

## Article

# The Welfare Landscape and Densification—Residents' Relations to Local Outdoor Environments Affected by Infill Development

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**Abstract:** Densification through infill developments is a common planning strategy where both advantages and problems have been brought forward. However, the knowledge on how such developments affect residents and their relations to local outdoor environments is limited. Also, modernist areas have been highlighted as planning heritage with specific values. We studied the case of a multi-family housing area in Uppsala, Sweden, originally planned in the 1960s as part of the Swedish modernist welfare era and later affected by densification through infill development. The mixed-methods approach included document analysis and observations followed by an online survey focused on the use of, perceived qualities of and satisfaction with outdoor environments among residents. The results revealed the heritage of careful planning during the 1960s concerning green space availability and solutions limiting car traffic, with recent densification affecting different sub-areas to various degrees. Respondents living in non-densified sub-areas reported higher levels of satisfaction, more qualities and a more varied use of the outdoor environment compared to in densified sub-areas. However, the management level was considered too low in mainly one of the non-densified sub-areas. Many respondents brought up the loss of qualities in their local outdoor environment through the infill development, both during the construction work and in the result, with less green spaces and increased car traffic. This study revealed large negative effects for residents of densification that focuses on density without securing sufficient qualities in the outdoor environment but also of neglected open space management.

**Keywords:** car traffic; compact cities; green space; infill development; neighborhood satisfaction; open space management; perceived qualities; planning; Uppsala



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## 1. Introduction

Urban spatial planning in Europe and beyond has been strongly focused on densification processes during the last decades, mainly in the form of infill in existing built areas [1]. Densification is often based upon an aim for sustainable development, claiming to achieve multiple goals, including land protection (from urban sprawl), carbon emission reduction (through short distances for transport and commuting leading to, e.g., less car dependence) and stimulation of other socio-economic effects [2]. However, there are also several arguments against densification, and challenges concerning transport and energy consumption have been revealed [3]. A review of the research literature on the effects of densification showed positive correlations for transport and economics but negative correlations for ecology, social impact and health [4], indicating that the ecological, social and health effects have not been sufficiently taken into account. Reviews on the effects of cities growing more compact are thus bringing up both positive and negative effects [5]. This duality can result from different aspects being studied and from the many different ways in which density can take physical form, showing the need for contextual, place-based understanding [1].

A major challenge is that cities undergoing densification have problems providing green space without loss in quality, quantity and social equality [6]. Having access to large green spaces close to home has specific values for residents as it affects their overall quality of life and health positively [7], as for example, mental health is supported by the frequency of visits to green and blue spaces [8], and the amount of neighborhood greenness is associated with slower ageing [9]. With increasing numbers of people sharing often diminishing green spaces, crowding can negatively influence their wellbeing in terms of mood and affective experience, affecting women in particular [10]. Other groups with specific needs for green space access include the elderly and children [11], as well as different ethnic groups [12].

A well-functioning green space provision for all users does require good planning, design and management [13], where these processes are well connected to provide quality over time [14]. However, urban green structures are increasingly conceptualized in order to fit within policies of compact cities, threatening the coherence of green space, as densification has become the priority rather than the shared goal of sustainability [15]. In planning documents, densification is therefore claimed to provide several positive qualities simultaneously, including green spaces and their functions, even when this is not actually spatially possible [16]. The current development with increased densification can thus be putting urban green space and its functions at risk, which is affecting its various users.

For people living in built environments, satisfaction, use and perceived qualities related to local outdoor environments are three highly interlinked aspects, all affected by multiple factors, connected to green spaces [17]. Neighborhood satisfaction is strongly affected by the perceived qualities of local green spaces [18]. The many aspects affecting the use of local green space [19] include positive perceived qualities relating to pleasantness and safety [20] but also qualities such as distance from home [21]. Perceived qualities are related to individual uses and user preferences but mainly describe these through conditions of existing local outdoor spaces [17]. Compared to urban sprawl, neighborhood satisfaction and wellbeing can be higher in compact built environments if certain qualities are fulfilled, including “mixed land uses, public transport, limited car traffic, access to green spaces, and social equity” as well as measures to limit noise, litter and fear of crime [22] (p. 270).

Despite the common densification trend in planning, little is known about how denser areas and infill projects are affecting the views and lives of urban residents. Infill developments are rarely considered positive among local residents [2], experiencing loss of open and green spaces and neighborhood character and increased traffic [23,24], while in some contexts, they are found rather attractive [1]. The fact that they are more commonly accepted in general than in one’s own neighborhood is something that Wicki and Kaufmann [2] describe as being caused by either NIMBYism or anti-growth sentiments, while Ruming [25] finds such labeling problematic against local engagement in protecting open spaces and vegetation. Concerning the use of private cars, denser built environments have shown not to guarantee reduced personal vehicular mobility neither in large cities [26] nor in smaller towns [27]. Car traffic and green space provision are also closely connected. For example, Qviström et al. [27] showed that retired persons living in newly built, dense areas with limited access to green spaces had chosen to compensate for the lack of outdoor areas by having second homes to which they drive by car.

There is an increasing interest in the heritage of modernist areas in many parts of the world, being highlighted as planning resulting in specific values for people, previously often not recognized and therefore under pressure to change [28,29]. The lingering structures of modernist-style planning in Sweden and neighboring countries might be described as a welfare landscape. It is the materialization of a complex welfare discourse [30], often found in multi-family housing areas part of the Swedish so-called million homes program [31]. Particularly during the 1960s and 1970s, much attention was given to the provision of, e.g., large surfaces for outdoor recreation and traffic solutions separating cars from pedestrians in those areas [30]. Today, many local residents appreciate the modernist

outdoor areas and express affection towards them but also experience too low maintenance levels [32]. However, a shift in the attitudes in planning has led to green spaces aimed for recreation being used for development, arguing for quality rather than quantity in outdoor space [33]. In the last decades, a patchwork of planning styles has appeared as densification is introduced in or next to older areas. As the materializations and assets of welfare planning are today being heavily transformed, Qviström [34] has called for a better understanding of the heritage and values in its topology, before it is too late. It is therefore of high interest to study the effects of this development through the views of urban residents. As local green space is a quality for residents that has been emphasized in planning both during the welfare era and in current densification, there is a need to learn more about residents' relation to green space in areas that are shaped according to these different ideals.

The aim of this study is to deepen the knowledge on how densification of urban residential areas from the welfare era is affecting satisfaction with, use and perceived qualities of outdoor environments among residents. A central research question guiding this study is as follows: How do the satisfaction with, use and perceived qualities of outdoor environments from the Swedish welfare era differ between where densification has been realized and where it has not?

## 2. Methods

This study is based on a single case study using mixed methods, including initial document analysis and observations of the planning and development (part 1), followed by an online survey on residents' satisfaction, usage and qualities sent out to residents of a selected case study area (part 2) (see Table 1 for an overview). The case is an area consisting of the two city districts Kvarngärdet and Kapellgärdet, which is part of central Uppsala, Sweden. The area was selected for the study as it contains elements which are materializations of both a welfare landscape and of later dense planning ideals, being characterized both by housing areas planned in the 1960s and 1970s, as well as more recent infill from the 2000s.

**Table 1.** Overview of the methods used in the case study.

Part 1—Planning and Development	Part 2—Residents' Satisfaction, Usage and Perceived Qualities
Document analysis	Online survey test
On-site observations	Online survey
Virtual observations	

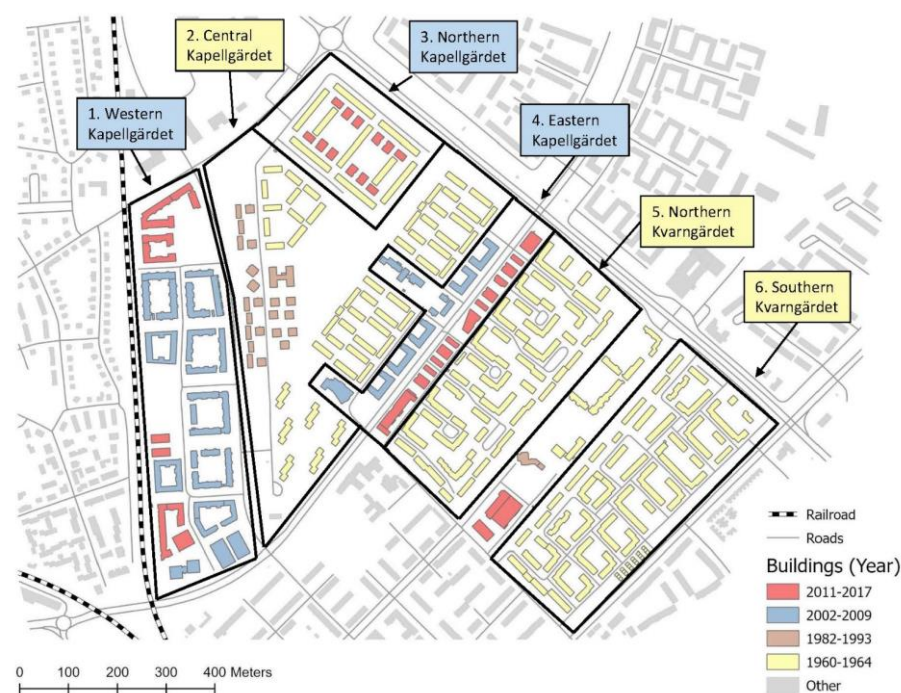
A combination of document analysis and observations was carried out during the spring of 2021 to conduct an initial analysis of the area. Relevant planning documents from the 1960s and 1970s were collected from city archives at Uppsala local government during two visits. One detailed development plan was excluded, as it had been renewed in the last couple of years in connection with the densification process. On-site observations were conducted on three occasions at varying times and days. Streets, parks, playgrounds and available courtyards were observed and documented with written notes and photographs to confirm which parts of the area had been densified. Virtual observations, using Google Street View, were used throughout this study to further understand information obtained through the survey.

The online survey was created in the program Netigate and consisted of three blocks, containing in total 13 questions (see Appendix A) connected to the outdoor environment: satisfaction, usage and qualities. Additionally, four questions were asked about the respondents' socio-demographic profile to obtain an overview of the respondents as a group. The survey contained multiple choice questions, rating questions and open-ended questions.

The options for the multiple choice questions regarding usage types were based on a categorization of uses by Fongar et al. [35], meant to capture the users' motivation to be outdoors: extrinsic (e.g., walk the dog, collect food, play with children), social interaction (e.g., visit/take part in events, meet friends, picnic), active (e.g., running, other sports, cycling, ball games, other activities), intrinsic (e.g., quietness, get fresh air, relax, get sun, experience nature) and non-users (e.g., passing through, do not visit green space). The last option was separated into two and lightly adjusted: (1) passing through and (2) do not use the outdoor environment.

The options for the multiple choice questions regarding which qualities could be found and appreciated in the outdoor environment were based on cultural ecosystem services as well as a categorization of qualities found to motivate people to visit green areas developed in previous surveys [36]. The options "changes and constructions" as well as "I do not value the area" were added.

To be able to compare parts of the case area that are densified and those that are not, the area was divided into six sub-areas, three of which contained densification through infill development and three that were not (yet) directly affected by infill (Figure 1). This division provides a simplified view of the area and its two qualities—either welfare landscape or densified—while there are also differences between the sub-areas as well as different parts of them. The sub-areas are Western Kapellgårdet (1), Northern Kapellgårdet (3) and Eastern Kapellgårdet (4), all densified, and Central Kapellgårdet (2), Northern Kvarngårdet (5) and Southern Kvarngårdet (6), which are not densified but largely consist of kept welfare landscape characters. Of the densified sub-areas, Northern Kapellgårdet (3) consists of housing from the 1960s, where open spaces have been densified both outside of and within existing courtyards, whereas infills in Western Kapellgårdet (1) have been built as a larger new infill area on former industrial space. In Eastern Kapellgårdet (4), infills have been built on open green or gray spaces in close connection to existing housing areas and a main road. Also, the sub-areas that are considered not densified are affected by infill to various extents, as for example, parts of Central Kapellgårdet (2) and Northern Kvarngårdet (5) are very close to the new buildings in Eastern Kapellgårdet (4), in an area where the division between the sub-areas is not evident.



**Figure 1.** The six sub-areas defined in this study. The colors of the buildings show the years the detail plans were formally accepted. Non-densified sub-areas mainly consist of buildings from the 1960s (yellow), while densified sub-areas include buildings from the 2000s (red and blue).

Questions regarding satisfaction, usage and qualities were posed on two scales, once about the outdoor environments in the immediate area (within 50 m from the home) and once about the area as a whole. This was performed to identify differences between the outdoor environment in the immediate area and in the area as a whole, as well as between residents in densified and non-densified sub-areas.

Before the questionnaire was sent out, it was tested on a limited number of people with connections to Kvarngärdet and Kapellgärdet, resulting in two answers. The feedback was used to adjust the questions. The questionnaire was then sent out to all residents residing in the area, after ordering addresses from Statens personadressregister, SPAR, (“the Swedish state personal address register”), identifying 5913 relevant and unique addresses. A QR code and a link were printed on physical postcards distributed to the addresses in May 2022. Both the postcard and the survey had text in Swedish only. After 3.5 months, the survey was closed to further answers. According to Swedish law, no ethical approval for the research was needed, as no personal or sensitive information was collected from the respondents, whose answers were given anonymously.

### *Analysis*

The survey results were analyzed in the program IBM SPSS Statistics 26, where one-way analysis of variance followed by Tukey’s test was used to determine statistically significant results between answers from the different sub-areas (on a 5% significance level). In the analysis of the question of usage frequency, a seven-step scale was grouped into seldom (a few times a month, more seldom and never) and often (several times a day, once a day, several times a week and once a week) to simplify the analysis. For usage frequency, usage types and perceived qualities, Crosstabs with Pearson’s chi-squared test were used, first for each sub-area, then grouped into densified and non-densified sub-areas. Answers to open-ended questions were analyzed qualitatively by coding and sorting them based on their similarities in content, forming larger themes. This process was performed manually using a digital spread sheet. The results were arranged in line with the three main blocks of the survey, with sub-categories under the two blocks satisfaction and qualities, where results from open-ended questions were included. Planning documents were scanned through, and parts relevant to the research questions were synthesized.

## **3. Results**

### *3.1. Planning and Development*

Plans for Kvarngärdet started during the 1950s, in a modernist style with parks, housing, public buildings and limited access for car traffic [37]. Parking spaces were placed along the main road in the city district, purposefully to limit car traffic as much as possible in the smaller streets, both for children’s safety and general well-being in the area. The housing consisted mainly of two-story buildings around common courtyards. Schools, preschools and open spaces for sports were built north of this area.

In 1964, Kapellgärdet was planned on the other side of a main road from Kvarngärdet, tied together by pedestrian and bicycle paths and a tunnel (Figure 2). Housing in the form of six-story buildings as well as lower two-story buildings was constructed, with some of them being designated as student housing, around a generous park and with open courtyards attached to other adjacent green spaces. Additional space in the north of Kapellgärdet was also planned as parkland, to compensate for the lack of green space in the surrounding housing areas [38]. Preschools and social spaces such as squares, common buildings and shops were also constructed. Traffic was planned in the same way as in Kvarngärdet, limiting car traffic and connecting the different parts of the city district with pedestrian and bicycle paths. In the west of Kapellgärdet, an area for small industries was built.



considerably higher than the average of 0.42 reported for all of Uppsala but also much lower than that of the city's most central parts [40].

### 3.2. Survey Response Rate and Socio-Demographic Profile

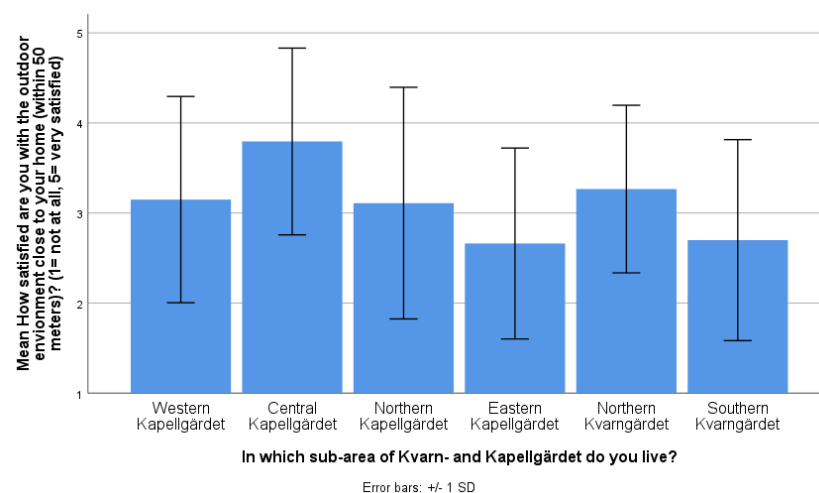
A total of 595 answers were collected, giving a response rate of 10%, of which 523 answers were complete (8.8%). The gender and age distributions of the respondents were fairly even, along with some very few non-binary people and people who did not wish to specify their gender. Nearly half of the respondents had lived in the area for 1–5 years, while only a few (2%) had lived there their whole life. A large share of the respondents (40%) lived in the densified sub-area Western Kapellgärdet (1), where many reside and the response rate was highest (13%).

### 3.3. Satisfaction

The level of satisfaction with the outdoor environments varied greatly between sub-areas, with answers ranging from not at all to very satisfied. A statistically significant difference was found between densified and non-densified sub-areas regarding the immediate area (within 50 m of the home), see Table 2, where respondents from non-densified sub-areas indicated higher levels of satisfaction. While respondents in two of the three non-densified sub-areas were the most satisfied with their outdoor environments, Southern Kvarngärdet (6) was the exception, see Figure 3. For satisfaction in the area at large, no statistically significant difference was found between densified and non-densified sub-areas, and the lowest level of satisfaction was reported in Southern Kvarngärdet (6).

**Table 2.** Tukey's test for satisfaction in regard to the outdoor environment in the immediate area, where sub-areas without a common letter (a, b, c) are separated on the level of significance of 5%.

In Which Part of Kvarngärdet or Kapellgärdet Do You Live?	N	Mean Value
Eastern Kapellgärdet	59	2.66 a
Southern Kvarngärdet	63	2.70 a
Northern Kapellgärdet	55	3.11 ab
Western Kapellgärdet	229	3.15 b
Northern Kvarngärdet	49	3.27 bc
Central Kapellgärdet	102	3.79 c



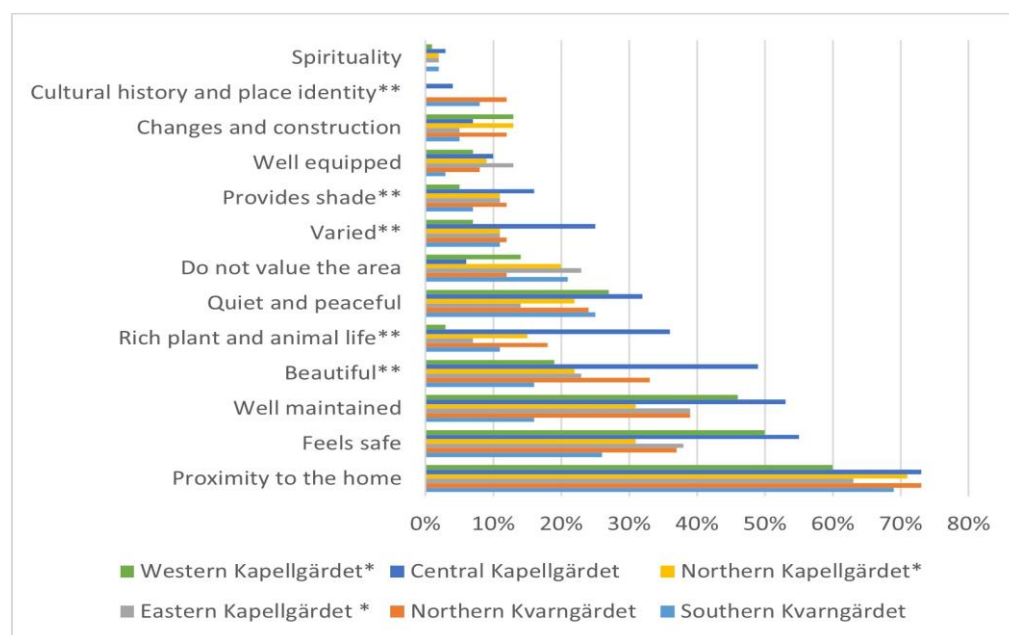
**Figure 3.** Mean level of satisfaction in regard to the outdoor environment in the immediate area, found to be higher in non-densified sub-areas (Central Kapellgärdet (2), Northern Kvarngärdet (5) and Southern Kvarngärdet (6)) in the statistical analysis.

### 3.3.1. Density

Respondents from all sub-areas mentioned that the area as a whole is or is becoming very dense, with buildings close to each other. They drew attention to some buildings in the densified sub-areas having small courtyards or having none at all. There were accounts of physical crowding in the outdoor environments, the sun rays not reaching the ground of the courtyards and noise echoing between the crowded buildings causing stress and sleep deprivation. An example of the sense of crowdedness is the fact that several respondents referred to a small hill in one of the parks as their favorite place because “(...) there you mostly get left alone and get to have a view”. Other accounts included the following: “There is way too much construction! Everything green is being replaced by buildings. It makes me consider moving” and “This place was beautiful before but now it’s so cramped”.

### 3.3.2. Maintenance and Perceived Safety

Respondents from all sub-areas expressed problems with littering and insufficient maintenance of the outdoor environment, connected to open space management and its operational maintenance. This issue had worsened during the last few years, particularly mentioned by residents in non-densified Southern Kvarngärdet (6). The maintenance in this sub-area was described as “a total catastrophe”, and someone expressed that “the area was good in the past, but now it is practically decaying”. The poor maintenance might explain the low level of satisfaction in Southern Kvarngärdet (6). In other sub-areas, respondents considered the immediate area or the area at large to be well maintained, e.g., more than half of the respondents in non-densified Central Kapellgärdet (2) and nearly half in densified Western Kapellgärdet (1) (see Figure 4).



**Figure 4.** Qualities that respondents from each sub-area found and appreciated in the immediate outdoor environment (50 m from the home). \* Densified sub-areas. \*\* Statistically significant difference, where the quality was found to a higher extent in non-densified sub-areas.

Some lack of perceived safety was experienced in all sub-areas, but mainly in Southern Kvarngärdet (6). This feeling was connected to a lack of maintenance, with untrimmed shrubs or broken streetlights as a result, or to known or suspected crimes, drug-use or “shady people” gathering in the area. However, respondents from most sub-areas described the outdoor environment in the area as calm or safe, for example, around half of the respondents in both densified Western (1) and non-densified Central Kapellgärdet (2), respectively (see Figure 4).



### 3.4. Usage

Of the six categories of usages available in the survey (extrinsic, social interaction, active, intrinsic, passing by and non-users), most respondents reported passing by, both in the immediate area and the area at large. Some types of usage rendered statistically significant differences between densified and non-densified sub-areas. Social interaction (e.g., visit/take part in events, meet friends, picnic) and intrinsic usage (e.g., quietness, get fresh air, relax, get sun, experience nature) were both higher in non-densified sub-areas than in densified sub-areas in the outdoor environments in the immediate area. The same applied to intrinsic usage in the area at large, which was also significantly higher among respondents from non-densified sub-areas. However, no statistically significant difference was found between densified and non-densified sub-areas concerning the frequency with which the residents use the outdoor environment.

### 3.5. Qualities

The most commonly found and appreciated qualities of the outdoor environments in the immediate area and the area as a whole were their proximity to the home, perceived safety and good maintenance. A statistically significant difference was found between densified and non-densified sub-areas, both in the immediate area and in Kvarngärdet and Kapellgärdet at large, regarding the qualities beauty, rich plant and animal life and variation. For the immediate area, a statistically significant difference could also be found between densified and non-densified sub-areas regarding the qualities shade and place identity and cultural history. All of these qualities were found and appreciated to a higher extent by respondents in non-densified sub-areas (see Figure 4).

#### 3.5.1. Green Spaces and Traffic

Green, open spaces or greenery were highlighted as particularly good qualities in Kvarngärdet and Kapellgärdet, especially the park and green spaces around Central Kapellgärdet (2). This park in Kapellgärdet was many respondents' favorite place, mainly because of its spacious, green and social qualities. The many pedestrian and bicycle paths and large and open spaces as well as the restriction of car traffic were highly appreciated in the non-densified sub-areas. The limited access for car traffic in the housing areas was also considered good for children. Some accounts of this included the following: "I moved away a few months ago, but what I valued the most was the fact that there was only a pedestrian and bicycle path going past my home. So no car traffic" and "that there are large and beautiful green areas for both children and adults [is particularly good]".

Many green areas and elements such as trees and shrubs have been removed as Kvarngärdet and Kapellgärdet are being densified: "They have cut down almost all the trees in the area (50 m) where I live. It was much greener and more beautiful before. Now there is hardly anything left, which I think is a great pity". This includes a loss of especially valued places: "[My favorite place] doesn't exist anymore because all the trees and the grove are gone". Several respondents also expressed a concern regarding further loss of green areas: "The ongoing densification means that the green character is deteriorating in a worrying way. Smaller green areas, fewer large trees (less shade)" and "There are still parks and greenery, but I am worried that more will be built". There is also a perceived lack of green spaces in the densified areas, expressed by several respondents: "Too few green areas. Absolutely crazy how the municipality builds without taking into account that the people who live here need green areas". In particular, respondents in densified Eastern Kapellgärdet (4) report a lack of greenery: "I miss green places! It feels very "confined" here, I miss green and leafy areas (...). This area feels surrounded by concrete and asphalt".

Car traffic in or around Kapellgärdet was considered problematic in places where it was not restricted, considering both safety and noise. Mainly respondents in densified Western (1) and Eastern Kapellgärdet (4) raised this issue but also to some extent those in non-densified Central Kapellgärdet (2) and Southern Kvarngärdet (6). The excessive amount and speed of the traffic on roads in or around the area at large was often mentioned

by respondents as a poor quality of the outdoor environments. Respondents in densified Eastern Kapellgärdet (4) reported issues with noise and stress, mainly from the main road leading through the area. However, a few respondents considered the traffic on the same road well organized, with clear rules and sections.

### 3.5.2. Social Qualities

The responses show a general lack of places with social qualities in Kvarngärdet and Kapellgärdet. This is referred to as a lack of physical places for socializing in the area, like restaurants, bars, shops, parks or squares, a poor social environment or insufficient green space maintenance (see Figure 5 for a comparison of characters). In the densified Western Kapellgärdet (1), the former is expressed: “I miss a park or a square, it would make the area feel more alive. Now it’s just houses” or “There is also a lack of a living street environment. There is no neighborhood restaurant, no cafe and very few businesses. There is nowhere to gather outside on summer evenings to have a glass of beer in the evening sun”. In all sub-areas but densified Northern Kapellgärdet (3), respondents expressed that there were not any, or enough, places for older children to use, particularly places considered safe. Still, many pointed out the park in the non-densified Central Kapellgärdet (2) as a “well visited area with all age groups represented, lots of laughter and activity” where “people socialize or pass through which brings life to the area”.



(a)



(b)



(c)



(d)

Figure 5. Cont.



**Figure 5.** Photos of rather typical settings in each of the sub-areas. (a) One of the smaller courtyards in a densified infill area of Eastern Kapellgärdet (4); (b) one of the larger courtyards in non-densified Central Kapellgärdet (2). (c) Entrance to courtyard in densified Western Kapellgärdet (1) and (d) courtyard in non-densified Northern Kvarngärdet (5). (e) Courtyard in densified Northern Kapellgärdet (3) with infill in the right half of the photo and (f) courtyard in non-densified Southern Kvarngärdet (6), where lack of management was seen as an issue.

Elder respondents pointed out the loss of shading trees, which together with a lack of public bathrooms and insufficient numbers of seats in the outdoor environments constituted a problem for them. Densified Eastern Kapellgärdet (4) in particular was expressed as ill-suited for elders: “Poor adaptation to the specific needs of the elderly, e.g., seating and opportunities to take a coffee break (...). The ongoing densification means that the green character is deteriorating in a worrying way. Smaller green areas, fewer large trees (less shade)”.

The social qualities in non-densified Southern Kvarngärdet (6) are affected by the insufficient management: “Very neglected outdoor environment, the landlord does not maintain it. Mostly weeds and gives an abandoned, impersonal impression. The outdoor environment is perceived as unsafe instead of inviting, inspiring and welcoming.” However, the structure of the physical environment in the sub-area with its outdoor spaces has a recognized potential: “Has the potential to be a green oasis. Many low-rise buildings with large courtyards. With proper care, it would promote outdoor socializing with neighbors and friends. Unfortunately, it does not feel that way at the moment”.

### 3.5.3. Densification Process

The densification of the area has affected respondents in many ways, one of which is inconvenience due to prolonged construction in the area, particularly voiced by respondents in Northern Kapellgärdet (3): “there is always construction somewhere here. Ever since we moved here in 2013, there has been construction in the area in various places with noise, construction traffic, dust etc. as a result”. Others expressed that building sites were being left unfinished for a long time, looking unpleasant, and that information and services from the municipality in the process were not sufficient, creating irritation: “(...) obstructions in the form of concrete sows that are not removed [once buildings are finished] are not so fun. Nor big signs that claim that something will happen ‘soon’, but that ‘soon’ never happens”.

## 4. Discussion

This study had the aim of deepening the knowledge on how the densification of urban residential areas from the welfare era is affecting satisfaction with, use and perceived qualities of outdoor environments among residents. The results show that there are differences in all these three aspects—satisfaction, use and perceived qualities of outdoor environments—between sub-areas that have been densified with infill and those that have

not. Moreover, the descriptions provided by the respondents give a picture of an area undergoing major change and where valuable green space quality and quantity as well as car traffic limitations are being lost.

The many negative comments on the experiences of living in an infill development project, both concerning the process and the result, can be described as rather expected. Previous studies have found that these areas can be considered rather attractive for living [1] but also that residents rarely look positively on infill development in their own neighborhood, connecting to NIMBYism or anti-growth sentiments [2]. However, the results of this study not only show how densification affects feelings and opinions but also demonstrate statistically significantly higher satisfaction with local outdoor environments with more different uses and qualities in sub-areas that are non-densified. This points to the actual experiences of densification in the case of Kvarngärdet and Kapellgärdet resulting in a less useful outdoor environment than found in the non-densified sub-areas. Interestingly, the negative effects for residents of the densification not only affect those who lived there before the new constructions but also to a large extent those who have moved into new buildings, inside the developments in Western (1) and Eastern Kapellgärdet (4), who are now lacking green spaces and safe traffic solutions. This points at an actual lack of qualities in the outdoor environment, which is partly different to a view of the residents as NIMBYs or anti-growth [2].

When studying the effects of densification, it is important to place awareness on the context of various cases, as density can take physical form in many ways [1]. Previous studies have highlighted the possibilities of having higher neighborhood satisfaction and wellbeing among residents in compact environments [22]. However, that is in comparison to urban sprawl and in cases when the compact areas include qualities such as “mixed land uses, public transport, limited car traffic, access to green spaces, and social equity” and furthermore with measures to limit litter, noise and fear of crime [22] (p. 270). In the context of Kvarngärdet and Kapellgärdet, the built environment from the welfare era was not urban sprawl but a multi-family housing area already containing the required qualities, in particular, many green spaces and limited car traffic. In line with Qviström [34], this study has shown specific assets in the materializations of welfare planning, a heritage that is now being highly threatened. In addition, the infill development has to some extent meant limited fear of crime and better maintenance as compared to some of the non-densified sub-areas, which is positive, but also problems such as increased noise [22]. Densification that in this way has led to mainly negative aspects being introduced for the residents, including loss of green spaces and increased noise and fear caused by traffic, appears more focused on the densification per se rather than social sustainability goals [15]. In the plans from the 1960s and 1970s, social places such as shops, restaurants and squares and green spaces such as parkland were given priority, something that evidently is not as prioritized in the densified areas today. This affects the social qualities and uses of the outdoor environments, particularly for elderly people and older children who are more dependent on e.g. shade and facilities. It further supports that the effects of densification can be negative in some aspects [5], including for social impact and health [4]. However, there may be contexts where densification can be realized with more priority given to social values, such as with a focus on saving and developing green spaces and social places and limiting car traffic.

The importance of well-functioning management of outdoor environments for residents was also shown in this study. Wear and tear as well as lack of maintenance and open space development were clear in mainly the older and non-densified sub-areas and lowered the satisfaction with outdoor environments among residents in those environments, as found also in other studies of similar areas [32]. Outdoor environments not being well managed over time is not directly a problem caused by planning but is still related to it [14], as the qualities of the welfare heritage are partly lost with insufficient management. A better co-play between planning and management is needed to reach environments of high quality [13].

This study has provided interesting insights through the use of mixed methods but also has limitations, including a low response rate for the survey and a simplified division into densified and non-densified sub-areas. A more detailed analysis of responses from different parts of the area might have provided more insight into the various experiences of living there. Also, despite including a rather large area, this study only considers a single case. The new development of a questionnaire was based on previous research as well as a small test of the questionnaire in order to support its validity and reliability, but it might be further improved in the future. The open questions in the questionnaire both provided rich qualitative data material and showed that respondents had understood the questions, which supports the validity. Future studies might deepen the insights into the context and provide more place-based and detailed results of densification projects and also how these are perceived by different user groups.

## 5. Conclusions

Based on this study, the importance of planning approaches that give residents access to varied and well-functioning green spaces as well as limit car traffic can be elevated. The study has mainly showed negative effects for residents in their relation to local outdoor environments, including limited satisfaction, use and perceived qualities, after densification through infill development, in a case where the densification has led to loss of green spaces and an increase in car traffic in a multi-family housing area from the welfare era in the 1960s. While there may be other more positive examples of densification processes to find, this study shows the need for more context-based planning approaches and also to question the current densification trend as a solution in all cases. There is a need to consider more diversified qualities in cities in order to fulfill all sustainability goals, including the social ones. This study also points to the values of the welfare planning and its heritage providing useful assets such as large green spaces, now threatened by both limited management as well as by densification projects that appear more focused on density per se than on providing qualities for residents.

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**Data Availability Statement:** For more data from the study, please see the data report (in Swedish): [schneider-j-et-al-20230315.pdf](https://schneider-j-et-al-20230315.pdf) (slu.se).

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## Appendix A

### Survey—questions and options

#### 1. Background

(a) How old are you?

1. 18–25 years
2. 26–35 years
3. 36–50 years
4. 50–65 years
5. >65 years

(b) What is your gender?

1. Woman

2. Man
3. Non-binary
4. I prefer not to specify
- (c) How long have you been living in Kvarngärdet or Kapellgärdet?
  1. <1 year
  2. 1–5 years
  3. 5–10 years
  4. 10–15 years
  5. >15 years
- (d) In which part of Kvarngärdet or Kapellgärdet do you live?
  1. Western Kapellgärdet
  2. Central Kapellgärdet
  3. Northern Kapellgärdet
  4. Eastern Kapellgärdet
  5. Northern Kvarngärdet
  6. Southern Kvarngärdet
2. Experience and usage
  - (a) How satisfied are you with the outdoor environments close to your home (within 50 m)?
    1. Not at all 2. 3. 4. 5. Very satisfied
  - (b) How satisfied are you with the outdoor environments in Kvarngärdet and Kapellgärdet at large?
    1. Not at all 2. 3. 4. 5. Very satisfied
  - (c) How do you use the outdoor environments close to your home (within 50 m)?
    1. Active (e.g., running, other sports, cycling, ball games, other activities)
    2. Intrinsic (e.g., quietness, get fresh air, relax, get sun, experience nature)
    3. Extrinsic (e.g., walk the dog, collect food, play with children)
    4. Social interaction (e.g., visit/take part in events, meet friends, picnic)
    5. Non-user (e.g., passing through, do not visit green space)
  - (d) How do you use the outdoor environments in Kvarngärdet and Kapellgärdet at large?
    1. Active (e.g., running, other sports, cycling, ball games, other activities)
    2. Intrinsic (e.g., quietness, get fresh air, relax, get sun, experience nature)
    3. Extrinsic (e.g., walk the dog, collect food, play with children)
    4. Social interaction (e.g., visit/take part in events, meet friends, picnic)
    5. Non-user (e.g., passing through, do not visit green space)
  - (e) Which qualities do you find and appreciate in the outdoor environments close to your home (within 50 m)?
    1. They are beautiful
    2. The cultural history and place identity
    3. Their spirituality
    4. They have a rich plant- and animal life
    5. They feel safe
    6. Their proximity to the home
    7. They are well maintained
    8. They are varied
    9. They are well equipped
    10. They are quiet and peaceful
    11. They provide shade
    12. The changes and construction in the area
    13. I do not value the area
  - (f) Which qualities do you find and appreciate in the outdoor environments in Kvarngärdet and Kapellgärdet at large?
    1. They are beautiful

2. The cultural history and place identity
  3. Their spirituality
  4. They have a rich plant- and animal life
  5. They feel safe
  6. Their proximity to the home
  7. They are well maintained
  8. They are varied
  9. They are well equipped
  10. They are quiet and peaceful
  11. They provide shade
  12. The changes and construction in the area
  13. I do not value the area
- (g) Do you have anything to add in regards to qualities in the outdoor environments in Kvarngärdet and Kapellgärdet? (Open-ended question)
- (h) How often do you use the outdoor environments close to your home (within 50 m)?
1. Several times a day
  2. Once a day
  3. Several times a week
  4. Once a week
  5. A few times a month
  6. More seldom
  7. Never
- (i) How often do you use the outdoor environments in Kvarngärdet and Kapellgärdet at large?
1. Several times a day
  2. Once a day
  3. Several times a week
  4. Once a week
  5. A few times a month
  6. More seldom
  7. Never
- (j) What is particularly good with the outdoor environments in Kvarngärdet and Kapellgärdet? (Open-ended question)
- (k) What is not so good with the outdoor environments in Kvarngärdet and Kapellgärdet? (Open-ended question)
- (l) Do you have a favorite place in Kvarngärdet and Kapellgärdet? Describe where and why! (Open-ended question)
- (m) Do you have anything else to add regarding in the outdoor environments in Kvarngärdet and Kapellgärdet? (Open-ended question)

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