Landscape-led approaches for the regeneration of low-income medium-rise housing:

A cross-cultural assessment of social and ecological sustainability

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Chapter 7

Residents' perception of their landscape following the sustainable regeneration

Introduction

The chapter analyses the respondents' perception of the characteristics of the current landscape layout in the case studies at Augustenborg and Rotes Viertel, and the way in which it encouraged respondents' use of outdoor areas for socializing.

The study is based on the responses of the perception survey that was delivered to a selection of residents living around chosen communal gardens (Appendix B and Figure 7.1). The survey was analysed with Kruskal-Wallis and Mann-Whitney statistical tests to find perception differences between storeys as well as among the communal gardens of various block layouts (See Introduction of thesis and appendices E, F, and G). The results of the survey and a preliminary discussion for each case study are presented separately so that respondents' preferred design characteristics can be compared.

In first instance, the characteristics of the surveyed population are explained to provide an overview of the background of the survey respondents. The chapter then presents perception responses for the general design characteristics of outdoor areas with scale, legibility, and datum and the way they affect social interaction in the case studies. Then the preferred design features of communal gardens are shown, starting with the most significant ones as perceived by respondents. At the end of the chapter, the design preferences of respondents are compared for each case study showing their relevance for encouraging socializing. Then the perception differences for each case study which may be attributed to culture are discussed to identify design features that may or may not be generally applicable.

The chapter concludes with design suggestions arranged in the order of relevance shown by the findings as recommendations for the future regeneration of other medium-rise housing areas.

Augustenborg

Characteristics of the surveyed population

In the first case study of Augustenborg, Malmö, the survey was sent to every household of the communal gardens from the selected layouts and there was a good response. For the purpose of the analysis, each of the blocks where the survey was applied was provided with a number identifier as well as the chosen layouts (Figure 7.1). A total of 430 questionnaires were sent out with one to each flat, from which 125 were received representing 29% of the total number of households. Responses were received from each of the layouts used for the analysis, with a lower response from the blocks in open layouts 1 due to a smaller number of households occupying those blocks (Figure 7.2).

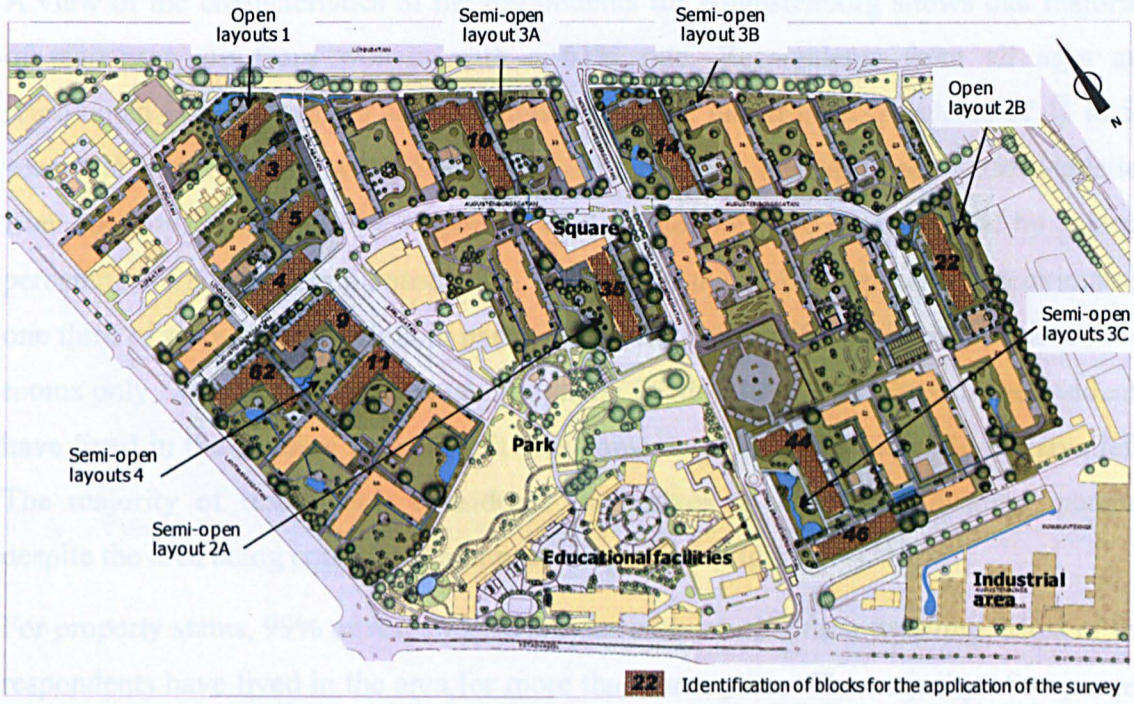

Figure 7.1 **Selected blocks for the application of the survey and their communal gardens and layouts in Augustenborg**

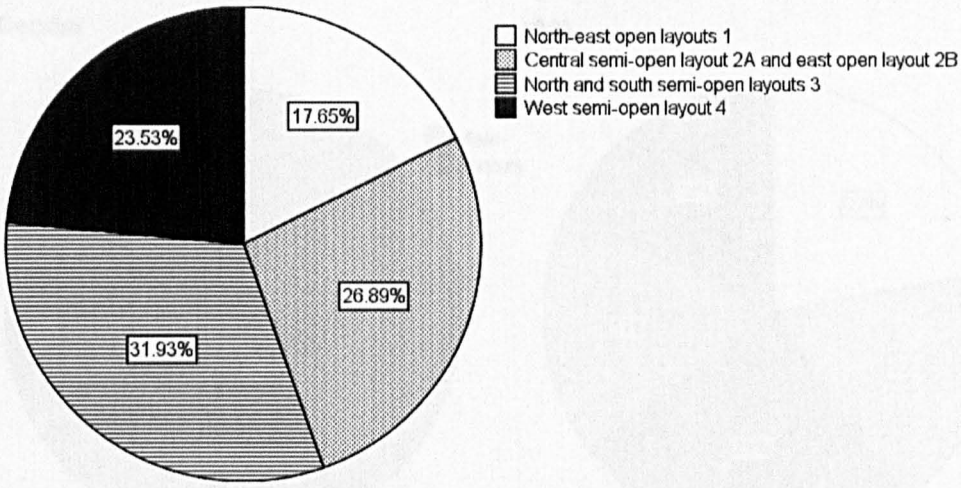

Figure 7.2 Distribution of responses to the survey in Augustenborg according to layout

A view of the characteristics of the respondents for Augustenborg shows that majority of responses are from women with a 61% rate. Respondents from all ages are represented evenly having a slightly higher response rate from respondents of 41 to 50 years and 18 to 30 years with 25% and 22% (Figure 7.3). Similar to population statistics from the city of Malmö, the responses in Augustenborg are characterised by a large percentage of single person households.[482] Adults with children represent approximately one third of responses, which is in partly due to the fact that 56% of flats consist of two rooms only, which is not an adequate provision for families. Also many of the residents have lived in the housing area since it was constructed in 1952 and children have left. The majority of respondents considered themselves as having an average income, despite the area being considered amongst the poorest (Figure 7.4).[483]

For property status, 99% of respondents are currently renting their dwelling. Most of the respondents have lived in the area for more than three years. The majority of responses come from residents living on second and third storeys with 27% and 21% and a lower response from those living on the fifth, sixth, and seventh storey with relatively 3% each (Figure 7.5).

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[482] Malmö Stad, 'Områdesfakta Augustenborg 1995-2000', *Statistik,* (1996) <http://www.malmo.se/Kommun--politik/Statistik/C-Omradesfakta-for-Malmo/Aldre-upplagor/Omradesfakta-2007-rev.inkomstuppgifter-081119/Fosie-07/pagefiles/156.Augustenborg-rev.-081119.pdf> [accessed on March 2008] (p. 2).

[483] Safija Imsirovic, (Head and founder of Gnistan children day activity centre), interview by C. Martínez, May 2007, transcript 4, Malmö, Sweden.

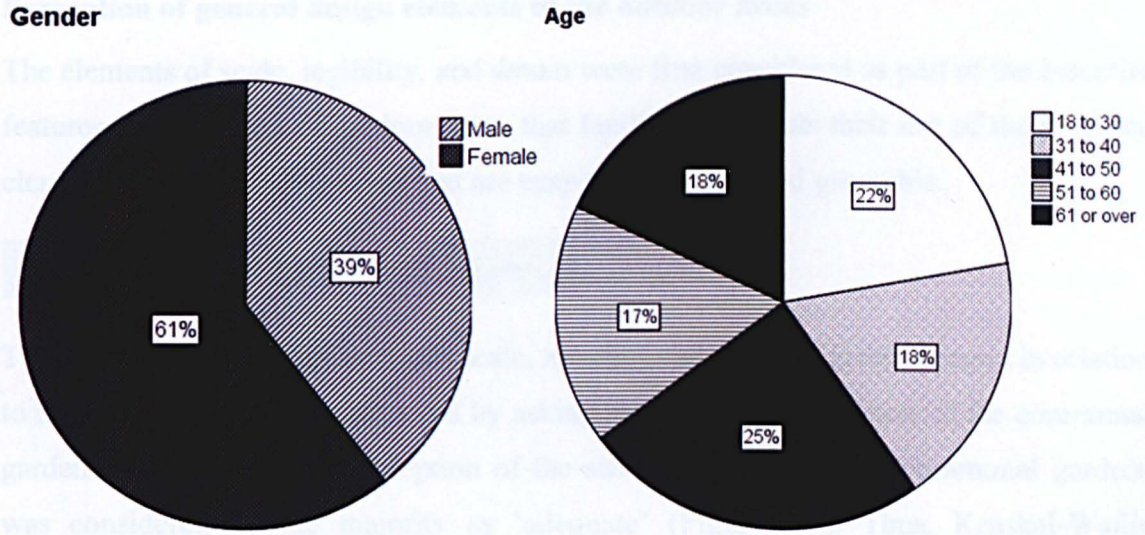

Figure 7.3 **Distribution of responses to the survey in Augustenborg according to gender and age**

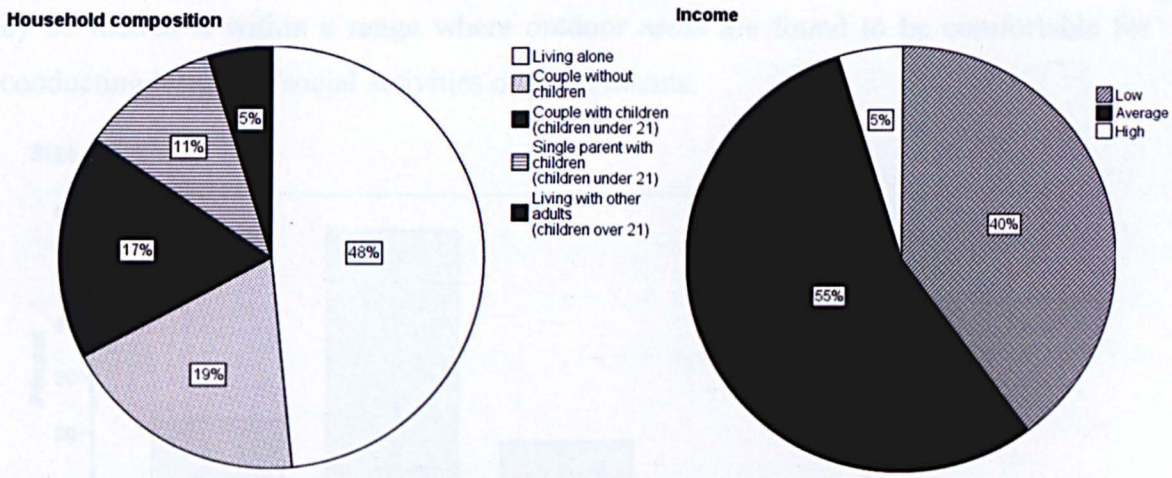

Figure 7.4 **Distribution of responses to the survey in Augustenborg according to household and income**

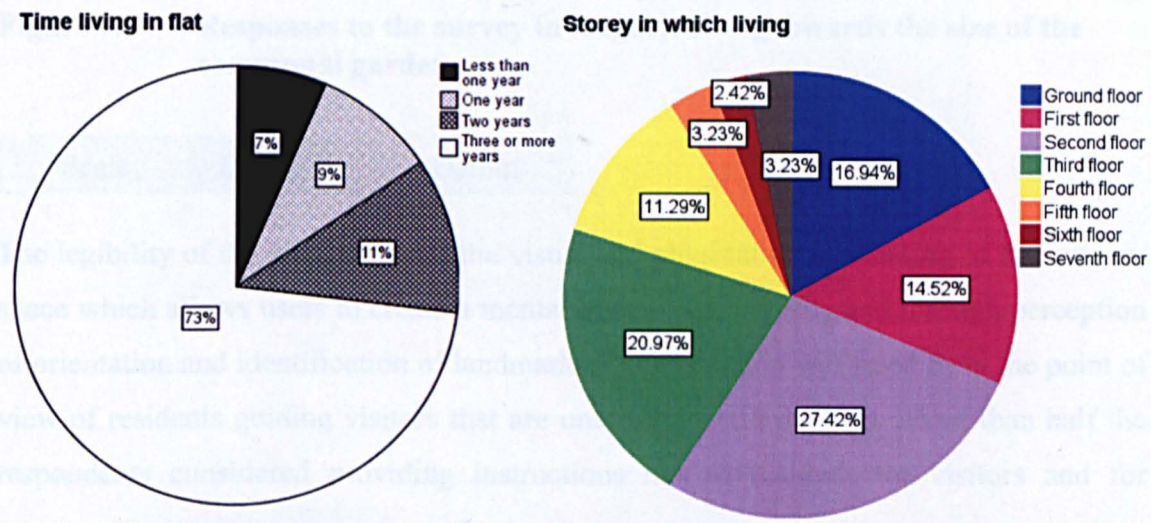

Figure 7.5 **Distribution of responses to the survey in Augustenborg according to the time that residents have spent living in their flat and the storey at which respondents live**

Perception of general design elements of the outdoor areas

The elements of scale, legibility, and datum were first considered as part of the essential features in the design of outdoor areas that facilitate residents their use of them. These elements aid in providing areas that are easy to read, safe, and graspable.

Scale	Legibility	Datum

The first issue to be addressed was scale, meaning the size of a given element in relation to human size, which was explored by asking residents to rate the size of the communal gardens.[484] Respondents' perception of the size of their respective communal gardens was considered by the majority as 'adequate' (Figure 7.6). Thus, Kruskal-Wallis statistical tests showed no differences in responses among layouts (Table 1 in appendix E). Effectively, the size of communal gardens with distances of 25 by 50 metres to 40 by 65 metres is within a range where outdoor areas are found to be comfortable for conducting leisure or social activities of the residents.

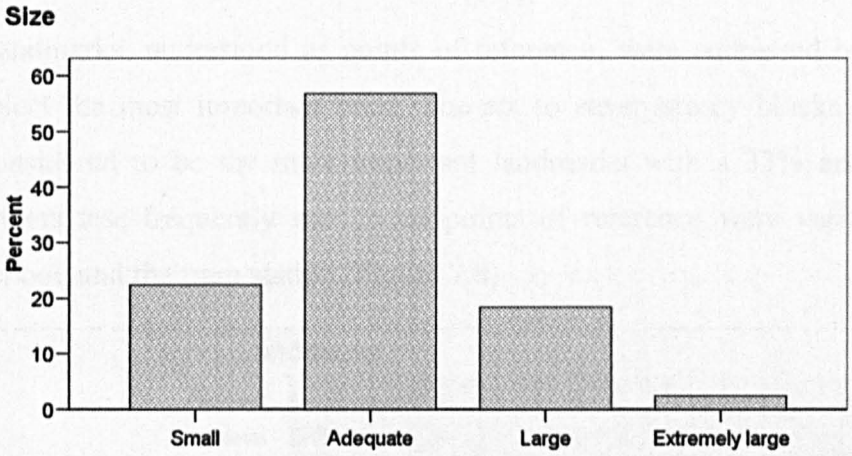

Figure 7.6 Responses to the survey in Augustenborg towards the size of the communal garden

Scale	**Legibility**	Datum

The legibility of the area, meaning the visual and physical understanding of the outdoor space which allows users to create a mental image, was investigated through perception of orientation and identification of landmarks.[485] Orientation was rated from the point of view of residents guiding visitors that are unfamiliar with the area. More than half the respondents considered providing instructions not so difficult for visitors and for

[484] Simon Bell, *Elements of Visual Design in the Landscape*, (London: Spon, 1993), pp. 150-151.
[485] Ian Bentley, Alan Alcock, Paul Murrain, and others, *Responsive Environments: A Manual for Designers,* (Burlington, MA: Architectural Press, 1985), p. 42.

approximately a third it was very easy (Figure 7.7). Kruskal-Wallis statistical tests showed no differences for responses among layouts (Table 2 in appendix E). Having legible outdoor areas has facilitated pedestrian modes of movement and opportunities for residents to know each other in the housing area

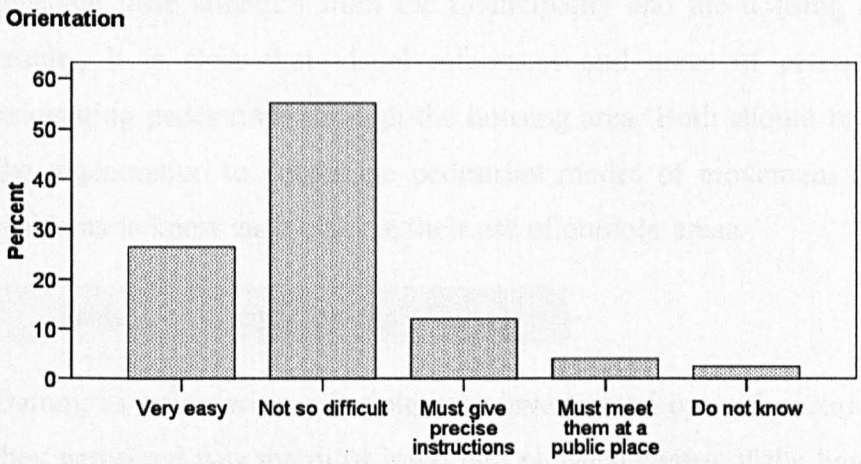

Figure 7.7 Responses to the survey in Augustenborg towards orientation in the housing area

Landmarks, understood as points of reference, were addressed by asking residents to select the most important ones. The six to seven storey blocks and the square were considered to be the most important landmarks with a 33% and 22% of responses. Others less frequently mentioned points of reference were various playgrounds, the school, and the train station (Figure 7.8).

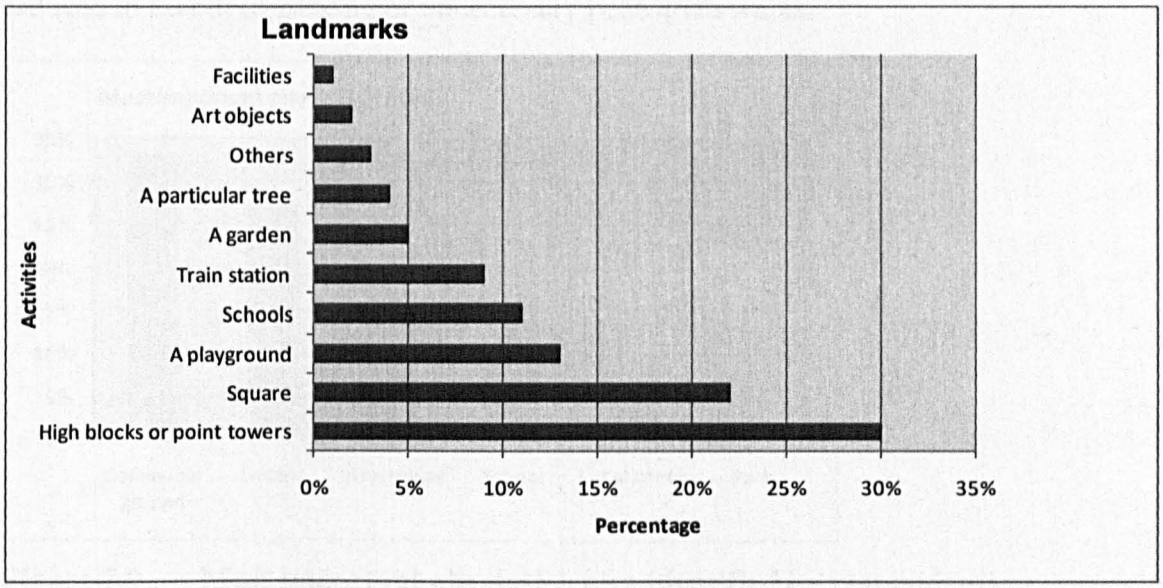

Figure 7.8 Most important landmarks identified by respondents in Augustenborg

Whilst the six to seven storey blocks were the easier identifiable visual reference, other smaller sized elements and areas of activity or nodes served as secondary references, of which the square was the most important one. Having such significance, the square should have been enhanced as part of the regeneration of the housing area but has received little attention from the municipality and the housing association. From the results, it is clear that visual references and areas of activity were important in orientating pedestrians through the housing area. Both should be considered as part of the regeneration to encourage pedestrian modes of movement that may facilitate for residents to know each other in their use of outdoor areas.

Scale	Legibility	**Datum**

Datum, as an ordering principle, was investigated by asking residents to identify what they perceived was the most important physical centre of the housing area also known as datum. The majority considered their communal garden to be their most important centre, followed by the square, and to a lesser extent the playgrounds and school (Figure 7.9). Similarly, the areas that respondents considered to be the limits of their personal realm also revolved around their communal gardens. This showed how significant communal gardens were to residents and the important role that the square held. Also, this expresses the significance of keeping the housing area as a pedestrian connected network in the regeneration although some communal gardens have been severely reduced in favour of parking or unnecessary pedestrian walks.

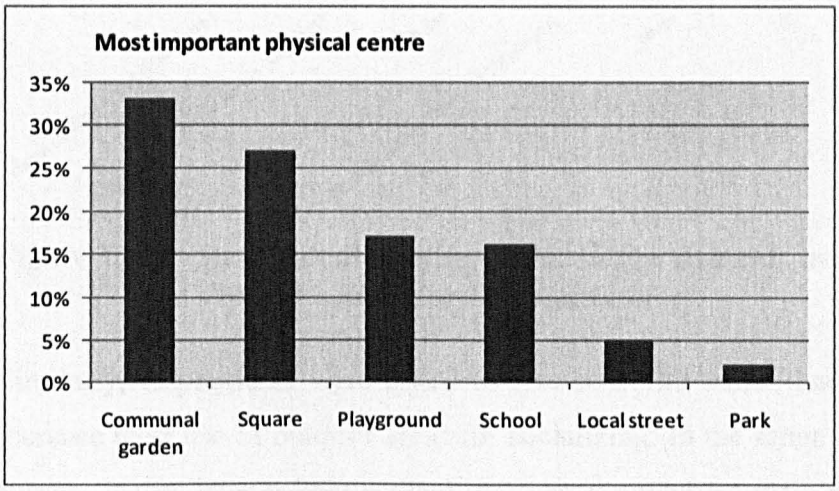

Figure 7.9 Most important physical centre identified by respondents in Augustenborg

Rating of landscape design elements to support socializing in communal gardens

Respondents were asked to select the design characteristics that would encourage them to use outdoor areas for socializing. The items to select from included robustness, mystery, enclosure, and order. Each was presented through specific examples, except order. This item was intended to mean the arrangement of elements that created some form of pattern in the communal garden. However, it was later realized it may have been interpreted as having an orderly environment through the management and maintenance of outdoor areas, which was the meaning adopted for the analysis. From the responses, the preferred characteristics were mystery and enclosure, followed closely by order and finally robustness (Figure 7.10). Respondents' choices for encouraging their socializing indicated their preference for visual stimulation that attracts them to use outdoor areas and areas that shelter them.

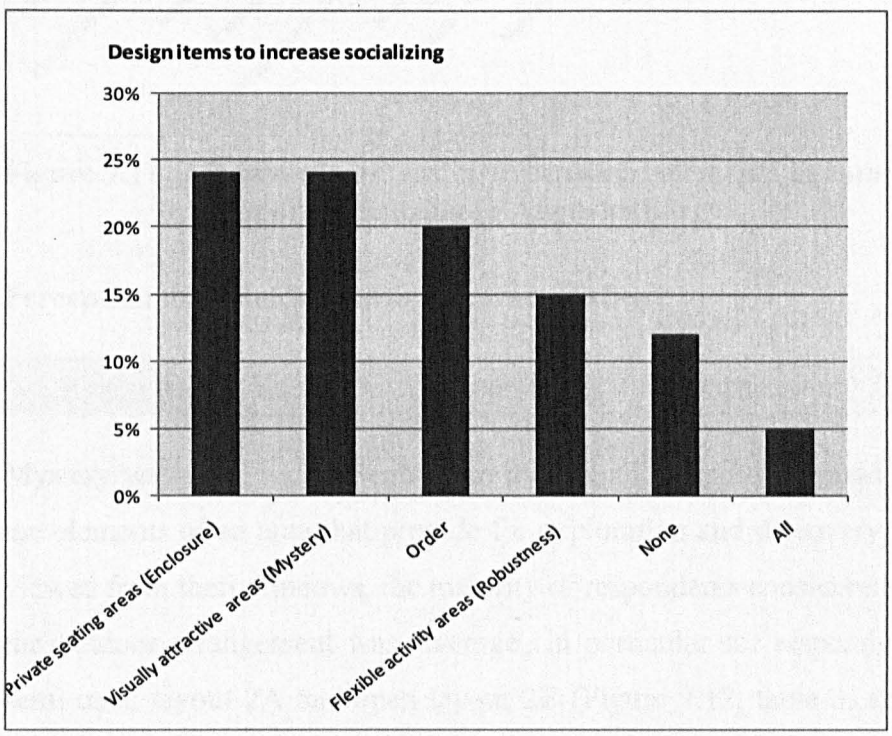

Figure 7.10 Respondents' rating of the design elements in communal gardens to support socializing in Augustenborg

Similarly, respondents were asked to rate sensorial items that they considered would increase their use of outdoor areas for socializing. In the range of items provided in the survey, it was later acknowledged that visual amenities may have been interpreted by respondents in a number of ways though it was intended to mean colours and shapes as was used for the analysis. From the results, more than a third of respondents indicated having visual amenities to be most important. This item was followed by having controlled levels of sounds and increasing sunny areas, and lastly having more

vegetated surfaces and increasing sources of good smells (Figure 7.11). Once more, the results showed the importance that visual stimulation has for respondents in increasing their socializing by providing visual variety through plants and materials that make up their communal gardens.

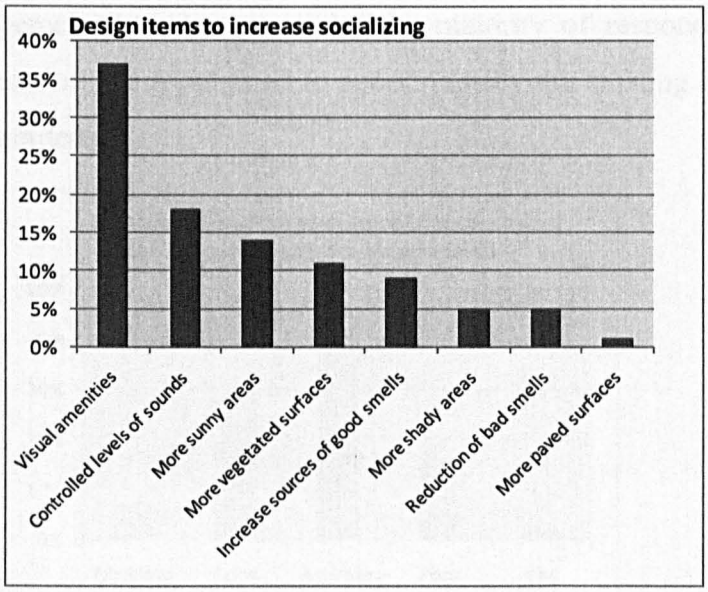

Figure 7.11 Respondents' rating of sensorial elements in communal gardens to support socializing in Augustenborg

Perception of individual design characteristics

Mystery	Enclosure	Complexity	Robustness	Coherence

Mystery was rated by residents from their window and on ground level, understood as the elements of an area that provide for exploration and discovery opportunities. When viewed from their windows, the majority of respondents considered the attractiveness of the outdoor arrangement was 'average', in particular for respondents of blocks in the semi-open layout 2A and open layout 2B (Figure 7.12, table 3, and 4 in appendix E). The outdoor areas in these layouts have had some parts of their communal gardens replaced with parking space or have bare lawn areas with a few trees.

The respondents that rated their outdoor areas to be better belonged to the blocks in open layouts 1 and semi-open layouts 4. The communal gardens of the semi-open layouts 4 had a diversity of areas arranged in spatial sequences with planting that allowed partial views. Partially secluded views were also provided in the pedestrian walk and small seating areas of the communal gardens of the open layouts 1 with *Acer campestre*, *Malus floribunda*, and *Symphoricarpos x chenaultii* 'Hancock' that remained from the 1952 design which were integrated with blocks of *Kerria japonica* 'Pleniflora'.

The results show that the diversity of the communal garden and integration of planting in blocks provided sufficiently attractive outdoor areas for respondents to be attracted into using their outdoor areas for socializing.

On ground level, areas for walking that offered views and areas to explore were perceived to be 'good' by the majority of respondents. In a way, opportunities to explore were provided to pedestrians by the existing connectedness between communal gardens.

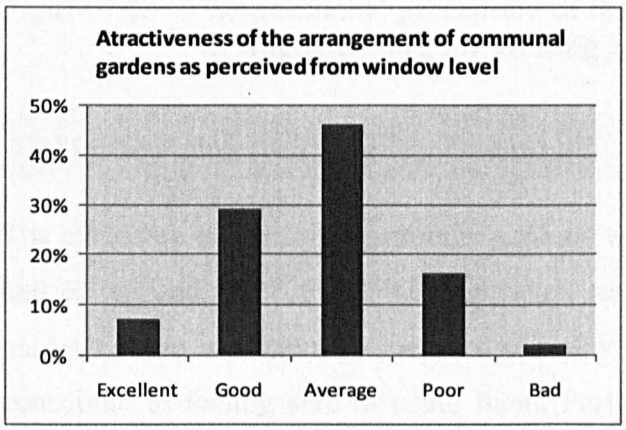

Figure 7.12 Respondents' perception from window level of the arrangement of communal gardens in Augustenborg

The arrangement of outdoor areas that may allow children to explore was found to be 'average' (Figure 7.13). This rating can be attributed mostly to the lack of informal play areas in communal gardens and vandalism of the sensory play material in the park. Also, though all playgrounds have kept a sand box, none of the water fountains found in the 1952 design have been retained. This feature was stated to be missed by respondents to a survey made by the municipality in June 2007, which intended to obtain residents' opinion in regard to any changes they considered necessary for the park. The requests of residents showed that despite having smaller playgrounds, it was necessary to have informal play opportunities as part of children's exploration and learning.

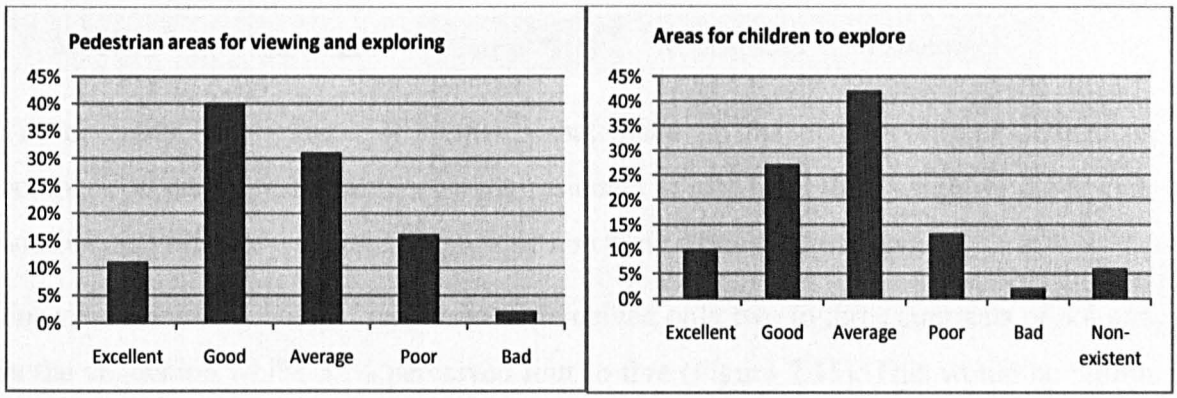

Figure 7.13 Respondents' perception of the arrangement of communal gardens in Augustenborg for viewing and exploring

Mystery	**Enclosure**	Complexity	Robustness	Coherence

The enclosure of areas in communal gardens was rated by residents from their window and on ground level. From window level, respondents perceived areas in communal gardens were sufficiently open to easily view people and activities, which may contribute to feeling safe in using them. Particularly, communal gardens in the open layouts 1 and semi-open layouts 4 were noted for their openness as small decorative trees that were planted during the regeneration have not yet reached their mature height (Table 5 and 6 in appendix E). From the ground, respondents generally rated the shelter of seating areas to be 'average' (Figure 7.14). Most of the seating areas in communal gardens have little tree cover to screen sunlight or provide some privacy which may discourage conversations among neighbours.

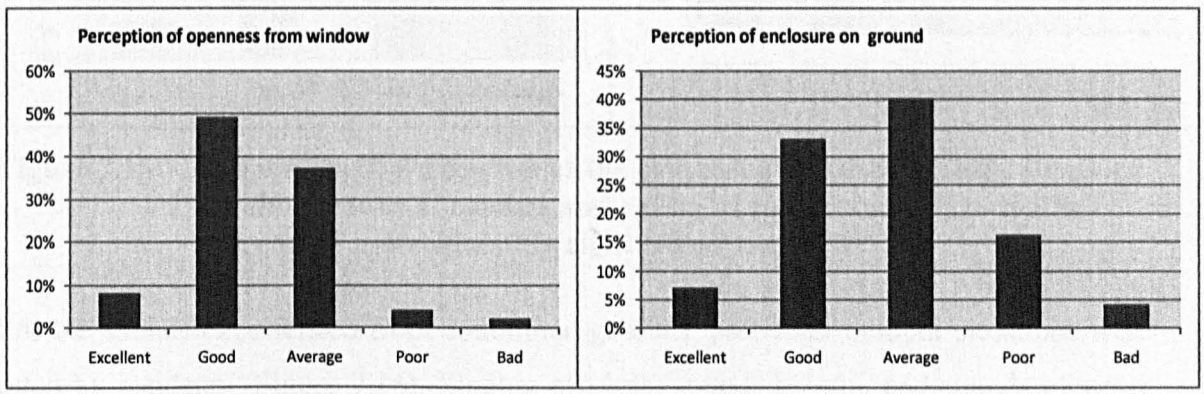

Figure 7.14 Respondents' perception of the openness and enclosure of communal gardens in Augustenborg

Mystery	Enclosure	**Complexity**	Robustness	Coherence

The diversity and richness of elements that make up the outdoor design defined as complexity, was investigated by asking residents to rate from their windows the visual, audible, and olfactory experience provided by their communal gardens.

For visual richness, 36% of respondents perceived only two to three contrasts of colours in the vegetation whilst 38% perceived four to five (Figure 7.15). This would be within the ideal number of five to nine contrasts. In reality, there was an average amount of eight contrasts of colours according to planting lists of communal gardens considering predominant colours present during spring flowering. Seeing fewer colours may have been influenced by the arrangement of small-sized flower beds, semi-evergreen, and deciduous shrubs interplanted with bulbs in communal gardens. Also, despite there were significantly fewer colour contrasts in some communal gardens, there were no statistical differences found among them. Overall respondents considered the maximum of five contrasts to be pleasant. However, since respondents visual stimulation was an important feature stated for socializing, a larger size of planting may be introduced in the regeneration of communal gardens to increase the amount of colours perceived.

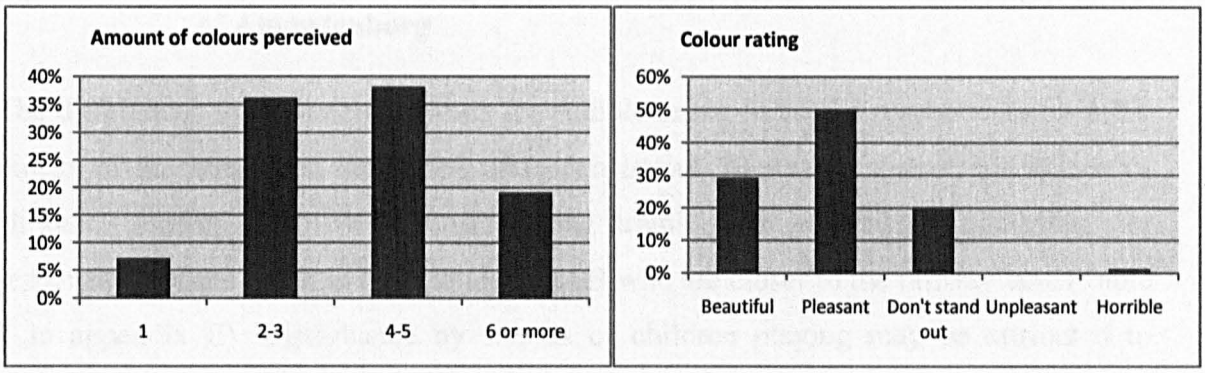

Figure 7.15 Respondents' perception of the communal gardens in Augustenborg for the amount of colours and rating of colour variety; in reality there were approximately eight colour contrasts

For the sounds experienced from communal gardens, particular outdoor situations were rated by residents (Figure 7.16). Singing of birds, sounds of rain, and sounds of water movement in fountains and channels were most enjoyed by respondents. Conversely, vehicular movement and blowing of wind were considered by almost half of respondents to be disturbing.

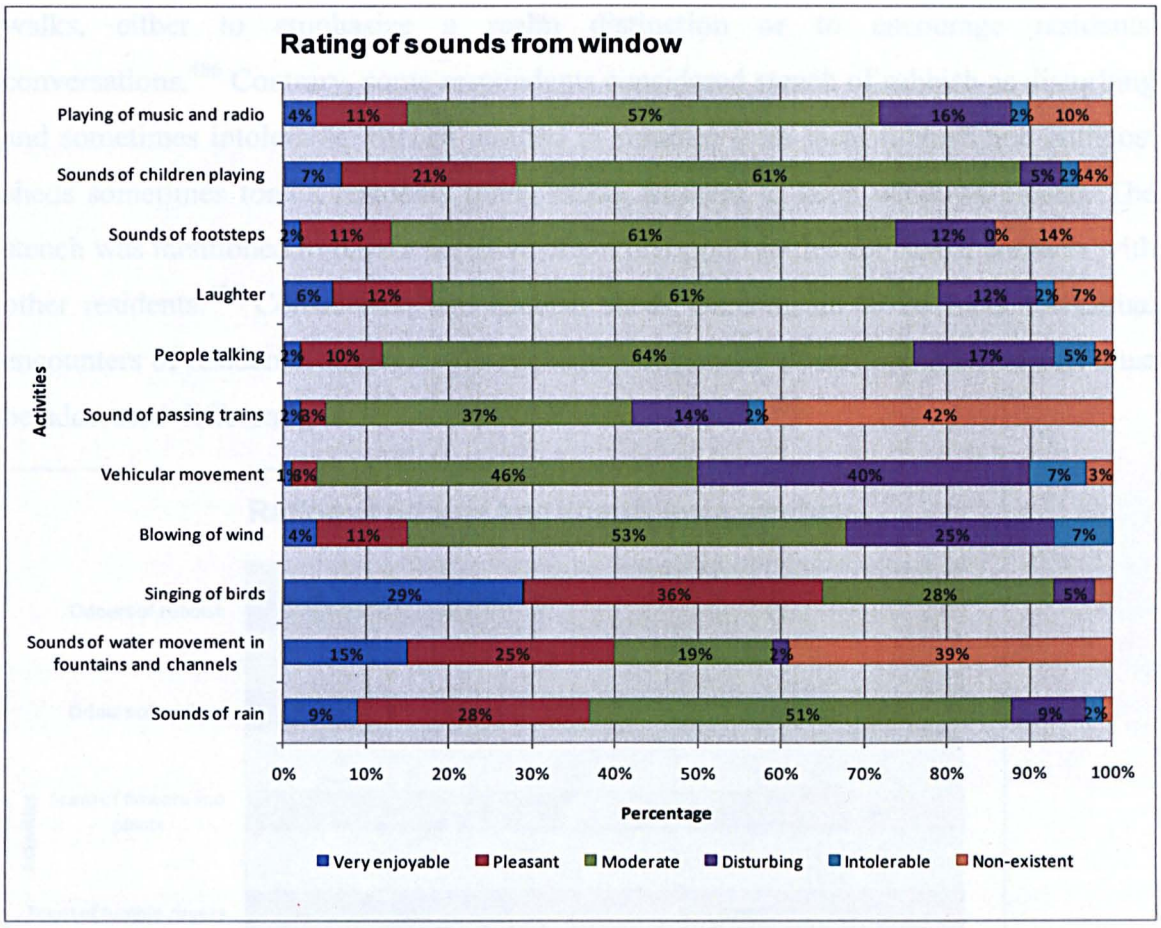

Figure 7.16 Respondents' rating of various sounds from the communal gardens of Augustenborg

The differences found among layouts for audible rating indicated respondents from the blocks of the semi-open layout 2A and open layout 2B were disturbed by sounds of children playing. Also, sounds of passing trains were particularly disturbing for respondents of the block in the open layout 2B who are closer to the railway lane (Table 7 in appendix E). Disturbance by sounds of children playing may be attributed to decisions made during the regeneration. When the east part of the park was built on, the children living in the six to seven storey block 22 of the open layout 2B only had an adjacent small playground and surrounding pedestrian walks to play in. The changes to the park also meant a higher concentration of children in the playground to the west of the park for residents living in the block of the semi-open layout 2A. Also, this change has disrupted the opportunities of children for meeting and playing with others located on the other side of the park.

For odours and scents provided by communal gardens, scent of flowers and plants were the most enjoyed items by respondents (Figure 7.17). The design has placed emphasis in locating fragrant plants adjacent to buildings' entrances and at crossings of pedestrian

walks, either to emphasize a realm distinction or to encourage residents' conversations.[486] Contrary, some respondents considered stench of rubbish as disturbing and sometimes intolerable. Stench emitted in summer from local rubbish and compost sheds sometimes forced residents living closer to them to keep windows closed. The stench was mentioned to have a negative effect on opportunities for casual contacts with other residents.[487] Considering that rubbish sheds were meant to be areas for casual encounters of residents, strategies for rubbish management during summer months must be addressed differently.

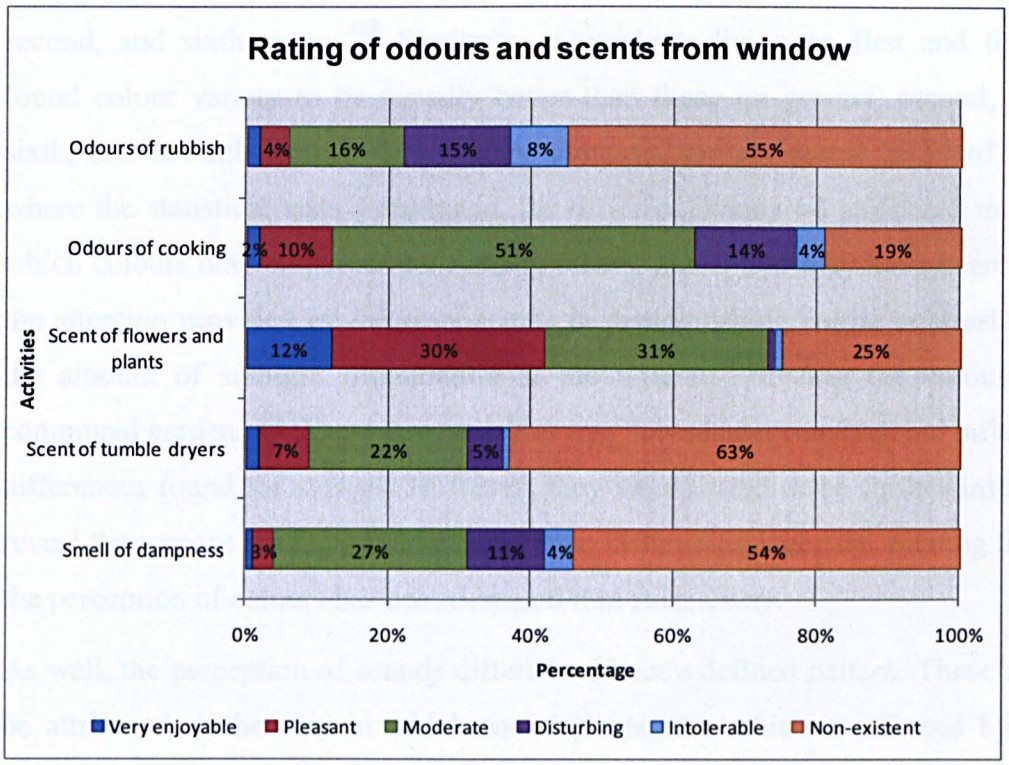

Figure 7.17 Respondents' rating of various odours and scents in communal gardens of Augustenborg

In particular, the differences found among communal gardens for olfactory perception showed that respondents from the blocks of the open layouts 1 were more affected by the stench of rubbish and the scent of tumble dryers. Also, respondents from the blocks of the semi-open layout 2A and open layout 2B not only considered those bothersome but also the odours of cooking and smell of dampness (Table 8 in appendix E). This has been attributed to the positioning of rubbish sheds and predominant wind direction

[486] Goran Larsson (Strategic planning, MKB), interview by C. Martínez, June 2007, transcript 14, city of Malmö, Sweden.

[487] Jose Ortega, (resident, personal communication), May 2007, city of Malmö, Sweden.

which may be dispersing odours more widely along the facades of the blocks in open layouts.[488]

Lastly, when comparing the responses of residents according to the storey in which they lived, an interesting finding was the lack of correlation between nearness to ground and visual and audible perception (Table 9 in appendix E). The rating of the various items were found to differ in relation to the storey in which respondents were living on though there was no apparent pattern related to nearness to ground.

Respondents living on first storey perceived many more colours than those on ground, second, and sixth storey.[489] Similarly, respondents living on first and fourth storey found colour variety to be visually better than those on ground, second, third, fifth, sixth, and seventh storey. Though this situation was consistent in all of the layouts where the statistical tests were made, the differences may be attributed to the way in which colours may be perceived. Among others, perception may have been affected by the attention provided by the respondents in distinguishing colour contrasts as well as the amount of sunlight illumination at the time of counting the colours found in communal gardens.[490] These two variables may have had a considerable influence in the differences found for storeys. However, they would need to be further investigated to reveal the reasons for these colour perception differences since the existing literature on the perception of colours has not addressed it in such a way.

As well, the perception of sounds differed without a defined pattern. These results may be attributed to the way in which sound propagates which is affected by numerous factors some of which are wind, temperature, as well as the horizontal and vertical

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[488] Ministry for the Environment, 'Good Practice Guide for Atmospheric Dispersion Modelling', *Air Quality* (2004) <http://www.mfe.govt.nz/publications/air/atmospheric-dispersion-modelling-jun04/adm-chapter4.pdf> [accessed February 2010] pp. 39-80 (pp. 40-62). See also Douglas W. Hamilton and J. D. Carlson, 'Movement of Odors Off-Farm', *Oklahoma Cooperative Extension Service* (2009) <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-2201/BAE-1739web%20color.pdf> [accessed February 2010] pp. 1-4 (p. 1).

[489] The ground storey is located at approximately 1.50m above ground.

[490] Karl-Heinz Bäuml, ' Simultaneous Color Constancy: How Surface Color Perception Varies with the Illuminant', *Vision Research*, (1999) <http://www.sciencedirect.com.eresources.shef.ac.uk/science?_ob=MImg&_imagekey=B6T0W-3VNPHX0-9-13&_cdi=4873&_user=128590&_pii=S0042698998001928&_orig=browse&_coverDate=04%2F30%2F1999&_sk=999609991&view=c&wchp=dGLbVlb-zSkWA&md5=d16640cf580760c3b4b0d599b6e13286&ie=/sdarticle.pdf> [accessed February 2010] 1531-1550 (p. 1531). See also Ralph Bolton, Carol Michelson, Jeffrey Wilde, and others, 'The Heights of Illusion: On the Relationship between Altitude and Perception', *Ethos*, (1975) <http://www.jstor.org.eresources.shef.ac.uk/stable/pdfplus/640101.pdf> [accessed February 2010] 403-424 (p. 419).

obstructions, in this case provided by the blocks length and height.[491] Therefore, sounds may be perceived in a variety of ways due to these factors independently of the storey in which respondents lived.

Mystery	Enclosure	Complexity	**Robustness**	Coherence

Robustness, meaning the flexibility of outdoor areas, was addressed by asking residents to rate the arrangement of their communal gardens from their window and at ground level for their flexibility. For both, communal gardens were noted to be 'average' by the majority of respondents (Figure 7.18). Indeed, most communal gardens did not have sufficient furniture, have small seating areas, or social edges have not been enhanced with design or planting. It is also noteworthy that the study showed no gender differences in the perception of communal gardens which shows they are equally accessible to both females and males. Additionally, opportunities for leisure and social activities through passive and active engagement in the outdoor areas were rated for their adequacy by residents through a set of specific activities (Figure 7.19).

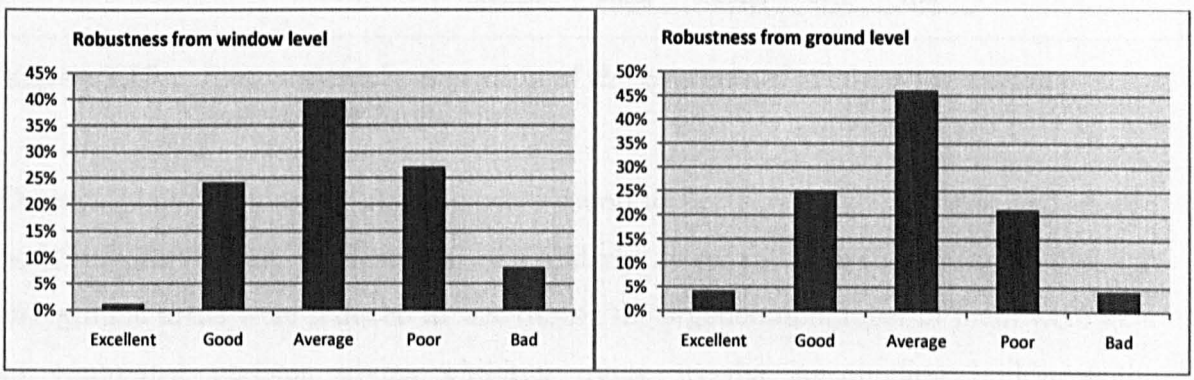

Figure 7.18 Respondents' perception of robustness in communal gardens of Augustenborg

[491] National Physical Laboratory, 'Guide to Predictive Modelling for Environmental Noise Assessment', *Sound in Air* (2007) <http://resource.npl.co.uk/acoustics/techguides/envnoiseassessment/appendix_a.pdf> pp. 1-30 (p. 2). See also Barry Truax, 'Sound Propagation', *Handbook for Acoustic Ecology*, (1999) <http://www.sfu.ca/sonic-studio/handbook/Sound_Propagation.html> [accessed February 2010] (para. 2-16 of 17).

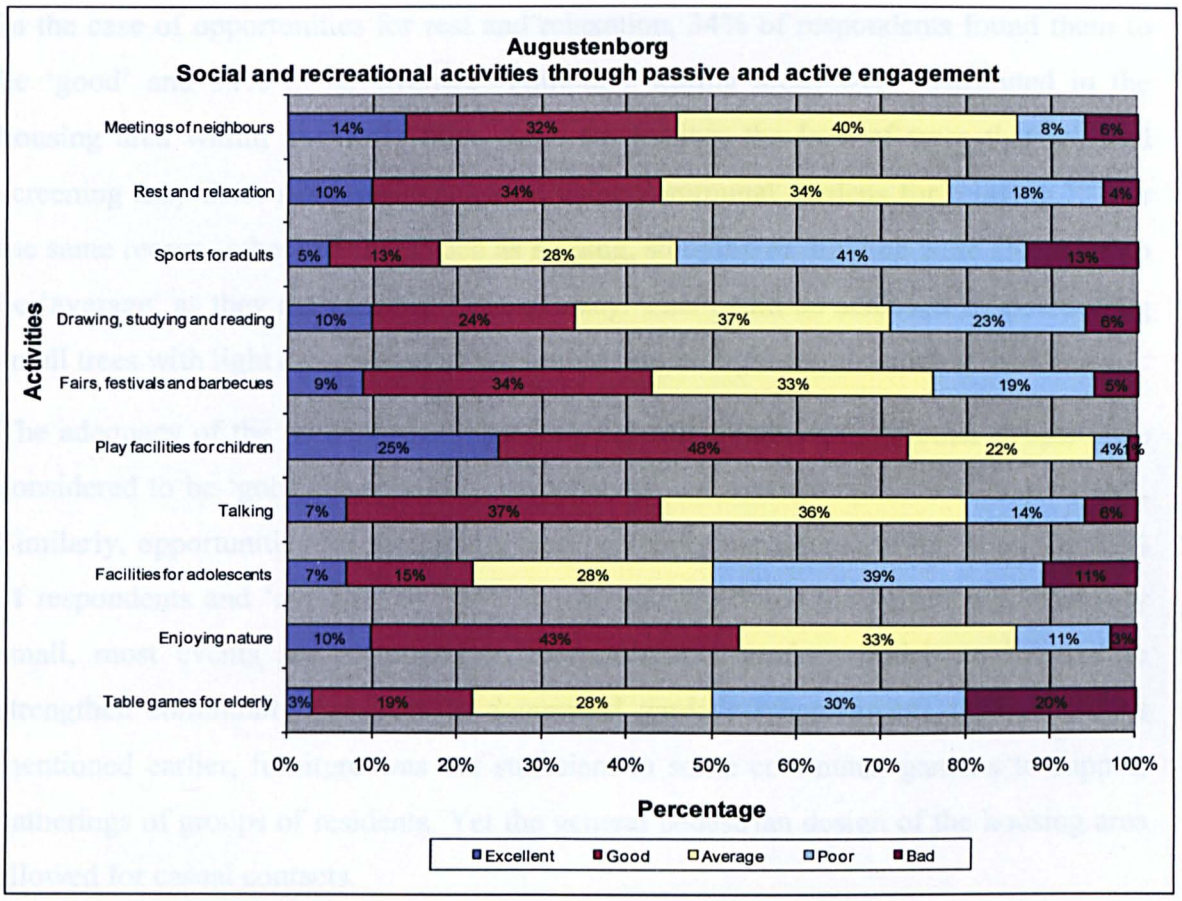

Figure 7.19 Respondents' perception of the communal gardens for various activities in Augustenborg

Overall, play facilities for children were found to be 'good', whilst social and leisure activities for adults, adolescents, and elderly were rated to be 'poor'. Although playground areas were reduced in size during the regeneration, most of them were kept in communal gardens giving children living in the surrounding buildings the opportunity to play. Also, more opportunities for social activities of residents in the outdoor areas were meant to be provided by increasing the amount of outdoor furniture. This was not fully achieved as their flexibility and arrangement were not adequate in relation to the areas they provided a service to. For instance, capacity of seating was limited and in many cases without or with one table only, and barbecue grills were placed near pedestrian walks or in an isolated position.

In regard to opportunities for the enjoyment of nature, these were considered to be 'good' by the majority of respondents. The current planting arrangement, with less height variety and shelter but with the availability of ponds appeared to provide sufficient elements for the enjoyment of nature of residents.

In the case of opportunities for rest and relaxation, 34% of respondents found them to be 'good' and 34% to be 'average'. Although seating areas were distributed in the housing area within an ideal 100m range for resting, the lack of trees that allowed screening may deter some residents from using communal gardens for relaxing.[492] For the same reason, other activities such as reading, studying or drawing were also rated to be 'average' as they may require more privacy. This could be achieved by positioning small trees with light canopies so as not to obstruct sunlight to surrounding dwellings.

The adequacy of the outdoor areas for fairs, festivals, barbecues, or other events were considered to be 'good' by a 34% of respondents and average by 33% of respondents. Similarly, opportunities for socializing were generally considered to be 'good' by 37% of respondents and 'average' by 36% of respondents. Since the square was relatively small, most events are organized in the communal gardens which contributed to strengthen community networks in communal gardens where events took place. As mentioned earlier, furniture was not sufficient in some communal gardens to support gatherings of groups of residents. Yet the general pedestrian design of the housing area allowed for casual contacts.

Finally, respondents from blocks 4, 5, 9, 11, 22, and 46 rated their outdoor areas to be better for meeting neighbours (Table 10, and 11 in the appendix E). Their communal gardens differed from others for having a compact robust design to accommodate a diversity of areas for different activities. Areas these included were a tree sheltered lawn area, a patch of lawn, an accessible water surface, an infant's sand box with seating areas, a playground, a gathering point with tables and benches, and open water channels. Also, some were close to grocery shops.

Mystery	Enclosure	Complexity	Robustness	**Coherence**

The issue of coherence, meaning the integrity of the parts to the whole, was explored through weighting the balance between hard and soft surfaces of the communal gardens as perceived by residents. Hard surfaces were defined as stone, pavement, concrete, and wood; soft surfaces as lawn, flowers, shrubs, trees, and soil. Most respondents perceived an average of 50% hard and 50% soft surfaces but in reality there is an average of 35% hard and 65% soft surfaces (Figure 7.20 and Figure 7.21). The proportions identified by

[492] Jan Gehl, *Life between Buildings: Using Public Space,* trans. by Jo Koch, 5th edn., (Copenhagen: Danish Architectural Press, 2001), p. 164.

respondents were considered in good balance despite the fact that they differed from the ideal rule of one-third to two-thirds proportions.

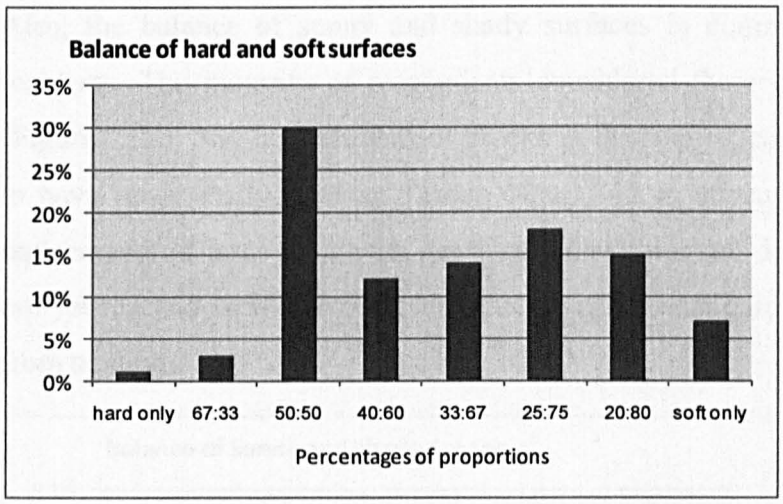

Figure 7.20 Respondents' perception of the balance of hard and soft surfaces in communal gardens of Augustenborg; the average existing balance is 35% hard and 65% of soft surfaces.

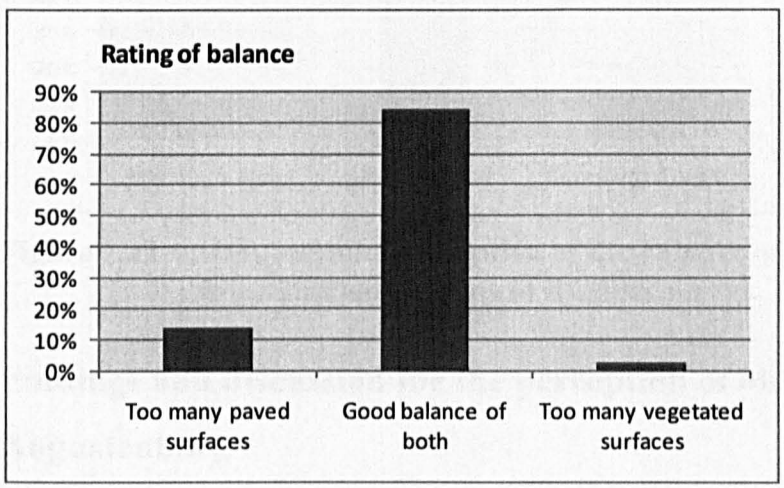

Figure 7.21 Respondents' rating of the balance of soft and hard surfaces in communal gardens of Augustenborg

If considering differences by layouts, respondents living in blocks of the open layouts 1 and 2B as well as the semi-open layout 2A considered having a higher amount of hard surfaces compared to the other layouts; even though they have an average of 38% of hard surfaces in their communal gardens (Table 12 and 13 in appendix E). Conversely, communal gardens in semi-open layouts 4 had the highest proportion of hard surfaces by 60% and were considered in good balance by respondents. Also, there seemed to be no differences among layouts with and without gravel paths that were left in some communal gardens from the 1952 design to soften the hardness of buildings. This indicates that even though soft surfaces were reduced during the regeneration, including

gravel paths, landscape arrangement of communal gardens with diverse areas and vegetation accounted for a higher perception of soft surfaces.

Also, the balance of sunny and shady surfaces in communal gardens was rated by residents. The majority of respondents considered there was a good balance of both (Figure 7.22). Still, respondents of blocks in the semi-open layouts 4 deemed necessary to have more shady surfaces (Table 14 and 15 in appendix E). This was due to the replacement of large trees with dense canopies for small decorative species which have not yet reached their mature height leaving communal gardens with few sheltered areas from sunlight.

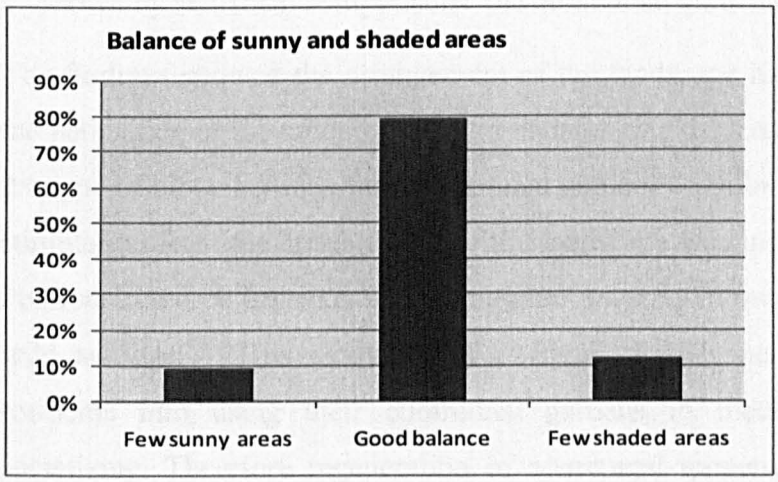

Figure 7.22 Respondents' perception of the balance of sunny and shady surfaces in communal gardens of Augustenborg

Findings and discussion for the perception of outdoor areas in Augustenborg

- Respondents to the survey preferred a design that provided visual stimulation through planting as a way of encouraging them to socialize.
- The arrangement of the landscape was more important than the type of block layout in which the communal garden was located.
- Respondents favoured mystery, enclosure, and visual amenities in first stance but these were not far off from preference for order in second stance, whilst robustness and coherence were the least important.
- The preferred communal gardens, as shown by statistical comparisons, contained a combination of distinctive blocks of plants in colour, texture, and height which appeared to provide for a more attractive view.

- A diversity of areas with planting and hard surfaces connected by subtle transitions had an effect in being perceived to have less hard surfaces even if in fact there was a higher quantity of these in communal gardens.
- A considerable lower amount of colour contrasts was found to be perceived from windows compared to the reality which was attributed to the small-sized planting that characterised the communal gardens.
- The square was the most important element of orientation for respondents whilst their communal gardens were considered to be the centres of the housing area.
- The landscape arrangement preferred by respondents for leisure and socializing, as shown by statistical comparisons, the communal garden of semi-open layout 4.

The findings showed the arrangement of the landscape had an important influence on the perception of the outdoor areas for encouraging their use to socialize independent of the type of block layout where communal gardens were located. In first instance, visual stimulation from the arrangement of the landscape was indicated to be most important. Previous research has shown it is important to users in outdoor areas such as parks and wild settings.[493] This study has also found that it was important for encouraging residents into using their communal gardens in medium-rise housing areas for socializing. Therefore regeneration of communal gardens should improve the visual stimulation provided by the outdoor areas as a way of supporting community life. It was also part of the comfort offered by outdoor areas as a pleasant view from residents' dwellings. Particularly given that communal gardens were shown to be central to their daily lives putting them forward as their perceived centre of the housing area; the realm where they conduct most of their daily activities (datum and personal realm).

Otherwise, the communal gardens that were found to be significant for meeting neighbours had similar design characteristics. These characteristics were related to the individual properties of plants and materials used (complexity) but also to the way in which the communal gardens were arranged providing for variety (scale, mystery, order, enclosure, robustness, coherence). They had a diversity of designed areas, visually amenable pedestrian walks through planting and water channels, and were close to grocery stores but distant from city main roads. Although certain characteristics were indicated to be least important by respondents in fostering their socializing, such as

[493] Rachel Kaplan and Stephen Kaplan, *The Experience of Nature: a Psychological Perspective*, (New York: Cambridge University Press, 1989), pp. 40-56. See also Rodney H. Matsuoka and Rachel Kaplan, 'People needs in the Urban Landscape: Analysis of Landscape and Urban Planning Contributions', *Landscape and Urban Planning*, 84 (2008), 7-19 (p. 14).

robustness and coherence, all appeared to be important when comparing preferred communal gardens which were more adequate for socializing.

Communal gardens of the semi-open layout 4, which had these characteristics as well as a semi-public feeling, were perceived to be better by respondents for leisure and socializing. Communal gardens which were perceived to be less adequate for social and leisure activities for adults and elderly had furniture which was not robust or functional in relation to the areas it was to provide service to. The most important issue related to the housing area as a whole was the identification of visible tall structures as orientation references as well as community gathering points such as the square. Despite its small size, the square of the housing area was an important part of the daily community life of residents as a landmark, as the centre of the housing area, and for events to take place. It should have been made part of the regeneration as a way of enhancing the quality of life of residents.

Lastly, from statistically testing all the design characteristics for differences among storeys it was found that there was a lack of correlation between nearness to ground and visual perception. Provided that sensory experiencing has proved to be important as an incentive for socializing, it presents opportunities for further future research.

It is clear therefore that the way outdoor areas are designed has the potential to encourage residents to use them as an incentive for residents to get to know each other, which is the first step towards the development of social networks.

Rotes Viertel

Characteristics of the surveyed population

In the second case study of Rotes Viertel, the survey was sent to the total number of households in the blocks of the selected layouts (Figure 7.23). A total of 1027 questionnaires were sent out from which 184 were received with mostly complete responses representing 18% of the total number of households.

The low response rate has been attributed to four major reasons. First, it was not possible to direct questionnaires to specific names of residents due to the German data protection law. Secondly, it was not possible to distribute the questionnaires personally due to privacy concerns from the housing company. Thirdly, some residents were evidently unfamiliar with the name for the estate and associated the term 'Rotes',

translated as red, with the previous Communist German Democratic Republic government which was unknown before the handing out of the survey. Finally, there appears to be a high presence of immigrants with few or no German language skills who have been legally naturalized and are not reflected in the municipality's statistics as foreigners.[494]

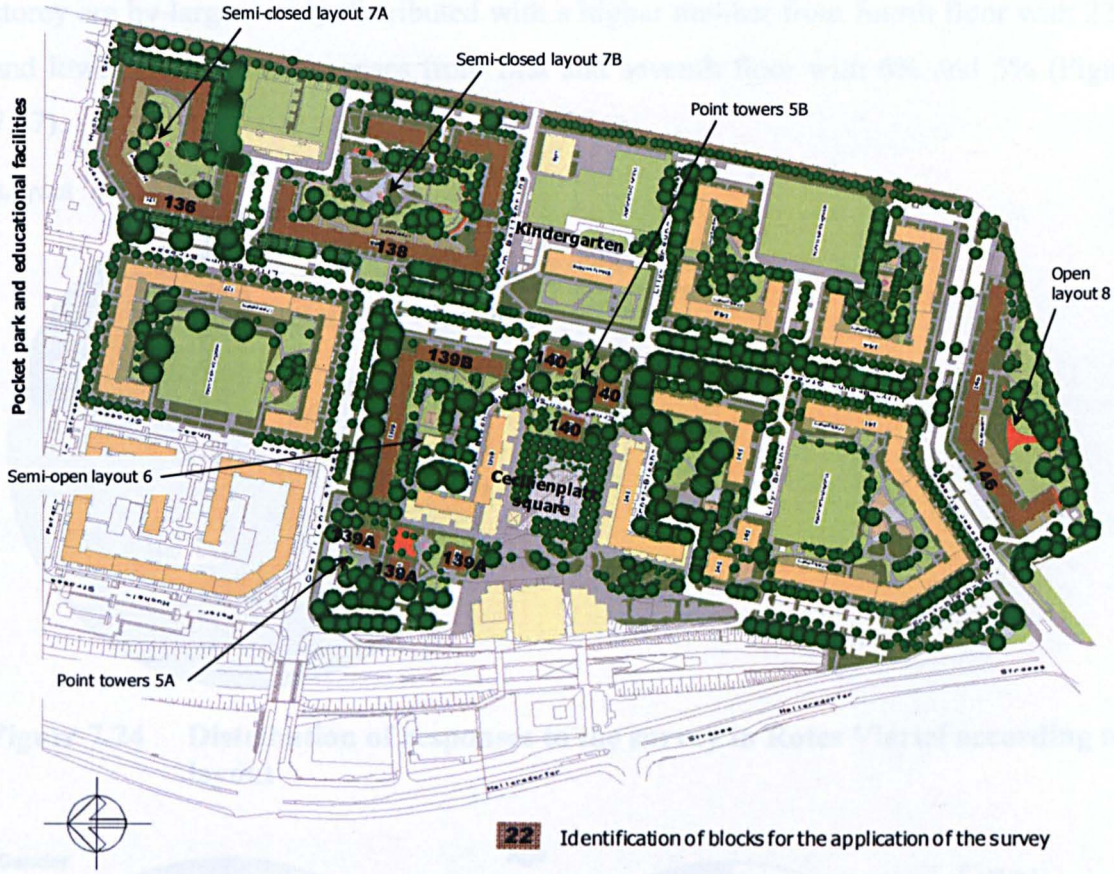

Figure 7.23 Selected blocks for the application of the survey and their communal gardens and layouts in Rotes Viertel

Responses were received from all the selected layouts with a lower response from the point towers 5A and 5B due to a smaller number of households occupying those blocks (Figure 7.24). The characteristics of the respondents of Rotes Viertel included a larger representation of women with a 64% rate. Respondents from all ages are represented evenly having a slightly higher response rate from respondents over 61 years old with 32%, and 41 to 50 years old with 27% (Figure 7.25). There is a large representation of single person households with 32% and couples without children with 29%. The

[494] Ernst Böhm, (Chairman of Club 74 committee for the local community centre), interview by C. Martínez, October 2007, transcript 11, East Berlin, Germany. See also Claudia Martínez, (arp05cm@sheffield.ac.uk) (2008, 04, 03), statistics on foreign background, Frank Gödicke (info.berlin@statistik-bbb.de).

majority of respondents considered having an average income, which is likely since better-off residents have moved into the housing area in the last years following the completion of the regeneration (Figure 7.26).

For property status, the survey showed that all respondents were renting their dwelling. Most of the respondents have lived in the area for more than three years. Responses per storey are by large evenly distributed with a higher number from fourth floor with 22% and lower amount of responses from first and seventh floor with 6% and 5% (Figure 7.27).

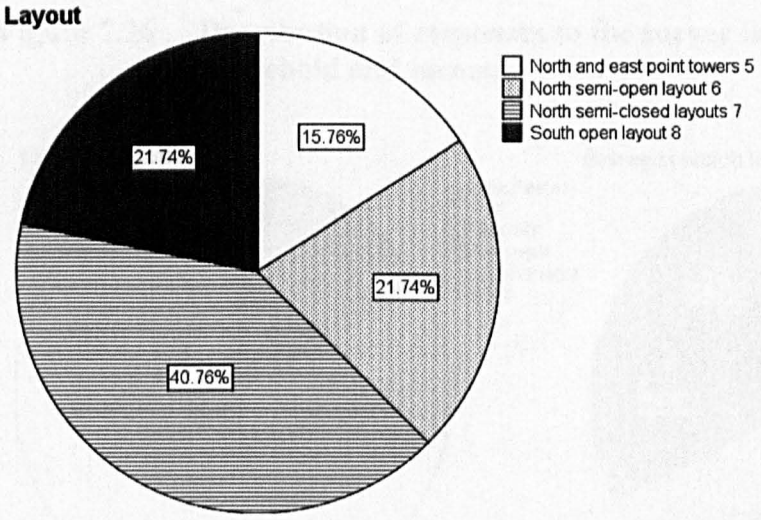

Figure 7.24 Distribution of responses to the survey in Rotes Viertel according to layout

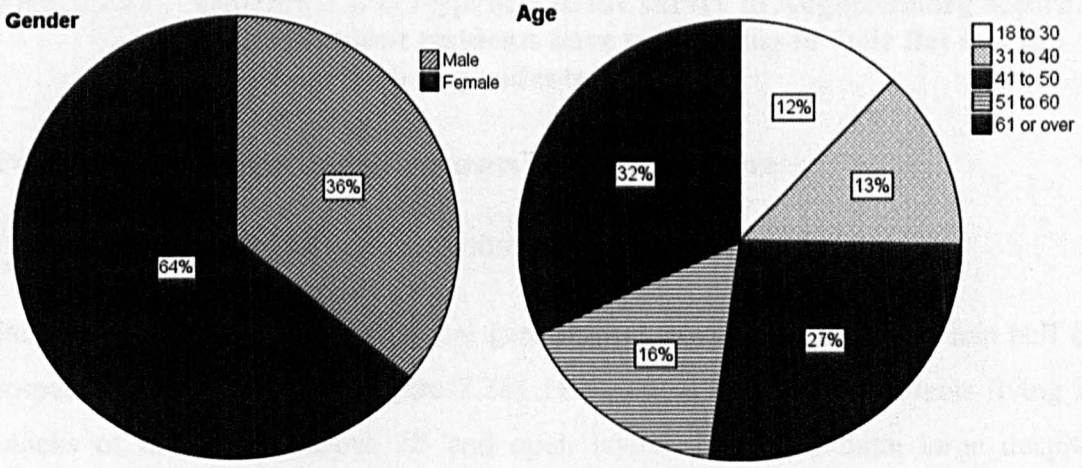

Figure 7.25 Distribution of responses to the survey in Rotes Viertel according to gender and age

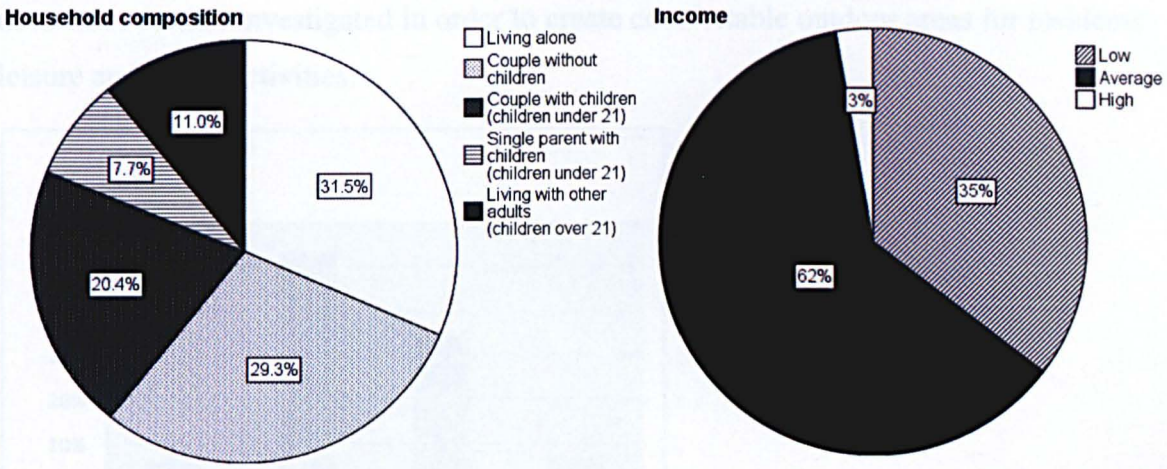

Figure 7.26 Distribution of responses to the survey in Rotes Viertel according to household and income

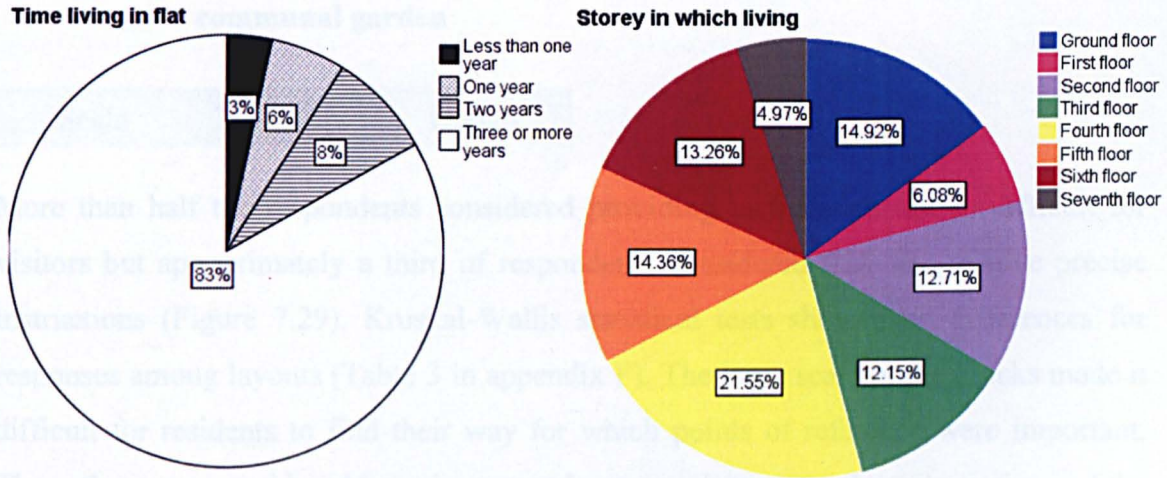

Figure 7.27 Distribution of responses to the survey in Augustenborg according to the time that residents have spent living in their flat and the storey at which respondents live

Perception of general design elements of the outdoor areas

Scale	Legibility	Datum

Perception of the size of communal gardens was considered by more than half of the respondents as 'adequate' (Figure 7.28). However, a third of respondents living in the blocks of the closed layout 7B and open layout 8 deemed them large despite the subdivision of the large communal gardens into smaller areas and integration of plants and trees to disguise its scale. Therefore planting may ameliorate the perceived scale of buildings up to a certain size of communal gardens, which in this case was no longer achieved in these layouts (Table 1 and 2 of appendix F). The reasons behind this would

need to be further investigated in order to create comfortable outdoor areas for residents' leisure and social activities.

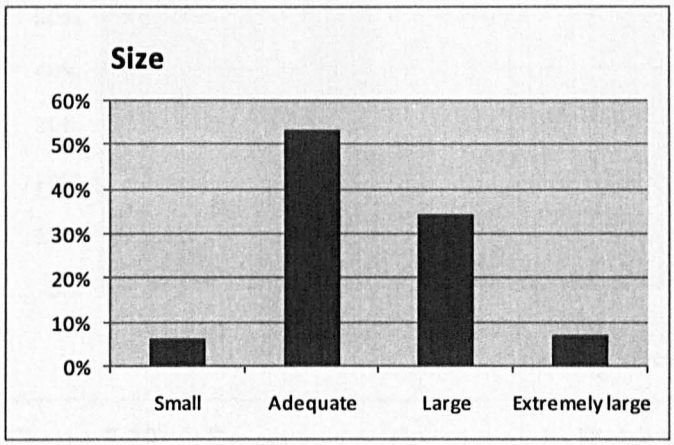

Figure 7.28 Responses to the survey in Rotes Viertel towards the size of the communal garden

Scale	**Legibility**	Datum

More than half the respondents considered providing instructions not so difficult for visitors but approximately a third of respondents considered they had to give precise instructions (Figure 7.29). Kruskal-Wallis statistical tests showed no differences for responses among layouts (Table 3 in appendix F). The large scale of the blocks made it difficult for residents to find their way for which points of reference were important. Those that were considered most important by respondents were the train station and the Cecilienplatz square and among the less mentioned features, art objects such as sculptures were prominent (Figure 7.30). Since there are no easy identifiable visual landmarks, the Cecilienplatz square and the train station were important as activity areas. They could have been much easier to visualize if a tall element had been integrated in the Cecilienplatz square as was proposed in the 'Planning for Real' Workshop.

Art objects in some entrances to buildings were secondary visual references which could also be integrated to the rest of the housing area and related to the design of the communal gardens. These changes would improve the legibility of the housing area and facilitate pedestrians' modes of movement that could improve opportunities for residents to meet each other.

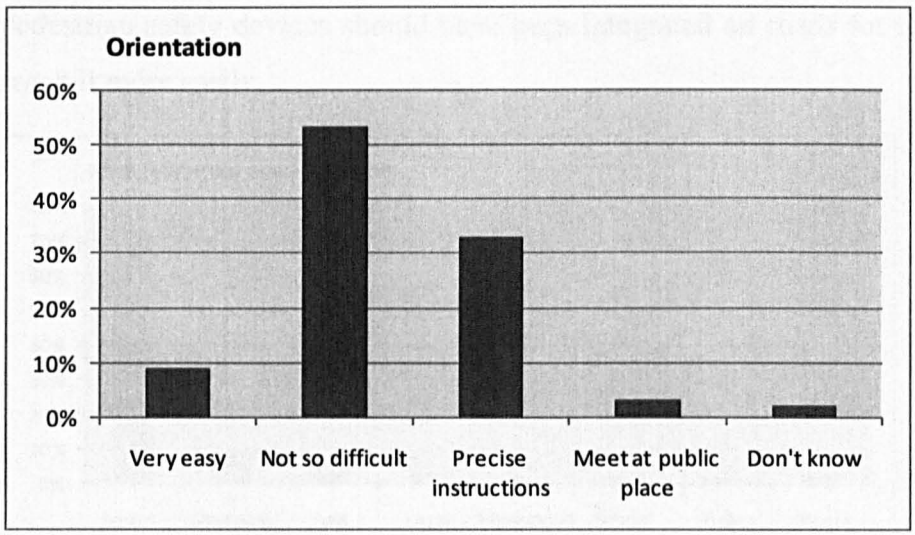

Figure 7.29 Responses to the survey in Rotes Viertel towards orientation in the housing area

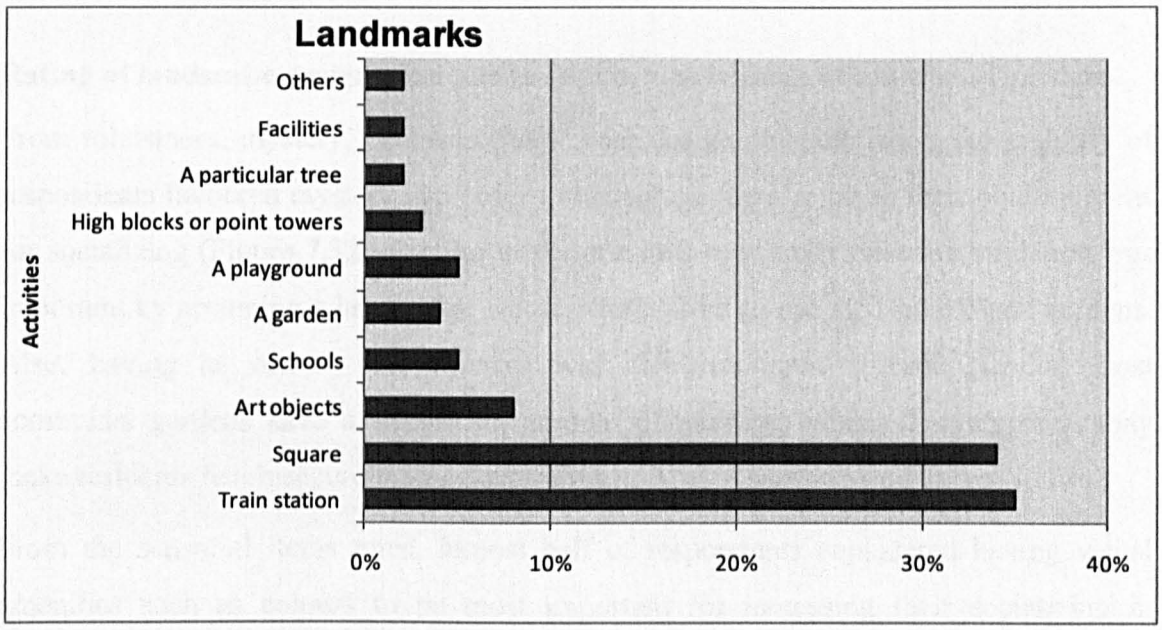

Figure 7.30 Most important landmarks identified by respondents in Rotes Viertel

Scale	Legibility	**Datum**

Respondents considered the Cecilienplatz square was the most important physical centre overall with little value attributed to other areas which showed that communal gardens may not be central to their lives (Figure 7.31). Similarly the Cecilienplatz square was also the area that the majority of respondents considered to be the limits of their personal realm and where they would most probably conduct their daily community activities. Considering the significance of the Cecilienplatz square,

pedestrian safety devices should have been integrated on roads for residents to be able reach it more easily.

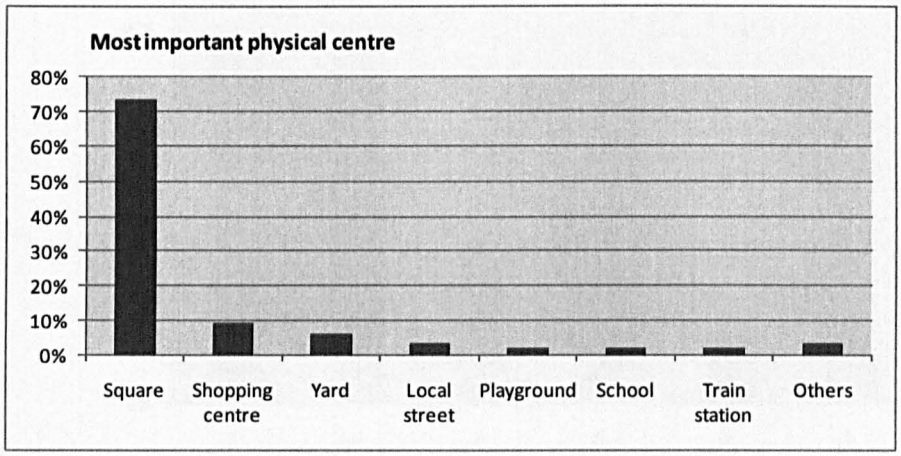

Figure 7.31 Most important physical centre identified by respondents in Rotes Viertel

Rating of landscape design elements to support socializing in communal gardens

From robustness, mystery, enclosure, and order design characteristics, the majority of respondents favoured mystery and order to encourage them in using their outdoor areas for socializing (Figure 7.32). Similar to the previous case study, visual stimulation was important by arranging a layout that would attract them to use their communal gardens. Also, having an orderly environment was also important considering that most communal gardens have a significant amount of planting, which if overgrown, may make residents feel insecure by blocked views.

From the sensorial items rated, almost half of respondents considered having visual amenities such as colours to be most important for increasing their socializing in outdoor areas. This was followed by having controlled levels of sounds and increasing shady areas (Figure 7.33). Therefore, the design characteristics that enhance the visual perception of communal gardens should be integrated in their regeneration.

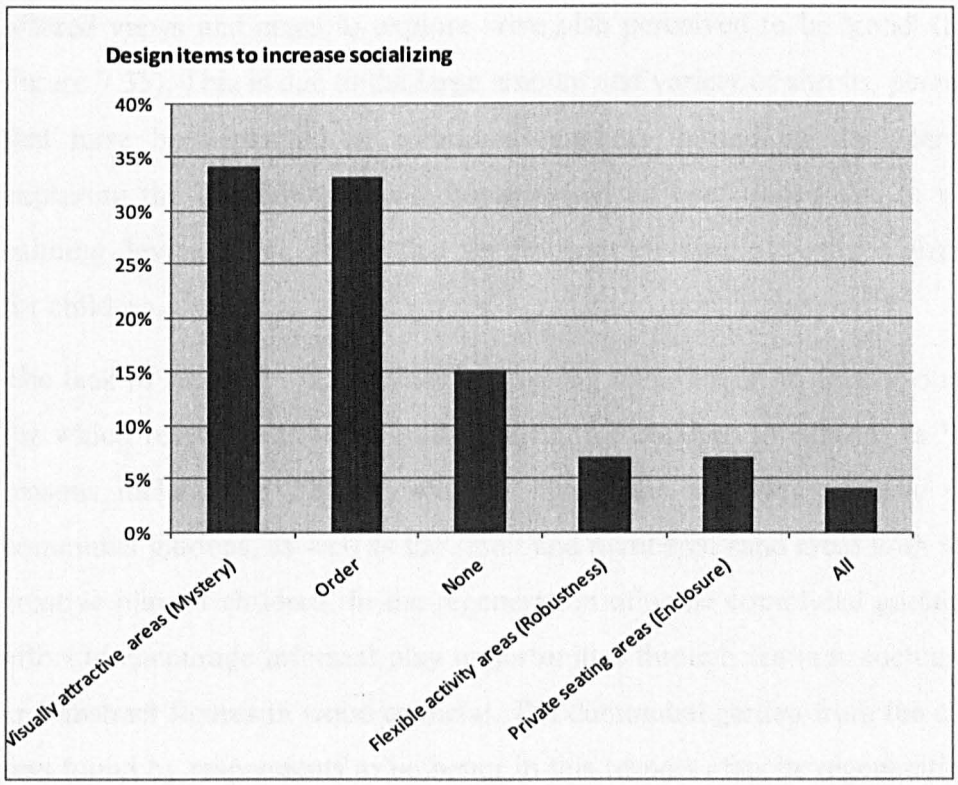

Figure 7.32 Respondents' rating of the general design elements in communal gardens to support socializing in Rotes Viertel

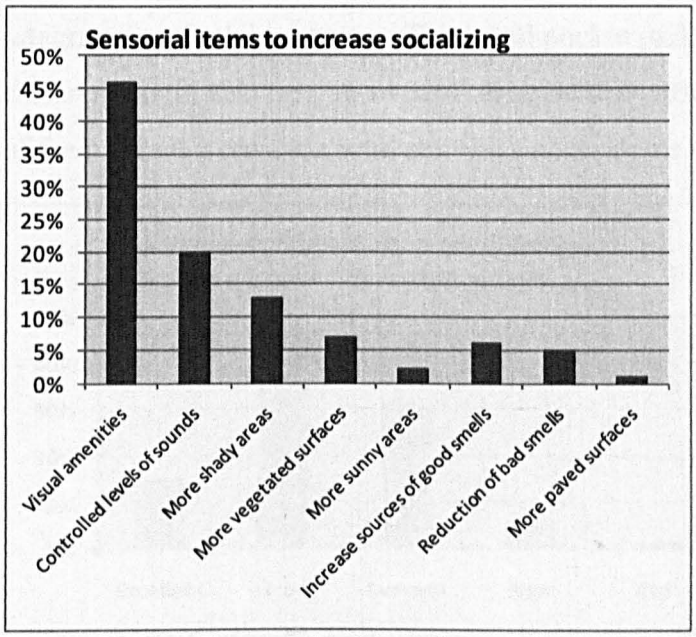

Figure 7.33 Respondents' rating of the sensorial elements in communal gardens to support socializing in Rotes Viertel

Perception of individual design characteristics

Mystery	Complexity	Enclosure	Robustness	Coherence

The majority of respondents considered the attractiveness of the arrangement of their communal garden to be 'good' when viewed from their windows. Areas for walking that

offered views and areas to explore were also perceived to be 'good' (Figure 7.34 and Figure 7.35). This is due to the large amount and variety of shrubs, perennials, and trees that have been planted in communal gardens throughout the years. Visiting and exploring the different gardens, however, is not encouraged due to a lack of traffic calming device which means that the frequent crossing of roads is unsafe, particularly for children.

The lack of safety for pedestrians in crossing roads might in part be one of the reasons for which respondents rated outdoor areas for children to explore as 'average'. Other reasons include the lack of informal play areas and play material in some of the communal gardens, as well as the small and numbered sand areas with fountains for the creative play of children. In the regeneration of some communal gardens there was an effort to encourage informal play opportunities through features such as ridges, stones, and abstract figures in wood or metal. The communal garden from the closed layout 7A was found by respondents to be better in this respect after its regeneration (Table 4 and 5 in appendix F). Yet, informal play opportunities could be improved if the adjacent brownfield areas of demolished kindergartens with spontaneous vegetation would be integrated to the leisure areas. The small pocket park, with some informal play areas for children, could also be improved if adjacent brownfield areas would be designed as part of the park's leisure and social activities of residents.

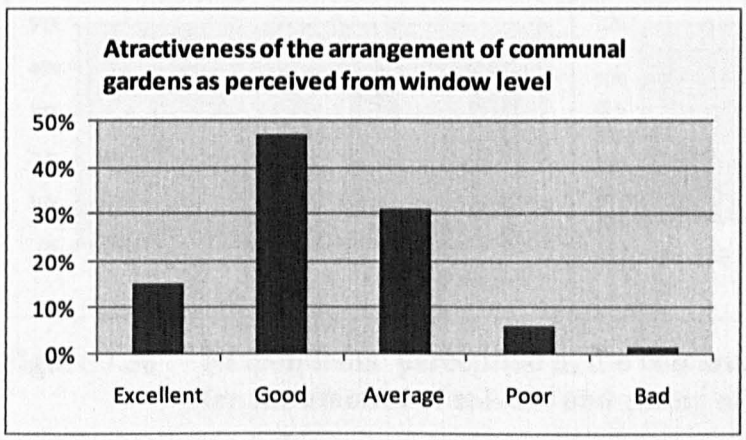

Figure 7.34 Respondents' perception from window level of the arrangement of communal gardens in Rotes Viertel for viewing and exploring

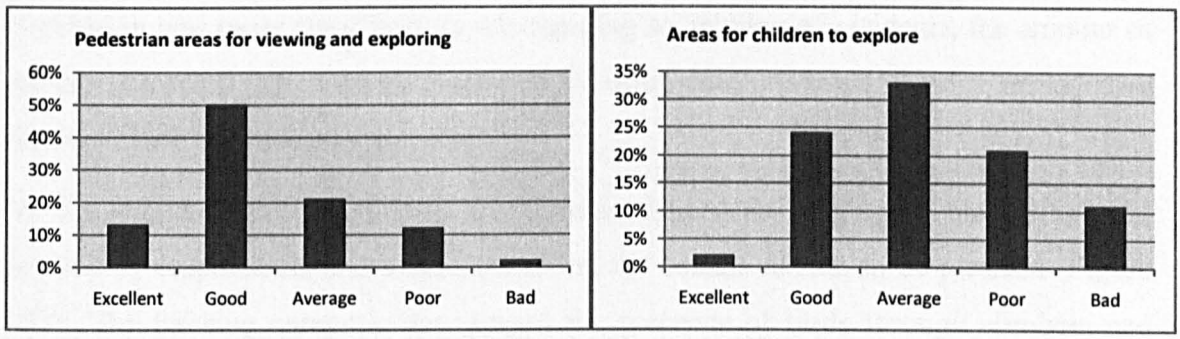

Figure 7.35 Respondents' perception of the arrangement of communal gardens in Rotes Viertel for viewing and exploring

Mystery	**Complexity**	Enclosure	Robustness	Coherence

For visual richness, 42% of the respondents perceived more than six colour contrasts in the vegetation and 37% perceived four to five. In rating this variety of contrasts, an overwhelming majority of responses deemed them as pleasant (Figure 7.36). In reality, there is an average amount of eleven colour contrasts according to planting lists of all communal gardens considering predominant colours present during autumn when the survey was applied. Despite this being over the limit of the ideal seven to nine contrasts that the eye can manage, the merging of colours perceived from distance might reduce the amount of colours perceived as suggested by Catherine Ziegler.[495]

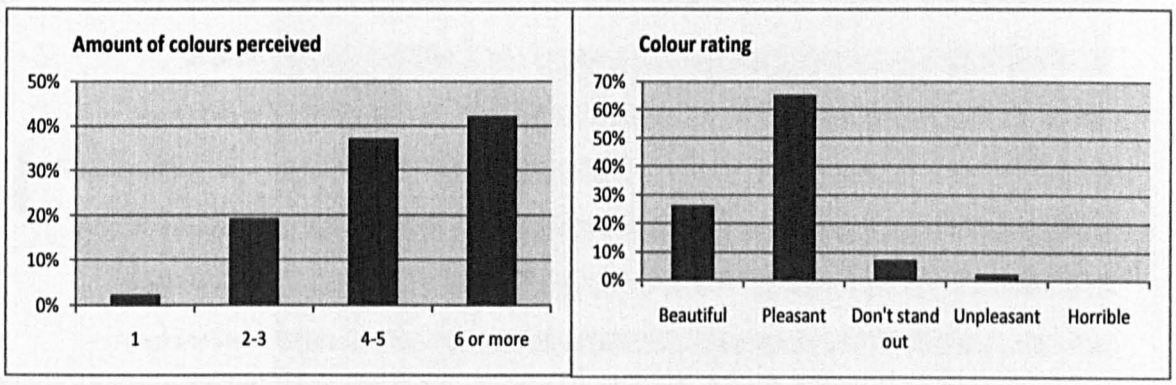

Figure 7.36 Respondents' perception of the communal gardens in Rotes Viertel for the amount of colours and rating of colour variety

By having a variety of small- and medium-sized plants arranged in large blocks, along with various species and sizes of trees, it was easier for respondents to visualize more than six contrasts from their window level. In particular, communal gardens of the closed layout 7B and open layout 8 were rated to be better due to the variety of planting and the rose selection (Table 6 and 7 in Appendix F). Considering that visual

[495] Catherine Ziegler, *The Harmonious Garden: Color, Form, and Texture*, (Portland: Timber Press, 1996), p. 3.

stimulation was more significant in encouraging socializing of residents, the amount of colours perceived may then be increased by using medium-sized planting arranged in blocks and with a variety of planting.

For the sounds experienced from the communal gardens, singing of birds was most enjoyed by respondents and some also found the sounds of rain to be pleasant (Figure 7.37). The housing company encouraged the presence of birds through climbers and various nesting boxes for different species, including falcons.[496] The enjoyment of rain sounds may be attributed to the increased amount of soft surfaces which has aided in softening rain sounds. Sounds that were considered to be disturbing were vehicular movement and talking, particularly for respondents from the point towers 5A and 5B as these are closer to roads and main facilities of the Cecilienplatz square. In general, respondents living in the point towers were most affected by disturbing sounds whilst respondents from blocks of semi-closed layout 7B were minimally disturbed (Table 8 in appendix F).

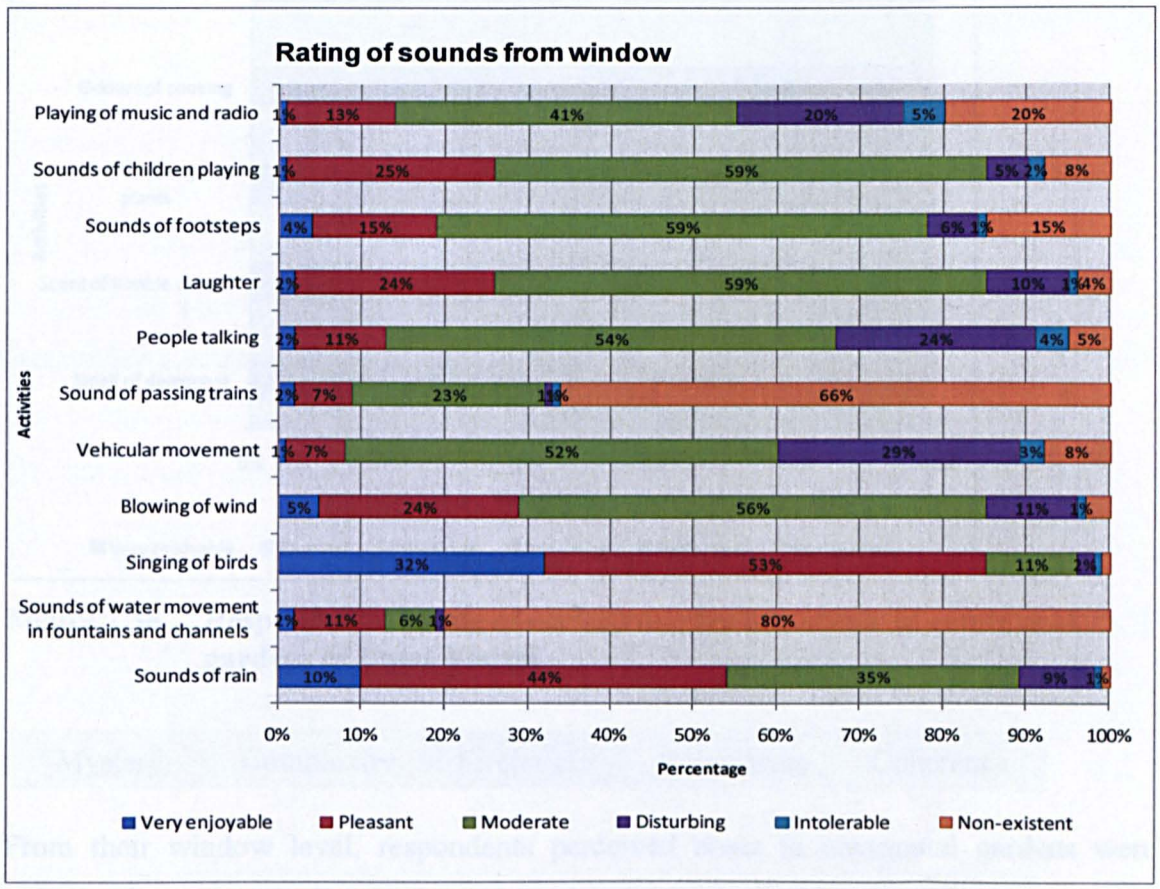

Figure 7.37 Respondents' rating of various sounds from the communal gardens of Rotes Viertel

[496] Stefan Rampelmann, (Landscape design manager, Stadt-und-Land) Interview by C. Martínez, October 2007, transcript 12G, city of Berlin, Germany.

For odours and scents provided by communal gardens, the scent of flowers and plants were most enjoyed by respondents, particularly in communal gardens of semi-closed layout 7B but considerably less in the point towers 5A and 5B (Figure 7.38, and table 9 in appendix F). Vandalism in communal gardens of the point towers has limited the possibility of having fragrant flower beds. Contrary, in the communal garden of the semi-closed layout 7B, the large amount of planting and the semi-public feeling that restricts access to outsiders ameliorated disturbing sounds. Also, it has fragrant plants that have been placed alongside seating areas to encourage conversations.[497]

Similarly to the previous case study, there was a lack of correlation between closeness to ground and audible perception. Respondents rated the various items for sounds in a very different way no matter which storey they were living on (Table 10 in appendix F).

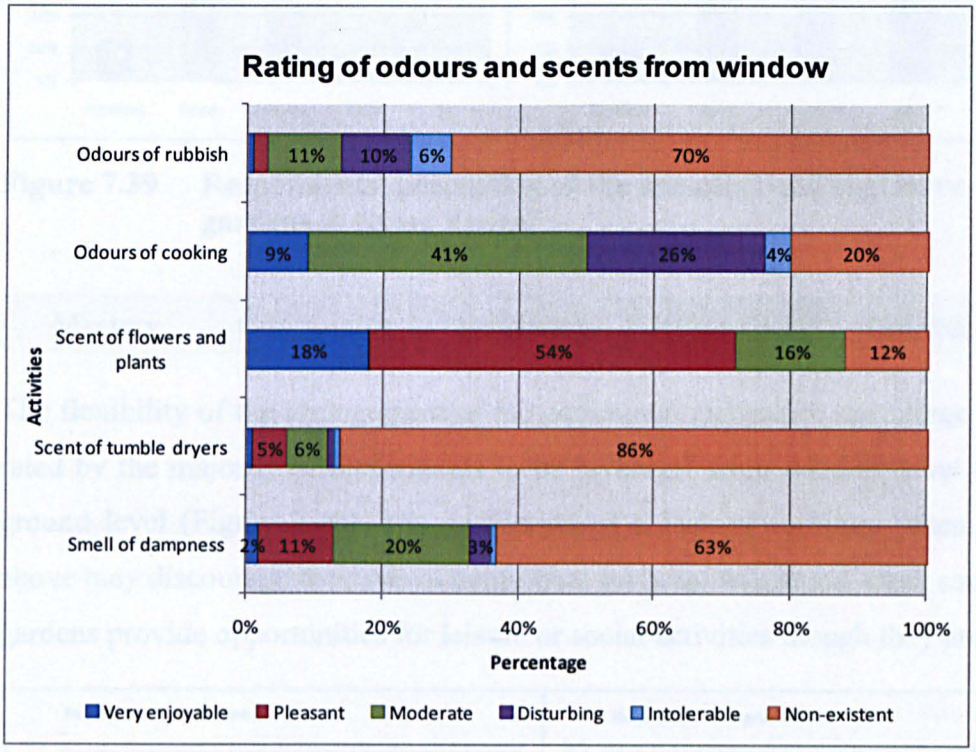

Figure 7.38 Respondents' rating of various odours and scents in communal gardens of Rotes Viertel

Mystery	Complexity	**Enclosure**	Robustness	Coherence

From their window level, respondents perceived areas in communal gardens were sufficiently open to easily view people and activities in communal gardens. At ground level, respondents rated the shelter of seating areas to be 'poor', 'average, and 'good' depending where they were living (Figure 7.39). Those with a better rating were in the

[497] Stefan Rampelmann, transcript 12G.

communal garden of the semi-closed layout 7B. Seating areas are partially enclosed with shrubs of various heights and species, tree cover, and mounds supplying a variety of areas with some privacy for conversations. Differently, communal gardens in the semi-closed layout 7A and the open layout 8 lack shelter which was the result of the regeneration design or removal of trees due to the heavy clay soil (Table 11 and 12 in appendix F). This shows that enclosure in seating areas is perceived to be better when both side and canopy shelter are arranged in conjunction and offer a range of arrangements for residents' leisure and socializing.

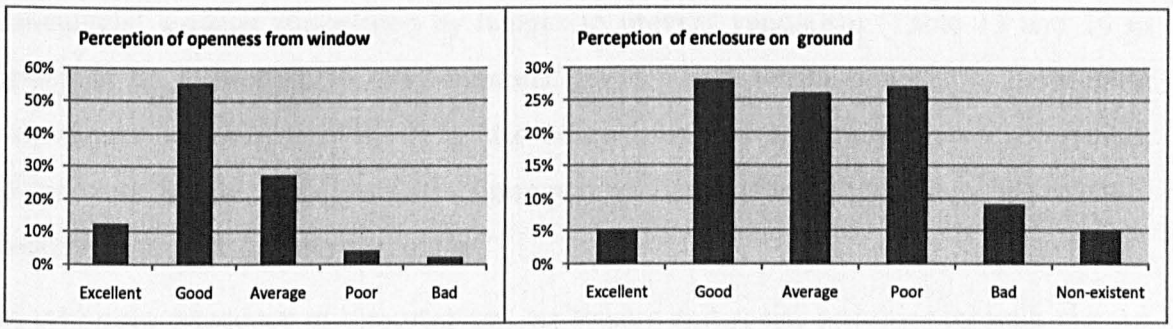

Figure 7.39 Respondents' perception of the openness and enclosure of communal gardens of Rotes Viertel

Mystery	Complexity	Enclosure	**Robustness**	Coherence

The flexibility of the arrangement of the communal gardens to encourage their use was rated by the majority of respondents to be 'average' from window level and 'good' at ground level (Figure 7.40). The perception of a lack of furniture when viewed from above may discourage their use of communal gardens. At ground level, some communal gardens provide opportunities for leisure or social activities though they are limited.

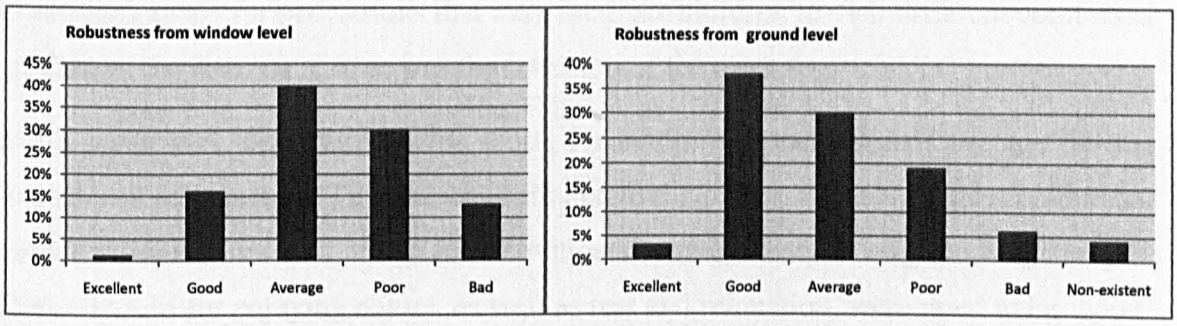

Figure 7.40 Respondents' perception of robustness in communal gardens of Rotes Viertel

For differences among communal gardens, respondents considered them to be better in the semi-closed layout 7B which has been subdivided through planting into several

areas enabling a range of activities. There are also sufficient seating opportunities and the arrangement enables future changes. The communal garden of the semi-open layout 6 was deemed to be slightly less good. It contains various play areas but its arrangement is quite un-flexible which limits the leisure or social activities that may be conducted there.

The communal gardens that were considered to be worse for flexibility were in the point towers 5A. This was due to an excess of pedestrian walks cutting up potential communal gardens into useless areas and the transformation of larger patches into ornamental gardens surrounded by hedges to prevent vandalism (Table 13 and 14 in appendix F). Consequently, the communal gardens have very few areas for developing any leisure or social activity. It is also noteworthy that the study showed no gender differences in the perception of communal gardens which shows they are equally accessible to both females and males.

In rating the adequacy of opportunities for leisure and social activities through passive and active engagement in the outdoor areas, there were few that were found to be 'good' (Figure 7.41). Among all items, social and leisure activities for adolescents and elderly were considered by respondents to be worst. This may be due to the removal of furniture in several communal gardens to encourage quieter environments. Additionally, traffic makes it difficult for elderly to access the Cecilienplatz square for recreation and socializing. Similarly, most respondents considered play facilities for children as 'average'. The majority of the open comments in the survey expressed the need for the improvement of play facilities for children or suggested additional play facilities in communal gardens would be required. Yet, it would also be necessary to improve safety in crossing roads for pedestrians that may facilitate children to visit different communal gardens in the housing area as was the intention of the regeneration.

In the same way, opportunities for sports for adults were considered 'average' by the majority of respondents. This can be attributed to the policy of creating quiet communal gardens which does not allow for activities that may disturb neighbouring tenants. Opportunities for enjoying nature, as well as rest and relaxation, were rated to be 'good' by the majority of respondents. Brownfield areas with spontaneous planting were indicated by respondents to be potential areas for leisure activities. Opportunities for reading, studying, or drawing were rated to be 'average' which may be related to the lack of seating areas in the majority of communal gardens. Altogether, leisure activities

are limited in the housing area reducing the possibility for possible casual encounters of residents.

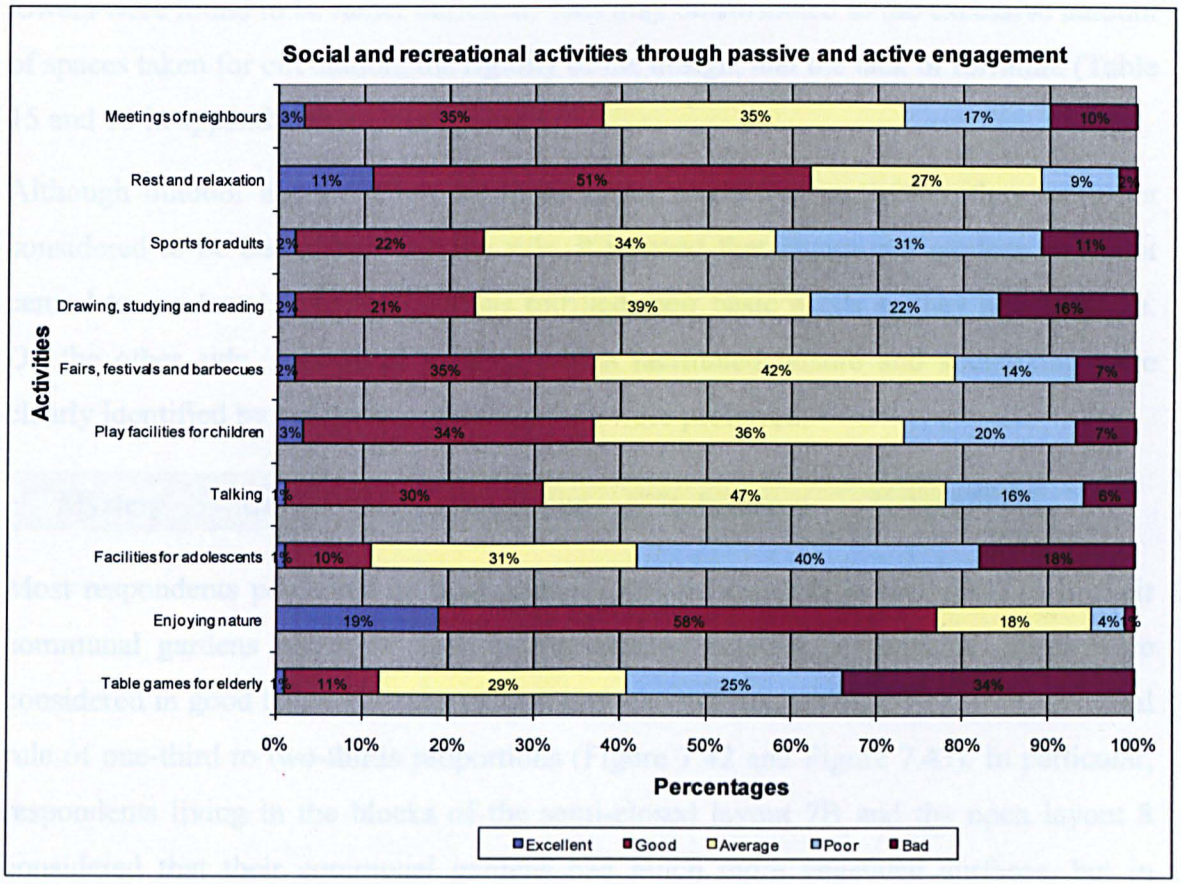

Figure 7.41 Respondents' perception of the communal gardens for various activities in Rotes Viertel

The adequacy of the outdoor areas for fairs, festivals, barbecues or other events has been considered to be 'average'. Moreover the emphasis on the Cecilienplatz square for events has meant fewer take place in the communal gardens, reducing opportunities to become acquainted with neighbours. Maybe as a result of these restricted possibilities for social interaction, and the lack of furniture, most respondents have rated opportunities for socializing to be 'average'. However, opportunities for meeting neighbours were considered in equal percentage to be 'good' and 'average'. This might be related to the sources of casual contacts that formal and informal seating areas in entrances to buildings allowed.

For differences among layouts, respondents regarded the communal gardens of the semi-closed layout 7B to be more adequate for social and leisure activities and in lesser extent those of the semi-open layout 6. The former had a diversity of areas including seating options with formal and informal seating, sand boxes with fountains, adolescents' compact play areas, and areas for drying lines. As a contrast, the semi-open

layout 6 has an assembly of various playgrounds and ball areas which restricts the flexibility of the communal garden. Among all communal gardens, those of point towers were found to be rather deficient. This may be attributed to the excessive amount of spaces taken for circulation, the rigidity of the design, and the lack of furniture (Table 15 and 16 in appendix F).

Although outdoor areas did not facilitate social and leisure activities, they were not considered to be bad either. On one side, it showed that communal gardens were not central to residents' lives and perhaps fulfilled their basic needs as they presently are. On the other side, communal gardens which facilitated leisure and socializing were clearly identified by residents suggesting they were preferred.

Mystery	Complexity	Enclosure	Robustness	**Coherence**

Most respondents perceived an approximate 20% hard and 80% soft surfaces in their communal gardens which is close to the average existing proportions. These were considered in good balance by the majority of respondents, which differs from the ideal rule of one-third to two-thirds proportions (Figure 7.42 and Figure 7.43). In particular, respondents living in the blocks of the semi-closed layout 7B and the open layout 8 considered that their communal gardens had much more vegetated surfaces, but in reality it is attributed to the arrangement of diverse areas and the large quantity of planting (Table 17 and 18 in appendix F).

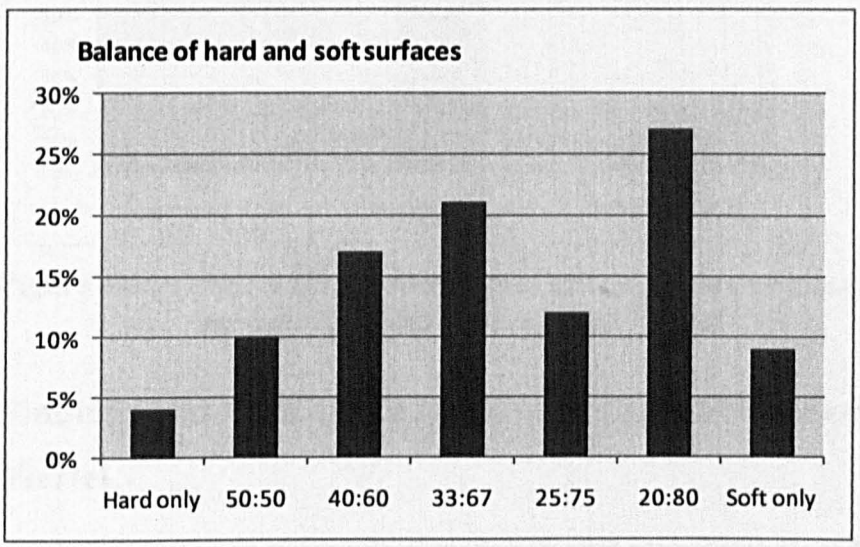

Figure 7.42 Respondents' perception of the balance of hard and soft surfaces in communal gardens of Rotes Viertel

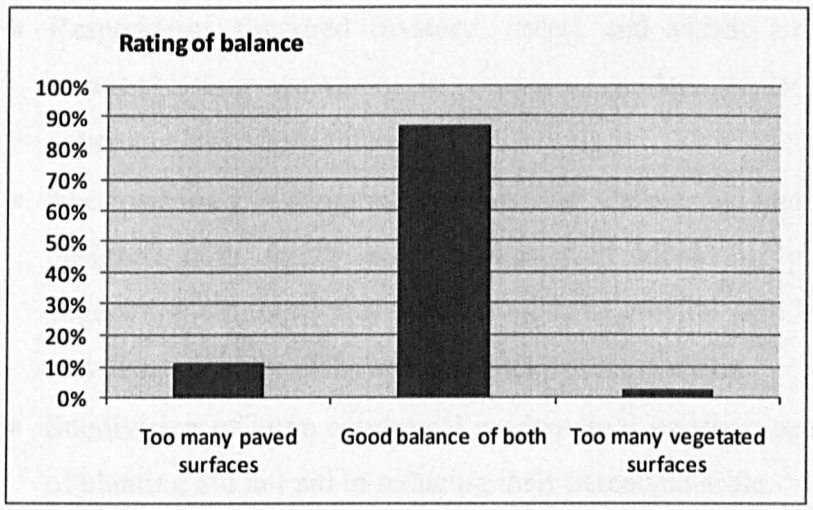

Figure 7.43 Respondents' rating of the balance of soft and hard surfaces in communal gardens of Rotes Viertel

For balance of sunny and shaded surfaces, the majority of respondents considered there is a good balance of both (Figure 7.44). Many of the trees planted in the '90s to disguise the hardness of the buildings had difficulty in establishing due to the heavy clay soil. Nevertheless, there are sufficient shaded areas to shelter residents in their leisure or social activities in warm summers.

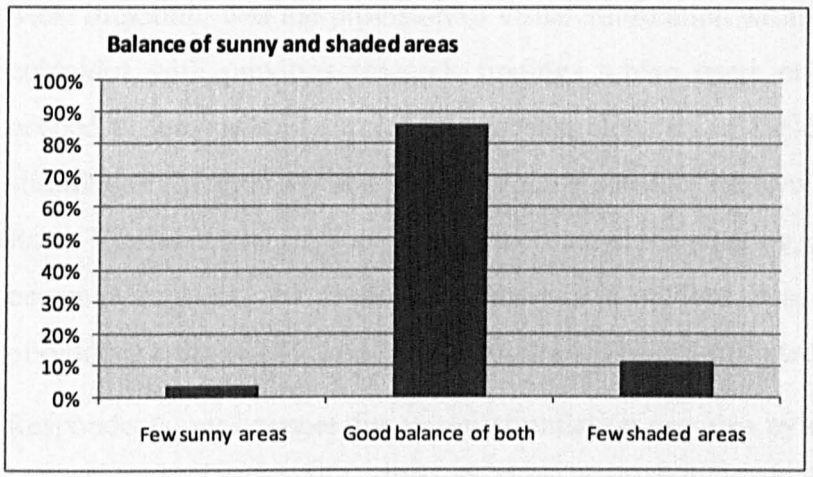

Figure 7.44 Respondents' perception of the balance of sunny and shady surfaces in communal gardens of Rotes Viertel

Findings and discussion for the perception of outdoor areas in Rotes Viertel

- Respondents to the survey preferred a design that provided visual stimulation through planting in an ordered context as a way of encouraging them to socialize.
- The arrangement of the landscape was more important than the type of block layout where the communal gardens were located.

- Respondents favoured mystery, order, and visual amenities in first stance to encourage their socializing in communal gardens whilst enclosure, robustness, and coherence were least important.
- The preferred communal gardens, as shown by statistical comparisons, were designed with small- and medium-sized blocks of plants that mixed existing vegetation with new; they were arranged to provide with legible areas for exploration and discovery as well as areas of enclosure and shade.
- Subdivision of large communal gardens into smaller areas through the arrangement of planting did not aid in reducing their perceived scale.
- The Cecilienplatz square was perceived to be the most important orientation landmark and physical centre of the housing area.
- The arrangement of landscape that was preferred by respondents for leisure and socializing, as shown by statistical comparisons, was found in the communal garden of the semi-closed block layout 7B.

The arrangement of the landscape was found to be more important for encouraging leisure and socializing than the block layouts where communal gardens were found. Most important was the provision of visual stimulation within an ordered setting, which coincides with previous research findings where users enjoying outdoor areas also needed to feel safe. In communal gardens, elements of the design that provided visual stimulation (complexity and mystery) and a sense of order were most significant. Since Rotes Viertel has large proportion of medium-sized planting, perceiving a sense of order becomes important for residents to feel safe in outdoor areas. Keeping the arrangement of outdoor areas legible and neatly maintained has contributed to a sense of safety.

Respondents' preferences for visual stimulation are also evident from their preference for informal playgrounds, although there were few of them. More could have been provided by integrating existing brownfield areas of demolished kindergartens as such and as areas for enjoying nature, which were indicated by respondents to be important for leisure and social activities. Visual stimulation should be pursued as part of the design of communal gardens and as a way of providing residents with an incentive to use them. Therefore it is significant to continue research that explores reasons behind differences that were found in perception for quantity of colours from different storeys.

Comparing communal gardens that were preferred by respondents for socializing, all design characteristics constituted them including those that were indicated to be least

important (enclosure, robustness, and coherence). Their arrangement included a diversity of flexible areas, seating options, as well as formal and informal playgrounds. The communal garden of the semi-closed layout 7B, which had these characteristics as well as a semi-public feeling, was perceived to be more adequate by respondents for leisure and socializing. Also, it was found that despite large communal gardens of 65m by 105m in semi-open and semi-closed layouts were subdivided into smaller areas with small- and medium-sized planting, it did not appear to ameliorate the perceived scale of communal gardens. Since there are many block layouts of this size in East Berlin, more research is needed in identifying which planting arrangement effectively ameliorates the perception of scale of communal gardens to create more comfortable outdoor areas for residents.

The most important issue related to the housing area as a whole was the needed provision of pedestrian safety in crossing roads. It was vital as a way of improving community life since the Cecilienplatz square was identified as the most important orientation reference and the physical centre of the housing area. Therefore, roads should have ideally been provided with safety measures for pedestrians as part of the regeneration.

These key issues have shown that the landscape has a significant impact on the development of community life by providing the design elements that trigger residents' desire for visiting their outdoor areas.

Perception comparison and cultural differences among Augustenborg and Rotes Viertel

Perception comparison among case studies

The findings showed that communal gardens which have the majority of the design quality issues indicated as part of social integration in Chapter 4 were perceived to be more adequate to foster social interaction of residents. Those that were found by respondents to encourage social interaction in both housing areas were visual amenities for sensory experience, as well as mystery and order for the arrangement of outdoor areas. In particular for Augustenborg, enclosure was also considered important.

In general, the communal gardens that were perceived to be more adequate for socializing were found in semi-open and semi-closed layouts in Augustenborg and Rotes Viertel (layouts 3, 4, 6, 7, and 8). The layout of the blocks and landscape

facilitated creating a semi-public environment. In particular, the semi-open layout 4 and semi-closed layout 7B were preferred which had most of the design criteria and a variety of areas and planting that provided visual stimulation. On the contrary, in communal gardens of point towers in Rotes Viertel (layouts 5) as well as in all open layouts and a semi-open layout in Augustenborg (layout 1 and 2), it was more difficult to create a semi-public feeling and were perceived to be less adequate for socializing.

In both case studies, viewing out into communal gardens from windows has been found to be important as a leisure activity but most significantly as a potential invitation for residents to use their outdoor areas for socializing. Therefore, further research should be allocated for understanding the way colours are perceived from different storeys.

Finally, for respondents in both case studies the square was important for orientation and as a central element of the housing area, thereby important in residents' lives. Therefore, regeneration of the square as well as providing traffic calming measure to facilitate the pedestrian connectivity of the housing area were essential as part of the community life of residents.

Differences in perception among case studies attributable to culture

Perception differences may be attributed to behavioural rules pertaining to specific different cultures. In Germany, elements that provide for order and privacy are highly valued as part of their everyday life. In particular, the latter was important for residents in East Germany with the intrusive measures of the German Democratic Republic in their social lives.[498] In Sweden, elements that provide for cooperation and equality are highly valued, which may be translated to the environment as having opportunities where to exchange experiences and build their community.[499] However, it must be taken into account that the populations in Augustenborg and Rotes Viertel include a high percentage of foreigners who may have their own traditions. Therefore, the perception and preferences of respondents presented in this study do not represent a specific culture in each housing area but an amalgam of cultures.

The majority of statistical differences found among case studies were similar to those found in each case study (Appendix G). Only playing facilities and exploration areas for children were found to be better in Augustenborg despite the fact that they were rated to

[498] Derek Lewis, *Contemporary Germany: A Handbook*, (London: Arnold, 2001) pp. 184-187.
[499] Henry Milner, *Sweden: Social Democracy in Practice*, (New York: Oxford University Press, 1990), pp. 50-52.

be 'average' in both case studies (Figure 7.13 and Figure 7.35). This is attributed to the presence of more furniture, playing equipment, a convenient central park, and the pedestrian connectivity of the housing area of Augustenborg, some of which could be improved in Rotes Viertel.

Also, there were differences in rating found for odours of cooking and tumble dryers which were less tolerated by German residents and could be deterring them from using their communal gardens. Yet the reasons for this difference could very well be more of a practical nature rather than cultural. As the summer is warmer in Germany than in Sweden, many more windows would be open that could have distributed the cooking odours. Similarly, the scent of tumble dryers might be more disturbing due to having drying appliances in flats rather than sharing a communal service per building as is done in Augustenborg.

Other differences which may be attributed to culture include the preferred characteristics of design for socializing. For instance, 'order' was most significant for respondents from Rotes Viertel and communal gardens were not central to their lives. These preferences cannot be attributed to an aging population since respondents in Augustenborg had the same population characteristics as those in Rotes Viertel and yet the former had a more active community life in communal gardens. It is most likely that the quietness that the housing association has been trying to create in the regeneration of the communal gardens is indeed part of the current lifestyle preferences of respondents.

However this can be argued as respondents in Rotes Viertel indeed rated better those communal gardens that offered more opportunities for leisure and socializing. This desire for quietness may be attributed to the vandalism of communal gardens from undesirables' visits due to their public feeling before the regeneration; quietness should then not be confused with residents' rejection for community life which they appeared to appreciate from their preferences for communal gardens. It would seem then that a desire for 'order' would be rather related to a feeling of safety in using communal gardens, which is understandable provided that planting in Rotes Viertel is higher than that in Augustenborg.

If it would be assumed that residents effectively prefer quietness in communal gardens then social opportunities in Rotes Viertel must be located outside them, for which the Cecilienplatz square becomes the most suitable place. However, the way it can meet the demand placed by 5844 residents is doubtful. This underlines the need for other choices

for gathering to be made available, for which brownfield areas appeared to be one significant choice. Yet, when raising this concern with local authorities, it was expressed that communal gardens were meant to be the areas for residents to socialize.[500] In summation, although some design preferences may be attributed to the particular lifestyles of the residents living in these housing areas most are due to practical reasons.

Summary lessons from the preferences of respondents to encourage socializing in outdoor areas

A series of initial guidelines have been proposed for the regeneration of communal gardens to encourage their use and contribute to the development of social networks. The guidelines have been arranged in the order that were found to be important according to respondents' perception of their outdoor areas from both case studies (Table 7.1).

Table 7.1 Proposed guidelines to provide a pleasant view of outdoor areas and to encourage their use for socializing

Permeability, spatial definition, and human scale	• Connectivity between communal gardens and local facilities should be facilitated - Providing traffic calming devices - Enhancing pedestrian and cycle routes • A semi-public environment should be created in each communal garden to encourage socializing of residents - Defining realms and boundaries through planting - Providing particular attention to communal gardens of point towers, open layouts, and communal gardens located on the perimeter of the housing area • Communal gardens should be defined with small areas that are easy to grasp visually and physically
Legibility	• The square should be enhanced as one of the most important places for the community life of residents • Improvement of legibility should include an array of small and large scale elements - Using large-scale elements for referencing the location of the square such as tall structures or art on facades - Using small-scale elements referencing building entrances or communal gardens such as art or design themes
Mystery	• A variety of partially secluded views should be arranged in communal gardens and pedestrian walks - Arranging distinctive blocks of planting that have varying colours, heights, and textures • Opportunities for informal exploration should be enabled - Providing informal play areas preferably with opportunities to play with water - Integrating areas with spontaneous planting which may be provided by brownfield areas

[500] Bernd Schütze, (Director, Department of Nature and Environment in Hellersdorf), Interview by C. Martínez, October 2007, transcript 14RV, city of Berlin, Germany.

Table 7.1 continued

Complexity	• The variety and richness of outdoor areas should be enhanced by integrating new planting with existent - Providing an array of colours, textures, and scents that residents may enjoy from their dwellings or on ground - Including medium-height planting or a combination of small- and medium-height planting that increases the number of colours perceived - Arranging planting in blocks that may be easily appreciated from different heights of balconies • Features that allow enjoying singing of birds and water movement should be introduced wherever possible - Including plants and features that attract birds as well as fountains • Introduction of recycling rubbish sheds with composting should consider strategies to lessen stench in summer
Order	• The design should incorporate measures ensuring that residents feel safe - Integrating maintenance and management of planting that provides orderliness • The landscape should foster attachment of residents by promoting communal gardens as the physical centre of their housing area - Ensuring opportunities for community development in communal gardens for residents to consider them as part of their personal realm
Enclosure	• Areas with shelter and screening should be provided - Providing transparent or light screening for seating areas, balconies, and playgrounds with mounds, transparent shrubs, and side wooden structures - Providing partial shelter from sunlight with climbers, overhanging shrubs, and tables which may be fitted with parasols - For screening and sheltering from sunlight, small trees with a light canopy were adequate where incoming sunlight was required in communal gardens, otherwise trees with a light, upright, or columnar canopy were adequate
Robustness	• A diverse range of areas for leisure and socializing should be integrated in communal gardens - Having furniture adequately related to the outdoor areas to which they provide a service to - Supplying diverse areas for the different needs of residents - Integrating a playground in each communal garden even if small • The design of communal gardens should facilitate the development of events in case they are desired - Keeping some flexible areas in communal gardens that may adapt if required such as lawn areas with and without tree shelter, close to pedestrian walks, and introducing movable furniture
Coherence	• Communal gardens with a large amount of hard surfaces should be regenerated to reduce this effect - Designing a diverse set of leisure and social areas through planting arrangement to achieve a variety of visual contrasts

The recommendations reflect the perceived preferences of respondents from the case study of Augustenborg during spring and from Rotes Viertel during autumn. Although there were common elements in the various responses to the case studies, other regenerated medium-rise housing areas should be surveyed in order to continue testing these findings in other geographical, cultural, and weather contexts. The survey structured for this research provided sufficient information to establish the main elements of design preferred by respondents. In future studies, a similar survey might be used in conjunction with focus groups to reveal more information in regard to design preferences and the reasons behind this.

This chapter has shown the quality design issues that were perceived to be most important for encouraging residents to use outdoor areas for leisure and socializing. The next chapter explores the outdoor areas that were used by residents and the way they contributed to social integration by investigating the design characteristics that distinguished these areas. This will enable a comparison between what residents said they liked, and the way they actually used the outdoor areas.

Chapter 8

Community spaces in the landscape of the sustainable regeneration

Introduction

The chapter explores the leisure and community opportunities provided by the current landscape in the case studies of Augustenborg and Rotes Viertel.

The analysis is based on the non-participant observation analysis made in the selected outdoor areas of the case studies as well as some relevant responses from the survey distributed to residents (Appendix B and C and Figure 8.1). The observation data was analysed with Chi-Square statistical tests to find differences in use for leisure and socializing of residents between most used areas and among communal gardens of different block layouts (See Introduction of thesis and appendices H and I). Similarly to the previous chapter, the results for the observation analysis of each case study and a preliminary discussion are presented separately so that the most used areas and features of the landscape can be compared.

The chapter starts by explaining the users' and usage characteristics in the outdoor areas to provide an overview of use patterns. The areas which were found to be more important for facilitating socializing and leisure are presented first, followed by areas that encouraged casual encounters, to show the features of the landscape that characterised them. From responses to the survey, preferences of respondents are then presented for the areas they considered best for leisure and socializing. The users' preferences are compared to those stated in the survey to show differences which are then discussed. At the end of the chapter, findings for both of the case studies are compared showing the features of the landscape that were most relevant for leisure and socializing of residents. Differences that could be attributed to culture in the case studies are also discussed to identify design features that may or may not be generally applicable.

The chapter concludes by complementing the initial design suggestions made in the last chapter for design preferences.

Augustenborg

Users and their activities

Augustenborg currently has a population of 3158 inhabitants.[501] In conducting the observation records of the way outdoor areas are used, a total of 8268 visits from residents were recorded in the outdoor areas of Augustenborg during the month of May. That included necessary activities of daily coming and goings of residents as well as their leisure and social activities in the morning, midday, and afternoon (See Introduction of thesis). For the purpose of the analysis, the communal gardens, the blocks, and the selected layouts were provided with an identifier for referencing them (Figure 8.1). Overall, there was a slight majority of male users and more than half of the recorded users were aged between 19 to 50 years old who were observed to use outdoor areas with regular frequency (Figure 8.2). The least frequent users observed were infants, children, and adolescents who represented 17% of the population in Augustenborg according to local statistics.[502] The low number of adolescents recorded was in part attributed to their use preferences of gathering for social activities after sunset. Since observation work was done before sunset for personal safety reasons, it was not possible to record activities of adolescents with a similar representativeness as the rest of the population.

From a few sporadic night visits, it was observed that adolescents preferred the square as a social gathering point despite all facilities being closed as this was the only well lit public area. Few adolescents were observed to use the park and outdoor school grounds at night due to the lack of illumination, which facilitated vandalism and a feeling of insecurity. Thus, further research would be required to target these users to explore their leisure and social activities.

[501] Malmö Stad, 'Områdesfakta Augustenborg 1995-2000', *Statistik*, (2007) <http://www.malmo.se/download/18.3964bd3611d8d4a5d1c800011019/156.Augustenborg+rev.+081119.pdf> [accessed November 2008] (p. 1).

[502] Ibid.

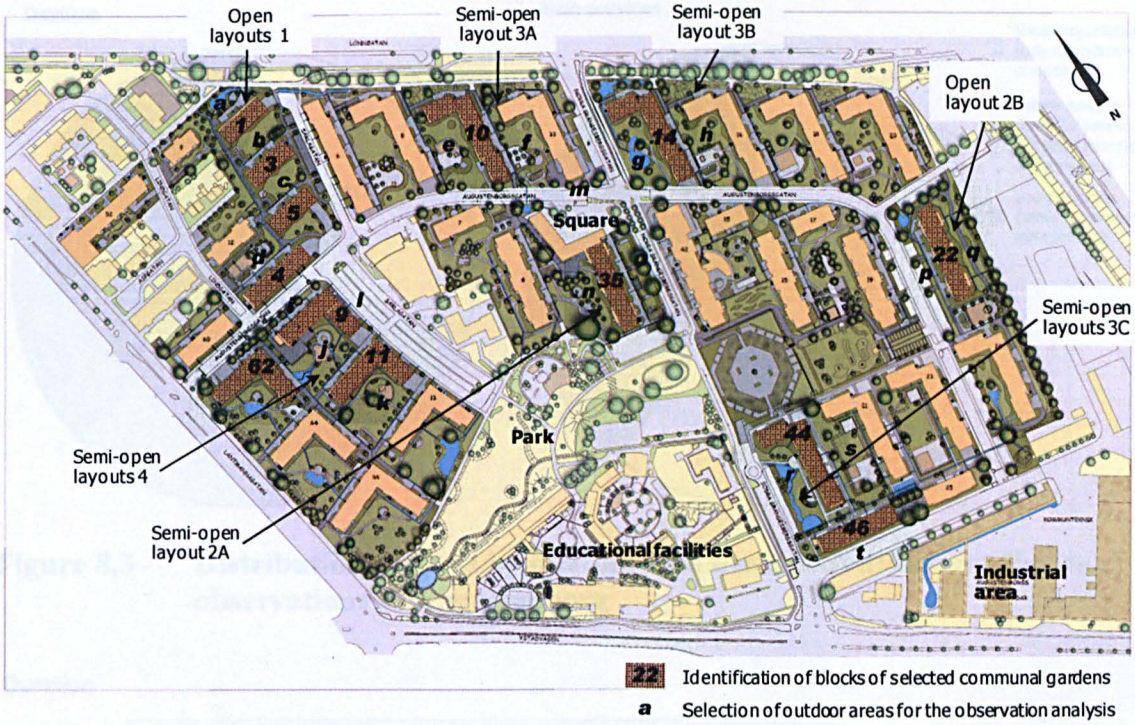

Figure 8.1 Selected communal gardens and their layouts for the observation analysis of outdoor areas in Augustenborg

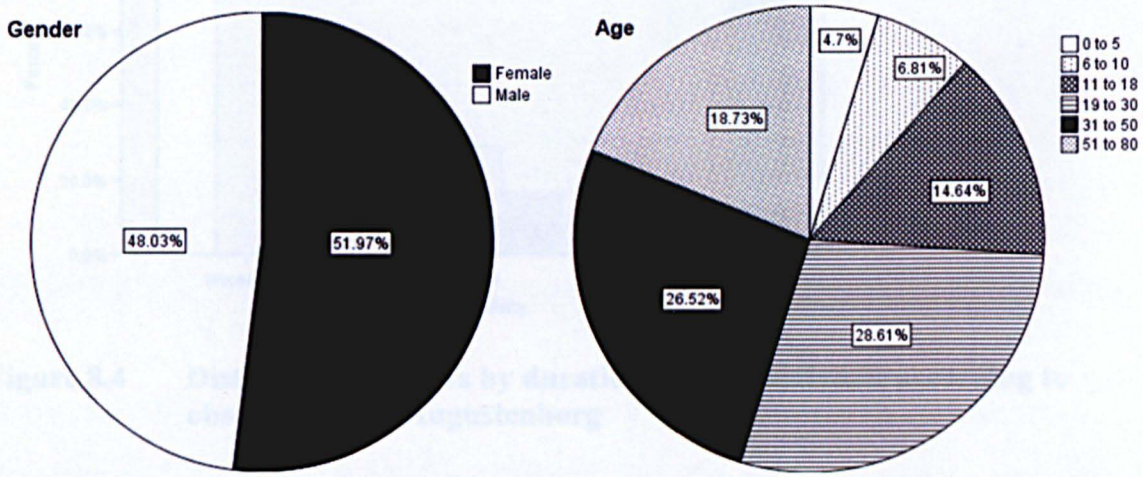

Figure 8.2 Distribution of users by gender and age according to observations in Augustenborg

All of the activities had a similar frequency throughout the day though surprisingly almost one third was social activities and a small proportion was leisure activities (Figure 8.3). Social activities of 5 to 15 minutes were of similar frequency to those longer than 16 minutes, indicating there were areas that supported short and long conversations (Figure 8.4).

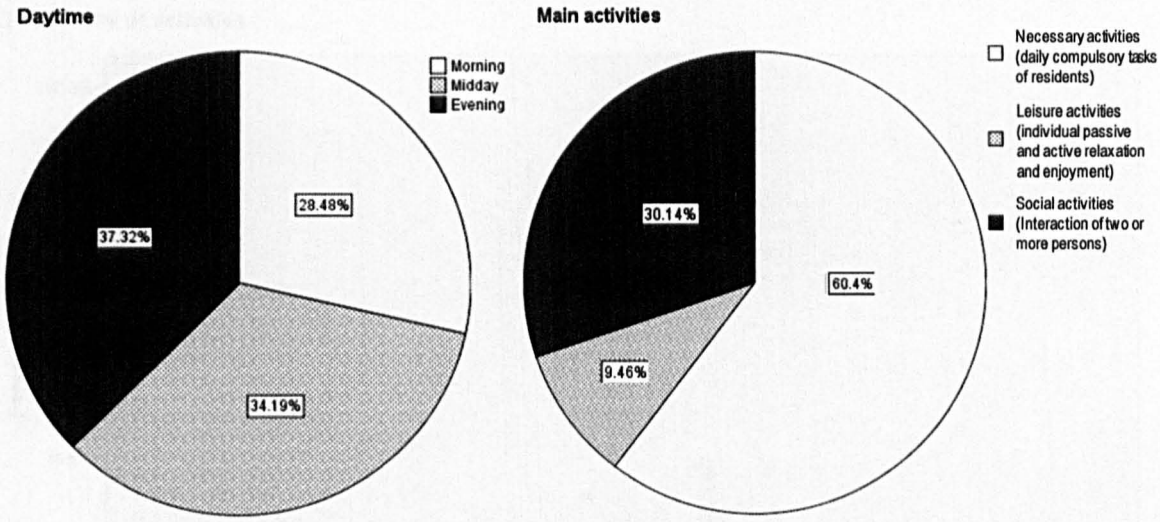

Figure 8.3 Distribution of users by daytime and main activities according to observations in Augustenborg

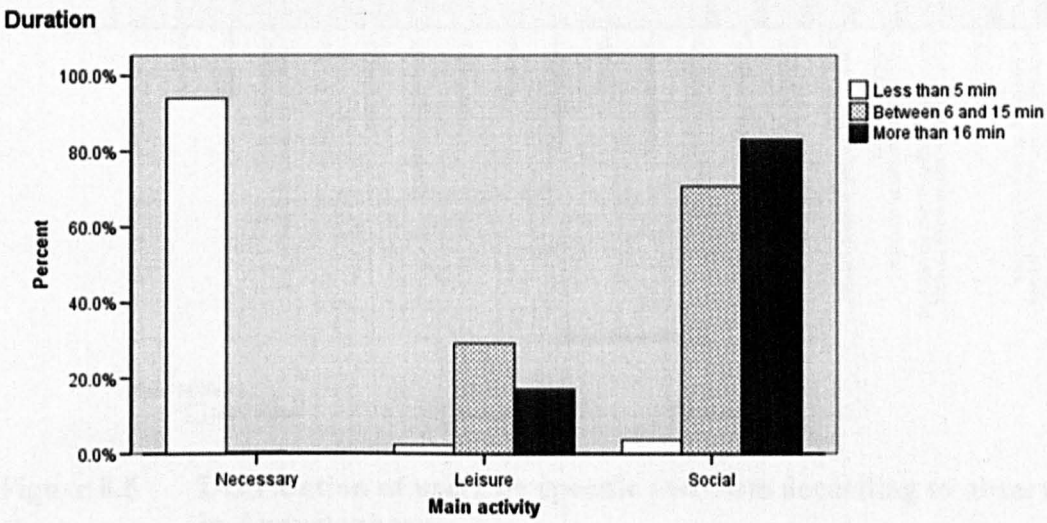

Figure 8.4 Distribution of users by duration of main activities according to observations in Augustenborg

From all the social activities, around 73% involved casual encounters, engagement in play with others, and conversations with neighbours of which the latter had the highest proportion (Figure 8.5). Therefore areas that facilitated conversations with neighbours are presented in first instance followed by areas for casual encounters of residents.

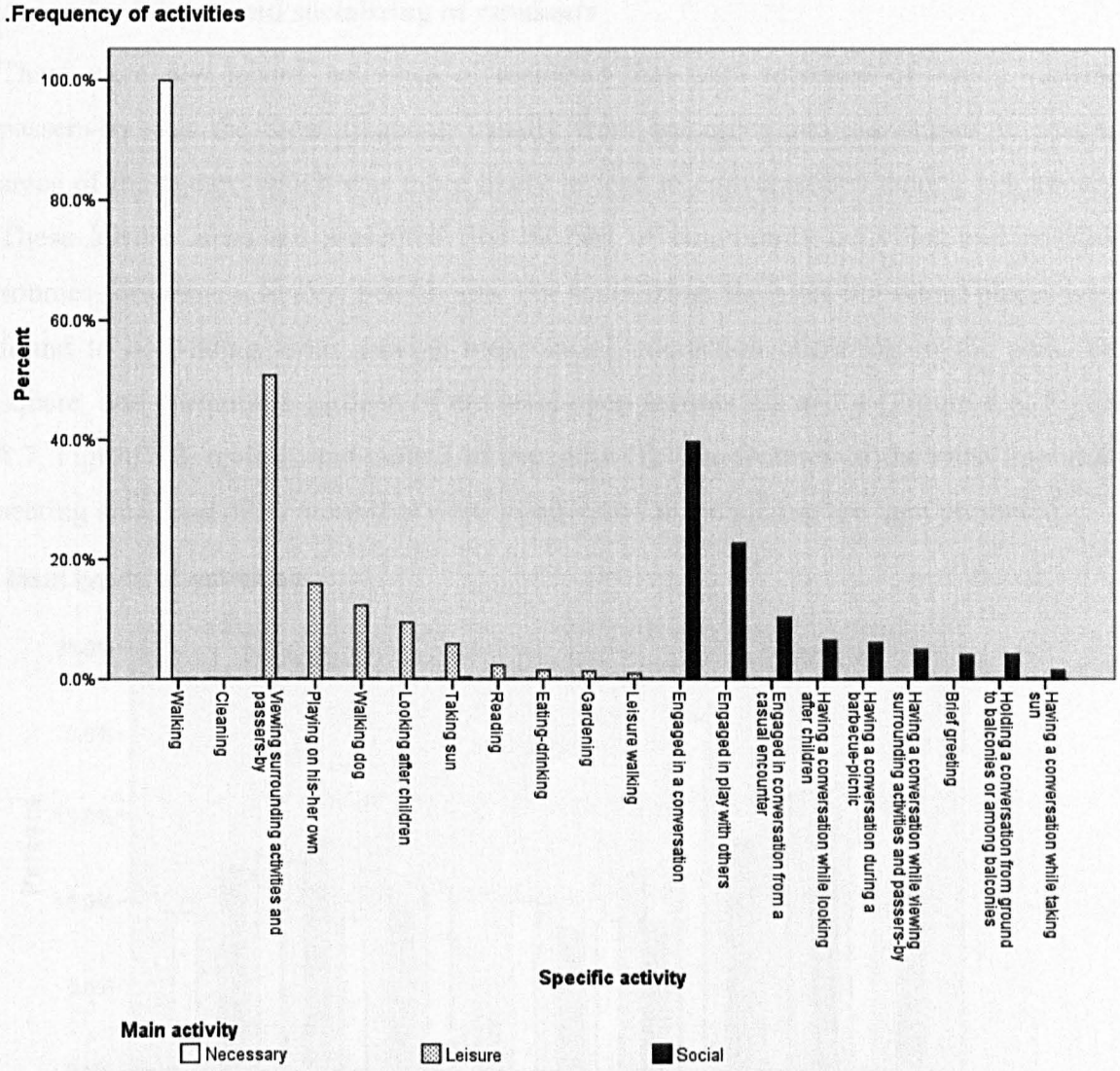

Figure 8.5 Distribution of users by specific activities according to observations in Augustenborg

Main areas for community life in the housing area

The park and the square were observed to be common ground for social activities of residents from all over the housing area, particularly elderly or parents with infants. The communal gardens were common ground for socializing of inhabitants who lived in flats around the communal gardens. Children would play in their or others' communal gardens which has been facilitated by the pedestrian connectivity of the communal gardens. A disadvantage towards the latter was found to be the division of the park in two areas due to a new building for the elderly, which inhibited the easy connection. It has reduced children's opportunities for meeting others on either side of the housing area and has created secluded left over lawn areas that were found to lack informal surveillance previously provided by their openness to the park (Table 1 in appendix H).

Areas for leisure and socializing of residents

There were few leisure activities of residents that were recorded of which viewing passers-by was the most frequent, usually from balconies and sometimes in seating areas of the square which was more likely to lead to conversations among neighbours. These leisure areas are presented first as part of community activities and possible sources for contacts among neighbours. For socializing, the most important places were found to be seating areas, having most social interaction occurring in the park, the square, and communal gardens of the semi-open layouts 2A and 4 (Figure 8.6, Figure 8.7, Figure 8.8, table 2, and table 3 in appendix H). The features of the most important seating areas and other areas that were significant for socializing are then presented.

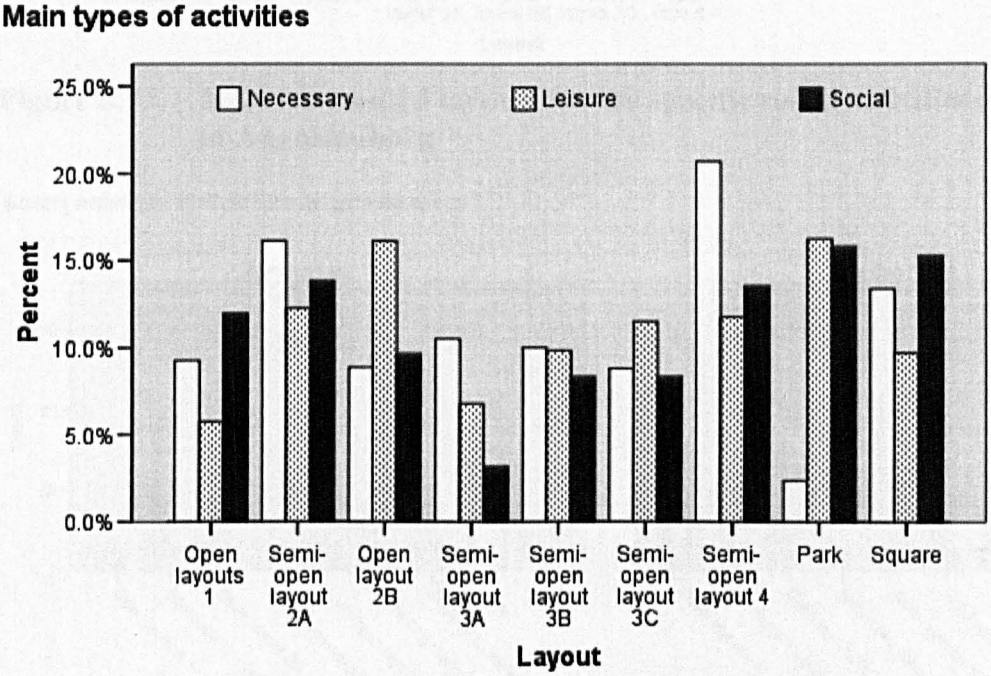

Figure 8.6 Distribution of users by layouts in relation to main activities according to observations in Augustenborg

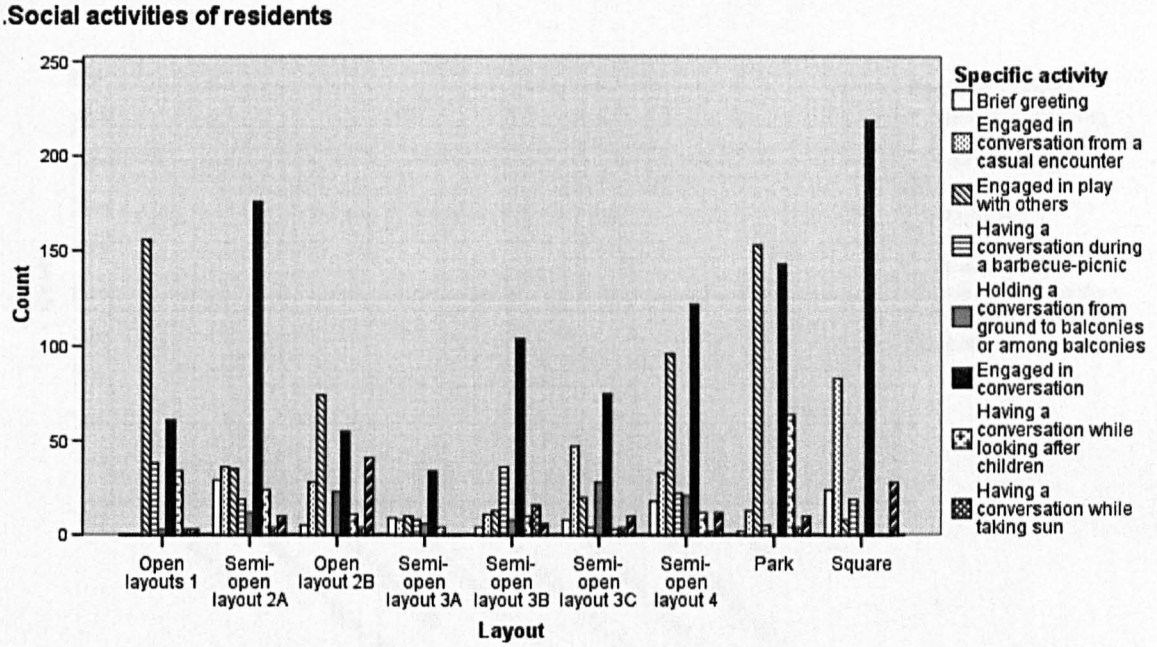

Figure 8.7 **Most frequented layouts for the specific social activities of residents in Augustenborg**

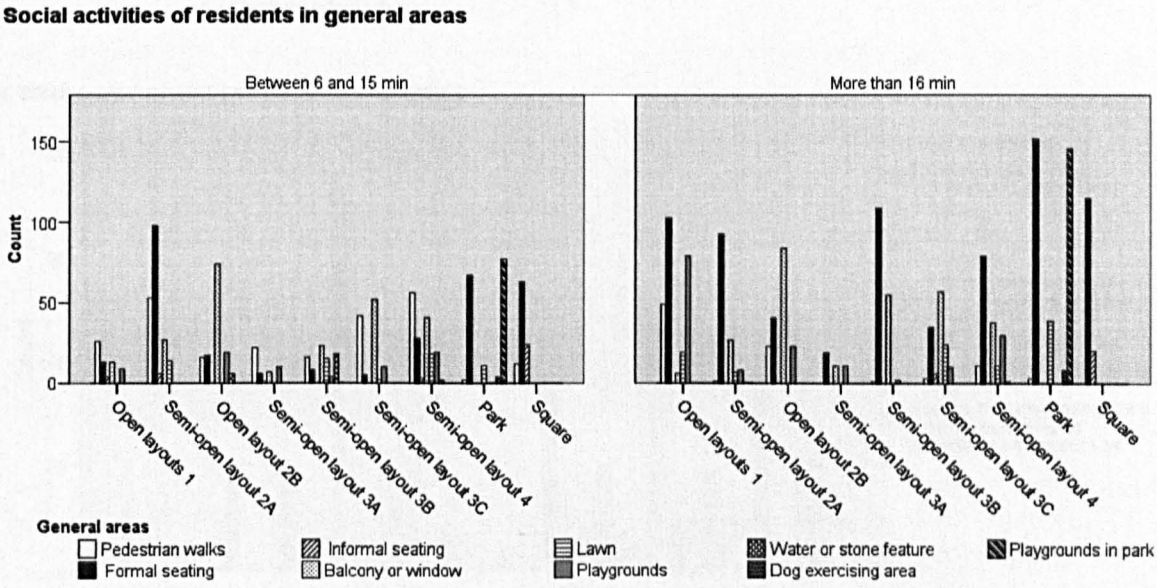

Figure 8.8 **Most frequented areas in layouts for general social activities of residents in Augustenborg**

Balconies	Park	Square	Communal gardens	Less relevant areas

Balconies were important for residents as a first step to relate and learn of their community. Residents would use their balconies for sunbathing, viewing, reading, or having a conversation while looking out was quite common in most layouts (Figure 8.9 and Figure 8.10). As commented by a resident without children living on the 7th storey, the outdoor areas were pleasant to look at even if he did not use them so often.

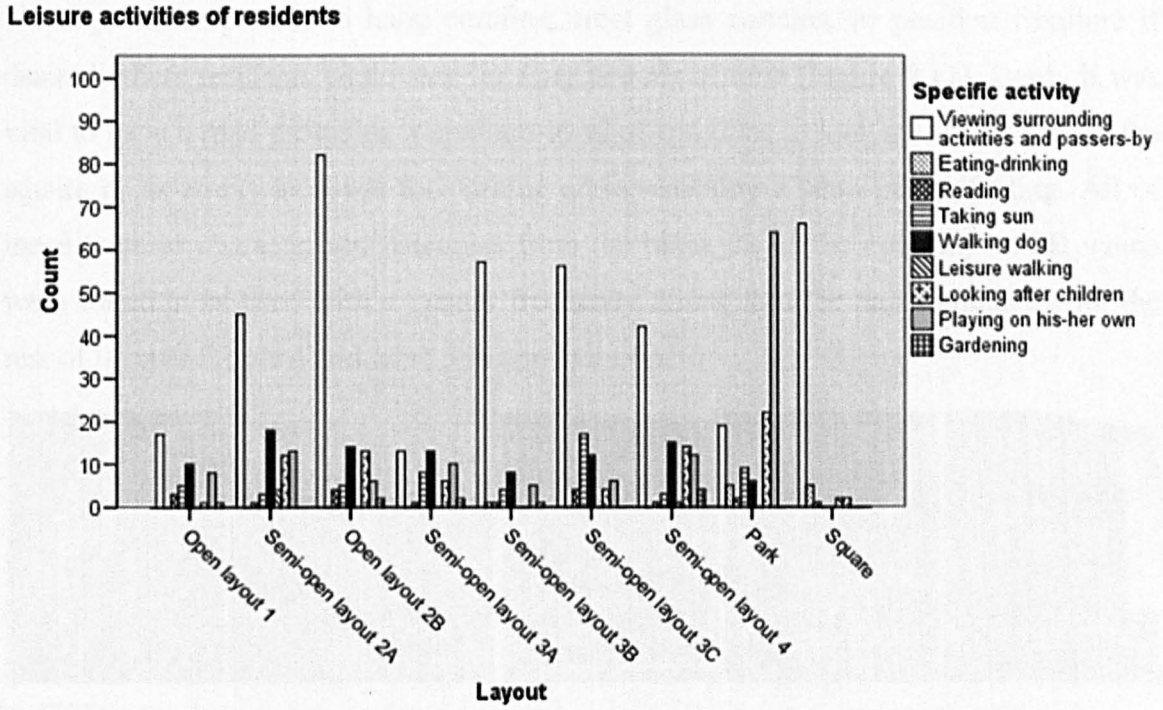

Figure 8.9 Most frequented layouts for specific leisure activities of residents in Augustenborg

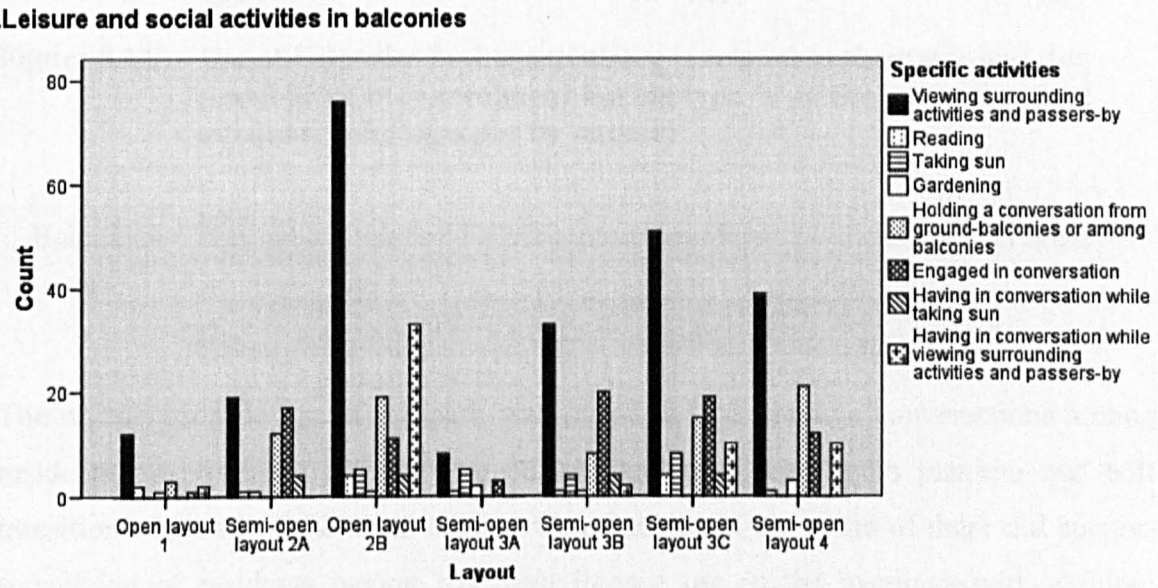

Figure 8.10 Most common leisure and social activities in balconies of the various layouts in Augustenborg

The characteristics that favoured the development of leisure or social activities in balconies were having opportunities for screening and positioning furniture, as well as having balconies orientated onto a road with a medium-level of activities. Opportunities for screening were facilitated by the balconies' integrated design with the building or through curtains and tinted glass which provided privacy to users. Partial screening from view was also made possible with sweet chestnut and poplar trees. A larger size of

balcony was important to hang curtains, erect glass curtains, or position furniture if desired where residents could stay for long periods of time (Figure 8.11). Lastly it was vital to have a road providing a medium-level of activities to look at, not as busy as the square or as empty as roads for parking areas, enabling a semi-public feeling. All of these features characterised balconies from the block 22 of the open layout 2B which were found to be used with a greater frequency throughout the day compared with the rest of layouts (Table 4 and table 5 in appendix H).

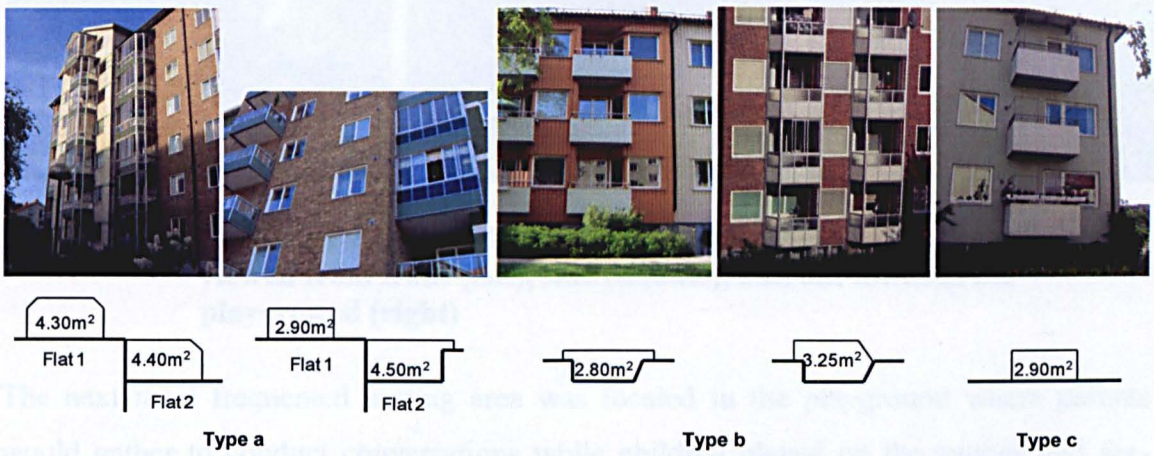

Figure 8.11 **Use of balconies in Augustenborg is related to their size and the possibility for concealment having type 'a' to the left as the most adequate (photographs by author)**

Balconies	**Park**	Square	Communal gardens	Less relevant areas

Seating areas, playgrounds, and a dog exercising court

The regeneration design of the park was intended to encourage conversations among residents by providing a variety of seating and play areas with planting and soft transitions. Not all of the areas created were successful but some of them did support socializing of residents having the most intense use in the evenings with children playing, gatherings of elderly, and parents looking after children (Table 6 in appendix H). The features of the most popular seating areas were having an interpersonal distance from edges of activity but with sight of surrounding activities, sufficient capacity, flexibility, and shelter.

The most successful seating area in the park contained five benches in a corner arrangement which were sheltered with planting and had sight onto children's activities or passersby. Pleasant shelter was supplied by ash trees and surrounding shrubberies with *Syringa amurensis, Syringa vulgaris* 'Andenken an Ludwig Späth', *Ligustrum*

vulgare 'Atrovirens', and *Spiraea betulifolia*. To the back and front, a block of low perennials with *Narcissus* 'Golden Harvest' and *Tulipa* 'Queen of Sheba' in spring was a source of visual and olfactory richness (Figure 8.12). This seating area allowed groups of elderly to gather for conversation in a comfortable environment whilst allowing sight of surrounding activities.

Figure 8.12 Preferred area by elderly residents in the park of Augustenborg as viewed from front (left), side (middle), and out towards the playground (right)

The next most frequented seating area was located in the playground where parents would gather to conduct conversations while children played on the swings and see-saw, which were the most frequented play equipment. It consisted of various benches in side-to-side arrangement that allowed various parents to gather for conversation. To the front of the seating areas, a buffer distance of 5m from the play equipment provided flexibility and sufficient personal space giving residents the chance to withdraw from conversations with other parents if desired. The back of seating areas was comfortably sheltered by a 6m high *Salix viminalis,* partially over-hanging and screening sunlight. These overhanging plants also helped to soften the dominance of hard surfacing materials throughout the play area giving it a greener look. Although there were also seating areas sheltered by timber pergolas, these were rarely used compared to those sheltered by the *Salix viminalis*.

Other enjoyed seating areas included a nearby tree trunk which was used for children's play or as informal seating for parents when looking after children. The most disliked feature of play areas was the rock labyrinth that was felt to be dangerous and was not used for play (Figure 8.13).

Although less frequented for social or leisure activities, an exercising area for dogs and a lawn area in the park are considered to be valuable as alternate choices for residents. Whenever a resident would use the exercising court for his or her dog, known acquaintances would join in. In turn, the lawn areas of the park with some back and side

shrub shelter were important for family gatherings rather than knowing other neighbours. Only newly raised lawn areas on the east part of the park due to underground parking were rarely used.

Figure 8.13 The playground in the park of Augustenborg with a popular tree trunk for informal seating as well as play (left), a predominance of hard surfacing materials (middle), and the most frequented seating area for conversations with plant shelter (right) (photographs by author)

Balconies	Park	**Square**	Communal gardens	Less relevant areas

Seating areas

There were two main issues in the square that affected the development of community activities which were the type of facilities available and the arrangement of the seating areas. The square was provided with many male-oriented facilities such as a cycling shop, a pub, and a fast food restaurant of which many closed early evening leaving little informal surveillance in the area. These two issues discouraged the presence of women in the square area which might have been addressed by the introduction of florists, cafes, bakeries, and others closing later at night (Table 7 in appendix H). For seating areas, there were certain features that characterised those that were most popular for socializing. They included having interpersonal distance, sight of edge activities, flexibility, and shelter.

The most important seating areas were found across the road of the square which were usually used by elderly residents to carry out conversations (Table 8 in appendix H). The benches of these seating areas were separated from the pedestrian walk by approximately 2m providing sufficient interpersonal distance from passers-by but had full sight of activities of the square providing them opportunities to engage with others if desired (Figure 8.14). Some tables were provided which was observed to be appreciated by residents who brought everything necessary for sharing a meal with

other residents. The seating areas also had back shelter of a wall or shrub, partial enclosure of sweet chestnut trees, and a variety of colours and textures from flowers, water in ponds, and rocks that made these areas pleasant (area g and m).

Figure 8.14 Preferred formal seating areas in the communal gardens of the semi-open layout 3A (area f) and 3B (area g) in Augustenborg enable contact with surrounding activities (photographs by author)

The seating area in the communal garden of the semi-open layout 2A (area o) was also important but slightly less visited by residents. Movable benches and tables were available that facilitated residents positioning furniture according to their needs when gathering for conversation or sharing tea. Residents using this seating area would often greet passers-by who would sometimes join in for a conversation (Figure 8.15). A similar area to this one might have been possible on the front part of the block 22 in the open layout 2B (area p) if it had not been transformed to parking, which could have had the same potential for social contacts.

Figure 8.15 Popular movable benches and tables in the communal garden of the semi-open layout 2A (area o) in Augustenborg (photograph by author)

Balconies	Park	Square	**Communal gardens**	Less relevant areas

Seating areas and playgrounds

Social interaction of residents was supported by the diversity of areas in communal gardens as well as the flexible arrangement of seating areas and playgrounds. The communal gardens that were most used had versatility, capacity, richness, and integration of different areas for various activities of residents, which provided them with the opportunity to engage passively or actively with their outdoor areas and their community.

These features were found in the communal gardens of the semi-open layout 4 (area j) and the open layout 1 (area d) which were visited constantly by residents for conversations among neighbours (Figure 8.16). The different areas with sand, water, lawn, play material, and some tree shelter of these communal gardens also provided diverse play opportunities for children. A strength in the design were the wide 3m pedestrian walks that could easily be adapted as an overflow for informal play. For instance, they were used for games amongst parents and children such as football and hockey. Lastly, outdoor sheds for storing outdoor furniture and play material were found to be appreciated here by residents using them constantly.

Figure 8.16 Social interaction was frequent in well-integrated communal gardens of Augustenborg such as in the semi-open layouts 4 (area j) (photograph by author)

The seating areas that were found to contribute most to socializing of residents had an interpersonal distance, sight of edge activities, a large capacity, and shelter. These seating areas were found in the communal gardens of the semi-open layout 4 (area j) and the open layout 1 (area d) (Table 9, 10, and 11 in appendix H). A minimum interpersonal distance of 10m and a maximum distance of 22m from the seating area to

the surrounding pedestrian walks allowed residents having partial sight of pedestrian activities and opportunities to greet passers-by who would sometimes join in. Visual contact with the pedestrian walk was also possible by using light screening of wood lattice fences and a surrounding shrub belt of 0.90m high on the back and sides of seating areas or back shelter with a shrub of 1.5m in height.

Sufficient capacity was provided by a set of benches with two tables for approximately eight residents to gather. During evenings it was most usual to find residents engaged in conversations sharing tea and were often used for family picnics using barbecue grills located close by to these seating areas. Lastly, residents were found to enjoy sunlight during their conversations but sometimes also required to shelter from it, for which it was important to have the possibility of placing parasols in tables for seating areas. Sunlight was important in communal gardens for which there were few trees for shading or small decorative ones. Therefore it was important for residents to have other choices to shelter from sunlight such as the parasols.

The communal gardens of the open layout 1 (area a, b, and c), semi-open layout 3A (area e and f), and the semi-open layout 3C (areas s) were less visited due to their poor design. Poor realm distinctions lessened the semi-public feeling of communal gardens and comfort in using them. The proximity of seating areas to balconies and the main pedestrian walk did not leave any space for interpersonal distance which soon discouraged users from these areas (Figure 8.17).

Figure 8.17 The proximity of seating areas to the main pedestrian walk in Augustenborg discourages conversations as in the communal gardens of the open layouts 1 (area b) (left) or fosters uncomfortable seating positions as in the park (right) (photographs by author)

Also, seating areas lacking visual contact with the pedestrian walk with the use of high shrubs or fully enclosed arrangements rarely encouraged residents into using them. Barbecue grills were not correlated to the positioning of benches and tables which made

them difficult to use. Lastly, the location of a sunken play area with a large tree caused the area to feel cold with parents and infants moving after a brief stay. They would generally relocate to playgrounds on the adjacent communal garden which was in a sunny location (Figure 8.18).

Figure 8.18 **Social interaction was discouraged in Augustenborg in isolated seating areas (left) as in the communal garden of the semi-open layout 3A (area e) and in over-shaded playgrounds (right) as in the communal garden of the semi-open layout 3C (area s) (photographs by author)**

Balconies	Park	Square	Communal gardens	**Less relevant areas**

Water bodies, lawn areas, and rubbish sheds

Seating areas with focal points such as ponds were not frequently used by residents for conversations which meant they were not an essential feature to encourage social interaction of residents. Instead, ponds were appreciated as an added visual feature and for children's exploration.[503] Often, parents with children were observed near ponds holding short conversations with other residents while taking their youngsters to view fish, ducks, or other animals. Also, lawn areas in communal gardens were convenient for their flexibility if their size and shape allowed the development of various leisure or social activities such as play of some ball games of adults and children or conducting of events (Figure 8.19).

Lastly, rubbish sheds were intended to be a meeting point among residents. However their foul stench in summer discouraged any form of social contact inside. Their stench also affecting the use of seating areas located at the rear of sheds. Since almost a third of communal gardens had rubbish sheds, they affected a considerable proportion of outdoor areas and lessened opportunities for socializing. The stench might have been

[503] Anonymous interview with resident, May 2007

addressed by increasing the frequency of refuse collection in summer and cleaning up of containers after emptying.

Figure 8.19 The balanced areas that integrate the communal garden of the semi-open layout G4 (area j) were frequently used by residents of various ages (photograph by author)

Areas for casual encounters of residents

The most important areas for casual encounters of residents were pedestrian walks, formal seating, and pedestrian junctions. Formal seating areas that were most relevant for casual encounters were the same as those found for social interaction mentioned above. Therefore this section concentrates on the most significant pedestrian walks and junctions for casual encounters of residents found in communal gardens and the square (Table 12 in appendix H).

Pedestrian junctions	Pedestrian walks	Parking and garage entrances

Casual conversations were most common in pedestrian junctions in the square where residents converged on their way there (Figure 8.20). The pedestrian junction that was most significant for casual encounters of residents was located in one of the busiest pedestrian walks passing in the front of a grocery store (Table 13 and 14 in appendix H). It was characterised by being flexible, having nearby traffic calming measures with textured pavement, opportunity for sunlight shelter, and informal seating. The width of the junction was of 6m for pedestrian circulation which was joined to a 4m two-way-cycle path, providing an ample area for residents to stop without interfering other users. Sweet chestnut trees partially sheltered the pedestrian junction providing residents with the choice of shaded and sunlit areas. Lastly, timber tree guards or a retaining wall along a ramp were used by residents as informal seating which facilitated residents the continuation of conversations when these persisted for periods longer than 16 minutes (Figure 8.21).

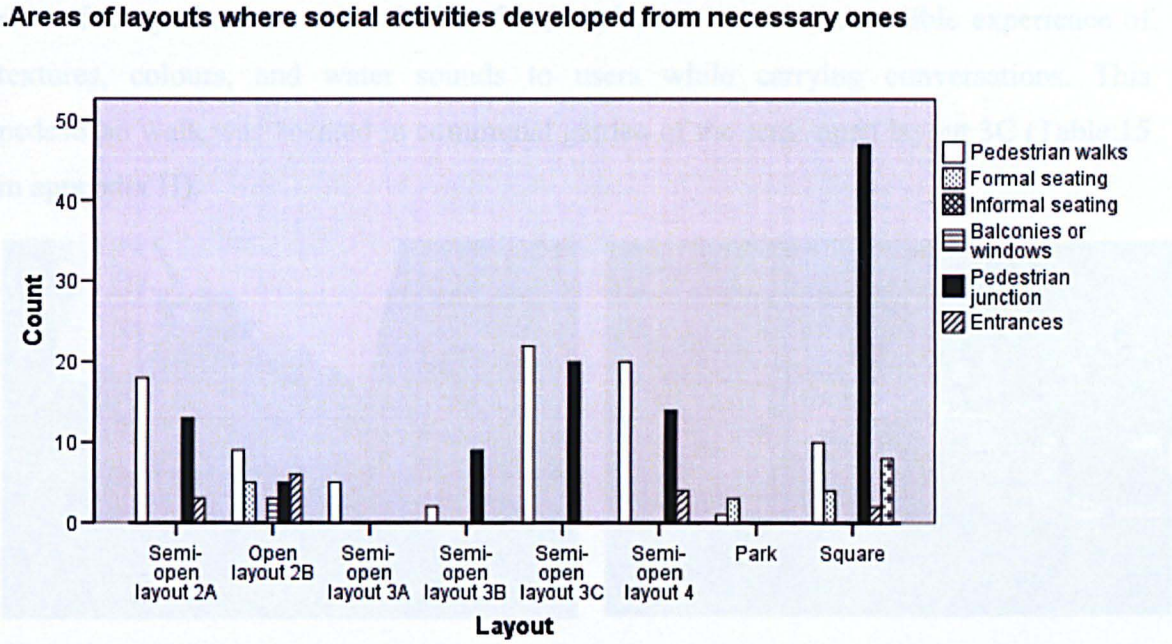

Figure 8.20 **Most frequented areas in layouts for casual encounters developed from necessary activities in Augustenborg**

Figure 8.21 **Shelter and an ample width characterise the most used pedestrian junction in the square (area m) of Augustenborg (photograph by author)**

Pedestrian junctions	**Pedestrian walks**	Parking and garage entrances

The pedestrian walk that was used more often for casual encounters was characterised by having robustness and richness provided by its arrangement allowing residents to have a conversation without interfering with other pedestrians. The gravel surfaces on the side and adjacent strips of lawn facilitated residents to carry out conversations while other users could use the central concrete walk to circulate (Figure 8.22). Richness was provided by the planting associated with the pond, fountain, and rock channel on the

side of the pedestrian walk which offered a pleasant visual and audible experience of textures, colours, and water sounds to users while carrying conversations. This pedestrian walk was 1ocated in communal garden of the semi-open layout 3C (Table 15 in appendix H).

Figure 8.22 Most frequented pedestrian walk in communal garden of the semi-open layout 3C (area r) in Augustenborg for casual encounters is characterised by diverse materials, plant textures, and views (photographs by author)

Pedestrian junctions	Pedestrian walks	**Parking and garage entrances**

Pedestrian walks near parking areas or roads were not found to be beneficial for conversations among neighbours with the exception of those located near the square. Particularly, pedestrian walks adjacent to city roads were hardly ever used for socializing due to their public feeling. Residents were found to welcome social interaction with their neighbours in the square and the park as public areas but not otherwise. This was most evident in communal gardens to the north of the housing area where the visits of undesirables discouraged socializing of residents.

Other areas of less significance due to their small number, but worth mentioning, are garage entrances. In these areas male residents were observed to join in extended conversations around vehicles with open hoods. Having such areas indicates the importance of providing alternate options for residents to engage in conversation with others.

Preferred social areas as stated by residents in the survey

The survey applied in the housing area questioned residents for the amount of friends they considered having in the housing area as neighbours with whom they could share support and trust. The responses of residents in the survey showed that 76% of

respondents stated they had friends in the housing area. From these respondents, 45% have met them in outside areas and a 31% indoors. This shows that outdoor areas were important for meeting others. The way that respondents have known most of their friends has been through other neighbours, children, community meetings, and sharing communal facilities indicating that a diversity of areas for socializing is necessary (Figure 8.23).

The areas that were rated to be most significant by respondents for meeting and socializing were lawn, pedestrian walks, seating areas, and playgrounds. This goes in line with the way respondents have known their friends and with most of the observation studies. Conversely, the areas that were considered less important were elevators, parking areas, communal rooms, and private gardens. As mentioned earlier, elevators are too small, there is not a communal room for the whole community as such, and there are no private gardens either. Only the rating for roads differed from the observation studies. Roads were rated by respondents to be good sources of social activities yet this was only found close to the square (Figure 8.24).

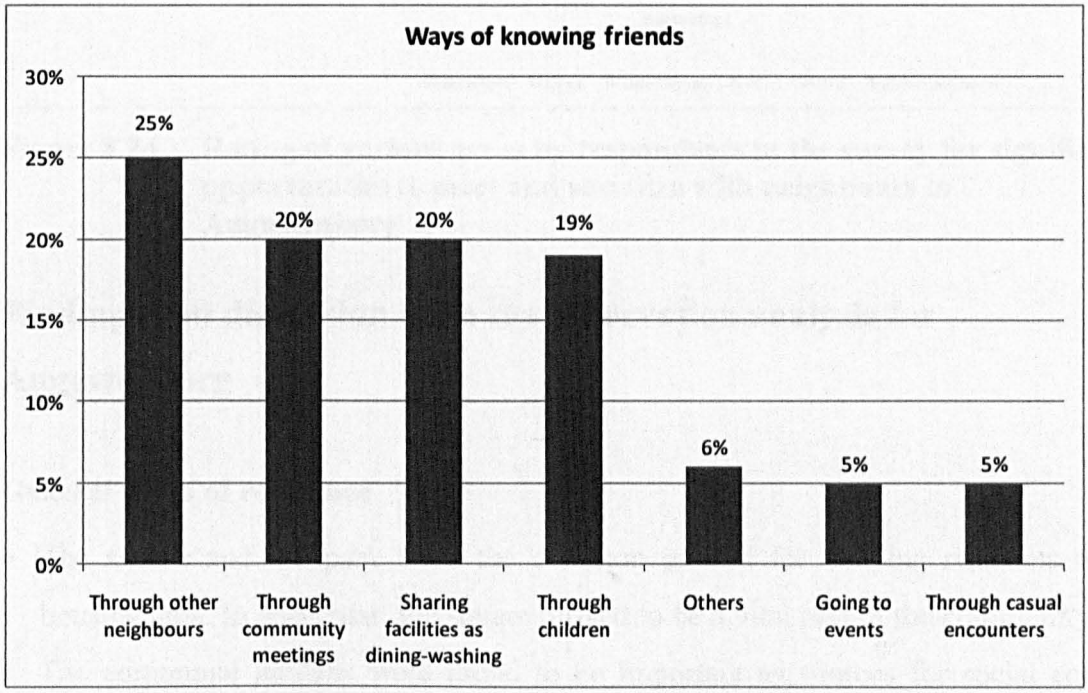

Figure 8.23 The ways that respondents have known the majority of their friends in Augustenborg as stated in the survey

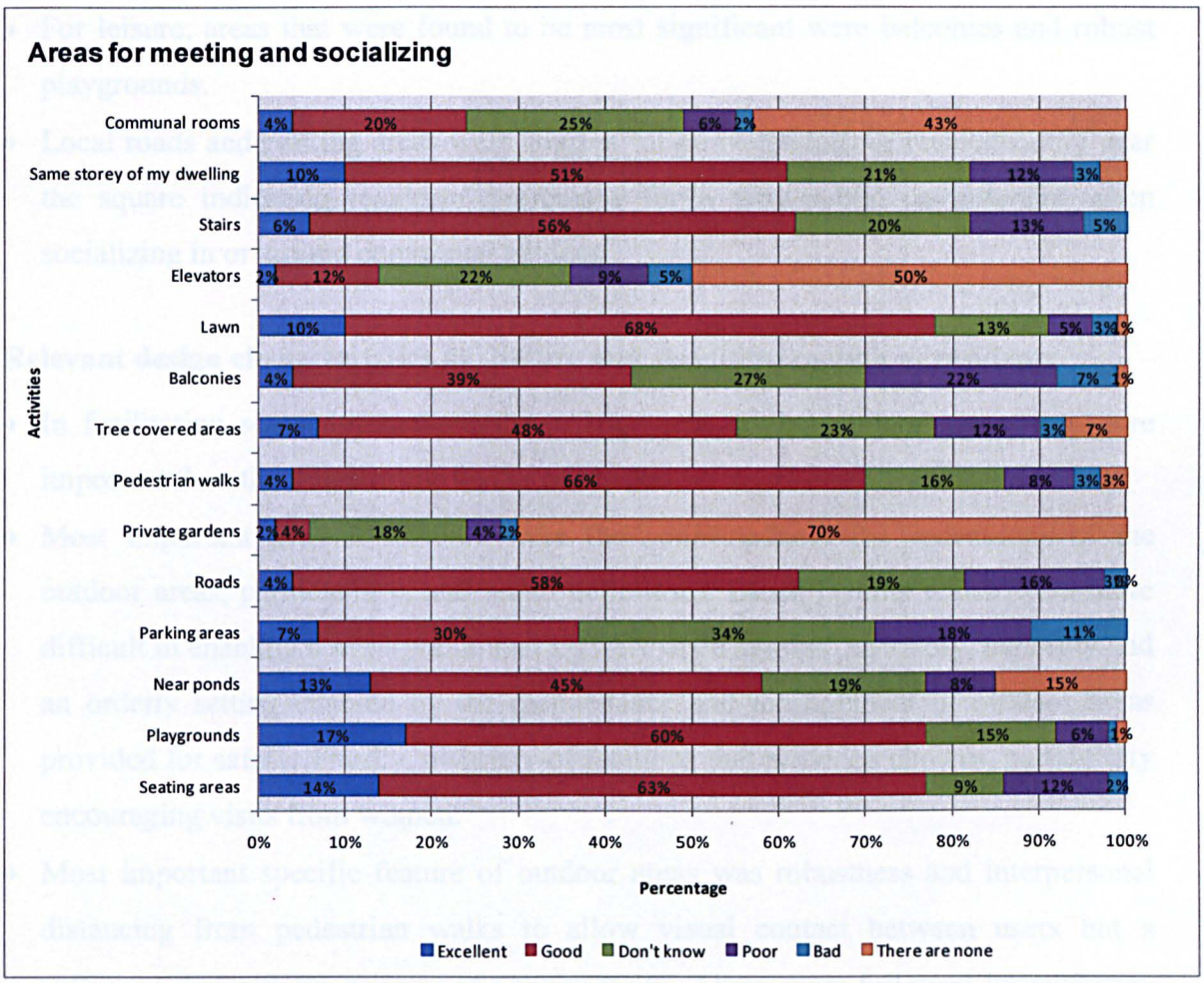

Figure 8.24 Rating of various areas by respondents in the survey for significant opportunities to meet and socialize with neighbours in Augustenborg

Findings and discussion from the observation analysis for Augustenborg

General areas of relevance

- The square and the park were the common ground for meeting residents of the housing area. In particular, the square proved to be a vital part of the community.
- The communal gardens were found to be important as sources for social contacts among neighbours living in the surrounding buildings.
- Formal seating areas were observed to be more relevant for social interaction of neighbours for periods of time longer than 16 minutes.
- For casual encounters of residents for periods of 6 to 15 minutes, formal seating areas, pedestrian walks, and pedestrian junctions were more relevant; though it was also desirable to have alternate areas such as garages and exercising areas for dogs.

- For leisure, areas that were found to be most significant were balconies and robust playgrounds.
- Local roads and parking areas were sources for conversations of residents only near the square indicating residents' preference for a semi-public environment when socializing in or around communal gardens.

Relevant design characteristics for leisure and social interaction of residents

- In facilitating social interaction, the arrangement of the outdoor areas was more important than the shape of the layout of blocks.
- Most important general features were the connectedness for pedestrians of the outdoor areas, permeability, and realm definitions. Block layouts which were more difficult in enabling a semi-public feeling were open layouts. Secondly, legibility and an orderly setting enabled by the maintenance and management of outdoor areas provided for safety. Thirdly, a variety of facilities that provided choices, particularly encouraging visits from women.
- Most important specific feature of outdoor areas was robustness and interpersonal distancing from pedestrian walks to allow visual contact between users but a sufficient distance for privacy of conversations. These were followed by enclosure and mystery, the former with certain preferences for shelter constitution and arrangement. The least important features were complexity and coherence.
- The arrangement that was observed to be more successful in facilitating leisure and social interaction of residents were in communal garden j in semi-open layout 4 and d in open layout 1.

Outdoor areas were found to be important for community life of a variety of residents (Figure 8.25). In general, the key issues that facilitated the development of leisure and social activities in the housing area were the pedestrian interconnectedness and permeability of the housing area as well as the definition of realms of communal gardens. The former allowed residents to visit the park and square for leisure or social interaction, and allowed children to visit different playgrounds of communal gardens. The latter provided a semi-public feeling with small areas that were comfortable to conduct social interaction, without which, residents would rarely use the communal gardens. These features were followed by the legibility of the housing area that facilitated residents finding their way as well as maintenance and management that created an orderly environment. Other issues of consideration were having a variety of

facilities in the square to attract female residents; otherwise their presence in the square was lessened reducing their opportunities for social interaction.

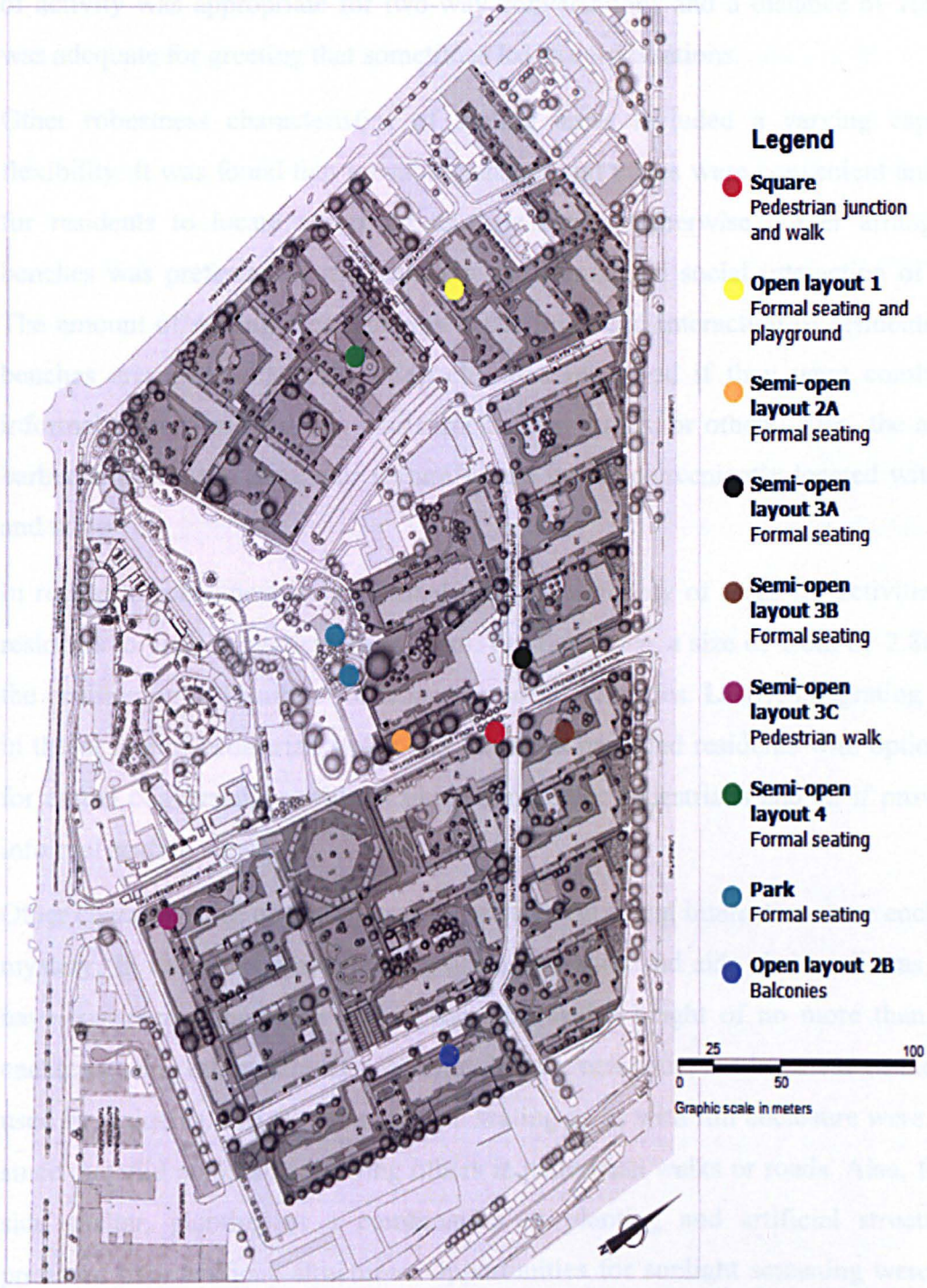

Figure 8.25 Location of most frequently used areas for social interaction of residents in Augustenborg according to observation studies

More specifically, the most important characteristic for conducting leisure or social interaction was found to be robustness as it facilitated the development of these activities in the outdoor areas by having versatility and providing choices. For seating areas, it was particularly significant having an interpersonal distance for residents to

have a choice in engaging with others if desired as well as keeping visual contact with others in edge activities. Having a distance of 2m to 10m from the seating area to areas of activity was appropriate for two-way conversations and a distance of 10m to 22m was adequate for greeting that sometimes led to conversations.

Other robustness characteristics of seating areas included a varying capacity and flexibility. It was found that movable benches and tables were convenient and versatile for residents to locate according to their needs. Otherwise corner arrangement of benches was preferred as it adequately accommodated social interaction of residents. The amount of seating area that was better for social interaction of residents had four benches arranged with tables. Capacity was improved if they were combined with informal seating such as low walls, rocks, tree trunks, or others. Also, the addition of barbecue grills was a popular feature where it was conveniently located with benches and tables.

In regard to robustness in communal gardens, a variety of areas for activities allowed residents to view or participate of them. For balconies, a size of 1.6m by 2.8m allowed the positioning of furniture for leisure or social activities. Lastly, integrating flexibility in the design of pedestrian walks and junctions provided residents with options to stop for casual conversations without obstructing other pedestrians and sit if provided with informal seating areas.

Other characteristics of importance for leisure and social interaction were enclosure and mystery. In the cases where seating areas had back and side shelter, it was crucial to have transparent screening with shrubs that had a height of no more than 0.90m to enable viewing other residents. Without this characteristic, seating areas would rarely be used by residents. For this same reason seating areas with full enclosure were least used since they did not enable viewing others in pedestrian walks or roads. Also, for back or side shelter, planting or a combination of planting and artificial structures were preferred over artificial structures. Opportunities for sunlight screening were observed to be appreciated by residents. It could be with the possibility to fit parasol structures in the tables of seating areas or overhanging shrubs, having light canopy of trees in pedestrian walks and balconies, and screening fixtures in balconies. Areas for exploration were also enjoyed by having a variety of areas with partial secluded views.

The characteristics that were found to be least important were complexity and coherence. Seating areas, pedestrian walks, or communal gardens having focal points

for visual richness or a balance of hard and soft surfaces allowing more visual contrasts were not frequented more often for socializing than others that did not have them. Ponds or colourful plant arrangements were focal points for some seating areas which were considered by residents as an additional amenity rather than a condition for encouraging their use.

Differences for socializing among communal gardens of the various types of block layouts were related to providing a semi-public feeling, which was lessened in parallel layouts. This was because the plant arrangement and integration of areas that provided structure to the communal garden and facilitated areas for socializing were removed during the regeneration. For instance, the elimination of the playground areas from 1952 in the communal gardens of the open layouts 1 (areas a, b, and c) have transformed the communal gardens into circulatory spaces making them devoid of interpersonal distance. Another example is the removal of the front lawn in the communal garden of the semi-open layout 2B (area p) that served as a critical area for transition and social interaction of residents. Therefore, particular attention should be paid to regeneration changes of communal gardens in parallel layouts.

Rotes Viertel

Users and their activities

Rotes Viertel had a population of 5844 inhabitants.[504] In conducting the observations, a total of 8595 visits from residents were recorded during the month of September in the selected outdoor areas of Rotes Viertel including necessary, leisure, and social activities registered in the morning, midday, and afternoon (Figure 8.26).

Generally, there was a slightly higher presence of women compared to men and almost half of the total recorded users were aged between 19 to 50 years old (Figure 8.27). Once again, the least frequent users were children and adolescents who represented 12% of the population according to local statistics.[505] From all the activities recorded, almost three quarters were necessary ones but there were almost twice as many social activities compared to leisure ones (Figure 8.28). In fact, the percentage of residents engaged in social interaction coincides with previous research figures in Taiwan showing a similar

[504] Viola Krämer, Amt für Statistik Berlin-Brandenburg, 2007, electronic communication, September 2007.
[505] Ibid.

trend with housing areas in high-rise type.[506] Most social activities lasted for periods longer than 16 minutes which indicated there were areas that supported residents' stay for long periods of time (Figure 8.29).

Looking at the specific activities, very few types of leisure activities were present whilst main social activities included casual encounters, engagement in play with others, and conversations amongst residents. The latter had the highest proportion and is therefore presented first followed by areas for casual encounters (Figure 8.30).

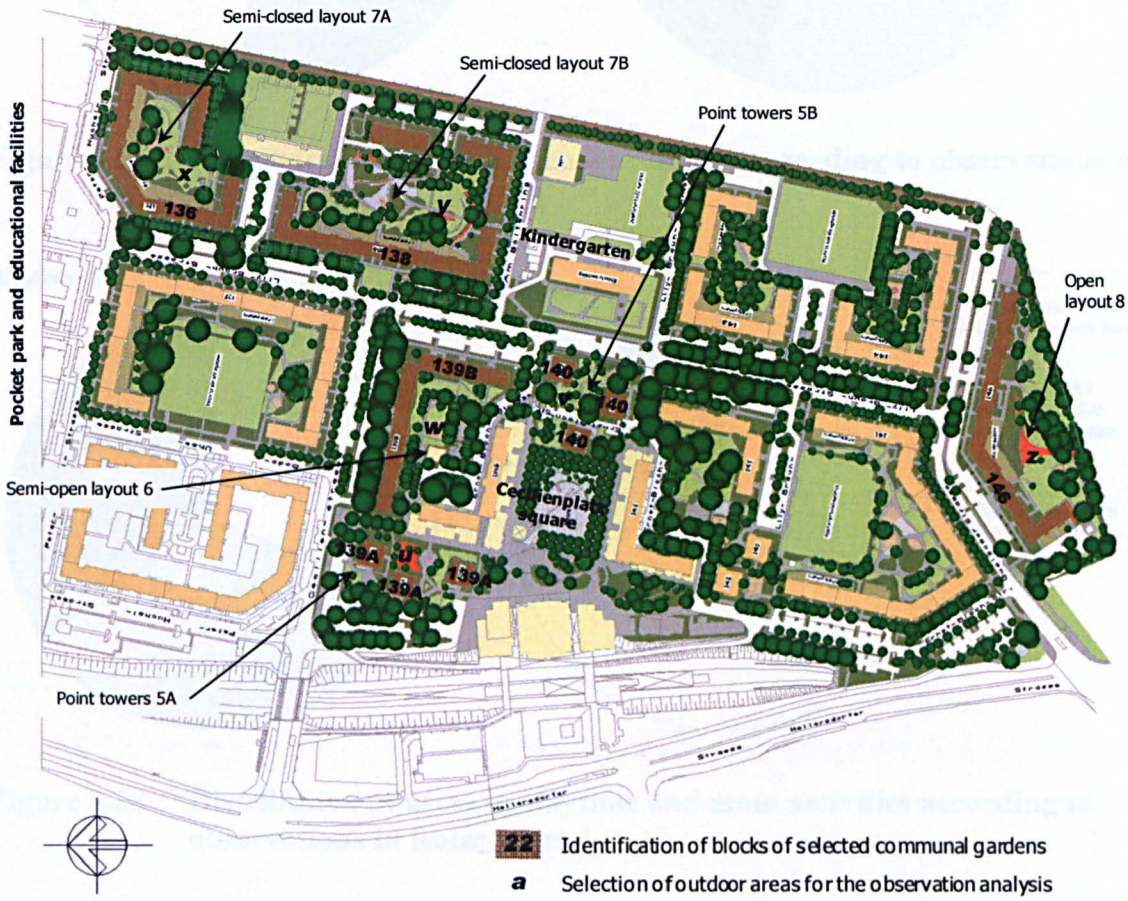

Figure 8.26 Selected communal gardens and their layouts for the observation analysis of outdoor areas in Rotes Viertel

[506] Shu-Chun Lucy Huang, 'A Study of Outdoor Interactional Spaces in High-rise Housing', *Landscape and Urban Planning,* 78 (2006) 193-204 (pp. 201-202).

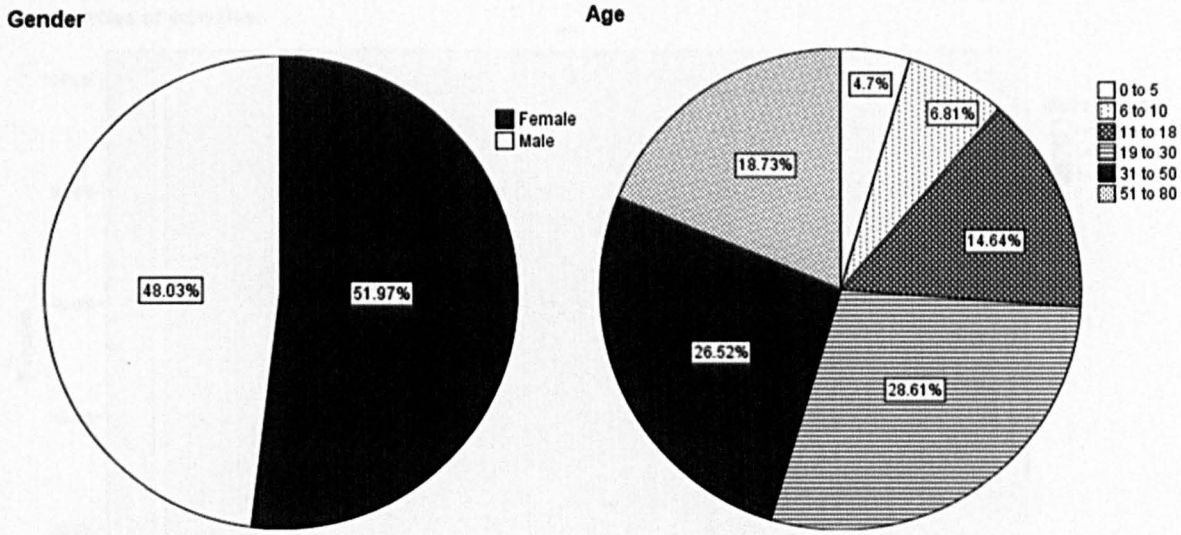

Figure 8.27 **Distribution of users by gender and age according to observations in Rotes Viertel**

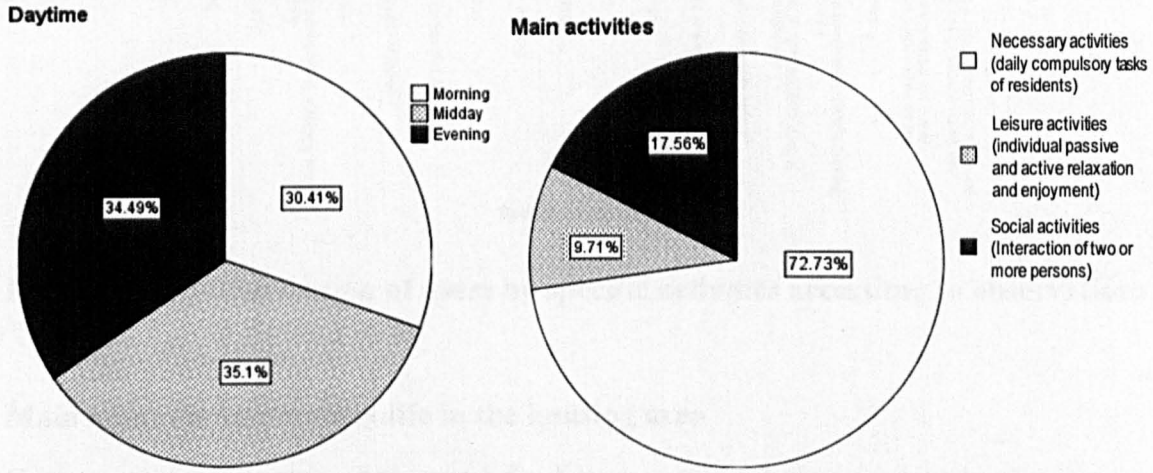

Figure 8.28 **Distribution of users by daytime and main activities according to observations in Rotes Viertel**

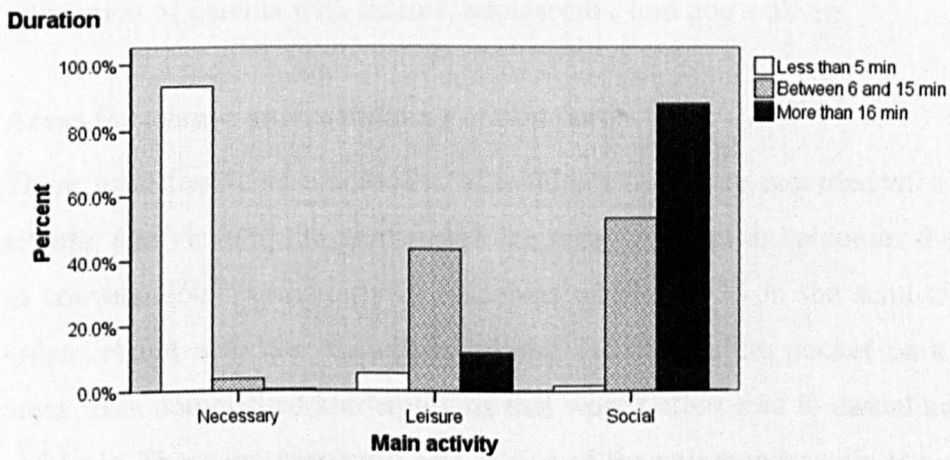

Figure 8.29 **Distribution of users by main activities and duration according to observations in Rotes Viertel**

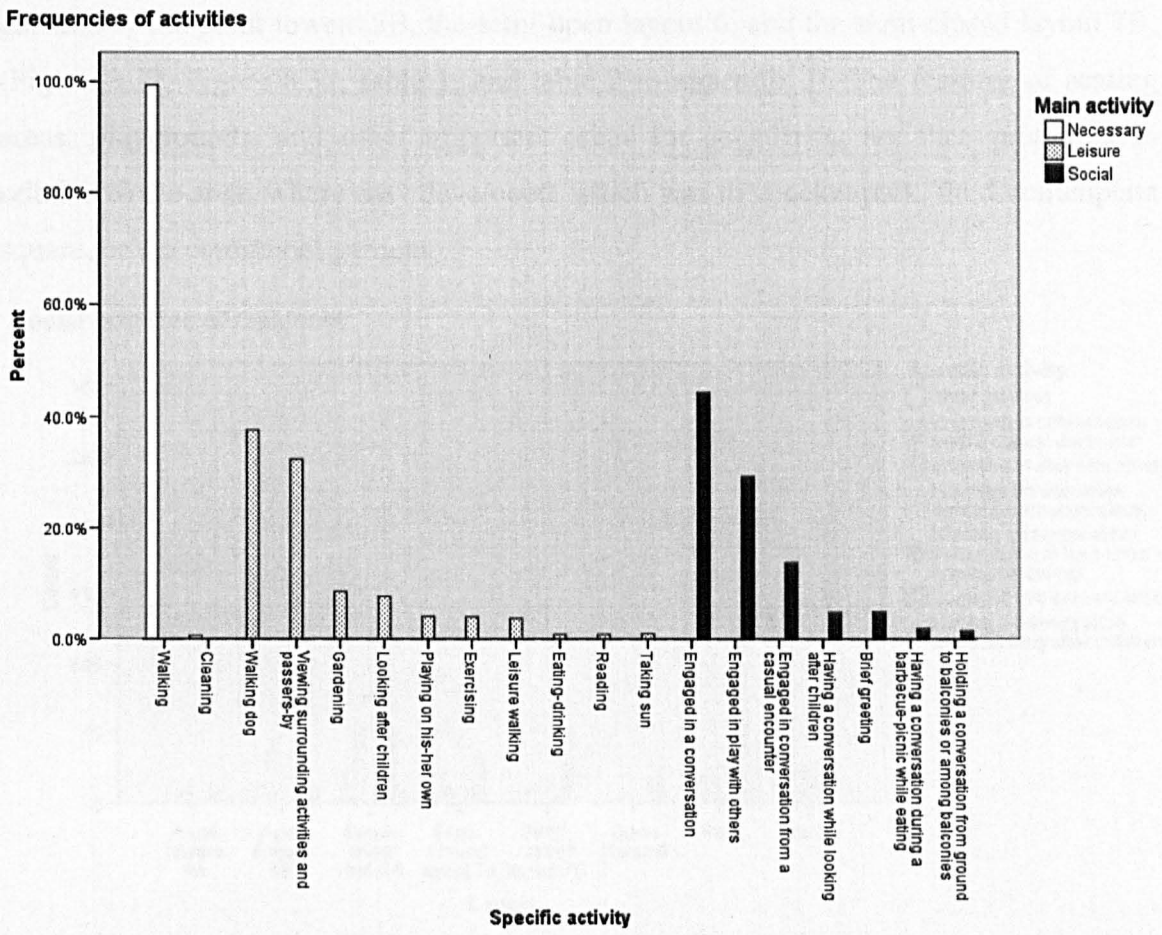

Figure 8.30 Distribution of users by specific activities according to observations in Rotes Viertel

Main areas for community life in the housing area

Communal gardens were little used for leisure or socializing as they hardly had any furniture and playground areas, which made the Cecilienplatz square and the park the common ground for residents to meet. In particular, the park was important for social interaction of parents with infants, adolescents, and dog walkers.

Areas for leisure and socializing of residents

There were few leisure activities of residents that were recorded of which taking sun, resting, and viewing the garden was the most frequent in balconies that sometimes led to conversations particularly in balconies of block 136 in the semi-closed layout 7A. Other leisure activities included walking the dog in the pocket park and brownfield areas from demolished kindergartens that would often lead to casual encounters among residents. These are presented first as part of the community activities that may support socializing of residents. For socializing, seating areas and playgrounds were found to be most important particularly in the Cecilienplatz square and the pocket park, communal

gardens of the point towers 5B, the semi-open layout 6, and the semi-closed layout 7B, (Figure 8.31, Figure 8.32, table 1, and table 2 in appendix I). The features of seating areas, playgrounds, and other important areas for socializing are then presented in relation to the areas where they developed, which was the pocket park, the Cecilienplatz square, or the communal gardens.

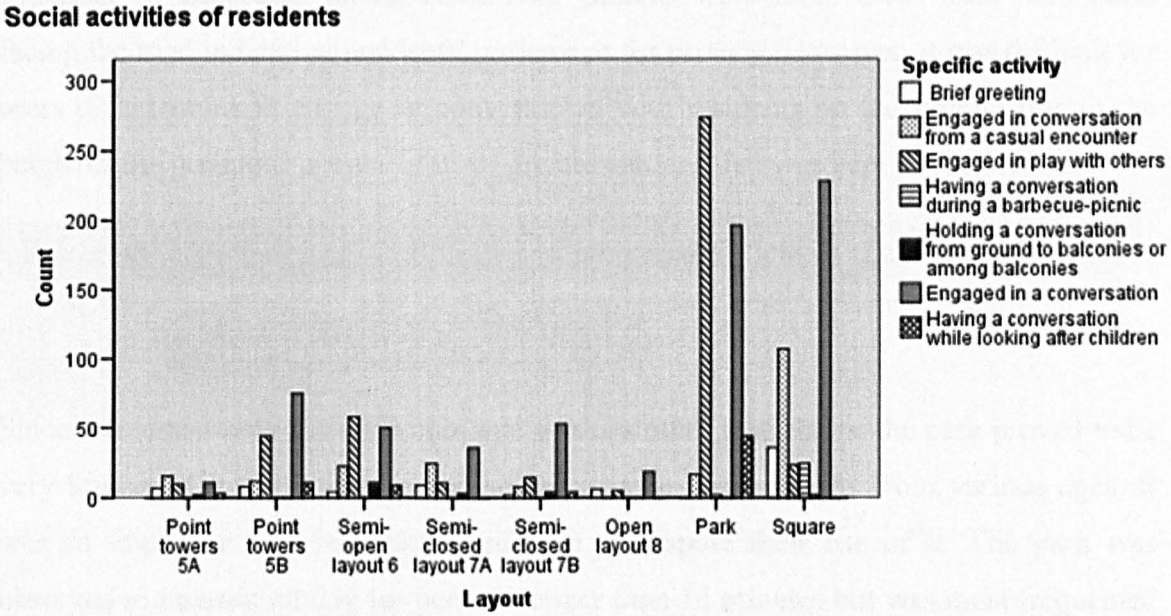

Figure 8.31 Most frequented layouts for the specific social activities of residents in Rotes Viertel

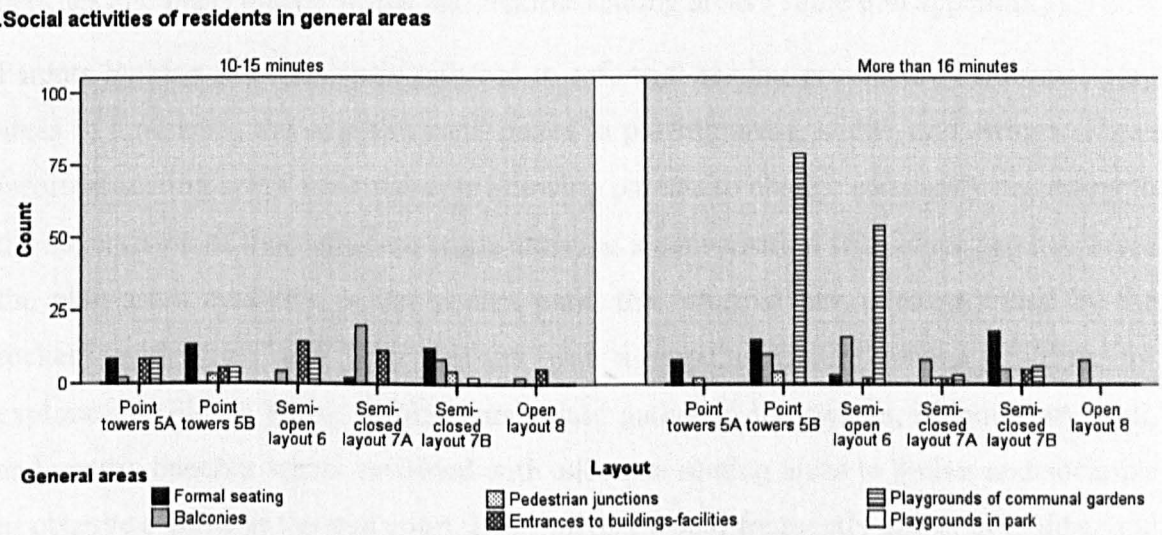

Figure 8.32 Most frequented areas in layouts for general social activities of residents in Rotes Viertel

Balconies	Pocket park	Square	Communal gardens	Less relevant areas

The balconies were important for residents to relate with their community. Balconies were used for reading, sunbathing, eating out, viewing, gardening, or having a conversation sometimes even with other users of surrounding balconies (Table 3 in appendix I). Balconies facing communal gardens were more often used than those facing the road indicating residents' preference for privacy. However, it was difficult for users of balconies to engage in conversation with residents on the ground due to the height of the perimeter shrubs of most private gardens that was kept above 1.80m.

Balconies	**Pocket park**	Square	Communal gardens	Less relevant areas

Seating areas and playgrounds

Since residents rarely visited communal gardens other than theirs, the park proved to be very important to fulfil leisure and social activities of residents from various ages. It was so important that residents were seen to dispute their use of it. The park was observed to be used all day for periods longer than 16 minutes but was most frequented in the evenings until sunset after which activities ceased primarily due to the lack of lighting (Table 4 and 5 in appendix I). The areas that were used most often were benches and playgrounds which had flexible seating areas (Table 6 in appendix I).

Parents looking after children gathered in informal seating provided by informal play areas in a rockery, the edges of sand boxes in playing areas, slides, and swings. These informal seating areas were versatile allowing parents to change constantly according to the supervision of their children while carrying a conversation with other parents. From the play areas available in the pocket park, the informal play area provided by the rockery with grass and wild flowers was a popular feature among children for exploration (Figure 8.33). Adolescents would gather in the swings, its boundary wall, and nearby benches which provided with adequate seating areas to gather and socialize or observe a game in the ball court. Dog walkers would frequently gather at midday and evenings to the south side of the park, on benches sheltered by rows of wild cherry trees. There, they held conversations with others while playing with their dogs. In general, it was observed that for all of the users of the park the benches without backrest were preferred for their versatility (Figure 8.34).

Figure 8.33 **The playground areas in the pocket park of Rotes Viertel are frequently used by parents, children, and adolescents for socializing (photographs by author)**

Figure 8.34 **Tree shelter and choice of views with backless benches was popular for socializing of residents in pocket park of Rotes Viertel (right) (photographs by author)**

Balconies	Pocket park	**Square**	Communal gardens	Less relevant areas

Seating areas

There were two issues in the Cecilienplatz square that affected community life, which included the facilities available and the type of benches used for seating areas. Having a variety of facilities available which closed until late night was vital in providing a rich outdoor life for residents. With the purpose of improving community life in the Cecilienplatz square, the housing company permitted some restaurants to put outdoor chairs and tables. Residents were seen to enjoy these seating areas, in particular those of fast food restaurants which were used daily by regular residents to meet and socialize with friends. For seating areas, the features that characterised those that were used for socializing included sight of edge activities and shelter. However, the type of benches

provided for most areas in the Cecilienplatz square were found to discourage residents from using them.

The most popular seating area was located to the west part of an area sheltered by small-leaved limes (Table 7 and 8 in appendix I). It included a sightline of activities all around the Cecilienplatz square and east-west sunshine which was partially screened by the small-leaved limes. Here, residents would sit to have a conversation or engaged in conversations with passers-by who were already known to the person. Other benches facing the pedestrian walk to the north and south were less used to engage in a conversation with passers-by. Their proximity to the pedestrian walk did not allow having an interpersonal distance which quickly discouraged residents from socializing who left within a short period of time. Overall, the regular users during daytime were elderly, adults on their own, and parents with infants (Table 9 in appendix I).

However, the two-sided-benches that characterised this area discouraged female residents from socializing (Figure 8.35). It was observed that female residents did not like to share the back of the two-sided-benches with male users, departing quickly when a male arrived, even if accompanied by other females. Females would share two-sided benches with other females although they always avoided physical contact with other users on the rear, having the same reaction from males sharing with other males. This would usually lead to having two-sided benches being used on one side only. Since it was females who were most uncomfortable, the Cecilienplatz square would often show a slightly higher presence of males accentuated at evenings (Table 10 in appendix I).

Figure 8.35 **Benches that discouraged conversations for the lack of interpersonal distance from the pedestrian walk and (left) two-sided seating bench disliked by women in the Cecilienplatz square of Rotes Viertel (right) (photographs by author)**

The key issues that encouraged social interaction in communal gardens were having a diversity of areas, traffic calming devices, and a flexible arrangement of seating and playground areas. The communal gardens which were most used had an array of versatile areas for various activities in which residents could engage and providing them with opportunities to know others neighbours. These features were found in communal gardens of the point towers 5B and the semi-closed layout 7B (Figure 8.36).

One of the most versatile playgrounds was found in point towers 5B which facilitated the play of children and the gathering of parents and adolescents for conversations for periods longer than 15 minutes. It enabled formal and informal play through diverse materials and activities in a concave sheltered area that was used as informal seating. An intimate character was also created through the diversity of materials and heights of plants. For instance, sand, shells, and rock slabs integrated the playground, while *Ribes sanguineum*, *Ligustrum vulgare*, and *Rosa multiflora* surrounded it and *Quercus robur* and *Crataegus x lavallei* 'Carrierei' sheltered it (Figure 8.37 and table 11 in appendix I). However, visitors were not necessarily living in the point towers, which is due to the public feeling of the communal gardens for the lack of well-defined realms.

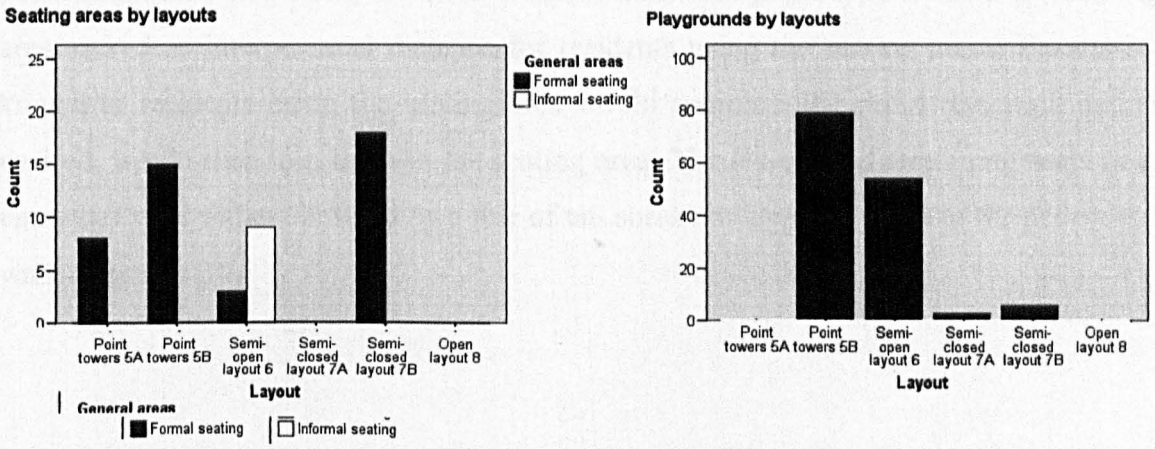

Figure 8.36 Most frequented seating areas and playgrounds for social interaction of residents in Rotes Viertel for periods longer than 16 minutes

Figure 8.37 A popular playground in the communal gardens of point towers 5B (area v) of Rotes Viertel for children as well as hanging out of adolescents (photograph by author)

The seating areas that were found to contribute most to socializing of residents were found near roads with traffic calming devices, had an interpersonal distance, sight of edge activities, a variety of seating areas, and shelter. These seating areas were located adjacent to an entrance of a point tower 5B, which was often used for short and long conversations or viewing passers-by, and in the communal garden of the semi-closed layout 7B that was used by residents living in the surrounding dwellings (Table 12 and 13 in appendix I).

The most popular seating area adjacent to the entrance of the point tower differed from the rest by being pleasantly sheltered by a *Polygonum aubertii* on top and was located in front of one of the few roads with traffic calming devices. It was observed that since pedestrians used this road, the 1.9m width of the front pedestrian walk to the seating area served as interpersonal distance for residents using the seating areas. Passers-by known to residents using the seating area would approach the pedestrian walk and if desired, would then join them in the seating area. The lesser used remaining seats near entrances were either confined by a line of tall shrubs or were too close to the pedestrian walk (Figure 8.38).

Figure 8.38 Arrangement of seating areas near entrances which were often used for viewing passersby or engaging in conversation (left) and those less used (right) in the communal gardens of point towers 5A and 5B of Rotes Viertel (photographs by author)

The seating areas that were most popular in the communal garden of the semi-closed layout 7B had an interpersonal distance to pedestrian walks that allowed sight of others who would sometimes join for conversation. A minimum interpersonal distance of 0.70m was observed to produce discomfort to users in some occasions as it was too close to the pedestrian walk whilst a maximum of 3.5m was found to be comfortable (Figure 8.39). The benches had a side-to-side arrangement, with back or side and back shelter as well as visual and olfactory richness of plants that provided users with a comfortable stay. For instance, a seating area was arranged with varying planting heights from 0.60m to 1.60m through *Cotinus coggygria*, *Potentilla fruticosa*, *Spiraea* 'Bumalda', *Weigela*, and *Amelanchier lamarckii*. Although these seating areas were positioned in a sunny location, residents were also found to enjoy shade provided by the blocks in the summer evenings. Lastly, it was also found that movable furniture was desirable after observing a bench was torn from its original place and re-located in another area.

The communal gardens in the semi-closed layout 7A and the open layout 8 were significantly less used by residents for conversations due to the few furniture available, lack of shelter of seating areas, and their isolation from the pedestrian walk. For instance, the location of seating areas or having a full enclosure blocked visual contact with pedestrians which discouraged their use (Figure 8.40).

Figure 8.39 **Sheltered seating areas, close to pedestrian walks, and with planting richness were commonly used for conversations in the communal garden of the semi-closed layout 7B in Rotes Viertel (photographs by author)**

Figure 8.40 **Seating areas isolated from the pedestrian walk as in the communal garden of the semi-closed layout 7A (area x) (left) and open layout 8 (area z) (right) discouraged conversations in Rotes Viertel (photographs by author)**

Balconies	Pocket park	Square	Communal gardens	**Less relevant areas**

Brownfield areas, fountains, rockeries, and private gardens

The demolition of kindergartens as part of the regeneration process of Rotes Viertel left various brownfield areas. These sites were left undisturbed for years after which spontaneous vegetation developed that was found to be attractive by many dog walkers. Brownfield areas were seen to be important gathering points for leisure and socializing despite the fact that they provided only uncomfortable seating areas, such as demolition materials and fallen tree branches. They also offered an alternative to the tidiness and quietness of the existing communal gardens which some residents enjoyed.

The fountain and the rockery of the Cecilienplatz square provided a unique feature to the housing area that was found to be quite a popular leisure facility for children and parents with infants. Despite the fountains' success in the Cecilienplatz square, the housing company has preferred to limit their use in the communal gardens due to safety concerns for infants. It was only possible to find sand boxes with manual water pumps in communal gardens such as that found in the communal garden of the semi-closed layout 7B which was an important alternative used by children (Figure 8.41).

Figure 8.41 The water pump in a sand box such as this one found in the communal garden of the semi-closed layout 7B in Rotes Viertel was used as an alternative to fountains or ponds for children to play with water (photograph by author)

Lastly, private gardens with perimeter shrubs to a low height of no more than 1.15m were found to facilitate conversations among residents in the communal garden of the semi-closed layout 7B. Residents appreciated having the opportunity for casual encounters with other residents from their private gardens. Unfortunately low perimeter shrubs were not present throughout the housing area for the concern of having untidy private gardens that would damage the image of the rest of the communal garden (Figure 8.42).

Figure 8.42 Low shrubs around the perimeter of private gardens in the semi-closed layout 7B of Rotes Viertel allowed residents to socialize with users of communal gardens (photograph by author)

Areas for casual encounters of residents

Most of the casual encounters of residents were made in the Cecilienplatz square and park. These were conducted mostly in pedestrian junctions of the Cecilienplatz square but also in pedestrian walks and entrances to buildings.

Pedestrian junctions	Other areas

The most important areas for casual encounters of residents were pedestrian junctions located in the northeast and northwest entrance to the Cecilienplatz square (Table 14 in appendix I). The pedestrian junctions were characterised by having nearby traffic calming devices, being flexible, and having visual richness. The pedestrian junction had textured pavement extended onto the road as part of a traffic calming measure which provided safety to pedestrians that was found to encourage casual encounters. Also, an ample circulation of 6m wide provided sufficient room for residents to hold conversations and for circulation of other users. Sight of others was facilitated by having a 1.1m high shrub belt on one of its sides allowing users to greet others and sometimes join in conversation. Lastly, a pleasant view was also provided for users of the pedestrian junction with various wild cherry trees (Figure 8.45).

As well, some opportunities for meeting new residents were found to be provided by the periodical market stands located at the entrance of the Cecilienplatz square. The inconvenience was that they were located where there was the greatest pedestrian flow from the train station reducing significantly the circulation width to 3.5m. This was observed to be uncomfortable for residents to hold lengthy conversations without

interfering pedestrian circulation. The original positioning of markets in the south part of the small-leaved limes' area, as they were planned in the Cecilienplatz square design, would have provided to be more adequate. That way, they would be close to the majority of the formal seating areas, the fountain and the rockery, which were planned to be for children's play while parents did their shopping.[507]

Pedestrian junctions **Other areas**

The formal or informal seating areas provided after the regeneration of the entrances to the blocks were found to provide opportunities for some social contacts, although these usually lasted no longer than 15 minutes. Conversely, parking areas were observed to be rarely suitable for conversations among neighbours. In part this was due to parking areas being located close to entrances reducing the distance of pedestrian trips.

Preferred social areas as stated by residents in the survey

The responses of residents in the survey showed that 60% of respondents stated they had friends in the housing area. Yet, only 22% have met them in outside spaces and 38% indoors. The way in which respondents came to know the majority of their friends was mainly through other neighbours, casual encounters, and children (Figure 8.43). Therefore, this shows the importance of providing opportunities for casual encounters as well as socializing of residents.

The most important indoor areas for socializing were indicated by respondents to be stairs, hall areas, and elevators of the blocks (Figure 8.44). Characteristics of hall areas that encouraged conversations were seen to be its ampleness and separation of door entrances. The former allowed stationary conversations without interfering the circulation of other residents and the latter reduced the intrusion to dwellings by keeping a distance from doors. For outdoor areas, pedestrian walks and balconies were rated as most important by respondents for conversations. From what was observed, pedestrian junctions in the Cecilienplatz square and entrances to buildings in pedestrian walks were observed to be most effective for casual encounters and sometimes there were conversations held between users of different balconies.

[507] Barbara Hanke, (Square regeneration designer, Hanke + Partner) Interview by C. Martínez, September 2007, transcript 2G, city of Berlin, Germany.

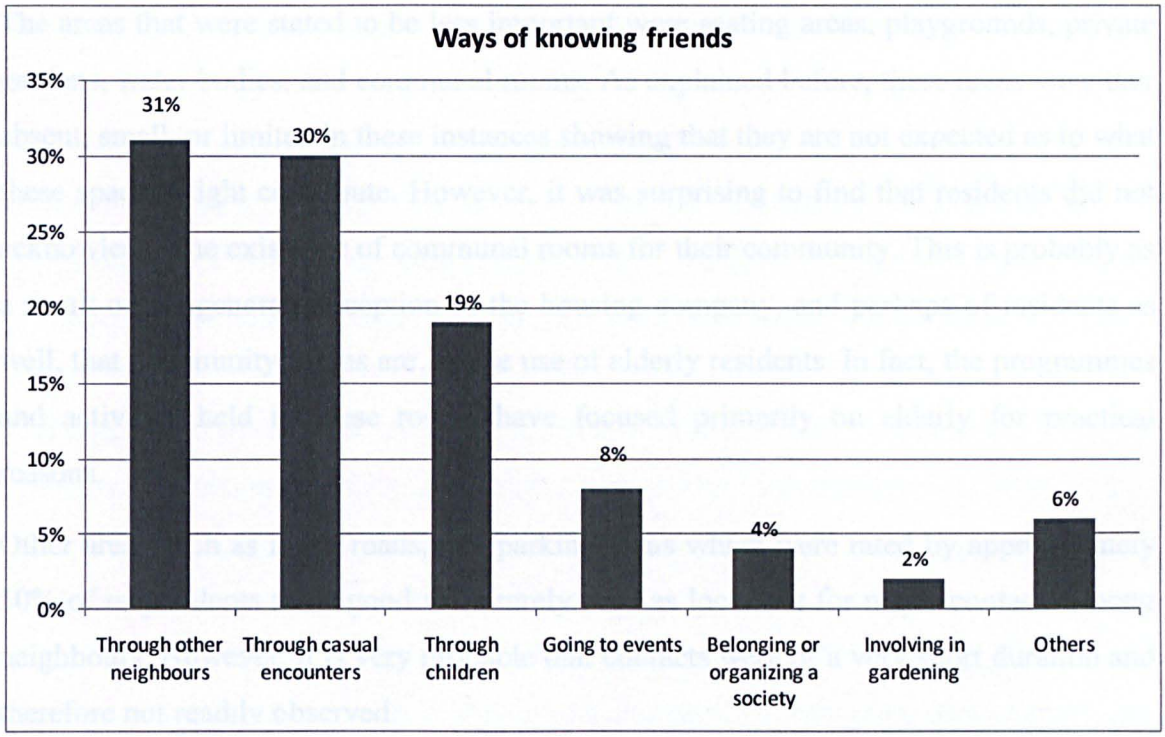

Figure 8.43 The ways that respondents to the survey have known the majority of their friends in Rotes Viertel

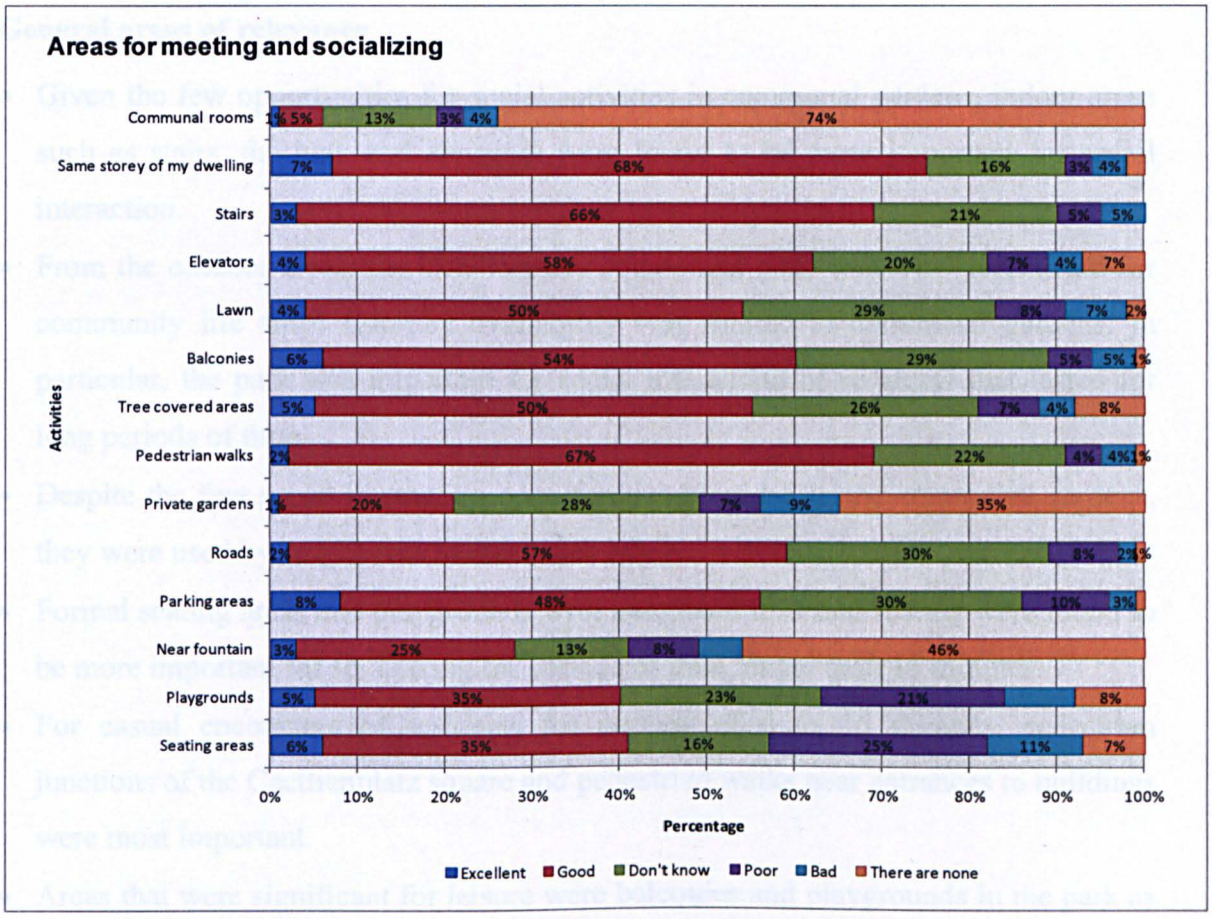

Figure 8.44 Rating of various areas by respondents to the survey for significant opportunities to meet and socialize in Rotes Viertel

The areas that were stated to be less important were seating areas, playgrounds, private gardens, water bodies, and communal rooms. As explained before, these areas are either absent, small, or limited in these instances showing that they are not expected as to what these spaces might contribute. However, it was surprising to find that residents did not acknowledge the existence of communal rooms for their community. This is probably as a result of the general perception of the housing company, and perhaps of residents as well, that community rooms are for the use of elderly residents. In fact, the programmes and activities held in these rooms have focused primarily on elderly for practical reasons.

Other areas such as lawn, roads, and parking areas which were rated by approximately 50% of respondents to be good were rarely seen as locations for major contacts among neighbours. However, it is very probable that contacts were of a very short duration and therefore not readily observed.

Findings and discussion from the observation analysis for Rotes Viertel

General areas of relevance

- Given the few opportunities for social activities in communal gardens, indoor areas such as stairs, the hall, and elevators were found to be more important for social interaction.
- From the outdoor areas, the Cecilienplatz square and park were very significant for community life since furniture availability was limited in communal gardens. In particular, the park was important for social interaction of residents that lasted for long periods of time.
- Despite the few social interaction opportunities provided in the communal gardens, they were used by neighbours to meet each other.
- Formal seating areas and playgrounds with integrated informal seating were found to be more important for socializing for periods of time longer than 16 minutes.
- For casual encounters of residents for periods of 6 to 15 minutes, pedestrian junctions of the Cecilienplatz square and pedestrian walks near entrances to buildings were most important.
- Areas that were significant for leisure were balconies and playgrounds in the park as well as brownfield areas as alternate choices.

Relevant design characteristics for leisure and social interaction of residents

- The arrangement of the outdoor areas was more significant in facilitating residents' socializing than the shape of the layout of blocks.
- Most important general features were realm definitions, connectedness for pedestrians of outdoor areas and permeability, though the latter two were limited. Block layouts which were more difficult in enabling a semi-public feeling were point towers. Secondly, legibility and an orderly setting enabled by the maintenance and management of outdoor areas provided for safety. Thirdly, having a variety of facilities with opening times at night as a way of providing choices.
- Most important specific features of outdoor areas were robustness and interpersonal distancing from pedestrian walks to allow visual contact between users but with sufficient distance for privacy of conversations. Certain seating design and arrangements were preferred. These were followed by enclosure and mystery, the former with certain preferences for shelter constitution and arrangement. The least important features were complexity and coherence.
- The arrangements that were observed to be more successful in facilitating leisure and social interaction of residents were in communal garden y in semi-closed layout 7B and area v in point towers 5B.

The arrangement of the outdoor areas was vital in facilitating residents' leisure and socializing even if opportunities were lessened by the shift of the regeneration towards a sense of privacy and quietness; it has reduced vandalism but has also diminished social opportunities of residents which were seen to be missed by residents (Figure 8.45). This is important as the municipality considered the communal gardens to be the main sources of social interaction for residents which justified the design of the small pocket park shared with the nearby housing area. Therefore, the design of communal gardens should allow residents to conduct leisure and social activities to develop social networks.

The general key issues for the housing area that facilitated it were the definition of realms, and wherever present, permeability and traffic calming devices for pedestrian safety. The former provided a semi-public feeling and created small comfortable areas in communal gardens. Where realms distinctions were not sufficiently defined, such as in point towers, the public feeling of the communal gardens attracted numerous visits of residents from around the housing area, sometimes undesirable ones. In a way these

visits certainly showed the need of users for social areas in their own communal gardens. Although the Cecilienplatz square and the park were to fulfil social activities of residents, few roads had traffic calming devices to facilitate safe access of pedestrians to these areas. The few roads that had them, such as in point towers 5B, were found to encourage significantly the social contacts of residents compared to other communal gardens.

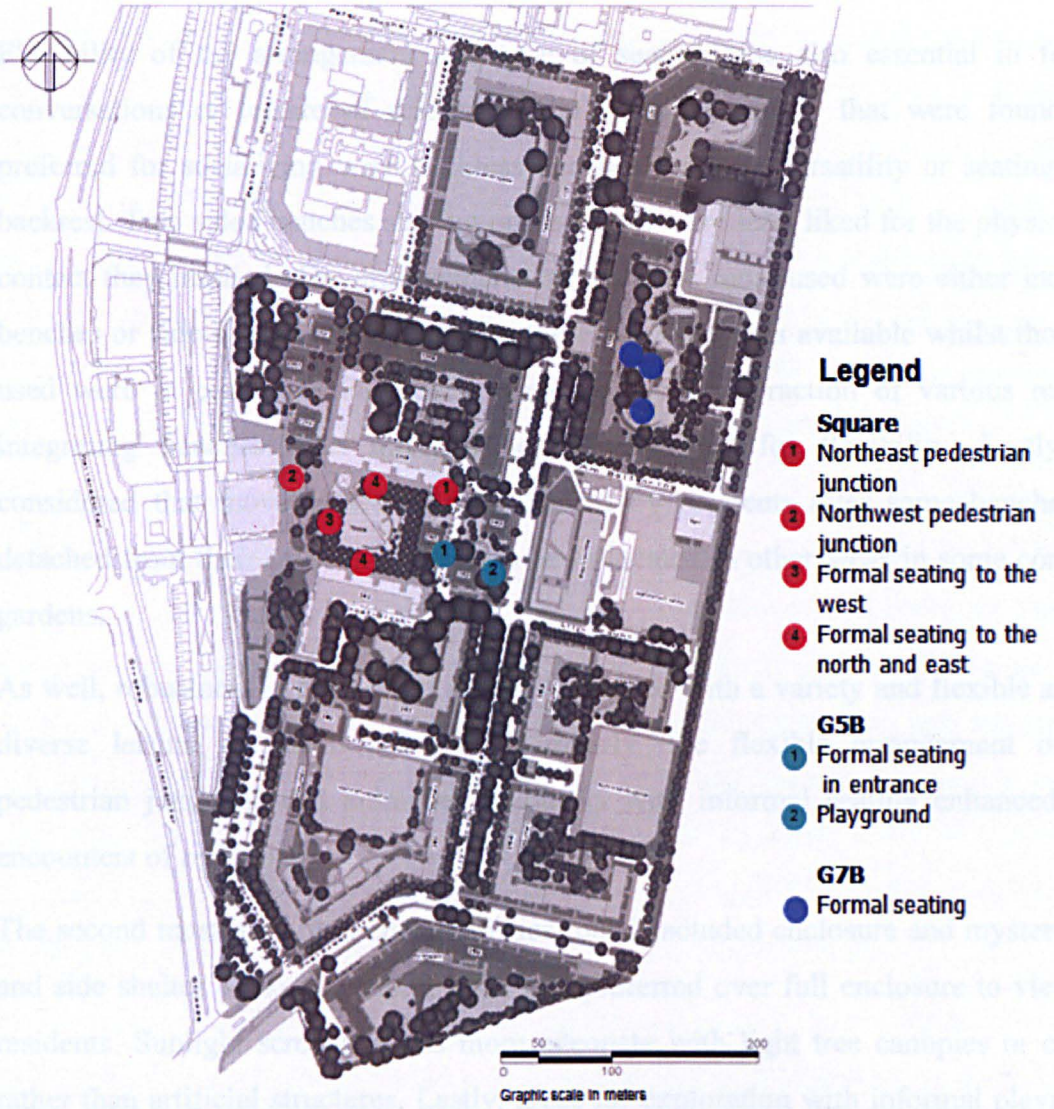

Figure 8.45 Location of most frequently used areas for social interaction of residents in Rotes Viertel according to observation studies

Other general issues of relevance for the housing area were the improvement of its legibility providing residents with orientation as well as maintenance and management that created an orderly environment. Lastly, the diverse array of facilities, markets, events, and others offered throughout the day in the Cecilienplatz square enhanced the community life of residents.

Similar to results in the previous case study, the most important characteristic for encouraging leisure or socializing in outdoor areas was found to be robustness. In seating areas, having an interpersonal distance and sight of activities of others in pedestrian walks or roads was crucial to give residents the opportunity to engage or withdraw from social contact if desired. Otherwise, residents would turn away from the pedestrian activities or leave soon after. An interpersonal distance of 1.9m to 3.5m from seating areas to pedestrian walks was found to be adequate for two-way conversations.

Flexibility of the arrangement and type of seating was also essential in fostering conversations or leisure of residents. The types of seating that were found to be preferred for socializing were backless benches for their versatility or seating with a backrest. Two sided benches sharing one backrest were least liked for the physical back contact they implied. The arrangements which were most used were either individual benches or side-to-side mainly because these were the ones available whilst those least used were in convex arrangement. Also for social interaction of various residents, integrating benches with informal seating provided for flexibility. Lastly, it is considered that movable seating was desired by residents after some benches were detached from their original location to be re-located in other areas in some communal gardens.

As well, robustness in communal gardens provided with a variety and flexible areas for diverse leisure or social activities. Similarly, the flexible arrangement of some pedestrian junctions and entrances to blocks with informal seating enhanced casual encounters of residents.

The second most important characteristics found included enclosure and mystery. Back and side shelter of no more than 1.5m was preferred over full enclosure to view other residents. Sunlight screening was more adequate with light tree canopies or climbers rather than artificial structures. Lastly, areas for exploration with informal playgrounds and surfaces with water were found to be particularly liked by infants and children; whilst pedestrian walks with partially secluded views were enjoyed by residents. The least important characteristics found for encouraging socializing were complexity and coherence. Seating areas which were arranged with planting for richness were not necessarily the most visited, confirming as in the previous case study, that these are an added amenity rather than a condition for socializing.

The following section explores the similarities and differences among case studies and those that can be inferred from cultural influences.

Comparison of observation findings in Augustenborg and Rotes Viertel and cultural differences

Comparison of design characteristics

For the properties that characterised leisure and social areas, it was satisfying to find that they were similar in both case studies. The regeneration of the outdoor areas for the housing areas has proved to be important in the amount of social opportunities available for residents. Despite the fact that Rotes Viertel has around 85% more population, there was a similar amount of persons recorded in both case studies and there were twice more social activities in Augustenborg. This was found to be due to the design arrangement of each communal garden in Augustenborg, the furniture that was made available, and the way in which outdoor areas facilitate pedestrian movement.

For both case studies, the square and the park were critical for meeting residents different from those living in the surroundings of their communal garden. Also, the most important areas for leisure or socializing were found to be similar. Pedestrian walks and pedestrian junctions were important for casual encounters; formal seating areas and playgrounds with informal seating for social interaction; and balconies and playgrounds for leisure. Yet, for both case studies it was relevant to have alternate sites such as brownfield areas, exercising areas for dogs, and garages which was seen to lead to lengthy conversations among residents. Lastly, it was found that local roads and parking areas were not sources for socializing in both housing areas.

The design characteristics were also similar. Provided that outdoor areas were accessible, with well-defined realms, and legible, the most important characteristic was robustness; in particular having an interpersonal distance, an availability of choices for areas where to socialize, and proximity to an activity edge that provided a variety of activities to view or engage with. The second most important characteristics for encouraging leisure or social interaction of residents were enclosure and mystery. For shelter, back and side shelter were preferable which allowed sight of surrounding activities of pedestrian walks. Therefore, areas with full enclosure or that were distant from pedestrian activity were the least used. Also, screening from sunlight was desirable either through light tree cover or parasol structures that could be fitted in the

existing tables. Lastly, having complexity and coherence were least significant. Areas of foci or complexity in planting were not a priority in choosing areas for conversations but rather an amenity that residents appreciated as a complement to their choice of types of areas.

From the types of furniture, in Rotes Viertel two-sided benches sharing one backrest were less convenient for social interaction due to the physical proximity of backs of users which was particularly disliked by females. This discomfort was also seen to be evident in similar benches that were found in a public park in Stockholm, showing the discomfort is not particular to residents in Rotes Viertel. For both case studies, the benches that were most used had either individual backrests or no backrest at all, but also were movable, and provided with tables. Most used arrangements were in corner, side-to-side, and in combination with informal type of seating whilst least used were convex arrangements. Capacity of seating areas was most used for four to eight persons.

In regard to differences among layouts, communal gardens of point towers and open layouts were least adequate in their design to facilitate leisure and social opportunities. This was in regard to poor realms' definition, excessive use of space for pedestrian circulation, and lacking furniture that facilitated conversations among residents.

A final comparison was made of the plants that integrated the most frequented areas for social interaction to explore if there were certain species which characterised these areas (Table 8.1). However, a relation was not found for specific plants either among layouts of each case study or of both case studies. Therefore, the arrangement of the communal gardens is more important in facilitating leisure and socializing among residents.

Table 8.1 Comparison of plants found in most used areas for social interaction of residents showing no relation amongst species and increased socializing

Augustenborg									Rotes Viertel									
Semi-open layouts 4 area j	Semi-open layouts 3C area r	Semi-open layouts 3B area g	Semi-open layout 2A area o	Open layouts 1 area d		Park		Closed layout 138	Point towers 140			Square	Park		
Formal seating	Pedestrian junction and pedestrian walk	Formal seating facing square	Formal seating	Playground and pedestrian walk	Formal seating	Playground	Formal seating	Formal seating	Playground & inform seating	Formal seating by entrance		Formal seating areas under small-leaved limes	Formal seating		
														Trees	*Alnus cordata*
															Amelanchier lamarckii
															Castanea
															Crataegus x lavalleei
															Fraxinus excelsior
															Juglans nigra
															Malus baccata
															Malus tschonoskii
															Populus tremula
															Prunus avium
															Quercus robur
															Sorbus aria 'Lutescens'
															Tilia cordata 'Rancho'
														Shrubs	*Buddleja davidii* 'Nanho Purple'
															Carpinus betulus
															Corylus avellana
															Cotinus coggygria 'Royal Purple'
															Fagus sylvatica
															Forsythia x intermedia 'Minigold'
															Potentilla fruticosa
															Potentilla fruticosa 'Kobold'
															Ribes sanguineum
															Salix lanata
															Salix purpurea 'Nana'
															Salix viminalis
															Spiraea 'Bumalda'
															Spiraea bumalda 'Sapho'
															Spiraea x cinerea 'Grefsheim'
															Spiraea japonica 'Little Princess'
															Symphoricarpos x chenaultii 'Hancock'
															Weigela
														Roses	*Rosa multiflora*
														Climbers	*Clematis* 'Jackmanii'
															Clematis macropetala 'Eximia'
															Jasminum nudiflorum
															Polygonum aubertii
														Perennials	*Spartina pectinata* 'Aureomarginata'
															Achillea filipendulina
															Achillea 'Parker's Variety'
															Alchemilla erythropoda
															Alchemilla mollis
															Anemone tomentosa 'Robustissima'
															Aruncus dioicus
															Astilbe x arendsii 'Fanal'
															Cotoneaster salicifolius
															Delphinium 'Galahad'
															Euphorbia polychroma
															Geranium endressii
															Geranium macrorrhizum 'Album'
															Hemerocallis 'Corky'
															Hosta lancifolia
															Hosta tardiana 'June'
															Hypericum calycinum
															Iris sibirica 'Blue Moon'
															Lamium maculatum 'Beacon Silver'
															Ligustrum ibota
															Ligustrum vulgare
															Matteuccia struthiopteris
															Miscanthus sinensis 'Malepartus'
															Ranunculus flammula
															Rudbeckia 'Juligold'
															Solidago aspera
														Bulbs	*Allium aflatunense*
															Leucojum vernum
															Tulipa 'Diana'

Differences attributable to culture

The design characteristics encouraging socializing were found to be similar for both housing areas. The differences were in regard to the availability of areas that facilitated socializing in communal gardens which was very limited in Rotes Viertel. Therefore, it may be said that there were no differences in the characteristics of design that were due to culture.

Summary lessons from the observation analysis of outdoor areas to facilitate socializing

A series of guidelines have been proposed from the observation findings which may be applied in the regeneration of outdoor areas of medium-rise housing to facilitate leisure and socializing that may contribute to the development of social networks. The guidelines complement those suggested in the previous chapter from residents' perception preferences. They have been arranged in the order that they were found to be important according to the observation analysis of the outdoor areas from the case studies Augustenborg and Rotes Viertel (Table 8.2).

Table 8.2 Proposed guidelines to provide outdoor areas that facilitate leisure and socializing of residents

Areas for casual encounters, leisure, and socializing	• A square and park should be made available and improved as the main sources of community life for residents[†] - Providing a variety of facilities in the square that give service for different age groups and gender users throughout the day and until late night - Providing sufficient lighting at night for safety of pedestrians - Facilitating opportunities to engage passive or actively with outdoor areas • Pedestrian walks and junctions should be robust and provided with partial shelter, and sensorial richness to facilitate casual encounters of residents • Communal entrances to blocks may be provided with some areas of informal seating for casual encounters of residents • Parking areas may be made available near the square to encourage casual encounters • Formal and informal seating areas should be made available to encourage socializing of residents, preferably integrated together • Playgrounds should integrate informal seating for socializing of parents • Interior communal areas should be improved to encourage conversations by minizing echoing • Balconies should be improved for leisure and possible socializing of residents • Lawn areas and combined informal-formal playgrounds should be provided and enhanced for leisure opportunities • Unregulated and alternate areas for leisure and socializing should be made available - Providing unmanaged areas with sponteanous planting, exercising for dogs, areas for messy work such as repairing of vehicles, and others

Table 8.2 continued

Permeability, spatial definition, and human scale	• Connectivity between communal gardens and local facilities should be facilitated - Providing traffic calming devices - Enhancing pedestrian and cycle routes - **Having accessible and interconnected communal gardens** • A semi-public environment should be created in each communal garden to encourage socializing of residents - Defining realms and boundaries through planting - Providing particular attention to communal gardens of point towers, open layouts, and communal gardens located on the perimeter of the housing area • Communal gardens should be defined with small areas that are easy to grasp visually and physically
Legibility	• The square should be enhanced as one of the most important places for the community life of residents • Improvement of legibility should include an array of small and large scale elements - Using large-scale elements for referencing the location of the square such as tall structures or art on facades - Using small-scale elements referencing building entrances or communal gardens such as art or design themes
Order	• The design should incorporate measures ensuring that residents feel safe - Integrating maintenance and management of planting that provides orderliness • The landscape should foster attachment of residents by promoting communal gardens as the physical centre of their housing area - Ensuring opportunities for community development in communal gardens for residents to consider them as part of their personal realm
Robustness	• A diverse range of areas for leisure and socializing should be integrated in communal gardens - Having furniture adequately related to the outdoor areas to which they provide a service to - Supplying diverse areas for the different needs of residents - Integrating a playground in each communal garden even if small - **Integrating flexible lawn areas in size and shape that may be used for diverse activities** - **Allowing partial view of users in the different areas of the communal garden without interfering each others' activities** • The design of communal gardens should facilitate the development of events in case they are desired - Keeping some flexible areas in communal gardens that may adapt if required such as lawn areas with and without tree shelter, close to pedestrian walks, and introducing movable furniture • **Pedestrian walks and pedestrian junctions should facilitate circulation of passers-by as well as the development of casual conversations** - **Having a width of 4m to 6m was adequate** - **Arranging areas for stopping by such as a wide bays, surfaces with different materials, or a cover by canopies of trees integrated with informal seating** - **Providing informal seating near entrances to blocks** • **Seating areas should be placed close to edges of activities but integrated with interpersonal distancing and sufficient capacity** - **Allowing a distance of 2.5m to 10m from benches to pedestrian walks for two-way conversations and 10m to 22m for greetings that may lead to conversations** - **Preferably using benches with individual backrests or without backrests** - **Avoiding the use of two-sided benches with one back rest in public areas**[††] - **Integrating informal seating, such as low walls, rocks, tree trunks, or others, with formal seating for four up to eight users** - **Integrating movable heavy benches, tables, and grills that may be arranged by users where needed** - **Having corner arrangements of benches preferably, otherwise side-to-side benches** • **Playgrounds should be integrated with informal seating** - **Facilitating gathering of parents near infants** • **Balconies should be flexible for leisure and social activities** - **Allowing a sufficient average size of $4m^2$ to place furniture and other artefacts for personalization** • **Private gardens should facilitate interaction with users of communal gardens** - **Keeping perimeter fencing of private gardens low**

Table 8.2 continued

Enclosure	• Areas with shelter and screening should be provided - **Allowing viewing others and surrounding activities from seating areas through back or back and side shelter with an average height of 1.50m** - Providing transparent or light screening for seating areas, balconies, and playgrounds with mounds, transparent shrubs, and side wooden structures - Providing partial shelter from sunlight with climbers, overhanging shrubs, and tables which may be fitted with parasols - For screening and sheltering from sunlight, small trees with a light canopy were adequate where incoming sunlight was required in communal gardens, otherwise trees with a light, upright, or columnar canopy were adequate • **Plant shelter should be preferred over artificial structures or a combination of both should be integrated** • **Opportunities for screening should be make available in balconies** - **Providing the possibility of placing fixtures such as curtains, tinted glass, or others**
Mystery	• A variety of partially secluded views should be arranged in communal gardens and pedestrian walks - Arranging distinctive blocks of planting that have varying colours, heights, and textures **Arranging planting in communal gardens to have partially secluded views and areas through shrubbery, trees, and moulds to create an array of different heights ranging from 1.30m to 2.50m** **Arranging partially secluded views for pedestrian walks with openings for viewing out placed at a distance of no more than 18m†††** • Opportunities for informal exploration should be enabled - Providing informal play areas preferably with opportunities to play with water - Integrating areas with spontaneous planting which may be provided by brownfield areas
Complexity	• The variety and richness of outdoor areas should be enhanced by integrating new planting with existent - Providing an array of colours, textures, and scents that residents may enjoy from their dwellings or on ground - Including medium-height planting or a combination of small- and medium-height planting that increases the number of colours perceived - Arranging planting in blocks that may be easily appreciated from different heights of balconies • Features that allow enjoying singing of birds and water movement should be introduced wherever possible - Including plants and features that attract birds as well as fountains • **If sustainable urban drainage systems are introduced, their design should provide for richness** - **Preferably facilitating safe areas for contact and play with water as well as sitting opportunities** • Introduction of recycling rubbish sheds with composting should consider strategies to lessen stench in summer
Coherence	• Communal gardens with a large amount of hard surfaces should be regenerated to reduce this effect - Designing a diverse set of leisure and social areas through planting arrangement to achieve a variety of visual contrasts

† Text in grey indicates findings from the perception survey and text in black indicate findings from the observation analysis

†† More research is recommended to distinguish the minimum distance at which it would be perceived to be attractive to continue exploring and the maximum to feel safe in using the pedestrian walk

††† It is suggested that they may be more adequate in settings where users may somewhat know each other such as in communal gardens although this would require further research

The findings from the observation analysis showed there was more in common than differences in the design characteristics of outdoor areas which facilitated leisure and socializing of residents. Yet, these findings should also be continued to be tested in other regenerated housing areas as suggested in the previous chapter. From the experience of this study, it was found that the application of the survey in conjunction with the observation analysis was essential to understand the results. For instance, the reasons behind certain preferences or least liked features stated in the survey would have not been clear without observing the everyday use of outdoor areas by residents.

The use of both methods also made it possible to show contradictions between what residents think and what they do. In the survey respondents stated that visual richness and areas for exploration were most important to encourage them into using outdoor areas for socializing. But observations showed these were least important when it came to selecting areas in which to socialize. This comparison showed that those features considered to be qualities of the design for outdoor areas are different in respect to perception and actual usage of outdoor areas for social interaction. Some are the encouraging elements to use their outdoor areas whilst others are more adequate in facilitating their use. Although their importance shifts, this shows all qualities of design are important and the regeneration of outdoor areas should seek to fulfil both.

Once having obtained the main lessons of the regeneration experiences (Chapter 5 and 6) and preferred design qualities (Chapter 7 and 8), the next chapter tests the suggested recommendations in a non-regenerated third case study located in a contrasting setting. The case study used is Infonavit Solidaridad in Cd. Juárez, Mexico which has a different geographical, cultural, and weather setting where the feasibility and general applicability of the findings were tested.

Chapter 9

Case study 3 Infonavit Solidaridad: a way forward

Introduction

The purpose of this chapter is to test the regeneration recommendations and residents' design preferences obtained from the previous case studies in a contrasting setting by means of a survey applied in a case study in Mexico.

The chapter starts by exploring the context and reasons for which the case study Infonavit Solidaridad was developed to understand the importance of its selection, the intentions of the design of the housing area, and its potential if regenerated. The concept of design for the landscape is explained to show its strengths and weaknesses for supporting community life and possible ecological improvements as well as the reasons that led to its decay. As a possible and ideal case study to be regenerated, the chapter goes on to explain the considerations made in the design of the survey to show the cultural transferability of the design criteria and lessons in the Mexican context (Appendix J). Then the preferences of respondents from the survey are discussed, as well as their cultural implications and the way they differ from the findings in the previous case studies.

In the last part of the chapter, the way in which the design criteria and lessons may be put into practice in Mexico is explored by means of interviews with several professionals involved in regeneration; they included head personnel of the existing programmes of regeneration in the country and local planning offices as well as non-profit organizations dedicated to low-income home-improvements.

The chapter concludes by confirming that the majority of the design criteria and lessons obtained in the first two case studies coincided with preferences in the Mexican case study but suggests providing choices is essential. Also, that in order to achieve a sustainable landscape regeneration in low-income housing areas taking into account such criterion, it is necessary for planners and designers to acknowledge the significance of the landscape.

Planning of Infonavit Solidaridad

Background

Mexico was at a critical moment in the second and third decades of the 20th century, not only for building its own identity but also for supplying basic facilities, meeting the resulting housing shortage, and raising dwelling standards; all of which were aggravated after the industrial development of major cities.[508] The new Mexican government set out to supply healthy and quality affordable housing which was influenced by the introduction of foreign ideas and the search for a national identity.[509]

The available mass production building techniques and the modernist ideals of Le Corbusier, introduced by architects educated abroad, were used to integrate housing projects on a large scale as part of the capital's housing programmes. In defining a cultural identity, local materials and plants, murals, and contrasting colours were introduced in these projects and a few sought to facilitate the building of community by integrating local facilities. However, overall focus was given to the development of minimum housing standards and dimensions and not to elements for supporting the community such as the landscape. In this context, medium- and high-rise housing areas were first developed in the capital with a few examples in the early 1930s and major housing developments from the early 1950s throughout the late 1960s.

The support of housing provision to other parts of the country was later provided with the integration of the financial institutes for housing such as Fovissste and Infonavit after 1972.[510] The frontier cities to the north of the country were first targeted to benefit from their social housing programmes due to their acute housing shortage compared to other parts of the country but particular emphasis was given to Cd. Juárez. Its central geographical position on the frontier had been optimal for economic trade since the middle of the nineteenth century, bringing large numbers of workers from the south of the country, particularly from the 1920s onwards. Yet housing and basic infrastructure

[508] Valerie Fraser, *Building the New World: Studies in the Modern Architecture of Latin America 1930-1960*, (London: Verso, 2000), pp. 53-62.

[509] Mauro F. Guillén, 'Modernism Without Modernity: The Rise of the Modernist Architecture in Mexico, Brazil, and Argentina, 1890-1940', *Latin American Research Review*, 39 (2004), 6-34 (p. 8).

[510] Infonavit, 'Historia del Infonavit', *Historia*, (n.d.) <www.infonavit.gob.mx> [accessed September 2010] para. 3 of 3. See also Fovissste, 'Que es el Fovissste?', *Conoce al Fovissste*, (2010) <http://www.fovissste.gob.mx/en/ FOVISSSTE/Que_es_FOVISSSTE> [accessed September 2010] para. 3 of 18.

provision was poor making Cd. Juárez the most deprived city on the frontier.[511] Therefore, the city not only attracted larger amounts of housing provision, it was also the usual testing ground for new models of housing.

Soon in the early 1970s, Cd. Juárez had its first medium-rise housing area with three parallel layouts followed by other medium-rise schemes at the end of the 1980s as part of the housing stock produced to meet the demand for housing. From these housing areas, which had few elements to support the building of community, the medium-rise housing area of Infonavit Solidaridad was designed with the intention to do so through a series of clusters that were to resemble the community life produced in colonial courtyard houses. It was a way of adapting medium-rise housing to the cultural context of Mexico which had not been tested before in the country. At the time, it was praised as a model for a high-density housing scheme and was expected to set the path for other similar developments in the country.

The architectural Bureau Grupo Geo, founded in the same years of Infonavit and Fovissste, designed and supervised the building of Infonavit Solidaridad having Enrique Pineda as the leading architect and author of the project idea.[512] The development was one of their most important social housing schemes where new dwelling prototypes were tested following the results of a study made by Infonavit and Grupo Geo in 1987.[513] Overall the study was highly technical, defining the minimum dwelling standards for social housing and some poor urban guidelines, most of which are still evident in the current thinking of social dwelling design. Infonavit Solidaridad was designed partially according to these guidelines as well as inspiration by the research work of architects such as N. John Habraken.[514] In his study, the integration of the design is made using a set of structural parts, adequate for the context, that put together

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511 Carlos Bustamante Lemus, 'La Emigración de Trabajadores Mexicanos a los Estados Unidos', *Vivienda*, 6 (1981) <http://infonavit.janium.com/janium/Documentos/32394.pdf > [accessed September 2010] 580-587 (pp. 582-585).

512 Enrique Pineda Cruz, (Project designer, Casas Geo Laguna S.A. de C.V.), interview by C. Martínez, January 2007, transcript 1S, Cd. Juárez, Mexico. See also CasasGeo, *Información Corporativa*, (n.d.) <http://www.casasgeo.com/default.aspx?Div=2&pagina=reportaje. asp&seccion=70> [accessed September 2010] para. 5 of 5.

513 José Campillo Sainz, Jaime Gomez Créspo, Jorge Cattaneo Cramer, and others, 'Sistema Integral de Vivienda La Morada', *Documentos de Investigación Técnica Infonavit*, (1988), <http://infonavit.janium.com/janium/Documentos/17731.pdf> [accessed September 2010] 1-122 (pp. 115-116). See also CasasGeo, 'Historia Geo', *Informacion Corporativa*, (n.d.) <http://www.casasgeo.com/includes/printerVersion.asp?type=&reportaje_id=75> [accessed September 2010] para. 2 of 11.

514 N. John Habraken, 'The Control of Complexity', *Places*, 4 (1987), <http://www.designobserver.com/media/pdf/The_Control_of_1318.pdf> [accessed September 2010] 1-13 (pp. 1-13).

would enable diverse flexible areas and provide visual and kinetic richness such as that found in vernacular architecture.

With these influences, Infonavit Solidaridad was integrated with a set of highly economical and efficient modular minimum dwelling designs to provide a visual diversity of facades and the establishment of territorial controls. Since the site was distanced from the city centre and other nearby surrounding services at the time of its development, the housing area was planned as a set of interconnected small communities with local facilities to meet the basic needs of residents at pedestrian distances. Most housing layouts were north-south oriented to have sunlight during part of the day and sheltered from the predominant cold winds of winter. When the housing area was completed, it consisted of 1925 dwellings from one to four storeys, having a maximum of four bedrooms, and approximately 80 dwellings per hectare. According to 2007 statistics, the size of the population was reported to have 8807 inhabitants.[515]

Enabling a semi-public environment

Infonavit Solidaridad was finished around 1992 in the south edge of the city where planning regulations have long established the city's growth. This was done to avoid development on the mountainous west part of the city and to protect agricultural land on the east part that fed from the Rio Grande River. The housing area was built on a mostly levelled vacant field of sandy soil that had previously been part of a ranch of which nothing was kept. At the time, vacant fields surrounded the housing area to the west and north sides which were later developed for housing and a vacant field to the east was later occupied by industrial units. Also, an irregular housing settlement was found to the south side which still remains at the time of this writing.

The layout of the housing area was designed to facilitate pedestrian and vehicle linkages with these future housing areas whilst providing a semi-public feeling to outdoor communal areas through the use of cluster blocks. By connecting a series of cluster blocks that were linked longitudinally with an indented central pedestrian area, the residents were meant to have intimate places to socialize in their outdoor communal areas whilst also being integrated with the rest of the community (Plate 9.1). This was the feature that provided the greatest strength to defining realms since the landscape was poorly addressed reducing the quality of the pedestrian areas.

[515] Instituto Nacional de Estadística y Geografía, *Censo por vivienda*, (Cd. Juárez: INEGI, 2007) [on CD-ROM].

Plate 9.1. Conjectural reconstruction of 1990 landscape design of Infonavit Solidaridad

(Produced with aerial photographs of 1993 from Departamento de Catastro de Cd. Juárez and on-site survey by author, January 2009)

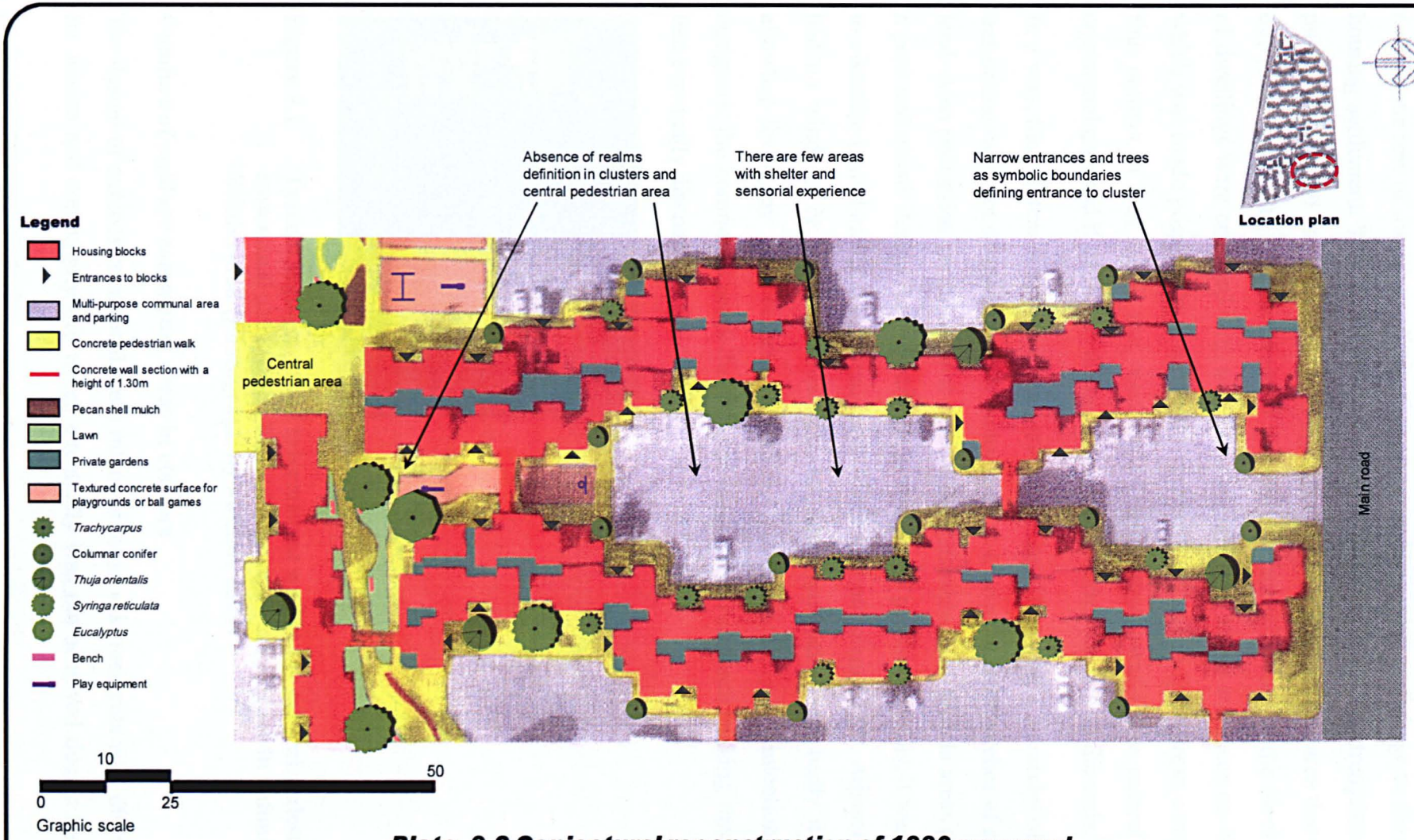


Plate 9.2 Conjectural reconstruction of 1990 proposed design of outdoor areas by GrupoGeo in Infonavit Solidaridad

(Produced with aerial photographs of 1993 from Departamento de Catástro de Cd. Juárez and on-site survey by author, January 2009)

There were two main elements that aided in defining realms. Firstly, a perimeter was built on the south side of the housing area as a barrier with the placement of a continuous row of dwellings eliminating any possible contact or linkage to the irregular housing settlement. This arrangement was made to improve safety, strengthen a semi-public feeling, and prevent damage to the future image of the housing area that may rise due to the proximity with the irregular housing settlement. Secondly, the block clusters of dwellings were arranged with a symbolical arch gate at the entrances on both ends which was made possible by locating the highest buildings in these areas consisting of four storeys. It was hoped that residents of each cluster would take control of their communal area and if there was the need, to place security barriers on the ends.[516]

In a way, the clusters did allow a semi-public feeling. However, a hierarchy of areas or transitions were not defined in the communal areas leaving useless patches of no-man's-land. Also pedestrian areas were not made distinguishable from vehicle areas providing a poor and unsafe design for pedestrians. In the central pedestrian areas, it was difficult to visualize boundaries and informal surveillance was not planned for. Adjacent houses had no windows or doors towards this area and illumination was badly distributed allowing for many dark corners (Figure 9.1). Despite the good intentions of the designers, the communal areas discouraged informal surveillance making them unsafe that eventually discouraged their use.

Figure 9.1 Typical segment of the intermittent wall in the central pedestrian communal area which limited informal surveillance in Infonavit Solidaridad (photograph by author, 2009)

Comfort of outdoor communal areas in clusters

The design of outdoor communal areas intended to provide residents with diverse areas for leisure and community life which eventually was not achieved due to the way in

[516] Enrique Pineda Cruz, transcript 1S.

which the landscape was planned. The centres of the clusters were to facilitate a rich social life similar to the eighteen century 'vecindades' with a central patio surrounded by various dwellings.[517] To do so, the communal area of the cluster was designed with average distances of 40m by 80m to enable various uses such as daily coming and going of residents as well as their leisure activities and community events but also for parking vehicles. Unfortunately, leisure and socializing areas of residents were not defined or sheltered making them uncomfortable for users.

The design of the landscape relied on the use of various hard surfacing materials of strong colours combined with a few tree species and other small plants. These were merely arranged to contrast and enhance the architectural shapes of the dwellings rather than providing sheltered areas from the hot summer sunlight and a rich sensory experience for a comfortable stay. For instance in communal areas of clusters, plants were only placed on the front door entrances of dwellings and on corners of buildings. These included small columnar conifers, *Syringa reticulata*, *Trachycarpus*, and *Thuja orientalis* species which scarcely ameliorated the scale and hardness of the buildings (Plate 9.2 and Figure 9.2). Similarly, the central pedestrian communal area was relatively bare with some *Pinus pinea*, *Populus fremontii*, *Ulmus*, *Eucalyptus*, and *Syringa reticulata* species placed selectively combined with few climbers, small patches of lawn, and pecan shell mulch.

Although the communal area of the clusters was meant to be the arena for community development of surrounding neighbours, it was not facilitated with traffic calming devices or the planting arrangement which eventually eroded any opportunities to do so. Instead, the landscape was designed with a strong emphasis on the built environment. This is regrettable, given that the configuration of the cluster layouts would have provided a magnificent ground for a more robust arrangement and intricate choice of plant species that may have contributed to the development of community life.

[517] The main concept derived from the colonial house which had several rooms facing a central patio that served as a semi-private area for the family's activities. The one-to-two-storey house created a microclimate and protected the dwelling's privacy with no openings on the core wall. Before the seventeen century, the four-side enclosure changed by opening large bay windows to the activities on roads. A later similar model denominated 'vecindades' developed in the eighteen century by the church to let rooms at low prices where the central patio was the social arena for the tenants.

Figure 9.2 Typical planting in clusters with trees in front of dwelling entrances in Infonavit Solidaridad (photograph by author, 2009)

Pedestrian networks and community life in the housing area

The design of the central pedestrian area as the backbone to link clusters and various leisure areas and facilities was intended to encourage pedestrian and cycle movement as a way of supporting social networks in the community. This arrangement would also facilitate pedestrian access to any part of the outdoor areas and to the surrounding housing areas and facilities that were built in the late 1990s to the north and west sides of Infonavit Solidaridad.

Continuous sun-lit areas were provided in the central pedestrian area by placing it with an east-west orientation whilst protection from predominant winds was planned through the use of an indented shape and sections of walls. Although these walls also provided some shelter from sun, the provision of a few *Syringa reticulata* species were most important which aided as well in softening the hardness of the buildings and providing for visual richness (Figure 9.3).

Figure 9.3 One of the few spaces in the central pedestrian area where the trees have survived providing shelter and softening the hardness of buildings in Infonavit Solidaridad (photograph by author, 2009)

Areas of interest for exploration and discovery in the central pedestrian area were achieved through the creation of secluded views by the use of an indented shape and the intermittent arrangement of the sections of walls. Yet this arrangement and that of dwellings in clusters with varied heights and projections made it difficult to create recognizable areas and created fully concealed corners that could be used as hideaway places (Figure 9.4). To facilitate legibility, each cluster junction with the central pedestrian communal area was supplied with a different coloured column though it was too small in size to be easily sighted. It was also hoped that the different schools available in the housing area would serve as references to block clusters around them.

Schools and grocery shops as well as playgrounds and small ball areas were available in various parts of the housing area. They were accessed through or located along the central pedestrian area to fulfil daily needs of residents and facilitate casual encounters. Alongside school facilities, open-air forum areas were placed for community events and meetings of the residents that could strengthen social networks (Figure 9.5). To support socializing, seating areas were supplied in the central pedestrian area or around the leisure areas. These consisted of concrete benches with back shelter placed side-to-side and long concave benches (Figure 9.6). Their arrangement was designed with the intention of enabling residents to get to know each other informally in their everyday coming and going, carrying leisure or sport activities, or while looking after their children. Regrettably, many of the seating areas were facing blank walls and therefore cut-off from the main activities in the communal areas of the clusters making them unsafe and boring.

In sum, the design concept of the central pedestrian area and integration with the rest of the housing area would have facilitated the building of community, yet their layout and planting arrangement was poor lessening social opportunities.

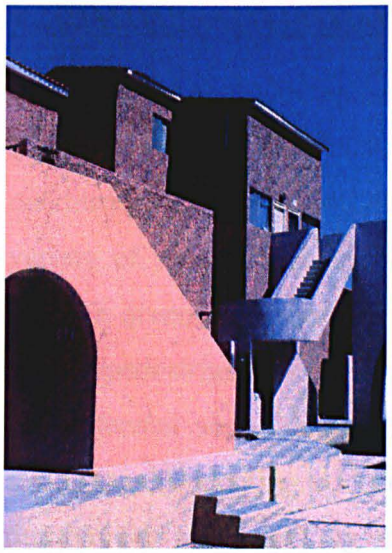


Figure 9.4 **It was difficult for residents to find their way in Infonavit Solidaridad with the indented arrangement of dwellings and varying storeys (from Mario Melgar Adalid, *6 Años de Arquitectura en Mexico 1988-1994*, p. 67)**

Figure 9.5 **One of the open-air forum areas for community events of all residents with seating and sheltering trees in Infonavit Solidaridad (photograph by author, 2009)**

Figure 9.6 **One of the leisure areas in the central communal pedestrian area having a concave seating area and small ball courts in Infonavit Solidaridad (photograph by author, 2009)**

Plant diversity and maintenance considerations

Management and maintenance plans were made in choosing a low-maintenance design. Native plants and trees were selected that could thrive in the type of soil and climatic conditions of the area. Although practical, the limited selection significantly reduced the variety of species that could provide for sensorial experience and shelter as well as wildlife diversity. At most a number of climbers were introduced in some parts of the central pedestrian area which later failed to establish due the lack of a maintenance plan and informal surveillance that made them prone to vandalism. Also, the number of surfaces with planting was kept low using instead concrete surfaces and furniture with durable but rough-looking materials. Although they effectively reduced the need for maintenance, the use of this type of materials also created a sterile and unappealing environment. As a result, furniture and other exterior fixtures were disliked, not cared for, and eventually vandalised damaging the image of the housing area.

Lastly, since it was not expected that residents would engage in caring and keeping plants or trees, no plans involving residents were introduced. Yet various visits to the area during the elaboration of the on-site survey showed that residents looked after plants or trees that were closer to their homes. The care for some of the vegetation shows their willingness and potential opportunities for residents to manage and maintain their outdoor areas.

Strengths and weaknesses of the approach to design

The arrangement of the block clusters could have been an effective feature for the building of community. They would have been successful if realms and areas for leisure and socializing had been defined in the outdoor communal areas to increase their safety and attachment of residents. The few plants and trees available as well as the harsh quality of the materials used for furniture provided little comfort and pleasantness in the outdoor areas. The lack of these features and poor legibility made it difficult for residents to venture around the housing area lessening opportunities for casual contacts and development of social networks. Lastly, the absence of management and maintenance schemes for the outdoor areas led to their disrepair and failure of planting producing a bleak environment. In sum, the focus was geared towards the design of the dwelling and poorly towards the landscape as is with many of the social housing areas that have been and still are produced.

Decay of the housing area

By 1996, decay was already becoming visible and the housing area gained a reputation of insecurity and vandalism, for which it seems that the design of the outdoor areas contributed immensely. The failure to enable safe leisure and social areas in the communal areas of clusters and the central area for pedestrians severely hindered opportunities for the development of community life. Without informal surveillance, these areas were vandalized and gradually became successful with undesirables. Only the forum areas nearby schools remained in good conditions which are still used for community events.

In the last years, residents of certain clusters have raised walls to enclose the communal areas of clusters preventing the entrance of undesirables and gaining more control over outdoor users. This has made pedestrian circulation problematic and unsafe for the rest of the residents who have to find their way through the housing area eliminating the initial connectedness of the housing area and available links to surrounding areas (Figure 9.7). Given the opportunity, this housing area as well as many others in decay, may improve significantly through an outdoor design that addresses the previous issues. Therefore, the design criteria obtained from the previous two case studies was asked to be rated by residents in Infonavit Solidaridad from selected cluster layouts.

Figure 9.7 The walls built up by residents in Infonavit Solidaridad to stop undesirables may endanger other pedestrians trying to find a way through (photograph by author, 2009)

Compatibility of findings as tested in Infonavit Solidaridad

Cultural transferability of the survey for the Mexican context

In the introduction of the thesis, outdoor areas were indicated to be important for socializing as a way for residents to explore, learn, and integrate with their community as well as to develop trust on others. In Mexico, gathering in outdoor areas for socializing has historically been a tradition when the environment and weather allows it. Since Aztec times, through the colonial period, and in the current social lifestyle, social gatherings have been an intrinsic part of the culture.[518] They are manifested through religious ceremonies, traditional festivities, and regular gatherings of family and friends to celebrate important dates and provide support to each other. Therefore, the survey assumes the importance of community life in Mexico and explores ways for revitalising it in the housing area based on the findings from the previous case studies.

The survey was divided in four main sections for which questions were designed so that they would be transferable to the Mexican context. In some cases, there were also new features that were tested for their transferability such as storage sheds, unregulated areas, areas with spontaneous planting, local circulars, visits to other housing areas, and others which are discussed in turn. The results of the responses are presented, compared to the findings of the previous case studies, and then their cultural transferability is discussed.

An initial part of the survey first focuses on exploring the benefits of community life for residents in the housing area as a way of verifying the desirability of social contact. The second part addresses different ways for improving community life for which proposed areas to do so, such as parks and squares, exist in housing areas in Mexico but are left to be developed by residents. By regulation, 15% of a housing area lot is reserved to park areas and facilities in a small square. The third part of the survey focuses on the design criteria of outdoor areas for leisure and socializing. In integrating the colour photographs to be used in the survey from examples of the first and second case study, an issue of concern was the adequacy of their transferability into a different context such as that of Mexico.

[518] Jacques Soustelle, *The Daily Life of the Aztecs on the Eve of the Spanish Conquest*, trans. by Patrick O'Brian (London: Weidenfeld & Nicolson, 1961) pp. 25-27. See also Louis B. Casagrande and Sylvia A. Johnson, *Focus on Mexico: Modern Life in an Ancient Land*, (Minneapolis: Lerner Publications Company, 1986) pp. 63-70.

The vegetation and context of the photographs to be used for the survey in Infonavit Solidaridad were kept as they were in the first and second case studies for various reasons. Only a limited selection of local native species' photos from Cd. Juárez was available to the researcher and they were usually not in the same growth stage as those of the selected photos for the survey. Existing planting species suitable to Cd. Juárez are available that resemble in appearance those of the photographs which can be used to achieve the same effect of the tested design criteria in the regeneration of Infonavit Solidaridad or any other housing area in the city (Table 9.1).

Also, scenarios created through digitalising programmes were found to be unsuitable because of their artificial feel, which residents would find difficult to relate to their own communal outdoor areas. Instead the photos were modified to eliminate objects that were evidently foreign such as signs. Also the sizing and contents of the photographs only showed the necessary vegetation that highlighted the object of interest without defined details that could identify the species. The elements that could be discerned to be foreign would be the large amount of lawn areas and ponds. However, the former is highly desired in the Mexican social housing context, even if small in size, as was expressed by the head of the planning department in the city during practice years of the researcher.

The fourth part explores ways of participating and working together in the community which were integrated according to possible opportunities in the cultural and physical context. For instance, the organizational and economical processes needed to implement participation schemes were proposed according to existing viable options in the city; non-profit organizations, Infonavit programmes, self-help governmental packages, and small credit loans. The latter are customary for improvement purposes, acquiring of furnishings, and many other goods which could be used to finance part of the regeneration of outdoor areas.

Table 9.1 Some of the species available which are suitable for Cd. Juárez requiring less water irrigation and their possible uses in outdoor areas

Trees and large shrubs	Conifers	Shrubs	Climbers, groundcovers, and grasses	Perennials
Sunlight screening or visual foci	Barrier for wind or visual foci	Hedges as barriers or surrounding shelter	Climbers	Definition of areas or visual foci
Arbutus xalapensis	*Cupressus glabra*	*Abelia grandiflora*	*Antigonon leptopus*	*Abronia fragrans*
Acacia farnesiana	*Juniperus scopulorum*	*Buxus microphylla japonica*	*Epixiphium wislizenii*	*Allium tuberosum*
Cercis canadensis		*Celtis pallida*	*Polygonum aubertii*	*Engelmannia pinnatifida*
Chilopsis linearis	Visual foci	*Elaeagnus pungens*	*Rosa banksiae*	*Erigeron divergens*
Diospyros tejana	*Pinus eldarica*	*Garrya wrightii*		*Gaillardia aristata*
Fraxinus cuspidata			Groundcovers	*Dyssodia acerosa*
Gleditsia triacanthos	Sunlight screening	Sunlight screening	*Artemisia ludoviciana*	*Erysimum capitatum*
Lagerstroemia indica	*Pinus pinea*	*Lippia gratissima*	*Baccharis 'Centennial'*	*Oenothera stubbei*
Leucaena retusa		*Caesalpinia mexicana*	*Carpobrotus edulis*	*Pavonia lasiopetala*
Parkinsonia		*Cassia nemophila*	*Dalea capitata*	*Penstemon ambiguus*
Pistacia chinensis			*Drosanthemum speciosum*	*Penstemon eatonii*
Prosopis glandulosa		Definition of areas, visual foci, or surrounding shelter	*Verbena rigida*	*Heterotheca villosa*
Prosopis pubescens		*Anisacanthus quadrifidus*		*Ipomopsis longiflora*
Quercus macrocarpa		*Artemisia filifolia*	Grasses	*Melampodium leucanthum*
Quercus texana		*Atriplex canescens*	Lawn	*Oenothera caespitosa*
Quercus virginiana		*Baccharis sarothroides*	*Buchloe dactyloides*	*Penstemon superbus*
Rhus lanceolata		*Berberis thunbergii 'atropurpurea'*		*Penstemon wrightii*
Sapindus drummondii		*Bouvardia ternifolia*	Accent	*Psilostrophe tagetina*
Sophora secundiflora		*Buddleja marrubiifolia*	*Cortaderia selloana*	*Ratibida columnaris*
Sophora affinis		*Caesalpinia gilliesii*	*Pennisetum setaceum*	*Senecio flaccida*
Ulmus parvifolia		*Calliandra eriophylla*		*Senna lindheimeriana*
		Chamaebatiaria millefolium		*Tagetes lucida*
		Cowania mexicana		*Viguiera stenoloba*
		Dalea bicolor var. argyraea		*Wedelia texana*
		Dalea frutescens		
		Ericameria laricifolia		
		Eriogonum fasciculatum		
		Eysenhardtia texana		
		Fallugia paradoxa		
		Forsythia intermedia		
		Hesperaloe parviflora		
		Leucophyllum laevigatum		
		Lippia graveolens		
		Rhus aromatica		
		Rhus glabra		
		Salvia chamaedryoides		
		Salvia greggii		
		Cassia wislizenii		
		Tecoma stans		

Source: Instituto Municipal de Investigación y Planeación (IMIP), *Arboles Recomendados para el Área de Ciudad Juárez Chih.* ; El Paso Water Utilities, *Desert Blooms: A Sunscape Guide to Plants for a Water-scarce Region.*

Characteristics of the surveyed population

The survey was delivered to every household of the selected communal areas in clusters and a good response was obtained (Appendix J). From a total of 395 surveys, 105 were received with mostly complete responses representing 27% of the total number of households. Responses were received mostly from cluster layout 3 where more residents were found at home during the visits (Figure 9.8).

An overview of the characteristics of the respondents shows that almost two thirds of the responses come from women who are more likely to be found at home. The majority of respondents are within a young adult age range of 18 to 40 years of age with few elderly. This is logical since social housing credit in Mexico can only be obtained by citizens who have a working status. Since the credit has a regular paying-time of thirty

years, it is usually obtained by young couples (Figure 9.9). Therefore, it is not surprising the household composition is characterised by couples with children.

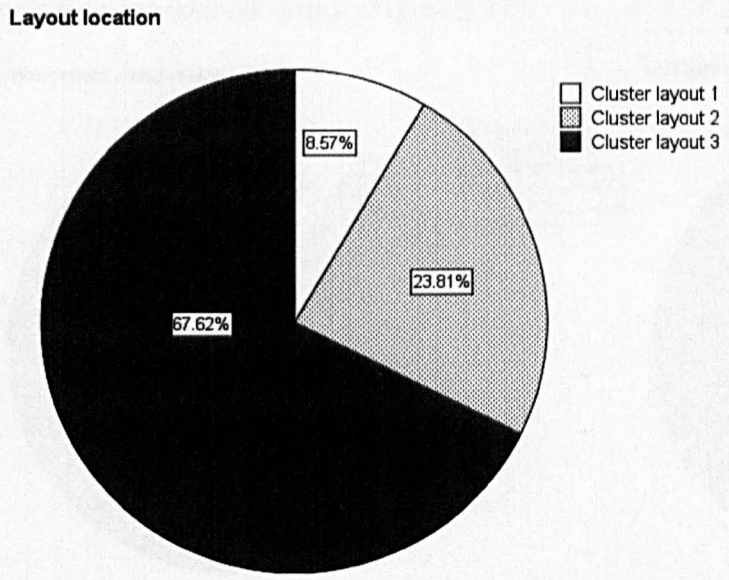


Figure 9.8 Distribution of responses to the survey according to cluster layout location in Infonavit Solidaridad

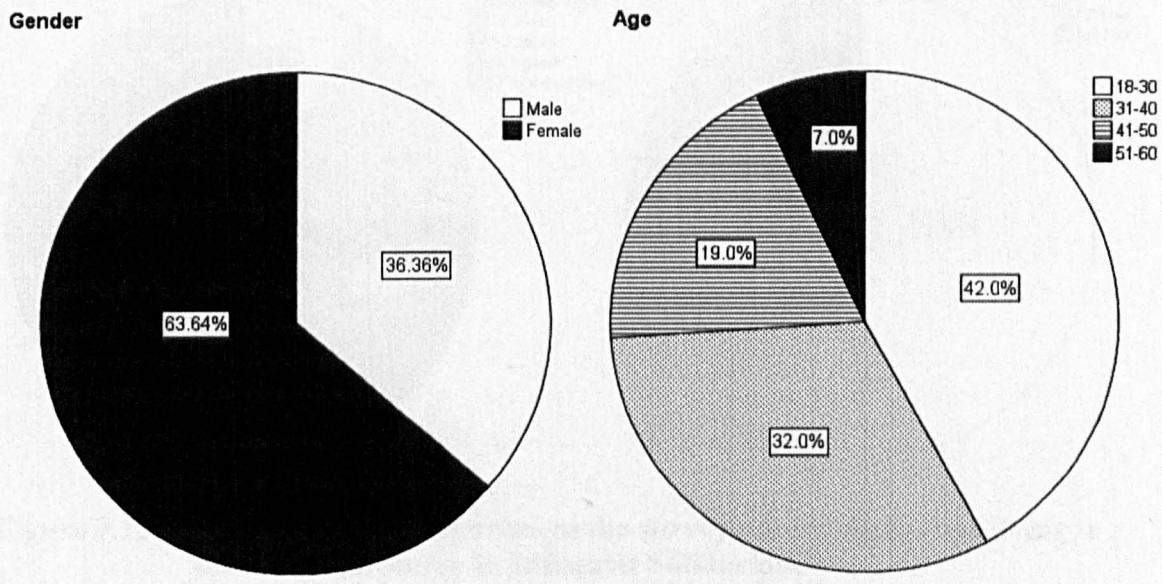


Figure 9.9 Distribution of responses to the survey according to gender and age in Infonavit Solidaridad

Despite being a social housing area, most respondents considered having an average income and 67% of the respondents were owner-occupiers which could facilitate the residents' involvement in outdoor improvements (Figure 9.10). Also, most respondents have lived there for more than five years, with almost 40% living in the area since it was

first started. Finally, 74% of responses came from dwellings with entrances on ground storey which is representative of the existing configuration of dwellings, having fewer entrances on second storey (Figure 9.11).

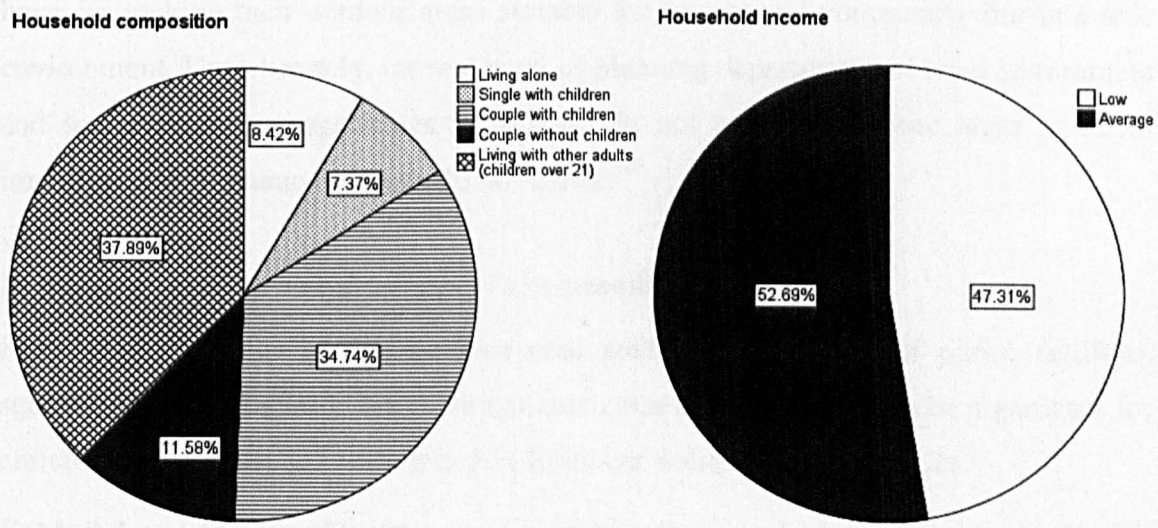


Figure 9.10 Distribution of responses to the survey according to household and income in Infonavit Solidaridad

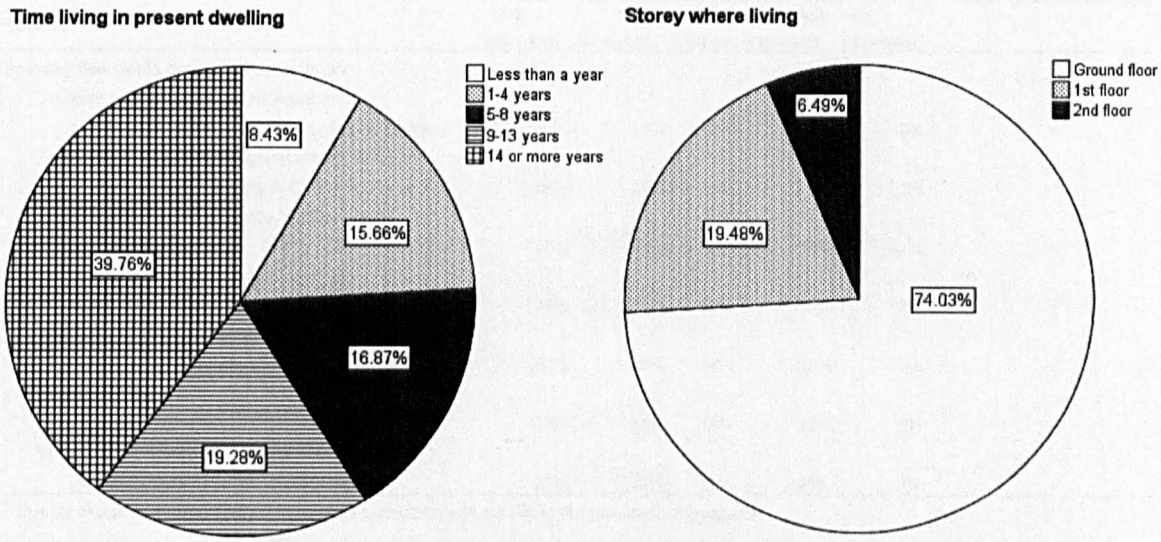


Figure 9.11 Distribution of responses to the survey according to time living in dwelling and storey in Infonavit Solidaridad

Overview of outdoor communal areas

A set of preliminary questions were included to explore the level of importance that outdoor areas have for respondents, sense of safety, and the extent to which regeneration would improve community life and safety. For 80% of respondents their outdoor areas were as important as their dwelling. However, half of the respondents felt unsafe after dark in all outdoor areas and some of them pointing to the fear of crossing

nearby the recently built walls in the central communal pedestrian area. For improving safety and community life, 76% of respondents considered that regenerating the outdoor areas was 'very important'. This shows the significance and urgent need that residents have for making their outdoor areas suitable for leisure and community life in a safe environment. Unfortunately, current head of planning departments of local government and social housing programmes in Mexico do not consider outdoor areas to be of importance and assume residents do not either.[519]

Features of outdoor areas to improve community life

From the experience in the previous case studies, the features of parks, facilities, squares, communal gardens, and unregulated areas that were found to be significant for enriching community life were tested in Infonavit Solidaridad (Table 9.2).

Table 9.2 Rating of features and activities that would improve community life in Infonavit Solidaridad

Variable	Responses					Compatibility with previous case studies†
	Very important	Important	Unsure	Somewhat important	Not important	
Features that would improve community life						
To have a park for diverse activities with playgrounds, ball courts, lawns, & seating areas	87%	13%	0%	0%	0%	✓
To have an integrated design of plants, furniture, playgrounds, and others in communal areas	64%	29%	5%	1%	1%	✓
To have a square with various facilities open until late	25%	46%	8%	10%	11%	✓
To have a square with outdoor seating for restaurants or cafes	30%	39%	12%	11%	8%	✓
To have a square with facilities that have products and services of interest to women	39%	28%	14%	10%	9%	✓
To have a square with periodical activities such as markets or outdoor events	33%	35%	12%	12%	8%	✓
To have an outdoor area designed for exercising pets	25%	28%	15%	23%	9%	✓

† The checkmark indicates design criteria that coincides with results in the previous case studies

All the features were rated by respondents to be of some significance although some more than others. From the three features considered most significant, having a park with a robust design was 'very important' for the greatest majority of respondents. The park in the previous case studies proved to be a neutral arena were residents from all the housing area could gather and meet. Then, for two thirds of respondents an integrated outdoor design of communal areas was also 'very important' to improve community life which underlines their importance for regeneration. Communal gardens of the previous

[519] Head of technical department for a social housing program, personal communication, January 2009, Cd. Juárez, Mexico (employee who preferred to remain anonymous).

case studies were the place to meet neighbours of nearby buildings, to engage with the landscape, or view others and surrounding activities. In regard for areas to train dogs, it is unusual to find such in housing areas of Mexico, yet these were rated to be 'important' by respondents showing the need for having diverse areas. They were similarly significant in Augustenborg for providing residents with choices for leisure and meeting other neighbours with similar interests.

From the options given for features related to the square, services or products of interest to women were found to be the most important as 76% of households females stay at home in charge of the family.[520] This was essential in the previous case studies to encourage the presence of both genders which provided the square with more life and reduced feelings of insecurity. For outdoor seating of restaurants and cafes as well as markets and outdoor events, respondents living alone or without children found these to be most significant since these would provide opportunities for meeting other neighbours (Table 9.3). Compared to previous case studies, these two features along with facilities open until late were essential as these worked together to provide life in the evenings when there were less users in the square. However, Infonavit Solidaridad is currently surrounded by large malls, restaurants, and various services which are open until late. Other specialized services opening at different times of the day may be more appropriate in the housing area. They may include clothing alteration, food stands, markets with fashion accessories and second-hand products, and others which are popular in Mexico.

Table 9.3 Mann-Whitney tests for features to improve community life in Infonavit Solidaridad

	Responses towards the features that would improve community life						
Variable	Characteristic	Mean rank†	Characteristic	Mean rank†	Z	P	
To have a square with outdoor seating for restaurants or cafes	Living alone, couple without children, and single with children	35.72	Couple with children and living with other adults	51.77	-2.64	0.008	***
To have a square with periodical activities such as markets or outdoor events	Living alone	10.83	living with other adults	23.28	-2.42	0.02	**

† A low mean rank indicates the item is rated to be better and a high mean rank to be worse

*p<.05 **p<.02 ***p<.01

[520] Instituto Nacional de Estadística y Geografía, *Censo por vivienda*, (Cd. Juárez: INEGI, 2007) [on CD-ROM].

Design criteria to facilitate casual contacts and engagement with others

The rating of most design criteria by respondents in Infonavit Solidaridad coincided with the observation results and perception preferences of the previous case studies and there were few statistical differences found (Table 9.4).

Table 9.4 Rating of design criteria for casual contacts and engagement with others in Infonavit Solidaridad

Variable	Responses					Compatibility with previous case studies[†]
	Very good	Good	Fair	Poor	Very poor	
Arrangement of pedestrian walks to encourage casual contacts						
Robustness, richness, and shelter						
A pedestrian walk with a variety of paved and vegetated surfaces	64%	23%	12%	0%	1%	✓
A pedestrian walk with tree shelter	60%	29%	9%	0%	2%	✓
A pedestrian walk with paved surfaces	26%	36%	34%	4%	0%	✓
Arrangement of seating areas to encourage engagement with others						
Distance range						
With a certain distance from a pedestrian walk in open areas	61%	28%	11%	0%	0%	✓
Adjacent to a pedestrian walk	22%	53%	21%	2%	2%	✓
Side enclosure						
Enclosure providing shelter to sides and back	38%	37%	18%	7%	0%	✓
Open seating providing shelter on back only	36%	38%	23%	2%	1%	✓
Full sheltered enclosure	27%	31%	33%	9%	0%	✓
Ceiling enclosure						
Cover of light tree canopies for partial screening	43%	36%	19%	2%	0%	✓
Covered enclosure provided by an artificial structure	19%	41%	28%	12%	0%	✓
Covered enclosure with climbers	23%	39%	30%	8%	0%	✓
Cover of dense tree canopies allowing full screening and shade	24%	29%	36%	10%	1%	✓
Robustness						
Furniture that enables group gatherings	55%	32%	9%	4%	0%	✓
Movable furniture	36%	32%	19%	12%	1%	✓
A range of seating options for sitting	53%	36%	10%	1%	0%	✓
One back for each bench	57%	37%	5%	1%	0%	✓
A shared back for two benches	33%	32%	27%	8%	0%	✗
Richness						
Scented plants	63%	28%	6%	3%	0%	✓
Bird song	55%	34%	10%	1%	0%	✓
Sound of water	53%	29%	13%	4%	1%	✓
Seating area with an ornamental feature such as a sculpture, bird bath, or other	47%	25%	24%	4%	0%	✓
Colourfulness of planting	44%	32%	18%	6%	0%	✓
Seating area with varied planting heights	21%	45%	26%	8%	0%	✓
Seating area with mixed planting textures	30%	42%	22%	6%	0%	✓

Table 9.4 continued

Arrangement of outdoor areas to encourage engagement with others						
Mystery						
An area with local plants for exploration and discovery	44%	28%	23%	3%	2%	✓
Partially concealed views with high shrubs	39%	24%	29%	7%	1%	✓
Partially concealed views with low shrubs	30%	50%	19%	1%	0%	✓
Informal playgrounds						
Planting and materials that encourage informal play opportunities for children	43%	28%	22%	6%	1%	✓
Robustness						
Areas that are flexible which may be used for a range of activities	68%	26%	4%	2%	0%	✓
Shared facilities for storage of outdoor furniture and play equipment	22%	23%	45%	8%	2%	✗
Richness						
Fruit trees	51%	18%	20%	9%	2%	✓
Realms						
Low boundaries around private gardens which are adjacent to communal areas	33%	48%	14%	3%	2%	✓

† The checkmark indicates design criteria that coincides with results in the previous case studies

For casual contacts, respondents favoured the arrangement of pedestrian walks having richness, tree shelter, and flexibility encouraging and facilitating stopping for a conversation. For social interaction, various items related to seating areas were integrated in the survey since these were the most frequently used areas for community engagement in the previous case studies. In first instance, respondents in Infonavit Solidaridad preferred to have a certain distance from seating areas to activity edges, such as pedestrian walks, rather than adjacent to them. From the previous case studies, a distance of 2.5m to 10m allowed greetings that often led to conversations. A distance of 10m to 20m enabled visualizing neighbours and a quick greeting but would less often lead to longer conversations.

Amongst the types of enclosure, respondents preferred to have seating with enclosure on the back and sides followed by open seating with shelter on the back. In the previous case studies, both were equally frequented for social interaction although sheltered areas on three sides were usually related to playground facilities. On the contrary, full sheltered enclosure was least liked for social interaction of residents which was similar to the previous case studies. Also, light canopy of trees for sunlight screening was preferred by the majority of respondents despite having warmer temperatures in Mexico. This was followed in rating by enclosure through climbers and the possibility of having an artificial structure such as parasols. Coinciding with the previous case

studies, shelter with planting was preferred but also having various choices was important.

In relation to the robustness of seating areas, the majority of respondents rated all the given options to be 'very good' which included a range of options for sitting, movable furniture, and arrangements that enabled group gatherings. However, the latter was rated lower by females in Infonavit Solidaridad (Table 9.5). This was due to current problems caused by groups of youngsters consuming drugs and alcohol in secluded areas of the central pedestrian area as was expressed in the commentaries of the survey. Whilst seating for group gatherings was uncommon in communal gardens of Rotes Viertel due to similar problems with youngsters, they were much appreciated by residents using the park and Cecilientplatz square. Otherwise, in Augustenborg furniture for group gatherings was clearly preferred. Two-sided benches having one back were liked by respondents from Infonavit Solidaridad despite these were disliked by residents in the Cecilienplatz square of the case study of Rotes Viertel; particularly by women sharing the back with males. Whilst this may be attributed to culture, it is more likely that respondents related these benches to be located in their communal outdoor areas where neighbours are likely to know each other.

Responses for richness of seating areas indicated that scented plants, bird song, sound of water, colourfulness of planting, and ornamental features of foci were 'very good'. These coincide with the perceived preferences of respondents in the previous case studies. However, the observed preferences in the use of outdoor areas in the previous case studies suggested these were complimentary rather than mandatory for a well-used seating area. In relation to varied planting heights and textures, these were rated slightly lower. From observing most used seating areas in the previous case studies, different heights were preferred when combined with colourfulness and scent of planting along with plant shelter on the back or back and sides.

The last section for social interaction focused on the arrangement of the outdoor areas that would encourage engagement with other residents. In first instance, areas for exploration and discovery were rated for communal gardens where respondents preferred having partially concealed views with higher-sized shrubs (1.3m up to 2.5m) instead of lower-sized shrubs (up to 1.3m). The former was particularly liked by single parents with children as this provides more opportunities for engaging with the outdoor areas (Table 9.5). This is similar to the findings in the previous case studies, showing

preference of respondents for shrubs that range from 1.3m to 2.5m in communal gardens if given the option.

Table 9.5 Mann-Whitney tests for the arrangement of seating and outdoor areas in Infonavit Solidaridad

	Arrangement of seating areas to encourage engagement with others					
Variable	Characteristic	Mean rank†	Characteristic	Mean rank†	Z	P
Robustness						
Furniture that enables group gatherings	Males	41.42	Females	54.19	-2.37	0.018 **
	Arrangement of outdoor areas to encourage engagement with others					
Mystery						
Partially concealed views with high shrubs	Single with children	26.43	Rest of respondents	48.67	-2.20	0.027 **

† A low mean rank indicates the item is rated to be better and a high mean rank to be worse

*p<.05 **p<.02 ***p<.01

As well, respondents of Infonavit Solidaridad found that areas with local plants for exploration and discovery were 'very good' just as was observed in Rotes Viertel with residents meeting in brownfield areas. Correspondingly, informal playgrounds were also rated to be 'very good' by respondents of Infonavit Solidaridad, in the same way that respondents of the previous case studies expressed they were preferred if available. Also, the presence of fruit trees in communal gardens, as part of the sensorial experience for richness, was found by respondents to be 'very good'. The few examples found in Rotes Viertel with nut trees were observed to lead to conversations among neighbours. Similarly in Augustenborg, fruit trees, found in some communal gardens prior to being removed after the regeneration, were a source of community life for surrounding neighbours.

In relation to robustness, flexible outdoor areas for a range of activities were rated by respondents to be 'very good' just as was observed in the most successful areas of the previous case studies. However, shared facilities for storage of outdoor furniture and play equipment were not an outstanding feature for respondents in Infonavit Solidaridad as was in Augustenborg. It should therefore be consulted with residents prior to installing such a facility.

Finally, having low boundaries around private gardens adjacent to communal areas were found by respondents of Infonavit Solidaridad to be 'good'. This is rather surprising given the current insecurity that currently prevails in the city, but also shows the willingness of respondents towards engaging with the community. From the few examples found in Rotes Viertel, these were observed to encourage conversations

among the occupiers of the gardens. Sometimes residents had also placed low gates connecting to the communal gardens, therefore low boundaries should be encouraged.

Design criteria to facilitate leisure opportunities

The few areas that were observed to be used for leisure activities in the previous case studies were tested in Infonavit Solidaridad. Respondents rated different design characteristics of pedestrian walks, seating and lawn areas, as well as general arrangement of outdoor areas that could improve their leisure opportunities (Table 9.6).

Table 9.6 Rating of design criteria for leisure opportunities in Infonavit Solidaridad

Variable	Responses					Compatibility with previous case studies†
	Very good	Good	Fair	Poor	Very poor	
Arrangement of pedestrian walks to facilitate leisure opportunities						
Mystery, robustness, richness, and shelter						
A pedestrian walk with semi-concealed views through planting	15%	13%	54%	15%	3%	✗
A pedestrian walk with a variety of paved and vegetated surfaces	52%	36%	11%	1%	0%	✓
A pedestrian walk with tree shelter	40%	39%	20%	1%	0%	✓
Arrangement of seating and lawn areas to facilitate leisure opportunities						
Side enclosure						
Enclosure providing shelter to sides and back	60%	25%	14%	1%	0%	✓
Shelter on back only	31%	50%	17%	2%	0%	✓
Full sheltered enclosure	20%	41%	33%	5%	1%	✗
Ceiling enclosure						
Cover of light tree canopies for partial screening	53%	27%	19%	1%	0%	✓
Cover of dense tree canopies allowing full screening and shade	47%	33%	18%	2%	0%	✓
Features of outdoor areas to facilitate leisure opportunities						
Privacy						
A projected balcony	31%	33%	23%	11%	2%	✗
A balcony integrated with the design of the building having opportunities for screening	14%	32%	42%	12%	0%	✗
Robustness						
Gardening in communal areas	23%	45%	25%	7%	0%	✓
Gardening in balconies	27%	42%	26%	5%	0%	✓
Gardening in allotments	18%	35%	39%	5%	3%	✗

† The checkmark indicates design criteria that coincides with results in the previous case studies

From the types of pedestrian walks showed, those with a variety of paved and vegetated surfaces were preferred followed by those with tree shelter. Contrary, pedestrian walks with semi-concealed views through planting were disliked particularly by female respondents (Table 9.7). This may be influenced by the current insecurity issues of the central pedestrian area in Infonavit Solidaridad where the indented design and concrete walls creates fully concealed views. Compared to the previous case studies, these types

of pedestrian walks were found and liked in Rotes Viertel where the length of the pedestrian walks semi-concealed with planting was usually no more than 18m and shelter on sides had at least one side no higher than 1.2m.

Similar to the previous case studies, enclosure for seating and lawn areas were preferred by respondents with shelter on back and sides. Therefore, if fully sheltered enclosed areas are used, these should be designed to have visual contact with pedestrian activities and include richness in their design. For screening sunlight, light and dense canopies were considered to be 'very good' by respondents. In the previous case studies, dense tree canopies were more likely to be found in areas for leisure such as lawn areas.

Responses for the general arrangement of outdoor areas showed that a higher level of privacy in balconies was not desired. Contrary to the previous case studies, this may be considered to be due to cultural influence. In Mexico projected balconies are aspired to. They were popular in 1900s, commonly associated with traditional serenades that are still current in today's society. Also they are still a connotation to better-off families and although they are seldom used, particularly in cities with extreme hot summers, they are a luxury space that people acquire when they have the opportunity to do so. Therefore, a screened balcony is understandably not preferred.

Also, the availability of different gardening opportunities was rated. Respondents found gardening in balconies and communal areas to be 'good' whilst allotments were in general not favoured. However, statistical tests showed that respondents living alone or who were owner-occupiers rated allotments better compared to the rest of respondents (Table 9.7). In the case study of Augustenborg allotments were part of the learning activities of children and of leisure time of elderly who wished to have them. This shows that allotments may be important for certain household members and therefore they should be part of the choices available to residents who may wish to have them.

Table 9.7 Mann-Whitney tests for the arrangement of pedestrian walks and outdoor areas in Infonavit Solidaridad

	Arrangement of pedestrian walks to facilitate leisure opportunities						
Variable	Characteristic	Mean rank†	Characteristic	Mean rank†	Z	P	
Mystery							
A pedestrian walk with semi-concealed views	Male	40.57	Female	53.98	-2.51	0.012	**
	Responses towards features of outdoor areas to facilitate leisure opportunities						
Robustness							
Gardening in allotments	Living alone	24.13	Rest of population	49.67	-2.69	0.007	***
	Owner-occupier	33.86	Tenant	45.03	-2.02	0.043	*

† A low mean rank indicates the item is rated to be better and a high mean rank to be worse

*p<.05 **p<.02 ***p<.01

Level of participation of residents to benefit their community and outdoor areas

The various ways in which residents participated in the regeneration of the outdoor areas in the previous case studies along with alternate options were tested in Infonavit Solidaridad. In order to adapt it to the context of Mexico, these were suggested to be supported by government programmes or not-for-profit organizations. Surprisingly, the results showed that the majority of respondents were willing to participate in almost all of the suggested options (Table 9.8).

Table 9.8 Participation level to benefit the community and outdoor areas as stated by respondents in Infonavit Solidaridad

	Responses				
Variable	Very likely	Likely	Unsure	Somewhat likely	Not likely
The design of the communal garden	36%	50%	10%	3%	1%
The construction of a communal garden	43%	39%	11%	5%	2%
Caring for and maintaining the communal garden	68%	25%	4%	3%	0%
Taking responsibility for maintaining one specific area within the communal garden	45%	34%	13%	7%	1%
Organizing a neighbourhood committee in charge of the communal garden	35%	32%	24%	9%	0%
Providing a regular financial contribution to revitalise and maintain the communal garden	24%	37%	23%	10%	6%
Looking after children of residents through organized play and social activities	48%	31%	17%	4%	0%

Although not all respondents were fully willing to participate with a financial contribution, the majority agreed on providing care and maintenance to communal gardens. Almost 50% of respondents were also interested in the construction, providing maintenance to a specific area, or looking after children of the residents. This contrasts with the view of current heads of planning and housing programmes in Cd. Juárez who

consider that residents would not contribute financially, maintain, or care about their outdoor areas.

Importance of communal activities and events for community life

Respondents rated various activities and events which were important in the previous case studies for community life. This was done considering a scenario where residents would have the opportunity to run and organize them with the support from government or not-for-profit organizations than can be found in the city (Table 9.9).

All of the activities and events were considered of importance with just one exception. For the suggestion of having trips to other housing areas to learn from their experiences, respondents were mostly unsure since there are few housing areas that may serve as good examples, particularly of medium-rise housing type. However, governmental programmes such as the newly started renovation of public spaces (Hábitat-Rescate de Espacios Públicos) could provide a good base for learning and sharing experiences. This was a common practice carried in Augustenborg that provided fresh ideas to residents for the housing area at the moment of regeneration and afterwards.

Table 9.9 Importance of community activities stated by respondents in Infonavit Solidaridad

Variable	Responses				
	Very important	Important	Unsure	Somewhat important	Not important
Participation in programs for recycling, reducing water consumption, and increasing solar-wind energy production	69%	21%	4%	6%	0%
Local workshops for leisure or developing skills such as electronics or jewellery crafting	49%	39%	12%	0%	0%
Social gatherings for residents with diverse activities	40%	48%	8%	4%	0%
Annual meetings where goals are stated and achievements presented	46%	35%	8%	8%	3%
Periodical events in communal gardens	26%	39%	22%	10%	3%
Local circulars published twice-three times yearly to record the activities and news of the community	25%	37%	23%	10%	5%
Trips or visits to other housing areas to learn from their experiences	20%	17%	32%	18%	13%

From the activities considered to be 'very important' by respondents, surprisingly participation in programmes encouraging sustainable practices were found by 69% as a potential for encouraging community life. In the previous case studies, respondents also found these sustainable initiatives facilitated engaging with neighbours. Therefore, there is an enormous potential for the introduction of sustainable practices as supporters of

community development. In Mexico, ecological programmes may be started as pilot projects with organization and financial support from NGO's, utility providers, and environmental governmental programmes such as SEMARNAP.

For workshops and annual meetings, almost half of the respondents found them to be 'very important' since these offered the opportunity to learn new skills and the chance to influence future change whilst meeting neighbours. Both of the previous case studies had workshops although only in Rotes Viertel they progressed to meet the changing demands of the users, currently focusing on youngsters, elderly, and unemployed residents. As to annual meetings, experience from the previous case studies showed that regular communication between the housing companies and social structures enabled exchange of experiences and skills as well as improved community strategies.

The items that were considered to be of slightly less importance included social gatherings of residents, periodical events in communal gardens, and local circulars. These items were significant in the previous case studies for various purposes: to know others, for socializing, and exchanging information not only of local community news but also on future changes in the housing area, energy conservation, and a variety of issues. However, in the Mexican context informal opportunities for meeting appear to be more desirable as shown earlier rather than formal social gatherings and periodical events. Casual opportunities for socializing provided by the communal areas, square, and park or formal gatherings organized by the residents themselves may be more suitable. It is common in Mexico that small or festive social gatherings are organized at the last minute with the time and resources available at the time. This way, residents have the flexibility of deciding the time and type of formal gathering that is adequate to their current needs.

In relation to the lack of interest for local circulars, information provided through word of mouth and boards at schools are usual ways of communicating which may be considered to be more efficient by respondents. As such it also emphasizes the importance of social networks in the Mexican context. Also, respondents may also be concerned about the reliability of the information source. Since educational institutions are held in high regard, collaboration with local schools to produce circulars may prove to be more successful.

Opportunities and obstacles for the design criteria and elements for community life in Mexico

Regeneration opportunities for outdoor areas of medium-rise housing in Cd. Juárez

In the current context of planning and programmes in Mexico, communal areas of medium-rise housing may be regenerated through the aforementioned programme Rescue of Public Spaces (REP), focused on improving outdoor public areas of the city. However, in exploring this possibility, there were a number of problems found related to underestimation of landscape, limited access to the programme, and maintenance. In first instance, in order for outdoor areas of medium-rise housing to participate of the REP programme, they would need to be settled in a commodatum that guarantees public access. Yet, the current focus of the REP programme is towards regeneration of parks and public areas of poverty housing in the city's periphery with little interest in medium-rise housing. This is as authorities believe it is too late to reverse the decay cycle of these areas due to the high crime levels that prevail there.[521]

On the contrary, respondents of the survey applied in Infonavit Solidaridad considered that improving their outdoor areas would lead to reduced levels of insecurity. Therefore, in order for REP to consider regenerating housing areas outside of its scope, residents are allowed to put forward their request to the local authorities. Whilst this may sound simple, this programme is little known or advertised. Only citizens with a political agenda are aware of the programme. Although they are usually part of residents' committees, they are commonly biased with political influences failing to truly represent residents' needs. This urgently points to the need of an independent and neutral not-for-profit organization that may disseminate, orientate, and provide skills to residents.

Once a housing area has been accepted and consultation is finished, the project for regeneration is then developed which are presented to the local authorities once a year. At that point, projects which are considered of uttermost importance are selected leaving others sometimes waiting up to five years. Within this time, there is a significant risk that the areas reserved for leisure in housing areas may have become of

[521] Abigail García, (General Planning and Program Coordinator, IMIP), interview by C. Martínez, January 2009, transcript 3S, Cd. Juárez, Mexico.

private or commercial property.[522] This reduces maintenance and increases sources of capital for local authorities. Another problem is the maintenance of regenerated areas. Although the local authorities stay in charge of providing general maintenance to outdoor public areas, this is usually very poor. Partially, the REP programme has made an effort in addressing this by integrating residents' committees for posterior management. However, regeneration experiences have shown these often failed due to the short-term social programmes that were established to achieve this and the lack of other posterior support schemes for residents.

Finally, due to political interests there are no coordinated efforts among the different departments involved in the process which duplicates efforts, results in fragmented improvements, and a low impact of the programme.

Applicability of the assessment and design criteria

Despite that one of the main aims of the programme of REP in regenerating outdoor public spaces is to reduce insecurity, they are not considered to be a priority by the local authorities. This is as public spaces do not provide them with a direct financial benefit and consider their regeneration a wasted effort since they are likely to be vandalised.[523] This view is reflected in the way that the local authorities sell leisure areas, select regeneration projects, execute them, and maintain them. For example, lower quality materials and construction procedures are lowered in the execution, tree species are changed for cheaper ones, much of the vegetation is eliminated during construction works, and the minimum maintenance is provided. All this often leads to the failure of the projects and encourages further negative perceptions of local authorities.

At department level where regeneration projects are designed, there are other concerning issues. In Cd. Juárez, the municipal institute for planning and research (IMIP) is assigned with developing the projects for the Sedesol programmes. Projects are developed by architects based on the needs expressed by users. For design, the literature often used is related to town planning having little access to landscape oriented research.[524] Given that most of the current regeneration projects are targeting the poorest areas, then issues about planting are not expressed by residents in the consultations since fulfilling the basic needs for leisure are the pressing demands. Also,

[522] Abigail García, transcript 3S.
[523] Ibid.
[524] Luis Martínez, (Project leader, IMIP), interview by C. Martínez, January 2009, transcript 4S, Cd. Juárez, Mexico.

there are no other areas as point of comparison that residents may learn from. Therefore, their needs usually sum up to tree shelter, seating areas preferably near playgrounds, and ball courts. Also, the introduction of foreign ideas through project competitions is generally not welcomed. Therefore the projects rely on built structures and focus on hardscape design.

In this context, there is little room for establishing guidelines such as the present assessment and design criteria. Although they were regarded as a useful source of information for design, little attention was given to them due to the lack of landscape knowledge and not being part of a regulatory measure. On the other hand, it is feasible to build the features of the landscape in any regeneration scheme for a housing area in Cd Juárez following the preferred design characteristics. There are various native- and non-native plant species available in the region that can be integrated in the design to produce a similar environment and which may be adequate to the cultural context. Yet it is essential that management and maintenance schemes are implemented with the involvement of residents for the upkeep of the landscape.

Findings and discussion

The results from testing the design features of outdoor areas, level of participation, and activities for encouraging community life through the survey applied in Infonavit Solidaridad are very positive:

- Outdoor areas were shown to be essential as part of the wellbeing and quality of life of respondents, and as such they were willing to participate in their regeneration and upkeep.
- Preferences for design criteria, actions for improving community life and participation, and interest in ecological projects were similar in the three case studies.
- A variety of choices in design and community issues was found to be essential as a way of fitting the needs of a diversity of users.

Respondents considered their communal outdoor areas to be as important as their dwelling, essential for reducing feelings of insecurity, and are very much interested in participating in one way or another towards improving them. From testing the design criteria, it is shown that design preferences for leisure and socializing are similar despite geographical location, culture, and weather as well as household data suggesting their general applicability.

Respondents in Infonavit Solidaridad were mostly aged 30 years or younger whilst there was a higher representation of elderly people in the previous case studies. Also, there were many more females staying at home compared to the previous case studies. Ownership status differed as well: there was a majority of owner-occupier dwellings in Infonavit Solidaridad, whilst tenant-occupiers predominated in the previous case studies. Household composition also varied, having mostly couples with children under and over 18 years of age in Infonavit Solidaridad, whilst singles and singles with children predominated in the previous case studies. Despite these differences, preferences in the design criteria for leisure and socializing in outdoor areas remained generally the same. These findings coincide with previous research where perception preferences of users were similar for characteristics of spatial design and the arrangement of outdoor settings across a range of cultures and geographical location (See Chapter 1, Social sustainability).

Most of the few differences found can be attributed to current drug-related insecurity problems that were beginning in early 2007 in Cd. Juárez at the time when the survey was applied. There was a wider availability of drugs to youngsters who started taking advantage of secluded parts in outdoor areas of Infonavit Solidaridad for drug trading and use, vandalism, and anti-social behaviour that has reduced the sense of safety of residents. At city level, conflicts between drug gangs started leading to violence and crime in outdoor areas, roads, and public spaces which has lessened their use by citizens in general. Although government has tried to address this problem by deploying military support to contain escalating drug related violence and crimes from 2007 to 2010, it has not yet been achieved at the time of this writing.

Otherwise, from the few preferences that differed between Infonavit Solidaridad and the previous case studies which can be related to culture, such as the choice of less privacy in balconies, must be further investigated as to ways in which they can support more adequately leisure and social activities of residents in the particular context of Mexico. Nevertheless it is suggested that further testing of the design criteria in general would be advisable in other medium-rise housing areas in different contexts. As well, there were design criteria which required more research such as arrangements for partial concealment in pedestrian walks of communal gardens and double-sided seating with a shared back. From the importance given to most items rated and the way these worked together in the previous case studies, it is acknowledged that providing different choices is perhaps the most relevant issue.

In relation to the applicability of the design criteria and lessons learned in a context such as Mexico, there were various issues found that need to be addressed to achieve a sustainable regeneration of the landscape in this type of housing:

- A change of attitude by planners and designers is required in acknowledging the landscape contribution to community life and support for ecological enhancement.
- Coordination between stakeholders enabling a regeneration project should be more efficient to avoid duplication of efforts and allowing the dissemination of experiences and evaluations.
- A set of landscape guidelines should be integrated as part of regeneration planning guidance as well as financial schemes and/or institutions that aid in coordinating the landscape management and maintenance after regeneration.
- Landscape education needs to be made more readily available throughout the country as well as research related to landscape, particularly studies made in the country.

The basic tools and funding for regenerating the outdoor areas in medium-rise housing are already established. The strongest obstacle for improving outdoor areas through landscape is the sceptical perception of local authorities towards the benefits that design may bring to community life. This jeopardises the efforts that may be brought by a regeneration project. There are also various pitfalls in the process of which lack of coordination and integrated efforts are crucial. Also, the lack of knowledge of the potential of landscape design amongst designers is limiting severely the quality and scope of regeneration projects despite having various planting species available.

Considering that current housing plans of the federal government are encouraging medium-rise housing again, regeneration of outdoor areas should become an urgent matter to address despite the resilience of local planning departments. There is also a pressing need for a neutral organization that assesses owner-occupiers as well as tenants in managing their outdoor areas once governmental programmes are finished. In this context, there is an enormous potential for the landscape guidelines used in this or other studies. However, they would be more effective if they would be part of Sedesol's or local planning guidelines, which in a way could be positively influenced if there was more access to landscape education and research.

The next and final chapter of the thesis concludes by identifying the findings of this research for which key issues are discussed and recommendations are provided for future regenerations with emphasis on achieving them in contrasting settings such as

Mexico. Lastly, various areas for further research are suggested to improve or complement the assessment used in this study, for finding adequate ways of enabling landscape regeneration in different contexts, or expanding the regeneration studies available.

Chapter 10

Conclusions and recommendations

Introduction

This final chapter concludes by exploring the contributions and findings that the research has made for social and ecological sustainability.

It starts by providing a concise overview of the results from this study to show new findings and areas that confirm previous research. This is followed by explaining the issues that are considered to be essential for any future regeneration in light of the findings and an order of importance is suggested to guide they way in which they should be treated. Recommendations are then provided to guide future regenerations showing those of general importance first, followed by specific guidelines for social integration and the revitalizing of community and ecological processes. The recommendations are made focusing on contexts different to those of the first and second case study, in this case such as Mexico, which provides a contrasting setting and culture. The design guidelines for social integration are made through sketches so that they are explained more clearly and wherever adequate, visual guidance is also provided for the other issues.

Areas for further research are then presented along with the ways in which they could be implemented and the actors who could be benefited from their development. Lastly, the specific contributions of this research are explained and the expectations for further development of the findings in this study. The thesis closes with a final summation, a brief overview of issues of importance for future regenerations and their future possibilities.

Key findings

Throughout the research, the regeneration of outdoor areas of medium-rise housing has been explored for their possibilities in enabling social and ecological sustainability. The experience of the regenerated case studies and testing of the gained lessons and design criteria showed that social strategies were essential in revitalising the housing area and ensuring the successful implementation of ecological ones on a long-term basis. A shift

in current planning guidance should then be considered towards placing more or equal emphasis to the development of social revitalisation strategies. However, research in the three case studies showed there were various constraints in achieving sustainability. This was related to the relevance given to certain issues, particularly social ones, by professionals involved in the management and maintenance schemes of outdoor areas.

From the design issues, as part of the social strategies, the study found that outdoor areas were important for a significant number of residents to relate with others. For that the spatial arrangement of the landscape was more relevant than the type of layout where residents lived, although it was more difficult to provide a semi-public feeling to communal gardens of point towers and open layouts. However, careful consideration for achieving a semi-public feeling was not always prioritized by designers who underestimated social needs of residents in Augustenborg or Rotes Viertel, or the potential of the landscape for encouraging it as in Mexico. It was precisely this, as well as other perceived ideas by professionals that proved to be one of the most important constraints in achieving a sustainable landscape.

In the specific design of communal gardens, this study has contributed in confirming some findings of previous research. That related to more adequate areas for encouraging the presence of people in public spaces and facilitating social opportunities in housing areas as well as perception preferences for design characteristics that provided visual stimulation. However, it was found that certain design characteristics for leisure and socializing were particular to housing areas. Such were the design of benches, pedestrian walks, interpersonal distances, level of enclosure, shelter preferences, and types of playgrounds. All these were found to be essential in facilitating the use of communal gardens whilst visual stimulation was mainly an encouraging factor to use them. In a way this proved to be a constraint since professionals perceived that ornamental aspects of the outdoor areas would be most significant in providing a quality environment whilst lessening other important design characteristics.

Nevertheless, an essential contribution of the regenerated schemes was enabling a variety of choices in outdoor areas which was more likely to fulfil the diverse needs of residents. Most important, the research found that both the areas and design characteristics preferred for encouraging socializing were similar in the three case studies despite cultural and geographical differences. This disputes the common perception that culture and geographical location conditions design preferences for

socializing. At minimum it may be said that the design criteria is feasible in settings similar to Mexico.

However, not all questions in the research regarding design were possible to be addressed. Although the study expected to find patterns of sensorial preferences from different storeys, they could not be ascertained since reasons for the differences in perception were unclear. Contrary to previous research, there was no relation between the preferences of residents living close to the ground or those in higher levels. Considering that viewing from balconies was an important leisure activity for residents, more research is required to address sensorial perception preferences.

For community issues, the study found that the regeneration of the landscape had the potential for implementing various initiatives which facilitated the building of community. An essential contributor element was providing various and permanent ways for residents to participate. This was possible in improving the image of the housing area and design of communal gardens, personalising and caring for outdoor areas, and providing access to a variety of facilities, events, and workshops. Altogether these strengthened pride for the housing areas which has been reflected in the reduced vacancies and turnover of residents, assistance to events, and volunteering in community groups. Unfortunately, the skills, management, and support for long-term participation were not planned for or were restricted without the assistance of local authorities.

Previous research in regenerated housing areas has also shown this has been a major setback in establishing social processes. Bodies in charge provide them with an initial assistance and expect them to continue their development on their own without the need of further support. Similarly in Mexico, this way of implementing social strategies has held back the posterior residents' management of the regeneration of public areas. Even more so, since the country does not have permanent management bodies of social housing such as housing companies. However, the lessons learned through the study contributed in establishing ways for achieving this. Such was having the permanent presence of offices in the housing area, collaborating with the housing company or other similar authority, establishing mechanisms for local learning of skills, and others.

Also, the general perception of housing companies that residents were not interested in participating and in trying to keep a tidy ornamental garden, has reduced opportunities for doing so. Although not all residents may be in the possibility of participating, the

regeneration and the case study in Mexico showed a large proportion of them were interested in getting involved in different forms to improve their outdoor areas. In fact, the study found that handling of ecological projects was significant in generating exchange of ideas among residents facilitating them in meeting other residents; confirmed as well by residents in the case study of Mexico. It was shown from the three case studies that residents were not only interested in participating from social or ecological projects in their outdoor areas but also cared and perceived them to be important for improving their environment.

In relation to ecological issues, the study has contributed in identifying the feasible features that were more adequate to be applied as part of the regeneration of landscape in this type of housing. These mainly included the reduction of pollution and in some ways the reduction of Carbon emissions and selection of materials for their life-cycle. The former two allowed more possibilities for residents to participate in handling and managing strategies which has been essential in their implementation. Also, this was found to raise their awareness and encourage an environmentally-oriented attitude as well as contributing to knowing other neighbours. For selection of materials, the study confirmed the importance of having landscape professionals as has been established in previous research. Although in this case, their permanent presence within the housing company helped define long-term sustainable practices, as well as having local offices has ensured the establishment of ecological processes.

From the lessons of the regeneration, the study has also confirmed from previous research similar constraints that have limited the application of other ecological projects. In practical terms, the least economically feasible strategy for such existing housing areas was saving drinking water. Otherwise, the lack of incentives from local authorities, as well as perceptions of professionals towards keeping safe and tidy ornamental outdoor areas to enhance the image of the housing areas, lessened the application of others. This occurred once funding to implement the strategies was finished and the housing companies were in charge of managing and maintaining the communal gardens taking over decision-making from residents. Consequently, this affected features of biodiversity, reduction of energy use through planting, and reduction of Carbon emissions from strengthening pedestrian movement.

Concerning biodiversity, the study found in the three case studies residents perceived outdoor areas were important for improving of having it as part of their leisure and

sensorial experiences. In fact, the introduction of ecological projects has contributed to improve the image of the housing area and forms part of the new identity of residents of living in an innovative and progressive housing area. It may be that not all residents would welcome changes that transform radically their communal gardens. However as previous research has shown, residents' involvement and providing a set of choices to be possibly implemented may set the way forward for their acceptance. Yet, housing companies considered too risky to implement such changes for the bad image and vacancies this may produce. Therefore, it would be necessary to allocate research into specific contexts of the housing areas with the participation of residents in establishing a model communal garden that would be acceptable to them.

Key elements in designing for the regeneration of future landscape for social and ecological sustainability

From the findings of previous research and the present study, key elements may be identified to be considered for the regeneration of medium-rise housing as part of a sustainable future. Although sustainable housing in the current and prevailing international agenda focuses on reducing the ecological impact on the environment, the development of community should be a priority in preventing housing areas to fall into decay. Not only for enabling social development but also, as the present study has contributed to show, since a community structure is necessary in having the support of residents for handling, caring, and taking responsibility for ecological projects. In doing so, previous research has shown outdoor areas have a key role by facilitating communication amongst residents for exchanging experiences, learning from other cultures, nature, and their surroundings, sharing ideas, making friends, and others.

Also, enabling outdoor areas that support community life constitutes part of the legacy for future generations in having a healthy lifestyle. For instance, the current critical problem of overweight population, which has started to affect children as well, may be partly attributed to the lack of nearby outdoor areas for playing and exercising. If housing areas are to be homes, where residents may want to live for a long time in a comfortable and safe environment, then the outdoor environment and ways for building the community must be facilitated. In that process, ecological projects that are feasible and with possibilities to be handled by residents may be introduced as part of learning and caring for the environment where they live. With time, and in a progressive manner, more improvements to ecological processes may be included but always giving priority

to the building and preserving of community. In that sense, a list of key issues may be set forward for the regeneration of medium-rise housing in relevant order for each feature (Table 10.1).

Table 10.1 Key issues of the landscape for future housing areas regeneration

More relevance → Less relevance

Social issues			Ecological issues
Design related issues	Community related issues		
Permeability, spatial definition, and scale	Community development	Community participation	Reducing energy use and Carbon emissions
Legibility	Image and identity	Short- and long-term opportunities	Reducing pollution
Complexity	Variety and an inclusive design	Different degrees of involvement	Materials
Mystery	Capacity building	Various ways of involvement	Increasing biodiversity
Order	Sharing and working together		Saving of potable water
Robustness	Actions of care		
Enclosure	Personalisation		
Coherence			

Less relevance

The issues of more relevance to be considered by designers and professionals in charge of future regenerations are located to the top and left of the table. It starts with the social issues that have been shown by this research to be a priority according to residents' perceptions and their use of outdoor areas as well as perceptions of professionals in charge of the regeneration projects.

Design quality issues are addressed first as these encourage the use of outdoor areas and facilitate ways for residents to know each other. Although all the design quality issues contributed in some way to enable outdoor areas for socializing and leisure of residents, these may be put in relevance order. From the preferences of residents, permeability, spatial definition, scale, and legibility were determinant in allowing users to know their way around the housing area, feel comfortable in a semi-public environment, and safe from undesirables. Complexity and mystery were then essential characteristics to encourage residents into using outdoor areas and also constituted an important leisure activity for balcony users. When using outdoor areas, order, robustness, and a variety of choices for shelter were key factors in facilitating socializing and leisure activities. In the process for using outdoor areas, complexity was no longer an essential feature but an added amenity. Lastly, coherence improved the way in which outdoor areas were perceived and used but were not essential for socializing.

The table then shows community related issues should follow to facilitate residents develop social networks and allow them to become involved in their community. If put in an order of relevance, from the issues regarding community development the most

important issue was to improve the image of the housing area that would then aid in fostering a sense of pride. This, as well as provision of various types of dwellings to meet the different needs of residents, was considered essential by the housing companies in reducing vacancies and giving residents choices, making the housing area a desirable place to live. A variety of facilities, events, workshops, community services, and others would then provide the means for residents to meet and develop knowledge of their community. In enabling and establishing community services on a long-term basis by residents, it was essential for them to learn the necessary skills to do so. In that process, the exchange of ideas and collaboration among residents and managing bodies would facilitate it.

After this, opportunities and areas for care and personalization provided residents with choices and opportunities to modify their outdoor areas and express their ideas. However, this was not always ideal in any of the three case studies for the way they may change the general image of the communal gardens or the causing of possible expression conflicts. From the issues regarding community participation, choice for doing so was essential. To allow for a continuous involvement of residents with their community and environment, short- and long-term options were essential followed by various degrees and ways of participation for residents to become involved.

Third, ecological issues should be introduced in consideration that they do not lessen social integration and the building of community. The most important issue to be considered is the enhancement of pedestrian and cycle movement as well as public transport to reduce carbon emissions and enhance community opportunities in the housing area. Otherwise there were various strategies for reducing energy use that could be integrated to lower heating costs for residents and which may improve the microclimate conditions of communal gardens. Similarly, various projects for reducing pollution could be integrated in the housing area with ecological and social benefits. For instance sustainable urban drainage systems provided communal gardens with sensorial richness, and projects for reuse of discarded products or vacant facilities gave residents opportunities to meet others and participate.

The selection of materials, furniture, and planting were more significant for the image they portrayed as part of the communal gardens. The selection of materials according to their life-cycle was not always possible due to their limited availability and variety. Increasing the biodiversity of outdoor areas was important for a number of residents in

the three case studies as part of the sensory experiences provided in outdoor areas and as learning resources. It was possible to establish areas to improve biodiversity by designing and managing outdoor areas in a way that reduced an untidy look for the housing area and by being part of leisure or social activities of residents. For instance there were dedicated areas such as training areas for dogs and areas with spontaneous vegetation, ponds were designed for providing sensory richness, green facades were placed and cut back to avoid intrusion to windows, among others. Lastly, saving of drinking water was least economically beneficial or technically feasible, and provided few opportunities for residents where residents could participate.

Taking in consideration the key issues, recommendations may be made as how they may be accomplished as well as the way they may be established in other geographical contexts such as Mexico.

Recommendations for future regenerations

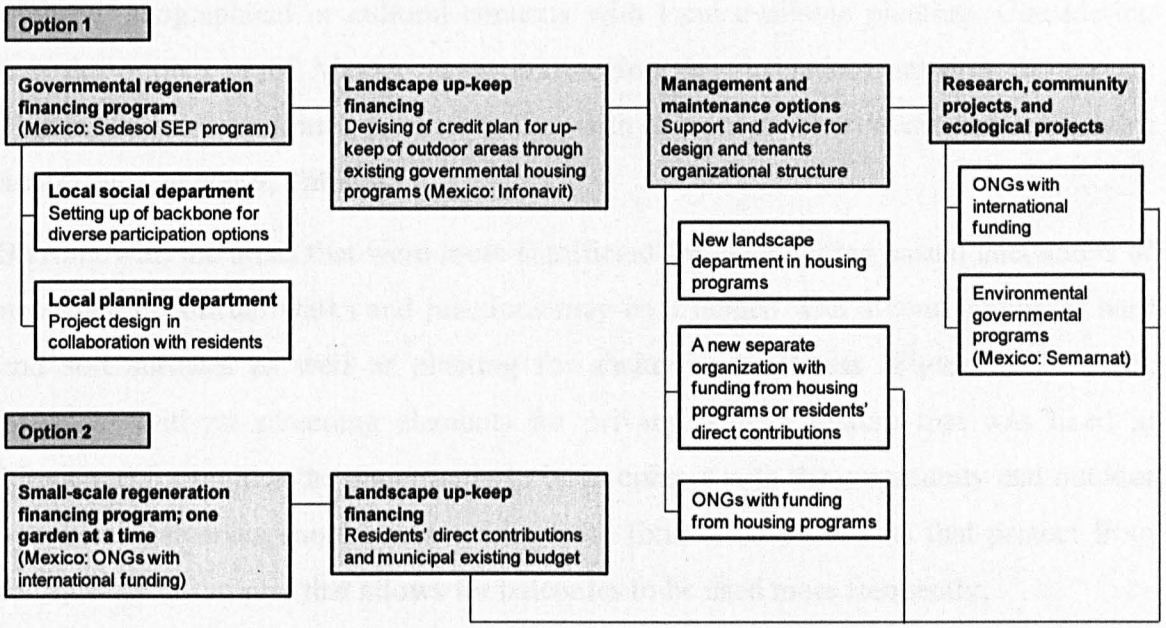
General recommendations

The first consideration to conduct a regeneration of existing housing areas in a context such as Mexico, and probably much of America, is the way it may be accomplished if social dwellings are of private property. This is inevitably linked to the ways social and ecological strategies could be implemented for which the participation of residents would play an essential role as well as short- and long-term organizational and support mechanisms. In Mexico, the aid of governmental programmes such as Sedesol's REP could get the regeneration started and supported on short-term basis. After that, long-term maintenance and management schemes could be easily set up through existing not-for-profit organizations providing support similar to that of the tenant management organization in the UK through the effective management scheme.

Ideally, an organization that may provide such a service to owner-occupiers would be needed even if not related to current governmental programmes. This would allow for existing social networks in the community of housing areas to strengthen from working together towards a same goal and participating in coordinated efforts that benefit their outdoor areas and their community. Through such programmes, a progressive schedule for regeneration per communal garden could be set up as it has been a tradition for dwellings in Mexico and South America, where residents may transform it through self-construction to meet their family needs and financial possibilities. This would provide

residents with options and flexibility in changing their outdoor areas which would allow some form of personalization adequate to their context that could develop a sense of pride. This would also allow residents to take up maintenance duties which may be coordinated with maintenance provided by local authorities (Figure 10.1).

Figure 10.1 Possible options for integrating a regeneration of the landscape in a context such as Mexico



However, for regeneration projects to be effective and avoid duplication of efforts in the current planning system of Mexico there is urgency for integrated communication among the different departments involved in regenerating public spaces; it is thus relevant that evaluations of existing regeneration programmes are made available to the collaborating departments as a way of learning from experiences. More important, there is the need to acknowledge the importance of outdoor areas as community spaces by local authorities. For that, it is essential to increase the presence of landscape architects in Mexico and landscape related literature that raises design knowledge and practice in outdoor areas. This is a task that current universities are taking by introducing specialized landscape courses in master degrees of architecture or the recently creation of the landscape degree in the capital of the country. Yet, efforts like this are still numbered in an environment that remains controlled by the architectural and planning profession.

For the process of the regeneration through programmes such as REP or non-profit organizations, recommendations for the design criteria, the building of community, and improvement of ecological processes should be part of their guidelines. Similarly, this

information should be made available to residents so that the process of selection of feasible issues is made in collaboration with programme officers.

Design guidelines for improving social integration of residents

From the design criteria, the various features that were found to be generally applicable in different settings may be introduced in the regeneration of communal gardens in different geographical or cultural contexts with local available planting. Considering that the north part of Mexico is an arid region, low-irrigation and drought-tolerant planting may be integrated in combination with drip irrigation systems and small lawn areas (See Chapter 9, Table 9.1).

Starting with the areas that were more significant for encouraging casual encounters of residents, pedestrian walks and junctions may be arranged with a combination of hard and soft surfaces as well as planting for shelter and richness (Figure 10.2). Also, balconies without screening elements for privacy were a feature that was liked in Mexico as it provides the opportunity to be in contact with the community and outdoor activities. Balconies should be provided with fixtures to place nets that protect from mosquitoes in summer that allows for balconies to be used more frequently.

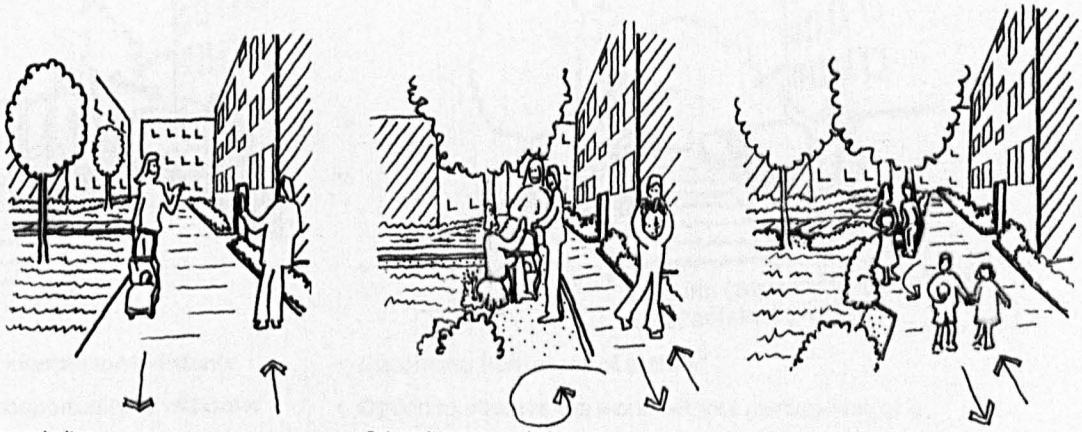


Figure 10.2 Arrangement of pedestrian walks may discourage (left) or encourage casual encounters (middle and right)

For seating areas, the most important characteristic was to enable users to have an interpersonal distance allowing them to view others and engage with them if desired (Figure 10.3). For that reason, seating areas were more adequate with back shelter or

back and side shelter with a height or density that allowed viewing others (Figure 10.4). Interpersonal distancing was also important in the preferred types of seating areas, having benches with a backrest and without a backrest being preferred; the latter for its flexibility particularly for public areas. Double-sided seating sharing a back was disliked by female residents in public areas for which they may be more adequately placed in semi-public areas such as communal gardens where users may know each other (Figure 10.5). It is considered that it would be appropriate to carry more research into this type of seating areas and their adequacy for socializing in housing areas.

Similarly, seating areas with capacity for four up to eight people were preferable which could be achieved through integrating formal and informal seating (Figure 10.6). Movable heavy weight benches were also adequate in allowing residents to accommodate themselves in different sized groups. Where gathering of youngsters at night is a nuisance or there is a vandalism problem, as in Mexico and Rotes Viertel, residents may be in the possibility of storing movable benches for daytime use only.

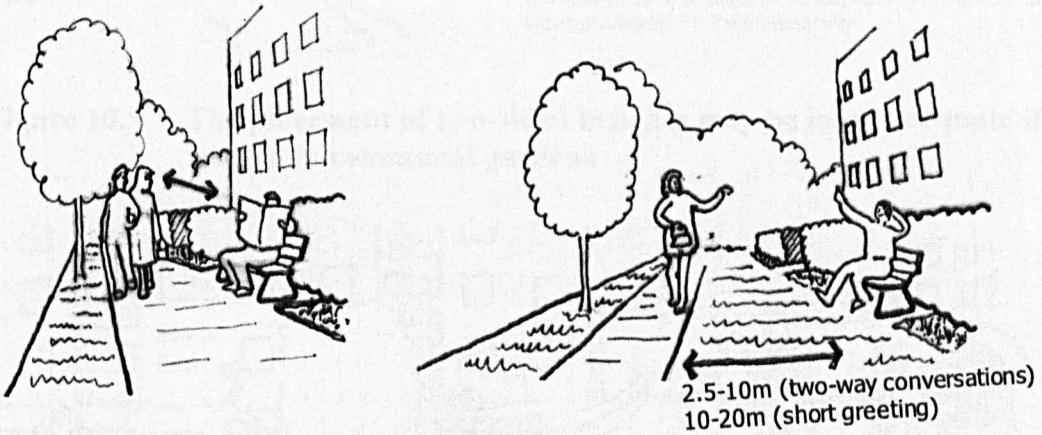


Figure 10.3 Distancing of seating areas to activity edges may discourage (left) or facilitate social interaction (right)

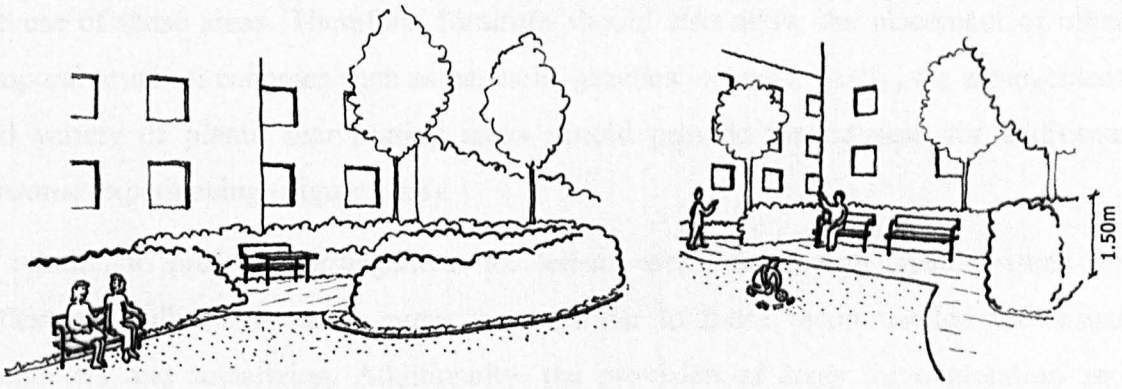
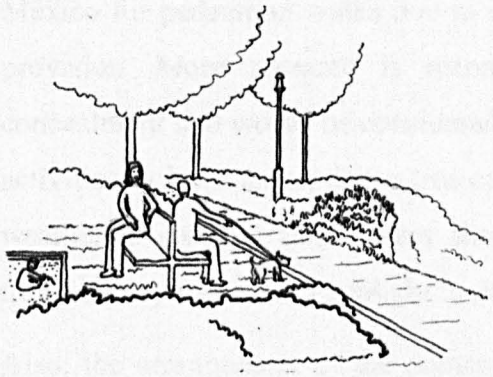
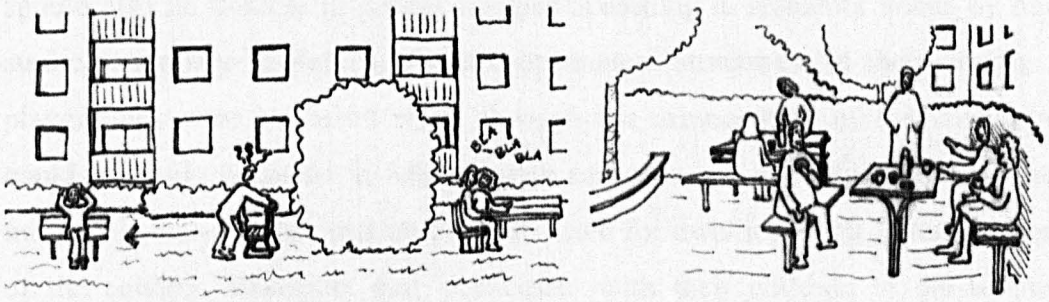


Figure 10.4 Full sheltered enclosure does not enable viewing edge activities (middle seating area) compared to open and three side enclosure (left and right seating area)



- Two-sided benches are uncomfortable to share with unknown users, particularly for women.
- They may not feel so intimidating in communal gardens where neighbours somewhat know each other and may instead involve in occasional conversations.
- It is recommended to locate each side of the bench with uses that do not cause conflict to each other.
- Compared to two-sided benches, those without backrest were preferred for their versatility

Figure 10.5 The placement of two-sided benches may be more adequate if located in communal gardens



- Heavy weight movable furniture aids in suiting the needs of the different residents without the risk of being stolen.
- Adults, elderly, and youngsters regularly gathered in groups of 4 at a minimum, preferably of 6, and sometimes up to 8 persons if furniture allowed it.
- Informal seating is recommended for complementing formal seating to meet the needs of group gatherings.

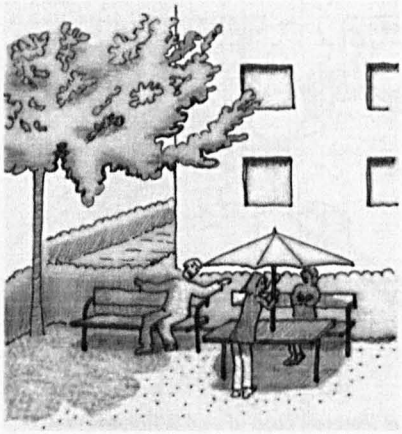
Figure 10.6 Flexible furniture facilitates the varied social activities that residents require

Shelter from sunlight was more adequate with trees of light tree canopies or other forms of plant shelter rather than using artificial structures (Figure 10.7). In Mexico, the use of climbers may become habitats to undesirable venomous insects which may discourage

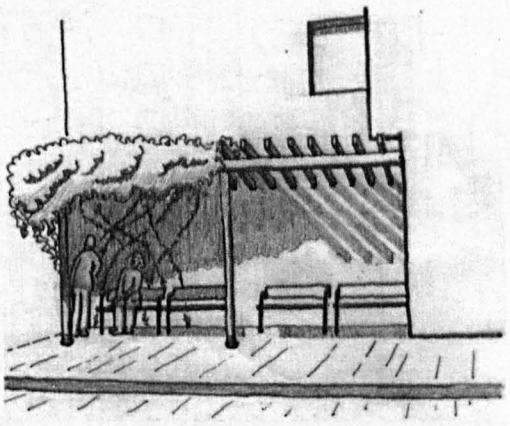
the use of these areas. Therefore, furniture should also allow the placement of other temporal artificial canopies such as parasols, gazebos, or tents. Lastly, the arrangement and variety of plants near seating areas should provide for richness for a diverse sensorial experiencing (Figure 10.8).

In relation to preferred arrangement for leisure areas, the design characteristics for pedestrian walks and seating areas were similar to those recommended for casual encounters and socializing. Additionally, the provision of areas for exploration and discovery were liked by residents in communal gardens achieved through partially secluded views with planting and mounds with varied heights ranging from 1.3m to 2.5m (Figure 10.9). However, these were not welcomed by female residents from Mexico for pedestrian walks due to insecurity, for which care should be taken in their provision. More research is recommended in finding the type and amount of concealment that would be considered safe by residents for pedestrian walks. For leisure activities in lawn areas, dense tree canopies were required in Mexico due to the warm weather in summer time. Trees should also be considered in terms of their branch transparency that allows sunlight in the cold winter months.

Also, the arrangement of the communal garden should include a variety of areas for residents to use them for different activities (Figure 10.10). Areas should be defined and integrated to allow view of the different activities without interfering each other. They should also be flexible to permit changes according to residents' needs by having soft surfaces, modular materials, and non-permanent structures. In their design, informal playgrounds were preferred made through the arrangement of the landscape. These could be easily be made in Mexico with carved wood and adobe figures, the latter a mouldable material that was traditionally used for dwelling walls in the northern region of the country. Residents may participate with their children to define the design, building, and maintaining them.

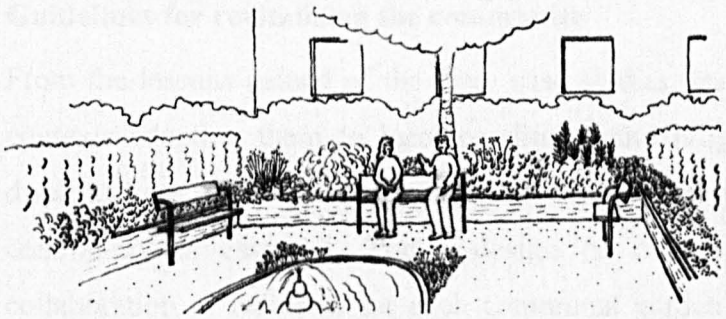


- Arrangement allows for various sheltering options
- Furniture enables the use of artificial structures
- Light tree canopies were preferred for partial screening



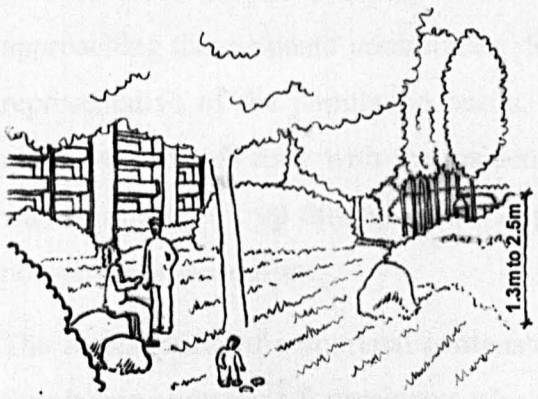
- Planting shelter was preferred to fixed artificial structures

Figure 10.7 Shelter of light tree canopies (left seating area) may be combined with artificial structures and climbers (middle and right seating area)

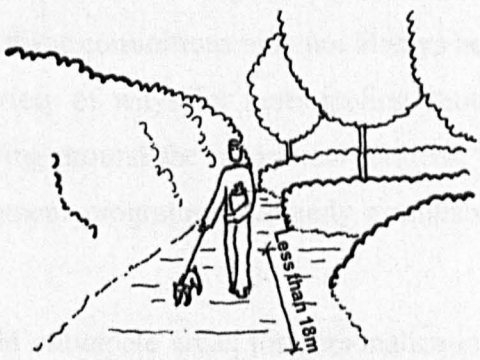


- Planting design in varying heights and textures is recommended to also integrate colourfulness and be used in seating areas with back or side and back shelter.
- It should always be considered to integrate planting with scents and colourfulness as well as elements that attract birds, enable sounds of water, and ornamental features of foci.

Figure 10.8 Planting arrangement near seating areas should provide for richness

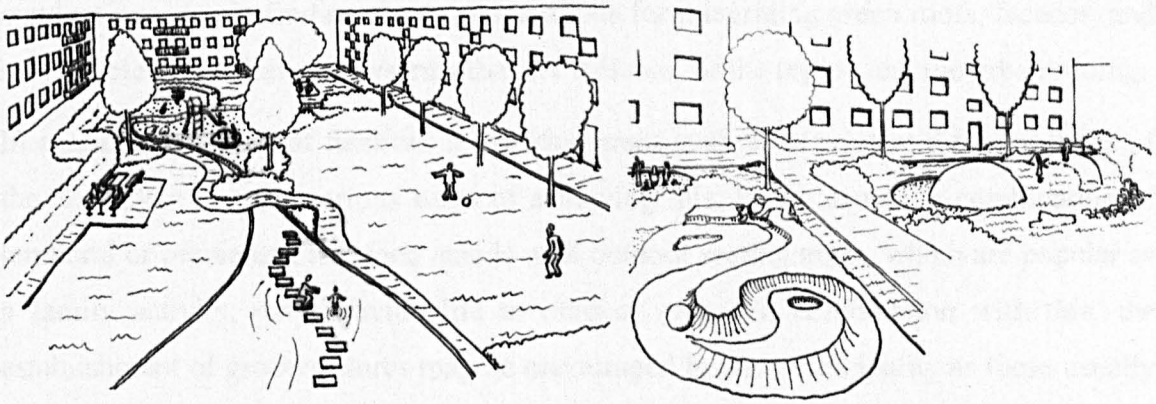


- Varying heights of shrub arrangements provide partial enclosure and diverse views in communal gardens.



- Partial concealment through planting was adequate having one continuous side shelter and intermittent ones on the other side where openings are found at no more than 18m.

Figure 10.9 Preferred height of shrub arrangement for partial concealment in communal gardens (figure left); partial concealment of pedestrian walks found in most frequented communal gardens in Rotes Viertel (figure right)



- Diverse activities may be accommodated in a communal garden without conflicting each other.
- There are various forms of shelter, materials, and planting that provide numerous experiences and opportunities for engagement.
- The areas are flexible and adaptable to users and changes.

- A variety of informal play areas may be created through the landscape which could be combined with formal play equipment.

Figure 10.10 Robustness in communal gardens (figure left); informal playgrounds were preferred to formal ones (figure right)

Guidelines for revitalising the community

From the lessons gained of the three case studies, lessons may be applied in different contexts adapting them to local conditions and programmes available to do so. As dwellings are of private ownership, the participation of residents in the building of the community is essential. The re-design of outdoor areas should be made with collaboration of residents for each communal garden or a group of them to establish their participation in the maintenance and management. Programmes like REP in Mexico have started working with residents on the design of public areas by approaching the residents' committees. Since these committees may not always be truly representative of the population needs, a variety of ways for participating should be made available directly with the residents living around the communal gardens. Other ways could be set up through home improvement programmes already established by non-profit organizations.

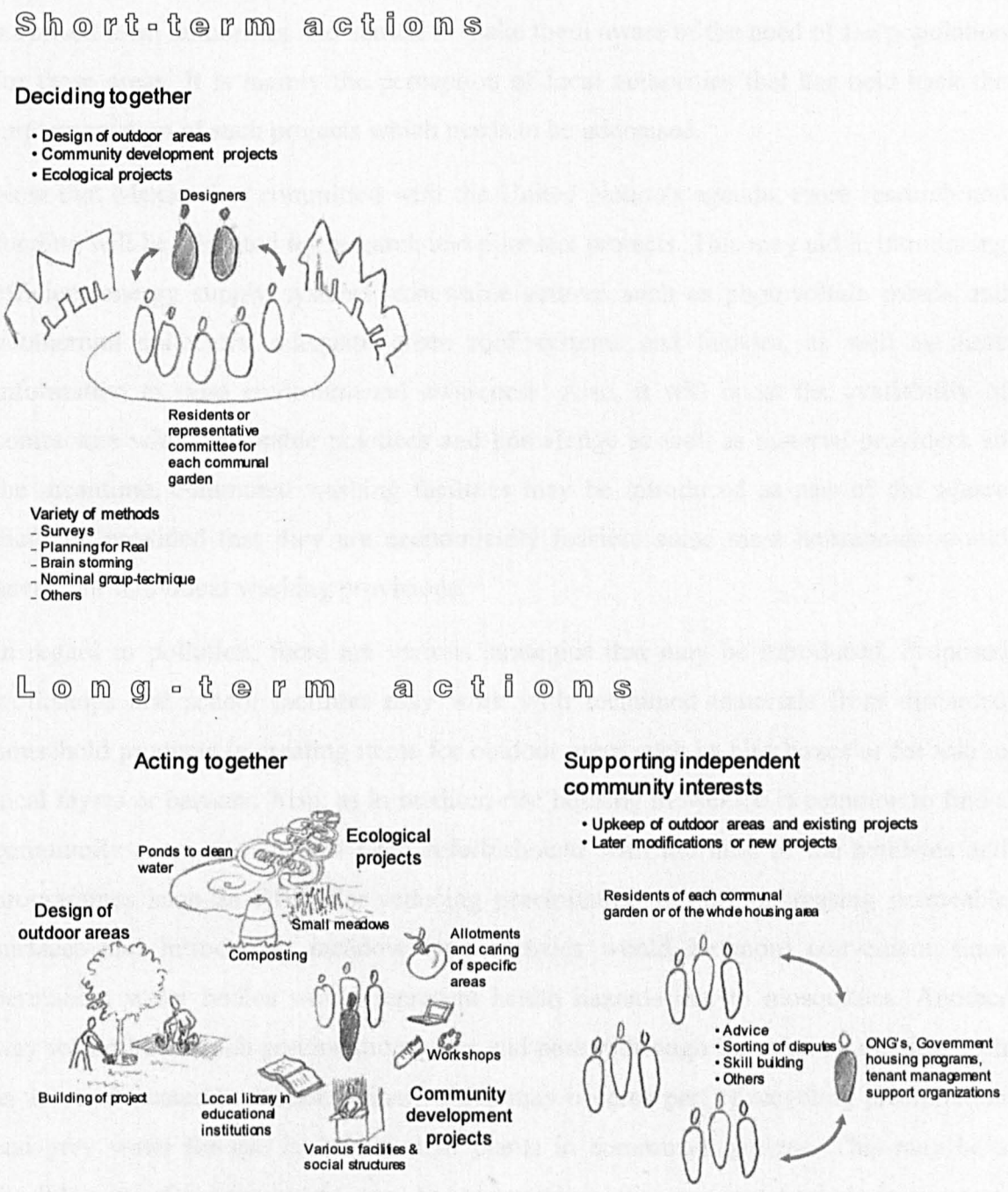
The regeneration of communal gardens should anticipate areas for personalization and for placing allotments for residents who may wish to do so. Allotments in Mexico may be adequate within educational facilities and areas for planters close to building entrances or in balconies. Otherwise, some few fruit trees may be considered such as apricot and pecan trees which can grow well in the region. It is recommended to involve residents in the selection of species to avoid conflicts in areas of diverse backgrounds such as Cd. Juárez, as well as to establish their collaboration in caring for the fruit trees. Also, community groups may be set up to collaborate with the local university to

conduct research in finding plants and methods for integrating green roofs, facades, and sustainable urban drainage systems that are suitable for the region and the urban setting.

In enabling a variety of facilities in housing areas such as Mexico at different times of the day, there may be various ways of achieving this. In the square, a combination of temporal or permanent fast food stands with outdoor seating areas, which are popular as a family activity, may provide life to outdoor areas. In combination with this, the establishment of grocery stores may be encouraged by the municipality as these usually offer services until midnight. Also, it is common in Mexico for households to have extra earnings through additional activities developed in the house during out-of-work hours such as cutting hair, repairing computers, and so on. There are also programmes from non-profit organizations that offer financial support for low-income people to acquire such skills and for setting up their own work area.

Having this, residents with similar skills may provide their services at different agreed times in a shared facility and dividing running expenses. They may also participate in establishing local workshops along with other interested residents for various activities which may be organized and disseminated in collaboration with local school programmes. Also, local educational facilities and religious institutions may participate in organizing events in communal gardens with collaboration of residents where fairs are popular as part of raising money for benefiting schools or parishes. Also, boot sale is a popular activity for weekends located in certain parts of the city which could be introduced in the square (Figure 10.11).

Figure 10.11 Schematic of some possible options for setting up of the regeneration project



Guidelines for revitalising ecological processes

From the strategies that were most successful in Rotes Viertel and Augustenborg, those that may be handled by residents and with technology locally available would be more feasible in contexts such as Mexico. Improving pedestrian and cycle movement may be possible through programmes such as REP. Otherwise, public transport options and the improvement of cycling infrastructure has already been put forward as a necessity in Cd. Juárez by previous research. In fact, some recent regeneration of brownfield areas

near the border that have been converted into cycling areas and youngsters' sports activities have been tremendously successful in their demand and use.[525] This has surprised local authorities and started to make them aware of the need of the population for these areas. It is mainly the perception of local authorities that has held back the implementation of such projects which needs to be addressed.

Now that Mexico has committed with the United Nation's agenda, more research and funding will be allocated for research and pilot test projects. This may aid in introducing efficient energy supply systems, renewable sources such as photovoltaic panels and geothermal collectors, adequate green roof systems and facades, as well as more information to raise environmental awareness. Also, it will boost the availability of contractors with sustainable practices and knowledge as well as material providers. In the meantime, communal washing facilities may be introduced as part of the square facilities provided that they are economically feasible since most households would have their individual washing provisions.

In regard to pollution, there are various strategies that may be introduced. Proposed workshops and school facilities may work with reclaimed materials from discarded household products in creating items for outdoor areas such as bird boxes or for sale in local fayres or bazaars. Also, as in medium-rise housing in Mexico is common to find a community room, it may just need refurbishment with the help of the residents and programmes such as REP. For reducing precipitation run-off, increasing permeable surfaces and introducing meadow type surfaces would be more convenient since permanent water bodies would represent health hazards due to mosquitoes. Another way would be to catch precipitation water and pass it through flow form cascades, such as those advocated by Rudof Steiner, which may become part of recycling precipitation and grey water for use in irrigation of plants in communal gardens. This may be a feasible way of reusing water, cool the temperature of communal gardens in summer, and provide a rich sensorial experience.

As for organic waste, composting bins may be placed in rubbish sheds located in each communal garden with a key-controlled access. Otherwise, separation of rubbish may bring extra income for garden maintenance if they are taken to dump facilities by residents. In relation to biodiversity, more research would be required towards finding the adequate balance of spontaneous and non-native plants which may thrive in arid

[525] Luis Martínez, (Project leader, IMIP), interview by C. Martínez, January 2009, transcript 4S, Cd. Juárez, Mexico.

regions and provide annual interest. Otherwise, maintenance and management practices could easily be arranged with residents since they would be in charge of providing it directly or by hiring gardeners. An essential task would be to have available the knowledge and experience of landscape professionals to define practices and work along with local authorities, the REP programme, or non-profit organizations chosen to regenerate the communal gardens.

Further research

There are various areas in which more research is required, either to complement areas presented in this study or for integrating other required issues to achieve a sustainable landscape regeneration in medium-rise housing (Table 10.2).

- It is necessary to investigate the ways in which planning and regulations may be changed to facilitate the implementation of landscape quality issues in regeneration projects as well as a continuous and efficient collaboration between stakeholders. The pilot testing of different approaches in different countries is required to define suitable processes that enable long-term solutions to improve the possibilities of achieving a sustainable housing regeneration.
- As such, the documentation and study of other landscape regeneration strategies in medium-rise housing is required, preferably following a similar assessment method that may be comparable between different contexts. Information exchange may be facilitated with research networks established between education institutions and government departments across countries through an international organization such as the European Union.
- From the quality issues established in this study, it is also necessary to complement them with economical and political issues as part of the regeneration scheme and the later revitalization of the internal processes.
- The design criterion used in this study also requires to be further refined. Further investigation is suggested for planting arrangements that ameliorate scale perception of buildings for closed layouts and the visual perception of design qualities of the landscape from different storeys and their contribution to socializing. Further testing in different geographical and cultural settings is required for double-sided seating sharing a back as well as the type and level of concealment preferred for pedestrian paths for exploration and discovery.

- In the specific context of Mexico further research is needed for various issues in the diverse climatic zones of the country. Optimal planting combinations to create the recommended guidelines and ecological projects should be assessed. In particular, adequate design and testing of sustainable urban drainage systems for level arid areas is suggested due to water shortage.

Table 10.2 Suggested areas for continuation of research of landscape regeneration schemes in medium-rise housing

	Areas for further research	Research application	Benefited actors
Social integration	Further investigation of gaps in design criteria	Local, national, and international information networks	Researchers, designers, planners, and developers
	Testing of design criteria in other contexts		Guidance for design
Community development and participation	Identification of efficient ways to provde long-term assistance for the development and thriving of social structures	Research diffusion to practice and users through papers, circulars, and presentations	Housing managers and maintenance providers
			Guidance for implementation and follow-up of strategies
	Identification of necessary trust issues for power to be handed down to users as part of participation schemes and devising of gradual stage implementation structures	Integration of quality issues into planning guidance and/or as part of regulation minimum standards	Community workers and housing managers
Ecological enhancement	Exploration of ways to enable governmental incentives, particularly in contexts such as Mexico		Guidance on successful strategies
	Testing of ecological projects for landscape regeneration (particularly for reducing and increasing biodiversity)		
	Testing and evaluation of efficient awareness information schemes for users (particularly for water consumption, reducing pollution, and improving biodiversity)		
Other areas	Integrating and testing of economical quality issues		
	Exploration of efficient ways for collaboration and delivering of structures for long-term revitalization processes in different countries		
	Assessment and comparison of other landscape regeneration experiences		

Research in these areas may provide a variety of solutions that can serve as information guidelines or be transferred as planning regulations. It is still uncertain when such guidelines would be fully integrated in planning guidelines as part of improving the quality of life of residents. Yet, a growing research interest in the regeneration of housing and ways for achieving sustainable communities as part of the local 21 agendas suggests it may be possible in the near future.

Key contributions of the research

The main contributions that this research has made are:

- It showed the relevance of social sustainability issues for improving the quality of life of residents and the importance of linking them to suitable ecological issues for their successful implementation.
- It confirmed the importance of outdoor areas for residents to know and relate to others in various low-income medium-rise housing areas.
- It provided insight into the community and landscape design qualities that were adequate for low-income medium-rise housing regardless of different cultural, geographical, and weather contexts.
- It demonstrated the different and feasible approaches for implementing ecological processes suitable to medium-rise housing in different geographical settings.
- It complemented previous research assessments by developing the necessary criteria for addressing social sustainability through the landscape for medium-rise housing, with the possibility of being adapted to other housing contexts.

From the findings of this study, it is clear that the arrangement of the landscape improves community life as part of a regeneration project and provides significant opportunities for enhancing the environment. The re-designed layout of the outdoor areas can create a quality setting with ecological features that encourages and facilitates the development and strengthening of social networks aiding in the continuous revitalization of the community. In the definition and upkeep of the landscape, and integrating of ecological projects, various degrees and type of participation opportunities can assist in their devising, implementation, and ownership by residents; the parts of the regeneration process and the whole of the regeneration scheme later becoming part of the valued memories and identity of residents. Ideally, the landscape would be regenerated to promote issues of community along with feasible ecological projects in close collaboration with residents.

Ways to achieve the regeneration of a landscape with a social and ecological focus still need to be developed in giving it the sufficient significance that may lead to more and varied economical, planning, and social support its development. As a start, it is hoped that future regeneration assessment methods currently used in practice are complemented in landscape features particularly those related to social sustainability. Their introduction can eventually lead to the change of attitudes towards the landscape

from planners and developers in their contribution for community life and ecological enhancement. In other contexts such as Mexico, the quality design criteria may be disseminated through landscape studies and research practice that in the future may change regulations for enhancing the landscape and ultimately improving the quality of life of residents.

Closing summation

Throughout the thesis, the relevant issues for sustainability related to landscape have been put forward for the regeneration of medium-rise housing, focusing on revitalising the community and ecological processes. From the experience of the regeneration schemes and the application of results, key issues have emerged which indicate the priority of enhancing community life over ecological strategies since the latter's success depended on the former. In improving the community, the way outdoor areas were designed have been shown to have a key role in facilitating the initial steps to create social networks, by providing a setting where residents may be encouraged to use, meet others, and develop their social life. For that, most of the preferred-for-socializing areas and design characteristics have been shown to be similar in different geographical and cultural contexts.

Introducing these design guidelines, community initiatives, and ecological projects in different contexts should not be difficult. However, it has been shown that a close collaboration of residents and stakeholders must be made possible to facilitate the process. For that, the most important obstacle is the narrow perception of stakeholders towards the potential of landscape for enabling community. This must be addressed in order for future regenerations to succeed in revitalizing the community and the ecological processes of the site.

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Appendices

Appendix A

Appendix A

Assessment for the performance of the ecological and social sustainability of the landscape in medium-rise housing after regeneration

The environmental assessment is separated into five sections and the social assessment into two sections. Each section contains questions that offer check boxes with different answers to which at least one should be selected. Each answer has points which add to a total value. In the case of questions that may not apply, an optional answer is provided as not-applicable (N/A). The scoring is based on grading from 0% to 100% with the following classifications:

100%	Outstanding	(Fully meets the standards of the present evaluation)
90%	Good	(Meets the standards with some deficiencies)
80%	Satisfactory	(Close to the standards, can be enhanced with improvements)
70%	Poor	(Below the standards)
60% and below	Bad	(Very deficient)

Grading of the assessment

All questions in each section are graded with a similar value whereas the grade for the entire assessment is separated into weighted values that differ for each section. The weight value for each section follows the 2008 model of the Multi-residential Code from BREEAM which was found to be more suitable for medium-rise housing areas. The weighting values are as follows:

Sections	Weighting Value
1 . Reducing energy use and Carbon Dioxide emissions. Strengthening pedestrian and bicycle transport. Strengthening public transport. Fixing Carbon Dioxide through vegetation. Reducing energy use in buildings.	29%
2 . Increasing biodiversity: Species richness, habitat complexity and genetic variation in flora and fauna.	12%
3 . Water saving.	8%
4 . Reducing pollution.	20%
5 . Materials.	13%
6 . Community development.	10%
7 . Community participation	10%
	Total 100%

At the end of the assessment, an example for grading is provided along with the tables for each section and the entire assessment.

Section 1. Reducing energy use and Carbon Dioxide (CO_2) emissions.
(169 points available)

1.1 Strengthening pedestrian and bicycle transport (100 points available).

A. Allocation of facilities at pedestrian distances.

- What percentage of residents are within 400m walk from their dwellings to the following?

	1) 95-100% (3 points each)	2) 80-94% (2 points each)	3) Less than 80% (1 point each)
a) Toddler's play area	☐	☐	☐
b) Community centre and workshops	☐	☐	☐
c) Public transport	☐	☐	☐
d) Playgrounds	☐	☐	☐
e) Primary school	☐	☐	☐
f) Local shops and restaurants	☐	☐	☐
g) Nursery	☐	☐	☐
h) Pharmacy	☐	☐	☐

- What percentage of residents are within a 800m walk from their dwellings to the following?

	1) 95-100% (3 points each)	2) 80-94% (2 points each)	3) Less than 80% (1 point each)
a) Playing fields or park	☐	☐	☐
b) Health unit	☐	☐	☐
c) Post office	☐	☐	☐

In order to encourage walking and decrease vehicle use, the regeneration should consider re-establishing main facilities within a 400m walk for at least 80% of the dwellings and within a 800m walk to other larger facilities. The type of facilities required will depend on the size of the population and particular needs of residents. Distances are determined according to physical conditions of prospective users, functionality of spaces and daily usage.[1] Residents with low mobility for physical or economic reasons rely on local facilities for a good amount of their shopping, leisure, and social needs.

[1] Hugh Barton, Geoff Davis and Richard Guise, *Sustainable Settlements: A Guide for Planners, Designers and Developers*, (Bristol: University of West of England, 1995), pp. 115-118. See also Anne R. Beer and Catherine Higgins, *Environmental Planning for Site Development: A Manual for Sustainable Local Planning and Design*, 2nd edn, (London: E & FN Spon, 1990; repr. 2000), p. 123. See also Anne Stevenson, Elaine Martin, and Judith O'Neill, High Living: A study of Family Life in Flats, (Australia: Melbourne University Press, 1967), p. 76.

B. Strengthening safety of pedestrians and cyclists in outdoor areas.

- What is the percentage of crime compared to city statistics?

☐ 1) High (1 point) ☐ 2) Average (2 points) ☐ 3) Low (3 points)

Regeneration should target to reduce crime and traffic accidents in order to encourage walking and cycling rather than vehicle use.[2]

- What is the percentage of pedestrian and bicycle accidents compared to city statistics?

☐ 1) High (1 point) ☐ 2) Average (2 points) ☐ 3) Low (3 points)

Bicycle and pedestrian routes that require greater care are those with bigger congregations of pedestrians to avoid spatial functional conflicts that lead to accidents.[3]

- What is the speed limit of vehicles?

☐ 1) 10 mph (3 points) ☐ 2) 20 mph (2 points) ☐ 3) More than 20 mph (1 point)

In the United Kingdom, a steady but low vehicle speed of 20mph provides priority to pedestrian areas although Home Zones design recommends 10mph.[4]

- Have routes been re-designed to have sufficient capacity for pedestrian and bicycle use?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Areas of conflict and possible accidents should be prevented. A width of 2.5m. is functional for a regular density of a single pedestrian and bicycle use of no more than 100 cycle trips per hour. Consideration for two pedestrians and a regular bicycle density requires 2.75m. minimum. In spots of larger concentrations of pedestrians and cyclists as entrances to facilities or close to bus stops, 3.0m. or more is required. This distances provided that there are no other built elements interfering.[5]

- Have roads been provided with safe road cross junctions for pedestrians and cyclists?

☐ 1) Yes (4 points) ☐ 2) Only at difficult crossings (3 points) ☐ 3) Only for pedestrians (2 points) ☐ 4) No (1 point)

Introduction of safe road cross junctions gives pedestrians and cyclists priority over vehicles either with changes in paved texture, gradient change, planting, diversions or others.[6]

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[2] Hugh Barton, Geoff Davis and Richard Guise, p. 43.
[3] Ibid., p. 54.
[4] Hugh Barton, Geoff Davis and Richard Guise, p. 128. See also East Lothian Council, 'Home Zone Design Standards', *Supplementary Planning Guidance 1*, (2005), <http://www.eastlothian.gov.uk/documents/contentmanage/Home%20Zone-11548.PDF> [accessed April 2007], 1-33 (p. 3).
[5] The American Institute of Architects, *Architectural Graphic Standards Version 2*, (John Wiley & Sons, 1998) p. 96. See also Hugh Barton, Geoff Davis and Richard Guise, p. 178.
[6] Hugh Barton, Geoff Davis and Richard Guise, p. 177.

- Have pedestrian areas been improved with informal surveillance?

	1) Yes (2 points each)	2) No (1 point each)
a) Side windows and entrances	☐	☐
b) Overlapping of facilities with pedestrian routes	☐	☐
c) Visual permeability of vegetated areas	☐	☐
d) Good illumination	☐	☐

Dwelling windows and entrances located onto pedestrian areas provide informal surveillance of users that can add to safety. The presence of different activities alongside of pedestrian routes ensures people presence that adds to safety and control. Arrangement of plants allowing residents to have a long-horizontal distance visual access provides them with a feeling of safety as they are aware of activities happening surrounding them. Well lit areas provides for a perception of safety and therefore use of exterior areas at night.[7]

- Has the re-design considered elements to give preference of pedestrians and cyclists over vehicles in shared road areas?

	1) Yes (2 points each)	2) No (1 point each)
a) Textured or coloured paving	☐	☐
b) Changes in gradients	☐	☐
c) Vegetation, bollard barriers, furniture	☐	☐
d) Narrow or winding road design	☐	☐

A re-design of roads should be provided to make vehicle users aware of pedestrian areas, make them slower their speed, and drive carefully.[8]

- Have measures been taken to give pedestrian areas preference over added parking areas?

	1) Yes (2 points each)	2) No (1 point each)
a) Underground parking	☐	☐
b) Green curtains to shield view	☐	☐
c) Shared surfaces with pedestrian emphasis	☐	☐

Increasing vehicle parking might be necessary to meet current demands yet it must be integrated to support and keep pedestrian and cycle areas.[9]

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[7] Jane Jacobs, *The Death and Life of Great American Cities*, (New York, Vintage, 1961; repr. 1989), p. 35. See also Ian Bentley, Alan Alcock, Paul Murrain, et al., *Responsive Environments: A Manual for Designers*, (Burlington, MA: Architectural Press, 1985), p. 27. See also Rebekah Levine Coley, Frances E. Kuo and William C. Sullivan, 'Transforming Inner-City Landscapes: Trees, Sense of Safety and Preference', *Environment and Behavior*, 30 (1998), 28-59 (p. 48). See also Rachel Kaplan and Stephan Kaplan, *The Experience of Nature: A psychological Perspective'*, (Cambridge: Cambridge University Press, 1989), p. 45.

[8] East Lothian Council, p. 18.

[9] CABE, 'Accommodating the Car', *Building for Life*, (2006) <http://www.cabe.org.uk/AssetLibrary/4263.pdf> [accessed February 2007] 3.

- How many vehicle parking spaces have been made available per household?

☐ 1) Maximum one (3 points) ☐ 2) Two (2 points) ☐ 3) More than two (1 point)

Keeping space for parking areas low is expected to contribute to lower vehicle ownership and more use of public and other forms of transport, and means also larger public areas can be provided for pedestrians.[10]

C. Enhancement of pedestrian and cycling circulation areas.

- Is the outdoor environment interconnected with pedestrian and bicycle routes?

☐ 1) All the area (3 points) ☐ 2) Some areas lack pedestrian or bicycle routes (2 points) ☐ 3) There are only pedestrian routes (1 point)

The regeneration should enable connections amongst all the pedestrian and cycle areas to provide easy access and a continuous network.[11]

- Are pedestrian and bicycle routes direct, with appropriate gradients and surfaces?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Gradients should be comfortable for pedestrians and cyclists with a maximum of 5% for pedestrians and cyclists for no more than 100m. An alternative is a top maximum gradient of 8% for pedestrians over very short distances and 7% for cyclists no longer than 30m. Deflection of routes should be kept up to around 15-20% for pedestrians and up to 10% for cyclists for no more than 500m, otherwise the use of vehicles is preferred. As well, pedestrians require surface textures that are not slippery while cyclists require well-drained, continuous-smooth and well-maintained surfaces.[12]

- How many bicycle parking spaces are available per household?

☐ 1) Not limited (3 points) ☐ 2) According to number of bedrooms (2 points) ☐ 3) None (1 point)

Providing sufficient and safe bicycle parking is essential to reduce use of vehicles and preferably sheltered from weather conditions as excessive sun and rain can damage the bicycle materials. It is recommended to have 1 space for two-bedroom flats, 2 spaces for three-bedroom flats and 4 spaces for four- or more bedroom flats. Safe provision can range from indoor or fenced spaces with a key to a door to racks to chain bicycles to, the former could be preferred than outside parking.[13]

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[10] Urban Task Force, 'Towards an Urban Renaissance: The Final Report of the Urban Task Force', *Department of the Environment, Transport and the Regions*, (1999) <http://www.renewal.net/Documents/RNET/Policy%20Guidance/Towardsurbanrenaissance.pdf> [accessed January 2007] 10. See also Dominic Stead, 'Unsustainable Settlements', in *Sustainable Communities: The Potential for Eco-Neighbourhoods*, ed. By Hugh Barton, (London: Earthscan, 2000; repr. 2002), p. 40.

[11] Hugh Barton, Geoff Davis and Richard Guise, p. 125.

[12] Hugh Barton, Geoff Davis and Richard Guise, pp. 122-127 and 178.

[13] Department for Communities and Local Government, 'Code for Sustainable Homes: A Step-change in Sustainable Home Building Practice', (2006) <http://www.planningportal.gov.uk/uploads/code_for_sust_homes.pdf> [accessed April 2007] 14.

- Have pedestrian and cycle routes been protected from exposure to climate through creation of microclimates?

☐ 1) With provision of screens and shelter areas from wind and sun (3 points) ☐ 2) With provision of shelter areas from sun (2 points) ☐ 3) No (1 point)

Pedestrian and cycle areas that may be exposed to prevailing winds, as in layouts with high buildings, should be sheltered by use of green screens that allow air to filter and reduce its speed. Access and shelter from sun should be provided for pedestrians depending on climate conditions of the area with dense- and large-leaf deciduous trees for shadow or non-dense- and small-leaf trees for filtering sunshine.[14]

- Have pedestrian and bicycle routes been protected from noise and pollution of major roads?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Use of green screens towards roads provide a visual barrier that reduces the perception of noise even though it is mostly the same with or without the barrier. However, the leaves of trees with wind can overpower the road noise. Green barriers absorb dust in the air which settles on leaves and stems improving the air quality, they can filter Carbon Dioxide (CO_2) from vehicles, and remove some of the Carbon Monoxide produced by traffic.[15]

- Have visual amenities been considered in the landscape re-design for pedestrian and bicycle areas ?

	1) Yes (2 points each)	2) No (1 point each)	3) N/A (0 points each)
a) Variety of colours	☐	☐	/
b) Variety of textures	☐	☐	/
c) Variety of forms	☐	☐	/
d) Historical references	☐	☐	☐
e) Art element	☐	☐	☐

Pedestrian and bicycle areas providing visual richness enhances journey experience and orientation references.[16]

[14] Hugh Barton, Geoff Davis and Richard Guise, p. 174. See also Anne R. Beer and Catherine Higgins, p. 86 and 113.
[15] Anne R. Beer and Catherine Higgins, pp. 113-115. See also Robert D. Brown and Terry J. Gillespie, *Microclimatic Landscape Design: Creating Thermal Comfort and Energy Efficiency*, (New York: John Wiley & Sons, 1955), p. 134.
[16] Ian Bentley, Alan Alcock, Paul Murrain, et al., p. 89.

- Have tactile, hearing, and olfactory experience opportunities been considered in the landscape re-design for pedestrian and bicycle areas?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Pedestrian and cycle areas can be enhanced with different sources of sense-experience.

- Was sense of scale addressed in the landscape re-design to reduce building's visual impact considering building layouts?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Sense of scale is important as part of the outdoor perception of space and comfort in using these spaces, which can be done through use of vegetation as trees in regard to height, continuous shrubbery and green facades that soften the visual impact of tall buildings.[17]

1.2 Strengthening public transport (9 points available).

☐ 1) Two or more (3 points) ☐ 2) One (2 points) ☐ 3) None (1 point)

- Is current public transport reliable?

☐ 1) Yes (2 points) ☐ 2) No (1 point) ☐ 3) N/A (0 points each)

Local authorities and housing companies should work together to define required public transport in regenerated housing areas. Different public transport services, such as two bus services combined with a tram, support different schedules and types of services provided for pedestrians and cyclists that may decrease car dependence and ownership. Reliable services may encourage working residents to take public transport more often.[18]

- Have public transport stops been illuminated and sheltered?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Pedestrian safety during all day should be ensured with well lit stops.[19]

- Have schemes of shared vehicles been encouraged?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Vehicles may be available for rent at lower prices than commercial ones for residents and trips may be organized to most frequented destinations on selected days. The vehicles should preferably rely on renewable energy such as electric or a hybrid combination.

[17] Anne R. Beer and Catherine Higgins, p. 116.
[18] Hugh Barton, Geoff Davis and Richard Guise, p. 23.
[19] Ibid, p. 125.

1.3 Fixing Carbon Dioxide (CO_2) through vegetation (6 points available)

- Has wooden vegetation been planted to improve existent air quality?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

- Has a practice of active vegetation management been established such as removal and replacement of dead trees?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Vegetation can absorb CO_2 through photosynthesis providing better air quality, but once decomposed or burned, the CO_2 is released back into the atmosphere, so vegetation must be replaced in order to keep the same balance of CO_2.[20]

- Have allotments been provided for sourcing local vegetables and fruits?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Growing herbs, fruits, and vegetables locally is healthy, provides opportunities for leisure, and have a low embodied energy compared to those of stores. These can be used for individual consumption or traded locally.[21]

1.4. Reducing energy use in buildings (55 points available).

A. Reducing energy loss and maximizing solar gain.

- Was insulation provided/improved for walls, ceilings and windows?

	1) Yes (3 points each)	2) Partially (2 points each)	3) No (1 point each)
a) Walls	☐	☐	☐
b) Ceilings	☐	☐	☐
c) Windows	☐	☐	☐

Energy waste in building temperature control can be reduced with an effective insulation layer that reduces heat loss in winter and heat gain in summer. Insulation should include windows since they allow more heat loss and gain than solid objects as walls and ceilings.[22]

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[20] Anne R. Beer and Catherine Higgins, p. 113. See also Hugh Barton, Geoff Davis and Richard Guise, p. 28.
[21] BioRegional, 'Guiding Principles of One Planet Living', *One Planet Living* (2008) <http://www.bioregional.com/programme_projects/opl_prog/principles.htm> [accessed April 2009] (para. 4 of 4).
[22] Hugh Barton, Geoff Davis and Richard Guise, p. 227

- Has green cover been encouraged in facades and roofs of dwellings?

	1) 90-100% (3 points each)	2) 75% (2 points each)	3) Less than 50% (1 point each)
a) Facades	☐	☐	☐
b) Roofs	☐	☐	☐

Green facades and roofs with dense planting act as a thermal wall by maintaining a pillow of air between the plant and the wall that reduces heat loss from interior in winter and heat coming in during summer, the latter up to 50 percent. They also provide a barrier against cold winds that remove heat from walls and ceilings. If a minimum of 25% reduction of energy was to be achieved as required by the Code for Sustainable homes by 2010 in the UK, then at least 50% of buildings should have green facades and roofs.[23]

- Have windbreaks been introduced to protect buildings from predominant and chill winds?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Windbreaks of trees can reduce up to a 15% heat loss in buildings from prevailing winds and wind chills. They can reduce frost pockets caused by Katabatic winds, cold dense air flowing from valleys and mountains usually at night that may cause frost pockets when facing a solid obstruction. Trees can reduce wind speed and turbulence by filtering it. Efficiency will be determined by height, density and length. Wind speed reduction is achieved best at 6 times the height of the windbreak. Density of trees should allow wind to filter through with spacing between trees so they don't act as solid objects. Earth banks can also work as windbreaks. Green facades contribute to reduce heat loss by wind chills of buildings where space is limited. Wind speed can also be reduced by the roughness of the surfaces present. The presence of buildings have a high roughness factor but they can also create wind tunnels in certain areas that are exacerbated by low roughness materials as concrete and lawn. Greenery as shrubs and hedgerows that have a medium roughness factor can reduce wind speed in these areas.[24]

- If no, continue to next question. If yes, have particular features or green species and their location been considered based on their efficacy to protect from wind exposure?

☐ 1) Yes (2 points) ☐ 2) No (1 point) ☐ 3) N/A (0 points)

Windbreaks close to the ground are more efficient. Coniferous trees and shrubs with low crowns, and earth banks can work well as a barrier to cold and hot wind. In warmer climates trees may reduce fresh air free-flow during spring and autumn if planted too close to dwellings or very close together.[25]

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[23] Anne R. Beer and Catherine Higgins, p. 114. See also Nigel Dunnet and Noël Kingsbury, *Planting Green Roofs and Living Walls*, Cambridge: Timber Press, 2004), pp. 30-34 and 130-131.

[24] Hugh Barton, Geoff Davis and Richard Guise, p. 158. See also Anne R. Beer and Catherine Higgins, pp. 81-86. See also Nigel Dunnet and Noël Kingsbury, pp. 30-34 and 130-131.

[25] Hugh Barton, Geoff Davis and Richard Guise, p. 158. See also Anne R. Beer and Catherine Higgins, pp. 81-86. See also Carl Smith, p. 26. See also U.S. Department of Energy, 'Landscape Windbreaks', para. 3-5 of 7.

- Was passive solar heating considered in the landscape re-design for winter/summer season?

☐ 1) Use of deciduous tree species according to winter transparency, orientation, crown height, and defoliation time (3 points)

☐ 2) Use of any deciduous species (2 points)

☐ 3) No (1 point)

Solar gain from east, west and south orientations should be maximized in winter to reduce energy consumption for heating the dwellings. Perennial wall climbers can act as thermal walls in themselves but any other perennial coniferous planting that obstructs sun in winter is not desirable. Deciduous wall climbers can allow sunlight into walls during winter while shadowing during summer in warm summer regions. The same way, use of deciduous trees can provide shade in warm summers and allow sunlight to walls in winter but branches may reduce more than one third of desired sunlight depending on species. Blockage of sun by branches can vary from 17-62% for which species should be chosen carefully for a higher transparency or with a high crown that will not block sun in winter and whose lower branches are possible to prune. Shading for warm climates can be provided with high spreading crowns of deciduous species on south walls and with lower crowns in east and west walls where sun angle is lower. Tree positioning on south orientations should be close to the building as to avoid shade of branches onto walls in winter. Selection of tree species should also be done to match the start and end of the hot and cold seasons with foliation and defoliation periods of trees depending on the type of climate. For colder climates, trees with late foliation in spring and early defoliation in winter can increase the period of sunlight over walls during start and end of winter whilst the opposite is desirable in warmer regions.[26]

- Different building layouts will produce different shading and microclimates depending on orientation, has over shading and enhancing of microclimates been addressed according to layout?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

In winter, courtyards enclosed by three or more buildings can trap warm air from sunlight, therefore it is recommended to use deciduous trees with high transparency. Over shaded areas, prone to become frost pockets, can use indirect sun reflected from other surfaces as glass, mirror walls and stainless steel to improve microclimate conditions. In summer, large deciduous trees can provide shelter from sunlight, however species should be chosen to fulfill winter and summer needs.[27]

B. Energy use awareness.

- Has it been made possible for residents to measure their individual energy consumption?

	1) Yes (2 points each)	2) No (1 point each)	3) N/A (0 points)
a) Electricity	☐	☐	☐
b) Gas	☐	☐	☐

[26] Nigel Dunnet and Noël Kingsbury, pp. 30-36 and 130-131. See also L. Walker, 'Landscaping for Energy Conservation', *Colorado State University Cooperative Extension - Horticulture*, (2006) <http://www.ext.colostate.edu/pubs/Garden/07225.html> [accessed April 2007] (para. 14 of 32). See also Susan Imboden, 'Planting Trees for Solar Control', *Growing Points*, 1 (1996) <http://ohric.ucdavis.edu/Newsltr/Growing%20Points/1996/Gp96fall.pdf> [accessed April 2007] pp. 4-5.

[27] Anne R. Beer and Catherine Higgins, pp. 78-80. See also William H. Whyte *The Social Life of Small Urban Spaces*, 3rd edn ([n.p.]: [n. pub.], 1980; repr. Michigan: Edwards Brothers, 2004), , p. 43.

- Have residents been given incentives for reducing energy consumption?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

- Have workshops been provided to residents in regard to energy awareness?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

In order to reduce the amount of energy consumed, residents need to be aware of energy provision, their consumption and impact on carbon emissions, and ways to reduce it. Providing individual bills allows them to control their consumption, whilst incentives may also encourage a change in usage behaviour.[28]

C. Minimising energy use.

- Has the use of energy efficient gadgets and appliances been introduced?

	1) Yes (2 points each)	2) No (1 point each)	3) N/A (0 points)
a) Communal facilities	☐	☐	☐
b) Appliances in flats	☐	☐	☐
c) Gadgets	☐	☐	☐

The use of horizontal front loading washing machines use from 30-50% less energy because they use less water but there are new energy efficient top loading washing machines too. Fluorescent lighting have 10-12 times more life than incandescent and use 2/3 less energy. New energy saving labeled appliances consume less energy than previous models, refrigerators use 15-20% less energy, dishwashing machines around 40% less energy and, TV use 30% less energy.[29]

- Have communal facilities been made available for residents?

	1) Yes (2 points each)	2) No (1 point each)
a) Washing	☐	☐
b) Indoor drying	☐	☐
c) Outdoor drying	☐	☐
d) Cooking	☐	☐

The concentration of facilities on-site can reduce energy consumption, ease the supply and control of energy efficient equipment, facilitate and justify the use of renewable energy supply, and create opportunities to socialize. The use of outdoor drying relieves indoor use of space, reduces use of drying machines, and the possibility of spoiling clothes. In the case of flats, a shared scheme is common therefore the drying line should meet the demands of the larger dwellings having a reference of a minimum drying line of 6m for 3 bedroom-dwellings.[30] Location of drying lines in the courtyard should consider maximum sunlight gain and avoid plant shading. Placing them in roofs saves ground space and have maximum sun and wind advantages.

[28] Petus, 'Evaluation of the Hedebygade Block', *Practical Evaluation Tools for Urban Sustainability*, (2005), <http://www.petus.eu.com/graphics/case_42.pdf> [accessed January 2006] 1-10, p. 4.

[29] Energy Saving Trust (2007), <http://www.est.org.uk/> [accessed February 2007]. See also Environmental Protection Agency, (2007) <http://www.energystar.gov/> [accessed February 2007].

[30] Mads Teisen, 'Urban Ecology', News from Copenhagen, 2 (2004) <http://www.cece.dk/F92EC02F-159A-4A98-A5D8-3B7FB68B1936> [accessed April 2007], 1-12 (p. 3). See also Carl Smith, Andy Clayden, and Nigel Dunnett, Residential Sustainability: A Checklist Tool, (Oxford: Blackwell, 2008), p. 159.

D. Increasing renewable energy use.

- Have renewable resources been introduced for heating generation?

	1) Yes (2 points)	2) No (1 point)
Biomass energy, geothermal energy, a combined heat and power system, solar thermal-collector systems, or other	☐	☐

Biomass refers to fuel sources from waste organic matter as wood from branches, pallets, etc., and from specially grown crops. Crops vary according to region, in the UK, it is recommended to use willow for its high production between 3-4 times more than conventional hardwoods and can be harvested every 3 years. Other fast growing plants can be corn, sugarcane or switchgrass. Regarding pollution, the same amount of CO_2 generated when degradation or burning occurs is absorbed by the same area of willow produced, as long as it is produced. In terms of comparison, carbon monoxide emitted by biomass is less to that produced by coal.[8]

Geothermal energy is a resource that is always readily available compared to sun, wind or biomass. The temperature found under the ground is usually warmer than air outside in winter and cooler in summer, which makes it suitable as a resource for obtaining heat and cold through the use of polyethylene horizontal or vertical buried collectors. Horizontal collectors are buried at around 1m. depth and take a large amount of land while vertical boreholes of 15-100m deep are more efficient and take up less land. Life expectancy of general components is 10-15 years and for polyethylene or polybutylene ground coils up to 50 years. Recovered pay back times of their embodied energy range between 3-7 years.[9]

The use of waste heat resulting during the generation of electricity can be used for district heating and is called combined heat and power station (CHP). There are different sizes available, but large scale systems that supply to districts have a higher efficiency than smaller domestic types. In order to power the CHP to generate electricity, it is recommended that renewable resources be used or fossil fuels that are carbon neutral as waste wood, since CO_2 generated by burning it is the same as that absorbed by the tree when growing, such as that used in BedZed. In terms of efficiency, CHP are 75% more efficient in fuel utilization than conventional systems that produce electricity with a 40%. The use of CHP can reduce the amount of fossil fuel consumption and CO_2 produced to heat spaces as with traditional systems of fossil fuel consumption.[10]

Solar thermal systems can be accommodated in housing areas to heat water in combination with conventional hot water tanks for storage, either with or without pumping system controls. The latter is used in cold regions to prevent freezing. Their embodied energy will be paid back in around 2 years depending on location and have a life service of approximately 15 years. Other solar collectors include less expensive options as the Azur solar collector that is almost as efficient as regular systems. Costs for solar thermal installed systems range from US$2000-4000 for 40-80 gallons/day for housing. The highest environmental impact lies on the high amount of energy to produce them and the existence of recycling strategies after disposal.[11]

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[8] Richard Landen, 'The Technologies: Biomass', in *Renewable Energy in the Built Environment*, ed. by Andrew Scoones, (Bedford: Newnorth Print, 2001), pp. 30-31.

[9] Rosemary Rawlings, 'The Technologies: Ground Source Heat Pumps', *Renewable Energy in the Built Environment*, ed. by Andrew Scoones, (Bedford: Newnorth Print, 2001), pp. 33-35.

[10] R. Neal Elliot and Mark Spurr, 'Combined Heat and Power: Capturing Wasted Energy', *American Council for an Energy-Efficient Economy*, (1999), <http://www.aceee.org/pubs/ie983.htm> [accessed April 2007] (para. 1 of 24). See also Peabody Trust, 'Beddington Zero Energy Development', *BedZED Factsheet*, (2005) <http://www.peabody.org.uk/pages/GetPage.aspx?id=179> [accessed April 2007] (para. 18 of 41). See also Department for Environment, Food and Rural Affairs, 'The Government's Strategy for Combined Heat and Power to 2010', (2004) <http://www.defra.gov.uk/environment/energy/chp/pdf/chp-strategy.pdf> [accessed April 2007] pp. 7-9.

[11] Andrew Scoones, *Renewable Energy in the Built Environment*, (Bedford: Newnorth Print, 2001), p. 13. See also SolarBuzz, 'Cost effectiveness', *Solar Thermal Systems*, (2007) <http://www.solarbuzz.com/Consumer/SolarThermal.htm> [accessed February 2007] (para. 15 of 20). See also Theocharis Tsoutsos, Niki Frantzeskaki, Vassilis Gekas, 'Environmental Impacts from the Solar Energy Technologies', *Energy Policy*, 33(2005) <http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6V2W-49JHJV2-2-1&_cdi=5713&_user=4861813&_orig=browse&_coverDate=02%2F28%2F2005&_sk=999669996&view=c&wchp=dGLbVlb-zSkzk&md5=0ead171dddc77122f0bb5d569bb0ae9b&ie=/sdarticle.pdf> [accessed April 2007] 289-296 (pp. 292-294).

- Have renewable resources been introduced for electricity generation?

	1) Yes (2 points)	2) No (1 point)
Photovoltaics, wind turbines, bioenergy, geothermal energy, or other	☐	☐

Use of photovoltaics (PV) and wind turbines do not generate CO_2 emission and can last up to 80 years and are easy to install in facades or roofs of buildings. Excess energy production can be returned to the national grid reducing costs to users and contributing to CO_2 emissions reduction produced by the national grid. Solar collectors currently developed include the ES Solar Roof, which is more efficient, less expensive and flexible to adapt to curved shapes.[12] PVs pay back time for its embodied energy differs according to the region, in middle Europe would be around 2.8-4.6 years and in southern Europe from 1.7-2.7 years. PV pollution derived from production can be compared to that of other fossil fuel technologies, and is reduced when using thin film PV rather than more usual mono and multi crystalline silicon PVs.[13] Efficiency can be doubled using mobile concentrator PVs that follow the sun rather than flat-plate PVs.[14] PVs are easy to maintain, install and versatile. Current costs have not changed much from 2003 and range between US$3.64-4.20 per Watt for a single solar module without installation costs.[15]
Wind turbines pay back time ranges between 3-10 months and have an average life of 20 years. The presence of wind turbines can add to the character of a place and have minimum environmental impact noise during operation and for installation where there are no habitats of ecological or biodiversity value, peat instability risks or important disturbance to birds and bats. Costs range at £3.2p/Kwh on shore and £5.5p/Kwh offshore which include equipment, operation and maintenance. Location should be where strongest winds are present without much turbulence and can be combined in hybrid systems with other forms of renewable energies. Location on top of roofs is not recommended due to building vibrations and if located among trees, should be 5m. above their crown.[16]

- What percentage of energy efficiency has been achieved after regeneration?

☐ 1) 100% (4 points) ☐ 1) 75% (3 points) ☐ 2) 50% (2 points) ☐ 3) Less than 25% (1 point)

Operation of buildings contributes to 27% of the total CO_2 emissions in the UK. The Code for Sustainable homes demands a 25% improvement by 2010, a 44% by 2015, and reach zero emissions by 2016.[17]

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[12] Andrew Scoones, p. 13. See also Casimir Iwaszkiewicz, 'The Technologies: Photovoltaics', *Renewable Energy in the Built Environment*, ed. by Andrew Scoones, (Bedford: Newnorth Print, 2001), p. 25.

[13] Erik A. Alsema, Mariska J. de Wild-Scholten, 'Environmental Impacts of Crystalline Sillicon Photovoltaic Module Production', *CIRP International Conference on Life Cycle Engineering*, (2006) <http://www.nrel.gov/pv/thin_film/docs/lce2006.pdf> [accessed February 2007] 1-6 (pp. 4-6).

[14] U.S. Department of Energy, 'Solar Energy Technology Program', *Energy Efficiency and Renewable Energy*, (2005), <http://www1.eere.energy.gov/solar/pv_systems.html> [accessed February 2007] (para. 2 of 4).

[15] Donald W. Aitken, 'Transitioning to a Renewable Energy Future', White Paper of the International Solar Energy Society, (2003) <http://whitepaper.ises.org/ISES-WP-600.pdf> [accessed February 2007] 1-59 (p. 32). See also SolarBuzz, 'Solar Module Price Highlights', *Solar Module Price Environment*, (2007) <http://www.solarbuzz.com/ModulePrices.htm> [accessed February 2007] (para. 13-14 of 18).

[16] Sustainable Development Commission, 'Wind Power in the UK: A Guide to the Key Issues Surrounding Onshore Wind Power Development in the UK', (2005) <http://www.sd-commission.org.uk/publications/downloads/Wind_Energy-NovRev2005.pdf> [accessed February 2007] pp. 17-18, 27, 46-47, 75-81. See also Windstream Power, 'Wind Stream Power LLC: Wind Power Step-by-Step' (2006) <http://www.windstreampower.com/Wind_Turbines_and_Towers.php#dwpa> [accessed February 2007] (para. 2 of 13).

[17] Keith Hall, 'Are you Ready for the Code for Sustainable Homes?', *Green Building*, 18 (2008), 15-21 (p. 15).

Section 2. Increasing biodiversity: Species richness and habitat complexity as well as genetic variation in flora and fauna. (28 points available in total)

A. Protecting existent habitats and resources.

- Were there considerations made for existent species' habitats when re-designing the landscape?

☐ 1) Yes (3 points) ☐ 2) Partially (2 points) ☐ 3) No (1 point)

An evaluation is performed towards habitat value by identifying the number and variety of species that are supported, sometimes areas of brownfields are important sources to species that are not found in other nearby areas. Valued habitats should be protected, integrated with the landscape design, improved and wherever necessary restored. Connections among new and old habitats should be created to increase transition and richness of species development.[1]

- How were existing habitats protected when required to be moved?

☐ 1) They are substituted in other close-by areas (3 points) ☐ 2) They are restored after works are finished (2 points) ☐ 3) Not considered (1 point)

Existent habitats should be replaced while carrying out building works with temporary or permanent shelters, some as bat boxes, insect boxes, dead wood piles, bird boxes and others which can additionally add to visual variety of areas.[2]

- When disturbance to local soil was necessary, how was it managed?

	1) Yes (2 points each)	2) No (1 point each)
a) By storing and re-using local soil or with natural colonization	☐	☐
b) By using local compost	☐	☐
c) By importing soil from local sources	☐	☐

Removal of top soil should be carefully done to disturb as little as possible the site, storing of topsoil should be done in bunds no more than 1.8m high to prevent anaerobic deterioration. It is also recommended to allow natural colonization of plants that will usually be native to the area. Importing soil from non-local sources and improving soil with pesticides can bring or favour exotic and invasive species, weeds, pests and diseases. Improvement of soils should be done with local compost or through non-polluting methods such as permaculture.[3]

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[1] Hugh Barton, Geoff Davis and Richard Guise, p. 30. See also A.D. Bradshaw, 'Ecological Principles in Landscape', in *Ecology and Design in Landscape*, ed. by A.D. Bradshaw et. al., (Oxford: Blackwell, 1986), p. 31.

[2] CABE, 'Making Contracts Work for Wildlife: How to Encourage Biodiversity in Urban Parks', (2006) <http://www.cabe.org.uk/AssetLibrary/8068.pdf> [accessed March 2007] 47-51.

[3] Hugh Barton, Geoff Davis and Richard Guise, p. 245.

B. Designing for diversity.

- Was new planting selected and landscape structure designed to increase species and habitat diversity?

☐ 1) Yes (3 points) ☐ 2) Partially (2 points) ☐ 3) No (1 point)

Species-rich communities are more stable in urban settings than species-poor. Plant community variety, food and nesting opportunities are the key starting point to support different habitats and enrich species diversity besides other important factors as planting levels, age structure, isolation, size of habitat, disturbance levels and edges.
-Variety within plant communities can be in terms of nesting and food opportunities, therefore plants and trees that provide food to birds, mammals, and forage to bees are valuable. Water bodies such as wetlands are rich in genetic and community diversity, they provide food and habitat for migrating birds and other creatures, and are nurseries for a wide range of aquatic organisms.[4] Edible allotments and bedding plants are valuable for invertebrate's habitats and food for birds.[5] Bat and bird boxes provide nesting opportunities and visual enrichment of the area. Variety of plant communities can also be considered in terms of colours.[6]
-Height of different plants or levels of planting also support different species as microclimate conditions change, as trees above 2m height have been shown to support a rich variety of invertebrate species.[7] Willows grown for biomass production in housing areas can become a good source for species richness. Green roofs and facades provide habitats to a diversity of invertebrates and wildlife. Studies have found insect species and rare species of birds at twenty storeys and above .[8]
-Age structure of plant communities can influence the presence of species as habitats and food suppliers, as a study showed that presence of butterfly species depend on the age of the existent grasslands.[9]
-Presence of various types of habitats, opposite to isolation, can support a richer variety of habitats and species, as study showed that soil invertebrates reduced in density as distance increased from edge shrubs into the mowed lawn.[10]
-Habitats that are bigger in size will have a greater amount of nutrients and more species, but size should be also related to required space of a type of vegetation to grow adequately.[11]
-Wild vegetation that has grown in human un-disturbed habitats is usually source to many plant and animal species that are not found elsewhere. Species-rich communities should be located away from intense uses that endanger them such as human activities.[12]
-Edges of habitats and the ecotones developed from merging the two habitats, are species-rich plant communities, particularly those facing sunny areas. They have a mix of species from both habitats making them diverse and usually very resilient.[13]

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[4] Anne R. Beer and Catherine Higgins, pp. 300-301. See also Hugh Barton, Geoff Davis and Richard Guise, pp. 187-193. See also D.A. Goode and P.J. Smart, 'Designing for Wildlife', in *Ecology and Design in Landscape*, ed. by A.D. Bradshaw et. al., (Oxford: Blackwell, 1986), p. 221.

[5] André Viljoen, Katrin Bohn and Joe Howe, 'More Food with Less Space: Why Bother', in *Continuous Productive Urban Landscapes: Designing for Agriculture for Sustainable Cities*, ed. by André Viljoen, (Burlington, MA: Architectural Press, 2005) p. 21.

[6] CABE, 'Making Contracts Work for Wildlife: How to Encourage Biodiversity in Urban Parks', 21.

[7] Richard M. Smith, Philip H. Warren, Ken Thompson and Kevin J. Gaston, 'Urban Domestic Gardens (VI): Environmental correlates of invertebrate species richness', *Biodiversity and Conservation*, 15 (2006), <http://www.springerlink.com/content/v14036060t6v3p18/fulltext.pdf>[accessed March 2007] 2415-2438 (p. 2433).

[8] Nigel Dunnet and Noël Kingsbury, pp. 37-41 and 133.

[9] Kimmo Saarinen and Juha Jantunen, 'Grassland Butterfly Fauna under Traditional Animal Husbandry: Contrasts in Diversity in Mown Meadows and Grazed Pastures', *Biodiversity and Conservation*, 14, (2005) <http://springerlink.metapress.com/content/r5g647pw1365x767/fulltext.pdf> [accessed March 2007] 3201-3213 (pp. 3209-3210).

[10] A.D. Bradshaw, p. 20. See also Jo Smith, Anna Chapman and Paul Eggleton, 'Baseline Biodiversity Surveys of the Soil Macrofauna of London's Green Spaces', Urban Ecosyst, 9 (2006) <http://www.springerlink.com/content/5157140864r87015/fulltext.pdf> [accessed March 2007] 337-349 (p. 347).

[11] Richard T.T. Forman and Michel Godron, *Landscape Ecology*, (New York: John Wileyt & Sons, 1986), p. 99.

[12] D.A. Goode and P.J. Smart, pp. 224-228.

[13] Richard T.T. Forman and Michel Godron, p. 60. See also Richard T.T. Forman, *Land Mosaics: The Ecology of Landscapes and Regions*, (New York: Cambridge Press, 1995), pp. 85-86 and 96-97.

- What plant species have been favoured in re-designing the landscape?

☐ 1) Native species (3 points) ☐ 2) Native and non-native (2 points) ☐ 3) Non-native species (1 point)

Native species support greater amounts of native wildlife, they visually integrate with the local environment, are more resilient to climate, and require less maintenance in terms of watering and fertilizers. They can also maximize genetic diversity if coming from seed-grown stock instead of clones. However, a balance of native and non-native plant communities may be more adequate in areas with high disturbance and human activities as non-natives are able to adapt better. A mixed approach is possible when there is a careful selection so that their growth will not conflict with each other's need of sun and space and can flower in different seasons.[14]

- Has the landscape design considered corridors and their connectedness within and beyond the housing estate for wildlife movement?

	1) Yes (2 points each)	2) No (1 point each)
a) Within the housing area	☐	☐
b) Beyond the housing area	☐	☐

A corridor is a linear landscape feature that can serve as a conduit for habitats to be connected and allow species movement. They can also function as barriers and habitats for species-rich communities depending on width[15]. Corridors can also serve to a wider and larger habitat than isolated ones.[16] Wide corridors with intermittent openings allow for movement alongside and across it. Invertebrates and vertebrates move along these corridors but also help for plant dispersal.[17] Movement of species should be encouraged within an urban area connecting old and new habitats but also beyond it into other existent green areas in the city allowing for a higher diversification (more) and composition (variety) of species. The use of stepping stones, or patches, provide animals areas for stops before they continue through the corridors, however large gaps and constant gaps may inhibit movement as they can act as barriers, due to different environment conditions and species.[18] Corridors can be hedgerows, windbreaks, shelterbelts, train tracks, shrubs, edge plantings, water channels, streams, green facades and roofs, and others, all of which can contribute to create a network.[19]

[14] Anne R. Beer and Catherine Higgins, p. 300. See also Hugh Barton, Geoff Davis and Richard Guise, p. 193. See also Nigel Dunnett and Andy Clayden, 'Raw Materials of Landscape', in *Landscape and Sustainability*, ed. by John F. Benson and Maggie Roe, 2nd edn (Oxon: Routledge, 2000; repr. 2007), pp. 196-223 (p. 206). See also CABE, 'Making Contracts Work for Wildlife: How to Encourage Biodiversity in Urban Parks', 26-27.

[15] Hugh Barton, Geoff Davis and Richard Guise, 192. See also Richard T.T. Forman, pp. 145-150.

[16] CABE, 'Making Contracts Work for Wildlife: How to Encourage Biodiversity in Urban Parks', 17.

[17] Richard T.T. Forman and Michel Godron, p. 381 and 401.

[18] H. Henke and H. Sukopp, 'Natural Approach in Cities', in *Ecology and Design in Landscape*, ed. by A.D. Bradshaw et. al., (Oxford: Blackwell, 1986), p. 321. See also Richard T.T. Forman, p. 201. See also A.D. Bradshaw, p. 31.

[19] Richard T.T. Forman and Michel Godron, p. 131.

- Have management and maintenance regimes been considered in terms of increasing biodiversity?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Management and maintenance regimes can also influence the variety of habitats and consequently species present. Ecological advice from professionals is recommended to seek the best methods but should always be adapted to local conditions of flora and fauna and allow for nature to change over time instead of suppressing it. Lawn areas that are mowed continually are species-poor, so they can be integrated with meadow grasslands, mixed grass/wildflower seedlings, un-mowed areas that allow any flowers contained to grow, or other supporting species-rich communities as shrub layers under trees. Coppicing of trees provides a range of different aged stems and branches as habitats for different species and allows sun into the ground for smaller plants to grow. The cutting of high grass, hay or shrubs, should be left piled in-situ for some days allowing invertebrates to escape. Some areas can be left unmanaged for wild plants and animals to colonize. Other forms of management should include avoidance of peat to keep moisture, chemicals and fertilizers, supporting other methods as permaculture.[20]

C. Biodiversity awareness.

- Are residents made aware of species and habitats present in their immediate outdoors?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Informing users of the flora and fauna present with the use of information boards, pictures, small sculptures, or others can contribute to nature protection, enjoyment, and development of identity.[21]

- Is there information available to residents in ways of caring for their immediate outdoors?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

It is important to inform residents on ways of caring for outdoor areas when there is a population from different backgrounds and cultures who may have a different attitude and behavior towards wildlife and plants.[22] Written information should be made available to residents regularly which can be passed on to children through adults and local schools.

[20] CABE, 'Making Contracts Work for Wildlife: How to Encourage Biodiversity in Urban Parks', 14-23.
[21] Ibid, p. 21.
[22] Maggie Roe, 'The Social Dimensions of Landscape Sustainability', in *Landscape and Sustainability*, ed. by John F. Benson and Maggie Roe, 2nd edn., (Oxon: Routledge, 2000; repr. 2007), pp. 58-83 (p. 59).

Section 5. Reducing water use. (28 points available)

A. Minimizing water use.

- Is there a system of water harvesting for re-use?

	1) Yes (2 points each)	2) No (1 point each)
a) Collection of rain precipitation	☐	☐
b) Collection of greywater	☐	☐
c) Collection of black water	☐	☐

Rain precipitation can be collected from roofs into tanks that can later be used for activities that do not require potable water such as flushing toilets, washing vehicles and irrigating non-edible gardens. Greywater from washing machines and dish washers can be used for flushing toilets after being treated with a cleaning agent. Black water can be treated and upgraded through surface or sub-surface flow wetlands and later used in irrigation of non-edible gardens. In designing wetlands, at least $2m^3$ per person should be considered and their location should take into consideration the type of wetland and resident's perception. With necessary maintenance, surface flow wetlands may be installed close to dwellings and be visually appealing to residents.[1]

- If yes, how is it used?

	1) Yes (2 points each)	2) No (1 points each)	3) N/A (0 points each)
a) Flush toilets	☐	☐	☐
b) Irrigate gardens	☐	☐	☐
c) Wash vehicles	☐	☐	☐

- Were species considered to reduce the amount of irrigation for exterior areas?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Native species are more resilient, have adapted to local conditions and require less maintenance in terms of watering and fertilizers.[2]

[1] Hugh Barton, Geoff Davis and Richard Guise, p. 235. See also Hugh Barton, 'The Neighbourhood as an Ecosystem', in *Sustainable Communities: The Potential for Eco-Neighbourhoods*, ed. by Hugh Barton (London: Earthscan, 2000; repr. 2002) p. 103. See also J. William Thompson and Kim Sorvig, *Sustainable Landscape Construction*, (Washington: Island Press, 2000), p. 167.

[2] Anne R. Beer and Catherine Higgins, p. 107.

- Have mulch cover been used for plant beds?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

A layer of mulch of 5cm helps to keep moisture, acts as a protective cover from frost for roots, and provides nutrients to plants. Organic types of mulches should be used such as plant waste of leaves, grass cuttings, bark, or others.

- Have water efficient appliances and gadgets been installed?

	1) Yes (2 points each)	2) No (1 point each)
a) Dual flush toilets	☐	☐
b) Washing machines	☐	☐
c) Shower and tap heads	☐	☐

Current appliance performance is usually available in terms of rating. New appliances have reduced their water usage considerably, flushing toilets up to 50% or more, washing machines to 45-60% compared to old machines.[3]

B. Water use awareness.

- Has it been made possible for residents to measure their individual water consumption?

☐ 1) Yes (2 points) ☐ 2) No (1 points) ☐ 3) N/A (0 points)

- Have residents been given incentives for reducing water consumption?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

- Have workshops been provided to residents in regard to water awareness?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

[3] Environment Agency, 'Water Efficient WCs and Retrofits', *Water Resources*, (2007), <http://www.environment-agency.gov.uk/homeandleisure/drought/38539.aspx> [accessed June 2009] (para. 1-2 of 13). See also Environment Agency, 'Domestic Appliances', *Water Consumption*, (2007) <http://www.environment-agency.gov.uk/homeandleisure/drought/38539.aspx> [accessed June 2009] (para. 3 of 10).

Section 4. Reducing pollution. (33 points available)

A. Reducing waste generation.

- Have methods been used to reduce waste ?

	1) Yes (2 points each)	2) No (1 point each)
a) Modular and adequate design to site requirements	☐	☐
b) Post-construction material evaluation	☐	☐
c) Educational programs and workshops for residents	☐	☐

The best way to start contributing to reduce CO_2 emissions is by using less amount of goods that we use, which also contributes to reduce expenses.[1] In construction, the use of modular design according to product size can reduce the amount of cut pieces, which is usually what represent the biggest amount of waste. During construction, having a continuous cleaning and organizing waste in piles can contribute to awareness on the amount produced that can be improved in following works. Continuous post-construction evaluations on waste and design can improve to reduce waste in future works. Use of educational programs for residents on methods to reduce waste at home with maximum use of goods.

- Have methods been used to re-use and reclaim materials, waste, buildings, and plants?

	1) Yes (2 points each)	2) No (1 point each)
a) Re-use of un-used construction materials and plants	☐	☐
b) Re-use of non-organic resident's waste	☐	☐
c) Flexibility and re-adaptation of un-used buildings	☐	☐
d) Re-claim and adaptation of materials and plants	☐	☐

Re-use refers to using a product, material or building again for another purpose than the original without transforming it. Such is the case of empty plastic containers for storing, stone materials as part of the re-design of the landscape, or wood trunks for seating for example. Similarly plants that require to be moved due to construction works, particularly those that take a long time to mature, may be re-adapted in nearby areas. For non-organic waste of residents, points of exchange could be arranged periodically. One man's waste is another man's treasure. Existing and new facility buildings should be re-adaptable and flexible for community's changing needs, as they will vary with time.[2] Reclaiming materials is where part of a product can be re-used for another purpose than the original one. Sometimes involves cutting or demolishing some parts without transforming the product such as furniture wood for making bird houses or construction materials used for building sculptures in the landscape. Reclaiming of metal for landscape works and furniture is ideal to reduce pollution from manufacturing and recycling.

[1] Deborah Brownhill and Susheel Rao, *A Sustainability Checklist for Developers: A common Framework for Developers and Local Authorities*, (London: BRE, 2002), p. 59. See also Nigel Dunnett and Andy Clayden, 'Raw Materials of Landscape', pp. 214-215.

[2] Hugh Barton, Geoff Davis and Richard Guise, p. 240.

- Have methods been used to re-cycle waste?

	1) Yes (2 points each)	2) No (1 point each)
a) Recycle of un-used construction materials	☐	☐
b) Recycle of organic waste through composting	☐	☐

Recycling implies transforming a used item into a new product which relies on on-site separation of waste. Recycling reduces consumption of virgin raw materials and their respective embodied energy, which is higher compared to that of recycled products. Such an example is the use of waste concrete for paving roads and curbs.[3]

B. Reducing water run-off.

- Were surfaces transformed to have more permeable surfaces when renewing the landscape?

	1) Yes (3 points each)	2) Partially (2 points each)	3) No (1 point each)
a) Higher rate of green surfaces	☐	☐	☐
b) Higher rate of paved filtering surfaces	☐	☐	☐

Increasing permeable surfaces reduces rain water run-off to filter back and recharge underground aquifers, reduces pollution into rivers and streams, reduces flood risk and reduces heat island effect. Paved surfaces should be constructed to allow filtration of surface water. Presence of green roofs can reduce water run-off from 60-80% depending on soil depth, station of the year, vegetative cover, and soil composition.[4]

- Has a sustainable urban drainage system been introduced in the area?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Open water systems can reduce the amount of run-off from hard surfaces by more than 90%, that can also add to the visual aesthetics of the area.[5]

[3] Hugh Barton, Geoff Davis and Richard Guise, pp. 240-243.
[4] Nigel Dunnet and Noel Kingsbury, p. 48.
[5] Nigel Dunnett and Andy Clayden, *Rain Gardens: Managing Water Sustainably in the Garden and Designed Landscape*, (Portland: Timber Press, 2007), pp. 32-36.

- If there is a sustainable urban drainage system, has water stagnation and eutrophication in water bodies been addressed?

☐ 1) Yes (2 points) ☐ 2) No (1 point) ☐ 3) N/A (0 points)

Water cascades can help reduce water stagnation by introducing oxygen into the water. As well, vegetation barriers can be used to prevent eutrophication by absorbing excess of nutrients from going into water such as fertilizers.[6]

C. Reducing use of chemicals.

- Has the landscape changes and maintenance made use of agro-chemicals?

☐ 1) Yes (1 point) ☐ 2) No (2 points)

The use of chemical pesticides can pollute water, therefore threatening human health but also because they harm present populations of beneficial insects that help in controlling pests. Control of pests can be done through enhancing habitats of beneficial organisms and keeping a diversity of habitats in planting. However, in necessity of pesticides, it is recommended to use those that cause minimal damage to beneficial organisms and decompose rapidly in the environment.[7]

- In the case of using agro-chemicals, have specifications been provided to avoid misuse by persons handling them?

☐ 1) Yes (2 points) ☐ 2) No (1 points) ☐ 3) N/A (0 points)

Contamination of plants and soil from inappropriate handling may be reduced by stipulating specifications that refer to the local codes of practice and legislation and hiring of competent and licensed contractors.[8]

- Have suppliers of materials and plants been selected in terms of their practices and handling of products that reduce the environmental impact?

☐ 1) Yes (2 point) ☐ 2) No (1 points)

A key measure for sustainability is to acquire products and services from certified companies with green credentials. However, care should be taken in ensuring that certification is reputable as methods of defining green standards may vary widely.

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[6] Hugh Barton, Geoff Davis and Richard Guise, p. 159.
[7] Preston Sullivan, 'Applying the Principles of Sustainable Farming', *Appropriate Technology Transfer for Rural Areas*, (2003) <http://attra.ncat.org/attra-pub/PDF/Transition.pdf>[Accessed February 2007] 1-16, pp. 12-13.
[8] Carl Smith, Andy Clayden, and Nigel Dunnet, p. 162.

Section 5. Materials selection according to their life-cycle. (40 points available)

- Was the selection of new construction material in terms of their embodied energy, durability, pollution / health impact, and performance?

	1)Embodied energy* (2 points each)	2)Durability† (2 points each)	3)Pollution / health impact‡ (2 points each)	4)Performance§ (2 points each)	5)None (1 point each)
a) Insulation	☐	☐	☐	☐	☐

*'Embodied energy is the energy input required to quarry, transport and manufacture building materials plus the energy used in the construction process'.[8] Cellulose is considered to have a high energy consumption due to the transport and weight of the material. Cotton insulation manufacturing and transport requires high input of energy.[9]
†Foam, cotton , glass fibre and cellulose will loose their thermal properties if exposed to moisture, particularly the two latter. As well, thermal properties will be diminished as insulation materials settle with time, particularly loose materials as glass fibre, cellulose and cotton. Mineral wool is the best recommended in this area.[10]
‡Use of rigid plastic foam and sprayed foam contributes to air pollution damaging the ozone layer in the manufacture process, even using a new method with carbon dioxide as a blowing agent as it contributes to global warming.[11] Cellulose has a high methane release in landfills which contributes to global warming.[12] Sprayed foam, glass fibre and mineral wool involves health hazards with the release of toxic particles and fibres if not handled and installed properly.[13] Vermiculite also involves health hazard when mixed with asbestos during the mining process.[14] Cotton is considered to be less pollutant and healthy safe, however, use of natural materials as straw or clay will represent the best options.

b) Outdoor works	☐	☐	☐	☐	☐
c) Outdoor furniture	☐	☐	☐	☐	☐
d) Playground structures	☐	☐	☐	☐	☐

* Designing to integrate the most of the existing features reduces the amount of new materials required. Use of locally sourced materials, within 50miles, is preferable since they use less energy for transportation. Those obtained from farther away should consider modes of transport considering roads as most pollutant. Specifications should go in accordance with the function specified in the design avoiding excess use of unnecessary materials and ensuring their longevity.
†Materials which have a long life are considered to have a lower environmental impact taking into account that their sourcing and production does not have a high negative impact such as many metal derivatives and synthetics.
‡Use of renewable materials is the best option from which wood is considered to be most sustainable for outdoor works and structures. Hardwoods are preferred to soft woods for the lower environmental impact given their longer life, although most durable types of hardwoods should be preferred. Other materials such as stone and natural aggregates are ideal if they do not imply a high environmental impact for their quarrying. As well, metal and plastic elements, aggregates, as well as timber treatments selected should be of low-impact specification to the environment. Similarly, certified suppliers accredited for environmental protection in their practice and products should be used.
§Besides durability and least pollutant, materials which age well should also be considered as they require less maintenance and integrate with the context in which they are located. In the case of wood, non-chemical treatments should be preferred.[15]

[8] Hugh Barton, Geoff Davis and Richard Guise, p. 26.
[9] Shu-Chi Chang, Chris Scheuer, and Jake Swenson, 'Life Cycle Assessment of Residential Insulation Materials: A comparative analysis of Cellulose, Cotton and Fiberglass Insulation Products for Insulation of Residential Walls', (2001), <http://sitemaker.umich.edu/snre-student-cscheuer/files/insulation_lca.pdf> [Accessed January 2007] 5.
[10] Dan Chiras, 'All about insulation, *Mother Earth News*, (2002)<http://www.motherearthnews.com/green_home_building/2002_December_January/All_About_Insulation> [Accessed January 2007] (para. 15-21 of 51).
[11] Ned Nisson and Alex Wilson, 'A Guide to Saving Energy, Money and the Environment', *Virginia Department of Mines and Energy*, (2005), <http://www.mme.state.va.us/De/residentframe.html> [Accessed February 2007] 34-35.
[12] Shu-Chi Chang, Chris Scheuer, and Jake Swenson, p. 6.
[13] Ibid, p. 8-9. See also Hugh Barton, Geoff Davis and Richard Guise, p. 244.
[14] Ned Nisson and Alex Wilson, p. 32.
[15] Nigel Dunnett and Andy Clayden, 'Raw Materials of Landscape', p. 218.

- Has planting been arranged to reduce management and maintenance as well as considered their resilience according to the areas were placed?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Constant management may be kept low by keeping the natural shape of plants and reducing pruning. Therefore, their location should consider their shape, height, and integration with nearby planting. As well, the selection and placing of plants should go in accordance with the use of the area to avoid constant maintenance such as over-growth of shrubs in pedestrian walks or damage to non-resilient plants near playgrounds. Also, considerations to protect new plants should be made until they have established or selecting mature species in areas prone to vandalism. The use large areas of mowed lawn also requires a large amount of maintenance which may be ameliorated through integrating it with shrubs and ground covers.[16]

- Were specifications provided and works scheduled to allow optimum implementation of the soft landscape works?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

- What has been the percentage of plant failure?

☐ 1) Less than 10% (2 points) ☐ 2) More than 10% (1 point)

- Is there a maintenance guarantee period from the contractor implementing the landscape?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

In implementing the soft landscape works, measures should be taken to ensure an adequate preparation of the soil, handling of plants, and planting in the appropriate seasons. This minimizes future plant failure and improves the longevity and health of plants. Therefore, as a way of ensuring the latter, contracts with developers of soft landscape works should include a period of guarantee after works are finished for failed plants to be replaced. However, landscape implementation may really be assessed when plants have reached their maturity after three years of completion. Therefore, it is desirable to hire contractors who are registered with incentive or award schemes for best practice which assess landscape works after that period.[17]

[16] Carl Smith, Andy Clayden, and Nigel Dunnett, p. 175.
[17] Ibid p. 178.

Section 6. Community development (56 points available)

6.1 Improving the image of the housing area.

- Has the landscape been renovated to improve the housing estate's image?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

The identity of a community represented in the image of a housing area affects the resident's sense of belonging and capacity to act together that lead to a state of constant turnover by residents. The design of the landscape can enhance the visual image perceived by residents and outsiders by providing cues.[1]

- Have historical references of the housing area been introduced as part of the image?

☐ 1) Yes (2 points) ☐ 2) No (1 point) ☐ 3) N/A (0 points each)

References to the local cultural heritage may become part of the resident's identity through art objects, murals, special habitats, or others.[2] Yet, these references should serve as a light way of rooting identity to the community and the housing area without anchoring permanently in the past and enabling viewing towards the future.[3]

- Have quality hard materials and plant material been selected with respect to image and uses of the outdoor areas?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

The materials used may convey a positive or negative message to users depending on their type and quality. Good quality, long-lasting, solid materials and plants are easier to be accepted and cared for residents than rough-looking, low-cost, durable ones.[4] Characteristics of materials should reduce opportunities for vandalism and tear. Finishes that are similar in colour in relation to the substrate, and avoidance of strong or light colours reduce the opportunity for markings. Surfaces as glazed tiles or painted surfaces are easy to clean or provide maintenance. Rough textures as bricks, rich patterns with tiles, or small areas of smooth surface will make it more difficult for graffiti. Plants should be selected according to the use that is to be given to the area, as resistant trees and use of sand instead of lawn in children's playgrounds or vegetation with thorns for keeping people off the area.[5]

- Has residential turnover changed since regeneration?

☐ 1) Increased (1 point) ☐ 2) The same (2 points) ☐ 3) Reduced (3 points)

The presence of a stable community is visible through the reduction on turnover of residents and vacancy rates. Turnover should be positively considered if movement happens within the estate to other dwellings that better meet their needs.

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[1] Bridgette Wessels and Siep Miedema, 'Towards Understanding Situations of Social Exclusion', in *Welfare Policy from Below: Struggles Against Social Exclusion in Europe*, Chap. 5, ed. by Heinz Steinert et. al., (Hampshire: Ashgate, 2007), pp. 69-70.

[2] BioRegional, para. 11 of 13.

[3] Georgia Butina Watson and Ian Bentley, *Identity by Design*, (Oxford: Elsevier, 2007), p. 12.

[4] Tim Coulthard, 'Just a Phase? The Staiths South Bank', *Landscape*, 55 (2008), 1-52 (p. 21).

[5] Alexander Miller, 'Vandalism and the Architect', in *Vandalism*, ed. by Colin Ward, (London: The Architectural Press, 1973), p. 99. See also Clare Cooper Marcus and Wendy Sarkissian, *Housing as if People Mattered*, (Los Angeles: University of California Press 1986) pp. 223-227.

6.2 Providing areas for personalisation.

- Have residents been able to personalise outdoor areas besides their own dwellings?

	1) Yes (2 points each)	2) No (1 point each)
a) In public areas as art, gardens and playgrounds	☐	☐
b) In semi-public areas such as stairs	☐	☐
c) In semi-private areas as balconies or tenant gardens	☐	☐

Areas that are personalised allow for less destruction than anonymous areas that provide cues of nobody's land.[6]

6.3 Encouraging residents' care.

- How involved have residents been in volunteering work benefiting the community and the housing area through and after the regeneration?

☐ 1) Very active (3 points) ☐ 2) Average (2 points) ☐ 3) Almost nothing (1 point)

When there is a strong social bonding, residents participate in voluntary work in benefit or protection of their community and outdoor environment. These can range with formal actions such as committee meetings, organizing events, and teaching skills to other residents for example. Or informal actions such as keeping tidy, picking rubbish, contributing to gardening, caring for the children of other residents in outdoor areas, repairing resident's toys and others. In some cases elderly are more inclined to participate in organizing activities as they have more time available.[7]

- How have residents participated in caring for their housing estate?

☐ 1) Public events, committees, radio, newspapers, seeking funds for improvements (3 points) ☐ 2) Complaints through the housing company (2 points) ☐ 3) Rarely do (1 point)

A way of manifesting community care is by protecting territory space that is considered to be of the residents against inside or outside events that might threaten to destroy any or all of the territory. Such events may get the community together to achieve their goals and protect their space.[8]

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[6] Maggie Roe, p. 72.
[7] Ibid, p. 71.
[8] Graciela de Garay Arellano, *Rumores y Retratos de un Lugar de la Modernidad: Historia Oral del Multifamiliar Miguel Aleman 1949-1999*, (México D.F.: Mora, 2002), p. 162.

- Have residents been assigned with care for particular outdoor areas, objects or vegetation?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Having residents involved in caring for their outdoor area provides them opportunities to personalize and survey these areas.[9]

6.4 Providing for variety and flexibility.

- Has a wide variety of facilities, workshops, and community services been made available for residents?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

- Have periodical information guides been given to residents regarding the facilities, workshops, and community services available?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Variety supply residents with different options which is important in a diverse human population.[10] These should be meet necessary, leisure, and social needs of residents. For that, permanent and temporal facilities, such as markets, are desired which improve choices, provide seasonal changes, visual variety, and stimulation for conversations. Consideration should be given to needs that are difficult to meet in flats of medium-rise housing such as communal facilities for washing. Also, spaces for storing and for man's duties which cannot be met inside the flat, as mechanical, carpentry, electronic or other repairs needed or just for messing about, or hobbies that keep youngsters busy.[11] It is important to keep residents informed on the different facilities, services, and workshops available to encourage their participation, particularly to new residents.

- Have various facilities been arranged to operate after evening?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

Facilities should be flexible to provide services at different times of the day to meet the varying schedules of the working and non-working population. Those open after evening also ameliorate sense of un-safety after dark and provides informal surveillance controls.[12] Care should be taken in having women-inclusive facilities to avoid dominance of male-oriented services that may cause feelings of un-safety.

- Have regular events been held for the community?

☐ 1) Yes, regularly (3 points) ☐ 2) Sometimes (2 points) ☐ 3) No (1 point)

The creation of events provides the community with leisure and social opportunities to meet other neighbours as well as possibilities for participating in organizing the events.

[9] Farmer and Dark, 'The Architect's Dilemma-One Firm's Working Notes', in *Vandalism*, ed. by Colin Ward, (London: The Architectural Press, 1973), p. 115.
[10] Deborah Brownhill and Susheel Rao, pp. 20-21.
[11] Department for Communities and Local Government, *Strong and Prosperous Communities*, The Local Government White Paper, (2006) <http://www.communities.gov.uk/documents/localgovernment/pdf/152456.pdf> [accessed June 2009] 1-176 (p. 31). See also Graciela De Garay Arellano, p. 52.
[12] Jane Jacobs, p. 35.

- Do residents of all population sections attend events, facilities, community services, and workshops offered within the community?

☐ 1) Yes (3 points) ☐ 2) Certain groups (2 points) ☐ 3) Very few (1 point)

Attendance of residents provides opportunities to know others and shows their interest to share and socialize within their community. Ideally, the services and facilities offered should be visited and used by the different groups that make up the community indicating they meet their various demands and needs.[14]

- Have workshops and community facilities been updated?

☐ 1) Yes (2 points) ☐ 2) No (1 point) ☐ 3) N/A (0 points)

As the population changes so do their necessary, leisure, and social needs therefore community services should reflect these changes or offer more a diversity of services.

- Has training been available for community leaders?

☐ 1) Yes, regularly (3 points) ☐ 2) Only by demand (2 points) ☐ 3) No (1 point)

The residents who seek to take a role as community leaders such as head of neighbourhood committees, social groups, community rooms, and others should have training available that allows them to develop general and leadership skills. Providing them regularly will ensure a better performance in community activities and therefore should be encouraged.

- Has a record of community initiatives, social groups, and their experiences been maintained?

☐ 1) Yes (3 points) ☐ 2) Only in eventual publications (2 points) ☐ 3) No (1 point)

The community should have the possibility of enabling changes they require by building awareness and understanding on processes that lead to action. Therefore, learning from previous experiences that strengthen and inform decisions is vital. The process and development should be recorded continuously for the length of any given initiative and preferably published regularly in the local circulars.

- Have all institutions and bodies involved worked jointly throughout the regeneration and afterwards?

☐ 1) Yes (3 points) ☐ 2) On certain occasions (2 points) ☐ 3) No (1 point)

For a successful integrated project it is necessary to have a holistic collaboration of the interested parties in all the processes and decisions ranging from users to professionals and maintenance bodies.[15] This permits having a unified vision throughout the regeneration, establishment of short- and long-term goals and commitments, as well as identifying problems and their possible solutions. Already established joint cooperation and communication should be continued after regeneration works are finished to support further modifications, decisions, community services, and others.

[14] Maggie Roe and Maisie Rowe, 'Community and the Landscape Professional', in Landscape and Sustainability, 2nd edn., ed. by John F. Benson and Maggie Roe, (Oxon: Routledge, 2000; repr. 2007), pp. 237-265 (p. 261).

[15] Adrian Pitts, *Planning and Design Strategies for Sustainability and Profit*, (Oxford: Architectural Press, 2004), pp. 221.

- Is the re-design of outdoor spaces robust for different activities of a diverse population?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

The outdoor design should allow for all residents to be included in its use without regard for gender, age, work shifts, time of the day, or household composition. For instance, versatility and choice are enhanced if presence of permanent and non-permanent features are included such as fixed and mobile seating areas.[16]

- Was the landscape re-designed to be flexible for the changing needs of residents?

☐ 1) Yes (2 points) ☐ 2) No (1 point)

In order to keep existing social bonds, the presence of permanent residents should be encouraged of which flexibility is an important part. Outdoor areas and facilities should be flexible to change as the requirements of residents vary. During long lapses of time generations grow older and new ones come into the area that will need different spaces. Current users will have different preferences for interaction according to their budget, culture, and time available depending on their working shifts.[17] New forms of technology have developed new forms of interaction that do not necessarily rely on the immediate outdoors or are locally based but can relate to a bigger global community outside of the locality through electronic communication. Therefore, sustainable communities should be planned taking into consideration this current feature.[18] Facilities and communication should take advantage and adapt to provide the community with a bigger share of interaction opportunities as a local electronic news website, radio program led by the community, and on-line facilities for the community at lower prices.

- Did the re-design consider outdoor-indoor areas for encouraging socializing of residents and facilitate community gatherings?

☐ 1) Yes (3 points) ☐ 2) Outdoor or indoor only (2 points) ☐ 3) No (1 point)

It is essential for residents to have areas where they can meet their surrounding neighbours and the wider community as this allows the development of social structures for achieving consensus on required decisions to be made.

- Have different sizes and types of dwellings been provided?

☐ 1) Size and type (3 points) ☐ 2) Size or type (2 points) ☐ 3) No (1 point)

Dwelling size and type options should be available to meet the growing or decreasing family or wall partitions easy to adapt. Position of dwellings should also offer opportunities to different family stages through ground accommodation for families with children and elderly or through efficient elevators for elderly.[19]

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[16] HM Government, 'Securing the Future: Delivering UK Sustainable Development Strategy', *Sustainable Development*, (2005) <http://www.defra.gov.uk/sustainable/government/publications/uk-strategy/documents/SecFut_complete.pdf> [accessed June 2009] pp. 1-188 (p. 184).

[17] Clare Cooper Marcus and Wendy Sarkissian, p. 233.

[18] Nigel Taylor, 'Unsustainable Settlements', in *Sustainable Communities: The Potential for Eco-Neighbourhoods*, ed. By Hugh Barton, (London: Earthscan, 2000), pp. 24-27.

[19] Derek Long and Mary Hutchins, 'A toolkit of indicators of sustainable communities', (2003) <http://www.ljmu.ac.uk/EIUA/EIUA_Docs/A_Toolkit_of_Indicators_of_Sustainable_Communities.pdf> [accessed November 2008] p 8.

Section 7. Community participation. (23 points available)

- How have users participated in modifying the landscape?

	1) During and after the regeneration (3 points each)	2) During the regeneration (2 points each)	3) No (1 point each)
a) Design	☐	☐	☐
b) Construction	☐	☐	☐
c) Maintenance	☐	☐	☐
d) Conservation	☐	☐	☐

Participation of residents in the change of their environment encourages a stronger attachment. An active and continuous involvement rather than consultative process encourages higher identification and attachment of residents towards their environment and other residents. Existing channels to participate provide interested users with options to become involved in their community if they desire so in different ways. However, capacity building and community development should be continuous and evaluated for gradually reducing the need of external inputs.[1] In some estates, the housing company hires residents as caretakers who can have a wider vision of the resident's needs or where residents have control of budgets over design and maintenance changes. Both reduce the continuous input of resources, provide capacity building, community empowerment and an outdoor environment likable to residents.[2]

- Have residents participated in creating a new image for the housing estate?

☐ 1) Formally and informally (3 points) ☐ 2) Informally (2 points) ☐ 3) In no way (1 point)

The general image of the community forges the path to the personal identity of individual residents. The participation of residents in maintaining a particular image of the housing area can be done through decisions in the regeneration, formal activities as meetings, seminars on experiences, providing education to other interested parties, building a society, or festivals for example or informal as local stores names with allusion to the local image, the way they brand themselves as residents of that area, local sports groups names, and others.[3]

[1] Janet Rowe and Celia Robbins, 'Leading from Below: The Contribution of Community-Based Initiatives', in *Sustainable Communities: The Potential for Eco-Neighbourhoods*, ed. by Hugh Barton, (London: Earthscan, 2000), pp. 161-164.

[2] Anne Beer, 'Innovative Solutions to the Design, Management and Maintenance of Urban Greenspace', (2001) <http://www.map21ltd.com/scan-green/eriksbo.htm> [accessed March 2007] para. 4 of 7.

[3] Bridgette Wessels and Siep Miedema, p. 70. See also Martin Wood and Clive Vamplew, 'Neighbourhood images in Teeside: Regeneration or decline?', *Joseph Rowntree Foundation*, (1999) <http://www.jrf.org.uk/knowledge/findings/housing/020.asp> [accessed November 2008] (para. 26 of 41).

- Have different degrees of participation and ways for getting involved been provided to residents?

☐ 1) Yes (2 points) ☐ 2) No (1 points)

Different degrees of involvement should be made available to provide residents with choices that fit their needs, limitations, or desire to participate. Selected techniques of participation should be suited to the degree of involvement but must also be varied to fit residents' time availability and skills. Also, opportunities to participate should be made available formally such as meetings for the specific purpose of exchanging ideas and informally by approaching residents in usual places of gathering such as schools or local shops.[4]

- Has there been support and encouragement from closest authorities for the development of residents' social organizations?

☐ 1) Yes (3 points) ☐ 2) Support if demanded (2 points) ☐ 3) No (1 point)

In order to support participation mechanisms, housing companies or local authorities may encourage the development of social organizations for different purposes in the housing area.

- Has discussion on environmental, economic, and social issues been encouraged amongst residents and closest local authorities?

☐ 1) Yes, regularly (3 points) ☐ 2) Occasionally (2 points) ☐ 3) No (1 point)

Exchange of information among residents and closest authorities provides important feedback that may inform required changes on the housing area, opens participation channels for residents, and keeps an open dialogue between both parties.[5] Therefore, regular communication with residents should be maintained rather than one-time participation processes during the regeneration only. Different methods of participation should be used to provide choices to residents.[6]

[4] Sherry R. Arnstein, 'A Ladder of Citizen Participation', *Journal of the American Institute of Planners*, 35 (1969) <http://lithgow-schmidt.dk/sherry-arnstein/ladder-of-citizen-participation.html> [accessed July 2010] para. 8 of 85. See also David Wilcox, *The Effective Guide to Participation*, (Brighton: Delta Press, 1994), pp. 4-9

[5] Department for Communities and Local Government, *Strong and Prosperous Communities*, p. 32.

[6] Nick Wates, The Community Planning Handbook, (London: Earthscan, 2000; repr. 2006), p. 17.

Instructions for grading the assessment

Individual sections.

The tables provided in the following pages calculate the score for each section. The top table provides the total amount of points and scores without having chosen any of the non-applicable items. The bottom table provides scores considering there are non-applicable items chosen. The total amounts of points achieved should be compared with the total points given and the closest should be selected for obtaining a grade. For values falling in the middle the closest lower number should be considered.

The following examples shows the way in reading the tables:

Example 1: Points acquired sum up to 137 without any non-applicable item

Procedure: *The closest amount of points in the table is 140 which results in a score of 7*

Example 2: Points acquired sum up to 146 with 3 non-applicable items

Procedure: *Using the total points indicated with 3 N/A items, the closest amount of points in the table is 144 which results in a score of 8*

Section 1. Reducing energy use and Carbon Dioxide (CO_2) emissions (170 points available)

	Total points (without N/A items)*											
	170	160	150	140	130	121	111	101	91	81	71	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

Number of N/A	Total points (with N/A items)*											
1	168	158	148	138	128	119	109	99	89	79	69	
2	166	156	146	136	126	117	107	97	87	77	67	
3	164	154	144	134	124	115	105	95	85	75	65	
4	162	152	142	132	122	113	103	93	83	73	63	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

* N/A indicates non-applicable items

** Utilise closest total number of points for score

*** 10= Excellent, 9=Good, 8=Satisfactory, 7=Poor, 6=Bad

Instructions for grading the assessment

Entire assessment.

For the score of the whole assessment, each section score is multiplied by the weighting value to obtain weighted scores for each section. These are then summed up to obtain the score of the entire assessment.

The following example shows the way in working the table for the final score:

Sections	Score for each section		Weighting values	Weighted scores per section
1 . Reducing energy use and Carbon Dioxide emissions.	8	X	0.29	2.32
2 . Increasing biodiversity.	7	X	0.12	0.84
3 . Water saving.	10	X	0.08	0.80
4 . Reducing pollution.	9	X	0.20	1.76
5 . Materials selection.	9	X	0.13	1.13
6 . Community development.	8	X	0.10	0.76
7 . Community participation.	10	X	0.10	0.95
			Score for the whole assessment (sum of the sections' weighted scores)	9

Grading for section 1 and 2 of the ecological assessment

Section 1. Reducing energy use and Carbon Dioxide (CO_2) emissions (169 points available)

	Total points (without N/A items)*											
	169	159	149	139	129	120	110	100	90	80	70	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

Number of N/A	Total points (with N/A items)*										
1	167	157	147	138	128	118	108	98	89	79	69
2	165	155	146	136	126	117	107	97	87	78	68
3	163	153	144	134	125	115	105	96	86	77	67
4	161	152	142	133	123	114	104	95	85	76	66
5	159	150	140	131	121	112	103	93	84	74	65
6	157	148	138	129	120	111	101	92	83	73	64
7	155	146	137	127	118	109	100	91	81	72	63
8	153	144	135	126	117	108	98	89	80	71	62
9	151	142	133	124	115	106	97	88	79	70	61
10	149	140	131	122	113	105	96	87	78	69	60
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

* N/A indicates non-applicable items

** Utilise closest total number of points for score

*** 10= Excellent, 9=Good, 8=Satisfactory, 7=Poor, 6=Bad

Section 2. Increasing biodiversity (28 points available)

	Total points (no N/A items available)*										
	28	26	25	23	22	20	18	17	15	14	12	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

* N/A indicates non-applicable items

** Utilise closest total number of points for score

*** 10= Excellent, 9=Good, 8=Satisfactory, 7=Poor, 6=Bad

Grading for section 3, 4, and 5 of the ecological assessment

Section 3. Reducing water use
(28 points available)

	Total points (without N/A items)*											
	28	27	25	24	22	21	20	18	17	15	14	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

Number of N/A	Total points (with N/A items)*											
1	26	25	23	22	21	20	18	17	16	14	13	
2	24	23	22	20	19	18	17	16	14	13	12	
3	22	21	20	19	18	17	15	14	13	12	11	
4	20	19	18	17	16	15	14	13	12	11	10	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

* N/A indicates non-applicable items

** Utilise closest total number of points for score

*** 10= Excellent, 9=Good, 8=Satisfactory, 7=Poor, 6=Bad

Section 4. Reducing pollution
(33 points available)

	Total points (without N/A items)*										
	33	31	30	28	27	25	23	22	20	19	17	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

of N/A	Total points (with N/A items)*										
1	31	30	28	27	25	24	22	21	19	18	16	
2	29	28	26	25	23	22	21	19	18	16	15	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

* N/A indicates non-applicable items

** Utilise closest total number of points for score

*** 10= Excellent, 9=Good, 8=Satisfactory, 7=Poor, 6=Bad

Section 5. Materials selection according to their life-cycle
(40 points available)

	Total points (no N/A items available)*										
	40	37	34	30	27	24	21	18	14	11	8	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

* N/A indicates non-applicable items

** Utilise closest total number of points for score

*** 10= Excellent, 9=Good, 8=Satisfactory, 7=Poor, 6=Bad

Grading for section 6 and 7 of the social assessment

Section 6. Community development
(56 points available)

	Total points (without N/A items)*											
	56	53	49	46	43	40	36	33	30	26	23	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

of N/A	Total points (with N/A items)*											
1	54	50	47	43	40	36	32	29	25	22	18	
2	52	49	45	42	38	35	31	28	24	21	17	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

* N/A indicates non-applicable items

** Utilise closest total number of points for score

*** 10= Excellent, 9=Good, 8=Satisfactory, 7=Poor, 6=Bad

Section 7. Community participation
(23 points available)

	Total points (No N/A items available)*											
	23	22	20	19	17	16	14	13	11	10	8	
Score**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	***

* N/A indicates non-applicable items

** Utilise closest total number of points for score

*** 10= Excellent, 9=Good, 8=Satisfactory, 7=Poor, 6=Bad

Grading for the entire assessment

Sections	Score for each section		Weighting values	Weighted scores per section
1 . Reducing energy use and Carbon Dioxide emissions.		x	0.29	
2 . Increasing biodiversity.		x	0.12	
3 . Water saving.		x	0.08	
4 . Reducing pollution.		x	0.20	
5 . Materials selection.		x	0.13	
6 . Community development.		x	0.10	
7 . Community participation.		x	0.10	
			Score for the whole assessment (sum of the sections' weighted scores)	

Appendix B

Perception survey

The survey integrates four sections related to the residents' perception towards the design quality issues. Then, another six sections explore community and environmental development issues. These are followed by questions regarding the respondents' characteristics.

Most of the survey consists of close-ended questions, having some where additional items may be provided by the respondents if the answers given do not consider it. At the end, an open-comment question is provided where residents may include views on issues that they consider would encourage social interaction in their outdoor areas.

The survey was calculated to take approximately 20 minutes to complete. For each question, instructions are provided and they should be answered taking into consideration the outdoor conditions at the time of responding.

Section 1. Opportunities for social and recreational activities and for passive and active engagement in the landscape.

I.- Please rate the adequacy of the outdoor environment in your housing area for each of the following:

	1) Excellent	2) Good	3) Regular	4) Poor	5) Bad
A) Table games for elderly	☐	☐	☐	☐	☐
B) Enjoying nature	☐	☐	☐	☐	☐
C) Facilities for adolescents	☐	☐	☐	☐	☐
D) Talking	☐	☐	☐	☐	☐
E) Play facilities for children	☐	☐	☐	☐	☐
F) Fairs, festivals, and barbecues	☐	☐	☐	☐	☐
G) Drawing, studying, reading	☐	☐	☐	☐	☐
H) Sports for adults	☐	☐	☐	☐	☐
I) Rest and relaxation	☐	☐	☐	☐	☐
J) Meetings of neighbours	☐	☐	☐	☐	☐

Section 2. Size perception of the outdoor environment.

I.- Seeing from your dwelling window, what is your perception of the dimension of the outdoor environment? (Select one)

☐ 1) Small ☐ 2) Adequate ☐ 3) Large ☐ 4) Extremely large

Section 3. Legibility: visual and physical understanding of the place.

I.– How easy is it for your new visitors to find their way to your dwelling? (Select one)

☐ 1) Very easy ☐ 2) Not so difficult ☐ 3) Must give precise instructions

☐ 4) Must meet them at public place ☐ 5) I don't know

II.– Where do you consider is the most important physical centre of your housing area? (Select one)

☐ 1) Plaza /Square ☐ 3) Courtyard ☐ 5) School ☐ 6) Other, please specify

☐ 2) Local street ☐ 4) Playground _____

III.– What features are you able to see from your dwelling window? (Select as many as needed)

☐ 1) Schools ☐ 4) Plaza / square ☐ 7) Trees ☐ 10) Private gardens

☐ 2) Playground ☐ 5) Sports facilities ☐ 8) Shrubs ☐ 11) Other, please specify

☐ 3) Street ☐ 6) Parking areas ☐ 9) Lawn _____

IV.– Seeing from your dwelling window, please rate the arrangement of the outdoor environment for the following:

	1) Excellent	2) Good	3) Regular	4) Poor	5) Bad
A) Attractiveness of exterior areas	☐	☐	☐	☐	☐
B) Balanced distribution of trees, shrubs, lawn and pedestrian areas	☐	☐	☐	☐	☐
C) Easiness to see and identify persons using the exterior areas in daytime	☐	☐	☐	☐	☐
D) Flexibility for a variety of activities that invite to use outdoor areas	☐	☐	☐	☐	☐

V.– In your everyday use, please rate the arrangement of the outdoor environment for the following:

	1)Excellent	2)Good	3)Regular	4)Poor	5)Bad	6)Non-existent
A) Areas for walking that offer views and areas to explore	☐	☐	☐	☐	☐	☐
B) Seating spaces that provide privacy	☐	☐	☐	☐	☐	☐
C) Play areas where children can explore and learn from nature	☐	☐	☐	☐	☐	☐
D) Simultaneous use of exterior areas by people of different ages for several activities during the day	☐	☐	☐	☐	☐	☐

VI.– How do the building positions make you feel in the exterior environment? (Select one)

☐ 1) Protected ☐ 3) Overlooked ☐ 5) Secluded ☐ 6) Other, please specify

☐ 2) Comfortable ☐ 4) Claustrophobic

_____

VII.– Which element encourages use of outdoor areas for socializing more? (Select a maximum of two)

☐ 1) None ☐ 3) Visually attractive areas ☐ 5) Order

☐ 2) Flexible activity areas ☐ 4) Private seating areas ☐ 6) All

Section 4. Sensory opportunities: visual, audible, olfactory, and tactile experience of outdoor areas

I.– From your dwelling window, how many colours do you perceive in the vegetation of the outdoor environment? (Select one)

☐ 1) 1 ☐ 2) 2 - 3 ☐ 3) 4 - 5 ☐ 4) 6 or more

II.– Please rate the existent visual variety of colours in the vegetation of the outdoor environment.

☐ 1) Beautiful ☐ 2) Pleasant ☐ 3) Don't stand out ☐ 4) Unpleasant ☐ 5) Horrible

III.– From your dwelling window, what type of paved and vegetated surfaces do you perceive in the outdoor environment? (Select as many as needed)

☐ 1) Stone ☐ 3) Pavement ☐ 5) Concrete ☐ 7) Wood ☐ 9) Dirt

☐ 2) Lawn ☐ 4) Flowers ☐ 6) Shrubs ☐ 8) Trees ☐ 10) Other

IV.– How is the existent visual balance of paved and vegetated surfaces in the outdoor environment? (Select one)

☐ 1)Too many paved surfaces ☐ 2)Good balance of both ☐ 3)Too many vegetated surfaces

V.– From your dwelling window, how is the existent balance of sunny and shady areas in the outdoor environment? (Select one)

☐ 1) Would like more sunny areas ☐ 2) Good balance of both ☐ 3) Would like more shadowed areas

VI.– From your dwelling, please rate your perception of sounds and smells from the outdoor environment?

	1)Very enjoyable	2)Pleasant	3)Moderate	4)Disturbing	5)Intolerable	6)Non-existent
A) Sounds of rain	☐	☐	☐	☐	☐	☐
B) Sounds of water movement in fountains and channels	☐	☐	☐	☐	☐	☐
C) Singing of birds	☐	☐	☐	☐	☐	☐
D) Blowing of the wind	☐	☐	☐	☐	☐	☐
E) Vehicular movement	☐	☐	☐	☐	☐	☐
F) Sound of passing trains	☐	☐	☐	☐	☐	☐
G) People talking	☐	☐	☐	☐	☐	☐
H) Laughter	☐	☐	☐	☐	☐	☐
I) Sound of footsteps	☐	☐	☐	☐	☐	☐
J) Sounds of children playing	☐	☐	☐	☐	☐	☐
K) Playing of music	☐	☐	☐	☐	☐	☐
L) Smell of dampness	☐	☐	☐	☐	☐	☐
M) Scent of tumble dryers	☐	☐	☐	☐	☐	☐
N) Scent of flowers and plants	☐	☐	☐	☐	☐	☐
O) Odours of cooking	☐	☐	☐	☐	☐	☐
P) Odours of rubbish	☐	☐	☐	☐	☐	☐

VII.– Which qualities would increase your use of the exterior environment for socializing? (Select a maximum of two)

☐ 1) Visual amenities

☐ 2) More sunny areas

☐ 3) More shady areas

☐ 4) More vegetated surfaces

☐ 5) Reduction of bad smells

☐ 6) More paved surfaces

☐ 7) Controlled levels of sounds

☐ 8) Increase sources of good smells

Section 5. Personalization: the way in which a person can individualize and express their identity

I.- From your dwelling window, please rate the attractiveness of the outdoor spaces that your community has adopted and made distinguishable.

	1) Beautiful	2) Pleasant	3) Don't stand out	4) Unpleasant	5) Horrible	6) There are none
A) Art in walls or floors	☐	☐	☐	☐	☐	☐
B) Trees	☐	☐	☐	☐	☐	☐
C) Shrubs	☐	☐	☐	☐	☐	☐
D) Fences	☐	☐	☐	☐	☐	☐
E) Private gardens	☐	☐	☐	☐	☐	☐
F) Playgrounds	☐	☐	☐	☐	☐	☐
G) Balconies	☐	☐	☐	☐	☐	☐

Section 6. Acquaintances and friendships

I.– If you consider having friends in your housing area, where have you made the majority of them? (Select one)

☐ 1) Within the building ☐ 2) In outdoor spaces ☐ 3) I do not have any friends

II.– How did you get to know the majority of your friends in your housing area? (Select a maximum three)

☐ 1) Through other neighbours
☐ 2) Through children
☐ 3) Going to events
☐ 4) Through casual encounters
☐ 5) Involving in gardening
☐ 6) Belonging to / organizing a society
☐ 7) Through community meetings
☐ 8) Employment within the community
☐ 9) Sharing facilities as dining/washing
☐ 10) I have no friends in my housing area
☐ 11) Other, please specify _____

III.– Please rate the following spaces for significant opportunities to meet and socialize with neighbours.

	1) Excellent	2) Good	3) Don't know	4) Poor	5) Bad	6) There are none
A) Seating areas	☐	☐	☐	☐	☐	☐
B) Playgrounds	☐	☐	☐	☐	☐	☐
C) Water fountain areas	☐	☐	☐	☐	☐	☐
D) Parking areas	☐	☐	☐	☐	☐	☐
E) Streets	☐	☐	☐	☐	☐	☐
F) Private gardens	☐	☐	☐	☐	☐	☐
G) Pedestrian paths	☐	☐	☐	☐	☐	☐
H) Tree covered areas	☐	☐	☐	☐	☐	☐
I) Balconies	☐	☐	☐	☐	☐	☐
J) Lawn	☐	☐	☐	☐	☐	☐
K) Elevators	☐	☐	☐	☐	☐	☐
L) Stairs	☐	☐	☐	☐	☐	☐
M) Same storey of my dwelling	☐	☐	☐	☐	☐	☐
N) Communal rooms	☐	☐	☐	☐	☐	☐

IV.– Where are community events most likely to happen? (Select one)

☐ 1) School grounds
☐ 2) Courtyard
☐ 3) Streets
☐ 4) The plaza / Square
☐ 5) Communal gardens
☐ 6) Sports areas
☐ 7) Communal rooms
☐ 8) Other, please specify _____

Section 7. Common interests and values

Note.- Biodiversity in this research is considered as the variety of species (as insects, birds or other animals) that exist in the housing area.

I.– How important do you consider the outdoor environment for the following?

	1) Essential	2) Important	3) Helpful	4) Not so important	5) Unnecessary
A) Leisure	☐	☐	☐	☐	☐
B) Socializing	☐	☐	☐	☐	☐
C) Enjoying nature	☐	☐	☐	☐	☐
D) Maximize use of rainwater	☐	☐	☐	☐	☐
E) Increasing biodiversity	☐	☐	☐	☐	☐
F) Use of renewable resources as sun and wind	☐	☐	☐	☐	☐

II.– Is drinking water a resource that you consider to be?

	1) Agree	2) Disagree	3) Don't know
A) Exhaustible	☐	☐	☐
B) Recyclable	☐	☐	☐

III.– Is it important for rubbish and waste to be?

	1) Agree	2) Disagree	3) Don't know
A) Reduced	☐	☐	☐
B) Re-used	☐	☐	☐
C) Separated at home	☐	☐	☐
D) Recycled	☐	☐	☐

IV.– Do you know whether your housing area does the following to improve the environment?

	1) Yes	2) No	3) Don't know
A) Use of solar or wind energy	☐	☐	☐
B) Recycle/separation of waste	☐	☐	☐
C) Re-use of rain water from roofs	☐	☐	☐
D) Recycling of water to flush toilets	☐	☐	☐
E) Reduction of water run-off through ponds, green roofs or green facades	☐	☐	☐

Section 8. Sharing and working together as a community

I.– Do you get involved in the following operations in the outdoor environment?

	1) Yes	2) No
A) General tidying and removal of rubbish	☐	☐
B) Gardening and weeding of communal areas	☐	☐
C) Preventing vandalism	☐	☐
D) Designing exterior areas or flower beds	☐	☐
E) Building new structures or other features	☐	☐
F) Planting and keeping trees, shrubs, meadows, and ponds that increase biodiversity	☐	☐
G) Designing, building or keeping structures that use sun and wind energy	☐	☐
H) Composting in bins	☐	☐

II.– Within your home, how do you help conserve the environment?

	1) Yes	2) No
A) Use of water and energy saving gadgets or home appliances	☐	☐
B) Reduce my waste through re-use	☐	☐
C) Reduce water consumption	☐	☐
D) Buy environmentally friendly products	☐	☐

III.– Within your community, do you discuss ideas and methods to conserve the environment?

☐ 1) No ☐ 2) Yes, with my neighbours ☐ 3) Yes, in community meetings

IV.– If no, continue to question V. If yes, has this exchange of information been useful for knowing neighbours?

☐ 1) Yes ☐ 2) A Few ☐ 3) No

V.– How important is it for you to be able to conserve the environment?

☐ 1)Essential ☐ 2)Important ☐ 3)No opinion ☐ 4)Not so important ☐ 5)Unnecessary

Section 9. Community recognition and safety

I.– What are the limits of what you consider to be part of your personal realm? (Select as many as needed)

☐ 1) Dwelling ☐ 4) Parking area ☐ 7) Main street ☐ 8) Local street
☐ 2) Private garden ☐ 5) Train station ☐ 9) Other, please specify
☐ 3) Courtyard ☐ 6) Plaza _____

II.– What are the landmarks you use in your personal realm? (Select as many as needed)

☐ 1) Art objects ☐ 4) Train station ☐ 7) A particular tree ☐ 8) Schools
☐ 2) The towers ☐ 5) Playgrounds ☐ 9) Other, please specify
☐ 3) A garden ☐ 6) Plaza / Square _____

III.– Do you feel safe in the outdoor environment of your neighbourhood?

☐ 1) Yes, all day ☐ 2) Only at daytime ☐ 3) No

IV– If yes, please continue to Section 10. If no, which spaces make you feel unsafe? (Select as many as needed)

☐ 1) Communal rooms ☐ 2) Plaza/square ☐ 3) Lawn ☐ 4) Playgrounds

☐ 5) Outdoor seating areas ☐ 6) Other, please specify_____

Section 10. Movement

I.– What is your main mode of transport? (select a maximum of two)

☐ 1) Walking ☐ 3) Car ☐ 5) Tram ☐ 7) Elevated train

☐ 2) Bicycle ☐ 4) Bus ☐ 6) Underground ☐ 8) Train

II.– If you own a car, approximately how many times do you use your car per day?

☐ 1) No ☐ 2) Once or twice ☐ 3) Three or four times ☐ 4) More than five times

Section 11. Household data

I.– What is your gender?

☐ 1) Male ☐ 2) Female

II.– What is your age?

☐ 1) 18-30 ☐ 2) 31-40 ☐ 3) 41-50 ☐ 4) 51-60 ☐ 5) 61 or over

III.– What is the composition of your household?

☐ 1) Living alone ☐ 3) Single parent with children ☐ 5) Couple without children

☐ 2) Couple with children ☐ 4) Living with other adults (children over 21)

IV.– How would you classify your household's income?

☐ 1) Low ☐ 2) Average ☐ 3) High

V.– What is your property status?

☐ 1) Owner – occupier ☐ 2) Tenant ☐ 3) Other

Note.- Consider option 1 if you have paid or are paying for the property. Consider option 2 if you or your family are paying rent.

VI.– How long have you been living in your present dwelling?

☐ 1) Less than one year ☐ 2) 1 year ☐ 3) 2 years ☐ 4) 3 or more years

VII.– In what storey is your dwelling?

☐ 1) Ground floor ☐ 3) 2nd floor ☐ 5) 4th floor ☐ 7) 6th floor

☐ 2) 1st floor ☐ 4) 3rd floor ☐ 6) 5th floor ☐ 8) 7th floor

VIII.– What is the position of your dwelling?

1) Street _____

2) Building _____ 3) Entrance _____

IX.– Do you have additional comments to improve social opportunities in the outdoor environment?

_____

_____

_____

Record of activities for observation analysis of outdoor areas

ID		Housing density		Storeys		Date		Daytime		Windy		Sunny		Clouded		Rainy		Cold		Mild		Warm	

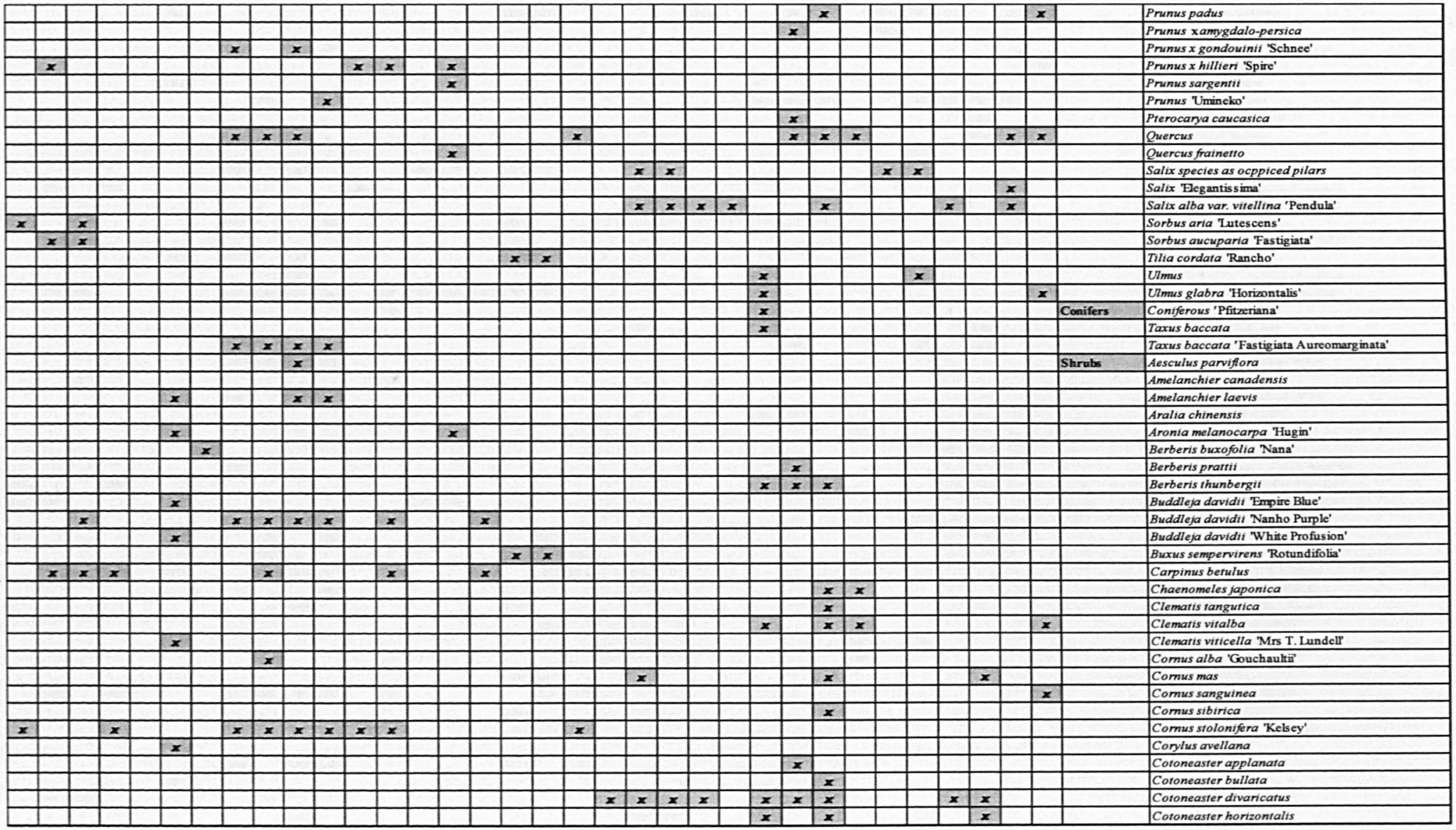
	NECESSARY											LEISURE											SOCIAL										
	age range						*Duration*			Conditions		*age range*						*Duration*			Conditions		*age range*						*Duration*			Conditions	
Areas/Activities	0-5	6-10	11-18	19-30	31-50	51-80	-5	5-15	15-25	sun	shad	0-5	6-10	11-18	19-30	31-50	51-80	-5	5-15	15-25	sun	shad	0-5	6-10	11-18	19-30	31-50	51-80	-5	5-15	15-25	sun	shad

Appendix D

Comparison of the use of planting material between communal gardens in Augustenborg

Semi-open layouts 4				Semi-open layouts 3C			Semi-open layouts 3B		Semi-open layouts 3A		Open layout 2B		Semi-open layout 2A		Open layouts 1				Semi-open layouts 4				Semi-open layouts 3C			Semi-open layouts 3B		Semi-open layout 2A		Open layouts 1					
Area l	Area k	Area j	Area i	Area t	Area s	Area r	Area h	Area g	Area f	Area e	Area q	Area p	Area o	Area n	Area d	Area c	Area b	Area a	Area l	Area k	Area j	Area i	Area t	Area s	Area r	Area h	Area g	Area o	Area n	Area d	Area c	Area b	Area a	
																	x	x		x	x	x		x			x		x					Trees	*Acacia*
																	x	x		x	x					x							(deciduous)	*Acer campestre*
																	x																	*Acer campestre* 'Elsrijk'
																	x	x																*Acer ginnala*
																		x																*Acer japonicum* 'Aconitifolium'
																												x			x			*Acer platanoides* 'Schwedleri'
							x																											*Aesculus hippocastanum*
		x																																*Alnus cordata*
	x						x						x		x	x	x	x																*Amelanchier lamarckii*
		x																																*Amelanchier ovalis* 'Edelweiss'
																									x									*Amygdalus persicoides*
																				x					x					x	x		x	*Betula pendula* 'Tristis'
										x					x											x	x		x						*Castanea*
																		x													x			*Cercidiphyllum japonicum*
																x																		*Cornus alba* 'Gouchaultii'
							x									x																			*Cornus mas*
																x	x																	*Corylus colurna*
					x																													*Crataegus x lavalleei*
					x																		x											*Fagus sylvatica* 'Pendula'
						x																													*Fagus sylvatica* 'Dawyck Gold'
																																		Fagus sylvatica
																												x						*Fraxinus*
							x	x					x																						*Juglans nigra*
																							x	x	x	x		x	x	x	x			*Laburnum*
																		x																	*Laburnum x watereri* 'Vossii'
																										x									*Malus baccata*
																															x				*Malus* 'Eleyi'
					x				x						x		x			x					x		x				x				*Malus floribunda*
					x							x																			x				*Malus* 'John Downie'
														x	x																				*Malus tschonoskii*
							x																												*Paulownia tomentosa*
																												x						*Populus nigra*
																												x			x	x		*Populus nigra var. pyramidalis*
							x	x	x													x		x		x	x			x	x		x	*Populus* 'Pyramidalis'
																																	x	*Populus* x*berolinensis*
																																		Prunus avium
		x																																*Prunus avium* 'Plena'

Table 5.5 continued



	Prunus padus
	Prunus xamygdalo-persica
	Prunus x gondouinii 'Schnee'
	Prunus x hillieri 'Spire'
	Prunus sargentii
	Prunus 'Umineko'
	Pterocarya caucasica
	Quercus
	Quercus frainetto
	Salix species as ocppiced pilars
	Salix 'Elegantissima'
	Salix alba var. vitellina 'Pendula'
	Sorbus aria 'Lutescens'
	Sorbus aucuparia 'Fastigiata'
	Tilia cordata 'Rancho'
	Ulmus
	Ulmus glabra 'Horizontalis'
Conifers	*Coniferous* 'Pfitzeriana'
	Taxus baccata
	Taxus baccata 'Fastigiata Aureomarginata'
Shrubs	*Aesculus parviflora*
	Amelanchier canadensis
	Amelanchier laevis
	Aralia chinensis
	Aronia melanocarpa 'Hugin'
	Berberis buxofolia 'Nana'
	Berberis prattii
	Berberis thunbergii
	Buddleja davidii 'Empire Blue'
	Buddleja davidii 'Nanho Purple'
	Buddleja davidii 'White Profusion'
	Buxus sempervirens 'Rotundifolia'
	Carpinus betulus
	Chaenomeles japonica
	Clematis tangutica
	Clematis vitalba
	Clematis viticella 'Mrs T. Lundell'
	Cornus alba 'Gouchaultii'
	Cornus mas
	Cornus sanguinea
	Cornus sibirica
	Cornus stolonifera 'Kelsey'
	Corylus avellana
	Cotoneaster applanata
	Cotoneaster bullata
	Cotoneaster divaricatus
	Cotoneaster horizontalis

Table 5.5 continued

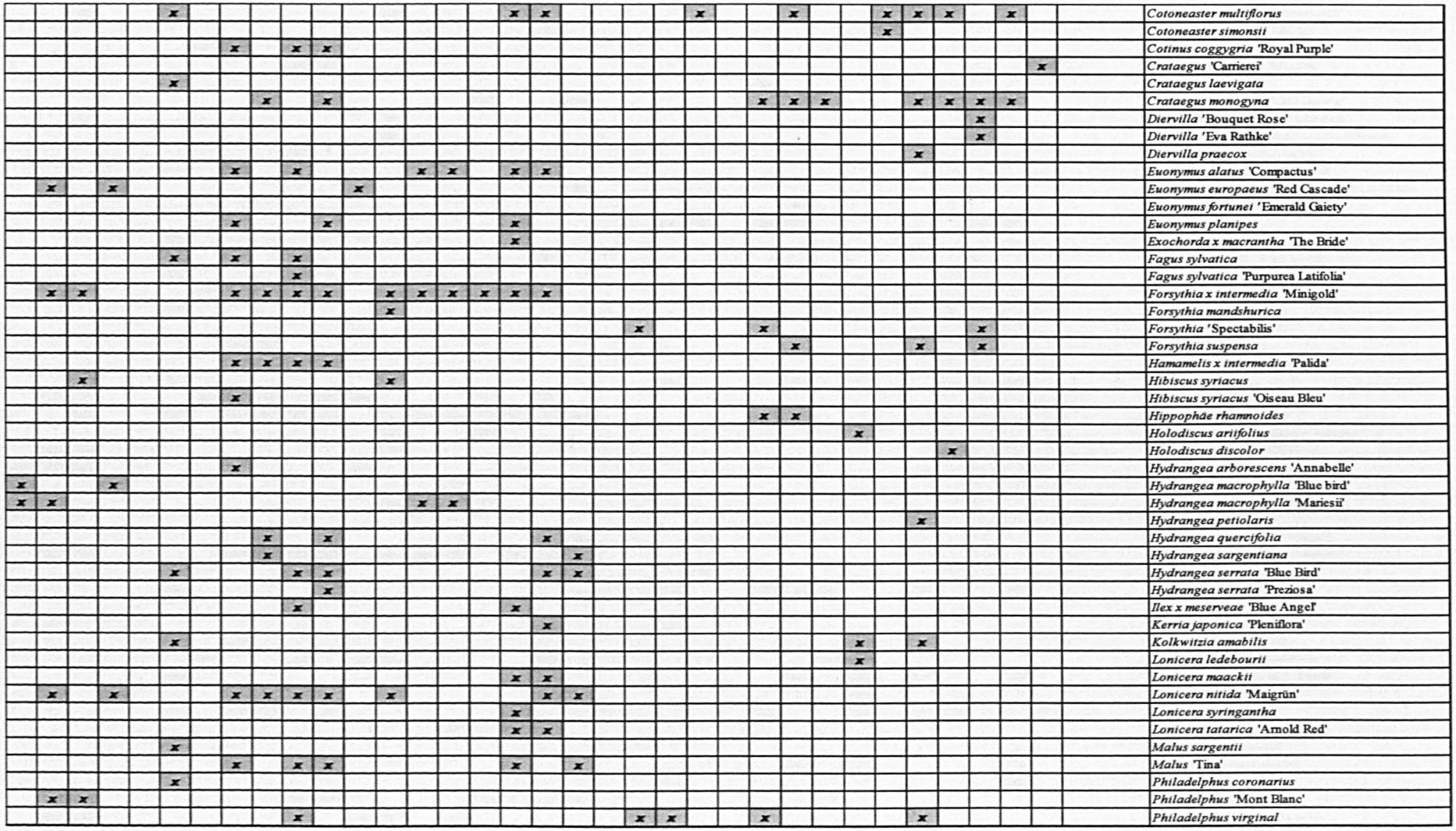
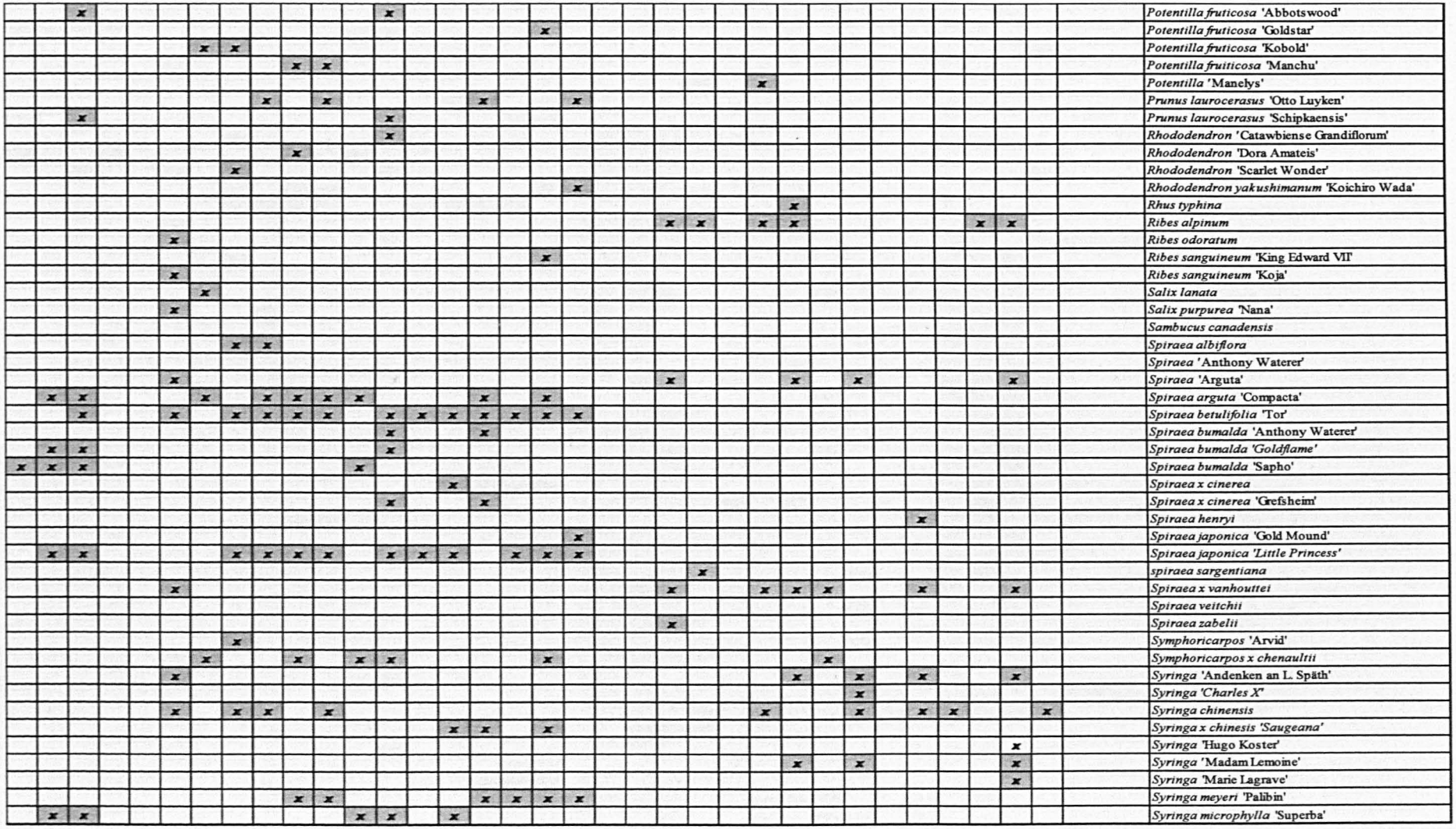
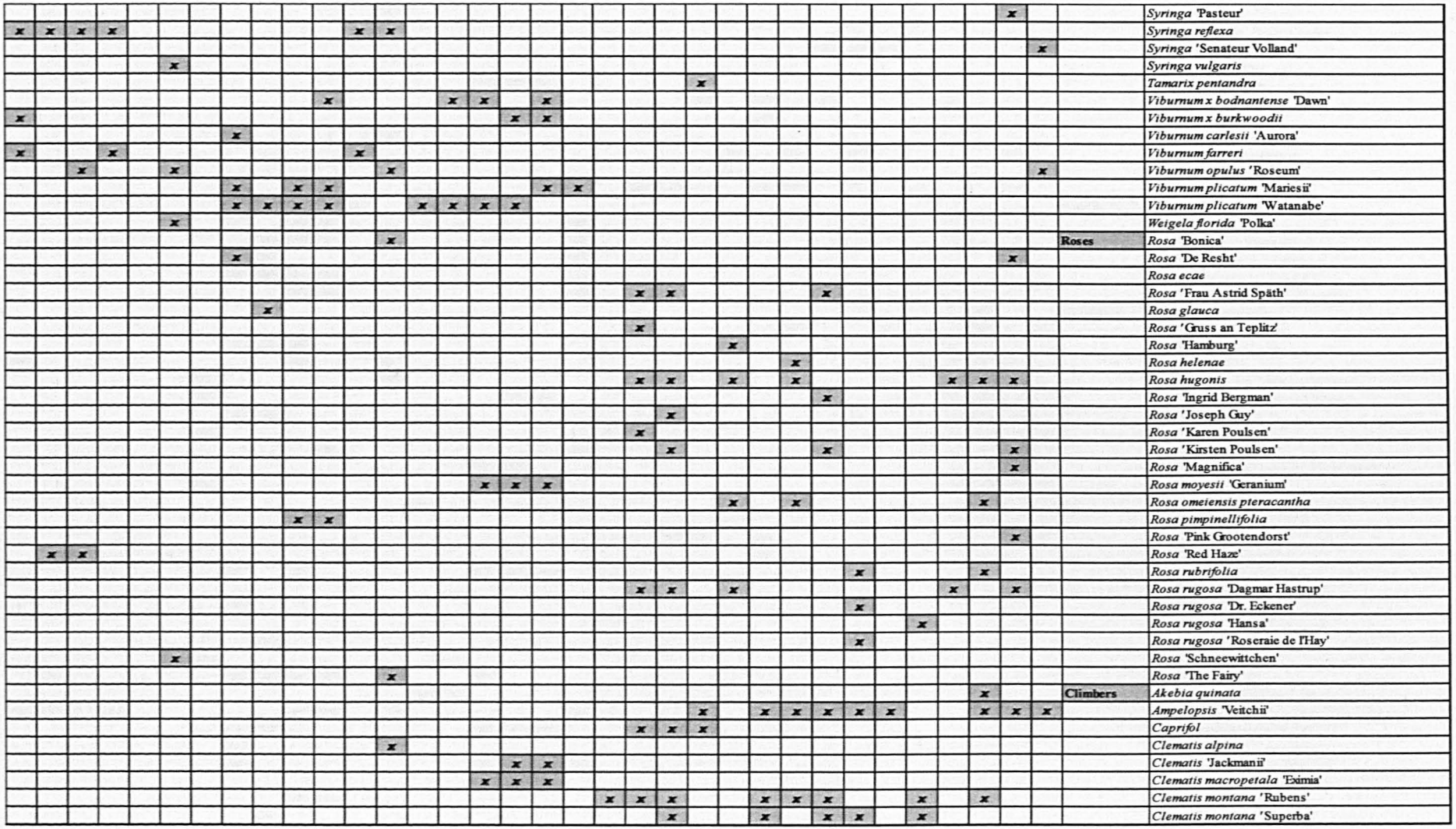


Table 5.5 continued



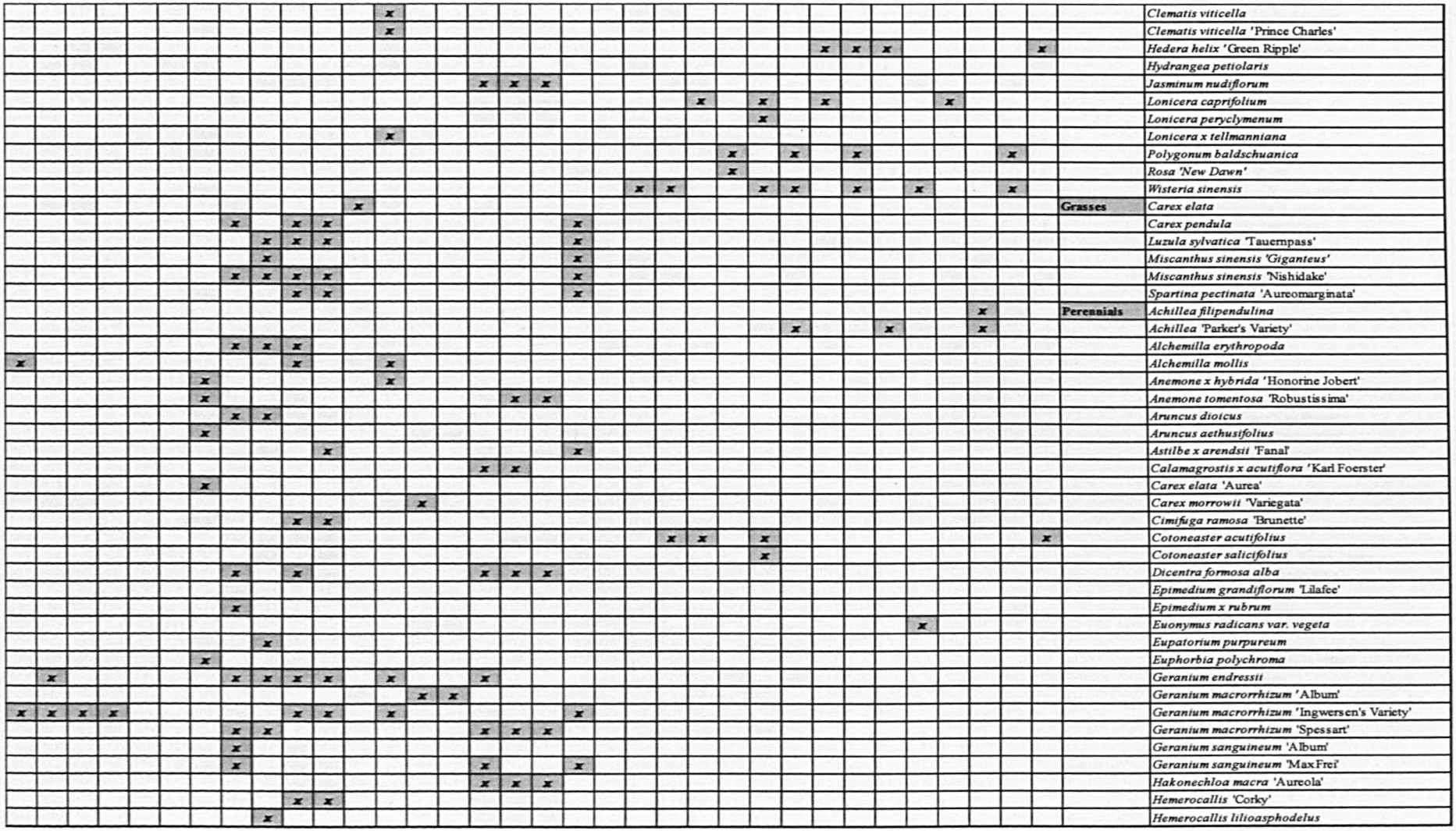
Potentilla fruticosa 'Abbotswood'
Potentilla fruticosa 'Goldstar'
Potentilla fruticosa 'Kobold'
Potentilla fruiticosa 'Manchu'
Potentilla 'Manelys'
Prunus laurocerasus 'Otto Luyken'
Prunus laurocerasus 'Schipkaensis'
Rhododendron 'Catawbiense Grandiflorum'
Rhododendron 'Dora Amateis'
Rhododendron 'Scarlet Wonder'
Rhododendron yakushimanum 'Koichiro Wada'
Rhus typhina
Ribes alpinum
Ribes odoratum
Ribes sanguineum 'King Edward VII'
Ribes sanguineum 'Koja'
Salix lanata
Salix purpurea 'Nana'
Sambucus canadensis
Spiraea albiflora
Spiraea 'Anthony Waterer'
Spiraea 'Arguta'
Spiraea arguta 'Compacta'
Spiraea betulifolia 'Tor'
Spiraea bumalda 'Anthony Waterer'
Spiraea bumalda 'Goldflame'
Spiraea bumalda 'Sapho'
Spiraea x cinerea
Spiraea x cinerea 'Grefsheim'
Spiraea henryi
Spiraea japonica 'Gold Mound'
Spiraea japonica 'Little Princess'
spiraea sargentiana
Spiraea x vanhouttei
Spiraea veitchii
Spiraea zabelii
Symphoricarpos 'Arvid'
Symphoricarpos x chenaultii
Syringa 'Andenken an L. Späth'
Syringa 'Charles X'
Syringa chinensis
Syringa x chinesis 'Saugeana'
Syringa 'Hugo Koster'
Syringa 'Madam Lemoine'
Syringa 'Marie Lagrave'
Syringa meyeri 'Palibin'
Syringa microphylla 'Superba'

Table 5.5 continued



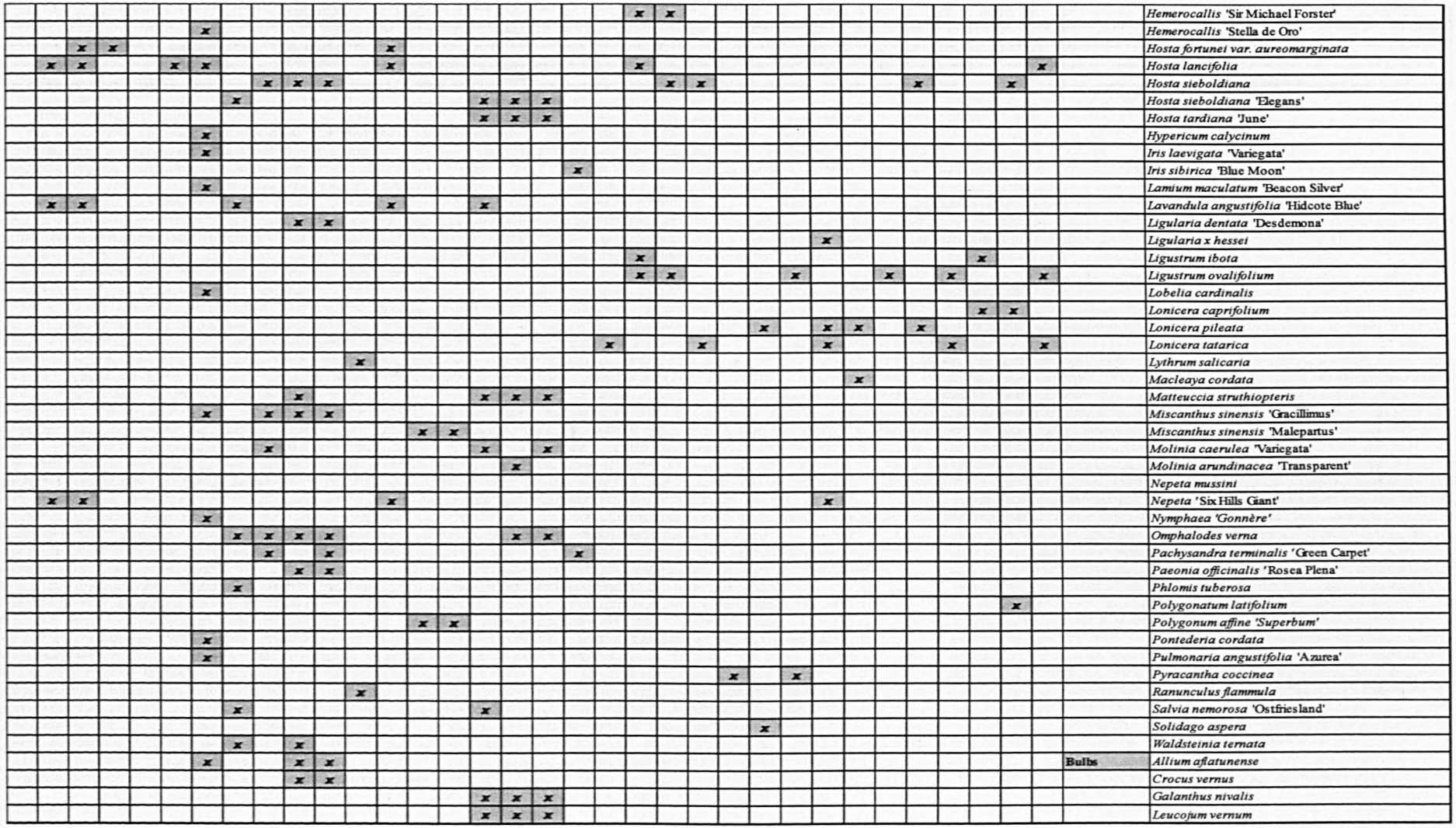
	Syringa 'Pasteur'
	Syringa reflexa
	Syringa 'Senateur Volland'
	Syringa vulgaris
	Tamarix pentandra
	Viburnum x bodnantense 'Dawn'
	Viburnum x burkwoodii
	Viburnum carlesii 'Aurora'
	Viburnum farreri
	Viburnum opulus 'Roseum'
	Viburnum plicatum 'Mariesii'
	Viburnum plicatum 'Watanabe'
	Weigela florida 'Polka'
Roses	*Rosa* 'Bonica'
	Rosa 'De Resht'
	Rosa ecae
	Rosa 'Frau Astrid Späth'
	Rosa glauca
	Rosa 'Gruss an Teplitz'
	Rosa 'Hamburg'
	Rosa helenae
	Rosa hugonis
	Rosa 'Ingrid Bergman'
	Rosa 'Joseph Guy'
	Rosa 'Karen Poulsen'
	Rosa 'Kirsten Poulsen'
	Rosa 'Magnifica'
	Rosa moyesii 'Geranium'
	Rosa omeiensis pteracantha
	Rosa pimpinellifolia
	Rosa 'Pink Grootendorst'
	Rosa 'Red Haze'
	Rosa rubrifolia
	Rosa rugosa 'Dagmar Hastrup'
	Rosa rugosa 'Dr. Eckener'
	Rosa rugosa 'Hansa'
	Rosa rugosa 'Roseraie de l'Hay'
	Rosa 'Schneewittchen'
	Rosa 'The Fairy'
Climbers	*Akebia quinata*
	Ampelopsis 'Veitchii'
	Caprifol
	Clematis alpina
	Clematis 'Jackmanii'
	Clematis macropetala 'Eximia'
	Clematis montana 'Rubens'
	Clematis montana 'Superba'

Table 5.5 continued



	Clematis viticella
	Clematis viticella 'Prince Charles'
	Hedera helix 'Green Ripple'
	Hydrangea petiolaris
	Jasminum nudiflorum
	Lonicera caprifolium
	Lonicera peryclymenum
	Lonicera x tellmanniana
	Polygonum baldschuanica
	Rosa 'New Dawn'
	Wisteria sinensis
Grasses	*Carex elata*
	Carex pendula
	Luzula sylvatica 'Tauernpass'
	Miscanthus sinensis 'Giganteus'
	Miscanthus sinensis 'Nishidake'
	Spartina pectinata 'Aureomarginata'
Perennials	*Achillea filipendulina*
	Achillea 'Parker's Variety'
	Alchemilla erythropoda
	Alchemilla mollis
	Anemone x hybrida 'Honorine Jobert'
	Anemone tomentosa 'Robustissima'
	Aruncus dioicus
	Aruncus aethusifolius
	Astilbe x arendsii 'Fanal'
	Calamagrostis x acutiflora 'Karl Foerster'
	Carex elata 'Aurea'
	Carex morrowii 'Variegata'
	Cimifuga ramosa 'Brunette'
	Cotoneaster acutifolius
	Cotoneaster salicifolius
	Dicentra formosa alba
	Epimedium grandiflorum 'Lilafee'
	Epimedium x rubrum
	Euonymus radicans var. vegeta
	Eupatorium purpureum
	Euphorbia polychroma
	Geranium endressii
	Geranium macrorrhizum 'Album'
	Geranium macrorrhizum 'Ingwersen's Variety'
	Geranium macrorrhizum 'Spessart'
	Geranium sanguineum 'Album'
	Geranium sanguineum 'Max Frei'
	Hakonechloa macra 'Aureola'
	Hemerocallis 'Corky'
	Hemerocallis liliioasphodelus

Table 5.5 continued



	Hemerocallis 'Sir Michael Forster'
	Hemerocallis 'Stella de Oro'
	Hosta fortunei var. aureomarginata
	Hosta lancifolia
	Hosta sieboldiana
	Hosta sieboldiana 'Elegans'
	Hosta tardiana 'June'
	Hypericum calycinum
	Iris laevigata 'Variegata'
	Iris sibirica 'Blue Moon'
	Lamium maculatum 'Beacon Silver'
	Lavandula angustifolia 'Hidcote Blue'
	Ligularia dentata 'Desdemona'
	Ligularia x hessei
	Ligustrum ibota
	Ligustrum ovalifolium
	Lobelia cardinalis
	Lonicera caprifolium
	Lonicera pileata
	Lonicera tatarica
	Lythrum salicaria
	Macleaya cordata
	Matteuccia struthiopteris
	Miscanthus sinensis 'Gracillimus'
	Miscanthus sinensis 'Malepartus'
	Molinia caerulea 'Variegata'
	Molinia arundinacea 'Transparent'
	Nepeta mussini
	Nepeta 'Six Hills Giant'
	Nymphaea 'Gonnère'
	Omphalodes verna
	Pachysandra terminalis 'Green Carpet'
	Paeonia officinalis 'Rosea Plena'
	Phlomis tuberosa
	Polygonatum latifolium
	Polygonum affine 'Superbum'
	Pontederia cordata
	Pulmonaria angustifolia 'Azurea'
	Pyracantha coccinea
	Ranunculus flammula
	Salvia nemorosa 'Ostfriesland'
	Solidago aspera
	Waldsteinia ternata
Bulbs	*Allium aflatunense*
	Crocus vernus
	Galanthus nivalis
	Leucojum vernum

Table 5.5 continued

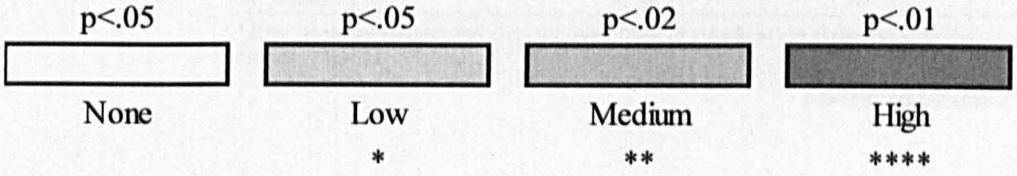
									x	x																									*Narcissus* 'Golden Harvest'
						x										x																			*Scilla siberica*
					x	x			x	x																									*Tulipa* 'Diana'
																x																			*Tulipa* 'White Triumphator'

Introduction to Appendices E, F, G, H and I

For the research there were various independent variables, such as perception of size, that were tested statistically to find relevant differences for the defined dependent variables, such as a range of storeys or layouts. This allowed viewing where there were statistically significant differences (P), which may not be attributed merely to chance. The significance level at which results were considered valid was $p<.05$ (any at less than 5%) which means that there is a minimum 95% chance that the results were true. As mentioned earlier, non-parametric tests were necessary to be used for this study after it was found that the data was not normally distributed. The level of significance $p<.05$ was considered to be more adequate for the use of non-parametric statistical tests rather than a more stringent one such as $p<.01$ or 99%. This is as non-parametric tests may be less robust in identifying differences compared to parametric tests.

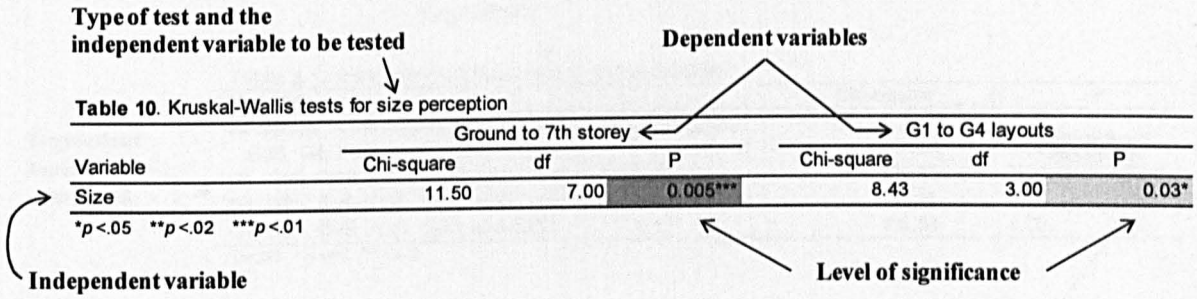
Nevertheless, significance levels are indicated for each test with low, medium, and high as these are related to the possibility of making a Type I error which is establishing there is a difference when in fact there is none. As the significance level is higher, there is less possibility of committing a Type I error. However, if significance levels are too stringent there is the chance of missing differences, particularly in non-parametric tests.

Levels of significance indicated in tables:



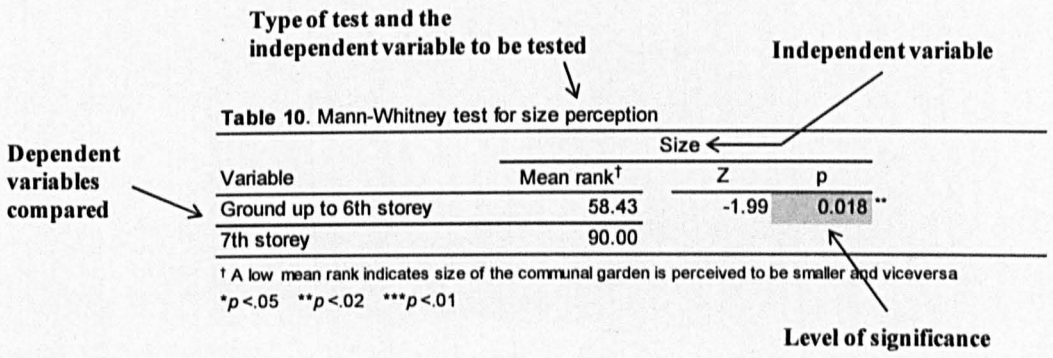
Example 1:

The table shows one independent variable that was tested with two separate dependent variables using a Kruskal-Wallis test. For the purpose of this example both tests show significant differences. In this type of test various data sets may be compared. In the case where size perception is tested for differences amongst a range of different storeys, p is less than 1% and therefore the level of significance is stated as high. For size perception tested for differences amongst a range of different layouts, p is less than 5% for which the level of significance is stated as low.



Example 2:

The table shows one independent variable that was tested with one separate dependent variable using a Mann-Whitney test. For the purpose of this example the test shows significant differences. In this type of test only two data sets may be compared. From ground up to six storeys the lower mean rank indicates that the size of the communal gardens was perceived to be smaller and larger for respondents living on the seventh storey. The mean rank value corresponds to the rating values assigned in the survey. In this case the level of significance is less than 2%, which is a medium level.



Example 3:

The table shows various dependent variables that were tested using a One-Sample Chi-Square test. For the purpose of this example the test shows significant differences. In this type of test various data sets may be compared to find differences in frequencies. The first test shows there were high significant differences of less than 1% amongst all the layouts in the housing area. The second test shows that without G4, the significance of differences is lower and so on until there are no more differences found for the tested layouts. This shows which the relevant layouts for social activities were.

Type of test

Table 2. One sample Chi-Square test for social activities

Variable	Chi-square	df	P	
All layouts in the housing area G1, G2A, G2B, G3A, G3B, G3C, G4, Park, and Square	300.89	8.00	0.00	***
G1, G2A, G2B, G3A, G3B, G3C, Park, and Square	200.81	7.00	0.02	**
G1, G2A, G2B, G3A, G3B, G3C, and Park	180.21	6.00	0.03	*
G1, G2A, G2B, G3A, G3B, and G3C	109.56	5.00	0.32	

*p<.05 **p<.02 ***p<.01

Dependent variables compared

Level of significance

Guide to abbreviations used in tables:

G: Layouts of blocks

Appendix E

Table 1. Kruskal-Wallis tests for size perception of communal gardens

	Ground to 7th storey			G1 to G4 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Size	6.70	7.00	0.46	2.39	3.00	0.50

*p<.05 **p<.02 ***p<.01

Table 2. Kruskal-Wallis tests for orientation

	Ground to 7th storey			G1 to G4 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Orientation	11.64	7.00	0.11	2.23	3.00	0.53

*p<.05 **p<.02 ***p<.01

Table 3. Kruskal-Wallis tests for the perception of attractiveness of the arrangement of communal gardens from window level

	Ground to 7th storey			G1 to G4 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Attractiveness for exploring	6.41	7.00	0.49	12.56	3.00	0.006***

*p<.05 **p<.02 ***p<.01

Table 4. Mann-Whitney test for perception of the attractiveness of the arrangement of communal gardens from window level

	Visual attractiveness of arrangement			
Variable	Mean rank†	Z	p	
G1	20.05	-2.31	0.02	**
G2	29.13			
G4	27.22	-3.39	0.001	***
G2	42.37			

† A low mean rank indicates visual attractiveness for exploration in communal gardens was perceived to be better and viceversa

*p<.05 **p<.02 ***p<.01

Table 5. Kruskal-Wallis tests for openness perception of the arrangement of communal gardens from window level

	Ground to 7th storey			G1 to G4 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Openness	5.21	7.00	0.63	6.26	3.00	0.10

*p<.05 **p<.02 ***p<.01

Table 6. Mann-Whitney test for openness perception of the arrangement of communal gardens from window level

	Openness			
Variable	Mean rank†	Z	p	
G1 and 4	49.13	-2.45	0.014	**
G2 and 3	63.02			

† A low mean rank indicates respondents perceived communal gardens to be more open and viceversa

*p<.05 **p<.02 ***p<.01

Table 7. Mann-Whitney test for the perception of sounds in communal gardens from window level in relation to layouts

	Sounds of passing trains			
Variable	Mean rank†	Z	p	
G2A	6.70	-2.31	0.02	**
G2B	13.47			
	Sounds of children playing			
Remaining layouts	52.36	-2.06	0.040	*
G2	64.70			

† A low mean rank indicates sounds in communal gardens were perceived to be more pleasant and viceversa

*p <.05 **p <.02 ***p <.01

Table 8. Mann-Whitney test for the perception of odours and scents in communal gardens from window level in relation to groups of layouts

	Odours of rubbish			
Variable	Mean rank†	Z	p	
G3 and 4	20.43	-2.43	0.015	**
G1 and 2	30.22			
	Scent of tumble dryers			
G3 and 4	17.72	-2.31	0.020	**
G1 and 2	25.19			
	Odours of cooking			
G1, 3, and 4	44.10	-2.01	0.044	*
G2	55.33			

† A low mean rank indicates scents and odours in communal gardens were perceived to be more pleasant and viceversa

*p <.05 **p <.02 ***p <.01

Table 9. Mann-Whitney test for the perception of various visual and audible issues in communal gardens from window level in relation to groups of storeys

	Amounts of colours			
Variable	Mean rank†	Z	p	
Ground, 2nd & 6th	33.52	-2.60	0.009	***
1st	47.64			

† A low mean rank indicates perception of more colours and viceversa

	Rating of colour variety			
Ground, 2nd, 3rd, 5th, 6th, & 7th	66.28	-2.73	0.006	***
1st & 4th	48.06			

† A low mean rank indicates colour variety w as perceived to be better and viceversa

	Vehicular movement			
Ground & 1st	47.47	-2.99	0.003	***
2nd, 3rd, 4th, 5ht, 6th, & 7th	65.88			
	Sounds of children playing			
Ground, 1st, 2nd, 3rd, 4th, & 7th	56.16	-2.95	0.003	***
5ht & 6th (G2)	91.42			
	Blowing of wind			
Ground & 5th	45.63	-2.56	0.010	***
1st, 2nd, 3rd, 4th, 6th, & 7th	64.22			

Table 9 continues

		Passing trains	
Ground, 1st, 2nd, 3rd, 4th, & 7th	34.58	-2.49	0.013**
5th & 6th (G2)	54.70		
		People talking	
1st, 2nd, 3rd, 4th, 5th, & 7th	56.57	-2.24	0.025*
Ground & 6th	71.61		
		Playing of music	
5ht & 7th (G2)	31.00	-2.21	0.027*
Ground, 1st, 2nd, 3rd, 4th, & 6th	55.88		
		Sounds of rain	
5ht & 7th (G2)	37.56	-2.08	0.038*
Ground, 1st, 2nd, 3rd, 4th, & 6th	61.62		

† A low mean rank indicates sounds in communal gardens were perceived to be more pleasant and viceversa

*p <.05 **p <.02 ***p <.01

Table 10. Kruskal-Wallis tests for the perception of opportunities for social and leisure activities in communal gardens

	Ground to 7th storey			G1 to G4 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Table games for elderly	7.65	7	0.36	0.98	3	0.81
Enjoying nature	5.00	7	0.66	1.01	3	0.80
Facilities for adolescents.	1.52	7	0.98	1.45	3	0.69
Talking	5.37	7	0.62	3.25	3	0.35
Play facilities for children	3.11	7	0.88	0.86	3	0.84
Fairs, festivals, and barbecues	3.22	7	0.86	0.60	3	0.9
Drawing, studying, and reading	4.38	7	0.74	1.74	3	0.63
Sports for adults	3.88	7	0.79	0.25	3	0.97
Rest and relaxation	6.05	7	0.53	1.36	3	0.72
Meeting neighbours	5.54	7	0.59	11.08	3	.01***

*p <.05 **p <.02 ***p <.01

Table 11. Mann-Whitney tests for identifying relevant layouts for meeting neighbours

Layout	Mean rank	Layout	Mean rank	Z	P
Block 4 and 5 in G1, block 46 in G3C, block 9 and 11 in G4, and G2B	45.92	Block 1 and 3 in G1, block 44 in G3C, block 62 in G4 and G2A, 3A, 3B,	68.1	-3.66	000***

† A low mean rank indicates opportunities for meeting neighbours are better and viceversa

*p <.05 **p <.02 ***p <.01

Table 12. Kruskal-Wallis tests for the perception of the balance of hard-soft surfaces in communal gardens

	Ground to 7th storey			G1 to G4 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Hard and soft surfaces	4.24	7.00	0.75	5.14	3.00	0.16

*p <.05 **p <.02 ***p <.01

Table 13. Mann-Whitney test for the perception of the balance of hard-soft surfaces in communal gardens

	Balance of hard and soft surfaces		
Variable	Mean rank†	Z	p
G1 and 2	54.69	-2.12	0.03 *
G3 and 4	63.29		

† A low mean rank indicates more paved surfaces were perceived in the communal garden and a high mean rank that more soft surfaces were perceived

*p<.05 **p<.02 ***p<.01

Table 14. Kruskal-Wallis tests for the perception of the balance of sunny-shady areas in communal gardens

	Ground to 7th storey			G1 to G4 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Sunny and shady surfaces	8.18	7.00	0.32	5.76	3.00	0.12

*p<.05 **p<.02 ***p<.01

Table 15. Mann-Whitney test for the perception of the balance of sunny-shaded areas in communal gardens

	Balance of sunny and shady areas		
Variable	Mean rank†	Z	p
G2	26.48	-2.36	0.018 **
G4	33.89		

† A low mean rank indicates respondents would like more sunny areas in communal gardens and a high mean rank that they would like more shaded areas

*p<.05 **p<.02 ***p<.01

Appendix F

Table 1. Kruskal-Wallis tests for size perception of communal gardens

	Ground to 8th storey			G5 to G8 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Size	16.40	7.00	0.02 **	13.87	5.00	0.02 **

*p<.05 **p<.02 ***p<.01

Table 2. Mann-Whitney test for size perception of communal gardens in relation to layouts

	Size of communal garden		
Variable	Mean rank†	Z	p
G6	38.06	-3.08	0.002 ***
G7B	53.75		
G6	35.00	-2.37	0.018 **
G8	46.00		

† A low mean rank indicates size of communal gardens was perceived to be smaller and viceversa

*p<.05 **p<.02 ***p<.01

Table 3. Kruskal-Wallis tests for orientation

	Ground to 8th storey			G5 to G8 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Orientation	9.30	7.00	0.23	2.23	3.00	0.53

*p<.05 **p<.02 ***p<.01

Table 4. Kruskal-Wallis tests for the perception of areas for exploring in communal gardens from ground level

	Ground to 8th storey		
Variable	Chi-square	df	P
Exploration for children	23.23	5.00	0.00 ***

*p<.05 **p<.02 ***p<.01

Table 5. Mann-Whitney test for the perception of areas for exploring in communal gardens from ground level in relation to layouts

	Exploration for children		
Variable	Mean rank†	Z	p
G7A	14.38	-2.51	0.01 ***
G5A	22.83		

† A low mean rank indicates areas for exploring in communal gardens were perceived to be better and viceversa

*p<.05 **p<.02 ***p<.01

Table 6. Kruskal-Wallis tests for colours' perception in communal gardens

	Ground to 8th storey			G5 to G8 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Colour perception	2.89	7.00	0.90	11.13	3.00	0.010 ***
Colour rating	5.05	7.00	0.65	19.82	3.00	0.000 ***

*p<.05 **p<.02 ***p<.01

Table 7. Mann-Whitney test for perception of colours in communal gardens from window level in relation to layouts

Variable	Mean rank†	Z	p	
	Amounts of colours			
G5A	25.82	-2.70	0.007	***
G7B	39.72			
G6	40.46	-2.05	0.041	*
G7B	39.72			
G5A	21.47	-2.82	0.005	***
G8	31.05			
G6	35.55	-2.07	0.039	*
G8	45.45			
	Rating of colour variety			
G7B	32.04	-3.51	0.000	***
G5A	48.95			
G7B	40.26	-3.24	0.001	***
G6	55.93			
G8	26.51	-2.71	0.007	***
G5A	37.34			
G8	35.90	-2.12	0.034	*
G6	45.10			

† A low mean rank indicates less colours were perceived in communal gardens and vicev

† A low mean rank indicates colour variety in communal gardens was perceived to be better and viceversa

*p<.05 **p<.02 ***p<.01

Table 8. Mann-Whitney test for perception of sounds in communal gardens from window level in relation to groups of layouts

Variable	Mean rank†	Z	p	
	Blowing of wind			
G6, 7, & 8	82.76	-3.34	0.001	***
G5	114.50			
	Vehicular movement			
G7B	43.40	-2.02	0.04	*
G5	54.82			
	People talking			
G7B	28.49	-2.84	0.004	***
G5A	40.78			
G7B	25.49	-2.97	0.003	***
G5B	39.30			
	Laugther			
G7B	28.87	-2.95	0.003	***
G5A	42.53			
	Sounds of children playing			
G6, 7, & 8	77.64	-2.26	0.024	*
G5	97.52			

† A low mean rank indicates sounds in communal gardens were perceived to be more pleasant and viceversa

*p<.05 **p<.02 ***p<.01

Table 9. Mann-Whitney test for perception of scents in communal gardens from window level in relation to layouts

	Scents of flowers and plants			
Variable	Mean rank†	Z	p	
G7B	29.99	-2.20	0.028	*
G5A	40.70			
G7B	26.88	-2.62	0.009	***
G5B	42.00			

†A low mean rank indicates scents in communal gardens were perceived to be more pleasant and viceversa

*p<.05 **p<.02 ***p<.01

Table 10. Mann-Whitney test for perception of sounds in communal gardens from window level in relation to groups of storeys

Variable	Mean rank†	Z	p	
	Vehicular movement			
Ground, 2nd, 5th, & 6th	75.25	-2.51	0.012	**
1st, 3rd, 4th & 7th	92.00			
	Sounds of rain			
2nd, 3rd, 4th, 5ht, 6th, & 7th	84.71	-2.33	0.020	**
Ground & 1st	105.24			
	People talking			
Ground, 2nd, 3rd, 5th, & 6th	78.72	-2.05	0.040	*
1st, 4th & 7th	93.15			

†A low mean rank indicates sounds in communal gardens were perceived to be more pleasant and viceversa

*p<.05 **p<.02 ***p<.01

Table 11. Kruskal-Wallis tests for the perception of enclosure in seating areas from ground level

	G5 to G8 layouts			
Variable	Chi-square	df	P	
Enclosure	30.99	5.00	0.00	***

*p<.05 **p<.02 ***p<.01

Table 12. Mann-Whitney test for the perception of enclosure of seating areas in communal gardens in relation to layouts

	Enclosure on ground			
Variable	Mean rank†	Z	p	
G7B	30.62	-3.83	0.000	***
G7A	50.74			
G7B	31.38	-3.06	0.000	***
G5A	47.42			
G7B	37.51	-3.57	0.000	***
G6	56.43			
G7B	34.14	-4.66	0.000	***
G8	58.64			
G7B	29.00	-2.28	0.020	**
G5B	42.56			

†A low mean rank indicates enclosure was perceived to be better and viceversa

*p<.05 **p<.02 ***p<.01

Table 13. Kruskal-Wallis tests for the perception of robustness of communal gardens

	From window level			From ground level		
Variable	Chi-square	df	P	Chi-square	df	P
Robustness	12.60	5.00	0.03 *	19.34	5.00	0.002 ***

*p<.05 **p<.02 ***p<.01

Table 14. Mann-Whitney test for the perception of robustness of communal gardens in relation to layouts

	From window level		
Variable	Mean rank†	Z	p
G7B	29.70	-2.81	0.005 ***
G5A	44.44		
	From ground level		
G7B	30.55	-3.31	0.001 ***
G7A	47.05		
G7B	29.46	-3.11	0.002 ***
G5A	45.15		
G7B	37.44	-2.60	0.009 ***
G8	50.57		
G7B	27.65	-2.10	0.035 *
G5B	39.56		
G6	26.51	-2.21	0.027 *
G7A	36.31		
G6	24.99	-2.19	0.029 *
G5A	34.74		

† A low mean rank indicates robustness of communal gardens was perceived to better and viceversa

*p<.05 **p<.02 ***p<.01

Table 15. Kruskal-Wallis tests for the perception of opportunities for social and leisure activities in communal gardens

	Ground to 8th storey			G5 to G8 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Table games for elderly	3.93	7	.79	5.07	3	.17
Enjoying nature	3.21	7	.87	18.75	5	.00***
Facilities for adolescents	8.50	7	.29	13.09	3	.00***
Talking	2.94	7	.89	6.21	3	.29
Play facilities for children	3.59	7	.83	22.89	5	.00***
Fairs, festivals, and barbecues	6.82	7	.45	11.51	5	.04*
Drawing, studying, and reading	1.64	7	.98	12.27	5	.03*
Sports for adults	3.10	7	.88	12.36	5	.03*
Rest and relaxation	1.85	7	.97	24.02	5	.00***
Meeting neighbours	10.35	7	.17	7.23	3	.07

*p<.05 **p<.02 ***p<.01

Table 16. Mann-Whitney tests for identifying relevant layouts for leisure and social activities

Layout	Mean rank†	Layout	Mean rank†	Z	P
		Enjoying nature			
G7B	37.76	G6	57.86	-4	.00***
G8	34.74	G6	46.26	-3	.01***
		Facilities for adolescents			
G6, 7, and 8	76.26	G5	110.2	-3.51	.00***
		Play facilities for children			
G7B	35.82	G8	54.55	-3.62	.00***
G7B	26.86	G5B	43.89	-2.99	.00***
G7B	28.59	G5A	46.5	-3.53	.00***
G6	29.45	G5	38.68	-2.03	.04*
		Fairs, festivals, and barbecues			
G7B	30.81	G6	44.75	-2.8	.00***
G6	24.99	G5A	37.69	-2.89	.00***
		Drawing, studying and reading			
G7B	25.68	G5A	39.53	-2.91	.00***
G7A	15.07	G5A	24.16	-2.63	.01***
G6	23.85	G5A	34.28	-2.37	.02**
G8	22.90	G5A	32.78	-2.28	.02**
		Sports for adults			
G7B	26.66	G5B	41.5	-2.57	.01***
G7B	29.43	G5A	41.72	-2.37	.02**
G7A	13.29	G5B	20.67	-2.19	.03*
		Rest and relaxation			
G7B	30.22	G5A	50.75	-3.93	.00***
G8	25.46	G5A	38.47	-2.98	.00***
G7A	16.11	G5A	25.86	-2.82	.01***
G7B	28.58	G5B	45.00	-2.76	.01***
G6	26.74	G5A	35.64	-1.98	.05*

† A low mean rank indicates communal gardens were perceived to be better for each activity and viceversa

*p<.05 **p<.02 ***p<.01

Table 17. Kruskal-Wallis tests for the perception of the balance of hard-soft surfaces in communal gardens

	Ground to 8th storey			G5 to G8 layouts		
Variable	Chi-square	df	P	Chi-square	df	P
Hard and soft surfaces	4.24	7.00	0.75	5.14	3.00	0.16

*p<.05 **p<.02 ***p<.01

Table 18. Mann-Whitney test for the perception of the balance of hard-soft surfaces in communal gardens in relation to layouts

	Balance of hard and soft surfaces		
Variable	Mean rank†	Z	p
G5 & 6	85.10	-2.45	0.014 **
G7B & 8	96.94		

† A low mean rank indicates more paved surfaces were perceived in communal gardens and a high mean rank that more soft surfaces were perceived

*p<.05 **p<.02 ***p<.01

Appendix G

Table 1. Mann-Whitney test for size perception of communal gardens considering both case studies

	Size of communal garden		
Variable	Mean rank†	Z	p
Augustenborg	128.33	-4.79	0.000***
Rotes Viertel	173.12		

†A low mean rank indicates size of communal gardens was perceived to be small and viceversa

*$p<.05$ **$p<.02$ ***$p<.01$

Table 2. Mann-Whitney test for orientation considering both case studies

	Orientation		
Variable	Mean rank†	Z	p
Augustenborg	125.49	-4.79	0.000***
Rotes Viertel	169.87		

†A low mean rank indicates orientation was perceived to be better and viceversa

*$p<.05$ **$p<.02$ ***$p<.01$

Table 3. Mann-Whitney test for the perception of the balance of hard-soft surfaces in communal gardens considering both case studies

	Balance of paved and vegetated surfaces		
Variable	Mean rank†	Z	p
Augustenborg	170.76	-2.64	0.008***
Rotes Viertel	143.54		

†A low mean rank indicates more paved surfaces were perceived in the communal gardens and a high mean rank that more soft surfaces were perceived

*$p<.05$ **$p<.02$ ***$p<.01$

Table 4. Mann-Whitney test for perception of enclosure of seating areas in communal gardens considering both case studies

	Enclosure of seating areas		
Variable	Mean rank†	Z	p
Augustenborg	131.51	-2.28	0.023*
Rotes Viertel	153.39		

†A low mean rank indicates enclosure of seating areas was perceived to be better in communal gardens and viceversa

*$p<.05$ **$p<.02$ ***$p<.01$

Table 5. Mann-Whitney test for the perception of the attractiveness of the arrangement of communal gardens from window level considering both case studies

Variable	Mean rank†	Z	p
Augustenborg	176.74	-4.58	0.000***
Rotes Viertel	132.76		

†A low mean rank indicates areas were perceived to be better and viceversa

*$p<.05$ **$p<.02$ ***$p<.01$

Table 6. Mann-Whitney test for the perception of areas for exploration for children in communal gardens from ground level considering both case studies

Variable	Mean rank†	Z	p	
Augustenborg	116.12	-3.60	0.000	***
Rotes Viertel	149.24			

† A low mean rank indicates areas for exploring in communal gardens were perceived to be better and viceversa

*p<.05 **p<.02 ***p<.01

Table 7. Mann-Whitney test for the perception of robustness of communal gardens of both case studies

	Mean rank†		Z	p	
Variable	Augustenborg	Rotes Viertel			
Table games for elderly	108.22	136.46	-3.21	0.010	***
Enjoying nature	139.65	111.64	-3.35	0.010	***
Facilities for adolescents	111.91	133.55	-2.48	0.013	**
Play facilities for children	90.27	150.64	-6.91	0.000	***
Drawing, studying, reading	112.56	133.04	-2.34	0.019	**
Rest and relaxation	135.43	114.97	-2.37	0.018	**
Mettings of neighbours	113.58	132.23	-2.13	0.033	*

† A low mean rank indicates robustness of communal gardens were perceived to be better and viceversa

*p<.05 **p<.02 ***p<.01

Table 8. Mann-Whitney test for perception of amount of colours in communal gardens considering both case studies

	Amount of colours			
Variable	Mean rank†	Z	p	
Augustenborg	124.56	-4.86	0.000	***
Rotes Viertel	171.96			

† A low mean rank indicates there were fewer colours perceived in communal gardens and viceversa

*p<.05 **p<.02 ***p<.01

Table 9. Mann-Whitney test for the perception of scents and odours in communal gardens considering both case studies

	Mean rank†		Z	p
Variable	Augustenborg	Rotes Viertel		
Scent of tumble dryers	61.55	85.44	-4.16	0.000
Scent of flowers and plants	79.10	64.70	-2.15	0.032
Odours of cooking	65.87	80.33	-2.19	0.029

† A low mean rank indicates scents and odours in communal gardens were perceived to be more pleasant and viceversa

*p<.05 **p<.02 ***p<.01

Table 10. Mann-Whitney test for visual and olfactory perception in communal gardens in relation to groups of storeys in both case studies

Variable	Mean rank	Z	p	
	Scents of flowers and plants†			
Ground, 1st, 5th, & 6th	113.37	-2.53	0.011	**
2nd, 3rd, 4th, & 7th	134.28			
	Amount of colours††			
Ground & 2nd	133.55	-2.72	0.007	***
1st, 3rd, 4th, 5th, 6th, & 7th	160.79			
	Rating of colours†			
1st, 4th, & 5th	138.36	-2.38	0.018	**
Ground, 2nd, 3rd, 6th, & 7th	160.11			

† A low mean rank indicates colours or scents in communal gardens were perceived to be more pleasant and viceversa

†† A low mean rank indicates there were fewer colours perceived in communal gardens and viceversa

*p<.05 **p<.02 ***p<.01

Table 11. Mann-Whitney test for the perception of enclosure of seating areas in communal gardens in relation to groups of layouts in both case studies

Variable	Enclosure of seating areas			
	Mean rank†	Z	p	
Block 4, G3C, & 7B	113.14	-4.25	0.000	***
Rest of layouts	160.29			

† A low mean rank indicates enclosure is better and a high mean rank as worse

*p<.05 **p<.02 ***p<.01

Table 12. Mann-Whitney test for the perception of the attractiveness of the arrangement of communal gardens from window level in relation to groups of layouts in both case studies

Variable	Mean rank†	Z	p	
	Attractiveness of the arrangement			
G7 & 8	105.61	-6.96	0.000	***
Rest of layouts	172.54			

† A low mean rank indicates areas of communal gardens were perceived to be better and viceversa

*p<.05 **p<.02 ***p<.01

Table 13. Mann-Whitney test for the perception of areas for exploring in communal gardens in relation to groups of layouts in both case studies

Rest of layouts	121.74	-4.69	0.000	***
G5 & 8	173.39			

† A low mean rank indicatesareas for exploring in communal gardens were perceived to better and viceversa

*p<.05 **p<.02 ***p<.01

Appendix H

Guide to abbreviations used in tables:

A: Pedestrian walk

J: Pedestrian junctions

G: Layouts of blocks

FS: Formal seating

Table 1. One sample Chi-Square test for most used pedestrian walks for social activities

Variable	Chi-square	df	P	
All pedestrian walks	138.71	33	0.00	***
Pedestrian walk 7 in G2B for age groups 0-5 and 6-10	6.55	2.00	0.01	**

*p <.05 **p <.02 ***p <.01

Table 2. One sample Chi-Square test for social activities

Variable	Chi-square	df	P	
All layouts in the housing area G1, G2A, G2B, G3A, G3B, G3C, G4, Park, Square†	300.89	8.00	0.00	***
G2A, G4, Park, Square	6.10	3.00	0.11	
G2B, G3B, G3C	3.32	2.00	0.19	

† G2A, G4, Park, and the square had the highest observed number of frequencies whilst G2B, G3B, and G3C had the lowest

*p <.05 **p <.02 ***p <.01

Table 3. One sample Chi-Square test among general areas longer than 16 minutes

Variable	Chi-square	df	P	
All general areas†	1372	10.00	0.00	***
Balcony-window, playgrounds in park, and playgrounds in communal gardens	5.83	2.00	0.05	
Lawn area, entrances to buildings, and facilities	3.46	1.00	0.06	
Pedestrian junctions and informal seating	1.43	1.00	0.23	
Pond-rockery feature, dog training area, and garage entrances	4.00	2.00	0.14	

† Formal seating had the highest observed number of frequencies whilst the pond-rockery, dog training area, and garage entrances had the lowest

*p <.05 **p <.02 ***p <.01

Table 4. One sample Chi-Square test among balconies for viewing as a leisure activity

Variable	Chi-square	df	P	
G1, G2A, G2B, G3A, G3B, G3C, and G4[†]	111.08	6.00	0.00	***
G3B, G3C, G4	5.93	2.00	0.05	
G1, G2A, G3A	1.19	2.00	0.55	
G4-B4, G2A-B1, G2B-B1, G3B-B1-B2, and G3C-B1-B3[††]	113.87	6.00	0.00	***
G4-B4, G2A-B1, G3B-B1-B2, and G3C-B1-B3	25.56	5.00	0.00	***
G4-B4, G2A-B1, G3B-B1-B2, and G3C-B3	10.11	4.00	0.04	*

[†] G2B had the highest observed number of frequencies whilst G1, G2A, and G3A had the lowest

[††] G2B-B1 had the highest observed number of frequencies whilst G4-B4, G2A-B1, G3B-B1-B2, and G3C-B3 had the lowest

*p <.05 **p <.02 ***p <.01

Table 5. One sample Chi-Square test among balconies of G2B for leisure and social activities by daytime

Variable	Chi-square	df	P
Morning, midday, and evening	1.04	2.00	0.59

*p <.05 **p <.02 ***p <.01

Table 6. One sample Chi-Square test among formal seating for social activities in park longer than 16min

Variable	Chi-square	df	P	
All areas of the park[†]	314.03	6.00	0.00	***
Formal seating and playground	23.45	1.00	0.00	***
Informal seating, lawn, and football play area	1.61	2.00	0.45	
Pedestrian walk and dog training area	2.27	1.00	0.13	
FS1, FS2, FS3, FS4, FS5, FS6, and FS7[††]	137.86	6.00	0.00	***
FS1, FS4, and FS6	4.96	2.00	0.08	
FS1 and FS4	4.79	1.00	0.03	*
FS2, FS3, and FS7	3.50	2.00	0.17	
0-5, 6-10, 11-18, 19-30, 31-50, and 51-80[†††]	191.79	5.00	0.00	***
Morning, midday, evening[‡]	93.63	2	0.00	***
Female and male	0.18	1	0.67	

[†] Formal seating had the highest observed number of frequencies, followed by the playground whilst pedestrian walks and the dog training area had the lowest

[††] FS5 had the highest observed number of frequencies, followed by FS4 and 6, whilst FS2, FS3, and FS7 had the lowest

[†††] Groups aged 51-80 had the highest observed number of frequencies whilst 0-5 and 11-18 had the lowest

[‡] Evening use had the highest observed number of frequencies whilst morning had the lowest

*p <.05 **p <.02 ***p <.01

Table 7. One sample Chi-Square test for gender for social activities in the square

Variable	Chi-square	df	P	
Female and male	63.06	1.00	0.00	***

*p <.05 **p <.02 ***p <.01

Table 8. One sample Chi-Square test among formal seating for social activities in square longer than 16min

Variable	Chi-square	df	P
All areas in the square†	94.47	3.00	0.00
Informal seating and pedestrian junctions	0.29	1.00	0.59
Formal seating and entrances to facilities	7.03	1.00	0.00
FS1, FS2, and FS3 in the square††	28.36	2.00	0.00
FS1 and FS2 in the square	1.67	1.00	0.20
FS1 and FS2 in the square and FS1 in G3B	5.02	2.00	0.08
FS1 and FS2 in the square, FS6 in G2A, and FS1 in G3B	7.06	3.00	0.07
0-5, 6-10, 11-18, 19-30, 31-50, and 51-80†††	151.64	4.00	0.00
Morning, midday, and evening	0.40	2.00	0.82
Female and male‡	33.36	1.00	0.00

† Formal seating had the highest observed number of frequencies whilst pedestrian junctions and informal seating had the lowest

†† Formal seating 1 and 2 had the highest observed number of frequencies

††† Age group 51 to 80 had the highest observed number of frequencies whilst 0 to 5, 11 to 18, and 19 to 30 had the lowest

‡ Males had the highest observed number of frequencies

*p <.05 **p <.02 ***p <.01

Table 9. One sample Chi-Square test among most important formal seating for social activities longer than 16min in the housing area

Variable	Chi-square	df	P
Most important seating areas for socializing in the housing area			
G4-FS1, G1-FS5, G3B-FS1, Park-FS5, and Square-Fs1†	0.45	4.00	0.45

† Comparison shows these seating areas are equally significant

Table 10. One sample Chi-Square test among formal seating for social activities in G4 longer than 16min

Variable	Chi-square	df	P	
All areas†	131.21	5.00	0.00	***
Pedestrian walks, pedestrian junctions, and lawn areas	2.27	2.00	0.32	
Balconies-windows and playgrounds	0.49	1.00	0.49	
G4-FS1 and G4-FS2††	29.39	1.00	0.00	***
0-5, 6-10, 11-18, 19-30, 31-50, 51-80†††	42.83	5.00	0.00	***
Female and male	2.72	1.00	0.09	
Morning, midday, and evening‡	64.33	2.00	0.00	***

† Formal seating had the highest observed number of frequencies whilst pedestrian walks, pedestrian junctions, and lawn areas had the lowest

†† Formal seating 1 had the highest observed number of frequencies

††† Age group 31 to 50 had the highest observed number of frequencies whilst 0 to 5, 6 to 10, and 19 to 30 had the lowest

‡ Evening use had the highest observed number of frequencies whilst morning had the lowest

*p <.05 **p <.02 ***p <.01

Table 11. One sample Chi-Square test among formal seating for social activities in G1 longer than 16min

Variable	Chi-square	df	P	
All areas†	206.48	5.00	0.00	***
Formal seating and the playground	2.96	1.00	0.08	
G1-FS1, G1-FS2, G1-FS4, and G1-FS5††	104.27	3.00	0.00	***
0-5, 6-10, 11-18, 19-30, 31-50, 51-80†††	134.86	5.00	0.00	***
Female and male	0.55	1.00	0.46	
Morning, midday, and evening‡	120.99	2.00	0.00	***

† Formal seating and the playground had the highest observed number of frequencies whilst pedestrian junctions and balconies had the lowest

†† Formal seating 5 had the highest observed number of frequencies

††† Age group 6-10 had the highest observed number of frequencies whilst 0 to 5, 11 to 18, 19 to 30, and 51 to 80 had the lowest

‡ Evening use had the highest observed number of frequencies whilst morning had the lowest

*p <.05 **p <.02 ***p <.01

Table 12. One sample Chi-Square test among general areas for 6-15 minutes

Variable	Chi-square	df	P	
All general areas†	786.54	11.00	0.00	***
Pedestrian walks, formal seating, and pedestrian junctions	6.60	2.00	0.04	*
Entrances to buildings-facilities, lawn, playgrounds in park and communal gardens	2.08	3.00	0.56	
Informal seating, pond-rockery, and pedestrian area in square	1.08	2.00	0.59	

† Pedestrian walks, formal seating, and pedestrian junctions had the highest observed number of frequencies whilst garage entrances had the lowest

*p <.05 **p <.02 ***p <.01

Table 13. One sample Chi-Square test among junctions for conversations of 6-15 minutes

Variable	Chi-square	df	P	
All junctions in the housing area	153.27	26.00	0.000	***
All junctions in the housing area without J8 in square	47.05	25.00	0.005	***
Most used junctions in the housing area G4-J4, G4-J5, G2A-J9, G2A-J11, G3B-J3, G3C-J2-J3, and Square-J1-J4-J8-J12-J13	100.13	12.00	0.00	***
Most used junctions in the housing area without J8 in square	10.69	11.00	0.47	

*p <.05 **p <.02 ***p <.01

Table 14. One sample Chi-Square test among junctions for social activities of 6-15 minutes that derived from necessary ones

Variable	Chi-square	df	P	
Most used junctions in the housing area G4-J1, G4-J5, G2A-J3, G2A-J11, G3B-J3, G3C-J2-J3, and Square-J1-J4-J8	32.48	9.00	0.00	***
Most used junctions in the housing area without J8 in square	3.75	8.00	0.88	
J1, J2, J4, J8, J10, J12, J13, and J15 in square	54.27	7.00	0.00	***
J1, J2, J4, J10, J12, J13, and J15 in square	6.08	6.00	0.41	
J1, J2, J3, and J4 in G3C	8.40	3.00	0.04	*

*p <.05 **p <.02 ***p <.01

Table 15. One sample Chi-Square test for conversations of 6-15 minutes†

Variable	Chi-square	df	P	
All pedestrian walks in the housing area	138.70	33.00	0.00	***
Most used pedestrian walks in the housing area G4-A2-A3-A4-A5, G2A-A4-A9-A11, G2B-A7, G1-A7, G3A-A3-A5, G3B-A7, G3C-A2-A4-A6, and Square-A2	37.56	15.00	0.00	***
Most used pedestrian walks in the housing area without A4 in G3C	25.11	14.00	0.03	*

† There was no difference between data for conversations of 6-15 minutes and those derived from necessary ones

*p <.05 **p <.02 ***p <.01

Appendix I

Table 1. One sample Chi-Square test among all areas for main social activities

Variable	Chi-square	df	P	
G5A, G5B, G6, G7A, G7B, G8, park and square†	1281.99	7.00	0.00	***
G5A, G5B, G6, G7A, G7B, G8††	142.15	5.00	0.00	***
G5B and G6	0.08	1.00	0.78	
G7A and 7B	0.02	1.00	0.88	
G5A and G8	4.57	1.00	0.03	*
Square and park†††	12.9	1.00	0.00	***

† The park and square had the highest observed number of frequencies whilst G5A and G8 had the lowest

†† G5B and G6 had the highest observed number of frequencies

††† The square had the highest observed number of frequency

*p <.05 **p <.02 ***p <.01

Table 2. One sample Chi-Square test among general areas for main social activities longer than 16 minutes

Variable	Chi-square	df	P	
All general areas†	1923.56	10.00	0.00	***
Formal seating, playgrounds in communal gardens and park††	105.71	2.00	0.00	***
Pedestrian walk, informal seating, entrance to blocks, lawn areas, and pedestrian areas and fountain in square	12.46	5.00	0.03	*
Balconies and pedestrian junctions	4.26	1.00	0.04	*

† Formal seating and playgrounds had the highest observed number of frequencies whilst pedestrian walks, informal seating, entrances to blocks, lawn, and pedestrian areas in the square had the lowest

†† Playgrounds in park had the highest observed number of frequencies due to ball games

*p <.05 **p <.02 ***p <.01

Table 3. One sample Chi-Square test among general areas for main leisure activities longer than 16 minutes

Variable	Chi-square	df	P	
All general areas†	135.19	8.00	0.00	***
Balconies and playgrounds	2.77	1.00	0.09	
Informal seating, lawn areas, private gardens, pedestrian areas and fountain in square, and playground in park††	10.40	5.00	0.07	

† Formal seating had the highest observed number of frequencies followed by balconies and playgrounds

†† Areas with the lowest observed number of frequencies

*p <.05 **p <.02 ***p <.01

Table 4. One sample Chi-Square test among daytime uses for main social activities in the park for longer than 16 minutes

Variable	Chi-square	df	P	
Morning, midday, evening†	139.30	2.00	0.00	***
Midday, evening	9.11	1.00	0.00	***

† Evening activities had the highest observed number of frequencies whilst morning had the lowest

*p <.05 **p <.02 ***p <.01

Table 5. One sample Chi-Square test among duration times for main social activities in the park

Variable	Chi-square	df	P	
Less than 5 min, 5-15 min, more than 16 min†	674.18	2.00	0.00	***

† Activities for a period of time longer than 16 minutes had the highest observed number of frequencies whilst those with a duration of less than 5 minutes had the lowest

*p <.05 **p <.02 ***p <.01

Table 6. One sample Chi-Square test among areas of the park for social acitivities longer than 16 minutes

Variable	Chi-square	df	P
All areas of park	576.78	10.00	0.00 ***
All formal seating areas (FS1, FS5, FS6, FS7)†	38.13	3.00	0.00 ***
FS1 and FS6	2.40	1.00	0.12
All play areas††	264.47	5.00	0.00 ***
P2, P3, and P4	10.97	2.00	0.00 ***
P3 and P4	2.47	1.00	0.12

† FS1 (Popular with dogwalkers) and FS6 (Popular with adolescents) had the highest observed number of frequencies compared to the rest

†† P2 (Infants play area), P3 (Ball game court), and P4 (Swings) had the highest observed number of frequencies compared to the rest

*p <.05 **p <.02 ***p <.01

Table 7. One sample Chi-Square test among formal seating in square for casual contacts from leisure activities

Variable	Chi-square	df	P
All formal seating areas†	32.15	3.00	0.00 ***
FS2, FS5, and FS10	0.29	2.00	0.87

† Formal seating 1 had the highest observed number of frequencies whilst formal seating 2, 5, and 10 had the lowest

*p <.05 **p <.02 ***p <.01

Table 8. One sample Chi-Square test among formal seating in square for conversations longer than 16 min

Variable	Chi-square	df	P
FS1, FS2, FS4, FS5, FS6, FS8, FS9, FS10, FS11, FS12†	210.44	9.00	0.00 ***
FS1 and FS8	2.37	1.00	0.12

† FS1 (west side benches under lime trees) and FS8 (outdoor seating of fast food restaurant) had the highest observed number of frequencies

*p <.05 **p <.02 ***p <.01

Table 9. One sample Chi-Square test among age groups in formal seating areas of the square for social activities longer than 16 minutes

	Morning†			Midday††			Evening††		
Variable	Chi-square	df	P	Chi-square	df	P	Chi-square	df	P
All age groups	10.03	3.00	0.02 **	27.65	4.00	0.00 ***	48.94	4.00	0.00 ***
19 to 30, 31 to 50, and 51 to 80	2.21	2	0.33						
11 to 18, 19 to 30, and 31 to 50				1.17	2	0.56			
11 to 18, 19 to 30, and 31 to 50							4.25	2	0.12

† Age groups 19 to 30, 31 to 50, and 51 to 80 had the highest observed number of frequencies

†† Age groups 11 to 18, 19 to 30, and 31 to 50 had the highest observed number of frequencies

*p <.05 **p <.02 ***p <.01

Table 10. One sample Chi-Square test among gender in formal seating areas having two-sided benches with a shared backrest of the square for social activities longer than 16 minutes

	Morning			Midday			Evening†		
Variable	Chi-square	df	P	Chi-square	df	P	Chi-square	df	P
Gender	2.27	1.00	0.13	0.04	1.00	0.85	17.04	1.00	0.00 ***

† Males had the highest observed number of frequencies in the evening

*p <.05 **p <.02 ***p <.01

Table 11. One sample Chi-Square test among layouts for conversations longer than 16 minutes in playgrounds

Variable	Chi-square	df	P
G5B, G6, G7A, and G7B†	117.21	3.00	0.00 ***
G5B and G6	4.7	1.00	0.03 **

† G5B had the highest observed number of frequencies whilst G7A and G7B had the lowest

*p <.05 **p <.02 ***p <.01

Table 12. One sample Chi-Square test among layouts for conversations longer than 16 minutes in formal seating

Variable	Chi-square	df	P
G5A, G5B, G6, and G7B[†]	12.54	3.00	0.01 ***
G5B and 7B	0.27	1.00	0.60

[†] G5B and 7B had the highest observed number of frequencies whilst G5A and G6 had lowest; G7A and G8 had none
*p <.05 **p <.02 ***p <.01

Table 13. One sample Chi-Square test among formal seating areas of group layouts for all leisure and social acitivities without the square and park[†]

Variable	Chi-square	df	P
G5A (FS1, FS2, FS4, FS5), G5B (FS1, FS5, FS6, FS7, FS8) G6 (FS1, FS2), G7A (FS1), G8 (FS1), G7B (FS1, FS3, FS4, FS5, FS6, FS7)[††]	66.08	19.00	0.00 ***
G5B (FS9) and G7B (FS6, FS7)	2.92	2.00	0.23

[†] Social and leisure activities of more than 5 minutes were included to meet the minimum variable frequency required for the test
[††] G5B (FS9) and G7B (FS6, FS7) had the highest observed number of frequencies compared to the rest
*p <.05 **p <.02 ***p <.01

Table 14. One sample Chi-Square test among pedestrian junctions for social activities

Variable	Chi-square	df	P
All areas in the square, park, and communal gardens of 6-15 minutes[†]	223.88	10.00	0.00 ***
Pedestrian walks, pedestrian junctions, and formal seating	4.33	2.00	0.115
All specific pedestrian walks, pedestrian junctions, and formal seating[††]	521.02	47.00	0.00 ***
J-1 and J-2 in the square	0.013	1.00	0.91
All pedestrian junctions in the square[†††]	115.36	7.00	0.00 ***
J-3, J-4, J-5, J-6, J-7, and J-9 in the square	4.00	5.00	0.55
J-1 and J-2 in the square	2.06	1.00	0.15

[†] Pedestrian walks, formal seating, and pedestrian junctions had the highest observed number of frequencies
[††] Pedestrian junctions 1 and 2 in the square had the highest observed number of frequencies from all specific areas
[†††] Pedestrian junctions 1 and 2 had the highest observed number of frequencies
*p <.05 **p <.02 ***p <.01

Appendix J

Perception survey for Infonavit Solidaridad

The survey integrates four sections related to the residents' perception towards the design quality issues. Then, another two sections explore community and environmental development issues. These are followed by questions regarding the respondents' characteristics.
The survey consists of close-ended questions having at the end, an open-comment question where residents may include views on issues that they consider would encourage social interaction in their outdoor areas.

The survey was calculated to take approximately 20 minutes to complete. For each question, instructions are provided and they were answered taking into consideration the outdoor conditions at the time of responding.

Section 1. Areas that might improve community life of residents.

I. Do you consider the outdoor areas as important for community life of residents as residential areas?

1) Very important___ 2) Important___ 3) Unsure___ 4) Somewhat important___ 5) Not important___

II. *Do you feel safe in the outdoor areas of your neighbourhood?*

1) Yes___ 2) Only at daytime___ 3) No___

III. If no, which area makes you feel unsafe? (Please state the most important one)

1)_____

IV. If improvements to the communal outdoor areas were possible, do you consider they would be important for improving community life of residents?

1) Very important___ 2) Important___ 3) Unsure___ 4) Somewhat important___ 5) Not important___

V. Do you consider that improvements to outdoor areas would be important to increase safety?

1) Very important___ 2) Important___ 3) Unsure___ 4) Somewhat important___ 5) Not important___

VI. Please rate how important you would consider each of the following to be for improving community life in your housing area.

	1) Very important	2) Important	3) Unsure	4) Somewhat important	5) Not important
A) To have a square with various facilities open until late.	___	___	___	___	___
B) To have a square with outdoor seating for restaurants or cafes.	___	___	___	___	___
C) To have a square with facilities that have products and services of interest to women.	___	___	___	___	___
D) To have a square with periodical activities such as markets or outdoor events.	___	___	___	___	___
E) To have an outdoor area designed for exercising dogs.	___	___	___	___	___
F) To have a park for diverse activities with playgrounds, ball courts, lawns, and seating areas.	___	___	___	___	___
G) To have an integrated design of plants, furniture, playgrounds, and others in communal areas.	___	___	___	___	___

Section 2. Features of pedestrian walks that might improve community life of residents

I. Please rate how you feel the arrangement of the following pedestrian walks would encourage and facilitate casual conversations with neighbours.

A) A pedestrian walk with paved surfaces.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

B) A pedestrian walk with a variety of paved and vegetated surfaces.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

C) A pedestrian walk with tree shelter

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

Section 3. Features of seating areas and communal outdoor areas that might improve community life of residents

I. Please rate how you feel the proximity of seating areas to pedestrian walks would be for engaging with others in the community.

A) Adjacent to a pedestrian walk.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

B) A certain distance from a pedestrian walk in open areas.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

II. Please rate how you feel the enclosure of seating areas would be for engaging with others in the community.

A) Full sheltered enclosure.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

B) Enclosure providing shelter to sides and back.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

C) Open seating providing shelter on back only.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

III. Please rate how you feel the type of cover for seating areas would encourage engagement with others in the community.

A) Covered enclosure with climbers.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

B) Covered enclosure provided by an artificial structure.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

C) Cover of light tree canopies for partial screening.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

D) Cover of dense tree canopies allowing full screening and shade.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

IV. Please rate how you would feel about these benches for engaging with others in the community.

A) A shared back for two benches.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___ 5) Very poor___

B) One back for each bench.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___ 5) Very poor___

V. Please rate how you feel these areas for exploration and discovery would enable you to engage with others in the community.

A) Partially concealed views with low shrubs.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

B) Partially concealed views with higher shrubs.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

C) Planting and materials that encourage informal play opportunities for children.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

VI. Please rate how you feel the following outdoor features would enable you to engage with others in the community.

A) Seating area with an ornamental feature such as a sculpture, bird bath, or other.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

B) Seating area with mixed planting textures.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

C) Seating area with varied planting heights.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

D) Areas that are flexible which may be used for a range of activities.

1) Very good___ 2) Good___ 3) Fair___

4) Poor___ 5) Very poor___

E) Furniture that enables group gatherings.

1) Very good___ 2) Good___ 3) Fair___

4) Poor___ 5) Very poor___

F) Low boundaries around private gardens which are adjacent to communal areas.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

FF) Movable furniture.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

G) A range of seating options for sitting.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

H) Shared facilities for storage of outdoor furniture and play equipment.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

I) Colourfulness.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

J) Sound of water.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

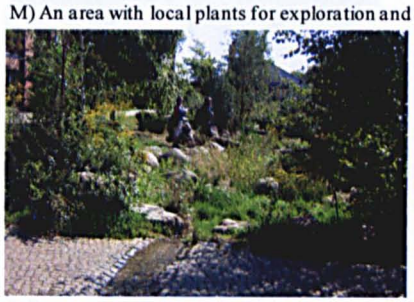
K) Bird song.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

L) Scented plants.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

M) An area with local plants for exploration and discovery.



1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

N) Fruit trees.

1) Very good ___
2) Good ___
3) Fair ___
4) Poor ___
5) Very poor ___

Previous studies have shown that the presence of people in outdoor areas, accompanied or on their own, attracts other users. This increases safety of outdoor areas through informal surveillance of users. Therefore, it is important to enable leisure areas for personal use.

Section 4. Features of pedestrian walks for encouraging leisure opportunities.

I. Please rate how you feel the arrangement of the following pedestrian walks would encourage your use of outdoor areas on your own.

A) A pedestrian walk with semi-concealed views through planting.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

B) A pedestrian walk with a visual variety of paved and vegetated surfaces.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

C) A pedestrian walk with tree shelter.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

Section 5. Features for encouraging leisure opportunities in communal outdoor areas.

I. Please rate how you feel the privacy of balconies would encourage your use of them.

A) A projected balcony.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___ 5) Very poor___

B) A balcony integrated with the design of the building having opportunities for screening.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___ 5) Very poor___

II. Please rate how you feel the enclosure of the following areas would encourage your use of outdoor areas on your own..

A) Full sheltered enclosure.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___ 5) Very poor___

B) Enclosure providing shelter to side and back.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___ 5) Very poor___

C) Open seating providing shelter on back only.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

D) Cover of dense tree canopies allowing full screening

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___ 5) Very poor___

E) Cover of light tree canopies allowing partial screening.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

III. Please rate how you feel the following areas would encourage your use of outdoor areas on your own.

A) Gardening in balconies.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

B) Gardening in allotments.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

C) Gardening in communal areas.

1) Very good___ 2) Good___

3) Fair___ 4) Poor ___

5) Very poor___

Section 6. Participating and working together in the community.

I. If financial and training support was made available from government or non-profit organizations please rate to what extent you would be able to participate in each of the following:

	1) Very likely	2) Likely	3) Unsure	4) Somewhat likely	5) Not likely
A. The design of the communal garden	___	___	___	___	___
B. The construction of a communal garden	___	___	___	___	___
C. Caring for and maintaining the communal garden.	___	___	___	___	___
D. Taking responsibility for maintaining one specific area within the communal garden.	___	___	___	___	___
E. Organizing a neighbourhood committee in charge of the communal garden.	___	___	___	___	___
F. Providing a regular financial contribution to revitalise and maintain the communal garden.	___	___	___	___	___
G. Looking after children of residents through organized play and social activities.	___	___	___	___	___

II. Please rate how important each of the following would be for community life of the housing area considering they were run by residents, supervised, and funded by non-profit or governmental organizations.

	1) Very important	2) Important	3) Unsure	4) Somewhat important	5) Not important
A. Local workshops for leisure or developing skills such as electronics or jewellery crafting.	___	___	___	___	___
B. Social gatherings for residents with diverse activities.	___	___	___	___	___
C. Trips or visits to other housing areas to learn from their experiences.	___	___	___	___	___
D. Annual meetings where goals are stated and achievements presented.	___	___	___	___	___
E. Local circulars published twice or three times yearly to record the activities and news of the community.	___	___	___	___	___
F. Allotments for growing fruits and vegetables.	___	___	___	___	___
G. Participation in programs for recycling, reducing water consumption, and ,increasing solar-wind energy production.	___	___	___	___	___
H. Periodical events in communal gardens.	___	___	___	___	___

Section 7. Household data

I. *Please specify your gender?*

1) Male ___ 2) Female ___

II. What is your age?

1) 18-30___ 2) 31-40___ 3) 41-50 ___ 4) 51-60 ___ 5) 61 or over ___

III. What is the composition of your household?

1) Living alone___ 2) Single parent with children___ 3) Couple without children ___

4) Couple with children ___ 5) Living with other adults (children over 21) ___

IV. How would you classify your household's income?

1) Low___ 2) Average___ 3) High ___

V. What is your status?

1) Owner-occupier___ 2) Tenant___ 3) Other ___

VI. How long have you been living in your present dwelling?

1) Less than one year___ 2) 1-4 years 3) 5-8 years___ 4) 9-13 years___ 5) 14 or more years___

VII. In what storey is the entrance to your dwelling?

1) Ground floor___ 2) 1st floor___ 3) 2nd floor___ 4) 3rd floor___

VIII. Please indicate the road where your dwelling is located.

_____

IX. Do you have additional comments that would improve community life in the outdoor areas?

_____

_____

_____