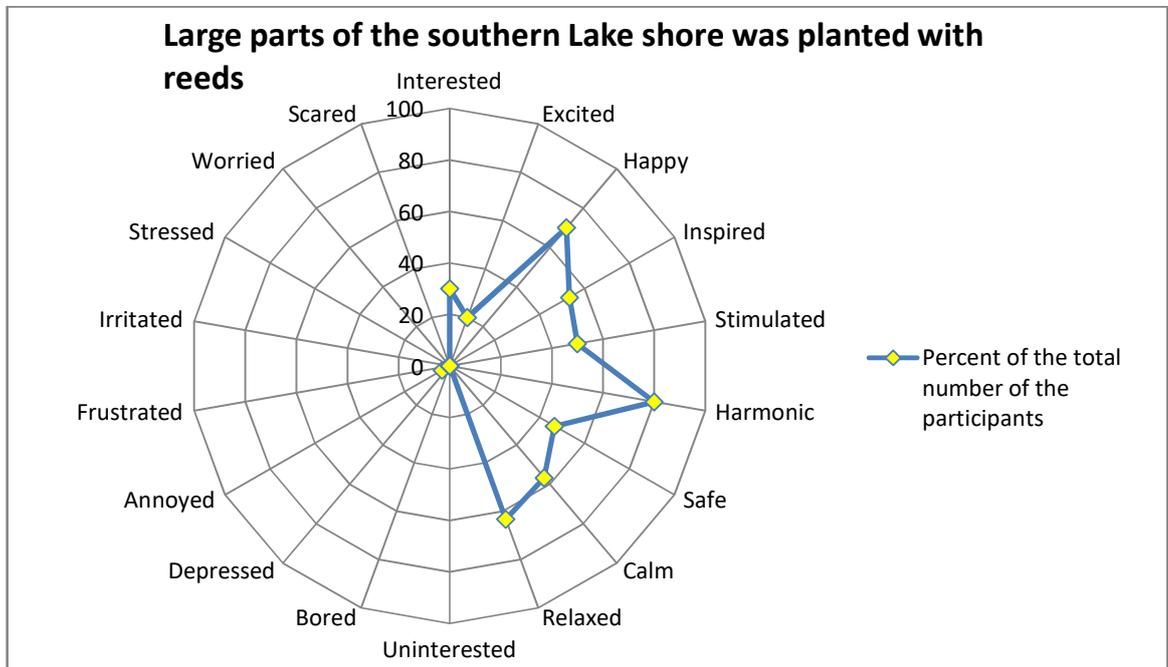


Figure 25: Diagrams of emotional experiences for large parts of the southern Lake shore was planted with reeds.

Table 9: A summary of the reasons for most common positive and negative experience for “large parts of the southern lake shore was planted with reeds” is given below on the basis of physical environment and activities (Translated into English).

	Positive Experience	Negative Experience
<b>Physical Environment</b>	<p>“Beautiful aquatic environment with seabirds and a beaver”</p> <p>“The bird life is interesting”</p> <p>“Wonderful to walk on planks and watch boats”</p> <p>“So beautiful with the reeds and how it changes over the year.”</p> <p>“Natural, close to nature”</p> <p>“The proximity to water is wonderful”</p> <p>“Pleasant to walk on the piers, birds get young in the reeds, beavers move here and start building nests”</p>	<p>“reeds ,it grows so fast that it must be kept better at bridges during the summer.”</p> <p>“Stressed Stockholmers who just pass quickly.”</p>
<b>Activities</b>	<p>“The piers are nice to walk on. This is my favorite walk path”</p> <p>“Jogs walks, bikes, runs, rests the dog quickly”</p>	

**Comparative analysis:** Figure-25 shows that 80% of the participants feel the large parts of the southern lake shore that was planted with reeds provide a harmonic character, where the participants mostly associated with feelings of being inspired, calm, happy, and relaxed space. Beside this, most participant's response leans towards the positive feeling side. Table-9, summarised participants experience this environment as exciting and pleasant due to the beautiful aquatic environment and enjoy walking on the planks. Indeed, there is a necessity of maintaining the area during the summer to make the area more enjoyable.

## 4. Observatorium



Figure 26: Picture of Observatorium; Source: Taken by the Author

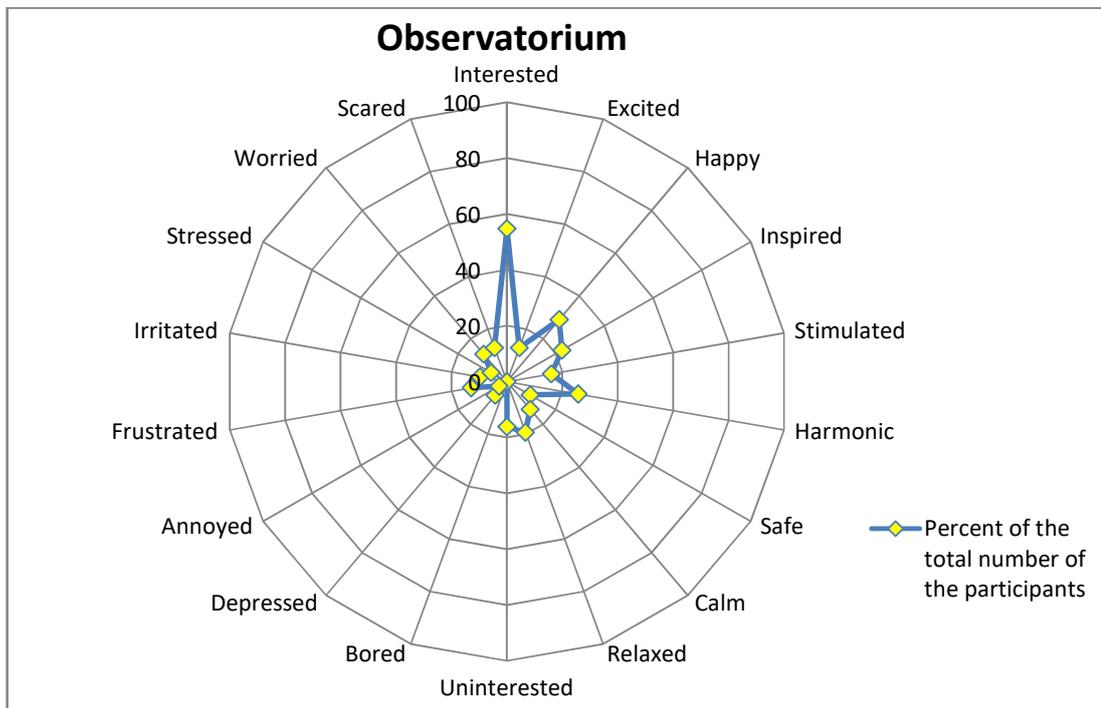


Figure 27: Diagrams of emotional experiences for observatorium

Table 10: A summary of the reasons for most common positive and negative experience for “observatorium” is given below on the basis of physical environment and activities (Translated into English).

	<b>Positive Experience</b>	<b>Negative Experience</b>
<b>Physical Environment</b>	<p>“It’s really nice to sit there feel water surround, hearing the birds”</p> <p>“Daytime it is nice, safe and a beautiful spot.”</p> <p>“Interesting design and beautiful view”</p> <p>“Great place to go out and be closer to the water”</p> <p>“It is such a beautiful installation and is appreciated by sunbathers”</p> <p>“Nice and beautiful to sit there”</p> <p>“Wonderful work of art”</p>	<p>“At night it is dark , No lights”</p> <p>“The hole in the middle is scary, gangs hangs there, no place for women to sit in the sun”</p> <p>“I am afraid being destroyed by visitor”</p> <p>“Full of noisy teenagers”</p> <p>“Sad that it is messed up. There should be a trash can!”</p> <p>“Unfortunately, young people use the place and litter with fumbles and bottles, urinating in the water.”</p> <p>“always worried that children will fall into the water there.”</p> <p>“it has become a haunt for young people”</p> <p>“I think it's a little scary.”</p>
<b>Activities</b>	<p>“Used extensively by residents and visitors, everything from student celebrations, wedding photos, sunbathing, yoga to filming”</p>	<p>“A place for teenagers pot smoking”</p> <p>“Cheaper built, more expensive to maintain perhaps”</p> <p>“where young people drink alcohol and also do drugs”</p>

**Comparative analysis:** The results from figure 27, show about 55% of the participants are interested for the Observatorium area but at the same the about 17% of the participants are uninterested. The experience they had within Observatorium is associated with feelings of being happy, worried and frustrated. Which mainly express kind of mix feeling. This shows that even though most of the responses have a positive feeling towards Observatorium but it has negative feelings also. The participant's reasons for their feelings are summarised in table 10, which mainly explain the reason behind these positive and negative feelings. According to table-10 the participants experience the area as unpleasant and insecure due to the unpleasant activities by the young. But at the same time the architecture of the observatorium is appreciated by the participants.

## 5. Extended deck with sitting arrangement



Figure 28: Picture of Extended deck with sitting arrangement; Source: Taken by the Author



Figure 29: Picture of Extended deck with sitting arrangement; Source: Google Map

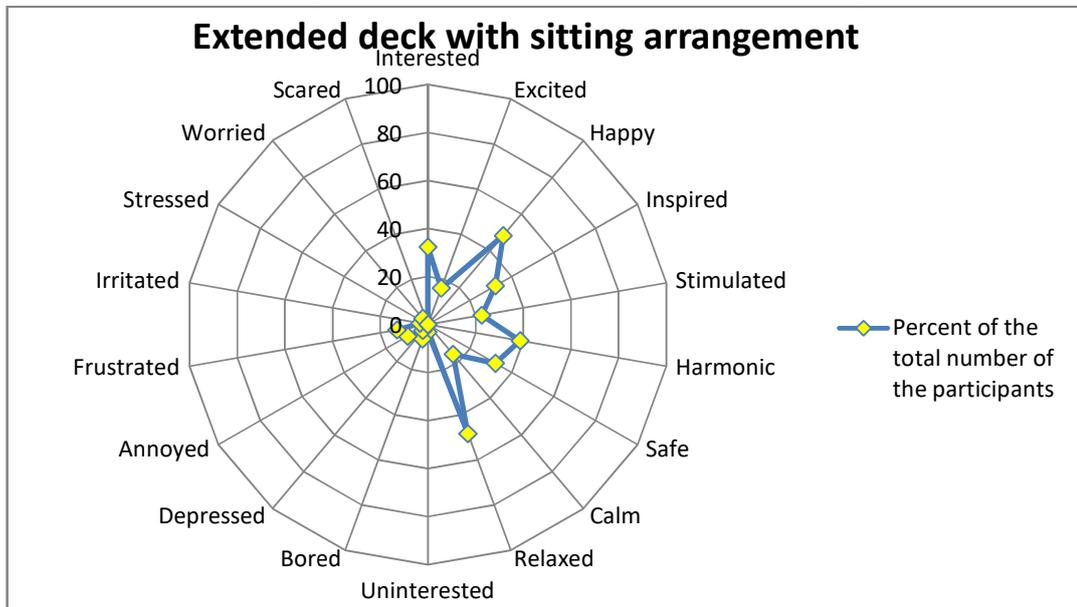


Figure 30: Diagrams of emotional experiences for extended deck with sitting arrangement

Table 11: A summary of the reasons for most common positive and negative experience for “extended deck with sitting arrangement” is given below on the basis of physical environment and activates (Translated into English).

	Positive Experience	Negetive Experience
<b>Physical Environment</b>	“Good to have this closeness with water”	“Not the most inspiring architecture”
	“like that open space, sit there looking toward to the hanmarby lake, peace, cozy and good view”	“irritating that it is in bad shape.”
	“Beautiful place to sit and enjoy the sunset. There are different "rooms" that provide variety.”	“need some renovation work on the tiles”
	“appreciate the idea behind and the desire to create beautiful places for the residents”	“Has been closed due to holes in the tree deck”
	“Beautiful place with nice view. Invites to social activities”	“scandal that they have used such bad wood and construction technology that it rotted so quickly.”
	“Nice with bridges - contributes to the archipelago environment and breathtaking views”	“The maintenance is handled so poorly and the condition of the bridge is under all criticism. It is frustrating that the plan and budget for maintenance are not set better.”
<b>Activities</b>	“When the weather is really nice, people have a picnic there”	“Annoyed by the patchwork quilt, that it is so broken and repaired temporarily with parquet pieces”
	“Nice relaxation during the walk”	“Big decks and few places to sit. so much better the place could be”

Fig: Summary of the participant’s responses

**Comparative analysis:** The result shows from the figure-30 is that 48% of the total participants associated with the relaxed feeling in extended deck area and most participant's response leans towards the positive feeling side. But there are few negative feeling which is associated as frastated. The table-11 provides summary of the reasons for most common positive and negative experience for “extended deck with sitting arrangement. According to table-11, the participants experience the area as pleasent and exciting as the area has scope of various activities and a place of nice view. But the construction of the sitting decks and the maintainence are not well enough that the participants can fully enjoy the place. Beside this they are annoyed and frastated by the poor construction of the deck.

## 5.2 Overall observation of Hammarby Sjöstad.

Analysing the overall results and participants experiences of physical environment I have observed the following ( table-12) strength, weakness, opportunity, and threat for the green space of Hammarby Sjöstad.

Table 12: Swot analysis for Hammarby Sjöstad's green area

<u>Strengths</u>	<u>Weaknesses</u>
<ul style="list-style-type: none"><li>• Very close to nature and beautiful aquatic environment</li><li>• Various Inner green space</li><li>• Pleasant environment for residents</li><li>• Green area as a source of improving quality life.</li><li>• Sustainable environmental goals</li><li>• Easy accessibility to all the green space (within walking distance)</li><li>• The green environment has been successfully integrated with the design.</li></ul>	<ul style="list-style-type: none"><li>• Poor maintenance system</li><li>• Few green area has unclear and weak separation with the main road</li><li>• Lacking of arrangement for sitting and other social activities</li><li>• Poor construction and selection of bad wood of extended deck</li><li>• There in no proper monitoring arrangement.</li><li>• Too small green space to use for any purpose</li></ul>
<u>Oppurtunities</u>	<u>Threats</u>
<ul style="list-style-type: none"><li>• Possibility to do much more within the green areas to make it more attractive.</li><li>• Open Landscape character</li><li>• Place for social interaction</li><li>• Location of the site is in close proximity to the city center</li></ul>	<ul style="list-style-type: none"><li>• Few places are too dark at night and not a place to feel safe and comfortable.</li><li>• Ignoring behavior and lacking of awareness.</li><li>• Reckless behavior of yong people</li></ul>

# Chapter 6 –Discussion and Proposal

## 6.1 Interpretation of main findings

Hammarby Sjöstad has been built with high ambitions when it comes to sustainable urban development. The focus has been on ecological sustainability and included measures to reduce the use of energy, water and materials, recycle goods and recycle as much as possible of what has been used. Hammarby Sjöstad stands well in comparison with other districts when it comes to conditions under many sustainable aspects.

The study has found from the questionery survey that there are various open green spaces all across Hammarby Sjöstad and are used by the residents on a regular basis. As found in the survey, almost everyone is aware of the green spaces in their district, and according to them, most of them are easily accessible and are quite near to their residences or places of work. Depending on their daily life routines, everyone visits them at least once a week. The number of respondents visiting daily and those are visiting once a week is the same with a negligible difference. Some people visit daily, while others go more than once a week depending upon their health and daily routines. The other reasons given by participants are the well-connected green network laid around area, making them convenient to walk into them, and making them easily accessible. It was also observed that the green spaces constructed near to the residences, which are easily accessible and have good infrastructure, have positive outcomes.

Furthermore, this study also examined the participant's affective appraisals of five different green spaces in Hammarby Sjöstad ( Lummaparken, Inner green are, Large parts of the southern Lake shore was planted with reeds , Observatorium, Extended deck with sitting arrangement). This result shows that all those areas are mostly experience in a positive way by the participants but there are few negative experiences reported also by the participants. The reasons reported by the participants can be grouped into reasons connected to the physical environment that within the green areas-

- There are opportunities to do more to make the area more attractive for social angangement and other activities.
- Gangs of young people gathering at the Observatorium
- Traffic unsafety for small kids at Lummaparken
- People throwing urinate into the water and trash on the ground
- Few places are too dark at night such Sickla park, Observatorium
- Poor construction and selection of bad wood of extended deck that construction needs always.

- Need for more arrangement for sitting and social activities.
- Need for proper intermediate green space where leisure community activity is possible.

Besides this, according to (Stockholms Stad, 2020) in the program level of the Hammarby sjöstad project included descriptions of social needs within in open green areas. But the study shows that in the case of social needs towards open green areas have not received the same attention as mention in the early face of program level. It seems planners show less interest or didn't do any comprehensive strategic planning in this regard.

Earlier mention in chapter-3 (see Hammarby Sjöstad part section 3.2), according to "Hammarby Sjöstad2.0" one of the main focuses of the Hammarby Sjöstad project is to provide various parks, green spaces, and walkways run through the district to provide a dense green environment. But the study has found that though there are various open green spaces, it is unable to provide a dense green environment with social activities. In this regard, I would like to agree with the author Ignatieva & Berg that the Hammarby Sjöstad area needs appropriate green areas and there is a lacking of several pedestrian paths and sitting arrangements in inner green areas, which makes it significant to re-develop leisure commuting and social activities.

The study result shows that Hammarby Sjöstad can be seen as a prosperous district with few social sustainability problems within open green areas. On the basis of above mention findings I have highlight the main issues that needs to be taken into consideration for further development and also while making green space strategy guideline for Hammarby Sjöstad -

- Lacking of regular monitoring and maintenance
- Accessibility problem,
- Awareness
- Maintenance
- Lacking of public Participation on UGS

## **6.2 Guidelines for existing green spaces in Hammarby Sjöstad**

To develop the existing green space in Hammarby Sjöstad, new strategies need to be developed to fix the study's main issues. Since green space development is a continuing issue requiring regular attention: both for urban development and for research and investigation. To provide a guideline for Hammarby sjostad I would like to use (chapters 2.4 and 2.5) as a background study. Depending on this study, I would like to provide an "Action cycle" ( Figure 31) for Hammarby Sjöstad's green space, which will work as a "strategic planning approach" to follow.

This action cycle needs to be repeated after a while as time goes by, human requirements will change, thus citizens needs. And also, Citizens are important stakeholders who can be mobilized to take part in shaping plans. Often it is easier to engage people at a neighborhood level, when the area they live in is directly concerned, rather than the whole city. This is why public participation, observation, and experiences about the urban green areas' environmental issues need to be summarized to provide a sustainable guideline to keep the common public rooms - squares, parks, streets, gardens, and waterways - in good condition

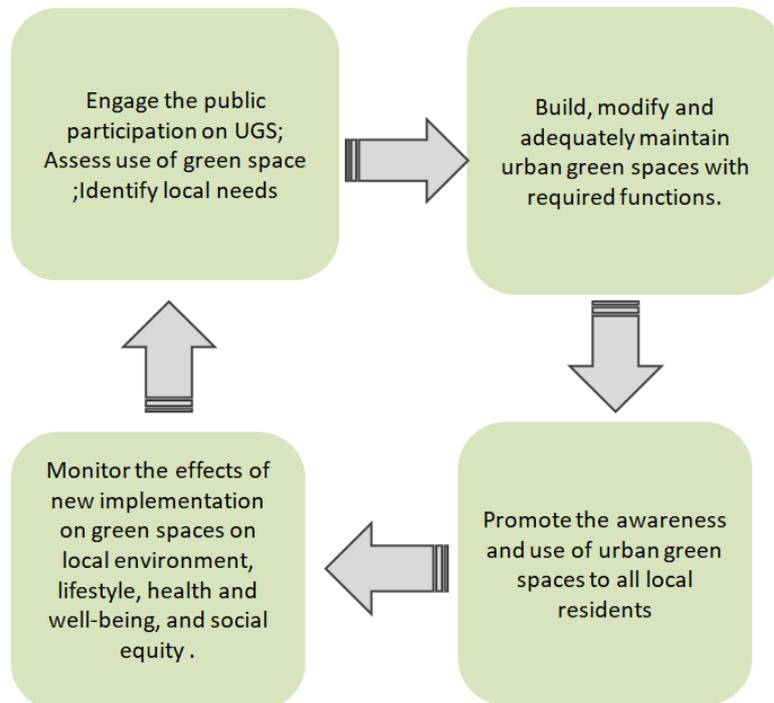


Figure 31: "Action cycle" for Hammarby Sjöstad's green space strategic planning  
Source: Developed by the Author

The first part of the action cycle is about the participation or engagement of citizens on UGS, which is needed realistically in the process of planning, designing, and maintaining urban green spaces. This provides a positive factor in motivating them to consider and to care for the spaces as an integral part of city life and also involving residents in planning, building, and maintaining the urban green space to increase the sense of ownership. Besides this, it also helps to find out the local needs and further necessity.

The second part of the action cycle is about ensuring adequate and frequent maintenance and ensuring new modification or addition to avoid the impression that the place is not taken care of. Regular maintenance and modification according to the local needs will help the green area to be more attractive, functional, and

liveable. This will help the green area to be used at different times of the day for different social events and increase social interaction. For example, in the case of Hammarby Sjöstad, providing adequate lighting where it is necessary ( such as Observatorium, Sickla park) to improve safety perceptions; and also increasing more equipment (such as sitting arrangement) to increase social interaction within green areas.

The third part of the action cycle is about spreading information about how the green space should be used and what disciplines need to be followed to maintain a healthy environment for all. Promoting awareness of the uses of green space will help to reduce the careless behavior or ignore attitude towards their green space. In this case, promoting awareness could help the people (especially the young group people) to stop their reckless behavior, urinate in the water, and throwing trash in the green area.

The fourth part of the cycle is about monitoring the effect of the new implementation and strategy that is taken for the green space. Besides this, urban green spaces and the related benefits need to be evaluated to inform future planning and ensure that existing green spaces are reviewed and adapted to meet the community's needs.

In addition, it is very important to remember that the strategic approach is not possible to follow without the collaboration between different associations, planners, municipal authorities/administrations, and, not least, among the citizens of Hammarby Sjöstad. However, the most important thing is to mobilize citizens' engagement and participation. People have to embrace the solutions and feel that they are part of new strategies to make it more successful as GreenKeys Project Team (2008) suggests, the collaboration between related actors like-local authorities, professional consultants, scientific advisors, and public participation is essential for the most optimal outcomes.

### **6.3 Strength of this study**

The benefits of urban green space is numerous; they are the city's lungs, place of social integration, opportunities for mental healing, physical exercise, moreover they are important as the social focal points where social needs are met such as the fact that people from different cultures and socioeconomic classes come together, become known with each other and share the life, and as the places where those living in the city merge with nature (Yılmaz & Mumcu, 2016). Natural places that are mainly ignored and are not designed well will turn into the places which citizens do not use, which cause economical loss and communication and social interaction break down as they cannot meet the needs of people. Therefore, within the scope of

this study, Considering peoples experiences in strategic planning for urban green space will help to the citydweller where they gain satisfaction experience. This strategic planning for UGS will help to promote a more holistic overview and better understanding of the urban green space situation, provision and quality as well as the needs, priorities and values of its inhabitants; discover the effective ways to solve urban green space problems and develop its urban green space potentials.

Besides this, I would like to mention that the methodological approaches were the most important element in understanding how the study could be designed to answer the study questions and collect the information to achieve the research aims. This study, which focused on evaluating peoples' experiences towards urban green space, needs to be considered for green space strategy planning and could be applied to other green areas. Depending on the type, location, and use of different green spaces could lead to different results and strategies. Thus, the study has the potential to make an important contribution to green space development. The study's practical implications are also important, as it highlights the necessity to evaluate people's experience to develop green spaces, planning, and management to meet urban residents' social needs better.

The study explores a realistic scenario of Hammarby Sjöstad's green area and provides a practical guideline. That the planners and decision makers can use the findings and guidelines of Hammarby Sjöstad as basic evidence that supports future developments. Besides this, the Hammarby Sjöstad area guideline can also be used in any green areas as basic strategic planning. This study offers a foundation for further research within green areas design based on people's experiences in the urban setting. This study has the potential to make an essential contribution to academic research as well as on the practice field. The decision-makers often neglect to focus on the green area based on evaluating people's experience, and this is why this study contributes to addressing the aspects within the subject of landscape architecture. The study's practical implications are also important, as it highlights the necessity to develop green spaces design, planning, and management to fulfill urban citizens' social needs. Moreover, the urban green area is mainly a public open space that could result in spaces where the local people can interact and be inspired by being a part of the strategic planning.

## Chapter 7 – Conclusion

### 7.1 Final reflection and recommendation

This section contains the concluding remarks found by this study. This study has shown the essential role of green areas, which have played through the beginning of urban planning, to address and overall social and wellbeing issues for urban residents. The urban green area provides a sense of meaning beyond environmental, physical, social, and economic benefits. Besides this, this study discusses the planning process and strategic planning in green space management to provide an overall understanding. Also, this paper shows the Hammerby project planning goals and conflict points, which indicates that a strategic landscape architecture plan for the green and blue infrastructure at the program level would have benefitted the project's possibilities to reach its planning goals.

In this paper, I have used a specific method to measure people's experience within urban green space to understand the real situation, which needs to be considered for further urban green space strategic planning for more development. This methodological study also shows the local needs and gaps between planning and implementation. Besides this, the urban green space strategy could be developed based on the data received from the survey study. As this research shows a realistic way to gather the information of people's experience and how to combine them for further development.

Moreover, this study suggests that, evaluation of the emotional experiences of urban green space should be integrated into project assessments procedure and be properly accounted for in policy decisions and urban planning strategies. Public experiences evaluation about user's satisfaction and needs is important to UGS planning. Since to become the most promising UGS planning, it needs to meet the need of its citizen. Therefore, within the scope of this study, some design guidelines that are proposed to improve the quality of life for the people living and working within the area. Thus, the findings in this research should be used to help planners and decision makers to develop a more meaningful urban green space strategy planning that can help to satisfy citizen needs and contribute to sustainable development.

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# Appendix: Online survey questioner

## Survey about feelings and experiences

This survey is about your feelings and experiences in the area shown on the map. The questionnaires are prepared at Swedish University of Agricultural Sciences by Master's student Sumiya Islam. The thesis work name is "Design and uses of parks (green areas) in urban environments on the basis of evaluations of people's experience, A study of Hammarby sjöstad, Stockholm, Sweden".

Hope you will find it fun to answer questions about how you experience your home environment and thank you in advance for your time spent.

If you have questions about the survey, I am happy to answer them. You can contact me via e-mail, [islamsumiya6@gmail.com](mailto:islamsumiya6@gmail.com).

Sumiya Islam  
SernandersVäg 11-142  
752 62 Uppsala

\* Required

### Informed Consent

The survey is conducted within the Master's thesis work in Landscape architecture at SLU (LASU). The method will be used to answer questions about how residents experience their surrounding area. The results and analysis of the survey will be presented and structured so that the individuals behind the answers are anonymous. The questions are designed so that you are encouraged to connect your experiences of the urban environment with your emotions.

Try to be honest with your own feelings, but do not think too long about each question but fill in the answer you first come think of. If there is a question that you do not have a suitable answer to, skip it or write a comment on the question.

Everyone who participates in the survey will be anonymous in the presentation of the results. You are asked to fill in certain personal information. If you absolutely do not want to answer the survey by name, you can do so. However, fill in the other information.

1. Do you want to participate? \*

*Mark only one oval.*

- Yes    *Skip to question 2*
- No    *Skip to section 3 (Declined Participation )*

### Declined Participation

You have declined to participate in this survey. Thank you for your time. You may close the browser or click submit below.

Personal Information (Optional)

2. 1. Name

\_\_\_\_\_

3. 2. Address

\_\_\_\_\_

4. 3. Age

\_\_\_\_\_

5. 4. Gender

*Mark only one oval.*

Female

Male

Other: \_\_\_\_\_

6. 5. How long have you lived in the area

\_\_\_\_\_

7. 6. Profession / education

\_\_\_\_\_

Question

8. 1. According to you; What was the Environmental Program for Hammarby Sjöstad mainly about?

*Mark only one oval.*

To improve natural environment around HammarbySjöstad

To help fight global climate problem

To highlight Sweden as environment friendly country

To improve quality of life of the inhabitants

Other: \_\_\_\_\_

9. 2. Are there any open green spaces, like public parks or open spaces, that you specifically notice in your area? \*

*Mark only one oval.*

yes

No *Skip to question 14*

Are there any open green spaces, like public parks or open spaces, that you specifically notice in your area? If yes

10. What is the name of the areas?

\_\_\_\_\_

11. Are they easily accessible from your home or office?

*Mark only one oval.*

yes

No *Skip to question 14*

12. How do you get there?

*Mark only one oval.*

By feet

By cycle

By car

By public transportation

Other: \_\_\_\_\_

13. How long does it take time to go there?

*Mark only one oval.*

less than 15 min

less than 30 min

less than one hour

more than one hour

Other: \_\_\_\_\_

14. How frequent you visit green spaces?

*Mark only one oval.*

Daily

Once a week

More than once a week

Never

Other: \_\_\_\_\_

15. How does green space effects your everyday life

*Mark only one oval.*

	1	2	3	4	5	
Good	<input type="radio"/>	Bad				

16. 6. Whenever you go to open spaces, what motivates you to go there? (mark one or several)

Check all that apply.

- Location
- Easy accessibility
- Design
- Functionality
- Personal Reasons

Other:  \_\_\_\_\_

Question

Images of five representative urban environments. What positive or negative feelings would you spontaneously associate with this place as you personally know it? Mark one or several of the 18 options.

17. What positive or negative feelings would you spontaneously associate with Lumaparken as you personally know it? Mark one or several of the 18 options.

1.Lumaparken



Source: Taken by the Author

Check all that apply.

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> Interested | <input type="checkbox"/> Uninterested |
| <input type="checkbox"/> Excited    | <input type="checkbox"/> Bored        |
| <input type="checkbox"/> Happy      | <input type="checkbox"/> Depressed    |
| <input type="checkbox"/> Inspired   | <input type="checkbox"/> Annoyed      |
| <input type="checkbox"/> Stimulated | <input type="checkbox"/> Frustrated   |
| <input type="checkbox"/> Harmonic   | <input type="checkbox"/> Irritated    |
| <input type="checkbox"/> Safe       | <input type="checkbox"/> Stressed     |
| <input type="checkbox"/> Calm       | <input type="checkbox"/> Worried      |
| <input type="checkbox"/> Relaxed    | <input type="checkbox"/> Scared       |

18. Describe reasons behind your emotional memory. The reasons can be the physical environment of the place or it can be activities that you remember has happened at this place.

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19. What positive or negative feelings would you spontaneously associate with Inner green areas of Hammarby sjöstad. as you personally know it? Mark one or several of the 18 options.

2. Inner green areas of Hammarby sjöstad.



Source: Taken by the Author

Check all that apply.

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> Interested | <input type="checkbox"/> Uninterested |
| <input type="checkbox"/> Excited    | <input type="checkbox"/> Bored        |
| <input type="checkbox"/> Happy      | <input type="checkbox"/> Depressed    |
| <input type="checkbox"/> Inspired   | <input type="checkbox"/> Annoyed      |
| <input type="checkbox"/> Stimulated | <input type="checkbox"/> Frustrated   |
| <input type="checkbox"/> Harmonic   | <input type="checkbox"/> Irritated    |
| <input type="checkbox"/> Safe       | <input type="checkbox"/> Stressed     |
| <input type="checkbox"/> Calm       | <input type="checkbox"/> Worried      |
| <input type="checkbox"/> Relaxed    | <input type="checkbox"/> Scared       |

20. Describe reasons behind your emotional memory. The reasons can be the physical environment of the place or it can be activities that you remember has happened at this place.

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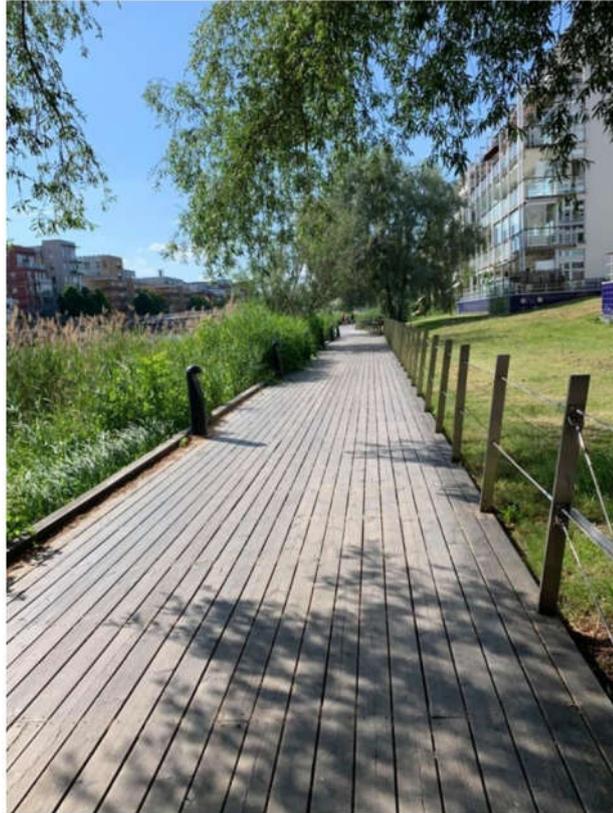
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21. What positive or negative feelings would you spontaneously associate with the large parts of the southern Lake shore was planted with reeds of Hammarby sjöstad as you personally know it? Mark one or several of the 18 options.

3. Large parts of the southern Lake shore was planted with reeds



Source: Taken by the Author

Check all that apply.

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> Interested | <input type="checkbox"/> Uninterested |
| <input type="checkbox"/> Excited    | <input type="checkbox"/> Bored        |
| <input type="checkbox"/> Happy      | <input type="checkbox"/> Depressed    |
| <input type="checkbox"/> Inspired   | <input type="checkbox"/> Annoyed      |
| <input type="checkbox"/> Stimulated | <input type="checkbox"/> Frustrated   |
| <input type="checkbox"/> Harmonic   | <input type="checkbox"/> Irritated    |
| <input type="checkbox"/> Safe       | <input type="checkbox"/> Stressed     |
| <input type="checkbox"/> Calm       | <input type="checkbox"/> Worried      |
| <input type="checkbox"/> Relaxed    | <input type="checkbox"/> Scared       |

22. Describe reasons behind your emotional memory. The reasons can be the physical environment of the place or it can be activities that you remember has happened at this place.

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23. What positive or negative feelings would you spontaneously associate with Observatorium of Hammarby sjöstad, as you personally know it? Mark one or several of the 18 options.

4. Observatorium



Source: Taken by the Author

Check all that apply.

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> Interested | <input type="checkbox"/> Uninterested |
| <input type="checkbox"/> Excited    | <input type="checkbox"/> Bored        |
| <input type="checkbox"/> Happy      | <input type="checkbox"/> Depressed    |
| <input type="checkbox"/> Inspired   | <input type="checkbox"/> Annoyed      |
| <input type="checkbox"/> Stimulated | <input type="checkbox"/> Frustrated   |
| <input type="checkbox"/> Harmonic   | <input type="checkbox"/> Irritated    |
| <input type="checkbox"/> Safe       | <input type="checkbox"/> Stressed     |
| <input type="checkbox"/> Calm       | <input type="checkbox"/> Worried      |
| <input type="checkbox"/> Relaxed    | <input type="checkbox"/> Scared       |

24. Describe reasons behind your emotional memory. The reasons can be the physical environment of the place or it can be activities that you remember has happened at this place.

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25. What positive or negative feelings would you spontaneously associate with the large extended deck with sitting arrangement of Hammmarby sjöstad. as you personally know it? Mark one or several of the 18 options.

5. Large extended deck with sitting arrangement



Source: Taken by the Author



Source: Google Map

Check all that apply.

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> Interested | <input type="checkbox"/> Uninterested |
| <input type="checkbox"/> Excited    | <input type="checkbox"/> Bored        |
| <input type="checkbox"/> Happy      | <input type="checkbox"/> Depressed    |
| <input type="checkbox"/> Inspired   | <input type="checkbox"/> Annoyed      |
| <input type="checkbox"/> Stimulated | <input type="checkbox"/> Frustrated   |
| <input type="checkbox"/> Harmonic   | <input type="checkbox"/> Irritated    |
| <input type="checkbox"/> Safe       | <input type="checkbox"/> Stressed     |
| <input type="checkbox"/> Calm       | <input type="checkbox"/> Worried      |
| <input type="checkbox"/> Relaxed    | <input type="checkbox"/> Scared       |

26. Describe reasons behind your emotional memory. The reasons can be the physical environment of the place or it can be activities that you remember has happened at this place.

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