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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Abstract

The regeneration of decaying housing is becoming paramount in meeting the current international demand for new dwellings within the sustainable agenda. Medium-rise housing is proposed as ideal as it meets the planning guidance's desirable densities and for its social and ecological sustainability possibilities through the landscape. Yet, having few medium-rise housing areas regenerated with a sustainable-oriented landscape approach, the amount of research undertaken in this area is limited. Therefore, the present study addresses this gap in knowledge by studying the short- and long-term contribution that may be made to inform future regeneration of housing.

The research investigates a regenerated case study in Sweden and another one in Germany which were assessed for social and ecological sustainability through a set of indicators, a survey, observational records, and semi-structured interviews. Afterwards, the applicability of the results was tested through a survey in an additional case study in Mexico where no regeneration has taken place.

It was found that the arrangement of landscape was essential for encouraging socializing and the respondents' design preferences were similar despite cultural differences. It was observed that robustness and interpersonal distancing were most important for socializing whilst visual richness and mystery were clearly favoured by respondents. Interestingly, it was also revealed that involving in ecological improvements facilitated residents in knowing each other. However, it was found that perceptions and unclear ideas of sustainability as well as poor collaboration among stakeholders resulted in poor management of initiatives and a reduced participation of residents.

Based on these findings, the study makes design recommendations for landscape designers as well as proposing regeneration and operational guidelines for planning, managing, and maintenance. Further research is required to document more regenerated housing areas to enable sustainability issues to be more generally applied.

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Abbreviations

BRE	Building Research Establishment, UK
BREEAM	Building Research Establishment Assessment Method, UK
CABE	Commission for Architecture and the Built Environment, UK
CIAM	Congrès Internationaux de l'Architecture Moderne, Switzerland
CIRP	College International pour la Recherche en Productique, France
DEFRA.....	Department for Environment, Food, and Rural Affairs, UK
DFT	Department For Transport, UK
Fovissste	Fondo de la Vivienda del Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, Mexico
IfS	Institut fur Stadtforschung und Strukturpolitik GmbH, Germany
IMIP	Instituto Municipal de Investigación y Planeación, Mexico
INEGI	Instituto Nacional de Estadística Geografía e Informática, Mexico
Infonavit	Instituto del Fondo Nacional de Vivienda para los trabajadores, Mexico
ISSSTE	Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, Mexico
LEED	Leadership in Energy and Environmental Design, USA
ODPM	Office of the Deputy Prime Minister, UK
PETUS	Practical Evaluation Tools for Urban Sustainability, UK
REP	Rescate de Espacios Públicos, Mexico
RIBA	Royal Institute of British Architects, UK
SEMARNAP...	Secretaria de Medio Ambiente y Recursos Naturales
UNAM	Universidad Nacional Autónoma de Mexico, Mexico

Foreword

As a child, I grew up in contrasting housing areas in which the layout considerably affected community development. My grandparents' home formed part of an old house distributed around a patio where other families lived. My parents' dwelling was a detached house in a grid layout as part of a new social housing scheme of the time in Cd. Juárez, Mexico. It was in my grandparents' home that adults would gather in the patio to socialize while children played in a heaven created through a variety of planting and allotments. In contrast, the community around my parents' home hardly got to know each other over a twelve year period. It is perhaps the memory of these experiences that started my interest in investigating the outdoor spaces of housing areas and a desire to promote their better arrangement in social type housing.

A second encouragement came during my professional development as an architect. Working with social housing, I came to realize how outdoor areas were neglected by planners and designers in Mexico. They considered them to be a luxury, were sceptical about the benefits to the community, or firmly believed that residents were not interested in having access to outdoor areas. One argued that:

'I can assure you that not one of the inhabitants in Infonavit Solidaridad will be interested in putting a single coin to improve their outdoor areas' (head of a local technical department for one of the main governmental social housing programmes of Infonavit, January 2009).

It was my feeling that such perceptions were usually founded on poor pilot projects where landscape quality was not part of the agenda. Such views could be promoted as there was a lack of landscape research and planning regulations, as landscape design studies have only recently been introduced to Mexico, in 2002, when a new course was opened in the capital. There was therefore no tradition of considering landscape as part of housing projects. Instead, designers often argued that a good quality dwelling should be able to meet all of its users' requirements. However, it is evident that this is not always the case, particularly where social housing consists of small units. Also, it is commonly believed by architect colleagues that social medium-rise housing is problematic in that it generates social problems and decay. This has limited the development of this type of housing despite the fact that it is more efficient in land use and resources.

I was able to prove these views wrong in my master's thesis with the analysis of a medium-rise housing area. It was found that the arrangement of outdoor areas discouraged their use though residents very much desired adequate spaces for social development. At the same time, I had the opportunity to work with an improvement programme for low-income social housing in different types of layouts. Being able to visit these housing areas long after their construction date allowed me to recognize the urgent need, and potential, for regenerating outdoor areas for leisure and community development.

Altogether, these experiences have caused me to develop a further desire to research landscape issues, particularly those relating to medium-rise housing. Although low-rise housing is predominant in Mexico, medium-rise housing may be a sustainable alternative now that it has gained recent popularity as a result of the latest demands for increasing density. This thesis explores these issues with the aid of a scholarship provided by the Mexican federal government institution Conacyt.

Introduction

The context of the study

This thesis was set up to explore, within an international context, some of the challenges faced in Mexico's housing crisis. One of the issues in the decline of existing housing is clearly in the organization of the landscape of their outdoor areas, which cannot be solved by quick short-term decisions. It should rather be carefully considered within a sustainable agenda in which Mexico has already started to participate.

Ever since the Brundtland Report was presented, sustainable development has been on the global agenda.[1] Since then the major concerns addressed by the United Nation's earth summits have included tackling increasing poverty, environmental depletion, and global warming derived from greenhouse gases produced by human activities.[2] It has been argued that if not addressed, these issues may lead to social instability, endangering of resources, and climate change. So emphasis has been put on supporting social development, the use of renewable energy sources, rational use and re-use of non-renewable resources, increasing biodiversity, but most importantly reducing greenhouse gases.[3] For instance, governments pledged to reduce carbon emissions by 8% to 10% below 1990 levels by the year 2012 as part of their ratification to the Kyoto Protocol.[4] Participant countries including Mexico, have agreed in the latest Copenhagen convention held in December 2009 to take the necessary action to prevent global warming from raising the earth's temperature by more than two degrees.[5]

In this context, the construction and operation of domestic buildings has considerable importance since they represent a significant source of total carbon emissions. The construction of new housing developments has been shown to represent 50% of the total

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1 United Nations, 'Our Common Future: Report of the World Commission on Environment and Development', *Sustainable Development* (1987) <http://www.un-documents.net/ocf-12.htm#III> [accessed June 2009] (para. 123-125 of 126).

2 United Nations, 'Climate Change', *Division for Sustainable Development*, (2008), <http://www.un.org/esa/sustdev/sdissues/climate_change/climate_change.htm> [accessed on April 2008] (para. 1-6 of 6).

3 The Royal Society, 'Climate change: What We Know and What We Need to Know', *Policy Document 22/02*, (2002) <http://royalsociety.org/displaypagedoc.asp?id=6295> [accessed on April 2008] 1-20 (pp. 9-14)

4 United Nations, 'Kyoto Protocol Reference Manual on Accounting of Emissions and Assigned Amounts', *Framework Convention on Climate Change*, (2007) <http://unfccc.int/files/national_reports/accounting_reporting_and_review_under_the_kyoto_protocol/application/pdf/rm_final.pdf> [accessed on April 2008] 1-105 (p. 8)

5 United Nations, *Copenhagen Accord*, (2009) <http://unfccc.int/files/meetings/cop_15/application/pdf/cop15_cph_auv.pdf> [accessed on January 2009] (pp. 2 of 6).

emissions whilst their operation takes approximately 27%.[6] Therefore, governments have targeted this sector by encouraging practices that reduce environmental impact as well as those that support social and economical development.

Although there is an increasing demand for new housing, there is also a need to improve existing housing developments. In the UK alone, two new million homes are estimated to be required by 2016, with existing but vacant housing areas expected to contribute a share. It is calculated that approximately 10% of existing housing areas require significant modification to improve living conditions, work that is expected to be completed within 20 years.[7] Berlin, Stockholm, and the Netherlands are examples of places which have sought to satisfy housing demand by making urban areas more compact with infill development and re-use of buildings.[8] Although this is less commonly seen in countries such as Mexico, similar strategies are now being implemented. For instance, the federal government's main social housing mortgage provider, Infonavit, has introduced a new pilot programme entitled Vivienda Vertical for infill development using low- to medium-rise housing. In this way existing housing is taking a relevant global role in the context of sustainable development.

There are many advantages that may be attributed to existing inner city housing areas. Firstly, re-using buildings instead of building new greatly reduces the ecological footprint of the process.[9] "The energy input required to quarry, transport and manufacture building materials, plus the energy used in the construction process, can amount to a quarter of the lifetime energy requirement of a very energy-efficient building".[10] Secondly, existing communal gardens provide a feasible way to integrate

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6 Communities and Local Government, 'Building a Greener Future: Policy Statement', *Planning, Building, and the Environment*, (2006) <http://www.communities.gov.uk/documents/planningandbuilding/pdf/building-greener.pdf > [accessed June 2009] 1-25 (p. 4).

7 Cabinet Office, 'A New Commitment to Neighbourhood Renewal', *National Strategy Action Plan*, (2001)<http://www.cabinetoffice.gov.uk/media/cabinetoffice/social_exclusion_task_force/assets/publications_1997_to_2006/neighborhood_action_plan.pdf> [accessed June 2009] 1-127 (p. 13). See also Office of the Deputy Prime Minister, 'Planning Policy Statement 3: Housing, *Planning, Building, and the Environment*, (2006) <http://www.communities.gov.uk/documents/planningandbuilding/pdf/planningpolicystatement3.pdf> [accessed July 2009]1-30 (p. 15).

8 Timothy Beatley, *Green Urbanism: Learning from European Cities*, (Washington, D.C.: Island Press, 2000), pp. 34-38. See also Stephen M. Wheeler, *Planning for Sustainability: Creating Livable, Equitable, and Ecological Communities*, (Abingdon: Routledge, 2004; repr. 2006), p. 118.

9 Chris Church and Toby Gale, 'Roads in the Sky: Towards Improving the Quality of Life in Tower Blocks in the UK', *The first report of the National Sustainable Tower Blocks Initiative*, (2000), <http://www.towerblocks.org.uk/html_report/index.htm> [accessed on July 2009], 1-38 (p. 13).

10 Hugh Barton, Marcus Grant and Richard Guise, *Sustainable Setlements: A Guide for Planners, Designers, and Developers*, (Bristol: University of West England, 1995), p. 26.

ecological processes from which dwellers may learn in their implementation.[11] Also, existing housing areas may have a key role for improving biodiversity by providing diverse urban habitats that can be integrated into a city green network and serve for to provide a variety of place experiences.[12] However, the capacity of outdoor areas to provide for sustainable development may vary depending on the housing typology.

Compared to other types of dwelling, medium-rise housing may offer better possibilities. The term 'medium-rise housing' in European and American literature refers to buildings from three up to six storeys. This is the scale which research has generally shown to be optimal for residents to retain eye and vocal content between their dwellings and those on the ground.[13] Also, residents living above six storeys no longer consider the outdoor areas to be as important as their dwelling.[14] However, in Mexico the threshold for medium-rise housing is usually buildings with three or four storeys. Therefore, in order to encompass both, this study refers to buildings of three to six storeys as medium-rise housing.

Some of the advantages of medium-rise housing include the possibility of having concentrated facilities, shared communal gardens, and a medium density which together are likely to enable joint ecological solutions and community life. The communal gardens of existing housing areas can be re-designed to meet inhabitants' needs better and contribute to the sustainability of the landscape.[15] Medium-rise housing areas are particularly liked by the elderly for their permanent dwellings, and can serve as an option for other groups who want to live in urban areas.[16] In some instances, they may

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11 Peter Kareiva, Sean Watts, Robert McDonald, and others, 'Domesticated Nature: Shaping Landscapes and Ecosystems for Human Welfare', *Science*, 29 (2007) <http://www.sciencemag.org.eresources.shef.ac.uk/cgi/content/full/316/5833/1866> [accessed July 2009] (para. 18 of 19).

12 Cynthia Girling and Ronald Kellett, *Skinny Roads & Green Neighborhoods: Design for Environment and Community*, (Washington: Island Press, 2005), p. 68. See also John M. Marzluff and Amanda D. Rodewald, 'Conserving Biodiversity in Urbanizing Areas: Nontraditional Views from a Bird's Perspective', *Cities and the Environment*,1 (2008) <http://escholarship.bc.edu/cgi/viewcontent.cgi?article=1013&context=cate> [accessed July 2009] 1-27 (p.15).

13 Kenneth Frampton, *Modern Architecture: A Critical History*, (London: Thames and Hudson, 1985; repr. 1990), pp. 272-273. See also Jan Gehl, *Life between Buildings: Using Public Space*, trans. by Jo Koch, 5th edn., (Copenhagen: Danish Architectural Press, 2001), p. 100.

14 Min-ShunWang and Hsueh-Tao Chien, 'Environmental Behavior Analysis of High-rise Building Areas in Tawian', *Building and Environment*, 34, (1999), 85-93 (p. 89).

15 Anne R. Beer, Tim Delshammar and Peter Schildwacht, 'A Changing Understanding of the Role of Greenspace in High-density Housing: A European Perspective', *Built Environment*, 29 (2003), 132-141 (p. 142).

16 Karien Dekker, Sako Musterd, and Ronald van Kempen, 'Explaining Differentials in Housing and Neighbourhood Satisfaction in Post-WWII Large Housing Estates in European Cities', *ENHR International Conference on Sustainable Urban Areas*, (2007) <http://www.enhr2007rotterdam.nl/documents/W11_paper_Dekker_Musterd_Kempen.pdf> [accessed July 2009] 1-22 (p. 17). See also Philippa Westbury, 'A Sense of Place: What Residents Think of their New Homes', *CABE* (2007) <http://www.cabe.org.uk/files/a-sense-of-place.pdf> [accessed July 2009] 1-29 (p. 18).

be an important part of the urban image, for example Norfolk Park towers in Sheffield which have been demolished to be replaced by low-rise dwellings. Lastly, some of existing dwellings in this type of housing are owner-occupied which makes them easier to regenerate, though a thorough analysis must be carried out to assess their potential wherever feasible.[17]

Despite the role that existing housing may have for sustainability, most planning guidance has been directed towards newly built dwellings and it is only recently that improving existing housing areas has also been tackled. For instance, in the UK the National Strategy for Neighbourhood Renewal was launched in 2001 whilst guidance strategies for new dwellings such as BREEAM have been around since the 1990s. Regeneration strategies have only recently moved away from focusing on buildings and indoor areas alone, recognizing outdoor areas as significant for improving the living environment of housing areas.[18] This change has stimulated previously disregarded fields of study such as urban ecology and landscape for their contribution to sustainability in urban areas.

Unfortunately, current planning guidance has focused mostly on supporting ecological development, hardly addressing social or economical issues. This is most evident in current assessment strategies such as BREEAM, LEED, and Green Star that are being used to guide sustainable housing in the UK, USA, and Australia. These assessments are not only rigid, limited, and sometimes lead to rather unsustainable solutions; they are also not fulfilling the basic premise of sustainable communities in providing a quality living environment for long-term permanence. It may be considered that ecological development is a pressing matter given current global warming concerns. Yet their social development is imperative to avoid future decline of housing areas: there are plenty of examples showing that physical improvements alone are not sufficient. Lastly, though economical development is also important, research shows it may be generated through social and ecological initiatives.[19] From all three issues, focus must be placed then in strengthening social development above all others.

Design and processes that enable socializing in housing areas are significant for various reasons. There are numerous publications and research studies indicating the importance

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[17] CABE, 'Regeneration and Remodeling', *Building for Life*, (2005) <http://www.cabe.org.uk/AssetLibrary/2124.pdf> [accessed on march 2006] 3.

[18] Communities and Local Government, 'Transforming Places; Changing Lives', *A framework for Regeneration*, (2008) <http://www.communities.gov.uk/documents/citiesandregions/pdf/896104.pdf> [accessed July 2009] 1-159 (p. 20).

[19] Stephen M. Wheeler, p. 213.

of providing opportunities for social interaction, which is a basic human need. It is important for children and adolescents in their exploration of their surroundings and their integration into society, as it is just as important for adults and the elderly to have contact with and wider knowledge of their community.[20] It is similarly significant for sharing ideas, learning from the experiences of others, as well as learning from other cultures.[21] Having opportunities to meet neighbours and develop networks of support and trust, friendships, has been shown to strengthen pride and attachment to the community.[22]

Yet there are claims that communities are no longer locally dependent on the housing area as a physical place, but are rather non-local. For instance, there are virtual communities relying on communication media which do not require face-to-face contact or inhabitants conduct more distant activities such as exercising in gyms.[23] However, this only adds to a variety of socializing choices since the experience of face-to-face communication cannot be replaced by virtual contact.[24] Also, one has to consider the population characteristics. Social housing inhabitants might not have access to computers or web-based communities. Neither will many residents have a vehicle or the economic means to access leisure or social facilities outside their housing area. Also, research shows that residents' care and responsibility towards the environment depends on their identification with their local surroundings, the social networks amongst them, and the social strength of the community.[25] Therefore in a sustainable housing context, it is considered that equal or higher weight should be placed on social development.

Provided that economic development may be generated through social as well as ecological development, the present study focuses on the latter two. For these,

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[20] Patsy Eubanks Owens, 'Adolescence and the Cultural Landscape: Public Policy, Design Decisions, and Popular Press Reporting', *Landscape and Urban Planning*, 39 (1997), 153-166 (pp. 161-163). 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). See also Andrea Faber Taylor and others, 'Growing Up in the Inner City: Green Spaces as Places to Grow', *Environment and Behavior*, 30 (1998) 3-27 (p. 17).

[21] Ken Worpole and Katherine Knox, 'The Social Value of Public Spaces', *Joseph Rowntree Foundation* (2007) <http://www.jrf.org.uk/sites/files/jrf/2050-public-space-community.pdf> [accessed March 2009] p. 7.

[22] Gustavo S. Mesh and Orit Manor, 'Social Ties, Environmental Perception, and Local Attachment', *Environment and Behavior*, 30 (1998) 204-519 (p. 514). See also Rainer Mackensen, 'Social Networks', in *The Quality of Urban Life: Social, Psychological, and Physical Conditions*, ed. by Dieter Frick, (Berlin: Walter De Gruyter, 1986), 49-53 (p. 50).

[23] Nigel Taylor, 'Unsustainable Settlements', in *Sustainable Communities: The Potential for Eco-Neighbourhoods*, ed. by Hugh Barton, (London: Earthscan, 2000), pp. 24-27.

[24] Henry Shaftoe, *Convivial Urban Spaces: Creating Effective Public Spaces*, (London: Earthscan, 2008), p. 11.

[25] David Uzzell, Enric Pol, and David Badenas, 'Place Identification, Social Cohesion, and Environmental Sustainability', *Environment and Behavior*, 34 (2002) pp. 26-53 (p. 50).

academia, policy, and planning guidance on sustainability address similar themes. Social sustainability focuses on the provision of opportunities for residents to learn and participate of their community and developing social networks that foster a stable community. Ecological sustainability focuses on reducing CO_2 emissions, the use of low-impact materials and practices, improving biodiversity, reducing water consumption, and decreasing pollution. If the components for ecological improvement are compared in terms of their level of importance, current planning guidance places more emphasis on specific targets. For instance, in the UK assessments such as BREEAM place more emphasis on reducing CO_2 emissions and decreasing pollution and less importance on saving drinking water. Although there is an urgent need to reduce carbon emissions, the level of importance of each component should be considered within their context. For instance, the provision of good drinking water would be more significant in arid areas.

Aims and objectives

The regeneration of medium-rise housing with a sustainable emphasis on its landscape setting has only been attempted on a small scale so far, which is reflected in the small number of critical studies on this topic. As a result the information gathered about experiences and lessons gained, that might inform future regeneration, is limited. The aim of this research is to explore the ways in which landscape may contribute to social and ecological sustainability in the regeneration of medium-rise housing. It particularly focuses on social housing since many existing medium-rise housing areas, built after WWII and now in decay, are occupied by low-income households in some countries such as the UK, the Netherlands, Scandinavia, Spain, Germany, and Mexico. This is either because they were part of a social housing programme or because there has been an outward migration of more economically affluent families once the decline of their area has commenced.

It is the intention of this research to analyse two regenerated case studies to learn more about the ways in which sustainable approaches may be implemented in the future. These case studies are located in different countries and each has been regenerated with a sustainable landscape approach. There is a thorough assessment of the case studies including their historical development, the process of regeneration, and their short as well as their long-term social and ecological performance. Issues that were found to integrate social and ecological sustainability according to planning and research guidance were used to assess the case studies as follows:

- Social quality issues
  - Community development
    - Improving the image and identity of the housing area
    - Providing areas for personalization
    - Encouraging residents' care
    - Providing for variety
  - Community participation
    - Providing an inclusive design and opportunities for participating
    - Providing for flexibility
  - Social integration through quality design issues
    - General principles of outdoor areas for community life
    - Permeability, spatial definition, and scale; complexity, diversity, and richness; legibility; order, coherence, enclosure, mystery, and robustness.
- Ecological quality issues
  - Reducing energy use and carbon dioxide emissions
    - Strengthening pedestrian, bicycle, and public transport
    - Fixing carbon dioxide through vegetation
    - Reducing energy use emissions from buildings
  - Increasing biodiversity
  - Reducing water use
  - Reducing pollution
  - Selection of materials according to their life-cycle

Then, specific communal gardens with diverse layouts were selected to compare their design for their social and ecological potential. In the present study, a layout is the resulting arrangement from a grouped unit of blocks and their outdoor areas; blocks are the built element defining its immediate outdoor space.[26] Space means the configuration of the boundaries that define the three dimensional extent and the properties that characterise them.[27] Thus, the comparison has allowed the extraction of design criteria and recommendations which were then tested in a third case study in Mexico to assess their feasibility in another context.

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[26] M.R.G. Conzen, *Alnwick Northumberland: A Study in Town-plan Analysis*, (London: Alden Press, 1960; repr. 1969) pp. 4-5.

[27] Francis D. K.Ching, *Architecture: Form, Space & Order*, (NY: Van Nostrand Reinhold, 1979), p. 108.

The research was undertaken considering the following four objectives:

- To define and integrate a framework of sustainable indicators for assessing the landscape, which are suitable for medium-rise housing and the international context of this study.
- To understand the contribution that landscape may make to improve the environment and to the building of community and social integration in different building layouts and from different storeys.
- From a number of case studies, to explore a range of different approaches that have been applied to landscape and how their success depends on different cultural, social, and geographical contexts.
- To devise criteria that may assist sustainable approaches to medium-rise housing and its environment.

These guide the research questions and the order of the thesis structure.

Methodology

Since it was necessary to have an in-depth understanding of the way landscape could contribute to support social and ecological sustainability in a specific type of housing, it was important to use case studies where the research could be applied. Therefore, an extensive search was conducted in order to find possible case studies that could be suitable for this study.

Internet and printed sources were used looking for exemplary examples of regenerations of low-income medium-rise housing areas with a sustainable landscape approach. Initial searches were first made in the UK including recognised good-practice research websites such as CABE and landscape-, housing, and planning- related journals and magazines. Also, well-known projects as well as the work of architects and landscape designers were searched whose focus of design was towards the building of community or improving the environment such as Byker, Span housing areas of Eric Lyons, World's End Estate, Lillington Gardens, Apple Tree Court Oasis, and others. With this initial search, it was not possible to locate housing areas which fulfilled the initial requirements and therefore it was necessary to expand to other countries; UK planning literature and research provided some insight of Scandinavian and Netherlands case

studies which had succeeded in integrating sustainable measures and had enhanced community development.

Besides Scandinavia, a search was made in countries with past or recent innovative environmental solutions such as Brazil and Germany or with community driven schemes such as in Spain and Mexico. East European countries were also included because they have a significant amount of medium-rise housing. Contact was made with planning departments of local authorities as well as academics of landscape and architecture departments in Universities in the capital cities who could recommend possible case studies. This was combined with a web search of projects with awards and good-practice recognition from institutions such as the European Union, local authorities, or academic research.

A number of possible projects were found. These included the Hedebygade Block and the Hollandervej/Fredensgade block in Denmark, Augustenborg in Sweden, the Bijlmermeer and Eva-Lanxmeer in the Netherlands, the Osterholz-Tenever Quarter and Rotes Viertel in Germany, and Trinitat Nova in Spain among others less relevant. Plans, literature, and existing research were gathered about these potential projects through web searches and contact with project leaders in order to evaluate them for their suitability for this study. Selection criteria for the case studies included having different types of block layouts that could be compared and a sufficient number of dwellings to enable statistical comparisons. It was also necessary to have a minimum of three years since the regeneration projects were finished in order that vegetation should have some degree of maturity after regeneration works. Lastly, projects were to have evidence of a low turnover and vacancies as an indicator that they were a socially stable community after the regeneration.

After screening the regeneration projects with these criteria, the two most suitable housing areas found were Augustenborg, located in Malmö, Sweden, and Rotes Viertel, located in the east part of Berlin, Germany. Although these were not part of social housing schemes, various social and economic problems caused both areas to fall into decay and they have since accommodated low-income families. Each site was visited to ascertain that the regeneration had been finished, the landscape had been established, that schemes for improving the environment were in place, and that opportunities for the building of community were provided.

The first case study, Augustenborg, was part of Sweden's Agenda 21 investment provided for sustainable development in new housing and regeneration schemes after

1995.[28] It was within this scheme that the decayed medium-rise housing area of Augustenborg in Malmö, built in 1948, was proposed for regeneration. It was to follow sustainability principles and has become a pioneer and unique exemplar of regenerated housing, not only in Sweden, but around the world. Regeneration not only targeted the buildings but also focused on the landscape as a way of improving the environment and integrating the community.[29]

The second case study, Rotes Viertel, a medium- and high-rise housing area in Berlin, went through singular circumstances that led to it becoming an interesting example. There were numerous decayed and newly constructed medium- and high-rise housing estates in the Hellersdorf district of former East Germany by the time the change of government occurred in 1989. This raised many concerns about their future due to a significant migration of their inhabitants to West Germany. So a strategy was developed to improve the quality of life of residents through changes in the blocks as well as to the outdoor areas with an emphasis on ecological and social development.[30] Since Rotes Viertel was one of the newest housing areas at the time, its outdoor areas were not completely finished and therefore became the target for an intensive 'Planning for Real' workshop in 1995 to guide changes in future regenerations.[31] This workshop has led to the implementation of a landscape strategy and various experimental ecological initiatives.

Further changes were being considered in Augustenborg as well as in the Rotes Viertel to improve the housing areas and to meet current needs of their residents, which made it an ideal time for this study. Therefore, these two housing areas were found to be suitable as case studies. During additional visits to the sites, permission was gained from the housing companies to conduct the study and a selection of possible communal gardens was made where it could be applied with the following criteria (Plate I and Plate II):

- The closeness of layout to public spaces such as a square, facilities, parks, or roads.
- The types of layouts creating varying outdoor spaces

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[28] Asa Abrahamson, 'Malmö: Local Agenda 21 Environmental Program and Action Plan', *European Academy of the Urban Environment*, (2001) <http://www.eaue.de/winuwd/192.htm> [accessed on April 2008] (para. 11 of 20).

[29] Trevor Graham, *Echoes of Tomorrow*, (Malmö: Tryckeri Wiking AB, 2002), pp. 6-8.

[30] Monika Schümer-Strucksberg, 'Berlin: Ecological Building Renovation of a Pre-fabricated Housing Complex', *European Academy of the Urban Environment*, (2001) <http://www.eaue.de/winuwd/90.HTM> [accessed on April 2008] (para. 4-10 of 29).

[31] IfS Institut fur Stadtforschung und Strukturpolitik GmbH, *Internationaler Community Planning Workshop: Berlin-Hellersdorf*, (Berlin: GmbH, 1995), p. 8.

- The height of the building blocks defining the layouts

Since Augustenborg and Rotes Viertel were located in two different countries with distinct cultures, it was recognised that this would provide an excellent opportunity to make comparisons between the regeneration projects. It would enable a critical assessment of the varying experience of the regeneration's implementation from the different perspectives of designers, managers, community leaders, local authorities, and others in both countries. Also, the preferences of residents regarding the design of their communal outdoor areas to encourage social interaction could be compared for differences due to culture and for similarities that could help to establish general design criteria. Cultural differences may be ascertained through the identification of specific cues in the design or making of decisions that are particular to the lifestyle of a group of people, which in this case are the residents and persons involved in the regeneration.[32]

However, since both of these case studies were located in North-Western Europe, it was then crucial to test the findings in a third non-regenerated case study with a different contrasting demographical location, culture, and weather conditions such as Mexico. Focusing the study in this country was ideal since Mexico's new governmental planning proposals were beginning to encourage the regeneration and building of medium-rise housing. The comparison would make it possible to show other ways in which sustainable regeneration could be applied in a different setting. It would also aid in establishing design criteria that may be generally applicable or which would be adequate in comparable contexts such as in North and South America.

In testing the findings in a different setting, the main problems faced included their transferability to the context of Mexico. Therefore, the findings were tested incorporating ways in which they could be applied in Mexico. Another problem with regard to the cultural background was the understanding of results in Mexico. The advantage here was that Mexico was the researcher's country of origin which enabled a more in depth understanding and identification of differences due to culture. Issues of consideration, which are particular to Mexico as part of cultural habits for leisure and socializing of its inhabitants, are explained more broadly in Chapter 9.

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[32] Amos Rapoport, 'Cross-Cultural Aspects of Environmental Design', in *Human Behavior and Environment: Advances in Theory and Research*, ed. by Irwin Altman and others, IV (New York: Plenum Press, 1980) pp. 7-46, (p. 11).

Plate I. Location of selected communal gardens and layouts in Augustenborg used for the analysis

(Original plan from ISS Landscaping)

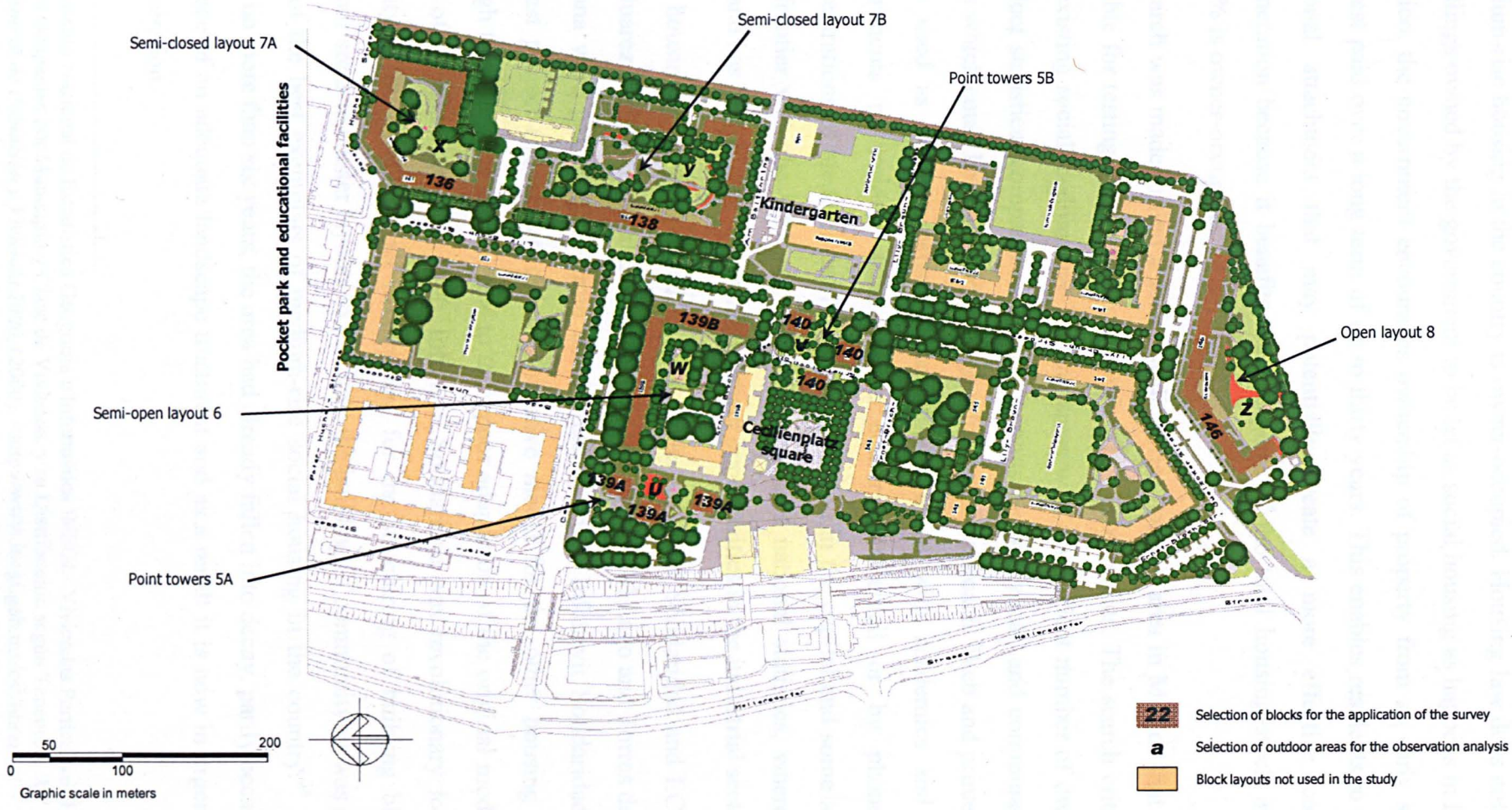

Plate II. Location of selected communal gardens and layouts in Rotes Viertel used for the analysis

(Original plan from Stadt-und-Land; survey of existent landscape by author)

One significant difference in the Mexican case study from the others was that almost all medium-rise housing in the country is owner-occupied. Housing law does not allow for dwellings owned by the government to be let as social housing as happens in Europe. In Mexico, the government encourages ownership of property from an early stage with interest paid over a long term of up to thirty years. This enables residents to develop a personal attachment that may potentially create a more effective context for regeneration because it benefits the occupier. Of the total housing stock in Mexico, 78.3% is owner-occupied.[33]

A search was made to find a social medium-rise housing area in Mexico that would be suitable for testing the results from the first two case studies. The search criterion was for existing social medium-rise housing areas with a sufficient number of dwellings to conduct statistical comparisons, having various block layouts, and communal outdoor areas which could be improved through a landscape approach. Web and printed sources were used as well as personal contact was made with academics and planning departments in various states of the country via email or by phone. Larger concentrations of medium-rise housing were found in the capital and some states near the frontier with the USA, as shown by country's national statistics, where housing demand has been higher due to employment opportunities in the industrial sector.

Few housing areas were found to be suitable. Infonavit Solidaridad and ECO2000 in Cd. Juárez, Chihuahua2000 in Chihuahua, and Porticos del Lago and Torres del Lago in Tijuana were possibilities. From these housing areas, Infonavit Solidaridad was the earliest project and served as an innovative model for the other housing schemes; though they had less success due to their poor adaptation of the original model. At the time of its construction in 1990, Infonavit Solidaridad was revolutionary for its high density of 80 dwellings per hectare and for the structuring of building blocks and outdoor areas in cluster layouts to facilitate the building of community. It was praised as one of the best exemplars of medium-rise social housing in the country.[34] However, after no more than six years, the area had already fallen into decay, partly because of the absence of an adequate landscape treatment and as a result it is now in urgent need of regeneration.

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[33] Instituto Nacional de Estadística Geografía e Informática INEGI, 'Viviendas Particulares Habitadas y sus Ocupantes por Municipio y Clase de Vivienda, y su Distribución según Tenencia', *XII Censo General de Población y Vivienda 2000*, (2000), <http://www.inegi.gob.mx/est/librerias/tabulados.asp? tabulado=tab_vi14b&c=787> [accessed on September 2006].

[34] Enrique Pineda Cruz, (Project designer, Casas Geo Laguna S.A. de C.V.), interview by C. Martínez, January 2007, transcript 1S, Cd. Juárez, Mexico.

After they had been selected, plans and details of each project were gathered from printed sources as well as aerial photographs from local planning authorities, after which site visits were made. These enabled considering the physical context and possibilities for landscape regeneration. Located in Cd. Juárez, a frontier city to the north of the country, Infonavit Solidaridad is set in a dry climate with an average high temperature of 35°C in summer and average low of 1°C in winter.[35] As part of the visits, communal outdoor areas were selected for the application of the findings with similar criteria as those from the other two case studies. It was not necessary to make a selection in relation to height or layout type since the clusters were similar with varying numbers of storeys. The selection was mainly made in terms of proximity to public spaces, which in this case consisted of ball courts, school facilities, and roads (Plate III).

In terms of funding the regeneration of a housing scheme as this, it was feasible because of the recent development of a governmental programme that may allow it. Around 2001, the federal government in Mexico started to coordinate programmes to improve the living conditions of low-income dwellers and their public spaces through the office of the Secretary of Social Development (Sedesol). The first efforts were started through the 'Habitat' programme which focused on providing basic infrastructure and strengthening community development in the low-income housing areas of poverty usually found at the edge of the cities. By 2007, a similar programme called 'Rescate de Espacios Públicos' (REP) was launched with wider scope for improving the social and physical conditions of public spaces in the hope of reducing vandalism and decay of communities. These public spaces included parks, squares, roads, green communal areas, gardens, sports and cultural areas, and others.[36]

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[35] Weather Channel <http://uk.weather.com/travel/travel-El-Paso-USTX0413?tab=2> [accessed March 2009].

[36] Sedesol, Programa Hábitat, (2009) <http://www.sedesol.gob.mx/index/index.php?sec=801581> [accessed January 2009] 1-2 (pp. 1-2). See also Sedesol, Programa de Rescate de Espacios Públicos, (2009) <http://www.sedesol.gob.mx/index/index.php?sec=801581> [accessed January 2009] 1-2 (p. 1).

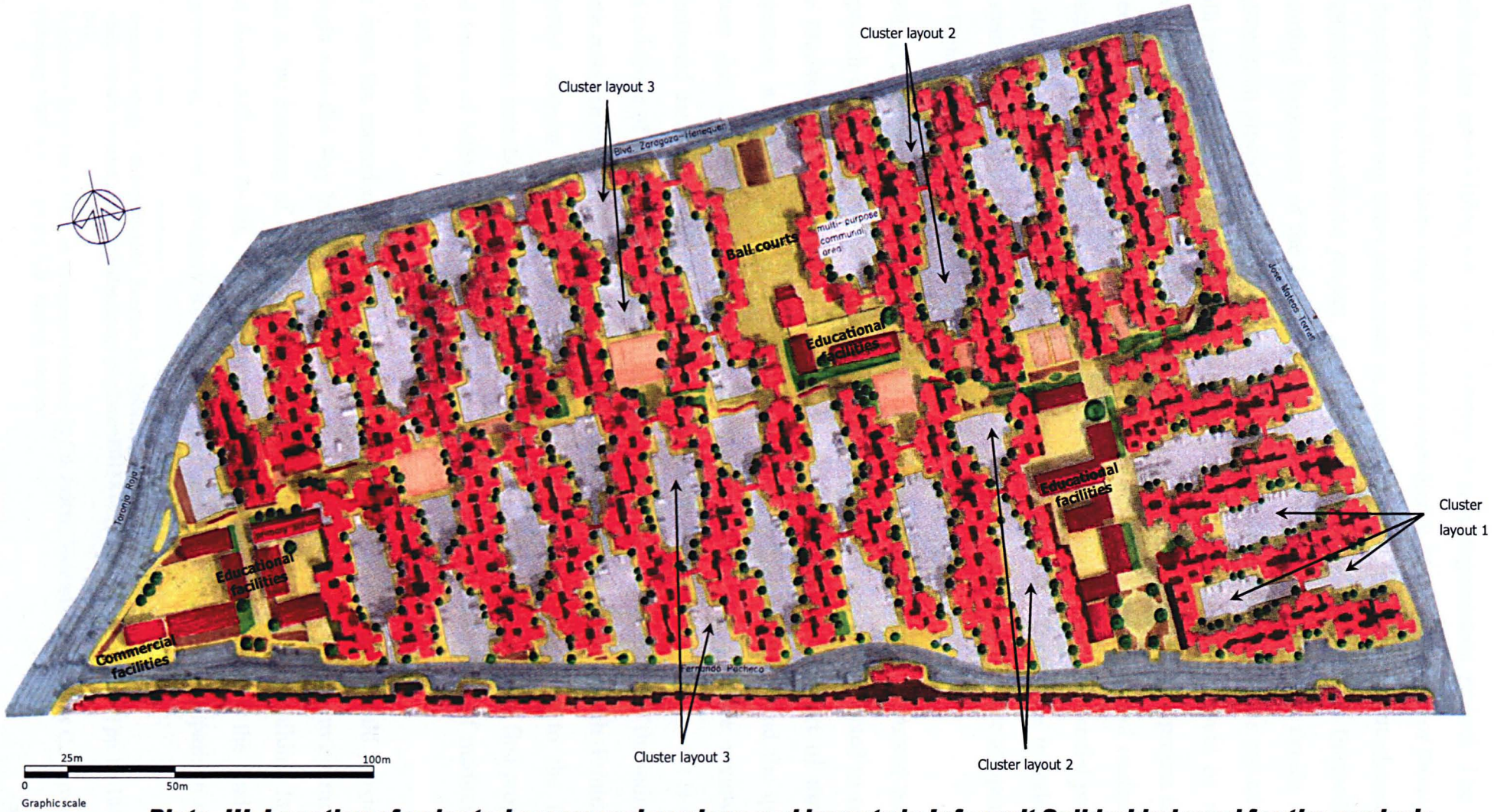

Plate III. Location of selected communal gardens and layouts in Infonavit Solidaridad used for the analysis

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

The REP programme is funded by the federal (50%) and local government (40%) as well as the users (10%) who are to benefit from a regeneration project. The local government and the users may contribute in machinery, material, labour, or money.[37] It is hoped that having users participate in some way produces a sense of attachment and responsibility towards the project, since they are to care for it once it is finished. The planning department of the local authorities, or other related institution, decide where regeneration projects are required and then proceed to design them after a consultation with residents. It is a prerequisite that the area to be regenerated should be in the ownership of the local authorities so that public access is maintained. The project is then executed by the building department of the local authorities or by external contractors. Once finished, the local Department of Social Development establishes social projects to strengthen local networks, support community life, and a committee intended for sustained care and maintenance.[38] This is the programme that may be more adequate for the regeneration of medium-rise housing in Mexico.

Having the examination of case studies as the main methodology, a mixed method approach of quantitative and qualitative research methods has been selected to collect the required data according to the objectives of the research. As part of the first objective, a set of indicators for social and ecological sustainability and the quality issues that characterise them has been integrated from the literature review. As mentioned earlier, the study does not focus on economic sustainability since it is really the evidence of social and ecological sustainability. The quality issues of the indicators were complemented with others of importance shown by previous research. Printed and internet sources were used which contained information in regard to the initial community intentions of designers when medium-rise housing areas were first proposed and issues of relevance for solving current problems in the landscape of medium-rise housing areas.

To meet the second objective, a set of methods were required that would provide an insight into the way landscape contributed to the improvement of the environment as well as the building of community and social integration in different building layouts and from different levels. Also, in order to understand the potential of the landscape regeneration, it was necessary to use methods that would allow the comparison of the

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[37] Sedesol, 'Reglas de Operación', *Rescate de Espacios Públicos*, (2009) <http://www.sedesol.gob.mx/index/index.php?sec=801581> [accessed January 2009] pp. 80-104 (p. 84).

[38] Francisco de la Torre Chacon, (General Director in Cd. Juárez, Sedesol), interview by C. Martínez, February 2009, transcript 2S, Cd. Juárez, Mexico.

existing opportunities provided in the housing areas with those after the regeneration as well as having a broad perspective from residents and professionals:

- Printed sources and spatial diagrams of outdoor areas

  Firstly, past and current publications, research, and landscape plans were used to show ecological achievements, community development and participation opportunities as well as the intentions of the design for supporting the social interaction of residents. These included newspapers, research papers, news of events, awards, articles, site plans, and others. The site plans allowed developing schematic diagrams of the design of the communal gardens to provide an understanding of the way its integration affected leisure and socializing opportunities.

- Grade assessment

  Secondly, a general overview of the performance of the landscape for ecological and social sustainability was required to provide an initial and un-biased understanding of the prevailing situation. The performance of the landscape was assessed by structuring the defined quality indicators into a graded assessment that the researcher could apply during the field work in each case study.

- Semi-structured interviews

  Thirdly, the views of professionals and other persons involved in the regeneration complemented the information obtained from the grade assessment. Their views helped to explain the reasons for the provision and implementation of community projects and ecological schemes as well as the limitations in doing so. Interviews were carried out with the housing companies' main directors and strategy development and publishing directors; landscape designers, project leaders for social and ecological programmes, heads of maintenance, and local authorities' directors for public spaces; directors of local residents' committees and other social organizations, directors of local schools, and caretakers.

- Non-participant observation

  Fourth, the research relies on the assumption that the physical environment may influence the way outdoor areas are used, affecting the development of social interaction. Therefore, opportunities for that in communal outdoor areas were clarified by observing the activities of residents and the way landscape facilitated them.

- Survey

  Fifth, to incorporate the views of residents of the characteristics of the landscape that encouraged their social interaction in communal gardens, a survey provided the broadest perspective. The survey also allowed enquiry about residents' views and participation in the improvement of the environment. Statistical analysis then allowed the comparison of residents' perception of the landscape from different building layouts and storeys.

To meet the third objective, the set of methods already selected allowed comparisons between case studies and the understanding of social, cultural, or geographical influences. Structuring the information relevant to each case study to show their initial development and following regeneration helped to explain them in their own context and the understanding of important influences for their progress that could then be compared. Also, by having an in-depth analysis of interviews in each case study, the experiences of each could be put in contrast to explain the strengths, limitations, and viable opportunities due to their cultural or geographical contexts. Lastly, the use of statistical tests to find differences between layouts and storeys of the two case studies for the survey responses and observation analysis allowed reliable comparisons where findings were then related to social, cultural, or geographical influences.

For the fourth objective and to keep consistency with the research design, a survey and semi-structured interviews were suitable methods for testing the findings in the third case study and exploring possible approaches for future regenerations. A survey provided a broad perspective of the view of residents towards the feasibility and adequacy of introducing measures for an ecological and social sustainable regeneration of the landscape in a different context. Semi-structured interviews provided insight into the opportunities for and obstacles to implementing sustainable regeneration in the existing medium-rise housing of Cd. Juárez, Mexico. Interviews were conducted with heads of departments of relevant regeneration programmes including Sedesol and local authorities' planning departments as well as heads of non-profit organizations.

Structuring of methods

- Printed sources

  Documents consulted were those that informed the research in regard to the regeneration of the first and second case study as well as the development of the third case study. Given that their content was not always in English, simple

documents were translated using Swedish or German dictionaries. A professional translator was approached for other documents which required a more detailed understanding.

- Spatial diagrams of outdoor areas

  The schematic designs show the spatial configuration of communal gardens of different building layouts to which the survey was applied. Schematic figures are used to show the characteristics of the landscape of communal gardens. These are complemented with comments on the opportunities for and obstacles to leisure and social opportunities.

- Ecological-social grade assessment

  The grade assessment was developed from current planning, academic, and hybrid indicators that was adequate and sufficiently robust to assess the performance of the regenerated landscape for social and ecological sustainability. The assessment employs a cumulative point system similar to those used by current planning assessments. The ecological part was separated into five sections and the social part into two sections. These parts were graded individually. In the cumulative point system, the questions in each section have a similar value whereas each section has a different weighted value denoting its relevance in the assessment as a whole. The weighted values for each section were based on the 2008 model of the Multi-residential Code from BREEAM which was found to be most appropriate for medium-rise housing. The final score for each section as well as for the assessment as a whole was set against a performance scale of 0% to 100% where 60% or less is bad, 70% is poor, 80% is satisfactory, 90% is good, and 100% is outstanding.

- Semi-structured interviews

  The specific problems and opportunities in achieving a social and ecological sustainable regeneration in the first and second case study were explored by means of professional semi-structured interviews. These also aided in addressing other issues such as design ideas, goals, implementation processes, and future changes that strengthened the community and led to improvements of ecological processes. Interviews were also part of the third case study to understand the design of the housing area and the landscape as well as the intentions for the building of

community and considerations made towards improving the environment. The data was then transcribed and substantive elements identified through content analysis.[39]

It was not always possible to find professionals for interviewing with equivalent positions in both housing areas of the first and second case study since they had different organization and work procedures. In a way this allowed learning from different experiences of their dissimilar ways of working. For each interview, an appointment was made explaining the purpose of the interview as well as the issues to be discussed. Authorization was obtained prior to recording and permission to use the data for the research was acquired through a formal signed consent. In one particular interview in the third case study, all the information wanted was not obtained due to numerous unforeseen delays caused by the interviewee forcing last minute cancellations on two occasions.

In conducting the interviews, many language problems were encountered for the second case study in former East Germany, where there are limited English skills. In some cases, interviews were conducted with the help of a bilingual colleague of the interviewee. However, this proved more difficult with municipal employees where sometimes it was not possible to arrange an interview because of the language barrier.

- Non-participant observation

Scheduled observation records in the first and second case study allowed analysis of the development of necessary, leisure, and social activities in outdoor areas that revealed the residents' most used areas and the design characteristics. The activities and the specific areas recorded were then tested statistically for differences between the layouts.

The observations were conducted daily during 28 days in the morning, noon, and early evening, including Saturdays and Sundays.[40] The period and timing of observations was organized during established foliation months and to represent the majority of users at different times of the day and days of the week. The observation days were not consecutive because of periods of rain, but most were made within a specific month. Each outdoor area was observed for a period of twenty minutes and the order in which they were visited was alternated. In conducting the observations,

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[39] Bill Gillham, *Case Study Research Methods*, (Bodmin: MPG Books, 2000; repr. 2005), pp. 6-7.
[40] Ibid, pp. 45-58.

different vantage points were used to reduce interference with users in the outdoor areas and wherever possible from third storey stair windows.

In respect to the information gathered, three main pieces of data were recorded including the weather conditions, characteristics of users, and their activities. For both case studies, the average temperature was similar at the time of the observations, 12.6 to 15.2 degrees Celsius.[41] The characteristics of users included gender and an age range to identify the groups of users. As for activities, their location, type, and duration were recorded to distinguish preferred areas for social interaction. For the location of activities a set of predetermined codes was assigned to several areas in each layout. With respect to the type of activity, a general identification was first made. It included necessary, leisure, and social activities which were then specified in more detail. Necessary activities were compulsory tasks such as shopping for groceries or going to work; leisure activities consisted of passive or active relaxation and enjoyment of individuals; and social activities were those where two or more persons interacted with each other. Lastly, the duration of activities were divided into three categories; five minutes or less, between 6 to 15 minutes, and more than 16 minutes.[42]

Once finished, the observations were captured for statistical analysis with one-sample Chi-Square tests to explore differences in the frequency of usage of the different areas in the layouts and between layouts. The significance level used from which to consider statistical differences was 0.05. The statistical analysis of social areas took into consideration those where residents were found to be interacting with each other, including conversations that developed from leisure activities for more than 15 minutes. Casual encounters were considered to be those that lasted for periods of 6 to 15 minutes.

Lastly, photographs were taken of the areas that were used for leisure and socializing. It was not always possible to take photographs while residents were using these areas. The photography was found intrusive by some residents, who preferred to leave. It was most difficult in Germany due to language and the law, which requires the permission of individuals to be obtained before taking their photograph.

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41 Weather Underground, <www.wunderground.com> [November 2007]

42 William H. Whyte *The Social Life of Small Urban Spaces,* 3rd edn ([n.p.]: [n. pub.], 1980; repr. Michigan: Edwards Brothers, 2004), pp. 72-73.

- Surveys

  Augustenborg and Rotes Viertel

  In the first and second case study, the residents' preferences in regard to the outdoor design of the existing communal gardens for encouraging them to use outdoor areas for social interaction are explored through the use of a survey. This same survey also reviews the residents' awareness, attitude, and contribution towards the improvement of the environment and the possible social opportunities derived from this.

  A Likert scale was used to rate the attitude of respondents towards the design qualities of the regenerated landscape and its influence on social activities.[43] For the majority of the questions, a five rating scale was provided with an intermediate value such as 'average', meaning the item being rated was ordinary and not distinctive in any way. The survey was initially intended for distribution to residents living at ground level up to six storeys, since previous research suggests that contact with the ground is lost when this height is exceeded. However, the survey was actually delivered up to seven and eight storeys above ground level due to practicalities or misunderstandings with the caretakers who distributed the survey. Since the analysis of the data did not show differences among storeys up to the sixth storey, it was decided to use all responses up to the seventh and eighth storeys to see if any other differences appeared.

  The survey form was pilot tested on a group of students from the Department of Landscape in the University of Sheffield and a random group of residents from Byker in Newcastle. After this, the final questionnaire was translated into German and Swedish respectively for distribution in each case study. The translation was validated by translating it back into English until the meaning of the questions was equivalent in both languages. A final pilot testing was also applied with a random group of residents in Augustenborg. The commentaries of respondents were translated into English once the survey was returned. After a preliminary statistical analysis of responses was conducted, it was found that data was not normally distributed. Therefore, non-parametrical Kruskal-Wallis and Mann-Whitney statistical tests were used for comparing responses from different storeys, layouts,

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[43] A.N. Oppenheim, 'Questionnaire Design', *Interviewing and Attitude Measurement*, 3rd edn (New York: Pinter Publications, 1994), pp. 195-200.

and combinations of these.[44] The significance level used from which to consider statistical differences was 0.05 taking into account that non-parametric tests may detect fewer differences than parametric ones.

Infonavit Solidaridad

In the third case study, a survey was developed to validate the results obtained from the first and second case studies by comparison. It explored the residents' preferences in respect to ways for improving community life as well as participating in ecological activities and the design, management, and maintenance of their outdoor areas. It also examined their preferences in design criteria in outdoor areas which may encourage their use for leisure and relating to residents.

The survey was designed using Likert scale questions for respondents to rate various items using a five-point scale. An intermediate value of 'fair' on the scale meant that the items being rated were ordinary and not distinctive in any way. The questions related to rating of the design criteria were provided with visual images so that residents could imagine how they could be in their communal outdoor areas if these were to be regenerated. It was intended that by doing that, responses would be more reliable by providing respondents with a possible scenario and clear understanding of the item to be rated.

Several types of images were considered which included black and white sketches, black and white photographs, and colour photographs. The goal was to use the image which would best display the information that was to be rated. Therefore, the three possible image options were pilot tested with a group of students and teachers from the Department of Landscape in the University of Sheffield. To do so, photographs of particular areas in the communal gardens of the case studies Augustenborg and Rotes Viertel were selected since they portrayed effectively the elements of interest.

From a set of chosen images for the pilot test, photographs were prepared in colour, black and white, and sketches. The colour as well as black and white photographs were modified by reducing the colour saturation and increasing the light level of the background to enhance particular elements in the image. Wherever necessary, objects in the photographs were adjusted in size, positioning, or quantity to achieve

[44] Neil J. Salkind, Statistics for People Who Think They Hate Statistics, 2nd edn (Thousand Oaks, CA: Sage Publications, 2004), pp. 261-270.

a desired effect. Once the pilot test was applied and finished, the results indicated that colour photographs were found to be best compared to black and white sketches or images.

Another consideration of importance was providing images that included most and least preferred design criteria as evidenced from the findings of the first and second case studies. This way, respondents of the third case study would have options to select from rather than only rating those that were found to be preferred in the previous case studies. Once the survey was structured and translated, it was pilot tested with a random group of residents from Infonavit Solidaridad.

In the application of the survey, its purpose was explained to the selected residents on their doorstep at weekends when a collection time was also arranged. Once the survey was collected, it was found that 36% of respondents preferred not to specify the storey in which they were living and 24% did not provide a road name either for safety reasons. This was due to the current violence and insecurity problems that prevail in the city because of drug traffic related problems. During the preliminary analysis, the data was also found to be not normally distributed. Therefore Kruskal-Wallis and Mann-Whitney non-parametrical statistical tests with SPSS software were used in the comparison of responses.[45] The significance level used from which to consider statistical differences was also 0.05.

Structure of the thesis

The research was addressed through three phases. The first one concentrated on examining the development and current potential of medium-rise housing as well as the criteria required for regenerating its landscape for ecological and social sustainability. Having completed this, the second phase assessed the regenerated landscape of the case studies in Sweden and Germany for their performance, exploring the regeneration experiences and differences in the findings due to culture and to the methods used. This allowed the establishment of initial guidelines which emerged from the issues that seemed important from the professionals' and the inhabitants' perspectives. In the final phase, these guidelines were tested in relation to the Mexican case study with an exploration of the possibilities for them to be applied in the current planning context. From the findings of the three case studies and the applicability of the guidelines, the

[45] Neil J. Salkind, pp. 261-270.

conclusions focus on establishing the relevant issues in regeneration, making recommendations, and showing the ways they may be replicated in other contexts.

There were various interpretations for the terms of regeneration and sustainability of which some were more appropriate to new developments than existing ones. It was necessary to ask what can be considered to be a sustainable regeneration? The various applicable terms were explored in order to adopt an approach best suited to existing housing areas and sufficiently robust to enable their constant revitalisation through ecological and social processes. The study then sought to integrate a framework of indicators for assessing the social and ecological sustainability of the landscape from which the following questions derived: What are the relevant quality issues for assessing the landscape of medium-rise housing? How do they differ considering different geographical contexts?

In identifying the main issues relevant to ecological and social sustainability, the first step was to compare the current range of assessments available for sustainable communities and housing development that would enable the use of perspectives from different geographical locations. These included the United States, Australia, the UK, and the European Union. Once a general set of quality issues was structured from this analysis, existing research and regeneration experiences from medium-rise housing were explored in order to identify the gaps in knowledge. This is presented in the first chapter of the thesis setting the current context for sustainable landscape regeneration in medium-rise housing.

The following step in integrating the quality issues was to understand the ideas that led to the design of the landscape of existing medium-rise housing areas so that regeneration efforts would not repeat the causes of decay. The development of medium-rise housing is explored in different countries, including Mexico, as well as the way different layouts came to be produced and their effect on the landscape for social and ecological development. Through this, the types of layout that characterise the selected case studies are established. Then the various problems deriving from the design of the landscape of medium-rise housing that diminished community life and opportunities for environmental improvement are identified. As part of the debate, the potential and limitations for landscape opportunities provided by various types of housing are compared as well as those supported by current planning ideals in achieving sustainable communities from an international perspective; medium-rise housing is shown to be the best option. These are the issues examined in chapter two and three.

Lastly, the specific ideal quality issues are defined for the regeneration of the landscape in medium-rise housing that best meet its social and ecological demands. These were oriented towards characteristics specific to this type of housing, including communal gardens and different types of layouts. The quality issues are then structured as indicators constituting the basis for the sustainability assessment of the case studies. This is presented in detail in chapter four as a discussion of the ideal landscape quality issues for regeneration.

Having selected two case studies that had been through the process of regeneration, this study has sought to establish whether the landscape contributed to their ecological and social sustainability. So it was necessary to ask, how did features of the landscape enhance social integration in different buildings layouts? How did the landscape enhance ecological sustainability? And how have various approaches in the examples produced distinctive outcomes? There were three perspectives from which these questions could be answered which included the professionals' view, the residents' perception, and the actual use of outdoor areas. All of these were important in order to obtain a full understanding of the landscape potential in regenerating medium-rise housing.

The professionals' view was addressed first in terms of the design concept for the landscape with the following interests: what was the purpose of the landscape in the social life of the community? And what was the objective in terms of ecological sustainability? As both case studies were model projects when they were first built and during regeneration, a thorough analysis of their landscape's planning and design was necessary in respect of both stages. This would allow an assessment of their social and ecological contribution as well as an overview of the decay-regeneration process.

Similarly, it was necessary to assess the current performance of the social and ecological initiatives implemented from a landscape perspective. This would permit the extraction of most relevant concerns, lessons, and experiences from the regeneration for short- and long-term benefit. Questions in this regard included: what landscape initiatives have contributed to the building of community and why were they important? What were the features implemented to improve ecological sustainability and did these provide opportunities for residents to become involved? How did these opportunities facilitate community development? How was landscape perception helpful to encouraging ecology in the examples? How did residents value participation towards improving their own environment? And what roles did planners, managers, and

residents played in each example in implementing and managing the landscape? This is explored in chapters five and six through the case studies of Augustenborg and Rotes Viertel.

Once a detailed overview of the landscape for both case studies was obtained, it was possible to address the residents' perception of their design characteristics and their use of outdoor areas for the encouragement of socializing. This raises the questions: how did the spatial design contribute to social activities? How did sensorial design characteristics affect the development of social activities? How was the landscape perception helpful to social integration and the building of community? And how did the use and perception of the landscape vary from different heights and layouts? In order to investigate these, a survey applied in both case studies was designed to show residents' preferences for design characteristics that would encourage the use of their outdoor areas for socializing. Also, an observation analysis of residents' activities in the outdoor areas was used to show opportunities for casual contacts and socializing. This is discussed in chapter seven in terms of residents' perception of the regenerated landscape design and in chapter eight through discussion of social spaces in the regenerated housing landscapes.

In order to determine the replicability of the findings in a different geographical and cultural context, the last phase of the research focuses on testing their feasibility through the third case study Infonavit Solidaridad in Mexico. This allows us to ask: how should future landscape be designed for social and ecological sustainability? First, the planning of the housing area and the design of the landscape were explored to provide a background to the level of improvement possible by the lessons and design criteria. These were then tested through a survey that would allow comparisons and ultimately consider their possible general application. This is complemented by investigating the opportunities and obstacles for implementing a sustainable regeneration in Cd. Juárez considering current planning regulations and practice. This case study of Infonavit Solidaridad is explored in chapter ten, along with a discussion of the application of findings.

In the last chapter of the thesis, the conclusion seeks to put forward the most important elements for sustainable regeneration in medium-rise housing and the way it can be integrated in different contexts. This discussion asks, what are the key elements in the landscape for improving social opportunities, the building of community, and encouraging ecology? And how can lessons be applied to different settings? A set of

recommendations are provided from which design criteria are expressed through hand-made sketches.

Limitations of the study

The ethics committee of the University of Sheffield were consulted about all of the methods used in the research and their approval obtained before commencing the field work. Yet there were general limitations of the study as well as specific ones related to the methods used and data collected from the survey.

The study was structured so that data would be obtained from different methods to compare and corroborate the validity of the results. Although interviews with residents would have given more information about preferred areas and community issues this was not possible because of language barriers. Also, it was not possible to explore the views of specific groups such as adolescents and children due to time constraints of the present study. In terms of the selected case studies, it has only been possible to address examples in three countries. The issues addressed in this study should ideally, be re-examined in more case studies, particularly with different geographical, social, and cultural contexts. Lastly, in conducting the field work in the case studies and interpreting the results there may be issues related to culture which were unknown by the researcher, though these issues have been addressed through the interviews and the use of guidelines related to cultural differentiation stipulated by previous research.

Specific limitations are related to weather, language, and possible biases. In the first instance, the case study analysis of Augustenborg and Rotes Viertel was proposed to be conducted over a period of three months per site, April-June and August-October, when the landscape could be better appreciated. This implied that the planting in each case study was at different stages of growth and flowering which was addressed by having a thorough survey of the outdoor areas that would allow the comparison of the survey results.

In relation to the survey, a limitation was the translation of the survey into another language. Although measures were taken to ensure the same meaning as that of the English original, the issues addressed may have been interpreted differently due to having different cultural backgrounds. It is also possible that having a survey delivered from a foreign educational institution may have reduced the number of responses received. This challenge was addressed by delivering introductory letters explaining the research and indicating the ethics approval from the University of Sheffield as well as

the general approval by the housing company. In relation to the data obtained from the survey applied in Sweden and Germany, there were some survey items which were found to be unclear during their analysis and which were indicated in survey results. Also, it was not possible to obtain all household details from the Mexican survey due to current security problems, which have not allowed the comparison of results in the same extensive manner as in the case studies in Sweden and Germany.

For the observation studies, the presence of the researcher in the outdoor areas may have encouraged or discouraged the users' activities despite measures taken to minimise this. These measures included the approval from the ethics committee of the University of Sheffield and the housing company, posters in building entrances, and wearing identification from the University of Sheffield when conducting the observations. Also, in order to reduce possible biases in the observation studies, records were kept that made it possible to quantify and analyse statistically the activities.

Despite the wide range of methods used for the research, it was felt that these were necessary to acquire reliable and sufficient data for comparison. For instance, observations allowed understanding data of the survey that otherwise would have proved difficult.

Chapter 1

The current context for sustainable landscape regeneration in medium-rise housing

Introduction

The aim of this chapter is to establish the main definitions that support this study and to provide an overview of the existing literature which allowed identification of the gaps in knowledge from which the study develops.

In first instance, the definition of improvement terms related to an existing housing area are analysed to find a robust approach that may best fit with the requirements of a sustainable approach. This is followed by an exploration of terms related to sustainable development and the implications for a sustainable regeneration in order to establish adequate definitions for this study. In order to establish the main elements required for sustainable landscape regeneration in medium-rise housing, a study is made of international guidance that allows identifying existing assessments and main indicators used. The definition, content, and context of the main indicators available are discussed to make a suitable selection for this study.

Having a selection of main indicators, the existing literature is revised in regard to research, evaluations, and regeneration experience aiming for social and ecological sustainability through the landscape in housing areas. Gaps in knowledge are then established which form the main issues for consideration arising from these experiences, and the consequent research requirements of this study.

Regeneration or renewal?

Before establishing the definitions for sustainability used in the study, it is considered necessary to survey what is implied by 'regeneration'. There are many terms that are closely related. These include renewal, restoration, renovation, and refurbishment which appear close in meaning. Most often, planning documents referring to improving the

conditions of a given housing area refer to renewal or regeneration, sometimes exchanging them.[46] Yet these various terms have different end purposes.

Restoring implies bringing them back to a state like that they were in their original condition or at a given modification time.[47] Renewal seeks to replace the physical elements that have degraded to a state where they appear as new. In building this term is also regarded as an equivalent to renovation, though when referred to as urban renewal, it focuses on redeveloping and rehabilitating decaying urban areas.[48] Renovation makes the necessary repairs to improve the physical properties of a housing area to a standard that is considered good quality at the time of the process. Lastly, refurbishment is an extension of renovation providing new fittings, usually indoors, after the necessary repair has been done.[49]

All of these focus mainly on the physical characteristics of an area and provide a one-time solution rather than considering long-term processes. Regeneration is a way to enable a reversal of decline.[50] In this sense, it refers to a solution that embraces preservation, revitalising, and the establishment of re-growth patterns which can lead to a prolonged improvement as the final target. It establishes a continuous cycle of resource replacement provided by the site's functional, social, and economic processes as well as exchanges leading towards a self-sustaining environment.[51] The latter is understood to include the area surrounding that in which residents live. Regeneration

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46 Homes and Communities Agency, 'Growth & Renewal', *What We Do*, (2009) <http://www.homesandcommunities.co.uk/growth_renewal> [accessed September 2008] para. 2 of 4. See also English Partnerships, 'Urban Regeneration', *Communities*, (2008), <http://www.englishpartnerships.co.uk/communitiesurbanregeneration.htm> [accessed September 2008]. para. 2 of 2.

47 William Ward Bucher, *Dictionary of Building Preservation*, (NY: John Wiley & Sons, 1996) p. 381.

48 Oxford University, *Compact Oxford English Dictionary of Current English*, ed. by Catherine Soanes and Sara Hawker, 3rd edn (Oxford: Oxford University Press, 2005), p. 637. See also, Communities and Local Government, 'Notes and Definitions for Housing Renewal', *Housing*, (2001) <http://www.communities.gov.uk/housing/housingresearch/housingstatistics/housingstatisticsby/housingrenewalincluding/notesdefinitions/> [accessed October 2009] para. 1 of 16. See also Nikolas Davis and Erkki Jokiniemi, *Dictionary of Architecture and Building Construction*, (Oxford: Architectural Press, 2008) p. 400.

49 Oxford University, pp. 631-637. See also Nikolas Davis, pp. 309-311.

50 Communities and Local Government, 'Transforming Places; Changing Lives: A Framework for Regeneration', *Cities and Regions*, (2008) <http://www.communities.gov.uk/documents/citiesandregions/pdf/896104.pdf> [accessed June 2009] 1-159 (p. 6). See also, Mathew Frith and Sarah Harrison, 'Decent Homes Decent Spaces', *CABE*, <http://www.neighbourhoodsgreen.org.uk/ng/_ui/dhds.pdf> [accessed September 2009] 1-20 (pp. 1-3).

51 Sim Van der Ryn and Stuart Cowan, *Ecological Design*, (Washington DC: Island Press, 1996), pp. 22-23.

then asserts a holistic approach which aims to provide quality housing areas where residents want to live on a long-term basis.[52]

Sustainability and regeneration

Academic and planning literature refer to the term 'sustainability' as maintaining the integrity of an ecosystem over a long period of time by keeping the consumption of natural resources within the limits of their replenishment.[53] Development is often associated with sustainability, and is the process of change that aims to improve the living conditions of a given population.[54] Although sustainable development usually refers to planning and building of new urban areas in most literature, it is an essential base to inform the sustainable regeneration of existing urban areas.

Whilst there are many definitions of sustainable development, these can be categorised as either human or environmentally oriented, and can rely on technology or ecologically based solutions (Table 1.1).[55] Yet, most recent emphasis has been placed on taking a hybrid approach where both human issues and the environment have the same degree of importance, and solutions are merged. This stance is judged to be more appropriate for regeneration because of its flexibility. For instance, existing permanent structures such as buildings may be improved through technology, whilst changes to other structures such as outdoor areas may be part of an ecologically considered design. The latter term is used to describe a design which seeks to reduce the negative impact on the environment by relying on the internal cycle processes of the site.[56] It is not expected that a sustainable design will reach a perfectly stable equilibrium nor sustain habitats indefinitely. It is rather a flexible solution that enables some degree of stability allowing for continuous changes and adaptations according to the needs of the users and the environment.

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52 Homes and Communities Agency, 'Regeneration and Renewal', *Growth and Renewal*, (2009) <http://www.homesandcommunities.co.uk/regeneration_renewal> [accessed June 2009] (para. 2 of 6).

53 Hugh Barton, Marcus Grant and Richard Guise, *Sustainable Setlements: A Guide for Planners, Designers, and Developers*, (Bristol: University of West England, 1995), p. 8. See also Richard T.T. Forman, *Land Mosaics: The Ecology of Landscapes and Regions*, (New York: Cambridge Press, 1995), p. 40.

54 Peter S. Brandon and Patrizia Lombardi, *Evaluating Sustainable Development*, (Oxford: Blackwell, 2005), p. 9.

55 Stephen M. Wheeler, *Planning for Sustainability: Creating Livable, Equitable, and Ecological Communities*, (Abingdon: Routledge, 2004; repr. 2006), pp. 23-26.

56 Sim Van der Ryn and Stuart Cowan, p. 18.

Table 1.1 Some definitions for sustainable development

Definition	Source	Date	Orientation	Focus
"That which meets the needs of the present without compromising the ability of future generations to meet their own needs"	United Nations, Brundtland Report	1987	Human	Technological
"Any form of positive change which does not erode the ecological, social, or political systems upon which society is dependent"	William Rees, Canada, academic	1988	Human	Both
It is conservation, regeneration, and stewardship	Sim Van der Ryn, USA, academic	1994	Environmental	Ecological
"It is about maintaining and enhancing the quality of human life – social, economic and environmental – while living within the carrying capacity of supporting eco-systems and the resource base"	Hugh Barton, UK, planner and academic	1995	Hybrid	Both
"It is about facilitating improvement without jeopardizing what exists already"	Peter Brandon & Patrizia Lombardi, UK, academic	2005	Hybrid	Both
"That which improves the long-term health of human and ecological systems"	Stephen Wheeler USA, academic	2005	Hybrid	Both
"It enables all people throughout the world to satisfy their basic needs and enjoy a better quality of life, without compromising the quality of life of future generations"	DEFRA, UK, governmental	2009	Human	Both

Sources: Our Common Future; Ecological Design; Sustainable Setlements: A Guide for Planners, Designers, and Developers; Evaluating Sustainable Development; Planning for Sustainability: Creating Livable, Equitable, and Ecological Communities; Sustainable Communities.

In these terms, the definition given by planner and academic Hugh Barton is practical and robust and is therefore used in the present study as a base, focusing on the ecological and social aspects of sustainability. Adding to that definition, sustainable regeneration is also about establishing actions and design qualities that support social and ecological re-growth for a prolonged period of time. Therefore, social sustainability is defined for this study as the establishment of actions, processes, and spaces that allow the development and continuous revitalisation of a stable community who care for and enhance their local eco-systems.[57] Ecological sustainability is defined as the

[57] Maggie Roe, 'Social Dimensions', in *Landscape and Sustainability*, 2nd edn., ed. by John F. Benson and Maggie Roe, (Oxon: Routledge, 2000; repr. 2007), pp. 58-83 (pp. 59-60). See also Homes and

maintenance, enhancement, and continuous revitalisation of the existing eco-systems reducing the inputs and outputs of resources.[58]

Current guidance for social and ecological sustainability

In order to establish a set of adequate sustainable indicators for assessing regeneration in the case studies, the literature was reviewed for guidance on sustainable housing development and communities. This included sources from different countries in order to establish a robust framework of sustainability issues from different geographical locations and climates. Three main sources were found. The first two were academic and policy-led, and the third consisted of hybrid systems that were developed from the former two (Table 1.2). Although all address similar themes, their structure and emphasis vary. Yet it is hybrid systems that are currently being used most by developers.

Table 1.2 Main types of indicators and assessments

		Hybrid systems	
Policy-led	Academic-led	Criteria systems	Life cycle assessments
What makes a Community Sustainable? (UK)	Residential Landscape Sustainability: A Checklist Tool (UK)	Green Star (Australia)	Envest (UK)
Sustainable Communities: Building for the Future (UK)	Planning for Sustainability: Creating Livable, Equitable, and Ecological Communities (USA)	BREEAM (UK)	Green Guide to Specification (UK)
A toolkit of indicators of sustainable communities (EU)	The Social Dimensions of landscape Sustainability (UK)	SAP (UK)	BEES (USA)
Sustainability Checklist for Developments (UK)	Sustainable settlements : a guide for planners, designers, and developers (UK)	LEED and HERS (USA)	BEAT (DK)
		NABERS (Australia)	Athena (Canada)
		NatHERS (Australia)	Equer and Team (France)
		GBTool (Canada)	Eco-Quantum (Netherlands)
		EcoProfile (Norway)	KCL-ECO (Finland)
		Environmental Status (Sweden)	
		SSI: Guidance and performance benchmarks (USA)	

The hybrid systems were integrated by the planning bodies of different countries to provide a practical and sustainable basis for developers in the design of new homes. Academics such as Adrian Pitts and Carl Smith have provided a comprehensive review of these assessments.[59] These hybrid assessments are currently being encouraged in the USA and Australia as the basis upon which developers can obtain certification. In other places such assessments are now mandatory, such as in the UK where it is intended to

Communities Agency, 'Sustainable Communities Wheel', *Introduction to the Components of a Sustainable Community*, (2004) <http://citizenship.homesandcommunities.co.uk/sustain.php> [accessed August 2010] (para. 4 of 12).

58 Sim Van der Ryn and Stuart Cowan, p. 1. See also Hugh Barton, Geoff Davis, and Richard Guise, p. 12.

59 Adrian Pitts, *Planning and Design Strategies for Sustainability and Profit*, (Oxford: Architectural Press, 2004), pp. 84-95. See also Carl Smith, Andy Clayden, and Nigel Dunnett, *Residential Sustainability: A Checklist Tool*, (Oxford: Blackwell, 2008), pp. 99-106.

reach a carbon emissions reduction target of a reduction of 34% from 1990s levels by 2020.[60]

There are two types of hybrid assessment, criteria systems and life cycle assessments. The former assigns points to a number of issues that are added to calculate a final score and is used mainly for new developments. These have recently included small changes to allow the assessment of the built fabric of existing buildings. Life cycle assessments provide for the selection of materials, design, and utility options to calculate the impact of specific combinations and are used for new developments. [61]

Comparing the academic, policy, and hybrid assessments, those coming from academic literature were much more robust and fully addressed the environmental impacts of landscape and social sustainability issues (Table 1.3, Table 1.4, and 1.5). However, these were usually approached separately. In comparison, policy assessments would often be poor at encompassing the various issues required to achieve sustainability and sometimes were not specific about the ways in which their desired goals might be achieved. Lastly, hybrid criteria systems lacked flexibility in allowing a diversity of solutions sometimes leading to unsustainable solutions. In part, this has been addressed by the LEED and Green Star criteria assessments by providing scoring sections for innovative design.

The only hybrid system that was found to be comparable to academic indicators was the set of guidance and performance benchmarks from the Sustainable Sites Initiative which is to be published in 2009 (Table 1.6). It is currently in a consultation process and is to be incorporated in the next version of the LEED framework for new housing areas in 2011, with a similar weighting system. This guidance offers a novel approach to the encouragement of social interaction, through general design recommendations in respect of outdoor areas, and to the use of sustainable urban drainage systems as part of a site's amenities. It also provides for the introduction of re-certification as a way of assessing the development once plants and a maintenance scheme have been established, which should be an effective monitor of the long-term effectiveness of the design.

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[60] Directgov, 'How the UK will meet CO_2 emissions targets', *Newsroom* <http://www.direct.gov.uk/en/Nl1/Newsroom/DG_179190> [accessed July 2009] (para. 1 of 12).

[61] G. Assefa, M. Glaumann, T. Malmqvist, and others, 'Environmental Assessment of Building Properties-Where Natural and Social Sciences Meet: The Case of EcoEffect', *Building and the Environment*, 42 (2007), 1458-1464 (p. 1459). See also Adrian Pitts, pp. 84-95.

Table 1.3 Academia-led indicators for sustainable and community development

Main categories obtained	Applicable indicators			
	Residential Landscape Sustainability: A Checklist Tool (UK)	Planning for Sustainability: Creating Livable, Equitable, and Ecological Communities (USA)	The Social Dimensions of landscape Sustainability (UK)	Sustainable settlements : a guide for planners, designers and developers (UK)
Reducing carbon emissions	Solar passive design Wind shelter External drying area Improve pedestrian-cycle movement	Compact urban form Close loop-resource cycle		Access to facilities Connectivity of the area Improving pedestrian-cycle movement and public transport Reduce energy use and increase renewables use Shelter from wind and solar passive design
Biodiversity	Protect and conserve existent habitats and create new ones Improve connectivity Build awareness	Conservation and restoration		Protect and conserve existent habitats and create new ones for species richness
Reducing water use	Reduce and reuse	Close loop-resource cycle		Reduce consumption, re-use, and recycle
Reducing pollution	Design and specifications to reduce waste, as well as on- and off-site pollution Reduce water run-off			Reducing water run-off Mitigating air pollution Reduce, re-claim, reuse, and recycle
Materials selection	Embodied energy and life cycle of materials Design to reduce waste and reduce failure of plants	Close loop-resource cycle		Local and durable materials with low embodied energy
Community development	Access to and variety of amenity areas	Equity	Cultural diversity Enhance quality of life Lifestyle and behaviour towards sustainability Stewardness and care Social integration Equity	Local historical references
Community participation	Facilitate food production	Environmental justice	Participation opportunities Decision making Consensus and discussion structures Flexibility	Mix of housing types and sizes

Sources: Carl Smith, Andy Clayden, and Nigel Dunnett, (2008); Stephen M. Wheeler, (2007); John F. Benson and Maggie Roe, (2007); Hugh Barton, Marcus Grant and Richard Guise, (1995).

Table 1.4 Policy-led indicators for sustainable and community development

Main categories obtained	Applicable indicators			
	What makes a Community Sustainable? (UK)	Sustainable Communities: Building for the Future (UK)	A toolkit of indicators of sustainable communities (EU)	Sustainability Checklist for Developments (UK)
Reducing carbon emissions	Safe communities Well-connected	Adapt to local climate Maximum efficiency of energy use	Reduction of crime and antisocial behaviour Access to facilities and services	Access, safety, and quality design of outdoor areas Improve transport options, proximity to facilities, and pedestrian-cycle use Use renewable energy
Biodiversity		Improve health and diversity of local ecosystems		Conservation, enhancement, and creation of new habitats
Reducing water use			Maximum efficiency of water use	Reduce and re-cycle water
Reducing pollution		Zero waste and pollution		Reduce water run-off and waste
Materials selection				Embodied energy and environmental impact Reduce, reclaim, re-use, and recycle
Community development	Fair for everyone Well-served	Care and territoriality Adapt to local context Health and wellbeing	Improvement of image Good housing quality, design, and layout Improve community cohesion	Enhance community identity Mix of facilities for all
Community participation	Active and inclusive communities Thriving communities	A flourishing local economy	Participation opportunities Demand for housing	Community involvement Flexibility

Sources: DEFRA (2006); ODPM, (2003); Derek Long & Mary Hutchins, (2003); Deborah Brownhill and Susheel Rao, (2002).

Yet, although the hybrid criteria systems are still being revised and improved, coverage of landscape and social issues is still limited, particularly in relation to regeneration of medium- or high-rise housing areas. For instance, the general LEED assessment has only recently addressed the life span and embodied energy of existing buildings, regional-climate variations, and historic preservation. Also, it is not until 2011 that it will address issues related to social equity.[62] The neighbourhood development assessment of LEED is limited by the ideas of New Urbanism. These rely on small housing quarters based on road grid systems, which are typical of the USA, and fragment pedestrian communal areas. BREEAM- and Green Star-Multi-residential include assessment of communal indoor and outdoor areas but in a very general manner. It was not possible to find one type of assessment that would be completely adequate for the present study.

[62] Amanda Sturgeon, 'Hello LEED v3', *Architecture Week*, 423 (2009) <http://www.archweek.com/2009/0415/news_1-1.html> [accessed April 2009] 1-2 (p. 2).

Table 1.5 Hybrid system assessments for housing areas and applicable issues

Green Star Multi-residential (Australia)	BRE Environmental and Sustainability Standard: Multi-residential (UK)	LEED for Neighborhood Development (USA)*
Management	Management	Smart location and linkage
Occupants Guide	Environmental and waste management	Close-by mixed facilities
Environmental and waste management	Consultation with residents	Close-by and various options of public transport
Visual meters	Keeping of historical buildings of interest as part of the local identity	Protect, enhance, and restore valuable habitats
Energy	Design for safety	Encourage pedestrian and cycle movement
Reduce energy loss in heating and cooling	Energy	Neighbourhood pattern and design
Minimise energy-use with energy-efficient equipment	Reduction of energy loss through heating	Foster connectivity with adjacent communities
Transport	Visual meters	Enable various types and sizes of dwellings
Fuel efficient transport	Minimise energy-use with energy-efficient equipment	Promote a mixed income population
Improvement of cyclist facilities	Use of renewable energy	Reduce parking footprint
Improvement of public transport	Provision of outdoor areas for drying clothes	Enhance pedestrian areas
Close-by mixed facilites	Transport	Enhance public transport facilities and services
Water	Improvement of public transport	Close-by access to robust outdoor areas for diverse leisure and social activities
Water-efficient appliances	Close-by mixed facilities	Encourage continuous community involvement
Reduction of potable water use for irrigating and cooling	Improvement of cylist facilities	Promote local food production
Materials	Discourage car use	Green construction and technology
Recycling of waste	Water	Reduce energy loss and use in buildings through passive solar design, efficient appliances
Re-use of buildings	Use of water-efficient appliances	Reduce heat-island effect through green roofs
Low-embodied energy materials	Reduction of potable water use by reusing rain and gray water for irrigating and flushing	Use renewable energy sources on- and off-site
Reclaimed and recycled materials	Visual meters	Efficient design to reduce waste and pollution
Design to reduce waste and improve longevity	Materials	Minimise water use in buildings with efficient appliances and water re-use
Land use & ecology	Low-embodied energy materials	Reduce potable water use for irrigation through adequate landscape design and gray water use
Conservation and enhancement of existent habitats	Materials of less environmental impact, more durability, local, and of better performance	Use low-embodied energy materials
A robust design of outdoor communal areas for passive and active activities	On-site reuse of materials	Reuse buildings and materials on-site
Emissions	Reuse of existent buildings	Use reclaimed and recycled materials
Minimise stormwater run-off, watercourse pollution, and discharge to sewerage	Design for ensuring longevity	Provide recycling facilities
	Land use & ecology	Preserve local historic heritage as part of site's identity
	Protect, conserve, and enhance existent habitats and create new ones	Reduce stormwater run-off
	Waste	
	Design and management to reduce waste	
	Use of reclaimed and recycled materials	
	Waste recycling facilities	
	Pollution	
	Reduce the use of chemicals and ensure adequate handling	
	Health and wellbeing	
	Access to a sheltered outdoor area for leisure or social activities	

Sources: Green Building Council Australia, (2009); BRE Environmental Assessment Method, (2008); U.S. Green Building Council, (2007).

* Following principles of Transit Oriented Developments and Compact Cities that seek to give preference to pedestrian and cycle movement with public transport nodes within walkable distances and mixed-used developments. *Source:* Peter Calthorpe, (1993).

Table 1.6 Main issues used in the hybrid system assessment of the Sustainable Sites Initiative for landscape performance to complement LEED assessment

Preserve existing resources and repair damaged systems
Plan for sustainability in the landscape design
Protect and restore site processes and systems
Build strong communities and a sense of stewardship
Conduct practices that reduce the environmental impact of materials used
Minimize the effect of constructed related activities
Establish maintenance practices that reduce inputs and outputs on the long-term

The selection of the main indicators for this study

A set of ecological indicators was first integrated since they were predominant in most of the existing sustainable assessments. Guidelines for site planning for new developments provided an initial broad set of ecological principles including preservation of distinctive geological features, preservation of flora and fauna, fertile soils, clean water, climate and air quality, and human safety.[63] Comparing these guidelines with the research towards new housing developments and policy guidelines in the UK strategy for sustainable development showed they preserved similar key elements. They were different in their arrangement of these elements by organising them in different groups or headings to provide a practical assessment suitable for planners and developers (Table 1.5 and Table 1.7).

For instance, reducing use of mineral resources was made a separate indicator in some assessments due to their potential high energy use, pollution of the environment, and damage to health.[64] Other changes replaced the air quality category for one addressing the reduction of pollution which provided a more efficient approach by grouping several related issues. As a next phase, the available indicators of these and other international assessments were compared as well as the issues under each that would allow integrating a robust assessment for this study. Since the guidelines provided by Hugh Barton and Carl Smith were found to be robust in their approach towards housing developments and their landscape focus, they were used as the backbone base for structuring the ecological indicators.

[63] 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), pp. 19-30.

[64] Hugh Barton, Geoff Davis, and Richard Guise, p. 19.

In this study, the transport and energy category are kept together following the objective of reducing energy use and carbon emissions. The rest of the indicators used are similar: increasing biodiversity, reducing water use, reducing pollution, and selection of materials according to their lifecycle. Some of the issues for each indicator were then complemented to integrate important elements for communal outdoor areas in medium-rise housing. Additional issues under some of the indicators headings included: minimizing energy use through communal facilities and indoor gadgets and increasing renewable energy use from possible projects suitable in this type of housing areas; increasing awareness of residents to reduce environmental impact; and microclimate considerations due to the presence of different types of block layouts.

Once ecological indicators were established, the social indicators were structured. From revising the assessments, the recommendations were poor with few, broad, or loosely structured indicators particularly in regard to the landscape (Table 1.8). In comparing them, issues to address referred to three main areas that were recurrent: the way in which the community could be strengthened; how residents could influence changes in their community; and lastly the enhancement of the environment to improve the quality of life of residents and support social interaction of residents. Social cohesion, social inclusion-exclusion, community development, and participation were terms that were used in policy and research literature to achieve them. However, the meaning and scope of these terms was often interchanged or could differ among disciplines and policies.

Social cohesion may be understood in two ways. Firstly, it is defined as the processes which allow groups of residents from different backgrounds, race, cultures, beliefs, or others to come together and get on well to form part of a community as a whole. It is achieved by the reduction of disparities, inequalities, and social exclusion as well as developing a sense of belonging, recognition, and participation. This approach was not adequate for the focus of this study to address the possible contribution of the landscape towards community life. Issues of equality and social exclusion, where residents may not participate of society due to being in a disadvantaged position as a result of disability, ethnicity, poverty, and others, were considered to be beyond the scope of the research.[65]

[65] Carey Oppenheim, *An Inclusive Society: Strategies for Tackling Poverty*, (London: Institute for Public Policy Research, 1998) p. 14.

Table 1.7 Ecological indicators of relevant assessments for housing areas and applicable issues

Residential Landscape Sustainability: A Checklist Tool (UK)	Sustainability Checklist for Developments (UK)	Sustainable settlements : a guide for planners, designers and developers (UK)
Energy: buildings	Land use, urban form, and design	Atmosphere and climate
Reduce energy inputs and CO_2 emissions	Encourage an efficient use of land	Reduce CO_2 and other emissions
Passive solar gain design	Site criteria	Reduce energy use in transport
Summer shading	Reusing sites	Reduce energy use in buildings
Wind modification by landscape features	Form of development	Increase carbon fixing
External drying space	Open space	
	Density	Biodiversity
Transport	Mix of uses	Conserve extent and variety of habitats
Provide a convenient & convivial design	Aesthetic aspects	Protect rare or vulnerable species
Layout of transport network to favour pedestrians and cyclists		
Adequate design of planting	Transport	Air
	Reduce congestion and air pollution	Maintain/enhance local air quality
Pollution	Public transport provision	Reduce pollution
Specification of materials to reduce pollution	Reduced and flexible parking	
Contractual obligations	Facilities for pedestrians and cyclists	Water
Timber detailing	Provision of local employment	Improve quality of water courses and bodies
Reduction of surface runoff	Proximity of local facilities	Protect ground water and supply
Use of reclaimed metal elements		
Use of recycled plastic elements	Energy	Land
Use of recycled/reclaimed plastic nursery containers	Reduce CO_2 emissions	Maintain soil fertility
	Community-wide energy production	Protect/recover land from erosion and contamination
Materials	Energy-efficient street lighting	
Materials' use of less environmental impact		Mineral resources
Sources of external timber	Reduce impact of individual buildings	Reduce consumption of non-renewables
Pre-treatment of timber		Protect/develop potential for renewables
Reduced impact metal, plastic, and stone, cement and aggregates	Natural resources	
Use of local materials	Reduce, re-use, and recycle resources	Buildings
Landscape hardworks and softworks detailing	Improve air quality through planting	Provision of appropriate residential, commercial, and social built space
Landscape establishment	Use of locally reclaimed materials	
Environmental rating of materials	Water conservation	Infraestructure
	Sustainable drainage use	Provision of needed and safe transport and service infraestructure
Water	Composting	
Reducing water consumption		Open space
Alternative sources of water	Ecology	Provision of accessible and appropriate open space
Mulching	Enhancement of existing site	
	Conservation of habitats	Aesthetic quality
Land use and ecology	Increase diversity through planting	Enhance sensorial experiencing
Conservation and enhancement of existing habitats	Community	Preserve sites of architectural or historical interest
Connectivity of green features	Involvement opportunities	
	Strengthen identity	
Health and well-being	Increase sense of safety	
Provision of private and communal leisure areas and allotments	Business	
	Support local businesses	
	Employment and training opportunities	

Sources: Carl Smith, Andy Clayden, and Nigel Dunnett, (2008); Deborah Brownhill and Susheel Rao, (2002); Hugh Barton, Marcus Grant and Richard Guise, (1995).

Table 1.8 Social indicators of relevant assessments for housing areas and applicable issues

What makes a Community Sustainable? (UK)	Sustainable Communities: Building for the Future (UK)	A toolkit of indicators of sustainable communities (EU)
Active, inclusive, and safe Promotion of equity, cohesion, identity, care, and diversity of the community	Support a flourishing local economy to provide jobs and wealth	Positive demand for housing Low turn-over and vacancies
Well-run Fostering participation and stewardship	Strong leadership to respond positively to change	Positive image of the community
Environmentally sensitive Minimising climate change and provision of pleasant outdoor areas	Effective engagement and participation by local people, groups, and businesses Planning and design Long term-stewarship Active voluntary sector	Increase sense of safety
Well-designed and built Enhancing site character and supply of robust and sufficient outdoor areas	Provide a safe and healthy local environment Well-designed public and green space	Reduce social exclusion Poverty, disability, and long-term unemployment
Well-connected Public, cycling, and pedestrian transport	Provide an efficient housing development Sufficient size, scale, and density Minimise use of resources	Provide access to employment, facilities, services, and public transport
Thriving Supportive to local economy	Supply efficient public transport	Provide quality built and outdoor environment No vandalism Lowering noise pollution Adequate maintenance
Well-served Sufficient and accessible basic, training, and leisure services	Building of flexible dwellings	Supply of quality dwellings Minimum standards
Fair for everyone Considerate to future generations	Integrating a mix of house types and tenures	Support community cohesion Attendance to community events Extent of community spirit or friends in the area
	Support quality local facilities Health and educational Training Community and leisure	Support community mix Diverse tenures and housing types People of diverse backgrounds
	Support a diverse local culture Pride for the community Cohesion	
	Encourage a sense of place	

Sources: DEFRA (2006); ODPM, (2003); Derek Long & Mary Hutchins, (2003).

Secondly, social cohesion is also defined as an end result, with strong social relations, interactions, and ties between new and existing residents from processes that promote social integration, also known as social capital.[66] The latter is the glue that holds a community together through the individual connections and social networks that exist in a community based on a level of trust and shared values that facilitate mutual cooperation.[67] It is addressed by facilitating empowerment, participation and support of

[66] Geraldine Blake, John Diamond, Jane Foot, and others, 'Community Engagement and Community Cohesion', *Joseph Rowntree Foundation*, (2008), <http://www.jrf.org.uk/sites/files/jrf/2227-governance-community-engagement.pdf> [accessed September 2010] 1-94 (p. 13). See also Regina Berger-Schmitt, 'Social Cohesion as an Aspect of the Quality of Societies: Concept and Measurement', *European Commission*, (2000), <http://www.gesis.org/fileadmin/upload/dienstleistung/daten/soz_indikatoren/eusi/paper14.pdf> [accessed September 2010] 1-31 (pp. 3-6).

[67] United Nations, 'Definition of Basic Concepts and Terminologies in Governance and Public Administration', *Economic and Social Council*, (2006), <http://unpan1.un.org/intradoc/groups/public/

social networking, association in formal and informal groups, sharing norms and values, having trust, safety, and a sense of belonging.[68] Due to the various ways in which social cohesion may be understood, social integration was used instead to explore the way in which the landscape supported social networks in the community, in conjunction with community development, and participation as separate terms which were less vague in the social and policy literature.

Community development is "the strengthening of the social resources and processes in a community, by developing those contacts, relationships, networks, agreements, and activities outside the household that residents themselves identify will make their locality a better place in which to live and work".[69] Issues to address include providing the means by which residents may meet and learn from each other, developing a sense of belonging, trust, and care. They may be achieved by improving the image and fostering pride with the housing area, strengthening processes for sharing ideas and common values, providing areas for personalization, encouraging actions of care, and supporting a variety of ways for residents to know each other. This approach provided a suitable term that would allow exploring ways of strengthening the community.

Lastly, community participation is the process by which residents become actively involved in their community and any given project. It allows residents to participate in deciding and making decisions to enable changes that improve their quality of life in the present and the future as well as taking ownership of developed projects.[70] This is achieved by providing residents short- and long-term participation opportunities with varying degrees and ways of involvement.[71]

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documents/un/unpan022332.pdf> [accessed September 2010] 1-15 (p. 14). See also Robert D. Putnam, 'Bowling Alone: America's Declining Social Capital', *Journal of Democracy*, 6.1 (1995), <http://muse.jhu.edu.eresources.shef.ac.uk/journals/journal_of_democracy/v006/6.1putnam.html> [accessed September 2010] 65-78 (p. 67).

68 Ray Forrest and Ade Kearns, 'Social Cohesion, Social Capital, and the Neighbourhood', Urban *Studies*, 38 (2001), <http://www.swetswise.com.eresources.shef.ac.uk/FullTextProxy/swproxy?url=http%3A%2F%2Fusj.sagepub.com%2Fcgi%2Freprint%2F38%2F12%2F2125.pdf%3Fxdata%3D143167002135&ts=1285255411444&cs=1236346712&userName=8080034.ipdirect&emCondId=12173&articleID=42565627&yevoID=2591847&titleID=207987&referer=1&remoteAddr=143.167.2.135&hostType=PRO&swsSessionId=7pyoilC3lf2Y-NvEaH5V7g**.pasc2> [accessed September 2010] 2125-2143 (p. 2140).

69 David N. Thomas, 'A Review of Community Development', *Joseph Rowntree Foundation*, (1995) <http://www.jrf.org.uk/sites/files/jrf/sp5.pdf> [accessed September 2010] 1-4 (pp. 2-3).

70 John Abbott, *Sharing the City: Community Participation in Urban Management*, (London: Earthscan, 1996), pp. 32-38. See also David Wilcox, *The Effective Guide to Participation*, (Brighton: Delta Press, 1994), pp. 4 and 31.

71 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, pp. 19-21.

Following this analysis of terms, community development, community participation, and social integration were used as the main indicators to guide social sustainability. Community refers to a group of people with common characteristics or interests that bonds them together.[72] The issues that were addressed for each indicator largely follow these definitions, although some were adjusted were necessary to avoid repetition. For instance, a sense of belonging, safety, and shared values were addressed as part of community development. Social integration focused on the development of social networks supported by the arrangement of the landscape. This separation of issues was also based on the proposed social dimensions of landscape architect Maggie Roe.[73] She suggests the two main dimensions of social structures and social learning, where the former coincides largely with community participation issues along with equality and social inclusion and the latter with community development.

The issues which may support the development of social interaction of residents in outdoor areas as part of strengthening networks that lead to social integration were poorly indicated in the social and policy literature. Therefore, literature on design guidelines that encouraged the presence of people and social interaction was followed to structure a set of relevant issues. These issues were based on recognised work by the American social researcher William Whyte, British architect Ian Bentley and the Danish architect Jan Gehl, which were then complemented with other research. Other issues addressed as part of this indicator were the support of the landscape arrangement for establishing community recognition and making friends, as evidence of shared support and trust.

Existent research towards social and ecological sustainability

The following literature search is based on existing housing regeneration experiences that have been made with a sustainable landscape emphasis. Each is discussed for the way in which it has contributed to the preliminary identified issues of the sustainable indicators or new ones that have been stated to be significant. Information searched included international research papers, magazines, BBC radio, international case studies from planning guidance or of international recognition such as from the European Union, relevant theses, landscape or architect designers known for their community-oriented focus, and UK organizations working in related issues such as CABE and the

[72] Graham Crow and Graham Allan, *Community Life: An Introduction to Local Social Relations*, (New York: Harvester, 1994) p. 3.

[73] Maggie Roe, p. 59.

Joseph Rowntree Foundation. Particular searches for papers included various key words, authors, and journals for which their references and other citations were followed to find relevant research. Key words and journals' titles used were those related to or a combination of terms for medium-rise, housing, landscape, the environment, behaviour, planning, management, community, participation, and social sciences as well as renovation, regeneration, and renewal.

Social sustainability

Although community development, participation, and social integration should be addressed altogether, the existing studies focus either on community development and participation or the elements of design promoting frequent and longer use for leisure or socializing. It was only recently, with the introduction of social sustainability in the agenda of governments, that one began to find both issues together in planning recommendations for housing areas.[74] However, in these the main weight of attention usually leans towards the former issues rather than on design. Also, academic, policy, and planning guidance put forward the landscape as an important element for improving the quality of life of residents. Unfortunately when it comes to practice, landscape takes a secondary role, evident in the often inadequate funding that is allocated to work for revitalising the community.

For community development, the literature shows that materials used in outdoor areas are an integral part of the housing image. An example of this is the housing area of Byker, a low- and medium-rise social housing area in Newcastle, UK built in the mid 1970s; it is significant for the way in which landscape arrangement supported community life through having well defined realm distinctions and facilitating participatory processes for residents in its design (Figure 1.1). Many of the materials for outdoor areas that required maintenance were replaced throughout the years by lower-quality ones which has had a negative effect on the image of the housing area.[75] A more up-to-date comparison was made in the new private low-rise housing area of Staiths South Bank in Gateshead, UK where landscape materials were lowered in quality in the

[74] Communities and Local Government, 'Sustainable Communities', *Communities and Neighbourhoods* <http://www.communities.gov.uk/corporate/help/glossary> [accessed April 2009] (para. 44 of 49).

[75] Newcastle City Council, 'Byker: Newcaste Upon Tyne Urban Design Competition', *Urban Context Study* (Newcastle: City Council, 2004) p. 53.

second phase which is already showing signs of disregard by residents.[76] Therefore, it is not possible for residents to identify with an area of which they cannot be proud of.

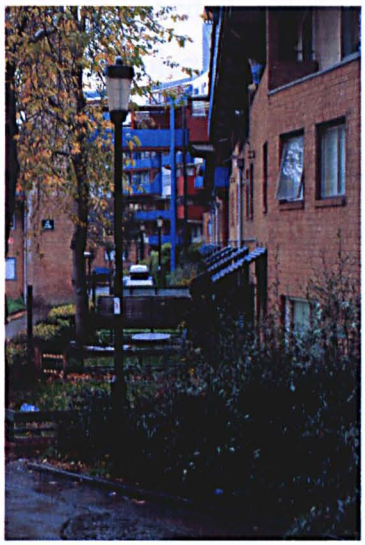

Figure 1.1 Realms defined by planting to support community contact in the housing area of Byker (photograph by author)

On the other hand, recent research has also shown that identity may also be strengthened through integrating 'heritage' objects or environments of value as part of the regeneration of a housing area. Evidence may be found in Byker where residents stated that the arrangement of outdoor areas and houses as well as the history of the development has made the housing area significant for them.[77] Unfortunately the lack of consideration and respect for the existing social structure deteriorated community networks. Before the regeneration, the community was divided into lower and upper parts, where the former were less affluent families and the latter were better-off families. That pattern was disrupted when residents were relocated into the newly designed Byker. In addition, the housing area was changed from being a private to a social one.[78] This led to the introduction of problem families into the area, disregarding its already weakened social structure.

Other studies in regard to the use of valued environments as part of regeneration projects have shown that whilst this focus has been attempted, it is usually restricted to the values as perceived by professionals. In the regeneration of public spaces in the city

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[76] Brian Clouston, 'Just a Phase?', *Landscape*, 55 (2008) 8-21 (p.21).

[77] John Pendlebury, Tim Townshend, and Rose Gilroy, 'Social Housing as Heritage: The Case of Byker, Newcastle upon Tyne', in *Valuing Historic Environments*, ed. by Lisanne Gibson et. al., (Surrey: Ashgate, 2009), pp. 179-200 (pp. 193-194).

[78] Pär Gustafsson, (Landscape designer, Byker) Interview by C. Martínez, April 2007, transcript 19, Alnarp, Sweden.

of Bethlehem-Palestine, the regeneration was carried out focusing on the historic period of the time of Jesus to ensure tourism's economic benefits. As a result, the regeneration only portrayed the past identity of the residents' culture without integrating current heritage objects valued by the community upon which future ones may be based.[79] Similarly in Coyoacan, one of the most important historical villages in Mexico City, legislation and poor community participation opportunities have failed to integrate the residents' cultural traits and traditions in regeneration efforts favouring instead tourist attractions and economic income.[80]

Encouraging social diversity through mixed tenure is recommended by current guidance in the UK and USA on sustainable communities as part of community development.[81] In practice, there are few successful examples such as the medium-rise housing BedZED and the Greenwich Millenium Village in London, UK which have an approximate 10% to 25% of social housing. Yet studies indicate that sharing similar values and ideas is more important for socializing than socio-economic heterogeneity.[82] This suggests that residents living in existing social housing areas may be brought together by the implementation of ecological projects.

Some studies claim that sharing these types of ideas is a result of the particular lifestyle that residents living there already had chosen before moving in as suggested for New Urbanism schemes and the low-rise private Village Homes in Davis, USA. Built at the end of the 1970s, the latter is known for its community-oriented design, active residents' participation, its residents' management scheme, a sustainable urban drainage system, and communal food produce (Figure 1.2). However, these choices and ideas may also be learned through the introduction of ecological projects or through environmental groups such as eco-teams, encouraging a change of lifestyle and behaviour, but also having other benefits such as reducing turnover of residents.

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79 Jane Handal, 'Rebuilding City Identity through History: The Case of Bethlehem-Palestine', in *Designing Sustainable Cities in the Developing World*, ed. by Roger Zetter et. al., (Hampshire: Ashgate, 2006), pp. 51-68 (pp. 54-55).

80 Yanet Lezama-López, 'Involving Local Communities in the Conservation and Rehabilitation of Historic Areas in Mexico City: The Case of Coyoacan', in *Designing Sustainable Cities in the Developing World*, ed. by Roger Zetter et. al., (Hampshire: Ashgate, 2006), pp. 85-102 (pp. 98-99).

81 Nick Bailey and Tony Manzi, 'Developing and Sustaining Mixed Tenure Housing Developments', *Joseph Rowntree Foundation*, (2008) <http://www.jrf.org.uk/sites/files/jrf/2295.pdf> [accessed July 2009] 1-12 (p. 1).

82 Jo Williams, 'Designing Neighbourhoods for Social Interaction: The Case of Cohousing', *Journal of Urban Design*, 10 (2005) 195-227 (p. 212).

Figure 1.2 Communal gardens and allotments are managed and maintained by residents in Village Homes (image from Mark Francis, *Village Homes: A Community by Design*, 2003, p. 6)

For instance, ecological projects that were introduced in the city of Albertslund in Denmark with the involvement of residents have shown a reduction in the turnover of residents. In the sustainable regeneration of the leasehold medium-rise Hedebygade block in Copenhagen, Denmark the contrary occurred.[83] The regeneration included the landscape and buildings with modifications and projects to reduce and measure energy and water consumption, use renewable energy, and recycling of waste among other things for which residents' cooperation was essential. Having residents be part of a consultation only, led to an increased turnover and consequently less environmental care and responsibility from residents. It then appears that ecological projects in housing regeneration may provide an opportunity to strengthen the community apart from providing opportunities for participation.

Research shows that involving the community is critical if regeneration programmes are to be effective. They should have short- and long-term participation schemes in which residents are the main managers of implemented strategies providing residents with a level of control on decisions made towards their outdoor areas.[84] There are usually two phases for involvement: one occurs during the regeneration programme and the other after the first finishes, enabling long-term resident management where ideally the call on outside resources is low or not necessary. Usually there is a strong input into the first

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[83] Timothy Beatley, *Green Urbanism: Learning from European Cities*, (Washington, D.C.: Island Press, 2000), p. 312. See also PETUS, 'Evaluation of the Hedebygade Block: A project on Urban Ecology', *Building and Land Use Case Studies*, <http://www.petus.eu.com/graphics/case_42.pdf> [accessed July 2009] 1-10 (p. 6).

[84] DETR, 'Involving Communities in Urban and Rural Regeneration', *Cities and Regions*, (1997) <http://www.communities.gov.uk/archived/general-content/citiesandregions/involvingcommunities/> [accessed July 2009] (para. 3 of 44). See also Joseph Rowtree Foundation, 'Developing Effective Community Involvement Strategies', (1999) <http://www.jrf.org.uk/sites/files/jrf/F169.pdf> [accessed July 2009] 1-8 (p. 1).

phase whilst the second is not fully established or continued, leading to the decay of regeneration efforts.[85] In some of these cases, involvement is no longer re-started and problems in outdoor areas are addressed by removing objects of conflict.[86] Therefore it is important that projects of the second phase are planned during the first phase so as to have them ready to be launched in the second phase.

The integration of long-term management schemes in partnership with local authorities and funding bodies may include tenant management, Friends groups, user groups, trusts, or others. Long-term management with the involvement of residents can provide a higher quality of outdoor areas as well as reducing costs for local authorities in charge of the outdoor areas. Unfortunately, it has been shown that opportunities for community involvement are few due to paternalistic attitudes using top-down decision making. Also management services are deficient because of poor coordination between departments of local authorities providing the services.[87]

In some recent housing regeneration efforts in the Netherlands, coordination has been improved through a scheme named the Relay Race Model. It reduced the time in delivering the regeneration project saving 40% from the funding available that was required for the development of social projects. The achievement was made by increasing the efficiency of coordination between stakeholders delivering the regeneration through defining a set of steps with a timetable, expected results for each, and clear designation of responsibilities to meet them.[88] Other regeneration experiences in Amsterdam showed that having an open attitude to collaboration, making necessary changes, and compromising amongst stakeholders through a negotiation team was vital in order to reach defined goals.[89]

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[85] Louise Lawson and Ade Kearns, 'Community Engagement in Regeneration: Are We Getting the Point?', *Journal of Housing and the Built Environment*, 25 (2010) <http://www.springerlink.com.eresources.shef.ac.uk/content/r761819380m713w2/fulltext.pdf> [accessed July 2010] 19-36 (pp. 34-35).

[86] Maggie Roe, p. 78.

[87] Nigel Dunnett, Carys Swanwick, and Helen Woolley, 'Improving Urban Parks, Play Areas, and Green Spaces', *Department for Transport, Local Government and the Regions*, (2002), <http://www.communities.gov.uk/documents/communities/pdf/131021.pdf> [accessed June 2010] 1-214 (p. 16).

[88] Gerard van Bortel, 'Network Governance in Action: The Case of Groningen Complex Decision-Making in Urban Regeneration', *Journal of Housing and the Built Environment*, 24 (2009) <http://www.springerlink.com.eresources.shef.ac.uk/content/c7065t6046358120/fulltext.pdf> [accessed June 2010] 167-183 (p. 179).

[89] Marietta Haffner and Marja Elsinga, 'Deadlocks and Breakthroughs in Urban Renewal: A Network Analysis in Amsterdam', *Journal of Housing and the Built Environment*, 24 (2009), <http://www.springerlink.com.eresources.shef.ac.uk/content/j2w253gp88w39607/fulltext.pdf>[accessed June 2010] 147-165, (pp. 161-162).

Although there are not many examples of long-term management schemes in communal gardens of medium-rise housing, there are few in other housing types that have been successful. For instance, a tenant management organization in the Apple Tree Court regeneration project of a point tower in Manchester has allowed residents to handle their own maintenance and management introducing areas for growing produce and a garden for gathering with other neighbours. Another exemplary long-term management scheme can be found in Eric Lyons' Span low-rise private housing areas in the UK (Figure 1.3). Residents signed a legal contract that binds them to contribute financially, decide on maintenance changes required, and to be responsible for the regular maintenance of their own dwellings.[90] Similarly a study of the re-development of three self-help settlements in Mexico showed it was essential to have a management strategy to ensure the continuous participation of existing and new residents in long-term changes required to maintain their outdoor areas and facilities.[91]

Figure 1.3 **Up-keeping of the landscape in Span housing areas has been made possible through a long-term management plan established with residents as was made in this Over Minnis housing (image from Barbara Simms, *Eric Lyons & Span*, 2006, p. 82)**

In establishing a management scheme involving residents, it is necessary to provide them with learning tools and involvement skills to make the process effective. Residents may benefit from visits to and experiences from other housing areas to widen their vision and ideas for their own community. This experience can shape the level of participation they may wish to have in managing their housing area.[92] For any part in which they become involved, it is important that social and ecological projects can be

[90] Barbara Simms, *Eric Lyons & Span*, (London: RIBA publishing, 2006), pp. 101-103.

[91] Luis Gabriel Juarez Galeana, 'Collaborative Public Space Design in Self-help Settlements: Mexico City', (Unpublished doctoral thesis, University of Oxford, Department of Planning, 2002), p. 340.

[92] Susanne Peutl and Rainer Hauswirth, 'Neighbourhood Management Guide', *Partnership on Socio-economic and Integrated Development of Deprived Neighourhoods*, (2006) <http://www.interreg3c.net/sixcms/media.php/5/Neighbourhood+management+guide.pdf> [accessed July 2009] 1-145 (p. 67).

handled by residents so they may take control of them. Otherwise residents may fail to adopt them as happened with the installation of a complicated sewage treatment in the regeneration of the leasehold medium-rise Hollandervej Fredensgade block in Kolding, Denmark that was initially meant to be run by residents (Figure 1.4). The technology used or labour required to be handled in the management of outdoor areas should be according to the local resources available or skills that residents have or may develop.

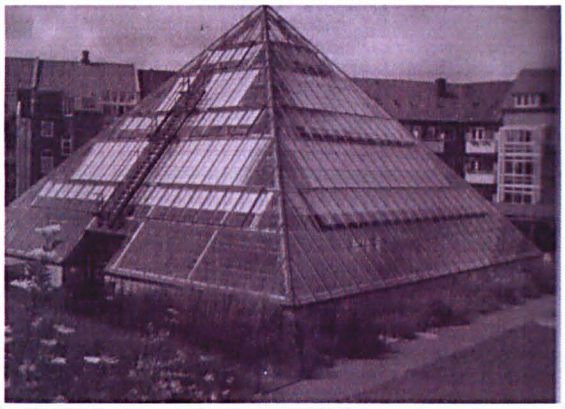

Figure 1.4 **Sewage has been entirely treated through an effective but complicated series of basins, plants, and reed beds in this pyramid as part of the regeneration for the Hollandervej Fredensgade block (image from Ian Bentley, *Green Urbanism: Learning from European* Cities, 2000, p. 250)**

For instance, for the re-development of the self-help housing settlements in Mexico, the outdoor areas were regenerated with materials that were locally available and built with techniques that were known to residents so that they might be able to carry out repairs.[93] In the recent regeneration of the social medium-rise housing Trinitat Nova in Spain, a successful part of the programme involved residents in workshops where they learned about their outdoor areas and developed the skills to maintain them.[94] These enabled residents to relate to their outdoor areas and participate in their upkeep. Conversely, residents of Byker in Newcastle had no knowledge of caring for plants and the residents' maintenance groups proposed by project leader Vernon Gracie were never implemented by local authorities.[95] This eventually led to the decay and removal of many plants, damaging the image of the housing area.

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93 Luis Gabriel Juarez Galeana, pp. 324-336.

94 Ricard Fernández Ontiveros, 'Urban Regeneration in Trinitat Nova', *Red Europea de Conocimiento Urbano*, <http://www.eukn.org/spain/themes/Urban_Policy/Urban_environment/Urban_renewal/Urban-Regeneration-in-Trinitat-Nova_1357.html > [accessed July 2009] (2007), (para. 16 of 18).

95 Pär Gustafsson, transcript 19.

Unfortunately there is a belief that the participation of residents should not rely on training as it compromises the objective of having volunteer participation.[96] Yet this approach is not adequate where responsibility and care for the environment as well as the community are necessary for sustainable housing to be successful. Not only is this important for the residents but also for the authorities and all bodies involved, where a responsibility structure must be set-up to encourage social and ecological development. Once a management structure has been put in place, the experiences people have had in participation processes must be then integrated into a learning scheme that leads to the formation of policies.[97] Also, actively-involved participants must be identified so that they are encouraged to remain in the housing area and become part of the establishment of long-term management processes.[98]

Lastly, it has been shown to be important to integrate a mix of social and commercial facilities as well as flexible housing, so that the needs of a diversity of residents can be fulfilled, though the viability of these facilities must be considered.[99] These facilities should be integrated with other organised community structures such as hobby rooms, social groups, ethnic associations, events, and others, helping residents to break down barriers and become involved in social interaction. In this respect, the social interaction of residents was found to improve if events and social activities were held in different communal gardens to provide residents the opportunity to meet others.[100]

From this review, it is possible to observe that the information available for community development and participation as part of regeneration practice is limited. There have been few assessments made after improvements to housing areas, opening significant opportunities for research.

In regard to design for social integration, the literature indicates that design does not determine the behaviour of users but may influence their use of it and encourage social interaction.[101] 'The built environment is seen as a setting for human activities. Such settings may be inhibiting or facilitating, they constrain choices selectively, and a

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96 Maggie Roe, pp. 70-71.

97 Timothy Beatley, p. 17. See also Susanne Peutl and Rainer Hauswirth, (p. 80).

98 Gerard Heins and André Bus, 'Self Supporting Urban Communities: Integrating a Preventive Social Approach of Urban Renewal', *European Network of Housing Research*, (2005) <http://registration.yourhost.is/enhr2005iceland/ppr/Heins-Bus.pdf> [accessed June 2006] 1-10 (p. 3).

99 Gerard Heins and André Bus, p. 3. See also Michael Carley, Karryn Kirk, and Sarah McIntosh, 'Retailing, Sustainability, and Neighgourhood Regeneration', *Joseph Rowntree Foundation*, (2005), <http://www.jrf.org.uk/sites/files/jrf/041.pdf> [accessed July 2009] 1-4 (p. 1).

100 Nick Bailey and Tony Manzi, p. 5. See also Jo Williams, p. 213.

101 Bill Hillier and Julienne Hanson, *The Social Logic of Space*, (London: Cambridge University Press, 1984), pp. 26-27.

particular setting may be facilitating to the extent of acting as a catalyst or releasing latent behaviour, but cannot, however, determine or generate activities'.[102] The design of the environment is important as it can be shaped to meet physical, social, and aesthetic needs of inhabitants that improve their living conditions. Also because humans acquire a majority of their information through the perception of the senses which informs the way an area can or should be used.[103] Therefore, the arrangement of an area can inhibit or allow the development and presence of different activities and users. In that sense, the research parts from the assumption that the physical environment may influence the development of social life.

Previous research has established preferred quality design criteria for frequently used outdoor spaces focusing mainly in public areas such as squares, low-rise housing, and to a smaller extent medium- or high-rise housing. These studies have been carried out through observation, project experiences, and spatial analysis coming from a variety of cultural and geographical backgrounds which suggests their universal applicability.

Studies of perception preferences for the spatial design and content of outdoor settings have shown consistency in their results despite geographical or cultural differences in their subjects.[104] The perception of characteristics of elements such as form, colours, textures, and patterns are relatively similar across cultures.[105] This was shown in a study where preferences for built or natural settings as well as forms or features were similar for respondents from Senegal, Ireland, and the United States.[106] User-based research in outdoor settings have also found that design and tree preferences are similar and have the same potential for encouraging social interaction of users.[107] Differences are attributed to user comfort varying according to the climate conditions of outdoor areas.

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[102] Amos Rapoport, 'Cross-Cultural Aspects of Environmental Design', in *Human Behavior and Environment: Advances in Theory and Research*, ed. by Irwin Altman and others, IV (New York: Plenum Press, 1980) pp. 7-46 (p. 27).

[103] Amos Rapoport, 'Cross-Cultural Aspects of Environmental Design', p. 9-13. See also Ian Bentley, Alan Alcock, Paul Murrain, and others, *Responsive Environments: A Manual for Designers*, (Burlington, MA: Architectural Press, 1985), p. 89.

[104] 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).

[105] Robert L. Thayer Jr., *Gray World Green Heart: Technology, Landscape, and the Sustainable Landscape*, (NY: John Wiley & Sons, 1994), pp. 105-110.

[106] Patricia Brierley Newell, 'A Cross-cultural Examination of Favorite Places', *Environment and behaviour*, 29 (1997), 495-514 (p. 504).

[107] Rebekah Levine Coley, Frances E. Kuo and William C. Sullivan, 'Where Does Community Grow?: The Social Context Created by Nature in Urban Public Housing', *Environment and Behavior*, 29 (1997), 468-494 (pp. 486-489). See also Andrea Faber Taylor, Angela Wiley, Frances E. Kuo, and others, 'Growing Up in the Inner City: Green Spaces as Places to Grow', *Environment and Behavior*, 30 (1998), 3-27 (p. 19).

These include wind, as an obstacle to the comfortable use of outdoor spaces, and the need for protection from, or, opening up to sunlight depending on the geographical location.[108]

Nevertheless, it is necessary to take into consideration the characteristics that may be particular to a specific culture. The physical environment is the result of culturally based decisions that are translated into the ideal settings that represent such culture. Those characteristics are identified by the way that cues, or the elements in the design, contribute to build a specific behaviour that is considered desirable and ideal in the lifestyle of a given group of people.[109] The elements of design include the arrangement of the area, the time in which it was created, the meanings that deliberately placed objects may have attached to them, and the way objects and areas of the design relate to each other. For instance, anthropologist Edward T. Hall found that order and privacy were strong German cultural traits showed by the arrangement of heavy weight furniture, denoting rigid distance standards of personal space.[110]

In the specific use of outdoor areas, environmental behaviour researcher architect Amos Rapoport has suggested these may be less used for practical or cultural reasons. As more social or leisure areas are provided, such as private gardens or indoor-nearby facilities, and where cultural norms discourage outdoor social-leisure activities then the use of outdoor areas should be expected to decrease.[111] Whilst cultural norms have a slower pace of change, an outdoor arrangement may integrate these areas to foster socializing.

The three main variables that were found to influence social integration in residential environments were the opportunities for passive social contacts, proximity to others, and adequate spaces that met the needs of users. This research proposes to look at this last variable and its contribution to the first, in an environment where proximity exists

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[108] Jan Gehl, *Life between Buildings: Using Public Space,* trans. by Jo Koch, 5th edn., (Copenhagen: Danish Architectural Press, 2001), pp. 175-182. See also John Zacharias, Ted Stathopoulos, and Hanqing Wu, 'Spatial Behavior in San Francisco's Plazas: The Effect of Microclimate, Other People, and Environmental Design', *Environment and Behavior*, 36 (2004), <http://www.swetswise.com.eresources.shef.ac.uk/FullTextProxy/swproxy?url=http%3A%2F%2Feab.sagepub.com%2Fcgi%2Freprint%2F36%2F5%2F638.pdf%3Fxdata%3D143167002135&ts=1284372755423&cs=1331748765&userName=8080034.ipdirect&emCondId=12173&articleID=20529726&yevoID=1313074&titleID=68433&referer=1&remoteAddr=143.167.2.135&hostType=PRO&swsSessionId=eit172P8aU6zv5SCgUMDiQ**.pasc> [accessed July 2010] 638-658 (p. 657).

[109] Amos Rapoport, 'Cross-Cultural Aspects of Environmental Design', p. 11.

[110] Edward T. Hall, *The Hidden Dimension: Man's Use of Space in Public and Private*, (London: Low & Brydone, 1969) pp. 124-129.

[111] Amos Rapoport, 'The Use and Design of Open Spaces in Urban Neighbourhoods', in *The Quality of Urban Life*, ed. by Dieter Frick, (Berlin: Walter De Gruyter, 1986) pp. 159-175 (p. 168).

due to the high density of medium-rise housing areas. Proximity may contribute to more opportunities for passive social contact if there are more people around, and if those potential contacts are in horizontal eye level range.[112] This is effective in housing if proximity does not equate to crowding or lack of privacy.[113]

The literature shows that longer stays of residents in outdoor areas may be encouraged if outdoor areas are comfortable and adequate, improving social contact and meetings between users. The literature divides into studies of public spaces and those of housing areas. The former are important since many of the studies in relation to housing rely on them. For public spaces, such as squares, there were certain areas and design characteristics that fostered social interaction with a longer stay. The areas include pedestrian walks or walkways, nodes, edges, and seating areas which were more frequently used as was indicated by observation studies of urban public spaces. The design characteristics of these public areas are included in a robust set of guidelines available from previous research (Table 1.9).

Comparing the guidelines, the findings reinforce each other with newer studies advancing more recommendations. For instance, sufficient space is necessary to allow distancing between users, also known as interpersonal distance. A study showed that types of seating including plinths, lawn, stairs, and others were preferred for their flexibility, because they provided users with an opportunity to move away from strangers.[114] Also, a study of parks suggested an average interpersonal distance of three to four metres between user groups of lawn areas as ideal.[115] Other recommendations for public spaces include providing ways for users to engage with the outdoor areas allowing them to meet other users; for example through active and passive opportunities such as sport areas, water surfaces, resting areas, and others, as well as providing opportunities for discovery and fun.[116] Lastly, it has also been stated the need for

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[112] Jan Gehl, p. 21 and 64.

[113] Machiel Johannes Van Dorst, 'Een Duurzaam Leefbare Woonomgeving Fysieke Voorwaarden voor Privacyregulering', *Technische Universiteit Delft*, (2005), <http://www.eburon.nl/product_details.php?category_id=92&item_id=22> [accessed on March 2006] 1-480 (p. 285-287).

[114] Henry Shaftoe, *Convivial Urban Spaces: Creating Effective Public Spaces*, (London: Earthscan, 2008), p. 52.

[115] Barbara Goličnik and Catharine Ward Thompson, 'Emerging Relationships between Design and Use of Urban Park Spaces', *Landscape and Urban Planning*, 94 (2010) <http://www.sciencedirect.com.eresources.shef.ac.uk/science?_ob=MImg&_imagekey=B6V91-4X6DBDF-1-1C&_cdi=5885&_user=128590&_pii=S0169204609001637&_origin=browse&_zone=rslt_list_item&_coverDate=01%2F15%2F2010&_sk=999059998&wchp=dGLzVlz-zSkWA&md5=b53204c35a9590777ff149c7d52d8614&ie=/sdarticle.pdf> [accessed August 2010] 38-53 (p. 49).

[116] Mark Francis, *Urban Open Space: Designing for User Needs*, (Washington: Island Press, 2003), pp. 23-26.

unregulated areas, also called loose areas, which may serve a variety of uses and work for different social functions.[117]

Table 1.9 Initial main recommendations for urban public spaces

Architect Jan Gehl (1987)*	Sociologist William Whyte (1980)*	Architect & urban designer Ian Bentley et al. (1985)*	Landscape architect Mark Francis (2003)*	Urban designer Henry Shaftoe (2008)*
Design within the limit of the human senses	Encourage presence of women	Permeability	Comfort	Physical
Design within human scale	Encourage presence of groups	Realm distinction	Sufficient adequate furniture	Sufficient and diverse seating areas
Flexible areas for different activities	Provision for seating areas	Scale	Shelter from weather	Flexible for changes
Accessible	Sufficient and comfortable	Hierarchy	Food venues	Sizing to keep distances within human senses
Physically and visually	Sheltered	Variety	Safety	Enabling interpersonal distances
Legible	Flexible, movable	Uses	Relaxation	Geographical
Comfort	Contact with nature	Forms	Contact with nature	Connected to public transport
Sufficient and adequate pedestrian walks	Access to and shelter from sunlight	Legibility	Passive engagement	Managerial
Short direct routes	Shelter from wind	Paths	Areas for passive activities	Diversity of uses
Shelter from weather	Access to tree cover	Nodes	Active engagement	Promote informal surveillance
Richness	Access to water surfaces	Landmarks	Areas for active activites	Inclusive
Visual enrichment of pedestrian walks	Provision for food venues	Edges	Discovery	Constant maintenance
Active edges	Variety	Districts	Exploration with planting and art	Safe with adequate lighting
Variety of facilities	Outdoor eating	Robustness	Learning opportunities	Entertainment
Provision for seating areas	Active edges	Flexibility of areas	Fun	Psychological and sensual
Comfortable and adequate	Variety of facilities near the road	Active edges	Areas for fun, adventure, and challenge	Designed within human scale
With back and ceiling shelter	Seating areas	Shared uses	Accessible for all users	Distinctive
Oriented towards activities	Avoid barriers	Flexible seating areas	Physically and visually	Safe
Access to and shelter from sunlight	No sunk or elevated areas	Shelter options	Management	Sheltered from weather
Different types of formal and informal seating	No gates	Richness	Constant programmed activities	Visually appealing
Close-by	Keep all areas in sight	Design for the senses	Constant maintenance	Contact with nature
	Management	Personalisation	Involvement of surrounding neighbours	Presence of food venues
	Establish carers	Enabling self-expression	On-going evaluation	
	Provide a variety of changing activities and art objects	Construction of image	Flexibility for change	

Source: The Social Life of Small Urban Spaces, (2004); Life between Buildings: Using Public Space, (2001); Urban Open Space: Designing for User Needs, (2003); Convivial Urban Spaces: Creating Effective Public Spaces, (2008); Responsive Environments: A Manual for Designers, (1985).

* This is the date when these recommendations were made in the first English editions of their books; in the particular case of Jan Gehl, they were first published in Danish in 1971.

In housing areas, observation studies are less frequent compared to the number that have been made in public spaces. A case study analysis in Jordan of low- and medium-rise dwellings in linear and cluster layout indicates that balconies and stairs, as semi-private areas, were often used for interaction. Playground areas were places of socializing for mothers, whilst pedestrian walks allowed the elderly to socialize. For casual conversations, car parks were common places as more people encountered each other on their way in or out.[118] Scenic areas with sculptures were also noted to attract more residents in observation studies of three high-rise housing areas with a different income level. Ample circulatory spaces accounted for large numbers of people but did not provide for contacts as there were no intermediate areas at which to stop for a

[117] Katharine Knox and Ken Worpole, 'The Social Value of Public Spaces', *Joseph Rowntree Foundation*, (2007), <http://www.jrf.org.uk/sites/files/jrf/2050-public-space-community.pdf> [accessed July 2009] 1-15 (p. 9).

[118] Tawfiq M. Abu-Ghazzeh, 'Housing Layout, Social Interaction and the Place of Contact in Abu-Nuseir, Jordan', *Journal of Environmental Psychology*, 19 (1999) <http://www.ingentaconnect.com/search/expand?pub=infobike://ap/ps/1999/00000019/00000001/art00106&unc=> [accessed on March 2006] 41-73 (pp. 60-62).

conversation.[119]

Another study of high-rise housing showed that verandas and forecourts were the most frequented areas for social interaction compared to dwellings, balconies, elevators, the lobby, playgrounds, the swimming pool, or car parking areas.[120] These observations may be attributed to cultural habits of the inhabitants where the study was conducted, which relate to typical detached housing units having these elements. Comparing the most frequented areas in public spaces with areas for casual encounters and socializing in housing areas, it may be said that public and housing spaces have different preferences or that culture may have played a role.

Other characteristics of design that have been found to be important in housing areas include connectivity of outdoor areas and traffic calming measures that have been found to encourage a higher presence of pedestrians and therefore social opportunities. Despite the fact that numerous housing areas are exemplars of this, a recent survey study showed that social interaction was not related to having a connected pedestrian environment.[121] However, the urban layout of the types of housing areas used for that study are not specified which may have had a significant impact in the responses to the referred survey.

It is also important to define realm distinctions to avoid the creation of no-man's land areas and to aid in preventing crime and vandalism, otherwise known as creating defensible spaces.[122] In defining realms, the design of public communal gardens in medium-rise housing areas should be provided with a semi-public feeling as an adequate ground for the interaction of inhabitants who know each other somehow.[123] In other words, a public feeling is adequate for city parks and squares where users rarely know each other, whilst housing areas are a middle ground between a private and a public feeling even if they have public access. These must allow a transition between private gardens and semi-private areas, such as balconies, which may allow social

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[119] Shu-Chun Lucy Huang, 'A Study of Outdoor Interactional Spaces in High-rise Housing', *Landscape and Urban Planning*, 78 (2006) <http://www.sciencedirect.com.eresources.shef.ac.uk/science?_ob=MImg&_imagekey=B6V91-4H998T9-1-1&_cdi=5885&_user=128590&_orig=browse&_coverDate=11%2F09%2F2006&_sk=999219996&view=c&wchp=dGLzVzz-zSkzk&md5=c41bbbb1eb5905d1facadba8b9de8b72&ie=/sdarticle.pdf> [accessed on July 2009] 193-204 (pp. 201-202).

[120] Joo-Hwa Bay, 'Sustainable Community and Environment in Tropical Singapore High-Rise Housing: The Case of Bedok Court Condominium', *Environmental Design*, 8 (2004) 333-343 (p. 339).

[121] Nicola Dempsey, 'Does Quality of the Built Environment affect Social Cohesion?', *Urban Design and Planning*, 161 (2008) 105-114 (p.110).

[122] Oscar Newman, *Design Guidelines for Creating Defensible Space*, (Washington: National Institute of Law Enforcement and Criminal Justice, 1976), p. 109.

[123] Clare Cooper Marcus, 'Shared Outdoor Space and Community Life', *Places*, 15 (2003) 32-41 (p. 32).

interaction and privacy at the same time. A survey study applied in a medium-rise housing area indicated that private gardens with low boundaries allowed for increased levels of social interaction.[124] Residents in Village homes also reported having more social opportunities due to the semi-public feeling of outdoor areas.

The literature in regard to social integration shows the importance of the spatial characteristics of the environment to influence social interaction. Yet there are few studies focusing on medium-rise housing and sometimes the research shows contradictory findings, opening opportunities for further research.

Ecological sustainability

Ecological sustainability is achieved by the reduction of CO_2 emissions, the improvement of biodiversity, the use of low-impact materials, and the reduction of water consumption as well as pollution. First, energy use and carbon dioxide emissions may be abated by strengthening pedestrian, bicycle, and public transport that brings lower vehicle use. Also, planting helps to absorb carbon emissions, improve air quality, and reduce heating loss in buildings. Similarly, the use of insulation materials and renewable sources of energy reduce demand and consumption as well as carbon emissions. Secondly, biodiversity is understood to include species richness and habitat complexity as well as genetic variation in flora and fauna.[125] It may be improved by protecting existing habitats and resources, designing a planting arrangement that allows for diversity, and establishing maintenance-management practices that support diversity.

Third, minimizing water consumption may be achieved by implementing systems that reduce its use or re-use and recycle it. Similarly, pollution may be abated by reducing the generation of waste, and establishing processes to re-use, re-claim, and recycle it as well as the avoidance of polluting chemicals and practices. Fifth, materials must be selected in terms of their life-cycle which means their impact and performance is assessed from their sourcing all the way to their disposal.[126]

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[124] Arne Lorz, 'The Tenant Gardens in the Berliner Viertel in Monheim am Rhein', *Research Institute for Regional and Urban Development of the Federal State of North Rhine-Westphalia*, (2001), <http://www.nhh.no/geo/NEHOM/case_studies/monheim.pdf> [accessed on March 2006] 1-41 (p. 23).

[125] Richard T.T. Formán, p. 54.

[126] J. William Thompson and Kim Sorving, *Sustainable Landscape Construction: A Guide to Green Building Outdoors*, (Washington, D.C.: Island Press, 2000), p. 195.

Whilst all these issues must be addressed to reach ecological sustainability, current literature shows that not all are straightforward. Growing concern for reducing ecological impact on the environment has recently begun to generate a body of literature in regard to landscape design and management practices in housing developments.[127] This concern falls into two main categories, experiences gained from model sustainable housing developments and, to a lesser degree, the barriers towards achieving sustainable landscape practices. For the former, there are several new housing developments that have been built as demonstration projects to lead the way for future developments. But regeneration projects with such credentials are few. The same may be said about research into landscape practices, which has mostly focused on buildings or new housing developments. Learning from the experiences that each may give is important for future regeneration, and to enable new developments to perform better.

In the planning and design process, the role of governmental bodies in encouraging sustainable strategies has been essential for them to be integrated by developers in housing areas. Numerous incentives have been established in Europe to support sustainable demonstration projects, including recycling programmes, green mortgages, renewable energy, and others which have been reviewed extensively elsewhere.[128] Another way of encouraging developers to integrate ecological improvements is by establishing them through inclusion in regulations.[129] Yet in most cases regulations and standards related to landscape design are rigid, non-site specific, and not providing room for innovative or alternate solutions, which discourages the introduction of ecological strategies in housing areas. This was often associated with a lack or late involvement of informed landscape designers or related consultants in a project.

Also, not having secure funding as well as a feasible and appropriate solution for the landscape and sustainable strategies was found to reduce the success of projects through late attempts to reduce costs.[130] Only demonstration projects have allowed the introduction of innovative, varied, and sometimes not widely tested solutions. For instance, some of these projects are the regeneration of Hedebygade and Hollandervej

[127] Mary L. Cadenasso and Steward T. A. Pickett, 'Urban Principles for Ecological Landscape Design and Management: Scientific Fundamentals', *Cities and the Environment*, 1 (2008) <http://escholarship. bc.edu/cgi/viewcontent.cgi?article=1024&context=cate> [accessed July 2009] 1-16 (p. 7).

[128] Timothy Beatley, pp. 307-313.

[129] Ajay Garde, Jean-Daniel Saphores, Richard Matthew, and others, 'Sustainable Neighbourhood Development: Missed Opportunities in Southern California', *Environment and Planning B: Planning and Design*, 37 (2010), <http://www.envplan.com/epb/fulltext/b37/b35098.pdf> [accessed August 2010] 387-407 (p. 397).

[130] Carl Smith, Andy Clayden, and Nigel Dunnett, pp. 151-154.

Fredensgade block in Denmark and new developments such as Greenwich Millenium Village and BedZED in the UK, Ecolonia in the Netherlands, Kronsberg in Germany, BO01 in Sweden, and Punta de Zicatela in Mexico. The features that have proved to be feasible for replication in other housing areas are practical, safe, easy, reasonably cost effective in operation-maintenance, and have a significant positive impact on the environment.

From the point of view of ways of encouraging residents in initiating and keeping actions that improve the environment in their back gardens, a recent study showed the need for two important elements. Education and learning by seeing as youngsters was vital for developing an attitude later in their life to improve the environment and engage in actions with that effect. Once residents initiated small projects such as composting, it was then essential that sources of information were readily available for them to continue their efforts despite initial failures.[131]

Overall, the most difficult barrier for the replication of ecological improvements has proved to be the perception of authorities as shown in the experience in the housing area of Byker in Newcastle. Because local authorities had a low expectation of social housing residents in regard to accepting and caring for plants, the number of trees that were initially planned for the housing area was reduced significantly.[132] This perception has not yet changed. Current social housing landlords and developers avoid planting and trees that are deemed likely to be destroyed by residents, particularly in social housing.[133] This issue is important as it negatively affects the reduction of carbon emissions and available habitats for biodiversity.

Another example is Village Homes which, despite its international success, replication of the plan concept has not been possible due mainly to local planning regulations as well as health and safety concerns.[134] In a recent study in Mexico, the outdoor areas of the town of Tepoztlan were assessed for their possible sustainable regeneration. It was shown that the major obstacles were the lack of landscape knowledge of its planning professionals, leading to its neglect and poor participation strategies as well as a poor

[131] June Greenway, 'Urban Gardens and Sustainable Cities: Explaining the Environmentally Beneficial Behaviours that Make a Difference', (Unpublished doctoral thesis, University of Sheffield, Department of Landscape, 2009), pp. 277-294.
[132] Pär Gustafsson, transcript 19.
[133] Carl Smith, Andy Clayden, and Nigel Dunnett, p. 153.
[134] Mark Francis, *Village Homes: A community by Design*, (Washington, D.C.: Island Press, 2003) p. 69.

collaboration between governmental departments responsible for planning and maintaining them.[135]

Similarly, sustainable urban drainage systems to reduce water run-off, reduce pollution, and improve biodiversity are slowly starting to find their way into housing developments. They are being encouraged by planning authorities as they form part of the visual amenity and character of a housing area. However, there is still concern for the danger they represent to children, which often leads to having fencing around water surfaces such as in Greenwich Millennium Village in London. Yet, there are examples such as the low-rise private Morra Park housing in Drachten, Netherlands that shows how a system to collect and clean precipitation in a wetland that connects to a closed-loop canal is enjoyed by residents for swimming.[136]

William Whyte recorded the success that fountains and water surfaces have in making public spaces popular if they are accessible to children for play and as a soothing amenity.[137] Other housing areas, such as the low-rise dwellings found in the Joachim-Ringelnatz road in the Hellersdorf district of Berlin, have used shallow canals to transport precipitation water, and deeper surfaces of water are kept sufficiently high to prevent infants from reaching them.

Although fewer in number there were some housing areas with systems for on-site cleansing of sewage water from toilet and kitchen drainage to reduce pollution. For instance, as part of the regeneration of the Hollandervej Fredensgade block in Kolding, Denmark sewage discharge has been completely disconnected from the city drainage treating it entirely on-site. It is broken down in a series of basins, filtered through various plants located in a four-storey glass pyramid, goes through a final filter stage in an outside reed bed, and is then percolated into the ground. Although it has worked effectively, it has not been replicated because of the running energy costs of the pyramid, though these have been observed to have a wider application in areas with warmer climates.[138] The same output was produced in BedZED in London where a

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[135] Ana Maria Maldonado Fuse, 'Sustainability Assessment of Green Open Spaces in Mexico: Indicative Applications in Tepotzotlan', (Unpublished doctoral thesis, University of Oxford, Department of Planning, 2005), pp. 298-314.

[136] Timothy Beatley, p. 251.

[137] William H. Whyte *The Social Life of Small Urban Spaces,* 3rd edn ([n.p.]: [n. pub.], 1980; repr. Michigan: Edwards Brothers, 2004), pp. 47-48.

[138] Jens Holck-Christiánsen, 'The Pyramid: Ecological Urban Renewal in Kolding DK', *The European Urban Knowledge Network*, (2004) <http://www.eukn.org/binaries/eukn/eukn/practice/2007/12/urban-ecology-in-denmark-illustrated.pdf> [accessed July 2009] 1-8 (p. 6).

small scale treatment plant stopped running in 2005 due to unexpectedly expensive maintenance costs and high energy operation costs.[139]

Another ecological feature that has had difficulty in reaching the housing environment is the improvement of biodiversity. This is due to the un-tidy look that planting arrangement or management and maintenance regimes may produce in enhancing biodiversity. Research suggests that integrating certain managed areas as cues for a culture of 'being cared for' is likely to be more accepted by residents. This may also be achieved by emphasizing the visual qualities of the planting design and providing areas for exploration with dense planting, partially secluded views, and curved pedestrian paths.[140] Such an example may be the low-rise housing area of Punta de Zicatela in Oaxaca, Mexico, where existing spontaneous vegetation was preserved as part of the outdoor areas of dwellings. Blocks of planting providing for visual contrasts and colours were enhanced with same-species plants as well as the arrangement of partially secluded views for pedestrian walks.[141]

Other ways of improving biodiversity might include providing information to residents on the plants of their outdoor areas, ecological features, and their benefits. Such type of information was given to residents in the low-rise housing of mixed occupancy Oikos in Enschede, Netherlands. It was made through publications to increase their environmental awareness and guidelines for making their own selection and management of plants for the communal allotments and their private gardens.[142]

Although communal allotments have been long associated with an un-tidy look and with economic crises like those following WWI and WWII, they are becoming fashionable again. They not only improve biodiversity, but also reduce carbon emissions, have healthy produce, provide for leisure and contact with nature, as well as having economical benefits. For instance, American landscape architect Fritz Haeg has recorded various experiences in the United States where front lawns have been changed into a garden for edible plants. The users not only enjoy the many benefits mentioned above but also the freedom of breaking away from a rigid tradition of neatly cut lawn. They have all had mostly positive reactions from neighbours, and have been a way of

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[139] Terry Slavin, 'Living in a Dream', *Guardian*, 17 May 2006, p. 9.

[140] Travis B. Beck, Joe E. Heimlich, and Martin F. Quigley, 'Gardeners Perceptions of the Aesthetics, Manageability, and Sustainability of Residential Landscapes', *Applied Environmental Education and Communication*, (2002) 163-172 (pp.170-171).

[141] Diego Villaseñor, 'Punta de Zicatela', *Projects*, [n.d.] <http://www.dva.com.mx/> [accessed September 2010] 1-4. See also Ana Maria Maldonado Fuse, p. 163.

[142] Timothy Beatley, p. 298.

meeting others, even encouraging community involvement.[143] The same may be said of examples in run-down medium- and high- rise social housing areas of the UK, where allotments have brought life back to decayed outdoor areas. Such an example is the social housing in the high-rise tower block of Apple Tree Court in Salford where a communal allotment, amongst other things, has given the communal garden a distinct character and has brought the community together.[144]

The most common ecological feature found in housing areas to reduce pollution is composting. It may be a simple compost pile box, which is most common for low-rise housing, or the advanced fast composting machines which are more suitable for medium- and high-rise housing areas. The regeneration of the leasehold medium-rise housing of Augustenborg and the new medium-rise BO01 in Sweden are model exemplars of this. All household waste has been arranged to be sorted on-site, compost is produced on-site, and swap stands are held every month for un-used items in relatively good condition to be exchanged amongst residents. An important component of composting was the initial education provided to residents regarding the process and operation of compost machines to prevent damage and encourage composting.[145]

Similarly, energy consumption reduction features are likely to be found in ecological projects. Those that have been shown to be more effective and replicable are the use of solar photovoltaic panels, solar heaters, insulation of buildings, combined heat and power systems at a large scale, and car-sharing schemes. Such may be found in BedZED in London, UK, the low-rise mixed occupancy Ecolonia housing in Alphen aan den Rijn, Netherlands, and Hedebygade block in Copenhagen, Denmark. BedZED has reduced up to 81% of energy consumption whilst the Hedebygade block has achieved around 10% to 25% depending on the number of household users in each building, having 25% as the set target.[146]

Other ways of reducing energy and carbon emissions is lower vehicle use, amongst which the well-known traffic calming measures of home zones in the UK and the Woonerf concept in the Netherlands are slowly being introduced in housing areas. After

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[143] Fritz Haeg, *Edible estates: Attack on the Front Lawn*, (New York: Metropolis Books, 2008) pp. 56-55.

[144] David Thorpe, 'Case Study: Apple Tree Court Urban Oasis', *A History of Green Space and Parks*, (2006) <http://www.davidthorpe.info/parkhistory/applecourt.html> [accessed July 2009] (para. 15 of 18).

[145] Trevor Graham, *Echoes of Tomorrow*, (Malmö: Tryckeri Wiking AB, 2002), p. 12.

[146] BioRegional, 'BedZED: The UK Largest Mixed Use Zero Carbon Community', *Solutions for Sustainability*, (2007) <http://www.bioregional.com/files/publications/BedZEDbriefingsheet.pdf> [accessed July 2009] 1-2 (p. 1). See also PETUS, pp. 3-5.

their establishment, research reported an increase of 20% in the number of children playing outdoors and improved social contacts among neighbours. Although they are reported to be expensive in their implementation and maintenance, funding schemes have been produced to implement them.[147] Examples may be found in Portland, Oregon, where a government programme coordinates with residents who wish to have and pay for them.[148] Yet their success relied on the existence of public transport options and integrated cycling opportunities. Lastly, it has not been easy to use low-environmental impact materials during the planning and construction stage of the outdoor areas. Research showed that for new developments these may not always be readily available from suppliers when needed and tight schedules left little room to search for alternatives.[149]

As may be observed, the literature in regard to ecological projects rarely focuses on regeneration lessons from landscape studies made in medium-rise housing areas for enhancing the environment, for which further research is required.

Discussion

The literature relating to community development and participation shows there are few assessments of medium-rise housing available and only fragmented lessons from various types and tenures of housing areas. Also, few studies provide insight into the way that the community has fared after a period of time, or whether the participation methods have worked, and which of them have strengthened social bonds in the community. Therefore it is important to gather in-depth information in regard to:

- The methods and processes of regeneration that have been designed to revitalise communities.
- The short- and long-term performance of community and participation processes in medium-rise housing.
- The social benefit gained from the organization and management of ecological practices through the participation of residents, as these methods are likely to become more frequent in the future of sustainable housing regeneration.

[147] Timothy Beatley, pp. 140-147.
[148] Office of Transportation, 'Speed Bump Purchase Program', *Traffic Calming* (2009) <http://www.portlandonline.com/transportation/index.cfm?&a=61469&c=35928> [accessed July 2009] (para. 56 of 72).
[149] Carl Smith, Andy Clayden, and Nigel Dunnett, p. 152.

The available research for social integration has few studies on the possibilities of landscape contributing to social interaction in social medium-rise housing and even less in cases of regeneration. There is also almost no research into the way the layout of medium-rise blocks or perception from different storeys have an effect on the social opportunities provided in outdoor areas. The regeneration of the landscape in medium-rise housing areas needs to be further investigated in relation to:

- The arrangement and characteristics of the landscape that encourage social interaction of residents in medium-rise housing.
- The impact of block layouts to socializing of residents in communal gardens.
- The influence of the design perception of the landscape from different storeys on the development of social opportunities in communal outdoor areas.

In relation to ecological enhancement of the environment, it is more common to find documentation and assessment studies of low-rise housing and new developments than of regeneration projects for medium-rise social housing. It is often small scale regenerations that are used as demonstration projects. Also, ecological revitalisation should not be confined to isolated cases in housing areas. It should be applied as an integrated approach to surrounding housing areas in order to establish a connected structure that adds to a whole urban area. Unfortunately, most of the literature focuses on the goals and benefits of using a given ecological approach but rarely is there an explanation or examination of their later performance, particularly important for landscape establishment. Therefore more research is required regarding:

- Documentation and assessment of those case studies which have been the object of regeneration projects incorporating ecological sustainability and using the landscape as an integral part of the scheme in medium-rise social housing.
- Exploration of barriers faced by such regenerations, the experiences of residents and people working on ecological projects, and the social opportunities they provide.

Taking into consideration the identified gaps in knowledge, this research established objectives for the study and the methodology required for addressing them (see introduction). The literature review also allowed the identification of important issues from the experiences of previous regenerations in housing areas and recommendations for the landscape in successful public spaces or housing areas for leisure and socializing. These are summarised under the previously identified indicators:

Community development and participation

Image/identity:

- Good-quality durable materials
- Past and present heritage objects or environments of value

Working together, sharing similar views:

- Participation in ecological projects implementation
- Encouragement of ecological awareness, care, and stewardship
- Capacity building skills
- Learning tools and involvement skills
- Learning from other regeneration experiences
- Using projects that may be handled and maintained easily by residents in terms of their skills, materials, and plants available

Social diversity

- Mix of social and commercial facilities
- Mix of dwelling types or flexible accommodation options
- Mix of community social structures
- Mix of events in diverse locations

Participation

- Short and long-term participation schemes for residents
- Collaboration and clear goals between stakeholders in delivering projects

Social integration

Public main areas: Pedestrian walks, nodes, edges, seating areas

- Permeable, legible, size and scale within limit of human senses, no visual and physical barriers, physically and visually accessible, safe, providing informal surveillance and sufficient lighting.
- Flexible, robust, and diverse areas and furniture, sufficient and adequate, and enabling interpersonal distancing.
- Sheltered from weather, access to and shelter from sunlight, and shelter from wind.
- Sensorial richness, visual variety, visually appealing, and contact with water.

- Encouraging presence of women and groups of people, variety of food venues and activities, active and passive engagement opportunities, contact with nature, and active edges.
- Opportunities for exploration, discovery, fun, challenge, and learning, and availability of unregulated areas.
- Personalisation opportunities for self-expression and distinctive areas.
- Constant management, establishment of carers, provision of evaluations, involvement of residents from surrounding areas.
- Availability of nearby public transport.
- Housing main areas: Balconies, stairs, playgrounds, pedestrian walks, car parks, verandas, forecourts
- Connectivity of outdoor areas, emphasis on pedestrian and cycle areas
- Realm's definition, creation of a semi-public feeling, informal surveillance, safety, transitions between areas, low boundaries for visual accessibility
- Visual richness, scenic areas with sculptures

Ecological enhancement

General

- Government incentives, regulations supporting sustainability
- Economically feasible, practical, safe, and easily-run projects
- Education and awareness at an early age and for the implementation of projects
- Readily-available sources of information
- Change of attitude and improve education of professionals towards the importance of landscape and allowing residents' participation, improve collaboration among professionals delivering sustainable projects

Reducing pollution

- SUDS as part of visual amenities and character of the housing area but there are un-resolved safety concerns
- Recycling of sewage on-site has not been economically feasible
- Waste recycling and composting are economically feasible

Improving biodiversity

- Introducing managed and un-managed areas as part of visual richness as well as exploration and discovery

Reducing carbon emissions and energy consumption

- Introduction of traffic-calming measures, available public transport options, and cycling facilities
- Solar photovoltaic panels, solar heaters, insulation of buildings, combined heat and power systems, and car-sharing schemes to be most efficient and cost-effective
- Allotments to provide local, economical, and healthy food produce, contact with nature, leisure and socializing opportunities

Materials' selection

- Limited commercial availability of materials for their lifecycle.

These recommendations and those of planning, research, and hybrid assessments were the preliminary issues considered for the assessment of the case studies in this study. The next step is to explore the historical context under which medium-rise housing was developed. This will allow understanding the design intentions for the landscape towards community life and improvement of the environment and the implications from using different types of block layouts that characterised this type of housing. This will allow the identification of further significant issues to be considered as part of the assessment and the main types of block layouts in medium-rise housing which are addressed in the following chapter.

Chapter 2

Ideology and concepts of outdoor areas in medium-rise housing

Introduction

This chapter explores the purpose of the landscape in the evolution of medium-rise housing areas and the different types of block layouts that characterise them.

An international historical review of housing models is made to understand the intentions that led to the creation of medium-rise housing and the role of the landscape in the various types of block layouts that emerged. The housing solutions for improving community life or the environment that were proposed in various countries are presented to show the qualities and limitations of the proposed design and the way medium-rise housing evolved. The countries selected are relevant for their innovative ideas in the creation and development of medium-rise housing schemes, including Mexico. This is followed by an examination of the types of block layouts that have characterised medium-rise housing areas to identify the main types and the impact of their shape on community development opportunities. From this analysis, the types of block layouts found in the case studies of this research are distinguished and explored for their possibilities for community life.

The chapter concludes by suggesting the desirable landscape elements that initially characterised medium-rise housing and most adequate types of layouts for community life and improvements to the environment.

The development of medium-rise housing

England

The late-eighteenth- and early–nineteenth-century traditional housing in most European countries, the USA, and Latin American countries such as Mexico, consisted mostly of low-rise linear arrangements facing the road or surrounding a court garden. As people from the countryside started to move into the city seeking employment opportunities, housing shortage became acute. Solutions to this were sought through the adding of rooms, floors, and height to existing housing. These measures soon caused poor

ventilation and a lack of sun-light.[150] Overcrowding and unsanitary conditions caused illnesses and there was a lack of access to natural areas. Ultimately this led to the development of new housing solutions.

One of these solutions was developed in England in the late nineteenth century by planner Ebenezer Howard, called the Garden City. This removed housing from the city to the countryside by proposing satellite cities for thirty thousand people surrounded by a green belt of agricultural land with industrial areas for employment and low-rise dwellings. In this way nature was restored to labourers in a pedestrian-oriented design, with areas for community development incorporated in the centre of the housing area. This would integrate large public buildings, a central park, and a commercial area for the sale of locally produced goods that were meant to provide for community life. Healthy conditions would be achieved by a low-density scheme of twenty-five people per acre which provided for areas of nature for all the inhabitants.[151] This led to the development of Letchworth and Welwyn Garden cities in 1903 and 1920 and influenced post-war housing through the New Town Act of 1946, which sought to improve the living conditions of inhabitants by following Howard's design concepts.[152]

However, due to the large demand of housing required to be built, the low density land use of the Garden city was not feasible without destroying much of the countryside. This led to other types of housing such as high-rise schemes proposed by Le Corbusier, which were characterised by blocks and point towers. They were used until they started showing signs of decay and there were suggestions that they might lead to the breakdown of communities. In an effort to humanise high-rise living, architects Alison and Peter Smithson re-introduced the road life concept through wide deck 'Roads in the Sky' that connected all the dwellings of each level in order to provide for community areas.[153] Such an attempt was Park Hill in Sheffield in 1961 but this failed because of worries about insecurity and vandalism, noise, and the lack of adaptability of the

[150] Richard Sheppard & Hilton Wright, *Building for Daylight*, (Allen & Unwin, 1948), pp. 39-41.
[151] Robert Fishman, *Urban Utopias in the Twentieth Century: Ebenezer Howard, Frank Lloyd Wright and Le Corbusier*, (New York: Basic Books Inc., 1977; repr. London: MIT Press, 1982), pp. 38-51.
[152] English Partnerships, 'New Towns', *Urban Regeneration*, (2007) <http://www.englishpartnerships.co.uk/newtowns.htm> [accessed November 2009] (para. 4 of 13).
[153] Kenneth Frampton, *Modern Architecture: A Critical History*, (London: Thames and Hudson, 1985; repr. 1990), pp. 272-273. See also Brent C. Brolin, *The Failure of Modern Architecture*, (London: Studio Vista, 1976), pp. 70-71.

decks.[154]

At this point, alternatives in low- and medium-rise housing of high-density started to emerge, like those proposed by architects such as Eric Lyons with various Span estates and Darbourne & Darke with the Lillington Gardens Estate, Victoria, in 1961. In these examples, landscape formed an integral part of the scheme. For instance, in Lillington Gardens the plants on balconies as well as in private and communal gardens contributed to a rich visual diversity in trying to disguise the density and scale of the built environment. Unfortunately, the majority of later developments focused on vehicle and road facilities lessening the role of the landscape.

United States, Germany, and the Netherlands

Although the concept of garden cities did not continue as proposed by Howard, it significantly influenced town planning through the post-war New Towns in England and also in other countries such as in the United States of North America.[155] For instance, architects Clarence Stein and Henry Wright adapted the garden city concept in their Radburn housing scheme of 1929. They introduced a density of 20 dwellings per hectare, smaller lots, and a layout with low-rise housing organized into clusters of cul-de-sacs that segregated main and secondary roads, as well as separating traffic from pedestrians. Between clusters of housing, pedestrian movement was facilitated through a park-like setting that connected to communal facilities.

In Germany, the concept of the garden city was adapted for both low- and medium-rise housing. After the establishment of the Weimar Republic in 1919, new models of housing were intended to provide good quality and healthy dwellings for inhabitants, particularly after 1924 when government required large-scale and low-cost housing developments.[156] The most important ideas stemming from the garden city movement were the use of agriculture as a way of having contact with nature, but also as a way of encouraging self-sufficiency and the placement of central communal facilities to support social life. Additionally, designers sought to provide housing developments with

[154] Chris Bacon, 'The Rise and Fall of the Deck Access Housing', (unpublished paper, University of Sheffield, Department of Town and Regional Planning, Faculty of Architectural Studies, 1986), pp. 50-51.

[155] Robert Fishman, p. 23.

[156] Barbara Miller Lane, 'Modern Architecture and Politics in Germany 1918-1945', in *Housing and Dwelling: Perspectives on Modern Domestic Architecture*, ed. by Barbara Miller Lane (Oxon: Routledge, 2007) pp. 259-271 (p. 260). See also Reyner Banham, *Theory and Design in the First Machine Age*, 6th edn, (London: Architectural Press, 1960; repr. 1975), p. 272.

diversity through colours and a certain variety of dwellings.[157] This generated a range of built examples whose quality relied heavily on the landscape arrangement until the end of the 1920s.

Most of the housing developments followed standardised rows of dwellings in low- or medium-rise form, or alternatively a combination of both which became more common in later developments. Separation amongst rows of dwellings was calculated on the basis of providing sufficient sunlight to dwellings and the ability to grow vegetables in private gardens.[158] The use of allotments after WWI was strongly supported by landscape architect Leberecht Migge. He considered it a way of fulfilling the basic nutritional needs of families in a self-sufficient manner.[159] He made detailed analysis of the produce and animals needed, of ways for recycling household wastes, and for reducing drinking water consumption through the introduction of dry toilets. Besides enabling interaction with nature, his design for allotments also provided informal playgrounds with sand boxes and sheltered seating areas. All of these were integrated with the dwelling through transitional areas and materials such as summerhouses, verandas, glass partitions, and balconies.[160]

Ideally, each dwelling would have an attached private garden with a size of 720m^2.[161] This was possible in low-rise housing such as the development in Ziebigk, Dessau designed by architect Leopold Fischer in collaboration with Migge from 1926 to 1929.[162] Other proposals by Migge which were more suitable for medium-rise housing included communal gardens with nearby allotments. Such was the Georgsgarten housing area in Celle developed by architect Otto Haesler in 1925 with a series of low- and medium-rise buildings in an L-shaped arrangement.[163] Their layout and the landscape facilitated pedestrian movement towards the communal facilities and allotments. Arrangement of shrubs and trees was used to establish hierarchy of

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[157] Barbara Miller Lane, 'Memory, Myth, and Ideas of Community in Modern German and Scandinavian Architecture', *Emeritus Gatherings*, (2001) <http://www.brynmawr.edu/emeritus/gather/Lane/lane.html> [accessed October 2009] (para. 20 of 29). See also Jean-Francois Lejeune, *The New City 3: Modern Cities*, (NY: Princeton Architectural Press, 1996), pp. 61-65.

[158] David H. Haney, 'Leberecht Migge's "Green Manifesto": Envisioning a Revolution of Gardens', *Landscape Journal*, 26 (2007) <http://lj.uwpress.org.eresources.shef.ac.uk/cgi/reprint/26/2/201> [accessed October 2009] 201-218 (p. 209).

[159] David H. Haney, ' No House Building without Garden Building! "Kein Hausbau ohne Landbau!": The Modern Landscapes of Leberecht Migge', *Journal of Architectural Education*, 53 (2001) <http://www3.interscience.wiley.com.eresources.shef.ac.uk/cgi-bin/fulltext/118989846/PDFSTART> [accessed October 2009] 149-157 (p. 153).

[160] Leberecht Migge, *Der Soziale Garten*, (Berlin: Gebr. Mann Verlag, 1999) pp. 41-58.

[161] Ibid, p. 78.

[162] Jean-Francois Lejeune, p. 65.

[163] Kenneth Frampton, p. 137.

pedestrian and road circulation routes as well as shelter. The facilities supplied a diversity of options for the community having kindergartens, laundries, hairdressers, meeting rooms, cafés, libraries, sports areas, and others. Altogether, the housing area was intended to work as an independent unit within the city.

Architect Ernst May introduced a more contextually-based landscape design similar to that of local traditional villages. One example is the medium-rise Bruchfeldstrasse zig-zag housing development of 1925 in Frankfurt.[164] The buildings, laid out in parallel but with an oblique position of dwellings, embrace private and communal gardens leading to the central communal facilities. This arrangement provides a rich visual variety of plants, colours, and buildings. Another development of significance is the Hufeisensiedlung by architect Bruno Taut in Britz, Berlin designed in collaboration with Migge in 1925. Low- and medium-rise parallel buildings are oriented towards the central communal facilities.[165] Pedestrian paths running along the back of private gardens connect to a series of communal gardens that facilitate pedestrian circulation. Also, the hierarchy, selection, and positioning of planting plays a key role in defining private and semi-public realms.

Besides these housing schemes, there were various others with similar quality characteristics that were developed up to the end of the 1920s. Thereafter, interest shifted towards maximizing the efficiency of land use by increasing the height of the blocks. With this, the landscape focus also changed, concentrating on providing ventilation and sunlight. This was proposed by the architect and founder of the Bauhaus, Walter Gropius, who had previously worked in exemplary housing schemes such as the low-rise Törten Housing of 1926 in Dessau. In 1927, he spoke in favour of high-rise parallel housing exploring the opportunities provided by the Zeilenbau.[166] This was an efficient standardized row system of buildings developed in 1923 by architect Otto Haesler which rationalized materials and was highly economical. It was oriented east-west to provide sun and ventilation through an optimum distance between each row, no less than twice their block height.[167]

[164] Kenneth Frampton, p. 137.
[165] Jean-Francois Lejeune, p. 61.
[166] Kenneth Frampton, pp. 137-140
[167] Ibid, p. 136.

Using a diagram, Gropius analysed the traditional closed and parallel blocks in relation to sunlight, ventilation, and viewing opportunities from different heights.[168] According to that study, the conditions of sun, air, and view improved as height was increased which in turn allowed more space between buildings that was free of construction. Following similar ideas to those of the French planner Le Corbusier, Gropius envisioned those outdoor areas between buildings as vehicle-free extensive connected parks with large mature trees that would contribute towards cleaner air. These outdoor areas would provide for playgrounds, visual relaxation, and opportunities for informal contacts, without the burden of managing a private garden. Centralized housekeeping services would assist with residents' domestic tasks, giving them free time for leisure. Also, cultural centres, outdoor kindergartens, and nurseries on the roof garden would be provided.[169] In this context, cooperation among residents was expected to be part of community life.

During the 1930s, the landscape of medium- and high-rise housing followed this park-like setting. After WWII (1939-45), housing developments in Germany were initially characterised mainly by large scale high-rise blocks in order to meet the housing shortage. However, by 1943 Gropius had witnessed the disintegration of communities caused by high-rise developments during his time in the United States. He, as well as planner Ludwig Hilberseimer, began advocating smaller housing developments that would enable the development of communities.[170] After a spiral of decline had started in high-rise housing areas, a combination of medium- and high-rise housing was used that was deemed to be more appropriate to the human scale.

Unlike Germany, by the start of 1930 a different approach was taken to housing developments in the Netherlands. Landscape had a significant role in the provision of leisure and social life for inhabitants there. This is evident in the Amsterdam extension plan of 1934 made by planner Cornelius van Eesteren, who encouraged design that supported community life as well as the individual development of each inhabitant.[171] Low-, medium-, and high-rise housing were combined in parallel and corner layouts to

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[168] Eric Mumford, *The CIAM Discourse on Urbanism: 1928-1960*, (London: MIT Press, 2000), pp. 50-51.

[169] Walter Gropius, *Scope of Total Architecture*, ed. by Ruth Nanda Anshen, (London: Allen & Unwin, 1956), pp. 115-130.

[170] Jeffry Diefendorf, 'Skyscrapers and Healthy Cities: Walter Gropius and Martin Wagner between Germany and America', *German Historical Institute*, 2 (2005) <http://www.ghi-dc.org/publications/ghipubs/bu_supp/supp002/29.pdf> [accessed November 2009] pp. 29-50 (pp. 36-37). See also L. Hilberseimer, *The Nature of Cities*, (Chicago: Paul Theobald & Co., 1955) pp. 196-199.

[171] R. Blijstra, *C. van Eesteren*, (Amsterdam: Meulenhoff, 1977), p. 16.

produce differentiated quarters with distinct communal gardens. These were connected to a central park as a leisure area for inhabitants. Also, roads were kept narrow giving preference to pedestrians. However, by the 1950s high-rise housing was preferred for its novelty and park-like setting leading to the construction of schemes such as the Bijlmermeer in Amsterdam which later fell into decay.[172]

France

In opposition to the land sprawl of garden cities in 1922, Le Corbusier proposed the Contemporary City project to increase densities through high-rise buildings. This project was designed for three million people with a density of a thousand people per 2.5 acres (400 per acre). The housing areas were separated in zones related to functions such as industry and administration. Dwellings were located in long continuous indented series of high-rise blocks and administration offices in point towers.[173] The continuous block, also called superblock, as well as the point towers became two of the most used layouts in high-rise housing of various countries.

High-rise buildings were used as they occupied only 15% of the ground area, leaving 85% for a large pedestrian open park that was to be connected to other city areas by mass transport. Ideally, roads were to be separated from the residential area and located instead in main arteries of efficient high-speed areas to protect pedestrians. The open park design and the distance between the superblocks were designed to ensure that dwellings were ventilated and sun-lit at least once a day. The height of the blocks and glass wall partitions in the facades were suggested as a way to achieve a continuous countryside-like sight of the surrounding park areas that would allow residents to relate to nature.[174]

The landscape was basically an open park with tall trees to provide a scale reference to residents of the high-rise buildings, integrating some areas for sport and serpentine paths.[175] However, the design of the outdoor areas was not planned to encourage community life in the same way as the Garden City housing quadrangles. Instead, a series of social encounters with any member of the entire community was meant to be

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[172] D.H. Frieling, 'Bijlmermeer: Compressed Urbanism', *Delft School for Design*, (2004), <http://www.deltametropool.nl/pages/english/Bijlmermeer,%20compressed%20urbanism.php> [accessed November 2009] (para. 6 of 44).

[173] Maurice Besset, *Le Corbusier: To Live with the Light*, trans. by Robin Kemball, 2nd edn, ([n.p.]: [n.pub.], 1968; New York: Rizzoli, 1987; Geneva: Skira, 1987), pp. 156-168.

[174] Reyner Banham, p. 267.

[175] Maurice Besset, pp. 175-176.

possible through a number of facilities available on roofs, daily use of the pedestrian walks, the rapid train stations, and the vast outdoor areas. This was believed to be feasible because of the large numbers of people available to meet.

These were the types of areas that were encouraged by Le Corbusier as a way of fulfilling housing demand in an idealised concept of community structure and a sterile arrangement of landscape. Furthermore, none of the cities planned by Le Corbusier were built, except the capital city of Chandigarh in India. Yet his ideas greatly influenced the planning of many medium- and high-rise housing estates that were developed mostly in Europe and to a lesser extent in America.

Sweden and Denmark

In Sweden and Denmark, architects such as Uno Åhrén were influenced by the proposals of Le Corbusier, Gropius, and the Congrès Internationaux de l'Architecture Moderne (CIAM) for medium- and high-rise building. Le Corbusier proposed a large scale high-rise development for Stockholm in 1930 that was not built but which influenced housing programmes of the 1940s leading to high-rise urbanization after WWII. Sweden became the leader in medium- and high-rise point towers for housing followed by parallel blocks.[176]

In Sweden and Denmark, point towers were preferred since they had the advantage of having no enclosed or restricted areas on the ground like those of the parallel and superblock. Instead, point towers allowed the landscape to flow around them providing connectivity.[177] Outdoor areas were restricted by the shape and position of the towers and the circulatory paths that connected them, where the star point towers allowed more intimate outdoor areas.[178] The position of the towers depended on various issues. Point towers were usually placed where there was difficult terrain or hilly conditions and positioned to ensure ventilation, views of nature, and sun-lit dwellings.[179] Or they might

[176] Lars-Erik Borgegård & Jim Kemeny, 'Sweden: The High-rise Housing for a Low-density Country', in *High-rise Housing in Europe: Current Trends and Future Prospects*, (2004) <www.ibf.uu.se/PERSON/jim/commers/hirise.pdf> [accessed September 2006] 31-48.

[177] Rolf Jensen, *High Density Living*, (London: Hill, 1966), p. 36.

[178] Bengt Persson & Agneta Persson, *Swedish Residential Gardens 1930-59*, (Arlöv: Berlings Grafiska, 1995), p. 30.

[179] Bengt Persson & Agneta Persson, p. 26.

be arranged as a visual dominant feature of a housing area or as part of squares or plazas.[180]

In the design of the outdoor areas of point towers, three important issues were considered, including providing a sense of space, partitioning for different functions, and planting. This was achieved by the simple use of a few plant species. For example, large crown trees were used for focus, shelter, and an open horizontal view whilst lawn was arranged as a green carpet with softly defined borders. Areas such as playgrounds were defined through small barriers with the primary objective of integrating them into the rest of the outdoor area.[181] To encourage community development, the Swedish housing estates were grouped around local centres with transport nodes, retail establishments, and communal facilities which ameliorated the dormitory effect of city zoning.[182] They were also supposed to reflect regional character and variation. Elements such as pitched roofs were used instead of flat roofs, as well as materials such as brick and wood, and a combination of medium- and high-rise buildings.[183]

Although these housing areas continued to be built, by 1959 the Swedish began to observe that the excess of open outdoor areas and lack of containment created spaces which were not at a human scale and made them problematic for community development. So, other alternatives were explored and cluster layouts were proposed for new developments as ideal for strengthening community.[184]

Mexico

Ideas of high- and medium-rise housing that entered Mexico may be traced to the end of the Mexican Revolution (1910-17) at which time the country was in the process of defining its identity. The introduction of modern housing was part of a desire to build a progressive future for the country, though it was to be adapted to Mexico's own cultural context.[185] It was not clear at the time how this would be achieved, but the influence of several professionals and the support of state and private subsidies allowed for such housing schemes to be introduced.

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[180] Wolfgang Rauda, *Raumprobleme im europäischen Städtebau*, (München: Verlag Georg D.W. Callwey, 1956), pp. 72-74.
[181] Bengt Persson & Agneta Persson, pp. 18-22.
[182] Mårten J. Larsson, *New Architecture in Sweden: A Decade of Swedish Building*, (Stockholm: National Association of Swedish Architects, 1961), pp. 45-46.
[183] Eric Mumford, pp. 166-167.
[184] Wolfgang Rauda, pp. 74-80.
[185] Mauro F. Guillén, 'Modernism Without Modernity: The Rise of the Modernist Architecture in Mexico, Brazil, and Argentina, 1890-1940', *Latin American Research Revie,w,* 39 (2004), 6-34 (p. 8).

Academics such as architect José Villagran Garcia in the 1920s, argued that new architecture should improve the country's precarious dwelling conditions while adapting to the culture and social behaviour of its users.[186] This would affect all the architecture that was developed as part of the progressive phase of Mexico's development and would influence the outdoor areas of later medium- and high-rise housing developments. For instance, historic-related murals, regional materials and colours, pre-Hispanic details, and other materials were used in outdoor areas as a way of reflecting Mexican culture. Best examples may be attributed to designer Luis Barragán in his projects for low-rise housing such as El Pedregal and architect Juan O'Gorman with educational facilities such as the University Library for UNAM, both in Mexico City, produced in the 1940s and 50s.[187]

Medium- and high-rise dwellings were developed as part of the modern and progressive lifestyle that was being introduced into Mexico. A prime example was the eight-storey Ermita Block of 1930 that integrated commercial facilities on the ground floor.[188] After this, many similar isolated medium- and high-rise blocks were built. However it was only at the end of the 1950s, with the influence of teachings from Le Corbusier in Paris, that architect Mario Pani introduced high-rise housing schemes with various types of layouts.[189] By then he had already produced one of the most influential magazines of the time, *Arquitectura México* (1938-1980), aiming to diffuse and promote modern architecture.[190] Other relevant magazines that aimed to disseminate architectural projects were *Revista Mexicana de Ingeniería y Arquitectura* (1923-1980), *Arquitectos de México* (1956-1969), *Arquitectura y Decoración* (1937-1941), among others.[191]

In 1949, Mario Pani was assigned the task of designing the first high-rise housing in Latin America, the Unidad Habitacional Miguel Aleman in Mexico City. It was

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[186] Ramón Vargas Salguero, 'José Villagrán García: Maestro de la Arquitectura Moderna en Mexico' *Noticias ArquiRed*, (2000) <http://noticias.arquired.com.mx/arqArticulo.ared?lid=es&idArt=133&seccion=1> [accessed on September 2006] (para. 8-14 of 21).

[187] Raquel Franklin, 'Transformations of Modernity: the Mexican Case', *Universal versus Individual, International*, (2002), <http://www.alvaraalto.fi/conferences/universal/finalpapers/raquelfranklin.htm> [accessed on June 2006] (para. 15-17 of 26).

[188] Alejandro Pérez-Duarte Fernández, 'Nacimiento del Modelo de Apartamento en la Cd. de Mexico 1925-1954: Lectura del Archivo de un Arquitecto', *Scripta Nova*, 7, (2003) <http://www.ub.es/geocrit/sn/sn-146(034).htm> [accessed on September 2006] (para. 2 of 73).

[189] Raquel Franklin, para. 9 of 26.

[190] Louise Noelle, 'Estados Unidos y la Arquitectura Mexicana en el Siglo XX: El Punto de Vista de las Publicaciones', *Anales del Instituto de Investigaciones Estéticas*, 85, (2004), <www.analesiie.unam.mx/pdf/85_49-60.pdf> [accessed on September 2006] 49-60 (p. 50).

[191] Bienal Iberoamericana de Arquitectura y Urbanismo, 'Revistas de Arquitectura Chilenas e Iberoamericanas 1930-1960', (2008) <http://revarq.com/pagina/Listado> [accessed September 2010] para. 9 of 14.

intended to meet the pressing demand for housing state civil workers and was sponsored by state institutions such as Dirección de Pensiones Civiles y de Retiro.[192] The scheme consisted of a zig-zag superblock model with 1080 dwellings and 75% free ground area.[193] The landscape was characterised by continuous lawn areas and native trees as well as regional materials, pre- Hispanic details, and mural paintings that contributed to the uniqueness and identity of the community. Also, the facilities provided, such as post-offices, nurseries, communal washing facilities, a community centre, shops, health units, and an Olympic swimming pool, contributed to community integration and the conviviality of residents.[194] Unfortunately, a scheme of long-term management and maintenance was not provided which led the housing area to fall into disrepair and vandalism.

After this revolutionary scheme, Pani developed two others of importance in Mexico city, the Unidad Habitacional Presidente Juárez in 1952 and the Unidad Habitacional Nonoalco Tlatelolco in 1964. The former included high-rise parallel blocks and a superblock but with a closer spacing of buildings than those recommended in Haessler's and Gropius's work due to the warmer climate. The latter consisted of medium- and high-rise superblocks but was particularly damaged during the political massacre of 1968 and the earthquake of 1989 and so decayed. The work of Pani and others with the ideas related to establishing a national identity were significant in introducing medium- and high-rise housing until the 1960s; however this trend was concentrated mainly in the capital. In other parts of the country, medium-rise housing developments were produced later by government housing institutions, such as Infonavit and Fovissste, though unfortunately with poor design of the landscape and few community opportunities.

These institutions completed various medium- and high-rise social housing developments in the country, either by means of their own house projects or, after 1985, through developers.[195] Currently, the medium- and high-rise housing found in the

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[192] Pensiones Civiles y de Retiro was created in 1925 to support the State civil workers for receiving health care treatment, loans and pensions provided by the Federal Government, which was later changed to ISSSTE in 1959.

[193] Raquel Franklin, para. 8.

[194] Graciela de Garay Arellano, *Rumores y Retratos de un Lugar de la Modernidad. Historia Oral del Multifamiliar Miguel Alemán 1949-1999*, (Cd. de Mexico: Mora, 2003), pp. 90-105.

[195] Infonavit and Fovissste are government housing programmes that administrate 'a payroll deduction fund [...] as a joint venture between the government, employees, and the labor force where 5% of gross wages are paid directly by employers as a contribution to their employees individual retirement account in the workers housing fund' [from which] 'Homes are paid by applying the money already deposited into the individual account towards the price of the house, and deducting up to 25% of

country forms 5.78% of the total housing stock, of which the capital and the nearby Mexico state comprise 60% with the other 40% distributed around the rest of the country.[196] The frontier city of Cd. Juárez has 2.3% of the medium-rise housing stock.[197] This was built mostly from 1970 to 2000 when housing demand increased after the frontier had been developed as an industrial city in 1965, attracting workers seeking employment from the southern part of the country.[198] The existing medium-rise housing consists of parallel and point-tower blocks developed in isolated form or as a group to increase density. Their outdoor areas were laid as vast expanses of lawn with few trees dominated by roads and parking areas. Today, most of these buildings in Cd. Juárez have decayed due to their poor quality materials, landscape arrangement, and poor maintenance as well as the lack of community opportunities.

Morphology of medium-rise housing block layouts

The previous section explained the design intentions for the conception of medium-rise housing as it occurred in various countries, relating it to the role of the landscape and type of block layouts devised. The following part of this chapter focuses on exploring the morphology of the block layouts in medium-rise housing showing those that are more commonly found and those that characterise the case studies selected for this study. The effect on community life for each is analysed to identify the block layouts which may contribute to a greater extent to community life.

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wages from the employers' pay check, plus the 5% employer contribution. Infonavit is aimed at private-sector employees while Fovissste is for public-sector employees. See Christian A. Corcino & Brigitte. Posch, 'Mexican RMBS and Brazilian FIDC: A Market Update', *Moody's Investor Service*, (2003) <http://www.moodys.com.br/brasil/pdf/STRUC_Mexican%20RMBS%20and%20Brazilian%20FIDC_Nov03_E.pdf#search=%22fovissste%20history%22> [accessed on July 2006] pp 1-6 (p. 2).

196 INEGI statistics office has categorized the existing dwelling stock under detached, multi-storey, room in roof, refuge, mobile and back to back only and does not identify the date of construction. For which the multi-storey category includes the colonial style buildings and not necessarily only those developed after 1920s, therefore it is not possible to compare amounts between states. See Instituto Nacional de Estadística Geografía e Informática INEGI, 'Viviendas Habitadas y sus Ocupantes por Municipio, Tipo y Clase de Vivienda Particular', *XII Censo General de Población y Vivienda 2000*, (2000), <http://www.inegi.gob.mx/est/librerias/tabulados.asp?tabulado=tab_vi01a&c=773&e=> [accessed on September 2006].

197 Instituto Municipal de Investigación y Planeación (IMIP), *Plan de Desarrollo Urbano de Ciudad Juárez 2003*, Ayuntamiento de Juárez, rev. in 2005, (Juárez: IMIP, 2003), p. 51.

198 Olga Lucía Rodríguez Álvarez, 'La Ciudad que Hace la Maquila: El Caso de Ciudad Juárez, Mexico', *Scripta Nova*, 6, (2002) <http://209.85.135.104/search?q=cache:leh7QxBMPlYJ:www.ub.es/geocrit/sn/sn119-53.htm+inmigracion,+vivienda+y+maquila+en+cd.+juarez&hl=en&ct=clnk&cd=1> [accessed on September 2006] (para. 31 of 35).

Main types of block layouts

There are many types of layouts, notably the perimeter block, the superblock, the point block, and the parallel row block (Figure 2.1). These were transformed in form and shape creating a variety of outdoor areas.[199] The perimeter block transformed from fully closed, closed- and semi-open layouts to open, providing different types of realms and community opportunities (Figure 2.2).[200] The fully closed and closed layout's arrangement with private back gardens limited residents' social life to dwelling entrances located on the road (Figure 2.2a and Figure 2.2b). Later, the provision of an internal pedestrian path between the back gardens to provide more sunlight and ventilation, allowed for casual social encounters for residents (Figure 2.2c).

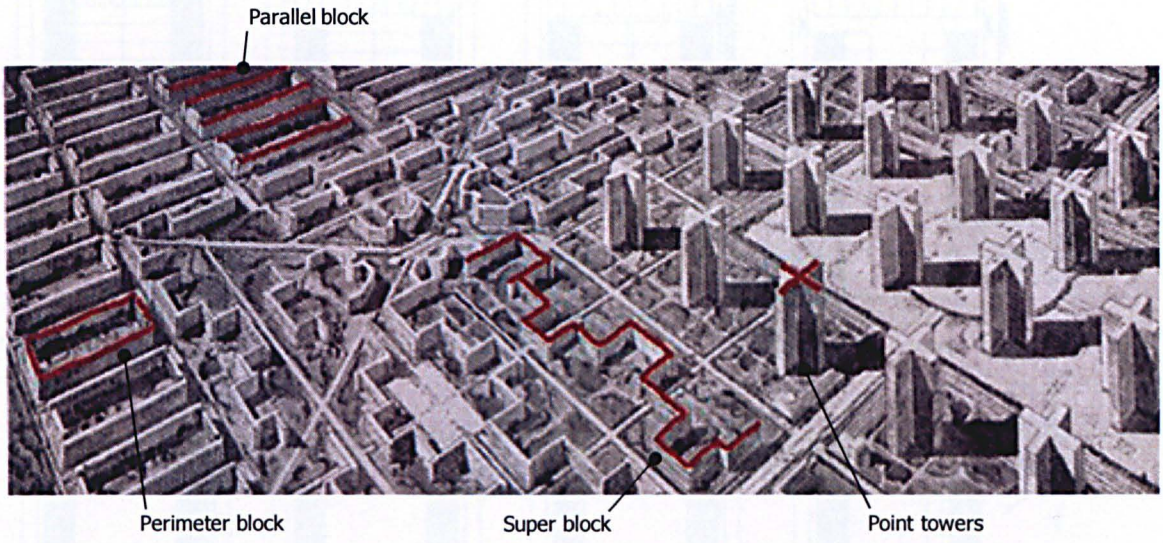

Figure 2.1 The four main types of layouts that characterised medium- and high-rise housing (image from Le Corbusier, *The City of Tomorrow and its Planning*, 1987, p. 173; modified by author to indicate block layouts).

As housing density increased with two to four storey flats, a semi-closed layout was developed having a shared semi-public communal garden and small private gardens where residents could conduct leisure and social activities (Figure 2.2d). In some cases, the small private gardens were removed to improve sun and ventilation. Although the enclosure of the blocks still created a semi-public feeling in the communal gardens, few social opportunities were available with the placement of building entrances through the road (Figure 2.2e). This was improved with the introduction of a road in the communal

[199] Matthew Carmona, Tim Heath, Taner Oc, and others, *Public Places Urban Spaces: The Dimensions of Urban Design*, (Oxford: Architectural Press, 2003), p. 61.

[200] W.C.J Boer, Stedelijk Groen 2: Recente ontwikkelingen de ruimtelijke en functionele relaties met architectuur en stedebouw, (Delft: Technische hogeschool, [n.d.]), pp. 125-127.

gardens bringing residents' daily activities back into the gardens and creating a semi-open layout (Figure 2.2f).

When rationalization of materials and design became imperative in providing housing at mass scale, parallel buildings provided the best choice. This produced the open layout among parallel buildings with a long and continuous communal garden (Figure 2.2g and Figure 2.2h). Building entrances would be either located through the communal garden or through roads on the blocks' outer perimeter. The arrangement of blocks with walks immediately to the front partitioned the outdoor areas into two or more long narrow segments that were difficult to use providing them with a public feeling.

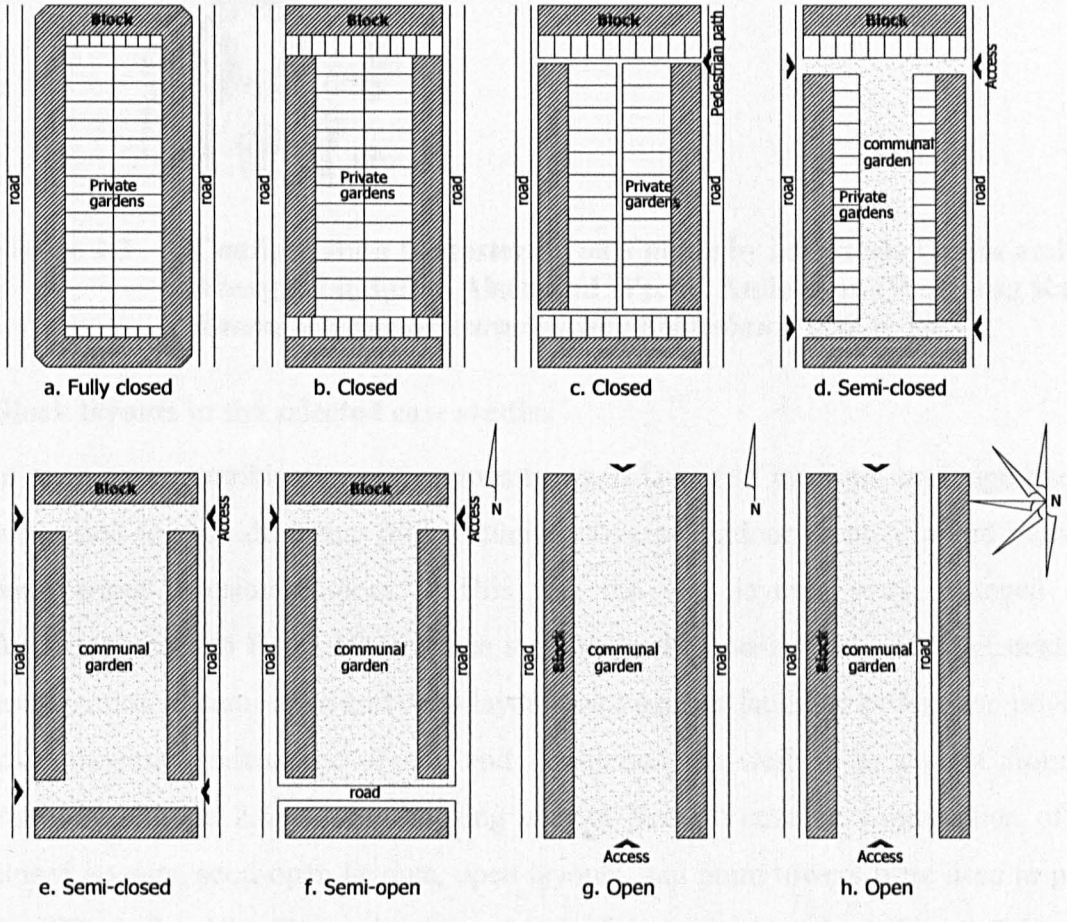

Figure 2.2 **Establishment of realms in the different arrangement of blocks (W.C.J Boer, *Stedelijk Groen 2: Recente ontwikkelingen de ruimtelijke en functionele relaties met architectuur en stedebouw*, [n.d.] p 125)**

From the remaining types of layout, the superblock sometimes comprised straight indented linear slabs or else was produced in S-shaped slabs. This arrangement provided continuous and interminable semi-enclosed spaces in different shapes and sizes with loosely defined areas granting them a public feeling with few opportunities for residents to socialize. Point towers also varied in shape from square, circular, cruciform, S-

shaped, indented, and trapezoidal forms, which provided the best exposure or a varied visual aesthetic. However, the communal gardens around them were usually excessively dissected by walkways, producing numerous small patches that were difficult to use. Other types of layout used were the cluster layouts proposed by the Swedish as a way of creating smaller, more human scale spaces which can more easily be adapted for community life. These would divide outdoor areas into various smaller interconnected and hierarchical gardens (Figure 2.3).[201]

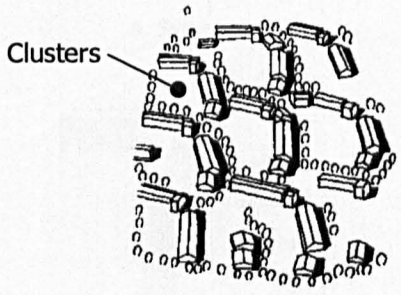

Figure 2.3 **Configuration of cluster layouts made by architects Oestin and Abergh, Lindgren, Alsén and Wecke, Andersson (Wolfgang Rauda, *Raumprobleme im europäischen Städtebau*, 1956, p. 80)**

Block layouts in the selected case studies

In most cases, combinations of various types of layout in medium- and high-rise form were used to provide visual differentiation, diverse outdoor areas to avoid monotony, and various housing choices.[202] This was the way layouts were arranged in the Augustenborg and Rotes Viertel case studies. In the housing area of Augustenborg, a combination of semi-open and open layouts was used to facilitate pedestrian movement, take maximum advantage of sun and ventilation, as well as to protect from wind exposure (Figure 2.4). In the housing area of Rotes Viertel, a combination of semi-closed layouts, semi-open layouts, open layouts, and point towers were used to provide for differentiated layouts and varying types of communal gardens (Figure 2.5). As for the housing area of Infonavit Solidaridad, cluster type layouts were used to encourage community life, to enable a semi-public feeling, and provide visual diversity (Figure 2.6).

[201] Wolfgang Rauda, pp. 74-80.
[202] Rolf Jensen, p. 109.

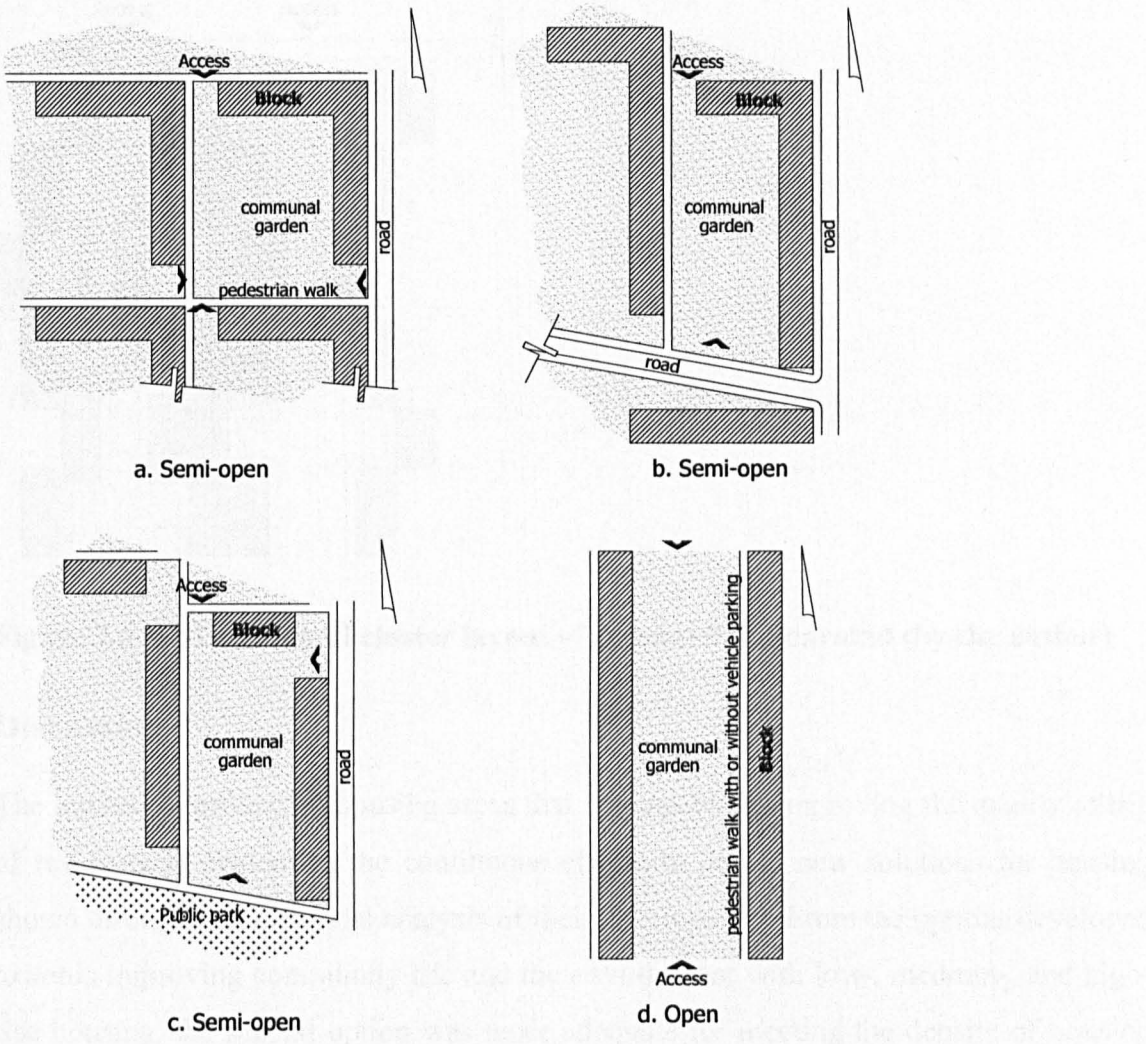

Figure 2.4 Drawing of layout types of Augustenborg (by the author)

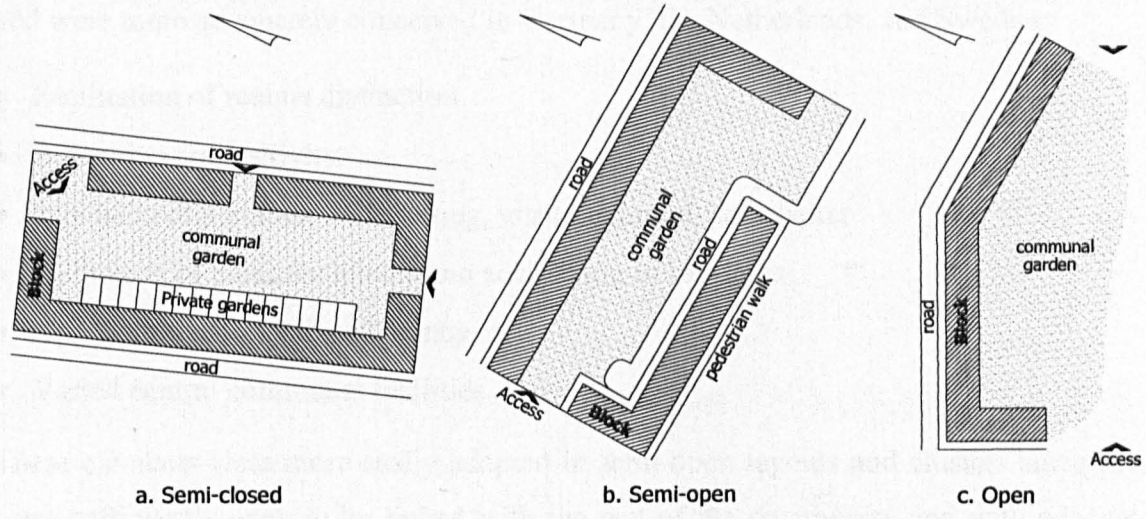

Figure 2.5 Drawing of layout types of Rotes Viertel (by the author)

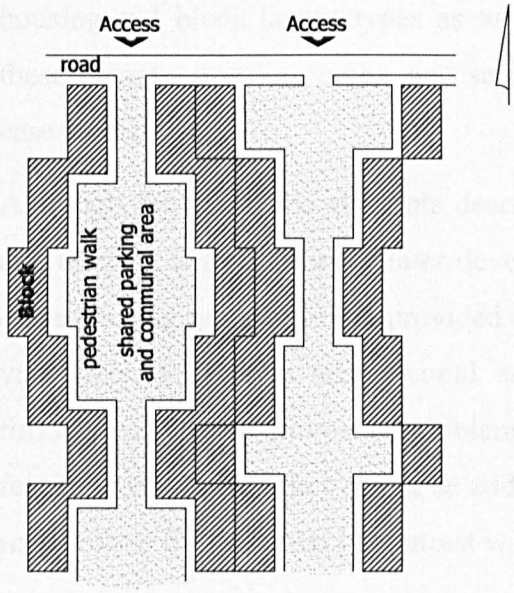

Figure 2.6 Drawing of cluster layout of Infonavit Solidaridad (by the author)

Discussion

The interest in producing housing areas that are capable of improving the quality of life of residents is evident in the continuous efforts to devise new solutions for housing shown through this historical analysis of their development. From the options developed towards improving community life and the environment with low-, medium-, and high-rise housing, the second option was more adequate for meeting the density of housing demand in a quality environment. Yet in order to achieve a comfortable setting, the arrangement of the landscape with particular quality elements appeared to be necessary and were more adequately conceived in Germany, the Netherlands, and Sweden:

- Facilitation of realms distinction
- Pedestrian connectivity
- Provision of a human scale setting, visual richness, and shelter
- Definition of areas for leisure and socializing of residents
- Opportunities for self-sufficiency
- Varied central communal facilities

These elements were more easily adapted in semi-open layouts and clusters since they were sufficiently open to be linked with the rest of the community and with adequate enclosure to create a semi-public feeling. In time, having a variety of options and a local character also became important for visual diversity, choices of dwellings, and establishing identity. This was done by integrating a combination of different types of

housing and block layout types as well as regional materials. Altogether or partially, these layouts, dwelling types, and search for local character are found in the selected case studies.

Although the landscape elements described were an important part of initial medium-rise housing design, most of later developments following modernist ideals in this and other housing types were not provided with them. It was assumed that the availability of vast amount of lawn areas would suffice for encouraging casual encounters. The following chapter explores the problems that derived from the absence of this and other features and the way they might be addressed in order for medium-rise developments to realize their full potential in contrast with the other types of housing.

Chapter 3

Current ideal housing typologies

Introduction

The purpose of this chapter is to analyse the potential of landscape in current medium-rise housing compared to other housing areas.

It starts by exploring the current state of the landscape in most medium-rise housing areas to understand the problems that developed, which may in turn provide insight into adequate solutions for future regeneration projects. Considering possible ways to address current problems, the landscape of medium-rise housing is compared to other housing types to show the opportunities and limitations of each for community life and ecological improvements. Lastly, planning guidance is reviewed to show the degree of support for medium-rise housing areas and the way it is affected by current research recommendations. This is done by reviewing available research and studies, addressing the constraints with which medium-rise housing areas were faced with after being established as well as the desirable housing typologies that are recommended in research and international planning guidance documents.

At the end of the chapter, medium-rise housing is concluded to be a desirable housing model in the current sustainable agenda so long as existing problems are addressed, for which landscape is essential.

Social and ecological constraints in the landscape of medium-rise housing areas

One of the failures of modernism was to assume that the design of space alone would determine the behaviour of the people inhabiting it. The designer's conception, to build a lively community, was in most cases not achieved by the modernist ideals of vast and unarticulated open areas intended for multifunctional purposes. Both medium- and high-rise housing were created following these ideas, so today they suffer from the same social and physical decay problems. They are now in need of regeneration. Through the years, a series of underlying design problems have manifested which need to be

addressed to enable user-oriented outdoor areas that improve social and ecological sustainability. Five main problems have been identified. These are the absence of a hierarchy of spaces and distinction of realms; their open arrangement discourages use; there are no supportive elements for the development of community; there are no established schemes for long-term maintenance and management; and there is little emphasis on improving ecological processes.

Not having a hierarchy of spaces to structure different realms made it difficult to define who should use communal gardens and for what activities.[203] This discouraged their use, reducing the attachment of residents to these areas and limiting the informal surveillance that occasional use generates, creating a no man's land prone to vandalism. Characteristics of design such as designing at human scale, providing for legibility, coherence, enclosure, mystery, robustness, richness, and personalization were not considered in the vast open outdoor areas limiting their use and opportunities to meet other residents.

The sheer size of the communal areas made them difficult to grasp but could have been ameliorated through articulation of smaller sized-areas by a careful positioning of vegetation. 'They are not large enough to act as public parks, and not small enough to possess the intimate pleasure of the private garden'.[204] Residents struggled to orientate themselves amongst the open grounds and repetitive buildings with few reference points in place.[205] As a result, residents would not venture far from their dwellings, reducing social opportunities. Also, the open areas devoid of tree shelter provided few opportunities for casual contact. Having a large population present in the area neither provided more opportunities for residents to meet each other as was expected.[206] There were no stimulating sensory experiences to enjoy outdoors because the intention was to create an illusion of countryside through a contrast between built and open outdoor areas.[207] In sum, the rigidity of the outdoor design did not allow for flexibility,

[203] Matthew Carmona, Tim Heath, Taner Oc, and others, *Public Places Urban Spaces: The Dimensions of Urban Design*, (Oxford: Architectural Press, 2003), p. 69.
[204] Serge Chermayeff and Christopher Alexander, *Community and Privacy: Toward a New Architecture of Humanism*, ([n.p.]: Doubleday, 1963; [n.p.]: Pelican Books, 1966), p. 66.
[205] Clare Cooper Marcus & Wendy Sarkissian, *Housing as if People Mattered*, (Los Angeles: University of California Press 1986), p. 57.
[206] Brent C. Brolin, *The Failure of Modern Architecture*, (London: Studio Vista, 1976), p. 65.
[207] Walter Curt Behrendt, *Modern Building: Its Nature, Problems and Forms*, (New York: Harcourt & Brace, 1937), p. 164.

adaptation, or personalization of the communal gardens to accord with users' needs diminishing their use, generating a lack of identity, and leading to decay.[208]

Another issue that was not addressed was the way in which the design of diverse layouts affected the functioning of outdoor areas. For example the three basic schemes, the superblock, the point block, and the parallel block, share an open landscape approach, yet they partitioned outdoor areas differently. These required special attention in their treatment to provide comfortable areas where residents would meet and socialize.

A problem that lessened community life was not having the community facilities that were initially intended. This restricted social as well as employment opportunities in the housing area, leaving them as dormitory towns vulnerable to vandalism.[209] As for long-term management and maintenance schemes, their absence did not provide ways through which residents could participate in caring for their outdoor environment. For instance, when some medium- and high-rise housing areas were newly built, residents committed to individual maintenance obligations such as cleaning of entrances and the front areas of flats. During the time that residents maintained their immediate outdoor areas, there was a sense of community where residents knew each other. As new residents arrived, who were not engaged in this up keep, community ties and care started to dissolve leading to the commencement of decay in the housing areas.[210]

Finally, although the conception of medium-rise housing areas gave some suggestions that would be important for ecological benefit, the later approach to landscape did not. There were few elements suggested, such as the use of large trees in outdoor areas to improve air quality although in many cases these were not planted after the housing developments were completed. This led to monotonous and monocultural grassy areas of low biodiversity.

All of these problems may be addressed in the regeneration of existing medium-rise housing areas. Yet it is necessary to question if in the current context the landscape of this type of housing can fare better compared to others, for which the potential that each offers in facilitating ecological and social development is compared.

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[208] Brent C. Brolin, pp. 25-28.

[209] Jane Jacobs; *The Death and Life of Great American Cities*, (New York, Vintage, 1961; repr. 1989), pp. 96-101.

[210] Dreda Say Mitchell, *A New Image for the Housing Estate*, BBC Radio 3, (16 November 2008).

Desirable housing typologies and landscape limitations

For many years, there has been a debate about low-rise, high-rise, and medium-rise housing and the possibilities that each offers in regard to sustainability. High-rise housing has been preferred in that it provides a large number of dwellings and therefore a high density, usually more than 70 dwellings per hectare, as well as permitting sufficiently sized outdoor areas. However, research has shown that high-rise housing provides relatively few opportunities for encouraging community life in outdoor areas since those living above six storeys loose visual and auditory communication with the ground. This leads residents to lose interest in outdoor areas and therefore rarely use them.[211] This makes it less likely that residents will participate in any management or maintenance initiatives for outdoor areas or in the implementation of ecological projects. Additionally, although recent research has shown that social opportunities may be improved by providing verandas and forecourts on each storey, this may not always be possible in existing high-rise housing areas, lessening their potential.[212]

In contrast, the traditional low-rise, low-density housing, usually less than 30 dwellings per hectare, has been favoured for its well-defined realms and the social opportunities that may derive from it having front and back gardens. The front garden acts as a buffer zone between the private area of the dwelling and the public area of pedestrian walks and roads that facilitate contact with others if desired. The back garden may be used for the family activities that are more private in nature but may still enable contact with adjacent neighbours.[213] However, opportunities for contact with others may not be so straightforward. Low-rise development creates extensive areas which are isolated from the rest of the city, so residents have to travel long distances to leisure or social areas.[214] Thus, social isolation is worsened in dwellings with extensive front gardens. This is a typical feature of dwellings in the United States, where increased distances discourage contact with people in the public realm.

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[211] Jan Gehl, *Life between Buildings: Using Public Space,* trans. by Jo Koch, 5th edn., (Copenhagen: Danish Architectural Press, 2001), p. 100. See also Tawfiq M. Abu-Ghazzeh, 'Housing Layout, Social Interaction and the Place of Contact in Abu-Nuseir, Jordan', *Journal of Environmental Psychology,* 19 (1999) <http://www.ingentaconnect.com/search/expand?pub=infobike://ap/ps/1999/00000019/00000001/art00106&unc=> [accessed on March 2006] 41-73 (p. 63). See also Min-ShunWang and Hsueh-Tao Chien, 'Environmental Behavior Analysis of High-rise Building Areas in Tawian', *Building and Environment,* 34, (1999), 85-93 (p. 89).

[212] Joo-Hwa Bay, 'Sustainable Community and Environment in Tropical Singapore High-Rise Housing: The Case of Bedok Court Condominium', *Environmental Design,* 8 (2004) 333-343 (p. 339).

[213] Ian Bentley, *Urban Transformations: Power, People and Urban Design,* (London: Routledge, 1999), pp. 213-214.

[214] Serge Chermayeff and Christopher Alexander, pp. 62-66.

In terms of improving the environment in low-rise housing, it is not possible to ensure that all residents will have permeable surfaces in their gardens, or adopt practices that encourage biodiversity. Therefore it becomes difficult to implement ecological initiatives that support sustainability. Even in the provision of new dwellings, developers refrain from planting trees to avoid having them vandalised.[215] Although there have been some exemplary private low-rise housing developments that have incorporated community and ecological solutions through a combination of private and large-shared communal gardens, these are still few. Such housing developments include Radburn in New Jersey from 1929, Village Homes in Davis from 1975, and those produced by the architectural firm Span in the UK during the 1950s and 60s. In these, the arrangement of outdoor areas, their semi-public feeling, the allotments, the frequent events, and shared pedestrian areas have contributed to a good social atmosphere.

Medium-rise housing can be considered as an ideal alternate housing typology between the segregation of low-rise housing and the crowdedness of high-rise housing. Medium-rise housing is most frequently built with a medium- to high density enabling an efficient use of land, sizeable outdoor areas, provision of public transport and connections, and integrating a diversity of facilities. Research showed that residents preferred living in housing areas that had a diversity of facilities when compared to those of low-rise housing.[216]

The communal gardens of existing medium-rise housing may be regenerated to provide them with a semi-public feeling, facilitate pedestrian movement of inhabitants, and meet the needs of a diversity of users. The latter two points are important because it allows inhabitants, particularly children, to visit various communal gardens instead of over-using one of them leading to its extreme wear.[217] In regenerating outdoor areas, planting may provide areas of enclosure and shelter from the weather as well as areas for exploration that also have a rich sensory experience. These adaptations may help neighbours to get to know each other and build social networks. Also, medium-rise housing with varied storey combinations provides more choices for singles, couples,

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[215] Carl Smith, Andy Clayden, and Nigel Dunnett, 'An Exploration of the Effect of Housing Unit Density on Aspects of Residential Landscape Sustainability in England', *Journal of Urban Design*, 14 (2009) <http://docserver.ingentaconnect.com.eresources.shef.ac.uk/deliver/connect/routledg/13574809/v14n2/s3.pdf?expires=1252671915&id=51995836&titleid=676&accname=University+of+Sheffield&checksum=5A8F95341C8990793A917E6B6ED08D39> [accessed August 2009] 163-187 (pp. 179-181).

[216] Stephen M. Wheeler, *Planning for Sustainability: Creating Livable, Equitable, and Ecological Communities*, (Abingdon: Routledge, 2004; repr. 2006), pp. 190.

[217] David Gosling and Barry Maitland, *Concepts of Urban Design*, (London: St Martin's Press, 1984), pp. 41-42. See also Peter Calthorpe, *The Next American Metropolis: Ecology, Community, and the American Dream*, (NY: Princeton Architectural Press, 1993), pp. 37-38

and small families.

All these issues were addressed in the housing area of Byker, Newcastle-upon-Tyne by community-oriented architect Ralph Erskine. Unfortunately, misunderstandings of the design intentions by the locals led to the removal of many essential areas that would have permitted the outdoor areas to fare better.[218] These included outdoor meeting places for adolescents and informal play areas for children who, in their absence, used vegetated areas leading to their excessive wear and tear.

In regard to improving the environment, medium-rise housing has more possibilities compared to other types of housing. Besides having a smaller ecological footprint compared to new building, its shared facilities and communal outdoor areas facilitate the implementation of ecological projects. With regeneration it is also possible to improve biodiversity in the arrangement and selection of planting for communal gardens.[219] A recent study showed that it is possible to achieve the same level of planted areas in communal gardens of medium-rise housing compared to those that may be found in low-rise housing. Similarly, medium-rise housing with densities of 40 to 50 dwellings per hectare was found to have more trees in communal gardens than its low-rise counterparts.[220] Also, the arrangement of dwellings in medium-rise layouts makes them more energy efficient in terms of heat-loss.[221]

In the view of these benefits, medium-rise housing has greater potential for improving social and ecological sustainability compared to other housing types. However, the development and regeneration of medium-rise housing may only be possible if it is supported by current planning guidance.

Housing typologies supported by current planning guidance

Throughout the last four decades there have been planning recommendations that mainly focus on increasing density as a way of supporting community life. In 1961,

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[218] Pär Gustafsson, (Landscape designer, Byker) Interview by C. Martínez, April 2007, transcript 19, Alnarp, Sweden.

[219] John M. Marzluff and Amanda D. Rodewald, 'Conserving Biodiversity in Urbanizing Areas: Nontraditional Views from a Bird's Perspective', *Cities and the Environment*,1 (2008) <http://escholarship.bc.edu/cgi/viewcontent.cgi?article=1013&context=cate> [accessed July 2009] 1-27 (p.14).

[220] Carl Smith, Andy Clayden, and Nigel Dunnett, 'An Exploration of the Effect of Housing Unit Density on Aspects of Residential Landscape Sustainability in England', p.182. See also Carl Smith, Andy Clayden, and Nigel Dunnett, *Residential Sustainability: A Checklist Tool*, (Oxford: Blackwell, 2008), p. 154.

[221] Hugh Barton, Marcus Grant and Richard Guise, *Sustainable Setlements: A Guide for Planners, Designers, and Developers*, (Bristol: University of West England, 1995), p. 202.

Jane Jacobs suggested having a density that would support sufficient diversity of facilities and functions throughout the day with an array of buildings with different number of storeys.[222] This would also provide a varied visual setting because of the different usages, ages, and heights of buildings. Later in 1973, through a comparison of various existing housing areas, urban critic Nicholas Taylor was more specific. He proposed an average density of 198 dwellings per hectare with buildings up to six storeys, an arrangement allowing for most to have access from the ground, an outdoor design providing for visual richness, and a distribution of facilities to support a lively community.[223]

Yet recent research has showed that densities which are too high may not be desirable as the design of human scaled community areas encourages residents' interaction. For instance, the comparison of two cohousing areas showed that densities of 47 dwellings per hectare supported social interaction whilst a density of 198 units per hectare deterred them.[224] Other recommendations suggest a density of 69 dwellings per hectare in order to enable human scaled and diverse outdoor areas that support community interaction, a density that can be achieved by medium-rise housing.[225]

There are countries that are beginning to introduce models of medium-rise housing and those which already have a tradition in producing them. For instance, a particular grid-type of medium-rise housing known as New Urbanism has been promoted in the United States and more recently in the UK, where it is given the name Urban Villages. These call for a minimum of 74 dwellings per hectare in order to support a lively and diverse community setting.[226] Its aim is to mediate small-scale pedestrian-sized neighbourhoods with grid-pattern roads typical of traditional small towns. One of the main criticisms of its contribution to the building of community is the lack of semi-public areas for residents to meet.[227] Instead, squares and parks with a public feeling are promoted as ideal for residents to meet and socialize in, although these are the same places as used by strangers who have little interest in knowing each other.

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[222] Jane Jacobs, pp. 214-217.

[223] Nicholas Taylor, *The Village in the City*, ed. by Paul Barker, (London: Temple Smith, 1973), p. 174.

[224] Jo Williams, 'Designing Neighbourhoods for Social Interaction: The Case of Cohousing', *Journal of Urban Design,* 10 (2005) 195-227 (pp. 213-223).

[225] Clare Cooper Marcus & Wendy Sarkissian, p. 35. See also Stephen M. Wheeler, p. 192.

[226] U.S. Green Building Council, 'Pilot Version LEED for Neighborhood Development Rating System', *LEED Rating Systems*, (2007) <http://www.usgbc.org/ShowFile.aspx?DocumentID=2845> [accessed July 2009]1-155, (p. 14).

[227] Michael Brill, 'Problems with Mistaking Community Life for Public Life', *Places*, (2001) <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=2090&context=ced/places> [accessed July 2009] 48-55 (pp. 48-50).

Looking at UK planning guidance, recommendations are directed towards having a density of 30 to 50 dwellings per hectare which may be best achieved through medium-rise housing.[228] However, design guides give preference to low-rise grid-type dwellings with private gardens. This reduces problems of realm distinction and takes the maintenance burden away from the authorities. In a way, this contradicts current sustainability goals which promote outdoor areas as a source of social life, well being, health, and profit.[229] Conversely, guidelines for regeneration in the UK often refer to foreign examples of medium-rise cluster-type housing, usually from the Netherlands, Sweden, and Denmark. Other countries such as Germany, Denmark, and Sweden have focused on medium-rise housing as a way of achieving compact and efficient cities.[230] In Mexico, the government has already started to generate housing programmes that support the building of medium-rise housing in urban areas as infill and new development.[231]

Discussion

The landscape problems that led to the current decay of medium-rise housing may be attributed to essential missing landscape elements which reduced the informal surveillance and adequacy of outdoor areas for leisure and socializing of residents. Many of these elements had been proposed by designers in the initial design of medium-rise housing, as discussed in the previous chapter, but they were unfortunately not part of later developments. Their provision, as well as other elements that have also become important in the current context and sustainable agenda, can be addressed through the arrangement of the landscape:

- Flexibility
- Provision of a maintenance and management scheme

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[228] Communities and Local Government, 'Better Places to Live by Design: A Companion Guide to PPG3', *Planning, Building, and the Environment*, (2001) <http://www.communities.gov.uk/documents/ planningandbuilding/pdf/152912.pdf> [accessed July 2009] p. 28.

[229] CABE, 'Investing in Neighbourhood Spaces, *Building for Life*, (2005) <http://www.cabe.org.uk/files/ building-for-life-newsletter-issue-4.pdf> [accessed on February 2007] 2-5. See also Office of the Deputy Prime Minister, 'Planning Policy Guidance 17: 'Assessing Needs and Opportunities: A Companion Guide to PPG17', *Planning, Building, and the Environment*, (2006) <http://www.communities.gov.uk/documents/ planningandbuilding/pdf/156780.pdf > [accessed July 2009]1-88 (pp. 45-46-).

[230] Timothy Beatley, *Green Urbanism: Learning from European Cities*, (Washington, D.C.: Island Press, 2000), pp. 34-38. See also Stephen M. Wheeler, p. 118.

[231] Infonavit, 'Más Cerca, Más Grande, Mejor', *Mesa Chihuahua Desarrolladores*, (Chihuahua: Infonavit, 2009) p. 33.

- Greater focus on ecological enhancement of outdoor areas

When comparing the three types of housing in the current context and sustainable agenda, the landscape of medium-rise housing has the possibility to enable more social and ecological opportunities in their communal gardens. Both low- and high-rise housing detaches residents from each other; horizontally by segregating residents with the extensive use of numerous private gardens and vertically by separating residents from communal areas for gathering and leisure with the stacking of dwellings beyond six storeys. Also, most planning guidance suggests a level of density and support for community life that may be best achieved through medium-rise housing.

In the last three chapters, the potential of medium-rise housing has been explored along with the necessary quality issues suggested to be addressed from various perspectives: sustainability indicators, previous regeneration experiences, the initial design intentions of this type of housing, the implications of different block layouts, and the current problems that need addressing. The next chapter focuses on putting together and defining the quality issues of the landscape that may lead to a social and ecological sustainable regeneration taking into account the issues of matter put forward in the last chapters of this study.

Chapter 4

Landscape quality issues for regeneration

Introduction

The purpose of this chapter is to explore the quality issues that support ecological and social sustainability and to outline the way in which they have been approached in this research.

Using the main indicators selected in the first chapter and the issues of importance that have been identified throughout this study, the quality issues of the landscape used in this study are explained in terms of which the selected case studies will be assessed. Since social quality issues have been proposed to be a priority, as established in the introduction and shown throughout the last chapters, they are presented first and then followed by ecological issues. Some of the issues presented here were integrated into a graded assessment developed for this study and others are addressed through the proposed non-participatory observation analysis and perception survey (Appendix A, B, and C). The discussion of each indicator is subdivided into sections which discuss the ways in which they are related to the regeneration of medium-rise housing areas.

The chapter closes by proposing the quality issues as ideal elements for social and ecological sustainability but indicates they are not prescriptive for all contexts.

Social quality issues

Community development

The basis for a sustainable housing development has been stated by policy and academic research to be a stable and flourishing community with strong bonds and attachment to the housing area where residents want to live for a long period of time.[232] These bonds allow residents to develop social networks that enable them to build confidence, capacity, and skills for engaging in decision-making processes that improve

[232] ODPM, Sustainable Communities: Building for the Future, *Communities*, (2003) <www.communities.gov.uk/documents/communities/pdf/146289.pdf> [accessed June 2009] 1-72 (p. 5).

their living conditions. By knowing and learning from other residents, a community may develop a sense of belonging and common values as well as mutual care that may lead them to work together towards a common goal.[233] There are various ways of strengthening community development. These include improving the image of the housing area, fostering pride with the area, strengthening processes for sharing ideas and common values, providing areas for personalization, encouraging actions of care, and supporting a variety of ways for residents to know each other.

The reputation or image of a housing area directly affects the way in which residents feel about it, if they belong there and identify themselves with it. An area's reputation consists of the perceptions of its residents and those of the broader city community, which reinforce each other. An area's reputation affects the permanency of residents in it, and ideally there should be little turnover and a low vacancy rate to foster long-term social networks.[234] In regeneration, a design can improve an area's perceived visual image by providing positive cues.[235] For instance, the materials used may convey a positive or negative message depending on their quality and type. Long-lasting, solid, and aesthetically appealing materials and plants are accepted more easily and they are more likely to be cared for by residents than low-cost and rough-looking ones. [236] Also, regeneration has to be evident to both residents and those who live in other housing areas.[237]

Another way for residents to identify with their housing area is through the integration of significant traits or processes which relate to the heritage of the area.[238] These may be valued artefacts or assets that distinguish it, for example physical objects including art,

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[233] David N. Thomas, 'A Review of Community Development', *Joseph Rowntree Foundation*, (1995) <http://www.jrf.org.uk/sites/files/jrf/sp5.pdf> [accessed September 2010] 1-4 (pp. 2-3). See also Maggie Roe, 'Social Dimensions', in *Landscape and Sustainability*, 2nd edn., ed. by John F. Benson and Maggie Roe, (Oxon: Routledge, 2000; repr. 2007), pp. 58-83 (p. 78).

[234] Jo Dean and Annette Hastings, 'Challenging Images: Housing Estates, Stigma, and Regeneration', *Joseph Rowntree Foundation*, (2000) <http://www.jrf.org.uk/sites/files/jrf/jr089-housing-estates-regeneration.pdf> [accessed June 2009] 1-55 (p. 1).

[235] 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.

[236] Tim Coulthard, 'Just a Phase? The Staiths South Bank', *Landscape*, 55 (2008), 1-52 (p. 21).

[237] Jo Dean and Annette Hastings, p. 10.

[238] John Pendlebury, Tim Townshend, and Rose Gilroy, 'The Conservation of English Cultural Built Heritage: A Force for Social Inclusion?', *International Journal of Heritage Studies*, 10 (2004) <http://docserver.ingentaconnect.com.eresources.shef.ac.uk/deliver/connect/routledg/13527258/v10n1/s3.pdf?expires=1256558677&id=52791012&titleid=774&accname=University+of+Sheffield&checksum=40B7AF257546F32BD5AE63BBE2683730> [accessed October 2009] 11-31 (p. 19).

murals, special habitats or buildings.[239] Assets may define the character of an area, establishing cues to memorable events, and reinforcing activities that inform about the past or current lifestyles.[240] In achieving this, residents may be involved in defining what constitutes the heritage of their housing area. Although these should serve as a way of fostering identity, they should not anchor the community permanently in the past limiting its flexibility for change.[241] Heritage references may become part of the self-expression of residents through personalized balconies, communal gardens, stairs and other features.[242] Lastly, identity may also be asserted through common recognition of the boundaries that residents consider to be part of their home, whether of their dwellings, the communal garden, the housing estate, or beyond.[243]

Shared common values and interests that unite residents persist and endure through time, despite and sometimes because of disturbances relating to religion, politics, culture, health, safety, well-being and the like. The organization of informal and formal associations based on common values enables residents to participate in democratic processes and develop networks for interaction.[244] During and after regeneration, associations may be encouraged as a way of developing awareness, changes in behaviour, and to promote action to improve the environment while supporting the social interaction of residents.

The existence of social bonds uniting a community is evident through residents' participation in simple actions of care in their everyday activities. There are formal activities such as community meetings, organizing events, providing education and others as well as informal activities like caring for the children of neighbours, helping the elderly with grocery shopping, keeping things tidy, gardening, repairing toys, and so

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239 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. 11 of 13).

240 Helen Graham, Rhiannon Mason, and Andrew Newman, 'Literature Review: Historic Environment, Sense of Place, and Social Capital', *English Heritage,* (2009) <http://www.english-heritage.org.uk/hc /upload/pdf/sense_of_place_lit_review_web.pdf?1255955629> [accessed October 2009] 1-44 (p. 23).

241 Georgia Butina Watson and Ian Bentley, *Identity by Design,* (Oxford: Elsevier, 2007), p. 12.

242 Maggie Roe, p. 72.

243 Gerhard Schneider, 'Psychological Identity of and Identification with Urban Neighborhoods', in *The Quality of Urban Life,* ed. by D. Frick, (Berlin: Walter de Gruyter, 1986), pp. 204-207.

244 Alison Gilchrist, 'Design for Living: The Challenge of Sustainable Communities', in *Sustainable Communities: The Potential for Eco-Neighbourhoods,* ed. by Hugh Barton, (London: Earthscan, 2000; repr. 2002), p. 148.

forth. These manifestations also evidence the way the community protects their housing area as part of their territory against inside or outside events that threaten the area.[245]

In order for residents to develop social networks, there must be a diverse selection of opportunities to meet others. To do so, a variety of facilities must be made available as well as a flexible outdoor-indoor design in the housing area. A variety of communal facilities, community services, workshops, social gatherings, and so on can supply choices to fulfil the necessary, leisure, and social needs of the various residents.[246] In establishing facilities, care should be taken to provide services that attract female residents. The diversity of opportunities is improved when permanent and temporary ones are enabled as for example flea markets, art exhibitions, road performances and special events.[247] Other areas can be provided for hobbies which are impractical in flats, for example mechanics, carpentry, or computer hardware for both existing and new residents.

The various opportunities established through which residents can meet must be updated periodically according to their needs, in order to adapt them to changes in the community structure and modern demands. It is important that residents are aware of these facilities as they become unsustainable if they are not used. Good signs of participation during regeneration work include the quantity and types of groups who attend events, community services and voluntary work.[248] The coordination of community activities, social associations, and neighbourhood committees or similar activities should preferably be performed by residents who have received community skills training. Also, it is important that the experiences gained through the coordination, implementation, and continuity of these various facilities and associations are recorded, as they may be sources for future evaluation and serve as a basis for new initiatives in the community.

A flexible design of outdoor areas must be provided that can meet the demands of different age- and gender- groups of residents and which can be transformed to satisfy current and future generations. Also, different sizes and types of dwellings can absorb

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[245] Graciela de Garay Arellano, *Rumores y Retratos de un Lugar de la Modernidad: Historia Oral del Multifamiliar Miguel Aleman 1949-1999*, (Mexico D.F.: Mora, 2002), pp. 161-162.

[246] Deborah Brownhill and Susheel Rao, *A Sustainability Checklist for Developers: A common Framework for Developers and Local Authorities*, (London: BRE, 2002), pp. 20-21.

[247] William H. Whyte *The Social Life of Small Urban Spaces,* 3rd edn ([n.p.]: [n. pub.], 1980; repr. Michigan: Edwards Brothers, 2004), pp. 94-96.

[248] 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).

the changes brought by transforming household structures, different age requirements, and differences in income which allow residents to move within their housing area.[249] This flexibility reduces vacancies and helps to maintain social bonds. Finally, continuous collaboration should be encouraged between the housing company, local authorities, and residents throughout and after the regeneration project.[250] This encourages a unified vision throughout the regeneration, the establishment of short– and long-term goals and commitments, as well as encouraging working together in managing problems and finding their possible solutions.

Community participation

The last component for a sustainable community is community participation. It is defined as the process by which residents become actively involved in their community and any given project. It enables residents to decide and make changes that may improve their quality of life on the short- and long-term as well as take ownership of implemented projects. There are various other benefits from implementing participation strategies for residents. They may develop attachment to their housing area and the community through participating in its modification. Acquiring information from residents is desirable as it provides important feedback of required changes in the housing area from the perspective and experience of residents.[251]

Lastly, participation allows effective implementation of projects, cost-sharing or reduced running costs for local authorities of a project, and development of residents' skills necessary for participating or running projects otherwise known as capacity building.[252] Ideally the community would improve their skills in decision-making until they are able identify, coordinate, implement, and sustain projects they require for the

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[249] Derek Long and Mary Hutchins, 'A toolkit of indicators of sustainable communities', *The Housing Corporation and the European Institute for Urban Affairs,* (2003) <http://www.ljmu.ac.uk/EIUA/EIUA_Docs/A_Toolkit_of_Indicators_of_Sustainable_Communities.pdf> [accessed November 2008] p 8.

[250] Adrian Pitts, *Planning and Design Strategies for Sustainability and Profit,* (Oxford: Architectural Press, 2004), pp. 221.

[251] 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. 32).

[252] John Abbott, *Sharing the City: Community Participation in Urban Management,* (London: Earthscan, 1996), pp. 32-38. See also David Wilcox, *The Effective Guide to Participation,* (Brighton: Delta Press, 1994), pp. 4 and 31. See also Nigel Dunnett, Carys Swanwick, and Helen Woolley, 'Improving Urban Parks, Play Areas, and Green Spaces', *Department for Transport, Local Government and the Regions,* (2002), <http://www.communities.gov.uk/documents/communities/pdf/131021.pdf> [accessed June 2010] 1-214 (pp. 14-16).

well-being of the community.[253]

Opportunities for participation vary according to the level of intensity, duration, and methods used. According to research, the intensity or degree of participation may be divided into five or eight levels.[254] Those which allow full participation or active involvement have been stated to be ideal (Figure 4.1). However, schemes which allow implementing different levels of intensities that may fit the limitations, needs, and choices of a diversity of residents have been indicated to be more suitable. The duration of participation may be for short periods of time during the development and establishment of a project or for long periods of time as part of the project's sustainment which is also known as community management.[255] Ideally both short-term participation opportunities during the regeneration project and long-term ones afterwards should be made available.

Figure 4.1 Possible levels of participation for residents

Types of participation	Levels of participation	
	Sherry Arnstein's model	David Wilcox's model
Full participation	1. Citizen control	Supporting independent
	2. Delegated power	community interests
	3. Partnership	Acting together
Limited participation	4. Placation	Deciding together
	5. Consultation	Consultation
	6. Informing	Information
No participation	7. Therapy	
	8. Manipulation	

Sources: A Ladder of Citizen Participation, (1969); The Guide to Effective Participation, (1994).

Similar to intensity, a variety of methods for participating should be made available and which are suitable for the degree of involvement as well as using formal and informal ways of making them available.[256] Passive methods include those which are used to inform or acquire information as one-way communication whilst active methods engage

[253] 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), p. 163.

[254] 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, pp. 4-9.

[255] John Abbott, pp. 40-41.

[256] Paul Skidmore, Kirsten Boundm, and Hannah Lownsbrough, 'Community Participation: Who Benefits?', *Joseph Rowntree Foundation*, (2006), <http://www.jrf.org.uk/sites/files/jrf/1802-community-network-governance.pdf> [accessed September 2010] 1-96 (p. 7). See also David Wilcox, pp. 19-21.

residents in exchanging ideas and decision-making as two-way communication. Formal ways of participation are those where residents attend designated events to do so and informal ways are by making opportunities available in usual community gathering areas such as schools, grocery shops, clinics, or others.

All these issues that form part of community development and participation are integrated into the assessment to be applied in the case studies of Augustenborg and Rotes Viertel (Appendix A).

Design quality issues for social integration

Principles of outdoor areas

Casual opportunities for contacts are most important for encouraging social integration.[257] As the number of people using outdoor areas increases, so do the opportunities to meet. The design characteristics of the landscape may facilitate or impede these opportunities for contact. In Jan Gehl's study of the usage of public spaces, necessary, optional, and social activities were identified as the main type of uses of outdoor areas. Of these, optional and social activities may be encouraged by the design of the landscape, contributing to longer stays and a rich outdoor activity life which attracts more people.[258] Areas that encourage the presence of groups and a high proportion of women are good indicators of well used areas.[259] Also, the possibility for passive and active engagement in the landscape increases options for using outdoor areas.[260] Altogether these elements aid in increasing the number of users in outdoor areas that improves informal surveillance and a sense of safety.[261] The following eight characteristics of landscape design should be integral to these areas for the comfort and quality that encourage their use for longer stays.

Permeability, spatial definition, and scale

Many authors agree that a key component of ideal outdoor areas that provides choice is

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[257] Leon Festinger, Stanley Schachter and Kurt Back, *Social Pressures in Informal Groups: A Study of Human Factors in Housing*, ([n.p.]: Harper & Brothers, 1950; repr. London, Tavistock, 1959), pp. 34-59.

[258] Jan Gehl, *Life between Buildings: Using Public Space,* trans. by Jo Koch, 5th edn., (Copenhagen: Danish Architectural Press, 2001), pp. 13-25.

[259] William H. Whyte, p. 18.

[260] Mark Francis, *Urban Open Space: Designing for User Needs*, (Washington: Island Press, 2003), p. 23.

[261] Oscar Newman, *Design Guidelines for Creating Defensible Space*, (Washington: National Institute of Law Enforcement and Criminal Justice, 1976), p. 111.

permeability, or accessibility. Permeability is defined as the number of available ways to gain access between areas, allowing movement or enabling links between them.[262] In enabling these links, it is essential that areas are defined to create different types of realms that allow establishing their private, semi-private, semi-public, or public hierarchy to increase users' sense of ownership, responsibility, and care.[263] The connections between realms should have transitions and recognisable boundaries that facilitate the distinction between the different types of realms.[264] All these elements provide residents with controls to reduce the chances for vandalism caused by undesirable users.

Boundaries are usually perceived by the physical and visual senses. They can be permanent, semi-temporal, or temporal and may be designed as physical or symbolic boundaries.[265] Permanent boundaries include solid and usually long-lasting structures such as walls or trees. Semi-permanent boundaries may be formed by screening structures such as wooden fencing or shrubs. Lastly, temporal boundaries include fluctuating elements as flower beds which may change, for example according to season. If boundaries are designed as physical obstacles, they separate one area from another, while symbolic ones have embodied information in the boundary's exterior material quality. Both may contain expressions of territoriality by users.

In housing areas, distinctions between realms are found inside and outside dwellings. For medium-rise dwellings, there are more public realms when there are shared communal gardens. Semi-private areas include small balconies and less frequently back gardens for dwellers living on the ground floor. We also find semi-public areas which include stairs, elevators, and entrances as well as public areas as a series of shared communal gardens and a central park-like area. Although these communal gardens have public access, a semi-public feeling may be provided through planting that strengthens residents' sense of attachment to them. Although BRE recommends the use of fencing as an option, it is not considered ideal as it may lead to reduced permeability in the

[262] Ian Bentley, Alan Alcock, Paul Murrain, and others, *Responsive Environments: A Manual for Designers,* (Burlington, MA: Architectural Press, 1985), pp. 12-26.
[263] Serge Chermayeff and Christopher Alexander, *Community and Privacy,* (Middlesex: Penguin Books, 1963; repr. 1966) pp. 140-141.
[264] Oscar Newman, p. 109.
[265] Ian Bentley and others, pp. 12-26.

housing area and tend to segregate the community.[266]

The first boundaries that define communal gardens in medium-rise housing are the building layouts. In communal gardens, planting may provide boundaries which define areas to provide them with a semi-public feeling, having transitions that enable a sequential movement. Areas which risk becoming left-over areas should be visually enhanced through the arrangement of shrubbery.[267] Distinguishing realms in communal gardens also provides smaller segments within areas that are easier to read, handle, and adopt than big open areas.[268] This is easier in courtyards of square shape and within a size of 40m to 60m on each side.[269] Other characteristics of planting design which have an effect in establishing the boundaries between realms are described below.

Legibility

The visual and physical understanding of a place allows users to create a mental image of a given area.[270] Legible outdoor areas enable users with some form of prediction of what lies ahead in order to provide a sense of safety.[271] Kevin Lynch suggested locating identifiable or memorable elements for orientation and creating an image of the area to help find the way easily. This is achieved through five basic elements which are paths, nodes, landmarks, edges, and districts.

Paths, or movement channels, should be distinct in size and character. This may be achieved by distinguishing pedestrian walks in communal gardens and roads with different trees or plants which have distinct architecture and heights. Nodes, or focal areas through which users can enter junctions, should be sized and emphasized according to their visual or functional importance. Details of flowers and shrubs, or particular arrangements of trees may give visual and physical emphasis to significant nodes like a square or the junctions of pedestrian walks in the housing area. These may become points of visual interest and sources of casual conversation. The dimensions of

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[266] BREEAM, 'BRE Environmental & Sustainability Standard: Multi-residential 2008 Assessor Manual', *BREEAM Multi-residential,* (2008), <http://www.breeam.org/page.jsp?id=2> [accessed June 2009] 1-413 (p. 108).

[267] 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. 301.

[268] Jack E. Ingels, *Landscaping: Principles and Practices*, 4th edn (New York, Delmar Publishers,1978; repr. 1992) pp. 97-99.

[269] Clare Cooper Marcus and Wendy Sarkissian, *Housing as if People Mattered: Site Design Guidelines for Medium Density Family Housing*, (Berkeley: University of California Press, 1986), p. 122.

[270] Ian Bentley and others, p. 42.

[271] Rachel Kaplan and Stephen Kaplan, *The Experience of Nature: A Psychological Perspective*, (Cambridge: Cambridge University Press, 1989) p. 55.

nodes should allow for standing and passing pedestrian traffic but also for viewing other activities nearby.[272]

Landmarks, or points of reference, should be distinct and related to existing activities in the area. Landmarks are identifiable if they have a clear form, contrast with the background where they are set, or are visible from many locations. Elements of significance to the housing area and to each communal garden may be introduced such as art objects, particular plant specimens of relevance, water fountains, or design themes.

Edges, or linear elements such as railways may act as boundaries and can also form transitions to adjacent areas. Finally districts, or the different parts that make up an area, usually have characteristics that distinguish them from one another. The properties of each district may rely on activities, physical characteristics, events, themes or other attributes. A housing area may be divided into manageable parts instead of being a large area with repetitive layouts, while the communal gardens can help to distinguish particular parts. All these elements should be related to each other in order to create an image of the whole area for users.[273]

Order

Order consists of the arrangement of elements to create some form of pattern.[274] This can be achieved through the use of ordering principles such as axis, symmetry or asymmetry, hierarchy or datum.[275] An axis is an imaginary or defined line used to arrange elements around it, usually with two focal points at each end. Symmetry is where a point or axis line divides the composition of elements into similar parts and asymmetry where there is a form of order that can be distinguished. For formal arrangements of gardens and housing layouts, a physically defined axis and symmetry are commonly used. For more loosely defined gardens and housing layout arrangement, an imaginary line and asymmetry are usually used.

Hierarchy, or the spatial and visual predominance of elements, facilitates the

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[272] Shu-Chun Lucy Huang, 'A Study of Outdoor Interactional Spaces in High-rise Housing', *Landscape and Urban Planning*, 78 (2006) <http://www.sciencedirect.com/science?_ob=ArticleURL&_aset=V-WA-A-W-A-MsSAYVA-UUW-U-AACBVACUUD-AACUEECYUD-EVEBVBVWW-A-U&_rdoc=1&_fmt=summary&_udi=B6V91-4H998T9-1&_coverDate=10%2F10%2F2005&_cdi=5885&_orig=search&_st=13&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=76feea3cd19cf16b54abb57018fc08fd> [accessed on February 2006] 193-204 (p. 201).

[273] Kevin Lynch, *The Image of the City*, (Cambridge MA: M.I.T. Press, 1960), pp. 47-80.

[274] Ibid., p. 4.

[275] Simon Bell, *Elements of Visual Design in the Landscape*, (London: Spon, 1993), pp. 146-158.

establishment of order in related elements. This applies to the distinction of realms in the communal gardens through planting to establish behaviour cues in their use. Datum is an element of reference for the organization of the rest of parts that constitute an arrangement. It may provide emphasis to a recognizable centre or system of elements. Housing layouts are commonly arranged around a square or park although residents may instead recognize their communal garden as a distinguishable centre for their everyday lives. Establishing a similar form of order throughout communal gardens and arrangement of layouts contributes to a sense of visual unity among the different elements.

Coherence

Coherence is the way the parts of a design integrate into a whole. There are various structural elements which keep a design together, such as consistency, balance, proportion, scale, and rhythm.[276]

Consistency implies the use of similar elements of design throughout the whole composition such as materials, colours, shapes, spatial solutions, planting concepts, or others. These elements link the design of the various communal gardens creating a distinctive integrated unit compared to other areas in the city. The balance or equilibrium of elements may be observed in terms of their visual weight in relation to each other, in terms of their shape, colour and mass. Balance may be achieved by using a system of proportion, that is, a given relation in size of one element to another. Among various systems of proportion, the rule of one-to-two thirds is commonly used in landscape for the relation of sizes among elements.[277] This relation keeps a good sense of visual balance between order and chaos.[278] This system of proportion may be used to relate the surface area of plants and hard materials as a distinction between diversity and order.

Scale means the relation of the size of given elements to that of the human body. The large size of medium-rise buildings may be mitigated through the use of vegetation in outdoor areas arranged in various layers. The overwhelming size of communal gardens may also be reduced by integrating various smaller areas reducing its scale.[279] Lastly

[276] Simon Bell, pp. 128-142.
[277] Ibid, pp. 140-141.
[278] Peter F. Smith, 'Human Habitat and Aesthetic Values', in *City Landscape,* ed. by A. B. Grove and R. W. Cresswell, (London: Butterworths, 1983), pp 31-32.
[279] Anne R. Beer and Catherine Higgins, p. 116. See also Simon Bell, pp. 150-151.

rhythm, which implies a repetition of shapes at given intervals, is characteristic of the medium-rise planning of building layouts.

Enclosure

Creating shelter to one side of an area, perhaps with a canopy, defines a given space and its relation to the adjacent areas.[280] The type and degree of enclosure, the number of elements used and their characteristics, will determine the users' perceptions, the microclimate, and its character.[281] For example, the degree of side enclosure varies with its density, which may be formed with shrubs or widely spaced trees. The more enclosure provided and the lower the degree of density to view in or out provides more privacy but may also lead to feeling constrained and unsafe. Conversely, areas that have little enclosure and are too open are not liked as they do not provide shelter or visual interest.[282] An adequate combination may be obtained through the placement of side and canopy enclosures such as trees and shrubs, which give some privacy to users on the ground as well as to those in balconies.[283] For this, side enclosure with a height of 1.80m provides adequate shelter and also privacy. However, a height of more than 2.40m may become too imposing and out of scale in relation to users.

The character of an area is also constituted by the type of materials and the size of the area enclosed. In other words, the way in which the properties of the elements that make up a space distinguish it from others.[284] Many of the failed communal gardens of medium-rise housing are characterised by being too open, uninteresting, never-ending lawn areas.

Mystery

The elements of an area can be arranged to provide for exploration and discovery opportunities. Planting may provide partially secluded views in the design of pedestrian walks and areas that make up the communal gardens. Each area may be characterised by different types, layers, and heights of planting as well as materials which together

[280] Simon Bell, pp. 112-114.
[281] Catherine Dee, *Form and Fabric in Landscape Architecture: A Visual Introduction*, (London: Spon Press, 2001; repr. 2004), pp. 42-44.
[282] Rachel Kaplan and Stephen Kaplan, p. 47.
[283] Jack E. Ingels, pp. 203-204.
[284] Carys Swanwick, 'Landscape Character Assessment: Guidance for England and Scotland', *The Countryside Agency and Scottish Natural Heritage*, (2002) <http://www.landscapecharacter.org.uk/files/pdfs/LCA-Guidance.pdf> [accessed on April 2008] 1-84 (p.8).

integrate diverse information to users for discovery and exploration.[285] Other considerations of interest include fun and joy which may be achieved through elements that enable passive and active engagement in the design, such as art objects, informal playgrounds, and entertainment such as clowns, dancers, and other elements which have been seen to lead to casual conversations among strangers.[286]

Robustness

Outdoor areas may be designed to be flexible for various activities and users and enable change over time. Robust areas allow for daily necessary activities and the possibility of being turned into leisure or social spaces.[287] Robustness can be achieved by enhancing edge activities, pedestrian areas, seating areas, improving outdoor microclimate conditions, and providing for flexible arrangements.[288]

Edge areas found between the building and the communal gardens such as entrances, private gardens, and balconies may be designed to support areas for standing or resting that may lead to casual encounters. Supportive elements include the size and type of boundaries, formal and informal seating, planting for shelter, and visual foci. Areas surrounding entrances to buildings may be supported with seating such as rocks or tree ledges or trees for users to rest. In the case of private gardens, transparent boundaries to the communal area enable viewing in and out, increasing opportunities for casual contact. In this case, a depth distance of no more than 5m is preferable to maintain contact with road or communal area's activities.[289] Balconies with options for privacy and large enough to have space for seating may facilitate leisure and casual contacts if desired.

Seating supply can be described in terms of type, quantity, orientation, comfort, level, and arrangement. There is the primary type of seating such as benches or chairs, and secondary such as stairs, stones, low walls, or other objects. The quantity of seating is recommended to be 30 linear centimetres for every 3 square metres of outdoor area, of which a minimum of 10% should be assigned for formal seating.[290] Seating should be located at regular intervals every 100m. Comfortable seating allows users to get up and

[285] Rachel Kaplan and Stephen Kaplan, pp. 55-57.
[286] Henry Shaftoe, *Convivial Urban Spaces*, (London: Cromwell Press, 2008), p. 111. See also Mark Francis, p. 25. See also William Whyte, p. 94.
[287] Jan Gehl, p. 11-14.
[288] Ian Bentley and others, pp. 56-60.
[289] Jan Gehl, p. 69-97.
[290] Ian Bentley and others, p. 73.

sit down easily and encourages a longer stay. Seating should be oriented to view daily activities or foci, be sheltered from weather and with minimum level differences.[291] Seating arrangement includes individual and grouped design arranged in different configurations which affect the interaction between users (Figure 4.2). The arrangement should allow users the option to distance themselves from others to maintain a comfortable interpersonal distance.[292]

Outdoor areas may be flexible for change, according to users' needs. This may be obtained by providing loose areas which are not regulated or strictly maintained and which provide users with an alternative to the communal gardens.[293] Diverse areas within the communal garden can be defined with planting that can be changed over time, rather than hard structures, or through the provision of movable furniture and modular elements which are easy to adapt into smaller or larger areas, as well as integrating formal and informal elements such as formal-informal seating or formal-informal play equipment.

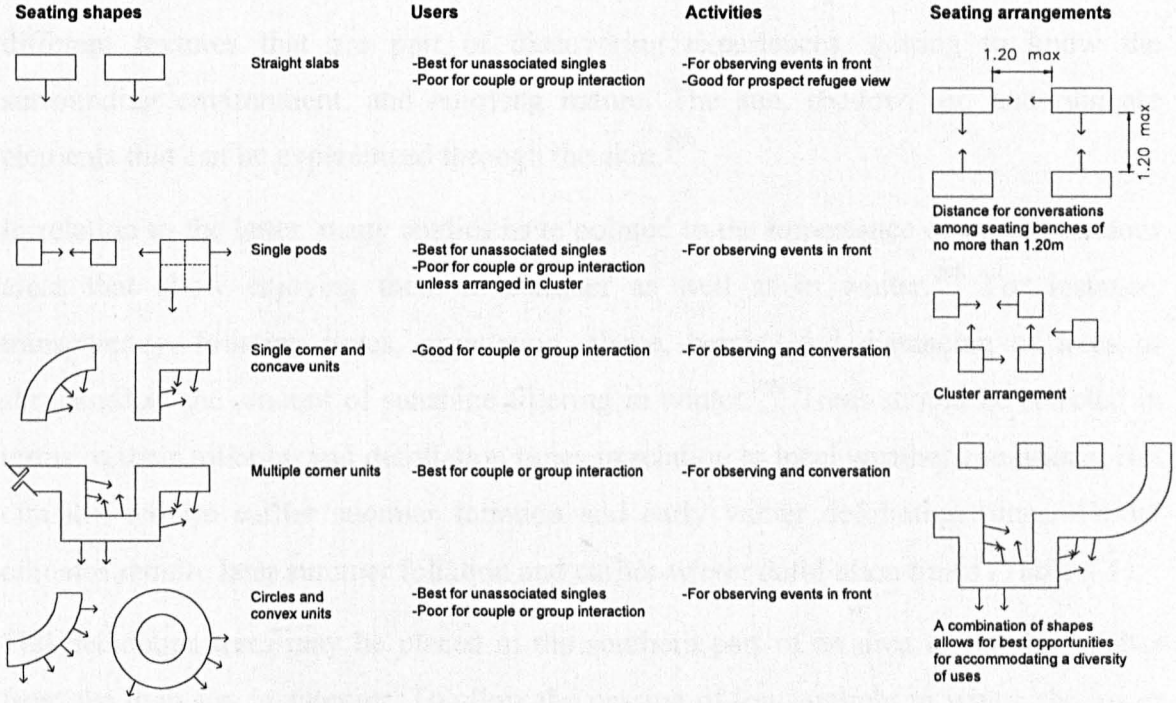

Figure 4.2 **Drawing after seating shapes and arrangement exemplified by Ian Bentley (*Responsive Environments: A Manual for Designers*, 1985, p. 73)**

[291] Jan Gehl, p. 144-164.
[292] Henry Shaftoe, p. 52.
[293] Ken Worpole and Katherine Knox, 'The Social Value of Public Spaces', *Joseph Rowntree Foundation*, (2007) <http://www.jrf.org.uk/sites/files/jrf/2050-public-space-community.pdf> [accessed July 2009] 1-16 (p. 9).

Complexity

Variety and richness are relevant because the human senses are devised to detect changes.[294] So the elements of outdoor areas should enable various sense experiences which support choice and make a journey more pleasant.[295] Ian Bentley provides a robust description of how the senses affect our perception. Sensory experience can be provided either by a permanent or a temporary source of information. If the sources are permanent, users can choose by focusing their attention on the various options provided at different times and by regulating the proximity to the source as senses have different distance limits.[296]

The sense of motion relies on the choices given by the spatial definition of a setting and the visual boundaries. Therefore, the design for realm distinctions and enclosure should be considered to enable diverse kinetic experiences. The sense of touch is closely related to the sense of motion, because as we move about, objects can provide information at touch. Tactile experience is voluntary as we can decide on what to touch but also involuntary in terms of weather conditions. Various plants and materials have different textures that are part of discovering experiences, getting to know the surrounding environment, and enjoying nature. The sun, shadow, air, and rain are elements that can be experienced through the skin.[297]

In relation to the latter, many studies have pointed to the importance of having outdoor areas that allow enjoying them in summer as well as in winter.[298] For instance, transparency, foliation times, orientation, shape, height, and distancing of trees or shrubs affect the amount of sunshine filtering in winter.[299] Trees should be selected in terms of their foliation and defoliation times in relation to local weather conditions. Hot climates require earlier summer foliation and early winter defoliation times. Colder climates require later summer foliation and earlier winter defoliation times (Table 4.1).

Tall deciduous trees may be placed in the southern part of an area to provide shelter from the high sun in summer. To allow the passing of low sunlight in winter the lower branches should be pruned (Table 4.2). On eastern sides, deciduous shrubs or small

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294 Niels L. Prak, *The Visual Perception of the Built Environment*, (Delft: University Press, 1977), p. 71.
295 Catherine Dee, p. 17.
296 Ian Bentley, pp. 89-98.
297 Anne Whiston Spirn, *The Language of Landscape*, (New Haven, CT: Yale University Press, 1998), pp.96-98.
298 William Whyte, pp. 42-44.
299 Robert D. Brown and Terry J. Gillespie, *Microclimatic Landscape Design: Creating Thermal Comfort and Energy Efficiency*, (New York: John Wiley & Sons, 1955), p.116.

trees will provide shelter from the rising sun. On western sides, a combination of perennial climbers, shrubs, or small trees may protect from the wind in winter and the sunlight at evening in summer. The shape of a tree's crown will produce a different shadow depending on the extent of the area to be covered.

Table 4.1 Foliation and defoliation times of deciduous trees

	Late foliation-early defoliation for cold climates			Early foliation-early defoliation for hot climates
Variable	England	Sweden	Germany	North of Mexico
Acer rubrum	x		x	
Acer saccharum	x		x	
Amelanchier	x			
Fagus	x			
Fagus sylvatica		x		
Fraxinus	x	x		x
Gleditsia triacanthos				x
Juglans	x			
Platanus x acerifolia	x	x	x	
Tilia	x	x	x	

Sources: Carl Smith, 'Green Homes: A Study of their Residential Landscape Sustainability, Detailed Residential Landscape Sustainability Checklist Appendix B', (Unpublished doctoral thesis, University of Sheffield, Department of Landscape, 2005), p. 2 of 33; Birger Myllenberg, 'Hur Skapas Trivsamma Omgivningar Kring Bostadshusen', *Sveriges Allmännyttiga Bostadsföretags Konferens i Malmö*, (Malmö: Framtiden, 1951) p. 108; Camilla Anderson, Strees and Parks Department Malmö, electronic communication, 6 May 2008; Kerstin Ehlebracht, Senatsverwaltung für Stadtentwicklung Berlin, electronic communication, 13 October 2008; IMIP, *Arboles Recomendados para el Área de Ciudad Juárez Chih*, (Cd. Juárez: IMIP; 2008), pp. 6-30; Robert D. Brown and Terry J. Gillespie, p. 116.

Table 4.2 Deciduous trees with high bare branch transparency

Variable	England	Sweden	Germany	North of Mexico
Acacia		x		x
Acer platanoides		x	x	
Acer pseudoplatanus	x		x	
Acer saccharinum	x			
Aesculus hippocastanum		x	x	
Betula pendula		x	x	
Gleditsia triacanthos				x
Quercus macrocarpa				x
Quercus robur	x		x	
Quercus rubra			x	
Quercus texana				x
Robinia pseudoacacia	x			
Salix		x		
Sapindus saponaria var. drummondii				x
Ulmus	x	x		x

Sources: Carl Smith, p. 2 of 33; Birger Myllenberg, p. 108; Camilla Anderson, electronic communication, 6 May 2008; Kerstin Ehlebracht, electronic communication, 13 October 2008; IMIP, pp. 6-30; Susan Imboden, 'Planting Trees for Solar Control', *Growing Points,* 1 (1996) <http://ohric.ucdavis.edu/Newsltr/Growing%20Points/1996/Gp96fall.pdf> [accessed on April 2007] pp. 4-5; Robert D. Brown and Terry J. Gillespie, p. 116.

The sense of sight depends on the distance from the source. Distance will determine the amount of information that can be acquired from an object or a person, either to the fine detail if very close or general information if distanced away. Jan Gehl points out the limits of the visual field for acquiring details and the importance of distance as a regulator for different types of interactions (Table 4.3).[300] Small-sized areas encourage conversations compared to large impersonal ones. Also, outdoor areas in the same level facilitate visual communication.[301] Jan Gehl indicates that after third storey a considerable loss of contact is present which is completely lost after fifth storey.[302]

Table 4.3 Horizontal distances recommended for social interaction

Purpose	Distance
Front yards	3.25m
Personal distance (close friends and family)	0.45-1.30m
Social distance (ordinary friends, neighbours, acquaintances)	1.30-3.75m
Public distance (two-way conversation)	3.75-7.00m
Public distance (one-way conversation)	7.00-35.00m
Maximum visual distance (fir distinguishing facial expressions)	20.00-25.00m

Source: Jan Gehl, pp. 65-74.

For visual richness, planting is very versatile because it can provide various colours, textures, and patterns that may mark the flow of time with seasonal changes.[303] Planting with fruits and flowers may attract diverse insects and animals that give a sense of life to the landscape while particular specimens can act as foci.[304] Hard surfacing materials such as concrete, stone, wood, or metal will also provide visual variety under different weather conditions, as sunshine exposure, shadow, or wet conditions.

The way in which visual variety may be assessed is in terms of the contrasts provided, the dissimilarity of the elements employed.[305] The number of contrasts should be around five to nine or composed in groups that produce those numbers as this is the amount of information that perception can process without creating confusion.[306] The contrasts achieved by colours and textures depend on various elements. Both are the result of the visual perception of light onto objects and are affected by the surface characteristics and

[300] Jan Gehl, pp. 65-74.
[301] William Whyte, p. 58.
[302] Jan Gehl, p. 100.
[303] Simon Bell, p 79.
[304] Jack E. Ingels, pp. 230-233.
[305] Steven Davis, *Color Perception: Philosophical, Psychological, Artistic and Computational Perspectives,* (New York: Oxford University Press, 2000), p. 32.
[306] Ian Bentley, p. 90.

the viewing distance, either horizontally or vertically.[307]

Contrast between colours depends on size, shape, location, and the number of elements in a given composition.[308] Contrasting colours are noted by the distinction between the primary colours, blue, red, and yellow followed by the secondary colours, purple, orange, and green. Contrasts will be most likely found in opposite quadrants of the wheel colour.[309] Their location in relation to others will provide contrasts or assimilations.

Contrasts in textures are a result of the surface characteristics which distinguish between objects and have a random pattern with fixed properties.[310] The textures of materials like stone, concrete and wood are hard while lawn, soil, water and sand have soft surfaces.[311] Contrasts between textures depend on the porosity, scale and gradient of the surface characteristics.[312] The composition of hard surfaces have a lower degree of permeability compared to semi-hard or soft paving which have visually more open grain. Different sizes of materials such as sand, gravel, or rocks enable contrasts between fine to coarse appearance and the surface properties can vary from smooth to rough such as polished wood or the bark of trees. Flowers and leaves also have a fine, medium, and broad scale properties. With this in mind, in areas where viewing distances are greater than six metres, medium-sized plants should be considered to achieve contrasts in textures of flowers and leaves.[313]

Another way of providing contrast in colours and textures is through sequences of scales, groupings, species, and age in planting.[314] For example, the various scales of planting may include ground cover, flower beds, shrubs, trees and climbers. These should be considered in reference to the three dimensions of colour. For example, highly saturated colours, or colours with vivid intensity in their hue are suited for smaller surfaces.[315]

The sense of hearing depends on the distance from the source although it may be

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[307] Gerald M. Murch, *Visual and Auditory Perception*, (Indianapolis: Bobbs-Merrill Company, 1973), p. 10-11. See also Michael Lancaster, *Colourscape*, (London: Academy Editions, 1996), p. 23.
[308] Steven Davis, p. 32.
[309] Catherine Ziegler, *The Harmonious Garden: Color, Form, and Texture*, (Portland: Timber Press, 1996), p. 2.
[310] Steven Davis, p. 81.
[311] Jack E. Ingels, pp. 217-223.
[312] Catherine Dee, p. 193.
[313] Catherine Ziegler, p. 3.
[314] Simon Bell, pp. 64-65.
[315] Michael Lancaster, pp. 52-53.

controlled through filters. Unless the filters are solid, the reduction of sounds is minimal. It is the movement of leaves in trees with wind which can overpower other sounds. Green screens of trees or shrubs may be used.[316] Materials with textures such as earth, lawn, planting, or other, perform better at muffling sounds whereas hard surfaces such as stones, concrete, or metal intensify the reflection of sounds. This is particularly important in communal gardens where there are a large proportion of hard surfaces reflecting sounds from people using the ground areas which can disturb residents in flats and reduce conversation privacy of ground users as well.

The sense of smell largely depends on the distance, strength, and arrangement of the source and wind conditions. Distance from the source can be controlled by coming closer or moving away from it depending on the strength of the source. Mostly, the sense of smell registers scents and odours up to one metre, more if the source is much stronger, for example perfume or rubbish, and some plants scents are perceived at walking distance.[317] The arrangement of the source and direction of wind affect the distribution of the odours or scents. A linear arrangement will emit a long cloud effect on its longitudinal side or a shorter cloud effect on its transversal side depending on wind orientation.

Finally, design of outdoor areas that addresses the sense of taste is rare. Current communal gardens are not usually designed for experiencing flavours of fruits or herbs due to the amount of maintenance they require. Yet tending fruit trees and allotments in communal gardens has many advantages, for example improving health, providing leisure, regaining contact with nature, and providing opportunities for meeting neighbours. Caring for an allotment may be integrated as part of a resident's informal or formal activities.[318]

The way in which these design related issues encourage leisure and social interaction in the outdoor areas of the selected case studies of Augustenborg and Rotes Viertel is explored through a survey and observation analysis (Appendix B and C). However in order to conduct these it was first necessary to analyse the landscape that characterises each case study, which is addressed in the next chapter. This is explored jointly with the way the regeneration has helped to improve the environment as well as community

[316] Anne R. Beer and Catherine Higgins, p. 113-115.
[317] Jan Gehl, p. 66.
[318] Joe Howe, André Viljoen, and Katrin Bohn, 'New Cities with more Life: Benefits and Obstacles', in *Continuous Productive Urban Landscapes*, ed. by André Viljoen, (Oxford: Architectural Press, 2005), p. 57.

development and community participation.

Ecological quality issues

Reducing energy use and Carbon Dioxide (CO_2) emissions by strengthening pedestrian and bicycle transport

Research indicates that transport accounts for 24% of domestic carbon dioxide emissions in the UK of which about 53% comes from vehicles.[319] In order to reduce reliance on vehicles it is necessary to improve pedestrian and cycling outdoor areas. There are three means of achieving this, including providing facilities at walkable distances, safe outdoor areas, and the adequate design of pedestrian and cycle areas.[320] Whilst existing housing areas cannot be redesigned entirely, these elements may be modified.

The location of large facilities such as parks, playing fields or post offices should be within an 800m walk whilst smaller facilities such as playgrounds, local shops and public transport should be within a 400m walk (Table 4.4). These measures, suggested by academic research, are more conservative compared to those of governmental guidance that recommend longer distances. For example LEED recommends most facilities should be within 800m and BRE extends that to 1000m. Whilst this might increase exercise, it may be less practical for most frequent users with mobility restrictions such as the elderly, mothers with children, and children. Most medium-rise housing areas were designed with a park and a square containing small and large facilities which only need reintegration. Missing large facilities may be shared with other housing areas and located between them.

Housing areas that have fallen to decay and currently have a high level of crime should be improved to encourage the use of their outdoor areas by residents. Design of outdoor areas may facilitate informal surveillance in various ways. Side windows and particularly entrances towards communal areas should be conserved as a way of enabling residents to supervise outdoor activities.[321] This must go in hand with the

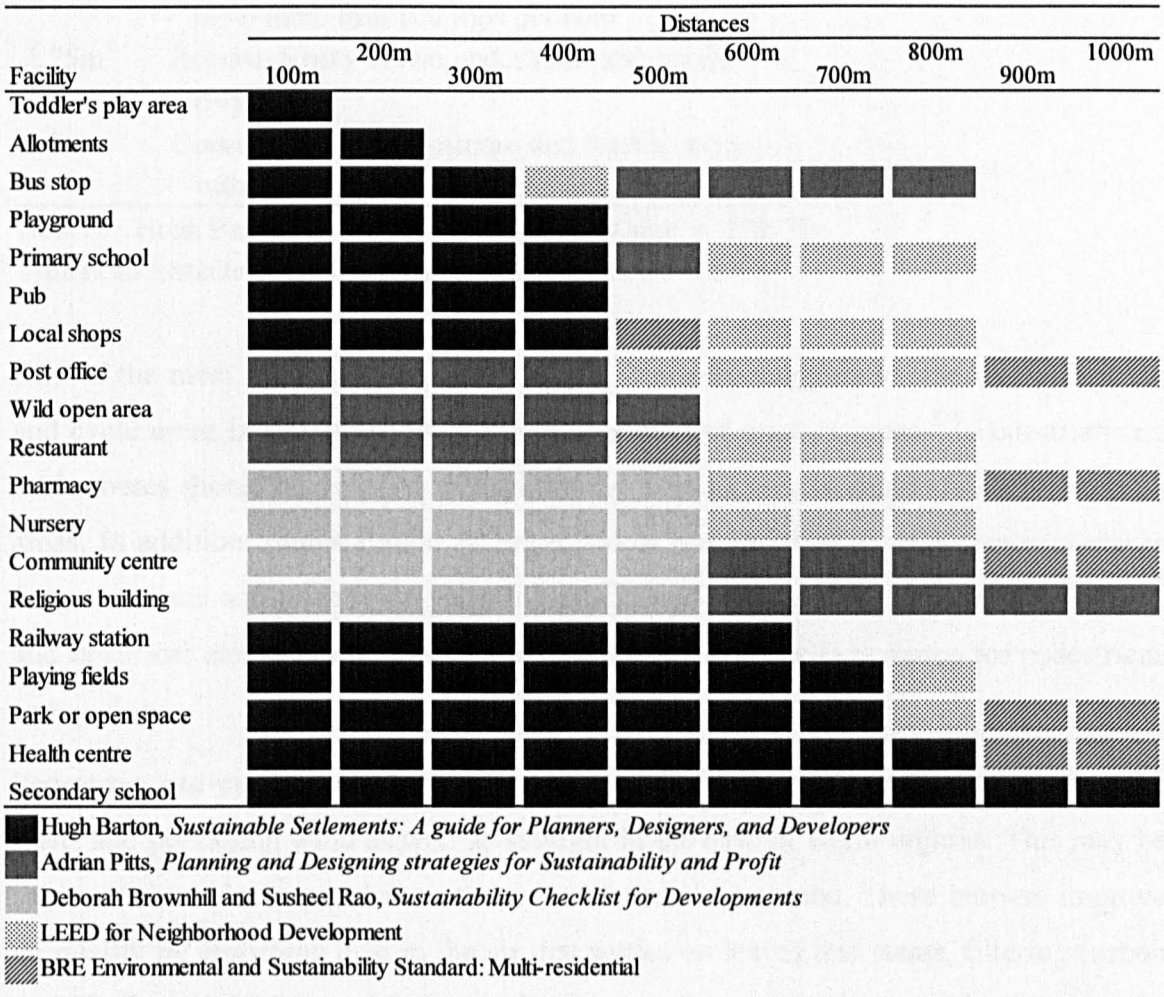
[319] DFT, 'Carbon Pathways Analysis: Informing Development of a Carbon Reduction Strategy for the Transport Sector', *Sustainable Travel* (2008) <http://www.dft.gov.uk/pgr/sustainable/analysis.pdf> [accessed June 2009] 1-111 (p. 10).

[320] Hugh Barton, Marcus Grant and Richard Guise, *Sustainable Setlements: A Guide for Planners, Designers, and Developers*, (Bristol: University of West England, 1995), pp. 115-117.

[321] Jane Jacobs, *The Death and Life of Great American Cities*, (New York, Vintage, 1961; repr. 1989), p. 35.

arrangement of plants so that their height or spread does not fully block views for pedestrians on the ground or residents viewing from windows.

Table 4.4 Recommended distances to facilities



Another consideration for safety is reducing the number of accidents involving pedestrians and cyclists. Existing roads and pedestrian walks may be easily adapted to reduce vehicle speed, ideally to 10mph, for example in a home zone area where pedestrians have priority over vehicles.[322] Alternatively, safe road crossings should be enabled through paved textures, gradient changes, planting, diversions, narrow roads, or other similar measures. Another consideration is to reduce the potential risk of accidents between pedestrians and cyclists. Design of pedestrian walks and cycle routes should have sufficient capacity for the different densities required (Table 4.5).[323] Lastly, priority for pedestrian and cycle areas may be enhanced by shielding parking areas from

[322] 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).

[323] Hugh Barton, Geoff Davis and Richard Guise, p. 178. See also The American Institute of Architects, *Architectural Graphic Standards Version 2*, (John Wiley & Sons, 1998) p. 96.

view through planting. Altogether, these changes would facilitate residents' socializing.

Table 4.5 Widths of shared routes for pedestrian and cycle use

2.50m	Regular density of a single pedestrian and bicycle use of no more than 100 trips per hour
2.75m	Regular density of two pedestrians and regular bicycle use
3.00m	Concentration of pedestrians and bicycle users without interfering built elements

Source: Hugh Barton, Geoff Davis and Richard Guise, p. 178; The American Institute of Architects, p. 96.

One of the most important elements that the literature suggests to improve pedestrian and cycle areas is strengthening the connectedness of outdoor areas.[324] Pedestrian and cycle routes should be supplied throughout the housing area to enable linkages between areas. In addition, routes should be improved to prevent slippery and uneven surfaces for pedestrians and to provide smooth well-drained surfaces for cyclists. Planting, art, and historical elements may contribute to a diverse sensory experience for pedestrians and cyclists.

Pedestrian and cycle routes should be sheltered from the noise and pollution of major roads and prevailing wind as well as sunlight in the case of warm regions. This may be achieved through the provision of screens of trees and shrubs. These barriers improve air quality by absorbing dust in the air that settles on leaves and stems, filtering carbon dioxide from vehicles, and by removing some of the carbon monoxide produced by traffic.[325] They may also reduce wind speeds by filtering the wind, more likely in areas with tall buildings such as medium-rise housing.[326] To shelter residents and visitors from sunlight, deciduous tree and shrub species should be selected for their height and density.

A final element that is essential is the provision of cycle parking, preferably sheltered from weather. LEED suggests 15% of the number of off-road vehicle parking spaces, Green Star advises one per dwelling, whilst BRE recommends an ideal of one per bedroom.[327] From the three options, the most robust is that based on the number of

[324] Hugh Barton, Geoff Davis and Richard Guise, pp. 125-127.
[325] Anne R. Beer and Catherine Higgins, p. 86 and 113.
[326] Robert D. Brown and Terry J. Gillespie, p. 134.
[327] Department for Communities and Local Government, 'Code for Sustainable Homes: A Step-change in Sustainable Home Building Practice', (2006), *Planning, Building, and the Environment*, <http://www.planningportal.gov.uk/uploads/code_for_sust_homes.pdf> [accessed April 2007] 14.

bedrooms.

Reducing energy use and CO_2 emissions by strengthening public transport and fixing through vegetation

Public transport services must be improved because they may reduce reliance on vehicle use and have lower CO_2 emissions. Vehicles represent 5% of total domestic transport in the UK whilst public transport represents 53%.[328] In order to achieve the necessary improvement, local authorities and housing companies in charge of housing areas should work together. Various modes of public transport with different schedules as well as frequent and reliable services are more likely to fulfil the diverse needs of residents. A convenient frequency of services is between fifteen to twenty minutes.[329] Similarly transport stops must have schedule information, should be sheltered, illuminated for safety, and preferably have seating areas. Another way of reducing energy use is to encourage and support car sharing schemes.[330] This could be arranged either with residents' own vehicles or energy-efficient vehicles that are specifically used for that purpose. Shared trips may be organised for daily commuting to work, leisure activities, attending health services, or other purposes, according to residents' needs.

The provision of vegetation in outdoor areas improves air quality by fixing carbon dioxide through their photosynthesis process. However, since CO_2 is released back into the atmosphere when plants decompose or are burned, vegetation management should be in place for their replacement. This maintains the balance of CO_2, particularly through trees and wooden vegetation, which are most effective for that purpose.[331] This applies to existing medium-rise housing estates where the outdoor areas usually have a large number of trees. Another indirect way of reducing carbon dioxide emissions through planting is by introducing communal allotments for the local production of fruits, herbs and vegetables. Such a strategy may help reduce a maximum of 8% of CO_2 emissions per person in the supply of food from non-local sources.[332]

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[328] Hugh Barton, Marcus Grant and Richard Guise, p. 22. See also DFT, p. 10.
[329] Deborah Brownhill and Susheel Rao, p. 28.
[330] Directgov, Sharing your car', *Act on CO_2*, (2009), <http://actonco2.direct.gov.uk/actonco2/home/what-you-can-do/sharing-your-car.html#a5> [accessed November 2009] (para. 4 of 8).
[331] Anne R. Beer and Catherine Higgins, p. 113. See also Hugh Barton, Geoff Davis and Richard Guise, p. 28.
[332] Sue Riddlestone, 'What makes an eco-town?: Can They be Delivered?', *Green Building*, 18 (2008) 24-27 (p. 24).

Reducing energy use and CO_2 emissions from buildings

The operation of domestic buildings produces up to 27% of total carbon emissions, of which heating accounts for 73% (Table 4.6).[333] Therefore measures should taken to prevent heating and cooling loss from buildings, making use of passive solar gain as well as renewable energy, energy-efficient appliances, and efforts should be made to build energy awareness in residents.

Table 4.6 Domestic Carbon Emissions

5%	Cooking
6%	Lighting
16%	Running of appliances
20%	Water heating
53%	Space heating

Source: Communities and Local Government, p. 3.

Energy loss from buildings may be reduced by the use of insulation layers and protection from wind. Many medium-rise housing estates were built with poor insulation and need to be upgraded. Two methods may be used in combination, using the artificial insulation of walls, ceilings, and windows as well as green insulation with green roofs and facades. Green facades and roofs with dense planting act as a thermal layer by providing a pillow of air that reduces heat loss from the interior of buildings in winter. Their use can reduce up to 50% of heat coming into buildings during summer.[334]

The cold wind of winter removes heat from walls and ceilings, and the cold dense air flowing down valleys, known as Katabatic winds, may cause frost pockets when they face a solid obstruction. Heat loss by cold wind may be mitigated by green roofs and facades. Also, Katabatic winds may be filtered through windbreaks of coniferous trees and shrubs, which can reduce up to 15% of heat loss in buildings.[335] Buildings are more adequately sheltered from wind when the windbreak is at a distance of six times the windbreak's height.[336] In warm regions, trees forming a windbreak should be spaced to allow the flow of fresh air in summer. Other options for windbreaks include earth banks

[333] Communities and Local Government, 'Review of Sustainability of Existing Buildings: The Energy Efficiency of Dwellings - Initial Analysis', *Planning, Building, and the Environment,* (2006) <http://www.communities.gov.uk/documents/planningandbuilding/pdf/154500.pdf> [accessed June 2009] 4-19 (p. 3).

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

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

[336] Hugh Barton, Geoff Davis and Richard Guise, p. 158.

which are more effective if used in conjunction with planting.

Heating and electricity for dwellings has been produced in the past mainly through the combustion of fossil fuels like coal, which are non-renewable and emit CO_2 which has contributed to global warming. Renewable sources of energy such as the sun may be harvested and stored to supply demand. Their installation in medium-rise housing is practical because there are surfaces available to locate the equipment required. They are also more likely to be economically viable because of the high population density.

The most common methods for sustainable heating generation are biomass energy, geothermal energy, solar thermal collector systems, and combined heat and power systems. The most used methods for sustainable electricity generation are photovoltaics, wind turbines, bioenergy, and geothermal energy. These may be combined depending on the availability of each source throughout the year. For example, sunlight may not be a primary source in countries like the UK. Although these sources are not polluting, the method of harvesting them might be. Selection should be considered in terms of the whole life-cycle, including all the environmental impacts of a product from beginning to end, so that the long term environmental impact of using them is lower than that of fossil fuels.[337]

From the options available for heating and electricity generation, medium-rise type housing benefits most from a combined method. Combined heat and power stations, where electricity is generated and the resulting waste heat is harvested, is the most common heating method, most efficiently if used in large scale systems like a city district.[338] Biomass, waste organic matter or specially grown crops such as willow can be used as a fuel source, and may be collected from communal garden waste or locally grown trees.[339] These may be part of the variety provided by the arrangement of the landscape. Solar thermal systems, collecting the sun's energy to heat water, may be provided in roofs and basements of buildings to enable communal washing facilities, for example.[340] Geothermal energy, heat and cold obtained from the ground, is probably the least common but may be installed through vertical boreholes in the park of the housing

[337] 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), p. 211.

[338] 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).

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

[340] Andrew Scoones, *Renewable Energy in the Built Environment*, (Bedford: Newnorth Print, 2001), p. 13.

area.[341]

For electricity generation from renewable sources, the most common is the use of photovoltaics and wind turbines. Photovoltaic panels may be used as part of the design of facades or located in roofs.[342] Wind turbines are more difficult to place in existing housing areas because of their size and the availability of wind, though various sizes are available which may be placed in roofs where wind conditions are optimum.

Comparing the various ways for sourcing renewable energy, photovoltaic panels have a higher rating in terms of efficiency and lower embodied energy (that is, the energy required to quarry, transport, construct, and install them). They have a long life of up to 80 years and it takes a minimum of 1.7 years for their embodied energy to be paid back. Although their production-derived pollution can be compared to that of other fossil fuel technologies, it may be lessened by using thin film photovoltaics rather than more usual mono- and multi-crystalline silicon ones. Also, efficiency can be doubled using mobile concentrator photovoltaics which follow the sun rather than flat-plate ones.[343] This can give them a lower environmental impact in relation to their service life (Table 4.7). Alternatively, sustainable heating and electricity may be acquired from suppliers who use renewable energy.

Energy consumption may also be reduced through the operation of communal washing facilities, energy-efficient appliances as well as gadgets, and by working to enhance residents' awareness of the issue. New energy-saving appliances consume less energy than previous models. Modern refrigerators use 15 to 20% less energy, whilst dishwashing machines around 40%, and televisions as much as 30% less than before.[344] Outdoor drying lines also reduce energy use. In the case of flats, shared schemes for the use of the drying line should be encouraged. The capacity of the line should be related

[341] 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.

[342] 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.

[343] Erik A. Alsema, Mariska J. de Wild-Scholten, 'Environmental Impacts of Crystalline Silicon 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). See also 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).

[344] 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].

to the number of bedrooms in the large type of dwellings, allowing 2m per bedroom.[345] The location of drying lines in the courtyard should reflect the capacity for maximum sunlight gain and the avoidance of plant shading.

Besides this, residents should be able to measure their individual energy consumption and preferably receive incentives for reducing it. BRE and LEED suggest supplying information about the operation of residents' homes as well as that relating to outdoor areas and surrounding facilities.[346] In order to encourage awareness and a change in behaviour, residents should have frequent workshops and research updates on issues related to energy.

Table 4.7 Comparison of renewable energy sources

	Average life of components	Embodied energy pay back time
Biomass	3 years	3 years to harvest
Combined heat and power	15 years	Variable
Solar thermal	15 years	2 years
Wind turbines	20 years	3-10 months
Geothermal	50 years	3-7 years
Photovoltaics	80 years	1.7-2.7 years (middle Europe) 2.8-4.6 years (southern Europe)

Sources: Richard Landen, pp. 30-31; Peter Mayer, 'What it costs: CHP', Building (2007) <http://www.building.co.uk/ story.asp?sectioncode=482&storycode=3092455> [accessed June 2009] para. 12 of 18; Fulvio Ardente, Giorgo Beccali, Maurizio Cellura, and others, 'Life Cycle Assessment of Solar Thermal Collector: Sensitivity Analysis, Energy and Environmental Balances', Renewable Energy, (2005) 109-130 (p. 125); SSustainable Development Commission, "Wind Power in the UK: A Guide to the Key Issues Surrounding Onshore Wind Power Development in the UK', Wind Power, (2005) <http://www.sd-commission.org.uk/publications/downloads/Wind_Energy-NovRev2005.pdf> [accessed February 2007] p. 18; Rosemary Rawlings, pp. 33-35; Casimir Iwaszkiewicz, p. 25.

Increasing biodiversity

Species-rich plant communities have the capacity to adapt more readily to urban settings than those which are species-poor. Therefore, the design of outdoor areas must consider increasing the species richness, habitat complexity, and genetic variation in flora and fauna.[347] To achieve this, existing habitats should be protected, enhanced, restored, and diversified.

An evaluation of existing habitats and species will identify the number of species and suggest which should be preserved. The assistance of qualified professionals is important as some urban areas may provide habitats for species not otherwise found in

[345] Carl Smith, Andy Clayden, and Nigel Dunnett, *Residential Sustainability: A Checklist Tool*, (Oxford: Blackwell, 2008), p. 159.

[346] Department for Communities and Local Government, 'Code for Sustainable Homes', p. 224.

[347] Richard T.T. Forman, *Land Mosaics: The Ecology of Landscapes and Regions*, (New York: Cambridge Press, 1995), p. 54.

the locality. Instances have been found in brown field sites and on the roofs of buildings. Any habitat valued for its structural, ecological, or aesthetic properties should be protected and integrated with the landscape design, improved, and if necessary restored.[348] Then connections with corridors should be created amongst existing and new habitats as well as to those outside the housing area, to increase species transit and development. Corridors can be hedgerows, windbreaks, shelterbelts, train tracks, shrubs, edge plantings, water channels, streams, green facades and roofs, and other forms which can create a network. Along these, invertebrate and vertebrate creatures move along, develop, and help in plant dispersal.[349]

Existing valued habitats that need to be moved temporarily are best placed nearby, or restored after works are finished. Temporary or permanent shelters such as bird boxes may become part of the visual appeal of the design. The management of necessary disturbance to top soil may be done through storing it in bunds no more than 1.8m high to prevent anaerobic deterioration and re-using it. An alternative is to allow natural colonization with plants which will most likely be native to the area. If importing soil is necessary, then local soil should be used to prevent the introduction of invasive species, weeds, pests and diseases.[350] Similarly, improvement of soils should consider the use of local compost or non-polluting methods such as permaculture.

In the design of outdoor areas, plant community variety as well as food and nesting opportunities for fauna are the key starting point to support different habitats and enrich species diversity. A way of addressing the variety of plant communities is through colour diversity. Water bodies such as wetlands are rich in genetic and community diversity and provide food and a habitat for migrating birds as well as other creatures, as well as providing nurseries for a wide range of aquatic organisms.[351] Other options include allotments with edible produce and bedding plants which are valuable for invertebrates' habitats and provide food for birds. Communal gardens might also be equipped with bat and bird boxes to provide nesting opportunities.

Other important factors are planting levels, age structure, isolation, size of habitat,

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[348] 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.

[349] Richard T.T. Forman and Michel Godron, *Landscape Ecology*, (New York: John Wileyt & Sons, 1986), pp. 381-401.

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

[351] 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. See also CABE, 'Making Contracts Work for Wildlife: How to Encourage Biodiversity in Urban Parks', *Public Space*, (2006) <http://www.cabe.org.uk/AssetLibrary/8068.pdf> [accessed March 2007] 1-63, (p. 21).

disturbance levels, and edges. The planting level, that is, the height of different plants, supports different species as microclimate conditions change. For example green roofs, green facades and trees provide different levels of support. Trees above 2m in height have been shown to support a rich variety of invertebrate species and studies have found insect species as well as rare species of birds at twenty storeys and above.[352] The age structure of plant communities as habitats and food suppliers can also influence the presence of species. A study has shown that the presence of some butterfly species can depend on the age of the existing grasslands.[353]

The isolation of habitats reduces the diversity of species; a study has shown that soil invertebrates reduce in density as distance increases from edge shrubs into a mowed lawn.[354] More extensive habitats will have a more nutrients and species, but their size should also recognize the space required by different types of vegetation.[355] The edges of habitats and the ecotones created, reflecting the combination produced by merging two or more habitats, are species-rich plant communities, particularly those facing sunny areas. They develop a mix of species from both habitats making them diverse and usually very resilient.[356]

There is a debate about the use of exotic species, or those that are native and indigenous to a locality. Native species are favoured because they are likely to be more resilient, having adjusted to a certain area, require less maintenance, and because they have a greater genetic diversity than cultivated or cloned plants.[357] On the other hand, exotic species might be better adapted to urban areas where there is more capacity for human intervention and have a greater capacity to thrive in the changing weather brought upon us by global warming.[358] Also, research has shown that exotic plants in gardens are a

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[352] 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). See also Nigel Dunnett and Noël Kingsbury, pp. 37-41 and 133.

[353] 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).

[354] 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 Ecosystems*, 9 (2006) <http://www.springerlink.com/content/5157140864r87015/fulltext.pdf> [accessed March 2007] 337-349 (p. 347).

[355] Richard T.T. Forman and Michel Godron, *Landscape Ecology*, p. 99.

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

[357] Anne R. Beer and Catherine Higgins, p. 300.

[358] Nigel Dunnett and Andy Clayden, pp. 206-207. See also, R. Bisgrove and P. Hadley, 'Gardening in the Global Greenhouse: The Impacts of Climate Change on Gardens in the UK', *The UK Climate*

significant support for biodiversity.[359] In indicating their use, LEED assessments have set a 90% minimum of native plant species for housing developments whilst BRE and the Sustainable Site Initiative guidelines have a more open approach. These admit plants with an attractive characteristic, which are beneficial for wildlife, have adapted to local site conditions, are resilient to pests, and do not require much irrigation.

Once work in the outdoor areas has been finished, management and maintenance regimes to encourage biodiversity must be established with the aid of a certified professional. For instance, naturally occurring changes for areas with planting may be adopted rather than suppressed. Other ways include leaving cuttings piled in-situ for some days to allow invertebrates to escape. Continually mowed lawns, which are species poor, may be integrated with meadow grasslands, mixed grass-wildflower seedlings, un-mowed areas or other similar areas. Also, coppicing of trees is desirable as it provides a range of different aged stems and branches providing habitats for different species and allowing sun to reach the ground that allows smaller plants to grow.[360] All of these issues must be considered in advance so as to be included in the maintenance contract budget.

Lastly, it is important to inform residents about the local flora and fauna through boards, images, sculptures, or in other ways. This contributes to education, care, and the development of a common identity, as well as providing residents with the opportunity to reconnect with nature.[361]

Water saving

The strategies available to save drinking water include reducing consumption, re-using water, and recycling. Reducing water consumption starts with residents' awareness of the issue, as mentioned earlier, which may be fostered through visual metering, continuous workshops and printed information, incentives, and the use of water-efficient appliances and gadgets (Table 4.8). In the UK, maximum daily consumption of water per person is recommended by the Code for Sustainable Homes to be 80 litres. In outdoor areas, the arrangement and selection of plant species requiring less irrigation is preferred. The use of native species is recommended as they are better adapted to local

Impacts Programme, (2002) <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.131.6205&rep=rep1&type=pdf> [accessed January 2010] 1-135 (p. 63).

[359] Ken Thompson, Kevin C. Austin, Richard M. Smith, and others, 'Urban Domestic Gardens (I): Putting Small-scale Plant Diversity in Context', *Journal of Vegetation Science*, 14 (2003) <http://www.jstor.org/stable/3236888?cookieSet=> [accessed January 2010] 71-78 (p. 77).

[360] Nigel Dunnett and Andy Clayden, pp. 206-207.

[361] Maggie Roe, p. 73.

weather, soil, and humidity. A design might consider reducing the area of planting requiring a significant irrigation such as lawns. Also, the use of a 5cm layer of mulch helps to retain moisture, acts as a protective cover against frost, provides nutrients for plants, prevents soil erosion, and reduces the growth of weeds.[362]

Table 4.8 Water use in dwellings

	Average proportion of consumption in a dwelling	Water consumption
Toilet flushing	30%	4.5 to13 litres per flush
Washing machines	16% (including dishwasher)	30 to 100 litres per wash
Dishwashers	-----	10 to 50 litres per wash
Shower	45% (including bath)	4 to 13 litres per min
Bath	-----	130 to 300 litres of capacity (60-138 litres of water)

Source: Environment Agency, 'Conserve water in Buildings', *Conserving Water in the Buildings,* (2009) <http://www.environment-agency.gov.uk/homeandleisure/drought/38527.aspx> [accessed June 2009] para 4 of 4.

In regard to the re-use and recycling of water, rain and grey water from dwellings may be harvested to irrigate gardens, to flush toilets, wash vehicles, or other similar uses. Rain precipitation from roofs may be collected in butts and used without treatment for flushing toilets. BRE recommends having a butt with a maximum capacity of 30 litres per dwelling for communal gardens whilst LEED suggests 2.35 litres per square feet of roof area. Grey water from washing machines, showers and wash basins can be used for flushing toilets. However, care must be taken in choosing how to use grey water, as a small sewage treatment plant may be very expensive and energy consuming, and chemical disinfectants may pollute wastewater. The best option is to use untreated grey water immediately after it is produced for irrigating gardens which have no edible produce.[363]

A final option is the use of black water from toilets, dishwashers, and kitchen sinks. It can be treated and upgraded through surface or sub-surface flow wetlands and may then be used for the irrigation of gardens. In designing wetlands, at least $2m^3$ per person

[362] U.S. Environmental Protection Agency, 'Water-Efficient Landscaping: Preventing Pollution, and Using Resources Wisely', *Water Sense,* (2009) <http://www.epa.gov/watersense/docs/water-efficient_landscaping_508.pdf> [accessed June 2009] 1-19 (p. 5).

[363] Environment Agency, 'Reusing grey water and harvesting rainwater', *Reusing and Harvesting Water,* (2009) <http://www.environment-agency.gov.uk/homeandleisure/drought/38559.aspx> [accessed June 2009] (para. 5-12 of 18).

should be considered and their location should take into account the type of wetland to be used and residents' perception of them. With the necessary maintenance a surface flow wetland, where water is visible among wetland plants, may be installed close to dwellings and be visually appealing to residents.[364]

Reducing pollution

In order to lower the contamination of air, water, and land, there must be a reduction in the amount of waste going to landfills, the extraction of raw materials, the use of chemicals, and water run-off.[365] The best way to start is by using less, contributes to reducing expense and the quantity of waste going to landfills. A significant contribution may be achieved through residents' handling of waste as well as the design of outdoor areas. Once more, information and workshops should be encouraged by the housing companies in collaboration with local authorities to raise awareness of issues relating to waste, its reduction and re-use at home, and encouraging the use of local recycling facilities. For the design of outdoor areas, design criteria should aim to reduce waste through modular design and avoiding over-specification.[366]

After considering ways to reduce waste, methods for re-using and reclaiming materials, waste, buildings, and plants may be addressed.[367] Re-use means using a product, material, or a building again for another purpose than the original without transforming it. Examples include the use of empty plastic plant containers for storage, stone materials as part of the design of the landscape, tree trunks for seating, or the use of a vacant building to provide a nursery. Plants that have to be moved because of construction works can be relocated nearby. Residents' non-organic waste can be exchanged through schemes, sometimes called swap points, in the housing area. Reclamation is where part of a product can be re-used for another purpose than originally intended. This sometimes involves cutting or demolishing some parts without transforming the product, for example by using furniture to make bird houses or construction materials for building sculptures in the landscape. Reclaiming metal for landscape works and furniture is ideal to reduce pollution from manufacturing and

[364] 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), pp. 166-167.

[365] Deborah Brownhill and Susheel Rao, pp. 59-64.

[366] Nigel Dunnett and Andy Clayden, pp. 214-215.

[367] Hugh Barton, Geoff Davis and Richard Guise, p. 240.

recycling.

Recycling refers to transforming a used item into a new product which reduces the consumption of virgin raw materials and their respective embodied energy that is higher than that of recycled products.[368] The outdoor areas of medium-rise housing may be provided with local waste separation and composting facilities for organic waste. Compost can then be used on-site or in surrounding areas.

In the implementation and maintenance of the outdoor areas, the use of chemical pesticides should be avoided as these can pollute water and harm populations of beneficial insects that help in controlling pests. Instead, the habitats of beneficial organisms should be encouraged, as well as keeping a diversity of habitats. If pesticides are necessary, those which cause minimal damage and decompose rapidly in the environment are preferred. Also, specifications must be provided with the design for the appropriate handling and application of any chemicals required. Lastly, all suppliers of materials and plants should be selected in terms of their practices and handling of products oriented to reduce environmental impact.[369]

The amount of rain water run-off in the outdoor areas needs to be lowered so that it can be filtered back to recharge underground aquifers, reduce flood risk, erosion of soils, the heat island effect, and contamination to rivers and streams. Increasing permeable surfaces and the amount of planting is essential. The presence of green roofs can reduce water run-off from 60% to 80% depending on soil depth, the time of year, vegetative cover and soil composition.[370] Tree cover retains and filters water run-off through their leaves and root systems which has been observed to vary depending on the amount of tree cover, the weather conditions of the region, the maturity of the trees, and time of the year. It has been observed in some studies in Oregon and California that a reduction of 25% to 36% of rain run-off was related to tree cover (Table 4.9).[371]

Sustainable urban drainage systems can reduce the amount of run-off from hard surfaces by more than 90% and add to the visual aesthetics of the area. Even in the arid regions of the USA they are deemed necessary to re-fill underground aquifers because of the

[368] Hugh Barton, Geoff Davis and Richard Guise, p. 240.
[369] Carl Smith, Andy Clayden, and Nigel Dunnett, p. 53-55.
[370] Nigel Dunnett and Noel Kingsbury, p. 48.
[371] Cynthia Girling and Ronald Kellett, *Skinny Roads & Green Neighbourhoods: Design for Environment and Community*, (Washington DC: Island Press, 2005), p. 108.

rare precipitation that characterises these areas.[372] In order to reduce water stagnation in retention areas, oxygen may be introduced through water cascades. As well, eutrophication may be prevented by using vegetation barriers which absorb excessive nutrients like fertilizers and stop them from going into the water.[373]

Table 4.9 Planting for reducing precipitation run-off in urban residential areas

Tree canopy cover recommended in USA		Amount of embedded green areas recommended in UK		
East of Mississipi and the Pacific Northwest	Southwest and dry West	Best	Intermediate	Worse
25%	18%	51% or more	31-50%	30% or less

Sources: American Forests, 'Setting Urban Tree Canopy Goals', *Urban Forests*, (2000) <http://www.americanforests.org/resources/urbanforests/treedeficit.php> [accessed June 2009] para. 11 of 15; Carl Smith, Andy Clayden, and Nigel Dunnett, p. 164.

Selection of materials

As with the selection of renewable energy methods, the selection of new materials for the regeneration of outdoor areas should be made taking into consideration their life-cycle. The latter refers to the embodied energy, pollution and health impact, durability, and performance of the materials (Table 4.10). Foremost, the need for new materials can be reduced by designing to integrate as many of the existing features in the outdoor areas as possible. New material that is required should preferably be selected from sources closest to the work site so that less energy is used for transportation. LEED suggests sourcing materials within a 500 mile radius though there have been examples of housing developments that have obtained materials from much shorter distances. Such was the housing area of BedZed in the UK which was able to obtain 52% of its materials within a 35 mile radius and the rest of them within an average 66.5 mile radius.[374] Materials delivered through transportation modes other than roads, particularly rail and ship, require less energy.[375] Specifications should accord with the functions specified, avoiding excess use of unnecessary materials and ensuring their longevity. Materials which have a longer life are considered to have a lower

[372] Carol Brzozowski, 'Stormwater Programs in the Arid Southwest: Challenges of Rainfall and Public Perception', *Stormwater* (2007) <http://www.stormh2o.com/july-august-2007/program-arid-southeast.aspx> [accessed June 2009] (para. 3 of 94).

[373] Hugh Barton, Geoff Davis and Richard Guise, p. 159.

[374] Nicole Lazarus, 'Beddington Zero (Fossil) Energy Development', *BioRegional Development Group*, (2007) <http://www.bioregional.com/Materials%20report%20web%20cut%20final%20draft.pdf> [accessed June 2009] 1-13 (p. 4).

[375] Carl Smith, Andy Clayden, and Nigel Dunnett, p. 173.

environmental impact so long as their sourcing and production does not have a high negative impact, as for example with many metal derivatives and synthetics.

Table 4.10 Environmental characteristics for insulation material

Materials	Embodied energy	Durability	Pollution-health impact
Cellulose	High in transport and weight		
Rigid and sprayed foam		Thermal properties reduced with humidity and time	Health hazard
Cotton	High in manufacture and transport	Thermal properties reduced with humidity and time	Less pollutant
Glass fibre		Thermal properties reduced significantly with humidity and time	Health hazard
Cellulose		Thermal properties reduced significantly with humidity and time	Landfill pollution
Rigid plastic foam			Air pollution
Mineral wool		Most durable	Health hazard
Vermiculite			Health hazard
Straw-clay			Less pollutant

Sources: 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', *Industrial Ecology*, (2001), <http://sitemaker.umich.edu/snre-student-cscheuer/files/insulation_lca.pdf> [Accessed January 2007] 5-6; 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); 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] 32-35.

In terms of pollution, the use of renewable materials is the best option. Wood is considered to be most sustainable for outdoor works and structures, and hardwoods are preferred to soft ones for their lower environmental impact because of their longer life, although the more durable types of hardwood should be preferred. Other materials such as stone and natural aggregates are ideal if they do not carry a high environmental impact as a result of their quarrying. Metal, plastic elements, aggregates and timber treatments should be specified to have a low-impact on the environment. Lastly, materials with good performance should be considered. For example, those which age well require less maintenance and integrate well with the context in which they are located, for example stone and wood without chemical synthetics.

In similar terms, planting selection and placement should seek to reduce management needs, maintenance and plant failure in order to enhance longevity. For instance, the need for management may be lowered by taking account of the natural shape of plants to reduce pruning requirements or by using a design approach with managed and un-

managed plant areas. Large lawn areas may be integrated with shrubs and ground cover to reduce maintenance. In this case, care should be taken in the plant selection and arrangement to ensure compatibility and the enhancement of their natural growth characteristics.[376] For example, wide shrubs near pedestrian walks should be avoided to limit pruning needs and resilient plants can be placed in areas with a high level of activities, for example near playgrounds.

In implementing the soft landscape works, measures should be taken to ensure adequate preparation of the soil, handling of plants, and planting in the appropriate season. This minimizes plant failure and improves the longevity and health of plants. New plants must be protected until they have become established; alternatively mature species may be chosen for areas prone to vandalism. This reduces plant failure and the energy required for replacement. Contracts with developers of soft landscape works should include a guarantee period after the works are finished during which failed plants should be replaced. It must be taken into account that landscape implementation can only be assessed when plants have reached their maturity, perhaps three years after completion, so it is practical to choose contractors who are registered with incentive or award schemes for best practice which assess landscape works after that period.[377]

The issues discussed in this section have been integrated into an assessment which will be applied in the case studies of Augustenborg and Rotes Viertel (Appendix A).

Discussion

The quality issues explored in this chapter represent the ideal quality issues with which medium-rise housing areas should be regenerated and therefore are used for assessing the case studies selected for this research. Yet, these issues should be considered in the light of the context where they are to be applied and if required, adjusted for given cultural customs. In the next two chapters, a first part of the assessment for the regeneration of the case studies Augustenborg and Rotes Viertel are presented where the goals towards community and ecological enhancement are discussed along with the experiences gained.

[376] Carl Smith, Andy Clayden, and Nigel Dunnett, p. 175.
[377] Ibid, p. 178.

Chapter 5

Case study 1 Augustenborg: from social democratic exemplar to sustainable model

Introduction

The chapter explores the landscape of Augustenborg for its contribution to social and ecological sustainability through its design proposals and regeneration initiatives.

The context in which Augustenborg was developed is explained to show its significance as a housing model at the time of its development and the community-oriented ideals of the landscape design. The design of the housing area and the landscape arrangement is then assessed for its performance towards improving community life and enhancing the environment to understand strengths and weaknesses and the causes for the decline of the housing area. This was done by conducting a thorough analysis from design plans and printed sources.

The context for regenerating the housing area is explored to understand the goals and intentions of the project. This was followed by an assessment of the processes of the regeneration, including the landscape, to identify significant lessons, problems, and areas of opportunity. To conduct the analysis, design plans, printed documents, semi-structured interviews with professionals, survey responses, and the grading assessment developed for this study were used (Appendix A and B). Design plans were translated from Swedish with the help of Swedish landscape designers. Similarly, printed documents that were in Swedish were translated by a professional translator into English. The semi-structured interviews with relevant persons involved in the regeneration were carried out in English: these included interviews with the housing company's managers and caretakers; regeneration project leaders; landscape designers in charge of the regeneration design; head of parks department; head personnel of the maintenance company; head personnel of community committees and associations; and teaching personnel of local schools.

The chapter concludes by identifying the issues that were more important and feasible as part of the regeneration. A series of recommendations for social and ecological sustainability are suggested.

The 1952 design of a community-oriented landscape in Augustenborg

Background

Similar to other countries, Sweden was searching for best ways to meet housing shortage and improve housing standards for workers after the industrial revolution. In the process for achieving this, various foreign influences impacted significantly on the development of housing in Sweden. On one side, modernist ideas of rational use of materials and design that allowed for mass production were introduced through the Stockholm exhibition of 1930.[378] On the other side, planners were also learning from community oriented developments, such as Radburn in the USA and the Garden Cities in England, which contrast with the segregation of functions advocated by the Radiant City of Le Corbusier.[379] Ideas for improving the health of inhabitants came from the design of parks in Germany, England, and the USA which focused in facilitating leisure opportunities and contact with nature.[380] These ideas initiated a set of policies that radically changed planning for housing and design in Sweden.

Supply of sunlit and ventilated dwellings with bathroom facilities were followed by increasing standards in quality of production and planning of housing from 1935 with the establishment of loans and creation of non-profit housing associations whose task was to supply and manage housing. These were closely controlled by the authorities.[381] Although it was an important operational strategy, it was the ideals of the Swedish social democratic government that encouraged community development in the design of the housing estates. Equal access, collaboration, participation, and solidarity were all characteristic thinking of Sweden.[382] Therefore, the improvement of the living conditions of inhabitants not only consisted of meeting the needs for sun and

[378] Morton Shand, 'Stockholm: 1930', in *The Architectural Review: A Magazine of Architecture & Decoration*, LXVIII (1930), p. 72.

[379] Mårten J. Larsson, *New Architecture in Sweden: A Decade of Swedish Building*, (Stockholm: National Association of Swedish Architects, 1961), pp. 45-46.

[380] Eivor Bucht, *Public Parks in Sweden 1860-1960: The Planning and Design Discourse*, (Alnarp: Swedish University of Agricultural Sciences, 1997) pp. 24-32.

[381] Swedish Council for Building Research, *Housing Research and Design in Sweden*, ed. By Sven Thiberg, (Stockholm: Ljunglöfs Offset AB, 1990), p. 80.

[382] Henry Milner, *Sweden: Social Democracy in Practice*, (New York: Oxford University Press, 1990), pp. 4-5.

ventilation. It was more important to provide for housing areas where inhabitants could have a comfortable, safe, and fulfilled life. An important part of this was having opportunities to integrate with the local community in the outdoor areas.

Housing estates in Sweden were planned around local centres with transport nodes, retail establishments, and communal facilities.[383] An exemplar of the ideals of the time was the housing area of Augustenborg built in 1948-52. It was developed to cope with housing shortage in one of the most deprived areas of Sweden, the city of Malmö, where Augustenborg became the first public housing area.[384] The City Housing Association 'MKB', started in 1946 in Malmö, was put in charge of building and managing the housing estate of Augustenborg. The general plan of the housing area was made by architect Gunnar Lindman, the town manager of the city, following the community ideals of Radburn. The result was an independent city-like housing area where residents would find everything they required without venturing too far, but close enough for cycling into the city of Malmö.[385] The town manager would have probably planned the housing area with collaboration of the landscape designer as has been documented with the design of some Malmö parks.[386]

Accordingly, housing blocks and the landscape were then designed to incorporate places for community development as well as high-quality housing. The design of the dwellings was provided by the Riksbyggens architect bureau in Stockholm having 1538 ventilated, sun-lit spacious two- to three bedroom flats.[387] When completed they had an approximate population of 6302 inhabitants with an average of four inhabitants per dwelling and approximately 46 dwellings per hectare.[388] The landscape was designed and laid out by Birger Myllenberg (1883-1974) the master gardener of the city of Malmö from 1924 to 1948. It was meant to provide residents with a park-like setting yet

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383 Mårten J. Larsson, pp. 45-46.

384 Catarina Rolfsdotter-Jansson, 'Ekostaden Augustenborg: on the way towards a Sustainable Neighbourhood', *Damanco Community*, <http://www.rolfsdotter.se/pdf/Ecocity_Aug.pdf> [accessed January 2010] 1-19 (p. 3).

385 Ulla Hårde, *MKB 50 år! En tidning full av minnen Från Augustenborg til Potatisåkern: En tidning full av minnen* (Malmö: MKB, [n.d.]) p. 7. Translation by Joanne Richardson, July 2007. jorichardson80@gmail.com.

386 Thorbjörn Andersson, Tove Jonstoij, and Kjel Lundquist, *Svensk Trädgårdskonst: Under fyrahundra år*, (Stockholm: Byggförlaget, 2000), p. 163. Translation by Joanne Richardson, July 2007. jorichardson80@gmail.com.

387 Bertil Pfannenstill, *Sociologisk Undersökning av Augustenborgsimrådet i Malmö*, (Malmö:AB Framtiden, 1953) p. 10. Translation by Joanne Richardson, July 2007. jorichardson80@gmail.com.

388 The density is the total number of dwellings divided by the total surface including the park and industrial area. See also 'Malmö Stad, 'Områdesfakta Augustenborg 1995-2000', *Statistik*, (1996) <http://www.malmo.se/Kommun--politik/Statistik/C-Omradesfakta-for-Malmo/Aldre-upplagor/Omradesfakta-1996/Fosie--96/pagefiles/156.Augustenborg.pdf> [accessed on March 2008] (p. 1).

with intimate communal spaces for community life, leisure, and informal rest.[389] Augustenborg was the culmination of Myllenberg's long career and testing of design concepts learned from foreign examples and human behaviour in local parks, as he was an avid detailed observer of the way outdoor areas were used.

Creating a setting for a semi-public environment

The scheme was realized on agricultural land with a predominantly levelled topography. To the south there was a farm surrounded by large trees which became part of Myllenberg's design for the landscape, with the central open area for a park and school grounds around which the blocks were built. The layout of the blocks and the design of the landscape created a semi-public feeling in communal gardens. It provided residents with a sufficiently intimate place for developing social networks yet connected with the rest of the community and surrounding existing housing and commercial areas (Plate 5.1). This was accomplished through integrating a pedestrian environment and secondly by defining a hierarchy of areas that would allow subtle transitions between the private, semi-public, and public realm through informal boundaries. This definition of realms aided in establishing territorial limits and avoided the existence of no-man's land areas lessening the intrusion of undesirable persons and increasing a feeling of safety for residents.

The transition between the private entrances to buildings and the semi-public communal gardens was accentuated by shrub planting with overhanging climbers, small decorative trees in combination with large shrubs, or trimmed hedges. The boundaries between the semi-public communal gardens and the public pedestrian walk were established through single or groups of trees, such as oak trees, acacias, chestnuts, or groups of pyramid poplars. Additionally low boundaries defined and enclosed playgrounds and seating areas in the communal gardens from the public pedestrian walk. These included timber fencing, sunken lawns lowered by some 50cm to 95cm, or shrubs such as *Ligustrum ovalifolium, Spiraea arguta, Rosa rugosa, Nepeta* 'Six Hills', or *Cotoneaster divaricatus* (Plate 5.2 and Plate 5.3).

[389] Thorbjörn Andersson, and others, pp. 163-171.

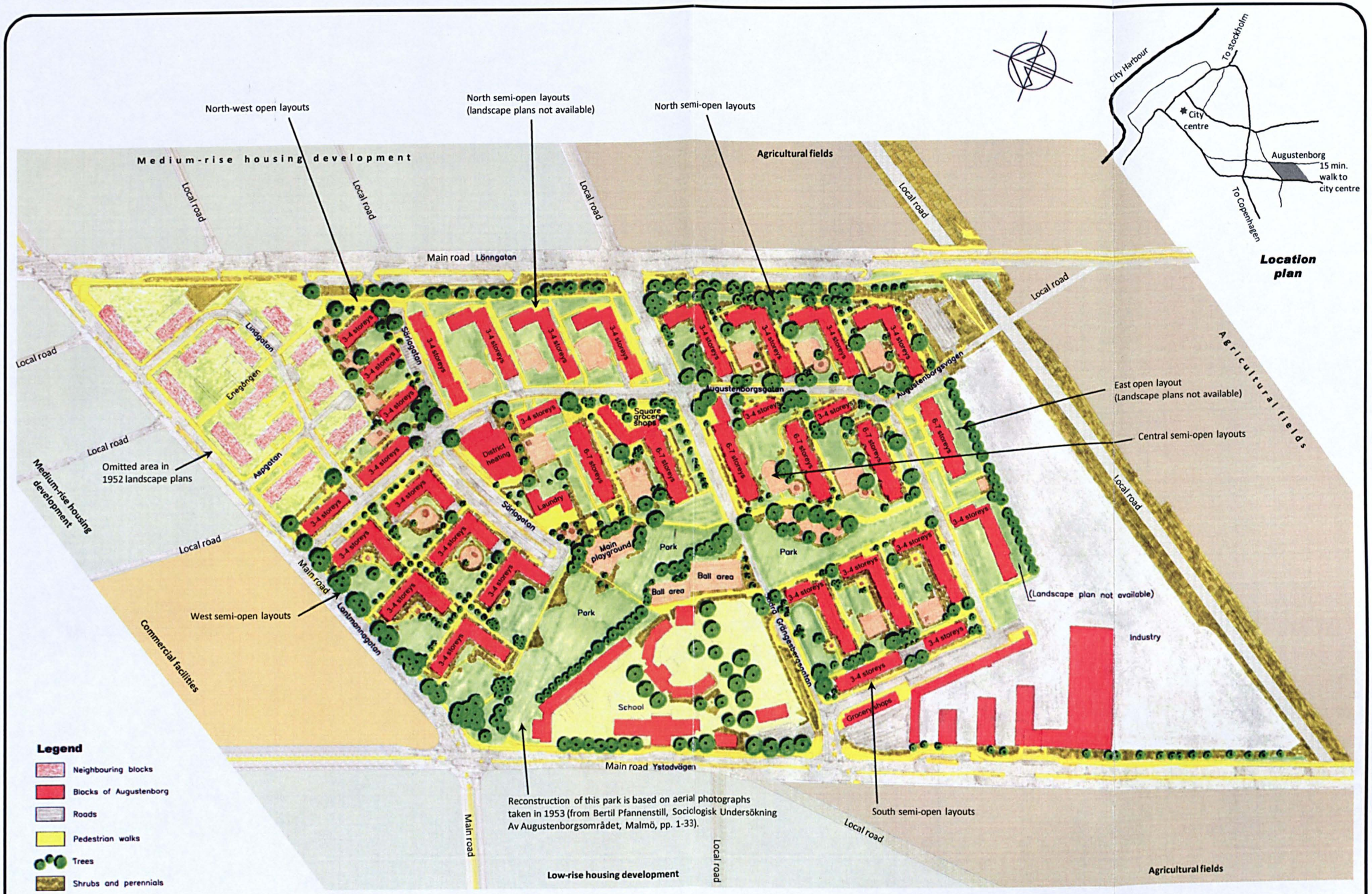


Plate 5.1. Conjectural reconstruction of 1952 landscape plan for Augustenborg
(Produced with sectional plans by Birger Myllenberg and aerial photographs supplied by Svenska Landskap AB, Malmö, June 2007)

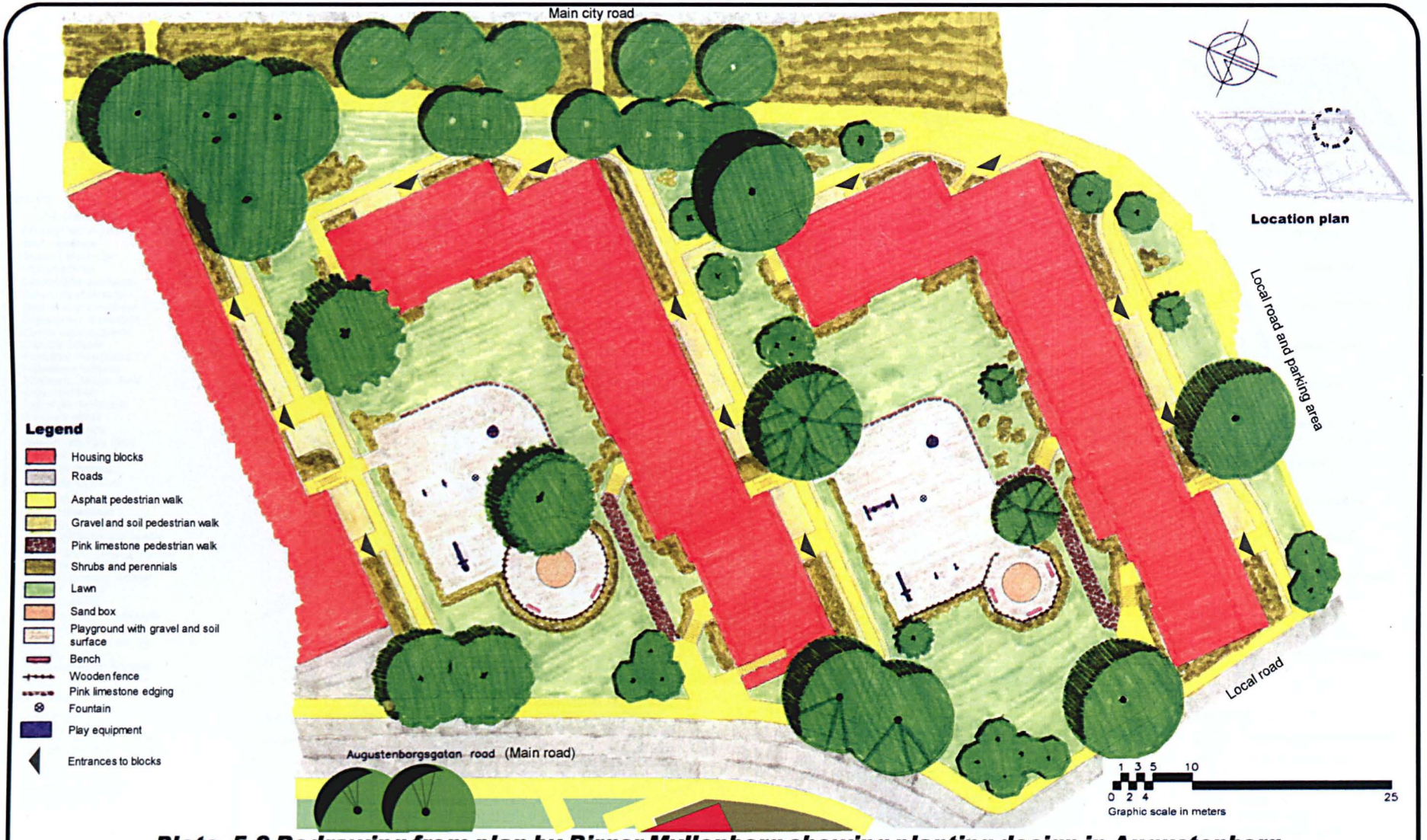


Plate 5.2 Redrawing from plan by Birger Myllenberg showing planting design in Augustenborg

(Redrawn and adapted from 1952 plan by courtesy of Svenska Landskap AB, Malmö, June 2007)

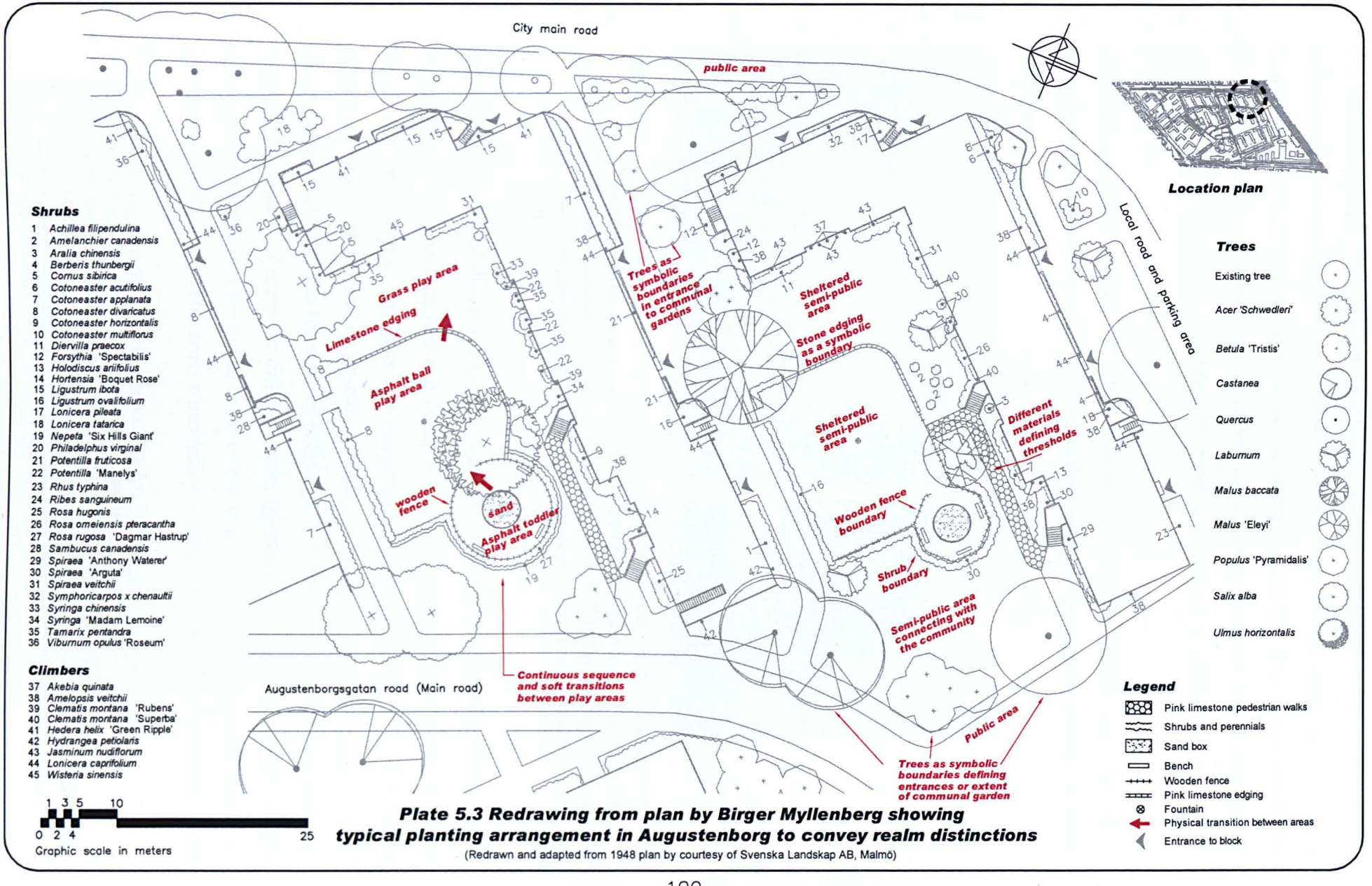


Plate 5.3 Redrawing from plan by Birger Myllenberg showing typical planting arrangement in Augustenborg to convey realm distinctions

(Redrawn and adapted from 1948 plan by courtesy of Svenska Landskap AB, Malmö)

The arrangement of these different boundaries varied slightly according to the type of layout in order to create a sheltered area from the public realm; open and semi-open layouts with three- to four-storeys and six- to seven-storeys. Yet they always facilitated visual contact with other residents on pedestrian walks as a way of encouraging casual encounters of residents and facilitated informal surveillance of outdoor areas (Figure 5.1).

Although communal gardens had public access, a semi-public feeling was achieved in communal gardens by means of defining realms through planting to provide informal boundaries.

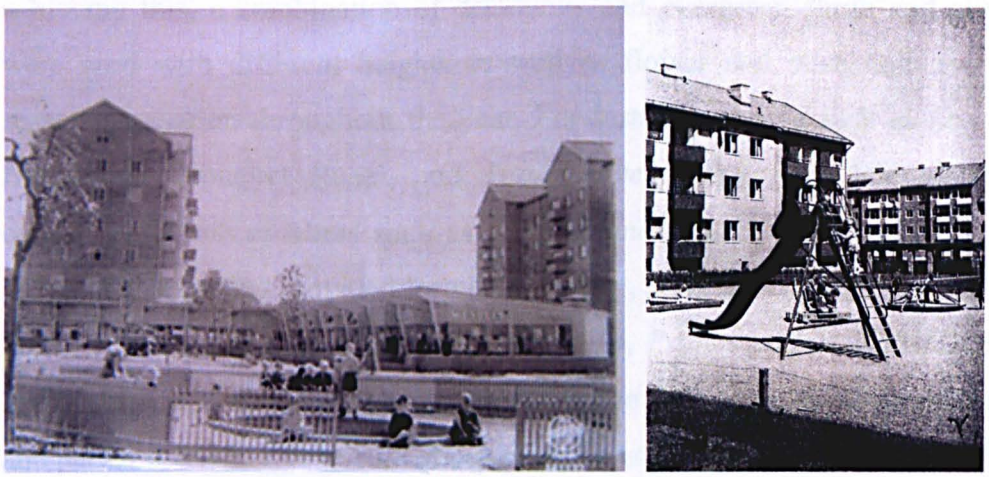


Figure 5.1 **Low-height boundaries of play areas enabled visual contact with others on the main pedestrian walks to be maintained (image left from Svenska Landskap AB archives, *c.* 1952; image right from *Sveriges Allmännyttiga Bostads Företags Konferens i Malm*ö, 1950, p. 110)**

Defining intimate and diverse areas for community life in communal gardens

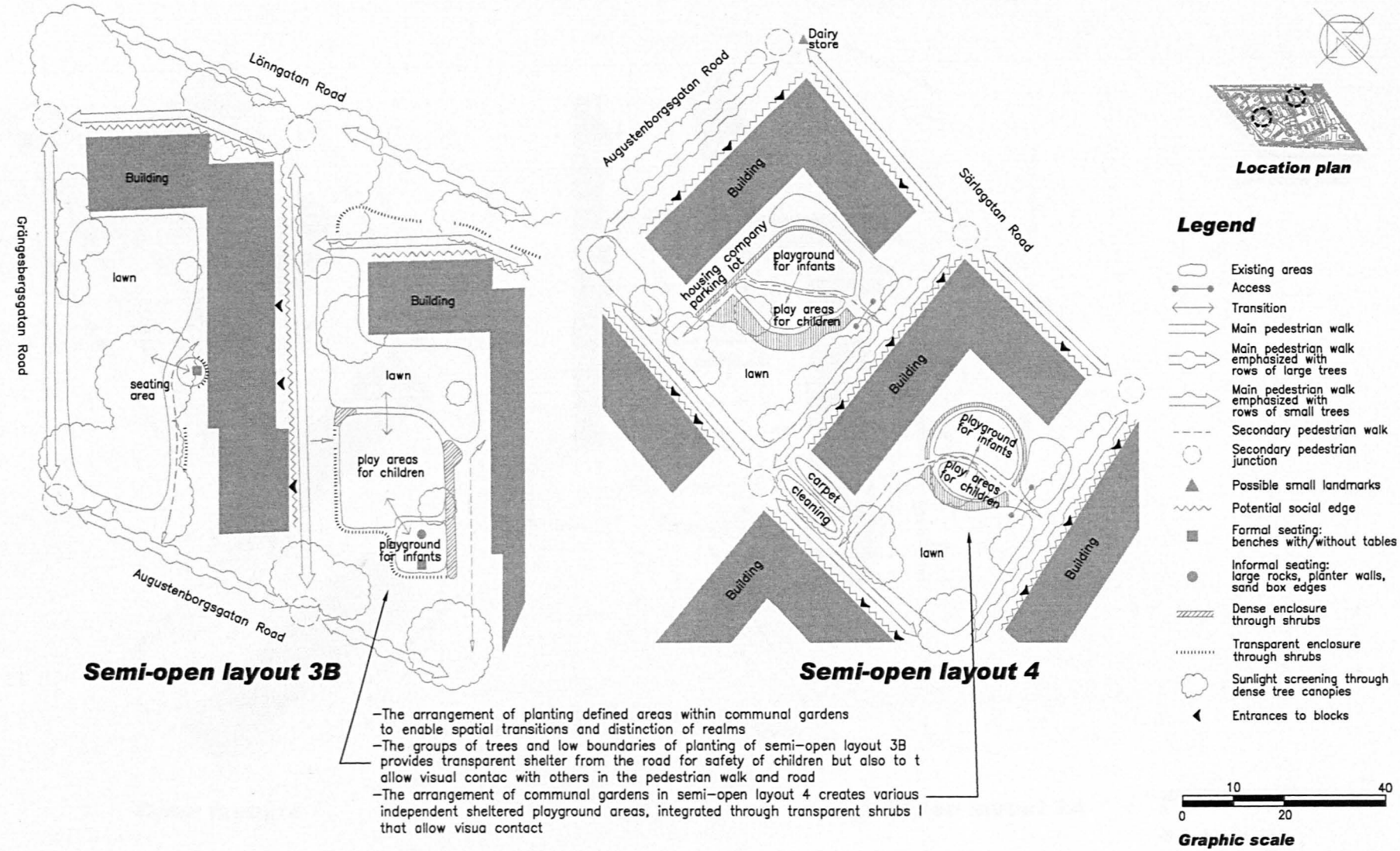
The design of communal gardens was made to provide a series of well-defined areas for leisure and socializing of residents in a comfortable environment. For this, Myllenberg considered it was important to provide flexible areas as well as an arrangement of planting that would disguise the scale of buildings.[390] Therefore the design was made by defining a gradation of areas for different uses, delineated in simple geometric shapes that provided an informal feeling to the outdoor areas where residents could engage in conversation with others. The areas consisted of a series of play areas for toddlers and

[390] Birger Myllenberg, 'Hur Skapas Trivsamma Omgivningar Kring Bostadshusen', *Sveriges Allmännyttiga Bostadsföretags Konferens i Malmö*, (Malmö: Framtiden, 1951) pp. 108-109. Translation by Joanne Richardson, July 2007, jorichardson80@gmail.com. See also Birger Myllenberg, 'Trädgården i staden', in *Trädgårdsodlingen i Sverige,* ed. by Nils Sonesson (Stockholm: *Saxon & Lindströms Förlags AB, 1935*) pp. 234-235. Translation by Joanne Richardson, July 2007, jorichardson80@gmail.com.

older children with integrated seating areas. They were subtly defined and partially enclosed through shrub hedges and limestone edging but connected with each other, keeping the accessibility from one area to another. This facilitated access to users between areas, social exchange, and various leisure activities (Plate 5.4 and Plate 5.5).

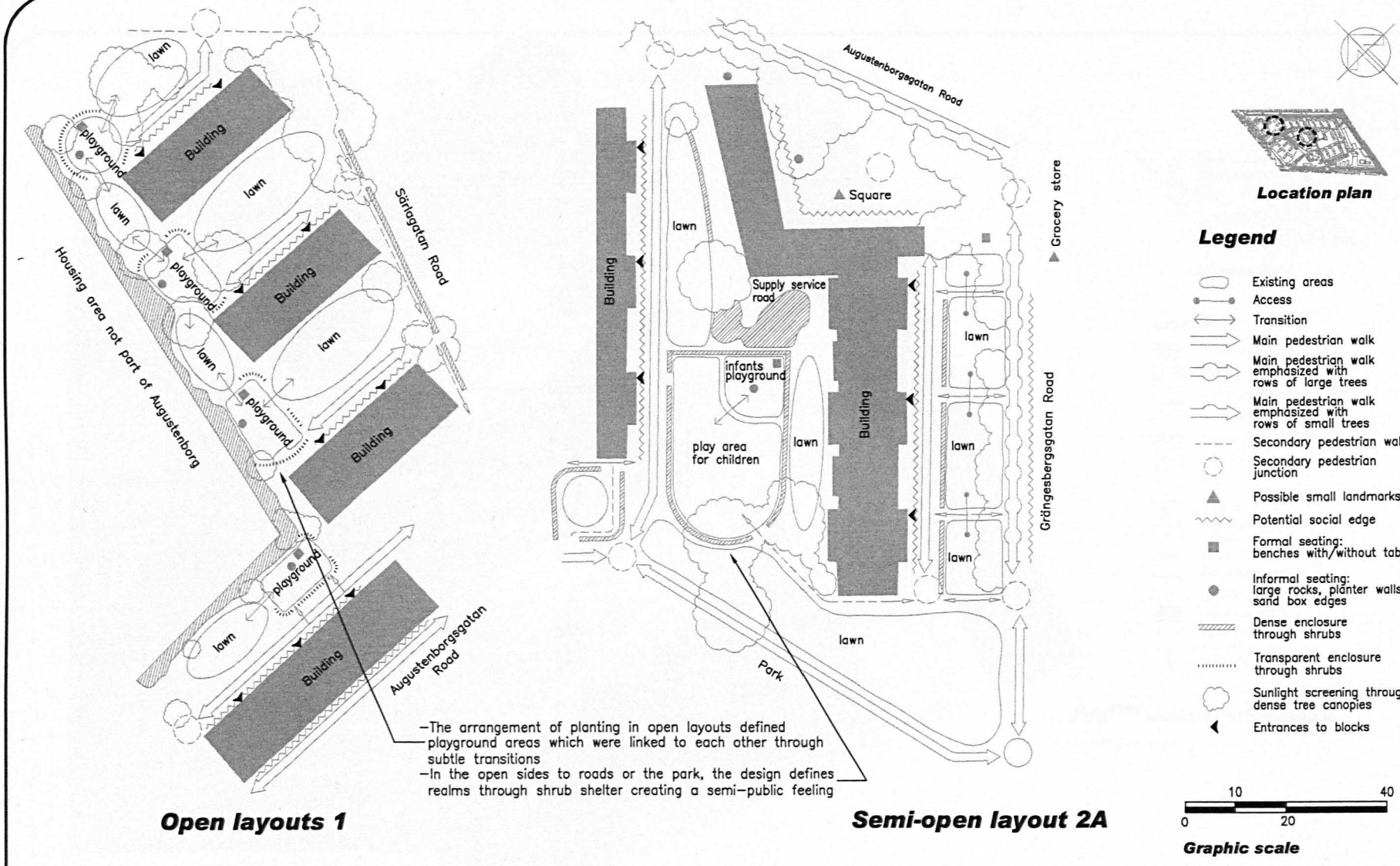
The planting and materials that defined these areas also allowed users to enjoy a rich sensory experience as part of a pleasant stay in their communal gardens. This was created in two ways: by introducing a variety of hard surfacing materials, colours, shapes, and textures; and with the arrangement of various plant layers on facades of buildings disguised their scale and created a frame for the communal garden. For achieving this, a combination of deciduous and evergreen shrub and climber species were used with different heights as well as flower and stem colours that provided seasonal variation throughout the year. For instance, shrubs such as *Lonicera pileata*, *Hydrangea* 'Bouquet Rose', and *Tamarix pentandra* were laid along facades in combination with climbers such as *Clematis montana* 'Superba'. Similarly trees with different shapes also provided for visual variety, such as *Acer platanoides* 'Schwedleri', *Malus baccata*, *Salix alba*, *Salix elegantissima*, *Prunus padus*, *Malus* 'Eleyi', *Populus nigra*, oaks, and chestnuts, among others. Some of these were also essential for shelter and partial screening from sunlight in playgrounds and seating areas (Plate 5.6 and Plate 5.7).

Arrangements of these areas in communal gardens varied in shapes and sizes, types and placement of trees, and shrub species enclosing them, which gave a distinctive character to each communal garden which provided children with different play opportunities. Most important, the arrangement was laid to support casual encounters and socializing of residents.



–The arrangement of planting defined areas within communal gardens to enable spatial transitions and distinction of realms
–The groups of trees and low boundaries of planting of semi–open layout 3B provides transparent shelter from the road for safety of children but also to t allow visual contac with others in the pedestrian walk and road
–The arrangement of communal gardens in semi–open layout 4 creates various independent sheltered playground areas, integrated through transparent shrubs l that allow visua contact

Plate 5.4 1952 situation of spatial transitions in semi-open layouts of Augustenborg



Open layouts 1

Semi-open layout 2A

Plate 5.5 1952 situation of spatial transitions in open layouts of Augustenborg

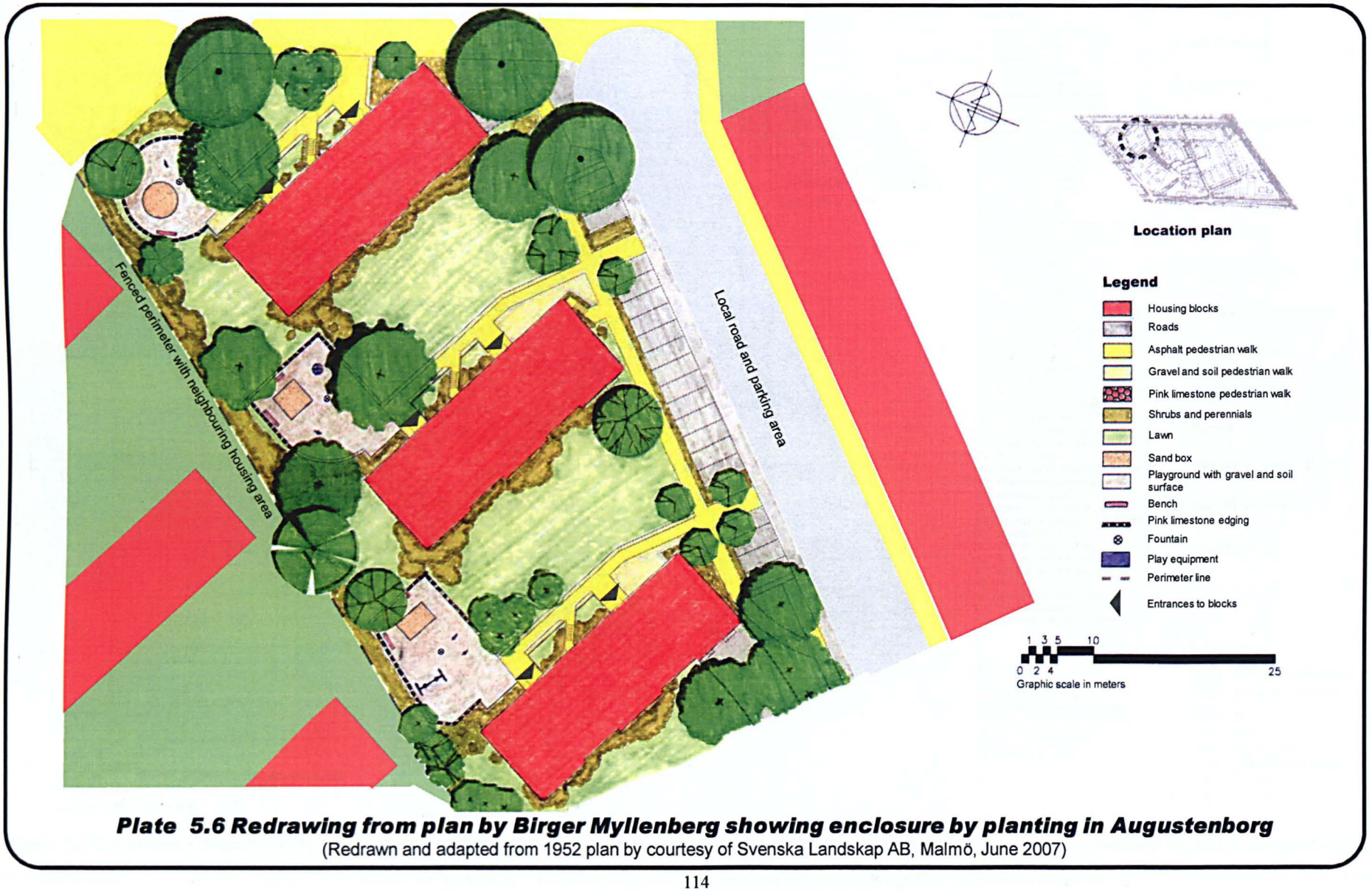
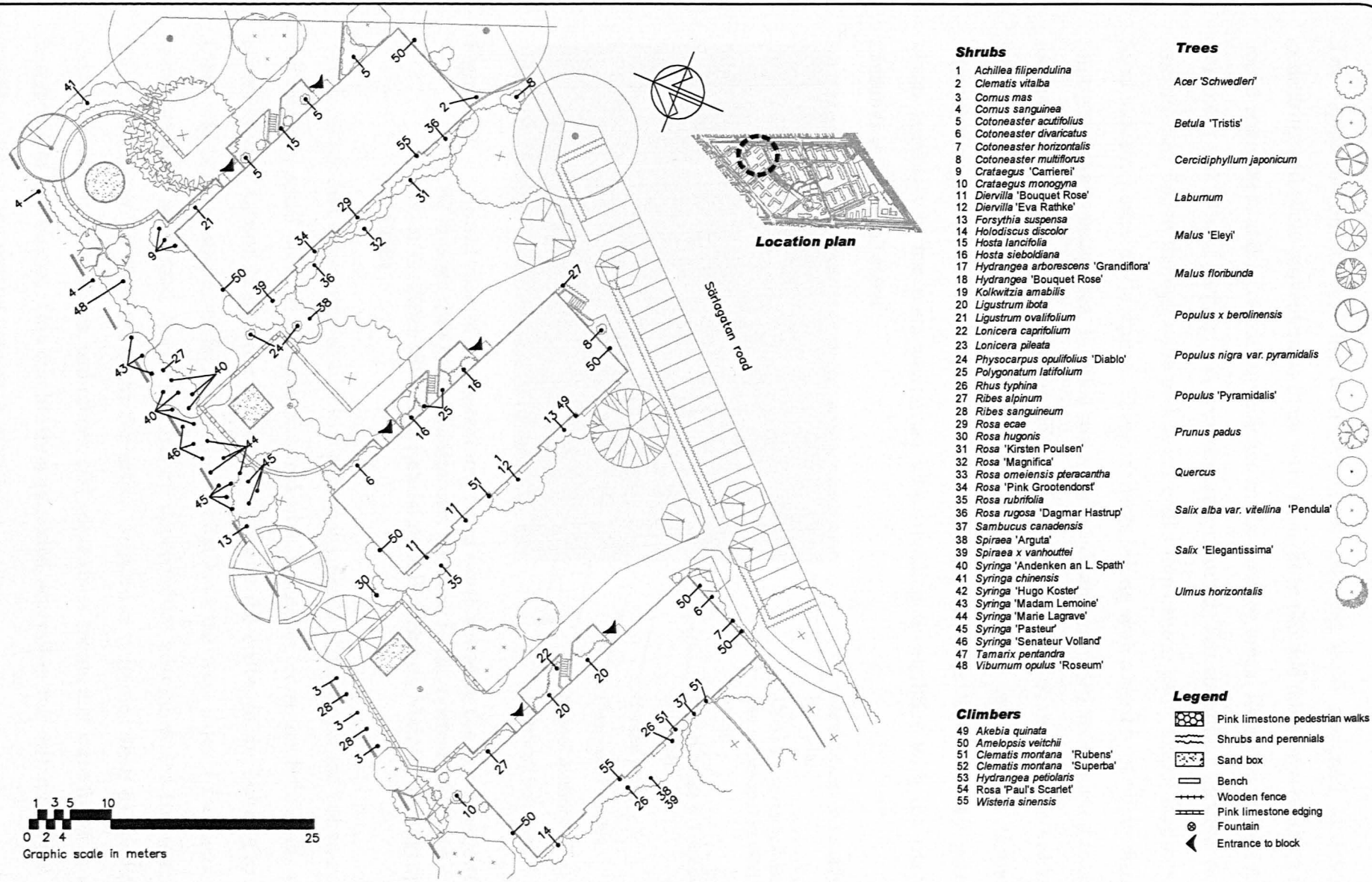


Plate 5.6 Redrawing from plan by Birger Myllenberg showing enclosure by planting in Augustenborg

(Redrawn and adapted from 1952 plan by courtesy of Svenska Landskap AB, Malmö, June 2007)



Shrubs

1 *Achillea filipendulina*
2 *Clematis vitalba*
3 *Cornus mas*
4 *Cornus sanguinea*
5 *Cotoneaster acutifolius*
6 *Cotoneaster divaricatus*
7 *Cotoneaster horizontalis*
8 *Cotoneaster multiflorus*
9 *Crataegus* 'Carrierei'
10 *Crataegus monogyna*
11 *Diervilla* 'Bouquet Rose'
12 *Diervilla* 'Eva Rathke'
13 *Forsythia suspensa*
14 *Holodiscus discolor*
15 *Hosta lancifolia*
16 *Hosta sieboldiana*
17 *Hydrangea arborescens* 'Grandiflora'
18 *Hydrangea* 'Bouquet Rose'
19 *Kolkwitzia amabilis*
20 *Ligustrum ibota*
21 *Ligustrum ovalifolium*
22 *Lonicera caprifolium*
23 *Lonicera pileata*
24 *Physocarpus opulifolius* 'Diablo'
25 *Polygonatum latifolium*
26 *Rhus typhina*
27 *Ribes alpinum*
28 *Ribes sanguineum*
29 *Rosa ecae*
30 *Rosa hugonis*
31 *Rosa* 'Kirsten Poulsen'
32 *Rosa* 'Magnifica'
33 *Rosa omeiensis pteracantha*
34 *Rosa* 'Pink Grootendorst'
35 *Rosa rubrifolia*
36 *Rosa rugosa* 'Dagmar Hastrup'
37 *Sambucus canadensis*
38 *Spiraea* 'Arguta'
39 *Spiraea x vanhouttei*
40 *Syringa* 'Andenken an L. Spath'
41 *Syringa chinensis*
42 *Syringa* 'Hugo Koster'
43 *Syringa* 'Madam Lemoine'
44 *Syringa* 'Marie Lagrave'
45 *Syringa* 'Pasteur'
46 *Syringa* 'Senateur Volland'
47 *Tamarix pentandra*
48 *Viburnum opulus* 'Roseum'

Climbers

49 *Akebia quinata*
50 *Amelopsis veitchii*
51 *Clematis montana* 'Rubens'
52 *Clematis montana* 'Superba'
53 *Hydrangea petiolaris*
54 Rosa 'Paul's Scarlet'
55 *Wisteria sinensis*

Trees

Acer 'Schwedleri'
Betula 'Tristis'
Cercidiphyllum japonicum
Laburnum
Malus 'Eleyi'
Malus floribunda
Populus x berolinensis
Populus nigra var. pyramidalis
Populus 'Pyramidalis'
Prunus padus
Quercus
Salix alba var. vitellina 'Pendula'
Salix 'Elegantissima'
Ulmus horizontalis

Legend

Pink limestone pedestrian walks
Shrubs and perennials
Sand box
Bench
Wooden fence
Pink limestone edging
Fountain
Entrance to block

Plate 5.7 Redrawing after plan by Myllenberg with landscape design showing the richness achieved by the various planting layers in Augustenborg

(Redrawn and adapted from 1948 plan by courtesy of Svenska Landskap AB)

Enabling a pedestrian-oriented community throughout the housing area

The layout of blocks and the arrangement of planting were designed to favour pedestrian and cycle movement as these were thought to provide more opportunities for social encounters and informal surveillance in the outdoor areas. Roads were kept to a minimum and 50% of parking was provided underground. The communal gardens were oriented and linked through wide pedestrian walks to a central park, school facilities, a local industrial area, and a square. These facilities, along with a variety of others found throughout the housing area, fulfilled residents' needs and provided an important source for community life in outdoor areas (Figure 5.2). The presence of residents in outdoor areas was encouraged by facilitating the legibility of the environment through strengthening semi-public and public realms' distinction. This was made by giving visual emphasis to the main pedestrian walks leading to facilities with the use of chestnuts or coppiced trees.

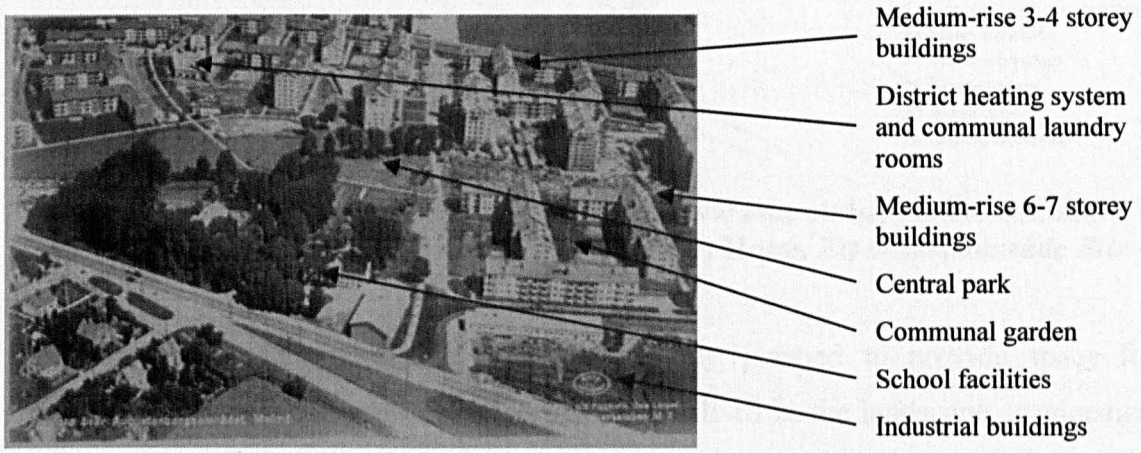


Figure 5.2 **Aerial view of Augustenborg from south showing the arrangement of layouts that linked communal gardens to the central park and other facilities (Svenska Landskap AB archives, Malmö, photograph c. 1950)**

The facilities that were made available for the daily needs of residents and community life included small local shops, groceries, bakeries, a butcher, communal washing, and other services located in or close to a small square at the centre of the housing area. Other additional commercial facilities were available to the west side of the housing area across the main road. Social and leisure opportunities also generated community spirit with about 18 different clubs for active or passive activities such as football, cinema, wrestling, workshops, and others, and community rooms that were found in the basements of the blocks. This combination provided accessible and different types of leisure activities throughout the day (Figure 5.3).

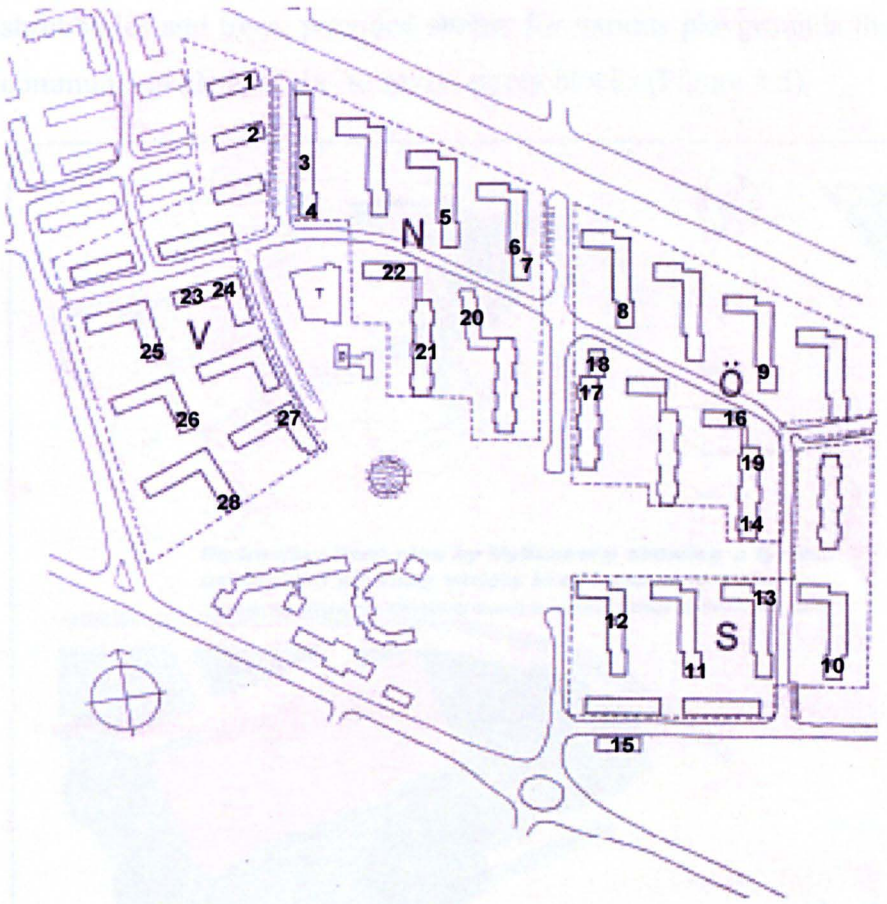


Figure 5.3 **Plan of Augustenborg showing the various clubs, businesses, and shops located in basements (Lennart Holm, *Ett bostadsområde Blir Äldre,* p. 3)**

Despite the fact that basements were not initially planned to provide space for' community activities, their potential was clearly realised in the landscape arrangement with a rich arrangement of planting on the side of pedestrian paths leading to basements in communal gardens. The pedestrian paths were enhanced with hexagonal limestone and shrubbery such as *Spiraea x vanhouttei* and *Cotoneaster multiflorus* (Figure 5.4).

Similarly, the leisure and social areas of the park contributed significantly to community development by integrating them to those of the communal gardens and of facilities. This provided linked areas with low boundaries that facilitated visual contact with other users, informal surveillance, and casual contacts throughout the housing area. Three main areas were designed in the park. To the north-west of the park, informal resting areas were created with semi-circular shrubberies that led to a large multi-purpose lawn area. The one located at the centre, with a children's playground and two ball game areas sheltered under a row of existing large trees, were connected to outdoor areas in the local school and communal laundry rooms through pedestrian paths and small openings. To the south-east a series of interconnected circular spaces created through

shrubberies and trees, provided shelter for various playgrounds that were connected to communal gardens of six- to seven-storey blocks (Figure 5.5).

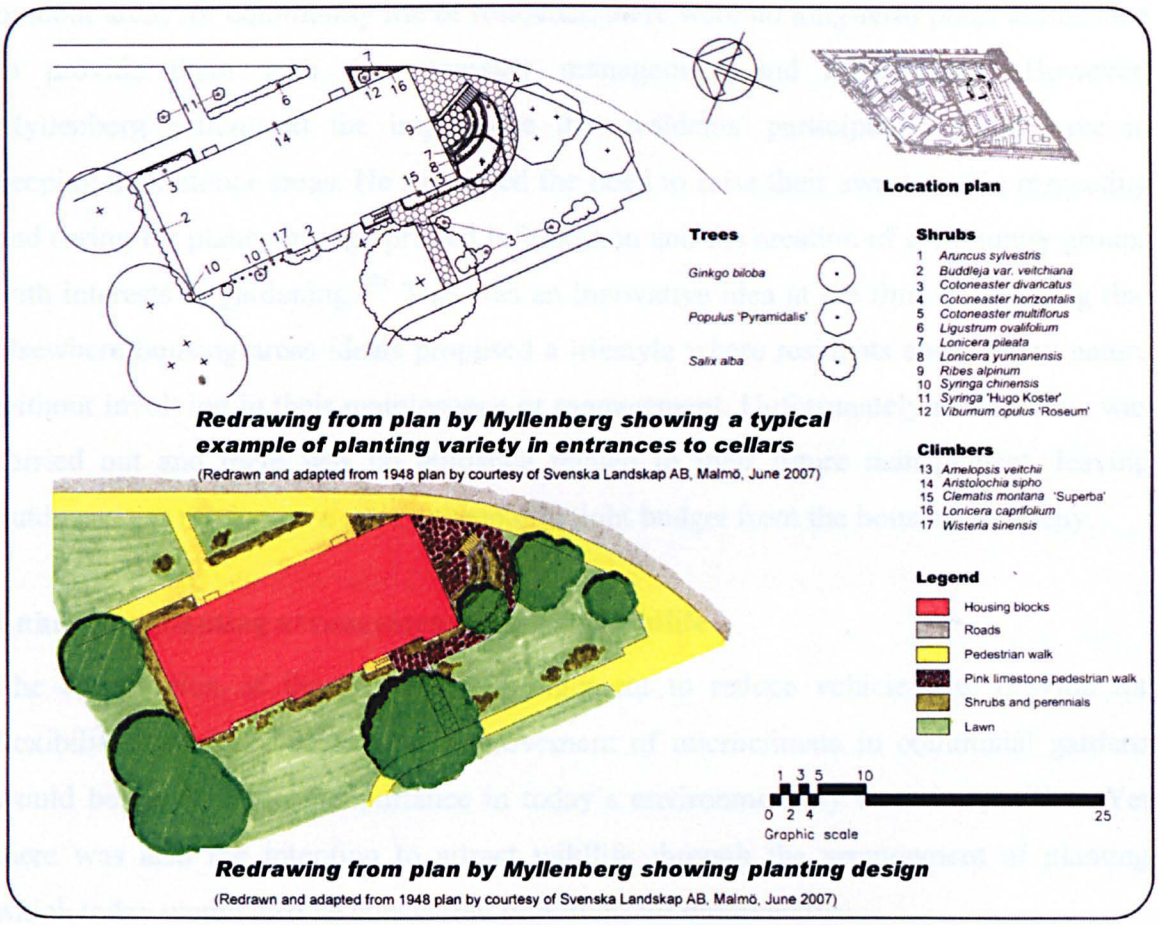


Figure 5.4 **Redrawings from plan by Myllenberg showing a typical example of planting richness in entrances to basements in Augustenborg (1952 plans of Svenska Landskap AB)**

Figure 5.5 **Augustenborg (left) in 1953 showing laundry and its toddler's playground on the left integrated with the park's older children playground to the right; and (right) showing playgrounds to the south of the park integrated with communal gardens (image left from Bertil Pfannenstill, *Sociologisk Undersökning av Augustenborgsimrådet i Malmö*, p. 1; image right from Yngve Svensson, Malmö Stadsarkiv, 1952)**

Envisioning management and maintenance schemes

Despite the importance provided in the design of the arrangement of planting to create outdoor areas for community life of residents, there were no long-term plans established to provide them with the necessary management and maintenance. However, Myllenberg anticipated the importance that residents' participation could have in keeping the outdoor areas. He suggested the need to raise their awareness in respecting and caring for plants through printed information and the creation of community groups with interests in gardening.[391] This was an innovative idea at the time considering that elsewhere housing areas ideals proposed a lifestyle where residents could enjoy nature without involving in their maintenance or management. Unfortunately none of this was carried out and there was no guidance related to their future management, leaving outdoor areas relying on a poor upkeep of a tight budget from the housing company.

Enhancing planting arrangement to attract wildlife

The contribution of the landscape arrangement to reduce vehicle use, provide for flexibility in outdoor areas, and improvement of microclimate in communal gardens would be considered of importance in today's environmentally conscious milieu. Yet there was also the intention to attract wildlife through the arrangement of planting which today would also be considered important for biodiversity.

The farmland where Augustenborg was built very likely had a higher diversity of plants and animals than that available after the housing area was built. However many small farms were facing economic hardship in the 1940s due to the demand for higher yields in the country and the elimination of governmental economical support forced farmers to seek other work opportunities.[392] Considering that the farm may have been neglected at the time, the landscape of Augustenborg re-established a moderate level of biodiversity. Different layers of planting and variety in plants were introduced in outdoor areas that provided food for birds and insects. Since some of the existing farm trees were also incorporated to the design, it aided in integrating old and new habitats.

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[391] Birger Myllenberg, 'Hur Skapas Trivsamma Omgivningar Kring Bostadshusen', p. 108.

[392] Basim Saifi and Lars Drake, 'Swedish Agriculture during the Twentieth Century in relation to Sustainability', *Ecological Economics*, 68 (2008) <http://www.sciencedirect.com.eresources.shef.ac.uk/science?_ob=MImg&_imagekey=B6VDY-4SGDW5Y-1-1&_cdi=5995&_user=128590&_pii=S0921800908001559&_orig=browse&_coverDate=12%2F01%2F2008&_sk=999319998&view=c&wchp=dGLzVtb-zSkzk&md5=c263f7f2a2c3859a56d69cc52f37cca6&ie=/sdarticle.pdf> [accessed January 2010] 370-380 (p. 375).

Similarly, the rows of trees used in the design and connectivity to surrounding housing areas created green networks for the movement of wildlife.

Finally, Myllenberg also considered important the introduction of construction and management practices that supported biodiversity. These included the use of soil from the site rather than importing it and the thinning out of trees for other smaller plants to grow below.[393] However, as mentioned earlier, these were suggestions that did not find their way into later management and maintenance practices.

Strengths and weaknesses of the design

This brief overview shows the way in which the building of community was valued as part of the quality of life intended for residents. For this, outdoor areas were an essential part of residents' development and social networking which would allow them to know each other and integrate the community as a whole. Therefore the landscape was designed to create the ideal place for it to develop. To accomplish this there were various important issues in the design: having well-defined realms and comfortably sheltered outdoor areas with a rich variety of planting; robust areas that accommodated changes according to residents' needs; and a disposition of areas that enabled visual contact with residents on pedestrian walks.

Unfortunately, the management and maintenance schemes to ensure the establishment and care for planting were not established, for which the participation of residents could have provided a good opportunity in keeping the landscape. Eventually, the planting scheme fell into decay and neglect once economic problems started to develop in the housing area.

Decay of the housing area

With the decline of industry in the late 1960s and early 1970s, Malmö was particularly affected. Vehicles were made available at lower costs making residents more mobile, with those better-off inhabitants heading for new and larger dwellings.[394] Augustenborg faced high vacancy rates and decay, becoming a residential area of less privileged inhabitants. A wave of migration in Sweden brought inhabitants from different ethnic backgrounds to Augustenborg that now represented 50% of the population, which has remained constant to the present.

[393] Thorbjörn Andersson, and others, pp. 169-170.
[394] Trevor Graham, *Echoes of Tomorrow*, (Malmö: Tryckeri Wiking AB, 2002), p. 5.

The decline of Augustenborg took its toll on existing facilities and the outdoor areas, which suffered from decay and neglect damaging the image of the housing area. Many facilities that were central to community life and a symbol of progress for Augustenborg were no longer economically feasible or were outdated compared to other newer housing areas, and so had to be removed. For example, a carpentry centre is now working where a local coal-fuelled district heating system once was, connecting the housing area to a larger system that would cater for various housing areas. The communal laundry facility was also replaced by a kindergarten. Laundry rooms were now included in each block intending to improve the services offered in the housing area and reduce vacancies, though it resulted in limited success. Some of the shops such as flower shops, bakery, and others which had previously located in the square and provided a variety of activities for community life, moved out of the housing area.

In outdoor areas, flooding during heavy rainfalls became a problem due to the reduction of permeable surfaces in outdoor areas after Augustenborg and surrounding housing areas were built.[395] Flooding deteriorated the communal spaces in basements causing community room activities to stop functioning. As a consequence, lawn areas close to basement entrances became no-man's land after the informal surveillance provided by daily activities in basement areas was lessened. Also the park and the playground, located to the east of the park, were eventually removed and the one located at the centre was missing much of the surrounding planting that defined it.

Planting suffered from neglect as well. Vegetation was not pruned nor replaced when damaged. When it was replaced this occurred with other species that added little variety.[396] Play, seating areas, and rest areas in communal gardens lost their semi-public feeling as their carefully constructed structure and boundaries were gradually removed. Only those in the semi-open layouts to the south were less affected due to probably being largely dependent on changes in level. All of these modifications meant that there was no longer consistency or uniqueness among the communal gardens. Community life, that suffered an onslaught from the downturn in the economy, deteriorated as all the smoothly contrived details that distinguished and personalized these landscapes were eroded.

[395] Trevor Graham, p. 6.

[396] Ann-Sofi Högborg (Landscape designer leader, Svenska Landskap), interview by C. Martínez, June 2007, transcript 8, city of Malmö, Sweden.

By 1997, Augustenborg had a high vacancy rate of 23%, 1659 dwellings, and 2898 inhabitants living in the area.[397] This was the time when regeneration ideas for Augustenborg were started as a way of reversing the decay problems faced by the housing area.

Planning for regeneration

By the start of the 1990s, Sweden was still going through a difficult economic recession, particularly severe in Malmö and Göteborg. After Sweden joined the European Union in 1994, it had the opportunity to receive investment from the URBAN-I programme to improve its most deprived areas. Malmö was worst affected having some of the poorest housing areas, lowest education level, and a high level of ethnic segregation.[398] Also in 1994 the Social Democratic Party regained control, starting a series of initiatives in Malmö to re-integrate the citizen's social structure and transform the city into a leader in knowledge- and service-based economy focusing on sustainability.[399] Once again the building of community became important, with an emphasis on participation as a way of encouraging citizens' integration. With this, the outdoor areas regained significance to facilitate these processes, although this time with a focus in reducing the impact to the environment.

The URBAN-I programme focused in five of the most disadvantaged housing areas in Malmö from 1997-99, including Augustenborg, for implementing a social project to revitalize and strengthen in a general way their communities.[400] It consisted in generating a series of key areas in-or-near the housing areas that meant to be linked to each other as social resources. These areas included community services as gathering points for residents with an emphasis on youngsters, development of skills for setting up new businesses, and setting up educational resources on sustainability through local schools. The project was in part coordinated by Bertil Nilsson who had worked as Augustenborg's school headmaster until 1997. In his search for ways to improve the

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397 Malmö Stad, (p. 1).

398 Mikael Stigendal, 'Young People-From Exclusion to Inclusion: Revitalizing European Cities', *URBACT Programme* (2006) <http://www.eukn.org/binaries/francais/text/practice/2009/september/young_people_from_exclusion_to_inclusion_-_urbact_research_report.pdf> [accessed January 2010] 1-124 (p. 38).

399 The Swedish National Board of Housing, Building, and Planning, 'Swedish Municipalities and the Sustainable Development of Towns, Cities and Communities: Examples of Habitat-oriented Work', *Swedish National Committee on Agenda 21 and Habitat,* (2001) <http://www.boverket.se/Global/Webbokhandel/Dokument/2001/swedish_manicipalities.pdf> [accessed January 2010] 1-112 (16-17).

400 Bertil Nilsson, 'Urban Malmö', *European Union,* [n.d.] <http://www.aktivstad.net/urban/english/index.html> [accessed March 2008] (para. 2 of 9).

outdoor areas as part of the URBAN-I project and revitalizing the existing facilities with a sustainable focus, the idea emerged of regenerating the whole of Augustenborg as an ecological housing area.[401]

However, from start the concept for ecology was not clearly defined or understood by Nilsson, or those who collaborated in initiating the scheme; namely Peter Lindhqvist from the Malmö's service department and Christer Sandgren as Augustenborg's housing manager of MKB at the time. So, an initial consultation and discussion tables were made with residents, businesses, as well as people from the local facilities and the housing company in regard to what was felt to be needed in the housing area. From these meetings, reducing living costs and flooding emerged as most important issues which were then proposed to be addressed through ecological solutions such as reducing energy consumption and use of a sustainable urban drainage system.[402] The latter being a forced solution requested by the Malmö Department of Water and Wastewater in order to alleviate drainage discharge.[403]

Along also came a flush of other ideas from people living or working in Augustenborg for social and ecological improvements. Some of them were made part of the social projects for URBAN-I or the City's Metropolitan Policy programmes until 1999 when their funds were finished. The introduction of these social and economic projects was later classified as the first phase of the regeneration for Augustenborg. As part of a second phase, to improve outdoor areas and introduce ecological projects, the MKB housing company and the municipality made funding available from various sources in 1998. These included the City of Malmö, the Fosie District, the Swedish government's Local Investments Programme for Ecological Conversion and Eco-Cycle Programme government, and the housing company MKB that summed up more than 100 million Swedish Kronor.[404]

At this point, four main priorities were agreed as part of an initial consultation with residents and agreements of professional bodies involved. First to continue enhancing the housing image through the various improvement projects that were to be installed; second for the re-design to take into account the 1952 design concept, though this was

[401] Catarina Rolfsdotter-Jansson, p. 2.
[402] Ibid.
[403] Tomas Leidstedt (Landscape design leader, ISS Landscaping), interview by C. Martínez, June 2007, transcript 12, city of Malmö, Sweden.
[404] Anna Granberg, 'Malmö: Ekostaden Augustenborg Sustainable Regeneration of an Urban Neighborhood', *European Academy of the Urban Environment*, (2001) <http://www.eaue.de/winuwd/189.htm> [accessed on March 2008] (para. 16 of 24).

unclear in what way; third, to update it in order to provide residents with a comfortable quality environment that would meet their social and leisure needs which were to be discussed with residents in a participation exercise; and fourth to reduce pollution by means of minimizing waste and water run-off to a 70% or 80%.[405] In order to reach these goals, community officer leader Trevor Graham was hired to lead brainstorming discussion meetings with residents along with a couple of firms of landscape architects. He also helped in forming partnerships for implementing ecological-related ideas from residents. In 2000, after some problems with organizational changes in the housing company developed and funding from the different programmes was finished, the landscape project for the regeneration was done once more by a different landscape firm changing many of the project priorities.

Revitalising a pedestrian-oriented community

The implemented projects as part of the URBAN I social programme which finished in 1999, had effectively initiated innovative projects to build the community, locally and between housing areas. Projects in Augustenborg included the creation of community rooms, cafe areas for residents to gather and exchange ideas, and computer facilities for youngsters, among others, as well as support in the development of new and existing community groups. Similar actions were taken in four surrounding housing areas as a way of facilitating the development of social networks among housing areas and exchange of experiences. Altogether, these community services and groups were intended to be run by interested residents.[406] Yet the projects failed in two ways: in providing residents with organizational skills that would ensure the long-term development of community services and groups; and keeping participation opportunities for residents open to run these services.

URBAN leaders naively expected for all participant residents to take up leadership without receiving any organizational and capacity building support for running and keeping the community projects. At the same time the economic goals of their programme, which involved addressing unemployment, clearly undermined the community projects. For instance, unemployed persons were put in charge of the community café and rooms though they lacked the necessary skills to manage the

[405] Trevor Graham (project leader of ecological regeneration, Malmö municipality), interview by C. Martínez, June 2007, transcript 16, Malmö municipality, city of Malmö, Sweden.

[406] Bertil Nilsson, (Project leader, URBAN-Metropolitan Police Program) Interview by C. Martínez, June 2007, transcript 17, city of Malmö, Sweden.

facilities and create a welcoming environment for all residents. Also these persons sometimes came from other housing areas and had no knowledge of the local social networks or ways to encourage them. Several community projects were ended after residents stopped using them when they became uncomfortable with the way they were run and the people that were in charge of them.

On the other hand, once funding was finished, control of management and decision-making was removed from residents by the local school administration since most of the newly created community services were provided in the school grounds. For instance, some of the community rooms were successfully run by youngsters but were distrusted in doing so.[407] The school had no intentions in ensuring residents' long term involvement in order to keep organizational control and decision-making in their realm. After community-run services and rooms were closed or taken over by the school administration, access was provided to students only or on request for a specific event. There were no opportunities available for residents anymore to run community services or places to gather, reducing their social opportunities that could have strengthened the social structure of the community.

Similarly, the development and success of community groups was also influenced by the organizational support and skills available to residents who ran them. Community groups were important in making available different activities that allowed residents to know each other such as children's play activities, aerobics, barbecues, card games, cycling, and others. During and after the regeneration, the housing company supported their start as a way of encouraging the development of community. This has been done through small starting grants and letting of basement rooms at a low cost.[408]

However, mainly those that have had some form of organization support and collaboration from the housing company, the local school, and local authorities have thrived. Such was the children's activity centre Gnistan which has been managed by a local resident and worked jointly with the housing company in defining goals and activities for the community. Collaboration amongst both was easier due to the presence of administrative offices of the housing company in Augustenborg.[409] Some of the results of this joint work have been the organization of events, sometimes held in

[407] Bertil Nilsson, transcript 17.
[408] Goran Larsson (Strategic planning, MKB), interview by C. Martínez, June 2007, transcript 14, city of Malmö, Sweden.
[409] Safija Imsirovic, (Head and founder, Gnistan) Interview by C. Martínez, May 2007, transcript 4, city of Malmö, Sweden.

communal gardens for neighbours to get to know each other and others in the square to enrich community life.[410] The participation of the housing company in organizing such activities was not only found to be important for the community groups. It was also indicated by respondents of the survey as an important incentive for them to attend as the housing company represented a neutral position amongst the different community groups.

Other forms for community groups to succeed have been made by the inherited experience from previous leaders.[411] Yet, this was difficult to attain in Augustenborg since there were no schemes available for exchanging experiences among residents or community group leaders. Therefore it is important to establish ways in which to pass on experiences to succeeding leaders or possibilities to learn from others' experiences. It could have been easily achieved through keeping records in local archives as part of the community's groups responsibilities and through local support from community workers who may visit the housing area when required as part of a training service. Similarly, there were no defined schemes to disseminate information among residents in regard of the presence and activities of community groups as a way of integrating them into the community.

As part of community life there were also some few workshops that remained from the 1950s such as carpentry, knitting, and pottery painting. However, the activities of the workshops were no longer of interest to residents since they were outdated and therefore rarely visited.[412] These and other new workshops could have been worked together with community rooms as part of the URBAN social programme which may have been of more interest to residents and youngsters. Also, none of the social programmes or the local authorities considered necessary the regeneration of the square which was vital in re-integrating a variety of facilities that would have benefited the community life of the housing area.

Lastly, the park was modified in two ways that affected community activities. On the negative side, the establishment of a care home for the elderly physically divided the park in two parts, reducing its surface area to the east, interrupting pedestrian movement

[410] Hampus Trellid, (Housing administrator Fastighetschef, MKB), interview by C. Martínez, June 2007, transcript 18, city of Malmö, Sweden.
[411] Elizabeth Mandarch, (Leader, The local behind building 9) Interview by C. Martínez, June 2007, transcript 10, city of Malmö, Sweden.
[412] King Löwendahl, (Head, Carpentry workshop) Interview by C. Martínez, June 2007, transcript 7, city of Malmö, Sweden.

in the outdoor areas, and reducing the informal surveillance its activities provided to adjacent communal gardens. On a positive note, the playground area was regenerated in the central part of the park with a design by the firm Svenska Landskap to provide residents with a set of areas for leisure and socializing. A musical theme was part of its design as the local school specialized in music training and the municipality wanted to promote unique parks within different housing areas in the city. Therefore the planting was arranged to create an experiential landscape of the music composition tempos and included play material for exploration of sounds with different new and recycled materials.

For instance, an area that was to signify the allegro tempo was provided with a large amount of plants with orange blossoms (Figure 5.6 and Figure 5.7).[413] However, it would not have been easy for residents to understand these intentions when using the park, and the musical play material was eventually vandalised. In reality, the strength of the design relied merely in the sheltered areas that were provided for residents to gather.

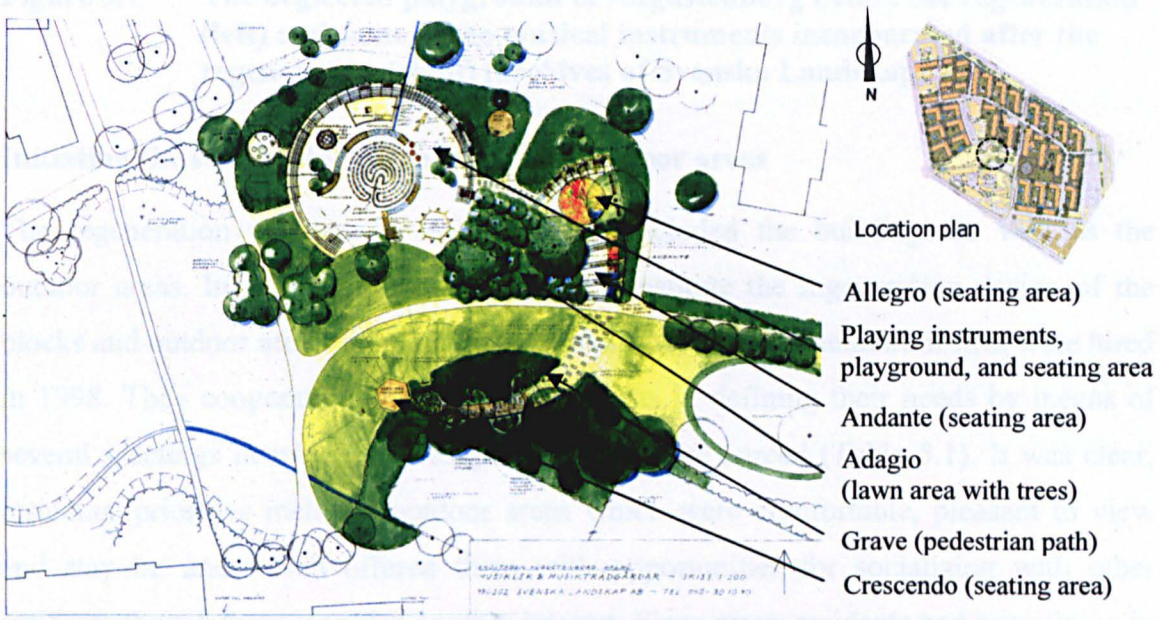


Figure 5.6 **The experiential design of the playground at the centre of the park in Augustenborg and the areas arranged for leisure and socializing (Svenska Landskap AB)**

In sum, despite participation of residents was understood to be essential in the beginning of the regeneration project for the building of community, it eventually ended as a consultation process. In reality, there was no real interest from the housing company in supporting community groups in a manner that they would effectively

[413] Ann-Sofi Högborg, transcript 8.

progress, because their contribution to community development has been underestimated. For instance, the housing company recognized the need to re-establish communication with residents, yet this was still planned to be carried out as a consultation process.[414] Even though the most important strength has been the flexibility that residents have had in putting forward their ideas and getting them started, they were undermined by the absence of tools to keep social structures together for the long term.

Figure 5.7 The neglected playground in Augustenborg before the regeneration (left) and some of the musical instruments incorporated after the regeneration (right) (archives of Svenska Landskap)

Initiating the sustainable regeneration of outdoor areas

The regeneration planned for Augustenborg included the buildings as well as the outdoor areas. In order to start what would constitute the regeneration design of the blocks and outdoor areas, the Svenska Landskap AB and the Mellanrum firm were hired in 1998. They cooperated together with residents in defining their needs by means of several meetings in which the design proposals were agreed (Table 5.1). It was clear, residents' priorities included outdoor areas which were comfortable, pleasant to view and stay in, and which offered them with opportunities for socializing with other residents though there was also another interest. Since many residents had been living in Augustenborg from the time it was first built, they also longed to recapture the memories of what the housing area once represented: a novel and unique project of which they were once proud of. Therefore, it was expressed by residents and the housing company, their interest in integrating the character from that period as part of the regeneration.

[414] Goran Larsson, transcript 14.

Table 5.1 Priorities of residents expressed in the consultation of Augustenborg for regenerating communal gardens

Restoring of 1952 design concept
Visually attractive design to view from above
More variety in plants and flowers in communal gardens and by entrances
More sheltered seating areas and barbecue grills
More play areas with low fences and better play material but smaller in size
Formalizing of desire line paths
Introduction of water fountains for bird life
Introduction of herbs and edible planting in some cases
Improvement of soil for growing flowers or vegetables
Improvements in maintenance

Source: Svenska Landskap AB

Keeping the character of that period was partially achieved by restoring the facades of some blocks as they were in 1952. This change later became a barrier in providing the blocks with a thicker insulation or introducing photovoltaic panels without changing the desired appearance of the facades, lessening opportunities for reducing energy consumption. Keeping the same character was also made possible by not making any structural changes to the blocks, which were not considered to be necessary as household composition was expected to remain as small families.[415] Therefore all the layouts remained the same with some modifications of flat sizes necessary in order to supply some few three room flats. However, the absence of larger dwellings later proved to be unsatisfactory. There were residents with larger families living in the housing area for a long time who were seeking to stay but were not able to find suitable dwellings.[416] This lack of flexibility has effectively led to disrupt existing community ties which should have been addressed by providing more dwellings of a larger size.

In the outdoor areas, the Mellanrum firm focused on designing the required sustainable urban drainage system whilst the Svenska firm attempted to integrate it with the new leisure and social areas as well as the 1952 character, of which the result was poor. The most important concept lost was the idea of creating community spaces integral to the rest of the housing area and the public spaces. The proposed design of communal gardens lacked spatial sequences to allow the fluidity between areas. There was no visual contact of seating areas with others on the pedestrian walks and roads due to the new placement of rubbish sheds on the open sides of communal gardens, reducing

[415] Goran Larsson, transcript 14.
[416] Anonymous resident of Augustenborg, personal communication, June 2007, city of Malmö, Sweden.

opportunities for casual contacts (Figure 5.8). Also, the sustainable urban drainage system design proposed by the Mellanrum firm lacked a leisure and social approach and was considered to be undesirable by the housing company.

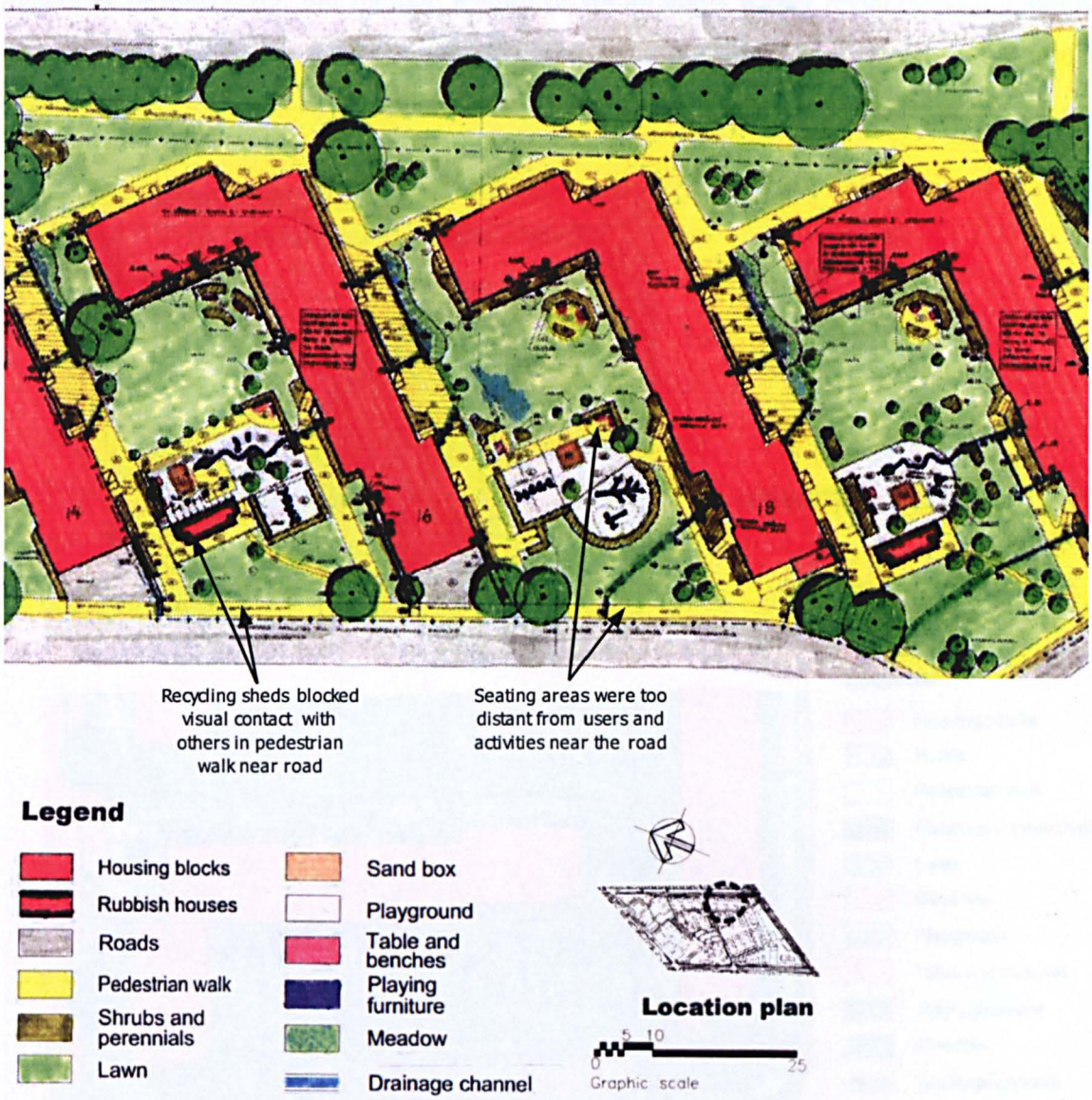


Figure 5.8 **The proposed design for north semi-open layouts in Augustenborg showing the reduced visual contact of seating areas with the pedestrian walk (Svenska Landskap AB)**

The design of the sustainable urban drainage system sought to integrate with the desired character, provide safe areas for children, allow the efficient cleaning of run-off water whilst retaining it, and improve biodiversity.[417] It was proposed that this should be addressed by means of a combination of shallow ponds and meadows with tall grasses and a range of plants to endure dry and wet conditions throughout the year. The ponds

[417] Anders Folkesson (Landscape design leader, Mellanrum), interview by C. Martínez, June 2007, transcript 9, city of Malmö, Sweden.

and meadows assimilated the sunken communal gardens of semi-open layouts to the south and had simple serpentine grass swales used to purify run-off water (Figure 5.9). However, as the design was done separately by the Mellanrum firm, the ponds and meadows proposed did not include leisure or social areas where residents could safely interact with the water surfaces which could have provided opportunities for casual contacts.

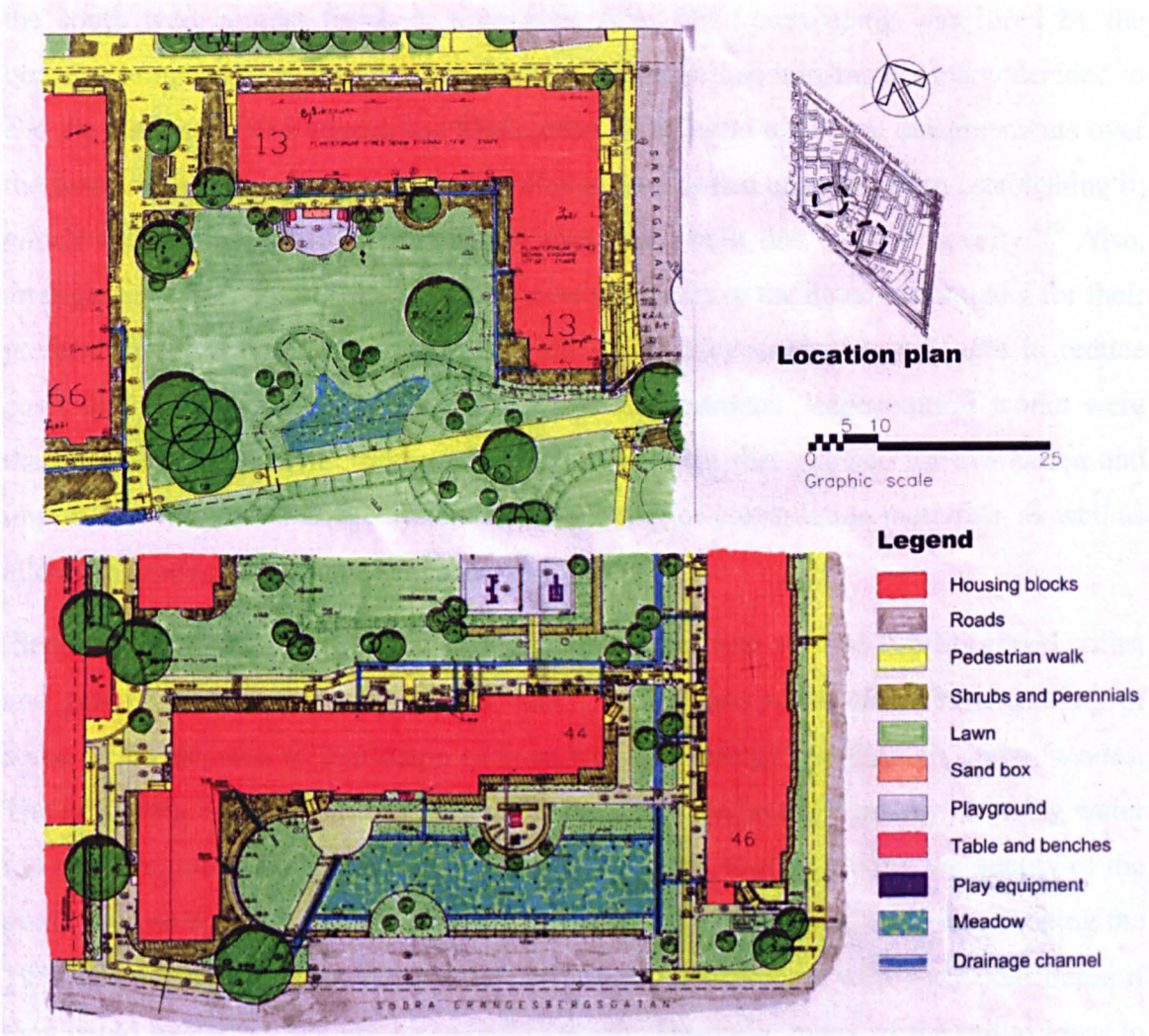


Figure 5.9 Details of retention meadows and concrete channels in semi-open layouts of Augustenborg (Svenska Landskap AB)

The housing company disagreed in the provision of meadows and swales because they believed them to be too closely located to buildings posing a risk of humidity, leakage, and flooding which later led to the use of concrete channels. Tall grasses of meadows were also said to be disliked by residents who were already familiar with a tidy ornamental garden.[418] These views derived from complaints of residents made at the start of the regeneration when meadows were first introduced. It was suggested by the

[418] Tomas Leidstedt, transcript 12.

housing company and maintenance contractor that acceptance of these type of areas would only be possible by introducing ecologically aware residents. However, 50% of respondents to the survey of the present study expressed outdoor areas were important for increasing biodiversity, showing there may be certain communal gardens where residents might be interested in introducing them.

At the end of 2000 when the landscape works in the park and the semi-open layouts to the south were almost finished, a separate firm ISS Landscaping was hired by the housing company to re-design the communal gardens. The housing company decided to end the contract with Svenska and Mellanrum firm due to the initial disagreements over the sustainable drainage system and the elevated costs that emerged from establishing it, which were practically unknown before they were built due to their novelty.[419] Also, arrangements had already been made by new managers in the housing company for their preferred designers, ISS Landscaping, with whom they immediately sought to reduce costs in the regeneration of following communal gardens. Regeneration works were then decided to be carried out over a longer timetable that allowed for evaluation and improvement to the drainage system and managing of construction materials, as well as allowing residents to adapt to changes.[420]

Plants and materials that implied a large maintenance cost such as shrubs, gravel paths, and green facades were subjected to cuts.[421] There was not a clear understanding of some of the benefits of landscape such as reducing energy use through green facades. The new main concern was to enhance the image of the housing area by reducing water run-off, integrating complete waste recycling schemes, and improving the quality of the outdoor areas but with lower construction and maintenance costs. Therefore keeping the 1952 character and requirements from the consultation process were only considered if they could be carried within the reduced budget. Similarly, many of the initial ideas to introduce projects for reducing energy use and using of non-renewable energy were put aside as heating and electricity was already obtained from efficient district heating systems.

Eventually, it became more important to establish the image of the housing area as a progressive and updated place to live. All the strategies that were introduced have

[419] Anders Folkesson, transcript 9. See also Hampus Trellid, transcript 18.
[420] Tomas Leidstedt, transcript 12. See also Jose Ortega, (resident, personal communication), May 2007, city of Malmö, Sweden.
[421] Tomas Leidstedt, transcript 12.

eventually become part of the identity of residents and have surely complemented in creating new memories about Augustenborg as a model housing area.

Re-establishing a semi-public feeling in outdoor areas

A good proportion of perimeter trees such as chestnuts, oaks, and some pyramid poplars remained from the original design. Yet, much of the shrubbery, which was essential in emphasizing realm distinctions, was lost subsequently. Although the design provided by ISS Landscaping attempted to restore a semi-public feeling of communal gardens, it was not quite achieved providing few intimate places for social interaction of residents or disconnected from the rest of the community (Figure 5.10). The hierarchy of areas in most communal gardens were poorly defined sometimes leaving areas without informal surveillance prone to vandalism. On the other side, the enhancement of the pedestrian environment has strengthened the semi-public feeling of the outdoor areas and remained a key component in facilitating residents with opportunities to meet each other. This was important considering that 79% of respondents to the survey of this study did not use vehicles as their main mode of transport but instead walked, cycled, or used the bus to move around.

Figure 5.10 Plan of Augustenborg from 2000 showing the design of communal gardens in Augustenborg (ISS Landscaping)

The transition between the semi-public communal gardens and the private entrances of buildings was emphasized with small decorative shrubs and ground covers. Such were *Geranium endressii* and *Geranium sanguineum* 'Max Frei' located on the either side of the entrances; *Prunus laurocerasus* 'Otto Luyken' and *Hydrangea arborescens* were placed along the entrance facade with scattered *Spiraea japonica* and *Hamamelis x intermedia* 'Pallida'. The transition from the public realm to the semi-public communal gardens was accentuated with remaining trees, small decorative trees such as *Tilia cordata* 'Rancho' and *Prunus avium* 'Plena', mounds, ridges, and rocks. For instance, mounds and ridges were added in semi-open layouts to the west to avoid visits of undesirables and vandalism from the main road. Similarly large rocks were placed at the side of pedestrian walks at entering the communal gardens in north semi-open layouts as an informal boundary. Yet, there were still visits of undesirables to these areas since the informal surveillance provided by the activities of many basements was missing (Figure 5.11 and Plate 5.8).

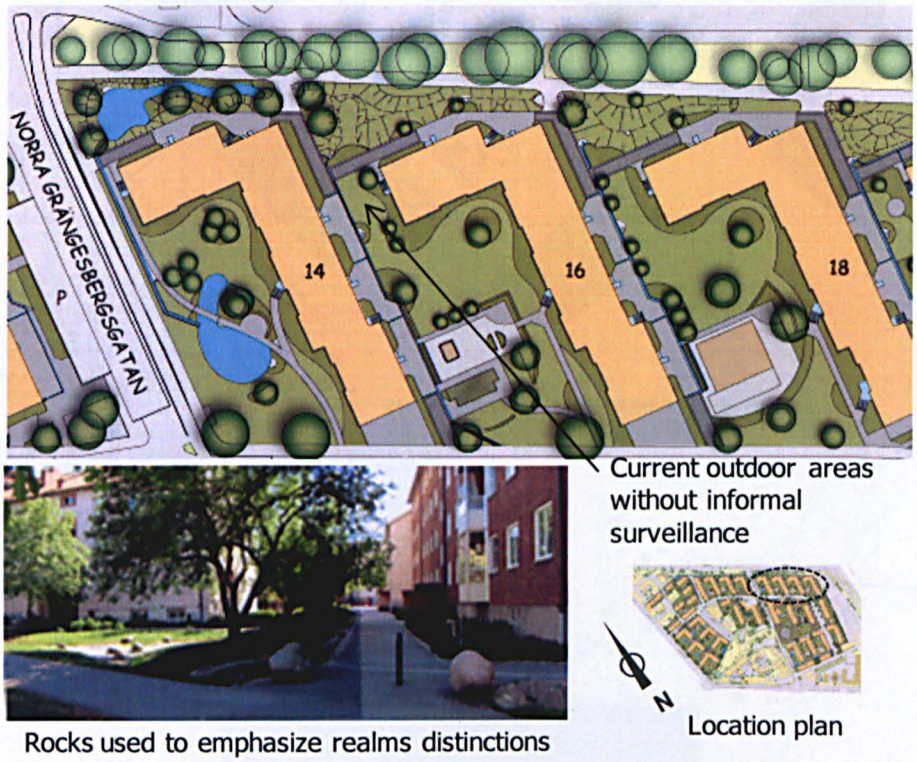


Figure 5.11 **Landscape design approach used to enable semi-public communal gardens in Augustenborg (plans from ISS Landscaping; photograph by author)**

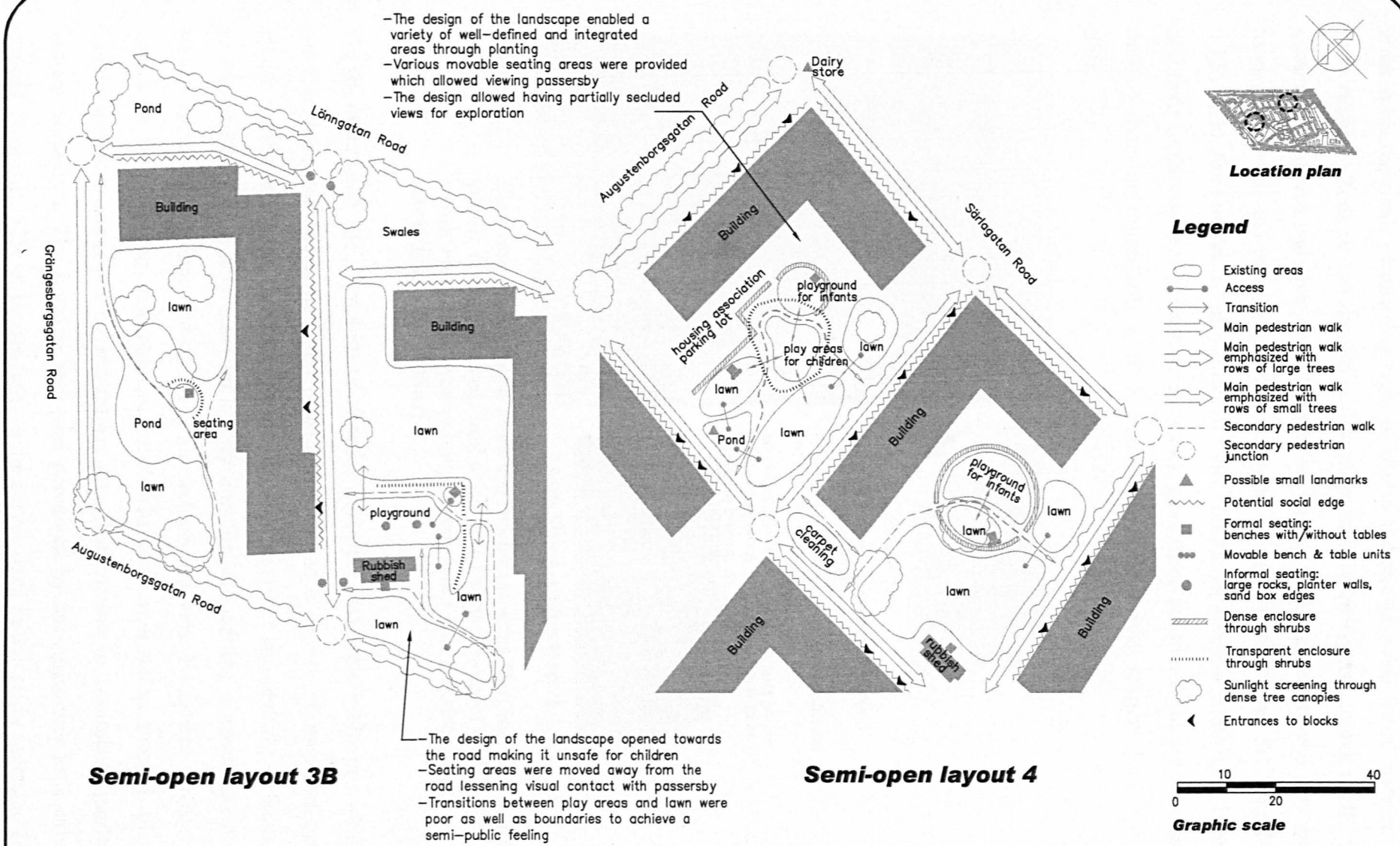


Plate 5.8 2007 situation of spatial transitions in semi-open layouts of Augustenborg

Tall and dense boundaries defined and enclosed some of the playgrounds and seating areas from the roads obstructing sight of others and any possible social contact. Such were rubbish sheds or tall shrubbery found on semi-open layouts to the north. Other communal gardens had open or no boundaries putting at risk children who may wonder towards the road and providing little privacy to conversations (Figure 5.12 and Figure 5.13). Also, the removal of play areas of most communal gardens in the open layouts 1 and their replacement with pedestrian walks, gave these outdoor areas a public feeling making them uncomfortable areas to conduct social activities (Figure 5.14 and Plate 5.9).

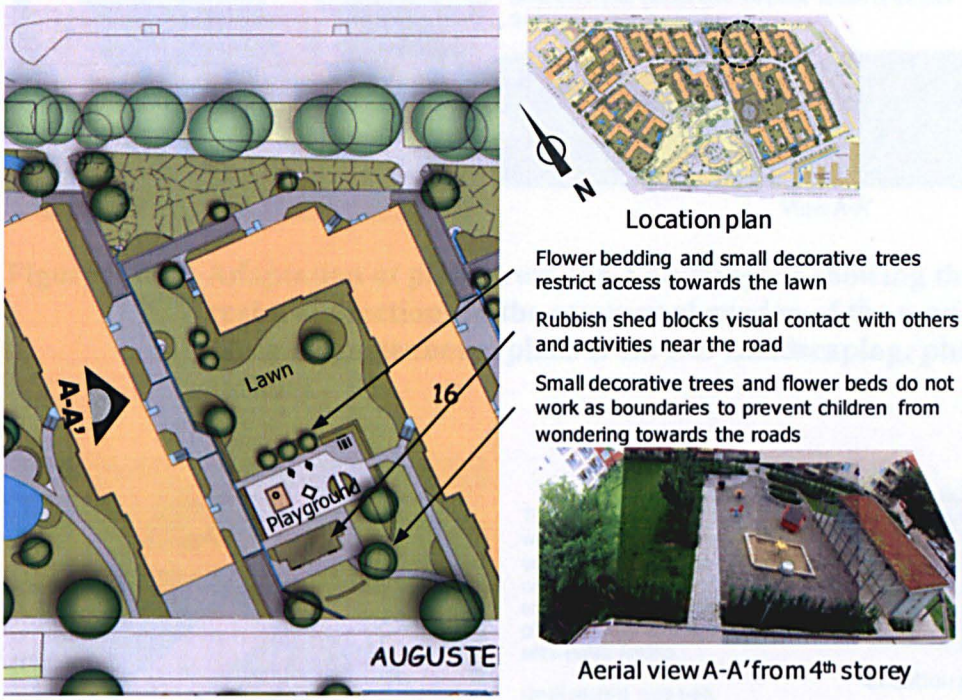


Figure 5.12 Plan and photograph showing the boundaries that increased the public feeling of areas and obstructed visual contact with pedestrians in Augustenborg (plans from ISS Landscaping; photograph by author)

On the other hand, the improvement of pedestrian areas was achieved by providing safe outdoor areas for pedestrians and possibilities to use a variety of transport options. Roads were modified to introduce traffic calming measures and parking surfaces were restricted by keeping new areas preferably underground, setting a maximum limit of two vehicles per dwelling, and charging for each parking area. Pedestrian surfaces were enhanced by providing amenable and sheltered pedestrian walks through planting. Safety was also improved by integrating dim illumination in communal gardens to reduce vandalism. The housing area was perceived by the researcher as a safe area overall. However, 37% of respondents to the survey used in this study indicated feeling

unsafe at night time in underground parking and park areas due to their lack of informal surveillance. Some residents have organised themselves in taking shifts to survey the outdoor areas at night.[422] It would be necessary to provide illumination in park areas and other forms of surveillance in underground parking.

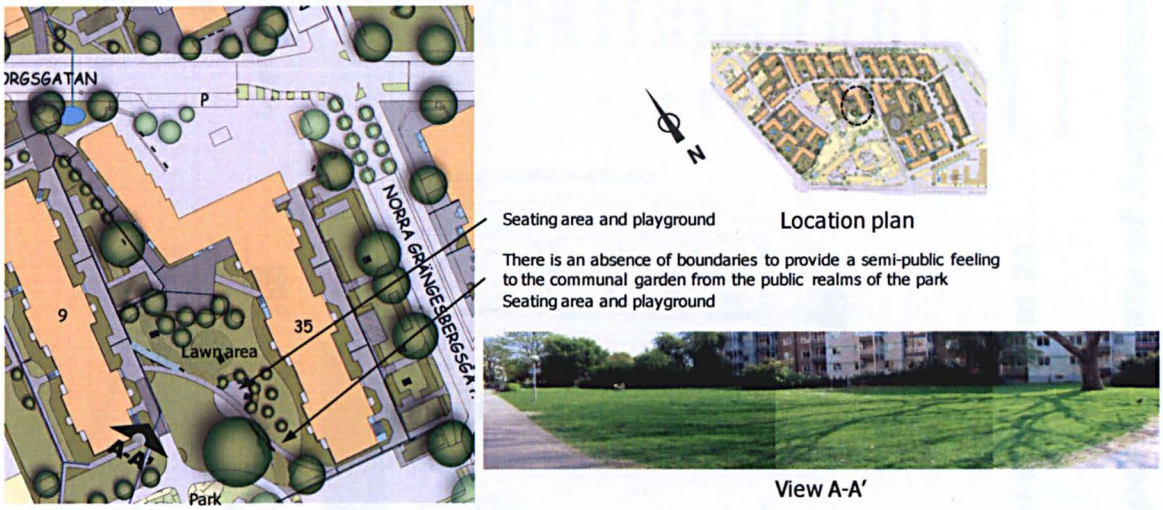
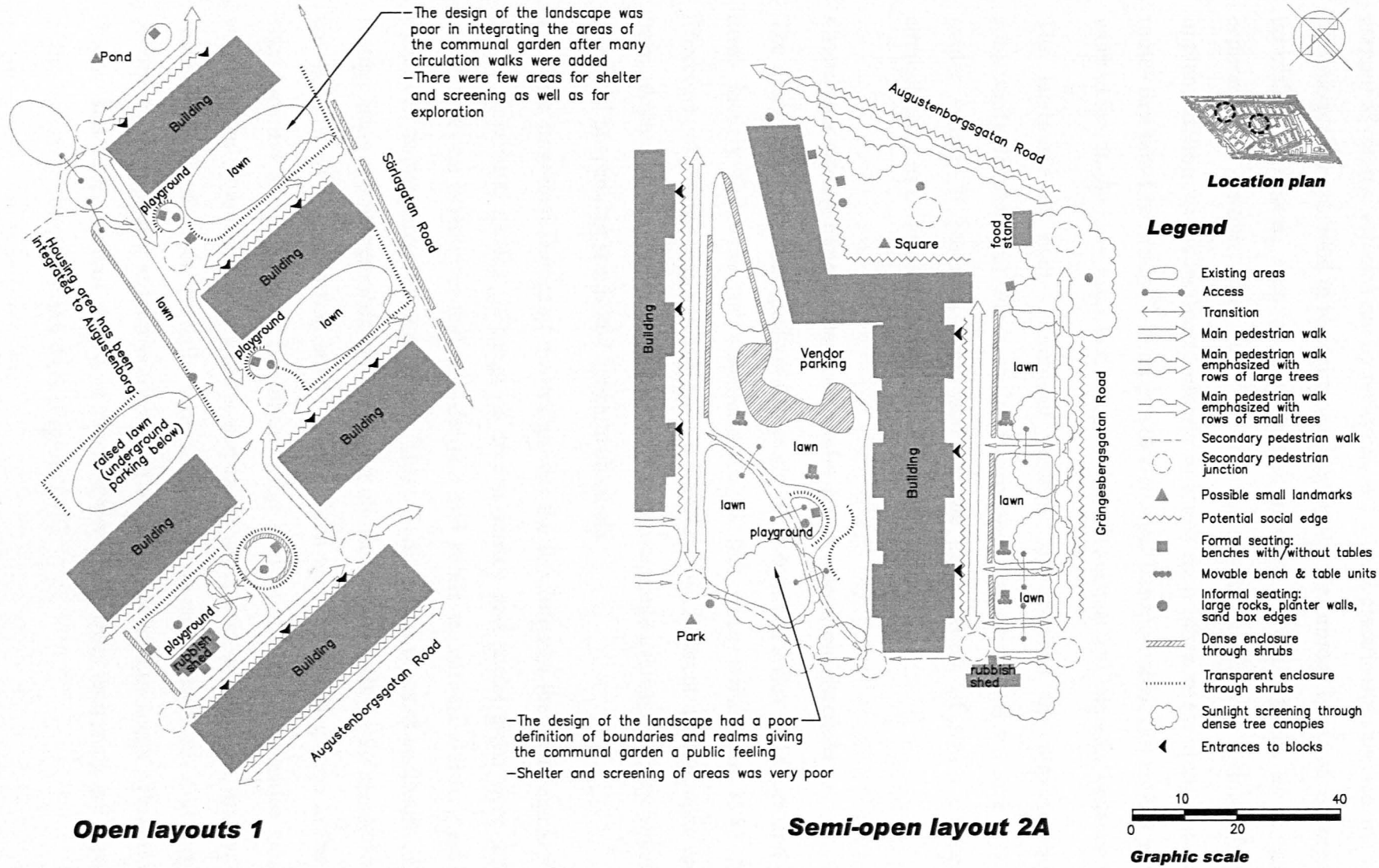


Figure 5.13 **Adaptation of plans from ISS Landscaping showing the absence of realm distinctions in the communal garden of the semi-open layout 2A in Augustenborg (plans from ISS Landscaping; photograph by author)**

Figure 5.14 **Plan and photograph showing new pedestrian walk that has contributed to the public feeling of the communal gardens in the open layouts 1 of Augustenborg (plans from ISS Landscaping; photograph by author)**

[422] Elizabeth Mandarch, transcript 10.



Open layouts 1

Semi-open layout 2A

Plate 5.9 2007 situation of spatial transitions in open layouts of Augustenborg

From the transport options provided during the regeneration, including buses, trains, a carpool of electric vehicles run by residents, and a local electric train service, the variety of options they provided to residents was important. Unfortunately not all of them were possible to be kept, such as the electric train on rubber wheels, as it was not economically feasible. Yet, one of the important experiences gained from its implementation was it facilitated elderly to know each other as the train had specific routes that benefited them.[423] Perhaps other cheaper transport solutions could have been worked that might have had a similar social benefit such as taxi bikes for instance.

The landscape of many communal gardens has lessened the opportunities for community development due to the poor structuring of realms and the lack of a semi-public feeling. It has then been vital for the development of social contacts the strengthening of pedestrian areas.

Creating a variety of areas for community life in communal gardens

The design of communal gardens was made to integrate a series of leisure and social areas loosely following the remaining shapes that characterised the 1952 design. Therefore, all communal gardens have a significantly different arrangement that has been adapted to allow the establishment of the sustainable drainage system which now consisted of retaining ponds and concrete channels.

The most important feature of the design was the flexibility of the areas that were part of the communal garden. A range of diverse leisure and social areas were arranged together which sometimes had well-defined and subtle transitions allowing access to each other without interfering activities. There were various types of enclosure defining seating areas and playgrounds, which at best allowed sight of others for casual contacts through low shrubs and wood lattice fences. Such was communal garden in the semi-open layout 4 where a simple hornbeam hedge is the framework to various areas that were divided smoothly by a narrow serpentine walk and an adjacent narrow water channel. Areas are then partially screened off the lawn by medium- and large-size decorative trees placed at their corners such as *Sorbus aria* 'Lutescens', *Prunus avium* 'Plena' and *Alnus cordata.* A row of *Amelanchier ovalis* trees then mark the separation of the lawn with the pedestrian walk (Figure 5.15).

[423] Jason M. Erwin, 'Realizing Malmö's Neighborhood Functionality and Social Capital Potential: The Impacts of High-Speed Transport Infrastructure on Rosengård and Fosie', *Lund University*, (2003), <http://www.lumes.lu.se/database/alumni/02.03/theses/ erwin_jason.pdf> [accessed on March 2007] 1-50 (p. 35).

A pleasant stay in these areas was provided through a rich sensory experience from the water in ponds and planting around them, ground covers, and small shrubs. Species around ponds included *Euonymus europaeus*, *Alchemilla mollis*, *Fargesia murielae* 'Simba', *Cotoneaster* 'Coral Beauty', and *Cornus stolonifera* 'Kelsey', among others. Also, decorative trees such as *Prunus sargentii*, *Amelanchier lamarckii*, *Prunus avium*, and *Tilia cordata* 'Rancho' were used that contributed to visual and textural variety and allowed sunlight into communal gardens. These are also used for enclosure of some seating areas in coordination with simple shrub lines (Figure 5.16). Lastly, in providing for comfortable communal gardens the use of good quality materials, furniture, and planting were essential.[424] These have fared well throughout the years with little vandalism.

The planting follows a similar arrangement throughout the housing area yet with diverse communal gardens that provided distinct areas. Although residents desired to keep some of the character of 1952 in outdoor areas, there were few that were restored. It was rather the simplicity and type of some of the materials used that partly evoked the memory of that period.

Figure 5.15 Plan and photograph showing the diverse spatial transitions achieved in a communal garden of the semi-open layout 4 in Augustenborg (plans from ISS Landscaping, June 2007; photograph by author)

[424] Tomas Leidstedt, transcript 12.

Figure 5.16 The use of stones in ponds of the landscape of Augustenborg adds to visual variety and consistency (left); Typical enclosure of seating area with small trees and simple low shrubbery (right) (photographs by author)

Providing areas for care and personalization

The design of communal gardens was not planned with defined areas for personalization and care, such as allotments and fruit plants, that would allow keeping the consistency of the design and level of maintenance in communal gardens. Personalization was only possible in balconies and small areas of communal gardens which were adapted later on the request of residents. They were usually selected under balconies where residents could keep good maintenance of them. Otherwise, allotments were allowed in educational facilities or in fenced communal gardens provided to elderly. It was believed by the housing company that few residents would be interested in keeping an allotment and that fruit bearing plants and trees were a source of conflicts among neighbours of different cultural backgrounds.[425] Yet, from previous experiences before the regeneration, having fruit trees provided residents with opportunities to share and know other neighbours without any conflicts.[426]

Therefore, there were few opportunities for residents to involve in caring for their outdoor environment. Despite that social leaders had proposed during the regeneration for residents to handle social structures, ecological projects, and management of their communal gardens on a long-term basis, the housing company preferred later to have control over the latter two.[427] This was in order to keep decision-making within the company that would ease the implementation of changes in communal gardens and to keep a certain level of maintenance throughout the housing area.

[425] Goran Larsson, transcript 14. See also Tomas Leidstedt, transcript 12.
[426] Trevor Graham, transcript 16.
[427] Ibid.

However, the survey responses showed that the discussion and implementation of ecological strategies have influenced residents in developing common shared values towards improving their outdoor environment and in taking a more sustainable lifestyle. Thus, they have also provided the means for residents to know others in sharing ideas and methods to improve the environment for at least a fifth of the respondents to the survey. Therefore, involving in strategies for improving the environment has the potential for strengthening networks among residents.

Most important lessons from ecological processes introduced through the landscape

The main emphasis of the design was to reduce pollution, by minimising precipitation run-off and waste. Precipitation run-off was reduced by 95% through the use of retention ponds and concrete channels as well as some swales and meadows as part of the sustainable drainage system. It was also supported by the use of green roofs in the industrial estate, on some of the school buildings, and on recycling sheds.[428] Yet there were many inconveniences in its establishment such as the low gradient of outdoor areas that made difficult the flow of water to ponds and continuous stagnation problems which have become expensive to solve.

On one side the sustainable urban drainage system has become part of the identity of the housing area, has contributed to the diversity of habitats, has become part of a pleasant setting for residents, and likely will become part of their memories of the housing area. On the other side, their expensive implementation and maintenance to keep them clean may prove to be inadequate for other social housing areas. If residents were involved in the general maintenance of outdoor areas then they may be more feasible economically. Also if ponds were designed in a way that they may become part of children's play and education about plants and wild life, residents may develop a stronger sense of attachment to their outdoor areas and as a result take greater care of them. There are clearly more benefits that can be obtained from the use of sustainable urban drainage systems if they are designed in collaboration with residents and maintained with their help.

As part of reducing pollution, all local waste of residents has been put for re-use in a local collection point or taken to the rubbish sheds for recycling or producing of

[428] Tomas Leidstedt, transcript 12.

compost. For its successful implementation, close collaboration with residents was kept by educating them in handling of waste with information through workshops and later through periodicals.[429] The establishment of waste recycling was also made easier by having local administrative offices of the housing company and permanent gardeners from the maintenance company in charge of composting who aided in decision-making processes. As a result of having residents participate in the implementation of recycling processes, it has changed their attitude towards the environment leading them to take a more sustainable lifestyle. Around 85% respondents to the survey of this study considered it important to reduce waste and have done so in their dwellings, as well as buying environmentally friendly products.

Composting was a practical solution derived from recycling household waste and was intended to be used for improving the soil in the housing area. It was best achieved with fast composting machines which processed all kitchen waste reducing malfunction problems otherwise raised by feeding wrong types of organic waste. However, it was known later that the fast composting machines produced a concentrated form of compost and quite more than was required in the housing area. As a result, it has been necessary to transport it elsewhere until it is ready for use taking three to six months.[430] This has created an alternate problem of pollution in its transport for its storage. Although the benefits of composting would still surpass the disadvantages encountered, there is still the need to implement management schemes that can reduce additional pollution, preferably with local solutions. Such could have been putting excess compost for sale for use in adjacent housing areas creating opportunities for employment to locals.

Other waste schemes that have proved to be successful were the re-use of household items and basements. In order to make re-use of discarded products more effective, the housing company worked in collaboration with maintenance gardeners in doing minor fixings required and have organized every month collection-swap stands. They were important as part of raising residents' awareness but also allowed some residents to collect items they needed and could not afford to buy new.

Saving drinking water was not made a priority of the sustainable goals of the regeneration scheme since Sweden has no potable water shortage and it is extremely expensive to make any changes in the existing pipelines. In fact, local authorities have

[429] Trevor Graham, transcript 16.
[430] Tomas Leidstedt, transcript 12.

discouraged any attempts by the housing company to introduce strategies that would reduce the sewage discharge since this may lead to clogging of pipelines. This was already becoming a problem in areas where water discharge had been significantly lowered.[431] Therefore strategies have focused in reducing consumption through planting of low- or no irrigation as was well as introducing water efficient gadgets and appliances for the significant financial savings. Although 77% of respondents indicated using measures to reduce their consumption, only an average of 60% considered drinking water to be exhaustible or recyclable indicating the need to provide them with more awareness information.

The appearance of outdoor areas and comfort for leisure or social activities of residents issues were of utmost importance in improving the image of the housing area and providing quality outdoor areas. Therefore, the selection of suppliers as well as materials and plants was made in terms of their long-time performance, durability, quality, and economy; wherever possible embodied energy and pollution were also taken into consideration. For instance, furniture and outdoor fencing were made of *Larix decidua* timber which was possible to be obtained in the South of Sweden where it has been largely grown for its durability, resistance to rotting, and not requiring chemical treatments. Yet, most trees and plants that were put in the garden areas have been acquired from suppliers in Germany for the variety, quality, and price not found in Sweden.[432] Whilst the selection of materials, plants, and suppliers may not be sufficiently adequate for reducing energy use and pollution it was rather more significant to provide outdoor areas that residents would like to use and stay in.

Lastly, reducing energy use was made possible in time by means of energy-efficient gadgets and pilot projects that were introduced as a way of testing and adapting best measures for the housing area. Energy-efficient gadgets and appliances have been installed in flats and communal laundry rooms of each building as a way of reducing energy use. Individual metering for hot water has also been set up in some buildings as a way of fostering consumption awareness. Small-scale renewable energy projects, such as a wind turbine and solar-geothermal collectors, have also been introduced to feed emergency back-up systems, pumps, or to sell electricity back to the main grid. In the

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[431] Hampus Trellid, transcript 18. See also Ulf Nyberg, VASYD Head of Sewerage technical department, (Ulf.Nyberg@vasyd.se) (2009, December 23), Clogging of sewepipes, (claumv@msn.com).

[432] Tomas Leidstedt, transcript 12. See also Marie Larsson-Stern, 'Aspects of Hybrid Larch (Larix X eurolepis Henry) as a Potential Tree Species in Southern Swedish Forestry', *Southern Swedish Forest Research Centre Alnarp,* (2003) <http://diss-epsilon.slu.se/archive/00000441/02/Lic1Larsson-Stern.pdf> [accessed January 2007] 1-34 (p. 24).

end, all of these strategies have been more important in raising residents' awareness and in integrating the housing identity than the energy reductions achieved.

Planting comparison of the 1952 and 2000 design

The planting used in the 1952 and 2000 landscape design in the selected layouts was also compared in more detail to find similarities and differences (Appendix D). Both designs show consistency throughout the housing area in the use of plant species with some variations among communal gardens that make them distinct. Only communal gardens in the semi-open layouts 4 differ for both the 1952 and 2000 design. In the former, communal gardens had fewer trees but more roses surrounded the larger playgrounds. In the latter, there is a smaller amount of planting but a larger quantity of small decorative trees. Both designs aimed at providing enclosure and visual richness although in a different spatial arrangement and with lower heights of planting in the 2000 design to reduce maintenance costs.

However, the 1952 and 2000 design used different plant species. The planting used in 1952 relied mostly on *Cotoneaster*, *Spiraea*, *Syringa*, *Ligustrum*, and *Lonicera* perennials, and *Hosta* perennials. There were various climbers and roses that altogether produced various layers, shapes, fragrances, textures, and colour displays. The 2000 design targeted mainly to enable a visual variety and a quick ground cover of small and large areas. It integrated the remnant planting with mostly *Cornus*, *Forsythia*, *Euonymus*, *Rhododendron*, and *Spiraea*, *Geranium* and *Hosta* perennials, and bulbs.

Findings and discussion

The regeneration process went through various phases of change which lessened the achievements of the social and ecological sustainability of the landscape. For both, the arrangement of outdoor areas was found to be essential as they provided residents with ways of meeting each other. The development of social structures and participation opportunities were significant in strengthening the social fabric and providing a variety of ways for residents to relate with others. Lastly, ecological processes that were introduced were important as a way of improving the environment but also for residents to know each other. Although the regeneration did poorly in the assessment of these issues, there were lessons to learn from which are discussed in the same order as they were found to be important (Table 5.2 and Table 5.3).

Table 5.2 Performance of the social issues for Augustenborg

Sections	Score for each section		Weighting values		Weighted scores per section
1 . Community development.	6	x	0.10		0.57
2 . Community participation.	5	x	0.10		0.48
		Total	0.19	Total	1.05
		Related value for scaling of 0% to 100%	0.019		
		Score for the environmental assessment (Total weighted score by the related scaled value)			55

Table 5.3 Performance of the ecological issues for Augustenborg

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.	3	x	0.12		0.36
3 . Water saving.	4	x	0.08		0.32
4 . Reducing pollution.	7.5	x	0.20		1.46
5 . Materials selection.	9	x	0.13		1.13
		Total	0.81	Total	5.59
		Related value for scaling of 0% to 100%	0.081		
		Score for the environmental assessment (Total weighted score by the related scaled value)			69

The regeneration of the landscape: strengths

- Strengthening pedestrian and cycle areas as well as the connectedness of communal gardens and facilities has provided residents with more opportunities for casual encounters, informal surveillance, and where children may play safely.
- The re-establishment of a semi-public feeling in some of the communal gardens has enabled intimate and comfortable areas for relating with others.
- Keeping visual contact of others in edges of activity such as pedestrian walks near roads was essential as part of the regeneration of the landscape to facilitate opportunities for possible social contacts with residents using communal gardens.
- The creation of a variety of sheltered and flexible leisure and social areas with a rich diversity of planting for sensory experience has created pleasant and comfortable areas for residents in communal gardens and the park.

The regeneration of the landscape: limitations

- Decisions to change the outdoor areas without taking into consideration the effects they would have on community life have lessened it. These included the erection of

new buildings on the park, building of parking areas on communal gardens, integration of unnecessary circulation spaces, and an inadequate adaptation of the design to loosely assimilate the 1952 landscape.

Community development and participation: strengths

- The most important issue for re-activating the social structure of the community was found to be the provision of various and flexible ways for residents to participate in social or ecological projects. This could be with ideas, organizing activities, running of community services, creating ecological gadgets, initiating community groups, gardening, providing maintenance, or others.
- Participation of residents in ecological projects has proved to be significant in giving residents opportunities to meet each other by exchanging ideas and as a potential way for developing a common view and sharing of values.
- Residents' participation has changed their attitude and led to changes in their lifestyles towards reducing their impact on the environment.
- The revitalisation of image of the housing area was made through integrating elements from the past and the present as well as by integrating good-quality durable materials and planting. The re-integration of the 1952 character of the housing area was achieved by the introduction of similar materials, colours, and plant arrangement. The present was represented by the sustainable urban drainage system, the recycling sheds, and other ecological projects.
- The most important issue found for enhancing the existing and few new social structures that thrived in the housing area, was the exchange of information and collaboration between them, the housing company, and the local school. It allowed learning from the experiences of each other and setting up of activities to benefit the community.

Community development and participation: limitations

- In order to maintain the social structures that were created, it was found to be essential for residents to have available the tools to develop skills for organizing and managing community projects. Unfortunately, these were not planned for or made available as part of the regeneration project.
- There were few participation opportunities made available for residents for the maintenance and management of outdoor areas. The most important was allowing

flexibility in the communal gardens for residents to care for adapted small areas near residents' dwellings with planting of their own choosing.

- The variety and adequacy of community services to residents' current needs were poor. By having a limited number of facilities on the square and unattractive workshops, residents had fewer opportunities for engaging with the community.

Ecological revitalization: strengths

- From the general experience of the regeneration the most important lesson was to carry a gradual regeneration of communal gardens that allowed testing and evaluating of new strategies;
- Also the presence of administrative offices in the housing area was found to be essential to facilitate decision-making processes in the implementation of ecological projects.
- In the implementation of specific ecological strategies, reducing carbon emissions, pollution, and selection of materials for their life-cycle were found to be more adequate to be implemented in an existing environment and for their support to community.
- Enhancing pedestrian and cycle areas was most important for ecological and social benefits but was only possible with municipal collaboration.
- Although the sustainable urban drainage system was expensive in its maintenance, it contributed to support community life in many ways; these included the improvement of the image of the housing area, as areas for exploration, discovery, education, sensorial richness, and support to biodiversity.
- Recycling waste and composting was the most efficient way of reducing pollution, involving residents, and raising their awareness towards the environment.
- Selection of materials and plants used in the regeneration works and communal gardens was more important for their contribution to the image of the housing area than their lifecycle.

Ecological revitalization: limitations

- The lack of definition of detailed sustainable goals and projects led to inadequate changes that lessened the ecological opportunities of the landscape. It would have been desirable to establish a detailed schedule according to

sustainable aims established with alternate solutions to possible problems that could develop and ways of assessing progress.

- Saving water, reducing energy, and improving biodiversity were more difficult to be implemented without support from the municipality and due to perception preferences for neatly maintained outdoor areas.
- There were few local education sources available for residents that may reduce their consumption of resources and raise awareness in regard to the ecological projects established in their housing area. It would be necessary that local libraries and circulars are put in place to gather ideas of residents, encourage communication exchange, and raise their awareness which may lead to changes in their lifestyle for improving their environment.

The 1952 arrangement of the outdoor areas with comfortable, intimate, and good quality areas had a significant influence in facilitating community life in the housing area. However, the various changes of the landscape during the regeneration process due to organization changes of the housing company personnel led to the final creation of a series of communal gardens which were not always ideal for socializing of residents. The strength of the current design relies on the flexibility and the variety of the outdoor areas that resulted after the regeneration of the communal gardens; it has allowed diverse leisure activities as well as socializing opportunities and modifications can be made easily according to the needs of residents.

For community development and participation, the regeneration project allowed establishing ways for revitalizing the community either through the URBAN programme or the housing company. A variety of ways for involving in different stages and projects during the regeneration provided residents with important ways for knowing each other and their community. However, their participation was not made available for management or maintenance on the long-term nor capacity building to keep social structures. In order to keep the consistency of the landscape appearance throughout the housing area, residents were not included as part of the general maintenance and management of outdoor areas. Whilst it aided in keeping an overall neat image for the housing area, the same result may have been achieved by providing residents with the necessary skills along with a written maintenance agreement.

Capacity building for keeping social structures was also not available during the regeneration. Although the local authorities would have been adequate in providing

skills training, the housing company and the local school could have more easily provided the means for the continuity of social structures through local exchange of information. It was not possible due to the paternalistic and distrustful attitude that characterised the housing company and local school administration who had no real interest in providing the means to establish long-term participation of residents. Therefore, the residents' role changed from active decision makers and shapers of the social and ecological projects during the URBAN programme to passive recipients of consultation.

Lastly, the improvements made to outdoor areas contributed significantly to the revitalization of the image of the housing area. By integrating elements from the past, valued memories of residents were incorporated in the process of regeneration whilst new elements of the landscape and ecological projects conferred it as a progressive housing area once more. Also the integration of good quality materials and planting has enhanced and provided comfortable communal gardens.

There were many ideas and projects that were proposed to revitalize ecological processes of the outdoor areas at the start of the regeneration scheme although a fully sustainable solution was not possible to be obtained. On one side there was a lack of understanding of the benefits of landscape for achieving it from URBAN leaders, the housing company, and local authorities who had an essential role in establishing them. Consequently, there were no short- and long-term plans implemented or contingency solutions for unforeseen problems. On the other hand, there were some ecological processes that were found to be more economically feasible and adequate in supporting community life whilst others were too expensive and perceived to lessen the image and quality of the communal gardens. The most important one was found to be the reduction of carbon emissions, followed by the reduction of pollution and the selection of materials for their life-cycle.

In enhancing outdoor areas to provide a safe and comfortable pedestrian environment to support community life, carbon emissions were reduced by discouraging vehicle use through a range of measures for pedestrian walks and roads. This measure was perhaps the first and most important towards achieving sustainability and as an initial way of raising awareness among residents and changing their lifestyle. Yet the financial and collaboration support from the municipality was partly essential in implementing traffic calming measures and alternate public transport options such as the electric train.

For reducing pollution, the sustainable urban drainage system used worked as part of ecological solutions used in the housing area but it was also beneficial for community life. As an ecological measure, it was fully effective after solving stagnation problems that were expensive in solving and in keeping maintenance of ponds. If residents had been involved in their maintenance, the cost could have been reduced and would have contributed to increase their care and attachment to their outdoor areas.

As a support for community life, the existing ponds and channels have enhanced the visual appeal of communal gardens, provided opportunities for casual contacts, and have become part of the image of the housing area and most certainly of memories of residents. Yet, the design of the sustainable urban drainage system could have been improved and reduced costs if more areas for filtering precipitation were installed such as swales and small meadow areas. Most importantly, it could have facilitated play areas for children allowing contact with water providing opportunities for casual encounters and socializing of residents. These are issues that must be addressed before engaging in the regeneration of a housing area.

Waste recycling was economically feasible and profitable through the production of composting but most importantly has also allowed residents to participate. Their involvement was vital for the success of the project and has raised their awareness towards the environment. There were some inconveniences in the excess production of compost which should be addressed to reduce energy use from transporting it elsewhere and which could create employment opportunities for residents if put for sale locally.

In the selection of materials, it was more significant that they enhanced the quality of the communal gardens, as part of their comfort and contribution to the image of the housing area, than their lifecycle credentials. This shows the relevance of social issues over ecological ones and the importance of considering the effects they have on each other in regeneration projects. Otherwise, larch was the most appropriate tree for furniture, outdoor works and shelter as it was easily found in Sweden; otherwise trees from Germany were preferred for their variety and quality.

Saving drinkable water, reducing energy, and enhancing biodiversity were more difficult to achieve. This was in part due to the difficulties they generated in the need to modify existing buildings and partly because they were not necessary: there was a surplus of drinkable water and using energy from nearby district heating systems. It was also because they were perceived to reduce the quality and image of the outdoor areas,

for example meadows and areas that looked untidy. Therefore, the most likely way of reducing the use of these resources was raising residents' awareness to reduce their consumption for which continuous sources of information were vital.

Summary lessons for community development and support of ecological enhancement

A series of initial guidelines have been proposed from the lessons of the regeneration for ecological and social sustainability. The guidelines have been arranged in the order that were found to be important according to the regeneration experiences (Table 5.4).

Table 5.4 Proposed guidelines from the lessons of the regeneration for social and ecological sustainability

General considerations	• Regeneration should plan for short- and long-term strategies - Ensuring a sufficient budget until residents may take up management - Preparing alternative solutions to possible problems • Regeneration should be conducted in a progressive way rather in one stage - Enabling changes to be accepted by residents and providing them with a sense of constant care and an up-to-date design of outdoor areas - Allowing testing and evaluating of solutions that best fit the local context • The management body, planning departments, local social structures, and residents should collaborate jointly† - Exchanging experiences on their invididual work - Planning for goals that benefit different groups of the population - Distributing organizational and operating responsabilities amongst residents and management bodies - Enabling different sources of information to users - Integrating feedback systems and evaluation from available social structures and managment personnel • Knowledgeable personnel should be available during and after the regeneration - Having administrative-management personnel in the housing area that facilitates local decision-making - Having a community development officer and landscape architects permanently working with the managing body • Regeneration and maintenance should preferably be conducted with residents participation - Creating attachment and care of residents to the housing area
General arrangement of outdoor areas	• 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 • Communal gardens should be integrated with local facilities - Facilitating access among areas - Enabling visual contact with others • Communal gardens should be designed with sheltered and robust areas with a rich variety of planting for sensory experience • Required changes should have a minimum impact to the integrity of the outdoor areas - Avoding disturbance of established realm boundaries as well as existing leisure and social areas - Integrating underground parking only if the roof serves as part of the communal gardens at ground level - Avoding unnecessary circulation areas • Communal gardens should be designed to meet the changing needs of residents - Supplying compact individual solutions in communal gardens - Arranging communal gardens with different features - Providing design queues to encourage residents in using communal gardens other than theirs, such as signals, maps, similar materials for a determined group of gardens, and others

Table 5.4 continued

Community development	• The quality of outdoor areas should be enhanced in a way that it significantly improves the image of the housing area - Re-designing according to residents' needs in each communal garden - Taking into consideration the heritage of the area and memorable areas - Making ecological strategies part of the character of the area • Local authorities and the managment body should encourage revitalization of a variety of facilities and social structures - Providing access to skills and financial stimulus for social structures - Gathering experiences of social structures and making them available locally such as an archive - Attracting businesses appealing to women and families, such as beauty shops, bakery, ice-cream parlor, etc. - Arranging periodical events in the square and communal gardens • Information on social structures, facilities, and their actvities should be disseminated regularly among residents - Arranging different information methods through the housing company, school facilities, and social structures • The regeneration of the landscape should consider areas for personalization - Allocating areas in communal gardens that may be suitable without affecting the consistency of the design - Locating them close to where residents may be in charge - Locating allotments close to educational facilities or community groups as a learning source - Planting produce that complements the design or does not have visual impact such as root vegetables • Flexible household arrangements for the changing stages of families should be facilitated - Making available different types and sizes of dwellings for residents to move to
Community participation	• Various and flexible ways for involvement should be planned for social and ecological projects - During and after the regeneration - Allowing all members of the community to voice their opinion - Allowing younger residents to become involved at early or later stages of the projects
Reducing carbon emissions	• The establishment of traffic calming measures and public transport options should be facilitated - Providing incentives for their installment and maintenance by local authorities or other programs working in collaboration with the management body for developing best strategies - Providing guidance for the development of innovative and feasible transport solutions by local authorities and universities • Management body and/or local authorities should encourage non-vehicle transport options - Charging for parking, for all vehicles or for having more than one vehicle - Supporting cycling schemes, programs, activities, and bicycle ownership - Fostering shared-vehicle schemes • Supply of energy should be acquired from efficient or renewable sources such as combined heat and power systems • Renewable energy should be generated for small-scale projects, communal facilities, or feeding back to main grid - Introducing small wind turbines in roofs or geothermal collectors in park areas • Energy efficient communal washing-drying facilities should be introduced as an option to residents - Having communal areas where residents may have opportunities to socialize
Reducing pollution and selection of materials	• Introduction of sustainable urban drainage systems should be planned with the involvement of residents - Agreeing on design features to ensure the safety of infants - Enabling engagement opportunities with the water - Agreeing on possible ways for residents to provide them with maintenance • Permeable surfaces should be kept and provided to reduce precipitation-run off - Avoiding unnecesary concrete pedestrian walks - Designing pedestrian walks with permeable surfaces such as a central concrete walk with gravel pedestrian paths - Designing areas of communal gardens with planting and soft materials that may also facilitate flexibility • Measures to clean the water should be considered in advance for retention ponds to avoid stagnation • Re-use of discarded household products in good conditions should be encouraged - Organizing periodical collection points by the housing company or volunteer groups • Full recycling facilities should be made available to residents - Planning and establishing the process in conjunction with residents - Providing continuous relevant information for their awarenes and operation of the process - Introducing robust fast composting machines that handle various household wastes Planning for management of excess compost preferably locally or as commercial feature where employment may be created for residents

Table 5.4 continued

Reducing pollution and selection of materials	• Vacant rooms and buildings should be facilitated for community purposes - Supporting residents in the rehabilitation of rooms - Charging low or null rents - Providing incentives for the development of activities • Materials and planting should be selected for their comfort, quality, image, and if possible from sustainable sources • Wherever available, certified providers should be selected for their sustainable practices • Products such as bird boxes made by residents from reclaimed materials should be encouraged - Providing personalization opportunities in items - Providing a source of income to residents
Biodiversity	• Improvements in communal gardens for biodiversity should be consulted with residents - Integrating meadows or other un-tidy areas in the communal gardens where residents agree • Modifications and benefits of improving biodiversity must be clearly defined to residents - Through various sources of information (workshops, local schools, periodicals, voluntary groups, and others) - Showing the way communal gardens may change - Introducing example areas in communal gardens with educational information • Restoration of a historic landscape character should meet current social and ecological needs - Integrating certain elements that formed part of the historic character - Creating a new character and comfortable environment from merging both
Saving drinking water	• Local authorities should allow the implementation of water saving measures for regenerating existent housing areas - Proposing solutions to address clogging of city's pipelines with reduced discharge Facilitating planning measures and providing financial incentives to reduce, re-use, and re-cycle water - Collaborating with housing companies in their establishment • Residents should be encouraged to reduce potable water consumption - Raising residents' awareness for saving potable water - Informing and engaging residents in strategies to reduce water consumption during and after the regeneration - Fostering a change of attitude towards water leading to changes in their lifestyle

† The management body refers to the housing company or other body in charge of the housing area

The recommendations provided here were based on the experiences from the case study of Augustenborg. Although they seek to address as many of the important issues as possible they are not to be considered complete since they respond to the specific requirements of Augustenborg as a housing area and the involved stakeholders. They should be considered within the context in which they are to be implemented as part of a regeneration project, preferably with residents' input and collaboration to make them more effective.

In implementing the graded assessment in Augustenborg, the need emerged to simplify the grading system that had been initially proposed and also integrating optional answers where certain issues would not apply. Otherwise, the graded assessment was found to be sufficiently detailed to address most relevant issues for social and ecological sustainability as part of the regeneration process and projects. However, it was seen that having semi-structured interviews was vital to explain processes that would have not otherwise been understood through the graded assessment alone. Therefore, they should be used in conjunction to obtain all relevant information of the regeneration project.

Ideally, an assessment would also include interviews with residents that could show a complete perspective of stakeholders involved though this was beyond the scope of this study.

The next chapter analyses the second case study Rotes Viertel, testing once more the graded assessment and to complement the recommendations generated from Augustenborg.

Chapter 6

Case study 2 Rotes Viertel: from large housing estates to a community-oriented model

Introduction

Following the same structure as the previous case study, this chapter explores the landscape of Rotes Viertel for its contribution to social and ecological sustainability through its design proposals and regeneration initiatives.

The context in which Rotes Viertel was developed is explained to show its significance at the time of its development, as a housing model for the creation of small-sized communities through its approach to housing layout.

The regeneration project of the housing area and the landscape was conducted in stages. Therefore they are assessed in that order to understand goals, strengths, and weaknesses of the projects as well as significant lessons, problems, and areas of opportunity of the regeneration processes. Design plans, printed documents, semi-structured interviews with professionals, survey responses, and the grading assessment developed for this study were used to conduct the analysis (Appendix A and B). Since most plans and printed documents were in English or had a small amount of text in German, a translation dictionary was used. Semi-structured interviews were carried out in English with relevant persons involved in the regeneration: the housing company's managers, maintenance administrator, and landscape designer; head of the municipal parks department; head personnel of community committees and associations; and teaching personnel from local schools.

The chapter concludes by identifying the most important issues of the regeneration for social and ecological sustainability and complements the recommendations provided in the previous chapter. A final comparison is made of the regeneration experiences in both case studies indicating strengths and limitations.

Setting the foundations for a community-oriented design

Background

After World War II the German Democratic Republic in East Germany was facing economic hardships that influenced the quality of the housing developments produced up to the 1990s. Having a large housing demand, the main focus was providing for quantity and not for quality. Large high-density high-rise housing estates were built as independent settlements on the periphery of the city with the necessary facilities. For many years, living in these housing estates located in the eastern suburbs of Berlin and distanced from the city's urban life, was a symbol of progress. The new sunlit and ventilated dwellings were a significant improvement from previous housing conditions by having individual bathroom, kitchen, and heating facilities. Yet, their building materials and the outdoor areas were of poor quality given that landscape design was underestimated by the government ideas during this period.[433]

By the start of the 1980s, the Hellersdorf district was being prepared as part of the government's Five-Year-Plan to supply housing. As the quality of flats declined in the large high-rise housing estates built in the nearby Marzahn district and a high vacancy rate prevailed, Hellersdorf was planned on a smaller scale with 18 housing areas of medium- and high-rise blocks. Following Le Corbusier's principles, Hellersdorf was designed by the firm Hunger as a self-contained city with employment, leisure, social, and educational facilities nearby as well as having ventilated and sun-lit flats with views towards large outdoor areas.[434]

By 1990, when the regime collapsed and merged with West Germany, the dwellings were almost completed except for the outdoor areas, which were not finished. At that time, the Hellersdorf Apartment Construction Company (WoGeHe) took over responsibility from the Communal Apartment Administration and continued with the development of the housing areas, one of which was Rotes Viertel.[435] Its particular advantage was being located on one of the two most important nodes of commercial and

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[433] Michael MacQueen, 'The Housing Problem in the GDR', *Radio Free Europe Research*, (1980) <http://www.osaarchivum.org/files/holdings/300/8/3/pdf/26-10-72.pdf> [accessed February 2010] 1-11, (p. 2-6). See also Marc Treib, *The Architecture of Landscape 1940-1960,* (Philadelphia: University of Pennsylvania, 2002) pp. 141-142.

[434] Thomas Knorr-Siedow & Christiane Droste, *Large Housing Estates in Germany: Overview of Developments and Problems in Berlin,* 2b, (Utrecht: A-D Druk bv, 2003), p. 87-89.

[435] Mathias Klenke, *Project Large Scale Estates Berlin Hellersdorf District: A Sustainable Strategy for Industrially Pre-fabricated Housing Developments* (Berlin: Rucksaldruck, 1996), p. 5.

public transport facilities in the district. Rotes Viertel was finished around 1992 with a total of 3716 one- and two-room flats. It had a population of approximately 9500, with an average of two to three inhabitants per dwelling, and a density of approximately 92 dwellings per hectare.[436]

The arrangement of the housing area was made with a variety of layouts that enabled visual differentiation with five- to six-storey open and semi-closed layouts, eleven-storey semi-open layouts, and eleven-storey point towers. These were the usual types of apartment layout found in East Berlin dating from 1980s and '90s.[437] The layouts grouped the buildings to work as independent units with their own kindergarten but were interconnected by pedestrian walks to the Cecilienplatz square, a small pocket park, and educational facilities. Furthermore, the housing layout facilitated road, cycle, and pedestrian connections with the surrounding areas, particularly to reach commercial facilities easily. Overall, the arrangement of the housing layout was intended to create a network of small communities where residents could easily meet each other and be in contact with the rest of the community in Rotes Viertel through the activities in the Cecilienplatz square (Figure 6.1 and Plate 6.1).

[436] Density of the housing area is an approximate calculation by the author using the number of dwellings divided by the total surface area of the housing area including the Mission layout and a shared estimated proportion of the park and school area. See also IfS Institut für Stadtforschung und Strukturpolitik GmbH, *Cecilienplatz: Ein Platz wird Quartier* (Berlin: GmbH, 1996), pp. 7-9.

[437] Uta Hanschke, 'Area Types: A Description of the Structural and Land-use Categories Maintained by the Urban and Environmental Information System of the Berlin Senate Administration for Urban Development', *Senate Department for Urban Development*, (2005) <http://www.stadtentwicklung.berlin.de/umwelt/umweltatlas/e_tab/eISU_Flaechentypen_2001.pdf> [accessed October 2007] p. 13.

Plate 6.1. Conjectural reconstruction of 1990 landscape layout for Rotes Viertel

(Produced with aerial photographs of 1990 and 1995 from the Geoinformation und Vermessung in the Senatsverwaltung fur Stadtentwicklung and sectional plans supplied by Stadt-und-Land, Berlin, October 2007)

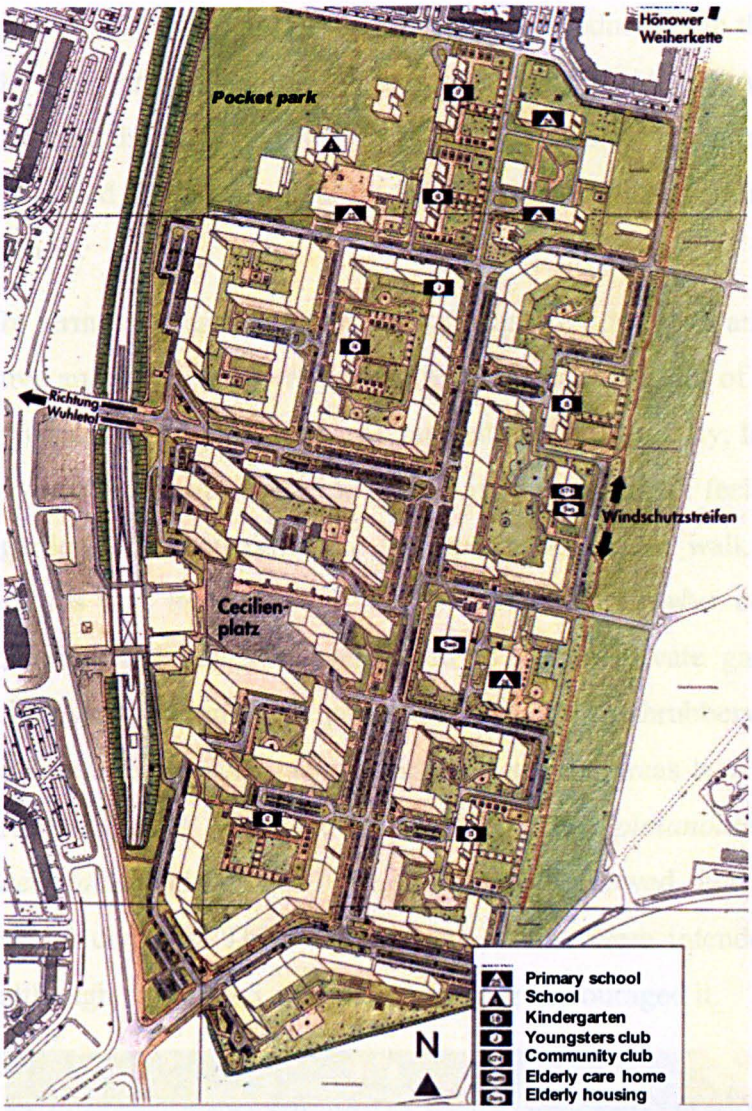

Figure 6.1 **Plan showing the grouped layouts with their own kindergarten to create small communities in Rotes Viertel (IfS Institut für Stadtforschung und Strukturpolitik GmbH, *Cecilienplatz: Ein Platz wird Quartier*, p. 5)**

Defining a semi-public environment for small communities

The Rotes Viertel was built in agricultural fields which had a predominantly levelled topography with a minor slope from east to west.[438] Although the outdoor areas were not finished by 1990, it is possible to trace some of the intended landscape in aerial photographs of the time (Figure 6.2 and Plate 6.1). The block layout groupings around the kindergartens and the design of the landscape provided a semi-public feeling to communal gardens where residents could relate to others in sufficiently intimate areas. This was achieved by defining a hierarchy of areas with informal boundaries between the private, semi-public, and public realms. However, the enclosure of the layout

[438] Thomas Knorr-Siedow & Christiane Droste, p. 87.

groupings also obstructed sight and connectedness with the rest of the community in the housing area lessening contact with other residents. As for the layout of the point towers, the lack of a hierarchy and definition of realms in their communal gardens provided them with a public feeling making it uncomfortable for residents to relate to others.

In terms of planting, Rotes Viertel was provided with an intimate character by a dense tree and shrub screen at the southern and eastern sides of the housing area that restricted physical access from the adjacent settlement. Similarly, layout groupings were enclosed by a tree screen to provide them with a semi-public feeling (Figure 6.3). In communal gardens, the boundaries to the public pedestrian walk were enhanced by stands of shrubs and trees such as *Populus simonii*, *Corylus colurna* and *Acer platanoides*. Additional boundaries were used to define private gardens from semi-public areas through a hierarchy of pedestrian walks and shrubbery or mesh fencing. Other low boundaries between playgrounds and seating areas were arranged through intermittent rows of trees with species such as *Acer platanoides, Tilia cordata, Platanus x acerifolia,* and *Populus balsamifera* which allowed sight of other residents and possible social contacts. This was the way realms were intended to support community life although the limited amount of planting discouraged it.

Figure 6.2 **Aerial photograph of Rotes Viertel of 1990 showing the intended landscape delineation (Geoinformation und Vermessung, Senatsverwaltung für Stadtentwicklung, Berlin)**

Figure 6.3 Typical tree rows surrounding block layouts in Rotes Viertel to provide them with a semi-public feeling (photograph by author)

Creating intimate areas for community life in communal gardens

The landscape, similar to that of many other housing areas at the time, intended to provide residents with distinct communal gardens for leisure and informal rest, with an emphasis on recreation for children and youngsters, usually following a different character for each communal garden (Figure 6.4).[439] Communal gardens were divided into flexible smaller areas by serpentine pedestrian walks that usually converged with each other having different users sharing areas facilitating opportunities for casual contacts.

The centre of the communal garden had most of the social and leisure activities with ball courts, playgrounds, and seating areas close to inner pedestrian walks to enable social contact between residents. The peripheral area, which served as a shelter from noise for the flats, had lawn and more intimate seating areas oriented so as to enable a wide visual overview of activities in the communal gardens with low planting. Play areas and benches in areas of a more open character were defined and sheltered by a range of trees such as *Fraxinus excelsior, Populus balsamifera, Populus nigra, Betula pendula,* and *Salix alba.* Benches located in smaller more intimate areas where sheltered by smaller species such as *Tilia cordata, Prunus padus,* and *Prunus cerasifera* which provided for visual and olfactory richness for a pleasant stay. This arrangement was meant to provide a variety of areas for residents' leisure and social activities. However, the number of trees and amount of planting used was not sufficient for the size of the communal gardens leaving them bare and uncomfortable for users (Figure 6.5).

[439] Bund Deutscher Landschaftsarchitekten, *Werkstatt Grossiedlung: Beiträge der Landschaftsarchitekten*, (Berlin: BDLA, 1996), pp. 18-19.

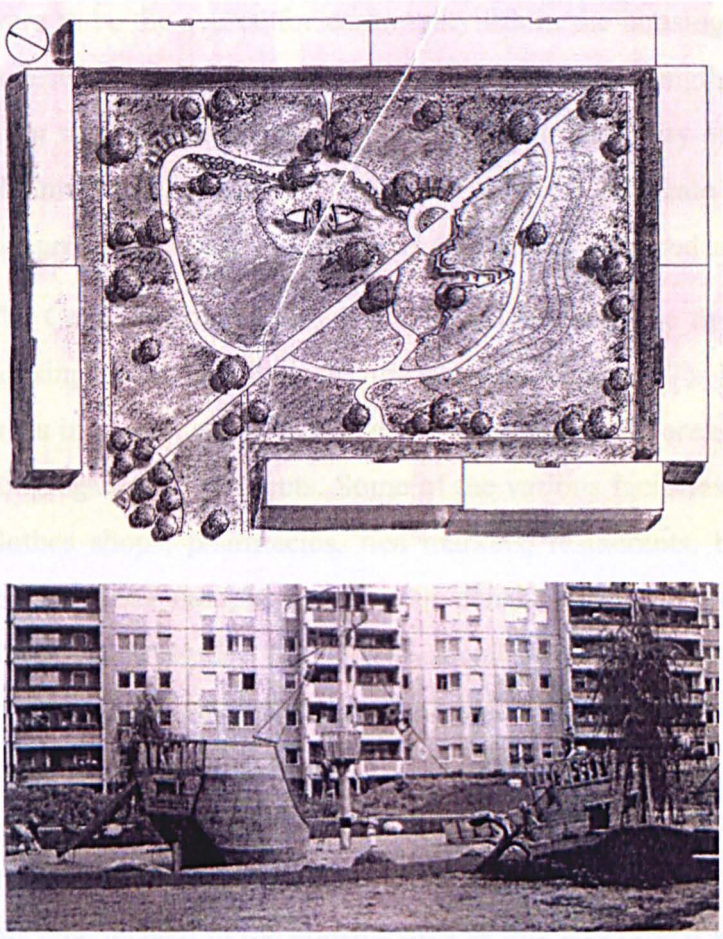

Figure 6.4 **Example of typical communal garden in adjacent Marzahn district designed by Schirmer & Kernbach (Bund Deutscher Landschaftsarchitekten, *Werkstatt Großsiedlung*, 1993, pp. 18-19)**

Figure 6.5 **Bleak conditions of communal gardens in Rotes Viertel in 1998 (Stadt-und-Land Archiv)**

Creating a setting for community life

The housing area and block layouts were designed in a size that allowed having comfortable communal gardens and within a pedestrian distance to the site facilities. A series of pedestrian walks connected the communal gardens with each other and to local educational facilities, the Cecilienplatz square, and a small pocket park which altogether

were to be the source for community life in the housing area. The trees placed on main pedestrian walks surrounding block layouts to strengthen the differentiation of public from semi-public realms also facilitated the legibility of the area. However, though the planning of the housing area was intended to create a pedestrian environment, the design of roads and parking areas did not facilitate pedestrian movement.

The Cecilienplatz square, designed in 1992, was the first area to be built as part of the housing areas' facilities (Figure 6.6 and Figure 6.7). It accommodated various retail areas in combination with robust leisure and social areas to facilitate the circulation and congregation of residents. Some of the various facilities available included grocery and clothes shops, pharmacies, flea markets, restaurants, banks, and other services. Flea market areas complemented with benches were located in the southern part of the Cecilienplatz square to facilitate socializing of residents whilst children played in the rockery and a water channel. The market, the informal play area, and the seating areas were framed and sheltered by *Tilia cordata* trees for residents to rest and have the opportunity to engage with others (Figure 6.8).[440] Altogether these were the community areas and social opportunities available for residents. There were no other facilities of this type located in the housing area as this was how it was preferred by residents at the time.

Other leisure and social opportunities were available from a club for youngsters, a community club, and a gym, all of which were found in basement areas, on ground floors or in buildings designated for such a specific purpose. Also in 1994, a small 2.2 hectares pocket park located to the north was designed by Krüger & Möhile with the main intention to create a pedestrian link with the adjacent housing area. Since communal gardens were considered would be the main source of community life for residents, the pocket park was only provided with small play areas, sports courts, and some rest areas sheltered by trees or shrubs (Figure 6.9).[441] Eventually, the park became much more important for community life of residents than was expected.

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

[441] Bernd Schütze, (Head of Departrment, Natur-und-Umweltamt, personal communication), October 2007, city of Berlin, Germany.

Figure 6.6 **Bleak conditions of the area for the Cecilienplatz square in Rotes Viertel around 1991 before adaptation of landscape proposal (Hanke + Partner)**

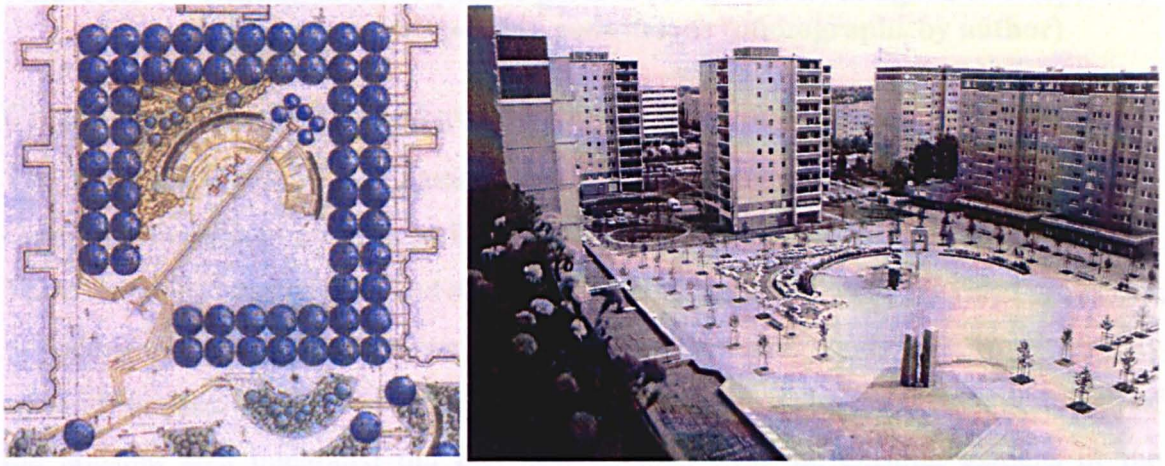

Figure 6.7 **Design proposal (left) and the finished 1995 regeneration of the Cecilienplatz square in Rotes Viertel (right) (Figure (left) Hanke + Partner; figure (right) IfS Institut für Stadtforschung und Strukturpolitik GmbH, *Internationaler Community Planning Workshop Berlin-Hellersdorf,* 1995, p. 6)**

Figure 6.8 **The 1995 design of the Cecilienplatz square in Rotes Viertel with surrounding local stores and space for flea markets (Figure (left) IfS Institut für Stadtforschung und Strukturpolitik GmbH, *Cecilienplatz: Ein Platz wird Quartier*, p. 15; Figure (right) Hanke + Partner)**

Figure 6.9 Seating areas of pocket park in Rotes Viertel designed as temporary resting areas for passing pedestrians (photographs by author)

Creation of microclimates and green corridors in outdoor areas

The most important contributions were the provision of comfortable microclimate conditions in outdoor areas as well green corridors for wildlife habitats and movement. The continuous rows of trees and shrubs on parking areas and roads provided protection to pedestrians and users of balconies from the predominant winds and provided shady areas in summer. These rows of trees and the screen of trees on the eastern perimeter of the housing area integrated old and new habitats with the existing gardens of the adjacent low-rise housing and provided corridors for wildlife.

Even though there were continuous landscape improvements in the communal gardens from 1990 to 1995, the quality of the outdoor areas as part of a desirable and modern housing area was not found to be appropriate by the housing company; therefore, leading to various consultations and the gradual regeneration of outdoor areas.

Changing management and maintenance schemes

Before the unification of West and East Germany, much of the management and maintenance of outdoor areas was carried out by residents. This changed when the housing company Stadt-und-land came to be in charge of the housing areas in Hellersdorf. Residents' participation and decision-making was removed from them and a fee was added to their rents for management and maintenance which was heatedly opposed by residents.[442] This early conflict would affect negatively the interest of residents in becoming involved to change their outdoor areas during later participation events organized by housing company.

[442] Barbara Hanke, transcript 2G.

Strengths and weaknesses of the preliminary design

This overview shows the approach used that intended to improve the quality of life of residents and opportunities to build stronger communities compared to those provided in the previous high-rise housing areas such as those found in Marzahn. The outdoor areas were an important part of the building of community through the design of the landscape with various robust areas that facilitated leisure and social activities of residents. However, the plants and trees used to define these areas were few leading to a bleak sight of communal gardens and a public feeling. Also, a missed opportunity was the setting up of management and maintenance schemes with residents when they were still eager to participate in their outdoor areas which would have provided the initial step for strengthening existing social structures.

Decay of the housing area

Even though many housing areas in Hellersdorf had been completed in the 1990s and efforts had been made to reduce their scale, they soon started to decay. They had been constructed with poor quality materials and consisted mainly of small-sized flats in monotonous buildings and outdoor areas. Inevitably a migration of residents started towards the west of Berlin where quality and standards were higher and employment opportunities better.[443] By 1995, 21% of mostly better-off residents had moved, leaving lower-income families in these housing areas.[444] Therefore, improving quality and standards in the housing area was crucial to avoid the spiral of decay already well established in Marzahn and which had also started in the housing areas of Hellersdorf, including Rotes Viertel despite its better-off provision of commercial facilities.

In Rotes Viertel, large areas of lawn and sandy playgrounds remained with few sheltered areas since the trees planted there, which were fundamental to the landscape design, had difficulty growing in the solid clay soil of the site.[445] The few plants in the communal areas and the many barren patches created a depressing image of the housing area. With few social activities taking place in the housing area, the completion of the Cecilienplatz square in 1995 had been expected to support the community life of residents. However, it failed to be accepted by residents due to the excess of hard

[443] IfS Institut für Stadtforschung und Strukturpolitik GmbH, *Internationaler Community Planning Workshop: Berlin-Hellersdorf*, (Berlin: GmbH, 1995), p. 2-12.
[444] Thomas Knorr-Siedow & Christiane Droste, p. 105.
[445] Stefan Rampelmann, (Landscape design manager, Stadt-und-Land) Interview by C. Martínez, October 2007, transcript 12G, city of Berlin, Germany.

surfaces and the cheap product stores that established there.[446] Having similar problems in all of the housing areas of Hellersdorf, regeneration plans were started in order to improve the quality of their outdoor areas led by the manager of the housing company Jack Gelfort and the Head of the local authorities department for Construction, Housing, and Transport Jürgen Klemann.

Planning for regeneration

The first major improvement made in Hellersdorf was designating each of the 18 housing areas that formed the district with a different character that the regeneration would focus on, having the 'New-town' characterisation assigned to Rotes Viertel. The goal was to provide each housing area with a distinct character that it was hoped would strengthen the attachment of residents to their community. In order to establish the aims that would guide the regeneration of the housing areas of Hellersdorf and provide opportunities for residents to feel part of the regeneration process, the local authorities and the housing company decided to conduct a participation project with residents of Rotes Viertel. A 'Planning for Real' workshop was led by the British architect John Thompson in 1995 who had recognition for his collaborative planning approach with users in defining design projects. Rotes Viertel was selected to conduct the workshop due to the recent renovation of the Cecilienplatz square and its importance in the district on account of its number of facilities and services.[447] The workshop would become the basis for decisions for the rest of the housing areas in the Hellersdorf district. Once the 'Planning for Real' workshop was finished, it helped define nine action areas that were integrated into a proposal as to how the Rotes Viertel should be developed (Figure 6.10 and Figure 6.11).

The results of the workshop initiated a long process that would see some of the suggested changes implemented, starting with the improvement of the blocks. Their energy efficiency performance was raised according to government standards to provide residents with desirable dwellings. All buildings were insulated and information regarding ways to reduce energy was provided to residents through periodicals to raise residents' awareness of consumption.[448] Energy and heat supply was provided from a combined heat and power station. However, current records of a popular energy

[446] IfS, *Internationaler Community Planning*, pp. 23-36. See also Barbara Hanke, transcript 2G.
[447] IfS, *Cecilienplatz: Ein Platz wird Quartier*, pp. 3-7.
[448] Tobias Mette, (Sub-manager, Stadt-und-Land) Interview by C. Martinez, August 2007, transcript 1G, city of Berlin, Germany.

provider in the north of Europe showed that less than 10% of residents choose renewable sources of electricity from their providers.[449] It would be necessary to provide more information in the options available to residents as to encourage their transition to renewable sources.

Workshop results

Home, block and neighbourhood
- Flexibility of flats for changes, size options, and personalization
- Orientation references
- Attractiveness and differentiation of blocks and entrances
- Improvement of life in the square and train station
- Emphasizing the square as the entrance to the housing area

Tenants and owners
- Higher involvement of residents in decision-making
- Availability of information

Nature and ecology
- More planting (green roofs, green facades, trees, shrubs, screening of bins)
- Rainwater management (ponds, toilets, tanks)
- More permeable surfaces
- Solar energy
- Resident involvement in landscaping measures
- Availability of information for environmental improvement

Traffic
- Safety measures for pedestrians and cyclists
- Improvement of cycle lanes and parking
- Tree sheltered areas for pedestrians

Employment and economy
- Employment opportunities on-site
- Facilities in the square used at different times of the day
- Facilities in the station
- Avoidance of local shops in blocks

Local traders
- Formalization of weekly markets
- Differentiation of facilities in square from those across the road

Social and health
- Availability of cultural and leisure activities
- Schemes for residents to participate

Children and young people
- Involvement of youngsters
- Sports, training, and workshop facilities

Culture and education
- Continuous support of projects
- Flexibility of school grounds at evenings
- Improvement of outdoor areas with differentiated images

Figure 6.10 Main points underlined in the workshop held in Rotes Viertel (IfS Institut für Stadtforschung und Strukturpolitik GmbH, *Cecilienplatz: Ein Platz wird Quartier*, pp. 20-64).

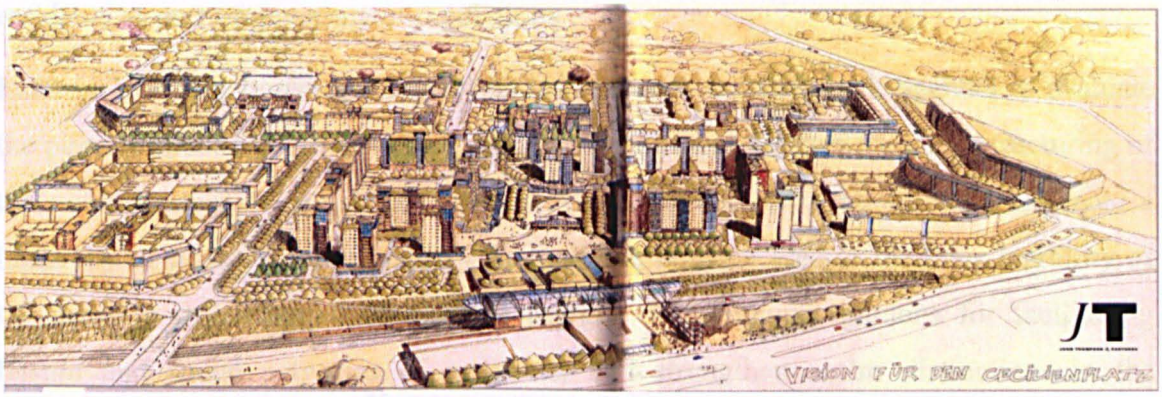

Figure 6.11 The results of the workshop as visualized in this sketch of Rotes Viertel (IfS Institut für Stadtforschung und Strukturpolitik GmbH, *Cecilienplatz: Ein Platz wird Quartier*, 1996, pp. 56-57)

Apart from enhancing the quality of the buildings, modifications were also made to enable different dwellings sizes that would meet the needs of different households. The number of flats in the Rotes Viertel was reduced from 3716 to 3033 to enable more flats

[449] Jan Erlandsson, Vattenfall Energy Company, (info@vattenfall.com) (2007, October 10), Contact (arp05cm@sheffield.ac.uk).

with three bedrooms.[450] Also, residents were provided with the opportunity of moving to larger flats within the housing area or closer to relatives allowing them to keep their social networks which has already benefited many families and has helped in reducing vacancies.

For the outdoor areas, the existing planting design of communal gardens in Rotes Viertel was proposed to be kept but enhanced and unified within the housing area to strengthen its image. Entrances to the housing area, to communal gardens, and to blocks were to be enhanced by planting with a specific colour, arrangement, or architecture as a way of re-establishing realm differentiations. Diverse areas within communal gardens were to be created through planting to support community life of residents. Parking areas were to be removed from communal gardens to strengthen pedestrian movement. Lastly, it was also considered necessary for residents to participate in the maintenance of their communal gardens as an expression of their attachment to their area.[451]

Also, ecologically-oriented pilot projects were started in some blocks in Hellersdorf under construction at the time. Such was the use of rain precipitation for flushing toilets. However, evaluations showed that economic benefits were lower than maintenance costs of the system.[452] Therefore, it was not replicated in other housing areas and also has discouraged other water saving measures such as re-use of grey water. Lastly, sorting of waste by residents for recycling was already part of the everyday activities of residents as part of government regulations.

Later in 1998, the housing company hired landscape architect Dirk Spender to evaluate the plans proposed in the workshop and provide further guidance for the restructuring of the outdoor areas of the Rotes Viertel. The main recommendations were to create a hierarchy of primary and secondary roads in the housing area to facilitate legibility of the area; to restructure dysfunctional designs of communal gardens for facilitating leisure and social activities of residents; and strengthen realm distinctions in the communal gardens of the layouts around the Cecilienplatz square.[453] Following these recommendations and some of the guidelines previously derived from the workshop, the regeneration of some communal gardens followed.

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[450] Tobias Mette, Sub-manager Stadt-und-Land, (Tobias.Mette@stadtundland.de) (2007, September), Answers, (arp05cm@sheffield.ac.uk)

[451] Mathias Klenke, pp. 15-35.

[452] Tobias Mette, transcript 1G.

[453] Dirk Spender, *Landschaftsplanerisches Konzept für das Rote Viertel in der Neubausiedlung Hellersdorf*, (Planergemeinschaft: Berlin, 1998) pp. 4-16.

Initiating the revitalization of the community

The interest of local authorities and the housing company for improving the quality of outdoor areas and building of community, led to support ideas of residents during the first half of the 90s for the development of social structures. New community groups were formed in Hellersdorf focusing on improving, protecting, or learning from their environment which could not have been developed before under the German Democratic Republic.[454] These social structures were successfully implemented and have progressed due to the support and collaboration with local authorities and the housing company as well as the development of residents' organizational skills.

Joint work and organization was integrated amongst residents, local authorities, and the housing company in putting together ideas, experiences, and strategies benefiting the outdoor areas and the community.[455] Through this collaboration, the work of community groups has been diffused to residents through periodicals printed by the housing area whilst new ideas and needs are obtained from residents through surveys.[456] As the continuity of these community groups relies on funding from the local authorities and the housing company, evaluations and skilled leaders have usually been in charge which has ensured their long-term presence. On one side, this unified effort allowed the development of strong social structures. However, this elaborated cooperation has also limited the variety and amount of them. For instance, each community group provided service to at least three housing areas in Hellersdorf which was not convenient for pedestrians discouraging residents' involvement in their activities. Therefore, local community groups with different interests should also be supported.

As part of encouraging community life in Rotes Viertel, the housing company has organized events and activities in the Cecilienplatz square that have been significant in providing the residents with alternatives for leisure and socializing. When the Cecilientplatz square was finished, the housing company began carrying out events and allowed outdoor seating areas of restaurants to facilitate residents with opportunities to gather and know each other.[457] Some of the events held included outdoor cinema on

[454] Barbara Nitsche, (Consultant, Environmental-social community group Green House) Interview by C. Martínez, October 2007, transcript 7G, city of Berlin, Germany.

[455] Lothar Brückner, (Chairman, Environmental community group Green Inspectors society) Interview by C. Martínez, October 2007, transcript 4G, city of Berlin, Germany.

[456] Ernst Böhm, (Chairman, Club 74) Interview by C. Martínez, October 2007, transcript 11G, city of Berlin, Germany.

[457] Brigitte Glabsch, (Maintenance and art manager, Stadt-und-Land) Interview by C. Martínez, October 2007, transcript 9G, city of Berlin, Germany.

summer nights, putting up of a Christmas tree, fairs, ambulant weekly markets, and others.

In sum, there have been some important experiences in the how to keep the social structures for residents for the long term though the way of doing so has also limited their variety and failed in providing all residents with opportunities to know others.

Regeneration of communal gardens in point towers and semi-open layouts

In 1998, the firm Gischow & Partner made proposals to strengthen the realm distinctions of communal gardens in point towers and semi-open layouts near the Cecilienplatz square. In general, the design proposals were poor consisting mainly of enhancing entrances to blocks in semi-open layouts with single species of small conifers and the removing of unnecessary pedestrian walks close to balconies or back entrances to reduce noise in communal gardens. On the other hand, leisure and social opportunities of residents were improved by the proposed changes in the communal gardens that provided for a variety of flexible seating and play areas.

Formal and informal seating areas were fitted in the entrances to the blocks sheltered by climbers on brightly coloured pergolas to encourage casual encounters and some were also screened off from the pedestrian walk by a narrow and low hedge as a way of providing a sense of privacy whilst viewing passersby. Also, communal gardens were re-arranged so that smaller or distinct play areas were available in each and seating areas were added nearby pedestrian walks for socializing of residents and opportunities for casual contacts (Figure 6.12 and Plate 6.2). Shelter was improved by adding some trees on lawn areas, shrub hedges to disguise ball game areas, and metal bright-coloured pergolas with climbers were used for seating areas (Plate 6.3 and Plate 6.4).[458] Lastly, art objects were introduced to facilitate the legibility of the housing area and to provide for distinctiveness to communal gardens.[459] Examples included multi-coloured and sinuous sculptures added to point tower entrances and a metal block sculpture with nocturne illumination as part of a seating area in a communal garden (Figure 6.13).

[458] IfS, *Cecilienplatz: Ein Platz wird Quartier*, pp. 70-71.
[459] Brigitte Glabsch, transcript 9G.

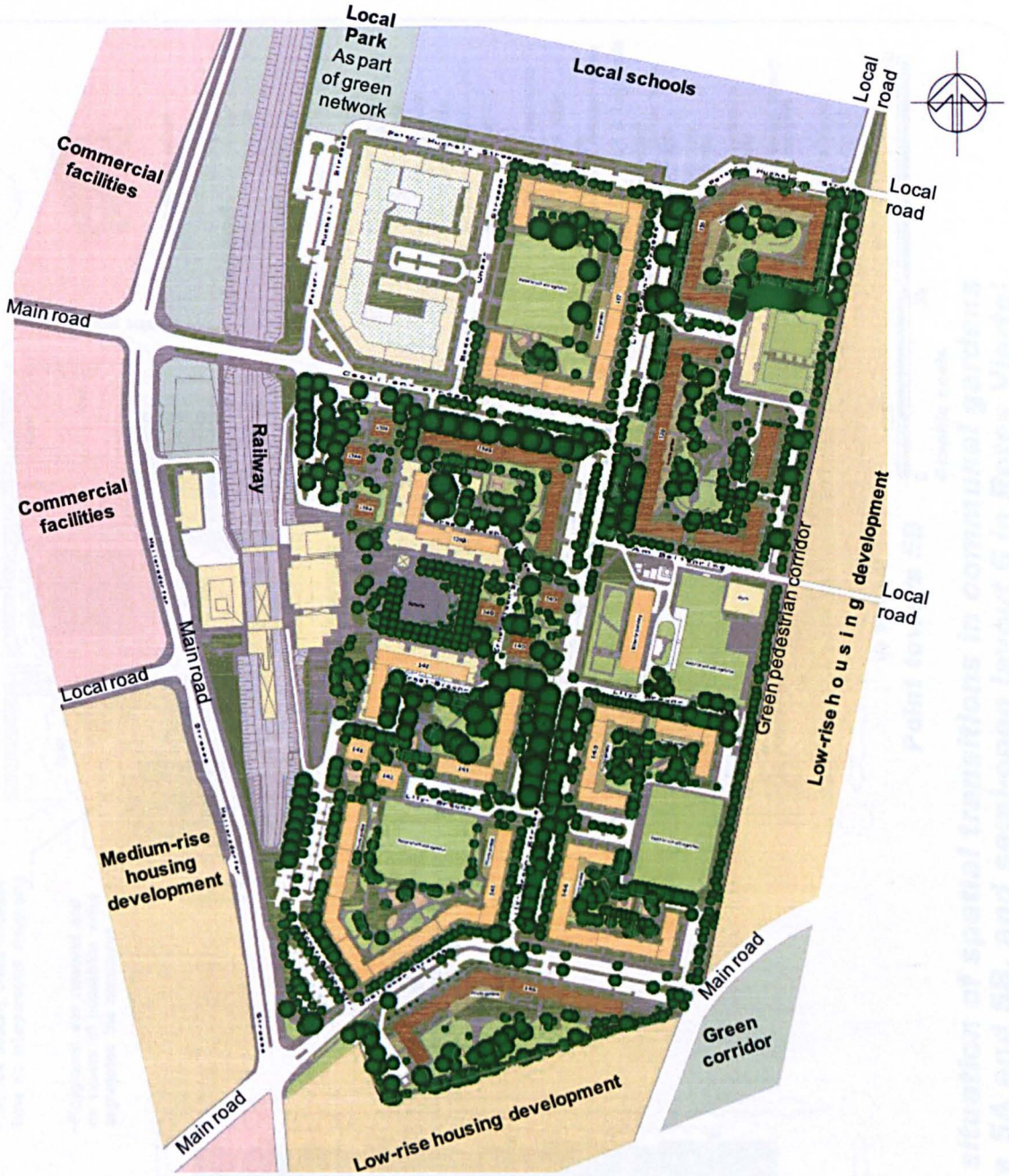

Figure 6.12 **Updated drawing of current landscape design in Rotes Viertel after existing plans and on-site survey (digital base plan and archive plans from Stadt-und-Land Archiv; survey by author)**

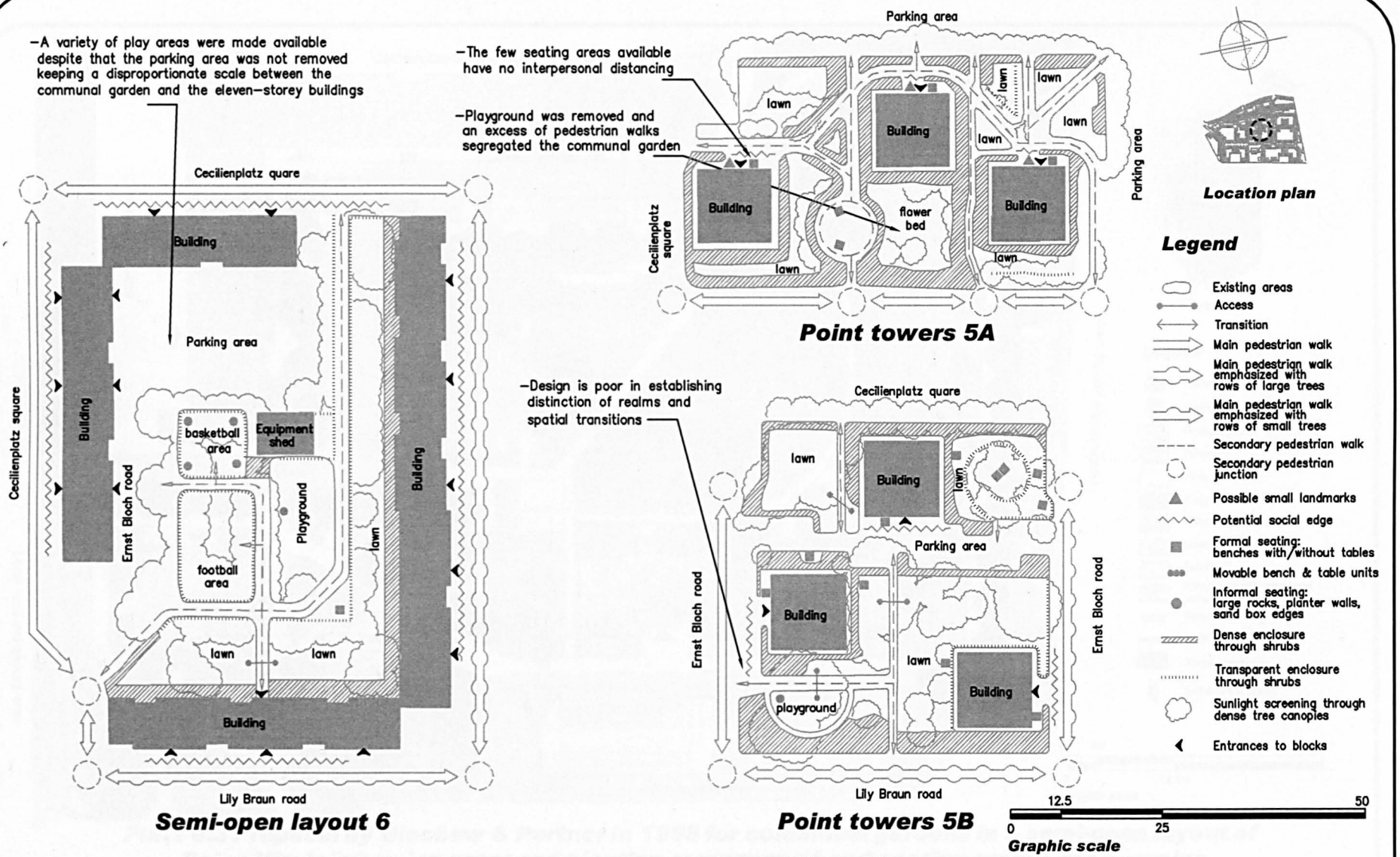

Plate 6.2 2007 situation of spatial transitions in communal gardens of point towers 5A and 5B, and semi-open layout 6 in Rotes Viertel

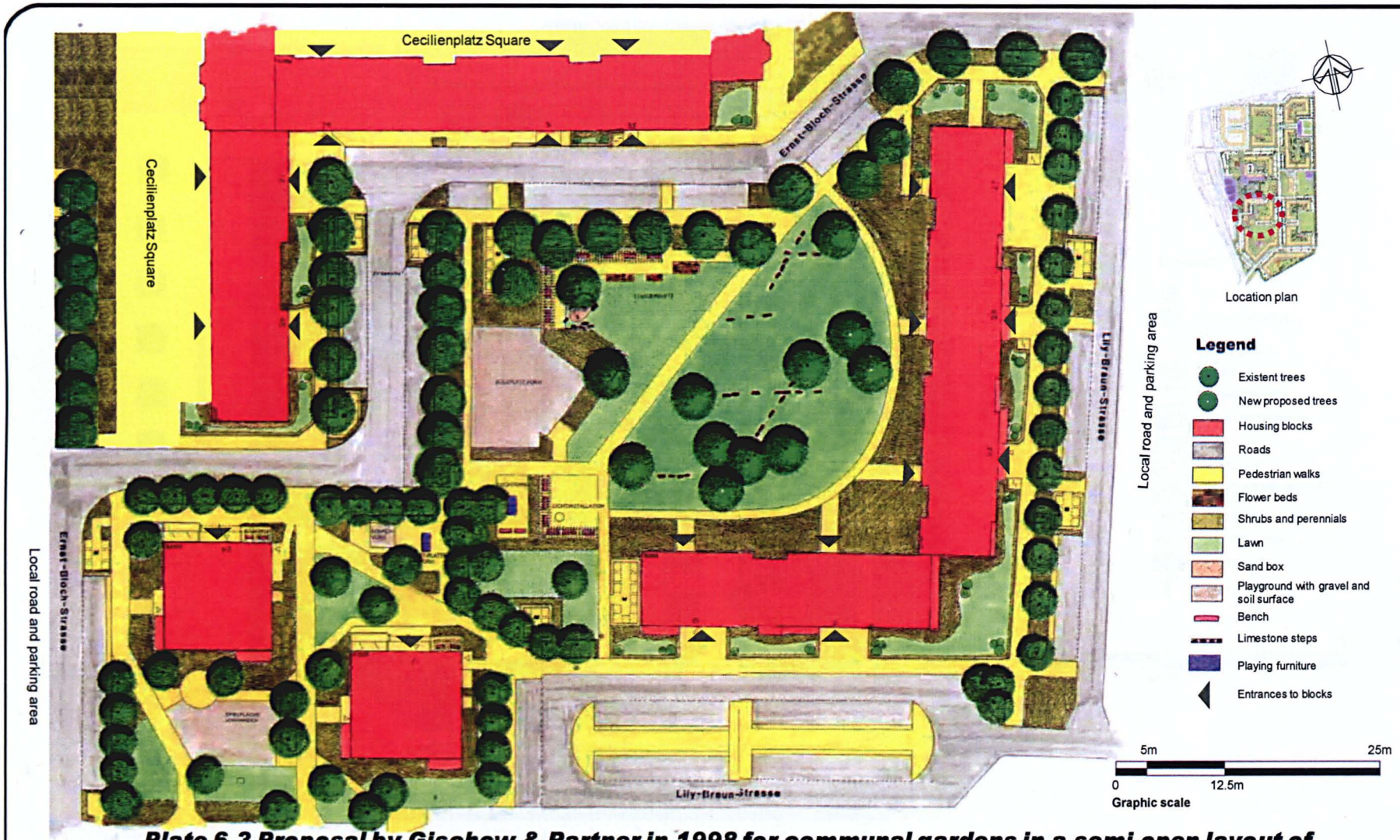

Plate 6.3 Proposal by Gischow & Partner in 1998 for communal gardens in a semi-open layout of Rotes Viertel showing proposed planting arrangement and seating areas with pergolas

(Original plan from Stadt-und-Land archive; colours by author)

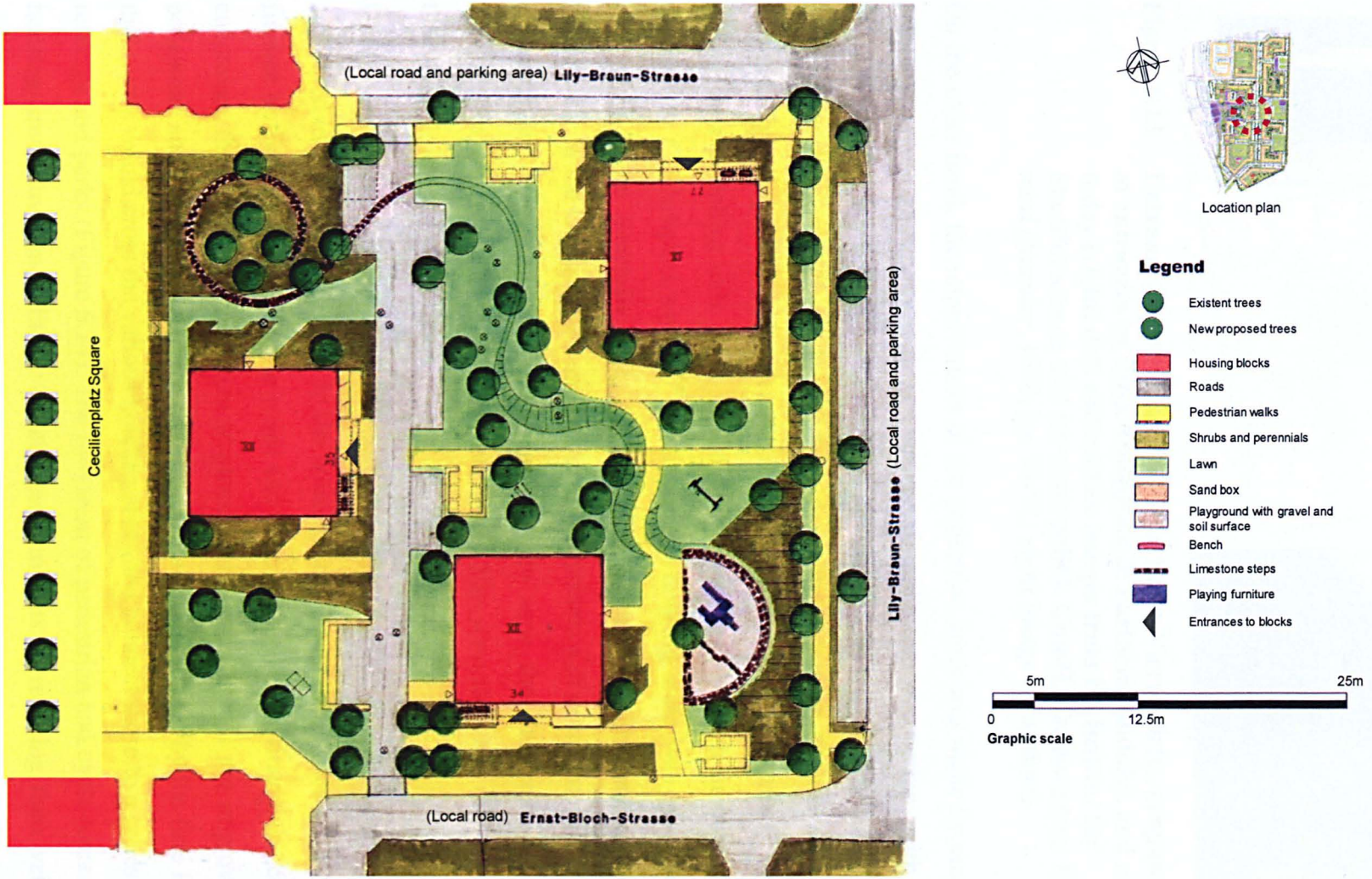

Plate 6.4 Proposal by Gischow & Partner in 1998 for Rotes Viertel showing planting arrangement and seating areas with pergolas in entrances to point towers

(Original plan from Stadt-und-Land archive; colours by author)

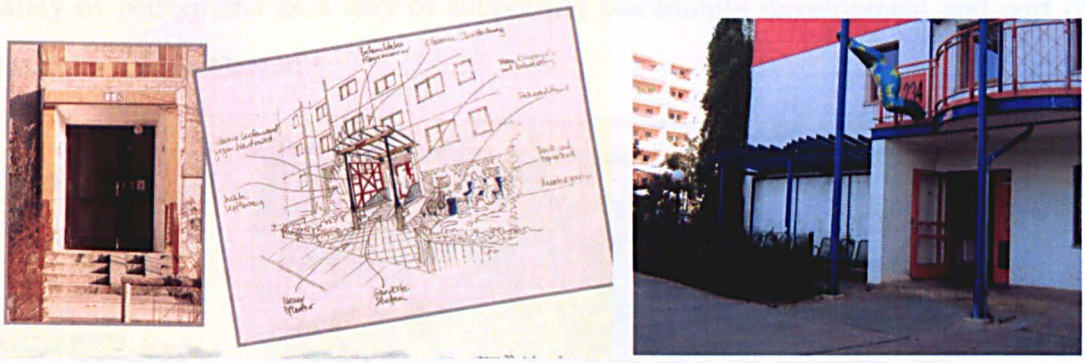

Figure 6.13 Entrance before regeneration in Rotes Viertel (left), proposed type of entrances by John Thompson & Partners (middle), and as it looks today (right) (left and middle images from IfS Institut für Stadtforschung und Strukturpolitik GmbH, *Cecilienplatz: Ein Platz wird Quartier*, 1996, pp. 70-71; right image by author)

On the other hand, the improvement of the pedestrian areas was made by ensuring the safety of pedestrians and providing a variety of public transport options with train and bus services. Enhancement of pedestrian areas was made through planting and tree shelter as well as providing robust and good quality pedestrian surfaces. Security was addressed by using dim lighting in communal gardens to reduce vandalism at night time as well as a patrolling unit. Also, facilities were introduced which functioned at night time in the Cecilienplatz square.[460] Although the housing areas was perceived by the researcher to be generally safe, 47% of respondents felt insecure at night time particularly in the Cecilienplatz square due to the presence of drunk people. It would be necessary to have more facilities open at night time that increases the informal surveillance of the area such as internet cafes, art film screening, and others or increase the amount of patrol surveillance.

Unfortunately, pedestrian safety in crossing roads and reducing vehicle speed was not addressed in a significant manner in the housing area. Local authorities were not able to finance traffic calming devices for roads and there were no other financial incentives to encourage the housing company in implementing them. Instead the improvement of pedestrian and cycle routes at district level was made as proposed by the firm Hunger so that routes would cross the various housing areas and connect these to a series of nature reserves and parks (Figure 6.14). The provision of pedestrian and cycle routes between housing areas have undoubtedly encouraged residents in reducing their vehicle use. Only 22% of respondents to the survey of this study indicated using vehicles as their main mode of transport. However, it would have been more beneficial to ensure the

[460] Stefan Rampelmann, interview transcript 12G.

safety of pedestrians as a way of supporting community development and part of the quality of life of residents.

Figure 6.14 Image showing the cycle and pedestrian network planned for Hellersdorf district by Hunger (Mathias Klenke, *Project Large Scale Estates,* 1996, p. 52; image modified by author to indicate location of the housing area)

Once the regeneration changes proposed by the firm Gischow & Partner were finished, they were considered by the housing company to be insufficient in improving significantly the image desired for the housing area. Therefore, as a separate commission, the landscape architect Stefan Rampelmann was entrusted with providing a landscape concept for the planting along facades of blocks that would be appropriate to the 'New-town' character of Rotes Viertel.[461] The design proposed a selection of deciduous and perennial shrubs with predominantly red tones, various heights, and different flowering seasons to provide visual unity and distinctiveness to the landscape

[461] Stefan Rampelmann, interview transcript 12G.

of the housing area. After this design task, Stefan Rampelmann was hired permanently by the housing company to continue the regeneration of the following communal gardens and implement other ecological initiatives.

The most feasible way of revitalizing ecological processes by means of the landscape was through the improvement of biodiversity. Small areas of buildings' facades were covered with removable metal trellises to support habitats for insects and deter graffiti. Green facades and roofs were otherwise considered to be unnecessary due to the insulation that had already been provided to the buildings and were not economically sustainable with the amount of maintenance required for their upkeep.[462] Also, existing recycling containers were relocated in metal shelters constructed of mesh frames intended for climbers to grow over them in order to conceal them from view which have also served as habitats for insects and invertebrates (Figure 6.15). Lastly, the community group Green Inspectors has worked in collaboration with the housing company in surveying the development of trees in the housing area since the early 1990s as a way of supporting wildlife habitats.[463] All of these improvements have contributed to the biodiversity of the housing area but also in the district in general with the green corridors connecting housing areas.

Figure 6.15 Original positioning of rubbish containers in Rotes Viertel (left), arrangement after regeneration (middle), and arrangement as they look today (right) (left and middle image from IfS Institut für Stadtforschung und Strukturpolitik GmbH, *Cecilienplatz: Ein Platz wird Quartier,* 1996, pp. 70-71; right image by author)

Regeneration of communal gardens in open and semi-closed layouts

After 2000, communal gardens were regenerated on a one-to-one basis. In defining their design it was the intention of the housing company to involve residents since it was believed this would allow residents develop a sense of attachment for their communal

[462] Stefan Rampelmann, interview transcript 12G.
[463] Lothar Brückner, transcript 4G.

gardens, yet they were met with disinterest.[464] At least three years had gone-by from the time when the 'Planning for Real' workshop had been conducted and many of the ideas discussed there were not implemented, which most likely the reason for their lack of interest in participating. Also, the fact that there were few participation choices made available to residents by conducting one or two meetings on a weekend. Certainly it would have been required to have various participation techniques for residents to get involved carried out during different times and days of the week. However, the housing company did not find participation strategies to be financially possible without outside funding. Therefore, a participation approach was only used in housing areas with conflicts among residents of different backgrounds.

Without the further participation of residents, communal gardens were designed with a specific unique character to each such as the garden of the senses in the semi-closed layout 7A and of the roses in the open layout 8.[465] For instance, the design of the garden of the senses represented a sea tide which can be viewed from balconies (Plate 6.5). The design of realms in communal gardens regenerated after 2002 took a different approach in order to enable a quieter environment and strengthen their semi-public feeling. A significant number of playgrounds, seating areas, and pedestrian walks were removed as well as closing of most through-passages. These modifications were intended to reduce vandalism, graffiti on walls of passages, and minimize noise in communal gardens produced by youngsters of whom residents complained about. It was also hoped that the changes would also increase the sense of attachment of residents to their communal gardens.

The transition between public pedestrian walks to the semi-public communal gardens was strengthened by integrating successive layers of *Ribes alpinum* and climber plants such as *Hedera helix.* In communal gardens, most private gardens of residents were provided with a shrub perimeter which provided boundaries with the semi-public areas of communal gardens. Their height was increased to 2.5m to conceal any unmanaged areas in private gardens which could lower the visual appeal of the communal gardens as a whole. The width of shrubbery fencing was also increased by introducing additional layers of shrubs, sometimes followed by groundcovers, and roses such as *Berberis thunbergii* 'Atropurpurea Nana', *Rudbeckia triloba,* and *Rosa* 'Heideroeslein Nozomi' with scattered *Lonicera tatarica* and *Spiraea* x *vanhouttei* (Plate 6.6). These

[464] Stefan Rampelmann, interview transcript 12G.
[465] Ibid.

changes lessened opportunities for contacts between users of the private and communal gardens. Only those located in the communal garden of the semi-closed layout 7B have been kept up to 1.10m in height that allowed eye contact with pedestrians and possible social contacts of residents.

The few seating areas and playgrounds that remained in most communal gardens were distanced from pedestrian walks and their transitions were poor discouraging their use and possible social contact with others (Plate 6.7). Some of these areas have little shelter providing instead focal points through art objects or ornamental planting such as patches of *Euonymus alatus* 'Compactus', *Waldsteinia ternata,* and *Berberis* 'Verrucandi' or an abstract marble piano as an informal play material for children to play different sounds.

The exception was the communal garden in semi-closed layout 7B that was modified slowly throughout the years according to the requirements of residents. It has incorporated various well-defined areas with subtle transitions that kept accessibility between them facilitating visual contact between users (Plate 6.8 and Figure 6.16). This arrangement was achieved by providing partially enclosed play and seating areas through small mounds, planting, and serpentine paths that has also enabled opportunities for discovery with partially hidden views. Shrubs such as *Corylus avellana* 'Rotblättrige Zellernuss', *Forsythia* x *intermedia* 'Spectabilis' or *Cornus sanguinea* that enclosed playgrounds were kept at a height between 0.50m to 1.50m to facilitate residents visual contact with others.

In providing for comfortable outdoor areas for the few leisure or social activities that were available the design sought to disguise the scale of buildings and provide flexible sheltered outdoor areas with a rich sensory experience throughout the year. A significant number and species of plants of varying heights were introduced, even when trees could not reach their full height due to the poor soil that was found in the site (Figure 6.17).[466] Such was the case in the communal garden of the semi-closed layout 7A which failed to grow sufficient trees and has few intimate areas for residents to socialize.

[466] Stefan Rampelmann, interview transcript 12G.

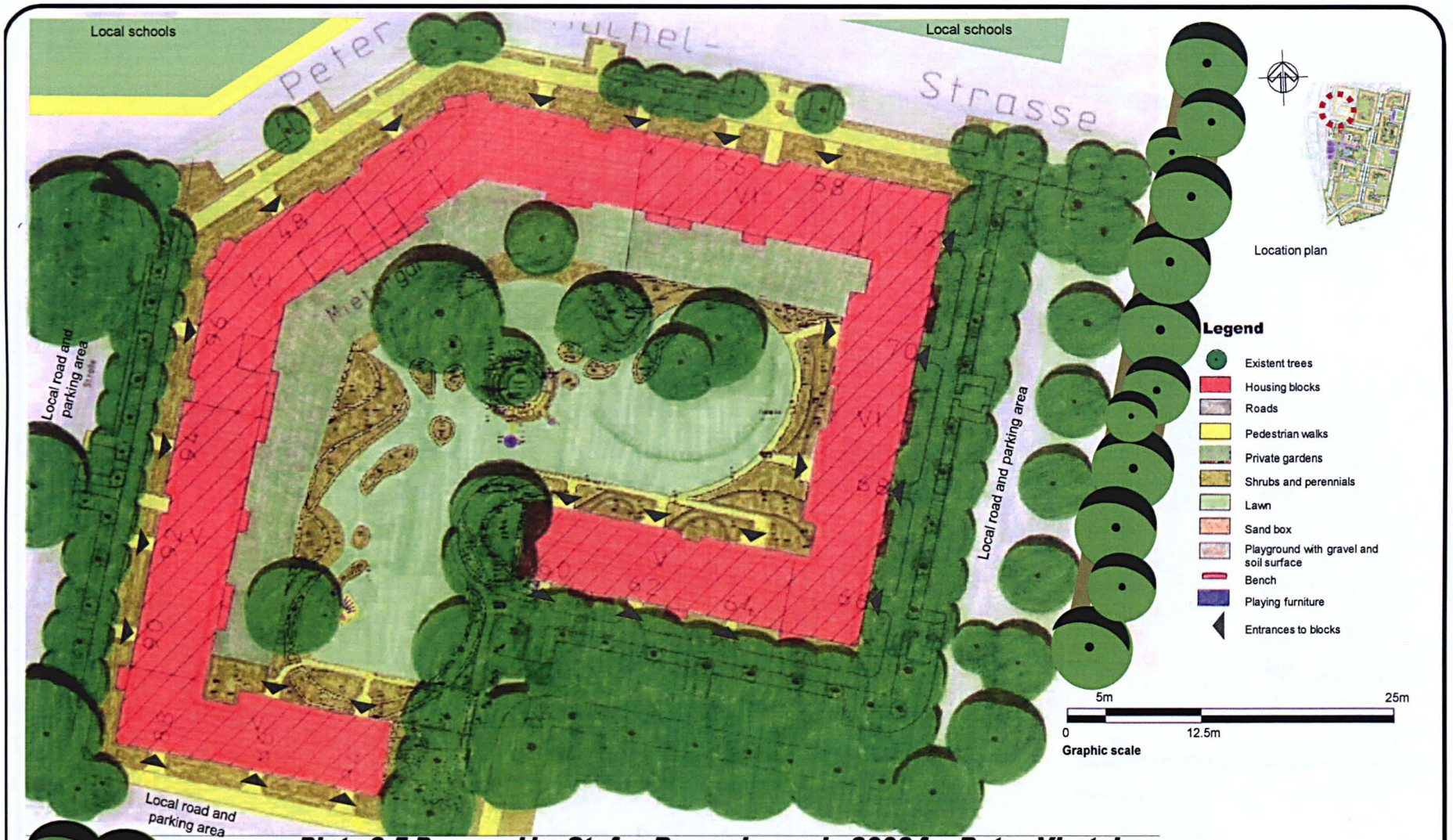

Plate 6.5 Proposal by Stefan Rampelmann in 2002 for Rotes Viertel showing planting arrangement assimilating a sea tide as viewed from balconies

(Original plan from Stadt-und-Land archive; colours by author)

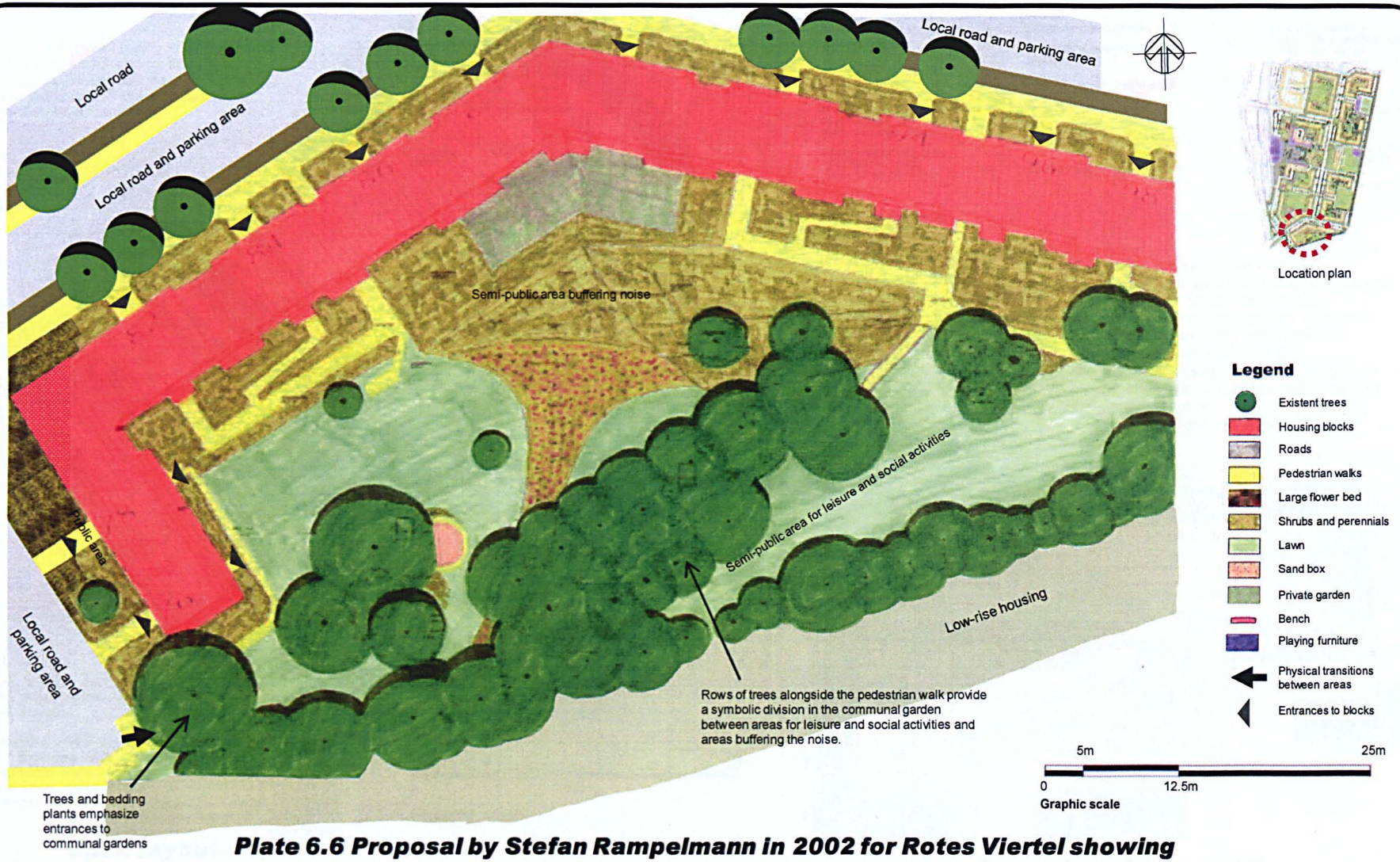

Plate 6.6 Proposal by Stefan Rampelmann in 2002 for Rotes Viertel showing extended private gardens and arrangements with trees for defining realm distinctions

(Original plan from Stadt-und-Land archive; colours by author)

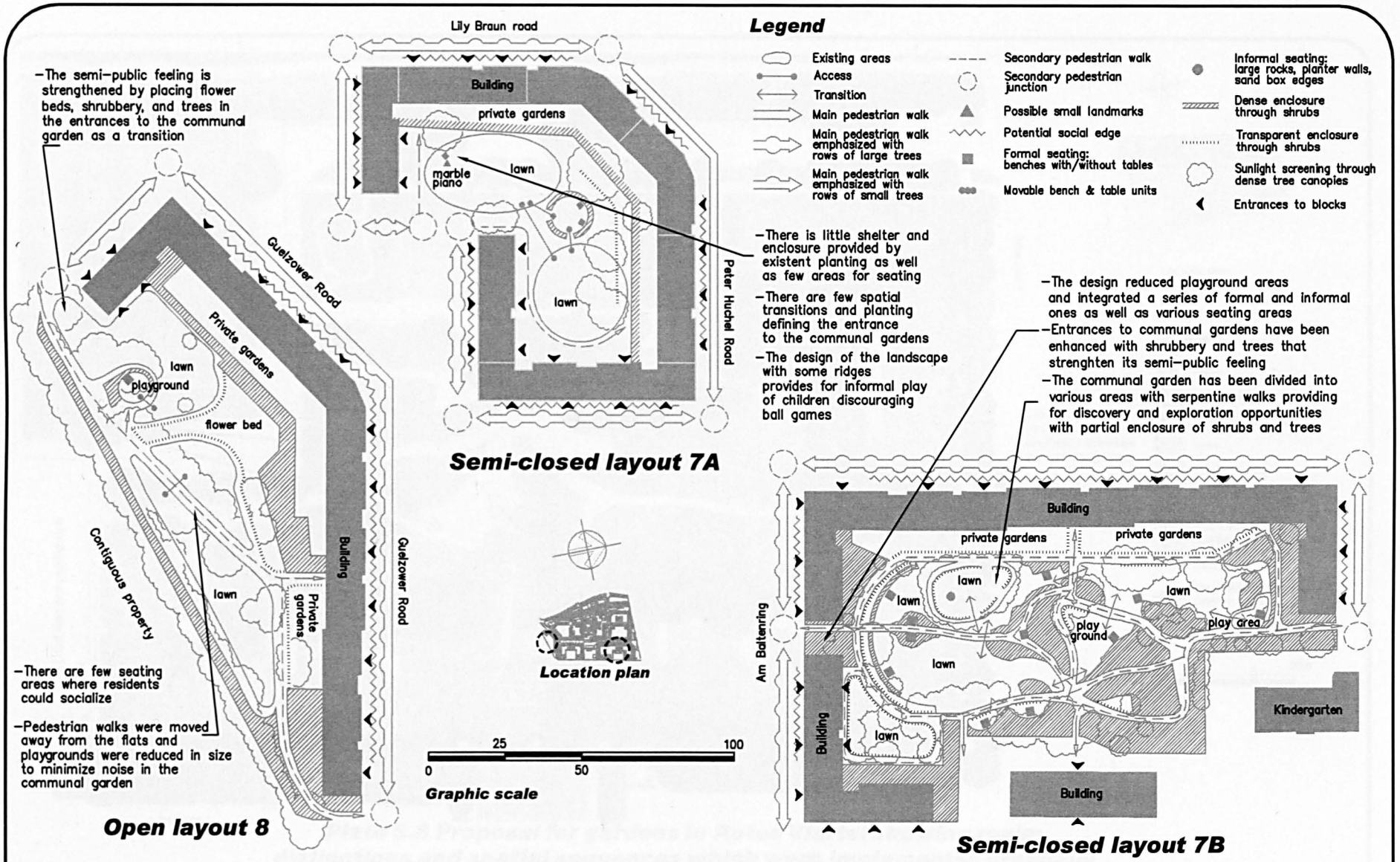

Plate 6.7 Situation of communal gardens in open and semi-closed layouts in Rotes Viertel

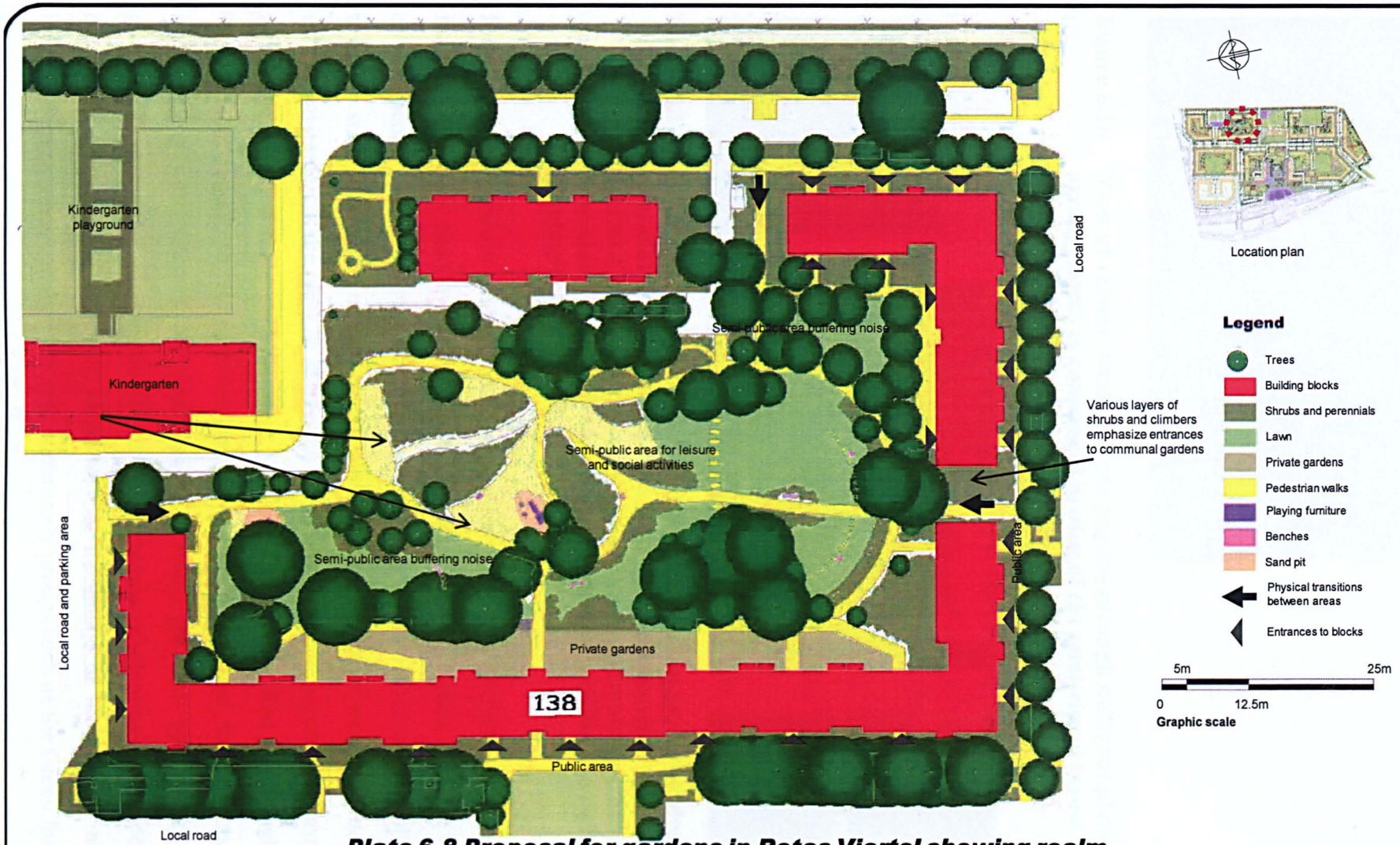

Plate 6.8 Proposal for gardens in Rotes Viertel showing realm distinctions and spatial sequences which were implemented gradually

(Original plan from Stadt-und-Land archive; colours by author)

Figure 6.16 **View of various smaller areas created through different plant arrangements in communal garden of the semi-closed layout 7B in Rotes Viertel (photograph by author)**

Figure 6.17 **Little disguising of the scale of buildings in communal garden of the semi-closed layout 7A (left) in Rotes Viertel compared to that achieved with mounds and planting in the communal gardens of the semi-closed layout 7B and the open layout 8 (middle and right) (photographs by author)**

Richness was achieved by introducing planting for year-round interest in fruit or colours from stems, leaves, and flowers that attained a varied mix of colours. Planting with this arrangement was placed around or near seating areas that provided a pleasant stay for residents such as those found in the semi-closed layout 7B. Other examples include the communal garden of the roses in semi-open layout 8 which have successive shrub layers to a large patch of roses such as *Rosa* 'Mainaufeuer', *Rosa* 'Red Meidiland', *Rosa* 'Snow Ballet', and *Rosa* 'Heideröslein Nozomi'(Figure 6.18). Also, furniture, materials, and planting were selected for their quality but also for their safety such as for playground equipment. To ensure the good conditions of planting and materials in communal gardens, and as a way of preserving the image of the housing area, the housing company has collaborated with community groups such as the Green Inspectors who survey outdoor areas on a regular basis.

Figure 6.18 Rose shrub arrangement provides for sight and olfactory richness in communal garden of the open layout 8 in Rotes Viertel (middle); and diverse areas provide for exploration in communal garden of semi-closed layout 7B (photographs by author)

In relation to opportunities for community life in the housing area, some facilities had to be removed after the size of the population decreased, particularly of children. According to 2007 statistics, Rotes Viertel had 5844 inhabitants with an average of two inhabitants per dwelling, and an approximate density of 86 dwellings per hectare.[467] The ethnic background of the population also changed over the years, introducing a multicultural diversity into the housing area.[468]

Having a smaller population of children in the housing area, kindergartens were no longer used and remained vacant for various years. In an attempt to re-use them, the local authorities attempted to lease them as a way of providing alternate facilities to the housing area. However, there were no interested candidates due to their location and target population and eventually had to be demolished since it was not economically feasible to keep running them without an economical gain.[469] It would have been more beneficial for the building of the community if they had been lent or leased for a low rent to local interested community groups or after school activities for children. To the north of the Rotes Viertel, most of the educational facilities that were shared with the

[467] Density of the housing area is an approximate calculation by the author using the number of dwellings divided by the total surface area of the housing area without the Mission layout and a shared estimated proportion of the park and school area. See also Viola Krämer, Amt für Statistik Berlin-Brandenburg, 2007, electronic communication, September 2007

[468] Official statistics do not hold information of residents' ethnic background before being naturalized as Germans; however, it was a recurrent issue in various interviews with the Sub-manager of Stadt-und-Land, Tobias Mette, and the Chairman of the Club 74 community centre, Ernst Böhm.

[469] Bernd Schütze, transcript 14RV.

adjacent Gelbes Viertel were kept, and in some cases the school grounds were improved in 2006, with more activity areas to be used after school hours by children.[470]

Improvement of ecological processes remained geared towards biodiversity although there was also interest in integrating strategies for saving water by the use of low-irrigation planting as well as water efficient gadgets in flats that would help reduce financial costs. The design approach did not necessarily make exclusive use of native planting but through a combination of native and non-native plants catered for visual interest most of the year and provided food for wild animals. However, trees and plants with edible fruits were not found to be adequate after being damaged by vandals, and were therefore reduced in number. Instead, shrubs and trees with nuts were preferred which could be collected by residents.[471] Although information has been provided to residents for reducing water consumption through periodicals, only 40% of respondents to the present survey indicated doing so and only 59% considered water to be exhaustible. Therefore there should be other ways for raising residents' awareness towards consumption.

Opportunities for personalization and care

The communal gardens provided few areas for personalization and care of residents as a way of keeping the maintenance and consistency of the design. Therefore, outdoor areas for residents to participate in providing maintenance or for personalization were restricted to private gardens and balconies. For instance, perimeter shrubbery of private gardens was kept above 1.80m as a way of concealing them and keeping a tidy image of the communal garden.[472] The housing company believed there was no interest of residents in gardening or providing maintenance since few residents have time available and it was considered to be the responsibility of the housing company.[473] Even if residents were interested in providing maintenance, there are no legal schemes of self-management that may benefit residents in reducing their rents. Only personalization of balconies was encouraged through annual prize incentives as part of the strategy to improve the overall image of the communal gardens.[474]

[470] Madeleine Lehradt, (Secretary, Local primary school) Interview by C. Martínez, August 2007, transcript 6G, city of Berlin, Germany.
[471] Brigitte Glabsch, Interview transcript 9G.
[472] Ibid.
[473] Stefan Rampelmann, interview transcript 12G.
[474] Lothar Brückner, transcript 4G.

Although throughout the process of the regeneration scheme there were many occasions where participation of residents was recommended, it was never implemented fully. There were many missed opportunities to include residents during the start of the housing area improvement and after the 'Planning for Real workshop'. The control of decision-making was kept by the housing company to facilitate any changes in the outdoor areas. Despite this and the few ecological schemes where residents have participated, such as recycling of waste, there seems to be a general interest in improving the environment. From exchanging ideas in ways for improving the environment, 17% of respondents indicated this facilitated them to get to know other residents. Therefore, choices for residents to become involved should be made available in many ways as it was found to strengthen social networks among residents. It could be either in suggesting ideas to improve their community and the environment through workshops, through the implementation of small or large scale projects, or others that encourage communication and information exchange among residents.

Most important lessons from ecological processes introduced through the landscape

At the start of the regeneration scheme there were many ecological strategies that were desired to be tested and implemented. The main emphasis of the regeneration scheme at the time of the 'Planning for Real' workshop was to reduce energy use, drinkable water use, pollution, and improve biodiversity. In the end, selecting materials according to their life cycle was best achieved whilst saving water and reducing pollution were also partially successful.

The housing company was interested in testing strategies for acquiring energy from non-renewable sources. From various experiments and evaluations they performed, the one that had been found to be most efficient was the use of photovoltaic panels in facades of buildings which has produced 31% of the energy consumption requirements for the housing area. These were still being experimented with to find the best orientations and height required for maximum efficiency, as well as assessing the visual impact on buildings for residents.[475]

In relation to reducing pollution, different waste and management strategies were aimed at reducing the impact on the environment as well as having financial benefits for the

[475] Stefan Rampelmann, interview transcript 12G.

housing company. Most successful strategies and projects were in regard to the landscape specifications and construction works as well as separation of rubbish, which was already a government regulation that residents were familiar with. To achieve this, it was found to be essential to have a permanent landscape architect in the improvement of the outdoor areas who contributed significantly to specifying appropriate practices in construction and management that were not polluting as well as obtaining re-used, re-claimed, or recycled materials. Although it was desired to select materials in terms of their life-cycle, it was not always possible to obtain them or find certified suppliers.[476] Therefore, the selection of plants, materials, and furniture was made in terms of their quality, durability, and performance to improve the image and comfort of the outdoor areas.

Also, a strategy that was considered important by the housing company was hiring maintenance providers on long-term contracts, usually six years, which would allowed providers and gardeners to develop a sense of attachment to the housing area and also allowed the gradual and continuous regeneration of the communal gardens.[477]

On the other hand, introducing new strategies such as composting was found to require permanent local management. Composting was pilot tested for almost three years, yet it was not possible to be adequately managed without having a local administrative office in the housing area to supervise, evaluate, and adapt the process until its full establishment. The management of the composting system was assigned to existing caretakers since they were present in the housing area on a daily basis. However, their numerous duties led them to neglect it, which eventually led to complaints from residents about its management and was later removed. This is unfortunate as the majority of respondents considered recycling to be important and took steps in their households to reduce and re-use it. Lastly, organizing the collection of discarded household products was initially established by the housing company. Later, it was deemed to be unnecessary as there were already organized groups of people in the housing area who dedicated to collect them on demand without charge.[478]

Increasing biodiversity was possible by introducing various plant habitats in outdoor areas. Their planning and introduction in outdoor areas was possible having a landscape architect as part of the personnel in the housing company who tried to introduce design

[476] Stefan Rampelmann, interview transcript 12G.
[477] Brigitte Glabsch, transcript 9G.
[478] Tobias Mette, transcript 1G.

and management ideas to enhance biodiversity. Also, some of them received financial support from government initiatives such as the integration of green facades. Otherwise, the introduction of areas with unmanaged planting was limited by having tidy communal gardens. The housing company believed residents would consider unmanaged areas of planting as neglected areas which could negatively affect the image of the housing area and thereby increase vacancies. Therefore, a collaboration of the housing company and the Technical University of Berlin was planned to introduce a range of meadows and investigate the perception of local residents. It was hoped that areas like these could be introduced in the future with the acceptance of residents.[479] It may be successful in certain communal gardens provided that 46% of respondents to the survey of the present study considered increasing of biodiversity to be important.

Lastly, the introduction of a sustainable urban drainage system was not considered adequate by the housing company for the danger that water surfaces represented to children as well as the legal problems in which the housing area could incur from that.[480]

Findings and discussion

In the case study of Rotes Viertel it was not possible to make a detailed comparison of the planting from 1990 to that of the current regeneration since for the former there were few planting lists available. In regard to the experiences learned from the regeneration process, the full potential of the landscape to support social and ecological sustainability was not achieved mainly due to pre-conceptions of the housing company as well as economic and management limitations. These were the main issues that contributed to the poor assessment performance (Table 6.1 and Table **6.2**). Yet the contribution of the landscape was clearly significant and sustainability could still be improved. The assessment showed that the most significant element of concern for the regeneration process was enabling a comfortable environment for residents for which the landscape was vital. Unfortunately socializing opportunities were not considered to be essential in communal gardens and focus was instead provided to the development of community life in the Cecilienplatz square.

Therefore, the findings for social integration are indicated and discussed first, followed by the most important issues for community development and participation for which

[479] Stefan Rampelmann, interview transcript 12G.
[480] Ibid.

the support to social structures was essential in their establishment. Ecological enhancement is discussed last as it was the least important due to their small contribution to the comfort and quality of outdoor areas and was dependant on the economical feasibility of projects.

Table 6.1 Performance of the social issues for Rotes Viertel

Sections	Score for each section		Weighting values		Weighted scores per section
1 . Community development.	7	x	0.10		0.67
2 . Community participation.	3	x	0.10		0.29
		Total	0.19	Total	0.95
Related value for scaling of 0% to 100%			0.019		
Score for the environmental assessment (Total weighted score by the related scaled value)					50

Table 6.2 Performance of the ecological issues for Rotes Viertel

Sections	Score for each section		Weighting values		Weighted scores per section
1 . Reducing energy use and Carbon Dioxide emissions.	6	x	0.29		1.74
2 . Increasing biodiversity.	6	x	0.12		0.72
3 . Water saving.	6.5	x	0.08		0.52
4 . Reducing pollution.	8	x	0.20		1.56
5 . Materials selection.	7	x	0.13		0.88
		Total	0.81	Total	5.42
Related value for scaling of 0% to 100%			0.081		
Score for the environmental assessment (Total weighted score by the related scaled value)					67

The regeneration of the landscape: strengths

- Improving the legibility of the housing area through a hierarchy of trees in the main pedestrian walks and artwork increased the safety of pedestrians providing more opportunities for casual encounters of residents.
- Re-establishment of realm distinctions reduced no man's land areas and enabled a semi-public feeling in the majority of communal gardens to provide residents with comfortable areas for leisure or socializing.
- The richness provided by the added planting amount and variety with annual interest have enhanced sensory experiencing, contact with nature, and reduced the scale of buildings increasing the quality and comfort of outdoor areas.

The regeneration of the landscape: limitations

- Pedestrian areas were enhanced but traffic calming measures were not implemented on roads, which has lessened the connectivity of outdoor areas and safety of children.
- The reduction of furniture in outdoor areas and placement of high shrub fencing around private gardens has limited the opportunities of residents to meet their neighbours and establish social networks.

Community development and participation: strengths

- The most important change was the improvement of the image of the housing area with the refurbishment of buildings and regeneration of the landscape using distinctive colours and artwork giving it a distinguishable character.
- Dwelling choices and support for residents to move within the housing area reduced vacancies and kept social networks of the community.
- A variety of events, activities, and facilities in the Cecilienplatz square enriched community life.
- Social structures were able to sustain themselves on the long-term through collaboration with the housing company and local authorities who aided in developing the organizational skills of residents in charge.
- Ecological projects have provided residents with opportunities for meeting others.

Community development and participation: limitations

- The degree and opportunities for participation of residents in the regeneration and maintenance of outdoor areas as well as in the establishment of ecological projects were not sustained. It was unfortunately considered to be unnecessary and not cost-effective by the housing company.
- The intention of profiting from re-using vacant buildings for commercial purposes failed which could have proven more adequate in enriching community life with activities for leisure or socializing of residents.

Ecological revitalization: strengths

- The most important aspect that improved ecological revitalization was having a landscape architect working permanently in the housing company. His landscape expertise enabled making efficient regeneration solutions towards the design,

building, management, and maintenance of the landscape that benefited ecological sustainability.

- Due to the above issue, ecological enhancement was best achieved by reducing pollution during the building, management, and maintenance of the landscape as well as in making the selection of materials according to their lifecycle. From pilot testing other ecological projects, the efficiency of water consumption reduction was enhanced through the use of low-irrigation planting, water efficient gadgets, and re-use of precipitation in toilets though the latter did not provide an economic profit.
- In a similar way with the landscape expertise of a permanent landscape architect and in some instances financial incentives from local authorities, biodiversity was enhanced by increasing the amount, variety, and layers of planting and habitats as part of providing a quality environment.
- The most efficient method for using renewable energy was shown to be photovoltaic panels in facades and roofs though there was concern in the way they would affect the image of the housing area.

Ecological revitalization: limitations

- The most important general limitation was the removal or avoidance of ecological projects that the housing company believed to affect negatively the image of the housing area or did not contribute to improve the quality of outdoor areas. Projects included composting, green facades, green roofs, unmanaged areas of planting or with spontaneous vegetation, and a sustainable urban drainage system.
- In implementing new projects, the most important weakness was the lack of a management office in the housing area which did not allow an adequate monitoring or development of participation strategies as was with composting.
- Improvement of pedestrian areas to reduce carbon emissions and support community life was limited without collaboration from local authorities.
- The availability of materials for their lifecycle and suppliers with ecological practices were poor and need to be encouraged.
- The dissemination of information to increase residents' awareness and contribution to improve their environment was poor. It requires other and constant sources of information such as workshops and development of projects where residents may participate and exchange ideas which can also strengthen social networks.

Although there were many occasions where the improvement of social opportunities were voiced by residents and recommended by external consultants, they were lessened or not addressed fully. The enhancement of the pedestrian and cycle areas was not fully accomplished without financial support from local authorities who did not consider it necessary to increase users' safety in crossing roads. It remains one of the most important setbacks of the regeneration, and needs urgent attention if residents are to feel safe and integrated with the rest of the community. The second important limitation is the lack of socializing opportunities in communal gardens, which were lessened to reduce noise and vandalism as well as to keep a neatly maintained communal garden. It would have been better if the residents living around each communal garden would have participated in making decisions towards these changes and proposed alternative solutions to problems.

The decisions made to reduce the availability of furniture can be challenged given that there are communal gardens with furniture and playgrounds that appear to be in a good state. If is not possible for residents to establish social networks it will be difficult to establish processes where the community can revitalise itself and all members of the population can feel integrated. If not addressed, it can lead to social decay, vacancies, and physical decay.

On the other hand, the most important strength of the regeneration design was the improvement made to the legibility and establishment of realms through a variety of planting in most of the outdoor areas. They have increased the safety of pedestrians in finding their way more easily and provided a semi-public feeling to communal gardens for residents' comfort in using them. The second most important change was the introduction of a significant amount of planting that was essential to eliminate the barren and monotonous situation of communal gardens that prevailed before the regeneration. It has replenished the vitality of outdoor areas with seasonal changes, colours, scents, nut trees, shrub berries, and birds' songs that have contributed to the quality of the environment.

For community development, the most important regeneration issue was the improvement of the perceived image of the housing area as part of making it a desirable place to live. As part of this, the landscape regeneration's focus on establishing a particular character was effective through the use of artwork and red colours in buildings and planting, richness of planting, and quality of construction materials and

furniture. Their introduction raised the quality and appeal of outdoor areas changing the desolated image that the housing area had before its regeneration. As part of maintaining this perception, posterior issues after the regeneration considered of importance by the housing company were keeping safe, neat, and tidy outdoor areas which lessened opportunities for personalization and the implementation of ecological projects; such were a sustainable urban drainage system to avoid children drowning and the provision of unmanaged areas for improving biodiversity. Though keeping the image of the housing area is imperative both of these projects could be addressed through design.

The second most important issue for community development was providing residents with choices for moving within the housing area and of facilities and events in the Cecilienplatz square at different times of the day. It enabled residents to stay and strengthened existing community ties as well as providing opportunities for casual contacts with others that the majority of communal gardens did not allow. Yet, they still required to be improved in terms of the options provided at night for residents when safety seemed to be lessened.

The third important issue was the revitalization of the community by supporting the establishment and continuity of social structures in the long-term. In order to initiate them, it was essential to have the housing company and local authorities' financial support. To maintain social structures in the long-term, mutual collaboration on the development of ideas to benefit the housing area were vital, and also provided access to organizational skills which were sometimes also acquired from shared experiences with other community groups or inherited from previous leaders. It was the strong and efficient communication links and willingness to collaborate that have allowed the existing social structures to thrive and develop.

Lastly, there was a clear interest from residents in participating in improving their housing area at the start of the regeneration, which has also provided them with opportunities for knowing others. Yet their participation was discouraged after proposed changes in the Planning for Real workshop failed to be implemented and there were no other short- and long-term participation opportunities made available. Although their implementation was considered to be too expensive by the housing company, they may have been possible through collaboration with existing social structures. Although communication exchange is strong among leaders of social structures and heads of the

housing company, it is poor with residents who have few ways of expressing ideas and collaborating in social or ecological projects and maintenance. Channels through which this can be done need to be developed and promoted in the housing area which can eventually contribute to a stronger and sustainable community.

For ecological sustainability, the ecological projects that were possible to be implemented contributed to improve the environment, the quality of outdoor areas, and were also found to provide residents with opportunities to know each other from exchanging ideas. From the projects initiated to revitalise ecological processes in the housing area, the most important element was having an adequate management for their setting up and implementation. For that, it was essential to have a landscape architect who could propose and conduct the regeneration scheme but also to have local administrative offices where ecological projects, such as composting, could be monitored from. Without it, projects were likely to fail. The installation of local offices could be temporary, allowing the development of short- and long-term participation strategies for residents who could aid in monitoring, supplying ideas, and maintaining ecological projects once they have developed the skills to organize and run them.

The ecological projects that were considered unnecessary or inadequate by the housing company were either expensive in their upkeep, did not contribute to the general quality of the outdoor areas, or were discarded because of the risk of damaging the image of the housing area. Whilst maintaining the image of the housing area is a priority, it is suggested that alternate solutions may be developed with the collaboration and maintenance aid of residents such as selecting areas for spontaneous vegetation or unmanaged planting that may become part of educational resources to the community. As a first step, it would be necessary to have widespread dissemination of information among residents concerning ways to improve the environment of the housing area in a variety of ways and ways to become involved as a way to encourage their interest. However, a joint effort among local social structures, schools, the housing company, and particularly local authorities is necessary to allow their establishment to the point where they can be run by residents.

In general, local authorities have the best chance of encouraging sustainability by integrating regulations to do so, providing incentives, providing best-practice recognitions, and supporting innovative ideas.

Comparison of the regeneration processes in Augustenborg and Rotes Viertel: Strengths and limitations

Achieving sustainability through the regeneration of the landscape in medium-rise housing was found to be in majority possible although there were issues that were more relevant to professionals and residents as well as others were more difficult to achieve. Starting with professional bodies, the most important prerogatives were to improve and sustain the image of the housing area as well as the quality of the outdoor areas, support community life, and introduce cost-effective ecological measures that would fit with the latter issues. This was important as a way of removing the decay image and of raising the level of quality of the housing area to reduce vacancies and turnover of residents.

A significant influence was the implementation of issues that the housing companies and designers perceived to be more adequate once funding for social programmes was finished and initial participation strategies with residents were terminated. Decision-making of changes was then kept by both of the housing companies as a way of controlling finances and internal organizational preferences. It was then that the introduction of a landscape designer working within the housing company in Rotes Viertel became critical for improvements to ecological processes in outdoor areas as well as providing for comfortable communal gardens for residents.

Issues that were less important for professional bodies included reducing consumption of drinking water and energy, biodiversity, and long-term community participation. Their lessening is rather an accumulation of elements in the network of tools and services that were available to them. For instance, local authorities had a significant role in enabling planning alternatives and providing incentives that encouraged social integration of residents in outdoor areas of Augustenborg as well as reducing pollution. In Rotes Viertel, the local authorities contributed to support the implementation of ecological sustainable solutions that improved biodiversity and strengthened long-term social structures. The local authorities' participation was also found to be crucial as owners of areas for facilities and roads that were central to the development of community of medium-rise housing which has been shown throughout the research to be essential in regenerating the case studies.

Also, local authorities have not worked jointly with housing companies in enabling long-term social involvement structures for ecological strategies. This was shown to be pivotal in their success but also as a way of changing residents' environmental attitudes

and increasing social opportunities from exchanging information in that regard. Unfortunately current practice still handles social and ecological projects separately, making communication and integrated solutions more difficult.

Another setback during the process of regeneration and later management, congruent with previous research findings, was that sustainability support tools were poor. The landscape designer in Rotes Viertel and maintenance contractor in Augustenborg struggled in finding certified material suppliers but also getting to those who were really committed to practices that were sustainable. In current practice, there has been concern in regard to the way evaluation for the certification of sustainable practices is currently being handled as sustainability may be interpreted in different ways. For instance, the National Association of Home Builders in the USA has launched their own sustainable materials and certifications whilst been criticised for their un-sustainable timber sourcing practices in the USA.[481]

Also for current or future sustainable regenerations, assessment tools available such as BREEAM are too rigid in providing solutions for comfortable and quality outdoor areas which was shown in the research to be essential. In this search of more adequate solutions to ecological or social strategies for regeneration, the availability and sharing of experiences of existing regenerations is of paramount importance. Unfortunately, reluctance was found amongst professionals in learning from other methods due to the different geographical locations and cultural contexts which may not necessarily be relevant for all social or ecological issues.

In regard to the most important issues for residents, social related ones contributed most to improve their quality of life and strengthening community networks in their daily use of outdoor areas. Although residents' role has been rather passive as part of consultation processes in most cases, participation in ecological projects provided them with ways of knowing each other. The projects that had their participation at the start and during their establishment were more likely to succeed. However, ecological projects were also significant for residents in various ways. They improved the physical state and image of their communal gardens becoming a source of memories and pride for their housing area in attaining a more sustainable lifestyle.

[481] Christine MacDonald,'Green or Greenwashed?', *Architecture Week*, 424 (2009) <http://www.architectureweek.com/2009/0422/environment_1-2.html> [accessed April 2009] 1-3 (p. 2).

Looking at possible replication of future sustainable regenerations, the research has shown there are many issues that must be addressed to facilitate them. One of the main problems was enabling social and ecological strategies to work together as these are handled separately in current theory and practice. This was manifested from the moment of acquiring funding and working with local authorities to the application of the programmes, which would have been easier having permanent landscape professionals and community development officers in the housing companies. A second problem is that the support from current authorities, regulations, services, and tools to achieve sustainability in existing housing areas are still in a development process and not structured together. In fact, the existing housing areas that have already undertaken a sustainable regeneration, such as the case studies presented, are still in a process of experimentation. Therefore there is an urgent need of incrementing support for sustainable regenerations and making available their experiences.

Summary lessons for community development and support of ecological enhancement

The initial guidelines acquired from the previous case study Augustenborg have been complemented from the lessons of the regeneration for ecological and social sustainability in Rotes Viertel (Table 6.3). They are presented in the order of relevance shown by the regeneration lessons.

Table 6.3 Proposed guidelines from the lessons of the regeneration for social and ecological sustainability

General considerations	• Regeneration should plan for short- and long-term strategies[†] - Ensuring a sufficient budget until residents may take up management - Preparing alternative solutions to possible problems • Regeneration should be conducted in a progressive way rather in one stage - Enabling changes to be accepted by residents and providing them with a sense of constant care and an up-to-date design of outdoor areas - Allowing testing and evaluating of solutions that best fit the local context • The management body, planning departments, local social structures, and residents should collaborate jointly[††] - Exchanging experiences on their invididual work - Planning for goals that benefit different groups of the population - Distributing organizational and operating responsabilities amongst residents and management bodies - Enabling different sources of information to users - Integrating feedback systems and evaluation from available social structures and managment personnel • Knowledgeable personnel should be available during and after the regeneration - Having administrative-management personnel in the housing area that facilitates local decision-making - Having a community development officer and landscape architects permanently working with the managing body • Regeneration and maintenance should preferably be conducted with residents participation - Creating attachment and care of residents to the housing area • Regeneration and maintenance should preferably be conducted with the same contractor for with a long-term contract - Creating attachment of the contractors and gardeners to the housing area - Ensuring the gradual and continuous regeneration work of communal gardens

Table 6.3 continued

General arrangement of outdoor areas	• 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 • Communal gardens should be integrated with local facilities - Facilitating access among areas - Enabling visual contact with others • Communal gardens should be designed with sheltered and robust areas with a rich variety of planting for sensory experience • Required changes should have a minimum impact to the integrity of the outdoor areas - Avoding disturbance of established realm boundaries as well as existing leisure and social areas - Integrating underground parking only if the roof serves as part of the communal gardens at ground level - Avoding unnecessary circulation areas • Communal gardens should be designed to meet the changing needs of residents - Supplying compact individual solutions in communal gardens - Arranging communal gardens with different features - Providing design queues to encourage residents in using communal gardens other than theirs, such as signals, maps, similar materials for a determined group of gardens, and others
Community development	• The quality of outdoor areas should be enhanced in a way that it significantly improves the image of the housing area - Re-designing according to residents' needs in each communal garden - Taking into consideration the heritage of the area and memorable areas - Making ecological strategies part of the character of the area • Local authorities and the managment body should encourage revitalization of a variety of facilities and social structures - Providing access to skills and financial stimulus for social structures - Gathering experiences of social structures and making them available locally such as an archive - Attracting businesses appealing to women and families, such as beauty shops, bakery, ice-cream parlor, etc. - Arranging periodical events in the square and communal gardens **- Attracting temporal markets for facilitating casual encounters of residents** • Information on social structures, facilities, and their actvities should be disseminated regularly among residents - Arranging different information methods through the housing company, school facilities, and social structures **- Encouraging volunteer work and integration of youngsters who may introduce novel ideas** • The regeneration of the landscape should consider areas for personalization - Allocating areas in communal gardens that may be suitable without affecting the consistency of the design - Locating them close to where residents may be in charge - Locating allotments close to educational facilities or community groups as a learning source - Planting produce that complements the design or does not have visual impact such as root vegetables **- Providing incentives such as prizes or lowered rent for managing of an area** **- Supplying information and workshops regarding productive and visually appealing allotments** • Flexible household arrangements for the changing stages of families should be facilitated - Making available different types and sizes of dwellings for residents to move to **- Facilitating residents with choices to move closer to relatives within the same housing area**
Community participation	• Various and flexible ways for involvement should be planned for social and ecological projects - During and after the regeneration - Allowing all members of the community to voice their opinion - Allowing younger residents to become involved at early or later stages of the projects
Reducing carbon emissions	• The establishment of traffic calming measures and public transport options should be facilitated - Providing incentives for their installment and maintenance by local authorities or other programs working in collaboration with the management body for developing best strategies - Providing guidance for the development of innovative and feasible transport solutions by local authorities and universities • Management body and/or local authorities should encourage non-vehicle transport options - Charging for parking, for all vehicles or for having more than one vehicle - Supporting cycling schemes, programs, activities, and bicycle ownership - Fostering shared-vehicle schemes

Table 6.3 continued

Reducing carbon emissions	• Landscape strategies to reduce energy that affect residents should be defined jointly with them - Agreeing on the size, maintenance, or elimination of areas that may affect residents such as green facades • Supply of energy should be acquired from efficient or renewable sources such as combined heat and power systems • Renewable energy should be generated for small-scale projects, communal facilities, or feeding back to main grid - Introducing small wind turbines in roofs or geothermal collectors in park areas - Introducing photovoltaic panels in facades or roof areas • Energy efficient communal washing-drying facilities should be introduced as an option to residents - Having communal areas where residents may have opportunities to socialize
Reducing pollution and selection of materials	• Introduction of sustainable urban drainage systems should be planned with the involvement of residents - Agreeing on design features to ensure the safety of infants - Enabling engagement opportunities with the water - Agreeing on possible ways for residents to provide them with maintenance • Permeable surfaces should be kept and provided to reduce precipitation-run off - Avoiding unnecesary concrete pedestrian walks - Designing pedestrian walks with permeable surfaces such as a central concrete walk with gravel pedestrian paths - Designing areas of communal gardens with planting and soft materials that may also facilitate flexibility • Measures to clean the water should be considered in advance for retention ponds to avoid stagnation • Re-use of discarded household products in good conditions should be encouraged - Organizing periodical collection points by the housing company or volunteer groups - Facilitating other ways for exchanging products among residents such as notice boards • Full recycling facilities should be made available to residents - Planning and establishing the process in conjunction with residents - Providing continuous relevant information for their awarenes and operation of the process - Introducing robust fast composting machines that handle various household wastes Planning for management of excess compost preferably locally or as commercial feature where employment may be created for residents • Vacant rooms and buildings should be facilitated for community purposes - Supporting residents in the rehabilitation of rooms - Charging low or null rents - Providing incentives for the development of activities • Materials and planting should be selected for their comfort, quality, image, and if possible from sustainable sources • Wherever available, certified providers should be selected for their sustainable practices • Products such as bird boxes made by residents from reclaimed materials should be encouraged - Providing personalization opportunities in items - Providing a source of income to residents
Biodiversity	• Improvements in communal gardens for biodiversity should be consulted with residents - Integrating meadows or other un-tidy areas in the communal gardens where residents agree • Modifications and benefits of improving biodiversity must be clearly defined to residents - Through various sources of information (workshops, local schools, periodicals, voluntary groups, and others) - Showing the way communal gardens may change - Introducing example areas in communal gardens with educational information • Restoration of a historic landscape character should meet current social and ecological needs - Integrating certain elements that formed part of the historic character - Creating a new character and comfortable environment from merging both
Saving drinking water	• Local authorities should allow the implementation of water saving measures for regenerating existent housing areas - Proposing solutions to address clogging of city's pipelines with reduced discharge Facilitating planning measures and providing financial incentives to reduce, re-use, and re-cycle water - Collaborating with housing companies in their establishment • Residents should be encouraged to reduce potable water consumption - Raising residents' awareness for saving potable water - Informing and engaging residents in strategies to reduce water consumption during and after the regeneration - Fostering a change of attitude towards water leading to changes in their lifestyle

† Text in grey indicates findings from Augustenborg case study and text in black indicate findings from Rotes Viertel case study

†† The management body refers to the housing company or other body in charge of the housing area

The recommendations provided should still be enriched with lessons from other regenerated housing areas. They could then be divided if necessary into relevant categories that may seem to affect the regeneration success. Such may include recommendations by size of housing areas, climatic conditions, type of management, or others. In the implementation of the graded-assessment in Rotes Viertel, new items were included which had not been considered before but were necessary as part of the assessment. One such element was the existence of collaboration for social projects between residents and the housing company as well as others. In the same way as the guidelines suggested, the graded assessment should also be upgraded from research in other regeneration experiences of medium-rise housing.

In order to explore in more detail the way in which the landscape arrangement has contributed to social integration of residents, the next two chapters analyse the residents' perceptions and their use of the regenerated landscape at both Augustenborg and Rotes Viertel. The findings are then integrated into guidelines in a similar format as those presented in this chapter.