The impact of design on privacy and social interaction between neighbours in sustainable housing developments in England and Wales

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to Catriona

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Abstract

The sustainable development of the built environment is advocated in both theory and policy. Social sustainability could be improved if the built environment is designed to encourage social interactions between residents, which enhance feelings of sense of community and social cohesion. Privacy is a vital component of an individual's social interaction process. However, the relationship between privacy and social interaction is rarely discussed in sustainable development literature. In order for social interactions between neighbours to be positive it is beneficial if levels of privacy in the home are sufficient for residents to feel comfortable. Therefore, for a housing development to be sustainable it is necessary that privacy in the home is addressed when designing to encourage social interactions between neighbours. The specific relationships under scrutiny in this thesis are: the impact of design on social interactions between neighbours; the impact of design on privacy in the home; and the effect of levels of privacy in the home on the relationship between design and social interactions.

Primary data was collected across 13 sustainable housing developments. Sixty five indicators were measured using; a site survey checklist to collect data on physical features affected by eight principles of sustainable design, and a household survey to collect data on the behaviour and characteristics of the residents. Statistical analyses were used to test the nature and extent of the hypothesised relationships.

The findings show that a number of physical features are significantly associated with privacy in the home and social interactions between neighbours. Not all features had a positive association, however private outdoor space to the front of dwellings and clearly marked boundaries between properties are beneficial for both privacy in the home and social interactions between neighbours.

A comprehensive list of features of sustainable housing developments was established and operationalised as a series of indicators which could be used in future empirical research on housing developments. This research also contributes new empirical evidence on the effect of sustainable design features for the built environment on residents' behaviour, particularly social interactions and privacy in the home.

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chapter ONE

Introduction

Chapter One: Introduction

'For a man's house is his castle, et domus sua cuique tutissimum refugium' ('One's home is the safest refuge for all'). Sir Edward Coke, *Third Part of the Institutes of the Laws of England* (1628)

This research is concerned with the effect of the design of sustainable housing on privacy in the home and social interaction between neighbours in new housing developments in England and Wales. The sustainable design of the built environment is part of a commitment to sustainable development by the UK Government. The Government, partly instigated by the Brundtland Report (1987), aims to promote sustainable living in order that current and future generations can prosper. The Government is promoting sustainable development in the form of sustainable communities; these encompass environmental, economic and social sustainability goals, such as active participation in local groups, a thriving local economy and protecting and enhancing the biodiversity of an area (DEFRA, 2005). The Government also wishes to improve quality of life and has produced a set of indicators to measure various aspects of the environment and society (Barton *et al.*, 1995; Barton *et al.*, 2003; DEFRA, 2004; CABE, 2005b). The design of the built environment has been associated mainly with environmental sustainability (for example improved thermal insulation, rainwater recycling systems and solar panels for heating domestic water). However, other aspects of design may impact on social sustainability (for example good pedestrian networks may increase opportunities for social interaction between residents as a result of residents walking more in a neighbourhood) and are being promoted through the planning system in England and Wales (DoE, 1995; ODPM, 2005b; DCLG, 2006).

Designing the built environment to enhance social interactions may result in unforeseen consequences, in particular levels of privacy in the home may be negatively affected (Al-Homoud and Tassinary, 2004). It has been argued that privacy and social interactions form a dialectical relationship, that is they are contrasting themes and yet closely related; as such privacy can play a key role in regulating social interactions (Altman, 1975). Policy and design guidance for sustainable housing developments encourage designing for social interactions (Llewelyn-Davies, 2000) but with no acknowledgement that privacy may be affected. Whilst there is empirical evidence supporting the claims that the design of sustainable housing developments can impact on social interactions, little has been done to assess the impact on privacy in the home, or whether levels of privacy in the home affect social interactions between neighbours. The objective of this research is to address the lack of existing evidence by testing whether the design of sustainable housing developments is associated with levels of social interaction between neighbours, or privacy in the home. The research will also test whether the impact of design on privacy has a subsequent impact on social interactions. The following sections set out the rationale for the research and the methods that will be used to test the three relationships.

1.1 Designing housing developments that are sustainable in England and Wales

The potential impact of the built environment on sustainable development has been recognised by the UK Government; in 1998 the then deputy Prime Minister, John Prescott, assigned the Urban Task Force with writing a report on the causes of urban decline in England and how this could be reversed, bringing about an urban renaissance (Urban Task Force, 1999). One of the key proposals put forward by the Urban Task Force was that cities be more sustainable and a 'higher quality urban product' as a result of being '...compact urban developments, based upon a commitment to excellence in urban design...' (ibid., p.11). Partly in response to this report the Government produced the White Paper 'Our Towns and Cities: the future: Delivering an Urban Renaissance' (DETR, 2000b). A key aspect of the policy is to improve the quality of the urban environment through better urban planning, design and architecture. Through better design, towns and urban areas can become more environmentally sustainable, public spaces can be of a high quality and facilities and amenities can be easily accessible to all residents on foot, bicycle or public transport (Urban Task Force, 1999; DETR, 2000b). Similarly, in the Government's White Paper on Sustainable Communities emphasis is put on the quality of the built environment and the importance of good design alongside resident participation in decision-making processes (DEFRA, 2005). However, there is debate over what constitutes a high quality built environment, although efforts have been made to qualify and quantify good design empirically (Dempsey, 2008b). The impact design can have on the quality of the built environment and sustainable development is highlighted in the Labour Government's general planning policy statement (ODPM, 2005b) and also in planning policy specific to housing (DCLG, 2006). Both documents emphasize the importance of high standards of design and that poor design should be rejected.

Several authors of design guidance advocate high quality design as one feature of the sustainable development of the built environment (Llewelyn-Davies, 2000; Rudlin and Falk, 2009). Specific features are also suggested such as the incorporation of a mix of uses at a scale that enables people to access local amenities, workplaces, public transport and public open spaces easily, on foot, or by bicycle (Jenks *et al.*, 1996b; Rudlin and Falk, 1999; Barton, 2000; CABE, 2003; TCPA, 2004b). The list of physical features that contribute to a development being sustainable vary between authors, often depending on their perspective. For example, Barton's (2000; 2003) work is focused on the environmental benefits (such as food production and biodiversity) of sustainable development, and Rudlin and Falk (2009) tend to focus on the regeneration of urban centres. Government policy encompasses many of the features advocated by theorists and design guidance, such as intensifying housing levels in urban areas, mixed-use developments, improved routes for pedestrians and higher net densities of housing (DETR, 2000c; ODPM, 2005e). However, there is no definitive list of the physical features that may contribute to a housing development being sustainable.

1.2 The significance of social interaction in sustainable housing developments

Features of the built environment may aid the creation of sustainable communities because the design of urban environments may be conducive to social interactions. The development of a sustainable community in a neighbourhood normally begins with social interactions between residents (Gilchrist, 2000). Casual social interactions are the first step towards forming deeper relationships with other people (Goffman, 1963). There is an assumption that all interactions are positive and therefore a good thing (for a review, see Rook, 1984). In certain situations this may be true, for example in a study of older people Bowling *et al.* found that high levels of neighbouring (knowing and trusting neighbours) contributed to better physical health and functioning (2006). The quantity of social interactions is not necessarily what is important but rather the quality of the interactions and who the older person is interacting with, for example a neighbour of a different age (Conner *et al.*, 1979; Lee and Ishiikuntz, 1987). These studies suggest that social interactions between residents are beneficial for residents' wellbeing and can contribute to the development of sustainable communities.

In the past, in England and Wales, cohesive communities were easily accomplished because of familial ties. The urbanisation of the population was considered to be the end of good neighbouring and local communities (Simmel, 1950; Wirth, 1964). However, research has shown that local communities could thrive in urban neighbourhoods. They tended to be kin-based and consisted of a series of inter-related extended families, such as was found in the East End of London up until the 1950s (Young and Willmott, 1957). Although, some research has indicated that relationships between neighbours can vary from extremely negative to very positive or non-existent (Merry, 1979; Unger and Wandersman, 1982), and increased mobility of society means that communities are more likely to be made of disparate groups than extended families. However, other factors such as homogeneity and propinquity can lead to social interactions between neighbours (Gans, 1968). Some level of homogeneity can be a positive influence, however high levels can lead to the creation of artificial communities which exclude, for example, those who are not of a particular socio-economic group or race. Levels of social interaction within the communities may be high but this does not extend to those who are excluded (Low, 2001; Minton, 2002).

Propinquity, or nearness, is a key physical attribute for creating opportunities for social interactions between residents in housing developments (Festinger *et al.*, 1950). Through the design of a development layout it is possible to increase the incidences of casual social interactions between residents (Williams, 2005b). Residents who live in the centre of a street are more likely to interact with more people than those who live at the end of a street (ibid.). Creating routes for pedestrians through developments that residents are likely to use regularly increases opportunities for social interactions (Hillier *et al.*, 1993; Gehl, 2001). Providing spaces for a specific group of residents to use, such as a communal garden or children's play area, can lead to increased levels of social interactions between the residents (Skjaeveland *et al.*, 1996). Theory and past research suggest that, while other factors are influential, the design of the physical environment can have an impact on whether residents will interact with one another.

The sociologists Ariès and Sennett believe that public spaces are vital as locations in the city for social exchanges between friends and strangers (Ariès, 1962; Sennett, 2002). Where once public spaces were about sociability they are now places of movement, '...as public space becomes a function of motion, it loses any independent experiential meaning of its own' (Sennett, 2002, p.14). Cities and suburbs have been designed as zones where functions are separated resulting in inhabitants continually having to move around to reach the specific space they need. Public spaces are no longer the spaces of exchange due to the increased use of the car (Ariès, 1977). The car has allowed the growth of suburbs so that cities are no longer easily negotiable spaces. People are using the public spaces of the city less for socialising, and instead they stay within their private realm through the use of the car (ibid.). For the public spaces of cities to be used for social interaction they must be designed accordingly.

Government recognises the importance of creating public spaces for social interaction and this is an integral part of policy on creating economic, environmental and socially sustainable housing developments (ODPM, 2005d). Likewise, design guides promoting sustainable living emphasise the importance of a sense of community and social cohesion, developed through social interactions (Rudlin and Falk, 1999; Barton, 2000). Optimising opportunities for social interaction are associated with particular scales, namely the neighbourhood and the street. The recommended scales are based on the theory that many facilities and amenities should be within walking distance of the home. Designing new streets to encourage residents to walk rather than drive, for example ensuring there is good visibility and suitable street furniture, may increase the number of people on foot and thus increase the potential for social interactions (Barton, 2000; Llewelyn-Davies, 2000; Kim, 2007; Rudlin and Falk, 2009). Over time interactions between residents may develop into a network of relationships across a housing development, with the possibility of becoming an inclusive community based on the local area (DETR, 2000b). Creating housing developments with a distinct character and strong identity based on local traditions can create an affiliation amongst residents which can promote a sense of community (Urban Task Force, 1999; DETR, 2000a; DCLG, 2006). Thus, it is argued that a resident will have a sense of belonging which, combined with the development of a network of relationships through social interactions with other residents, will translate to a socially cohesive community.

1.3 The importance of privacy in housing

As outlined above, social interaction is seen as a necessary element in creating sustainable communities within housing developments. The impact of the built environment on the creation of sustainable communities is thought to be significant and policy and design guides reflect this. Another important facet of English culture is that of privacy, particularly of the home (Sennett, 2002), and it is important to analyse the role it may play in the relationship between the design of sustainable housing developments and social interaction. Privacy in the home has generally been neglected in recent planning policy concerning design, although the potential negative impact of higher housing densities and town cramming on privacy is raised in "Our Towns and Cities: the future: Delivering an Urban Renaissance" (DETR, 2000b). In policy relating to social interaction and inclusive communities privacy is not discussed despite theory showing there are correlations between levels of privacy and levels of social interaction.

Privacy is an important aspect of the relationships between the self, others and the environment (Marshall, 1974; Altman, 1976; Newell, 1995). For an individual to have a sense of self and to understand that their mind and body is a private realm they must be aware of others (Laufer *et al.*, 1973; Esser and Greenbie, 1978). Esser and Greenbie (1978) argue that communality and privacy are corollary concepts and that they are different aspects of a single experience. Laufer *et al.* (1973) suggest that a concept of privacy assumes others exist and that privacy is a tacit agreement between the self and others not to interact with one another. Privacy is also necessary for the development of personal autonomy, self-evaluation and emotional release (Westin, 1967; Laufer *et al.*, 1973; Esser and Greenbie, 1978; Margulis, 2003a). All four reasons for desiring privacy (control of social interaction, development of personal autonomy, self-evaluation and emotional release) have implications for an individual's mental health (Margulis, 2003b). Quality of life is affected by physical and mental health; sufficient privacy (particularly in natural surroundings) can be restorative and beneficial for mental health thus improving quality of life (Kaplan *et al.*, 1998; Hammitt, 2000).

Reduced levels of privacy have been shown to have a detrimental effect on a person's mental health: levels of social withdrawal increase as people avoid social interaction, engage more in solitary pursuits and use more cues of withdrawal such as reduced levels of eye contact (Evans *et al.*, 1989). Patients in institutions often have to deal with an environment that actively prevents patient privacy, for example shared bedrooms, doorless bathrooms and constant monitoring (Goffman, 1961; Ittelson *et al.*, 1970), and can result in withdrawal by patients particularly when sharing bedrooms. Individual rooms provide patients with the freedom to do a range of activities in their room whereas shared rooms tend to be used for lying on a bed, awake or sleeping (Ittelson *et al.*, 1970). Insufficient privacy in children's psychiatric wards results in patients altering their behaviour on purpose so that they can be sent to isolation as this is their only form of privacy (Newell, 1995). However, too much privacy (in the form of living alone), reduces social interactions and can have a detrimental effect on a person's mental health (Halpern, 1995, p.81).

Various privacy mechanisms can be used to control levels of interaction with others at the individual level (Altman, 1975). Territoriality is just one aspect of how an individual can control interactions between themselves and others (Laufer and Wolfe, 1977). The home can aid the process of control because it is an extension of the individual (Altman, 1975; Edney and Buda, 1976). In theory the home has many different roles in terms of it being a private space separate from the public. For some it may be perceived as a private enclave beyond the reaches of the state (Westin, 1967). For others it is a refuge from everyday life and the constant requirement of public life to be on display (Goffman, 1959; Bachelard, 1994). It is also a space where the occupants can control who and how they interact with by allowing people of their choice into particular areas of the home (Chermayeff and Alexander, 1963). In the theory perceptions of privacy in the home are regarded as an integral part of how people control their social interactions with others and yet privacy is rarely discussed in policy.

Privacy and private outdoor space are discussed in design guides predominantly as an independent issue. In many cases advice is given on the clear demarcation between public and private space (for example Llewelyn-Davies, 2000; ACPO, 2004). This is highlighted, particularly in terms of security, in the 'Manual for Streets' (DfT and DCLG, 2007) where the fronts of homes are seen as public and the backs of homes are private and should not be easily accessible from public space. Overlooking is a primary issue in terms of privacy and most guides suggest designing housing developments in such a way that natural surveillance of public and semi-public areas is high but direct views from one dwelling to another are avoided (ACPO, 2004). Noise intrusion can also be a problem and high quality construction is advocated to ensure adequate sound insulation between dwellings, particularly in areas of higher densities (CABE *et al.*, 2009). The theoretical relationship that reduced levels of privacy may have a negative impact on social interactions with neighbours may be implicit in some design guides; however, it is more common for privacy to be discussed as an independent issue.

In theory privacy is associated with the control of social interactions, at the level of the individual and in the context of the home (Altman, 1976). Policy on sustainable development, in particular social sustainability, has placed a great deal of emphasis on creating communities through the creation of high quality built environments which can lead to informal social interactions between residents. However, the connection between privacy and levels of social interaction is not recognised in policy documents and rarely in design guidance. Privacy is treated as an independent issue, unrelated to social interactions in design guides and little is said about how the design of sustainable housing developments may impact on privacy in the home. This is an important omission in both policy and design guides which needs to be addressed in order that sustainable housing developments are able to accomplish the goal of becoming the settings for sustainable communities and provide residents with opportunities for a high quality of life.

1.4 Research aims

It has been established that in new housing developments the design of the physical environment is being advocated as a tool to encourage social interactions between neighbours. Casual social interactions are recognised as being a preliminary step towards building stronger relationships and developing networks. Through the provision of a suitable built environment it is argued that a sense of community can be developed amongst residents. A sense of community is seen as a positive attribute within a housing development leading to a socially sustainable environment.

However it is possible that the design features that may enhance social interaction may also have a detrimental impact on perceptions of privacy within the home. Privacy has an influence on social interaction which while discussed widely in theory has not been accounted for in policy. Research that has been carried out in communes where there is minimal privacy suggests that this is detrimental to social interaction between commune members (Rigby, 1974). The rise of gated communities suggests that people are willing to go to extremes to protect their privacy, homogeneity and safety (Low, 2001; Minton, 2002). The aim of this research is to investigate empirically the relationships between the design of sustainable housing developments, perceptions of privacy in the home and social interactions between neighbours.

In order to understand the relationships between the design of sustainable housing developments, perceptions of privacy in the home and social interactions between neighbours the research has been broken down into three aims. To achieve the research aims six research questions have been developed and three are pertinent to the first aim (see Figure 1.1). The first aim is:

- **To establish if and how the design of sustainable housing developments can support social interactions between neighbours.**

The first research question asks: **what are the design elements required to achieve sustainability in housing developments that may have an impact on privacy in the home and social interaction between neighbours?** The second question is: **what is the definition of social interactions between neighbours?** The third question seeks an answer to: **what is the impact of design elements on social interaction between neighbours in sustainable housing developments?** It is important to verify that there is an association between the design of the built environment and social interactions between neighbours for two reasons. First to test the validity of theory and policy, and second as the first step towards developing an understanding of how the design of sustainable housing developments impacts on social interactions between neighbours and perceptions of privacy in the home.

The second aim is similarly a preliminary step towards a more complete understanding of the relationships:

- ***To identify if and how privacy in the home is affected by the design of sustainable housing developments.***

Two research questions have been proposed to address this aim. The first question asks: **what is the definition of privacy in the home for the purposes of this research?** The second question asks: **do the design features of sustainable housing developments have an impact on privacy in the home and if so, what is the nature of the impact?** Confirmation of a correlation between the design of sustainable housing developments and privacy in the home will indicate that the impact of design has consequences further to the aims of policy. The third aim is the final step in developing a fuller understanding of the relationships:

- **To ascertain if and how privacy in the home affects the relationship between the design of sustainable housing developments and social interactions between neighbours.**

The final research question asks: **how does privacy in the home affect the relationship between design and social interactions between neighbours?** Each of the three relationships will be looked at in detail using a comprehensive set of indicators and variables measuring the design features, the concept of social interaction between neighbours, the concept of privacy in the home and intervening factors. A more complete picture of the impact of the design of sustainable housing developments in terms of privacy and social interactions is developed through the accomplishment of the third aim (see Figure 1.1 for a diagram of the relationships).

1.5 Research approach

Currently, much of Government policy relating to the design of sustainable built environments is based on theory with little empirical evidence to support design guidance. This research sought to test the design theory and create new empirical knowledge to aid the sustainable design of the built environment. In order that the relationship between the design of sustainable housing developments, privacy in the home and social interactions between neighbours in housing developments in England and Wales can be more fully understood empirical research was undertaken. The doctoral research ran alongside the 'Sustainable Lifestyles' project (EPSRC-funded project under the SUE programme) which sought to test the relationship between the design of sustainable housing developments and sustainable behaviour.

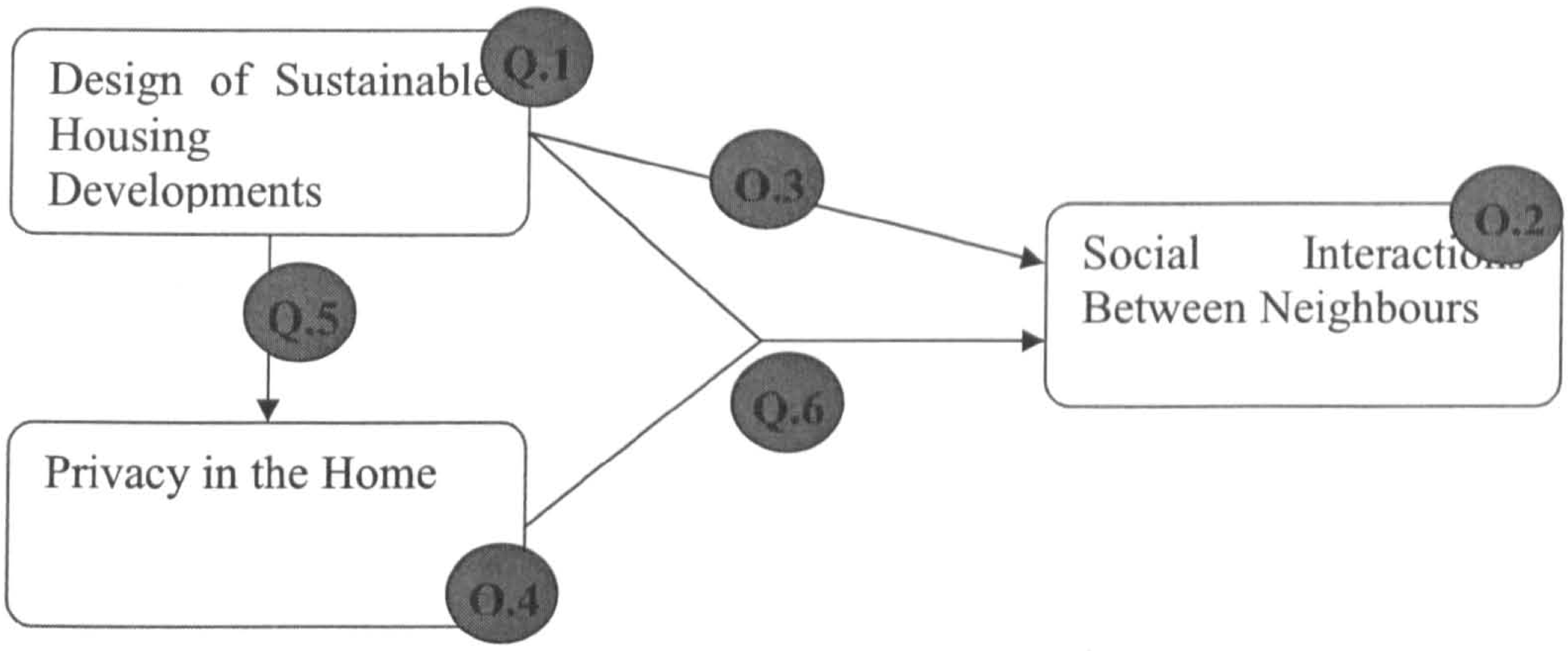
Thirteen sustainable housing developments in England and Wales were chosen to be the cases for the research (see Section 5.5, Chapter Five for an explanation of the selection process). The research was restricted to England and Wales for reasons relating to policy context, time and cost. The housing developments were chosen after an extensive desktop study and literature review of the current state of sustainable building in England and Wales (Williams and Lindsay, 2007). Those that were selected were chosen because they reflected the variety in levels of sustainable design in housing developments at the time of the research. The thirteen developments studied in the research are:

- Grange Farm, Milton Keynes
- Amersham Road, Reading
- The Waterways, Oxford
- Alpine Close, Maidenhead
- The Courtyards, Horsham
- Great Notley Garden Village, Braintree
- Greenwich Millennium Village, Greenwich
- Ingress Park, Greenhithe
- Lansdowne Gardens, Cardiff
- Newcastle Great Park, Newcastle-upon-Tyne

- The Staiths South Bank, Gateshead
- Westoe Crown Village, South Shields
- Cooper Road, Rye

Within each case primary data has been collected on three elements according to a list of indicators developed from the literature review. The three elements are: sustainable design features, residents' perceptions of privacy within the home and social interactions with neighbours. A site survey checklist was used to collect data on the sustainable physical features in the development. This was followed by a household questionnaire which was posted to, and collected in person from, residents within the case studies. The household questionnaire contained questions pertaining to residents' perceptions of privacy within the home and the level of social interactions they had with their neighbours. Triangulation of the data was possible because of the two methods of data collection.

The data collected is predominantly quantitative. With the aid of statistical analyses the relationships between the indicators were investigated. Through the use of validated statistical tests it was possible to establish the patterns and trends underlying the relationships. A quantitative approach was taken to provide an opportunity for patterns across the numerical data to emerge in relation to the features of the built environment being measured and the behaviours of residents. Also, theory can be tested using hypotheses with the results being used to refine the theory. Finally, the measurement of the built environment is a new and expanding field; attempting to quantify the design features of sustainable developments in an objective way contributes new empirically-based knowledge that may be of benefit to policy and design guidance.



Key to the research questions:

Aim 1: To establish if and how the design of sustainable housing developments can support social interactions between neighbours.

1. What are the design elements required to achieve sustainability in housing developments that may have an impact on privacy in the home and social interaction between neighbours?
2. What is the definition of social interactions between neighbours?
3. What is the impact of design elements on social interaction between neighbours in sustainable housing developments?

Aim 2: To identify if and how privacy in the home is affected by the design of sustainable housing developments.

4. What is the definition of privacy in the home for the purposes of this research?
5. Do the design features of sustainable housing developments have an impact on privacy in the home and if so, what is the nature of the impact?

Aim 3: To ascertain if and how privacy in the home affects the relationship between the design of sustainable housing developments and social interactions between neighbours.

6. How does privacy in the home affect the relationship between design and social interactions between neighbours?

Figure 1.1: Diagram representing the research aims and questions

1.6 Thesis structure

There are a further nine chapters in this thesis. The following three chapters form the literature review. Chapter Two addresses the second research question and contains a review of the literature relating to the concept of social interactions and why they are important for social sustainability. The factors that may influence social interactions are considered, in particular the built environment and personal characteristics. Finally, social interaction between neighbours is defined.

The fourth research question is answered in Chapter Three through an examination of the concept of privacy in the context of the individual and the home. The concept of privacy is discussed within the frameworks of two theorists and the relevance, to this thesis, of the separate approaches is reviewed. Subsequently, definitions of privacy of the individual and privacy in the home are formulated. The potential for the design of housing developments to impact on individual privacy and privacy in the home is examined, as is the relationship between privacy and social interactions.

In Chapter Four eight principles of design for achieving sustainable housing developments are identified in answer to the first research question. Each principle is defined and discussed in terms of how it can contribute to sustainable housing developments. The particular physical features of each principle that may impact on privacy in the home and social interactions between neighbours are established. How they may impact on privacy and social interaction is also discussed. Hypotheses are developed in order to address the research aims of identifying and testing the relationships between design, privacy and social interactions.

Chapter Five explains the methodology used for addressing the research aims and answering the research questions. The definitions and concepts discussed in the previous three chapters are operationalised as indicators in order that they can be measured. The methods for measuring the features are explained and justified, as are the statistical tests used for testing the relationships between the three concepts. An explanation of the case selection process is provided as is a brief overview of each of the developments selected.

The purpose of Chapter Six is to provide some background information on the characteristics of the sustainable housing developments and the sample of residents taken from them. Descriptive results are presented about the eight design principles for each development, as well as general characteristics of the sample, for example age and tenure. This data contributes to an understanding of the sample and is preparatory to reading the results from the analyses.

In order to answer the research questions the quantitative data was statistically analysed. The hypotheses derived from the literature review were tested and the results are presented in Chapters Seven, Eight and Nine. Chapter Seven addresses the third research question and discusses the results of the analysis of the relationship between particular aspects of sustainable housing developments and social interaction between neighbours. The nature and significance of the relationship is discussed. The results from the fifth research question, testing the relationship between the design of sustainable housing developments and privacy in the home, are presented in Chapter Eight. Chapter Nine focuses on the sixth research question, the impact of the interaction between the design of sustainable housing developments and privacy in the home on social interactions between neighbours.

The concluding chapter, Chapter Ten, presents a review of the results of the hypotheses tested and the significance of the findings in terms of the contribution they have made to theory, as well as the implications of the research findings for design guidance and policy. Suggestions are made for further research investigating the relationship between the built environment and behaviour. The chapter concludes with a discussion about maintaining a balance between privacy in the home and social interactions between neighbours, in the context of a wider debate surrounding private and public life in sustainable communities and cities.

chapter TWO

The importance of social interactions between neighbours for sustainable development

Chapter Two: The importance of social interactions between neighbours for sustainable development

2.1 Introduction

This research is concerned with the relationships between the design of sustainable housing developments, privacy in the home and social interactions between neighbours. A study of social interactions requires an understanding of the concept. The purpose of this chapter is to explore its meaning and to discuss how social interactions between neighbours can contribute to sustainable communities, with particular reference to social networks, social cohesion and sense of community. A definition of social interactions between neighbours is proposed, followed by a discussion of some of the factors that may influence the interactions. Two factors are of particular relevance to the research and are discussed; the personal characteristics of the residents and the built environment.

Policy and design guidance recommend designing urban environments that are conducive to the creation of a sense of community amongst residents (DEFRA, 2005), which in turn contributes to the social cohesion of the neighbourhood (The Urban Green Spaces Taskforce, 2002). For residents to develop a sense of community it is necessary for them to form relationships with other residents and develop social networks (Forrest and Kearns, 2001). To do this they need to interact with one another in a variety of situations, for example through local community organisations (Rohe and Basolo, 1997). It has been shown that the design of the built environment can influence social interactions between neighbours (Festinger *et al.*, 1950; Skjaeveland and Garling, 1997; Raman, 2005). However, other factors such as the personal characteristics of the neighbours are also likely to affect the level of social interaction between them (Gans, 1968). Figure 2.1 shows the framework for the research with the subject of this chapter highlighted.

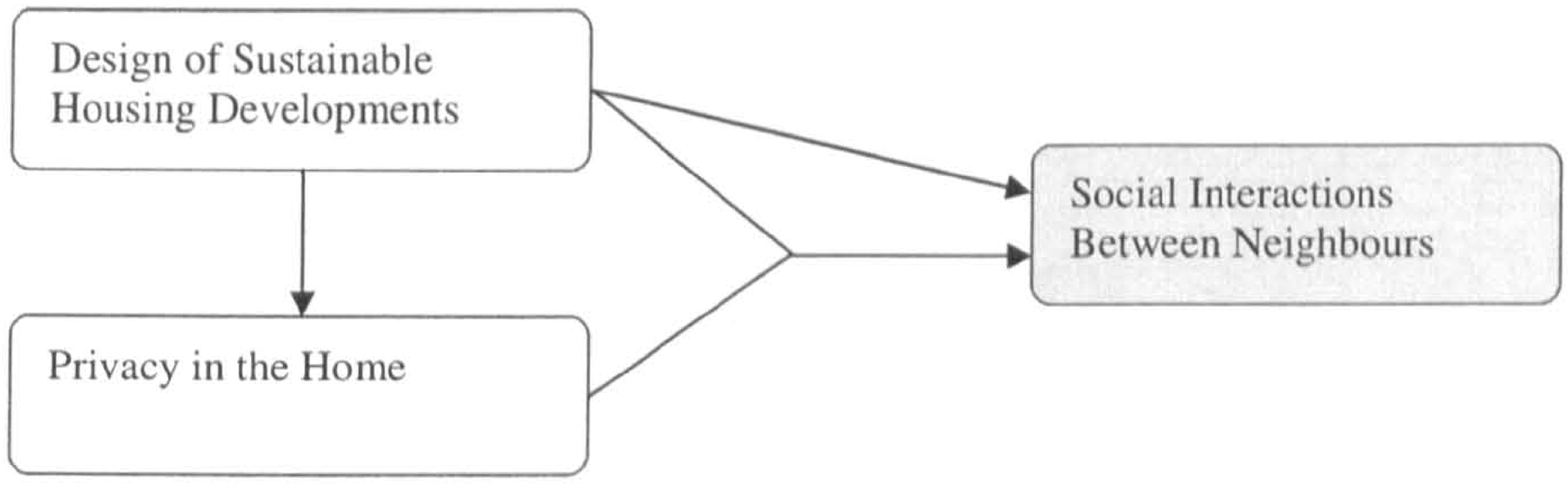


Figure 2.1: Diagram representing the concepts and relationships under scrutiny in the research with the focus of Chapter Two highlighted

2.2 Sustainable communities and social sustainability

Social interactions between neighbours may contribute towards the social sustainability of an urban area by aiding the development of sustainable communities. To understand this contribution it is necessary to discuss what a sustainable community is. Also discussed are the particular features of a sustainable community that social interactions between neighbours may affect, for example sense of community and social networks. Social sustainability has been part of UK government policy since the publication of 'Our Common Future' (WCED, 1987) and the United Nation's Agenda 21 (United Nations Conference on Environment and Development, 1993). The UK government has produced three White Papers proposing strategies for sustainable development (UK Government, 1994; DETR, 1999; DEFRA, 2005). There is no clear definition of social sustainability, however the government has focused on the concept of communities and how they can be sustainable (Nash and Christie, 2003; Bramley and Power, 2009). In the latest White Paper on sustainable development (DEFRA, 2005) the government calls for the creation of sustainable communities. According to the government sustainable communities should be:

- 'Active, inclusive and safe – fair, tolerant and cohesive with a strong local culture and other shared community activities
- Well run – with effective and inclusive participation, representation and leadership
- Environmentally sensitive – providing places for people to live that are considerate of the environment
- Well designed and built – featuring a quality built and natural environment
- Well connected – with good transport services and communication linking people to jobs, schools, health and other services
- Thriving– with a flourishing and diverse local economy
- Well served – with public, private, community and voluntary services that are appropriate to people's needs and accessible to all
- Fair for everyone– including those in other communities, now and in the future' (ibid., p.121).

The features of a sustainable community listed by the Government incorporate aspects of environmental and economic sustainability as well as social sustainability. However, the feature relevant to this research is the first item on the list. To be 'active, inclusive and safe' a sustainable community should encompass:

- 'a sense of community identity and belonging
- tolerance, respect and engagement with people from different cultures, background and beliefs
- friendly, co-operative and helpful behaviour in neighbourhoods
- opportunities for cultural, leisure, community, sport and other activities, including for children and young people
- low levels of crime, drugs and anti-social behaviour with visible, effective and community-friendly policing
- social inclusion and good life chances for all' (ibid., p.184)

In order to achieve success in terms of the features listed above positive social interactions between neighbours may be necessary. Positive social interactions may enhance residents' sense of community, deter crime and anti-social behaviour and promote social cohesion, as well as being necessary for the creation of social networks. What sense of community, social networks and social cohesion are, and how they can contribute to a sustainable community, and therefore social sustainability, is discussed in the following sections. The government's approach to social sustainability is reviewed because this research is primarily about the impact of policy relating to the sustainable design of housing developments on social interactions between neighbours and privacy.

In a review of the literature and policy regarding social sustainability Bramley and Power (2009) argue that social sustainability can be separated into two elements; social equity and sustainability of community. Social equity is about achieving fair access, for all members of a community, to facilities, services and opportunities (Burton, 2000a). The sustainability of community element is harder to pinpoint but Bramley and Power suggest that it encompasses 'interaction with other residents or social networks; participation in collective community activities; pride or sense of place; residential stability (versus turnover); [and] security (lack of crime and disorder).' (2009, p.33).

2.2.1 The contribution of social networks to sustainable communities

Social networks can contribute to some of the features of a sustainable community listed above. In particular they can contribute to a sense of community, friendly and helpful behaviour in neighbourhoods and crime prevention. Social interactions contribute to a person's existing social networks, for example family, and can also generate new networks, such as friendships with new neighbours. A person's informal social network can be described as 'the pattern of social relationships with and among friends, neighbours, and relatives.' (Bott, 1971, p.3). In situations where there is little social mobility there tends to be a large amount of overlap between different parts of a network - that is, neighbours are family, friends and work colleagues. Hence, people's lives are situated in a small geographical area and therefore their social network is based there. This results in the majority of the members of the network knowing each other and having close-knit relationships with one another (Granovetter, 1973). In contrast, those who have moved around tend to have social networks that are geographically dispersed and with little overlap between kin, neighbours and friends (Cubitt, 1973). These networks tend to be made of a combination of close-knit and loose-knit ties - that is, there are small clusters of people, such as family members, with a high-density of relationships between them but the majority of the members have a low-density of relationships between them (Cubitt, 1973; Granovetter, 1973).

A study has suggested that a person is only able to maintain a network of approximately 150 members (Hill and Dunbar, 2003) and therefore people prioritise certain individuals over others, for example family members over neighbours. The seeming demise of locally-based networks made of strong ties has caused much concern, first with the arrival of the industrial age and the resultant increase in urbanisation (Simmel, 1950; Tönnies, 1955; Wirth, 1964), and now with the advent of the information age (Nie, 2001). It has been suggested that the concern for the loss of locally based networks is a worry of the intellectual classes and that the everyday routine of life continues to take place amongst a locally based network for the majority of people (Forrest and Kearns, 2001). As has been shown by Young and Willmott's research in the East End of London locally-based networks can exist in urban areas amongst the working class (Young and Willmott, 1957). Research on the impact of the internet on the relationships between members of social networks has found that internet use tends to amplify existing behavioural tendencies; a person who already participates in community groups was found to increase their participation, whilst someone who rarely participates is unlikely to increase the amount (Kavanaugh *et al.*, 2005).

The importance of locally-based social networks has been emphasised in theory and research (Sherlock, 1991; Skjaeveland *et al.*, 1996; Forrest and Kearns, 2001). Neighbours can provide support in particular situations that far-flung members of a social network cannot (Litwak and Szelenyi, 1969; Unger and Wandersman, 1982). A network of neighbours can have an important role to play in forming sustainable communities because the neighbours are likely to be '... a group of individual agents who share *informal* norms or values ...' (Fukuyama, 1999, p.199). Having a similar moral code may enable residents to contain anti-social behaviour in their neighbourhood (Sampson and Groves, 1989; Cattell, 2001). Forrest and Kearns argue the importance of social networks: 'It is these residentially based networks which perform an important function in the routines of everyday life and these routines are arguably the basic building blocks of social cohesion - through them we learn tolerance, co-operation and acquire a sense of social order and belonging.' (Forrest and Kearns, 2001, p.2130). Social networks, like social interactions, are a vital component of society, and therefore socially sustainable development. Locally based social networks rely on a level of social interaction within a neighbourhood that contributes to a socially sustainable environment.

2.2.2 The contribution of 'sense of community' to sustainable communities

A sense of community can relate to a community of place, that is, a geographical area, or a community of interest which is aspatial and based on common interests or lifestyle choices (McMillan and Chavis, 1986; Lyon, 1987; Heller, 1989; in, Nasar and Julian, 1995). In the context of this research the focus is on a sense of community related to a geographical area, or 'a sense of community identity and belonging' as described by the government (see above list). Sense of community is perceived to be a psychological dimension and is '... an attachment or shared emotional connection that people may experience toward others ...' (Skjaeveland *et al.*, 1996, p.416). In their seminal work, McMillan and Chavis state that there are four dimensions of sense of community; membership, influence, integration and fulfilment of needs, and shared emotional connection (1986). Membership incorporates the feelings of belonging and connectedness with other members (Unger and Wandersman, 1985; McMillan and Chavis, 1986; Skjaeveland *et al.*, 1996). The dimension of influence is similar to social control; the member has the power to affect the group but the group also has the power to affect individual members (Unger and Wandersman, 1985). Integration and fulfilment of needs reflects an individual's need to be rewarded for their values and participation in a community (McMillan and Chavis, 1986). A shared emotional connection between the individual and the group relates to a shared history or participation in events, where sharing can be physical involvement or identifying with an event (Unger and Wandersman, 1985; McMillan and Chavis, 1986). Talen suggests that neighbourhood or place attachment (physical rootedness and attraction to a neighbourhood) and a sense of place (environmental cognition) should be included in a definition of a sense of community when based on a community of place (Talen, 1999). A second point Talen makes in her review of the literature on sense of community is that social interactions between neighbours may contribute in a small way to sense of community but that the relationship is complex and that there are other, potentially more influential, features such as the length of time of residency or homogeneity (ibid.). However, the very fact that two of the dimensions of sense of community are about membership of, and participation in, a group suggests social interactions between neighbours has an impact.

A resident's sense of community can increase the likelihood of their participation in a local organisation, and participation then reinforces the sense of community (Unger and Wandersman, 1985; Wilson and Baldassare, 1996). In a study of neighbouring behaviour Unger and Wandersman found that having a sense of community leads to high levels of neighbouring - that is, 'social contact and a willingness to exchange goods and services with neighbors ...' (Unger and Wandersman, 1982, p.497). A sense of community in relation to a neighbourhood encompasses a variety of dimensions relating to social interactions, participation and rootedness in a place and that without these a person is likely to suffer from loneliness and alienation (Glynn, 1981). Residents with a sense of community may therefore represent a neighbourhood that values the people who live there as a collective whole, rather than as a cluster of individuals with little common interest and this can be deemed as being socially sustainable.

2.2.3 The contribution of social cohesion to sustainable communities

Social cohesion is an umbrella term that encompasses a multitude of distinct but related concepts (Stafford *et al.*, 2003). Dempsey defines social cohesion as 'the ongoing integration of individual behaviours in a social setting ...' (Dempsey, 2008a, p.107), where the social setting is the neighbourhood. Social cohesion is achieved through: high levels of social interaction; social networks (including networks of mutual support); a sense of community; participation in neighbourhood organisations; trust and reciprocity; feelings of safety; and a sense of place attachment (Dempsey, 2006). There is an overlap between the features listed here as part of social cohesion and the features listed earlier as part of a sustainable community, suggesting that social cohesion is a requirement of a sustainable community.

Social networks, a sense of community and social cohesion can each contribute towards the creation of a sustainable community. Social interactions between neighbours can help to expand social networks to include neighbours, improve a resident's sense of community and create a more socially cohesive neighbourhood. The following sections discuss social interactions, social interactions between neighbours and the factors that can impact on them.

2.3 Social interactions

The term 'social interaction' encompasses any sort of communication between two or more people and does not have to involve physical co-presence, for example a letter can constitute a social interaction (Rummel, 1976; in, Raman, 2005). However, in this research the type of social interactions that are of particular interest are face-to-face encounters between individuals 'which occur[s] in a situation of immediate co-presence and reciprocal influence' (Jary and Jary, 2000, p.206). In other words, interactions that happen directly between people where all who are involved are aware they are participating in an interaction. Goffman refers to this as 'instances of two or more participants in a situation joining each other openly in maintaining a single focus of cognitive and visual attention – what is sensed as a single *mutual activity*' (Goffman, 1963, p.89). The participants use various methods to signal and aid their interaction such as eye contact and gestures (Argyle and Dean, 1965; Graham and Argyle, 1975). Eye contact in particular is a valuable part of face-to-face encounters and lack of it can lead to suspicion between the participants (Argyle and Dean, 1965). The distance between the participants is an important feature of social interaction and people from different cultures are comfortable with different distances (Hall, 1969). The location of a social interaction can impact on distance and eye contact between the participants (Mehrabia and Diamond, 1971). Gestures are used to aid the communication and the amount of gesturing tends to vary with the culture of the participants (Graham and Argyle, 1975). However, face-to-face encounters are a universal form of communication across all cultures.

Social interactions are fundamental to a life in society (Goldschmidt, 1972, p.59) and how people interact with one another can determine whether relationships are formed (Goffman, 1963, p.105). The relationships that develop as a consequence of social interactions vary enormously in terms of depth, that is, the level of intimacy between the participants. Granovetter described these as weak and strong ties (Granovetter, 1973). Strong ties tend to reflect a high level of intimacy between two people whereas weak ties do not. In an urban setting the relationships between family members and between friends are likely to be strong ties and those between work colleagues or neighbours are more likely to be weak ties (ibid.). Granovetter argues that information does not flow through a neighbourhood that is made of separate groups of people with strong ties between them and with little or no ties beyond their group. He suggests that neighbourhoods are more likely to come together as a community if there are people with weak ties to many people, as well as strong ties to some people (ibid.). However, the argument has been made that less intimate relationships with neighbours leads to a reduction in social capital and social cohesion in neighbourhoods (Putnam, 2000). In order to redress the balance calls have been made to encourage social interactions between neighbours to help foster a sense of community in neighbourhoods (Sherlock, 1991; Stafford *et al.*, 2003).

2.4 Social interactions between neighbours

A definition of the term 'social interaction between neighbours' is important for understanding the context of the research. A neighbour is someone who lives in an adjacent dwelling, or on the same street, that is they are defined by proximity (Unger and Wandersman, 1985). The discussion of social interactions in the previous section related to face-to-face meetings and this also applies to social interactions between neighbours in this research. Thus the definition of a social interaction between neighbours is: **an encounter between two or more people, who reside in proximity to one another, occurring in a situation of immediate co-presence and reciprocal influence**. An encounter can incorporate many activities ranging from a nod of mutual acquaintance to chatting, or borrowing and lending items. The important point is that it leads to a relationship of some type between neighbours. In some situations the relationship may be positive whilst in others it may be negative.

Empirical research has been carried out that suggests there is a positive correlation between social interaction between neighbours and a sense of community (for example, Hunter, 1975; Forrest and Kearns, 2001; Farrell *et al.*, 2004). Farrell found that 'the frequency of neighboring behavior was predictive of increased sense of community, consistent with previous findings that neighborhood relations predicted individuals' sense of community' (Farrell *et al.*, 2004, p.20). As well as contributing to residents' sense of community, positive social interactions between neighbours can lead to the development of social cohesion in a neighbourhood and deter crime (McGahan, 1972; Hunter, 1975; Riger and Lavrakas, 1981; Foster, 1995; Bellair, 1997; Forrest and Kearns, 2001; Farrell *et al.*, 2004). Riger and Lavrakas (1981) investigated levels of community attachment which may result in a sense of community. They distinguished between social bonding and physical rootedness; the implication being that residents can feel attached to an area without having any local social interactions, or they can be involved in the local community without feeling attached to the physical area.

Community attachment tends to be higher in neighbourhoods where people are not highly mobile. The result is a sense of community amongst residents and a high degree of social control, that is 'practices developed by social groups of all kinds which enforce or encourage conformity and deal with behaviour which violates accepted norms' (Jary and Jary, 2000, p.566). The relationships between neighbours are likely to be made of strong ties because there is a high chance that neighbours are friends, family members, or work colleagues (Young and Willmott, 1957; Bott, 1971). However, it is more common in today's society for people to have moved away from their parental home and to be living in a neighbourhood that may be close by but where neighbours are less likely to be friends or family members (DCLG, 2010). People moving into established housing areas may find that amongst long-term residents there is a sense of community that can be tapped into (Hunter, 1975). In contrast, those who move into new housing developments must create a sense of community (if they want to) from scratch (CABE, 2007). To do this they need to make contact with other people in the locale, that is their neighbours. Moving into a new development simultaneously may be a sufficient common experience for neighbours to build up relationships with one another.

The relationships that residents develop with one another can influence other aspects of their lives. In a review of the benefits of social interaction in terms of social support Shinn *et al.* (1984) concluded that negative social interactions are more likely to have an influence on health and well-being than positive social interactions and that it cannot be assumed that all social interactions are positive. Studies have shown that dealing with daily stresses, such as negative social interactions with neighbours, can have a deleterious effect on mental health (Kanner *et al.*, 1981; Paquin and Gambrill, 1994). In one investigation Paquin and Gambrill found that 'Neighbor annoyances can destroy the sanctity of home for those who feel helpless, afraid, or enraged.' (1994, p.30). Reactions to neighbour annoyances such as noise vary; the majority of people do nothing in order to avoid conflict but in other situations the problem is only resolved through the involvement of a neutral third party (Merry, 1979; Levy-Leboyer and Naturel, 1991; Paquin and Gambrill, 1994).

Often people are unaware that a neighbour annoyance is causing them stress and as a result blame other factors. Consequently they are less able to cope with major life events, such as divorce or death (Kanner *et al.*, 1981). Whilst social interactions and relationships with neighbours impact on other aspects of a resident's life there are factors that may facilitate social interactions between neighbours. The factors pertinent to this research are discussed in the following section.

2.5 Influences on social interactions between neighbours

The level of social interaction between neighbours, and whether they are positive or negative, may be affected by a range of influences. Of particular interest in this research is the impact of the design of sustainable housing developments. Previous research has shown that social interactions can be affected by the design of the built environment (Festinger *et al.*, 1950; Raman, 2005; Dempsey, 2009) and these are discussed below. It is also worth considering the personal characteristics of individual residents. The characteristics that could be influential include their housing tenure, whether or not children live in the dwelling, their age and their interest in participating in the wider community.

2.5.1 Personal characteristics and social interactions between neighbours

The personal characteristics of neighbours may have a bearing on the level of interaction between neighbours, for example, a person's personality affects their disposition towards social interaction (Berry and Hansen, 1996). Those with a positive outlook tend to have high quality social interactions, and more of them, than those with a more negative outlook (ibid.). If neighbours are different from one another they may have little interaction whereas those who are similar may interact more. Homogeneity is very influential in determining the level of social interaction between neighbours (Gans, 1968; Insko and Wilson, 1977; Merry, 1987). Ethnicity, especially in the USA, has been found to have a high impact (Merry, 1979; Sigelman *et al.*, 1996). In some situations neighbours from different ethnic groups tend not to interact with one another in housing developments. Instead, they prefer to interact with the people from the same ethnic group, regardless of where they live in the housing development (Merry, 1979; Foster, 1995). In other situations propinquity aids the quantity and quality of interactions white Americans have with African Americans, whereas it makes no difference to the number of social interactions African Americans have with white Americans (Sigelman *et al.*, 1996). Gans found that even though people lived next door to one another if they were demographically different deep relationships were unlikely to develop (Gans, 1968). However, at the other end of the spectrum, in for example sheltered housing for elderly people, some residents were found to be unhappy to be neighbouring people identical to themselves (Percival, 2001).

Social interactions between neighbours seem to be more prevalent amongst homeowners than tenants (Fischer, 1982; Blum and Kingston, 1984; Rohe and Basolo, 1997). Blum and Kingston (1984) suggest this is due to the type of person who is drawn to homeownership and also the substantial economic investment owning a house represents. As investors, homeowners wish to maintain the worth of their property and therefore feel it is necessary to invest time in creating a sense of community through interacting with neighbours (ibid.). Homeowners are likely to stay in the same place for a number of years and become enmeshed in the local community, particularly if they have a young family. Young children can be an impetus for interacting with neighbours (Unger and Wandersman, 1982), particularly for stay-at-home mothers who build up networks of friends in similar situations (Bould, 2003). People who have raised their children in a neighbourhood tend to have high feelings of attachment and high levels of social interaction whereas those who have no children, in the same neighbourhood, are less likely to participate in social interactions with their neighbours (Riger and Lavrakas, 1981). Some people actively seek out areas perceived as having a sense of community as suitable locations for raising children. They then contribute to, and perpetuate, the sense of community by participating in social interactions with their neighbours and other residents (Hunter, 1975).

In the context of sustainable housing developments participation in a local neighbourhood or community organisation can result in formal social interactions between the residents (Rohe and Basolo, 1997). The type of organisations that are run at the local level vary enormously in their focus; some common ones are neighbourhood watch programmes, children's groups (for example Brownies) or political action groups (such as organisations to provide a better bus service or traffic calming) (Blum and Kingston, 1984; Putnam, 2000; Clayden *et al.*, 2006). Involvement in a local organisation can be sporadic or regular, however involvement provides residents with the opportunity to interact with one another (Clayden *et al.*, 2006). The creation of, and participation in, a community organisation is largely a societal event, involving residents from across a neighbourhood or housing development. Residents may come to know their neighbours as a result of involvement in a local group rather than as a result of propinquity.

2.5.2 The built environment and social interactions between neighbours

The design of the built environment may facilitate the occurrence of informal social interactions. These tend to be unplanned and sporadic interactions as a consequence of two or more people being in the same place at the same time. Frequent meetings between people create familiarity and with time this may develop into deeper social interactions. One of the premises of Jane Jacob's theory on creating vibrant neighbourhoods is the development of relationships as a result of informal social interactions occurring on streets and in shops regularly used by local residents (Jacobs, 1961). The loose connections residents have with one another ensure that social order is maintained and a sense of community is fostered.

Shared spaces such as small semi-private access courtyards can lead to informal social interactions between neighbours. The spaces are small enough for residents to feel proprietorially about them resulting in them personalising, and using, them regularly (Abu-Ghazzeh, 1999; Schaefer *et al.*, 1999). Other communal spaces that are accessible from the street have also been found to facilitate social interactions between neighbours, particularly those residents who live close to the spaces (Raman, 2005).

McGahan's study of apartment-dwellers in central New York discovered that residents had a desire to be on friendly terms with their neighbours but that they were happy not to have overly intimate relationships with them (1972). However, living in a flat can result in higher levels of stress due to neighbour annoyances (Paquin and Gambrill, 1994). Festinger *et al.* (1950) found that people living in a block of flats who used the same routes as their neighbours developed relationships with them as a result of informal social interactions occurring on those routes. Festinger *et al.* also found that those who did not use the same routes as others were friendly with fewer people (ibid.). Other research has shown that in blocks of flats residents interact with the people on their own floor more frequently than with people on other floors, or in other buildings, suggesting that proximity and layout are important factors in creating potential for informal social interactions (Foster, 1995). The residents living on the same floors developed small social networks and looked out for one another, resulting in a reduction in the fear of crime and the perceived crime rate (ibid.). The social interaction between neighbours does not necessarily have to be often to be effective. Rather, if the social interaction between neighbours is regular residents are able to impose social control over their neighbourhood and this reduces the level of crime (Bellair, 1997). Residents' fear and mistrust in neighbourhoods blighted by disorder (for example graffiti and vandalism) is lessened by social interactions between neighbours. However, fear of crime can be increased as a result of social interactions with neighbours because residents hear about more incidents than they would have if they had not interacted (Unger and Wandersman, 1985). There does seem to be a circular relationship in that low levels of social interactions between neighbours leads to higher levels of mistrust, and as mistrust increases social interactions become less likely (Ross and Jang, 2000). However in situations where mistrust is overcome and social interactions between neighbours increase there are opportunities for residents to increase the number of people they know and regain social control of their neighbourhood (ibid.).

2.6 Conclusion

The review of literature in this chapter has established that positive social interactions between neighbours are, arguably, elemental to the formation of localised social networks, but that negative social interactions between neighbours can lead to increased levels of stress that reduce a person's ability to cope with major life events. Studies have shown that participation in formal social interactions in local organisations and informal social interactions in the neighbourhood can lead to a sense of community, and aid social cohesion within a neighbourhood. In order to measure levels of social interaction between neighbours and to what extent they are positive or negative, formal or informal it is necessary to develop indicators based on the definition of social interactions between neighbours: an encounter between two or more people who reside in proximity to one another occurring in a situation of immediate co-presence and reciprocal influence. The literature revealed that other factors can have an impact on levels of social interaction between neighbours and it will be necessary to develop indicators to measure age, tenure, family make-up and length of residency. Indicators are operationalised in a later chapter relating to methodology.

A brief review revealed that the occurrence of informal social interactions between neighbours may be influenced by the design of the built environment (this is discussed extensively in Chapter Four). Advocates of the sustainable design of housing developments propose that particular design features should be used to encourage the development of relationships through informal social interactions between neighbours and residents (Urban Task Force, 1999). However, designing sustainable housing developments to encourage social interactions may have a detrimental effect on levels of privacy in the home. In theoretical discussions privacy and social interactions are often seen as inter-related concepts but this is not alluded to in policy and infrequently in empirical research. The concept of privacy, and its relationship with social interactions, is discussed in the following chapter.

chapter THREE

A definition of privacy in the home, and its relationship with social interactions between neighbours

Chapter Three: A definition of privacy in the home, and its relationship with social interactions between neighbours

3.1 Introduction

The previous chapter reviewed the concept of social interactions between neighbours. In this chapter the second concept of the relationship under scrutiny, privacy in the home, is considered (Figure 3.1). The review begins with individual privacy; in particular, two theories about the control of access to the self and information about the self are discussed in detail. The context of the home is discussed in relation to privacy and how the design of the home may affect the privacy of the household. Finally, the relationship between privacy in the home and social interactions between neighbours is examined.

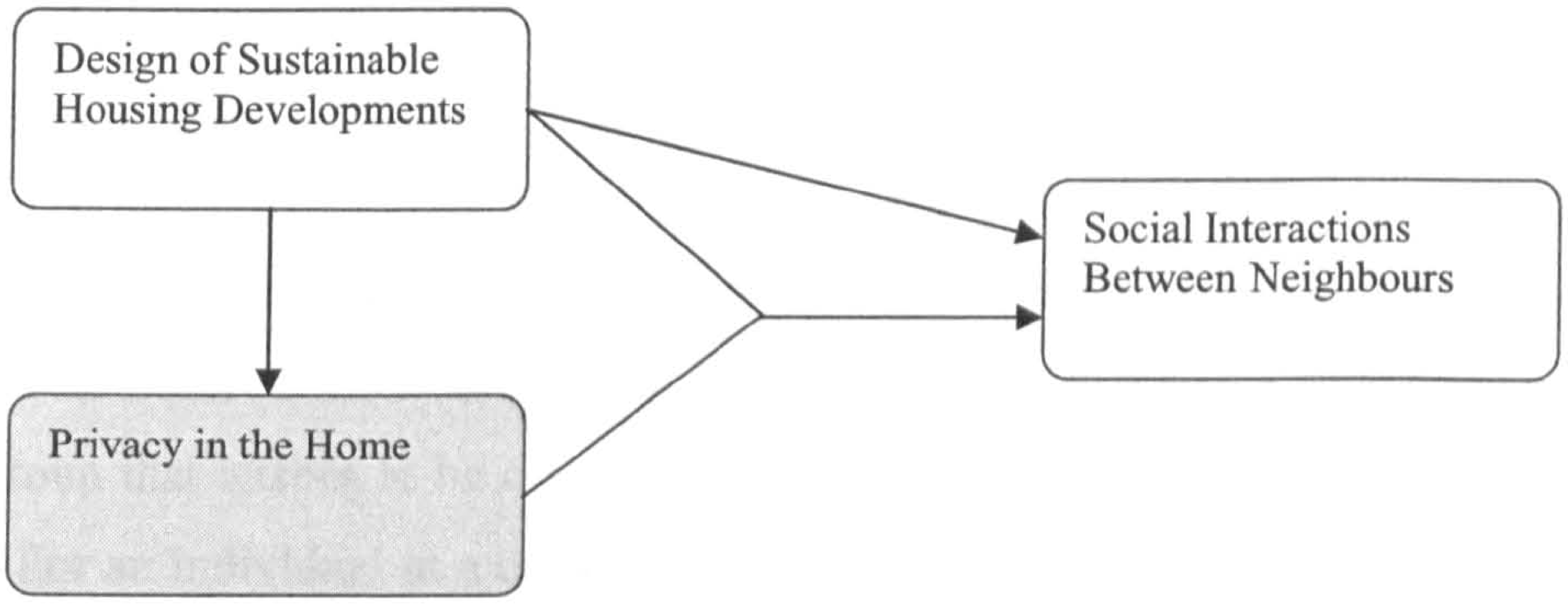


Figure 3.1: Diagram representing the relationships under scrutiny in the research. The focus of Chapter Three is highlighted

3.2 Privacy of the individual

The aim of this section is to derive a definition of privacy of the individual pertinent to this research. The discussion revolves around two highly influential theories of privacy that have developed within the fields of psychology (Altman, 1975) and political science (Westin, 1967). Both theories reflect a Western philosophical approach to privacy which can be different from the perception of privacy in other cultures (Altman, 1977). Privacy is an important concept in Western countries (especially England) and it is within this context that privacy will be discussed and defined. Even within a society there are alternatives to the norms, particularly amongst those who have been institutionalised or are mentally ill (Goffman, 1961; Ittelson *et al.*, 1970; Chapman and Carder, 2003). It is important to recognise these differences at the start of the discussion in order to emphasise that the definition of privacy will be culturally specific and based on societal norms.

In Western thought it has been argued that the most private aspect of an individual is the mind, an inner sanctum to which only the individual has access: 'The human subject has privileged and exclusive access to a realm of consciousness, which is the ultimate private realm of an individual.' (Madanipour, 2003, p.37). The body acts as a conduit, and a boundary, between the mind and the world beyond. Control of access to the self (that is, the body and the mind) is a key theme that runs through both Westin and Altman's work.

3.2.1 Westin's theory of privacy and its development

Westin's theory is based on the control of information about the self: 'Privacy is the claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others' (1967, p.7). Westin suggests that the desire for privacy is a continually changing goal, balanced with a desire to participate in society and reveal information about the self. He theorises that there are four types of privacy depending on the situation the individual is in: solitude, intimacy, anonymity and reserve. Solitude is selected by individuals in situations where they wish to be free from observation by others. An individual chooses intimacy when they are part of a small group that wishes to be close with one another to the exclusion of others not in the group. For an individual in a crowd anonymity allows them to express themselves freely, safe in the knowledge that they are unimpeded by identification. Reserve can be described as a psychological barrier used to prevent unwanted intrusion (ibid., p.31). Through the use of these four types of privacy an individual is able to develop and maintain a sense of autonomy. The process involves emotional release (when a person can shed their mask and be themselves) and self-evaluation (the absorption and integration into the self of information which an individual has received).

Westin's four types of privacy have been corroborated and added to through empirical research (Marshall, 1974; Pedersen, 1979). Marshall and Pedersen independently identified six types of privacy, bringing more depth to Westin's original four. Marshall identified intimacy, not neighbouring, seclusion, solitude, anonymity and reserve as types of privacy in her research on suburban households. In Pedersen's locationally non-specific research he identified solitude, anonymity, reserve, isolation, intimacy with friends and intimacy with family. Both studies, as well as Westin's work, suggest that the location where a person seeks privacy can have ramifications for achieving particular types of privacy. For example, Marshall's study highlighted that five of her six privacy types were achievable in the suburban home (anonymity in an urban crowd being the exception). Solitude can be achieved in locations other than the home; for example, national parks and urban forests are specifically used by people seeking solitude (Hammitt, 2000). However, Pedersen (1979) suggests that solitude does not require the individual to be in a remote location. He claims that being alone and away from people is isolation and that for some individuals this would be an unpleasant experience rather than a desired goal.

3.2.2 Altman's theory of privacy and its development

As with Westin's theory, Altman's theory is based on control. Altman's theory and definition of privacy revolve around the premise that privacy is used to control access by others to the self, or one's group. Privacy is controlled through the use of one, or a combination of, behavioural mechanisms: verbal, nonverbal, environmental and culturally based (Altman, 1975). Verbal mechanisms are how and what people say to one another to obtain their preferred level of privacy. Nonverbal mechanisms are body language and facial expressions used to regulate privacy. They are frequently used when a person is standing or sitting too close to someone; for example, arms and legs are used as barriers and eye contact is commonly avoided (ibid.). Altman identifies two types of environmental mechanisms: clothing and personal space. Wearing the clothing you wish to wear can be interpreted as a sign that an individual is in control of themselves and their privacy (ibid.). Personal space is used to regulate privacy by controlling the distance between the self and other people. The amount of space between people can indicate the degree of intimacy between them (Hall, 1969), although this varies widely between cultures. The fourth behavioural mechanism is culture; the norms and customs for regulating privacy vary widely. Physical barriers, such as closed doors, are an important feature of privacy regulation in Western culture, whereas in other cultures (e.g. Javanese culture) physical barriers are not used at all (Altman, 1975).

As a result of the constant use of behavioural mechanisms, privacy regulation is an active and dynamic process that continually adapts as the situation changes. The process of control is viewed as a balancing act between an individual's desired level of privacy and their actual level of privacy. Altman understands this as an 'interpersonal boundary-control process' (ibid., p.29). The ideal level of privacy is achieved when the desired level and the actual level are equal. When this does not happen a person can be left feeling crowded (actual privacy is lower than desired privacy) or isolated (actual privacy is higher than desired privacy). Regulating privacy is important for individuals for three reasons. The first reason is that it can help in the management of interactions between the self and others, thereby contributing to self-definition. The second reason is that 'privacy ... provides the opportunity for a person to assimilate experiences and information, and to examine possible future relationships with others' (Altman, 1976, p.25). The third reason is that sufficient privacy allows a person self-knowledge, defining them as an autonomous individual. As a result of good privacy regulation a person is more able to interact with others because they are aware of their own personality and limitations (ibid.).

Altman's conceptualisation of privacy has been explored across many different subject areas (Margulis, 2003a). The effect of the environment on individual privacy is an important aspect of Altman's theory (1975). Although there are multiple definitions of environment in use across different studies, the definition relevant to this research is the 'objective, physical environment,' that is, the environment we are in and which we move through (Margulis, 2003a, p.420). The relationship between the objective, physical environment and privacy has been explored in a variety of settings such as the home, mental institutes, schools and workplaces (for example, Archea, 1977; Kupritz, 1998). Consistent across the various studies is an understanding that the objective, physical environment has the potential to impact on the behaviour of occupants (Margulis, 2003a). Inconsistencies tend to relate to the measurement of the objective physical environment, which will likely take time to resolve. It has been argued that the objective measurement of the built environment, in particular, is a new and expanding science (Burton *et al.*, 2005). The research presented in this thesis will add to the body of knowledge on the relationship between the objective, physical environment and privacy.

3.2.3 A definition of privacy of the individual for this research

A comparison of Westin's and Altman's theories of privacy is helpful for deriving a definition of privacy of the individual appropriate for use in this thesis. Margulis (2003a) has written a useful critique of the two theories, highlighting the similarities and differences between the two (Table 3.1). Evidently, there are many more similarities than differences between the theories. Both authors view privacy as a means of controlling access to the self, as well as a means of developing self-identity and evaluating the self. They also classify privacy: Altman names his classifications as types of privacy situations (1975; 1976), and Westin calls them states and functions (1967). Pedersen suggests that

Westin's states were developed in an ad hoc manner, although Pedersen's empirically tested states are remarkably similar to those devised by Westin (Pedersen, 1979). There are two major differences between the theories. First, Altman's theory is more comprehensive and encompasses all aspects of privacy phenomena, whereas Westin's theory concentrates on information privacy. It has been suggested that Altman's comprehensive approach lacks adequate definitions and that the relationships between concepts are vague (Foddy, 1984); however, this does enable other researchers to expand and delineate concepts and definitions. The second difference is that, although Westin does not present a clear definition of secrecy, he focuses on the similarities between privacy and secrecy (Westin, 1967; Margulis, 2003a). Conversely, Altman focuses on the relationship between privacy and the environment and how the environment can affect privacy. Also, Altman is explicit that his theory is about the relationship between controlling privacy and controlling social interactions with others, which is particularly relevant to this research. The relationship between privacy and social interaction is discussed in Section 3.5. Owing to the importance of these two factors (the environment and social interactions) to Altman's theory, and their relevance to this research, the definition of privacy of the individual that will be used is Altman's: **'selective control of access to the self or to one's group,'** (1975, p.18).

3.3 Privacy in the home

Having assessed the privacy of the individual, this section will consider the concept of privacy in the context of the home. Again, the concept will be looked at primarily from Altman and Westin's perspectives. The uses of the home to aid the privacy of the individual or a group, and as a physical representation of the group, are discussed in the following section. A definition of privacy in the home is then developed for use in this thesis.

		Aspects of privacy
Similarities	1	Limited-access approach, i.e. emphasising the control of access to the self
	2	Address privacy processes (e.g. temporal/dynamic aspect of privacy)[1]
	3	Classifications of privacy (state and functions for Westin; types of privacy situations for Altman)[2]
	4	Privacy is dynamic and changes with the situation
	5	Applied to individuals and groups
	6	A cultural universal – wherever you are you will find some behaviour relating to privacy, regardless of the culture you are surrounded by (for Altman this means psychological expressions of privacy are culturally specific; for Westin it means states and functions of privacy are specific to the political system and the underlying socio-political values of a culture)
	7	Functions of privacy – Altman's notion of interpreting the self in relation to others closely resembles Westin's self-evaluation function. Altman's development of self-identity and Westin's personal autonomy function are similar
	8	No emphasis on violations of privacy
Differences	1	Altman's theory is comprehensive and encompasses all privacy phenomena whereas Westin focuses on information privacy
	2	Westin is interested in the similarities between privacy and secrecy. Altman is interested in the potential impact of the environment on privacy

[1]This is primary to Altman's theory [2]This is primary to Westin's theory

Table 3.1: An overview of the similarities and differences between Westin and Altman's theories of privacy (taken from Margulis, 2003a)

3.3.1 The home as a setting for privacy

Altman and Westin approach the home from different perspectives: Altman looks upon it as an extension of personal space and a territory belonging to particular people; Westin views the home in light of his four types of privacy and whether or not the privacy types can be attained there. Altman recognises homes as territories associated with specific groups: 'primary territories are owned and used exclusively by individuals or groups, are clearly identified as theirs by others, are controlled on a relatively permanent basis, and are central to the day-to-day lives of the occupants' (1975, p.112). He suggests that the home is a territorial mechanism similar to that of personal space but at a relatively remote distance from the self. Controlling the space involves the use of boundary markers and the personalisation of the space to ensure that ownership is clearly identifiable. Within the territory of the home it may then be possible to achieve privacy from the outside world.

As mentioned in Section 3.2.1, Westin defined four states of privacy which were further developed independently by Marshall (1972; 1974) and Pedersen (1979). Table 3.2 is an overview of the definitions of the types of privacy and whether they are achievable in the setting of the home. Marshall's research is of particular relevance to this investigation because she studied privacy in the context of American suburban homes, whereas Pedersen's research is not location-specific. In addition to those defined by Westin, Marshall defined a further two privacy types; seclusion and not-neighbouring (Marshall, 1974). Seclusion is about wanting to have a home isolated from neighbours and traffic, in terms of sight and noise, as well as being alone (Marshall, 1972). Not-neighbouring is defined as 'disliking the tendency of friends or neighbors to drop in without warning and a preference for non-involvement with neighbors' (ibid., p.97). Marshall and Pedersen both found that the home is a place where the individual can achieve solitude. Separation from other household members is important for achieving solitude, either physically through the use of separate rooms (Pedersen, 1979), or psychologically within the same room (Marshall, 1974). The home is an important setting for an individual to achieve solitude and the design of the home may impact on that.

Intimacy is a privacy type for groups, such as a husband and wife, the family or a work group (Westin, 1967). It allows the group to develop 'a close, relaxed and frank relationship' (ibid., p.31). For Marshall's respondents the level of intimacy was more important; adults maintained more distance in their relationships than their teenage offspring, reflecting the premise that life-cycle stages affect an individual's desire for privacy (Marshall, 1972). The home as a setting for intimacy was featured in the lists of factors in Pedersen's and Marshall's work, particularly for family groups. This relates closely to Altman's theory of the home as a territory belonging to a particular group; the group has control over both the boundaries of the territory, and who enters the space.

By its definition, anonymity, where an individual is in public but is free from identification or surveillance (Westin, 1967, p.31), requires a person to be in a public space with other people. Pedersen was not explicit with a setting for anonymity, whereas Westin and Marshall both relate anonymity to city living. The urban setting is at the forefront of Marshall's definition: 'The central theme of the Anonymity factor was the anonymity of urban living. Items dealt with being able to attain privacy in a large city because "everyone wouldn't know everything about you" as opposed to the interest in and involvement with others in a small town' (Marshall, 1972, p.99). From Marshall's perspective anonymity is achievable in the home when the home is in an urban setting; the dwelling does not provide the feeling of anonymity but its location does.

Westin (Westin, 1967) argued that reserve is the most subtle of the privacy types. The individual develops a psychological barrier between them and others in order that they can withhold information about themselves. This relates directly to the philosophical idea that the mind is the most private aspect of an individual. Marshall's definition of reserve is also about guarding the mind from others. Reserve is about limiting self-disclosure, particularly to people who are not known well (Marshall, 1972). As with intimacy, Marshall found that life-cycle played an important role in the amount of reserve people desired. Pedersen suggests that reserve is an 'unwillingness to be with and talk with others, especially strangers' (Pedersen, 1979, p.1293). People might show less reserve when they are in the familiar surroundings of their home with their family. However, as Marshall found, the life-cycle can influence a person's reserve and this may be reflected by a reluctance by teenagers to reveal everything about themselves to their parents.

3.3.2 A definition of privacy in the home

For some types of privacy, the home plays an important role in providing the appropriate environment; this is less pronounced for others. Most individuals would hope to be able to find solitude within their own home, and possibly seclusion (or isolation) as well. The home environment is unlikely to contribute towards a person's feeling of anonymity or reserve but may contribute to a person's ability to not neighbour and provide a suitable environment for intimacy with a group, especially the family group. This requires that the family group has control over the home as an extension of their personal space (or territory). Privacy of the home is about a territory that is controlled by a specific group. The definition of privacy of the home to be used in this research is: **the ability to realise the selective control of access to the self or to one's group in the setting of the home.** Being in control of access to the home means being in control of physical access, visual access and noise intrusion by others, where possible, so that any particular privacy type can be achieved in the home. Therefore, the design of the home may have an important role to play in an individual's ability to achieve desired levels of privacy. A discussion of the importance of the home, and its design, in terms of privacy follows this section.

Type of privacy	Definition of privacy type according to: Westin (Westin, 1967)	Marshall (Marshall, 1974)	Pedersen (Pedersen, 1979)	Achievable in the home setting
Solitude	Freedom from observation by others	Being alone with others nearby or being far away from others	Preference for being alone and free from observation	Yes
Intimacy	Being alone with others, e.g. friends, family	Being able to get away from others with friends or family	-	Yes
Intimacy with family	-	-	Preference for being alone with one's family	Yes
Intimacy with friends	-	-	Preference for being alone with one's friends	Yes
Anonymity	Being amongst others but unidentified	Anonymity of urban living	To go unnoticed in a crowd and to not be the centre of attention	Yes
Reserve	Psychological barrier to prevent unwanted intrusion	Preference not to disclose much information about oneself	Unwillingness to be with or talk to others, particularly strangers	Yes
Seclusion	-	Tolerance for being alone, unseen & unheard	A desire to be alone and away from others	Yes/no[1]
Not neighbouring	-	Dislike of friends or neighbours dropping in, preference for non-involvement with neighbours	-	Yes

[1] Marshall argues this can be achieved in the home whereas Pedersen argues it cannot

Table 3.2: Types of privacy identified in the literature and relevance to the home

3.4 The design of homes and privacy in the home

The design of British homes today reflects historical changes in the concept of the home and standards of living (Burnett, 1978). The home as a centre for the nuclear family became the norm in Victorian times (Hepworth, 1999). The nuclear family became the focus of the home and parents centred their attention on the upbringing of their children (Ariès, 1962). The change happened in the homes of the bourgeoisie first and spread to the working classes (Madanipour, 2003). In many situations in the Victorian era, the change was forced on the working classes through slum clearances. New, three bedroom homes were built as replacements in an attempt to improve the morality of the working classes; for example, adults and children would no longer have to share bedrooms (Evans, 1997). Within the house, further segregation took place with the division of spaces reflecting the social hierarchy of male-dominated households; rooms were divided between male and female spaces, there were rooms for the servants and rooms for being served, and spaces were separated between adults and children(Hanson, 1998; Hepworth, 1999; Madanipour, 2003).

This was particularly evident in the homes of the upper classes. In her analysis of the house plans of four aristocratic country homes, Hanson (1998) showed that designs changed to reflect the move from communal households to households segregated between the served and the servants. Rooms are served by spaces used purely for circulation, rather than connecting directly to one another to maximise the privacy of the owners of the house (ibid.). This type of segregation has been copied in the smaller houses of the middle and working classes over the last one hundred years. In recent times, the owners of such homes have frequently sought to minimise the segregation of spaces; the fashion of knocking-through between rooms to create open-plan living areas is especially common in areas that have been gentrified (ibid.). However, new houses built by volume housebuilders (for example, Countryside Properties, 2009; Crest Nicholson, 2009) tend to be designed in the traditional, segregated, fashion; there are many separate rooms around a circulation space which can provide members of the household with individual privacy, if not enough space (Oseland and Donald, 1993; Oseland and Raw, 1996). In contrast one and two bedroom flats are frequently designed to be open-plan to reflect an idea of modern city-centre living for young professionals. Either design has implications for levels of privacy between household members as examined in the next section.

3.4.1 The impact of the design of homes on the individual privacy of household members

The discussion in Section 3.2 highlighted the importance of privacy as a psychological requirement for the individual. There are many places where people can seek out privacy and one of those is the home. Ideally the design of a home should enable individual members of the household some form of privacy. However, research has shown that some housing design is not providing the spaces people need for privacy (Madigan and Munro, 1999). Madigan and Munro's (1993) work in lower-middle class areas of Glasgow showed that post-1950s housing does not provide adequate space for families. Women, in particular, found that they had no private space and that they compensated for this by having temporal privacy instead. A particular issue was small kitchens and large living/dining rooms; residents would prefer separate living rooms and bigger kitchens with room to dine in. This would provide more flexible space, thus providing residents with more opportunities for privacy (ibid.).

Chermayeff and Alexander (1963) suggest that modernist, open-plan style housing is inappropriate for family living and that a family home should consist of rooms ranging in character from communal to private. Empirical research confirms that having a high number of rooms in a house ensures sufficient privacy for all members of a family household (Oseland and Raw, 1996). A range of spaces that are flexible are important because the different members of a household are at different stages in their life-cycle and, thus, have different privacy requirements. Access to privacy is important for the process of child development (Cooper Marcus, 1992; in Newell, 1995) and the family home has a role to play in providing appropriate spaces (Chermayeff and Alexander, 1963). Teenagers often use their bedrooms as a private place of retreat (Csikszentmihalyi and Rochberg-Halton, 1981) and may look on them as an extension of their personal space (Hall, 1969). Sufficient space is important to ensure minimal conflict between household members, particularly when the person who ultimately controls the space (for example a parent) disagrees with how another member is using it (Allan, 1989). Although there may be conflict between members of the household, the home is a private space associated with a particular group of people who control overall access to the space (ibid.).

3.4.2 The impact of the design of homes on privacy in the home

The home can be viewed as a private space for all the household and, therefore, the relationships between the dwelling and the spaces around it are important for levels of privacy in the home. Central to the concept of privacy of the home are notions of territoriality, boundary control and buffer zones in the form of private outdoor space. The study of territoriality began with animals before extending to research into human behaviour (Newell, 1995). It has been suggested that territoriality is purely a biological behaviour (Bell *et al.*, 1996; in Madanipour, 2003) but others posit that it is a more complex behaviour combining biological behaviour with culturally specific social signals (Madanipour, 2003). Working in laboratory conditions, Edney and Buda (1976) found territoriality to be separate from, but closely related to, privacy. Privacy provided participants with individual freedom and autonomy whilst territoriality provided a sense of self. When combined, participants also had a sense of security. Edney and Buda suggest that the home provides both privacy and territory, therefore providing security, autonomy and a sense of individuality to the individual (ibid.). Others propose that territoriality is a defence mechanism used to keep outsiders out of the home (Newman, 1972; Ashcraft and Scheflen, 1976). Newman expanded this idea to produce his theory of defensible space where the design of housing would encourage feelings of territoriality in residents. Historically, having protected territory was an indication of an individual's high social status and was coveted by the middle and working classes (Schwartz, 1968; Kellett, 1982). Empirical work suggests that there is still an important link between social hierarchy and territoriality (de Long, 1973; Sundstrom and Altman, 1976) and, in the UK, this may be reflected in the kudos associated with owning a home, particularly one with outdoor space.

The outdoor spaces attached to homes, particularly houses, are an important feature of the private space of the home. Gardens can enhance feelings of privacy felt in the home because they provide a view of nature rather than a view of other homes (Day, 2000). Gardens that are protected from overlooking are seen as places of retreat that provide residents with a sense of privacy (Bhatti and Church, 2004). Being in control of a garden can contribute to a person's sense of self and their feelings of privacy, which are not experienced in public green spaces (Day, 2000; Bernardini and Irvine, 2007). Gardens can act as buffer zones, particularly to the front of homes where they provide space between the street and the dwelling (Hall, 2006). A front garden can reduce opportunities for people on the street to look into homes (ibid.). Demarcating or enclosing the space to the front of homes gives people a sense of control over the space, resulting in more frequent use than if it was completely open to the street (Al-Homoud and Tassinary, 2004). The personalisation of the front areas of homes indicates a sense of control and may reflect a feeling of group membership or attachment to a neighbourhood (Greenbaum and Greenbaum, 1981; Harris and Brown, 1996).

Being able to control the outdoor space adjacent, or near, to the home has consequences for levels of crime and feelings of safety (Newman, 1972; Coleman, 1985). Both Newman (1972) and Coleman (1985) have analysed the relationship between crime and building design, specifically of high-rise flats, in the USA and the UK, respectively. Enabling residents to control outdoor space adjacent to flats can significantly reduce littering and vandalism. A lack of ownership and control where many households share internal access corridors can increase crime levels. However, if access is limited to a few households, they can take control of the space, demarcating it and making it semi-private; this results in little or no vandalism and litter (Newman, 1972). Coleman (1985) argues that houses rather than blocks of flats are generally more conducive to lower levels of littering and vandalism. In particular, houses that face the street, with front gardens, and clearly marked boundaries with a gate, ensure there is surveillance of the street and control of private, semi-private and public space.

Boundaries are an essential part of territories and of homes; they are a way of controlling access to the private space of the home (including outdoor space). Boundaries of the home need to be flexible and permeable in order that outsiders can come and go at the discretion of insiders (Allan, 1989; Madanipour, 2003). The physical realisation of flexible and permeable boundaries tend to be fences, hedges and walls with openings. The boundary between properties can have negative or positive impacts on relationships with neighbours (Stokoe and Wallwork, 2003). Stokoe and Wallwork discovered that the boundary is a very significant feature of neighbour relations and that good neighbours respect boundaries, whilst bad neighbours do not. The activities of good neighbours in their homes do not transgress boundaries whereas bad neighbours pollute the spaces beyond with activities like playing loud music or producing strong smells (Marshall, 1972; Stokoe and Wallwork, 2003). The boundary between properties is also the space of communication between neighbours: each person is at the edge of their home, or territory, but not invading the other (Allan, 1989; Stokoe and Wallwork, 2003; Bhatti and Church, 2004). It is important that the boundary is well defined for the relationship between neighbours to flourish (Stokoe and Wallwork, 2003; Al-Homoud and Tassinary, 2004). Residents value the privacy and the levels of control that a home with boundaries provides (Marshall, 1972; Allan, 1989). Homes with well-defined boundaries and outdoor spaces can be beneficial for both privacy in the home and social interactions between neighbours. How these concepts relate to one another is considered in the following section.

3.5 Exploring the relationship between privacy in the home and social interactions between neighbours

Having established a definition of privacy in the home, and that the design of the home can impact on privacy, it is now appropriate to investigate the relationship between privacy in the home and social interactions between neighbours. The relationship is looked at from a theoretical perspective and then the empirical evidence is reviewed.

3.5.1 Theoretical approaches to the relationship between privacy and social interactions

Viewing the relationship between privacy and social life as dialectical has several proponents. The two concepts appear to contrast one another but in fact are closely related.

Altman (1976) theorises that controlling privacy is a way of controlling social interactions, and Goffman (1959) suggests that life can be viewed as a performance where private home life is backstage and public social life is front stage. Ariès' history of the family is another explanation of how and why private family life and public social life are treated as a dichotomy (Ariès, 1962; Weintraub, 1997). Ariès (1962; 1977) argues that the evolution of the nuclear family, combined with increased levels of surveillance by the state and employers, created a distinct social life. In the past, public social life revolved around establishments such as cafés and pubs, particularly for men, and private life was centred on the intimate family unit (Ariès, 1977). Private family life was where people were able to be in their natural state whilst the public arena became a place of culture with associated expectations of behaviour and dress (Sennett, 2002). Rather than being at odds with one another, public and private balance one another out: the culture of public life evens out the rudeness of private life, and the freedom of natural private life keeps in check the codes of public life (Sennett, 2002). Sennett sees public life (that is life beyond the realm of the home) as one of role playing that allows strangers to interact with one another in a regulated way.

Sennett has a similar perspective to that of Goffman in that they both perceive public life as an arena for performance and role playing. However, Sennett criticises Goffman's approach for being static; Sennett suggests that Goffman is unconcerned with the history of a scene or how it may affect those participating and therefore does not consider that people experience situations and change as a result of them (Sennett, 2002, p.36). Either way, life in the home is viewed as a separate and opposite place to public life, resulting in different behaviours occurring in the two settings. From Goffman's (1959) perspective the home is a backstage area where a person is able to remove their mask and regroup after role playing in public. Access to the backstage area is limited to a select group of people, similar to Altman's (1975) perspective that the home is a territory controlled by a particular group of people. Controlling a territory through personalisation and the use of markers can help to regulate social interactions with neighbours; personalisation provides 'visible cues about social actors' which may encourage social interactions (Altman, 1975, p.143). This is part of Altman's perspective that privacy is an 'interpersonal boundary control process, or a series of events involving regulation and control of social interaction or "permeability" of the self to others. This boundary control process aids in the pacing and management of social interaction.' (Altman, 1976, p.27). In a public space, control of access to the self may require recourse to verbal and non-verbal behavioural mechanisms, continually adapted for the situation; by contrast, the home is a territory with permanent boundaries that allows a person to achieve privacy within its confines, with minimal intrusion by outsiders.

3.5.2 Empirical evidence of the relationship between privacy in the home and social interactions between neighbours

Research has shown that levels of privacy in the home can impact on interactions with neighbours. The relationship between residents can be affected by the relationship between the private space of the home and the public space of the street (Al-Homoud and Tassinary, 2004). Schaefer *et al.* (1999) found that social interaction between residents in apartment blocks varied according to their satisfaction with their dwellings and the local environment. Residents tended to interact with their neighbours in the squares outside their apartments if they felt that the squares were a shared private space between neighbours; by contrast, those who did not interact in these spaces felt that the squares were public spaces and that their private domain did not start until they reached the door of their apartment. Squares with fewer dwellings per entry and less incivilities (for example, litter) tended to be viewed positively as places of interaction (ibid.).

Satisfaction with levels of privacy in and around the home has been found to have a positive impact on sense of community within residents in suburban California (Wilson and Baldassare, 1996). Wilson and Baldassare suggest that, 'rather than privacy being defined as a way of withdrawing from people, it is perhaps better described as the regulation of social life' (ibid., p.38). However, other empirical work refutes this relationship. Turnbull found a negative correlation between a desire for privacy and a desire for community. A desire for community correlated positively with a desire to live life locally while the opposite was true for those who desired privacy (1978). Suburban neighbours who have developed strong friendships cite a lack of concern for privacy as one of the reasons the friendships have developed. Balancing privacy and social interaction can be achieved through 'friendly distance' (Crow *et al.*, 2002, p.129). 'Friendly distance' allows some give and take between neighbours, therefore enabling people at different stages in their life-cycle or with different levels of association with a neighbourhood to live next door to one another amicably (ibid.).

3.6 Conclusion

In this chapter, privacy of the individual, privacy in the home and the relationship between privacy in the home and social interactions between neighbours have been discussed. The premise of viewing privacy and private space as one side of a dichotomy has been highlighted. Sociability and social interaction have been established as the other side of the dichotomy. Privacy is a multifaceted concept; however, definitions pertinent to this research have been identified. Privacy of the individual is defined as the **selective control of access to the self or to one's group.** Privacy in the home is defined as **the ability to realise the selective control of access to the self or to one's group in the setting of the home.**

The design of housing has been shown to impact on privacy in the home; controlling for visual access and noise intrusion from outsiders are particularly important. Internally, sufficient space and rooms can aid privacy between household members. Sufficient privacy in the home can be of benefit for social interactions with neighbours and the boundary between properties can also be beneficial. In order to understand the potential of the design of sustainable housing developments to impact on privacy in the home and social interactions between neighbours it is necessary to understand what sustainable housing developments comprise in design terms. The following chapter reviews what the sustainable design features of a housing development are and how they impact on privacy in the home and social interactions between neighbours.

chapter FOUR

The design principles of sustainable housing developments

Chapter Four: The Design Principles of Sustainable Housing Developments

4.1 Introduction

The purpose of this chapter is to identify the aspects of design in sustainable housing developments that may impact on privacy in the home and social interactions between neighbours. A list of eight principles of design is defined. How the eight aspects of design may contribute to the sustainability of a housing development is one focus of this chapter, the second focus is the potential impact that such aspects of design have on social interactions between neighbours as well as privacy in the home (Figure 4.1).

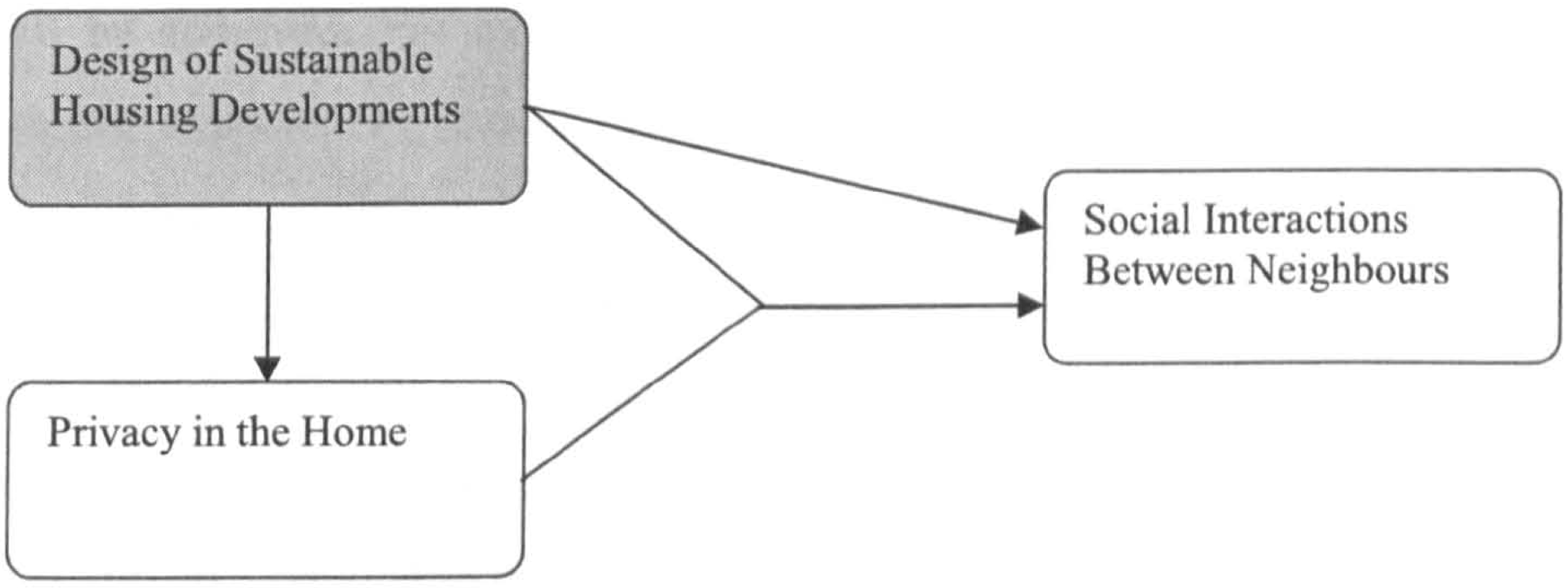


Figure 4.1: Diagram representing the concepts and relationships under scrutiny in the research with the focus of Chapter Four highlighted

Sustainable development is now an integral part of UK Government policy and has been incorporated in planning policies and building regulations (for example, ODPM, 2005b; a; DCLG, 2006). According to Government, sustainable urban and rural development includes features such as 'making suitable land available for development in line with economic, social and environmental objectives to improve people's quality of life;' and 'contributing to sustainable economic development,' (ODPM, 2005b, p.2,3). In its definition of sustainable development the Government's expectations include 'ensuring high quality development through good and inclusive design, and the efficient use of resources;' as well as 'protecting and enhancing the natural and historic environment' and 'ensuring that development supports existing communities and contributes to the creation of safe, sustainable, liveable and mixed communities with good access to jobs and key services for all members of the community' (ODPM, 2005b, p.2,3). The ideals that Government policy aspire to are similar to those of theorists from ecological (such as

Boyle and Harper, 1976 in; Barton, 2000) and urban backgrounds (for example the new urbanists, Duany *et al.*, 2001). Both Government and theorists argue that good planning and the high quality design of the built environment have a crucial role to play in sustainable development because 'promoting sustainable lifestyles and social inclusion in our towns and cities depends on the design of the physical environment' (Urban Task Force, 1999).

4.1.1 The design principles of sustainable housing developments

Government policy, design guidance and theoretical texts were reviewed to establish the particular aspects of design that are integral to sustainable development. Careful analysis of the aims of advocates of sustainable development as well as the design features they recommended was required. Government policy often states an aim without explicating how it will be achieved. For example, little guidance is given on how Local Planning Authorities are expected to create 'places, streets and spaces which meet the needs of people, are visually attractive, safe, accessible, functional, inclusive, have their own distinctive identity and maintain and improve local character' (DCLG, 2006, para 14, p.8), which is an aim of Government design policies. Through a detailed analysis of the aims, and the prescriptive guidance suggesting how they may be achieved through design, a list of eight features of sustainable housing design has been compiled. The terminology may vary between the literature, but the list encompasses the aspects of the sustainable development of the built and urban environment which are commonly cited and agreed upon. The eight principles of design that should support the creation of sustainable housing developments are:

- High dwelling densities
- A mix of dwelling types and sizes
- A mix of uses
- An urban brownfield location
- A walkable urban environment
- The provision of adequate recreational and communal space
- Energy efficient design of the urban environment and buildings
- High quality design in keeping with the local character

The reasons these principles are deemed to be necessary for sustainable development are outlined in Section 4.2 onwards.

4.2 Higher dwelling densities

New housing in the UK is being built at higher densities than in the recent past as a result of changes made to planning policy in the last ten years. Policy documents recommend building between 30 and 50 dwellings per hectare (DETR, 2000c; DCLG, 2006), whereas in the 1970s and 1980s the maximum set by Local Authorities was normally 35 dwellings per hectare (Jenks and Dempsey, 2005). The figures discussed as being 'higher' or 'lower' densities are only relevant to the UK context; in comparison to cities in other countries (for example, Hong Kong and Mumbai, India) the housing densities in the UK are very low (CABE, 2005a, p.7). Even within the UK there is variation regarding what is classified as a high dwelling density. However, there does seem to be agreement that housing should be built at higher densities than is seen in many suburbs across the UK for reasons of sustainability (Jenks and Dempsey, 2005).

The UK Government is a proponent of higher dwelling densities because it is thought that higher dwelling densities can make a positive contribution to sustainable urban environments (DETR, 2000b). Higher dwelling densities can aid sustainability in a range of ways as suggested by advocates (Jenks *et al.*, 1996b; Rudlin and Falk, 1999; Urban Task Force, 1999; CPRE, 2006). A claimed benefit is the reduction of urban sprawl and the resultant protection of the countryside for agriculture and leisure uses (Duany *et al.*, 2001; CPRE, 2006). Higher dwelling densities could result in land being used more efficiently, particularly brownfield sites in urban locations (Jenks, 2001). Building at higher densities may provide a sufficient population to sustain local facilities and amenities (Jenks *et al.*, 1996a). Providing facilities and amenities locally means that they are accessible in higher-density neighbourhoods to all residents on foot and bike (mixed-use development is discussed in Section 4.4) (Urban Task Force, 1999). Decreasing the use of the car for local journeys and replacing it with walking would increase the number of people on the street which is claimed to provide increased opportunities for social interactions leading to the development of a sense of community (Elkin *et al.*, 1991; Talen, 1999; Duany *et al.*, 2001).

However, results from empirical research suggest that the proposed benefits of high dwelling densities need to be considered alongside the disadvantages. Examinations of the impact of urban form on social equity have revealed many complex relationships between urban form, including residential density, and measures of social equity. For example, residents' access to open spaces may be reduced as a result of living in high-density areas (regardless of their level of affluence) (Burton, 1997) but at the same time access to other facilities and services is better than in low-density areas (Burton, 2000a; Leslie and Cerin, 2008; Bramley and Power, 2009). Dissatisfaction with the local area is often higher in areas of high dwelling densities (Oliver, 2003; Bramley and Power, 2009) but levels of social segregation are likely to be lower (Burton, 2000a). Some research has suggested that higher dwelling densities can reduce the use of cars (ECOTEC, 1993; Newman and Kenworthy, 2000; Cooper *et al.*, 2001; Freeman, 2001; Ferguson and Woods, 2009) and increase the use of public transport by residents (Burton, 2000a). This is likely to be a consequence of being near to a range of facilities including good public transport links. Attempts to further encourage this behaviour are being made in new higher density developments; areas of new housing are being designed with reduced parking facilities to encourage people to give up their cars (DETR, 2000c). Unfortunately this can result in insufficient parking for residents and visitors on developments leading to disputes between neighbours (Hodge and Haltrecht, 2009), and general dissatisfaction with the development (Goodchild, 2005). People are unwilling to give up their cars if viable alternatives are not made available, that is, an efficient public transport system. Higher residential densities can have both a positive and a negative impact on residents' lives; therefore compromises may be required when designing new developments for the benefits of higher residential densities to outweigh the negative effects (Bramley and Power, 2009).

Advocates of higher-density housing emphasise the importance of good design to ensure that quality of life is not compromised. High-density housing is often associated with high-rise development; however, high-density housing can take many forms such as terraced housing or three- and four-storey townhouses built around a communal square. It is argued that the urban building block can be designed to accommodate higher densities if the scale and proportion of the buildings are appropriate for pedestrians using the street (Rudlin and Falk, 2009). This involves maintaining the existing building line, preferably with perimeter blocks, and defining the street space through enclosure (ibid.). Variations in the form and density within a development can ensure an attractive development built at a human scale (Llewelyn-Davies, 2000). According to urban design guidance, well-designed higher density developments should incorporate the provision of good public transport links alongside adequate car parking that does not dominate the development (Llewelyn-Davies, 2000; CABE, 2005a). Goodchild concludes his review of the impact of higher dwelling densities by stating that 'the problems associated with higher densities can be countered through high quality design and management'(Goodchild, 2005, p.6). How the design may impact on social interaction between neighbours and privacy in the home is discussed in the next section.

4.2.1 Impact of higher dwelling densities on social interaction between neighbours and privacy in the home

Whilst the discussions regarding the benefits and negative impacts of higher dwelling densities primarily revolve around issues pertaining to reduced car use, improved access to local facilities and the conservation of countryside, there are other potential impacts that have received less coverage, in particular, the effect of higher dwelling densities on privacy in the home and social interaction between neighbours (Baldassare, 1976; Fox *et al.*, 1980; Paulus and Nagar, 1987; Brueckner and Largey, 2008). Higher dwelling densities are purported to encourage social interaction between residents through a combination of higher densities of people populating public places, such as streets, and the proximity of dwellings to one another (Krupat, 1985; Churchman, 1999; Putnam, 2000). However, higher dwelling densities have also been associated with social withdrawal, commonly due to the perception that a neighbourhood is overcrowded (Freeman, 2001). Raman (2005) found that at net dwelling densities of 70 to 80 dwellings per hectare (dph) residents know more people in their neighbourhood than people who live at densities below and above this range. As well as knowing more people, the residents also participate in more positive social interactions in public places within their developments. In contrast, Dempsey (2006) found that in higher-density developments residents were less likely to know their neighbours or to interact with them. It is worth noting that the net dwelling densities of the neighbourhoods studied by Dempsey range from 26dph to 80dph, whereas those in Raman's study ranged from 25dph to 271dph, and this may partly account for the differences in the results.

4.2.1.1 Plot size and private open space (POS)

Designing developments to achieve higher dwelling densities can influence the physical features of the development: features such as the layout, housing types, dwelling sizes and plot sizes are affected by the requirement to build to particular dwelling density levels (Leishman *et al.*, 2004; HATC, 2006). In turn, these physical manifestations of higher dwelling densities are likely to impact on privacy in the home and social interactions between neighbours. One such feature, related to plot size, is the front garden (Ravetz and Turkington, 1995). The space in front of a dwelling has been shown to be a valuable resource for promoting social interactions and privacy in the home, both in the UK and abroad (Winter *et al.*, 1993; Brown and Cropper, 2001; Mulholland Research and Consulting, 2003; Al-Homoud and Tassinary, 2004; Hall, 2006; Kim, 2007; Design for Homes, 2009). A private open space (POS) between the street and the entrance to a dwelling creates a buffer zone that may reduce the amount of overlooking experienced in the dwelling (Ravetz and Turkington, 1995; Mulholland Research and Consulting, 2003; Williams, 2005b). The POS may help to enforce the boundary between public and private space (Hall, 2006). This results in the resident having an increased sense of control over the front of their property and may encourage residents to personalise the space (Greenbaum and Greenbaum, 1981; Harris and Brown, 1996; Williams, 2005b). Social interactions may be aided by the presence of a front POS as the report by Mulholland Research and Consulting states 'they also encourage sociability on the street as passers-by stopped to chat to people tending their gardens' (2003, p.8). However, the importance of a front POS for privacy in the home and social interactions between neighbours has been overlooked in some developments where dwellings open directly on to the street in a bid to increase net dwelling densities (Hall, 2006). In some developments, such as Poundbury in Dorset, front gardens have been omitted to give the development a local and traditional character but with the same negative results for privacy and social interaction (Mulholland Research and Consulting, 2003).

Other consequences of reducing plot sizes to meet higher density requirements are: smaller rear gardens; detached dwellings being built closer together; and an increase in terraced housing and flats (Leishman *et al.*, 2004; Williams, 2009). Each of these changes has the potential to impact negatively on privacy in the home and social interactions between neighbours (Winter *et al.*, 1993; Abu-Ghazzeh, 1999; Churchman, 1999). Research has shown that living in close proximity to others in high-density developments can lead to social withdrawal (Evans *et al.*, 1989). The perception of crowding within a neighbourhood can mean an individual retreats to their home and avoids interactions with neighbours (Baum *et al.*, 1978; Evans *et al.*, 1989; Freeman, 2001). Research carried out in a high-density residential development in India found that perceptions of overcrowding resulted in social withdrawal (Evans *et al.*, 1989). Consequently, social bonds are weakened and lead to a reduction in levels of social support. Another study, in the USA, investigating the relationship between density and social interactions in a neighbourhood found that using a car had a similar impact as crowding; residents had fewer opportunities for social interaction with their neighbours and subsequently social ties within the neighbourhood were reduced (Freeman, 2001). The author concluded that creating developments that were pedestrian friendly (and most likely at higher densities) would aid social interaction through the co-presence of people on streets (ibid.). However the impact of this design feature may not be entirely positive as Baum *et al.* (1978) discovered in their study comparing streets with and without grocery stores and chemists. They found that residents on streets with commercial units used their front gardens less. The residents perceived the street to be crowded and retreated into their homes in order to avoid unwanted social interactions with people passing by. The residents felt they were unable to control who they interacted with when in their front gardens.

Feelings of crowding may be reduced if a person is able to retreat to the privacy of their home. However, it is important that people feel that their home is a private space. Smaller plots and the resultant smaller gardens can reduce levels of privacy in the garden because smaller gardens are more easily overlooked by neighbours (Winter *et al.*, 1993; Williams, 2005a). Noise from neighbours can more easily envelop a small garden relative to a larger garden (Winter *et al.*, 1993). The proximity of dwellings to one another can lead to privacy being impaired inside a dwelling; for example, noise may be transmitted through walls and floors in terraced housing and flats (Marshall, 1972; Abu-Ghazzeh, 1999; Mulholland Research and Consulting, 2003). In some developments where dwellings are close together residents have found that they are able to look into the window of the home across the street because the windows have not been staggered (Mulholland Research and Consulting, 2003). It is claimed that privacy in the home can be enhanced, and feelings of crowding reduced, through good design; Day (2000) found that residents in high-density developments who had views to open spaces and greenery were less likely to complain of crowding or a lack of privacy than those whose views consisted of other dwellings in close proximity. Residents were more content with their levels of privacy when they felt they could control the level of social interaction they had with their neighbours (ibid.). Goodchild (2005) found that planting and trees in high-density developments could also improve feelings of privacy.

In summary, private open space to the front of a dwelling can increase privacy and be beneficial for social interactions between neighbours. However if plot sizes are reduced the POS to the front of a dwelling may be reduced or removed potentially reducing privacy in the home and opportunities for social interactions. The close proximity of neighbours brought about by smaller plots may lead to social withdrawal as a result of feelings of crowding. Smaller gardens may be more easily overlooked and enveloped by noise from neighbours. The design of developments may mitigate smaller plot sizes if residents have open aspects from their homes, also the careful positioning of trees and planting can aid privacy in the home.

4.2.1.2 Dwelling size and layout

Higher dwelling densities have resulted in smaller dwellings, with smaller private outdoor spaces, being built in the UK (Winter *et al.*, 1993; Burton, 2000a; Williams, 2009). However households are also becoming smaller (Office for National Statistics, 2004). That said, dwellings need to be of an appropriate type and size for the type of households living in them (Goodchild, 2005). Flats are less appropriate for households with children than dwellings with ground floor entrances (ibid.). Overcrowding is a result of dwellings being too small for the number of people living in them (frequently measured in terms of the number of people per bedroom, House of Commons, 1985). Overcrowding in the home can lead to signs of withdrawal and aggression by the occupants (Regoeczi, 2003) which are detrimental to social interactions within the household. Social withdrawal has been found to occur in student accommodation where high numbers of students have to share spaces and are unable to control social interactions (Valins and Baum, 1973). Research carried out in private homes has shown that households can adapt to living in small dwellings (Nagar and Paulus, 1997; Madigan and Munro, 1999). Coping with small dwellings requires strong and positive interpersonal relationships between members of the household, and minimal negative relationships (Nagar and Paulus, 1997). Residents also need to be able to coordinate their use of the available space to minimise disturbing one another (Nagar and Paulus, 1997; Madigan and Munro, 1999). This is exemplified by the women in Madigan and Munro's study of Glaswegian housing (Madigan and Munro, 1999). To overcome the inadequate design of the housing the housewives in the study adjusted their lives so that they were able to enjoy private conversations with friends when the house was empty, as opposed to being able to use a separate room when the other members of the household were in (ibid.).

Small dwellings tend to be most problematic for households with children. Sufficient space in the home is necessary to provide adequate privacy between members of the household; this is particularly important for families (Allan, 1989). Dwellings that have small rooms or are small and open plan lead to friction between adults and children using the space (Oseland and Raw, 1996; Mulholland Research and Consulting, 2003). This problem can be overcome through vertical separation in the form of three, or more, storey townhouses (Mulholland Research and Consulting, 2003). The division of living space into separate rooms for dining and sitting can also improve levels of privacy between adults and children (Oseland and Raw, 1996), as can access to private outdoor space (Oseland and Raw, 1996; Design for Homes, 2009). Research shows it is common in new housing, regardless of the size of properties, for the internal space to be divided into rooms with different functions rather than one open-plan space (Hanson and Zako, 2007). This desire for privacy between members of the household may seem like extreme behaviour, however it does seem to aid positive relationships between household members (Batty and Rana, 2004). If privacy and space within dwellings is not sacrificed to meet higher densities then people are likely to be as happy living at higher densities as they would be at lower densities (Cooper *et al.*, 2001).

4.2.1.3 Conclusion

This review of the literature has revealed some potential impacts of higher densities on social interactions between neighbours and privacy in the home. The physical features that may be affected by designing higher density developments and how they may impact on social interaction between neighbours and privacy in the home are listed as research hypotheses below:

- **Less private open space reduces levels of privacy between members of the household.**
- **Less private space in the home reduces levels of privacy between members of the household.**
- **Where it is easier for people in the street and neighbours in dwellings to look into homes, privacy in the home is infringed.**
- **The space to the front of dwellings is too small for residents to utilise, reducing the opportunity for social interaction with neighbours.**
- **The space to the front of a dwelling provides a semi-private buffer zone that mediates between the public street and the private home, thus aiding social interactions with neighbours.**
- **Higher-density housing has a negative impact on privacy in the home subsequently reducing levels of social interaction with neighbours.**

4.3 Variety of dwelling types and sizes

Creating developments with a mix of dwelling types and sizes is closely linked to increasing dwelling densities. Incorporating blocks of flats and terraced housing in a development can mean there is space for larger detached homes with private open space without reducing the overall dwelling density. Theoretically, housing developments that include a mixture of dwelling types of various sizes appeal to a cross-section of society (Bailey *et al.*, 2006). Mixed communities may be formed as a result of residents at different stages of the life cycle living in the same housing development (Barton, 2000; Bailey *et al.*, 2006). It then follows that people of different ages are able to offer different services to the community (Barton, 2000). A balanced mix of people at different stages of the life cycle ensures that there is a constant and even pressure on facilities and amenities, for example there is a constant supply of children for primary schools rather than there being peaks and troughs. Smaller dwellings are likely to be suitable for people without dependent children, such as young single adults or elderly retired people. Larger dwellings with access to private open space are apparently more suited to people with young children (Hall, 1987). However, Barton (2000) points out that ideally there should be a mixture of house sizes and types and gardens, such as large detached houses with small and large gardens and terraced housing with small and large gardens, therefore providing prospective residents with a range of options to suit their requirements.

Without government intervention it appears that there is a tendency for people to self-segregate. There is an ever-growing number of retirement villages or developments built exclusively for the over-50s (for example English Courtyards developments). Gated communities are increasing in number in the UK and these tend to exclude people based on socio-economic status (Atkinson *et al.*, 2003). It could be argued that government intervention has implicitly increased segregation of housing types (Minton, 2009). Large areas of inner-cities have been redeveloped by predominantly private developers at the behest of government, and almost all the dwellings that have been built are flats with one or two bedrooms and minimal access to private or communal outdoor space (Kucharek, 2006; Silverman *et al.*, 2006). These types of development are less suited to households with dependent children than those without. Government policy has also impacted on social housing: the right-to-buy scheme for council homes has meant that often the bigger detached and semi-detached dwellings in council estates have been bought and what remains in public (or Housing Association) ownership are the smaller and lower quality dwellings (Forrest and Murie, 1990, in Burton, 2000a). Both scenarios result in homogenous populations to the detriment of the concept of mixed communities. The likelihood of the homogenisation of a neighbourhood and its community may be reduced by building housing developments with a mix of dwelling types and sizes combined with a mix of tenures. People are then given a wider range of options when choosing where to live (Urban Task Force, 1999; Silverman *et al.*, 2006) . Research has indicated that the mix needs to be fine grain for mixed communities to genuinely occur and that there should be no difference in the aesthetics between the different types of housing (Jupp, 1999).

4.3.1 The impact of dwelling type mix on social interaction between neighbours and privacy in the home

Using a mixture of dwelling types to encourage a mixed range of residents to live in a development may result in a heterogeneous community. The benefits of such a community are thought to include positive social interactions between residents resulting in the transfer of knowledge and expertise between generations (Barton, 2000). A study of sheltered housing revealed that some of the residents missed the opportunity to interact with people from different generations, and found living with other elderly people too quiet (Percival, 2001). Living with other old people reminded the residents of their own age and made them feel unwanted. Other studies, particularly in America, have found that residents do not develop strong ties with neighbours who are socially, economically or ethnically different (Gans, 1968; Merry, 1979). In situations where neighbours are very different from one another negative social interactions can be magnified because of the differences (Merry, 1979). Advocates of mixed dwelling types and tenures seldom contemplate the potential for negative social interactions as a result of neighbours being at different stages in the life cycle or having different lifestyles. This may have an impact on the quality of life of the residents.

In her research on the levels of social equity in compact cities Burton (2000a) discovered that levels of segregation were lower where terraced housing and flats were the primary types of dwelling; in areas where detached or semi-detached housing were predominant the majority of residents were homeowners. Burton's research would suggest that new developments should be composed primarily of flats and terraced housing; however, Bramley and Power have found that levels of dissatisfaction with the residential area are higher in neighbourhoods where the housing is predominantly terraced (Bramley and Power, 2009). Problems between neighbours are compounded by the fact that they live closer together than if they were in detached or semi-detached housing. Not only are levels of dissatisfaction higher in developments predominantly composed of flats but levels of social interaction between residents are often lower (Festinger *et al.*, 1950; Raman, 2005). In particular, those people who live on floors above ground level tend to interact less with other residents than those who reside on the ground floor or on streets (Raman, 2005). While residents who share a floor in a block of flats may interact with one another, it is less likely that they will know people from other floors (Coleman, 1985; Foster, 1995). This issue highlights the need for the careful consideration of the ratio of different dwelling types and high quality design in developments of higher-density mixed dwelling types. To conclude, there are three potential impacts of mixed dwelling types and sizes on social interactions between neighbours and privacy in the home that should be considered carefully when a development is being designed, and therefore should be analysed in this research:

- **Where neighbours are at different stages in the life cycle with different lifestyles, the opportunities for conflict and negative social interaction are increased.**
- **Proximity in flats, terraces and semi-detached housing increase levels of overlooking and noise, reducing privacy in the home.**
- **The design of blocks of flats provides residents with fewer opportunities for social interactions than the design of housing.**

4.4 Mixed-use development

Alongside higher densities mixed-use development is advocated by Government and is part of planning policy (DCLG, 2006). Incorporating particular uses other than dwellings in a development is thought to improve the social, economic and environmental sustainability of a development (Jacobs, 1961; Urban Task Force, 1999; CPRE, 2006). Llewelyn-Davies (2000) list the benefits of mixed development as being:

- More convenient access to facilities
- Travel-to-work congestion is minimised
- Greater opportunities for social interaction
- Socially diverse communities
- Visual stimulation and delight of different buildings within close proximity
- A greater feeling of safety, with 'eyes on the streets'
- Greater energy efficiency and more efficient use of space and buildings
- More consumer choice of lifestyle, location and building type

- Urban vitality and street life
- Increased viability of urban facilities and support for small business (such as corner shops) (p.39)

There is an implicit assumption that mixed-use means more than one or two uses other than housing. There is no definitive list of what uses should be included (Dempsey, 2009) but they do tend to be facilities and amenities of benefit to residents in the development (Winter and Farthing, 1997). Uses such as parks and playgrounds, convenience stores, a Post Office, pubs, primary schools, secondary schools, a GP surgery, a community hall, supermarkets, chemists, cafés, and banks have been recommended in theory and design guidance (Burton, 1997; Urban Task Force, 1999; Barton, 2000). Providing a variety of facilities and amenities in close proximity to homes has been shown to reduce car usage, and encourage walking (Winter and Farthing, 1997). Research has suggested that the relationship between the use of facilities and mode of transport is more complex (Ferguson and Woods, 2009). In particular many people 'trip chain,' that is they combine multiple destinations in one trip which necessitates the use of a car (Noland and Thomas, 2007; Ferguson and Woods, 2009). This would suggest that multiple uses need to be provided locally, including a public transport hub with good connections to other parts of the urban area, for people to be able to walk rather than drive. It is important that such facilities are provided when a development is being started rather than after all the housing has been completed. Too frequently developers renege on their promises of building facilities first and residents are then obliged to use alternatives in neighbouring areas (CABE, 2005d). A potential positive outcome of this situation is that residents create a group to fight for facilities and in doing so develop relationships and a sense of community, although these groups can occasionally become insular and destructive (Forrest and Kearns, 2001).

4.4.1 The impact of mixed use development on social interaction between neighbours and privacy in the home

One of the purported benefits of mixed-use development is increased levels of walking by residents. Including a range of facilities and amenities at walkable distances from dwellings may also help to reduce the use of cars. Researchers in New Zealand have found that primary school children would prefer walking to school than going by car (Mitchell *et al.*, 2007). Walking to school would enable the children to explore their local environment and chat to friends, thus helping to develop their independence whilst providing exercise. It could be argued that these three benefits apply to adults as well: being aware of the local environment may encourage residents to develop an affinity with their neighbourhood

(Borst *et al.*, 2008); daily exercise in the form of walking to facilities may contribute to a person's wellbeing and fitness; and regular walking between the home and various facilities could lead to recognition between people which in turn could develop into frequent social interactions (Burton, 2000b; Allen *et al.*, 2005; Leslie and Cerin, 2008). Regular encounters at locally situated facilities and amenities may also provide the opportunity for social interaction. In the USA studies have suggested that where residents live close enough to walk to a facility they do associate the facility with increased levels of social interactions with other residents, particularly if the neighbourhood is designed for pedestrians rather than for cars (Kim, 2007; Wood *et al.*, 2010).

Mixed-use development may impact on privacy in the home. It is inevitable that some dwellings will need to be adjacent to non-residential development. In the situation where the non-residential property is commercial there may be issues relating to noise at inappropriate times of the day. However, dwellings situated next to public open green spaces or school grounds may be more private as a result of not being overlooked. It could be argued that mixed-use development could impact positively and negatively on both social interaction and privacy in the home and that these impacts are:

- **Meeting at facilities and amenities in the development increases opportunities for social interaction between residents.**
- **Walking to/from facilities and amenities in the development increases opportunities for social interactions between residents.**
- **Privacy in the home can be enhanced or reduced by a non-residential land-use adjacent to the home.**

4.5 Urban brownfield location

In order to contain urban sprawl and save the countryside for environmental, agricultural and leisure purposes the Government advocates the building of new developments in urban locations, preferably on brownfield sites (DCLG, 2006). Often described as the intensification of cities there are several claimed benefits to building in urban locations (Williams, 2000; Jenks, 2001). The benefits include reducing the use of the private car, providing land for much needed housing and increasing the vitality of a local centre (Williams, 2000). Utilising small urban sites for housing means that existing infrastructure and facilities can be used by new residents thus resolving the problem of developers not providing amenities immediately. However, this only works when local facilities are not already at capacity (CABE, 2005a, p.16). Urban brownfield development on previously derelict land tends to be welcomed by residents; however, the development of amenity land (such as playing fields) tends to be viewed negatively by residents. Small-scale residential development is generally accepted whereas large-scale development, particularly non-residential, is unacceptable to residents according to research findings (Jenks, 2001). Urban brownfield sites therefore need to be assessed on a case by case basis and the development should be sensitively designed according to the history of the site. The layout of new housing in an urban area needs to be carefully designed in order to ensure it is well integrated with the surrounding area.

4.5.1 The impact of an urban location on social interaction between neighbours and privacy in the home

Building new housing developments in urban locations may be advantageous in terms of social, environmental and economic sustainability; however, it may not be so beneficial for levels of privacy in the home. A study monitoring the impact of intensification in three London Boroughs found that after intensification new dwelling units were smaller than the local average size and tended to be two bedroom dwellings (Williams, 2000). An implication of smaller dwellings is less private space per person with a potential for overcrowding to occur. The study also revealed that residents' complaints about noise from their neighbours (either domestic or otherwise) increased after intensification. The urban location may have contributed significantly to higher levels of noise although it is highly likely that other factors relating to anti-social behaviour are involved. However, in an urban location it is likely that new housing will be surrounded by other buildings as opposed to open countryside which could have a detrimental impact on privacy in the home. Residents of suburban areas are particularly wary of this impact and tend to view urban development less enthusiastically than residents in urban centres (Jenks, 2001). In summary one impact of urban development that needs to be tested for a relationship with privacy in the home is:

- **The intensification of urban areas impacts on privacy in the home through an increase in overlooking and noise from neighbours and street users.**

4.6 Walkable urban environment

For an urban environment to be walkable it needs to be integrated, legible, accessible and safe (Hillier *et al.*, 1993; Urban Task Force, 1999; ACPO, 2004; Rudlin and Falk, 2009).

According to policy and design guidance the street layout of a development should be well-connected to existing street networks; and existing routes should be extended through the new development to enable residents to walk to local facilities and amenities (DfT and DCLG, 2007). Rudlin and Falk (1999) suggest that streets are more than roads for traffic; they are places where people interact with one another and therefore should be designed as spaces for pedestrians. However, streets still need to be designed to allow access by bicycles, public transport and cars, and it is important to achieve the right balance, with pedestrians, bicycles and public transport being given priority (Carmona *et al.*, 2003; CPRE, 2006). Well-connected and legible routes can increase the use of bicycles for utilitarian journeys regardless of the topography of a city (Titze *et al.*, 2008). Pedestrian movement can be aided and encouraged by a grid or deformed-grid street pattern consisting of short blocks which give pedestrians varying views and options for routes (Burton and Mitchell, 2006). Shorter blocks contribute to the legibility of a development by enhancing the pedestrian's knowledge and understanding of where they are (Rudlin and Falk, 1999). A hierarchy of street types can also aid orientation; high streets are the primary streets situated at the commercial and social centre of an area or neighbourhood with secondary and tertiary streets feeding into them (ibid.). Landmark buildings, such as civic buildings, at strategic points in a development, for example the corner of a block on a primary street, can aid legibility for pedestrians (Llewelyn-Davies, 2000). An important feature is to ensure that the central area with its associated mix of facilities and amenities is within walking distance of all the households in a development, or that residents have easy access to a frequent and efficient public transport system that can deliver them to the central area (Dempsey, 2006). This is closely linked to creating mixed-use developments and as such there is no definitive list of services that should be accessible. However, some theories and design guidance have been put forward suggesting the distance particular features should be from housing. For example Barton *et al.* (1995) suggests that primary schools should be a maximum distance of between 400 and 600m from a residence and that a bus stop should be no more than 400m from a home. It is thought that workplaces such as offices could be located close enough to residences to enable people to walk to them (Barton, 2000; Llewelyn-Davies, 2000).

A safe urban environment for pedestrians encompasses two goals. The first is safety from, and more generally, a fear of attack and the second is road safety. It is thought that the design of the built environment can have an influence on opportunistic crime and the fear of crime (Newman, 1972; Coleman, 1985; Hillier, 1996; Donnelly and Kimble, 1997; ACPO, 2004). Active building frontages rather than blank walls create an atmosphere of being watched and this is further aided by many people being on the streets as a result of the mix of uses in the locale (Doeksen, 1997). Wide pavements that are well-lit also enhance people's feelings of safety, particularly if they are part of the street domain and are not segregated from other forms of transport. Prioritising pedestrians in streets means that the speed of vehicular traffic should be limited, possibly through the use of barriers and bumps. For busy streets theorists have suggested that public spaces should be designed as shared spaces where pedestrians and vehicles use the same space but pedestrians have priority (Hamilton-Baillie, 2008; Shared Space). On residential streets Home Zones (based on the Dutch *Woonerf* concept) are advocated as a way of prioritising residents and pedestrians over cars and through-traffic. Using different features such as planting, surface variations and speed bumps designers can create streets that are safer for pedestrians by ensuring that cars have limited access and are driven slowly (Home Zones, 2007).

There are many benefits to creating a walkable urban environment. Increasing the amount of walking people do has a positive impact on their health, both physical and mental (Bird, 2004; Leslie and Cerin, 2008; O'Campo *et al.*, 2009). Encouraging people to walk rather than use their cars is beneficial for the environment and also for the community. Residents who regularly walk around their development may grow familiar with one another and develop relationships through social interactions as a result of frequent contact in the public realm.

4.6.1 The impact of a walkable urban environment on social interaction between neighbours and privacy in the home

Researchers have looked into the different aspects that can contribute to a walkable urban environment and how they may provide opportunities for residents to interact with one another. There are a range of results, discussed below; some suggest that walkable streets can increase social interactions whilst others suggest not. Walkable urban environments have the potential to impact on privacy in the home and the physical features that may impact on social interactions and privacy are discussed in this section.

4.6.1.1 Legible and permeable street layouts

A key design feature that can aid walking is the layout of a development; grids, deformed grids and curvilinear patterns make walking between locations easy compared to layouts dominated by culs-de-sac (Hillier *et al.*, 1993). Leslie and Cerin's work in Australia covers many features of the urban environment and their relationship to mental health (Leslie and Cerin, 2008). Their results suggest that well-connected streets promote walking and are positively associated with the number of people a resident knows, or is friendly with, in their neighbourhood. Other research (du Toit *et al.*, 2007) carried out in Australia also found that residents did walk more in streets that were well-connected and legible, especially when walking for the purpose of transport rather than leisure. However, they found that the amount of walking residents did in a neighbourhood did not have an impact on the level of social interactions residents had with one another. Research investigating the relationship between the urban environment and people with dementia found that street layouts made of small blocks in the pattern of deformed grids were the most beneficial for wayfinding (Burton and Mitchell, 2006). This type of layout is both interesting and legible for the pedestrian and when it is combined with attractive buildings and appropriate planting can encourage old people to walk (Borst *et al.*, 2008). Other age groups are equally attracted to walking in such streets and subsequently social interaction occurs (Mehta, 2009). However, research has shown that legible streets do not always mean increased levels of social interaction (Dempsey, 2006). Residents tended to not know their neighbours, or avoid them, on streets that were well connected and legible. This may be because the streets were popular with a high number of pedestrians. A similar situation occurred on a mixed-use street; residents avoided using the front garden of their homes because of the numbers of pedestrians walking by. Subsequently they had lower levels of social interactions with their neighbours (Baum *et al.*, 1978).

Encouraging social interaction and a sense of community in residents is a fundamental goal of New Urbanist theory in the USA (Duany *et al.*, 2001). Increasing the opportunities for walking through a neighbourhood is a primary method of achieving this (ibid.). Studies of developments built using the New Urbanist guidelines have sought to find if this relationship holds true (Nasar and Julian, 1995; Brown and Cropper, 2001; Lund, 2002; Kim, 2007). Overall, the research has tended to find that where developments are more legible for pedestrians, for example a grid layout that connects residential streets with commercial streets, residents walk more frequently and subsequently have a higher number of social interactions (Brown and Cropper, 2001; Lund, 2002; Kim, 2007). The layout of the streets is just one feature of a walkable urban environment, in order to encourage more people to walk the footpaths and street furniture must be good quality and usable.

4.6.1.2 The provision of footpaths and street furniture

The design of footpaths can encourage people to walk. The best materials used for footpaths are hardwearing and smooth to minimise the likelihood of tripping (DfT and DCLG, 2007). A well-designed footpath is wide enough for people to pass one another freely (Burton and Mitchell, 2006). It should also be wide enough to accommodate seating where it is required (ibid.). Seating on footpaths and pavements provide pedestrians with focal points for stopping which can result in social interaction (Mehta, 2009). Seating designed to be comfortable and made of durable materials enhance the appearance and walkability of an area (Burton and Mitchell, 2006; DfT and DCLG, 2007), although in some cities seating is removed from public places in order to reduce the number of undesirables using a space (Dempsey, 2006). The inclusion of other street furniture, such as lighting and signage, needs to be considered carefully to ensure the pavement is not cluttered. Planting is a valuable addition to footpaths and can provide shade and aesthetic pleasure to a walk (DfT and DCLG, 2007; Foltete and Piombini, 2007; Borst *et al.*, 2008).

4.6.1.3 Traffic calming

A key concern of urban designers is how to make the urban environment safer for pedestrians. Designing streets for pedestrians rather than vehicular traffic may encourage more people to walk therefore increasing opportunities for social interaction. Streets with high traffic loads have been found to have a negative impact on the occurrence of social interaction on the street (Appleyard and Lintell, 1972; Leslie and Cerin, 2008). Appleyard and Lintell compared several streets with differing levels of traffic and found the highest levels of social interaction on the street with the lowest levels of traffic. The pavement and the road are used for social interactions of various sorts by residents of all ages on the quiet street. The street is considered as a communal space for the residents whereas those living on the busy street had withdrawn from life on the street and subsequently had lower levels of social interaction. Leslie and Cerin (2008) found that heavy traffic on streets tended to inhibit residents from having social interactions with one another whereas an aesthetically pleasing street can promote interactions. Reducing traffic on a street does not always result in increased levels of social interaction. An experiment to reduce crime in a US city resulted in streets being gated to stop vehicular traffic passing through but, importantly, cyclists and pedestrians were able to use the streets as before (Donnelly and Kimble, 1997). The outcome was a reduction in opportunistic crimes but there was no change in the level of social interaction between residents. Levels of interaction were deemed to be high before the policy was implemented and perhaps they were as high as they could be. However, if pedestrians and cyclists had been restricted in their movements the way vehicles were it may have resulted in a reduction in social interactions. In the UK the concept of Home Zones has been introduced to slow traffic down and create residential streets oriented towards pedestrian users rather than vehicles (Home Zones, 2007). Many factors influence the success of Home Zones including the design of the street (Clayden *et al.*, 2006). Planting and good lighting alongside facilities for young children were cited by residents as positive features. Shared surfaces are less popular with residents because they feel that drivers do not respect the right of a pedestrian to be in the space (ibid.). Residents also feel that the levels of social interaction with neighbours have increased as a result of living in a street with a Home Zone.

4.6.1.4 Active building frontages

Natural surveillance is claimed to be essential for walkable urban environments. Buildings that open on to a street and have windows looking over public spaces (i.e. high levels of active frontage) provide residents with opportunities to overlook streets. This low-level surveillance can enhance feelings of safety on a street, particularly when compared to streets with many blank walls (Jacobs, 1961). An awareness of the public space beyond the front door can lead to residents feeling they have a shared responsibility for that space and what happens in it (Doeksen, 1997). Levels of crime may be low as a result of the social control of residents over the space. The collective responsibility of residents for the space may increase the levels of social interactions that occur between them (ibid.). The perception of a street being safe as a result of active frontages can aid social interactions. A study of a variety of urban neighbourhoods revealed that as levels of active frontage increased so did social interactions (Dempsey, 2006). Residents reported that they stop and interact with one another because they feel comfortable in areas that are overlooked. However, too much natural surveillance may hinder social interaction (Raman, 2005). Residents whose front doors open on to areas that are heavily overlooked, both from buildings and the street, tend to have lower levels of social interaction than those with a moderate amount of surveillance (ibid.). The amount of surveillance provided by active frontages needs to be carefully balanced with levels of privacy to ensure that privacy is not impaired and opportunities for social interaction are not reduced. A successful development design in Canada has resulted in a balance being achieved. Townhouses with porches and small setbacks from the street have been incorporated on a busy street. The consequences are a good level of natural surveillance resulting in plenty of opportunities for social interaction (MacDonald, 2005).

4.6.1.5 A uniform hierarchy from public to private space

A consistent and uniform ordering of buildings so that the public rooms face the street and the private areas are to the rear is thought to aid both social interaction and privacy (Carmona *et al.*, 2003; Rudlin and Falk, 2009). Streets that are lined by the fronts of buildings can aid legibility, and make a street more interesting and attractive to walk along, thus improving the potential for social interactions (Urban Task Force, 1999; Mehta, 2009). Positioning dwellings in a similar orientation can aid privacy in the home (Rudlin and Falk, 2009). The more public rooms of a dwelling, such as the living room, should be positioned towards the front of the dwelling and more private spaces towards the rear.

4.6.1.6 Conclusion

Encouraging residents to walk in their neighbourhoods is claimed to aid social interactions. The physical features that are required to make a neighbourhood walkable have been discussed in this section. The relationships between walking and social interactions, walking and privacy have been explored. Empirical evidence supporting a positive relationship between the physical features, walking and social interaction is often lacking, as is evidence of a relationship between physical features, walking and privacy. The results from this research will therefore contribute to this body of knowledge. The hypotheses that will be tested are:

- **A legible and permeable street layout connected to the existing street network encourages residents to walk through the development, increasing opportunities for social interaction.**
- **A high level of legibility, due to a grid or deformed grid layout, encourages residents to walk through the development, increasing opportunities for social interaction.**
- **Small urban blocks encourage residents to walk through the development, increasing opportunities for social interaction.**
- **A high level of walkability results in more pedestrians on the street resulting in privacy being impaired because homes are overlooked.**
- **Good footpath provision encourages residents to walk through the development, increasing the opportunities for social interaction.**

- **High quality street furniture provision encourages residents to walk through the development, increasing opportunities for social interaction.**
- **Traffic calming encourages residents to use streets as pedestrians, increasing the opportunities for social interaction.**
- **Active building frontages encourage residents to walk through the development, increasing opportunities for social interaction.**
- **A high level of walkability increases pedestrian activity which has a negative impact on privacy thus reducing social interactions with other residents.**

4.7 Provision of adequate recreational and communal space

There are many claimed benefits, in terms of sustainability, of providing different types of open spaces in new housing developments, if they are well designed and appropriate to the development. Open spaces need to be more than swathes of grass or left over spaces between buildings; they need to be designed with a purpose in mind (DETR, 2000d). Some spaces need to be designed for physical activity for different age groups, for example playgrounds for young children and sports pitches for older children and adults. Other open spaces should be more natural to encourage wildlife and biodiversity. These spaces may be part of a network that allows wildlife (and pedestrians and cyclists) to travel between open spaces within an urban area. Another use for open space is food production for the local community in the form of allotments or community gardens (Barton, 2000). Not all open space has to be public; communal and private gardens are an integral part of an open space network within an urban area. Private gardens are seen by many as being essential for families with young children and less so for other sectors of the public (Alexander *et al.*, 1977; Crawley Borough Council, 2008). However private gardens are highly coveted by all household types (CABE, 2005c). Communal gardens are argued to be a viable alternative to private gardens; they offer semi-private space for use by a few residents. The spaces are large enough to accommodate a variety of features such as seating, planting and a children's play area. The private squares in parts of cities such as London or Edinburgh are often cited as successful communal gardens and recommended as models for new developments (Ravetz and Turkington, 1995).

Public open spaces should be accessible to all residents without the need for a car. Access, either physical or visual, to green open space has been shown to have a positive impact on mental wellbeing and can aid recuperation from illnesses and operations (Ulrich, 1979; Kaplan, 2001). Open spaces provide habitats for wildlife and if they are designed appropriately can increase the biodiversity of an urban area (Barbosa *et al.*, 2007). Increased biodiversity has been shown to be beneficial to the psychological wellbeing of the users of open spaces (Fuller *et al.*, 2007). Some theorists have suggested that too much open space in urban areas can lead to a decrease in residential densities with implications for travel; people have to travel further to reach their destinations (Jacobs, 1961; Rudlin and Falk, 1999). Rudlin and Falk (1999) suggest that parks need to be designed like streets so that they are safe because they are overlooked and filled with activity. Accessible and well-designed open and communal spaces are thought to be conducive to social interactions between residents and enhance the sense of community they may have (Burgess *et al.*, 1988; Kuo *et al.*, 1998). There may also be unseen impacts on privacy for residents and these issues are discussed in the next section.

4.7.1 The impact of recreational and communal space on social interaction between neighbours and privacy in the home

Recreational and communal space can be one of three types; one is public open green space such as a municipal park, a second type is a communal space or garden shared by residents, and a third is private open space, that is a private garden to be used by the resident of one dwelling. Each type of space has the potential to contribute to social interactions between neighbours and privacy in the home, as discussed in the following sections.

4.7.1.1 Public open green space

Public open green space, or parks, have been shown to enable social interaction and privacy (Hammitt, 2000; Kim, 2007). However, parks need to be well-designed to be beneficial; a variety of types of spaces and planting encourage both humans and wildlife to use parks (The Urban Green Spaces Taskforce, 2002; TCPA, 2004a). Research has shown that where parks are well-designed with a variety of features, such as cycle paths and trees for shade, there is an increase in the use of the park by children in the neighbourhood (Crawford *et al.*, 2008). Other studies have shown that trees in public areas can promote social interaction. The shade provided by trees and the pleasant aesthetics contribute to making a location more attractive for lingering (Coley *et al.*, 1997; Sullivan *et al.*, 2004). As well as enabling social interaction, public open green space provides individuals with the opportunity to obtain privacy if they want to 'get away from it all' (Kaplan *et al.*, 1998, p.71). Spaces that are rich in biodiversity are particularly advantageous for those seeking privacy, either for reflection or for solitude (Hammitt, 2000; Fuller *et al.*, 2007).

4.7.1.2 The location of communal spaces

The location of a communal space in relation to the dwellings it serves may have a significant impact on the frequency with which the space is used. Research has shown that communal spaces that act as a buffer between the public space of the street and the private space of the home are popular with residents (Abu-Ghazzeh, 1999). These spaces create opportunities for social interaction because they are regularly used to access the front entrance of dwellings, as well as for other activities (Abu-Ghazzeh, 1999; Schaefer *et al.*, 1999; Williams, 2005b). The number of entrances that open on to a communal space influences the feelings of territoriality and ownership that residents have towards the space; less than twenty dwellings promotes these feelings whereas more than this does not (Schaefer *et al.*, 1999). Chermayeff and Alexander (1963) reflected on the need for a hierarchy between the public spaces of the street and the private space of the home. They theorised that a hierarchy of spaces is required in order that people can control levels of privacy in and around the home, thus enabling them to regulate the amount of social interactions they participate in. Where the hierarchy is disrupted, as above, the balance between privacy and social interactions can be skewed towards one or the other.

Communal spaces that are accessed from the rear of the dwellings may be viewed in a less positive light by residents. It is possible that residents feel over-exposed whilst using the space due to many windows opening out on to the space. This may result in the space being used infrequently. Dwellings with ground floor access can benefit from having a small private outdoor space adjacent to the dwelling to act as a buffer zone. A combination of private and communal space may therefore aid both social interactions between neighbours and privacy in the home.

4.7.1.3 Features of a communal space

For a communal space to be successful it needs to appeal to all residents, therefore a variety of features should be included in a communal space. This is especially important when a communal space is replacing private open spaces (DETR, 2000a; Llewelyn-Davies, 2000). Spaces for young children to play in are important as is seating (particularly to attract older residents). The inclusion of seating can encourage social interaction between neighbours (Skjaeveland and Garling, 1997). Ideally communal spaces would include some hard surfaces as well as greenery. Trees and planting are conducive to social interactions; they are aesthetically pleasing, provide shade and can create intimate spaces (Coley *et al.*, 1997; Kuo *et al.*, 1998; Sullivan *et al.*, 2004).

4.7.1.4 Conclusion

The provision of open space for recreational purposes is a vital feature of a sustainable development. Without open spaces residents' health, both mental and physical, is likely to suffer (Mitchell and Popham, 2008). Open spaces can be public, communal or private and each type has the potential to impact on either social interaction between neighbours or privacy in the home, and in some cases both. The hypotheses to be tested are:

- **Provision of public open space for a common purpose encourages residents to interact with one another.**
- **Households regularly using communal space have more opportunities for social interaction with their neighbours.**
- **An appropriate variety in landscape design encourages all residents to use communal space regularly, increasing opportunities for social interaction.**

4.8 Energy efficient design of buildings and the urban environment

There is a wide range of reasons for the need for the energy-efficient design of buildings and the urban environment. Twenty eight percent of carbon emissions in the UK are a result of domestic energy consumption (DEFRA, 2005). Rainfall varies greatly across England and Wales; the majority of western areas tend to have more than enough water to supply the population, however in the east and south east of England water shortages can occur due to these being the driest parts of the country and also the areas where demand is greatest due to high population density (Environment Agency, 2008). Domestic waste accounts for 89% of municipal waste sent to landfill each year (Last, 2003) and a significant proportion of that waste is food. Government is exhorting the public to waste less, save energy and reduce the amount of water they use (Directgov, 2010). Homes that are well-insulated and have efficient heating systems such as condensing boilers require less energy for heating (Energy Saving Trust, 2009). Orientating and designing dwellings to maximise passive solar gain can also reduce energy consumption, for example large south facing windows combined with a high thermal mass reduce the amount of mechanical heating required (Roaf *et al.*, 2003). Solar energy can be engaged in a more proactive way with the use of solar panels for heating water and photovoltaics for generating electricity (ibid.). Incorporating rainwater and greywater recycling systems in the design of housing can reduce the amount of water a household draws from the mains supply (Williams and Dair, 2007). Providing space for recycling bins and composting facilities can encourage residents to reduce the amount of waste they send to the landfill (ibid.). At the housing development scale combined heat and power plants (CHP) can reduce CO_2 emissions and sustainable urban drainage systems can reduce the risk of flooding. Developments can be designed to encourage cycling and discourage driving by reducing incurtilage car parking and providing ample bicycle parking facilities. Locating developments near public transport hubs may provide residents with a viable alternative to driving (Frey, 1999). Using planting and trees in urban areas can provide shade and windbreaks for buildings and open spaces (DfT and DCLG, 2007). Greenery can also reduce the ambient temperature (Hebbert, 2008; CABE, 2009). As well as reducing energy consumption and saving water, energy efficient buildings may be potentially healthier to live in, and increasing the amount of greenery in a neighbourhood can have benefits not only for wildlife but also for people's mental health.

4.8.1 The impacts on social interaction between neighbours and privacy in the home

The majority of the features discussed above are unlikely to have an impact on privacy in the home or social interactions between neighbours. However, the ones that may have an impact are the orientation of dwellings to maximise solar gain, the use of planting and trees to aid the microclimate and the provision of car parking and bicycle storage to reduce car usage. Large south facing windows may have a negative impact on privacy in the home if the windows face public spaces. Orientating dwellings so that the living rooms face the south may result in the front, or public side, of some dwellings facing the back, or private side, of other dwellings as is the case in BedZed (a well-known sustainable housing development in Sutton, Greater London); residents have reported a lack of privacy as a result (Hodge and Haltrecht, 2009). However, the impact of this feature is not being tested in this research due to a lack of examples in the developments. Planting and trees could aid both social interaction between neighbours and privacy in the home. Communal areas with trees that provide shade and aesthetic value have been found to be more popular than areas with no trees (Coley *et al.*, 1997). Trees planted at appropriate distances from dwellings can aid privacy by providing screening and a buffer zone between the home and public space (DfT and DCLG, 2007). Unfortunately, the impact of greenery could not be tested because of the age of the developments; the trees and planting had not had time to mature. Also, the impact varies over the year due to the trees and shrubs losing their leaves over the winter period.

The other two physical features that could impact on social interactions between neighbours (car parking facilities and bicycle storage) are measurable across the developments. The arguments that suggest walkable urban environments could be good for social interaction also apply to car parking and bicycle storage; regular and frequent use of a public space may provide residents with the opportunities to interact with one another (Gehl, 2001). In-curtilage parking is unlikely to provide residents with the same opportunities for interacting with other residents as are more public forms of parking. Sharing a communal parking facility with neighbours may result in frequent and regular contact between the same group of people as they walk to and from their homes to their cars (Abu-Ghazzeh, 1999; Williams, 2005b). The regular use of on-street parking may mean that residents begin to interact with one another as they walk to their cars and pass others who are walking further afield (Southworth and Owens, 1993, in Doeksen, 1997). On-street parking can increase the levels of activity on a street (DfT and DCLG, 2007). In-curtilage parking is unlikely to provide the same chances for meeting other residents because a person does not walk through any public space to reach their car (Southworth and Owens, 1993, in Doeksen, 1997). Similar arguments can be put forward with regard to bicycle storage; bicycles stored in communal areas provide the owners opportunities to interact with other bicycle users and residents. In contrast, in-curtilage storage means that the cyclist does not need to walk through any public space to reach their bike and therefore minimises the opportunities for social interaction to occur with neighbours and residents. The emerging hypotheses are therefore:

- **Communal cycle storage areas provide opportunities for social interaction between residents.**
- **Communal parking areas for residents increase opportunities for social interaction.**
- **On-street car parking increases opportunities for residents to interact with those walking by.**

4.9 High quality development in keeping with local character

The quality of the design of the urban environment is an integral part of Government policy on planning (DCLG, 2006). This is partly in response to the report by the Urban Task Force in 1999, which placed high quality urban design at the core of creating liveable urban environments (Urban Task Force, 1999). High quality design encompasses several features of the built environment (Dempsey, 2006). The quality and type of materials used for the buildings, surfaces and street furniture in a development contribute to the overall quality of the design (Llewelyn-Davies, 2000). Materials that are durable, hardwearing and attractive to look at are considered to be of a high quality (DETR, 2000a). Preference should be given to local materials in order that the new development retains a local identity. The character and identity of the development should be influenced by local street patterns, building materials, scales and traditions so that the development is integrated with its surroundings (Urban Task Force, 1999; DETR, 2000a). Creating a development with a distinctive yet local character is thought to enhance residents' sense of belonging and sense of place (Dempsey, 2009). Consideration of local character whilst designing a development may help to prevent the use of a standard design regardless of the location of the development (ODPM, 2005c). Whilst local character is important modern materials and designs may be more conducive to energy efficient or mixed use buildings. New ideas should not be rejected for fear of repeating the mistakes of the 1960s and 1970s (Coleman, 1985). Aesthetically, buildings and public open spaces should be of a high quality to encourage people to walk about and use open spaces for congregating and socialising. It is also important that the scale, massing and height of new buildings are appropriate for the local surroundings and that where appropriate landmark buildings are used to enhance legibility. The overall design of the development can be considered as high quality when the different physical features discussed in the previous sections are successfully incorporated in the design of a development; consideration for walkability, energy efficiency, recreational space, mixed use, higher densities, dwelling mix and the location of the site are balanced with one another to provide a development that can induce civic pride and a sense of community in the residents.

4.9.1 The impact of high quality on social interaction between neighbours and privacy in the home

As Dempsey (2006) identified in her research there are many aspects to design quality, including some that have been discussed in this chapter, for example legibility. The focus of this section will be one physical feature that is important to the creation of a high quality development: the boundary between different types of space, that is the boundary between public and private space, and the boundary between private spaces. Clear boundaries between different types of property can aid privacy in the home and social interactions between neighbours. How a boundary of a home is demarcated impacts on the level of privacy in the home, and potentially the level of control the resident has over their private outdoor space (Al-Homoud and Tassinary, 2004). The boundary between neighbouring dwellings is an important feature of the relationship neighbours have with one another (Stokoe and Wallwork, 2003). Neighbouring relationships tend to happen at the boundary, where both parties are at the edge of the space they control. Good neighbouring means respecting the boundary and not transgressing it with any form of pollution, such as noise, smells or a visual intrusion. A good quality boundary between neighbouring properties can contribute to the relationship being positive (ibid.).

Design guidance tends to advocate a threshold between private and public spaces: an area that is semi-public that provides a person with the opportunity to adjust to the space they are about to enter (von Meiss, 1990). Dwellings that open directly on to streets provide residents with little opportunity to personalise the space in front of their homes thereby declaring their ownership of the space. However, many residents do try to demarcate the space with shrubs or ornaments and create a semi-private space in front of their home. Dwellings set back from the street and with small front gardens automatically have a semi-private buffer zone between the dwelling and the street. The presence of the space can enhance the feeling of privacy in the home as can the type of boundary. Solid features such as fences, hedges or walls create a strong barrier between pedestrians walking by and the person in their home. Changes in level or surface material are also used to demonstrate a change from public to private space. These markers can be less effective as barriers. Personalising the space in front of the home can emphasise that it is private space (Schaefer *et al.*, 1999; Al-Homoud and Tassinary, 2004). The way a person personalises the space tends to reflect their identity, and possibly any group affiliations (Greenbaum and Greenbaum, 1981). Such a representation may encourage social interaction with other people with similar affiliations (ibid.).

The two hypotheses generated from the discussion on the importance of boundaries are:

- **Clearly marked boundaries have a positive impact on privacy in the home.**
- **Cleary marked boundaries aid social interactions between neighbours.**
- **Clearly marked boundaries can benefit privacy in the home resulting in social interactions between neighbours.**

4.10 Conclusion

The design principles that are essential to the creation of sustainable housing developments were discussed in this chapter; how they contribute to sustainability and how they may impact on privacy in the home and social interactions between neighbours. The discussion revealed that there is a complex relationship amongst the design principles. It was also revealed that there are complex relationships between the physical features, social interactions and privacy. Table 4.1 provides an overview of the hypotheses generated from the review of literature. In order to test these it is necessary to operationalise the physical features and dimensions of privacy and social interaction as indicators. The following chapter outlines the methodological approach used to analyse the relationships and the development of the indicators.

Overall sustainable design principle	Hypotheses
Higher dwelling densities	The space to the front of dwellings is too small for residents to utilise, reducing the opportunity for **social interaction** with neighbours.
	Less private open space reduces levels of **privacy** between members of the household.
	Less private space in the home reduces levels of **privacy** between members of the household.
	Where it is easier for people in the street and neighbours in dwellings to look into homes**, privacy** in the home is infringed.
	In higher-density housing it is easier to hear neighbours, which infringes **privacy** in the home.
	The space to the front of a dwelling provides a semi-private buffer zone that mediates between the public street and the **private** home, thus aiding **social interactions** with neighbours.
	Higher density housing has a negative impact on **privacy** in the home subsequently reducing levels of **social interaction** with neighbours.
Variety of dwelling types & sizes	Where neighbours are at different stages in the life cycle with different lifestyles, the opportunities for conflict and negative **social interaction** are increased.
	The design of blocks of flats provides residents with fewer opportunities for **social interactions** than the design of housing.
	Proximity in flats, terraces and semi-detached housing increase levels of overlooking and noise, reducing **privacy** in the home.
Mixed use development	Meeting at facilities and amenities in the development increases opportunities for **social interaction** between residents.
	Walking to/from facilities and amenities in the development increases opportunities for **social interactions** between residents.
	Privacy in the home can be enhanced or reduced by a non-residential land-use adjacent to the home.
Urban location	The intensification of urban areas impacts on **privacy** in the home through an increase in overlooking and noise from neighbours and street users.
Walkable urban environment	A legible and permeable street layout connected to the existing street network encourages residents to walk through the development, increasing opportunities for **social interaction**.
	A high level of legibility, due to a grid or deformed grid layout, encourages residents to walk through the development, increasing opportunities for **social interaction.**
	Small urban blocks encourage residents to walk through the development, increasing opportunities for **social interaction**.

Overall sustainable design principle	Hypotheses
	Good footpath provision encourages residents to walk through the development, increasing the opportunities for **social interaction**.
	High quality street furniture provision encourages residents to walk through the development, increasing opportunities for **social interaction**.
	Traffic calming encourages residents to use streets as pedestrians, increasing the opportunities for **social interaction.**
	Active building frontages encourage residents to walk through the development, increasing opportunities for **social interaction**.
	A high level of walkability results in more pedestrians on the street resulting in **privacy** being impaired because homes are overlooked.
	A high level of walkability increases pedestrian activity which has a negative impact on **privacy** thus reducing **social interactions** with other residents.
Provision of adequate recreational & communal space	Provision of public open space for a common purpose encourages residents to **interact** with one another.
	Households regularly using communal space have more opportunities for **social interaction** with their neighbours.
	An appropriate variety in landscape design encourages all residents to use communal space regularly, increasing opportunities for **social interaction.**
Energy efficient design of buildings & urban environment	Communal cycle storage areas provide opportunities for **social interaction** between residents.
	Communal parking areas for residents increase opportunities for **social interaction**.
	On-street car parking increases opportunities for residents to **interact** with those walking by.
High quality development in keeping with local character	Clearly marked boundaries aids **social interactions** between neighbours.
	Clearly marked boundaries have a positive impact on **privacy** in the home.
	Clearly marked boundaries can benefit **privacy** in the home resulting in **social interactions** between neighbours.

Table 4.1: An overview of the hypotheses

chapter FIVE

Methodology

Chapter Five: Methodology

5.1 Introduction

Many physical features of sustainable housing developments are purported to enable residents to interact with one another (for examples see: Churchman, 1999; Burton, 2000b; du Toit *et al.*, 2007). However, designing the built environment to encourage social interactions without considering the privacy of residents could have a negative impact on social interactions and be detrimental to levels of privacy in the home. The purpose of this research was to test empirically the relationship between the design of sustainable housing, privacy in the home and social interactions between neighbours. The methodology for the empirical research is set out in this chapter. An explanation of the research framework is given and is followed by a description of the development of the indicators and variables used to measure the three elements of privacy in the home, social interactions between neighbours and sustainable design. The methods for collecting the data are explained as are the types of statistical analyses used to interpret the data.

5.2 The research framework

Social sustainability can be aided through the design of the built environment (Urban Task Force, 1999). The design of the built environment can also make a positive contribution to developing supportive environments for the benefit of residents' mental and physical health (World Health Organisation, 1991). However, little empirical work has been carried out to test these suppositions or to delineate the aspects of the built environment that could be beneficial for social sustainability or wellbeing (some examples of empirical research are Weich *et al.*, 2002; Bramley *et al.*, 2009; Dempsey, 2009). This research seeks to contribute new empirical knowledge to the discussion using a deductive approach to test theory. It also applies a quantitative approach to the analysis of the relationships between features of the built environment, privacy in the home and social interactions between neighbours. The stance taken in this research is that the built environment does not create social interactions or privacy, rather that it can facilitate or be detrimental for them.

In sociological and psychological literature a discussion of privacy frequently involves a discussion of social interaction and vice versa. However, in literature relating to the impact of the built environment social interactions and privacy tend to be considered separately.

The premise for this research is that they should be considered simultaneously in relation to the impact the built environment may have on them. To understand the relationships between the built environment, privacy in the home and social interactions between neighbours they were looked at separately and then as a whole. This approach resulted in the following aims for the research:

- To establish if and how the design of sustainable housing developments can support social interactions between neighbours.
- To identify if and how privacy in the home is affected by the design of sustainable housing developments.
- To ascertain if and how privacy in the home affects the relationship between the design of sustainable housing developments and social interactions between neighbours.

Six research questions were developed to address the three research aims and these are:

- What are the design elements required to achieve sustainability in housing developments that may have an impact on privacy in the home and social interaction between neighbours?
- What is the definition of social interactions between neighbours?
- What is the impact of design elements on social interaction between neighbours in sustainable housing developments?
- What is the definition of privacy in the home for the purposes of this research?
- Do the design features of sustainable housing developments have an impact on privacy in the home and if so, what is the nature of the impact?
- How does privacy in the home affect the relationship between design and social interactions between neighbours?

To answer the research questions an extensive literature review was undertaken. This resulted in a theoretical framework that included a series of hypotheses and a set of indicators that were used to test the relationships between the design of sustainable housing developments, privacy in the home and social interactions between neighbours. The results of the hypotheses testing were scrutinised and evaluated to understand the impact of design on social interactions between neighbours and privacy in the home.

In order to test the theoretical proposition that features of the built environment can affect social interactions between neighbours and privacy in the home a quantitative approach was taken. This involved testing and analysing primary data that had been collected across thirteen sustainable housing developments. A household survey was used to collect data relating to privacy, social interactions between neighbours and general socio-demographic information on the residents. Data on the physical form of the sustainable housing developments was collected using a site survey checklist.

A quantitative approach was chosen for three reasons. Firstly, examining specific features of the built environment across a variety of cases provides opportunities for patterns in the numerical data to emerge. It may also be possible to make generalisations about the observed phenomena that are applicable to other similar situations, for example new sustainable housing developments (Ragin, 1994). A second reason for choosing a quantitative approach is that the implications of a theory can be tested using hypotheses and that the results of the research can then contribute to the refinement or rebuttal of the theory (ibid.). The third reason is measurement. Measuring the characteristics of the built environment or the attitudes of respondents using quantitative scales can provide a range of values that show 'fine differences' between respondents (Bryman, 2004, p 6). Measurement tends to be consistent so a researcher is able to use a measuring instrument development by another researcher at a later date with the expectation of uniform results (Bryman, 2004; Burton *et al.*, 2005). The measurement of the built environment is an emerging field and there are few tried and tested methods (for example, Burton *et al.*, 2005), therefore the individual physical features have been measured using a series of indicators developed for this research. The indicators are transferable to other research projects.

5.2.1 Theoretical framework

The study takes a comprehensive approach to the potential effects of the built environment in sustainable housing developments on privacy in the home and social interactions between neighbours. This approach was influenced by the supportive environment theory, which asserts that the built environment may affect social outcomes through its ability to support the activities and behaviour people want to participate in (Lawrence, 2004). The empirical testing of the potential effect of the built environment is a new and emerging field (Weich *et al.*, 2001; Dilani, 2007). Existing research has been carried out in other fields (for example, environmental psychology) and consequently there is a lack of understanding of design features in these studies. Frequently, previous research evaluates and audits the built environment as a whole, whereas in this research the physical features are described individually. Consequently, it was possible to investigate the relationships between individual design features, privacy and social interactions in order to unpack the influence of each of the design features, not each sustainable housing development as a whole. The results of the research may lead to empirically-based design guidance that can help to inform built environment policy and practice of what physical features do and do not facilitate social interactions between neighbours and privacy in the home.

A cross-sectional design was used so that any significant relationships between individual physical features and respondents' behaviours were discovered across the different developments. A disadvantage of the cross-sectional design is that there is 'ambiguity about the direction of causal influence' because the data is collected simultaneously (Bryman, 2004, p. 42). If time had permitted a longitudinal study could have been used. It may have produced results indicating a causal influence, that is measuring residents' behaviours before and after moving into a sustainable development may have indicated the influence of the built environment. However, many other factors could have changed in a resident's life, for example their job and commuting distance, that would possibly impact on their behaviour. Using a cross-sectional design may minimise the influence of external factors and these were addressed with the inclusion of intervening variables. While considerable effort was made to collect data on these indicators, it may be the case that variables not measured in this research will have an impact on respondents' answers (De Vaus, 2002b).

5.3 Indicators and measures

Indicators are used to measure a concept where the concept is not easily quantifiable in a direct way (Bryman, 2004). It is necessary to use indicators in this research because the concepts of social interactions between neighbours and privacy in the home (as defined in Chapters Two and Three, respectively) are not easily quantified. In Chapter Four it was established how each of the eight principles of sustainable design may impact on privacy in the home and social interactions between neighbours. Some of the physical features affected by the eight principles are easy to measure numerically, for example distances, however some features cannot be quantified in this way and indicators are necessary.

Likert scales are a useful way of measuring features when the feature does not have an inherent numerical measurability (Oppenheim, 1992; De Vaus, 2002a; Bryman, 2004). Likert scales were originally created as a psychometric scale to measure respondents' feelings towards a statement. However, they can also be used to measure aspects of physical features, for example quantities can be collapsed across a scale or quality can be measured using a scale (Burton *et al.*, 2005). The scale tends to be a uni-dimensional 5-point scale ranging from high to low. The 5-point scale is scored 1 to 5 and these numerical values can then be used in statistical analyses. The scores have no absolute value rather they must only be considered in relation to one another (De Vaus, 2002a). The following sections discuss the indicators used for the physical features potentially affected by sustainable design, privacy in the home and social interactions between neighbours. Having established the range of indicators required to measure each of the concepts two research instruments were developed (a site survey checklist and a household questionnaire) to enable the collection of the data (see Section 5.6).

5.3.1 Indicators related to dwelling densities

Higher dwelling densities are said to be an essential part of sustainable development, however measuring dwelling densities can be complex. Residential densities can be measured in a variety of ways and at various levels and it is frequently very difficult to make comparisons between different measures (Churchman, 1999; Jenks and Dempsey, 2005). Residential density measures can either be gross or net measures, that is all urban land is included in the measure or non-residential land is removed. The number of dwellings in an area is frequently used as is the number of persons (Churchman, 1999). For the purposes of this research the measurement of residential density used is the one defined in Planning Policy Statement 3: Housing:

> 'Net dwelling density is calculated by including only those site areas which will be developed for housing and directly associated uses, including access roads within the site, private garden space, car parking areas, incidental open space and landscaping and children's play areas, where these are provided.' (DCLG, 2006).

This measure was decided upon because it is in common use in the UK. The range of net dwelling densities across the case studies is considerable so in order to minimise the influence of any one case in the analysis the measure of dwelling density has been collapsed into three categories and represented in a separate variable. Net dwelling density is divided into three groups; low (30 or less dwellings per hectare), medium (31-50 dwellings per hectare) and high (51 or more dwellings per hectare). The thresholds for the three groups are based on recommendations in policy (DCLG, 2006) and design guidance (Rudlin and Falk, 2009). Table 5.1 shows the indicators of dwelling density used in this research.

Net dwelling density provides an overall measure indicating if a development has been built at a high-density. However, net dwelling density does not measure the effect of density on specific physical features. The review of literature pertaining to high-density developments, in Chapter Four, revealed that there are specific physical features that are likely to be affected by the dwelling density of a development. Some of these features are also likely to have a significant relationship with social interactions and privacy in the home. Therefore it was necessary to measure the individual physical features. Previous research has shown that private open space to the front of a dwelling can be beneficial for social interactions and for privacy (Mulholland Research and Consulting, 2003). Research has also shown that front gardens are often reduced or removed from developments to meet high-density targets (Hall, 2006). Consequently, a variable measuring the area of the POS to the front of each dwelling and the setback distance between the front of the dwelling and the street was included. A variable measuring the area of the POS to the rear of each dwelling was also included as plot sizes are frequently smaller in high-density developments (Winter *et al.*, 1993), and a POS to the rear of a dwelling can impact on privacy in the home (Bhatti and Church, 2004). Another result of smaller plot sizes is that dwellings are closer to one another and this was measured using three variables; the distance to the dwelling to the left, the distance to the dwelling to the right and the distance to the dwelling to the rear of each dwelling. A final indicator measuring the number of bedrooms in a dwelling was used to give an indication of the size of the dwelling. Dwellings have been found to be smaller in higher density developments (Williams, 2009). This indicator was measured via a question in the household questionnaire and the other indicators were measured using OS Mastermap data in MapInfo software.

Name of indicator	What is being measured	Scale of indicator	Type of variable used and unit of measurement or name of categories used	Source
Net residential density	Number of dwellings in area excluding non-residential area	Development	Scale: Dwellings per hectare (dph)	Ordnance Survey maps
Net residential density (group)	Net residential density divided into three groups	Development	Ordinal: Low (< 30dph), Medium (31-50dph), High (>50dph)	Site survey checklist
Size of Private Open Space to front	Area of private garden to front of dwelling	Dwelling/household	Scale: Area measured as m^2	Ordnance Survey maps
Size of Private Open Space to rear	Area of private garden to rear of dwelling	Dwelling/household	Scale: Area measured as m^2	Ordnance Survey maps
Setback distance between front of dwelling & street	Distance between the public street and the front of the dwelling	Dwelling/household	Scale: Distance measured in metres	Ordnance Survey maps
Distance from dwelling to dwelling at front	Distance between the front of the dwelling and the one opposite	Dwelling/household	Scale: Distance measured in metres	Ordnance Survey maps
Distance from dwelling to dwelling at rear	Distance between the rear of the dwelling and the one opposite	Dwelling/household	Scale: Distance measured in metres	Ordnance Survey maps
Distance from dwelling to dwelling to right	Distance between the dwelling and the dwelling to the right	Dwelling/household	Scale: Distance measured in metres	Ordnance Survey maps
Distance from dwelling to dwelling to left	Distance between the dwelling and the dwelling to the left	Dwelling/household	Scale: Distance measured in metres	Ordnance Survey maps
Number of bedrooms	Number of bedrooms	Dwelling/household	Scale: Integer	Household questionnaire

Table 5.1: Indicators measuring density

5.3.2 Indicators of dwelling types and the mix of dwelling types

A range of dwelling types in new developments is thought to be beneficial for social interaction between neighbours. However, a review of literature has shown there is no clearly defined way of measuring dwelling type mix in a development. Surveys such as the English Housing Survey (DCLG, 2010) record the dwelling type of each household surveyed but do not attempt to measure mix. Burton *et al.* (2005) highlight the importance of measuring dwelling type and dwelling type mix in their paper on The Built Environment Site Survey Checklist (BESSC). There is no measure of the ratio of dwelling types; however, the BESSC does include an indicator measuring how many dwellings are accessed from a street level entrance. This provides information on the ratio of houses to flats in a study area. Given the importance placed on dwelling type mix in sustainable development literature it was necessary to develop indicators that could reflect the dwelling type mix in the developments. The indicators are shown in Table 5.2. The dwelling type of all the units in each of the developments was established during the site survey and confirmed using OS Mastermap data.

Name of indicator	What is being measured	Type of variable and Unit of measurement or name of categories used	Source
Type of dwelling	Type of dwelling	Categorical: Detached; semi-detached; terrace; flat	Ordnance Survey maps
Mix of dwellings on street	The range of dwelling types found on a street	Ordinal: Score 1 to 4 (1= 1 dwelling type, 4= all dwelling types)	Site survey checklist
Ratio of dwelling types in development	The ratio of detached houses to terraced (and semi) houses and to flats within the development	Categorical: 0 = equal no. of det, terr & flats; 1=det>terr>flats; 2=det>flats>terr; 3=terr>det>flats; 4=terr>flats>det; 5=flats>terr>det; 6=flats>det>terr	Site survey checklist

Table 5.2: Indicators of dwelling types and the mix of dwelling types

5.3.3 Indicators of the mix of uses in the development

A variety of uses within a development is a key feature of sustainable design. There is some consensus regarding what uses should be included, in particular facilities and amenities that residents would regularly use. Ideally they should be located within walking distance of housing; Burton and Mitchell (2006) suggest that primary services (for example, GP surgery, general foodshop) should be no more than 500m from an older person's home. Barton *et al.* suggest a range of distances depending on the type of facilities and the population size required to make them viable (1995). The facilities and amenities measured in this research cover a broad range of those recommended in policy and theory/design guidance. The occurrence of the uses was recorded within the boundary of the development and also within a 500m buffer zone of the boundary. This was to allow for situations where new developments were built in well-provisioned neighbourhoods where new facilities were not required. It also accommodated the 'edge effect' where residents living on the periphery of a development may use a facility outside the development because it is more convenient than one within the development. An indicator measuring whether or not residents walk to facilities within and nearby the development was developed because encouraging residents to walk is one of the justifications for mixed-use development. The indicators are listed in Table 5.3.

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Local store in development or nearby	Is there one or more local stores in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Shopping centre or High Street in development or nearby	Is there one or more shopping centres or High Street in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Healthcentre or GP in development or nearby	Are there healthcare facilities in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Pre-school in development or nearby	Is there one or more pre-school facilities in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Primary school in development or nearby	Is there one or more primary schools in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Secondary school in development or nearby	Is there a secondary school in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Pub/cafe/restaurant in development or nearby	Is there one or more pub/cafe/restaurant in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Place of worship or community centre in development or nearby	Is there a place of worship or community centre in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Play area in development or nearby	Is there one or more play areas in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Park in development or nearby	Is there one or more parks in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Indoor leisure centre in development or nearby	Is there an indoor leisure centre in the development or within a 500m buffer zone	Dichotomous: Yes/no	Ordnance Survey map/ www.upmystreet.com
Land use to rear of dwelling	The type of land use to the rear of the dwelling	Categorical: Buildings; gardens; communal space; public open space; public open green space; fields; industrial/commercial; schools & grounds	Site survey
Land use to front of	The type of land use to the	Categorical: Buildings;	Site survey

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
dwelling	front of the dwelling	gardens; communal space; public open space; public open green space; fields; industrial/commercial; schools & grounds	
Walk to facilities in or nearby development	Does the respondent walk to any of the facilities available in or nearby to the development?	Dichotomous: yes/no	Household questionnaire

Table 5.3: Indicators of the mix of uses in the development

5.3.4 Indicators of location

Minimising the amount of new building on greenfield land is deemed to be sustainable and the government has responded by issuing targets for the amount of new housing that should occur on brownfield sites (DETR, 2000c; DCLG, 2006). Ideally the brownfield sites should be located in urban areas but frequently they are in rural or semi-rural areas, for example old military sites. Whether or not a site is brownfield is likely to have no impact on social interaction between neighbours and privacy in the home, however a rural or urban location may do. The indicators aim to measure the location of a dwelling in terms of a rural or urban position as shown in Table 5.4.

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Rural land use to rear of dwelling	Is the space to the rear of the dwelling open fields?	Dichotomous: fields/development	Site survey
Rural land use to front of dwelling	Is the space to the front of the dwelling open fields?	Dichotomous: fields/development	Site survey

Table 5.4: Indicators of location

5.3.5 Indicators of walkability

Many physical features contribute to making an urban environment walkable and some may impact on privacy in the home. Higher volumes of pedestrians are thought to increase the likelihood of social interactions occurring between neighbours and residents (Jacobs, 1961). A variety of ways to measure how walkable the urban environment is have been established in previous research. The indicators tend to be: direct metric measures, for example the length of urban blocks; likert scales that measure the quality of features such as street furniture; and categorical lists that classify cases according to particular criteria, for example predominant street pattern (see Table 5.5). Other indicators that attempt to metrically measure urban morphology have been developed and rigorously tested. One such collection of methods is that developed by University College London called Space Syntax and these are discussed in the following section.

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Local integration (permeability)	Measure of the relationship between one space and other spaces in the immediate locale	Scale	Ordnance Survey map/Depthmap software
Global integration (permeability)	Measure of the relationship between one space and all other spaces in a system	Scale	Ordnance Survey map/Depthmap software
Overall legibility	The overall legibility of a development	Ordinal: very good; good; adequate; poor; very poor	Site survey
Predominant street pattern	The overall street pattern in a development	Categorical: regular grid; distorted grid; curvilinear; culs-de-sac; radial; ribbon; no discernible pattern	Site survey
Mean length of blocks	Mean length of an urban block in the development	Scale: metres	Ordnance Survey maps
Quality of the public realm	The overall quality of the public places in a development	Ordinal: very good; good; adequate; poor; very poor	Site survey
Quality of the street furniture	Overall quality of the street furniture in a development	Ordinal: very good; good; adequate; poor; very poor	Site survey
Type of street calming	Level of traffic calming features	Categorical: none; street bumps?; Home Zone	Site survey
Levels of active frontage	Natural surveillance afforded by the design of the buildings	Ordinal: A (>25 openings per 100m); B (>15 openings per 100m); C (over 6 openings per 100m); D (<6 openings per 100m); E (<3 openings per 100m)	Site survey

Table 5.5: Indicators of walkability

5.3.5.1 Space Syntax indicators

Space Syntax is a theory of the configuration of space and how it reflects the society that created it (Hillier and Hanson, 1984; Hillier, 1996). Urban space can be understood as a system for movement. Spaces may be created at the local level but they feed into a whole system of spaces that allow people to move through an urban area (Hillier *et al.*, 1993; Hillier, 1996). Theorising about urban space in this way allows a clearer understanding of why some urban spaces attract more use than others. Along with the development of a theory of space there has also been a development of indicators for measuring the configuration of space. Two of these indicators are used in this research to measure the walkability of a development. The indicators are global integration and local integration. Global integration is a measure of the relationship of a space to every other space in a system. Local integration is a similar measure but on a smaller scale, that is it is a measure of the relationship of a space to every other space within a small section of a whole system. The integration value calculated for a street is an indication of how permeable and connected a street is, for example a cul-de-sac would likely have a low integration value because it is relatively short and connects with one street, the feeder. Whereas the feeder street would have a high integration value because it is connected to many other streets and tends to be a long route. From the integration measures it is possible to interpret how walkable a city is. A criticism of the Space Syntax methodology is that it is a two-dimensional measurement of a three-dimensional space. However when the integration measures are combined with the indicators of walkability in Table 5.5 a more rounded measurement of the urban environment is achieved.

5.3.6 Indicators of the amount, type and quality of recreational and communal space

Public open space has been shown to have a positive impact on physical and mental wellbeing (Newton, 2007). It is important that residents have access, preferably on foot, to public open space for recreational purposes. Young children benefit from having access to play areas close to their homes and play areas should be incorporated in sustainable housing developments (Barton *et al.*, 2003). Public open space can also foster social interactions, particularly where the spaces include a range of facilities, are aesthetically pleasing and rich in biodiversity (Sullivan *et al.*, 2004; Crawford *et al.*, 2008). Two variables were used to measure the provision of public outdoor space and play areas within the development and the nearby area, as shown in Table 5.6. As well as having access to public outdoor space it is argued that it is good for residents to have access to private or semi-private communal space. Access to private outdoor spaces can provide household members with a space to be alone that may not be available inside a dwelling (Oseland and Raw, 1996). Access to a communal space can provide opportunities for neighbours to interact with one another (Abu-Ghazzeh, 1999; Schaefer *et al.*, 1999). For communal spaces to be attractive to all residents they should contain a variety of features such as seating and trees for shade (Coley *et al.*, 1997; Skjaeveland and Garling, 1997). A combination of some, or all, of these features may result in a communal space being popular with residents. An indicator measuring the type of private and semi-private space to which each household has access was included. Five dichotomous indicators measuring the provision of features in communal spaces were used to assess the quality of the communal spaces.

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Public open space in development and nearby	The number of parks in the development and within a 500m buffer zone	Scale: integer	Ordnance Survey map/ www.upmystreet.com
Play areas in development and nearby	The number of play areas for young children in the development and within a 500m buffer zone	Scale: integer	Ordnance Survey map/ www.upmystreet.com
Private and semi-private outdoor space	Type of private or semi-private open space residents have access to.	Categorical: no POS & no Communal space; no POS & communal space; POS & no communal space: POS & communal space	Ordnance Survey map/ www.upmystreet.com
Hard surface in communal space	Are there hard surfaced areas in the communal space?	Dichotomous: Yes/no	Site survey
Planting in communal space	Is there planting in the communal space?	Dichotomous: Yes/no	Site survey
Grass in communal space	Are there grassed areas in the communal space?	Dichotomous: Yes/no	Site survey
Seating in communal space	Is there seating in the communal space?	Dichotomous: Yes/no	Site survey
Play facilities in communal space	Are there play facilities for young children in the communal space?	Dichotomous: yes/no	Site survey

Table 5.6: Indicators of the amount, type and quality of recreational and communal space

5.3.7 Indicators of car parking and bicycle storage provision

The discussion on energy efficient design in Chapter Four concluded that two physical features of energy efficient design are relevant to this research. The two features are car parking and cycle storage provision. The location of car parking and cycle storage facilities may have a beneficial impact on social interactions between neighbours. Communal and on-street facilities may facilitate social interactions in a way that in-curtilage storage does not (Gehl, 2001; Williams, 2005b). Categorical indicators were used to ascertain the type of car parking and cycle storage available to residents. A third indicator specifically measures the availability of on-street parking for cars.

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Type of cycle storage	The type of space a resident can store there bicycle in	Categorical: none, in-curtilage, public storage	Site survey
Car parking facilities	Type of provision for car parking	Categorical: on-street, communal courtyard, in-curtilage	Site survey
On-street parking	Whether parking is on – street or not.	Dichotomous: yes/no	Site survey

Table 5.7: Indicators of car parking and bicycle storage provision

5.3.8 Indicators of delineation between public and private space

Many features constitute high quality design (Dempsey, 2009), however only some of them are likely to impact on privacy in the home and social interactions between neighbours. The feature of particular interest in this research is the delineation between private and public space, and its quality. The boundary between public space and the private space of the home has been shown to impact on the privacy of the householder, especially the level of control they have over their private space (Al-Homoud and Tassinary, 2004). The relationship between neighbours can be affected by the type and quality of the boundary between their properties (Stokoe and Wallwork, 2003). Two indicators were used to measure delineation between private and public space. The first indicator measures the type of delineation, that is what feature is used to mark the separation between the different spaces (see Table 5.8). The second indicator measures the quality of the delineation between public and private space using a 5-point likert scale. This variable is taken as a proxy for the quality of the boundary separating neighbouring properties as it was not possible to collect data on the boundaries between private open spaces at the rear of properties.

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Type of delineation between public & private space	How private and public spaces are separated	Categorical; surface change; physical barrier; level change	Site survey
Quality of delineation between public & private space	The quality of the separation between public and private spaces	Categorical: very good; good; adequate; poor; very poor	Site survey

Table 5.8: Indicators of delineation between public and private space

5.3.9 Indicators of social interaction between neighbours

Social interaction between neighbours was measured in order to assess whether or not there are significant relationships with particular physical features of a sustainable housing development, as outlined in Chapter Four. Three indicators were used to measure social interactions. Two of the indicators specifically address relationships with neighbours, an underlying assumption being that social interactions needed to occur for the relationships (positive or negative) to develop. The third variable measures relationships between residents across a wider area, again the assumption is made that social interactions aided the development of the relationships (see Table 5.9). This measure was included to enable the analysis of some of the broader implications for social interactions of the design of sustainable housing development, for example the premise that legible layouts may aid social interaction. However, the primary focus of the research is on social interactions between neighbours rather than across the neighbourhood. Previous research has tended to look at community spirit and neighbouring across a whole neighbourhood (for example, Unger and Wandersman, 1982; Skjaeveland *et al.*, 1996). The overall measures used in such research are not appropriate for measuring social interactions between neighbours.

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Number of neighbours with positive relationship	How many neighbours the respondent has a positive relationship with	Scale/ordinal: 0-4	Household questionnaire
Get on with neighbours	The overall quality of the relationships with neighbours	Ordinal: do not get on at all; tend not to get on; fairly well; very well; do not know neighbours	Household questionnaire
Know people in the development	How many people the respondent knows in the development and nearby area	Ordinal: do not know people; know a few people; know some people; know many people	Household questionnaire

Table 5.9: Indicators of social interaction between neighbours

5.3.10 Indicators of privacy in the home

In order to assess the impact of the design of sustainable housing developments on privacy in the home, three aspects of privacy in the home were measured. The three aspects are levels of satisfaction with privacy from other members of the household; levels of comfort with overlooking by outsiders; and the impact of noise on privacy in the home. The indicators are listed in Table 5.10. The development and choice of questions were influenced by previous research on privacy in the home. The indicators measuring levels of satisfaction with privacy in particular rooms whilst other members of the household were at home were adapted from previous work on new housing in the UK (Oseland and Donald, 1993; Oseland and Raw, 1996). The use of existing indicators ensures that they are reliable and valid. It also allows comparisons between results from different research (Bryman, 2004).

The potential for overlooking by neighbours and passers-by to have a negative impact on privacy in the home was highlighted in Chapter Four. A second externality that may have a negative impact on privacy in the home is noise created by neighbours. The indicators measuring levels of comfort with the view into various parts of the home follow a similar design as the indicators for satisfaction with privacy in the home; likert scales were used to measure levels of comfort with overlooking for individual rooms. Three indicators were used to measure the impact of noise. Two measure the frequency with which noise made by neighbours is heard and one indicator measures how annoyed the respondent is with the noise. Likert scales measuring levels of annoyance with neighbour behaviour has been shown to be an effective measure in previous research (Levy-Leboyer and Naturel, 1991; Paquin and Gambrill, 1994).

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Satisfaction with privacy in private outdoor space (POS)	Level of satisfaction with privacy in POS when other members of household are about	Ordinal: very satisfied; satisfied; neither; unsatisfied; very unsatisfied	Household questionnaire
Satisfaction with privacy in kitchen area	Level of satisfaction with privacy in kitchen when other members of household are about	Ordinal: very satisfied; satisfied; neither; unsatisfied; very unsatisfied	Household questionnaire
Satisfaction with privacy in living area	Level of satisfaction with privacy in living area when other members of household are about	Ordinal: very satisfied; satisfied; neither; unsatisfied; very unsatisfied	Household questionnaire
Satisfaction with privacy in bedroom area	Level of satisfaction with privacy in bedroom when other members of household are about	Ordinal: very satisfied; satisfied; neither; unsatisfied; very unsatisfied	Household questionnaire
Overall satisfaction with privacy in home	Overall level of satisfaction with privacy in home when other members of household are about	Ordinal: very satisfied; satisfied; neither; unsatisfied; very unsatisfied	Household questionnaire
Level of comfort with view into living area	Level of comfort with the view into the living area from the street and neighbouring properties	Ordinal: very comfortable; comfortable; neither; uncomfortable; very uncomfortable	Household questionnaire
Level of comfort with view into bedroom area	Level of comfort with the view into the bedroom area from the street and neighbouring properties	Ordinal: very comfortable; comfortable; neither; uncomfortable; very uncomfortable	Household questionnaire

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Level of comfort with view into POS	Level of comfort with the view into the bedroom area from the street and neighbouring properties	Ordinal: very comfortable; comfortable; neither; uncomfortable; very uncomfortable	Household questionnaire
Frequency noise heard in home	How often neighbour noise is heard when respondent is in their home	Ordinal: constantly; much of the time; quite often; hardly ever; not at all	Household questionnaire
Frequency noise heard in POS	How often neighbour noise is heard when respondent is in their POS	Ordinal: constantly; much of the time; quite often; hardly ever; not at all	Household questionnaire
Level of annoyance with noise heard	Level of annoyance with the amount of noise heard	Ordinal: very annoyed; fairly annoyed; a little annoyed; not at all annoyed	Household questionnaire

Table 5.10: Indicators of privacy in the home

5.4 Intervening variables

Social interactions and privacy in the home are highly likely to be affected by other variables and it is necessary to account for these intervening variables where possible when investigating the influence of the built environment (De Vaus, 2002a; Robson, 2002; Bryman, 2004; Fielding and Gilbert, 2006). It is common practice to measure socio-economic and social characteristics of respondents so that the impact of factors such as age and gender can be tested (see Table 5.11). Previous research and methodological theory have shown that these factors can have a large impact on relationships between the built environment and behaviour (Rose and Sullivan, 1996; Burton and Mitchell, 2006). Key intervening variables measuring some characteristics of the respondent such as age, gender and socio-economic class were included in this research. Also included were measures relating to the household such as household type, tenure, the number of residents in the dwelling and the length of residency.

Name of indicator	What is being measured	Type of variable and unit of measurement or name of categories used	Source
Age	Age of respondent	Interval: under 30, between 30 and 40, over 40	Household questionnaire
Gender	Gender of respondent	Dichotomous: male/female	Household questionnaire
Socio-economic class	Socio-economic class	Categorical: Higher managerial and professional occupations; Lower managerial occupations; Intermediate occupations; Small employers and own account workers; Lower supervisory and technical occupations; Semi-routine occupations; Routine occupations; Unclassified	Household questionnaire
Household type	The composition of the household	Categorical: Couple with no dependents; Retired couple with no dependents; Couple with dependents; Lone parent with dependents; Other multi-person household; Single non-retired; Single retired	Household questionnaire
Tenure	Type of tenure	Categorical: Outright owner; mortgage; Part rent/part mortgage; Rent private landlord; rent RSL; No rent	Household questionnaire
Number of residents in dwelling	Number of people living in the dwelling	Scale: integer	Household questionnaire
Length of residency	How long the respondent has lived in this dwelling	Dichotomous: less than 2 years/ 2years or more	Household questionnaire

Table 5.11: Intervening variables

5.5 Case selection process

Choosing cases involved a rigorous process of identifying housing developments with particular physical features that are deemed to be sustainable. The criteria for sustainable physical features were determined by the literature review of sustainable design and the requirements of the 'Sustainable Lifestyles' project. The objective of the 'Sustainable Lifestyles' project was to assess whether the physical features of a sustainable development support sustainable behaviour (Williams and Dair, 2007). The criteria for both projects were very similar, that is the developments had to have physical features that reflected one or more of the sustainable design principles outlined in Chapter Four. The developments were also required to be of a certain age; between one and five years old. This age bracket was chosen because developments under five years old were subject to changes in planning policy that advocate sustainability whereas those over five years old were not. The minimum age of one year was chosen because residents were likely to be more settled into their daily routines.

A list of 50 developments was compiled as a result of an extensive desktop study to identify developments with physical features thought to be sustainable. The selected developments were all located in England and Wales. Developments from Scotland were excluded from the selection process because planning policy there is different to England and Wales. The constraints of time and cost were also taken into consideration. There is no central database recording sustainable development (Williams and Lindsay, 2007), therefore various databases were consulted, as well as promotional material and Corporate Sustainability Reports from housing developers. From the list of 50 developments a shortlist of 13 developments was selected based on the physical features present in the development. To ensure a statistically significant proportion of the sample included each of the sustainability features, each one had to be present in a minimum of four developments. This was important because the relationship between each physical feature and behaviour was tested across all the cases. The cases were not looked at independently of one another as discussed in Section 5.2.

The boundaries of the cases were defined according to the age of the development and also whether there were any features that delineated the development, for example a main road. In some larger developments parts of the site were incomplete, under one year old, or over five years old. These areas were excluded from the case because they did not fit the criteria outlined above. In other large developments features such as roads were used to delineate the case area because this was seen as an objective method for delineating neighbourhoods (Jenks and Dempsey, 2007). Buffer zones of 500m from the case boundaries were adopted for collecting the data on mixed use development. This was to ensure that data was collected on any uses residents on the edge of the case area might use because of their proximity (see Appendix C for maps outlining the boundaries of the cases and the buffer zones).

5.5.1 Overview of the cases

The thirteen developments chosen as the cases are located in England and Wales (see Figure 5.1). The names of the developments are:

- Grange Farm, Milton Keynes
- Amersham Road, Reading
- The Waterways, Oxford
- Alpine Close, Maidenhead

- The Courtyards, near Horsham
- Great Notley Garden Village, Braintree
- Greenwich Millennium Village, London
- Ingress Park, Greenhithe
- Lansdowne Gardens, Cardiff
- Newcastle Great Park, Newcastle-upon-Tyne
- Westoe Crown Village, South Shields
- The Staiths South Bank, Gateshead
- Cooper Road, Rye

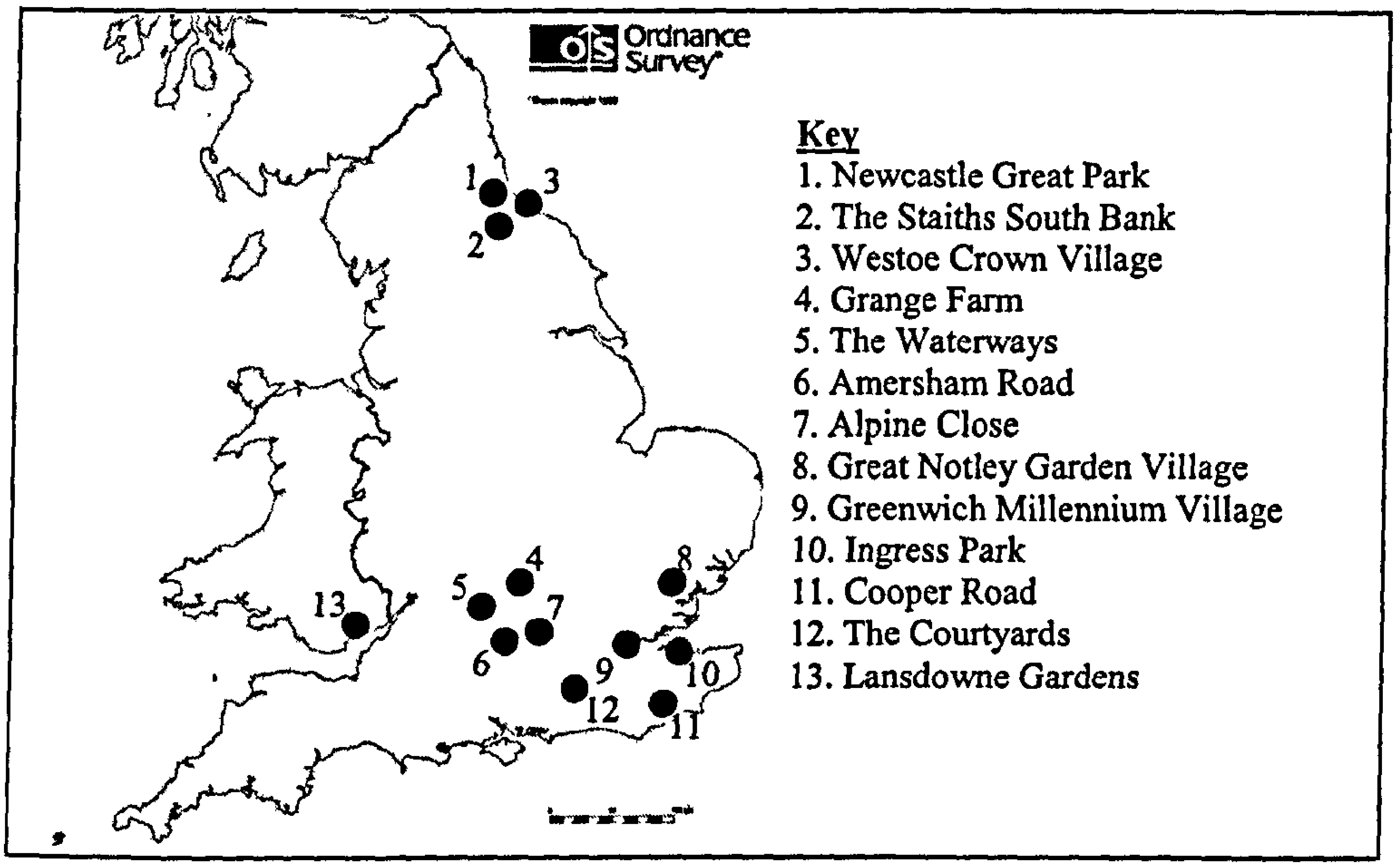


Figure 5.1: Map showing the locations of the 13 developments

The data in Table 5.1 provides an overview of some of the characteristics of the developments used as cases in the research. The cases range in size from 27 units to 303 units. In some of the cases there is a tenure mix including both private and RSL tenants as well as owner-occupiers. Five of the cases are made up entirely of private owners and renters, and in one case (Cooper Road) the residents all rent from the registered social landlord (RSL). The cases are located in both greenfield and brownfield sites, some in rural locations and others in urban centres, or edges. A variety of uses were recorded for each development and its buffer zone, including newsagents, schools and pubs. There is a variety of dwelling mixes across the cases; some developments (for example The Courtyards) have the four dwelling types whereas some developments only have two dwelling types (there are only flats and terraced housing in Westoe Crown Village). Terraced housing features in all the developments. The cases represent the type of development commonly being built across England and Wales in the last eight years.

Name of 'Sustainable' development	**Grange Farm, Milton Keynes (Bellway Homes)**	**Amersham Road, Reading (Catalyst Housing Group)**	**The Waterways, Oxford (Berkeley Group)**	**Alpine Close, Maidenhead (Maidenhead & District HA)**	**The Courtyards, nr Horsham (English Courtyard Association)**	**Great Notley Garden Village, Braintree (Countryside Properties)**	**Greenwich Millennium Village, London (English Partnerships)**	**Ingress Park, Greenhithe (Crest Nicholson)**	**Lansdowne Gardens, Cardiff (Taff HA/ Redrow Homes)**	**Newcastle Great Park, Newcastle-upon-Tyne (consortium)**	**Westoe Crown Village, South Shields (George Wimpey)**	**The Staiths South Bank, Gateshead (George Wimpey)**	**Cooper Road, Rye (Rother Homes)**
General profile data													
No of units	39	172	291	27	104	265	303	216	215	175	122	159	68
Dwellings per hectare (net)	26.0	27.1	42.0	42.0	32.5	28.0	153.0	32.0	38.7	29.1	87.1	55.0	29.9
Greenfield/brownfield	G	B	B	B	G	G	B	B	B	G	B	B	G
Rural/edge/centre	E	C	E	C	R	R	C	E	C	E	C	C	E/R
Total no of uses[1]	1	5	2	2	2	3	5	2	2	2	2	3	1
Uses													
No. parks/play areas	4	5	4	4	0	1	4	4	1	4	6	4	2
No. cafes, pubs, etc	0	2	2	2	0	1	5	4	6	1	9	1	4
No of schools[2]	1	1	6	6	0	3	2	2	4	3	8	2	2
No of local shops	0	1	1	1	0	1	2	2	3	2	2	2	1
Tenure													
% private homes	100	36	87	87	85	89	85	100	75	100	100	100	0
% RSL homes[3]	0	64	13	13	15	11	15	0	25	0	0	0	100
Dwelling mix													
Flats	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N
Terraced housing	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Semi-detached housing	Y	Y	Y	N	Y	Y	N	Y	Y	Y	N	Y	Y
Detached housing	Y	Y	N	N	Y	Y	N	Y	Y	Y	N	N	Y

Notes:

1. This is simple a count of the number of different uses. Categories were: schools, health facilities, place of worship or community halls, local store (e.g. post office, newsagent or food store), shopping centre or high street, social space (e.g. public house, restaurant, café'), indoor leisure/sports facility, park and public open space. This count is for uses in the development (i.e. within the boundary of the development area) and nearby (within a 500m radius of the development boundary)
2. This includes pre-school, primary and secondary in the development or within 500m of the boundary.
3. RSL: Registered Social Landlord

Table 5.12: An overview of some of the characteristics of the developments

Figures 5.2 to 5.14 illustrate the thirteen developments. The design in some developments, such as Great Notley Garden Village (Figure 5.7), seeks to replicate the character of the buildings in the local area, whereas the energy efficient design of Alpine Close (Figure 5.5) is reflected in its appearance. Many of the developments consist of red brick housing with the occasional feature wall made from wood (for example The Courtyards, Figure 5.6). Greenwich Millennium Village (Figure 5.8) and The Staiths South Bank (Figure 5.13) are less traditional in their appearance despite the building materials being similar to those in the other developments.

Figure 5.2 a&b: Images of Grange Farm development

Figure 5.3 a&b: Images of Amersham Road development

Figure 5.4 a, b&c: Images of The Waterways development

Figure 5.5 a&b: Images of Alpine Close development

Figure 5.6 a, b&c: Images of The Courtyards development

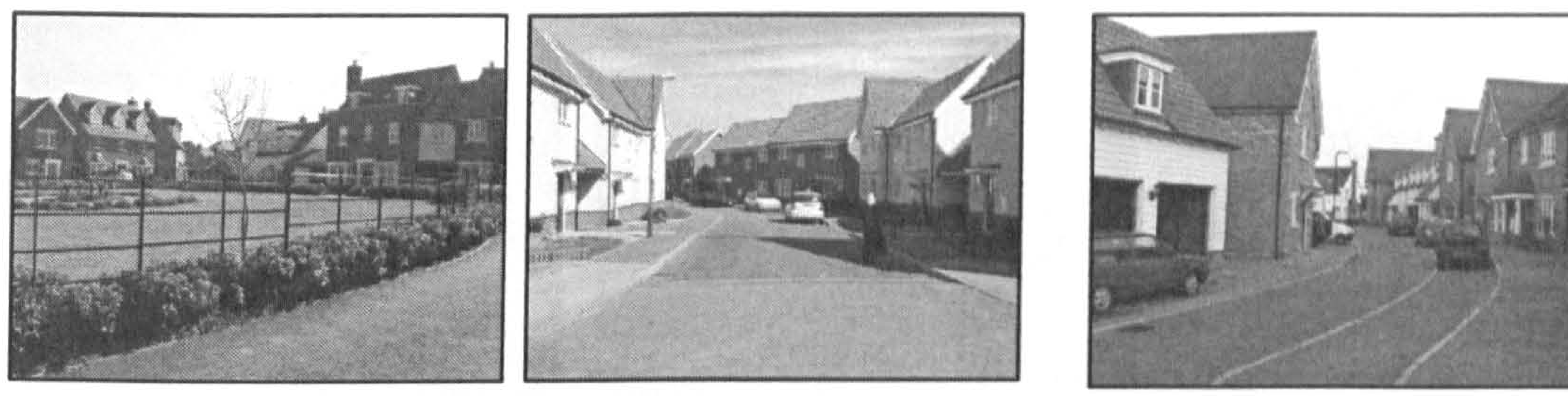


Figure 5.7 a, b&c: Images of Great Notley Garden Village development

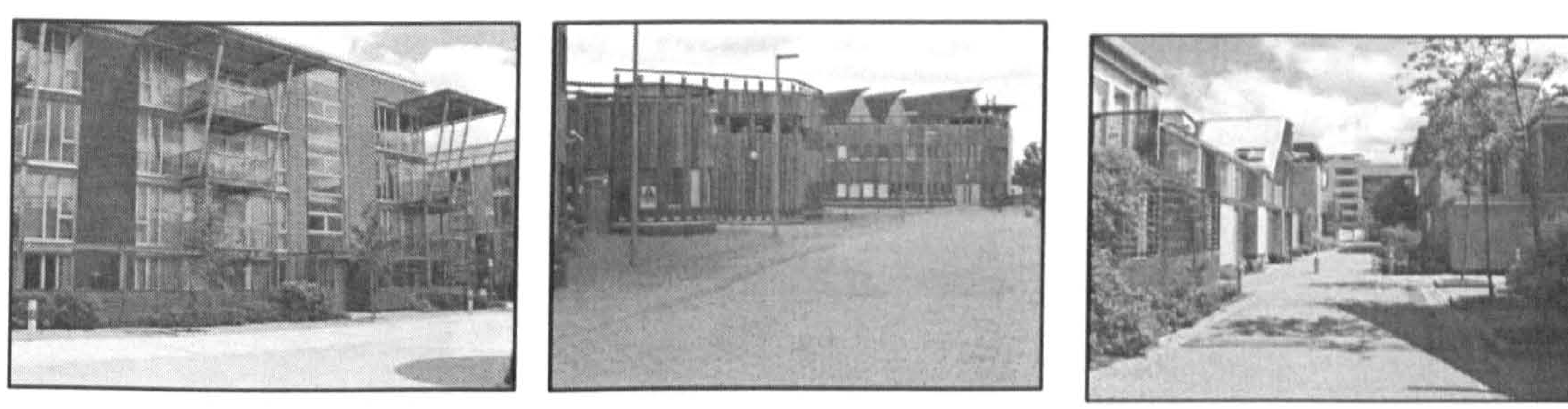


Figure 5.8 a, b&c: Images of Greenwich Millennium Village development

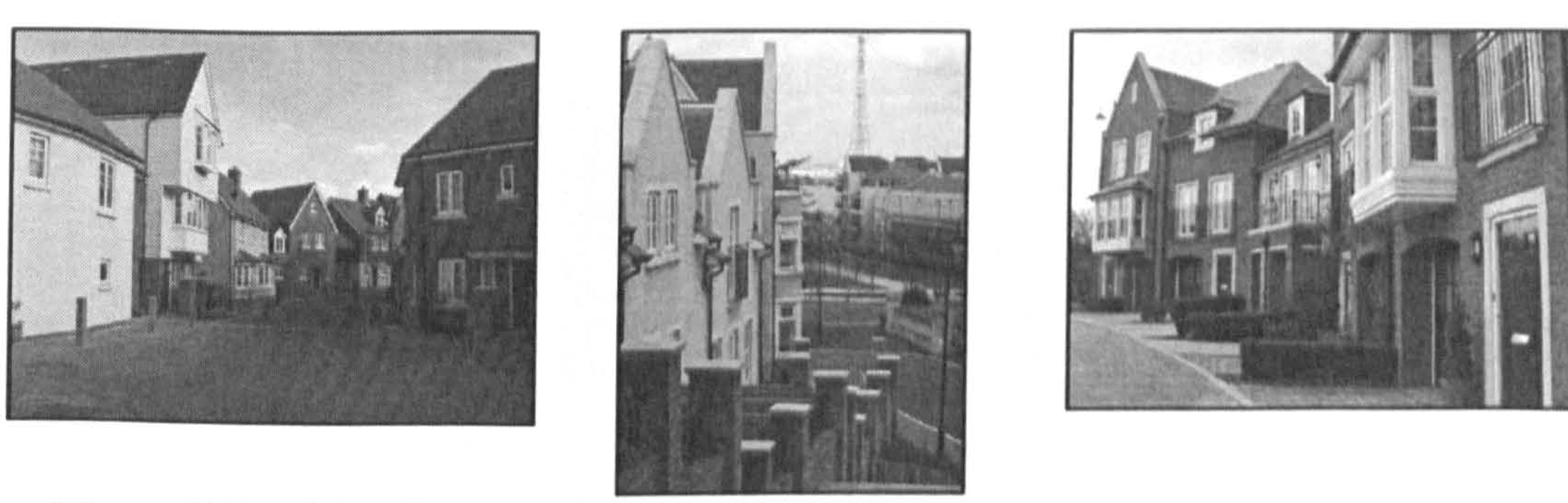


Figure 5.9 a, b&c: Images of Ingress Park development

Figure 5.10 a, b&c: Images of Lansdowne Gardens development

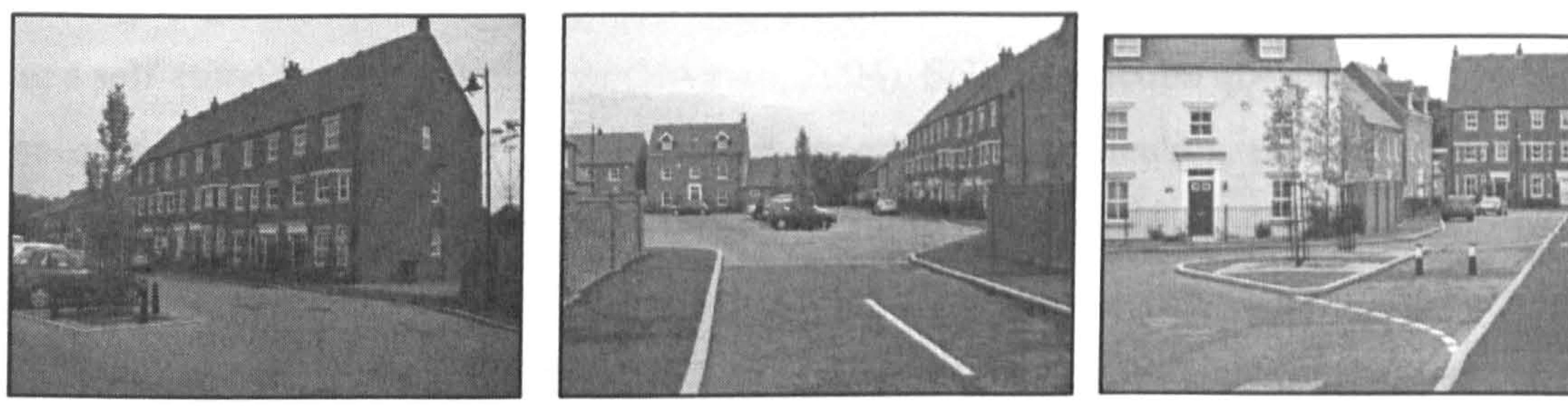


Figure 5.11 a, b&c: Images of Newcastle Great Park development

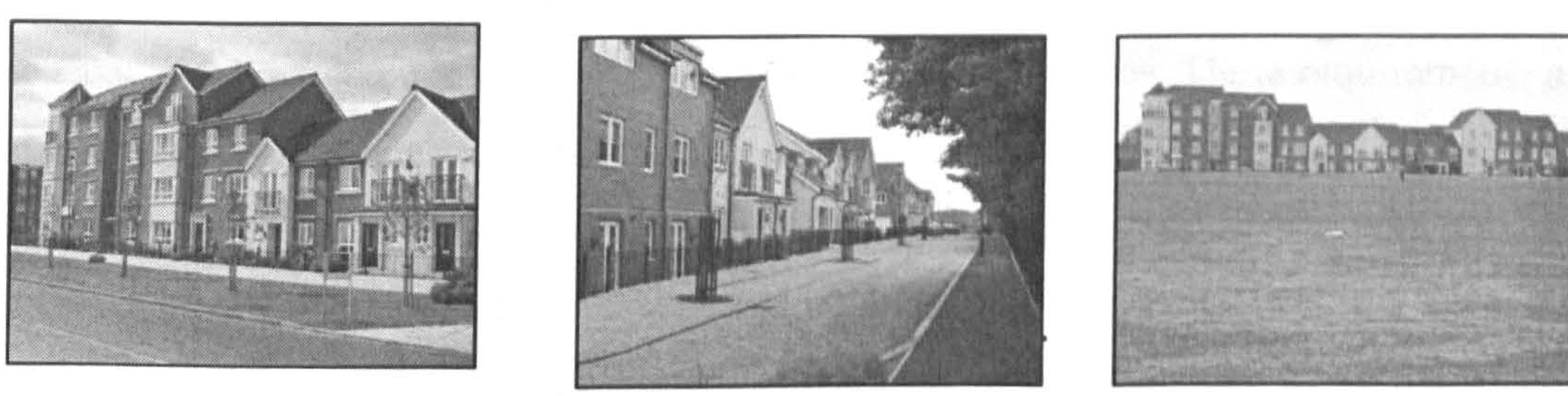


Figure 5.12 a, b&c: Images of Westoe Crown Village development

Figure 5.13 a, b&c: Images of The Staiths South Bank development

Figure 5.14 a, b&c: Images of Cooper Road development

5.6 Data collection

The information collected to measure the indicators is mostly primary data. Two methods were used to gather the information: a household questionnaire was used to collect information regarding individuals' behaviours and household profile data; and a site survey checklist was used to collect information on the physical features of the developments.

5.6.1 Household questionnaire

Collecting large amounts of data from many people on their behaviour is best achieved using a self-completion questionnaire (Bryman, 2004). Self-completion questionnaires tend to be cost- and time-effective in comparison to other data collection methods such as structured interviews (ibid.). However, self-completion questionnaires do have limitations with regard to the information that is being collected because there is no interviewer to guide the respondent through the questions (although having an interviewer can be problematic and influence the respondents' answers). Questions in self-completion questionnaires tend to be closed rather than open-ended and the best questionnaires should be easy to follow and not too long to ensure complete responses. These requirements mean that the wording of questions has to be accurate to minimise the possibility of respondents misinterpreting the questions (Oppenheim, 1992). A pilot study was conducted in two stages; first the questionnaire was reviewed by a panel of experts and second it was tested in the field. The wording of questions was changed where necessary to ensure meanings were clear.

The method of administration can vary; a common approach is to post the questionnaire with a stamped addressed envelope, however return rates can be low with this method (Bryman, 2004). An alternative approach is to deliver and collect the questionnaires by hand. The involvement of personnel can result in higher response rates (ibid.) but can lead to higher costs. The approach taken in this research is a hybrid; the questionnaires were posted to the residents of the developments and collected by fieldworkers in an effort to maximise response rates.

The household questionnaire was posted to 2005 residents in the thirteen developments (see Appendix A for a copy of the questionnaire). In the smaller developments the questionnaire was sent to all the residents and in the larger developments it was sent to a randomly selected sample (for example, every second or third address). The residents were given approximately one week to complete the questionnaire and then fieldworkers visited the developments to collect the questionnaires. If no-one was at home, the fieldworker left a leaflet stating when they would next visit. Households were visited up to three times at various periods of the day over the course of three days. If there was no response on the third visit a questionnaire and stamped addressed envelope was left. Seventy-four per cent of the questionnaires were collected by the fieldworkers and the remaining 26% were returned by post. Overall the response rate was 33%, as shown in Table 5.12. The lowest response rate, of 25%, was in Greenwich Millennium Village. This development has been the focus of previous research and the residents may have been suffering from survey fatigue. There are also a high number of flats and these proved to be difficult to access at times in this development, and in others such as Westoe Crown Village and The Staiths South Bank. The highest response rate of 60% was in Grange Farm. Out of the developments where the household questionnaire was posted The Waterways had the highest return rate of 42%, possibly as a result of the socio-economic profile of this area. The overall total number of questionnaires returned was 659 and this was a sufficient number of cases to analyse statistically.

Name of development	Total number of questionnaires sent	Number of questionnaires returned	Percentage returned (%)
Grange Farm	25	15	60
Amersham Road	190	59	31
The Waterways	194	82	42
Alpine Close	27	11	41
The Courtyards	105	35	33
Great Notley Garden Village	204	64	31
Greenwich Millennium Village	302	77	25
Ingress Park	229	71	31
Lansdowne Gardens	215	78	36
Newcastle Great Park	175	68	39
Westoe Crown Village	111	30	27
The Staiths South Bank	158	42	27
Cooper Road	70	27	39
Overall	**2005**	**659**	**33**

Table 5.13: Household questionnaire response rates by development

5.6.2 Site survey checklist

The site survey checklist was a research instrument used to provide a framework for the collection of data on the physical features of the developments. The physical features were measured in one or more of four ways which were either developed specifically for this research or adapted from previous research (for example, Rao *et al.*, 2000; Burton *et al.*, 2005). For some features the quantity of the feature was measured, for example the area of the POS to the front of the dwelling, or the number of parks in the development. The second type of measurement was dichotomous and assessed whether or not a feature existed in the development or dwelling, for example communal cycle storage. The third type of indicator was descriptive, for example the predominant street pattern in the development. The fourth measurement was the quality of the feature. This measure was susceptible to the subjectivity of the fieldworker so two steps were taken to minimise subjectivity. The first step was the development of guidelines to ensure that each fieldworker was working to the same standards. The second step was that measures of quality were rated by two independent fieldworkers and then the results were tested for interrater reliability. Consequently all the measurements of quality were reliable. The indicators were measured at one of three levels; the individual dwelling, the street or the development. Some of the data were collected on site visits to each of the developments whilst other data were collected using Ordnance Survey Mastermap in the MapInfo software package. For some of the physical features it was necessary to collect the information from the local planning office. This enhanced the accuracy of the site survey checklist because it resulted in the information for some features being collected twice, once in situ and a second time in the planning office. The site survey checklist can be found in Appendix B.

5.7 Data analysis

The data from the site survey checklist and the household questionnaire were entered into an Access database and transferred to the Statistical Package for Social Sciences (SPSS) programme for analyses. The analyses investigated three of the research questions:

- What is the impact of design elements on social interaction between neighbours in sustainable housing developments?
- Do the design features of sustainable housing developments have an impact on privacy in the home and if so, what is the nature of the impact?
- How does privacy in the home affect the relationship between design and social interactions between neighbours?

Preliminary analyses using descriptive statistics such as frequencies were carried out to provide information about each of the thirteen developments and the sample. Descriptive statistics may aid the interpretation of more complex analyses and are therefore an important first step in scrutinising the data. The second step was to answer the three questions above in terms of the strength and direction of associations between variables. This was achieved using multiple linear regression, binary logistic regression analyses, factorial ANOVA analyses and loglinear analyses. Binary logistic regression was used where the outcome variables were dichotomous and multiple linear regression was used for models where the outcome variables were ordinal or continuous. Factorial ANOVA analyses and loglinear analyses were used to test the third relationship where the interaction between two predictor variables may have a significant relationship with the outcome variable. Loglinear analyses were used where the variables were categorical and factorial ANOVA analyses were used for continuous or ordinal outcome variables.

5.7.1 Regression analyses

Multiple linear regression analyses are used to predict the value of an outcome (or dependent) variable based on the values of predictor (or independent) variables. The relationship between predictor and outcome variables is described using a linear model, that is the general trend is summarised using a straight line that best fits the data (Field, 2005). Binary logistic regression is used where the outcome variable is dichotomous; the model predicts which value the outcome variable is most likely to be, based on the values of the predictor variables (ibid.). When carrying out multiple linear regression there are some rules and assumptions that should be met to ensure that the analyses are rigorous and accurate: it is best if the predictor variables are not highly inter-correlated as this can lead to unreliable models; the general trend in the data should be a linear relationship between the predictor and output variables; a normal distribution of data for each variable is preferable to minimise the risk of distorting the Type I error rate; the relationship between predictor and outcome variables should be homoscedastic, that is the values of the predictor and outcome variables should vary consistently across the dataset; and the researcher needs to be wary of the influence of outliers as these can have a disproportionate impact on the model (De Vaus, 2002a; Field, 2005). The main concern with binary logistic regression is the issue of multicollinearity between predictor variables as this can lead to unstable and biased models (Field, 2005).

Multiple linear regression can be carried out manually or can be automated using the process of forwards, backwards or stepwise regression (Field, 2005). Research has shown that the three automated methods (forwards, backwards and stepwise) of regression can produce different models from the same data, especially when the predictor variables are highly correlated (Derksen and Keselman, 1992). There is also a danger that using one of these methods leads to an inappropriate belief in one model where other combinations of predictor variables might provide an equally powerful model, or a better one (Whittingham *et al.*, 2006). Field (2005) emphasises the importance of basing the choice of predictor variables on theory and previous research rather than relying on the mathematical rationale used by SPSS when calculating regression models. To overcome the shortcomings in the methods of regression analyses the choice of predictor variables was based on previous research and theory. Also, both backwards and forwards regression methods were used and the results were compared to ensure that the best model for the data was chosen.

5.7.2 Factorial ANOVA analysis

Factorial ANOVA analysis is used to compare the variance in an outcome variable caused by more than one predictor variable, with the variance caused by unmeasured factors (Field, 2005). Analysing the data using factorial ANOVA enables the effect of an interaction between the predictor variables to be tested. In the case of this research the effect of the interaction between the physical features and privacy in the home on social interactions between neighbours was tested. As with multiple regression there are assumptions regarding the data that should be met to ensure the validity of the analysis. The analysis works best if the data is normally distributed, the variances between groups are evenly spaced, the predictor variables are independent of one another, and the outcome variable is continuous (ibid.). However, ANOVA can still be accurate even if an assumption is violated, particularly the homogeneity of the data and the outcome variable not being continuous. If the group sizes across the predictor variables are equal then the ANOVA analysis maintains its robustness. As this was the case in this research it was possible to use ANOVA analyses.

The impact on the outcome variable of the interaction between two predictor variables can be more significant, and have a greater effect, than either of the predictor variables taken independently (Field, 2005). The effect size is an important part of data analysis that is often overlooked because null hypothesis testing using significance values is regarded as adequate evidence of a relationship (Cohen, 1990; Field, 2005). The effect size is 'an objective and standardised measure of the magnitude of an observed effect.' (Field, 2005, p.730). It is common for an effect to be significant, particularly when a large sample has been used, even when the effect is so small as to be unimportant (ibid.). Rejecting null hypotheses in these conditions is common but may not be statistically rigorous (Cohen, 1992). The calculation of the effect size takes into account the sample size and the probability of a Type I error and is therefore a robust and meaningful estimation of the impact of a variable (ibid.). Reporting the effect size for an interaction is particularly useful because it is possible to compare the size of the effect of the interaction with the size of the effects of the separate predictor variables. The interpretation of these results contributes to a greater understanding of the relationships being tested; in this case those between physical features and privacy in the home, and social interaction between neighbours.

5.7.3 Loglinear analyses

Loglinear analysis was used in this research to test for interaction effects between categorical predictor variables measuring physical features and privacy in the home. Loglinear analysis is used to test whether there is a relationship between three or more categorical predictor variables, and is an extension of the chi-square test of independence. The analysis is similar to a factorial ANOVA but log transformed values are used. Loglinear analysis works in a hierarchical fashion to 'try to fit a simpler model to the data without any substantial loss of predictive power' (Field, 2005, p703). The most complex model is fitted to the data first and then the most complex interaction is removed and this process is continued until the simplest but most powerful model is found. The assumptions for loglinear analysis are similar to the chi-square test; the cells of the table should be independent of one another and the frequencies need to be large enough for the analysis to be reliable (Field, 2005). If either of these assumptions are violated then the test power of the analysis is substantially reduced.

5.8 Conclusion

The methodology for the collection and analyses of data relating to the research aims has been expounded in this chapter. The rationale for the selection of cases was explained and the development of indicators was discussed. The data were collected using two methods: data regarding the characteristics and behaviours of the residents of sustainable housing developments were gathered using a household questionnaire; and information pertaining to the physical features of sustainable housing developments was collected using a site survey checklist. The relationships between the physical features of the sustainable housing developments, privacy in the home and social interactions between neighbours were analysed using multiple regression, binary logistic regression and factorial ANOVA. The results of the analyses must be treated with caution and it may be inappropriate to generalise beyond the developments studied. However, the results will help to further understand the impact of the design of sustainable housing developments on privacy in the home, and social interactions between neighbours and therefore contribute new knowledge.

The following chapter provides information relating to the characteristics of the sample and the case studies. The descriptive statistics enables the reader to familiarise themselves with the sample in order to enhance the understanding of the regression analyses.

chapter SIX

A description of the sample and the cases

Chapter Six: A description of the sample and the cases

6.1 Introduction

This chapter provides some background information and general characteristics of the sample and the cases. The information regarding the sample is taken from the household questionnaire which was distributed to residents in the thirteen housing developments. Data for each development from the site survey checklist is presented according to the eight principles of sustainable design defined in Chapter Four. Most of the data is arranged so that there is an overall figure as well as figures for each development to provide an overview of the different characteristics of each of the developments. However comparisons are not made between developments in later analyses because the dataset as a whole was analysed rather than employing a comparative analysis. The data presented in this chapter are descriptive and as such provide background information that may help with the interpretation of the results of the regression analyses in the following chapters.

A detailed explanation of the methodology for choosing the cases was given in Chapter Five (Section 5.4). As was explained, this research is linked to the CityForm Plus project 'Sustainable Lifestyles' and therefore the criteria for choosing cases were related to physical features of the built environment that may engender sustainable behaviours, including social interactions. Thirteen cases were chosen in order that all the physical features of interest were represented and could be analysed for their impact on respondents' behaviours. The developments are located in England and Wales; Scottish developments were considered however they were rejected due to variations in planning laws and building regulations, prohibitive costs and limited time. Depending on the size of the development, either all residents were sent a household questionnaire, or a group was randomly selected for inclusion in the sample.

6.2 Features of the design principles

The tables in this section contain data pertaining to the eight design principles of sustainable housing developments. The data are broken down into the indicators used to measure the impact of the design principles on various physical features.

6.2.1 Higher densities

The potential impact of higher densities on the physical features of the development was measured in several ways and relates to distances between dwellings and areas of private outdoor spaces. Density was also measured using an overall measure; net dwelling density which is the number of dwellings per hectare (dph) of residential land (see Section 5.3.1 in Chapter Five for a full discussion). The net dwelling density ranges from 26dph in Grange Farm to 153dph in the Greenwich Millennium Village as shown in Table 6.1. Overall there are four developments with a net dwelling density between 30dph and 50dph, the level of density specified in planning policy (DCLG, 2006). Five developments have been built to densities below 30dph and four developments have been built to higher densities.

As well as the net dwelling density Table 6.1 shows the indicators for the area of private open space (POS) to the front and rear of a dwelling, the distances between dwellings and the setback distance between the dwelling and the street. The two developments where all dwellings have a POS to the front have net dwelling densities under 30dph. Of the two developments, Cooper Road also has the highest mean area (89.6 m^2) of POS to the front. The lowest mean for a front POS occurs in The Waterways which has a net dwelling density of 42dph. However, the highest area for a rear POS also occurs in The Waterways development suggesting that higher dwelling densities do not necessarily compromise the ability to provide large areas of private open space. Average areas for a rear POS are highest in the low-density development of Cooper Road, whereas the lowest is in Greenwich Millennium Village, the development with the highest net dwelling density.

All the developments have some dwellings attached to other dwellings in the form of flats, terraces, semi-detached or linked-detached housing types. This is shown numerically by the minimum distance from a dwelling to the dwelling to the left or the right being 0m for all developments. The lowest maximum and mean distances between dwellings left and right occur in Greenwich Millennium Village and Westoe Crown Village; the two developments with the highest net dwelling densities of 153dph and 87dph respectively.

The low-density development of Grange Farm has the highest average distances between dwellings to the left and right. The highest average distance between a dwelling and the dwelling to the rear occurs in Greenwich Millennium Village: this is likely to be a result of the communal gardens around which the properties are situated. Some of the minimum distances between dwellings at the rear are very low, for example 2.2m in Ingress Park, where dwellings are adjacent to narrow walkways. Low minimum distances between dwellings and the dwellings to the front occur in Ingress Park and The Courtyards developments. Again, the design of the layout means that some dwellings are adjacent to narrow walkways. The setback distance between the front of dwellings and the street vary considerably across the developments. The minimum distance is 0m, that is front doors open directly on to the pavement or street, and the maximum distance is 42.6m, which occurs in The Waterways development. This is probably because some houses in The Waterways are accessed from semi-private communal roads rather than public roads. The data discussed here suggest that at this stage it is possible to surmise that there may be some correlation between higher densities and reduced amounts of space between dwellings.

Data were collected on some internal measures of dwellings that may be affected by higher net density values. The data were not available for all cases due to files either being in storage or destroyed by the housing developers. However, data were collected for seven of the thirteen developments representing 216 respondents (see Table 6.2). The data show that there is a wide range in the internal areas of the dwellings in the sample; the minimum total internal area is 33.3m^2 and the maximum is 188.3m^2. However, the range is not so wide for the area per bedspace measurement; the minimum is 7m^2 and the maximum is 13m^2. The mean measurements for Grange Farm tend to be the highest across the developments and may be related to the high number of detached dwellings in the Grange Farm development. Many of the dwellings in The Waterways are terraced (see Table 6.3 in Section 6.2.2 below) but despite this the mean internal areas are above the average for the sample, although the mean area per bedspace measurement is just under the average. The figures suggest that in some developments there is a bigger variety in dwelling sizes than in other developments. For example in Newcastle Great Park the number of bedspaces per dwelling ranges from four to ten but in Westoe Crown Village the range is three to six. There does not seem to be a correlation between the net dwelling density of a development and the internal measurements of the dwellings. However, this can only be confirmed with further statistical analyses testing the relationships between variables.

Density Measure	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
Area of private open space to front (m^2)														
Min	0.0	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.7
Max	230.6	158.8	230.6	52.6	128.7	172.0	120.6	48.5	47.1	203.9	64.3	54.7	53.0	152.7
Mean	25.7	51.1	71.2	2.5	25.2	23.1	34.3	4.7	13.7	42.4	14.4	6.8	12.0	89.6
Area of private open space to rear (m^2)														
Min	0.0	71.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.2	0.0	0.0	78.0
Max	344.3	237.5	232.9	344.3	119.1	271.8	284.5	42.7	205.4	257.7	295.4	70.3	99.6	213.5
Mean	68.9	112.8	101.9	55.9	31.5	69.7	113.7	4.6	61.3	78.7	111.5	12.4	29.9	129.0
Distance to dwelling to left (m)														
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max	45.2	29.2	24.0	33.8	20.9	19.6	45.2	7.7	15.2	23.0	17.8	2.5	21.3	33.8
Mean	2.4	7.5	3.0	1.2	4.1	1.9	3.7	0.1	2.4	2.9	4.0	0.1	1.6	5.5
Distance to dwelling to right (m)														
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max	42.4	14.2	25.7	41.4	11.1	16.0	42.4	0.0	16.3	16.6	13.6	12.6	36.4	40.1
Mean	2.3	5.1	2.3	1.3	4.0	1.7	4.9	0.0	2.8	2.4	3.8	0.4	1.3	3.7
Distance to dwelling to rear (m)														
Min	2.1	10.8	11.8	10.3	n/a	9.6	2.1	13.7	2.2	11.4	8.8	13.5	11.6	11.8
Max	64.3	29.2	39.0	64.3	n/a	39.5	36.7	49.1	28.9	29.5	27.1	60.0	34.0	35.3
Mean	23.8	20.1	22.8	36.5	n/a	20.3	21.3	37.6	17.9	18.3	18.4	24.4	31.8	23.1
Distance to dwelling to front (m)														
Min	2.0	10.4	14.2	3.8	n/a	3.2	6.7	8.5	2.0	10.4	6.7	12.9	16.9	9.9
Max	49.6	34.2	46.8	51.4	n/a	30.5	36.3	14.5	30.5	37.1	31.0	32.3	49.6	43.0
Mean	20.9	23.8	27.1	29.4	n/a	18.4	18.7	11.8	13.5	20.3	15.6	16.6	29.3	26.4
Setback Distance (m)														
Min	0.0	1.1	0.0	3.4	4.1	0.8	0.0	1.6	0.0	1.9	0.0	1.5	0.0	1.9
Max	42.6	10.7	23.2	42.6	9.7	10.6	8.5	6.3	7.6	20.5	10.7	6.8	10.1	15.6
Mean	5.2	4.5	11.1	11.8	7.0	2.6	2.6	3.5	2.1	6.0	1.4	2.5	3.6	9.4
Net dwelling density (dph)	26	27	42	61	32.5	28	153	32	39	29	87	55	30	
Dwelling densitygroup[1]	L	L	M	H	M	L	H	M	M	L	H	H	L	

[1]Dwelling density by group divided into three groups: Low (L), d<30; Medium (M), 30<d<50; and High (H), d>50

Table 6.1: Indicators of external measurements of higher densities by development

Density Measure	Overall	Grange Farm[1]	Amersham Road	The Waterways[2]	Alpine Close	The Courtyards	Great Notley[3]	GMV	Ingress Park[4]	Lansdowne Gdns	NGP[5]	Westoe Crown Vill.[6]	The Staiths Sth Bk[7]	Cooper Road
Area of living space (incl. dining) m²														
Min	12.9	18.7	-	15.4	-	-	23.2	-	16.6	-	12.9	14.2	15.9	-
Max	68.1	68.1	-	52.1	-	-	56.7	-	56.8	-	55.3	28.4	38.9	-
Mean	29.7	34.6	-	32.0	-	-	34.2	-	31.9	-	30.7	17.3	27.6	-
Area of kitchen space m²														
Min	4.5	6.6	-	7.0	-	-	5.1	-	5.4	-	7.8	5.5	4.5	-
Max	64.2	17.6	-	64.2	-	-	27.0	-	16.5	-	20.9	13.2	13.6	-
Mean	12.9	13.2	-	20.8	-	-	13.6	-	10.0	-	12.7	7.6	9.6	-
Area of bedroom space m²														
Min	10.7	46.5	-	19.9	-	-	36.4	-	12.0	-	26.6	16.2	10.7	-
Max	103.6	103.6	-	49.4	-	-	58.2	-	50.8	-	69.2	34.9	45.5	-
Mean	36.6	62.2	-	37.7	-	-	44.5	-	34.7	-	39.9	19.1	28.1	-
Total indoor area m²														
Min	33.3	79.5	-	43.2	-	-	67.7	-	43.8	-	59.8	39.6	33.3	-
Max	188.3	188.3	-	123.2	-	-	138.2	-	108.2	-	140.9	71.2	93.4	-
Mean	78.6	110.0	-	88.9	-	-	92.3	-	76.6	-	83.4	44.0	61.6	-
Number of bedspaces														
Min	2	5	-	4	-	-	4	-	2	-	4	3	2	-
Max	11	11	-	8	-	-	10	-	8	-	10	6	7	-
Mean	6	7.6	-	7	-	-	7	-	6	-	6.6	3.8	4.8	-
Area per bedspace m²														
Min	7.0	12.1	-	7.0	-	-	10.7	-	10.7	-	11.0	10.1	10.8	-
Max	23.7	17.1	-	17.9	-	-	18.3	-	23.7	-	20.1	14.5	16.7	-
Mean	13.0	14.5	-	12.7	-	-	13.5	-	13.8	-	12.8	11.8	13.1	-

[1] N=11, [2] N=35, [3] N=15, [4] N=37, [5] N=68, [6] N=27, [7] N=13(for kitchen area N=8)

Table 6.2: Indicators of internal measurements of higher densities by development

6.2.2 Mix of dwelling types and sizes

A mix of dwelling types and sizes (alongside mixed tenure) is advocated in policy as a means to encourage mixed communities within a development (DCLG, 2006). Four of the developments include houses that are detached, semi-detached or terraced, and flats: Amersham Road, Great Notley, Ingress Park and Lansdowne Gardens (Table 6.3). Amersham Road, Great Notley and Lansdowne Gardens also have a mixture of social and private housing (see Table 6.16 in Section 6.3.6 below). These developments tend to have dwelling densities at the lower end of the range whereas the developments with just terraced housing and flats have dwelling densities at the upper end of the scale. Grange Farm, Newcastle Great Park and Cooper Road do not have flats and all have net dwelling densities under 30dph.

Dwelling Type (%)	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
Detached	13	40	7	0	0	8	23	0	4	33	43	0	0	0
Detached-linked	4	6	0	0	0	0	18	0	13	0	6	0	0	0
Semi-detached	16	27	32	16	0	0	8	0	23	8	24	0	5	100
Terraced	45	27	57	50	36	89	49	22	57	47	27	50	55	0
Flat	22	0	4	34	64	3	2	78	3	12	0	50	40	0

Table 6.3: Indicators of dwelling type by development

The most common dwelling type is the terraced house; forty five percent of the dwellings across all the developments are terraced. The only development without terraced housing is Cooper Road. Cooper Road is unusual for this sample in that all the dwellings are semi-detached. There are at least two types of dwelling in the other developments. Overall, flats make up a higher proportion of the dwelling types than the individual proportions of detached, detached-linked and semi-detached dwellings. There may be a significant relationship between net dwelling density and dwelling type and this will be investigated further in the analyses chapters.

6.2.3 Mixed use

Developments containing a variety of uses other than dwellings are claimed to aid social interaction between residents (Burton, 2000b; Kim, 2007; Leslie and Cerin, 2008). Table 6.4 shows the different uses that are in a development and the nearby area (the nearby area is defined as the area within 500m of the boundary of the development, see Section 5.3.3, Chapter Five). The Courtyards development is the only development that is purely housing; it is in a rural location but with access to a regular train service to Horsham less than five miles away. Four of the developments have nine different uses in or nearby them. The developments (The Waterways, Ingress Park, Westoe Crown Village and The Staiths South Bank) are medium to high-density and are situated in the centre or edge of urban areas (see Table 6.5 below). The locations of these four developments mean that they are close to existing facilities and amenities which have been supplemented with some new ones within the developments. Grange Farm, Alpine Close and Great Notley have five or less uses nearby or within the development. Grange Farm is on the edge of Milton Keynes and Great Notley is in a rural location close to Braintree in Essex, therefore it is perhaps not surprising that there are a low number of uses in these developments. However, it is surprising that there are so few uses in or nearby to the Alpine Close development; this is in an urban location close to the centre of Maidenhead.

Type of Use	**Grange Farm**	**Amersham Road**	**The Waterways**	**Alpine Close**	**The Courtyards**	**Great Notley**	**GMV**	**Ingress Park**	**Lansdowne Gardens**	**NGP**	**Westoe Crown Vill.**	**The Staiths Sth Bk**	**Cooper Road**
Pre-school	0	1	4	1	0	1	1	1	2	2	6	1	1
Primary school	1	0	2	0	0	2	1	1	2	0	2	1	1
Secondary school	0	0	0	0	0	0	0	0	1	0	0	0	0
Health facilities	0	0	1	0	0	0	1	2	2	1	8	1	1
Community hall or place of Worship	0	1	5	0	0	0	1	3	2	3	3	2	0
Pub/cafe/restaurant	0	2	2	13	0	1	5	4	6	1	9	1	4
Local store	0	1	1	1	0	1	2	2	3	2	2	2	1
High St/Shopping centre	0	0	0	0	0	0	0	0	0	0	0	0	0
Play areas	3	3	2	2	0	0	1	1	0	1	1	1	1
Parks	1	2	2	2	0	1	3	3	1	3	5	2	1
Indoor leisure facility	0	0	1	0	0	0	0	1	0	0	1	1	0
Total number of different uses	3	6	9	5	0	5	8	9	8	7	9	9	7

Table 6.4: Different uses within each development and the nearby area

The most common feature to be found in or nearby each of the developments is a park; however, there are fewer play areas in the same vicinity. This is somewhat unexpected given that government policy is to provide play areas within very close walking distance in residential areas (Barton *et al.*, 2003). Despite the central locations of many of the developments none of them are very near to a high street or shopping centre, nevertheless almost all the developments have a local store within them or nearby. All the developments except Grange Farm and The Courtyards have a pre-school facility in close proximity. These two developments as well as Amersham Road and Alpine Close do not have primary schools in or nearby the area. However there is a secondary school near the Alpine Close development, likewise with the Lansdowne Gardens development.

6.2.4 Urban location

The developments are located on either brownfield or greenfield sites in central urban, urban-edge or rural areas. Table 6.5 shows that five of the developments are on greenfield sites located in rural or urban-edge areas; the remaining eight developments are on brownfield sites located in central or edge areas. The predominant land use to the front of dwellings across all the developments is public open space, followed by communal space, and then public open green space. The picture is more varied in relation to the land use to the rear of dwellings. The most common features are gardens and communal spaces however in developments such as Great Notley some dwellings face on to buildings at the rear, most likely garages. The land use to the rear of all the dwellings in Alpine Close is industrial, whereas in Grange Farm, Lansdowne Gardens and Cooper Road some of the dwellings look out on to schools and their playing fields. In two of the rural developments (The Courtyards and Great Notley) and one urban-edge development (The Waterways), some dwellings look out on to fields at the rear.

Urban location	**Grange Farm**	**Amersham Road**	**The Waterways**	**Alpine Close**	**The Courtyards**	**Great Notley**	**GMV**	**Ingress Park**	**Lansdowne Gardens**	**NGP**	**Westoe Crown Vill.**	**The Staiths Sth Bk**	**Cooper Road**
Land use to front (%)													
buildings	0	4	0	0	8	0	1	1	0	0	0	0	0
Gardens	0	6	0	0	0	0	0	0	0	4	0	0	0
Communal space	53	15	69	0	11	8	0	11	15	7	0	0	0
Public open space	40	75	29	100	72	65	52	56	82	79	87	100	100
Public open green space	7	0	2	0	9	23	43	31	4	9	13	0	0
Fields	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial/commercial	0	0	0	0	0	0	0	0	0	0	0	0	0
Schools & grounds	0	0	0	0	0	5	4	0	0	0	0	0	0
Land use to rear (%)													
buildings	0	5	0	0	14	24	6	17	9	9	0	2	0
Gardens	67	91	22	0	69	57	0	21	53	43	7	0	63
Communal space	7	0	20	0	6	11	94	33	9	22	87	60	0
Public open space	7	0	16	0	0	0	0	21	9	15	0	0	0
Public open green space	0	4	24	0	0	2	0	7	16	9	6	38	0
Fields	0	0	9	0	11	7	0	0	0	0	0	0	0
Industrial/commercial	0	0	9	100	0	0	0	0	0	3	0	0	0
Schools & grounds	20	0	0	0	0	0	0	0	4	0	0	0	37
Urban brownfield location													
Brownfield/greenfield	G	B	B	B	G	G	B	B	B	G	B	B	G
Urban(C) /urban edge (E) /rural (R)	E	C	E	C	R	R	C	E	C	E	C	C	E/R

Table 6.5: Indicators of Urban Location by development

6.2.5 Walkable urban environment

Walkable urban environments may aid social interaction between residents and neighbours because people will walk through their development rather than go by car (Duany *et al.*, 2001). Some street patterns, for example regular or distorted grids, are thought to be more walkable than other street patterns, such as culs-de-sac. The most common street pattern across the thirteen developments is a cul-de-sac pattern; six of the developments are arranged in this pattern type (Table 6.6). Figure 6.1 shows the layouts of each of the thirteen developments. The four developments with distorted grid patterns are built to higher net dwelling densities than the other developments (Alpine Close is the exception; it is high-density in a single cul-de-sac). Despite many of the developments having a cul-de-sac pattern 35% of the dwellings in the sample are situated on through-roads. Fifty six percent of the dwellings in Greenwich Millennium Village are on through-roads and the remaining forty four percent are on roads that are not passable by cars but can be walked along; it could be argued that all the dwellings in Greenwich Millennium Village are on through-roads in terms of walkability. The majority of dwellings in Westoe Crown Village are not on through-roads (for vehicles or pedestrians) but this is because the development is incomplete. Once finished, many of the roads will have become through-roads for both vehicles and pedestrians. Of those who live on culs-de-sac most residences are situated at the end or in the middle of the cul-de-sac rather than at its entrance.

The public rooms, or living area, in over half of the dwellings in Alpine Close, The Courtyards, Great Notley and Ingress Park face the street, with or without a narrow strip of private space between the front of the dwelling and the street. Despite this these developments are graded as 'B' in terms of active frontage (see note 1 in Table 6.6). Another seeming anomaly is that 62% of the dwellings in The Staiths South Bank have public rooms that face a rear POS but there is still a very high level of active frontage in the development. Many of the houses are designed to have open-plan ground floors and as a result the kitchen area faces the street and the public room, or living area, faces the rear POS. The levels of active frontage across the developments is very high, however there is variation within each development. Some streets in some of the developments are not rated so highly due to expanses of blank walls next to the street but this normally brings a rating for a street down to a minimum of a grade 'C'.

Table 6.7 contains the minimum, maximum and mean values for local and global integration measures for each of the developments (see Section 5.3 in Chapter Five for an explanation of Space Syntax theory and measures). The measures give an indication of

how accessible a street is in relation to the surrounding streets. The developments that are laid out in distorted grid or curvilinear patterns tend to have higher mean values of local integration, reinforcing the idea that these street patterns are better connected than other patterns, such as culs-de-sac. The local integration values for the developments with culs-de-sac are generally lower than the values for the other developments. The majority of the developments have a considerable range between the minimum and maximum values. This can be interpreted as dwellings being situated in easily accessible to less accessible locations within each of the developments.

Walkable Urban Environment	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
Predominant street Pattern														
Regular Grid	-													
Distorted grid	-			✓				✓				✓	✓	
Curvilinear	-								✓					
Culs-de-sac	-	✓	✓		✓	✓				✓				✓
Radial	-													
Ribbon	-													
No discernible pattern	-						✓				✓			
Type of street dwelling is on (%)														
Through road	35	47	39	35	0	25	45	56	39	63	47	23	31	50
Entrance to cul-de-sac	6	0	21	6	0	8	3	0	4	4	9	0	10	0
End of cul-de-sac	14	40	14	14	36	22	13	0	12	19	21	0	2	42
Mid cul-de-sac	16	13	25	18	64	14	19	0	26	15	9	0	24	8
No through road	29	0	0	27	0	31	19	44	19	0	15	77	33	0
Type of space public room faces														
Rear POS	8	40	2	15	0	8	10	0	0	0	0	0	62	0
Front POS	9	0	78	4	18	3	3	9	2	0	0	0	0	0
Front strip & street	14	13	2	0	0	58	45	12	48	0	2	0	0	0
Street	11	0	2	5	82	11	8	22	31	0	0	43	0	0
Communal space	7	0	16	34	0	8	0	0	11	0	0	7	0	0
Strip & comm. space	0.5	0	0	0	0	0	3	0	0	0	0	0	0	0
Park	3	0	0	11	0	0	7	0	7	0	0	0	0	0
Rear & Front POS	15	47	0	31	0	11	24	2	2	49	0	0	0	33
Don't know	32	0	0	0	0	0	0	56	0	51	98	50	38	67
Levels of active frontage														
Grades A to E[1] (A highest)	-	B	A	A	B	B	B	A	B	B	B	A	A	A

[1]Levels of active frontage are graded thus: A: >25 doors & windows every 100m, B: >15 doors & windows every 100m, C: >6 doors & windows every 100m, D: >3 doors & windows every 100m, E: <2 doors & windows every 100m

Table 6.6: Indicators of a walkable urban environment by development

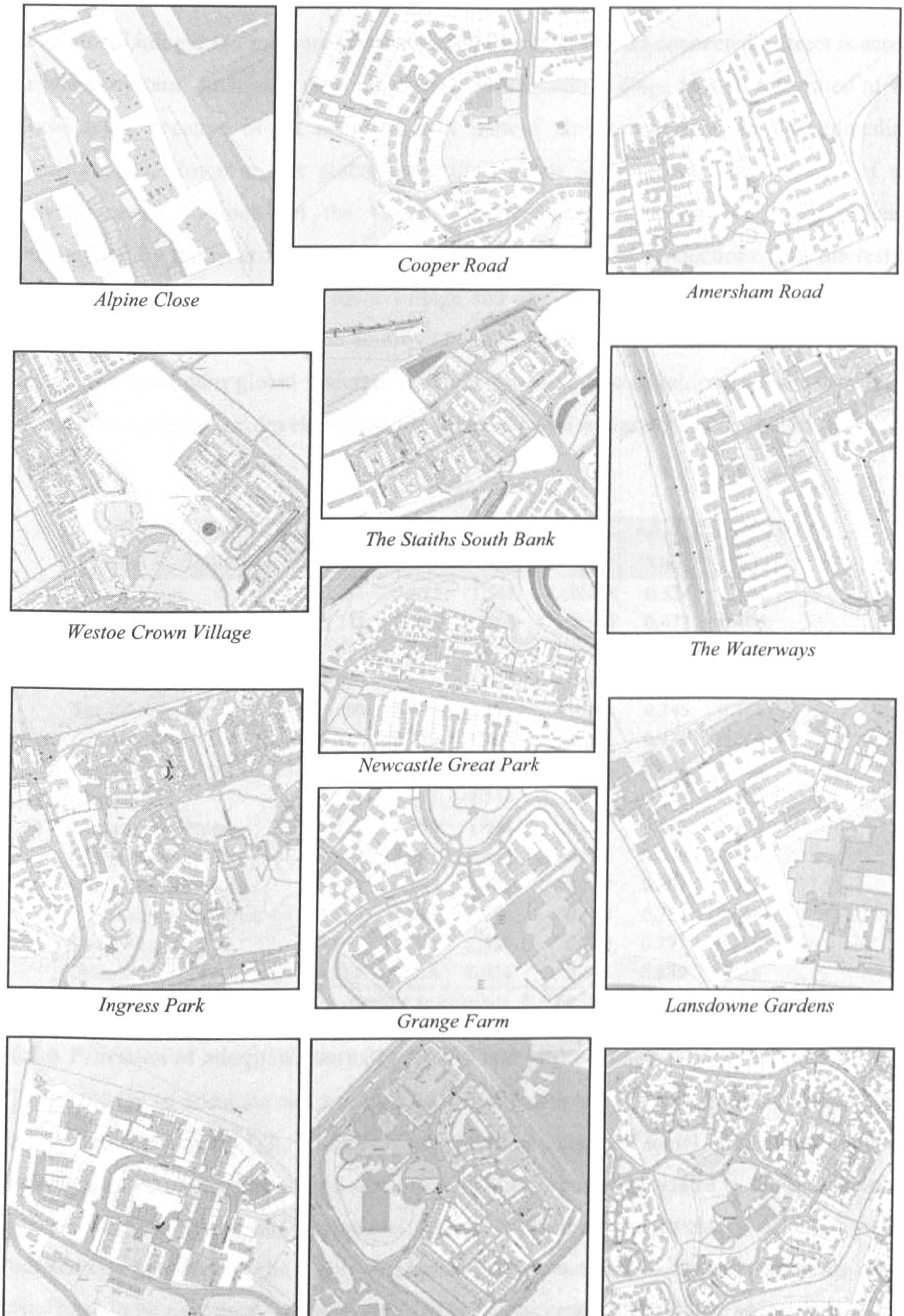


Figure 6.1: Plans showing the street patterns and layouts of the 13 developments

The global integration measure gives an indication of how well-connected a street is across a whole system, such as a city. Greenwich Millennium Village is well-integrated at the local level because of its distorted grid pattern and connections to the immediate surroundings. However, the global integration levels are relatively low because of the development's location on the Greenwich Peninsula in south-east London; being surrounded by the river on three sides reduces the number of connections with the rest of London. In contrast, Westoe Crown Village and The Waterways are both located next to major arterial roads close to the centres of South Shields and Oxford, respectively. As a result, the maximum global integration values for these two developments are very high; the access roads to the developments are linked to well-integrated roads within the whole city.

	Local Integration			**Global Integration**		
Name of Development	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**
Grange Farm	0.211	2.615	1.502	0.415	0.524	0.454
Amersham Road	0.211	2.305	1.321	0.367	0.473	0.406
The Waterways	1.019	2.927	2.418	0.666	0.806	0.746
Alpine Close	1.000	1.056	1.036	0.418	0.458	0.443
The Courtyards	0.500	3.476	1.591	0.281	0.345	0.303
Great Notley	0.211	3.213	1.995	0.304	0.429	0.363
G MV	1.659	3.454	2.916	0.351	0.365	0.360
Ingress Park	0.211	4.071	2.174	0.513	0.889	0.660
Lansdowne Gardens	0.211	2.750	1.604	0.371	0.562	0.439
Newcastle Great Pk	1.149	3.881	2.464	0.538	0.749	0.646
Westoe Crown Village	1.698	5.255	2.733	0.570	0.807	0.673
The Staiths South Bank	0.500	3.804	1.784	0.618	0.753	0.668
Cooper Road	0.566	2.099	1.526	0.263	0.291	0.280
Overall	0.211	5.255	2.074	0.263	0.889	0.516

Table 6.7: Local and global integration measures for each development

6.2.6 Provision of adequate recreational and communal space

The provision of adequate recreational and communal space is a key feature of sustainable development policy (DETR, 2000d; DCLG, 2006) and may aid social interactions between neighbours (Hammitt, 2000). The data presented in this section relates to the provision of private outdoor spaces and communal spaces, as well as an inventory of the type of landscaping provided in the communal spaces. In almost half of the developments some dwellings have no private outdoor space (POS) or access to communal space. It is likely that the dwellings without access to a POS or communal space are flats. Some dwellings in all of the developments have a POS but no access to a communal space. In the case of Newcastle Great Park and Cooper Road there is no communal space within the developments. In many of the developments residents have access to both a POS and communal space.

Recreational & communal Space (%)	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
No POS, no comm.	0	8	12	0	0	1	0	6	2	0	36	28	0
No POS, yes comm.	0	3	23	55	0	2	77	0	12	0	17	0	0
Yes POS, no comm.	40	75	5	36	83	89	5	94	86	100	47	12	100
Yes POS, yes comm.	60	14	60	9	17	8	18	0	0	0	0	60	0
Comm. - Hard surface	60	14	78	-	17	3	94	-	12	-	-	60	-
Comm. - Grass	-	-	32	-	17	3	77	-	12	-	10	19	-
Comm. - Seating	-	-	-	-	-	7	61	-	-	-	-	41	-
Comm. – Play area	-	-	-	-	17	-	55	-	-	-	-	38	-
Comm. - planting	-	12	81	-	17	3	94	-	12	-	10	30	-

Table 6.8: Indicators of recreational and communal space provision by development

In the developments where residents do have access to communal space the type of landscaping varies. The majority of communal areas have hard surfaces and planting in them. Less common are grassed areas. Seating and play areas do not occur in all of the communal areas. The communal areas in Greenwich Millennium Village and The Staiths South Bank contain all five types of landscaping.

6.2.7 Energy efficient design of buildings and the urban environment

There are many ways to incorporate energy efficient design into buildings and the urban environment; the two being investigated in this research are bicycle and car storage facilities. The principal type of storage facility for bicycles available to residents across all the developments is in-curtilage (see Table 6.9), and in some cases this is the only type of storage available, for example in Grange Farm and Alpine Close. In some developments the option to store bicycles in communal areas is available, such as in The Staiths South Bank, and in the case of Greenwich Millennium Village this is the only option. Public storage areas for bicycles are less common and are only available in The Waterways and Great Notley developments.

Car parking facilities are predominantly communal courtyards across most of the developments. In Alpine Close the car parking facilities for all the dwellings is on-street. In the higher density developments, such as Westoe Crown Village, the majority of car parking facilities are communal courtyards. In the developments with low dwelling densities car parking tends to be in-curtilage. None of the developments have been designed without car parking facilities.

Energy Efficient Design	**Overall**	**Grange Farm**	**Amersham Road**	**The Waterways**	**Alpine Close**	**The Courtyards**	**Great Notley**	**GMV**	**Ingress Park**	**Lansdowne Gardens**	**NGP**	**Westoe Crown Vill.**	**The Staiths Sth Bk**	**Cooper Road**
Private Bike Storage														
None	1	-	-	-	-	25	-	-	-	-	-	-	-	-
In-curtilage	73	100	100	63	100	75	98	-	94	88	100	37	31	100
Public	5	-	-	37	-	-	2	-	-	-	-	-	-	-
Communal	21	-	-	-	-	-	-	100	6	12	-	63	69	-
Car parking														
On-street	5	-	4	-	100	31	-	-	-	-	7	-	10	-
Communal courtyard	55	-	15	96	-	61	42	97	50	28	37	100	88	-
In-curtilage	40	100	81	4	-	8	58	3	50	72	56	-	2	100

Table 6.9: Indicators of energy efficient design by development

6.2.8 High quality design of boundaries

The quality of the delineation between public and private space is high; eleven of the developments are rated as very good and the remaining two are rated good (Table 6.10). This is regardless of the type of delineation found in the developments. There are very few properties where a level change is used to indicate a boundary, whereas a surface change is the most common type of delineation, for example tarmac on the walkway and redbrick in the private property. Hedges, fences or walls are used in all but one of the developments to signify a boundary but in seven of the developments there are situations where there is no delineation at all. In Greenwich Millennium Village and The Staiths the majority of ground floor dwellings open out on to pedestrianised areas and it was may be thought that there was no requirement for delineation in these situations. It is anticipated that the type of boundary may impact on levels of privacy in the home.

High quality Design & Local Character	**Overall**	**Grange Farm**	**Amersham Road**	**The Waterways**	**Alpine Close**	**The Courtyards**	**Great Notley**	**GMV**	**Ingress Park**	**Lansdowne Gardens**	**NGP**	**Westoe Crown Vill.**	**The Staiths Sth Bk**	**Cooper Road**
Quality of delineation														
Very good	89	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Good	11		✓		✓									
Neither good or poor														
Poor														
Very poor														
Type of delineation (%)														
Surface change	48	80	64	98	-	80	47	22	34	62	44	3	45	-
Hedge or fence	30	20	36	2	100	20	43	-	39	29	43	43	10	100
Level change	1	-	-	-	-	-	2	-	4	-	-	-	-	-
No delineation	21	-	-	-	-	-	8	78	23	9	13	53	45	-

Table 6.10: Indicators of high quality design of boundaries by development

6.3 Characteristics of the sample

This section presents some data collected from the Household Questionnaire representing various demographic and socio-economic features of the sample.

6.3.1 Age

Table 6.11 shows the breakdown of the respondents between three age groups. Overall 21 percent of the sample were under 30, just over a third were between 31 and 40 years of age and the remaining 46% were over 40. This breakdown is similar to that recorded in the 2001 Census {ONS, 2010 #1415} where 22% of the population is under 30, 28% are between 30 and 44 years old and 50% are 45 and over. The majority of the developments followed the same pattern, that is the lowest number of respondents are under 30, followed by those between 31 and 40, followed by those who are over 40. However, in some cases this pattern is reversed. Both the Greenwich Millennium Village and The Staiths South Bank show a reversal of the pattern with nearly half of the respondents in both developments being under 30, around a third are between 31 and 40 and a fifth are over 40. Both these developments have a high proportion of high rise flats which may be more suited to single member households or couples. Cooper Road is different to the other developments in that the spread of respondents is heavily skewed towards those who are over 40 with 96% of the respondents being in this category. The remaining 4% are in the under 30 category. This may be a result of Cooper Road being a more established development than the others.

Age	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
Under 30	21	46	30	11	30	5	13	43	10	21	13	13	48	4
31-40	33	27	45	38	30	31	32	35	38	24	40	30	31	0
Over 40	46	27	25	51	40	64	55	22	52	55	47	57	21	96

Note: figures for England in 2001 Census are; under 30, 22%; 31-44, 28%; 45 and over, 50% (ONS, 2010)

Table 6.11: Age of the respondents by development and overall (%)

6.3.2 Gender

The overall proportion of male respondents is 37% while 63% are female, whereas nationally there is an equal proportion of males and females over the age of 16 (Table 6.12). This ratio is approximately the same for all the cases except for The Staiths South Bank: in this case females account for 39% of respondents and men 61%. This may be because there are a high number of one and two bedroom flats in The Staiths South Bank development and a majority of them may be occupied by single males.

Gender	National population	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
Male	50	37	27	25	35	36	36	31	44	34	40	32	47	61	35
Female	50	63	73	75	65	64	64	69	56	66	60	68	53	39	65

Note: National population taken from Focus on Gender (ONS, 2006b)

Table 6.12: Gender of the respondents by development and overall (%)

6.3.3 Household type

There is a range of household types across the whole sample; single retired people make up the lowest proportion of household types overall and couples with dependents account for the highest proportion overall. This is slightly different to the 2001 Census figures which show that single retired people account for approximately a sixth of all households and couples with dependents a fifth (see Table 6.13). Couples with dependents tend to make up a fifth to a half the sample population in the individual cases apart from in The Staiths South Bank and Cooper Road. This may be due to the lower number of three or more bedroom properties in these two developments. Working childless couples are the second highest proportion overall and account for 25% of the sample. The lowest proportion is to be found in Cooper Road (7%), and the highest proportion in Greenwich Millennium

Village (42%). The highest proportions of single occupancy dwellings are in Greenwich Millennium Village, Westoe Crown Village and The Staiths South Bank. These developments also have a high proportion of one and two bedroom properties which tend to be flats. There are relatively few multi-person households that are not made of parents and dependents. A total of 9% overall with the proportion ranging from just 3% in Great Notley Garden Village and Westoe Crown Village to 21% in The Staiths South Bank.

Household Type	National population	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
Non-retired couple, no dependents	24	25	33	13	17	18	28	14	42	32	29	21	27	40	7
Retired couple, no dependents	9	7	7	5	6	9	19	14	1	7	4	4	10	0	27
Couple, dependents	21	33	47	36	43	37	19	40	19	41	38	50	20	7	8
Lone parent, dependents	6	8	0	35	7	9	3	13	8	3	6	6	0	0	8
Multi-person	7	9	13	9	6	9	9	3	9	6	12	8	3	21	8
One non-retired person	19	13	0	2	18	18	8	13	21	10	6	7	33	31	4
One retired person	14	5	0	0	3	0	14	3	0	1	5	4	7	0	38

Note: National population taken from 2001 Census (ONS, 2010)

Table 6.13: Household type by development and overall (%)

6.3.4 Household size

Table 6.14 shows that the households in the sample tend to consist of two people (39% of the overall sample), followed by three people (20%), then one person (18%) and four people (18%), and households of five or more people make up 5% of the sample. There is a fairly even spread across household sizes for both Newcastle Great Park and for Amersham Road whereas in the other developments the proportions are more skewed. For example, over 80% of the Cooper Road sample are in one or two person households and tend to be retirees (see previous section). A similar proportion of respondents in The Staiths South Bank belong to one and two people households but these people tend to be non-retirees.

Household size	National population	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
1	28	18	0	4	21	30	22	14	21	11	13	12	40	31	42
2	36	39	40	36	28	10	53	32	54	41	30	35	37	55	46
3	16	20	40	27	10	40	8	14	17	31	26	25	17	12	8
4	13	18	20	15	33	10	17	33	3	11	28	24	3	0	4
5 or more	7	5	0	18	9	10	0	7	5	6	3	4	3	2	0

Note: National population taken from Survey of English Housing (DCLG, 2007)

Table 6.14: Household size by development and overall (%)

6.3.5 Number of bedrooms

Overall, the dwellings in the sample tend to have two (30%), three (27%) or four (30%) bedrooms, whereas nationally (in 2001) new-build dwellings tended to have three or more bedrooms. One-bedroom dwellings account for 9% of dwellings overall and dwellings with five or more bedrooms account for 4% of the overall total, as shown in Table 6.15. However, there is variation between the developments; some have no one bedroom properties, for example Great Notley Garden Village, whereas others have no four bedroom properties, such as Westoe Crown Village. The one and two bedroom properties tend to be in the developments which are built to higher residential densities and the four and five or more bedroom properties are more likely to be in the developments built to lower residential densities. There are three bedroom properties in all the developments. The lowest proportion of three bedroom dwellings is in Alpine Close where they make up 10% of the total dwelling numbers for the sample. At the other end of the spectrum they make up 51% of properties in Ingress Park.

No. of bedrooms	Completed new build	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
1	1	9	0	2	4	60	0	0	42	3	7	0	3	3	23
2	19	30	0	60	30	30	36	19	43	13	5	0	80	50	62
3	40	27	40	29	17	10	42	25	12	51	23	39	17	31	15
4	40	30	33	9	46	0	19	44	3	28	64	51	0	14	0
5 or more		4	27	0	3	0	3	11	0	5	1	10	0	2	0

Note: Completed newbuild figure taken from UK in Figures (ONS, 2002)

Table 6.15: Number of bedrooms per dwelling by development and overall (%)

6.3.6 Tenure

There are some substantial variations between cases with regard to the type of tenure respondents have, as is shown in Table 6.16. Overall 48% of the sample have mortgages, however across the individual cases the percentage varies from 0% in Alpine Close and Cooper Road to 86% in Grange Farm. The residents of Alpine Close and Cooper Road are all tenants of Registered Social Landlords. Whereas in Grange Farm, Ingress Park, Westoe Crown Village and The Staiths South Bank all of the residents are either ownerbuyers or renting from private landlords. Overall, only 4% of the sample have a part rent/part mortgage tenure, however this increases to 32% of the sample in Amersham Road. Outright ownership accounts for 16% of tenures overall with 28% being the highest proportion of outright owners in The Courtyards.

Tenure	National population	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
Outright owner	29	16	7	2	22	0	28	27	5	25	15	18	24	7	0
Mortgage	39	48	86	2	32	0	50	59	50	64	56	72	59	60	0
Part rent/part Mortgage	1	4	0	32	5	0	3	0	5	0	1	0	0	0	0
Rent privately	12	14	7	0	36	0	8	3	26	11	8	9	14	33	0
Rent RSL	19	16	0	62	5	100	5	11	13	0	15	1	0	0	96
No payment	-	1	0	2	0	0	3	0	1	0	5	0	0	0	4
Other	-	1	0	0	0	0	3	0	0	0	0	0	3	0	0

Note: National population taken from 2001 Census (ONS, 2010)

Table 6.16: Tenure of the respondents by development and overall (%)

6.3.7 Socio-economic status

Table 6.17 shows that overall, the socio-economic status of the respondents is biased towards the upper end of the scale compared to the 2001 Census. This may be a consequence of the type of housing developments being studied; they tend to be oriented towards the owner-occupier market. The socio-economic status of the sample varies across the cases. Many respondents can be classified as higher managerial and professional, lower managerial or in intermediate occupations. For example, 56% of respondents in Newcastle Great Park are classified as lower managerial and 42% of respondents in The Waterways are in the higher managerial or professional group. In some developments the socio-economic status of the sample tends to be from the other end of the classification system. Thirty six percent of respondents living in Alpine Close have semi-routine jobs and 22% of respondents from Cooper Road have routine jobs. The majority of respondents in Alpine

Close and Cooper Road rent their homes from Registered Social Landlords whereas respondents from The Waterways and Newcastle Great Park tend to be owner occupiers. There are very few respondents classified as being small employers or lower supervisory and technical; in four developments no one is from the latter group, and the highest percentage of respondents who are small employers is 11%.

Socio-Economic status	National population,	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
Higher managerial & professional	9	24	33	3	42	0	19	18	36	27	19	29	7	38	0
Lower managerial	19	38	40	27	33	18	50	38	36	45	33	56	40	45	15
Intermediate Occupations	9	10	7	20	7	9	11	13	7	14	10	6	17	5	0
Small employers & own account	7	5	7	2	9	9	11	2	7	6	1	4	7	2	11
Lower supervisory & technical	7	5	0	9	2	0	0	6	4	3	10	2	13	0	7
Semi-routine	12	7	13	12	0	36	0	8	5	1	10	0	10	5	30
Routine	9	3	0	9	0	0	3	5	0	1	5	0	3	0	22
Unclassified	28	8	0	19	7	27	6	11	5	3	10	3	3	5	15

Note: National population taken from 2001 Census (ONS, 2010)

Table 6.17: Socio-economic status of the respondents by development and overall (%)

6.3.8 Length of residence in the development

The length of time a resident has lived in a development has been shown to impact on their perceptions of their surroundings (Coulthard *et al.*, 2002; Groves *et al.*, 2003). Two years was chosen to allow residents time to settle into the development but without compromising the premise that the developments were newly built. Overall the split between less than two years and two years or more is 40:60 (see Table 6.18). However, this masks some large discrepancies between individual cases. For example, all the residents in Grange Farm have lived there for less than two years (the development was still being built during the fieldwork), whereas in Alpine Close and Cooper Road over 90% of residents had lived in those developments for over two years. Only in Westoe Crown Village is the sample split evenly between the two options.

Length Of time	**National population**	**Overall**	**Grange Farm**	**Amersham Road**	**The Waterways**	**Alpine Close**	**The Courtyards**	**Great Notley**	**GMV**	**Ingress Park**	**Lansdowne Gardens**	**NGP**	**Westoe Crown Vill.**	**The Staiths Sth Bk**	**Cooper Road**
Less than 2 yrs	18	40	100	15	53	9	56	30	65	18	27	34	50	81	7
2 yrs or more	82	60	0	85	47	91	44	70	35	82	73	66	50	19	93

Note: National population taken from Family Resources Survey (ONS, 2006a)

Table 6.18: Length of residence of the respondents by development and overall (%)

6.4 Social interaction between neighbours in the sample

Social interactions are fundamental to the development of relationships and the creation of social cohesion within housing developments and neighbourhoods (Goldschmidt, 1972). Table 6.19 contains the data relating to social interactions garnered from the household questionnaire. The table shows that in Greenwich Millennium Village and The Staiths South Bank over 40% of residents do not have a positive relationship with any neighbours. These two developments have high net dwelling densities and also a high proportion of flats compared to the other developments. Many of the residents have lived in the developments for less than two years. In contrast the residents of Westoe Crown Village, which also has a high proportion of flats and a high net dwelling density, are the most likely to have positive relationships with four neighbours. It is most common for residents to have positive relationships with two neighbours; possibly those who live either side. The two developments with the highest two mean numbers of positive relationships with neighbours are Great Notley and Cooper Road. Both of these developments are built at net dwelling densities of under 30dph and are in rural locations, but a high proportion of the respondents have been in residence for over two years. The vast majority of respondents claim to get on with their neighbours either fairly well or very well. In contrast very few (1% overall) respondents claim that they do not get on at all with their neighbours. Interestingly, the developments with respondents claiming they do not get on at all with neighbours are also some of the developments with the highest numbers of residents who have positive relationships with their neighbours.

Alpine Close and Cooper Road are the only two developments where all respondents know at least a few people in the development. Residents have lived in both of the developments for over two years so may have had more time to get to know other residents. In comparison 40% of respondents from Grange Farm do not know people in their development. This is a new development and no one has lived in it for more than two years; potentially the reason that no residents in Grange Farm know many other residents. The other development where no respondents know many people is Westoe Crown Village; a high-density development with a high proportion of flats and where 50% of respondents have lived there for under two years. Most of the respondents claim to know some or know a few people in their development.

Social interaction	**Overall**	**Grange Farm**	**Amersham Road**	**The Waterways**	**Alpine Close**	**The Courtyards**	**Great Notley**	**GMV**	**Ingress Park**	**Lansdowne Gardens**	**NGP**	**Westoe Crown Vill.**	**The Staiths Sth Bk**	**Cooper Road**
Number of neighbours have a positive relationship with														
0 neighbours	21	33	18	17	9	14	6	45	18	18	19	14	44	4
1neighbour	28	40	25	24	27	20	24	23	32	28	34	38	22	35
2 neighbours	30	0	45	37	36	37	38	21	32	22	25	17	29	31
3 neighbours	8	13	5	7	27	11	16	3	7	11	7	3	5	8
4 neighbours	13	13	7	15	0	17	16	8	10	22	15	28	0	23
Mean number	1.66	1.33	1.59	1.78	1.82	1.97	2.11	1.05	1.58	1.91	1.65	1.93	0.95	2.12
Get on with neighbours														
Do not get on at all	1	0	4	-	-	3	2	-	-	5	-	4	-	-
Tend not to get on	4	10	8	3	10	3	7	2	3	5	7	4	-	4
Fairly well	45	70	67	41	50	44	37	57	48	34	40	52	48	23
Very well	49	20	20	56	40	50	55	41	49	57	53	41	52	73
Know people in development														
Know many	14	-	14	10	18	34	14	8	6	12	6	-	19	77
Know some	25	7	33	28	36	31	40	17	24	32	16	28	10	15
Know a few	48	53	45	54	46	26	44	46	51	49	65	59	45	8
Do not know people	13	40	7	7	0	9	2	30	19	7	13	14	26	0

Table 6.19: Indicators of social interaction by development

6.5 Levels of privacy in the home for the sample

Sufficient privacy in the home can aid positive social interactions between neighbours (Marshall, 1972; Allan, 1989). Privacy in the home was measured in the household questionnaire through a series of questions about visual and audio privacy. The data from the questions are shown in Tables 6.20 and 6.21. Overall, over half of the respondents are either uncomfortable or very uncomfortable with the view into the living area of their homes. Despite the low net dwelling density (28dph) in Great Notley, 38% of respondents claim to be very uncomfortable with the view into the living area. Conversely, Alpine Close is a high net density development and no respondents report being very uncomfortable with the view into the living areas. This may be a result of the cul-de-sac layout of the development as well as the majority of the dwellings being flats. Some of the respondents who live in the higher density developments, which tend to have distorted grid layouts, are very comfortable with the view into the living area; however, in the low-density developments of Newcastle Great Park and Grange Farm no one claims to be very comfortable with the view into the living area.

Visual Privacy	Overall	Grange Farm	Amersham Road	The Waterways	Alpine Close	The Courtyards	Great Notley	GMV	Ingress Park	Lansdowne Gardens	NGP	Westoe Crown Vill.	The Staiths Sth Bk	Cooper Road
Level of comfort with view into living area														
Very comfortable	8	0	11	9	20	0	5	9	12	6	0	7	17	17
Comfortable	18	20	18	13	20	31	8	21	20	6	31	23	22	25
Neither comfortable Or uncomfortable	16	13	18	18	30	8	10	11	13	15	25	23	15	12
Uncomfortable	34	53	36	30	30	44	39	41	32	38	27	30	29	13
Very uncomfortable	23	13	16	29	0	17	38	18	23	36	17	17	17	33
Level of comfort with view into POS														
Very comfortable	22	21	13	26	0	15	25	23	27	27	17	5	25	44
Comfortable	40	43	34	35	17	39	36	36	42	34	53	32	50	56
Neither comfortable Or uncomfortable	18	14	15	29	17	24	18	13	17	16	17	37	11	0
Uncomfortable	13	7	17	5	33	12	16	23	11	14	11	11	8	0
Very uncomfortable	7	14	21	3	33	9	4	6	3	9	2	11	6	0

Table 6.20: Levels of comfort with overlooking by development and overall (%)

The respondents seem to be more comfortable with the view into their private open space than with the views into the living area. Overall, forty percent of respondents are comfortable with the view into the POS and twenty two percent are very comfortable. The respondents in Cooper Road report either being very comfortable or comfortable with the view into the POS; the dwellings in this development have the highest mean area for a POS to the rear of the property. A high number of residents in Alpine Close report being uncomfortable or very uncomfortable with the view into their POS. This may be a result of some properties only having a POS to the front, or streetside, of the property.

The data in Table 6.21 show that the respondents are less conscious of noise than of overlooking. When in their home fifty percent of respondents overall hardly ever hear noise made by their neighbours compared to five percent who hear their neighbours constantly. Noise is heard constantly in Amersham Road and The Waterways; the predominant dwelling type in these two developments is terraced housing. No residents claim to hear noise constantly in other developments with a high proportion of flats and terraced housing, for example The Staiths South Bank and Alpine Close. Although the Greenwich Millennium Village is a high-density development, comprised mainly of flats, over half of the respondents claim to hear noise hardly ever or not at all. However, relative to the other developments a high proportion (8%) of residents in Greenwich Millennium Village do hear noise constantly.

Noise disturbance	**Overall**	**Grange Farm**	**Amersham Road**	**The Waterways**	**Alpine Close**	**The Courtyards**	**Great Notley**	**GMV**	**Ingress Park**	**Lansdowne Gardens**	**NGP**	**Westoe Crown Vill.**	**The Staiths Sth Bk**	**Cooper Road**
Frequency neighbour noise heard in home														
Not at all	9	7	5	1	10	3	8	10	13	4	14	7	10	15
Hardly ever	50	72	20	2	20	47	55	48	49	56	64	50	38	52
Quite often	25	7	39	26	30	28	24	25	23	21	18	23	40	18
Much of the time	11	14	23	57	40	17	8	9	11	11	5	17	12	11
Constantly	5	-	13	13	-	6	5	8	4	8	-	3	-	4
Frequency neighbour noise heard in POS														
Not at all	8	7	7	9	17	-	3	17	8	3	8	11	11	8
Hardly ever	46	72	20	55	17	39	40	35	46	51	61	61	49	56
Quite often	30	21	38	28	50	36	39	22	28	31	24	17	31	20
Much of the time	10	-	20	5	17	17	13	20	14	8	6	-	3	4
Constantly	6	-	16	3	-	8	5	6	5	7	2	12	6	12
Level of annoyance with noise														
Not at all annoyed	51	77	39	59	13	41	46	36	57	45	75	45	49	64
A little annoyed	31	23	33	34	63	41	33	34	20	35	22	30	41	14
Fairly annoyed	9	-	14	3	25	6	10	17	14	6	2	10	3	14
Very annoyed	8	-	15	3	-	12	11	13	7	12	2	10	8	9
Don't know	1	-	-	1	-	-	-	-	2	2	-	5	-	-

Table 6.21: Levels of neighbour noise heard and level of annoyance with noise by development and overall (%)

The overall breakdown between responses for the frequency neighbour noise is heard in the POS is very similar to that of frequency neighbour noise is heard in the home. Most respondents claim either that they hardly ever hear their neighbours or that they quite often hear their neighbours. The development with the highest percentage of respondents claiming to hear their neighbours constantly is Amersham Road. The private open spaces tend to be relatively large and the net dwelling density is low. In comparison the highest percentage of residents who claim never to hear their neighbours' noise when in the POS are the residents who live in two high-density developments, Alpine Close and Greenwich Millennium Village.

Despite hearing some noise from their neighbours 51% of respondents say they are not at all annoyed by the noise. The developments where residents are most likely to say this are Grange Farm and Newcastle Great Park; both are low-density with a high proportion of detached houses. A third of the sample claim they are a little annoyed by the noise they can hear. Very few say they are fairly annoyed or very annoyed by the noise made by their neighbours. In some developments there are similar percentages for residents being very annoyed and being able to hear their neighbours constantly, for example Amersham Road. However, in other developments there are more people who are very annoyed than can hear the noise from their neighbours constantly suggesting there are other factors relating to personal preferences impacting on the residents' levels of satisfaction with noise levels.

6.6 Conclusion

The data presented in this chapter provide some background information on each of the developments and the respondents. It is possible to build up a picture of each of the developments, and the residents, from the information provided. The data reveal that there are many differences between the developments, and, yet, also some similarities and patterns. Whilst it is possible to surmise from these data that there are relationships between particular aspects of a development, for example the net dwelling density and levels of social interaction or privacy, the strength and direction of a relationship cannot be ascertained without further analyses, such as correlations and multiple regression. The following three chapters explore some of the relationships between the three concepts of design, social interactions and privacy. The first relationship to be scrutinised is the impact, if any, that the design of sustainable housing developments may have on social interactions between neighbours. This is the focus of the next chapter: Chapter Seven.

chapter SEVEN

Design features and social interaction in sustainable housing developments

Chapter Seven: Design features and social interaction in sustainable housing developments

7.1 Introduction

This study has three aims and, in order to accomplish them, the research has been split into six questions. This chapter addresses the aim: to **establish if and how the design of sustainable housing developments can support social interactions between neighbours.** To do this the following research question is investigated (Figure 7.1):

- **What is the impact of design elements on social interactions between neighbours in sustainable housing developments?**

To answer this question a series of hypotheses were developed based on a review of the literature on social interactions (Chapter Two) and sustainable design elements (Chapter Four). Each hypothesis was tested using multiple regression analysis and the significance and nature of the relationship was scrutinized; specifically its direction (whether positive or negative), magnitude and the extent to which the physical feature is associated with variation in the outcome of social interactions. The analysis included testing for the impact of intervening variables as well as physical features on social interactions (see Table 7.1 for a list of the indicators and variables used). The results of the analyses are recorded in tables, where only the significant coefficients are included (see Appendix D for the full list of coefficients).

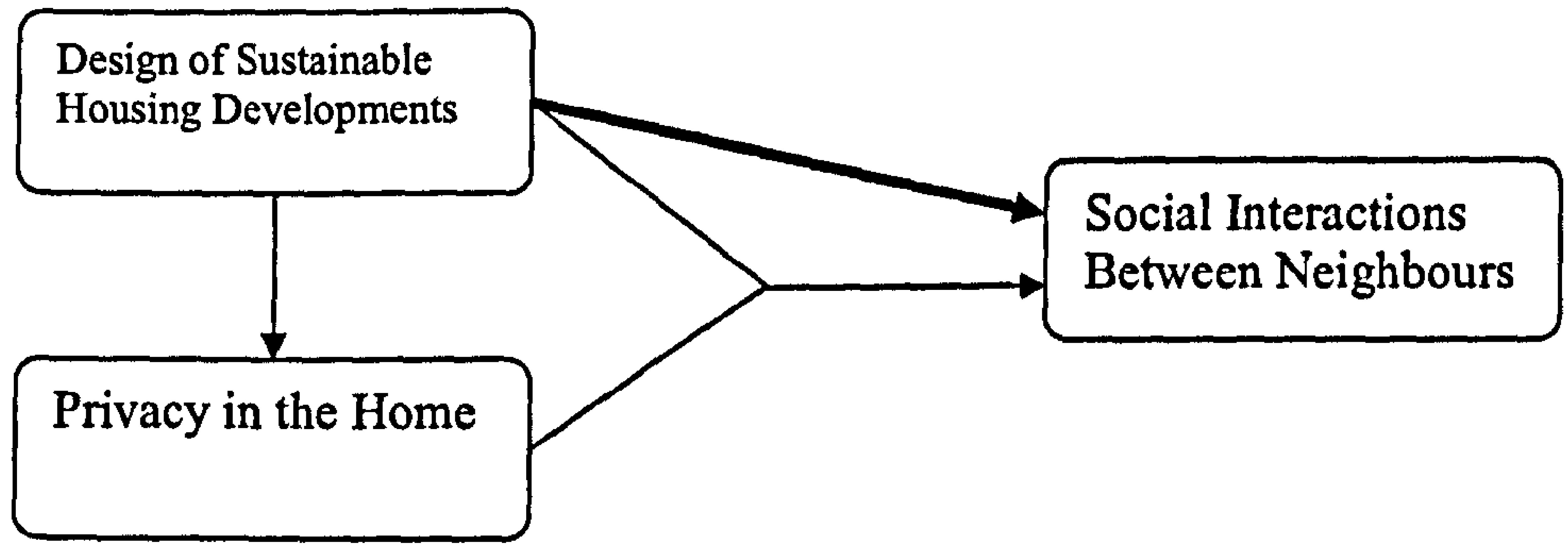


Figure 7.1: Diagram representing the relationships under scrutiny in the research. The focus of Chapter Seven is highlighted

Indicators and variables measuring physical features	Indicators and variables of social interaction	Intervening variables
Area of POS to front	Know people in development	Household type
Setback distance	Number of neighbours with positive relations	Tenure type
	Get on with neighbours	Age
Dwelling type is a flat		Gender
		Socio-economic status
Health centre in dev/nearby		Length of time in dwelling
Cafe/pub in dev/nearby		
School in dev/nearby		
Newsagent in dev/nearby		
Place of worship in dev/nearby		
Park in dev/nearby		
Indoor leisure in dev/nearby		
High street shopping centre in dev/nearby		
Predominant street pattern		
Local integration		
Global integration		
Levels of active frontage		
Street calming		
Type of bike storage		
Type of car parking facilities		
Quality of delineation between public and private space		
Type of delineation between public and private space		

Table 7.1: List of variables and indicators used in the regression analyses (a full description of the indicators and variables can be found in Chapter Five)

7.2 The impact of higher dwelling densities on social interactions

Current Government policy promotes higher dwelling densities in new developments as part of a drive to use land efficiently (DETR, 2000c; DCLG, 2006). A claimed benefit of high dwelling densities is an increase in social interactions between residents (Llewelyn-Davies, 2000; Putnam, 2000). However, there is conflicting evidence of the positive effect of high dwelling densities on social interaction (Freeman, 2001; Raman, 2005). Building at high dwelling densities impacts on the physical features and design of a housing development. One potential impact of increasing dwelling densities on the physical features of a housing development is smaller plot sizes. Consequently, private open space (POS) to the front of dwellings may be reduced and this could have a negative impact on social interactions between neighbours (Hall, 2006). This leads to the hypothesis that is analysed and discussed in this section:

- **The space to the front of dwellings is too small for residents to utilise, reducing the opportunity for social interaction with neighbours.**

The influence of a POS to the front of a dwelling was analysed with respect to two outcome variables; one measuring social interaction with residents from the whole development and one measuring social interaction with neighbours. The first analysis (Model 1 in Table 7.2) revealed that an increase in the setback distance between the front of a dwelling and the street is associated with knowing more people in the development. The results of the second analysis show that an increase in the area of the POS to the front is associated with an increase in the number of neighbours with positive relations. The impact of both the setback distance and the area of the POS to the front is very small in the respective models but nevertheless significant. Household type was found to have a significant influence on both of the outcome variables, in particular being a retired couple with no dependents or being a couple with dependents has a positive association with knowing more people in the development and the number of neighbours with positive relations.

Previous research has shown that providing some space and distance between the dwelling and the street has a positive impact on social interactions (Mulholland Research and Consulting, 2003; Al-Homoud and Tassinary, 2004). Both studies found that residents who used their front POS were likely to interact with their neighbours and people passing by. The same effect could be in evidence in the thirteen developments studied; the front POS is a semi-private space (or buffer zone) controlled by the resident and therefore they feel comfortable interacting with others from within its boundaries. Retired people may have more time to spend in their front private outdoor space and consequently this household type tend to have more social interactions with neighbours and other residents passing by. Likewise, families with young children may use their front POS more than other household types and as a result interact with more people.

Predictor variables	Model 1 Know people in development *b*	SE	β	t	*p*	Model 2 No. of neighbours with positive relations *b*	SE	β	t	*p*
(Constant)	2.082	.083		25.124	0.000	1.412	.103		13.726	0.000
Indicators of high-density										
Setback distance	0.027	.007	.154	3.605	0.000					
Area of POS to front						0.003	.001	.087	2.133	0.033
Intervening variables										
Retired, no dependents	0.655	.150	.205	4.361	0.000	0.750	.208	.156	3.607	0.000
Couple & dependents	0.386	.097	.216	3.998	0.000	0.261	.132	.097	1.983	0.048
Lone parent & dependents	0.384	.143	.128	2.676	0.008					
Multiperson						-0.39	.197	-.09	-2.002	0.046
Single, retired	0.746	.189	.178	3.940	0.000					
R	.329					.232				
R^2	.108					.054				
Adjusted R^2	.096					.043				
N	508					630				

Table 7.2: Multiple regression models for indicators of high-density & intervening variables

7.3 The impact of a variety of dwelling types and sizes on social interactions

A variety of dwelling types and sizes, as well as tenures, can contribute to a housing development having a sustainable community (Bailey *et al.*, 2006). A sustainable community includes people at all stages of the lifecycle and each have a valuable contribution to make to society (Barton, 2000). Building developments with a variety of housing types and sizes can help people stay in the same place (if they choose to) for a long period of time, aiding the stability, and therefore the sustainability, of a community (Allen *et al.*, 2005). However, two issues that may have a negative impact on positive social interactions have been identified. One is that neighbours who are at different stages in the lifecycle, or who have different lifestyles, may not get on well. The second is that a predominance of flats in a development may lead to lower levels of social interaction. The following two sections discuss the analyses testing the hypotheses generated by these issues.

7.3.1 The impact of lifecycle differences between neighbours on social interaction

The concern that neighbours in developments of mixed dwelling types may not get on as a result of differing lifestyles and ages resulted in the formulation of the following hypothesis:

- **Where neighbours are at different stages in the life cycle, with different lifestyles, the opportunities for conflict and negative social interaction are increased.**

The hypothesis was tested using the household type and length of time predictor variables, and two outcome variables: how well residents get on with neighbours (Model 1 in Table 7.3) and the number of neighbours with positive relations (Model 2). The results show which household types tend to have higher levels of positive social interaction.

	Model 1 Get on with neighbours					**Model 2 No. of neighbours with positive relations**				
Predictor variables	***b***	**SE**	**β**	**t**	***p***	***b***	**SE**	**β**	**t**	***p***
(Constant)	1.544	.173		8.941	.000	3.488	.087		40.305	.000
Retired, no dependents	0.664	.217	.138	3.067	.002	0.224	.118	.095	1.897	.058
Couple, dependents	0.255	.130	.095	1.958	.051					
Single, retired						0.370	.141	.127	2.617	.009
Rent private landlord	-0.461	.204	-.128	-2.258	.024					
Rent RSL						-0.217	.099	-.126	-2.198	.028
Length of time in home	0.252	.113	.098	2.223	.027					
R	.254					.263				
R^2	.065					.069				
Adjusted R^2	.043					.050				
N	529					641				

Table 7.3: Multiple regression models for lifecycle differences between neighbours

Retirees get on well with their neighbours and consequently have a high number of neighbours with positive relations. Families with young children also tend to get on with their neighbours. It may be that retired people and families spend more time in and around their homes, consequently having more opportunities to meet their neighbours. Some residents might have moved into their new homes at the same time as their neighbours which can increase opportunities for social interactions. For other household types there are no significant associations with positive social interactions.

Renting from a private landlord or from an RSL affects positive social interactions: those who rent from private landlords tend to get on less well with their neighbours and those who rent from RSLs have fewer neighbours with positive relations. There is a correlation between renting privately and living in a development for less than two years and it may be that residents of this tenure type have not lived there long enough to interact with their neighbours. Renting privately is correlated with living in flats and, as is discussed in the next section, this may have a negative effect on opportunities for social interaction. Interestingly, residents who rent from RSLs tend to have lived in their current homes for over two years and so have had time to interact with their neighbours. The lack of choice with regards to location can be an issue for RSL tenants which may manifest itself in a lack of social interactions with neighbours.

7.3.2 Living in flats and social interactions

Building at high dwelling densities has given rise to a high proportion of flats being built in new developments. Previous research has shown that residents whose front door is not at street level interact less than those whose front doors are at street level (Festinger *et al.*, 1950; Raman, 2005). Consequently the following hypothesis was developed to test whether living in flats impacts on social interactions:

- **The design of blocks of flats provides residents with fewer opportunities for social interactions than the design of housing.**

The analyses consisted of two models; one for the output variable knowing people in the development and one for the number of neighbours with positive relations (see Table 7.4). A dichotomous variable for whether a respondent lived in a flat or not and intervening variables were the predictor variables. Living in a flat, as opposed to living in a house, is associated with knowing fewer people in the development and having a smaller number of neighbours with positive relations. Renting from a private landlord also results in knowing fewer people in a development. The combination of renting privately and living in a flat significantly reduces the number of people a resident knows. Similarly, the combination of living in a flat and being in a multiperson household has a negative association with the number of neighbours with positive relations. These findings correlate with those of Festinger (1950) and Raman (2005); living in a flat can have a negative influence on a resident's ability to interact with other residents and neighbours.

7.4 Mixed use development and social interactions

Mixed use development was identified, in Chapter Four, as a design principle that has the potential to encourage social interaction between residents in a development. Through the frequent use of facilities and amenities within walking distance of the home people may come into regular contact with other residents (Jacobs, 1961; Rudlin and Falk, 1999; Llewelyn-Davies, 2000). Two hypotheses were generated from the discussion and the results of the analyses are reported in the following two sections.

	Model 1 Know people in development					Model 2 No. of neighbours with positive relations				
Predictor variables	***b***	**SE**	**β**	**t**	***p***	***b***	**SE**	**β**	**t**	***p***
(Constant)	2.265	.104		21.756	.000	1.485	.120		12.343	.000
Dwelling type										
Dwelling type is a flat	-0.205	.088	-.097	-2.334	.020	-0.484	.133	-.157	-3.642	.000
Intervening										
Rent private landlord	-0.376	.130	-.151	-2.900	.004					
Rent RSL	0.299	.123	.122	2.434	.015					
Retired couple, no dependents	0.570	.145	.167	3.924	.000	0.675	.206	.140	3.283	.001
Couple, dependents	0.387	.087	.208	4.437	.000					
Multiperson						-0.381	.195	-.084	-1.958	.051
Single, retired	0.773	.181	.175	4.281	.000					
Length of time in home						0.285	.104	.110	2.737	.006
R	.426					.287				
R^2	.181					.082				
Adjusted R^2	.164					.070				
N	628					622				

Table 7.4: Multiple regression models for living in flats and social interactions

7.4.1 The provision of a variety of facilities and social interaction

Planning policy (DCLG, 2006) and design guidance (Urban Task Force, 1999; Llewelyn-Davies, 2000) advocate the incorporation of a variety of facilities and amenities within new developments. It is thought that regular use of such facilities within walking distance of home will increase residents' opportunities to meet one another and interact and the following hypothesis seeks to test this:

- **Meeting at facilities and amenities in the development increases opportunities for social interaction between residents.**

Table 7.5 contains the results of the analysis testing whether and which facilities and amenities have an association with knowing people in the development (Model 1). Twenty-five per cent of the variance in knowing people in the development is explained by the model and the presence of particular facilities or amenities has a highly significant impact. A healthcare facility, such as a GP practice, in or near the development is associated with knowing more people in the development. Likewise the presence of a café, pub or restaurant is associated with knowing more people in a development. The social nature of a café or pub may contribute to residents interacting with one another. Interestingly, a park in the vicinity is associated with knowing fewer people in the development (this is discussed in Section 7.6.1), as is the presence of a place of worship or community hall. The denomination of the place of worship may not be that of the residents in the development, and it may be that the activities in the community hall do not appeal to the residents. Other uses were tested, for example newsagents, schools and Post Offices, and it is perhaps surprising that none of these uses were significantly associated with knowing people in the development. Children do not necessarily go to the school nearest to their home but it might have been assumed that regular use of the local newsagent would result in regular contact with other residents.

Predictor variables	Model 1 Know people in development *b*	SE	β	t	*p*	Model 2 Know people in development *b*	SE	β	t	*p*
(Constant)	2.870	.164		17.462	.000	2.077	.101		20.590	.000
Mixed use										
Health centre yes/no indev & nearby	1.031	.194	.523	5.321	.000					
Cafe etc yes/no indev & nearby	0.903	.219	.270	4.126	.000					
Worship yes/no indev & nearby	-1.262	.199	-.665	-6.351	.000					
Park yes/no indev & nearby	-1.312	.243	-.331	-5.396	.000					
Walk to work in dev or nearby						0.411	.065	.227	6.307	.000
Intervening										
Rent/mortgage	-0.363	.176	-.084	-2.060	.040					
Rent private landlord	-0.456	.121	-.181	-3.777	.000	-0.419	.122	-.166	-3.439	.001
Rent RSL						0.286	.116	.118	2.469	.014
Retired, no dependents	0.370	.140	.108	2.647	.008	0.623	.140	.181	4.466	.000
Couple, dependents	0.438	.081	.234	5.407	.000	0.343	.083	.183	4.159	.000
Lone parent, dependents	0.370	.136	.114	2.716	.007					
Single, retired	0.352	.178	.081	1.980	.048	0.807	.170	.186	4.748	.000
R	.501					.468				
R^2	.251					.219				
Adjusted R^2	.232					.203				
N	648					648				

Table 7.5: Multiple regression models for mixed use and walking to facilities

7.4.2 Walking to facilities and social interaction

Including a mix of uses in a development within walking distance of the dwellings has benefits for physical health and potentially social interactions. The hypothesis analysed in this section is based on this premise:

- **Walking to/from facilities and amenities in the development increases opportunities for social interactions between residents.**

The results of the analysis (see Table 7.5) indicate that there is a high level of association between walking in the development to get to work and knowing people in the development. However, walking to and from particular facilities in the developments is not associated with knowing people in the development. The regularity of walking to work, possibly five days a week, could result in familiarity between residents leading to social interactions, whereas irregular or infrequent walking trips to facilities in the development are perhaps not sufficient to encourage social interactions between residents. Previous research found no link between walking in a neighbourhood and local social interactions (du Toit *et al.*, 2007) so it is interesting that there is a link in the developments studied here.

7.5 A walkable urban environment

According to design guidance and theory (Rudlin and Falk, 1999; Barton, 2000; Burton and Mitchell, 2006) developments should be designed to encourage residents to walk rather than use other forms of transport, in particular the car. Residents who regularly walk through their development have a higher chance of interacting with other residents on foot than those who use other forms of transport (Appleyard and Lintell, 1972; Brown and Cropper, 2001). Various features of the layout and design of a development are thought to be beneficial for walking and subsequently may lead to social interactions between residents and neighbours. Several hypotheses were developed as a result of a review of the literature and they were all analysed. However, four of the hypotheses are not discussed as a result of there being no relationship between the physical feature and social interactions between neighbours or knowing people in the development. The four hypotheses are:

- **Small urban blocks encourage residents to walk through the development, increasing opportunities for social interaction.**
- **Good footpath provision encourages residents to walk through the development, increasing opportunities for social interaction.**
- **High quality street furniture provision encourages residents to walk through the development, increasing opportunities for social interaction.**
- **Active building frontages encourage residents to walk through the development, increasing opportunities for social interactions.**

The discussion pertains to the hypotheses where there was a significant relationship between the physical features and social interaction between neighbours or knowing people in the development.

7.5.1 Walkability and knowing people in the development

Hypotheses were tested in relation to social interactions with residents from across the development, and social interactions with neighbours. This section concentrates on the former output variable, that is knowing people in the development. Streets that are faced by buildings with active frontages, are legible and permeable, and are designed in a grid layout of smaller blocks with good quality footpaths and traffic calming features can be more attractive for walking. As a result of pedestrian activity on the streets social interactions between residents may occur. The first hypothesis examines one element of street design and is:

- **A legible and permeable street layout connected to the existing street network encourages residents to walk through the development, increasing opportunities for social interaction.**

High levels of legibility are associated with knowing more people in the development (Model 1, Table 7.6), as is living on a permeable street, that is a street with a high level of local integration (this measures the relationship of a street to all other streets within part of a larger system, i.e. a neighbourhood or development within a city, see Chapter Five). However, living on a street with a high global integration value (a measure of the relationship of a street to all other streets within a whole system, e.g. a city) is associated with knowing fewer people in a development. Streets with a high global integration score are likely to be the main thoroughfares in a development, and as such are likely to be busy with potentially both pedestrians and vehicular traffic. Living on busy roads has been found to impede social interactions between neighbours (Appleyard and Lintell, 1972) and this may be happening in the developments studied here. In comparison, streets with a high local integration score are well-linked to other nearby streets without necessarily being well-linked to streets beyond the local area. This could mean residents find these streets pleasant to walk along because there is less vehicular traffic, and they are likely to be good for accessing other parts of the development.

The second feature of a walkable urban environment that spawned a hypothesis is the street pattern and the subsequent hypothesis is:

- **A high level of legibility, due to a grid or deformed grid layout, encourages residents to walk through the development, increasing opportunities for social interaction.**

The only type of street layout found to have an association with knowing people in the development was the type where there was no discernible pattern. This was unexpected, however in these types of layout there are elements of a distorted grid structure which may contribute to the walkability of the development. They may also contain culs-de-sac and no through roads but it may be that these elements are in the minority and so do not impede walking.

Four hypotheses related to the length of the urban blocks, the level of active frontage and also to the quality of the footpaths and street furniture were formulated. There were no significant associations between any of the physical features and knowing people in the development. Consequently it is not possible to say whether they have an influence on walking and social interactions in the particular developments looked at in this study.

The final hypothesis, related to walkability, to be tested in relation to knowing people in the development was based on the idea that traffic calming features can increase pedestrian activity and therefore social interactions. The hypothesis is:

- **Traffic calming encourages residents to use streets as pedestrians, increasing the opportunities for social interaction.**

Streets with traffic calming features, such as speed bumps and bollards to slow down vehicles, were found to be associated with knowing more people in the development. Streets designed as Home Zones were also associated with knowing more people in the development. A relationship between reduced traffic and higher levels of social interaction have been established in previous research (Appleyard and Lintell, 1972; Clayden *et al.*, 2006) and the results here contribute further evidence that traffic calming is beneficial for social interactions.

	Model 1 Know people in development					Model 2 No. of neighbours with positive relations				
Predictor variables	***b***	**SE**	**β**	**t**	***p***	***b***	**SE**	**β**	**t**	***p***
(Constant)	0.358	.462		.775	.438	0.953	.237		4.026	.000
Walkability										
Legibility reversed	0.503	.124	.512	4.047	.000					
Local integration value for street	0.091	.044	.093	2.048	.041					
Global integration value for street	-2.194	.399	-.412	-5.501	.000					
No discernible pattern	0.626	.264	.289	2.373	.018					
Street calming	0.814	.150	.429	5.409	.000	0.826	.182	.296	4.532	.000
Home Zone	0.658	.153	.311	4.295	.000	0.751	.200	.241	3.750	.000
Intervening										
Rent/mortgage	-0.465	.184	-.105	-2.525	.012					
Rent private landlord	-0.380	.129	-.152	-2.934	.003	-0.504	.192	-.139	-2.623	.009
Retired, no dependents	0.412	.141	.122	2.929	.004	0.550	.218	.114	2.519	.012
Couple, dependents	0.401	.084	.216	4.781	.000					
Lone parent, dependents	0.426	.140	.131	3.037	.002					
Single, retired	0.441	.187	.098	2.359	.019					
Length of time	0.213	.074	.120	2.899	.004					
Lower & technical						0.558	.252	.093	2.217	.027
R	.505					.320				
R^2	.256					.102				
Adjusted R^2	.230					.072				
N	634					644				

Table 7.6: Multiple regression models for walkability

7.5.2 Walkability and social interactions with neighbours

The hypotheses were tested for relationships between the physical features and social interactions with neighbours. One feature was found to have an association with the number of neighbours a resident has positive relations with; the feature is street calming. Residents who live on streets that are Home Zones or have traffic calming features tend to have a higher number of neighbours with positive relations than those who live on streets with no traffic calming features (see Model 2 in Table 7.6). Yet again this suggests that reducing the speed and quantity of vehicular traffic travelling along a road has significant benefits for residents in terms of social interactions.

7.6 The provision of adequate recreational and communal space and social interactions

Sustainable housing developments should include sufficient open space and facilities for residents to use for physical activities (ODPM, 2005b; DCLG, 2006). Public open spaces and communal open spaces can be important for social interactions between neighbours (Kuo *et al.*, 1998; Rudlin and Falk, 1999). The hypotheses analysed in this section investigate the relationship between the provision of recreational and communal space and social interactions.

7.6.1 Public recreational space and social interactions

Public open space within walking distance of dwellings is likely to be beneficial for residents' physical and mental well-being (Mitchell and Popham, 2008). In addition the public open spaces may provide residents with the chance to meet one another and form relationships. The following hypothesis has been created to test the relationship:

- **Provision of public open space for a common purpose encourages residents to interact with one another.**

The effect of having public open space and play areas for children on knowing people in the development was tested. Surprisingly, the presence of both features have a negative association with knowing people in the development. The negative association between play areas and knowing people seems to conflict with the positive relationship between couples with dependents and knowing people in the development. A fair assumption to make would be that families with young children would use local play areas and therefore come into contact with one another. If this is happening it is not resulting in sufficient social interactions for people to say they know one another. It may be that meetings at play areas do not occur frequently enough for social interactions to occur. In some developments residents have walkable access to more than one park and so residents may not interact with other residents from the development because they are in another park. Alternatively the public open space may be designed for uses not favoured by the local residents who therefore do not use the space. However this does not explain the negative relationship. It may be related to the length of time people have been in residence and regular use of parks over a prolonged period of time will eventually result in positive social interactions between residents.

Predictor variables	Model 1 Know people in development *b*	SE	β	t	*p*
(Constant)	2.660	.172		15.507	.000
Public open space					
Play area yes/no indev & nearby	-0.154	.080	-.077	-1.925	.055
Park yes/no indev & nearby	-0.456	.157	-.115	-2.910	.004
Intervening					
Rent private landlord	-0.294	.132	-.117	-2.236	.026
Rent RSL	0.331	.119	.137	2.790	.005
Retired, no dependents	0.513	.141	.150	3.632	.000
Couple, dependents	0.387	.084	.207	4.639	.000
Lone parent, dependents	0.257	.138	.079	1.866	.062
Single, retired	0.749	.178	.167	4.193	.000
Length of time	0.179	.074	.100	2.428	.015
R	.454				
R^2	.206				
Adjusted R^2	.187				
N	646				

Table 7.7: Multiple regression models for the provision of public recreational space

7.6.2 Communal space and social interactions

Two hypotheses were generated specific to communal space and social interactions. The first is related to using the communal space regularly alongside other residents:

- **Households regularly using communal space have more opportunities for social interaction with their neighbours.**

The results of the regression analysis in Table 7.8 show that the number of neighbours with positive relations is positively associated with the frequent use of the shared space in the summer. Regular use of the shared space could be a reason for getting on with many neighbours, although the association could be read the other way. Residents get on with many neighbours and therefore are happy to use the shared space frequently.

The second hypothesis attempts to discover if particular features attract residents to the communal space, resulting in social interaction:

- **An appropriate variety in landscape design encourages all residents to use communal space regularly, increasing opportunities for social interaction.**

Table 7.8 shows that two features of communal space have a significant association with the number of neighbours with positive relations. Where communal spaces have play areas there is a negative association. Children using play areas regularly could be noisy and other residents who wish to use the communal space for quiet reflection may find the noise intrusive. This could result in friction between residents. Conversely, the inclusion of planting and shrubs has a positive association with the number of neighbours with positive relations. Communal spaces that are attractive are likely to be popular with residents resulting in regular use. Careful and attractive planting might help mitigate the potential disturbance that play areas in communal spaces can cause.

	Model 1 No. of neighbours with positive relations				
Predictor variables	***b***	**SE**	**β**	**t**	***p***
(Constant)	0.040	.322		0.126	.900
Communal space					
Frequency shared space used in summer reversed	0.155	.040	.185	3.835	.000
Play area in communal area	-0.315	.090	-.228	-3.519	.000
Planting and shrubs in communal area	0.735	.152	.313	4.846	.000
R	.311				
R^2	.097				
Adjusted R^2	.090				
N	397				

Table 7.8: Multiple regression models for the use of communal space

7.7 Car and bicycle storage and social interactions

Reducing in-curtilage car parking and increasing bike storage facilities are thought to increase the likelihood of residents using their cars less. An additional benefit of communal or on-street car parking and communal bike storage is that they may encourage residents to interact with one another (Abu-Ghazzeh, 1999). Three hypotheses arose from the literature review and are tested below.

7.7.1 Storage facilities for bicycles and social interaction

The first hypothesis relates to bike storage and states:

- **Communal cycle storage areas provide opportunities for social interaction between residents.**

The presence of bike storage facilities was found to have a significant association with knowing people in the development (see Table 7.9). Unexpectedly, all types of bike storage (in-curtilage, communal and public) were found to be negatively associated with knowing people, although public storage is not significant. The negative association between in-curtilage bike storage and knowing people supports the hypothesis, however the negative association between communal bike storage and knowing people does not. Communal bike storage is associated with blocks of flats and renting from private landlords. Residents in this situation tend to know fewer people in the development and communal bike storage is perhaps unable to mitigate it. Of course, even though residents have access to bike storage there is no guarantee that they own bikes and use the storage facilities.

7.7.2 Parking facilities for cars and social interaction

Two hypotheses arose from the discussion regarding car-parking facilities:

- **Communal parking areas for residents increase opportunities for social interaction.**
- **On-street car parking increases opportunities for residents to interact with those walking by.**

The findings from the regression analysis show that on-street parking does not have a significant association with social interactions and therefore the hypothesis can neither be confirmed or refuted. In contrast, communal car parking has a significant and negative association with the number of neighbours a resident is on friendly terms with. Communal car parking facilities are provided in developments with houses as well as flats so the lack of social interaction is not necessarily related to dwelling type as is perhaps the case with communal bike storage. As with bicycles, not all residents necessarily own cars and therefore have no need to use car parking facilities. Complex patterns of car usage involving trip chaining may mean that residents do not meet one another regularly in the communal car parking area. Alternatively, the character of the communal parking areas may mean residents do not linger in them and therefore social interactions do not happen.

	Model 1 Know people in development					Model 2 No. of neighbours with positive relations				
Predictor variables	***b***	**SE**	**β**	**t**	***p***	***b***	**SE**	**β**	**t**	***p***
(Constant)	2.554	.205		12.446	.000	1.850	.169		10.949	.000
Car/bike storage										
Bike storage – in-curtilage	-0.473	.187	-.242	-2.533	.012					
Bike storage - public	-0.403	.242	-.094	-1.665	.096					
Bike storage - communal	-0.436	.199	-.201	-2.186	.029					
Communal parking						-0.243	.107	-.095	-2.268	.024
On-street parking						-0.221	.235	-.038	-0.937	.349
Intervening										
Rent private landlord	-0.329	.134	-.131	-2.451	.015	-0.544	.195	-.150	-2.793	.005
Rent RSL	0.291	.120	.120	2.428	.015					
Retired, no dependents	0.563	.144	.164	3.920	.000	0.664	.218	.137	3.046	.002
Couple, dependents	0.400	.086	.213	4.625	.000	0.266	.131	.099	2.040	.042
Single, retired	0.780	.181	.174	4.310	.000	0.209	.270	.034	0.775	.438
Length of time	0.177	.076	.099	2.346	.019					
R	.436					.263				
R^2	.190					.069				
Adjusted R^2	.169					.049				
N	646					644				

Table 7.9: Multiple regression models for car and bicycle storage

7.8 High quality design of boundaries and social interactions

The boundaries between properties have an important role to play in the relationships between neighbours. Clearly marked boundaries can contribute to positive social interactions between neighbours (Stokoe and Wallwork, 2003), and this is the basis for the final hypothesis to be tested in this chapter:

- **Cleary marked boundaries aid social interactions between neighbours.**

The type and the quality of boundaries were analysed for their association with social interactions. The type of boundary was found to be positively associated with knowing people in the development (Model 1, Table 7.10). In particular boundaries marked by a fence or a hedge are related to knowing more people in the development. Getting on with neighbours is positively associated with the quality of the boundary, that is better quality boundaries are linked to getting on with neighbours well. Al-Homoud and Tassinary (Al-Homoud and Tassinary, 2004) suggest that high quality boundaries mean a person feels in control of their private outdoor space and are therefore happy to interact with their neighbours and passers-by. This may well be the case in the developments studied.

	Model 1 Know people in development					**Model 2 Get on with neighbours**				
Predictor variables	***b***	**SE**	**β**	**t**	***p***	***b***	**SE**	**β**	**t**	***p***
(Constant)	2.166	.103		20.979	.000	2.000	.453		4.414	.000
Boundary										
Fence/hedge	0.999	.409	.089	2.441	.015					
Level change	0.148	.078	.072	1.892	.059					
Quality of public/private delineation						0.289	.091	.139	3.161	.002
Intervening										
Rent private landlord	-0.382	.126	-.152	-3.029	.003					
Rent RSL	0.320	.119	.132	2.685	.007					
Retired, no dependents	0.568	.144	.165	3.944	.000	0.226	.110	.096	2.044	.041
Couple, dependents	0.395	.084	.211	4.684	.000					
Lone parent, dependents	0.289	.140	.089	2.062	.040	-0.240	.109	-.108	-2.200	.028
Single, retired	0.769	.175	.177	4.401	.000	0.306	.133	.105	2.296	.022
R	.426					.256				
R^2	.182					.066				
Adjusted R^2	.164					.053				
N	648					529				

Table 7.10: Multiple regression models for boundary type and quality

7.9 Conclusion

The purpose of this chapter was to test whether the physical features of sustainable housing developments impact on social interactions between neighbours, and residents. Some of the hypotheses were validated by the results whereas others were refuted. Positive social interactions between neighbours appear to be enhanced by a resident having a private open space between the front of the house and the street. Living on streets where there are traffic calming features (such as bollards and speed bumps) or designated Home Zones is associated with increased levels of positive social interactions with neighbours. However, residents who live in flats are likely to have lower levels of social interaction with their neighbours as are those who use communal or on-street parking. Residents with access to communal spaces may be encouraged to interact with their neighbours if they use the space frequently, or if the communal space has planting and shrubs, although play areas in communal spaces can result in residents having lower levels of positive social interactions with their neighbours.

The influence of the built environment on social interactions across the wider scale of the development was also analysed. Knowing people in the development is associated with various elements of the built environment. Greater setback distances between the dwelling and the street seem to result in residents knowing more people in the development, as does having a clearly marked boundary around the dwelling. Developments with integrated and permeable streets with uses such as a health centre, café or pub are advantageous for knowing more people in the development. However, places of worship, community halls or parks and play areas are not associated with knowing more people in the development. Living in a flat is associated with knowing few, if any, people in the development, as is communal bike storage.

In almost all the analyses respondents' likelihood of socialising was related to their personal characteristics. Residents who are retired and people with dependent children tend to have more positive relations with their neighbours than couples or singles who have no children and who are not retired. Renting privately seems to result in knowing fewer people in the development and having fewer neighbours with positive relations. However, living in the development for over two years may mitigate this as people in this category tend to have more positive relations with their neighbours and know more people in the development.

The majority of the hypotheses tested in this chapter were either confirmed or refuted by the statistical analyses. Many of the associations between the features and social interactions were found to be weak, but they were significant. The results imply that the built environment can have an impact on social interactions between neighbours. In the following chapter the hypotheses relating the physical features of a sustainable housing development to privacy in the home are tested using statistical analysis.

chapter EIGHT

Design features and privacy in sustainable housing developments

Chapter Eight: Design features and privacy in sustainable housing developments

8.1 Introduction

This chapter focuses on the research question: **do the design features of sustainable housing developments have an impact on privacy in the home and if so, what is the nature of the impact,** in order to address the second research aim, which is **to identify if and how privacy in the home is affected by the design of sustainable housing developments** (Figure 8.1).. The discussion in Chapter Three established that privacy in the home is an important feature of quality of life. Whilst policy on the design of sustainable housing developments has been influenced by theory encouraging increased social interactions between residents, little thought has been given to the potential impacts on levels of privacy in the home. A series of hypotheses were developed in Chapter Four which identified physical features that may impact on privacy in the home. As with the previous chapter multiple regression analysis is used to test the hypotheses and the significant coefficients are presented in tables (see Appendix E for the full list of coefficients). The analysis includes intervening variables to discern their impact on the relationships between the sustainable design principles and privacy in the home.

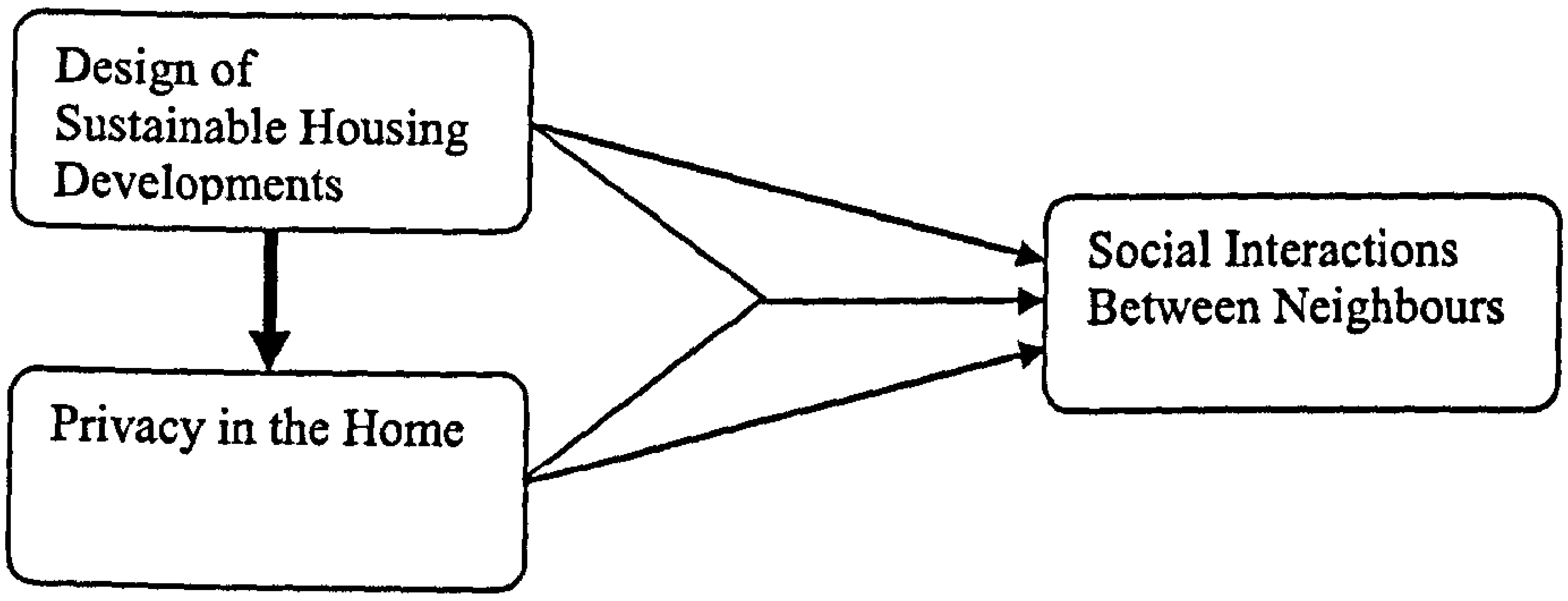


Figure 8.1: Diagram representing the relationships studied. The focus of Chapter Eight is highlighted

In Chapter Four each principle of sustainable design was discussed and defined. An outcome of the discussion was a series of hypotheses relating physical features to privacy in the home. The variables used to measure privacy in the home, design features, and intervening factors are listed in Table 8.1. Privacy in the home was measured in terms of overlooking and noise intrusion in the dwelling and in the private outdoor space (POS).

The privacy variables are a measure of the levels of comfort associated with the view into the living area and the bedroom area of the dwelling, and in the POS. In terms of neighbour noise the variables measure the frequency with which neighbour noise is heard in the dwelling and in the POS; these variables range from a low score representing hearing neighbours all the time to a high score representing never hearing neighbours. Finally there is a variable measuring the level of annoyance with the noise heard, ranging from very annoyed at the low end to not at all annoyed at the high end of the scale. The results of the multiple regression analyses are presented in tables.

Indicators and variables measuring physical features	**Indicators and variables of privacy in the home**	**Intervening variables**
Area of private open space to front	Level of comfort with view into living area	Household type
Area of private open space to rear	Level of comfort with view into bedroom area	Tenure type
Area of private open space in total	Level of comfort with view into POS	Age
No. of bedrooms	Frequency neighbour noise heard in home	Gender
Distance dwelling to left	Frequency neighbour noise heard in POS	Socio-economic status
Distance dwelling to right	Level of annoyance with noise heard	Length of time in dwelling
Distance dwelling to rear Distance dwelling to front Net dwelling density (dph) Setback distance		
Type of dwelling Dwelling ratio for development Number of dwelling types on street		
Land use to the rear of the dwelling Land use to the front of the dwelling		
Quality of delineation between public and private space Type of delineation between public and private space		

Table 8.1: List of predictor (including intervening) and outcome variables used in the analyses

8.2 The impact of higher dwelling densities on privacy in the home

Increasing net dwelling densities in the UK is likely to have an impact on privacy in the home. There may be more opportunities for homes to be overlooked and noise to be transferred between dwellings. Privacy between members of a household may also be affected. In the UK building at net dwelling densities upwards of 30 dwellings per hectare (dph) has resulted in a decrease in the internal area of dwellings (Williams, 2009). Insufficient internal space in a home has been shown to have a detrimental effect on the privacy of the members of the household (Oseland and Raw, 1996; Regoeczi, 2003), however in some situations households are able to adjust to the situation and achieve privacy (Nagar and Paulus, 1997). Two hypotheses about the effects of the internal and external areas of dwellings on the privacy of household members were formulated:

- **Less private open space reduces levels of privacy between members of the household.**
- **Less private space in the home reduces levels of privacy between members of the household.**

The results of the analysis showed that the total area of the home and POS had no association with levels of privacy between members of the household. The number of rooms or the configuration of the rooms within the home may have an influence on the privacy of household members rather than the size of the home, as previous research has shown (Oseland and Raw, 1996). However, 57% of the respondents live alone or with one other person and this could have influenced the results. The privacy of the household as a whole may be impaired by building at high densities and this is discussed in the next section.

8.2.1 Features of higher dwelling densities and privacy in the home

The two principal concerns regarding the impact of dwelling densities on privacy in the home are overlooking by neighbours and passersby, and noise being transmitted between dwellings. The hypotheses were developed to reflect these concerns:

- **Where it is easier for people in the street and neighbours in dwellings to look into homes, privacy in the home is infringed.**
- **In higher-density housing it is easier to hear neighbours, which infringes privacy in the home.**

Overlooking was analysed in relation to the living area of a dwelling, the bedroom area and the POS. The results for the bedroom area and the POS were similar, however those for the living area were not (see Models 1, 2 and 3 in Table 8.2). Two physical features were associated with levels of comfort with the view into the living area: the number of bedrooms and the setback distance. Both associations were negative, that is the more bedrooms a property has the lower the levels of comfort with the view into the living area, likewise discomfort increases as the setback distance increases. Residents of new properties regard front gardens as essential for maintaining privacy in the home (CABE, 2005c), however it is possible that people in bigger homes with more outdoor space expected minimal overlooking and these expectations have not been met. Conversely, a higher number of bedrooms is associated with higher levels of comfort with the view into the bedroom area and the POS. Expectations for privacy may be lower for these areas of a home and so levels of comfort with the view into them are higher. Bedrooms tend to be above ground floor level in houses therefore overlooking may not be such an issue. A higher proportion of bedroom spaces may be at the rear of a property rather than on the streetside (compared to living areas) and are therefore afforded more privacy from overlooking. Renting has a negative association with comfort with the view into the bedroom area and the POS. Residents may be restricted in what they can do to prevent overlooking in rental properties and these properties tend to have fewer bedrooms. Curiously, levels of comfort with overlooking appear to decrease with time. After two years residents are likely to be more aware of the features of their home and street that annoy them (Coulthard *et al.*, 2002; Groves *et al.*, 2003).

The relationship between the physical features and neighbour noise were analysed to test the second hypothesis. An increase in the distance between properties appears to be associated with a decrease in the volume of neighbour noise heard in the home. In particular, it is the distance to the dwelling to the right of the property. This may be related to the layout of the dwellings; stairs and hallways in terraced properties may not be providing a sound barrier as they have done in older housing. Renting tends to be associated with hearing neighbours more, in particular renting from RSLs. This may be related to RSL tenants having little or no choice in the selection of their home and being unhappy with the dwelling assigned to them. Also, social housing tends to have optimal occupation, that is more people living in a house than there would be in a same-sized house in the private sector. The results suggest that bigger homes with more space around them are associated with residents having more privacy, although not in the case of living areas. The results for noise and for overlooking both suggest that the dwelling layout in relation to the street could have a high level of influence on levels of privacy in the home and further research to test this relationship would be useful.

Predictor variables	Model 1 Comfortable with view into living area					Model 2 Comfortable with view into bedroom area					Model 3 Comfortable with view into POS					Model 4 Neighbour noise heard when in home				
	b	SE	β	t	*p*	*b*	SE	β	t	*p*	*b*	SE	β	t	*p*	*b*	SE	β	t	*p*
(Constant)	3.463	.198		17.471	.000	1.851	.273		6.772	.000	3.710	.226		16.407	.000	3.987	.114		35.015	.000
Indicators of high-density																				
Number of bedrooms	-.271	.055	-.219	-4.934	.000	.509	.066	.316	7.752	.000	.114	.054	.098	2.118	.035					
Setback distance	-.026	.011	-.109	-2.453	.015															
Distance to dwelling to right																.021	.007	.110	2.760	.006
Intervening variables																				
Part mortgage/ part rent											-.763	.273	-.134	-2.799	.005	-.771	.205	-.163	-3.758	.000
Rent private landlord						-.553	.256	-.111	-2.163	.031	-.590	.202	-.168	-2.923	.004					
Rent RSL											-.485	.187	-.148	-2.593	.010	-.685	.133	-.261	-5.137	.000
N o rent						1.772	.610	.112	2.905	.004										
Length of time						-.416	.151	-.117	-2.749	.006	-.286	.116	-.118	-2.471	.014	-.224	.087	-.116	-2.582	.010
R	.234					.343					.261					.314				
R^2	.055					.117					.068					.098				
Adjusted R^2	.051					.106					.054					.086				
N	489					645					528					594				

Table 8.2: Multiple regression models for indicators of dwelling density & intervening variables

8.3 The impact of a variety of dwelling types on privacy in the home

A variety of dwelling types could impact on privacy in the home. High dwelling densities may lead to a large proportion of dwellings being flats or terraces in a development. In areas where there is a lot of terraced housing residents tend to be more dissatisfied with their local area (Bramley and Power, 2009). Living at close proximity to neighbours may exacerbate any problems neighbours have with one another, particularly if residents feel that they have insufficient privacy in the home. The discussion about the influence of dwelling types on privacy resulted in the following hypothesis:

- **Proximity in flats, terraces and semi-detached housing increase levels of overlooking and noise, reducing privacy in the home.**

The results of the analysis testing the hypothesis are separated into two components: levels of overlooking and levels of neighbour noise heard.

8.3.1 Proximity due to dwelling type and overlooking

The impact of dwelling type and dwelling type mix on overlooking was analysed for three areas of the home; the living area, the bedroom area and the POS, and the results are reported in Table 8.3. The mix of dwelling types has no significant impact on the level of comfort with the view into the living room, however the type of dwelling a respondent lives in does. Residents tend to be more uncomfortable with the view into their living room when they do not live in a flat. In particular, terraced housing and detached housing are significantly associated with less comfort with the view into the living area. As was mentioned earlier, residents in detached housing may have higher expectations for privacy which are not fulfilled. Residents in terraced housing may feel that there is not enough distance between the street and the windows of the living areas. It may be that residents in flats on the first floor and above are more comfortable with the view into the living area because they are above street level. There may also be sufficient space between blocks of flats which deters people from looking into other dwellings from their own. Women are more comfortable than men with the view into the living room; this may reflect a desire to show off the interior decoration of a property as is common in areas that have been gentrified (Hanson, 1998).

Predictor variables	Model 1 Comfortable with view into living area					Model 2 Comfortable with view into bedroom area					Model 3 Comfortable with view into POS				
	b	SE	β	t	*p*	*b*	SE	β	t	*p*	*b*	SE	β	t	*p*
(Constant)	2.755	.168		16.364	.000	2.250	.232		9.695	.000	4.426	.234		18.922	.000
Dwelling type variables															
Terrace[a]	-.395	.130	-.157	-3.044	.002	1.136	.171	.319	6.639	.000					
Semi-detached	-.299	.166	-.087	-1.800	.072	1.041	.222	.215	4.679	.000					
Detached linked	-.326	.289	-.048	-1.131	.258	1.100	.377	.119	2.917	.004					
Detached	-.538	.178	-.146	-3.016	.003	1.318	.240	.248	5.492	.000					
Flat>terr>det											-.415	.164	-.124	-2.528	.012
Intervening variables															
Rent/mortgage											-.788	.271	-.138	-2.902	.004
Rent private landlord											-.617	.201	-.176	-3.071	.002
Rent RSL											-.543	.185	-.167	-2.928	.004
No rent	-1.057	.457	-.095	-2.315	.021	1.873	.622	.116	3.012	.003					
Gender	.216	.106	.083	2.044	.041										
Length of time						-.393	.155	-.109	-2.532	.012	-.251	.117	-.104	-2.156	.032
R	.211					.322					.277				
R^2	.045					.104					.077				
Adjusted R^2	.027					.088					.059				
N	622					656					530				

[a] Dwelling type variable represented by dummy variables. The reference category is 'flat'.

Table 8.3: Multiple regression models for dwelling type and overlooking

The type of dwelling a resident lives in has a significant association with the level of comfort with the view into the bedroom area. Residents who live in dwellings other than flats are likely to be more comfortable with the view into the bedroom area than those who live in flats. It is interesting that this relationship is the opposite to the one between dwelling type and comfort with the view into the living area. Bedroom areas are likely to be on the first floor of a house and this may reduce the feeling of being overlooked. A proportion of the bedrooms are likely to be to the rear of a dwelling, consequently they may only be visible from private outdoor space. The bedroom areas of flats may seem more exposed to overlooking if the flat is single-aspect and faces the street; all the bedroom windows will face the street and whilst this is not problematic for living areas it may lead to discomfort with overlooking in bedroom areas. In some developments the bedrooms may face on to an internal communal space which may lead to feeling uncomfortable with the view into the bedroom area.

The type of dwelling the resident lives in is not significantly associated with the level of comfort with the view into the POS. Rather, the ratio of dwelling types across the development is significantly associated with the level of comfort with the view into the POS. Residents who live in developments that are predominantly flats, then terraced housing then detached housing tend to be less comfortable with the view into the POS. Renting, either privately or from an RSL, is negatively associated with being comfortable with the view into the POS. Tenants may be uncomfortable because the rented accommodation may not be their ideal. Also, they may be limited by their tenancy agreement regarding what they can do with the POS. In developments where the dwelling type is predominantly flats residents with private open spaces may feel exposed to overlooking as a result of being near to high blocks of flats.

8.3.2 Proximity due to dwelling type and neighbour noise

The relationship between dwelling type and neighbour noise was analysed for two locations; inside the dwelling, and in the POS. A third analysis was carried out to establish if there was a relationship between the dwelling type and how annoyed a person was with the noise they could hear. The dwelling type or dwelling mix did not have a significant impact on hearing neighbour noise when in the POS. However, the dwelling type is associated with the level of neighbour noise heard in the home (as shown by Model 1 in

Table 8.4). Respondents who live in detached dwellings are less likely to hear neighbour noise when in their home, compared to those who live in flats. This result is perhaps unsurprising but it could be inferred that the materials and building methods used in constructing flats could be improved to further reduce the amount of noise transferred between flats. Retirees tend to hear neighbour noise less than other household types. This may be a result of retirees living adjacent to one another and being quieter households.

Residents who live in dwelling types other than flats tend to be less annoyed by neighbour noise than those who do live in flats. Those living in detached or detached-linked houses are less annoyed by neighbour noise than residents who live in terraced housing. This corresponds with the results for the previous analysis; residents will be less annoyed by neighbour noise if they are unable to hear it.

	Model 1					**Model 2**				
	Neighbour noise when in home					**Annoyed by neighbour noise**				
Predictor variables	***b***	**SE**	**β**	**t**	***p***	***b***	**SE**	**β**	**t**	***p***
(Constant)	3.761	.143		26.351	.000	3.240	.108		29.968	.000
Dwelling type variables										
Terrace						.216	.108	.114	2.012	.045
Detached linked	.534	.205	.108	2.603	.009	.536	.216	.112	2.488	.013
Detached	.479	.137	.167	3.496	.001	.468	.147	.164	3.194	.001
Intervening variables										
Rent/mortgage	-.407	.205	-.087	-1.982	.048					
Rent RSL	-.478	.140	-.182	-3.407	.001					
Retired, no dependents	.378	.159	.104	2.373	.018					
Single, retired	.585	.203	.121	2.887	.004	.437	.219	.087	1.992	.047
Length of time	-.283	.084	-.145	-3.356	.001	-.354	.083	-.182	-4.245	.000
R	.375					.265				
R^2	.141					.070				
Adjusted R^2	.118					.052				
N	644					566				

Table 8.4: Multiple regression models for dwelling types & neighbour noise

8.4 The impact of mixed use development on privacy in the home

Mixed use development may impact on the privacy of households who live adjacent to non- residential development. The impact could be positive or negative depending on the type of use. The hypothesis to be tested is:

- **Privacy in the home can be enhanced or reduced by a non-residential land-use adjacent to the home.**

The impact of the type of space to the rear and front of dwellings may have on privacy in the home was analysed in terms of overlooking and noise heard (see Table 8.5). There was no significant relationship between the type of space surrounding a dwelling and the level of comfort with the view into the living area. However, the type of space to the rear of a dwelling was found to have an association with the level of comfort with the view into the bedroom area and the POS. Communal space to the rear of a dwelling tended to be associated with lower levels of comfort with the view into the bedroom area. In Section 8.3.1 above it was suggested that people living in flats overlooking communal areas may feel like the bedroom areas are exposed to overlooking. The results from this analysis suggest that this could well be true. Other uses that have a negative association with the view into the bedroom area are industrial or commercial uses. Again, these uses are related to comfort with the view into the bedroom area when they are to the rear of the dwelling. The level of comfort with the view into the POS is positively associated with schools and grounds being located to the rear of dwellings. This is perhaps unsurprising especially if access to the grounds is restricted to staff and students of the school through the week and no one at weekends. Renting from either a private landlord or a RSL is associated with lower levels of comfort with the view into the POS. As mentioned earlier this may be related to tenants being limited in what they can do to their POS.

Predictor variables	Model 1 Comfort with view into bedroom area					Model 2 Comfort with view into POS				
	b	SE	β	t	*p*	*b*	SE	β	t	*p*
(Constant)	2.953	.276		10.687	.000	4.081	.200		20.368	.000
Mix of uses variables										
rear communal space	-.521	.253	-.134	-2.062	.040					
rear industry/commercial	-1.407	.461	-.136	-3.051	.002					
rear school & grounds						.726	.370	.091	1.963	.050
Intervening variables										
rent/mortgage						-.764	.272	-.134	-2.813	.005
rent private landlord						-.657	.202	-.188	-3.256	.001
rent RSL						-.538	.186	-.165	-2.895	.004
no rent	1.672	.641	.103	2.609	.009					
couple, dependents	.489	.181	.129	2.701	.007					
Length of time						-.238	.116	-.099	-2.050	.041
R	.278					.304				
R^2	.077					.093				
Adjusted R^2	.050					.068				
N	659					530				

Table 8.5: Multiple regression models for mix of uses and overlooking

8.5 The impact of high quality boundaries on privacy in the home

New sustainable housing developments are to be made from high quality materials and designed to a high standard (DETR, 2000a; DCLG, 2006). The type and quality of boundaries between properties can affect levels of privacy in the home (Al-Homoud and Tassinary, 2004). The final hypothesis to be discussed in this chapter seeks to test the impact of boundaries on privacy in the home:

- **Clearly marked boundaries have a positive impact on privacy in the home.**

The quality of the boundary between private and public space is positively associated with the level of comfort with the view into the POS. High quality boundaries are those which are made from durable materials and which have been designed well so that their purpose is obvious to the passer-by. Where boundaries fit these criteria residents tend to be comfortable with the view into the POS. Renting from a private landlord is negatively associated with the level of comfort with the view into the POS. As mentioned previously this may be related to a lack of control over the space by the resident as a result of being a tenant.

Predictor variables	Model 1 Comfort with view into POS				
	b	SE	β	t	*p*
(Constant)	1.048	1.095		.957	.339
Boundary quality variables					
quality of public/private delineation	.604	.217	.161	2.779	.006
Intervening variables					
rent private landlord	-.644	.200	-.184	-3.219	.001
R	.271				
R^2	.073				
Adjusted R^2	.059				
N	530				

Table 8.6: Multiple regression model for boundary quality and overlooking

8.6 Conclusion

Statistical analysis in the form of multiple regression has been used to test the series of hypotheses relating features of the built environment to privacy in the home. The results relating physical features affected by dwelling densities and privacy in the home are interesting; more space does not necessarily mean more privacy from overlooking. This may be a result of high expectations for privacy on the part of the resident. The level of comfort with the view into the dwelling depended on whether it was the living area, bedroom area or POS. It seems likely that the internal configuration of rooms in the dwellings and how the rooms relate to external space have some bearing on the level of comfort with the view into the dwelling. The layout of the rooms in a dwelling may affect noise transmission between dwellings, particularly in terraced housing or flats. The quality of the materials used and the construction methods could also have an influence on noise transmission. Testing whether there was a relationship between the quality of boundaries and privacy in the home found that higher quality is associated with higher levels of comfort with the view into the POS. The use of high quality materials and design through a development may enhance privacy through a reduction in noise transmission and a decrease in the amount of opportunities for overlooking homes and private open space.

The testing of the hypotheses revealed that some physical features of a housing development are associated, negatively and positively, with privacy in the home. Many of the relationships are weak but they are significant. In Chapter Nine the results from the third set of analysis are discussed; whether the physical features of a sustainable housing development affect privacy in the home and consequently influence social interactions between neighbours.

chapter NINE

The impact of design and privacy on social interaction in sustainable housing developments

Chapter Nine: The impact of design and privacy on social interaction in sustainable housing developments

9.1 Introduction

The focus of this chapter is to explore the third aim of the research:

- **To ascertain if and how privacy in the home affects the relationship between the design of sustainable housing developments and social interactions between neighbours.**

To address this aim the following research question was investigated: **how does privacy in the home affect the relationship between design and social interactions between neighbours?** In Chapter Three it was proposed that privacy and social interaction are closely related concepts that affect one another. In particular, levels of privacy can impact on the quantity and quality of social interactions a person has, especially with a neighbour. The results reported in the previous two chapters indicated that the built environment can have a small influence on levels of privacy in the home and social interactions between neighbours, as hypothesised in Chapter Four. The remaining hypotheses to be tested theorise that the relationship between the built environment and social interactions between neighbours is affected by levels of privacy in the home (see Figure 9.1). To test these hypotheses factorial ANOVA and loglinear analyses were carried out and the results are discussed below. These two analyses were used to test the effect of the interaction between the design features and privacy in the home on social interactions. Some of the variance in the outcome variable not explained by the separate predictor variables may be explained by the interaction effect between the predictor variables (see Section 5.7, Chapter Five, for a detailed explanation). The interaction between the design variables, privacy variables and intervening variables was not analysed. This is because the sample size was not sufficiently large enough for the analysis to be significant or accurate. Therefore, it is important to be cautious when interpreting the results and to be aware that other interactions, with intervening variables such as household type, could also have an effect on the outcome variables. However, the results provide some indication of significant interactions between the design features and these are worthy of discussion.

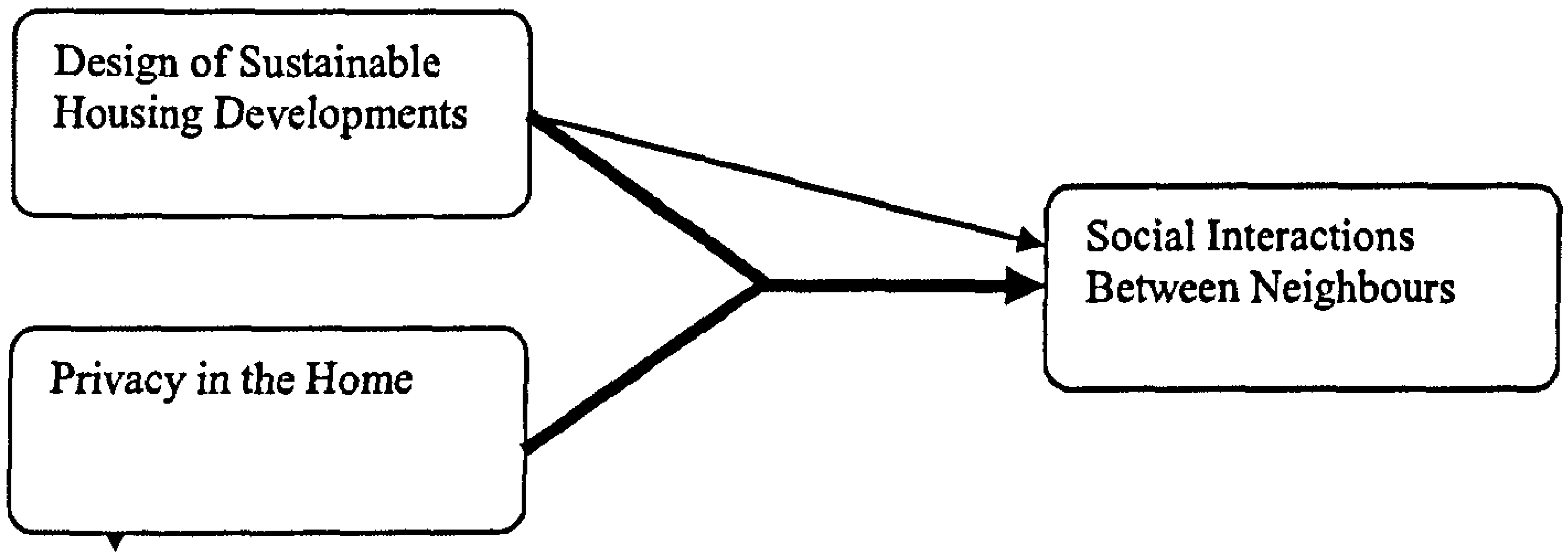


Figure 9.1: Diagram representing the relationships studied. The focus of chapter nine is highlighted

9.2 Higher dwelling densities, privacy and social interaction

The potential impact of higher dwelling densities on the physical features of a sustainable housing development, and the repercussions for privacy in the home and social interaction between neighbours were discussed in Chapter Four. Of the hypotheses proposed two were directly concerned with the interaction between the physical features potentially affected by density and privacy in the home, and how this interaction may affect social interactions between neighbours. The two hypotheses are:

- **The space to the front of the dwelling provides a semi-private buffer zone that mediates between the public street and the private home, thus aiding social interactions with neighbours.**

- **Higher density housing can have a negative impact on privacy in the home subsequently reducing levels of social interaction with neighbours.**

The results from the factorial ANOVA analyses testing these hypotheses are discussed in the following two sections.

9.2.1 The relationship between the front POS, privacy in the home and social interaction between neighbours

It was established in Chapter Four that private outdoor space between the dwelling and the public street can be beneficial for privacy in the home and for social interactions between neighbours (see Section 4.2.1.1). Previous research has shown that a front POS can reduce overlooking of the home and also provide a place for social interactions to occur between the resident and their neighbours (Ravetz and Turkington, 1995; Brown and Cropper, 2001). The results in Chapter Seven (Section 7.2) indicated that there was a positive association between having a front POS and positive social interactions between neighbours, although no such association was found with privacy in the home in Chapter Eight (Section 8.2.1). However, it may be the case that the interaction between having a front POS and privacy in the home would be significantly associated with social interactions between neighbours.

A two-way factorial ANOVA was carried out to ascertain whether the interaction between the area of the POS to the front of a dwelling and the level of comfort with the view into the POS has a significant association with the number of neighbours with positive relationships. The analysis also assesses whether the predictor variables have any individual, or main, effect on the outcome variable, that is the amount of variance in the outcome variable explained by the predictor variables (see Section 5.7, Chapter Five). When taken separately the predictor variables were significantly associated with the number of neighbours with positive relationships, and had a small main effect (see Table 9.1). The area of the POS to the front is associated with the number of neighbours with positive relationships; an increase in the area of the POS is reflected by an increase in the number of neighbours with a positive relationship. Similarly, the main effect of the level of comfort with the view into the POS was significant and small. The results suggest that respondents who are more comfortable with the view into their POS are associated with having a higher number of neighbours with positive relationships.

Independent variables and interactions	**Simple effects analysis of interaction**	**F-ratio**	df_{model}	$df_{residual}$	p	**Effect size (ω^2)**
Area of POS to front		2.94	2	503	.054	0.01
Level of comfort with view into POS		4.87	2	503	.008	0.02
Area of POS to front x Level of comfort with view into POS		.269	4	503	.898	0.008
	Level of comfort with view into POS within Area of POS to front (0m^2)	2.41			.091	
	Level of comfort with view into POS within Area of POS to front (< 25m^2)	.83			.435	
	Level of comfort with view into POS within Area of POS to front (> 25m^2)	3.52			.030	

Table 9.1: Results of factorial ANOVA analyses testing the relationships between the area of POS to the front, the level of comfort with the view into the POS and the number of neighbours with positive relationships

The results of the factorial ANOVA analyses show that the interaction between the area of the front POS and the level of comfort with the view into the POS was not significant and the effect size was negligible, therefore the interaction should be discounted.

The hypothesis being tested with this set of analyses was whether providing a private outdoor space to the front of a dwelling can aid privacy and therefore contribute to social interactions between neighbours. The non-significant interaction between the POS to the front and the level of comfort with the view into the POS suggest that in the case of the thirteen housing developments used in this research the hypothesis should be rejected. A POS to the front of the dwelling is associated with having positive relationships with neighbours regardless of the levels of comfort with the view into the POS. Similarly, higher levels of comfort with the view into the POS are associated with higher numbers of positive relationships with neighbours. This provides some tentative evidence of the dialectical relationship between privacy and social interactions; however, it also suggests that a POS to the front of a dwelling does not facilitate this relationship.

9.2.2 The relationship between net dwelling density, privacy in the home and social interaction between neighbours

Higher dwelling densities have been linked to increased levels of social interaction because of an increase in the number of pedestrians using streets, and dwellings being in close proximity to one another (Krupat, 1985; Churchman, 1999). Research has also shown that higher dwelling densities can lead to feelings of overcrowding and reduced privacy which cause residents to withdraw from social interactions with their neighbours (Evans *et al.*, 1989; Freeman, 2001). In order to analyse the relationships between dwelling densities, privacy in the home and social interaction between neighbours a two-way factorial ANOVA was carried out. The results in Table 9.2 show that dwelling density was significant as a main effect. That is, it has an effect on the number of neighbours with positive relationships. The mean number of neighbours with positive relationships is almost constant for low (under 30dph) and medium (31-50dph) dwelling densities but drops significantly when the dwelling density is high (51 and over dph), as shown in Table 9.4.

Independent variables and interactions	Simple effects analysis of interaction	F-ratio	df_{model}	$df_{residual}$	p	Effect size (ω^2)
Density (grouped)		3.367	2	609	.035	0.01
Level of comfort with view into living		.059	2	609	.943	0.004
Density (group) x Level of comfort with view into living		2.506	4	609	.041	0.013
	Level of comfort with view into living area within low-density group	2.01			.135	
	Level of comfort with view into living area within medium density group	3.65			.027	
	Level of comfort with view into living area within high-density group	5.72			.003	

Table 9.2: Results of factorial ANOVA analyses testing the relationships between the net dwelling density, the level of comfort with the view into the living area and the number of neighbours with positive relationships

The interaction between net dwelling density and the level of comfort with the view into the living area is significantly associated with the mean number of neighbours with positive relationships. Table 9.3 shows that the mean number of neighbours with positive relationships drops considerably for both those who are comfortable and uncomfortable with the view into the living area when the dwelling density is high. The combination of high dwelling densities and reduced privacy has a considerable negative influence on social interactions with neighbours as found by Evans *et al.* (1989).

	Net dwelling density			
Level of comfort with view into living	Low (0-30dph) *M (SD)*	Medium (31-50dph) *M (SD)*	High (51 and over dph) *M (SD)*	Overall *M (SD)*
Uncomfortable	1.85 (1.22)	1.93 (1.25)	1.07 (1.17)	1.72 (1.26)
Neither	1.51 (1.28)	1.54 (1.30)	1.67 (1.55)	1.56 (1.35)
Comfortable	1.82 (1.18)	1.67 (1.31)	1.40 (1.20)	1.64 (1.24)
Overall	1.79 (1.22)	1.81 (1.28)	1.27 (1.26)	1.67 (1.27)

Table 9.3: Mean number of neighbours with positive relationships for net dwelling density and level of comfort with view into the living area

The purpose of this analysis was to test the hypothesis that people living in higher density housing developments may have fewer social interactions with their neighbours as a result of a lack of privacy in the home. The results indicate that residents in high-density developments have a lower number of neighbours with positive relationships compared to those living in low or medium density developments, regardless of whether they are comfortable or uncomfortable with the view into the living area. However, in high-density developments those who are comfortable with the view into the living area have a higher mean number of neighbours with positive relationships than those who are uncomfortable. This result suggests that the hypothesis holds true for the sample used in this research. It may be that if high-density developments are designed to ensure optimal privacy residents will have more neighbours with positive relationships.

9.3 A walkable urban environment, privacy and social interactions

Claims have been made that the design of the urban environment can encourage residents to walk to destinations rather than use other forms of transport, particularly the private car (du Toit *et al.*, 2007; Leslie and Cerin, 2008). As well as being beneficial for physical health it has been suggested that social interactions would increase, benefiting feelings of sense of community and social cohesion (Brown and Cropper, 2001; Duany *et al.*, 2001) . However, there are implications for privacy in the home in that busy streets may lead to less privacy resulting in a decrease in social interactions with neighbours (Baum *et al.*, 1978). The conclusion of this review was the following hypothesis which will be tested in this section:

- **A high level of walkability increases pedestrian activity has a negative impact on privacy thus reducing social interactions with other residents.**

In Chapter Seven multiple regression analyses were carried out to establish which physical features impacted on social interactions between residents, and between neighbours. The results showed that only traffic calming measures had a positive association with the number of neighbours a resident has positive relationships with. In light of this result the analyses in this section specifically test whether levels of privacy affect this relationship in an effort to understand how privacy in the home may be associated with social interactions between neighbours.

9.3.1 The relationship between traffic calming, levels of privacy in the home and the number of neighbours with positive relationships

The effect privacy in the home may have on the relationship between traffic calming and the number of neighbours with positive relationships was tested using a two-way ANOVA. The influence of levels of comfort with the view into the POS, and levels of comfort with the view into the living area were tested separately. However, the results of the two separate analyses are similar (Table 9.4). The type of traffic calming feature (no traffic calming features, some traffic calming features or a Home Zone design) on a street had a significant and medium effect on the number of neighbours with a positive relationship. Residents on streets where there is traffic calming have a higher mean number of neighbours with positive relationships than residents on streets where there are no traffic calming features and those streets designed as Home Zones. Both the level of comfort with the view into the POS and into the living area were found to have little effect and not be significant. Similarly, the interactions between traffic calming and the level of comfort variables had little impact on the mean number of neighbours with positive relationships. A potential increase in pedestrians as a result of less traffic in a street does not seem to affect residents' feelings of being overlooked and subsequently this has no impact on social interactions between neighbours.

A third factorial ANOVA analysis was carried out to investigate the relationship between traffic calming, neighbour noise heard, the level of annoyance with the noise heard and the number of neighbours with positive relationships. As with the previous models traffic calming had a significant and substantial influence on the number of neighbours with positive relationships. On streets where there are traffic calming features or a Home Zone residents who cannot hear their neighbours tend to have an increased number of neighbours with positive relationships compared to residents on streets with no traffic calming features (see Figure 9.2). Even when residents can hear their neighbour noise on streets with traffic calming features the mean number of neighbours with positive relationships is similar to those who cannot hear neighbour noise (Table 9.5). In contrast, those who live on streets that are Home Zones tend to have positive relationships with a smaller number of neighbours if they can hear neighbour noise compared to those who cannot hear neighbour noise.

The aim of these analyses was to establish whether traffic calming features reduced levels of privacy in the home and consequently impaired social interactions between neighbours. Traffic calming features did not affect levels of comfort with the view into the dwelling or private open space, however neighbour noise seems to be affected. In situations where streets have traffic calming features the level of social interaction is high for both those whose privacy is impaired and is not. However, on streets designed as Home Zones a lack of audio privacy is associated with a drop in social interaction. There may be a number of reasons for this beyond the scope of the research but one possibility is that a lack of noise from vehicular traffic in Home Zone areas may result in residents being more aware of neighbour noise.

Independent variables and interactions	Simple effects analysis of interaction	F-ratio	df_{model}	$df_{residual}$	p	Effect size (ω^2)
Traffic calming		6.49	2	515	.002	.058
Level of comfort with view into POS		2.51	2	515	.082	.016
Traffic calming x Level of comfort with view into POS		.632	4	515	.640	.008
Traffic calming		7.05	2	609	.001	.058
Level of comfort with view into living area		.106	2	609	.899	.001
Traffic calming x level of comfort with view into living area		.817	4	609	.515	.000
Traffic calming		8.12	2	498	.000	.081
Noise heard when in POS		2.31	1	498	.129	.007
Annoyed by noise heard		.068	1	498	.794	.005
Traffic calming x noise heard in POS		2.99	2	498	.051	.023
	Noise heard in POS within traffic calming (no traffic calming)	2.49			.115	
	Noise heard in POS within traffic calming (yes traffic calming)	.92			.337	
	Noise heard in POS within traffic calming (Home Zone)	4.79			.029	
Traffic calming x annoyed by noise		3.53	2	498	.030	.039
	Annoyed by noise within traffic calming (no traffic calming)	.10			.757	
	Annoyed by noise within traffic calming (yes traffic calming)	12.92			.000	
	Annoyed by noise within traffic calming (Home Zone)	1.74			.187	
Noise heard when in POS x annoyed by noise heard		0.56	1	498	.457	.003
	Annoyed by noise within noise heard in POS (hear noise)	10.89			.001	
	Annoyed by noise within noise heard in POS (cannot hear noise)	0.39			.532	
Traffic calming x noise heard in POS x annoyed by noise		.897	3	498	.442	.005

Table 9.4: Results of factorial ANOVA analyses testing the relationships between traffic calming, privacy in the home and the number of neighbours with positive relationships

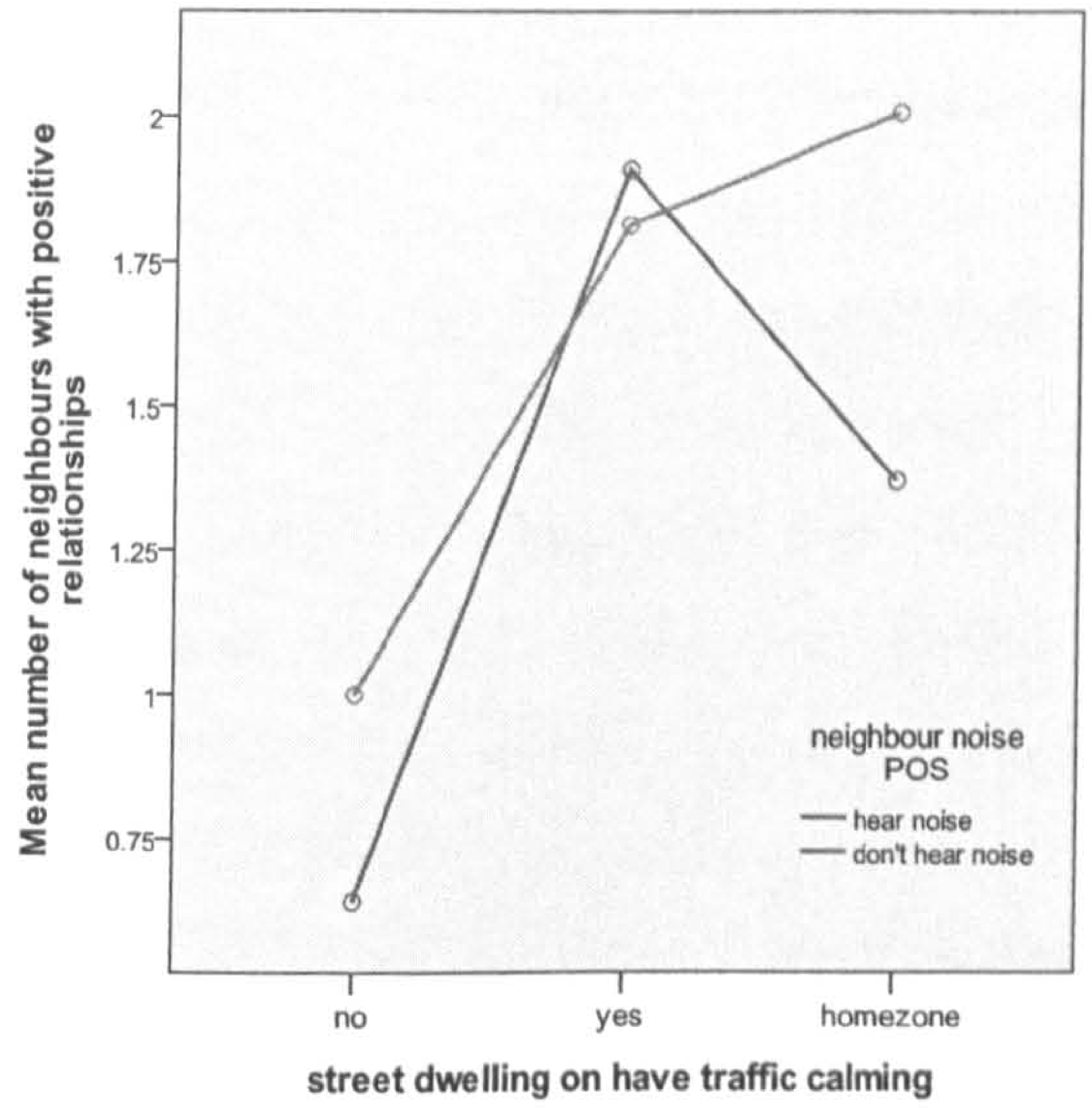


Figure 9.2: Graph showing the interaction between traffic calming and the level of neighbour noise heard when in POS

Level of neighbour noise heard	Level of traffic calming no *M (SD)*	yes *M (SD)*	Home Zone *M (SD)*
Hear noise	0.63 (0.895)	1.80 (1.20)	1.40 (1.22)
Don't hear noise	1.00 (1.23)	1.88 (1.28)	1.86 (1.33)
Overall	0.78 (1.04)	1.84 (1.24)	1.67 (1.30)

Table 9.5: Mean number of neighbours with positive relationships

9.4 The quality of boundaries, privacy and social interaction

The feature of high quality pertinent to the research are the boundaries between the space of the home and the street, and the boundary between neighbouring dwellings. The type and quality of a boundary can aid or detract from privacy in the home as well as social interactions between neighbours (Stokoe and Wallwork, 2003; Al-Homoud and Tassinary, 2004). The results of the analyses in Chapters Seven and Eight revealed associations between boundaries and privacy in the home as well as social interactions between neighbours. Loglinear analysis (see Section 5.7.3, Chapter Five, for a discussion) has been used to establish whether there are any interactions between the quality of boundary, levels of comfort with the view into the POS, and the frequency with which neighbour noise is heard in order to test the following hypothesis:

- **Clearly marked boundaries can benefit privacy in the home resulting in social interactions between neighbours.**

9.4.1 The relationship between the quality of boundaries, privacy in the home and social interactions between neighbours

In the first of two three-way loglinear analyses carried out the variables of quality of boundary, feeling comfortable with the view into the POS and getting on with neighbours were tested for any interactions. The final model contains two interactions: getting on with neighbours x level of comfort with view into the POS; and level of comfort with view into POS x quality of boundaries (see Table 9.6). The results show that the quality of the boundaries between private and public space does have an association with feeling comfortable with the view into the POS. Residents who live in dwellings with very good quality boundaries are twice as likely to be comfortable with the view into the POS as those with boundaries that are good quality (Table 9.7). The level of comfort with the view into the POS appears to affect how well residents get on with their neighbours; those who are comfortable with the view into their POS are significantly more likely to get on with their neighbours than those who are uncomfortable with the view into their POS.

	χ^2	*df*	*p*
Overall model	2.884	3	.410
Get on with neighbours x level of comfort with view into POS	6.270	2	.044
Level of comfort with view into POS x Quality of boundaries	8.031	2	.018

Table 9.6: Results of loglinear analysis between the quality of boundaries, the level of comfort with the view into the POS and get on with neighbours

Variables		Comfortable with view into POS			
		Uncomfortable	Neither	Comfortable	TOTAL
(a) Get on with neighbours	Yes	71	71	265	407
	No	10	6	12	28
	TOTAL	81	77	277	435
(b) Quality of boundary	Good	25	21	74	130
	Very Good	46	56	203	305
	TOTAL	81	77	277	435

Table 9.7: Contingency table showing (a) how many respondents get on with their neighbours according to their level of comfort with the view into the POS and (b) respondents' level of comfort with the view into the POS when the quality of the boundary between public and private space differs

The second three-way loglinear analysis investigated the relationships between the quality of boundaries, neighbour noise heard in the POS and how well respondents get on with neighbours. Two interactions were significant (Table 9.8). Respondents with good quality boundaries were more likely to hear neighbour noise than those who had very good quality boundaries (Table 9.9). The analysis revealed that neighbour noise heard in the POS interacts with getting on with neighbours. Residents who cannot hear neighbour noise are four times more likely to get on with their neighbours than those who can hear neighbour noise. The results from both of the analyses suggest that privacy in the home has an influential role as the intermediary between the quality of the boundaries and social interactions between neighbours.

	χ^2	*df*	*p*
Overall model	3.883	3	.143
Get on with neighbours x neighbour noise heard in POS	13.174	1	< .001
Neighbour noise heard in POS x Quality of boundaries	11.488	1	< .001

Table 9.8: Results of loglinear analysis between the quality of boundaries, neighbour noise heard in the POS and get on with neighbours

Variables		**Neighbour noise heard in POS**		
		Hear noise	**Don't hear noise**	**TOTAL**
Get on with neighbours	Yes	199	249	448
	No	24	7	31
	TOTAL	223	256	479
Quality of boundary	Good	95	67	162
	Very Good	172	241	413
	TOTAL	267	308	575

Table 9.9: Contingency table showing(a)how many respondents get on with their neighbours according to whether they can hear neighbour noise in the POS and (b) whether respondents' can hear neighbour noise in the POS when the quality of the boundary between public and private space differs

The analyses in this section were carried out in order to identify an association between the quality of property boundaries, privacy in the home and social interactions between neighbours. The quality of the boundaries seems to have a significant association with privacy in the home and privacy in the home have a subsequent association with social interactions between neighbours. Better quality boundaries are likely to be associated with higher levels of satisfaction with privacy in the home. Higher levels of satisfaction with privacy in the home are related to higher levels of social interaction with neighbours. Ensuring that boundaries are clearly demarcated is likely to enhance privacy in the home, possibly resulting in more social interactions between neighbours.

9.5 Conclusion

The purpose of this chapter was to investigate interactions between the design of sustainable housing developments, privacy in the home and social interactions between neighbours. Building on the results from Chapters Seven and Eight, and working from the hypotheses derived from the literature review in Chapters Two, Three and Four, a series of analyses were carried out. The results from the analyses suggest that the design of the built environment has an effect on privacy in the home resulting in a decrease or increase in social interactions between neighbours. An overview of the findings are summarised in Table 9.10. The findings suggest that where the design of built environment enhances privacy in the home there tends to be an increase in social interactions between neighbours. The implications of these findings, and those from the previous two chapters, for theory and policy are discussed in the following chapter.

Hypothesis	**Evidence to support hypothesis**	**Significant effect of impact on social interactions of the interaction between physical features & privacy in the home**
The space to the front of the dwelling provides a semi-private buffer zone that mediates between the public street and the private home, potentially aiding social interactions with neighbours.	No	-
Higher density housing can have a negative impact on privacy in the home subsequently reducing levels of social interaction with neighbours.	Yes	Very weak
Social interactions increased as a result of a walkable urban environment. Privacy possibly impaired as more pedestrians on street potentially increasing levels of overlooking of homes.	Yes	Weak
Clearly marked boundaries may have a positive impact on privacy in the home. Social interaction between neighbours may be aided as no ambiguity regarding boundaries.	Yes	Weak

Table 9.10: Overview of evidence supporting the interaction between physical features, privacy in the home and social interactions between neighbours

chapter TEN

Balancing privacy in the home with social interactions between neighbours in sustainable housing developments

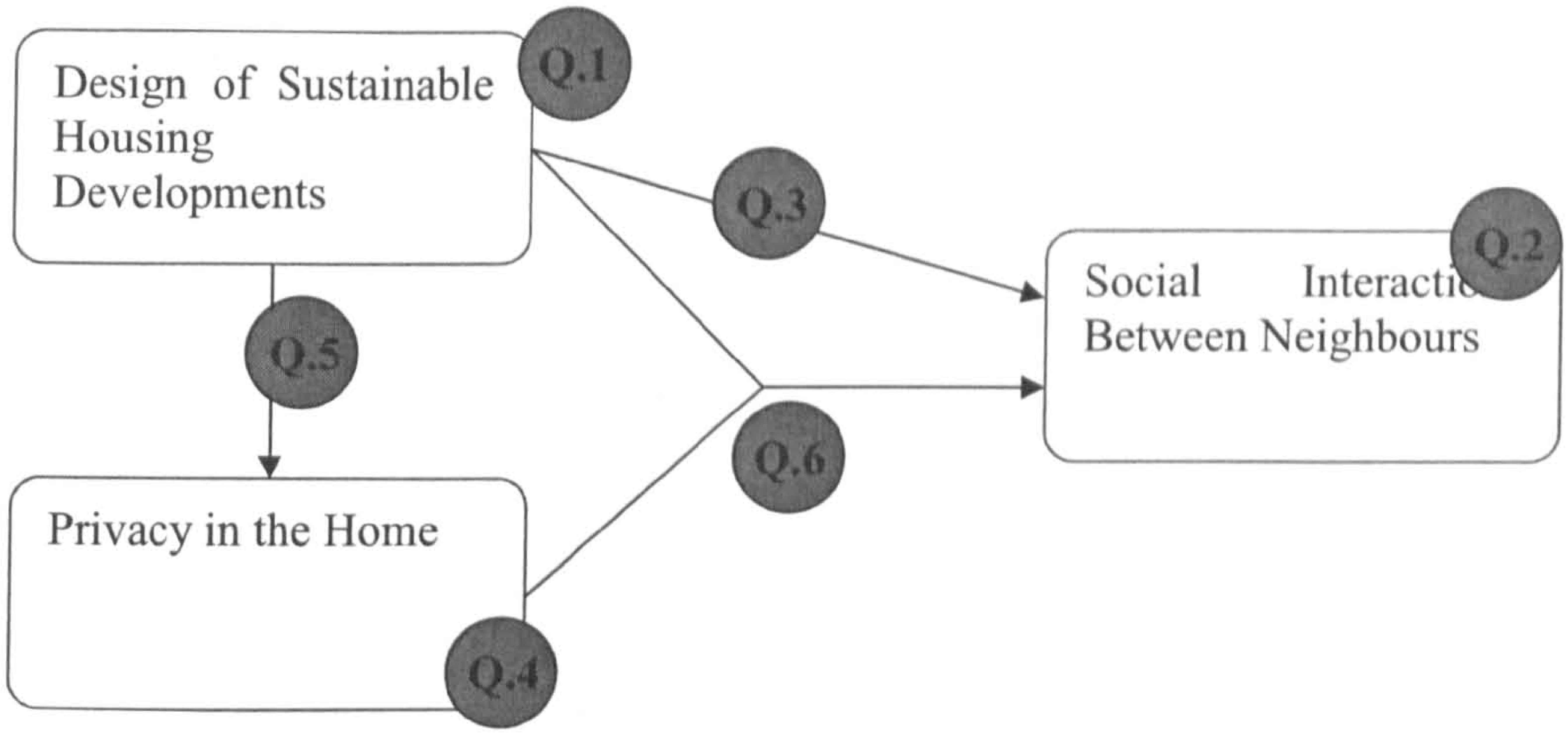
Chapter Ten: Balancing privacy in the home with social interactions between neighbours in sustainable housing developments

10.1 Introduction

The purpose of the research was to investigate the relationship between the design of sustainable housing developments, privacy in the home and social interactions between neighbours (see Figure 10.1). This thesis argues, based on the empirical findings from thirteen case studies, that whilst certain features of sustainable design do reduce levels of privacy in the home, others facilitate not only social interactions between neighbours but also enhance privacy in the home. The findings show that both privacy in the home and social interactions between neighbours are associated positively with the provision of private open space (POS) to the front of a dwelling, and high quality boundaries. Communal spaces that are appropriately designed are associated positively with social interactions between neighbours, whereas living in a flat is not. However, living in a flat reduces the likelihood of overlooking.

Empirically investigating the premise that the built environment can facilitate particular behaviours is an emerging field known as supportive environment theory. This research contributes new knowledge in the form of indicators measuring the built environment, social interaction between neighbours and privacy in the home. It also highlights the importance of considering privacy as well as social interactions in policy and design guidance. The findings provide empirical evidence that could be used to inform built environment policy and practice.

In this chapter the broad outcomes of the research are considered in relation to government policy, design guidance and theory, beginning with an overview of the results and their contribution to knowledge. Some particular limitations that prompt caution in interpreting the results are reviewed, followed by a discussion of the implications of the findings for the future design of sustainable housing developments, including recommendations for policy and practice. Some directions for future research extending from this research are given and the chapter concludes with a summary of the most important outcomes for privacy in the home and social interactions between neighbours in sustainable housing developments.



Key to the research questions:

Aim 1: To establish if and how the design of sustainable housing developments can support social interactions between neighbours.

1. What are the design elements required to achieve sustainability in housing developments that may have an impact on privacy in the home and social interaction between neighbours?
2. What is the definition of social interactions between neighbours?
3. What is the impact of design elements on social interaction between neighbours in sustainable housing developments?

Aim 2: To identify if and how privacy in the home is affected by the design of sustainable housing developments.

4. What is the definition of privacy in the home for the purposes of this research?
5. Do the design features of sustainable housing developments have an impact on privacy in the home and if so, what is the nature of the impact?

Aim 3: To ascertain if and how privacy in the home affects the relationship between the design of sustainable housing developments and social interactions between neighbours.

6. How does privacy in the home affect the relationship between design and social interactions between neighbours?

Figure 10.1: Diagram representing the research aims and questions

The sustainable development of built and urban environments has been incorporated into UK government planning policy and building regulations (ODPM, 2005b; DCLG, 2006). It has been argued that the design of the urban environment can contribute to social sustainability through the creation of mixed-use, high-density development that is built to a high quality (Elkin *et al.*, 1991; Sherlock, 1991; Churchman, 1999; Urban Task Force, 1999). Such development can encourage people to walk rather than drive, to use local facilities rather than distant ones, and to interact with one another (Winter and Farthing, 1997; Burton, 2000b). Social interactions between residents in their local area can lead to the creation of relationships, fostering a sense of community and social cohesion (Unger and Wandersman, 1985). However, social interactions are one side of a dichotomy, the other side of which is privacy (Altman, 1975). Privacy in the home is important for mental well-being and can have considerable effects (both negative and positive) on a person's social interactions (Evans *et al.*, 1989; Regoeczi, 2003). Therefore, when discussing how the built environment can influence social interactions between neighbours, it is important that the impact on privacy in the home is also understood. This thesis presents empirical research on how the design of sustainable housing developments could impact on privacy in the home, as well as on social interactions between neighbours. A particular focus was whether the relationship between the design of sustainable housing developments and social interactions between neighbours was in any way affected by privacy in the home.

10.1.1 Summary of results

Previous chapters considered a series of hypotheses concerning the impacts that physical features affected by sustainable design principles may have on social interactions between neighbours and privacy in the home. Table 10.1 lists the hypotheses and the extent of empirical support for each. Many of the hypotheses were supported; however, the majority of the relationships were weak, compelling caution in generalising about the results. There are indications that higher dwelling densities are associated with less privacy in the home as a result of overlooking from the street. Providing private open space to the front of a dwelling is associated with increased privacy in the home and also higher levels of social interaction with neighbours. Residents who live in flats appear to have lower levels of social interaction with their neighbours as hypothesised. Residents who live in developments with a mix of uses seem to know more people in their development and this may also be related to legible and permeable street layouts and traffic calming features which can encourage walking. The regular use of communal spaces is associated with higher levels of social interaction with neighbours, however the physical features of the communal space may influence who will use the space.

For some of the remaining hypotheses there was no relationship at all between the variables and, for others, the relationship tended to be the opposite of that posited. Many of the features thought to contribute to the walkability of a development were not significantly associated with knowing people in the development. In particular there was evidence to suggest that rather than gridlike patterns being advantageous for walking, and therefore social interactions, it was layouts with no discernible pattern that were beneficial.

The quality of the street furniture and footpaths had no relationship with knowing people in the development, nor did the length of the urban blocks. Communal and on-street car parking facilities and bicycle storage did not influence social interactions between neighbours. Communal car parking and communal bike storage were found to be associated with less social interaction with neighbours. The implications of these findings are discussed in Section 10.4.

Design principle	Hypothesis	Evidence to support hypothesis	Strength of evidence
Higher dwelling densities			
	The space to the front of dwellings is too small for residents to utilise, reducing the opportunity for **social interaction** with neighbours.	Yes	Weak
	Less private open space reduces levels of **privacy** between members of the household.	No	-
	Less private space in the home reduces levels of **privacy** between members of the household.	No	-
	Where it is easier for people in the street and neighbours in dwellings to look into homes, **privacy** in the home is infringed.	Yes	Weak
	In higher density housing it is easier to hear neighbours, which infringes on **privacy** in the home.	Yes	Very weak
	The space to the front of a dwelling provides a semi-private buffer zone that mediates between the public street and the **private** home, thus aiding **social interactions** with neighbours.	No	-
	Higher density housing has a negative impact on **privacy** in the home subsequently reducing levels of **social interaction** with neighbours.	Yes	Very weak
Variety of dwelling types & sizes			
	Where neighbours are at different stages in the life cycle with different lifestyles, the opportunities for conflict and negative **social interaction** are increased.	Yes	Weak
	The design of blocks of flats provides residents with less opportunities for **social interactions** than the design of housing .	Yes	Very weak
	Proximity in flats, terraces and semi-detached housing increase levels of overlooking and noise, reducing **privacy** in the home.	Yes	Weak
Mixed use development			
	Meeting at facilities and amenities in the development increases opportunities for **social interaction** between residents.	Yes	Medium
	Walking to/from facilities and amenities in the development increases opportunities for **social interactions** between residents.	Yes	Medium
	Privacy in the home can be enhanced or reduced by a non-	Yes	Very weak

Design principle	Hypothesis	Evidence to support hypothesis	Strength of evidence
	residential land-use adjacent to the home.		
Urban brownfield location			
	The intensification of urban areas impacts on **privacy** in the home through an increase in overlooking and noise from neighbours and street users.	Inconclusive	Inconclusive
Walkable urban environment			
	A legible and permeable street layout connected to the existing street network encourages residents to walk through the development, increasing opportunities for **social interaction**.	Yes	Medium
	A high level of legibility, due to a grid or deformed grid layout, encourages residents to walk through the development, increasing opportunities for **social interaction**.	No (opposite)	Weak
	Small urban blocks encourage residents to walk through the development, increasing opportunities for **social interaction**.	No	-
	Good footpath provision encourages residents to walk through the development, increasing the opportunities for **social interaction**.	No	-
	High quality street furniture provision encourages residents to walk through the development, increasing opportunities for **social interaction**.	No	-
	Traffic calming encourages residents to use streets as pedestrians, increasing the opportunities for **social interaction**.	Yes	Medium
	Active building frontages encourage residents to walk through the development, increasing opportunities for **social interaction**.	No	-
	A high level of walkability results in more pedestrians on the street resulting in **privacy** being impaired because homes are overlooked.	Insufficient data	-
	A high level of walkability increases pedestrian activity has a negative impact on **privacy** thus reducing **social interactions** with other residents.	Yes and no	Very weak
Provision of adequate recreational & communal space			
	Provision of public open space for a common purpose encourages residents to **interact** with one another.	No (opposite)	Medium
	Households regularly using communal space have more opportunities for **social interaction** with their neighbours.	Yes	Very weak
	An appropriate variety in landscape design encourages all residents to use communal space regularly, increasing opportunities for **social interaction**	Yes and no	Very weak
Energy efficient design of buildings & urban environment			
	Communal cycle storage areas provide opportunities for **social interaction** between residents.	No (opposite)	Medium

Design principle	Hypothesis	Evidence to support hypothesis	Strength of evidence
	Communal parking areas for residents increase opportunities for **social interaction**.	No (opposite)	Medium
	On street car parking increases opportunities for residents to **interact** with those walking by.	No	-
High quality developments in keeping with local character			
	Clearly marked boundaries aids **social interactions** between neighbours.	Yes	Very weak
	Clearly marked boundaries have a positive impact on **privacy** in the home.	Yes	Very weak
	Clearly marked boundaries can benefit **privacy** in the home resulting in **social interactions** between neighbours.	Yes	Very weak

Table 10.1: An overview of the hypotheses and whether the findings support them

10.2 Contribution to knowledge

The empirical research described in this thesis was underpinned by a review of theory on privacy, social interactions and the sustainable design of the built environment. An examination of the concept of privacy revealed specific definitions of privacy in terms of the individual. Definitions of privacy in the home were more general and varied. From these existing definitions a new definition of privacy in the home was developed. Privacy in the home was operationalised as a series of new quantitative indicators designed to capture the various aspects of the concept. Similarly, a definition of social interactions between neighbours was developed to encompass the locational and sociological aspects of the concept relevant to this research. Empirical research has tended to focus on neighbouring across a larger spatial scale than that used in this research and previous definitions focus on the concept of neighbouring rather than social interactions. It is common in sociological and psychological research and theory to consider social interactions and privacy as two related concepts that form a dichotomy; however, in built environment theory, policy and research they are treated as two separate and unrelated concepts. In an attempt to redress this misconception the dichotomy of privacy and social interactions was studied in relation to the built environment The definitions and operationalisation of privacy in the home (developed in Chapter Three) and social interactions between neighbours (developed in Chapter Two) could be more widely employed in other research investigating the concept of the home and neighbours.

Previous empirical research has tended to focus on one or two design principles at a time (for example density and dwelling type; Bramley and Power, 2009). In contrast, all the key principles considered necessary in the design of a sustainable housing development, are brought together in this thesis (see especially, Chapter Four). The specific physical features likely to be affected by the key principles have been identified and indicators have been developed to measure those effects. This set of indicators should prove invaluable to other researchers investigating housing developments at the scale of the development or neighbourhood.

The findings presented in previous chapters have implications for policy and practice in the UK. Much of current policy on the sustainable design of the built environment in the UK is based on assumptions rather than rigorously tested evidence of what features do and do not work. This research contributes to the much-needed evidence base for the design of sustainable housing developments. The results highlight that the design principles of sustainable housing are associated with (negatively as well as positively) social interactions between neighbours and that privacy in the home can also be affected. The findings also suggest that the dichotomous relationship between privacy in the home and social interactions between neighbours should be addressed by policymakers and designers of sustainable housing. The division of the design of sustainable housing into eight principles and subsequent physical features provides the opportunity to understand how each part of the design can have an effect. Scrutinising sustainable housing developments in such a comprehensive way had not been carried out in research previous to this study. The level of detail in the data collected in this research would be lost if the design of sustainable housing had been measured using an overall composite indicator (created by aggregating the underlying indicators).

10.3 Limitations of the research

The relationships outlined in the preceding three chapters are statistically significant but, despite that, caution must be exercised in their interpretation. The findings are based on data from thirteen housing developments of varying sizes across England and Wales. A rigorous selection process ensured that there was meaningful variation in scores for the physical features being measured. However, the drawback of this system is variation in development size and, consequently, sample sizes associated with each development. Selecting meaningful physical boundaries of the developments meant that it was not possible to have similarly sized populations across the thirteen developments. To try to minimise differences in sample sizes, in some developments all members of the population were asked to participate whilst, in others, only a random sample were invited (for example, every third address), as discussed in Chapter Five.

This was primarily a quantitative study and therefore it was important that the number of respondents was sufficient for statistical analyses. No qualitative data were collected in the form of interviews or focus groups. A result of this is that some depth is missing from the data which may have been beneficial in understanding respondents' feelings about privacy in the home and social interactions between neighbours. Qualitative data can facilitate the interpretation of the relationship between two numerical variables which statistical analyses are unable to provide (Bryman, 2004).

A cross-sectional approach was taken in this study and this is a significant drawback of the research. Cross-sectional research is problematic because it is almost impossible to infer causal relationships. The data is collected simultaneously and therefore there is no time ordering of the variables. Inferences can be made based on sound reasoning however 'the real pattern of causal direction [may be] ... the opposite of that which is anticipated (ibid., p.231). If time had allowed, it may have been better to attempt a longitudinal approach. If possible, residents would have been traced moving from one development to another, more sustainable one. The differences in design features between the developments would have been measured as would any changes in the residents' levels of social interaction and perceptions of privacy. It would then be possible to infer some causal relationships. However, there is a potential problem with a longitudinal approach for this research. When a person moves house it is not necessarily just their physical environment that changes, for example a person may have a different job, the composition of the household may have altered, and they may have a longer (or shorter) commute to work. Consequently many variables would need to be measured to try to ascertain the effect of intervening factors, as well as the built environment on behaviour.

The variables used in the research were specific to social interaction between neighbours as discussed in Chapter Five. It may have been advantageous to collect more data on the frequency of interactions between neighbours and the quality of those interactions. In particular, collecting data measuring which specific neighbours the respondent interacted with could have enhanced the analysis of the data relating to dwelling types and dwelling densities. In this way, the relationship between the respondent's social interactions with a neighbour, and the location of the neighbour's dwelling relative to the respondent's dwelling could have been analysed more fully. Similar neighbour-specific data on privacy would also enhance the data and subsequent analysis.

Throughout the analysis automated stepwise procedures were avoided for reasons discussed in Chapter Five (and see also Derksen and Keselman, 1992). In spite of this the analyses remained vulnerable to concerns relating to statistical hypothesis testing (for example see Cohen, 1994), and the selection of particular models when others could provide a similarly good explanation of observed data. Emerging techniques for model selection using information theory (for example, Whittingham *et al.*, 2006) may overcome some of these problems but have yet to be accepted and widely used in built environment research. An alternative approach to the analysis and interpretation of the data is fuzzy-set theory (Ragin, 2000). Using the fuzzy-set theory approach could provide a more informed and less restricted analysis of the data. Fuzzy-set theory looks to move away from linear models, common in quantitative analysis, and follows a set-theoretic model where the diversity between cases is explored rather than minimised. There is an argument that these alternative methods to null hypothesis testing should be tried in the built environment field.

The overview of results highlighted the fact that the majority of the significant relationships were weak associations between the physical features and social interactions and privacy in the home. The associations may be weak but they should not be dismissed; given that the majority of the UK population live in urban areas across the country the impact of weak results on each individual can multiply into a strong effect. There are also many other factors that could impact on privacy in the home and social interactions between neighbours which were beyond the scope of the research. Specific characteristics of residents such as ethnicity and religion have been found to influence neighbouring (Merry, 1979), as well as aspirations for creating a sense of community (Riger and Lavrakas, 1981; Unger and Wandersman, 1982). It was not possible to collect data on all the characteristics of the residents and those shown to be repeatedly influential in previous research were selected for use (Bryman, 2004). Characteristics peculiar to individual developments and the cities they are in may also contribute to the levels of privacy a person desires and the amount of social interaction they participate in. Therefore to find that the design of the built environment does have some weak but overall impact on privacy and social interactions should not be ignored.

10.4 Implications of the findings for policy and practice

Design guidance and government policy on planning and housing advocate the building of housing developments that are socially sustainable (ODPM, 2005b). Various physical features may facilitate social interactions between residents, resulting in the development of social cohesion and a sense of community amongst residents. The findings from this research offer empirical evidence that is relevant to these policies and design guidance. The implications of the results for policy and design guidance are examined and discussed in terms of each design principle of sustainable development.

10.4.1 High-density development

According to its advocates, there are many benefits (in sustainability terms) of building housing at high densities, such as an increase in opportunities for social interactions as a result of more people being in the street and dwellings being closer together (Krupat, 1985; Churchman, 1999). For dwellings to be closer together there needs to be a reduction in the amount of space surrounding dwellings, such as smaller private outdoor spaces at the front of dwellings. Private open space to the front of a dwelling has the potential to aid privacy in the home and social interactions (Winter *et al.*, 1993; Brown and Cropper, 2001; Mulholland Research and Consulting, 2003). The findings reported in the previous chapters indicate that there is an association between having little or no front private open space and interacting less with neighbours and knowing people in the development. The provision of a private open space between the front of the dwelling and the street is associated with reduced levels of overlooking whilst simultaneously providing a semi-private space that is associated with providing opportunities for social interactions between neighbours, and other residents.

Residents in higher density housing reported higher levels of overlooking and noise intrusion as well as lower levels of social interaction with neighbours than residents in lower-density housing (see also, Lindsay *et al.*, 2010). Previous empirical research has also shown that living in high-density housing can lead to social withdrawal and knowing few, if any, people in the locale (Dempsey, 2008a). Although other research has shown that high-density housing can have a positive impact on the number of people a resident knows in their neighbourhood (Raman, 2005). This may be a consequence of the design of the development and even in higher density housing developments, planners and developers should give careful consideration to the provision of private open space to the front of dwellings.

10.4.2 Variety of dwelling types and sizes

Many developments, such as retirement villages or gated communities, promote homogenous communities through the restrictions placed on who may live in a development (Atkinson *et al.*, 2003). This may be detrimental to society as a whole and, therefore, developments with a variety of dwelling types and sizes have been advocated (Barton, 2000; DCLG, 2006; Rudlin and Falk, 2009). Housing developments made up of a variety of dwelling types and sizes are less likely to be populated by a homogenous group (Barton, 2000). Residents at different stages in the life cycle are able to contribute different services to a community, and pressure on facilities (for example schools) is evenly spread over the years (ibid.). Chapter Seven illustrates that retired people and those with young families are likely to know more people in their developments than other household types. However, it was not possible to discern whether they knew neighbours who were similar to themselves or who came from other household types, such as couples with no dependents or single occupants. Renting accommodation from RSLs tended to be associated with less social interaction between neighbours and it may be the case that the dwelling mix is not fine enough; Jupp (1999) found that a fine grain mix of dwelling types and tenures is essential to creating a mixed community. The findings also show a very weak association between living in a flat and a reduction in the likelihood of neighbours having positive social interactions with one another. It may be that, rather than large blocks of flats dominating a development (as is the case in the Greenwich Millennium Village), a number of smaller blocks of flats would be beneficial. There would be more entrances at street level which would increase the level of active frontage. Smaller blocks of flats would increase the potential for neighbours to interact with one another partly because a small recognisable group would use the same street level entrance, rather than an anonymous crowd.

10.4.3 Mixed use development

Incorporating a mix of uses, other than housing, in new developments built at high dwelling densities is considered to be sustainable, providing economic vitality and vibrancy to an area (Llewelyn-Davies, 2000; DCLG, 2006). Developments with sufficient populations are able to sustain a variety of uses and facilities that are within walking distance of all the homes on the site (Winter and Farthing, 1997; Urban Task Force, 1999). Frequent use of local facilities may lead to residents developing relationships as a result of social interactions occurring at, or *en route* to, facilities (Borst *et al.*, 2008; Leslie and Cerin, 2008). The findings presented in Chapter Seven are consistent with this theory; a variety of uses in a development is positively associated with residents knowing more people in their development. Also, residents who frequently walked through the development to work were found to know more people in their development than those who did not. The findings suggest that combining dwellings and appropriate different uses in a fine grain mix have a beneficial impact on positive social interactions between neighbours and knowing other residents across a development.

10.4.4 Walkable urban environment

Encouraging people to walk through urban areas is considered beneficial for physical and mental health, the environment (potentially fewer trips by car) and positive social interactions (CPRE, 2006; Leslie and Cerin, 2008; O'Campo *et al.*, 2009). Various physical features are thought to contribute to the walkability of an area, such as the pattern and legibility of the street layout (Llewelyn-Davies, 2000). Some of the findings in this thesis support these claims but others refute them, suggesting that it is not a simple relationship. A street network that is permeable and well-connected to the existing street network (as measured using the Space Syntax theory and methodology of axial line maps and integration analyses, see Section 5.3.5.1, Chapter Five) is positively associated with an increase in the number of people a resident knows in their development. Previous research has shown that residents walk more when streets are integrated (Lund, 2002; Kim, 2007) and the findings in Chapter Seven adds to that international body of evidence. The presence of physical features designed to aid traffic calming are associated with higher levels of social interaction between neighbours (Clayden *et al.*, 2006). Reducing traffic speeds and volumes with the adoption of physical features such as Home Zones has been shown to have a positive impact on social interactions between neighbours and this research confirms that this is effective in housing developments in England and Wales. The results presented in Chapter Nine revealed that privacy in the home affected the relationship between the presence of traffic calming features and social interactions between neighbours. In particular, there was less privacy from neighbour noise in streets designed as Home Zones and, consequently, residents tended to have fewer social interactions with their neighbours. Construction techniques that reduce the transfer of noise combined with high quality building materials could mitigate the increase in noise. Higher levels of noise from neighbours using the street could be a consequence of minimal traffic on the street to which residents have to adjust.

Design guidance (Rudlin and Falk, 2009) and previous research have suggested that smaller urban blocks can be helpful for pedestrians, in particular those with dementia (Burton and Mitchell, 2006), and therefore aid social interactions between residents across the whole development. No evidence of such a relationship was found in this research. However the impact of other physical features is influential. Using the street pattern, for example a deformed grid, to enhance the legibility of a development for pedestrians can aid knowing people in the development as previous research has shown (Brown and Cropper, 2001). However, the findings from this research found the opposite to be true: a lack of any discernible street pattern was significantly associated with knowing more people in the development. This finding is consistent with other research showing that legible streets do not necessarily result in higher levels of social interaction (Dempsey, 2006). This could be related to streets being very busy with pedestrians and a consequent lack of recognition between people using the streets. There may be an optimum volume of pedestrians where there are enough people on the street to engage in social interaction but not in such numbers that it feels like an anonymous crowd.

Other physical features are thought to contribute to the use of streets by pedestrians. Streets with active frontages are claimed to aid natural surveillance and contribute to feelings of safety on streets. Good footpaths and street furniture such as seating are considered to be beneficial for pedestrians and therefore may facilitate social interactions. Unlike previous empirical research (Mehta, 2009), the findings presented in Chapter Seven do not support these assertions in the developments studied. It is possible that a relationship between the quality of street furniture and social interaction exists in other housing developments and urban areas across the UK. The relationship could be examined further using a wider range of housing developments.

10.4.5 Provision of adequate recreational and communal space

Public open space and recreational space are recognised in government planning policy as being important features of a sustainable urban environment (DETR, 2000d). There are benefits for the environment, for mental and physical health, and for society. Recreational open space can provide a focal point for the local community, helping to foster social interactions between residents (ibid.). This study found no evidence for a positive association between the provision of local open spaces for recreation and knowing more people in the development. However, this may be related to the developments in the study only being a few years old. Cases of relatively recent construction were required to ensure an appropriate mixture of sustainable design principles across the developments; consequently, this meant that in most cases residents were new and perhaps had not made regular use of the recreational facilities. Further research could establish other factors which may influence the relationship between the provision of recreational space and social interaction. Interviews could provide information on user behaviour and perceptions, whilst observation data could provide insight into the extent of social interactions in recreational space.

Communal spaces are thought to be useful in providing access to semi-private space (shared with others) to residents with no private space (Rudlin and Falk, 2009). Dwellings with small private open spaces may also have access to communal spaces. Sharing communal spaces with other residents may provide residents with opportunities for positive social interactions. The findings from this research indicate that there is a weak association between the regular use of communal spaces and social interactions between neighbours. However, the design of the communal space also has an important influence on social interactions between neighbours; planting and shrubs were conducive to social interactions but play areas for young children were not. It would appear that balancing the needs of different users of communal spaces is an aspect of the design process that needs to be considered carefully if positive social interactions between neighbours are to be encouraged.

10.4.6 Car parking and bicycle storage facilities

The literature review in Chapters Two, Three and Four generated hypotheses relating to methods of transport; they included encouraging the use of bicycles, and reducing the use of cars, through the provision of bicycle storage and communal parking. Previous empirical research has found that providing communal and on-street car parking and bike storage facilities can increase the opportunities for residents to interact with one another (Abu-Ghazzeh, 1999; Williams, 2005b). By contrast, this research found no evidence for a positive relationship between communal parking facilities and social interactions between neighbours or knowing people in the development. In fact, the findings suggested that there was a negative relationship between communal parking and positive social interactions between neighbours. The implication of these findings is that whilst communal parking facilities and bike storage areas are beneficial in terms of environmental sustainability, additional benefits in terms of social sustainability may be limited or non-existent. However, the relationship could be further researched across a wide range of car parking and bike storage options in a variety of new developments and older neighbourhoods.

10.4.7 The nature and quality of boundaries

A high quality development in keeping with the local character is claimed to enhance feelings of belonging and contribute to a sense of place among residents (Dempsey, 2009). Both design guidance and planning policy increasingly encourage developers to use high quality local materials, and designs that are influenced by local character and tradition (Urban Task Force, 1999; DETR, 2000a; DCLG, 2006). The type and quality of boundaries between properties are features that should be of a high quality as this can influence the level of control a person has over their property and their relationships with neighbours (Stokoe and Wallwork, 2003; Al-Homoud and Tassinary, 2004). Both privacy in the home and social interactions between neighbours were positively associated with clearly marked boundaries in the developments studied for this research. Further, the positive influence of high quality boundaries on privacy in the home in turn was positively associated with social interactions between neighbours. This does not suggest that boundaries should be impenetrable and dwellings fortresses but, rather, that boundaries formed by low walls or hedges are likely to be a useful physical feature in aiding privacy in the home and supporting social interactions between neighbours.

10.4.8 Recommendations for policy and design relating to sustainable housing developments

As a result of the research findings discussed above it is possible to make some recommendations for policy and design guidance. Evidence was found of associations between some physical features and social interactions, as well as privacy. Including these design features in a new housing development could facilitate social interaction between neighbours as well as residents, and enhance privacy. Recommendations for policy, planners, developers and urban designers are:

- Continue to promote developments that include a mix of uses. Non-residential uses next to dwellings should not have a negative impact on the privacy of the residents. Developments with more than one use were associated with residents knowing more people across the development. Non-residential uses were associated with both higher and lower levels of privacy in adjacent housing.
- Traffic calming features should be considered for streets. Streets with traffic calming features were associated with higher levels of social interaction between neighbours. However, higher levels of noise intrusion were associated with Home Zones – appropriate building materials and techniques could be used to minimise noise transfer.
- Streets in new developments should be permeable and integrated (particularly for pedestrians) with the existing street network. Streets that were integrated with the surrounding streets were associated with residents knowing more people across the whole development.

The following features should be considered when a development is being designed, or an existing development is being remodelled. These recommendations are directed at Registered Social Landlords, architects and developers:

- Where possible a private open space of at least $25m^2$ between the front of the dwelling and the street should be included in developments. These types of spaces were positively related to higher levels of privacy in the home and higher levels of social interactions between neighbours.
- Design blocks of flats so that a small number of households use the same ground floor entrance. Living in a flat was associated with knowing less people in the development and interacting less with neighbours – fewer households using one entrance may facilitate social interactions between neighbours. Living in a flat was associated with higher levels of privacy as a result of lower levels of overlooking of the living area of the dwelling.
- The physical features in communal spaces need to be appropriate to the users of the space. Planting and shrubs were associated with regular use of communal spaces whereas children's play areas were not.
- Boundaries between properties should be clearly marked, preferably with a wall, fence or hedge. Clearly marked boundaries were associated with higher levels of

privacy and higher levels of social interaction between neighbours and knowing more people in the development.

10.5 The potential for further research

Section 10.4 examined the implications of the research presented in this thesis for the design of socially sustainable developments. In addition, this research has important implications for future research in related areas, serving as a robust platform from which to develop further research directions. Drawing on the discussion of the limitations of this research in Section 10.3 it would be worthwhile to look beyond sustainable housing developments to a cross-section of existing neighbourhoods from the whole of the UK. Examining areas where the dwellings are older would enable a greater understanding of the influence that the physical features of housing developments may have on privacy in the home and social interactions between neighbours. Comparisons could be made more easily between established residents and those new to a development or neighbourhood.

The collection of qualitative data, for example through interviews, on residents' perceptions of privacy as well as their interactions with neighbours could add greater depth to the findings (Ragin, 1994; Bryman, 2004). Gathering more information about residents' social networks and the types of social interactions they had with other residents would enable a more detailed and informative analysis of the impact of the physical features. A particular physical feature that would be worthy of further investigation is the spatial quality of developments. That is, a more detailed analysis of the layout, legibility and permeability of developments. Raman (2005) employed Visibility Graph Analysis to understand how the public areas of a development are visually connected and related this to social interactions between residents. Combining Raman's methodology with approaches developed in this thesis could result in a more detailed understanding of the impact that the layout of developments has on privacy in the home and social interactions between neighbours. A second physical feature that would be worthy of more investigation for its potential impact on privacy in the home is the materials used for building homes. It was beyond the scope of this research to collect information on the materials and building techniques used but future research could be conducted to understand what impact these have on privacy, particularly in relation to the impact of neighbour noise. The influence of a third physical feature, the layout of dwellings, on privacy and social interactions should be researched. Data pertaining to dwelling layouts were unavailable for the developments studied otherwise this feature would have been considered. Future research could investigate the relationship between the layout of dwellings and the layout of the street and whether it impacts on privacy in the home or social interactions between neighbours.

The limitations of analysing the data using the null hypothesis testing method were discussed in Section 10.3 and future research could be directed at testing alternative methods of analysis, such as the information theory method or the fuzzy set theory method. Advocates of these methods suggest that they provide a more rounded analysis of the data and comparing the results across the three methods would be worth exploring.

Some of the results discussed in Section 10.4 were inconclusive or contradicted previous research. More research could be carried out analysing the impact of different dwelling types on social interactions between neighbours and privacy in the home. Mixed tenure developments, and their impact on social interactions among other things, have been researched extensively (for a review of the research see Bailey and Manzi, 2008). However, the influence of dwelling type mix has not been researched to the same extent. Another feature that could be examined in more detail over a wider range of developments and neighbourhoods is the impact of local parks and play areas on social interactions between neighbours and residents. Research has shown the benefits of public open spaces for well-being (Kaplan *et al.*, 1998; Barbosa *et al.*, 2007; Fuller *et al.*, 2007), and further research could investigate how residents use parks and how this affects their relationships with neighbours and other residents. The findings regarding the relationship between car parking facilities, bike storage and social interactions between neighbours and other residents contradicted previous research; further research involving travel diaries to establish travel patterns, and interviews or questionnaires to understand attitudes towards forms of transport as well as social interactions with neighbours could be beneficial to understanding the relationship.

Most importantly, this study has established that there is a relationship between the design of housing, privacy in the home and social interactions between neighbours. Previous research has shown that impaired privacy can be deleterious to social interactions in various situations (for example see; Ittelson *et al.*, 1970; Evans *et al.*, 1989; Halpern, 1995). This thesis has contributed empirical research on the design of homes in England and Wales and, using the methodology developed here, this could be expanded to examine different cultures and different domestic situations.

10.6 Designing for privacy in the home and social interactions between neighbours: an opportunity for sustainability

The design of the built environment reflects the duality of private and public aspects of civil life, a theme that has run through western society since Ancient Greece (Benn and Gaus, 1983; Weintraub, 1997). Traditionally, the private space of the home was a space for informal relations with family and friends, and the public spaces of the street and the public square were the spaces of society, where formal relations with acquaintances and strangers take place. The boundaries between private and public are shifting as a result of increased surveillance by governments and the general public's desire for intimacy (Sennett, 2002). However, revealing personal information (that would normally be kept private) through various media, for example social networking sites, is increasingly common. There is a growing expectation that everyone should do likewise in order to reveal their personality, particularly those who are in government (ibid.). At the same time the UK Government is potentially increasing its control over its citizens through the collection of personal data such as DNA and the drive for ID cards and biometric passports[1]. Public spaces in cities are under increasing levels of surveillance, primarily through the use of CCTV by the private management companies that are expanding their control of public spaces (Minton, 2009). This 'Big Brother' surveillance of public spaces could ultimately influence the way people interact with one another in public places. The use of CCTV to ensure public areas are safe should not compromise the use of public spaces as places for positive social interactions between friends and strangers alike.

The changing way in which the home is used may also impact on how and where social interactions take place. Flexible working practices and higher levels of self-employment have resulted in a growing proportion of the populace working at home (Ruiz and Walling, 2005). Work-related social interactions are less likely to be face-to-face encounters and levels of privacy may be such that people experience feelings of solitude or isolation. Increasing amounts of leisure time are spent in the home. The smoking ban in pubs, cheap

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[1] However, note that the new coalition government are planning to stop the production of ID cards and biometric passports, reduce the amount of information held on the national DNA database and tighten regulation of CCTV usage, as listed in The Queen's Speech to open the new session of Parliament in May 2010 UK Government. (2010), "Queen's Speech 2010." Retrieved 8th June, 2010, from http://www.number10.gov.uk/news/latest-news/2010/05/queens-speech-2010-3-50297.

alcohol in supermarkets and the closure of private clubs (such as working men's clubs) are likely to have contributed to an increase in the amount of time spent in the home. The growth in the use of the internet for shopping, socialising and relaxing reduces the requirement for people to leave the confines of their home. As with home working, face-to-face encounters with people beyond the household are reduced and yet privacy may be compromised through self-exposure on social network sites. Children do not play outdoors, in their locale, to the same extent as previous generations did (Karsten, 2005), partly through their parent's fear of strangers and partly as a consequence of the rise in home entertainment such as computer games (Carver *et al.*, 2008). Subsequently, children are less likely to interact with other local residents, of all ages, because of fear and a lack of opportunities for spontaneous encounters. An ageing population may lead to people being restricted to their homes for longer periods of the day, resulting in fewer opportunities for social interactions beyond the confines of the home, and greater levels of unwanted privacy (Halpern, 1995). The focus of the home for so many aspects of a person's life may mean that the role of the home in the relationship between privacy and social interactions will change. Despite the concentration of activities in the home it is still important that housing developments are designed with public spaces that can provide the settings for social interactions between residents.

The UK Government is keen to regenerate public spaces as places for members of society to engage with one another. Current government policy seeks to reinvigorate the public spaces of society and create urban environments that are conducive to social interactions between neighbours and residents in an effort to create sustainable communities (ODPM, 2005b). Re-engaging people in the political process and encouraging them to participate in local voluntary associations is also thought to benefit the development of sustainable communities (DETR, 2000b). Focusing on participation in society and shifting the existing balance towards public life, rather than letting private life centred on the home become the norm, may result in less individualism across the populace (Weintraub, 1997). Redressing this imbalance is likely to have an impact on quality of life; residents' quality of life may benefit from a return to engaging in society, alongside the re-establishment of the home as a private space. Housing developments could provide the ideal settings for residents to achieve a high quality of life if the developments are designed to allow residents the privacy they desire within a sustainable community. This thesis highlights specific design features that may contribute to that end.

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Appendices

Appendix A

The Sustainable Urban Form Consortium CITY FORM

EPSRC Engineering and Physical Sciences Research Council

OXFORD BROOKES UNIVERSITY

Sustainable Lifestyles Survey

INTRODUCTION

The questions in this survey cover a range of activities that are connected with your usual routines and lifestyle.

Who should complete the questionnaire?
Please can only one person, aged 18 or over, in your household complete the questionnaire.

How to fill in the questionnaire
Most questions ask you to record your answer by ticking a box. In a few cases you are asked to write in your answers. No special knowledge is needed. For each question instructions are given on how to indicate your response.

Returning the questionnaire
Please complete the questionnaire in the next three days. The person who delivered it to your home will call to collect it in a few day's time. If you are not present at the time of the visit, the person will call again on another day.

We hope you find the questionnaire interesting and enjoyable.

Thank you very much for your help. It is very much appreciated.

In case of any queries about this questionnaire, please contact Dr Carol Dair on 01865 484200.

☐☐ ☐☐☐ ☐☐☐

First we would like to ask you some questions about your home

1. **Please can you tell us how long you have lived in your home?**
   Please tick (✓) one box

   - [ ] Less than 2 years
   - [ ] 2 years or more

2. **Please indicate if any of the reasons listed below were important in your decision to choose your home. If you had little, or no, choice please indicate if any of the reasons listed would be important to you.**
   Please tick a maximum of 5 boxes (✓)

   - [ ] Size of home
   - [ ] Type of home (e.g. house/flat/bungalow)
   - [ ] Private garden
   - [ ] Parking space for cars
   - [ ] General appearance of the development
   - [ ] Quality of the development (design & materials)
   - [ ] Quality of local facilities (amenities & services)
   - [ ] Energy efficient development
   - [ ] Water efficient development
   - [ ] Possibility to extend or change home
   - [ ] Convenient access to public transport
   - [ ] Convenient access to work
   - [ ] Convenient access to family/friends
   - [ ] Convenient access to city or town centre
   - [ ] Other(s) *please specify*
     …………………..
     ……………………………………
     …………

Now some questions about how you travel

3. **How do you USUALLY travel to the facilities and activities listed in the table below? Please answer only about the facilities and activities located WITHIN YOUR DEVELOPMENT.**
   Please tick (✓) any that apply

   walk — cycle — public transport, e.g. bus, tram, train — private car, van or taxi

Facilities or Activities ***Within your development***	**Usual Method of Travel** (walk)	(cycle)	(public transport)	(car)	**N/A**
EXAMPLE – school	✓				
Healthcare centre or GP practice					
Pub, café or restaurant					
Local shops e.g. food, newsagent, post office					
Community hall or place of worship					
Outdoor public open space, park or play areas					
Indoor leisure facilities					
School, college etc.					
Place of **main** employment					
Visiting a friend(s)					
Visiting a relative(s)					

4. **How do you USUALLY travel to the facilities and activities listed in the table below? Please answer only about the facilities and activities located OUTSIDE YOUR DEVELOPMENT BUT WITHIN THE NEARBY AREA.**
Please tick (✓) any that apply

Facilities or Activities ***Outside your development but within the nearby area***	**Usual Method of Travel**				
					N/A
EXAMPLE – school, college etc.	✓		✓		
Healthcare centre or GP practice					
Pub, café or restaurant					
Local shops e.g. food, newsagent, post office					
Shopping centre or high street					
Community hall or place of worship					
Outdoor public open space, park or play areas					
Indoor leisure facilities					
School, college etc.					
Place of **main** employment					
Visiting a friend(s)					
Visiting a relative(s)					

5. **How do you USUALLY travel to the facilities and activities listed in the table below? Please answer only about the facilities and activities located OUTSIDE THE NEARBY AREA.**
Please tick (✓) any that apply

Facilities or Activities ***Outside the nearby area***	**Usual Method of Travel**				
					N/A
EXAMPLE – Shopping centre or high street		✓			
Healthcare centre or GP practice					
Pub, café or restaurant					
Local shops e.g. food, newsagent, post office					
Shopping centre or high street					
Community hall or place of worship					
Outdoor public open space, park or play areas					
Indoor leisure facilities					
School, college etc.					
Place of **main** employment					
Visiting a friend(s)					
Visiting a relative(s)					

6. **How often do you visit the places and people listed in the table below? Please answer only about the places and people located** WITHIN YOUR DEVELOPMENT.
Please tick (✓) all that apply

Facilities or Activities ***Within your development***	**Frequency of Visits**						
	Every day	About once a week	About once a fortnight	About once a month	Less than once a month	Never	N/A
EXAMPLE – Local shops			✓				
Healthcare centre or GP practice							
Pub, café or restaurant							
Local shops e.g. food, newsagent, post office							
Community hall or place of worship							
Outdoor public open space, park or play areas							
Indoor leisure facilities							
School, college etc.							
Place of **main** employment							
Visiting a friend(s)							
Visiting a relative(s)							

7. **How often do you visit the places and people listed in the table below? Please answer only about the places and people located** OUTSIDE YOUR DEVELOPMENT BUT WITHIN THE NEARBY AREA.
Please tick (✓) all that apply

Facilities or Activities ***Outside your development but within the nearby area***	**Frequency of Visits**						
	Every day	About once a week	About once a fortnight	About once a month	Less than once a month	Never	N/A
EXAMPLE – school, college etc.	✓						
Healthcare centre or GP practice							
Pub, café or restaurant							
Local shops e.g. food, newsagent, post office							
Shopping centre or high street							
Community hall or place of worship							
Outdoor public open space, park or play areas							
Indoor leisure facilities							
School, college etc.							
Place of **main** employment							
Visiting a friend(s)							
Visiting a relative(s)							

8. **How often do you visit the places and people listed in the table below? Please answer only for places and people located** <u>OUTSIDE THE NEARBY AREA</u>.
Please tick (✓) all that apply

Facilities or Activities ***Outside the nearby area***	**Frequency of Visits** Every day	About once a week	About once a fortnight	About once a month	Less than once a month	Never	N/A
EXAMPLE – indoor leisure facilities				✓			
Healthcare centre or GP practice							
Pub, café or restaurant							
Local shops e.g. food, newsagent, post office							
Shopping centre or high street							
Community hall or place of worship							
Outdoor public open space, park or play areas							
Indoor leisure facilities							
School, college etc.							
Place of **main** employment							
Visiting a friend(s)							
Visiting a relative(s)							

9. **Still thinking about travel, how many cars or vans are owned, or available for use, by your household?**
Please tick (✓) one box

☐ None
☐ One
☐ Two
☐ Three
☐ Four or more

If one or more please go to Question 11

10. **Are any of the following reasons important to you in deciding not to own, or have regular use of, a car or van?**
Please tick (✓) all that apply

☐ There is no garage at my home
☐ There is no car parking space at my home
☐ There is not enough on-street parking near my home
☐ There are good public transport facilities
☐ Don't need one as I can walk, cycle or use public transport
☐ Don't drive
☐ It is too expensive
☐ Other(s) *please specify* ....

11. **If you** <u>**REGULARLY**</u> **walk or travel by bicycle or public transport to get to where you want to go are any of the features listed below important in encouraging you to use these methods of travel?**
Please tick (✓) all that apply

☐ Traffic calming measures
☐ Convenient pedestrian routes
☐ Convenient cycle routes
☐ Convenient places to store a bicycle
☐

Convenient pedestrian crossings
- [ ] Well lit routes
- [ ] Overlooked routes (i.e. visible from buildings along the route)
- [ ] Good signposting
- [ ] Public seating
- [ ] Routes connecting directly to local facilities
- [ ] Other people are around on foot and in cars
- [ ] Bus lane
- [ ] Bus or coach stop nearby
- [ ] Tube, tram or train station nearby
- [ ] Bus or coach station nearby
- [ ] Good frequency of buses, trains or trams
- [ ] Other(s) *please specify*

....

Now some questions about living in your neighbourhood

12. Thinking about where you live, do you use nearby public open space (green spaces and public areas such as squares) at least once a month for recreation or meeting people?
Please tick (✓) one box

- [ ] Yes
- [ ] No

If 'no' please go to Question 14

13. Please indicate if any of the reasons listed below are important in your decision to use public open spaces.
Please tick (✓) *all that apply*

- [ ] Areas are litter-free
- [ ] Areas are well-maintained with no signs of vandalism
- [ ] Entrances and exits are highly visible
- [ ] Good seating is provided
- [ ] Hard surfaces are provided
- [ ] Public spaces are well-lit
- [ ] Buildings in and around public spaces are high quality and welcoming
- [ ] Public spaces and the surrounding buildings have attractive and distinctive features that fit in with local styles and local character
- [ ] I like spending time outdoors
- [ ] Areas have children's play spaces
- [ ] Other(s) *please specify*

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14. Since moving to the development have you been active in any local community or neighbourhood groups (e.g. Tenants'/Residents' Association; Neighbourhood Watch; community group; local pressure group)?
Please tick (✓) *one box*

- [ ] Yes
- [ ] No

If 'no' please go to Question 16

15. How often over the last 12 months have you done something to help this (these) group(s)?
Please tick (✓) *one box*

- [ ] More than once a week
- [ ] About once a week
- [ ] About once a month
- [ ] Other(s) *please specify*

....

16. Thinking about where you live, would you say that you:
Please tick (✓) one box

- ☐ Know many of the people in your development and the area nearby
- ☐ Know some of the people in your development and the area nearby
- ☐ Know a few of the people in your development and the area nearby
- ☐ Do not know people in your development and the area nearby
- ☐ Would like to know people in your development and the area nearby

If you do not know people in your development or the area nearby please go to Question 18.

17. If you know a few, some or many people in your development or area nearby (other than old friends or relatives) how or where did you first meet them?
Please tick (✓) three boxes that apply

- ☐ Involvement in a local organisation or group (e.g. school, or association)
- ☐ At the local shops
- ☐ Walking around or through the streets in the development
- ☐ Sitting or standing in a local public park or area
- ☐ Walking through a local public park or area
- ☐ At a neighbour's house
- ☐ At the local bus stop
- ☐ Other(s) *please specify*

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18. Since moving to the development have you been, or are you now involved in looking after green spaces in your local area that have been set aside as a refuge for wildlife?
Please tick (✓) one box

- ☐ Yes
- ☐ No
- ☐ N/A

19. Thinking about your home, if you have the use of a private open space such as a garden, roof garden, patio or balcony, do you do any of the following activities to encourage wildlife?
Please tick (✓) all that apply

- ☐ Leave an area undisturbed for wildlife
- ☐ Provide and maintain shrubs and trees rich in nectar, pollen, berries, nuts and seeds
- ☐ Provide and maintain a pond
- ☐ Provide food and water for wildlife
- ☐ Use organic gardening methods

20. If you don't do any of the activities to encourage wildlife please can you say why.
Please tick (✓) any that apply

- ☐ I like my garden to be neat and tidy
- ☐ Wild birds and animals are a nuisance
- ☐ Pesticides and weedkillers are useful
- ☐ There is no space for wildlife provision
- ☐ Other(s) *please specify*

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Now thinking about your home and the environment

21. Below is a list of examples of how to reduce the amount of energy used in your home. Which do you do <u>REGULARLY</u>?
Please tick (✓) all that apply

- ☐ Time heaters and heating systems to be on only when someone is at home
- ☐ Set thermostats on heaters and heating systems to the lowest temperature needed to meet your needs
- ☐ Leave empty rooms unheated (or at a low temperature)
- ☐ Heat only the water you need
- ☐ Take showers instead of baths
- ☐ Turn off lights in empty rooms
- ☐ Use open windows for ventilation rather than power driven methods such as electric fans

22. If you don't do some, or any of the above activities please say why.
Please tick (✓) all that apply

- ☐ The timers on water and heating systems are difficult to change
- ☐ Lights are left on for security
- ☐ Water in the hot water cylinder is kept hot all the time for convenience
- ☐ Household heating comfort needs are more important than saving energy
- ☐ Other(s) *please specify*

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23. Do you live in an energy efficient home?
Please tick (✓) one box

- ☐ Yes
- ☐ No
- ☐ Don't know

If 'no' or 'don't know' please go to Question 25

24. Has your energy efficient home encouraged you to:
Please tick (✓) one box

- ☐ Be more cautious in the way you use energy
- ☐ Be less cautious in the way you use energy
- ☐ Not change the way you use energy

25. Below is a list of examples of how to reduce the amount of water used in the home. Which of the following, if any, do you do <u>REGULARLY</u>?
Please tick (✓) all that apply
If your home does not have the feature described then please mark the box NA

- ☐ Use water from a garden water butt rather than mains water
- ☐ Use water from rainwater recycling systems rather than mains water
- ☐ Use water from greywater recycling systems rather than mains water
- ☐ Use dual flush toilets
- ☐ Don't know

26. If you don't do some, or all, of the above activities please say what reasons, if any, your household has for this.
Please tick (✓) all that apply

- ☐ There is no need to save water
- ☐ Mains water is more convenient to use
- ☐ Greywater recycling system is always breaking down
- ☐ Recycled greywater used to flush the toilets looks unclean
- ☐ Rainwater recycling system does not work well
- ☐ Toilet system's long flush works better
- ☐ Garden water butt is empty

☐ Other(s) *please specify*
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....

27. Do you live in a water efficient home?
Please tick (✓) one box

☐ Yes
☐ No
☐ Don't know

If 'no' or 'don't know' please go to Question 29

28. Has your water efficient home encouraged you to:
Please tick (✓) one box

☐ Be more cautious in the way you use water
☐ Be less cautious in the way you use water
☐ Not change the way you use water

29. Do you REGULARLY recycle waste?
Please tick (✓) one box

☐ Yes
☐ No

If 'no' please go to Question 31

30. Below is a list of examples of facilities for recycling waste. Please tick (✓) any that you use regularly.
If you do not have any of these facilities then please mark the box NA

☐ Kerbside collection service
☐ Nearby recycling facilities
☐ Nearby composting facilities
☐ Recycling facilities in your home (space for bins, bags etc.)
☐ Composting facilities in your garden
☐ Other(s) *please specify*
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31. If you don't recycle waste please can you tell us why.
Please tick (✓) all that apply

☐ No kerbside collection
☐ No recycling facilities nearby
☐ No composting facilities nearby
☐ No recycling facilities/space in my home
☐ No composting facilities/space in your garden
☐ There is no need to recycle waste
☐ Other(s) *please specify*
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Now thinking about privacy in your home

32. How satisfied are you with the levels of privacy for relaxing and/or peace and quiet in the following rooms when other members of the household are at home?
Please tick (✓) one box for each room that applies

	Very satisfied	Satisfied	Neither satisfied or disatisfied	Unsatisfied	Very unsatisfied	Don't know
Kitchen	☐	☐	☐	☐	☐	☐
Kitchen/diner	☐	☐	☐	☐	☐	☐
Dining room	☐	☐	☐	☐	☐	☐
Living room	☐	☐	☐	☐	☐	☐
Living/dining	☐	☐	☐	☐	☐	☐
Own bedroom	☐	☐	☐	☐	☐	☐
Other bedrooms	☐	☐	☐	☐	☐	☐
Outdoor space	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐

Please specify ....

33. Still thinking about your home, how satisfied are you with the sizes of the rooms in your home?
Please tick (✓) one box for each room that applies

	Very satisfied	Satisfied	Neither satisfied or disatisfied	Unsatisfied	Very unsatisfied	Don't know
Kitchen	☐	☐	☐	☐	☐	☐
Kitchen/diner	☐	☐	☐	☐	☐	☐
Dining room	☐	☐	☐	☐	☐	☐
Living room	☐	☐	☐	☐	☐	☐
Living/dining	☐	☐	☐	☐	☐	☐
Own bedroom	☐	☐	☐	☐	☐	☐
Other bedrooms	☐	☐	☐	☐	☐	☐
Outdoor space	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐

Please specify ....

34. When you are in your home are you comfortable with the view INTO your house from the outside?
Please tick (✓) one box for each room that applies

	Very comfortable	Comfortable	Neither comfortable or uncomfortable	Uncomfortable	Very uncomfortable	Don't know
Kitchen	☐	☐	☐	☐	☐	☐
Kitchen/diner	☐	☐	☐	☐	☐	☐
Dining room	☐	☐	☐	☐	☐	☐
Living room	☐	☐	☐	☐	☐	☐
Living/dining	☐	☐	☐	☐	☐	☐
Own bedroom	☐	☐	☐	☐	☐	☐
Other bedrooms	☐	☐	☐	☐	☐	☐
Outdoor space	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐

Please specify ....

35. Still thinking about privacy in your home, since you moved here have you done any of the following to prevent overlooking?
Please tick (✓) all that apply

- ☐ Kept curtains or blinds on windows at the front (i.e. facing the street) of your home shut
- ☐ Kept curtains or blinds on windows at the back of your home back shut
- ☐ Put up net curtains or similar on windows at the front of your home
- ☐ Put up net curtains or similar on windows at the back of your home
- ☐ Put large potplants in the windows at the front of your home
- ☐ Put large potplants in the windows at the back of your home
- ☐ Grown large plants and/or shrubs in your front garden
- ☐ Grown large plants and/or shrubs in your back garden
- ☐ Put up a fence, wall or hedge around your front garden
- ☐ Put up a fence, wall or hedge around your back garden
- ☐ Other(s) *please specify*.....................

36. If you ticked any of the boxes in Question 35 were any of the following the reason(s) why?
Please tick (✓) all that apply

- ☐ The windows are too big
- ☐ People passing by can see into my home
- ☐ Too much light (sun or streetlamps)
- ☐ My home opens straight on to the street
- ☐ There is no front garden
- ☐ It is possible to look into my windows from the homes across the street

☐ I don't want people to see into my garden

☐ Other(s) *please specify*

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37. How would you describe how you get on with your IMMEDIATE neighbour(s)? If you have more than one neighbouring household, please give an answer for each household.
Please tick (✓) all that apply

	neighbour 1	2	3	4
Very well	☐	☐	☐	☐
Fairly well	☐	☐	☐	☐
Tend not to get on well	☐	☐	☐	☐
Do not get on at all	☐	☐	☐	☐
Don't really know neighbours	☐	☐	☐	☐
Don't know	☐	☐	☐	☐

38. Whether or not you find it disturbing, how much noise can you hear from your neighbour(s) when you are INSIDE your HOME?
Please tick (✓) one for neighbour(s) in home and one for neighbour(s) in garden

Level of disturbanc e	Neighbour(s) in home	Neighbour(s) in garden
Not at all		
Hardly ever		
Quite often		
Much of the time		
Constantly		
Don't know		
Not applicable		

39. Whether or not you find it disturbing, how much noise can you hear from your neighbours when you are in your GARDEN?
Please tick (✓) one for neighbour(s) in home and one for neighbour(s) in garden

Level of disturbanc e	Neighbour(s) in home	Neighbour(s) in garden
Not at all		
Hardly ever		
Quite often		
Much of the time		
Constantly		
Don't know		
Not applicable		

If you cannot hear any noise please go to Question 41.

40. If you can hear any noise from your neighbour(s), how much are you personally annoyed by it?
Please tick (✓) one box

☐ Not at all annoyed

☐ A little annoyed

☐ Fairly annoyed

☐ Very annoyed

☐ Don't know

41. Thinking about your home, do you have any private outdoor space?
Please tick (✓) all that apply

☐ Front garden/yard

☐ Back garden/yard

☐ Balcony

☐ Roof garden/terrace

☐ Other(s) *please specify*

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If you do NOT have outdoor space please go to Question 44

42. How often would you say you use your private outdoor space?
Please tick (✓) one box for summer and one for winter

Frequency	Summer	Winter
Daily		
Weekly		
Monthly		
Once or twice a year		
Never use it		

43. Please indicate if any of the reasons listed below are important in your decision to use your private outdoor space.
Please tick (✓) all that apply

- ☐ My garden is like an extra room of my home
- ☐ It is protected from overlooking
- ☐ I do not like communal spaces
- ☐ I do not like running into my neighbours when I am in the communal or park areas
- ☐ Other(s) *please specify*

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44. Do you have access to an outdoor shared space (e.g. communal garden, play space, shared courtyard) near to your home?
Please tick (✓) one box

- ☐ Yes
- ☐ No
- ☐ Don't know

If 'no' or 'don't know' please go to Question 47

45. How often would you say you use the outdoor shared space?
Please tick (✓) one box

Frequency	Summer	Winter
Daily		
Weekly		
Monthly		
Once or twice a year		
Never use it		

46. Please indicate if any of the reasons listed below are important in your decision to use the outdoor shared space.
Please tick (✓) all that apply

- ☐ It is very close to my home
- ☐ I have no private outdoor space
- ☐ There are facilities for young children
- ☐ There are nice plants, flowers and trees
- ☐ I run into my neighbours
- ☐ Other(s) *please specify*

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Now we would like to know your views on some topical issues

47. Have you heard of the term 'sustainable development'?
Please tick (✓) one box

- ☐ Yes
- ☐ No

48. Do you agree or disagree that most people in the UK today need to change their way of life so that future generations can continue to enjoy a good quality of life and the environment?
Please tick (✓) one box

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree
- ☐ Don't know

49. Do you agree or disagree that YOU PERSONALLY need to change your way of life over the next few years, so that future generations can continue to enjoy a good quality of life and environment?
Please tick (✓) one box

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree
- ☐ Don't know

50. How concerned are you about the environment in general. Would you say you are:
Please tick (✓) one box

- ☐ Very concerned
- ☐ Fairly concerned
- ☐ Not very concerned
- ☐ Not at all concerned
- ☐ Don't know

Finally, we would like you to answer a few questions about you and your household

51. Please say how many people live in your household – that includes yourself and any other adults and children?
Please write the number in the box

☐

52. From the list below, please tick the box that best describes your household.
Please tick (✓) one box

- ☐ Non-retired couple with no dependent children
- ☐ Retired couple with no dependent children
- ☐ Couple with dependent children
- ☐ Lone parent with dependent children
- ☐ Other multi-person household
- ☐ One non-retired person
- ☐ One retired person

The remaining questions are about you and your home.

53. Please indicate your gender.
Please tick (✓) one box

- ☐ Male
- ☐ Female

54. Please indicate your age group.
Please tick (✓) one box

- ☐ 30 or under
- ☐ Between 31 and 40
- ☐ Over 40

55. Please indicate your household's accommodation.
Please tick (✓) one box

- ☐ A detached house
- ☐ A detached bungalow
- ☐ A semi-detached house
- ☐ A semi-detached bungalow
- ☐ A terrace house
- ☐ A purpose built flat
- ☐ A flat in a converted building
- ☐ Other(s) *please specify*

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56. Please tell us the number of bedrooms in your home.
Please write the number in the box

☐

57. Thinking about your home, in which way do you occupy your accommodation? Do you, or are you:
Please tick (✓) one box

- ☐ Outright owner of your property
- ☐ Buying it with the help of a mortgage or loan
- ☐ Pay part rent and part mortgage (shared ownership)
- ☐ Rent from a private landlord
- ☐ Rent from a housing association, housing trust or local authority
- ☐ Live here rent-free
- ☐ Other(s) *please specify*

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The following questions are about your current main job, or (if you are not working now) your last main job.
If you have never worked please go to Question 61

58. Do (did) you work as an employee or are (were) you self-employed?
Please tick (✓) one box

- ☐ Employee
- ☐ Self-employed with employees
- ☐ Self-employed/freelance without employees *please go to Question 61*

59. For employees please indicate how many people work (worked) for your employer at the place where you work (worked). For self-employed please indicate how many people you employ (employed).
Please tick (✓) one box

- ☐ 1 to 24
- ☐ 25 or more

60. Do (did) you supervise any other employees?
Please tick (✓) one box

- ☐ Yes
- ☐ No

61. What is (was) the full title of your <u>MAIN</u> job? E.g. Primary school teacher, state registered nurse, car mechanic, television service engineer, benefits assistant, call centre agent, plumber

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Thank you very much for taking part in this survey.

62. If you wish, please use this space to make any additional comments.

Appendix B

Name of Development ____________________

Location ____________________

Name of Developer ____________________

(& contact details) ____________________

Local Planning Authority ____________________

(& contact details) ____________________

____

____

Planning Application No. ____________________

Development Type ____________________

Comments

A Development Type, Form, Use and Size

	Characteristic	Description	Total no. in dev.	%	Comment
A1a	**Tenure of dwellings (planning consent & application)**	private housing			
b		social housing			
c		TOTAL		100%	
A2a	**Form of dwellings**	Detached house			
b	**(planning consent &**	Detached bungalow			
c	**application)**	Semi-detached house			
d		Semi-detached bungalow			
e		Terraced house			
f		Terraced bungalow			
g		Flats (block of)			
h		maisonette			
i		Other			
j		TOTAL		100%	

	Characteristic	Description	Total no. buildings in dev.	No. of flats	No. of blocks	
A3a	Height of buildings (planning consent & application)	1 storey				
b		2 storeys				
c		3 storeys				
d		4 storeys				
e		5 storeys				
f		6+ storeys				

	Characteristic	Description	No. in mixed use bldgs	No. as whole bldgs	Total no. in dev.	
A4a	Mix of Uses	Residential				
b	Summary Table	Commercial (offices)				
c		Retail				
d		Amenities (healthcare, school, local shops, hall)				
e		Public outdoor space (parks, squares, play areas)				
f		No. of mixed use buildings				

g	**Comments on Mixed use buildings:**

	Characteristic	Description	From centre of development				
			<500m	500m<x<1km	1km<x<2km	no	comment
A5a	Amenities	Local foodstore, newsagent, PO					
b	(inside dev: planning	Shopping Centre/High Street					
c	outside: desktop)	Healthcare facility or GP practice					
d		Pre-school					
e		Primary school					
f		Secondary school					
g		Public house, restaurant, café					
h		Place of worship, community hall					
i		Indoor leisure/sports facility					
A6a	Public outdoor space	Park and public open space					
b	as above	Play facilities					

	Characteristic	Description	Answer	Comment
A7	**Number of live/work units in the development (planning consent)**			
A8	**Number of homes with space for offices or teleworking (developer)**			
A9	**Total area of Development**	1 hectare = 2.471 acres		
A10a	**Density (planning)**	households per hectare		
b		households per ha in built-up area		
c		Households per ha in residential built-up area		

B Design

	Characteristic	Description	Answer	Comments
B1a	**Predominant mix of use**	Only residential		
b		Residential with occasional other uses		
c		Fine grain mix of residential and non-residential uses		
d		Clusters of residential and non-residential		
B2a	**Predominant street pattern**	Regular geometric grid		
b		Distorted grid		
c		Curvilinear		
d		Cul-de-sacs		
e		Radial		
f		Ribbon		
g		No discernible pattern		

B3a	**General extent of natural surveillance**	Very good		
b		Good		
c		adequate		
d		Poor		
e		Very poor		
f		Great variety throughout the development		
B4a	**General level of legibility (visual links to distinctive landmarks)**	Very good		
b		Good		
c		adequate		
d		Poor		
e		Very poor		
B5a	**Level of maintenance of external areas of whole development (incl. Buildings)**	Very good		
b		Good		
c		adequate		
d		Poor		
e		Very poor		

B6a	**Levels of litter**	None		
b		Almost none		
c		Small amount		
d		Fairly large amount		
e		Large amount		

Comments

B7a	**Levels of incivilities (e.g. vandalism, graffiti)**	None		
b		Almost none		
c		Small amount		
d		Fairly large amount		
e		Large amount		
B8a	**Levels of active frontage**	Grade A frontage - >25 doors & windows every 100m		
b		Grade B frontage - >15 doors & windows every 100m		
c		Grade C frontage - >6 doors & windows every 100m		
d		Grade D/E frontage - <6 doors & windows every 100m		

B9 a	**Quality of Buildings**	Very good		
b		good		
c		adequate		
d		Poor		
e		Very poor		

Comments

B10a	**Attractive & distinctive features**	Large amount		
b		Fairly large amount		
c		Small amount		
d		Almost none		
e		None		
B11a	**Fit in with local style & character**	Very good		
b		Good		
c		adequate		
d		Poor		
e		Very poor		

B12a	Quality of Public Realm	Very good		
b		Good		
c		adequate		
d		Poor		
e		Very poor		
B13a	Quality of public/private space differentiation	Very good		
b		Good		
c		adequate		
d		Poor		
e		Very poor		

C Provision for transport

Characteristic		Description	Answer									
C1a	Public Transport (developer or maps)	How many bus routes run through the development?										
b		Are there bus lanes in the development?										
c		No. of bus stops in development.										
d		If no stops in development, distance to nearest stop from centre of development.	metres									
e		Distance (from centre of dev) to nearest train station.	metres									
f		Distance (from centre of dev) to nearest bus station.	metres									
g		Distance (from centre of dev) to nearest tram station	metres									
h		Distance (from centre of dev) to nearest tube station.	metres									
C2a	Pedestrian (site survey)	Street lighting is:	v.g.		good		fair		poor		v. poor	
b		Public seating along streets is (no., position & quality):	v.g.		good		fair		poor		v. poor	
c		Public seating in public open spaces (not streets) is:	v.g.		good		fair		poor		v. poor	
d		Pedestrian crossings are (amount & position):	v.g.		good		fair		poor		v. poor	
e		Pedestrian routes are (quality, amount, convenience):	v.g.		good		fair		poor		v. poor	
f		No. of direct pedestrian route links to routes outside dev										

C3a	**Routes**	Number of direct road links to routes outside development.										
b		Clear street signs	Y		N		Don't know					
c		Directional signs	Y		N		Don't know					
d		Maps	Y		N		Don't know					
C4a	**Bicycles**	No. of homes with secure & sheltered bicycle storage										
b	**planning**	Is there secure storage for bikes in public areas?	Y		N							
c	**or**	Quality of cycle paths	v.g.		good		fair		poor		v. poor	
d	**developer**	Number of direct cyclepath links to routes outside development										
C5a	**Motorised Vehicles (planning consent, Local Plan, Highways Officer)**	What parking standards have been applied for ea. size of property (spaces per bedroom)?	1bed		2bed		3bed		4bed		5bed	
b		Is onstreet parking included in the above										
c		Do residents have access to a car club?	Yes		No		Don't know					
d		No. of streets with traffic calming measures										
C6	**Comments**											

D Biodiversity

	Characteristic	Description	Answer		Details
D1a	New areas	What area of the development has been made into a wildlife area, refuge or corridor?	area sqm		
b	Planning cons	Percentage of total development area	%		
D2a	Retained areas (planning con)	What area of the development has been left undisturbed for a wildlife refuge?	area sqm		
		Percentage of total development area	%		
b		Are there any natural features that have been preserved, e.g. wetland, woodland?	Y		
			N		
			Don't know		
c		Have any existing trees been preserved?	Y		
			N		
			Don't know		
D3a	Management	Who manages the wildlife areas?			
	developer	e.g. professional service, community based volunteer group			

E Energy efficiency of homes

	Characteristic	Description	Answer							
E1a	General (developer)	Number of homes in the development with a high SAP rating (100-120).			No.		%			
b		Have the homes been EcoHomes tested?			Yes		No			
c		What rating did the homes receive?	excellent		V.G.		Good		Pass	
E2a	Heating, Ventilation and Energy Provision (developer, planning consent)	What type of heating system(s) is/are used in the homes? E.g. condensing boiler								
b		What are the levels of efficiency (rating) of the heating systems?								
c		Is there a CHP system in the development?	Yes		No		Don't know			
d		How many homes have solar panels?	No.		%					
e		How many homes have photovoltaics?	No.		%					
	Comments									

F Water efficiency of homes

	Characteristic	Description	Answer				Comments
F1a	Recycling	How many homes have rainwater recycling systems?	No.		%		
b	developer	How many homes have greywater recycling systems?	No.		%		
c		How many homes have water butts?	No.		%		
F2a	Use	How many homes have dual flush toilets?	No.		%		
	developer						
	Comments						

G Recycling Waste

	Characteristic	Description	Answer				Comment
G1a	**Home-based**	Number of homes with dedicated space provided for recycling bins.	no.		%		
b	**dev, planning**	Number of homes with facilities provided for composting.	no.		%		
G2a	**Development**	Is there a regular kerbside collection system for recycling? (Local Auth)	Y		N		
b	Planning	Are there communal recycling bins provided in the development?	Y		N		
c	developer	Are there communal composting facilities provided in the development?	Y		N		
	Comments						

H	Privacy		
	Characteristic	**Description**	**Answer**
H1 a1	**private outdoor area**	Private open space to rear	
a2		Private open space to front	
a3		Total private open space	
b1	**indoor area**	area of kitchen	
b2		area of living room	
b3		area of bedroom space	
b4		total indoor area	
c1	**bedrooms**	number of bedrooms	
c2		number of bedspaces	
c3		area per bedspace	
d1	**personalisation**	setback distance	
d2		homes with large shrubs/plants in front garden	
d3		homes with fence, wall, hedge put in by occupant on street front	
d4		Decoration e.g. gnomes, sculpture	

e1	**distances**	distance to dwelling to left					
e2		distance to dwelling to right					
e3		distance to dwelling to front					
e4		distance to dwelling to rear					
H2a	**mixed use**	Number of uses in development					
c		number of mixed use buildings					
H3a		feature to front of dwelling	buildings	communal space	public open space	public open green space	fields
b		feature to rear of dwelling	buildings	communal space	public open space	public open green space	fields
H4a1	**recreational spaces**	total area of park space in development					
a2		number of parks in development					
a3		number of play areas in development					
b1		number of communal spaces in development					
b2		area of communal space associated with dwelling					
c1	**Communal areas**	Hard surfaces			Yes	No	
c2		Grass			Yes	No	

c3		Seating			Yes	No	
c4		Children's play area			Yes	No	
c5		Planting (shrubs, flowers, trees)			Yes	No	
H5a	**walkabilty**	number of pedestrian routes in development					
b1		local integration value for dwelling					
b2		global integration value for dwelling					
c1		type of street dwelling is on	through road	entrance cul-de-sac	end cul-de-sac	mid cul-de-sac	no through road
c2		block length for dwelling					
d1		depth of kitchen					
d2		depth of living area					
e1		private open space to rear			Yes	No	
e2		Private open space to front			Yes	No	
e3		dwelling has balcony			Yes	No	
f1		street furniture	very good	good	adequate	poor	very poor
f2		street signage	very good	good	adequate	poor	very poor
f3		street calming		no	yes	don't know	homezone

H6a1		public room face	back garden	front garden	front strip & street	street	communal space
b1		cycle storage		none	in curtilage	public storage	communal storage
c1		car parking facilities			on street	communal courtyard	in-curtilage
H7a		dwelling type	detached	detached linked	semi-detached	terrace	flat
H8a		delineation type		surface change	fence, hedge	level change	nothing
b1		number of public squares in development					
b2		area of public squares in development					

Appendix C

APPENDIX NOT COPIED ON INSTRUCTION FROM UNIVERSITY

Appendix D

Density measures and social interaction

Number of neighbours with positive relationships

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.551	.062		24.911	.000	1.428	1.673					
	size of private outdoor space to front	.004	.001	.120	3.017	.003	.001	.007	.120	.120	.120	1.000	1.000
2	(Constant)	1.412	.103		13.726	.000	1.210	1.614					
	size of private outdoor space to front	.003	.001	.087	2.133	.033	.000	.006	.120	.085	.083	.914	1.095
	retired, no dependents	.750	.208	.156	3.607	.000	.342	1.159	.142	.143	.141	.811	1.233
	couple, dependents	.261	.132	.097	1.983	.048	.003	.520	.054	.079	.077	.641	1.559
	lone parent, dependents	.326	.206	.068	1.584	.114	-.078	.730	.045	.063	.062	.814	1.229
	multiperson	-.394	.197	-.086	-2.002	.046	-.780	-.007	-.136	-.080	-.078	.815	1.226
	single non-retired	.148	.170	.039	.872	.384	-.185	.481	-.021	.035	.034	.752	1.330
	single, retired	.310	.265	.049	1.171	.242	-.210	.829	.038	.047	.046	.861	1.162

a. Dependent Variable: total score - number of neighbours with positive relationship

Know People in Development

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.325	.055		42.488	.000	2.218	2.433					
	setback distance	.033	.008	.187	4.290	.000	.018	.048	.187	.187	.187	1.000	1.000
2	(Constant)	2.082	.083		25.124	.000	1.919	2.245					
	setback distance	.027	.007	.154	3.605	.000	.012	.042	.187	.159	.152	.978	1.023
	retired, no dependents	.655	.150	.205	4.361	.000	.360	.950	.131	.191	.184	.808	1.238
	couple, dependents	.386	.097	.216	3.998	.000	.196	.576	.112	.176	.169	.611	1.637
	lone parent, dependents	.384	.143	.128	2.676	.008	.102	.666	.053	.119	.113	.782	1.279
	multiperson	.018	.150	.006	.122	.903	-.277	.313	-.093	.005	.005	.809	1.236
	single non-retired	.006	.150	.002	.042	.966	-.289	.301	-.102	.002	.002	.809	1.237
	single, retired	.746	.189	.178	3.940	.000	.374	1.118	.127	.174	.166	.873	1.146

a. Dependent Variable: Q16_knowpeopleTOTrev

Dwelling type and social interaction variables

Number of neighbours with positive relationship

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.476	.097		15.187	.000	1.285	1.666					
	retired, no dependents	.816	.204	.170	3.996	.000	.415	1.217	.143	.157	.155	.836	1.196
	couple, dependents	.285	.129	.106	2.204	.028	.031	.539	.059	.087	.086	.652	1.535
	lone parent, dependents	.371	.198	.080	1.871	.062	-.018	.759	.045	.074	.073	.826	1.210
	multiperson	-.348	.194	-.077	-1.797	.073	-.729	.032	-.128	-.071	-.070	.819	1.221
	single non-retired	.096	.167	.026	.574	.566	-.232	.424	-.026	.023	.022	.761	1.314
	single, retired	.284	.267	.044	1.065	.288	-.240	.809	.017	.042	.041	.903	1.107
2	(Constant)	1.710	.156		10.955	.000	1.404	2.017					
	retired, no dependents	.675	.217	.140	3.106	.002	.248	1.102	.143	.123	.120	.732	1.366
	couple, dependents	.285	.130	.106	2.189	.029	.029	.540	.059	.087	.085	.638	1.569
	lone parent, dependents	.330	.215	.071	1.536	.125	-.092	.752	.045	.061	.059	.695	1.439
	multiperson	-.248	.196	-.055	-1.266	.206	-.633	.137	-.128	-.050	-.049	.795	1.258
	single non-retired	.107	.167	.028	.640	.523	-.221	.434	-.026	.026	.025	.756	1.323
	single, retired	.163	.280	.025	.584	.560	-.386	.713	.017	.023	.023	.815	1.228
	mortgage	-.187	.156	-.074	-1.198	.231	-.493	.119	.010	-.048	-.046	.394	2.536
	rent/mortgage	-.217	.278	-.034	-.781	.435	-.763	.329	.002	-.031	-.030	.768	1.301
	rent private landlord	-.614	.193	-.170	-3.184	.002	-.992	-.235	-.163	-.126	-.123	.524	1.909
	rent RSL	-.204	.184	-.059	-1.110	.267	-.564	.157	.038	-.044	-.043	.531	1.884
	no rent	-.510	.459	-.045	-1.109	.268	-1.412	.393	-.025	-.044	-.043	.920	1.087
	other	-.130	.892	-.006	-.145	.885	-1.882	1.623	.015	-.006	-.006	.966	1.035
3	(Constant)	1.544	.173		8.941	.000	1.205	1.883					
	retired, no dependents	.664	.217	.138	3.067	.002	.239	1.090	.143	.122	.118	.731	1.367
	couple, dependents	.255	.130	.095	1.958	.051	-.001	.511	.059	.078	.075	.631	1.585
	lone parent, dependents	.345	.214	.074	1.610	.108	-.076	.766	.045	.064	.062	.694	1.440

	multiperson	-.259	.195	-.057	-1.327	.185	-.643	.124	-.128	-.053	-.051	.794	1.259
	single non-retired	.091	.166	.024	.546	.586	-.236	.418	-.026	.022	.021	.754	1.326
	single, retired	.118	.280	.018	.421	.674	-.432	.667	.017	.017	.016	.810	1.234
	mortgage	-.153	.156	-.061	-.981	.327	-.460	.153	.010	-.039	-.038	.391	2.560
	rent/mortgage	-.281	.278	-.045	-1.010	.313	-.828	.265	.002	-.040	-.039	.760	1.316
	rent private landlord	-.461	.204	-.128	-2.258	.024	-.862	-.060	-.163	-.090	-.087	.464	2.154
	rent RSL	-.237	.184	-.068	-1.291	.197	-.597	.123	.038	-.051	-.050	.527	1.896
	no rent	-.460	.458	-.040	-1.003	.316	-1.360	.441	-.025	-.040	-.039	.918	1.089
	other	-.187	.890	-.008	-.210	.834	-1.935	1.561	.015	-.008	-.008	.965	1.036
	Length of time	.252	.113	.098	2.223	.027	.029	.474	.155	.088	.086	.770	1.298

a. Dependent Variable: total score - number of neighbours with positive relationship

Get on with neighbours

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.782	.057		31.470	.000	1.671	1.894					
	dwelling type is a flat or not	-.582	.122	-.189	-4.790	.000	-.821	-.344	-.189	-.189	-.189	1.000	1.000
2	(Constant)	1.645	.106		15.580	.000	1.438	1.852					
	dwelling type is a flat or not	-.551	.131	-.179	-4.193	.000	-.809	-.293	-.189	-.167	-.163	.833	1.201
	retired, no dependents	.723	.206	.150	3.511	.000	.319	1.128	.144	.140	.137	.824	1.214
	couple, dependents	.161	.133	.060	1.208	.228	-.101	.422	.059	.049	.047	.619	1.616
	lone parent, dependents	.202	.206	.042	.983	.326	-.202	.606	.036	.040	.038	.812	1.231
	multiperson	-.397	.196	-.087	-2.025	.043	-.781	-.012	-.130	-.081	-.079	.818	1.223
	single non-retired	.241	.170	.065	1.417	.157	-.093	.576	-.026	.057	.055	.721	1.387
	single, retired	.205	.277	.030	.740	.459	-.339	.749	.026	.030	.029	.893	1.119
3	(Constant)	1.485	.120		12.343	.000	1.248	1.721					
	dwelling type is a	-.484	.133	-.157	-3.642	.000	-.745	-.223	-.189	-.146	-.141	.805	1.243

	flat or not											
	retired, no dependents	.675	.206	.140	3.283	.001	.271	1.079	.144	.131	.127	.818	1.223
	couple, dependents	.129	.133	.048	.971	.332	-.132	.390	.059	.039	.038	.614	1.628
	lone parent, dependents	.168	.205	.035	.822	.411	-.234	.571	.036	.033	.032	.809	1.235
	multiperson	-.381	.195	-.084	-1.958	.051	-.764	.001	-.130	-.079	-.076	.817	1.224
	single non-retired	.208	.170	.056	1.223	.222	-.126	.541	-.026	.049	.047	.717	1.394
	single, retired	.115	.278	.017	.414	.679	-.430	.660	.026	.017	.016	.881	1.135
	Length of time	.285	.104	.110	2.737	.006	.080	.489	.166	.110	.106	.927	1.079

a. Dependent Variable: total score - number of neighbours with positive relationship

Know people in development

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.496	.039		64.286	.000	2.420	2.572					
	dwelling type is a flat or not	-.467	.083	-.220	-5.638	.000	-.630	-.304	-.220	-.220	-.220	1.000	1.000
2	(Constant)	2.586	.084		30.715	.000	2.420	2.751					
	dwelling type is a flat or not	-.377	.083	-.177	-4.546	.000	-.540	-.214	-.220	-.180	-.171	.931	1.074
	mortgage	-.162	.097	-.092	-1.676	.094	-.352	.028	-.048	-.067	-.063	.469	2.131
	rent/mortgage	-.258	.183	-.059	-1.411	.159	-.618	.101	-.029	-.057	-.053	.824	1.214
	rent private landlord	-.501	.124	-.201	-4.030	.000	-.744	-.257	-.226	-.160	-.152	.569	1.759
	rent RSL	.333	.120	.136	2.784	.006	.098	.567	.218	.111	.105	.593	1.686
	no rent	.181	.306	.023	.590	.555	-.420	.782	.030	.024	.022	.931	1.074
	other	.103	.594	.007	.173	.863	-1.063	1.269	.007	.007	.007	.980	1.020
3	(Constant)	2.265	.104		21.756	.000	2.060	2.469					
	dwelling type is a flat or not	-.205	.088	-.097	-2.334	.020	-.378	-.033	-.220	-.094	-.085	.778	1.286
	mortgage	-.057	.103	-.032	-.549	.584	-.259	.146	-.048	-.022	-.020	.389	2.571

	rent/mortgage	-.179	.184	-.041	-.973	.331	-.540	.182	-.029	-.039	-.036	.770	1.299
	rent private landlord	-.376	.130	-.151	-2.900	.004	-.630	-.121	-.226	-.116	-.106	.491	2.035
	rent RSL	.299	.123	.122	2.434	.015	.058	.540	.218	.098	.089	.529	1.889
	no rent	.179	.300	.023	.596	.551	-.411	.769	.030	.024	.022	.909	1.100
	other	-.334	.582	-.021	-.573	.567	-1.476	.809	.007	-.023	-.021	.960	1.041
	retired, no dependents	.570	.145	.167	3.924	.000	.285	.855	.150	.156	.143	.736	1.359
	couple, dependents	.387	.087	.208	4.437	.000	.216	.558	.150	.176	.162	.608	1.646
	lone parent, dependents	.259	.145	.078	1.779	.076	-.027	.544	.089	.072	.065	.691	1.447
	multiperson	.014	.130	.004	.108	.914	-.242	.270	-.102	.004	.004	.798	1.253
	single non-retired	-.052	.111	-.020	-.471	.638	-.270	.166	-.170	-.019	-.017	.723	1.382
	single, retired	.773	.181	.175	4.281	.000	.419	1.128	.171	.170	.156	.796	1.256

a. Dependent Variable: Q16_knowpeopleTOTrev

Number of neighbours with positive relationship

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.782	.057		31.470	.000	1.671	1.894					
	dwelling type is a flat or not	-.582	.122	-.189	-4.790	.000	-.821	-.344	-.189	-.189	-.189	1.000	1.000
2	(Constant)	1.645	.106		15.580	.000	1.438	1.852					
	dwelling type is a flat or not	-.551	.131	-.179	-4.193	.000	-.809	-.293	-.189	-.167	-.163	.833	1.201
	retired, no dependents	.723	.206	.150	3.511	.000	.319	1.128	.144	.140	.137	.824	1.214
	couple, dependents	.161	.133	.060	1.208	.228	-.101	.422	.059	.049	.047	.619	1.616
	lone parent, dependents	.202	.206	.042	.983	.326	-.202	.606	.036	.040	.038	.812	1.231

	multiperson	-.397	.196	-.087	-2.025	.043	-.781	-.012	-.130	-.081	-.079	.818	1.223
	single non-retired	.241	.170	.065	1.417	.157	-.093	.576	-.026	.057	.055	.721	1.387
	single, retired	.205	.277	.030	.740	.459	-.339	.749	.026	.030	.029	.893	1.119
3	(Constant)	1.485	.120		12.343	.000	1.248	1.721					
	dwelling type is a flat or not	-.484	.133	-.157	-3.642	.000	-.745	-.223	-.189	-.146	-.141	.805	1.243
	retired, no dependents	.675	.206	.140	3.283	.001	.271	1.079	.144	.131	.127	.818	1.223
	couple, dependents	.129	.133	.048	.971	.332	-.132	.390	.059	.039	.038	.614	1.628
	lone parent, dependents	.168	.205	.035	.822	.411	-.234	.571	.036	.033	.032	.809	1.235
	multiperson	-.381	.195	-.084	-1.958	.051	-.764	.001	-.130	-.079	-.076	.817	1.224
	single non-retired	.208	.170	.056	1.223	.222	-.126	.541	-.026	.049	.047	.717	1.394
	single, retired	.115	.278	.017	.414	.679	-.430	.660	.026	.017	.016	.881	1.135
	Length of time	.285	.104	.110	2.737	.006	.080	.489	.166	.110	.106	.927	1.079

a. Dependent Variable: total score - number of neighbours with positive relationship

Mixed use variables and social interaction variables

Variety of uses

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.941	.140		21.051	.000	2.667	3.216					
	Healthcentre yes/no indev & nearby	1.074	.175	.545	6.140	.000	.731	1.417	-.141	.235	.222	.167	5.992
	cafe etc yes/no indev & nearby	.952	.222	.285	4.285	.000	.516	1.388	-.049	.167	.155	.297	3.365
	worship yes/no indev & nearby	-1.450	.164	-.765	-8.821	.000	-1.773	-1.127	-.261	-.329	-.320	.175	5.722
	park yes/no indev & nearby	-1.275	.253	-.322	-5.047	.000	-1.770	-.779	-.144	-.195	-.183	.323	3.095
2	(Constant)	3.072	.152		20.149	.000	2.773	3.372					
	Healthcentre yes/no indev & nearby	.993	.181	.504	5.479	.000	.637	1.349	-.141	.212	.195	.150	6.655
	cafe etc yes/no indev & nearby	.909	.226	.272	4.027	.000	.466	1.353	-.049	.158	.144	.278	3.596

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
	worship yes/no indev & nearby	-1.288	.187	-.679	-6.877	.000	-1.656	-.920	-.261	-.263	-.245	.130	7.675
	park yes/no indev & nearby	-1.265	.250	-.319	-5.057	.000	-1.756	-.774	-.144	-.196	-.180	.318	3.140
	mortgage	-.122	.091	-.069	-1.331	.184	-.301	.058	-.056	-.053	-.047	.476	2.102
	rent/mortgage	-.349	.176	-.080	-1.986	.047	-.694	-.004	-.027	-.078	-.071	.777	1.288
	rent private landlord	-.529	.116	-.210	-4.564	.000	-.756	-.301	-.225	-.178	-.163	.601	1.664
	rent RSL	-.016	.126	-.007	-.126	.900	-.263	.232	.229	-.005	-.004	.466	2.145
	no rent	-.076	.295	-.010	-.258	.797	-.655	.503	.029	-.010	-.009	.935	1.069
	other	-.247	.575	-.016	-.430	.668	-1.377	.882	.006	-.017	-.015	.973	1.027
3	(Constant)	2.870	.164		17.462	.000	2.547	3.193					
	Healthcentre yes/no indev & nearby	1.031	.194	.523	5.321	.000	.651	1.412	-.141	.207	.183	.123	8.140
	cafe etc yes/no indev & nearby	.903	.219	.270	4.126	.000	.473	1.333	-.049	.162	.142	.277	3.616
	worship yes/no indev & nearby	-1.262	.199	-.665	-6.351	.000	-1.652	-.872	-.261	-.245	-.219	.108	9.253
	park yes/no indev & nearby	-1.312	.243	-.331	-5.396	.000	-1.790	-.835	-.144	-.210	-.186	.315	3.177
	mortgage	-.109	.098	-.062	-1.115	.265	-.300	.083	-.056	-.044	-.038	.390	2.564
	rent/mortgage	-.363	.176	-.084	-2.060	.040	-.709	-.017	-.027	-.082	-.071	.722	1.386
	rent private landlord	-.456	.121	-.181	-3.777	.000	-.693	-.219	-.225	-.149	-.130	.517	1.936
	rent RSL	-.082	.132	-.034	-.621	.535	-.341	.177	.229	-.025	-.021	.397	2.518
	no rent	-.117	.289	-.015	-.407	.684	-.685	.450	.029	-.016	-.014	.909	1.100
	other	-.411	.560	-.026	-.734	.464	-1.511	.689	.006	-.029	-.025	.958	1.044
	retired, no dependents	.370	.140	.108	2.647	.008	.096	.645	.147	.105	.091	.717	1.395
	couple, dependents	.438	.081	.234	5.407	.000	.279	.597	.138	.210	.186	.635	1.574
	lone parent, dependents	.370	.136	.114	2.716	.007	.103	.638	.085	.108	.094	.675	1.482
	multiperson	.032	.123	.010	.258	.796	-.210	.273	-.099	.010	.009	.801	1.249
	single non-retired	-.121	.104	-.046	-1.168	.243	-.326	.083	-.169	-.046	-.040	.759	1.317
	single, retired	.352	.178	.081	1.980	.048	.003	.701	.170	.079	.068	.709	1.410

a. Dependent Variable: Q16_knowpeopleTOTrev

Walking in development

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.217	.043		51.641	.000	2.133	2.301					
	walk to work in dev or nearby	.469	.069	.259	6.817	.000	.334	.605	.259	.259	.259	1.000	1.000
2	(Constant)	2.377	.084		28.258	.000	2.211	2.542					
	walk to work in dev or nearby	.432	.066	.238	6.490	.000	.301	.562	.259	.249	.236	.986	1.014
	mortgage	-.186	.093	-.105	-1.999	.046	-.368	-.003	-.056	-.079	-.073	.482	2.077
	rent/mortgage	-.245	.174	-.056	-1.405	.161	-.588	.097	-.027	-.055	-.051	.823	1.214
	rent private landlord	-.620	.117	-.246	-5.307	.000	-.850	-.391	-.225	-.205	-.193	.616	1.622
	rent RSL	.274	.114	.113	2.398	.017	.050	.498	.229	.094	.087	.594	1.682
	no rent	-.021	.301	-.003	-.071	.944	-.612	.570	.029	-.003	-.003	.937	1.067
	other	.123	.585	.008	.211	.833	-1.026	1.273	.006	.008	.008	.982	1.018
3	(Constant)	2.077	.101		20.590	.000	1.878	2.275					
	walk to work in dev or nearby	.411	.065	.227	6.307	.000	.283	.539	.259	.243	.221	.952	1.050
	mortgage	-.036	.098	-.020	-.366	.715	-.229	.157	-.056	-.015	-.013	.398	2.514
	rent/mortgage	-.118	.174	-.027	-.676	.499	-.459	.224	-.027	-.027	-.024	.768	1.303
	rent private landlord	-.419	.122	-.166	-3.439	.001	-.658	-.180	-.225	-.135	-.121	.527	1.897
	rent RSL	.286	.116	.118	2.469	.014	.059	.514	.229	.098	.087	.535	1.868
	no rent	.055	.292	.007	.187	.852	-.520	.629	.029	.007	.007	.922	1.085
	other	-.292	.568	-.018	-.513	.608	-1.408	.824	.006	-.020	-.018	.967	1.035
	retired, no dependents	.623	.140	.181	4.466	.000	.349	.897	.147	.175	.157	.748	1.336
	couple, dependents	.343	.083	.183	4.159	.000	.181	.506	.138	.163	.146	.636	1.573
	lone parent, dependents	.201	.137	.062	1.472	.142	-.067	.469	.085	.058	.052	.698	1.432
	multiperson	.071	.125	.022	.567	.571	-.175	.317	-.099	.023	.020	.800	1.250
	single non-retired	-.112	.106	-.043	-1.065	.287	-.320	.095	-.169	-.042	-.037	.763	1.311
	single, retired	.807	.170	.186	4.748	.000	.473	1.141	.170	.185	.167	.804	1.244

a. Dependent Variable: Q16_knowpeopleTOTrev

Walkability and social interaction variables

Know People in Development

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.776	.180		15.466	.000	2.424	3.129					
	legibility reversed	.067	.041	.068	1.619	.106	-.014	.149	.001	.064	.063	.856	1.168
	local integration value for street	-.059	.040	-.060	-1.463	.144	-.137	.020	-.116	-.058	-.057	.902	1.109
	global integration value for street	-1.010	.234	-.190	-4.308	.000	-1.470	-.549	-.182	-.169	-.168	.786	1.273
2	(Constant)	.504	.439		1.150	.251	-.357	1.366					
	legibility reversed	.555	.113	.565	4.907	.000	.333	.778	.001	.192	.187	.109	9.162
	local integration value for street	.030	.043	.031	.704	.482	-.054	.115	-.116	.028	.027	.737	1.357
	global integration value for street	-1.620	.355	-.304	-4.561	.000	-2.318	-.923	-.182	-.179	-.173	.325	3.076
	curvilinear	.462	.150	.164	3.072	.002	.167	.758	-.085	.122	.117	.505	1.979
	culs-de-sacs	.447	.104	.240	4.290	.000	.243	.652	.217	.169	.163	.463	2.159
	no discernible pattern	1.263	.243	.582	5.189	.000	.785	1.741	.004	.203	.197	.115	8.707
3	(Constant)	-.074	.440		-.168	.867	-.939	.791					
	legibility reversed	.578	.115	.588	5.046	.000	.353	.804	.001	.198	.186	.100	9.971
	local integration value for street	.138	.046	.142	3.011	.003	.048	.228	-.116	.120	.111	.615	1.626
	global integration value for street	-2.420	.370	-.454	-6.542	.000	-3.146	-1.693	-.182	-.253	-.242	.283	3.539
	curvilinear	.263	.149	.093	1.758	.079	-.031	.556	-.085	.070	.065	.483	2.071
	culs-de-sacs	.116	.116	.062	1.006	.315	-.111	.344	.217	.040	.037	.354	2.822
	no discernible pattern	1.045	.250	.482	4.185	.000	.555	1.536	.004	.165	.155	.103	9.724
	street calming	.979	.155	.516	6.316	.000	.675	1.284	.157	.245	.233	.204	4.897
	homezone	.785	.160	.371	4.895	.000	.470	1.100	-.020	.192	.181	.237	4.212

4	(Constant)	.385	.457		.843	.399	-.511	1.282					
	legibility reversed	.519	.119	.528	4.381	.000	.287	.752	.001	.173	.159	.091	11.044
	local integration value for street	.115	.045	.119	2.545	.011	.026	.204	-.116	.102	.092	.607	1.647
	global integration value for street	-2.189	.384	-.411	-5.707	.000	-2.943	-1.436	-.182	-.224	-.207	.254	3.941
	curvilinear	.115	.151	.041	.760	.447	-.181	.410	-.085	.031	.028	.459	2.179
	culs-de-sacs	-.026	.119	-.014	-.216	.829	-.260	.209	.217	-.009	-.008	.321	3.114
	no discernible pattern	.823	.256	.379	3.217	.001	.321	1.325	.004	.128	.117	.095	10.563
	street calming	.961	.154	.506	6.245	.000	.659	1.263	.157	.243	.227	.200	4.992
	homezone	.751	.159	.355	4.735	.000	.440	1.062	-.020	.187	.172	.234	4.265
	mortgage	-.147	.093	-.084	-1.587	.113	-.329	.035	-.055	-.064	-.058	.472	2.120
	rent/mortgage	-.372	.182	-.084	-2.041	.042	-.731	-.014	-.022	-.082	-.074	.771	1.297
	rent private landlord	-.554	.120	-.222	-4.626	.000	-.790	-.319	-.223	-.183	-.168	.572	1.748
	rent RSL	.003	.126	.001	.022	.983	-.245	.251	.218	.001	.001	.484	2.064
	no rent	-.016	.299	-.002	-.055	.956	-.603	.570	.029	-.002	-.002	.907	1.102
	other	-.270	.574	-.017	-.470	.638	-1.397	.857	.006	-.019	-.017	.975	1.025
5	(Constant)	.412	.464		.887	.375	-.500	1.324					
	legibility reversed	.508	.125	.516	4.057	.000	.262	.753	.001	.162	.142	.076	13.147
	local integration value for street	.096	.045	.099	2.156	.031	.009	.184	-.116	.087	.076	.585	1.710
	global integration value for street	-2.163	.401	-.406	-5.393	.000	-2.950	-1.375	-.182	-.213	-.189	.217	4.606
	curvilinear	.057	.151	.020	.381	.704	-.238	.353	-.085	.015	.013	.430	2.327
	culs-de-sacs	-.083	.119	-.045	-.703	.482	-.317	.150	.217	-.028	-.025	.304	3.292
	no discernible pattern	.684	.265	.315	2.584	.010	.164	1.204	.004	.104	.091	.083	12.106
	street calming	.816	.151	.430	5.389	.000	.519	1.113	.157	.213	.189	.193	5.170
	homezone	.664	.154	.314	4.309	.000	.362	.967	-.020	.171	.151	.232	4.311
	mortgage	-.112	.099	-.064	-1.131	.258	-.306	.082	-.055	-.046	-.040	.386	2.590
	rent/mortgage	-.392	.184	-.089	-2.137	.033	-.753	-.032	-.022	-.086	-.075	.712	1.405
	rent private landlord	-.491	.124	-.197	-3.954	.000	-.735	-.247	-.223	-.158	-.139	.497	2.011
	rent RSL	-.095	.136	-.039	-.699	.485	-.361	.172	.218	-.028	-.025	.393	2.545
	no rent	-.068	.293	-.009	-.231	.817	-.643	.508	.029	-.009	-.008	.883	1.132
	other	-.532	.560	-.034	-.950	.342	-1.631	.568	.006	-.038	-.033	.958	1.044
	retired, no dependents	.421	.141	.125	2.974	.003	.143	.699	.150	.119	.104	.701	1.427

	couple, dependents	.422	.084	.228	5.030	.000	.258	.587	.144	.199	.177	.600	1.667
	lone parent, dependents	.417	.141	.128	2.954	.003	.140	.694	.100	.118	.104	.653	1.530
	multiperson	.052	.125	.016	.413	.680	-.194	.298	-.091	.017	.014	.798	1.253
	single non-retired	-.138	.107	-.053	-1.284	.199	-.348	.073	-.173	-.052	-.045	.715	1.399
	single, retired	.484	.188	.107	2.578	.010	.115	.852	.176	.104	.090	.708	1.412
6	(Constant)	.358	.462		.775	.438	-.549	1.265					
	legibility reversed	.503	.124	.512	4.047	.000	.259	.747	.001	.161	.141	.076	13.149
	local integration value for street	.091	.044	.093	2.048	.041	.004	.178	-.116	.082	.071	.584	1.713
	global integration value for street	-2.194	.399	-.412	-5.501	.000	-2.977	-1.411	-.182	-.217	-.192	.217	4.609
	curvilinear	-.028	.152	-.010	-.181	.856	-.327	.272	-.085	-.007	-.006	.414	2.417
	culs-de-sacs	-.120	.119	-.065	-1.014	.311	-.354	.113	.217	-.041	-.035	.300	3.331
	no discernible pattern	.626	.264	.289	2.373	.018	.108	1.145	.004	.095	.083	.082	12.176
	street calming	.814	.150	.429	5.409	.000	.518	1.110	.157	.214	.189	.193	5.170
	homezone	.658	.153	.311	4.295	.000	.357	.959	-.020	.171	.150	.232	4.311
	mortgage	-.085	.099	-.049	-.860	.390	-.279	.109	-.055	-.035	-.030	.383	2.613
	rent/mortgage	-.465	.184	-.105	-2.525	.012	-.827	-.103	-.022	-.102	-.088	.699	1.431
	rent private landlord	-.380	.129	-.152	-2.934	.003	-.634	-.126	-.223	-.118	-.102	.453	2.207
	rent RSL	-.132	.135	-.054	-.973	.331	-.398	.134	.218	-.039	-.034	.389	2.568
	no rent	-.039	.291	-.005	-.135	.893	-.612	.533	.029	-.005	-.005	.882	1.134
	other	-.601	.557	-.039	-1.080	.281	-1.695	.492	.006	-.044	-.038	.956	1.046
	retired, no dependents	.412	.141	.122	2.929	.004	.136	.688	.150	.118	.102	.701	1.427
	couple, dependents	.401	.084	.216	4.781	.000	.236	.565	.144	.190	.167	.595	1.680
	lone parent, dependents	.426	.140	.131	3.037	.002	.151	.701	.100	.122	.106	.653	1.531
	multiperson	.039	.125	.012	.313	.755	-.206	.284	-.091	.013	.011	.797	1.254
	single non-retired	-.163	.107	-.063	-1.524	.128	-.373	.047	-.173	-.061	-.053	.710	1.408
	single, retired	.441	.187	.098	2.359	.019	.074	.809	.176	.095	.082	.704	1.421
	Length of time	.213	.074	.120	2.899	.004	.069	.358	.214	.116	.101	.714	1.400

a. Dependent Variable: Q16_knowpeopleTOTrev

Number of positive relationships with neighbours

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.782	.168		4.660	.000	.452	1.111					
	street calming	.989	.178	.355	5.567	.000	.640	1.338	.135	.215	.215	.366	2.730
	homezone	.863	.199	.276	4.334	.000	.472	1.253	-.006	.169	.167	.366	2.730
2	(Constant)	1.132	.208		5.429	.000	.722	1.541					
	street calming	.895	.179	.321	5.000	.000	.544	1.247	.135	.195	.191	.354	2.823
	homezone	.777	.199	.249	3.908	.000	.386	1.167	-.006	.153	.149	.361	2.771
	mortgage	-.236	.141	-.093	-1.678	.094	-.512	.040	.007	-.066	-.064	.478	2.091
	rent/mortgage	-.347	.267	-.055	-1.303	.193	-.871	.176	.001	-.052	-.050	.827	1.209
	rent private landlord	-.705	.178	-.194	-3.958	.000	-1.054	-.355	-.163	-.155	-.151	.609	1.643
	rent RSL	-.195	.171	-.056	-1.138	.255	-.532	.142	.043	-.045	-.044	.598	1.673
	no rent	-.540	.453	-.047	-1.192	.234	-1.430	.350	-.025	-.047	-.046	.937	1.067
	other	.032	.881	.001	.036	.971	-1.699	1.763	.015	.001	.001	.982	1.018
3	(Constant)	1.001	.220		4.544	.000	.569	1.434					
	street calming	.820	.182	.294	4.497	.000	.462	1.178	.135	.176	.171	.338	2.960
	homezone	.724	.200	.232	3.622	.000	.332	1.117	-.006	.143	.138	.353	2.837
	mortgage	-.127	.154	-.050	-.825	.409	-.431	.176	.007	-.033	-.031	.393	2.547
	rent/mortgage	-.242	.275	-.038	-.878	.380	-.782	.299	.001	-.035	-.033	.768	1.302
	rent private landlord	-.520	.191	-.143	-2.717	.007	-.896	-.144	-.163	-.108	-.103	.520	1.922
	rent RSL	-.168	.180	-.049	-.934	.351	-.523	.186	.043	-.037	-.036	.534	1.872
	no rent	-.458	.455	-.040	-1.007	.314	-1.352	.436	-.025	-.040	-.038	.919	1.088
	other	-.120	.884	-.005	-.136	.892	-1.856	1.616	.015	-.005	-.005	.966	1.036
	retired, no dependents	.561	.217	.116	2.586	.010	.135	.986	.141	.103	.098	.721	1.388
	couple, dependents	.173	.131	.064	1.322	.187	-.084	.431	.056	.053	.050	.614	1.628
	lone parent, dependents	.219	.214	.047	1.023	.307	-.201	.639	.043	.041	.039	.688	1.454
	multiperson	-.309	.194	-.068	-1.590	.112	-.691	.073	-.128	-.063	-.060	.791	1.264
	single non-retired	.086	.165	.023	.517	.605	-.239	.410	-.027	.021	.020	.753	1.328
	single, retired	.133	.267	.021	.497	.619	-.392	.657	.033	.020	.019	.787	1.271

4	(Constant)	.953	.237		4.026	.000	.488	1.418					
	street calming	.826	.182	.296	4.532	.000	.468	1.184	.135	.179	.172	.337	2.965
	homezone	.751	.200	.241	3.750	.000	.358	1.145	-.006	.149	.142	.350	2.853
	mortgage	-.111	.155	-.044	-.717	.473	-.416	.193	.007	-.029	-.027	.388	2.576
	rent/mortgage	-.235	.276	-.037	-.853	.394	-.777	.306	.001	-.034	-.032	.762	1.312
	rent private landlord	-.504	.192	-.139	-2.623	.009	-.881	-.127	-.163	-.105	-.100	.516	1.938
	rent RSL	-.186	.196	-.054	-.949	.343	-.570	.198	.043	-.038	-.036	.454	2.205
	no rent	-.396	.456	-.035	-.870	.385	-1.291	.499	-.025	-.035	-.033	.915	1.093
	other	-.042	.886	-.002	-.047	.962	-1.781	1.698	.015	-.002	-.002	.960	1.042
	retired, no dependents	.550	.218	.114	2.519	.012	.121	.979	.141	.101	.096	.709	1.410
	couple, dependents	.189	.131	.070	1.439	.151	-.069	.447	.056	.058	.055	.611	1.636
	lone parent, dependents	.240	.214	.051	1.120	.263	-.181	.660	.043	.045	.043	.686	1.458
	multiperson	-.306	.195	-.067	-1.575	.116	-.689	.076	-.128	-.063	-.060	.788	1.269
	single non-retired	.106	.166	.028	.636	.525	-.220	.431	-.027	.025	.024	.747	1.339
	single, retired	.188	.270	.030	.696	.487	-.343	.719	.033	.028	.026	.767	1.304
	low manager	-.036	.126	-.014	-.289	.773	-.284	.211	-.034	-.012	-.011	.616	1.622
	intermediate	.027	.185	.006	.146	.884	-.337	.391	.010	.006	.006	.738	1.356
	small employer	.264	.241	.045	1.093	.275	-.210	.738	.033	.044	.042	.847	1.181
	lower & technical	.558	.252	.093	2.217	.027	.064	1.052	.106	.089	.084	.829	1.206
	semi-routine	-.063	.237	-.012	-.266	.790	-.529	.402	-.004	-.011	-.010	.680	1.470
	routine	.046	.315	.006	.145	.885	-.573	.664	.020	.006	.006	.782	1.279
	unclassified	-.102	.220	-.021	-.465	.642	-.535	.330	-.008	-.019	-.018	.739	1.353

a. Dependent Variable: total score - number of neighbours with positive relationship

Recreational space and social interaction variables

Know People in Development

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF

1	(Constant)	2.941	.149		19.727	.000	2.648	3.234					
	play area yes/no indev & nearby	-.251	.084	-.126	-2.983	.003	-.416	-.086	-.163	-.117	-.116	.847	1.181
	park yes/no indev & nearby	-.376	.166	-.095	-2.259	.024	-.703	-.049	-.144	-.089	-.088	.847	1.181
2	(Constant)	3.088	.158		19.529	.000	2.777	3.398					
	play area yes/no indev & nearby	-.220	.082	-.110	-2.681	.008	-.382	-.059	-.163	-.106	-.099	.809	1.237
	park yes/no indev & nearby	-.433	.160	-.110	-2.702	.007	-.748	-.118	-.144	-.106	-.100	.833	1.200
	mortgage	-.180	.095	-.102	-1.903	.057	-.366	.006	-.057	-.075	-.070	.478	2.092
	rent/mortgage	-.180	.178	-.041	-1.008	.314	-.530	.171	-.028	-.040	-.037	.809	1.237
	rent private landlord	-.560	.120	-.223	-4.658	.000	-.797	-.324	-.226	-.181	-.172	.598	1.671
	rent RSL	.385	.117	.159	3.291	.001	.155	.615	.227	.129	.122	.586	1.708
	no rent	-.001	.305	.000	-.004	.997	-.601	.599	.028	.000	.000	.936	1.069
	other	-.261	.596	-.016	-.438	.662	-1.432	.910	.006	-.017	-.016	.973	1.028
3	(Constant)	2.747	.168		16.301	.000	2.416	3.078					
	play area yes/no indev & nearby	-.175	.080	-.087	-2.193	.029	-.331	-.018	-.163	-.087	-.078	.799	1.251
	park yes/no indev & nearby	-.407	.156	-.103	-2.608	.009	-.714	-.101	-.144	-.103	-.093	.814	1.228
	mortgage	-.078	.100	-.044	-.781	.435	-.274	.118	-.057	-.031	-.028	.398	2.513
	rent/mortgage	-.121	.178	-.028	-.680	.497	-.470	.228	-.028	-.027	-.024	.757	1.322
	rent private landlord	-.401	.125	-.160	-3.223	.001	-.646	-.157	-.226	-.127	-.115	.517	1.933
	rent RSL	.353	.119	.146	2.966	.003	.119	.586	.227	.117	.106	.526	1.901
	no rent	.037	.297	.005	.123	.902	-.546	.619	.028	.005	.004	.918	1.089
	other	-.612	.578	-.039	-1.059	.290	-1.748	.523	.006	-.042	-.038	.959	1.043
	retired, no dependents	.525	.142	.153	3.703	.000	.247	.803	.147	.146	.132	.744	1.344
	couple, dependents	.409	.083	.218	4.905	.000	.245	.573	.137	.192	.175	.641	1.559
	lone parent, dependents	.251	.138	.077	1.814	.070	-.021	.522	.085	.072	.065	.700	1.429
	multiperson	.025	.127	.008	.200	.842	-.224	.275	-.099	.008	.007	.801	1.249
	single non-retired	-.102	.107	-.039	-.954	.340	-.313	.108	-.170	-.038	-.034	.761	1.314
	single, retired	.788	.178	.175	4.415	.000	.437	1.138	.184	.173	.157	.804	1.243
4	(Constant)	2.660	.172		15.507	.000	2.324	2.997					
	play area yes/no indev & nearby	-.154	.080	-.077	-1.925	.055	-.310	.003	-.163	-.076	-.068	.790	1.266
	park yes/no indev & nearby	-.456	.157	-.115	-2.910	.004	-.764	-.148	-.144	-.115	-.103	.800	1.249

	mortgage	-.052	.100	-.029	-.520	.603	-.248	.144	-.057	-.021	-.018	.393	2.542
	rent/mortgage	-.169	.178	-.039	-.952	.342	-.519	.180	-.028	-.038	-.034	.747	1.339
	rent private landlord	-.294	.132	-.117	-2.236	.026	-.553	-.036	-.226	-.089	-.079	.459	2.176
	rent RSL	.331	.119	.137	2.790	.005	.098	.565	.227	.110	.099	.523	1.911
	no rent	.077	.296	.010	.261	.794	-.504	.659	.028	.010	.009	.915	1.092
	other	-.665	.576	-.042	-1.154	.249	-1.797	.466	.006	-.046	-.041	.958	1.044
	retired, no dependents	.513	.141	.150	3.632	.000	.236	.791	.147	.143	.129	.743	1.345
	couple, dependents	.387	.084	.207	4.639	.000	.223	.551	.137	.182	.165	.634	1.577
	lone parent, dependents	.257	.138	.079	1.866	.062	-.013	.527	.085	.074	.066	.699	1.430
	multiperson	.016	.127	.005	.130	.896	-.232	.265	-.099	.005	.005	.800	1.250
	single non-retired	-.116	.107	-.044	-1.088	.277	-.326	.094	-.170	-.043	-.039	.759	1.317
	single, retired	.749	.178	.167	4.193	.000	.398	1.099	.184	.165	.149	.798	1.254
	Length of time	.179	.074	.100	2.428	.015	.034	.324	.218	.096	.086	.750	1.334

a. Dependent Variable: Q16_knowpeopleTOTrev

Get on with neighbours

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.093	.144		7.571	.000	.809	1.376					
	frequency shared space used in summer reversed	.172	.041	.206	4.182	.000	.091	.253	.206	.206	.206	1.000	1.000
2	(Constant)	.040	.322		.126	.900	-.592	.673					
	frequency shared space used in summer reversed	.155	.040	.185	3.835	.000	.075	.234	.206	.190	.184	.989	1.011
	play area in communal area	-.315	.090	-.228	-3.519	.000	-.491	-.139	-.030	-.175	-.169	.548	1.826
	planting and shrubs in communal area	.735	.152	.313	4.846	.000	.437	1.033	.165	.237	.232	.550	1.819

a. Dependent Variable: total score - number of neighbours with positive relationship

Car and cycle storage and social interaction variables

Know People in Development (wrt bike storage)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.048	.189		16.087	.000	2.676	3.420					
	bike storage - in curtilage	-.592	.194	-.303	-3.057	.002	-.972	-.212	.098	-.120	-.118	.152	6.573
	bike storage - public	-.875	.249	-.205	-3.518	.000	-1.364	-.387	-.056	-.138	-.136	.440	2.274
	bike storage - communal	-.885	.204	-.408	-4.344	.000	-1.285	-.485	-.139	-.169	-.168	.170	5.876
2	(Constant)	3.048	.193		15.821	.000	2.669	3.426					
	bike storage - in curtilage	-.517	.191	-.265	-2.698	.007	-.892	-.141	.098	-.106	-.101	.145	6.904
	bike storage - public	-.575	.247	-.135	-2.330	.020	-1.061	-.090	-.056	-.092	-.087	.415	2.412
	bike storage - communal	-.710	.202	-.327	-3.508	.000	-1.108	-.313	-.139	-.138	-.131	.160	6.247
	mortgage	-.143	.097	-.081	-1.478	.140	-.334	.047	-.057	-.058	-.055	.461	2.168
	rent/mortgage	-.255	.179	-.059	-1.424	.155	-.606	.097	-.028	-.056	-.053	.818	1.222
	rent private landlord	-.544	.124	-.217	-4.404	.000	-.787	-.302	-.226	-.172	-.164	.576	1.736
	rent RSL	.335	.118	.139	2.852	.004	.104	.566	.227	.112	.106	.590	1.695
	no rent	.167	.309	.021	.540	.590	-.439	.773	.028	.021	.020	.931	1.074
	other	-.192	.604	-.012	-.319	.750	-1.379	.994	.006	-.013	-.012	.963	1.038
3	(Constant)	2.670	.200		13.349	.000	2.277	3.062					
	bike storage - in curtilage	-.459	.187	-.235	-2.451	.015	-.827	-.091	.098	-.097	-.088	.141	7.095
	bike storage - public	-.431	.242	-.101	-1.780	.076	-.908	.045	-.056	-.071	-.064	.401	2.494
	bike storage - communal	-.466	.200	-.215	-2.332	.020	-.858	-.074	-.139	-.093	-.084	.153	6.522
	mortgage	-.052	.102	-.029	-.510	.610	-.252	.148	-.057	-.020	-.018	.391	2.558
	rent/mortgage	-.174	.178	-.040	-.975	.330	-.524	.176	-.028	-.039	-.035	.766	1.306

	rent private landlord	-.425	.128	-.169	-3.318	.001	-.676	-.173	-.226	-.131	-.119	.500	2.000
	rent RSL	.312	.120	.129	2.600	.010	.076	.547	.227	.103	.094	.529	1.889
	no rent	.150	.301	.019	.498	.619	-.441	.740	.028	.020	.018	.914	1.094
	other	-.624	.588	-.039	-1.062	.289	-1.778	.530	.006	-.042	-.038	.948	1.055
	retired, no dependents	.566	.144	.165	3.926	.000	.283	.849	.147	.155	.141	.735	1.361
	couple, dependents	.413	.087	.220	4.768	.000	.243	.583	.137	.187	.172	.607	1.647
	lone parent, dependents	.251	.140	.077	1.795	.073	-.024	.526	.085	.071	.065	.696	1.436
	multiperson	.044	.129	.014	.344	.731	-.209	.297	-.099	.014	.012	.795	1.258
	single non-retired	-.110	.110	-.042	-1.000	.318	-.326	.106	-.170	-.040	-.036	.740	1.352
	single, retired	.808	.181	.180	4.464	.000	.453	1.164	.184	.175	.161	.797	1.254
4	(Constant)	2.554	.205		12.446	.000	2.151	2.958					
	bike storage - in curtilage	-.473	.187	-.242	-2.533	.012	-.840	-.106	.098	-.100	-.091	.141	7.102
	bike storage - public	-.403	.242	-.094	-1.665	.096	-.878	.072	-.056	-.066	-.060	.400	2.501
	bike storage - communal	-.436	.199	-.201	-2.186	.029	-.827	-.044	-.139	-.087	-.078	.153	6.549
	mortgage	-.028	.102	-.016	-.271	.786	-.228	.172	-.057	-.011	-.010	.387	2.584
	rent/mortgage	-.217	.179	-.050	-1.216	.224	-.568	.134	-.028	-.048	-.044	.757	1.320
	rent private landlord	-.329	.134	-.131	-2.451	.015	-.592	-.065	-.226	-.097	-.088	.453	2.207
	rent RSL	.291	.120	.120	2.428	.015	.056	.526	.227	.096	.087	.526	1.900
	no rent	.178	.300	.022	.594	.552	-.411	.767	.028	.024	.021	.912	1.096
	other	-.685	.586	-.043	-1.169	.243	-1.836	.466	.006	-.047	-.042	.946	1.057
	retired, no dependents	.563	.144	.164	3.920	.000	.281	.845	.147	.154	.141	.735	1.361
	couple, dependents	.400	.086	.213	4.625	.000	.230	.570	.137	.181	.166	.605	1.654
	lone parent, dependents	.261	.140	.080	1.868	.062	-.013	.535	.085	.074	.067	.696	1.437
	multiperson	.040	.128	.013	.313	.754	-.212	.292	-.099	.012	.011	.795	1.258
	single non-retired	-.133	.110	-.051	-1.207	.228	-.349	.083	-.170	-.048	-.043	.734	1.363
	single, retired	.780	.181	.174	4.310	.000	.424	1.135	.184	.169	.155	.794	1.260
	Length of time	.177	.076	.099	2.346	.019	.029	.326	.218	.093	.084	.727	1.375

a. Dependent Variable: Q16_knowpeopleTOTrev

Get on with neighbours (wrt car parking)

Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	Correlations	Collinearity Statistics

		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.852	.078		23.812	.000	1.700	2.005					
	communal parking	-.322	.103	-.126	-3.120	.002	-.525	-.119	-.110	-.122	-.122	.937	1.067
	on street parking	-.367	.233	-.064	-1.575	.116	-.826	.091	-.032	-.062	-.062	.937	1.067
2	(Constant)	2.112	.137		15.421	.000	1.843	2.381					
	communal parking	-.242	.107	-.095	-2.265	.024	-.452	-.032	-.110	-.090	-.088	.857	1.167
	on street parking	-.324	.234	-.056	-1.386	.166	-.784	.135	-.032	-.055	-.054	.913	1.096
	mortgage	-.298	.142	-.117	-2.099	.036	-.577	-.019	.007	-.083	-.081	.483	2.069
	rent/mortgage	-.371	.272	-.058	-1.363	.173	-.905	.163	.001	-.054	-.053	.818	1.223
	rent private landlord	-.752	.181	-.207	-4.147	.000	-1.108	-.396	-.163	-.162	-.161	.604	1.656
	rent RSL	-.210	.177	-.061	-1.186	.236	-.557	.138	.043	-.047	-.046	.579	1.728
	no rent	-.535	.462	-.047	-1.158	.247	-1.443	.373	-.025	-.046	-.045	.928	1.078
	other	.130	.895	.006	.145	.885	-1.627	1.887	.015	.006	.006	.982	1.019
3	(Constant)	1.850	.169		10.949	.000	1.518	2.182					
	communal parking	-.243	.107	-.095	-2.268	.024	-.454	-.033	-.110	-.090	-.087	.835	1.198
	on street parking	-.221	.235	-.038	-.937	.349	-.683	.242	-.032	-.037	-.036	.888	1.126
	mortgage	-.180	.156	-.071	-1.155	.249	-.486	.126	.007	-.046	-.044	.395	2.533
	rent/mortgage	-.273	.280	-.043	-.975	.330	-.822	.276	.001	-.039	-.038	.761	1.314
	rent private landlord	-.544	.195	-.150	-2.793	.005	-.926	-.161	-.163	-.111	-.107	.515	1.943
	rent RSL	-.211	.185	-.061	-1.136	.256	-.574	.153	.043	-.045	-.044	.518	1.930
	no rent	-.468	.463	-.041	-1.010	.313	-1.377	.441	-.025	-.040	-.039	.909	1.100
	other	-.043	.895	-.002	-.048	.962	-1.800	1.714	.015	-.002	-.002	.965	1.036
	retired, no dependents	.664	.218	.137	3.046	.002	.236	1.093	.141	.121	.117	.729	1.372
	couple, dependents	.266	.131	.099	2.040	.042	.010	.523	.056	.081	.078	.634	1.578
	lone parent, dependents	.308	.216	.066	1.428	.154	-.116	.732	.043	.057	.055	.692	1.446
	multiperson	-.269	.197	-.059	-1.368	.172	-.656	.117	-.128	-.054	-.053	.789	1.267
	single non-retired	.144	.168	.038	.857	.392	-.186	.473	-.027	.034	.033	.748	1.337
	single, retired	.209	.270	.034	.775	.438	-.321	.739	.033	.031	.030	.789	1.267

a. Dependent Variable: total score - number of neighbours with positive relationship

High quality boundaries and social interaction variables

Know People in Development

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.308	.040		58.373	.000	2.230	2.385					
	fence/hedge	.942	.437	.084	2.157	.031	.085	1.800	.076	.085	.083	.998	1.002
	level change	.348	.079	.170	4.392	.000	.193	.504	.166	.170	.170	.998	1.002
2	(Constant)	2.434	.087		27.891	.000	2.263	2.606					
	fence/hedge	.889	.422	.079	2.107	.036	.060	1.718	.076	.083	.078	.990	1.010
	level change	.244	.079	.119	3.110	.002	.090	.399	.166	.122	.116	.943	1.060
	mortgage	-.148	.096	-.084	-1.545	.123	-.335	.040	-.056	-.061	-.058	.475	2.107
	rent/mortgage	-.149	.181	-.034	-.823	.411	-.504	.206	-.027	-.033	-.031	.801	1.248
	rent private landlord	-.549	.121	-.218	-4.528	.000	-.788	-.311	-.225	-.176	-.169	.598	1.671
	rent RSL	.342	.117	.142	2.929	.004	.113	.571	.229	.115	.109	.594	1.682
	no rent	.068	.308	.009	.222	.824	-.536	.672	.029	.009	.008	.938	1.066
	other	.066	.599	.004	.110	.913	-1.110	1.241	.006	.004	.004	.982	1.019
3	(Constant)	2.166	.103		20.979	.000	1.963	2.368					
	fence/hedge	.999	.409	.089	2.441	.015	.195	1.802	.076	.097	.088	.982	1.018
	level change	.148	.078	.072	1.892	.059	-.006	.301	.166	.075	.068	.892	1.121
	mortgage	-.037	.101	-.021	-.365	.715	-.236	.162	-.056	-.015	-.013	.395	2.532
	rent/mortgage	-.095	.180	-.022	-.530	.597	-.448	.258	-.027	-.021	-.019	.754	1.326
	rent private landlord	-.382	.126	-.152	-3.029	.003	-.629	-.134	-.225	-.120	-.109	.516	1.938
	rent RSL	.320	.119	.132	2.685	.007	.086	.553	.229	.106	.097	.533	1.877
	no rent	.119	.300	.015	.395	.693	-.470	.707	.029	.016	.014	.919	1.088
	other	-.334	.583	-.021	-.573	.567	-1.479	.811	.006	-.023	-.021	.964	1.038
	retired, no dependents	.568	.144	.165	3.944	.000	.285	.851	.147	.155	.142	.737	1.357
	couple, dependents	.395	.084	.211	4.684	.000	.229	.561	.138	.183	.168	.640	1.564
	lone parent, dependents	.289	.140	.089	2.062	.040	.014	.564	.085	.082	.074	.696	1.438

	multiperson	.022	.128	.007	.173	.862	-.230	.274	-.099	.007	.006	.800	1.249
	single non-retired	-.098	.109	-.037	-.904	.367	-.312	.115	-.169	-.036	-.032	.757	1.321
	single, retired	.769	.175	.177	4.401	.000	.426	1.113	.170	.172	.158	.798	1.253

a. Dependent Variable: Q16_knowpeopleTOTrev

Get on with neighbours

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.611	.436		3.693	.000	.754	2.468					
	quality of public/private delineation reversed	.368	.089	.177	4.138	.000	.194	.543	.177	.177	.177	1.000	1.000
2	(Constant)	2.000	.453		4.414	.000	1.110	2.891					
	quality of public/private delineation reversed	.289	.091	.139	3.161	.002	.109	.468	.177	.137	.134	.927	1.079
	retired, no dependents	.226	.110	.096	2.044	.041	.009	.443	.108	.089	.087	.809	1.237
	couple, dependents	-.028	.074	-.020	-.382	.703	-.173	.116	-.030	-.017	-.016	.628	1.591
	lone parent, dependents	-.240	.109	-.108	-2.200	.028	-.455	-.026	-.154	-.096	-.093	.750	1.333
	multiperson	-.051	.120	-.020	-.426	.670	-.287	.185	-.021	-.019	-.018	.837	1.195
	single non-retired	.003	.100	.002	.033	.973	-.192	.199	.012	.001	.001	.767	1.303
	single, retired	.306	.133	.105	2.296	.022	.044	.567	.122	.100	.097	.864	1.158

a. Dependent Variable: get on with neighbours overall score

Appendix E

Density measures and privacy in the home

Comfort with view into living area

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.463	.198		17.471	.000	3.073	3.852					
	number of bedrooms	-.271	.055	-.219	-4.934	.000	-.379	-.163	-.208	-.218	-.218	.990	1.010
	setback distance from front of house to street	-.026	.011	-.109	-2.453	.015	-.047	-.005	-.087	-.111	-.108	.990	1.010

a. Dependent Variable: comfortable with view into living overall

Comfort with view into bedroom area

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.538	.189		8.131	.000	1.166	1.909					
	number of bedrooms	.479	.061	.297	7.891	.000	.360	.598	.297	.297	.297	1.000	1.000
2	(Constant)	1.637	.263		6.217	.000	1.120	2.155					
	number of bedrooms	.483	.065	.300	7.390	.000	.354	.611	.297	.281	.277	.852	1.173
	mortgage	-.139	.190	-.040	-.734	.463	-.512	.233	.072	-.029	-.027	.476	2.099
	rent/mortgage	-.240	.359	-.028	-.669	.504	-.944	.464	-.049	-.026	-.025	.803	1.245
	rent private landlord	-.316	.242	-.063	-1.306	.192	-.791	.159	-.087	-.052	-.049	.599	1.670
	rent RSL	-.084	.241	-.018	-.351	.725	-.557	.388	-.077	-.014	-.013	.557	1.796
	no rent	1.841	.613	.117	3.005	.003	.638	3.044	.108	.118	.113	.933	1.072
	other	.397	1.190	.013	.334	.739	-1.939	2.733	.002	.013	.012	.980	1.020
3	(Constant)	1.851	.273		6.772	.000	1.314	2.388					
	number of bedrooms	.509	.066	.316	7.752	.000	.380	.639	.297	.294	.289	.834	1.200
	mortgage	-.196	.190	-.056	-1.034	.302	-.570	.177	.072	-.041	-.039	.471	2.125

	rent/mortgage	-.115	.360	-.013	-.321	.748	-.821	.591	-.049	-.013	-.012	.790	1.265
	rent private landlord	-.553	.256	-.111	-2.163	.031	-1.055	-.051	-.087	-.085	-.081	.531	1.885
	rent RSL	-.011	.241	-.002	-.046	.964	-.484	.462	-.077	-.002	-.002	.550	1.819
	no rent	1.772	.610	.112	2.905	.004	.574	2.970	.108	.114	.108	.931	1.074
	other	.546	1.185	.017	.461	.645	-1.781	2.872	.002	.018	.017	.978	1.023
	Length of time	-.416	.151	-.117	-2.749	.006	-.713	-.119	-.043	-.108	-.102	.769	1.301

a. Dependent Variable: comfortable with view into bedroomoverall

Comfort with view into POS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.133	.163		19.215	.000	2.812	3.453					
	number of bedrooms	.148	.050	.127	2.937	.003	.049	.247	.127	.127	.127	1.000	1.000
2	(Constant)	3.254	.170		19.174	.000	2.920	3.587					
	number of bedrooms	.158	.050	.136	3.139	.002	.059	.257	.127	.136	.135	.993	1.007
	Length of time	-.254	.104	-.105	-2.440	.015	-.459	-.050	-.094	-.106	-.105	.993	1.007
3	(Constant)	3.710	.226		16.407	.000	3.266	4.154					
	number of bedrooms	.114	.054	.098	2.118	.035	.008	.220	.127	.093	.090	.840	1.190
	Length of time	-.286	.116	-.118	-2.471	.014	-.513	-.059	-.094	-.108	-.105	.783	1.277
	mortgage	-.255	.146	-.108	-1.740	.082	-.542	.033	.068	-.076	-.074	.470	2.128
	rent/mortgage	-.763	.273	-.134	-2.799	.005	-1.299	-.228	-.116	-.122	-.119	.780	1.282
	rent private landlord	-.590	.202	-.168	-2.923	.004	-.986	-.193	-.055	-.127	-.124	.544	1.838
	rent RSL	-.485	.187	-.148	-2.593	.010	-.852	-.117	-.115	-.113	-.110	.549	1.821
	no rent	.787	.430	.081	1.829	.068	-.058	1.632	.109	.080	.077	.911	1.097
	other	-.653	.829	-.034	-.787	.431	-2.281	.976	-.031	-.035	-.033	.971	1.030

a. Dependent Variable: comfortable with view into outdoor space

Neighbour noise heard when in the home

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.594	.043		84.364	.000	3.510	3.677					
	distance from dwelling to dwelling to right	.022	.008	.116	2.842	.005	.007	.037	.116	.116	.116	1.000	1.000
2	(Constant)	3.827	.096		39.892	.000	3.639	4.016					
	distance from dwelling to dwelling to right	.019	.007	.101	2.521	.012	.004	.033	.116	.104	.099	.979	1.021
	mortgage	-.148	.108	-.078	-1.378	.169	-.360	.063	.085	-.057	-.054	.484	2.067
	rent/mortgage	-.822	.205	-.174	-4.009	.000	-1.225	-.419	-.133	-.163	-.158	.827	1.210
	rent private landlord	-.052	.136	-.019	-.380	.704	-.318	.215	.068	-.016	-.015	.608	1.644
	rent RSL	-.709	.134	-.270	-5.309	.000	-.972	-.447	-.224	-.214	-.209	.600	1.668
	no rent	-.354	.358	-.040	-.990	.323	-1.056	.348	-.008	-.041	-.039	.941	1.062
	other	.173	.652	.011	.265	.791	-1.108	1.454	.022	.011	.010	.982	1.019
3	(Constant)	3.987	.114		35.015	.000	3.764	4.211					
	distance from dwelling to dwelling to right	.021	.007	.110	2.760	.006	.006	.035	.116	.113	.108	.971	1.030
	mortgage	-.180	.108	-.095	-1.666	.096	-.392	.032	.085	-.069	-.065	.478	2.093
	rent/mortgage	-.771	.205	-.163	-3.758	.000	-1.173	-.368	-.133	-.154	-.148	.819	1.221
	rent private landlord	-.191	.145	-.071	-1.312	.190	-.477	.095	.068	-.054	-.051	.525	1.906
	rent RSL	-.685	.133	-.261	-5.137	.000	-.947	-.423	-.224	-.208	-.202	.597	1.676
	no rent	-.427	.357	-.049	-1.197	.232	-1.128	.274	-.008	-.049	-.047	.935	1.069
	other	.237	.650	.014	.364	.716	-1.039	1.512	.022	.015	.014	.980	1.020
	Length of time	-.224	.087	-.116	-2.582	.010	-.395	-.054	-.151	-.106	-.101	.767	1.303

a. Dependent Variable: noise when in home overall (scale)

Dwelling type and privacy in the home

Comfort with view into living area

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.803	.103		27.323	.000	2.601	3.004					
	terrace	-.357	.127	-.142	-2.811	.005	-.607	-.108	-.057	-.112	-.112	.624	1.602
	semi-detached	-.236	.163	-.068	-1.449	.148	-.555	.084	.014	-.058	-.058	.714	1.401
	detached linked	-.348	.284	-.051	-1.225	.221	-.906	.210	-.011	-.049	-.049	.902	1.109
	detached	-.534	.171	-.145	-3.118	.002	-.871	-.198	-.080	-.125	-.124	.739	1.352
2	(Constant)	2.842	.163		17.404	.000	2.521	3.163					
	terrace	-.353	.128	-.140	-2.749	.006	-.605	-.101	-.057	-.111	-.109	.607	1.648
	semi-detached	-.275	.166	-.080	-1.659	.098	-.601	.051	.014	-.067	-.066	.679	1.472
	detached linked	-.284	.289	-.042	-.983	.326	-.850	.283	-.011	-.040	-.039	.867	1.153
	detached	-.480	.177	-.130	-2.719	.007	-.827	-.133	-.080	-.109	-.108	.690	1.450
	mortgage	-.152	.145	-.061	-1.049	.295	-.438	.133	-.097	-.042	-.042	.467	2.139
	rent/mortgage	.170	.270	.028	.629	.530	-.361	.701	.039	.025	.025	.783	1.276
	rent private landlord	.068	.188	.019	.360	.719	-.301	.436	.062	.015	.014	.576	1.736
	rent RSL	.168	.182	.049	.922	.357	-.190	.526	.081	.037	.037	.554	1.806
	no rent	-1.006	.457	-.091	-2.200	.028	-1.904	-.108	-.082	-.089	-.087	.928	1.078
	other	-.666	.886	-.030	-.752	.453	-2.405	1.074	-.024	-.030	-.030	.980	1.021
3	(Constant)	2.755	.168		16.364	.000	2.424	3.086					
	terrace	-.395	.130	-.157	-3.044	.002	-.649	-.140	-.057	-.122	-.120	.592	1.690
	semi-detached	-.299	.166	-.087	-1.800	.072	-.625	.027	.014	-.073	-.071	.676	1.479
	detached linked	-.326	.289	-.048	-1.131	.258	-.893	.240	-.011	-.046	-.045	.862	1.160
	detached	-.538	.178	-.146	-3.016	.003	-.889	-.188	-.080	-.121	-.119	.672	1.487
	mortgage	-.163	.145	-.065	-1.127	.260	-.448	.121	-.097	-.046	-.045	.467	2.142
	rent/mortgage	.115	.271	.019	.425	.671	-.417	.647	.039	.017	.017	.776	1.289
	rent private landlord	.049	.187	.014	.262	.793	-.319	.417	.062	.011	.010	.575	1.740
	rent RSL	.119	.183	.035	.646	.518	-.242	.479	.081	.026	.026	.544	1.838
	no rent	-1.057	.457	-.095	-2.315	.021	-1.955	-.160	-.082	-.093	-.092	.925	1.081
	other	-.666	.883	-.030	-.754	.451	-2.401	1.069	-.024	-.030	-.030	.980	1.021
	gender	.216	.106	.083	2.044	.041	.009	.424	.065	.082	.081	.946	1.057

a. Dependent Variable: comfortable with view into living overall

Comfort with view into bedroom area

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.071	.137		15.124	.000	1.802	2.339					
	terrace	1.103	.170	.310	6.490	.000	.769	1.437	.139	.246	.245	.626	1.597
	semi-detached	.881	.216	.182	4.072	.000	.456	1.306	.014	.158	.154	.713	1.402
	detached linked	1.009	.368	.109	2.741	.006	.286	1.733	.021	.107	.103	.896	1.116
	detached	1.291	.232	.243	5.557	.000	.835	1.747	.100	.213	.210	.747	1.338
2	(Constant)	2.016	.214		9.428	.000	1.596	2.436					
	terrace	1.104	.171	.310	6.440	.000	.767	1.440	.139	.246	.241	.606	1.649
	semi-detached	.956	.221	.197	4.328	.000	.522	1.389	.014	.168	.162	.675	1.482
	detached linked	.957	.374	.104	2.557	.011	.222	1.692	.021	.100	.096	.854	1.171
	detached	1.236	.239	.232	5.178	.000	.767	1.705	.100	.200	.194	.697	1.435
	mortgage	.177	.190	.050	.934	.351	-.196	.550	.092	.037	.035	.488	2.049
	rent/mortgage	-.334	.366	-.038	-.915	.361	-1.052	.383	-.043	-.036	-.034	.804	1.244
	rent private landlord	-.042	.247	-.008	-.170	.865	-.528	.444	-.078	-.007	-.006	.589	1.698
	rent RSL	-.236	.239	-.049	-.985	.325	-.706	.234	-.076	-.039	-.037	.570	1.756
	no rent	1.937	.624	.120	3.104	.002	.712	3.163	.109	.121	.116	.935	1.069
	other	.432	1.213	.013	.356	.722	-1.949	2.813	.003	.014	.013	.982	1.019
3	(Constant)	2.250	.232		9.695	.000	1.794	2.705					
	terrace	1.136	.171	.319	6.639	.000	.800	1.473	.139	.253	.248	.603	1.658
	semi-detached	1.041	.222	.215	4.679	.000	.604	1.477	.014	.181	.175	.659	1.517
	detached linked	1.100	.377	.119	2.917	.004	.360	1.840	.021	.114	.109	.835	1.198
	detached	1.318	.240	.248	5.492	.000	.847	1.789	.100	.212	.205	.684	1.462
	mortgage	.127	.190	.036	.666	.506	-.247	.500	.092	.026	.025	.483	2.072
	rent/mortgage	-.235	.366	-.027	-.641	.522	-.954	.484	-.043	-.025	-.024	.794	1.259
	rent private landlord	-.257	.261	-.051	-.985	.325	-.769	.255	-.078	-.039	-.037	.526	1.900
	rent RSL	-.187	.239	-.039	-.783	.434	-.657	.282	-.076	-.031	-.029	.566	1.767
	no rent	1.873	.622	.116	3.012	.003	.652	3.095	.109	.118	.112	.934	1.071

	other	.575	1.209	.018	.475	.635	-1.799	2.949	.003	.019	.018	.980	1.021
	Length of time	-.393	.155	-.109	-2.532	.012	-.697	-.088	-.048	-.099	-.094	.751	1.331

a. Dependent Variable: comfortable with view into bedroomoverall

Comfort with view into POS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.565	.073		48.907	.000	3.422	3.708					
	terr>flat>det	.156	.112	.063	1.389	.165	-.065	.377	.086	.060	.060	.904	1.107
	flat>terr>det	-.244	.152	-.073	-1.606	.109	-.543	.055	-.093	-.070	-.070	.904	1.107
2	(Constant)	3.972	.186		21.310	.000	3.605	4.338					
	terr>flat>det	.107	.114	.044	.944	.346	-.116	.331	.086	.041	.041	.874	1.144
	flat>terr>det	-.397	.165	-.119	-2.410	.016	-.720	-.073	-.093	-.105	-.104	.766	1.306
	no. of different dwelling types on street	-.144	.061	-.111	-2.369	.018	-.263	-.025	-.071	-.103	-.102	.845	1.183
3	(Constant)	4.278	.224		19.064	.000	3.837	4.719					
	terr>flat>det	.038	.120	.015	.316	.752	-.198	.273	.086	.014	.013	.760	1.316
	flat>terr>det	-.380	.164	-.114	-2.319	.021	-.703	-.058	-.093	-.101	-.098	.743	1.346
	no. of different dwelling types on street	-.146	.061	-.113	-2.399	.017	-.265	-.026	-.071	-.105	-.102	.814	1.229
	mortgage	-.209	.146	-.088	-1.435	.152	-.496	.077	.070	-.063	-.061	.472	2.120
	rent/mortgage	-.832	.272	-.146	-3.062	.002	-1.365	-.298	-.115	-.133	-.130	.787	1.270
	rent private landlord	-.467	.189	-.133	-2.469	.014	-.838	-.095	-.061	-.108	-.104	.613	1.632
	rent RSL	-.562	.186	-.173	-3.028	.003	-.927	-.198	-.112	-.132	-.128	.551	1.814
	no rent	.863	.430	.089	2.007	.045	.018	1.708	.109	.088	.085	.913	1.095
	other	-.597	.832	-.031	-.718	.473	-2.231	1.037	-.030	-.031	-.030	.965	1.036
4	(Constant)	4.426	.234		18.922	.000	3.966	4.886					
	terr>flat>det	.028	.120	.011	.236	.813	-.207	.263	.086	.010	.010	.759	1.318
	flat>terr>det	-.415	.164	-.124	-2.528	.012	-.738	-.093	-.093	-.110	-.107	.736	1.359

	no. of different dwelling types on street	-.129	.061	-.100	-2.112	.035	-.249	-.009	-.071	-.092	-.089	.801	1.249
	mortgage	-.243	.146	-.103	-1.664	.097	-.531	.044	.070	-.073	-.070	.466	2.145
	rent/mortgage	-.788	.271	-.138	-2.902	.004	-1.321	-.255	-.115	-.126	-.122	.783	1.278
	rent private landlord	-.617	.201	-.176	-3.071	.002	-1.011	-.222	-.061	-.134	-.130	.539	1.855
	rent RSL	-.543	.185	-.167	-2.928	.004	-.906	-.179	-.112	-.127	-.124	.550	1.819
	no rent	.792	.430	.082	1.842	.066	-.052	1.636	.109	.081	.078	.908	1.102
	other	-.530	.829	-.027	-.639	.523	-2.159	1.099	-.030	-.028	-.027	.964	1.037
	Length of time	-.251	.117	-.104	-2.156	.032	-.480	-.022	-.090	-.094	-.091	.763	1.311

a. Dependent Variable: comfortable with view into outdoor space

Neighbour noise when in home

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.599	.076		47.121	.000	3.449	3.749					
	terrace	-.020	.094	-.011	-.216	.829	-.206	.165	-.068	-.009	-.008	.621	1.610
	semi-detached	-.124	.121	-.047	-1.028	.304	-.361	.113	-.080	-.041	-.040	.711	1.407
	detached linked	.541	.203	.109	2.668	.008	.143	.939	.103	.105	.103	.893	1.120
	detached	.474	.129	.165	3.680	.000	.221	.727	.168	.144	.142	.743	1.347
2	(Constant)	3.761	.118		31.888	.000	3.529	3.993					
	terrace	.009	.093	.005	.095	.924	-.175	.192	-.068	.004	.004	.601	1.663
	semi-detached	.048	.121	.018	.395	.693	-.190	.285	-.080	.016	.015	.668	1.496
	detached linked	.457	.202	.092	2.264	.024	.061	.854	.103	.090	.085	.850	1.177
	detached	.432	.130	.151	3.335	.001	.178	.687	.168	.131	.126	.693	1.442
	mortgage	-.131	.105	-.068	-1.248	.212	-.336	.075	.089	-.050	-.047	.474	2.109
	rent/mortgage	-.675	.198	-.144	-3.404	.001	-1.064	-.286	-.122	-.134	-.128	.792	1.263
	rent private landlord	.029	.135	.011	.215	.830	-.236	.295	.069	.009	.008	.573	1.745
	rent RSL	-.655	.132	-.250	-4.961	.000	-.914	-.396	-.231	-.193	-.187	.557	1.796
	no rent	-.201	.358	-.022	-.563	.574	-.904	.501	-.009	-.022	-.021	.940	1.064
	other	.235	.653	.014	.359	.719	-1.048	1.517	.020	.014	.014	.980	1.020
3	(Constant)	3.612	.137		26.409	.000	3.343	3.880					

	terrace	.002	.098	.001	.019	.984	-.191	.195	-.068	.001	.001	.534	1.874
	semi-detached	-.040	.126	-.015	-.317	.751	-.288	.208	-.080	-.013	-.012	.603	1.659
	detached linked	.428	.204	.087	2.097	.036	.027	.830	.103	.083	.078	.818	1.222
	detached	.413	.137	.144	3.025	.003	.145	.681	.168	.120	.113	.615	1.627
	mortgage	.005	.115	.003	.044	.965	-.221	.231	.089	.002	.002	.387	2.586
	rent/mortgage	-.485	.206	-.103	-2.358	.019	-.888	-.081	-.122	-.094	-.088	.726	1.378
	rent private landlord	.163	.145	.060	1.124	.262	-.122	.448	.069	.045	.042	.490	2.039
	rent RSL	-.522	.141	-.199	-3.708	.000	-.798	-.245	-.231	-.146	-.138	.483	2.071
	no rent	-.076	.360	-.008	-.211	.833	-.782	.630	-.009	-.008	-.008	.917	1.090
	other	-.072	.655	-.004	-.110	.913	-1.357	1.214	.020	-.004	-.004	.961	1.040
	retired, no dependents	.373	.160	.102	2.324	.020	.058	.688	.079	.092	.087	.718	1.392
	couple, dependents	.064	.097	.031	.655	.512	-.127	.254	.036	.026	.024	.610	1.640
	lone parent, dependents	-.196	.159	-.056	-1.231	.219	-.508	.116	-.172	-.049	-.046	.668	1.497
	multiperson	.025	.145	.007	.170	.865	-.260	.309	-.004	.007	.006	.790	1.266
	single non-retired	-.013	.125	-.004	-.103	.918	-.258	.232	-.022	-.004	-.004	.730	1.371
	single, retired	.545	.204	.112	2.671	.008	.144	.946	.083	.106	.100	.790	1.265
4	(Constant)	3.761	.143		26.351	.000	3.480	4.041					
	terrace	.031	.098	.016	.313	.755	-.162	.223	-.068	.012	.012	.530	1.888
	semi-detached	.023	.127	.009	.178	.859	-.226	.272	-.080	.007	.007	.590	1.696
	detached linked	.534	.205	.108	2.603	.009	.131	.937	.103	.103	.096	.799	1.251
	detached	.479	.137	.167	3.496	.001	.210	.747	.168	.138	.129	.602	1.660
	mortgage	-.031	.115	-.016	-.273	.785	-.256	.194	.089	-.011	-.010	.383	2.610
	rent/mortgage	-.407	.205	-.087	-1.982	.048	-.810	-.004	-.122	-.079	-.073	.716	1.396
	rent private landlord	.009	.151	.003	.060	.952	-.287	.306	.069	.002	.002	.445	2.246
	rent RSL	-.478	.140	-.182	-3.407	.001	-.753	-.202	-.231	-.135	-.126	.479	2.089
	no rent	-.136	.357	-.015	-.381	.703	-.837	.565	-.009	-.015	-.014	.915	1.093
	other	.025	.650	.001	.039	.969	-1.251	1.302	.020	.002	.001	.959	1.043
	retired, no dependents	.378	.159	.104	2.373	.018	.065	.690	.079	.094	.088	.718	1.392
	couple, dependents	.089	.097	.044	.919	.359	-.101	.278	.036	.037	.034	.606	1.650
	lone parent, dependents	-.215	.158	-.062	-1.365	.173	-.525	.095	-.172	-.054	-.051	.667	1.499
	multiperson	.036	.144	.010	.247	.805	-.247	.318	-.004	.010	.009	.789	1.267
	single non-retired	.023	.124	.008	.181	.856	-.221	.266	-.022	.007	.007	.724	1.380
	single, retired	.585	.203	.121	2.887	.004	.187	.983	.083	.115	.107	.788	1.270
	Length of time	-.283	.084	-.145	-3.356	.001	-.448	-.117	-.150	-.133	-.124	.732	1.365

a. Dependent Variable: noise when in home overall (scale)

Annoyed by neighbour noise

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.073	.085		36.334	.000	2.906	3.239					
	terrace	.208	.103	.109	2.016	.044	.005	.410	.020	.085	.084	.596	1.677
	semi-detached	.114	.130	.044	.879	.380	-.141	.370	-.034	.037	.037	.687	1.455
	detached linked	.449	.214	.094	2.101	.036	.029	.869	.057	.088	.088	.879	1.137
	detached	.449	.140	.157	3.201	.001	.173	.724	.104	.134	.134	.727	1.375
2	(Constant)	3.105	.105		29.594	.000	2.899	3.311					
	terrace	.170	.109	.089	1.563	.119	-.044	.383	.020	.066	.065	.532	1.880
	semi-detached	.031	.137	.012	.224	.822	-.238	.300	-.034	.010	.009	.615	1.625
	detached linked	.393	.216	.082	1.818	.070	-.032	.818	.057	.077	.076	.854	1.171
	detached	.375	.147	.131	2.549	.011	.086	.664	.104	.108	.106	.655	1.528
	retired, no dependents	.178	.169	.048	1.049	.295	-.155	.511	.048	.044	.044	.825	1.213
	couple, dependents	.077	.106	.038	.726	.468	-.131	.285	.078	.031	.030	.617	1.622
	lone parent, dependents	-.228	.153	-.070	-1.495	.136	-.528	.072	-.075	-.063	-.062	.787	1.271
	multiperson	-.017	.162	-.005	-.107	.914	-.336	.302	-.017	-.005	-.004	.823	1.216
	single non-retired	-.157	.139	-.054	-1.129	.259	-.430	.116	-.092	-.048	-.047	.743	1.345
	single, retired	.343	.222	.068	1.550	.122	-.092	.779	.065	.066	.064	.887	1.127
3	(Constant)	3.240	.108		29.968	.000	3.027	3.452					
	terrace	.216	.108	.114	2.012	.045	.005	.428	.020	.085	.082	.526	1.900
	semi-detached	.146	.138	.056	1.060	.290	-.124	.416	-.034	.045	.043	.592	1.690
	detached linked	.536	.216	.112	2.488	.013	.113	.960	.057	.105	.102	.833	1.200
	detached	.468	.147	.164	3.194	.001	.180	.756	.104	.134	.131	.640	1.563
	retired, no dependents	.213	.167	.058	1.273	.203	-.115	.541	.048	.054	.052	.823	1.216
	couple, dependents	.104	.105	.052	.998	.319	-.101	.310	.078	.042	.041	.614	1.628
	lone parent, dependents	-.183	.151	-.056	-1.215	.225	-.479	.113	-.075	-.052	-.050	.783	1.277
	multiperson	-.053	.160	-.015	-.328	.743	-.367	.262	-.017	-.014	-.013	.820	1.219
	single non-retired	-.105	.137	-.037	-.766	.444	-.375	.165	-.092	-.033	-.031	.738	1.356
	single, retired	.437	.219	.087	1.992	.047	.006	.868	.065	.084	.082	.878	1.139

	Length of time	-.354	.083	-.182	-4.245	.000	-.517	-.190	-.143	-.177	-.174	.912	1.097

a. Dependent Variable: annoyed by neighbour noise

Mixed use development and privacy in the home

Comfort with view into bedroom area

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.265	.212		15.403	.000	2.849	3.681					
	rear gardens	-.315	.240	-.085	-1.311	.190	-.787	.157	.025	-.051	-.050	.348	2.875
	rear communal space	-.672	.246	-.173	-2.728	.007	-1.156	-.188	-.109	-.106	-.105	.368	2.719
	rear public open space	-.395	.334	-.057	-1.184	.237	-1.050	.260	-.003	-.046	-.045	.641	1.559
	rear public open green space	.148	.306	.025	.484	.628	-.452	.748	.096	.019	.019	.574	1.742
	rear fields	-.065	.499	-.005	-.130	.897	-1.044	.914	.027	-.005	-.005	.838	1.193
	rear industry/commercial	-1.665	.445	-.161	-3.744	.000	-2.538	-.792	-.129	-.145	-.144	.797	1.255
	rear school & grounds	.135	.499	.011	.271	.786	-.844	1.114	.044	.011	.010	.838	1.193
2	(Constant)	3.155	.245		12.864	.000	2.673	3.636					
	rear gardens	-.248	.242	-.067	-1.026	.305	-.723	.227	.025	-.040	-.039	.338	2.959
	rear communal space	-.618	.250	-.159	-2.469	.014	-1.109	-.126	-.109	-.097	-.094	.351	2.847
	rear public open space	-.367	.334	-.053	-1.098	.273	-1.024	.290	-.003	-.043	-.042	.628	1.591
	rear public open green space	.229	.308	.038	.744	.457	-.376	.835	.096	.029	.028	.555	1.801
	rear fields	.076	.497	.006	.153	.879	-.899	1.051	.027	.006	.006	.832	1.202
	rear industry/commercial	-1.431	.458	-.138	-3.124	.002	-2.331	-.532	-.129	-.122	-.119	.739	1.353
	rear school & grounds	.269	.506	.023	.533	.594	-.724	1.262	.044	.021	.020	.803	1.246
	mortgage	.216	.194	.061	1.113	.266	-.165	.597	.094	.044	.042	.486	2.056
	rent/mortgage	-.268	.373	-.031	-.718	.473	-1.001	.465	-.042	-.028	-.027	.805	1.242
	rent private landlord	-.256	.250	-.050	-1.025	.306	-.747	.235	-.076	-.040	-.039	.603	1.659
	rent RSL	-.184	.250	-.038	-.736	.462	-.674	.307	-.069	-.029	-.028	.542	1.845
	no rent	1.749	.637	.108	2.747	.006	.499	2.999	.108	.108	.105	.939	1.065
	other	.278	1.239	.009	.225	.822	-2.155	2.712	.003	.009	.009	.982	1.018
3	(Constant)	2.953	.276		10.687	.000	2.411	3.496					
	rear gardens	-.219	.243	-.059	-.902	.367	-.695	.258	.025	-.036	-.034	.334	2.992

	rear communal space	-.521	.253	-.134	-2.062	.040	-1.018	-.025	-.109	-.081	-.078	.342	2.924
	rear public open space	-.337	.334	-.048	-1.007	.314	-.993	.320	-.003	-.040	-.038	.626	1.598
	rear public open green space	.240	.310	.040	.774	.439	-.369	.848	.096	.031	.029	.547	1.829
	rear fields	.111	.499	.009	.223	.824	-.869	1.091	.027	.009	.008	.819	1.221
	rear industry/commercial	-1.407	.461	-.136	-3.051	.002	-2.312	-.501	-.129	-.120	-.116	.726	1.377
	rear school & grounds	.351	.514	.030	.683	.495	-.658	1.361	.044	.027	.026	.773	1.294
	mortgage	.101	.215	.028	.470	.639	-.322	.524	.094	.019	.018	.393	2.545
	rent/mortgage	-.433	.386	-.049	-1.122	.262	-1.192	.325	-.042	-.044	-.043	.748	1.338
	rent private landlord	-.356	.270	-.070	-1.318	.188	-.886	.174	-.076	-.052	-.050	.514	1.947
	rent RSL	-.350	.267	-.072	-1.311	.190	-.873	.174	-.069	-.052	-.050	.473	2.114
	no rent	1.672	.641	.103	2.609	.009	.414	2.931	.108	.103	.099	.922	1.085
	other	.318	1.246	.010	.255	.798	-2.129	2.766	.003	.010	.010	.966	1.035
	retired, no dependents	.253	.303	.037	.833	.405	-.343	.848	.007	.033	.032	.731	1.369
	couple, dependents	.489	.181	.129	2.701	.007	.134	.845	.107	.106	.103	.629	1.590
	lone parent, dependents	.496	.299	.076	1.656	.098	-.092	1.083	.025	.065	.063	.686	1.459
	multiperson	.340	.274	.053	1.242	.215	-.198	.878	-.006	.049	.047	.792	1.263
	single non-retired	.114	.232	.022	.493	.622	-.341	.569	-.040	.019	.019	.753	1.327
	single, retired	-.056	.371	-.006	-.150	.881	-.785	.673	-.029	-.006	-.006	.783	1.277

a. Dependent Variable: comfortable with view into bedroomoverall

Comfort with view into POS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.700	.151		24.525	.000	3.404	3.996					
	rear gardens	-.300	.172	-.123	-1.749	.081	-.637	.037	-.124	-.076	-.075	.369	2.708
	rear communal space	-.133	.180	-.050	-.736	.462	-.486	.221	-.009	-.032	-.032	.407	2.459
	rear public open space	.182	.251	.038	.727	.468	-.310	.675	.066	.032	.031	.682	1.466
	rear public open green space	.281	.219	.072	1.284	.200	-.149	.712	.113	.056	.055	.586	1.706
	rear fields	-.008	.358	-.001	-.022	.983	-.710	.695	.014	-.001	-.001	.843	1.187
	rear industry/commercial	-.791	.383	-.095	-2.064	.040	-1.544	-.038	-.083	-.090	-.088	.863	1.159
	rear school & grounds	.550	.370	.069	1.488	.137	-.176	1.276	.086	.065	.064	.853	1.173
2	(Constant)	3.891	.178		21.846	.000	3.541	4.241					

	rear gardens	-.169	.171	-.069	-.986	.325	-.505	.168	-.124	-.043	-.042	.358	2.796
	rear communal space	-.053	.180	-.020	-.296	.767	-.407	.300	-.009	-.013	-.012	.392	2.549
	rear public open space	.218	.249	.045	.876	.382	-.272	.708	.066	.039	.037	.665	1.504
	rear public open green space	.378	.219	.097	1.728	.085	-.052	.807	.113	.076	.073	.568	1.759
	rear fields	.082	.354	.011	.231	.818	-.613	.776	.014	.010	.010	.831	1.204
	rear industry/commercial	-.537	.387	-.065	-1.390	.165	-1.297	.222	-.083	-.061	-.059	.818	1.223
	rear school & grounds	.774	.370	.097	2.089	.037	.046	1.501	.086	.092	.088	.819	1.221
	mortgage	-.214	.147	-.090	-1.457	.146	-.503	.075	.070	-.064	-.061	.460	2.176
	rent/mortgage	-.810	.271	-.142	-2.984	.003	-1.343	-.277	-.115	-.130	-.126	.780	1.282
	rent private landlord	-.513	.190	-.147	-2.704	.007	-.885	-.140	-.061	-.118	-.114	.603	1.659
	rent RSL	-.557	.186	-.171	-2.994	.003	-.923	-.192	-.112	-.131	-.126	.543	1.840
	no rent	.832	.426	.086	1.953	.051	-.005	1.669	.109	.086	.082	.920	1.087
	other	-.780	.823	-.040	-.948	.344	-2.396	.837	-.030	-.042	-.040	.976	1.024
3	(Constant)	4.081	.200		20.368	.000	3.687	4.475					
	rear gardens	-.173	.171	-.071	-1.016	.310	-.509	.162	-.124	-.045	-.043	.358	2.797
	rear communal space	-.091	.180	-.034	-.504	.615	-.445	.264	-.009	-.022	-.021	.388	2.576
	rear public open space	.257	.249	.053	1.031	.303	-.233	.747	.066	.045	.043	.661	1.512
	rear public open green space	.339	.219	.087	1.552	.121	-.090	.769	.113	.068	.065	.564	1.772
	rear fields	.035	.353	.005	.100	.920	-.658	.729	.014	.004	.004	.827	1.209
	rear industry/commercial	-.562	.386	-.068	-1.458	.145	-1.320	.195	-.083	-.064	-.061	.817	1.224
	rear school & grounds	.726	.370	.091	1.963	.050	-.001	1.453	.086	.086	.082	.816	1.226
	mortgage	-.251	.148	-.106	-1.698	.090	-.541	.039	.070	-.075	-.071	.453	2.208
	rent/mortgage	-.764	.272	-.134	-2.813	.005	-1.297	-.230	-.115	-.123	-.118	.774	1.291
	rent private landlord	-.657	.202	-.188	-3.256	.001	-1.053	-.260	-.061	-.142	-.137	.530	1.888
	rent RSL	-.538	.186	-.165	-2.895	.004	-.902	-.173	-.112	-.127	-.122	.542	1.845
	no rent	.772	.426	.080	1.814	.070	-.064	1.609	.109	.080	.076	.916	1.092
	other	-.711	.821	-.037	-.866	.387	-2.324	.902	-.030	-.038	-.036	.974	1.026
	Length of time	-.238	.116	-.099	-2.050	.041	-.466	-.010	-.090	-.090	-.086	.760	1.316

a. Dependent Variable: comfortable with view into outdoor space

High quality boundaries and privacy in the home

Comfort with view into POS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.006	.787		-.007	.994	-1.552	1.540					
	quality of public/private delineation reversed	.734	.161	.195	4.572	.000	.419	1.050	.195	.195	.195	1.000	1.000
2	(Constant)	.855	1.095		.781	.435	-1.296	3.007					
	quality of public/private delineation reversed	.606	.218	.161	2.780	.006	.178	1.035	.195	.121	.118	.533	1.875
	mortgage	-.215	.145	-.091	-1.480	.139	-.501	.070	.070	-.065	-.063	.475	2.106
	rent/mortgage	-.474	.312	-.083	-1.518	.130	-1.087	.139	-.115	-.066	-.064	.596	1.677
	rent private landlord	-.487	.187	-.139	-2.601	.010	-.855	-.119	-.061	-.113	-.110	.625	1.600
	rent RSL	-.332	.204	-.102	-1.630	.104	-.732	.068	-.112	-.071	-.069	.458	2.184
	no rent	.814	.428	.084	1.903	.058	-.026	1.654	.109	.083	.081	.923	1.083
	other	-.887	.825	-.046	-1.075	.283	-2.508	.734	-.030	-.047	-.045	.980	1.020
3	(Constant)	1.048	1.095		.957	.339	-1.103	3.200					
	quality of public/private delineation reversed	.604	.217	.161	2.779	.006	.177	1.031	.195	.121	.117	.533	1.875
	mortgage	-.252	.146	-.107	-1.730	.084	-.539	.034	.070	-.076	-.073	.468	2.135
	rent/mortgage	-.420	.312	-.074	-1.347	.179	-1.033	.193	-.115	-.059	-.057	.593	1.688
	rent private landlord	-.644	.200	-.184	-3.219	.001	-1.037	-.251	-.061	-.140	-.136	.543	1.842
	rent RSL	-.315	.203	-.097	-1.552	.121	-.714	.084	-.112	-.068	-.065	.457	2.188
	no rent	.756	.427	.078	1.769	.077	-.083	1.594	.109	.077	.075	.919	1.088
	other	-.821	.823	-.043	-.998	.319	-2.438	.795	-.030	-.044	-.042	.979	1.022
	Length of time	-.248	.114	-.103	-2.170	.030	-.472	-.023	-.090	-.095	-.092	.795	1.257

a. Dependent Variable: comfortable with view into outdoor space

Appendix F

APPENDIX NOT COPIED

ON INSTRUCTION FROM

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